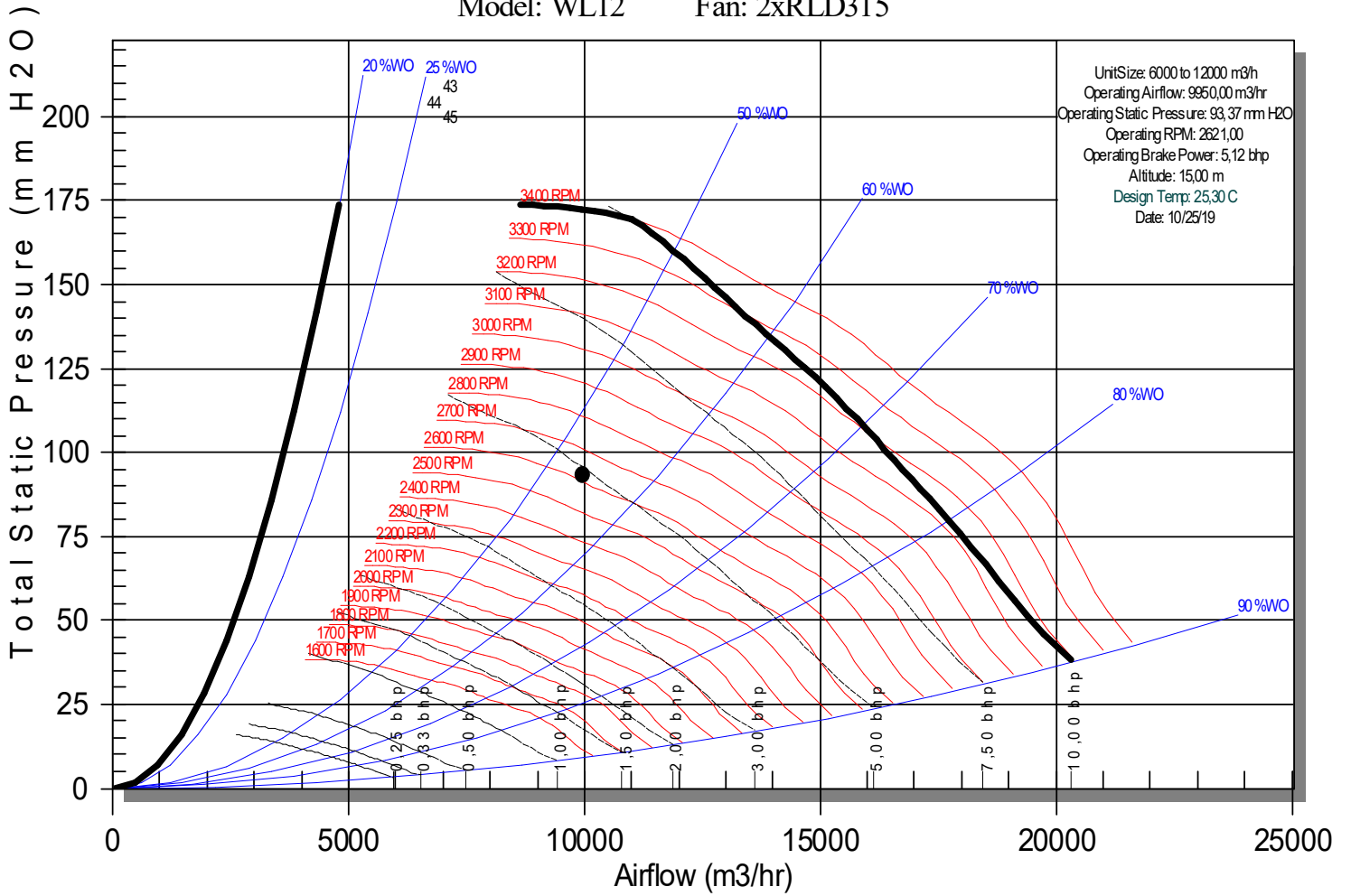




AH-2P-27

Model: WL12 Fan: 2xRLD315



BerlinerLuft do Brasil Ltda

Bruno Roza Martins

51 3101-9014

bruno@berlinerluft.com.br**BerlinerLuft.**

11/11/2019

Item	Ref./TAG	Quant.	Tipo de ventilador	Modelo/tamanho	Arranjo	Classe	Modo
6	AH-2P-28	1	Centrífugo	BPF 560	4	2	Insuf.

Ponto de operação

Vazão de ar	m³/h	5.750
Pressão total (op)	mmCA	130,0
Pressão estática (op)	mmCA	130,0
Temperatura de operação	°C	20
Altitude	m	0
Densidade do fluido	kg/m³	1,205
Rotação operacional	1/min	1.709
Rotação máxima	1/min	2.490
Rotação Nominal do Motor	1/min	1.740

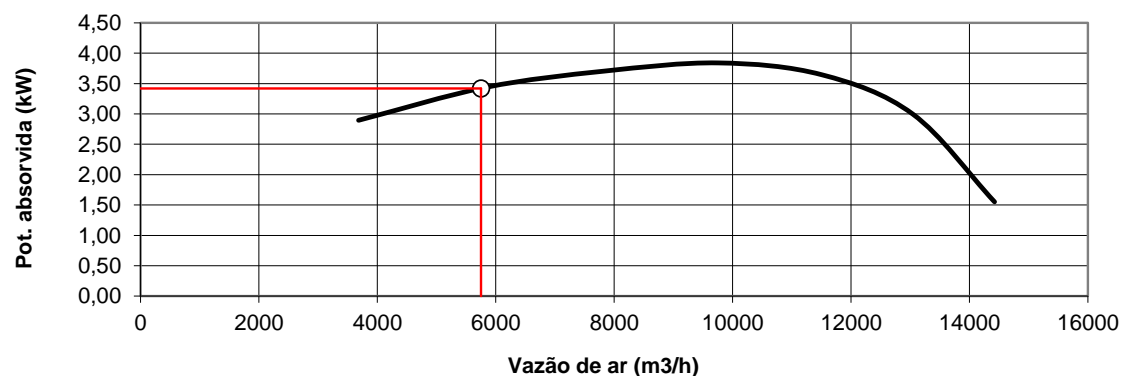
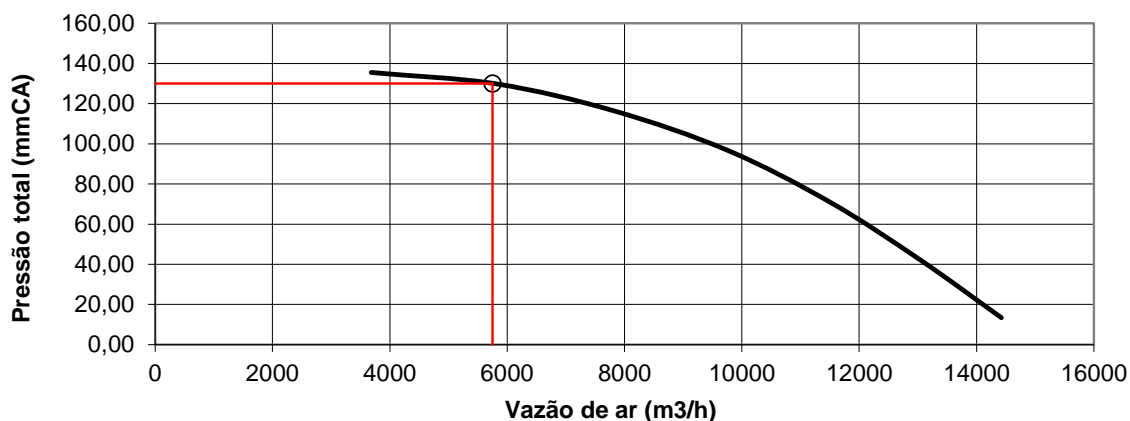
Pressão estática a 20 °C	mmCA	130,0
Pressão total a 20 °C	mmCA	130,0
Potência absorvida a 20 °C	kW	3,42
Potência absorvida (op)	kW	3,42
Velocidade periférica	m/s	50,1
Rendimento total	%	59,5
Potência sonora total LwA	dB (A)	88
Potência sonora total Lw	dB	92
Motor sugerido	kW / Polos	4,5/4

Espectro de potência sonora Lw (dB)

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
79	85	84	85	81	82	77	74	92

Espectro de pressão sonora Lpa (dBA) estimado* a 1 m - Duto na descarga

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
45	61	67	74	73	76	70	65	80

Curva de desempenho

* - Considerado campo livre, propagação semi-esférica unidirecional, sem motor elétrico



"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-29
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGBEKTFE00 Y00B8AWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Horizontal	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,66 mm H2O
Mixing Box Air Pressure Drop	2,06 mm H2O	Filter Air Pressure Drop	20,72 mm H2O

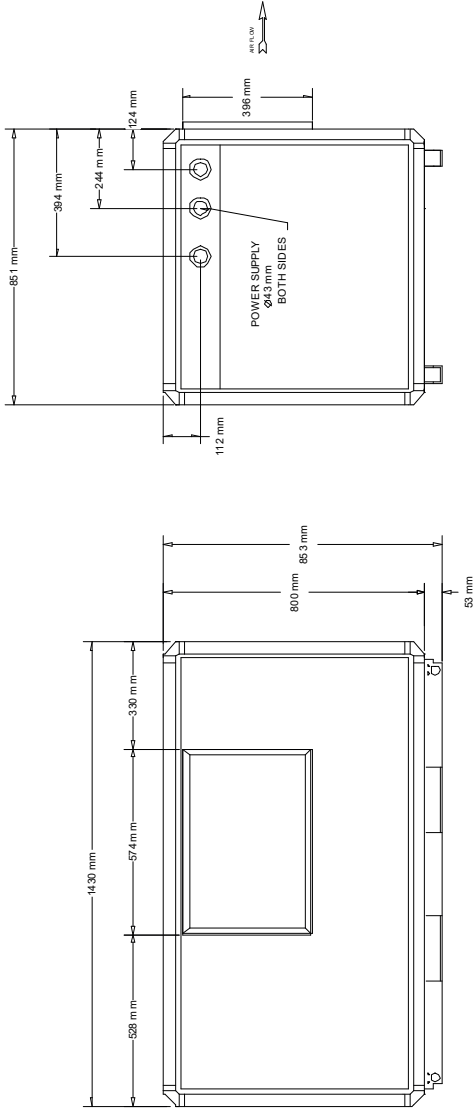
Coil			
Cooling Entering Dry Bulb	27,9 C	Cooling Entering Wet Bulb	22,1 C
Cooling Leaving Dry Bulb	10,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	9,39 m3/hr
Cooling Capacity	65,66 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	5800,00 m3/hr	Sensible Capacity	34,45 kW
Cooling Leaving Wet Bulb	10,6 C	Cooling Water Volume	27,37 L
Cooling Water Velocity	1,1 m/s	Cooling Water Pressure Drop	2336,32 mm H2O
Cooling Air Pressure Drop	18,24 mm H2O	Cooling Coil Wet Weight	290 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	79,69 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,53 bhp
Fan RPM	2155 rpm	Transmission Option	E
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,6 m/s	Velocity Pressure	44,4 Pa

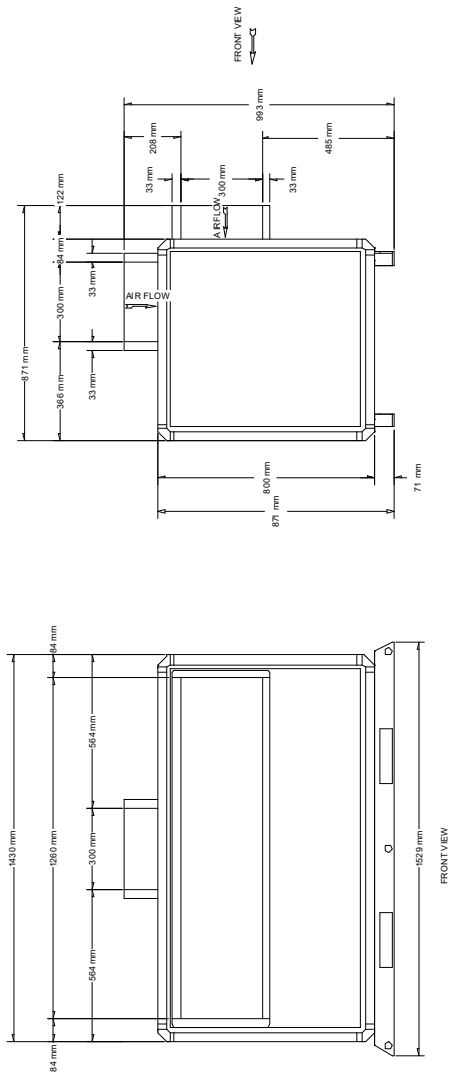
Humidifier	
Humidification	w/o Humidification / Not Applicable



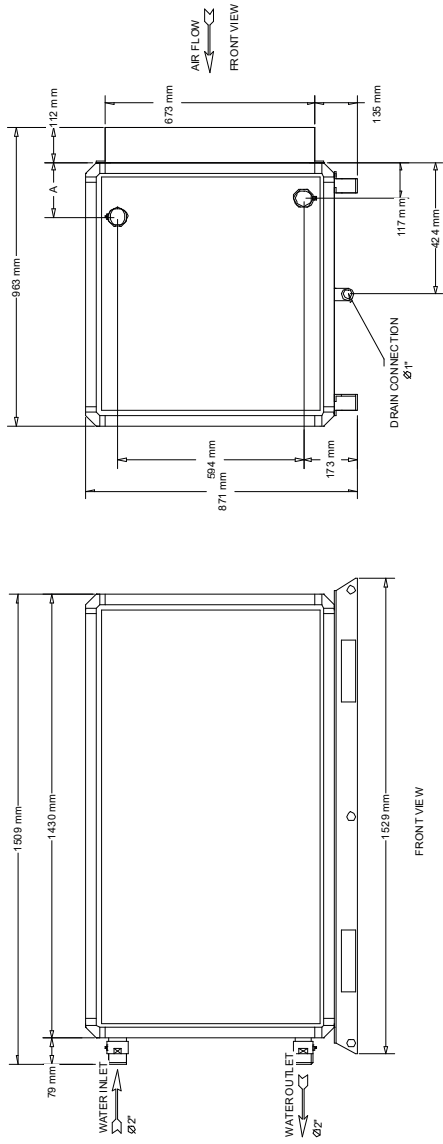
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 08

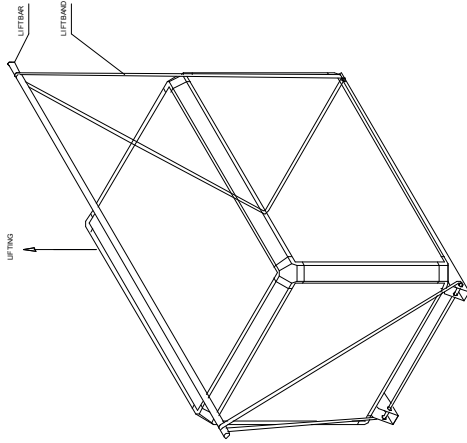


MIXER BOX SECTION
WAVE DOBLE 08

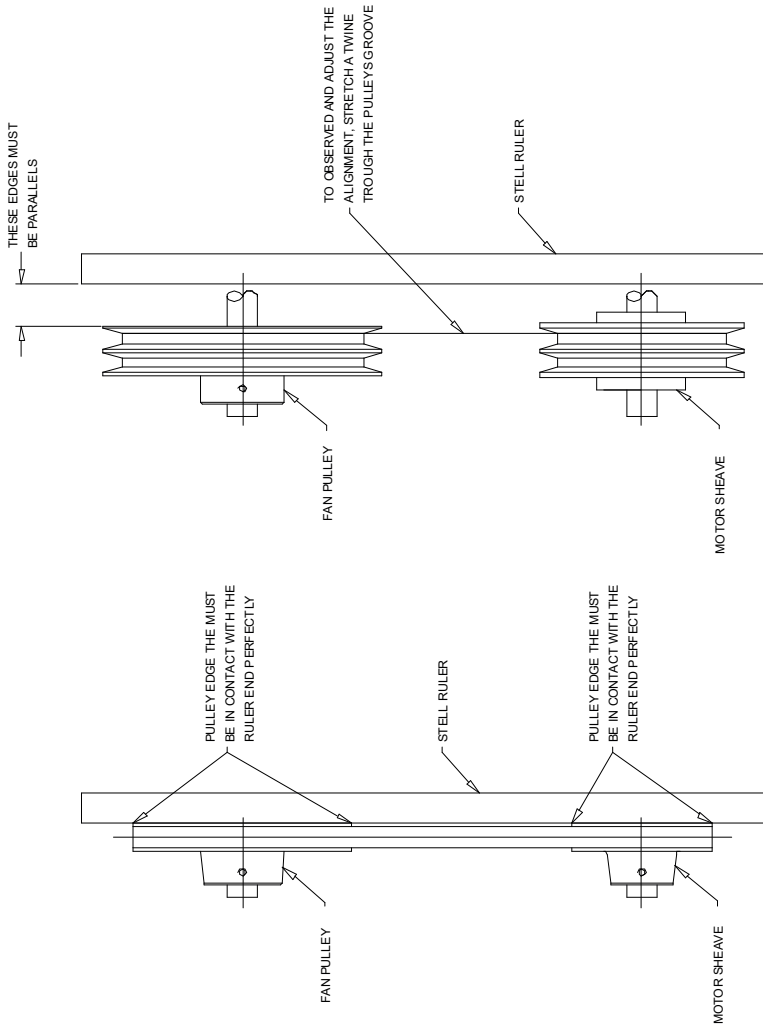


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 08

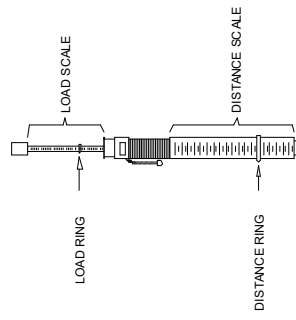
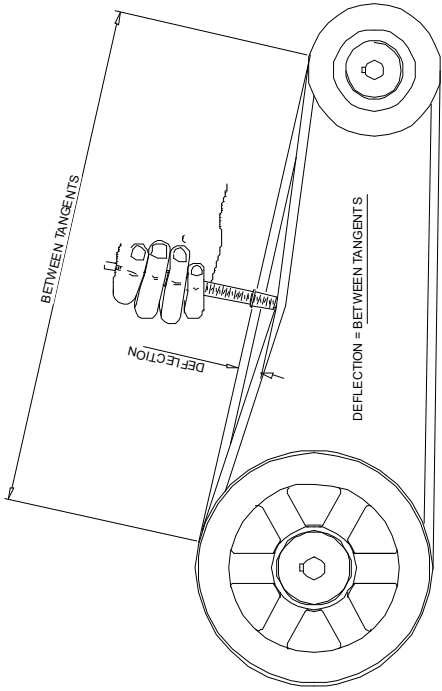
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



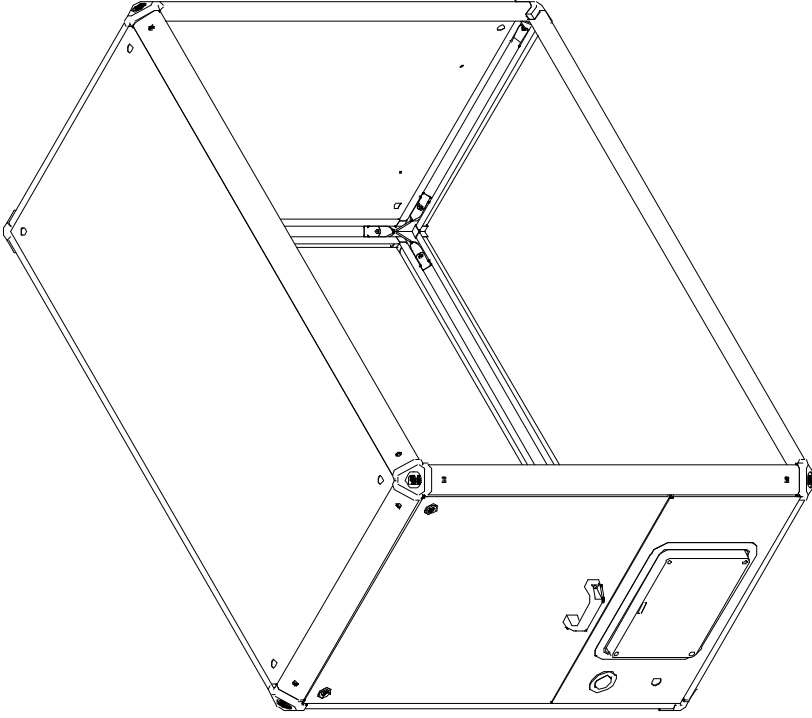
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

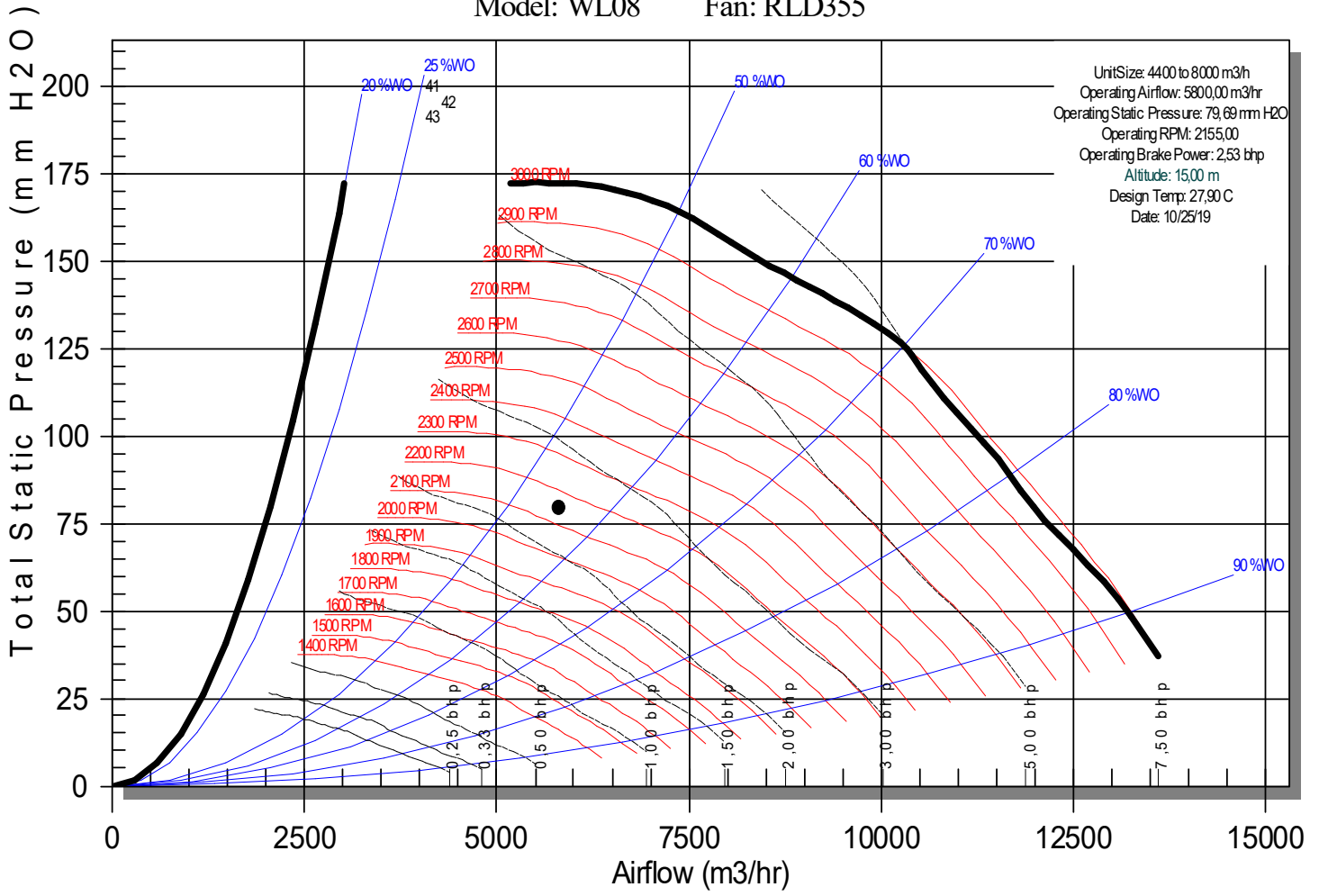
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-29

Model: WL08 Fan: RLD355



BerlinerLuft do Brasil Ltda

Bruno Roza Martins

51 3101-9014

bruno@berlinerluft.com.br**BerlinerLuft.**

11/11/2019

Item	Ref./TAG	Quant.	Tipo de ventilador	Modelo/tamanho	Arranjo	Classe	Modo
7	AH-2P-30	1	Centrífugo	BPF 355	4	2	Insuf.

Ponto de operação

Vazão de ar	m³/h	4.100
Pressão total (op)	mmCA	145,0
Pressão estática (op)	mmCA	145,0
Temperatura de operação	°C	20
Altitude	m	0
Densidade do fluido	kg/m³	1,205
Rotação operacional	1/min	3.175
Rotação máxima	1/min	3.300
Rotação Nominal do Motor	1/min	3.450

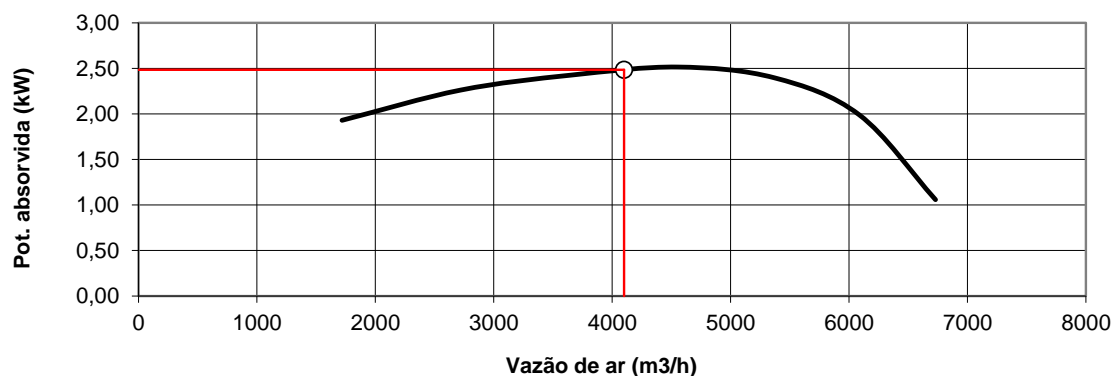
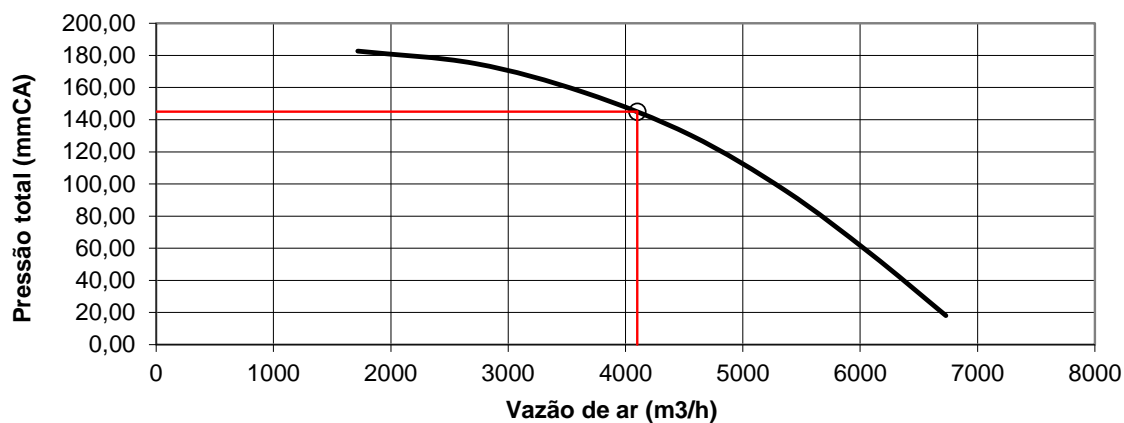
Pressão estática a 20 °C	mmCA	145,0
Pressão total a 20 °C	mmCA	145,0
Potência absorvida a 20 °C	kW	2,48
Potência absorvida (op)	kW	2,48
Velocidade periférica	m/s	59,0
Rendimento total	%	65,2
Potência sonora total LwA	dB (A)	90
Potência sonora total Lw	dB	93
Motor sugerido	kW / Polos	3/2

Espectro de potência sonora Lw (dB)

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
81	87	84	87	84	85	78	71	93

Espectro de pressão sonora Lpa (dBA) estimado* a 1 m - Duto na descarga

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
48	63	68	76	77	79	72	62	83

Curva de desempenho

* - Considerado campo livre, propagação semi-esférica unidirecional, sem motor elétrico

BerlinerLuft do Brasil Ltda

Bruno Roza Martins

51 3101-9014

bruno@berlinerluft.com.br**BerlinerLuft.**

11/11/2019

Item	Ref./TAG	Quant.	Tipo de ventilador	Modelo/tamanho	Arranjo	Classe	Modo
8	AH-2P-31	1	Centrífugo	BPF 355	4	2	Insuf.

Ponto de operação

Vazão de ar	m³/h	4.050
Pressão total (op)	mmCA	150,0
Pressão estática (op)	mmCA	150,0
Temperatura de operação	°C	20
Altitude	m	0
Densidade do fluido	kg/m³	1,205
Rotação operacional	1/min	3.201
Rotação máxima	1/min	3.300
Rotação Nominal do Motor	1/min	3.450

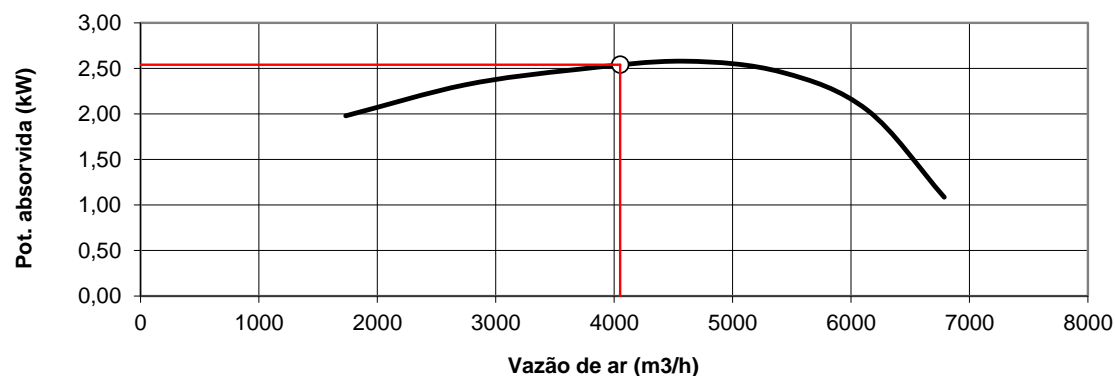
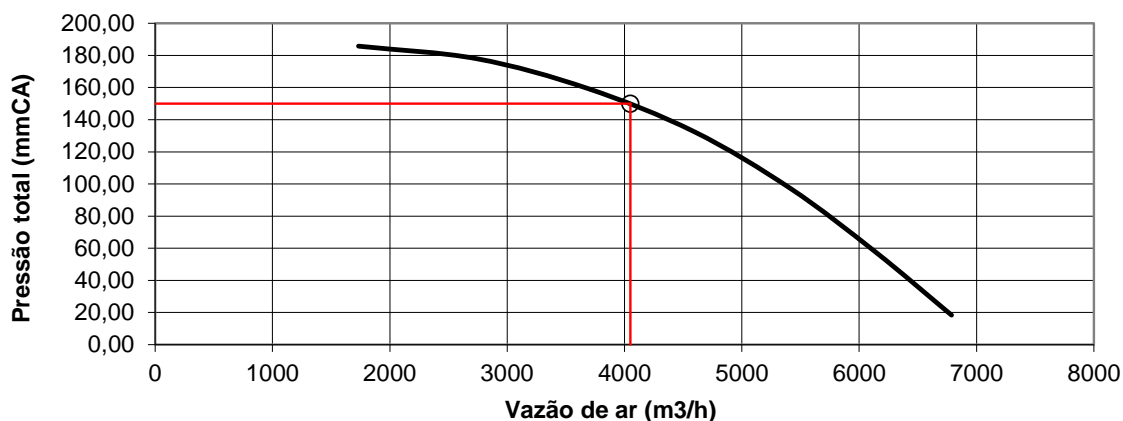
Pressão estática a 20 °C	mmCA	150,0
Pressão total a 20 °C	mmCA	150,0
Potência absorvida a 20 °C	kW	2,54
Potência absorvida (op)	kW	2,54
Velocidade periférica	m/s	59,5
Rendimento total	%	65,1
Potência sonora total LwA	dB (A)	90
Potência sonora total Lw	dB	93
Motor sugerido	kW / Polos	3/2

Espectro de potência sonora Lw (dB)

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
81	87	84	87	84	85	78	71	93

Espectro de pressão sonora Lpa (dBA) estimado* a 1 m - Duto na descarga

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
48	64	68	77	77	79	72	63	83

Curva de desempenho

* - Considerado campo livre, propagação semi-esférica unidirecional, sem motor elétrico

BerlinerLuft do Brasil Ltda

Bruno Roza Martins

51 3101-9014

bruno@berlinerluft.com.br**BerlinerLuft.**

11/11/2019

Item	Ref./TAG	Quant.	Tipo de ventilador	Modelo/tamanho	Arranjo	Classe	Modo
9	AH-2P-32	1	Centrífugo	BPF 560	4	2	Insuf.

Ponto de operação

Vazão de ar	m³/h	5.200
Pressão total (op)	mmCA	135,0
Pressão estática (op)	mmCA	135,0
Temperatura de operação	°C	20
Altitude	m	0
Densidade do fluido	kg/m³	1,205
Rotação operacional	1/min	1.725
Rotação máxima	1/min	2.490
Rotação Nominal do Motor	1/min	1.740

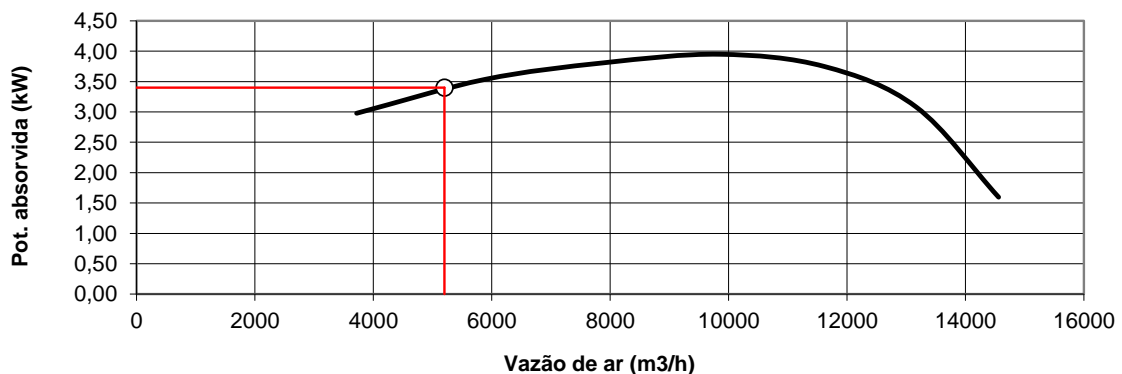
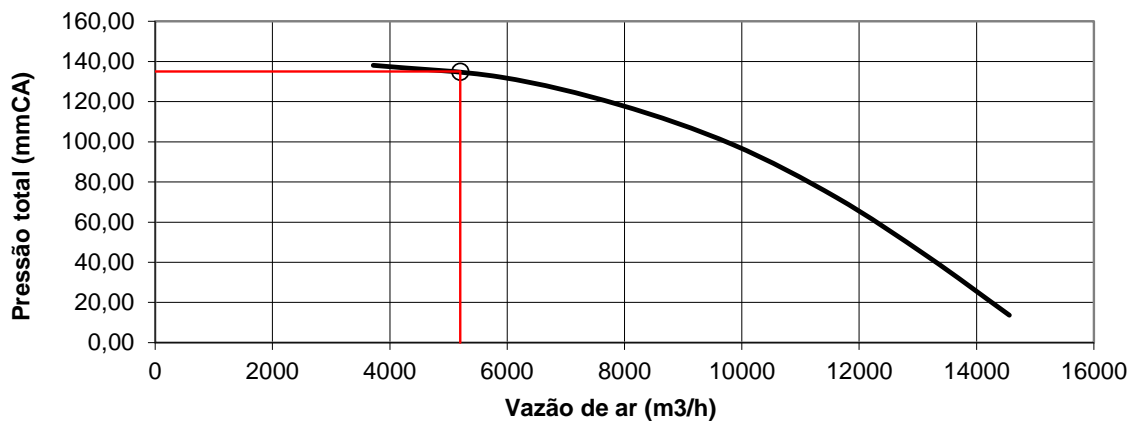
Pressão estática a 20 °C	mmCA	135,0
Pressão total a 20 °C	mmCA	135,0
Potência absorvida a 20 °C	kW	3,40
Potência absorvida (op)	kW	3,40
Velocidade periférica	m/s	50,6
Rendimento total	%	56,2
Potência sonora total LwA	dB (A)	89
Potência sonora total Lw	dB	93
Motor sugerido	kW / Polos	4,5/4

Espectro de potência sonora Lw (dB)

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
80	86	85	86	82	83	78	75	93

Espectro de pressão sonora Lpa (dBA) estimado* a 1 m - Duto na descarga

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
46	62	68	75	74	77	71	66	81

Curva de desempenho

* - Considerado campo livre, propagação semi-esférica unidirecional, sem motor elétrico

BerlinerLuft do Brasil Ltda

Bruno Roza Martins

51 3101-9014

bruno@berlinerluft.com.br**BerlinerLuft.**

11/11/2019

Item	Ref./TAG	Quant.	Tipo de ventilador	Modelo/tamanho	Arranjo	Classe	Modo
10	AH-2P-33	1	Centrífugo	BPF 355	4	2	Insuf.

Ponto de operação

Vazão de ar	m³/h	4.200
Pressão total (op)	mmCA	150,0
Pressão estática (op)	mmCA	150,0
Temperatura de operação	°C	20
Altitude	m	0
Densidade do fluido	kg/m³	1,205
Rotação operacional	1/min	3.236
Rotação máxima	1/min	3.300
Rotação Nominal do Motor	1/min	3.450

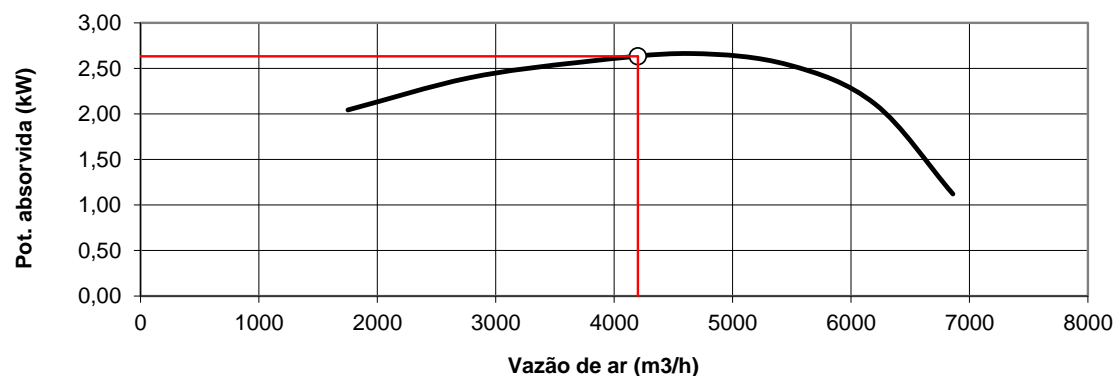
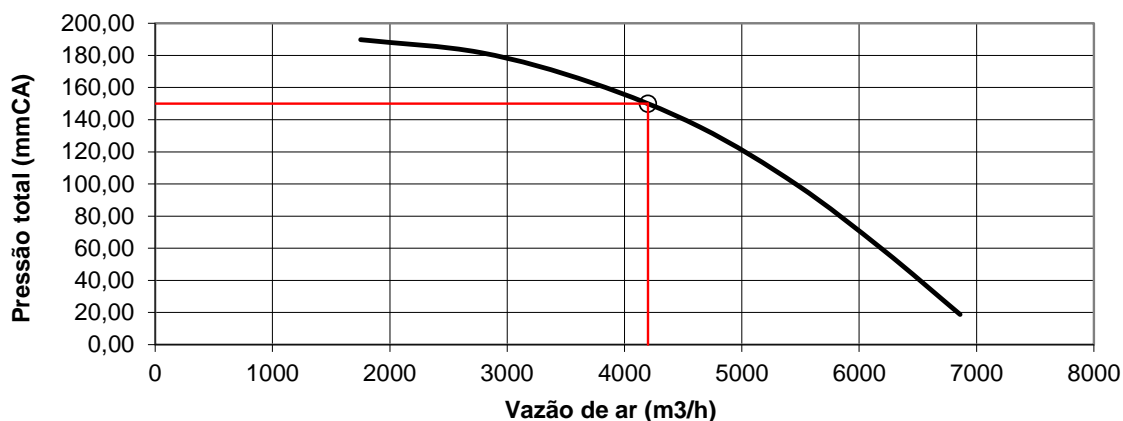
Pressão estática a 20 °C	mmCA	150,0
Pressão total a 20 °C	mmCA	150,0
Potência absorvida a 20 °C	kW	2,63
Potência absorvida (op)	kW	2,63
Velocidade periférica	m/s	60,1
Rendimento total	%	65,2
Potência sonora total LwA	dB (A)	91
Potência sonora total Lw	dB	94
Motor sugerido	kW / Polos	3/2

Espectro de potência sonora Lw (dB)

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
82	88	85	88	85	86	79	72	94

Espectro de pressão sonora Lpa (dBA) estimado* a 1 m - Duto na descarga

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total
48	64	68	77	77	79	72	63	83

Curva de desempenho

* - Considerado campo livre, propagação semi-esférica unidirecional, sem motor elétrico



"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-34
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGAEKTCA00 Y00A6BWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,59 mm H2O
Mixing Box Air Pressure Drop	1,79 mm H2O	Filter Air Pressure Drop	18,11 mm H2O

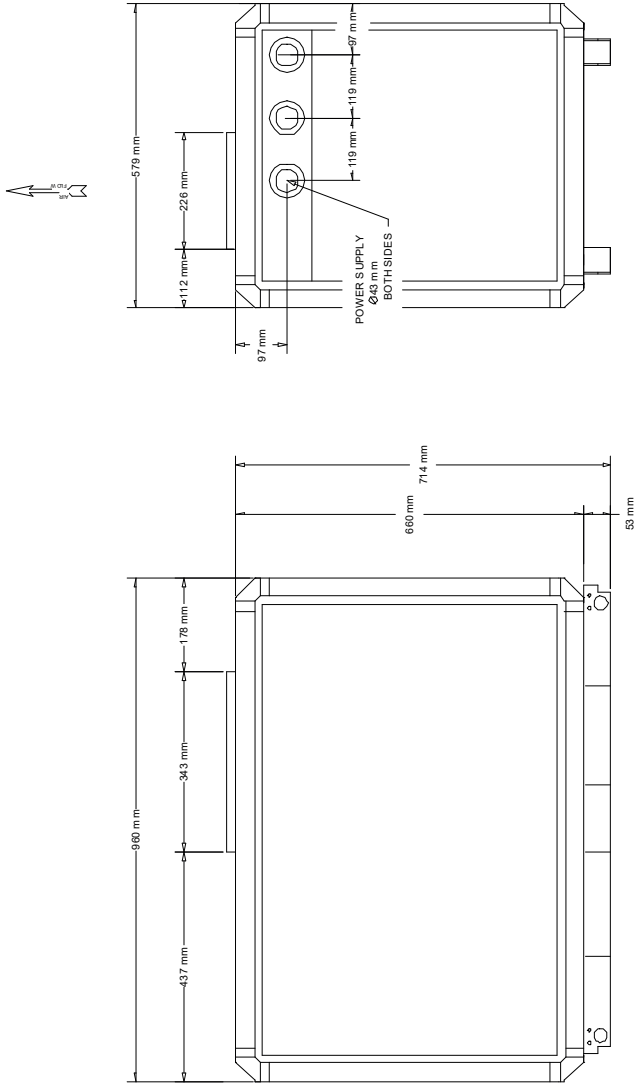
Coil			
Cooling Entering Dry Bulb	23,6 C	Cooling Entering Wet Bulb	17,4 C
Cooling Leaving Dry Bulb	13,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	0,83 m3/hr
Cooling Capacity	5,84 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	1460,00 m3/hr	Sensible Capacity	5,17 kW
Cooling Leaving Wet Bulb	13,1 C	Cooling Water Volume	4,72 L
Cooling Water Velocity	0,2 m/s	Cooling Water Pressure Drop	101,31 mm H2O
Cooling Air Pressure Drop	9,66 mm H2O	Cooling Coil Wet Weight	106 kg
Actual Cooling Face Velocity	2,0 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	67,15 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,63 bhp
Fan RPM	3015 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	7,5 m/s	Velocity Pressure	34,1 Pa

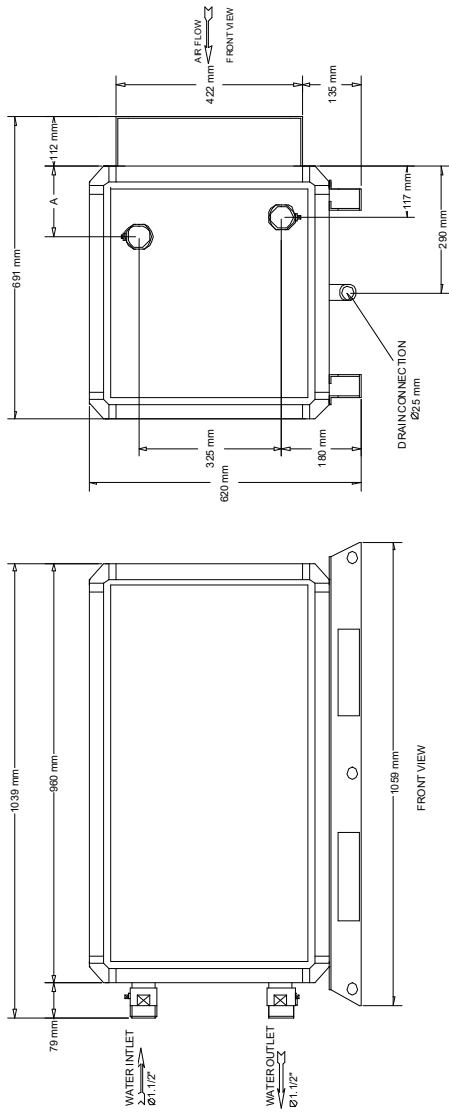
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		

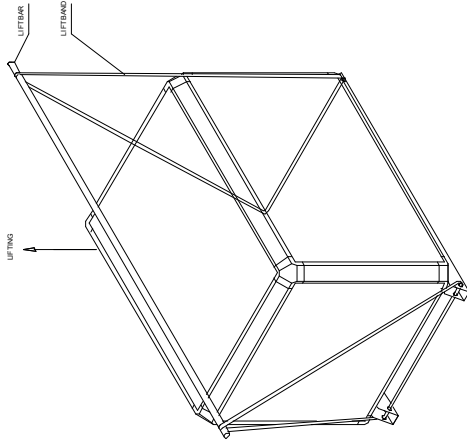


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

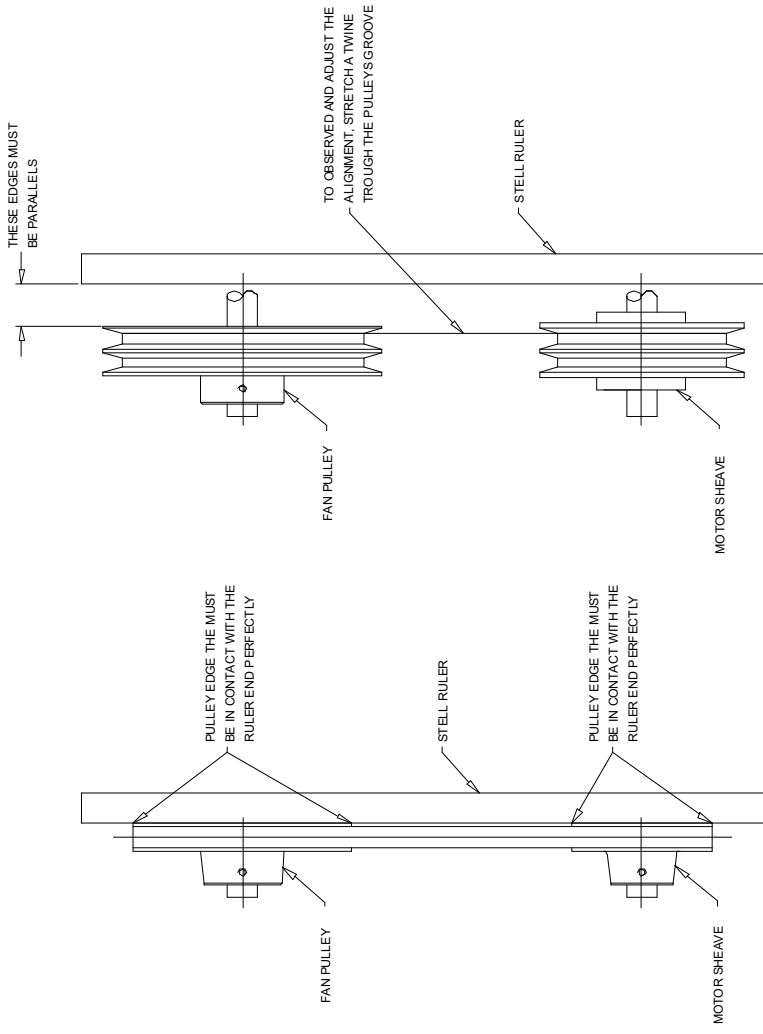


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

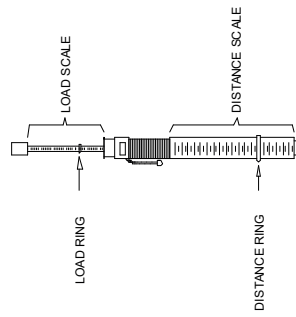
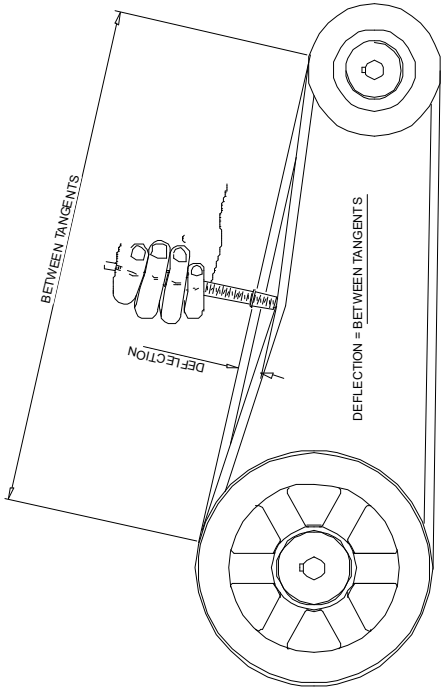
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 02



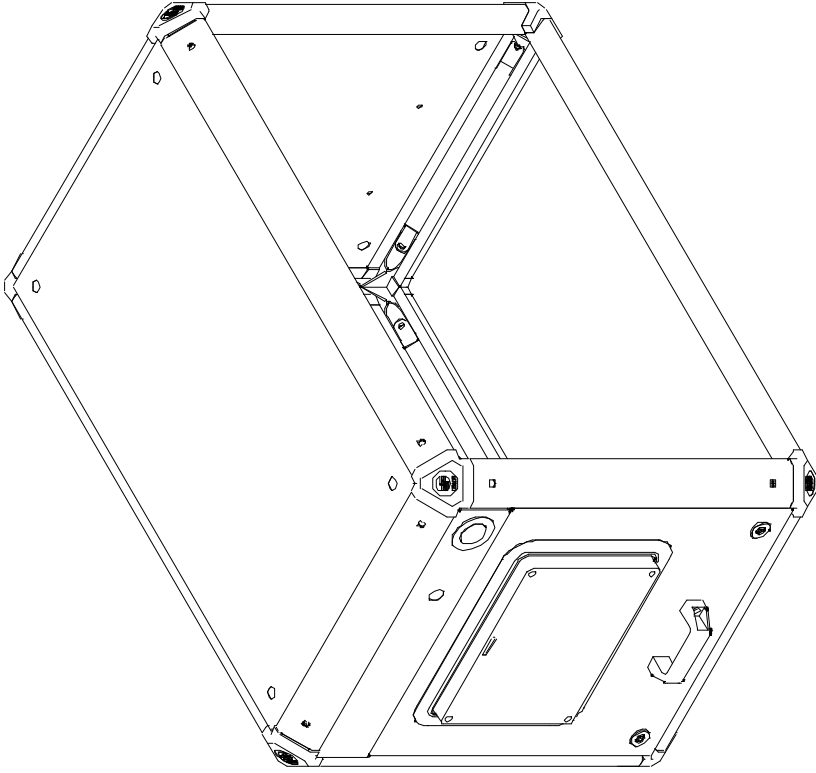
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

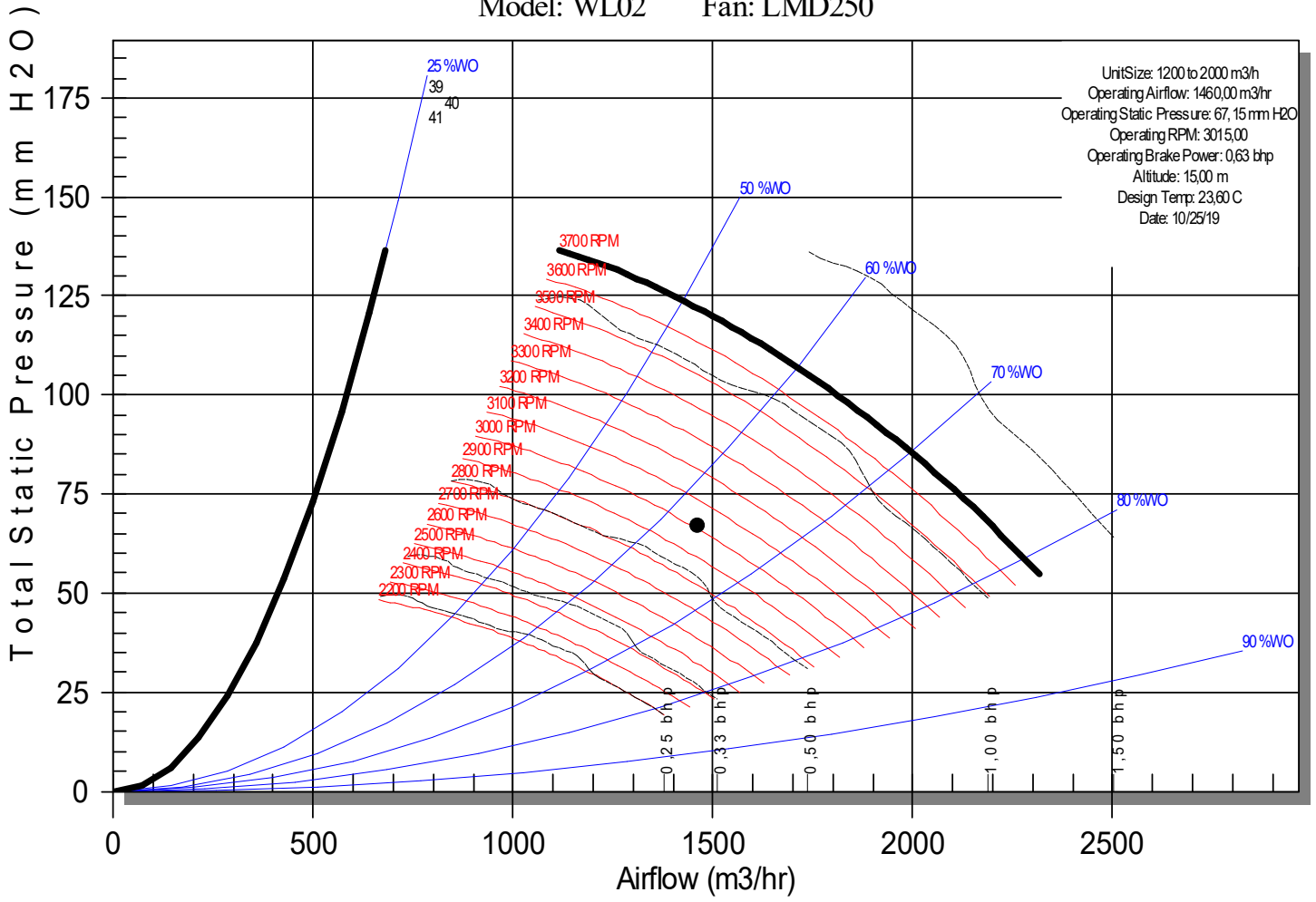
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-34

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-35
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGBEKTFH00 Y00B6BWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,70 mm H2O
Mixing Box Air Pressure Drop	2,51 mm H2O	Filter Air Pressure Drop	26,57 mm H2O

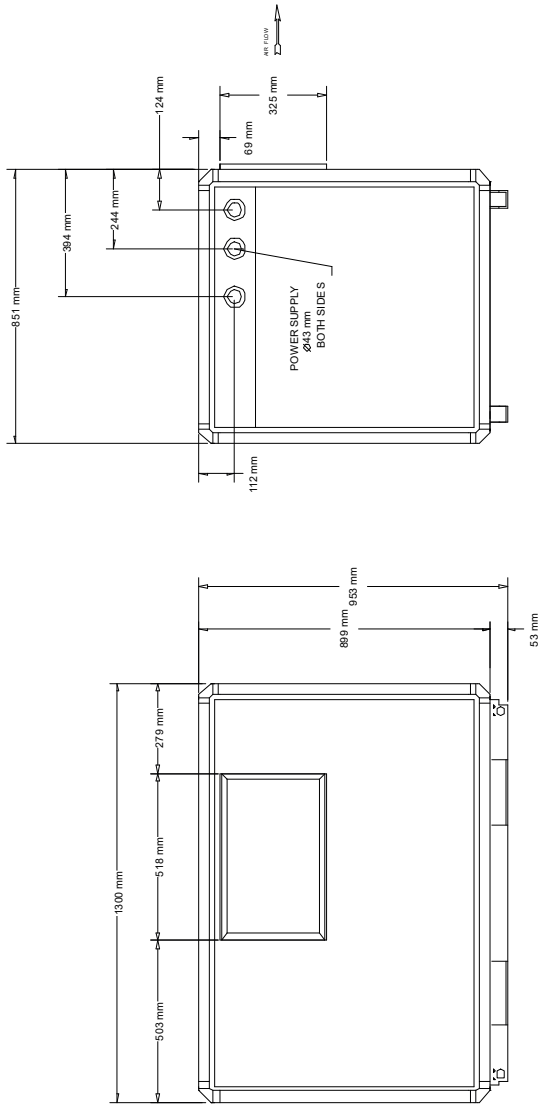
Coil			
Cooling Entering Dry Bulb	25,6 C	Cooling Entering Wet Bulb	19,1 C
Cooling Leaving Dry Bulb	12,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,35 m3/hr
Cooling Capacity	30,40 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4850,00 m3/hr	Sensible Capacity	21,66 kW
Cooling Leaving Wet Bulb	12,5 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	402,40 mm H2O
Cooling Air Pressure Drop	16,22 mm H2O	Cooling Coil Wet Weight	211 kg
Actual Cooling Face Velocity	2,4 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	34,14 mm H2O	Total Static Pressure	90,14 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,25 bhp
Fan RPM	2053 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,9 m/s	Velocity Pressure	59,4 Pa

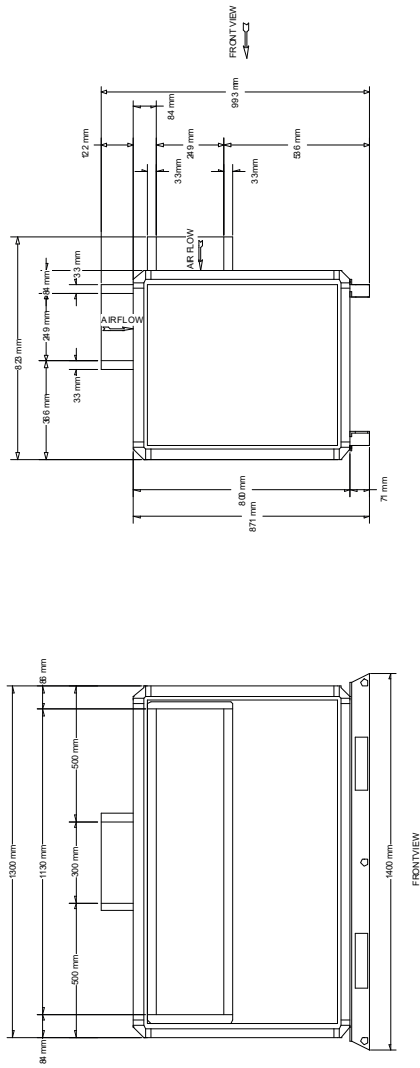
Humidifier	
Humidification	w/o Humidification / Not Applicable



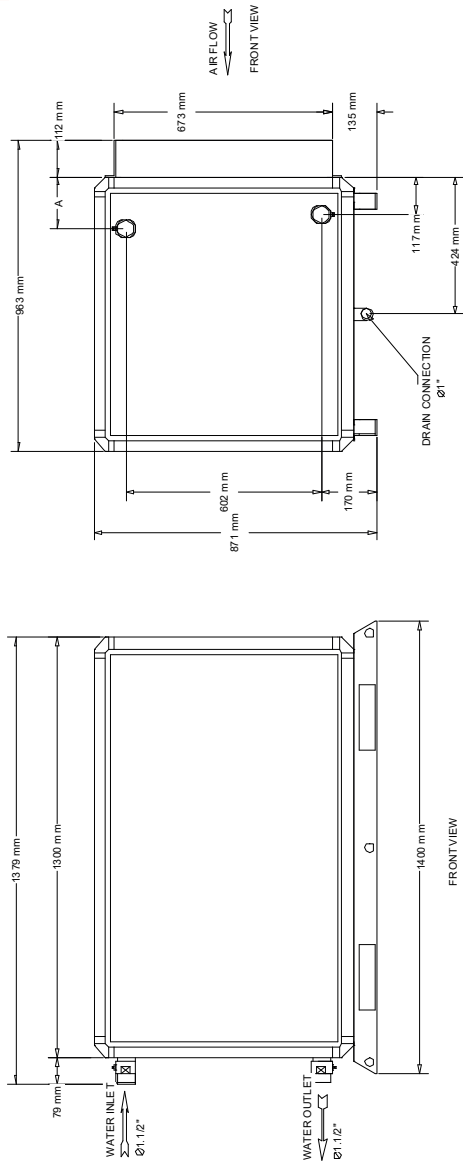
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

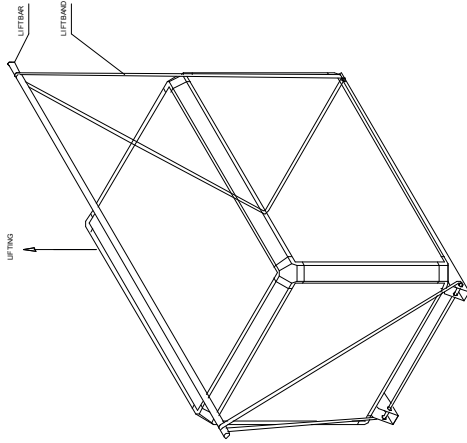


MIXER BOX SECTION
WAVE DOBLE 06

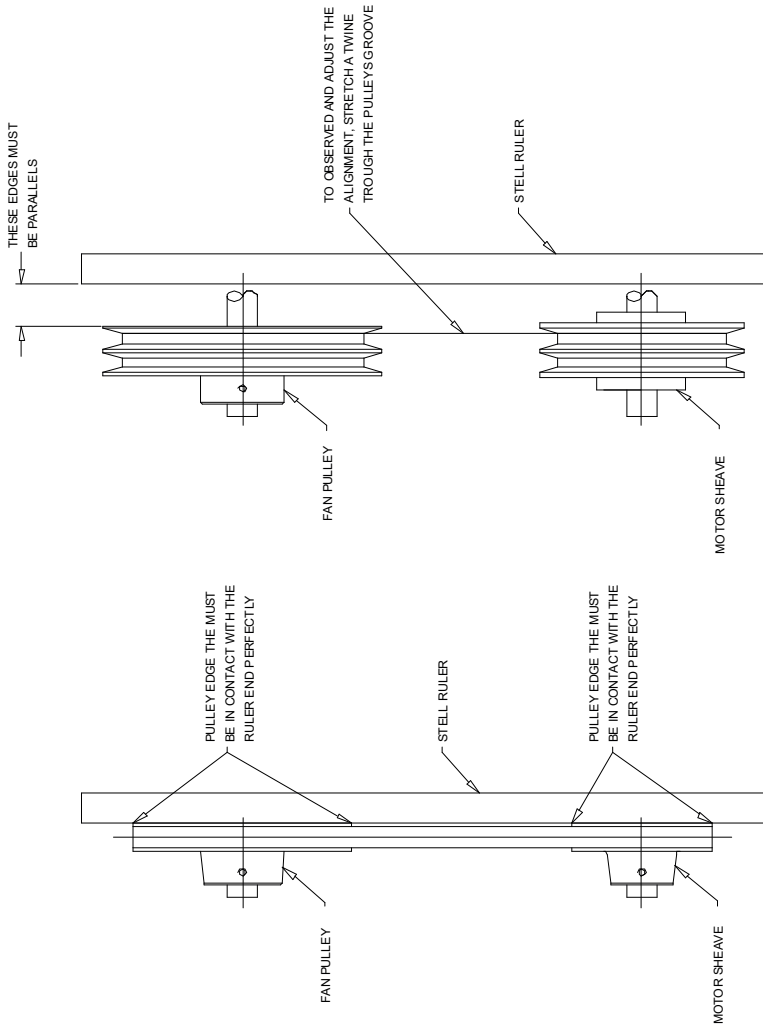


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

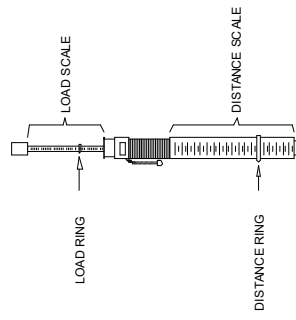
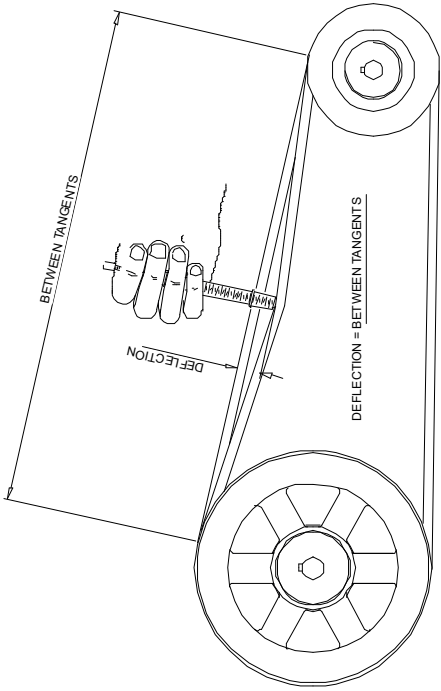
COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 06



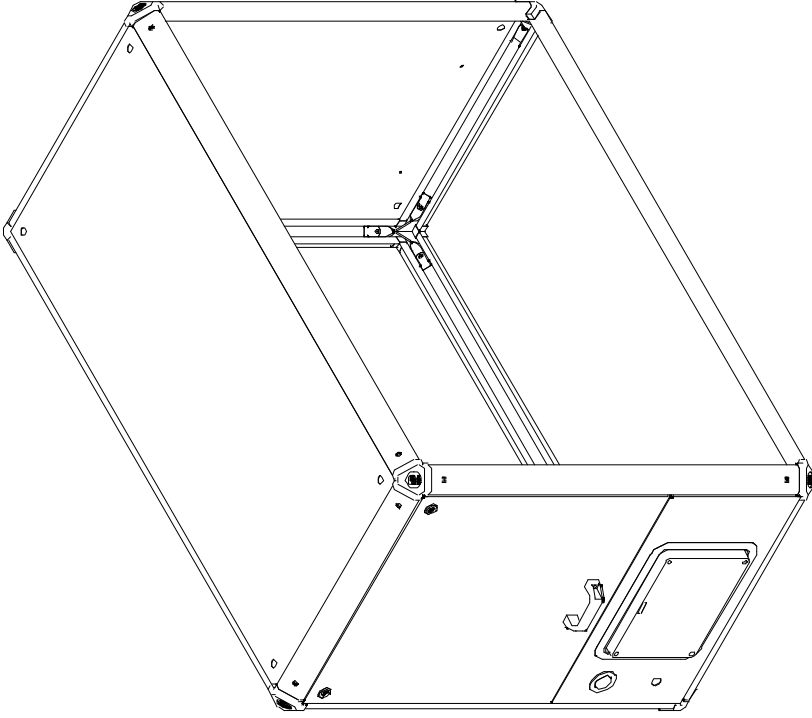
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

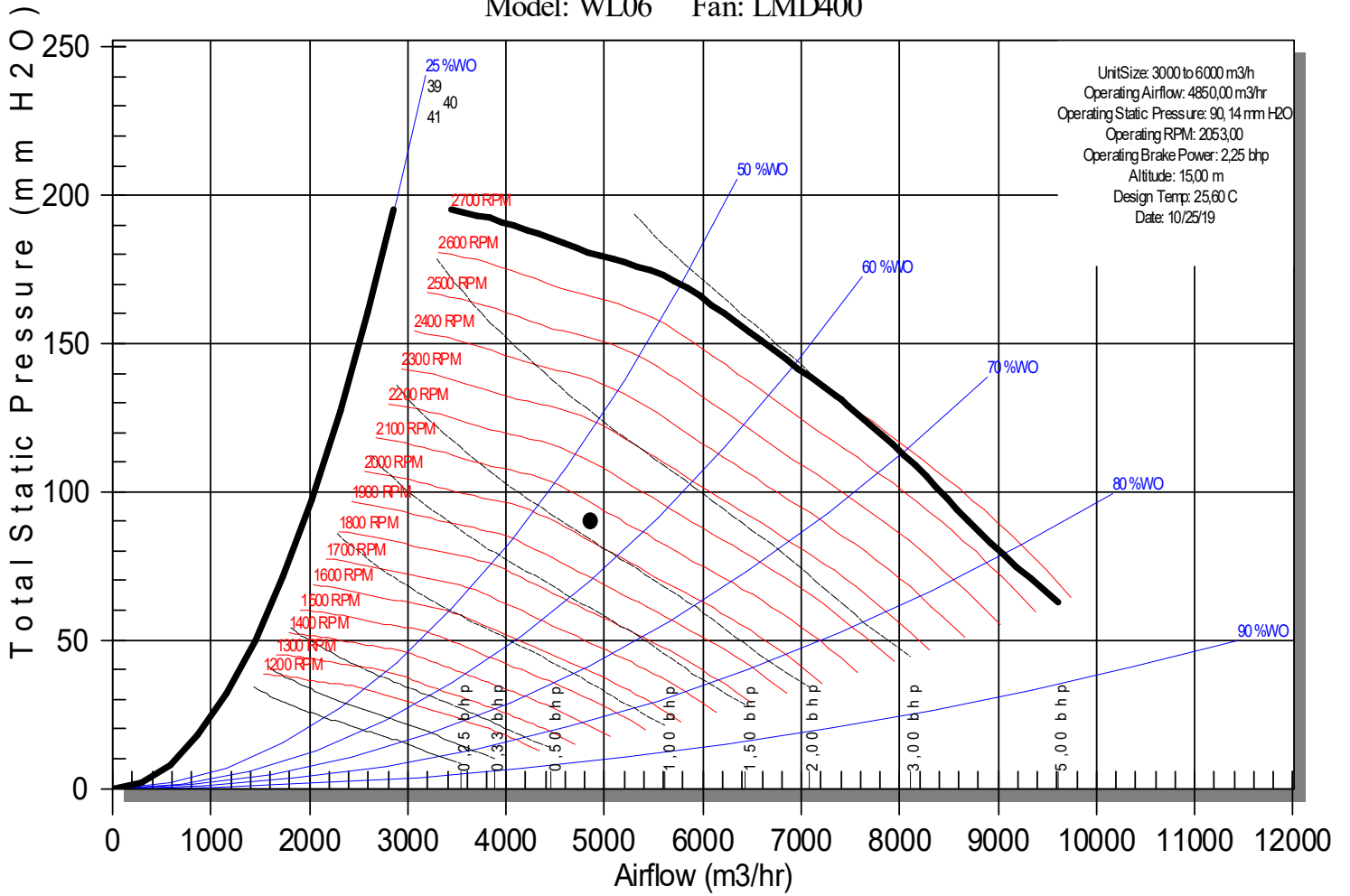
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-35

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-36
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGBEKTFH00 Y00B6BWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,70 mm H2O
Mixing Box Air Pressure Drop	2,51 mm H2O	Filter Air Pressure Drop	26,57 mm H2O

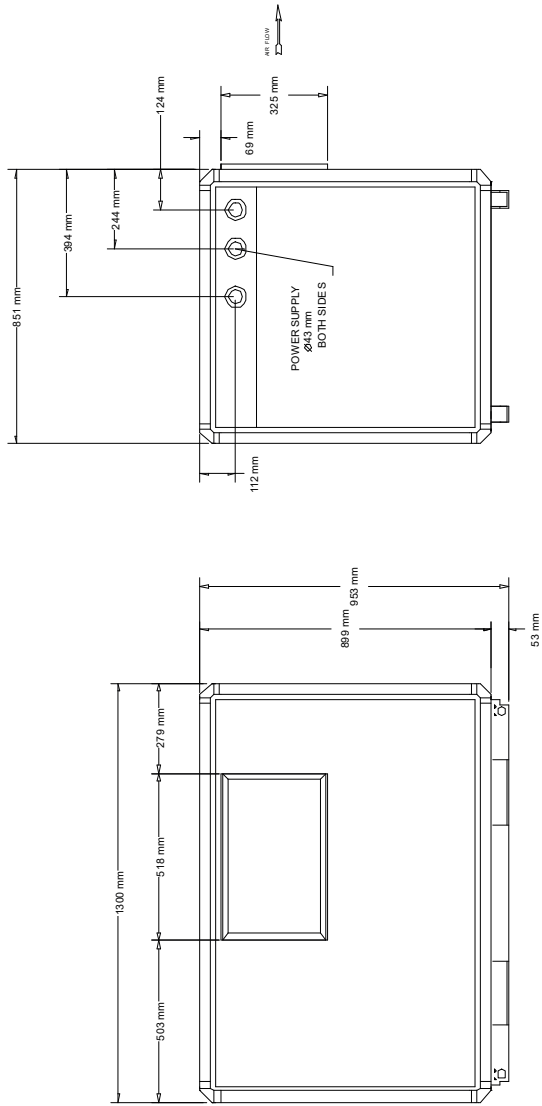
Coil			
Cooling Entering Dry Bulb	25,6 C	Cooling Entering Wet Bulb	19,1 C
Cooling Leaving Dry Bulb	12,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,35 m3/hr
Cooling Capacity	30,40 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4850,00 m3/hr	Sensible Capacity	21,66 kW
Cooling Leaving Wet Bulb	12,5 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	402,40 mm H2O
Cooling Air Pressure Drop	16,22 mm H2O	Cooling Coil Wet Weight	211 kg
Actual Cooling Face Velocity	2,4 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	86,01 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,15 bhp
Fan RPM	2021 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,9 m/s	Velocity Pressure	59,4 Pa

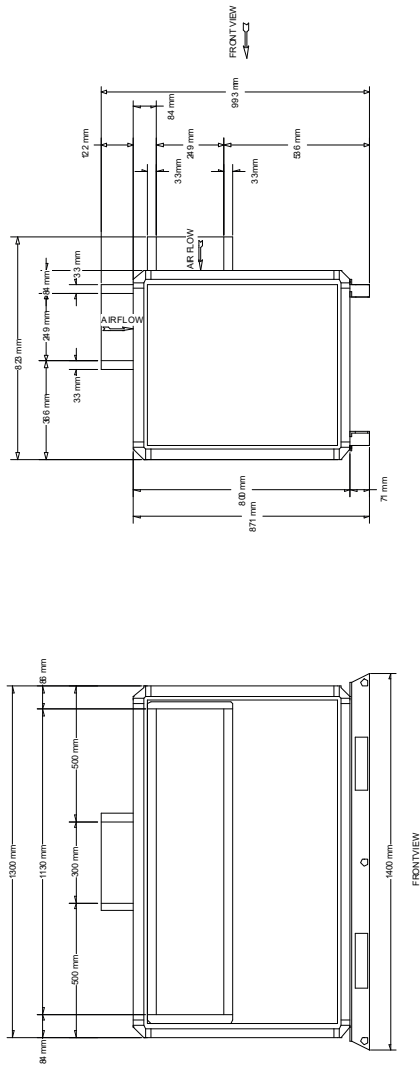
Humidifier	
Humidification	w/o Humidification / Not Applicable



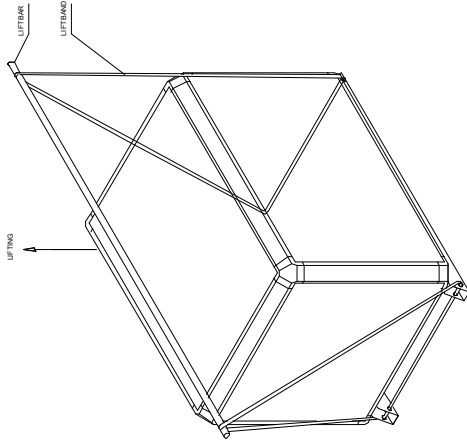
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



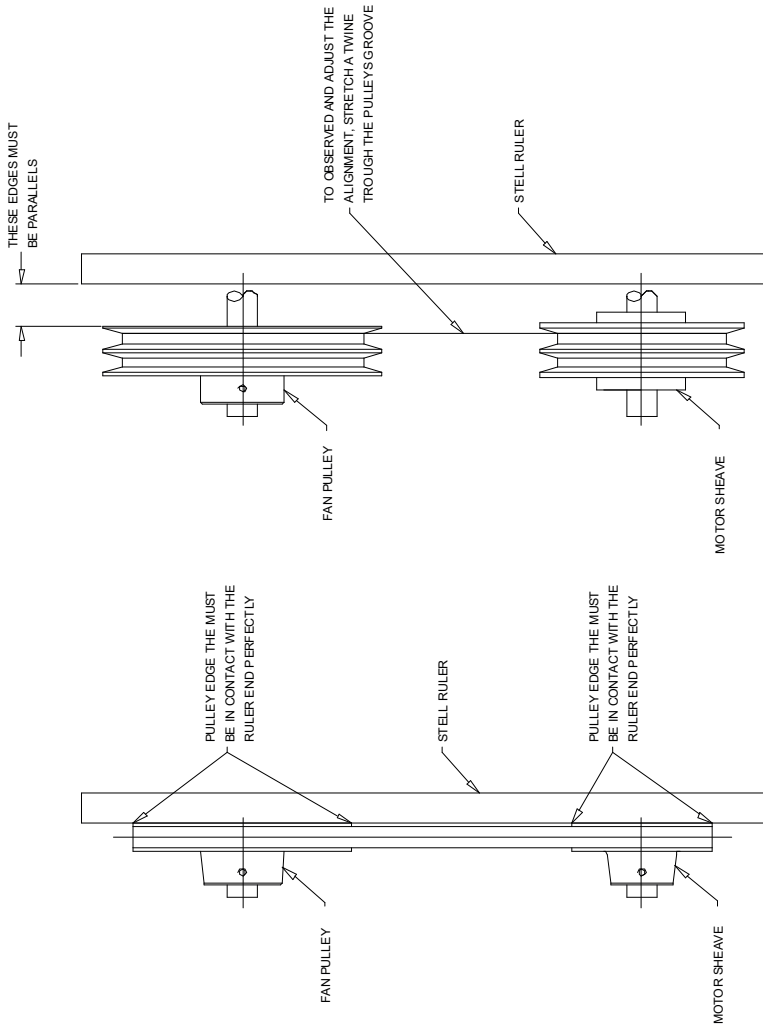
FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06



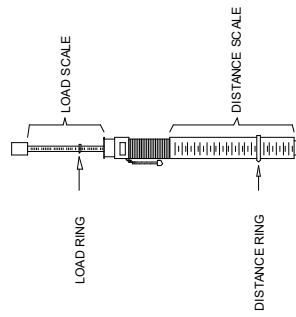
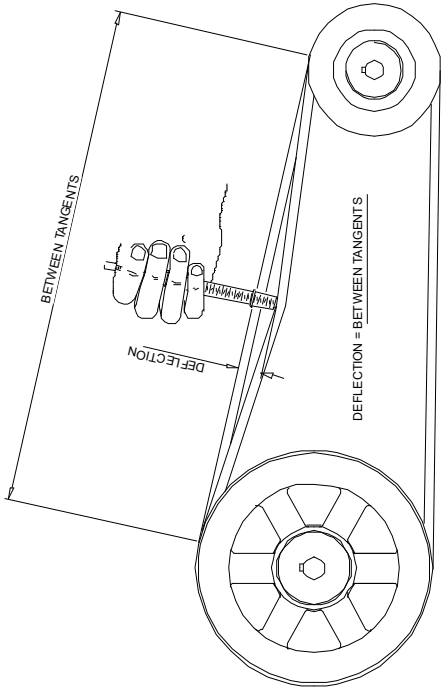
MIXER BOX SECTION
WAVE DOBLE 06



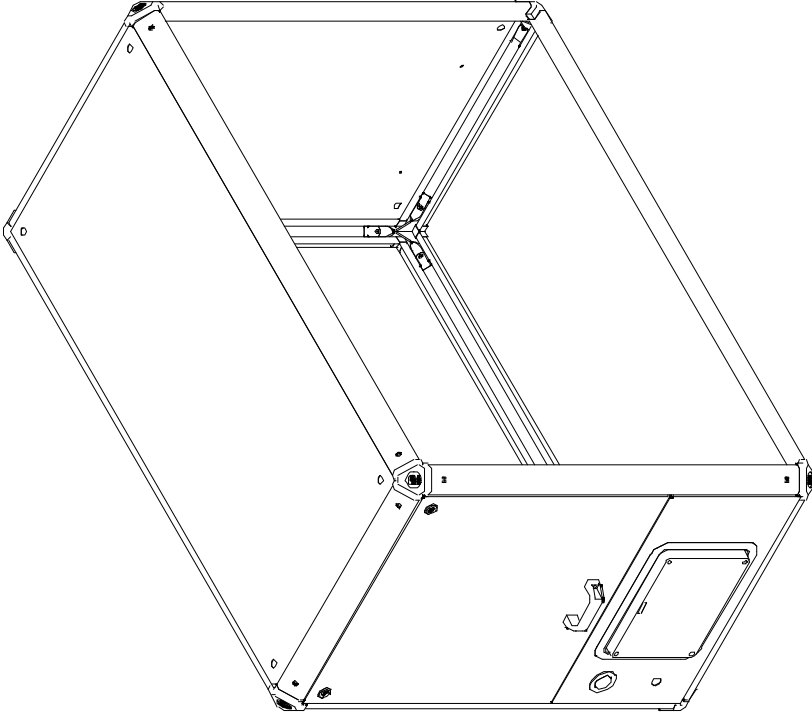
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

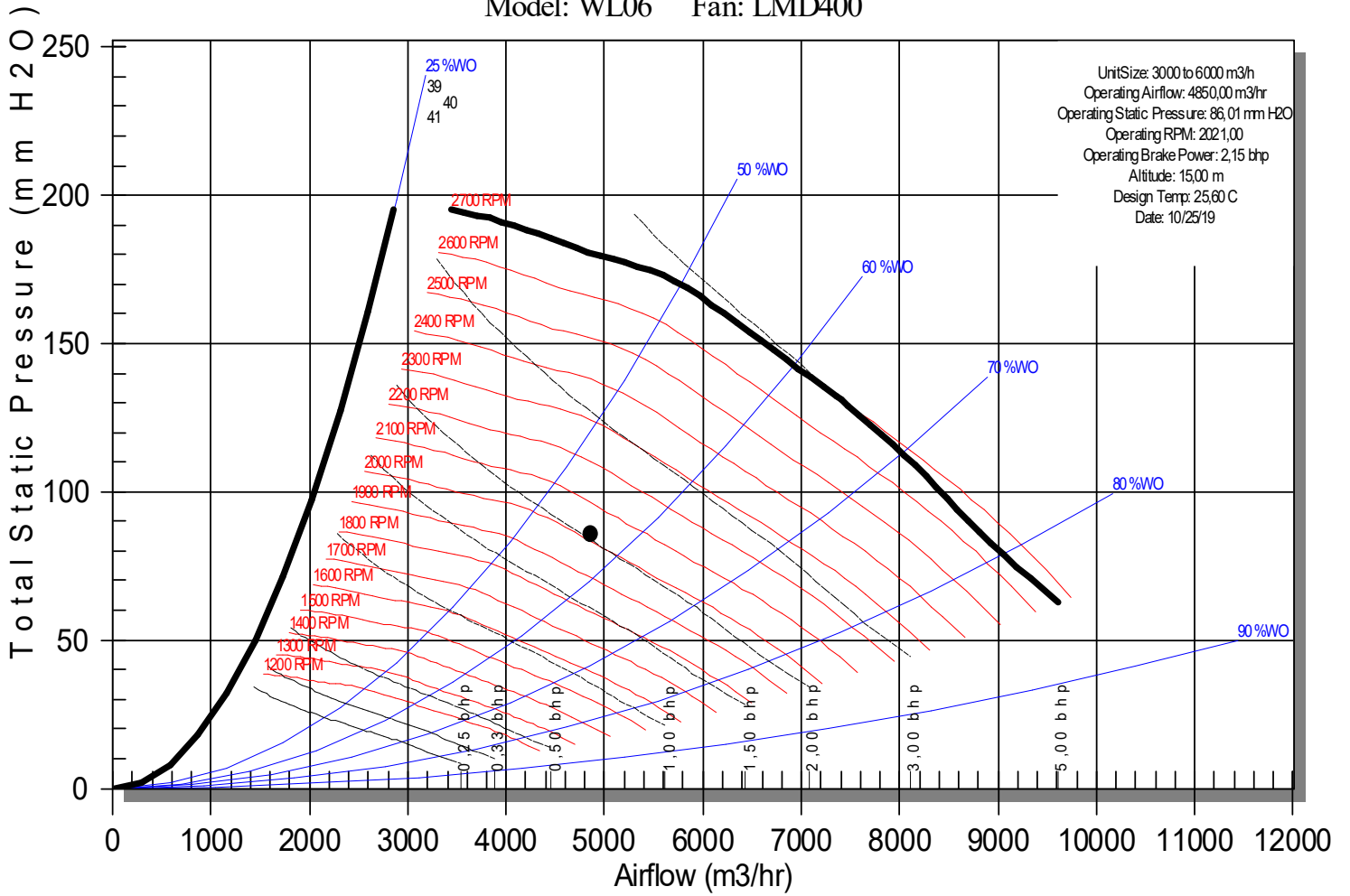
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-36

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-37
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA10AGBEKTHH0 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Horizontal	Unit Size	5500 to 10000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,30 mm H2O
Mixing Box Air Pressure Drop	2,20 mm H2O	Filter Air Pressure Drop	18,92 mm H2O

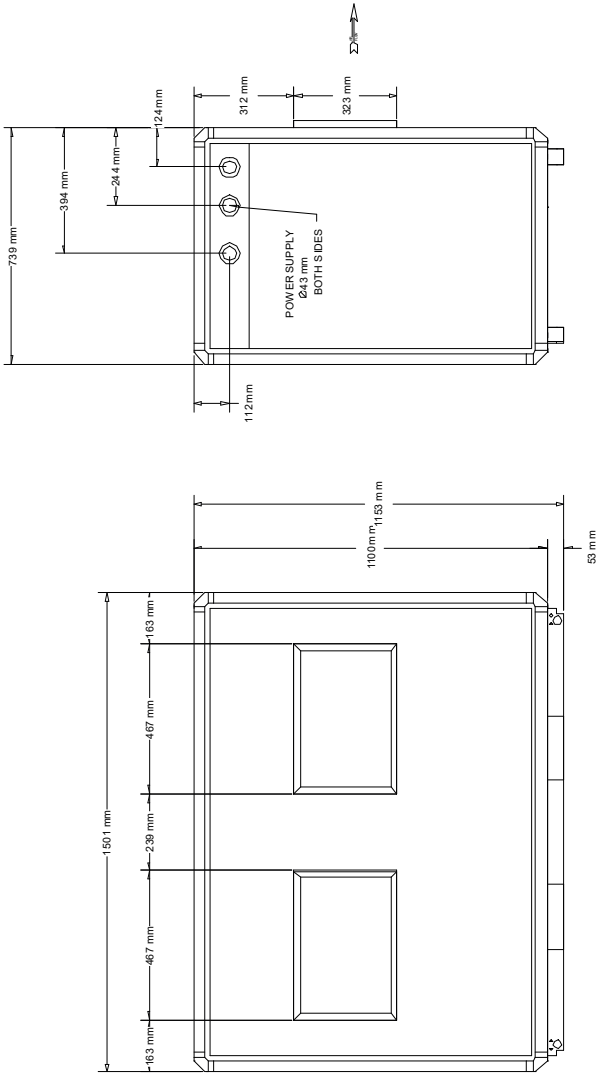
Coil			
Cooling Entering Dry Bulb	29,1 C	Cooling Entering Wet Bulb	22,9 C
Cooling Leaving Dry Bulb	13,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	10,49 m3/hr
Cooling Capacity	73,36 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	7290,00 m3/hr	Sensible Capacity	39,19 kW
Cooling Leaving Wet Bulb	13,3 C	Cooling Water Volume	28,74 L
Cooling Water Velocity	0,9 m/s	Cooling Water Pressure Drop	1198,31 mm H2O
Cooling Air Pressure Drop	14,35 mm H2O	Cooling Coil Wet Weight	300 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	74,77 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	3,27 bhp
Fan RPM	2645 rpm	Transmission Option	H
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	8,4 m/s	Velocity Pressure	42,6 Pa

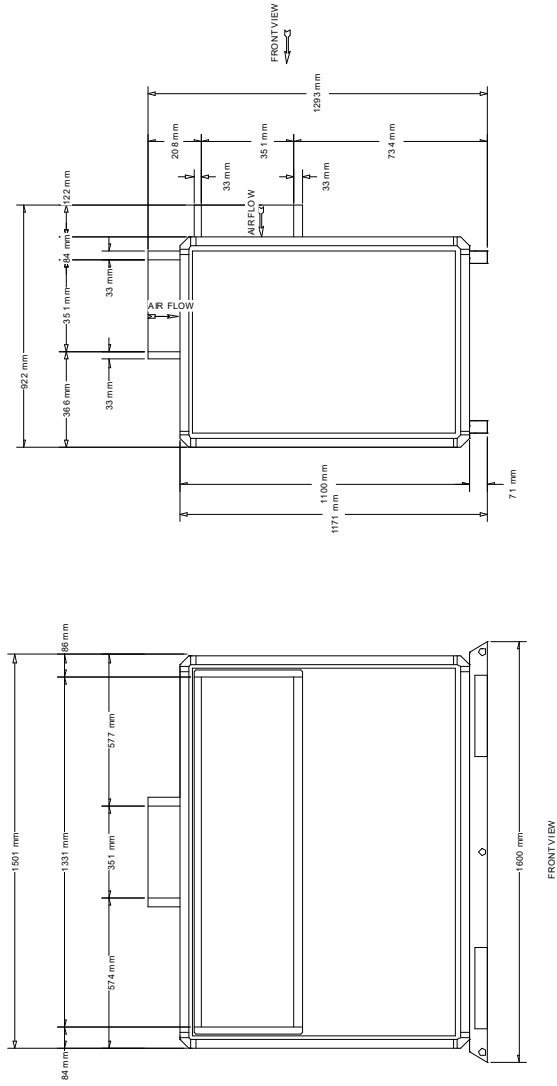
Humidifier	
Humidification	w/o Humidification / Not Applicable



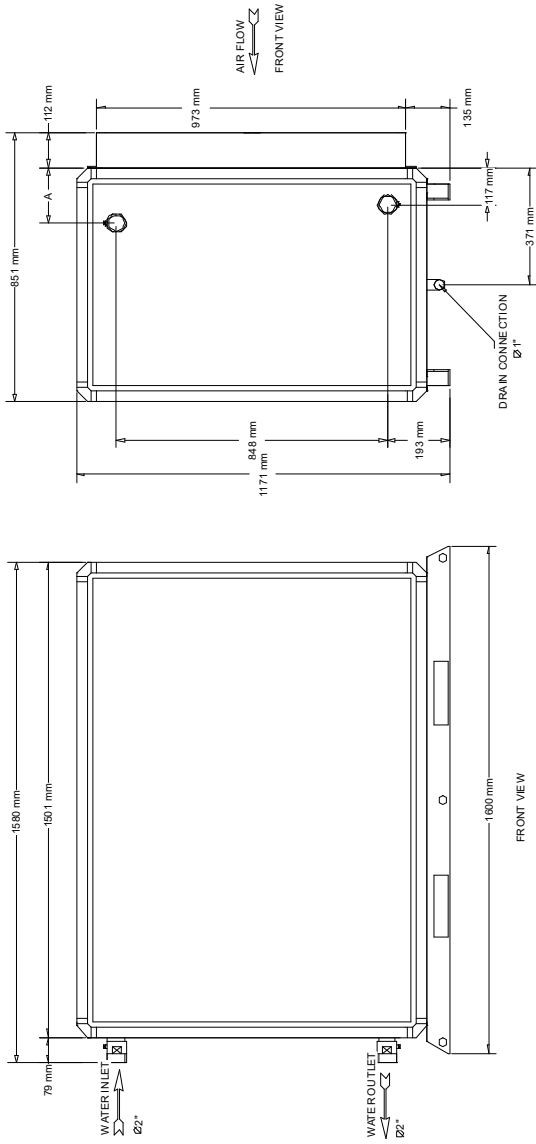
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 10

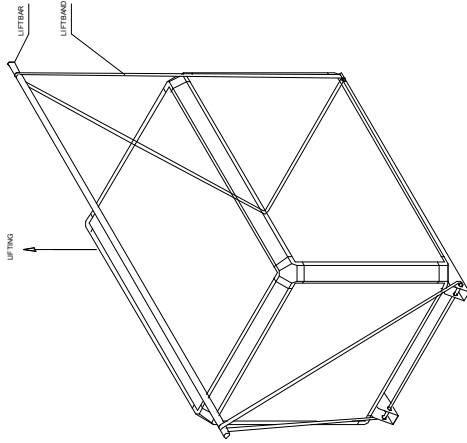


MIXER BOX SECTION
WAVE DOBLE 10

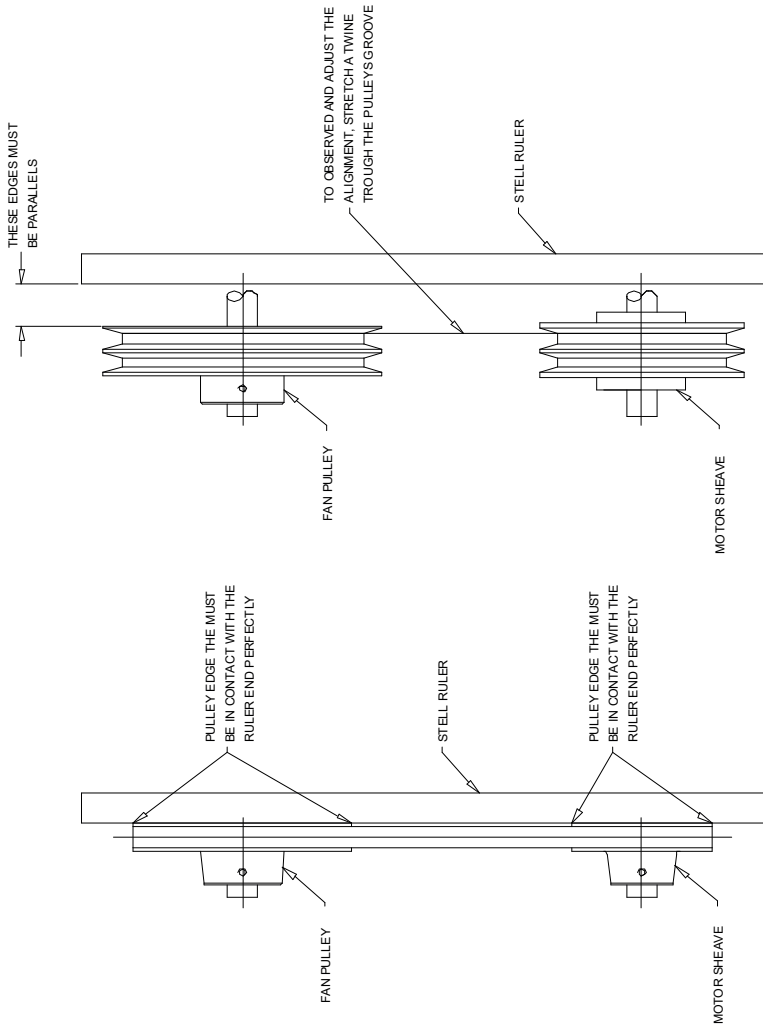


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 10

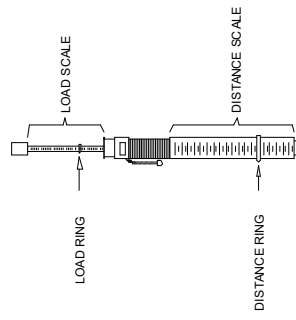
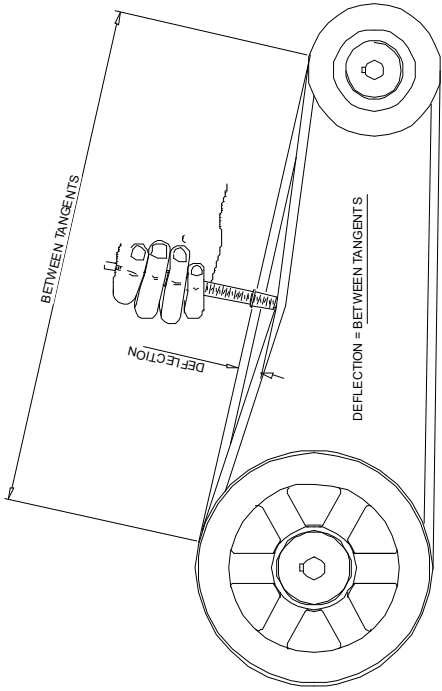
ROWS	A
3	172 mm
4	199 mm
6	255 mm
8	310 mm



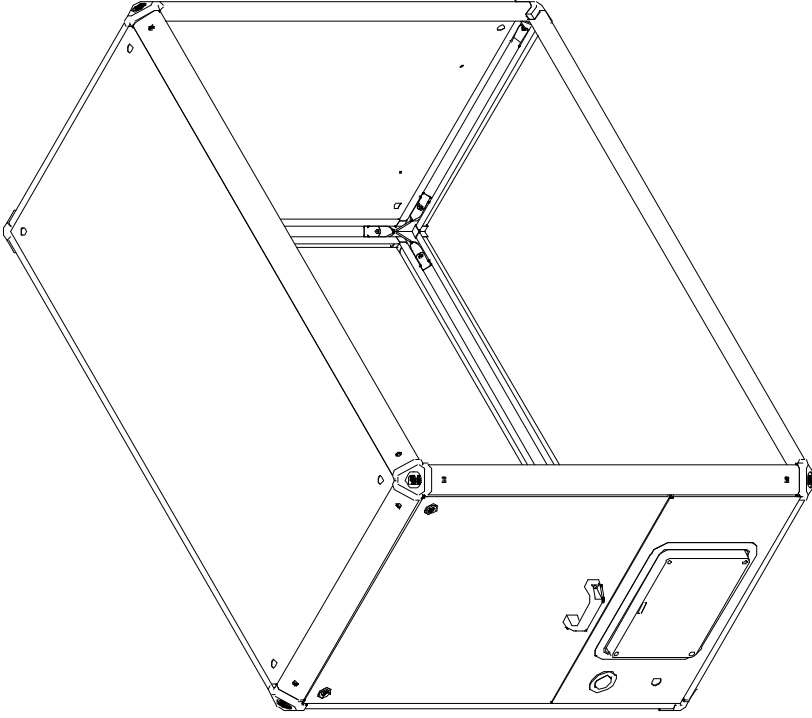
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

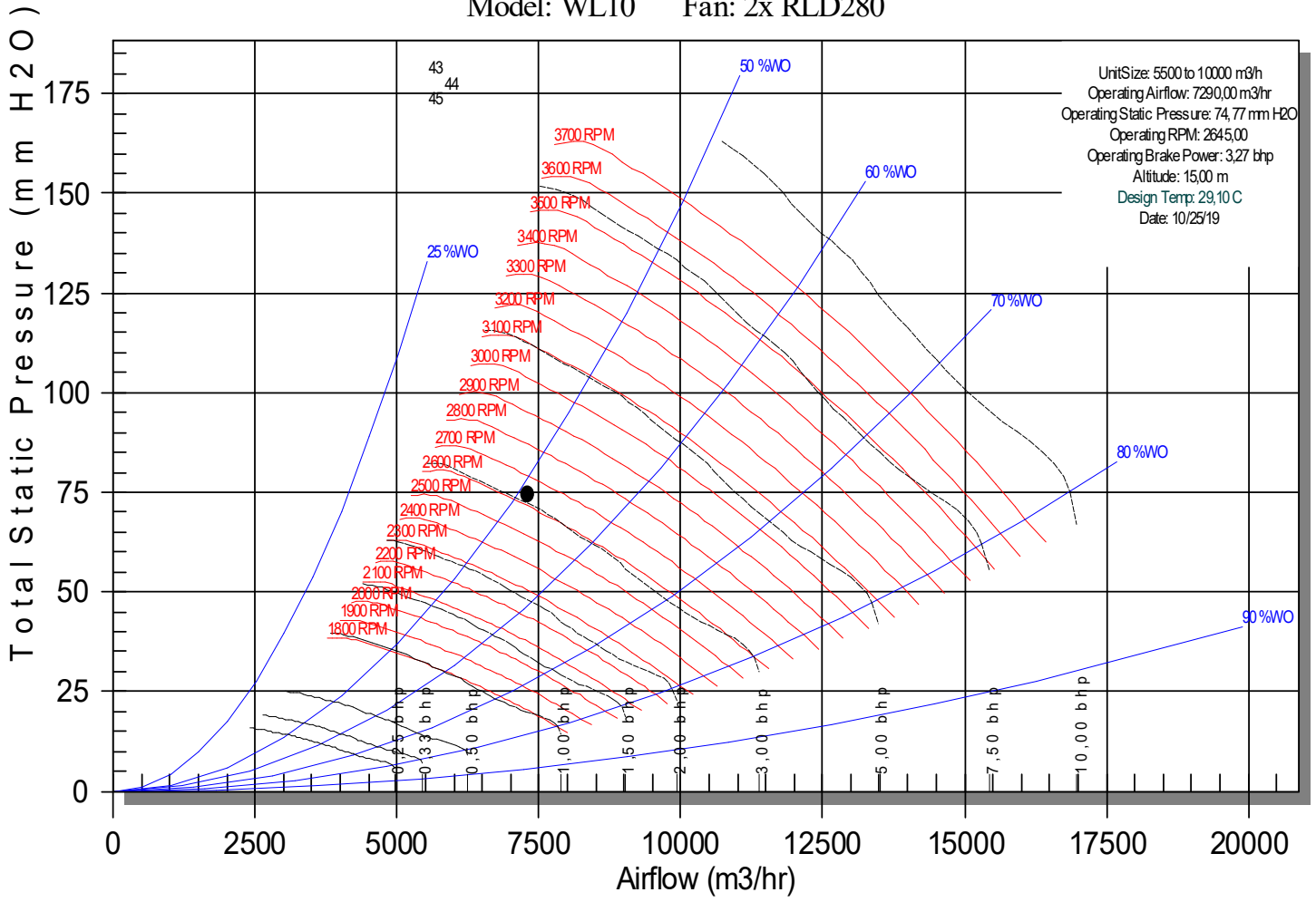
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-37

Model: WL10 Fan: 2x RLD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-38
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKCA0 0Y00A8WBAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

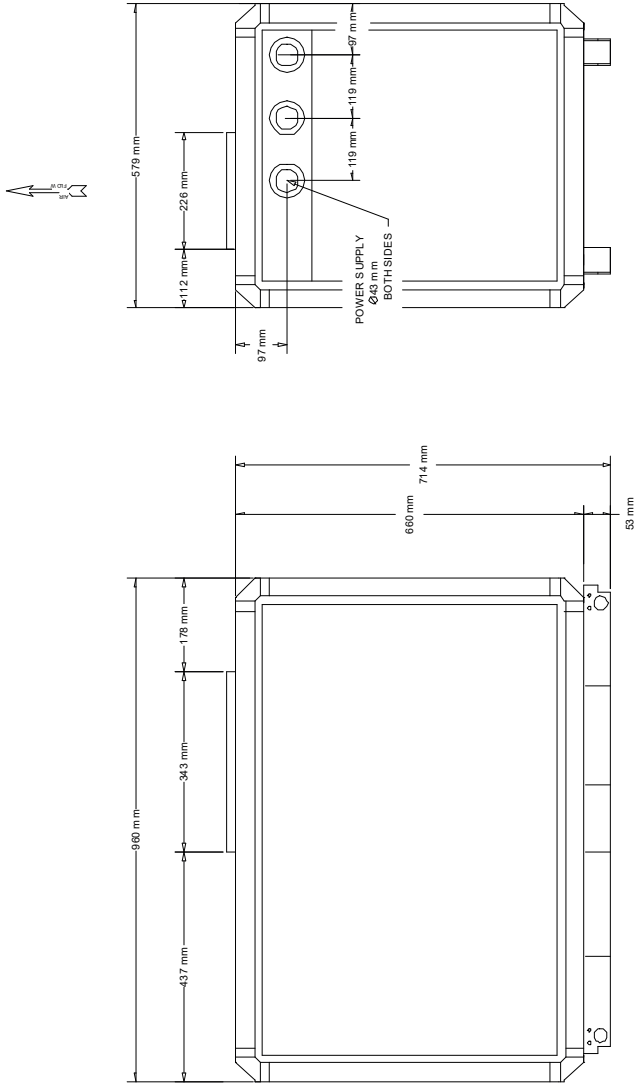
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	14,1 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

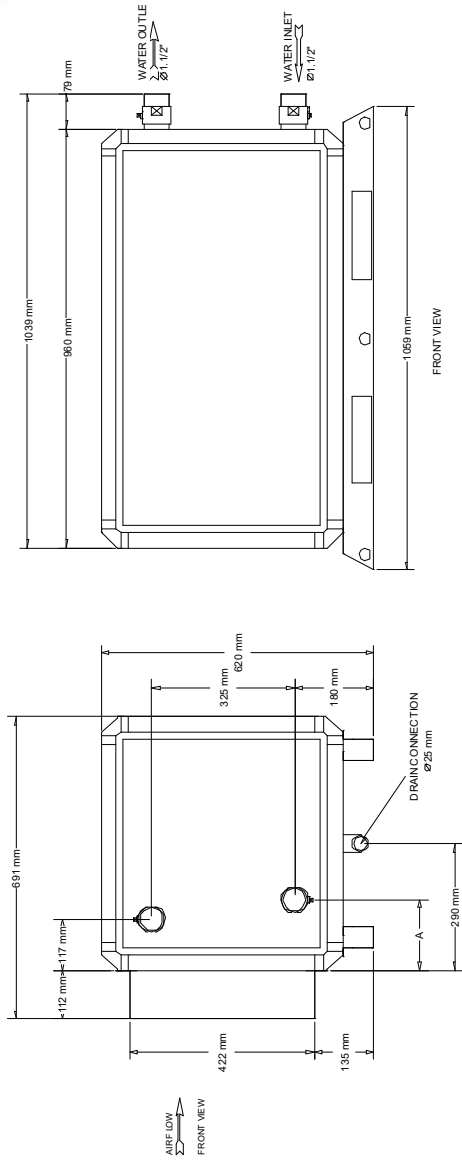
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

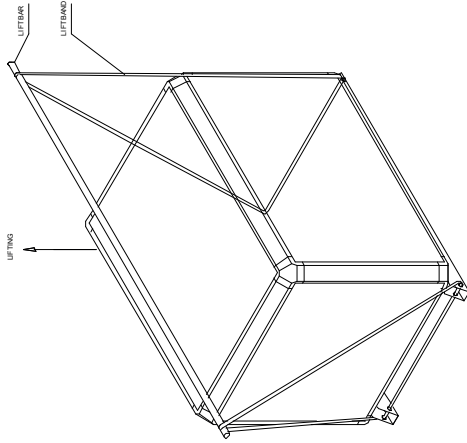


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

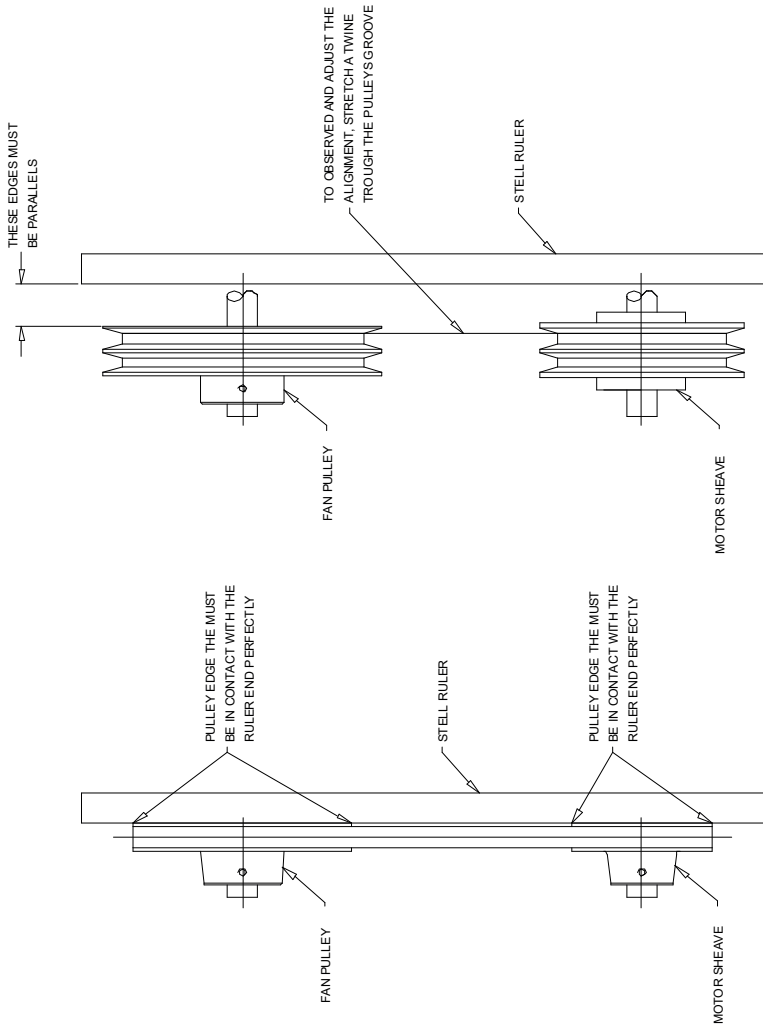


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

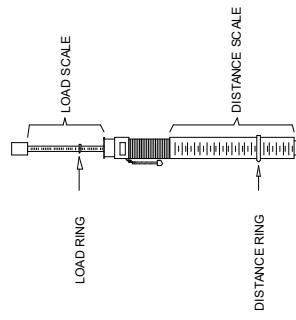
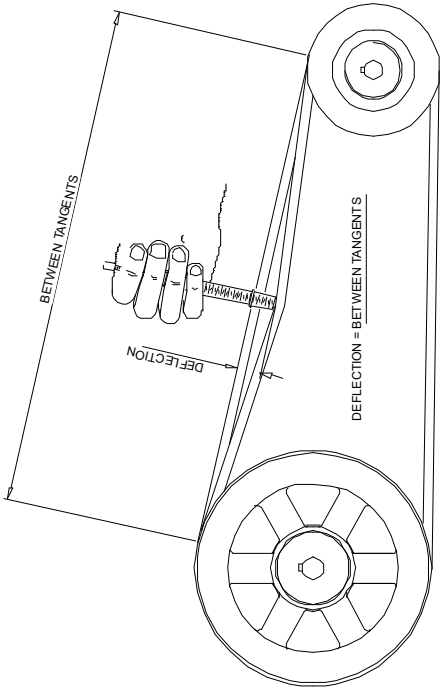
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



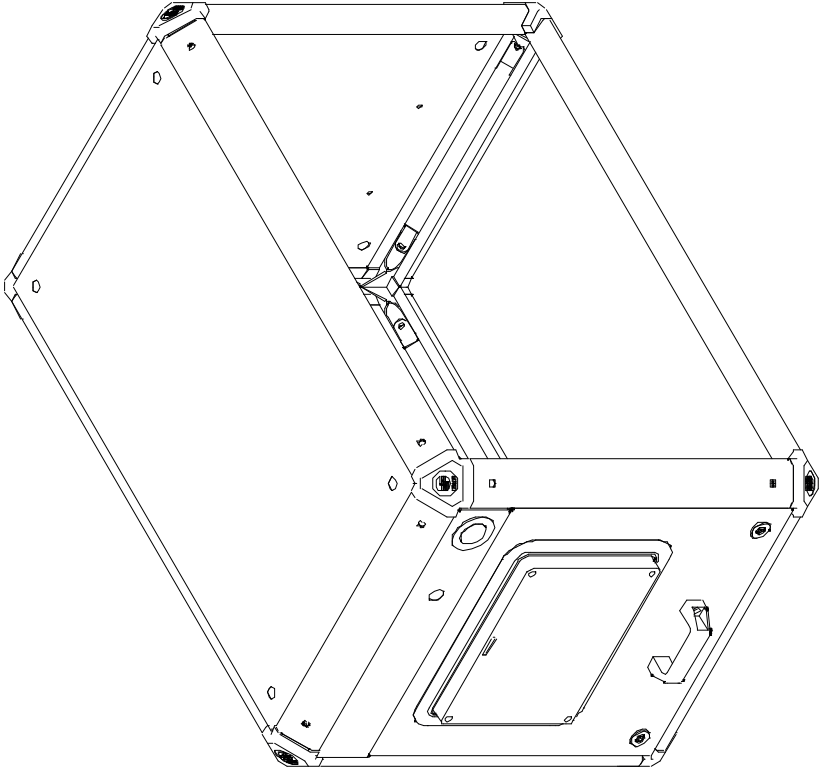
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

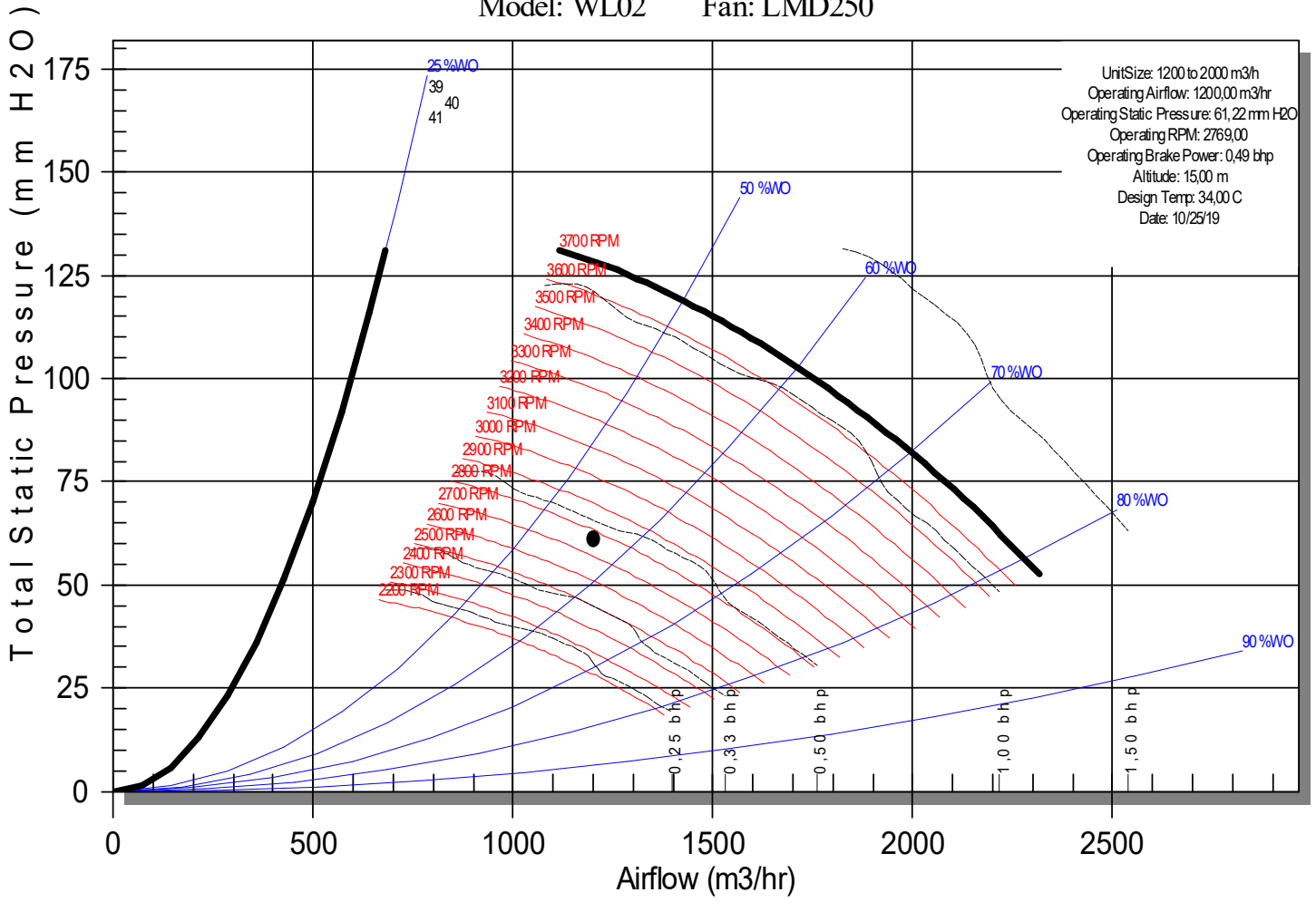
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-38

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-39
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKTCA0 0Y00B6A2BAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,34 mm H2O
Mixing Box Air Pressure Drop	1,13 mm H2O	Filter Air Pressure Drop	14,00 mm H2O

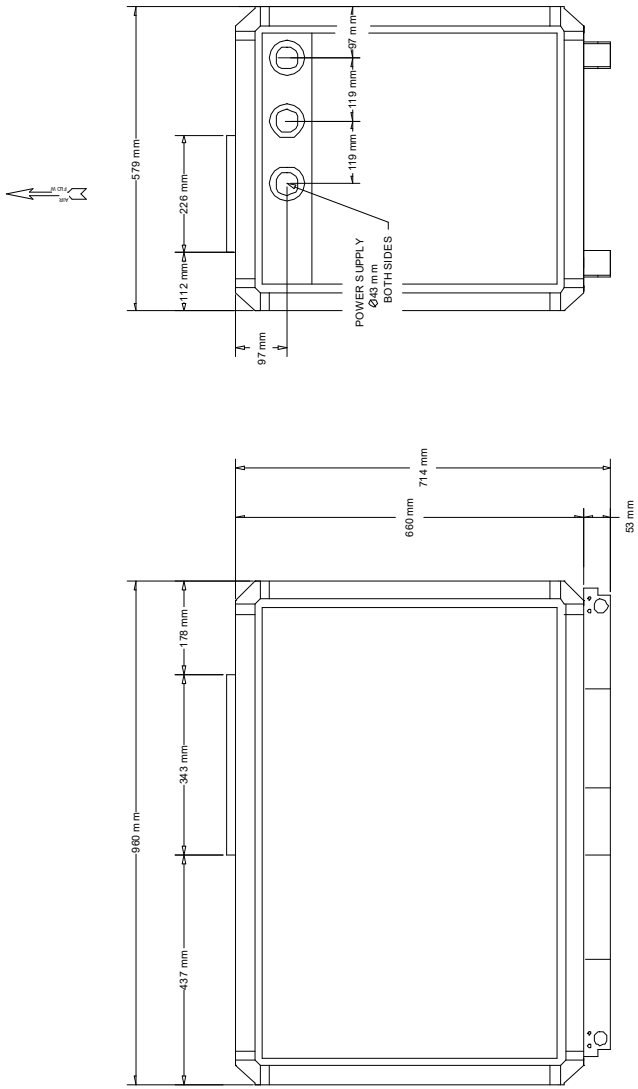
Coil			
Cooling Entering Dry Bulb	22,9 C	Cooling Entering Wet Bulb	16,6 C
Cooling Leaving Dry Bulb	11,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	0,84 m3/hr
Cooling Capacity	5,84 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	11,7 C	Cooling Airflow	1300,00 m3/hr
Sensible Capacity	4,98 kW	Cooling Leaving Wet Bulb	11,5 C
Cooling Water Volume	6,76 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	202,42 mm H2O	Cooling Air Pressure Drop	7,61 mm H2O
Cooling Coil Wet Weight	116 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,82 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	59,90 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,50 bhp
Fan RPM	2782 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,7 m/s	Velocity Pressure	27,0 Pa

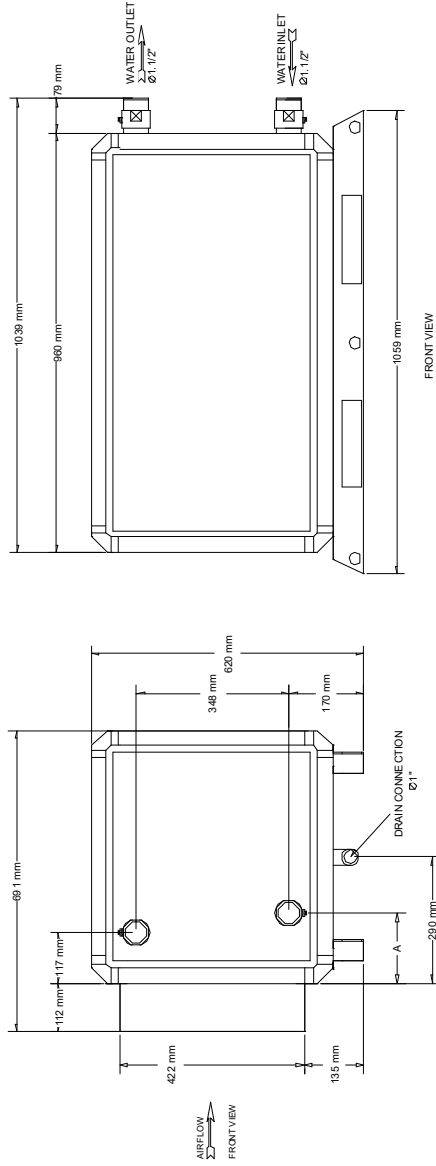
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

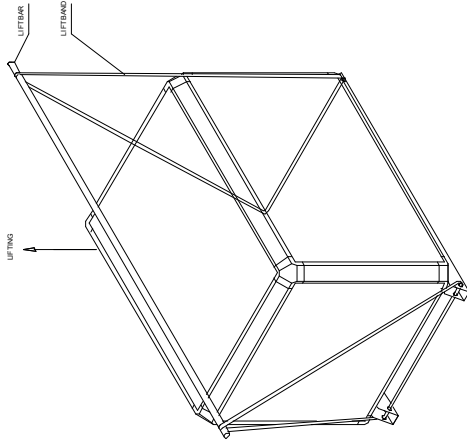


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

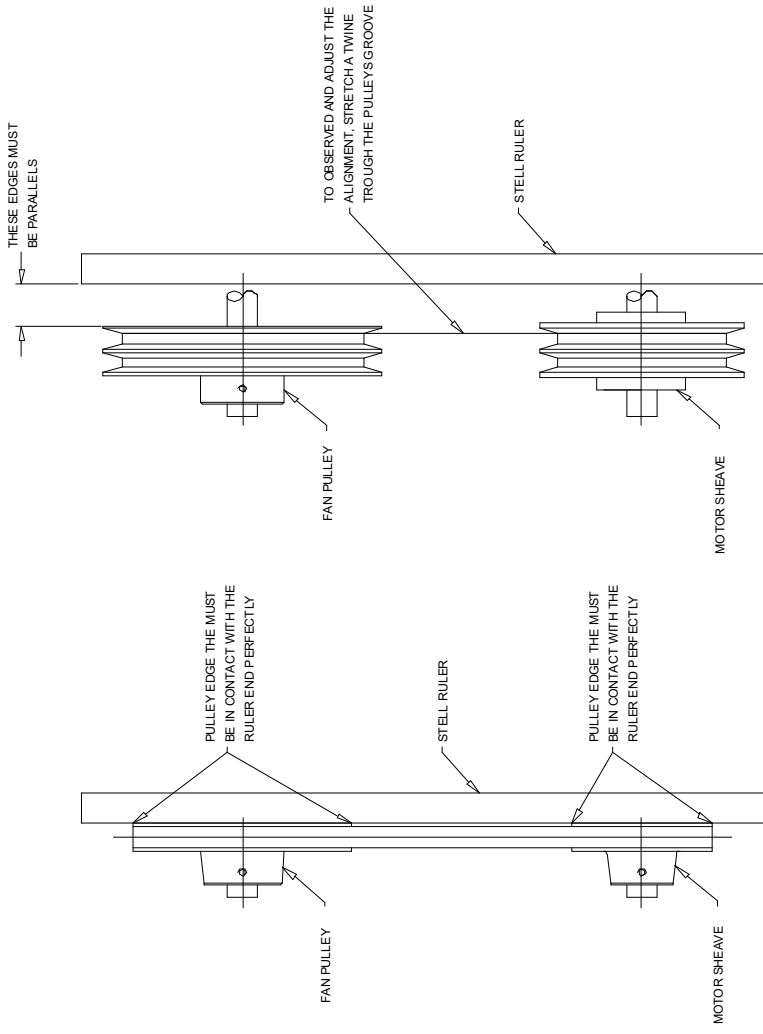


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 02

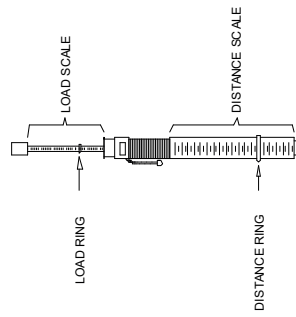
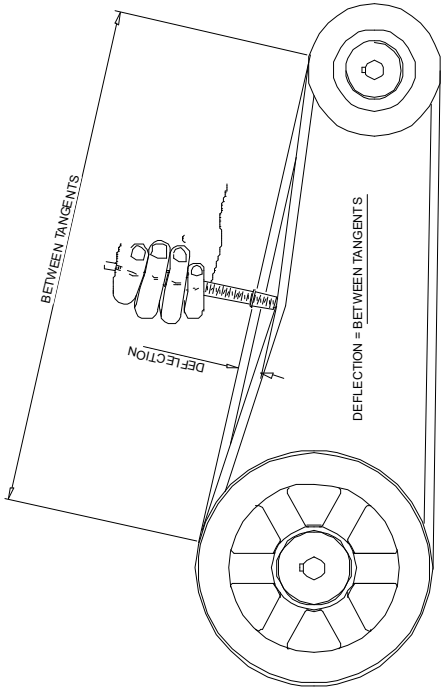
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



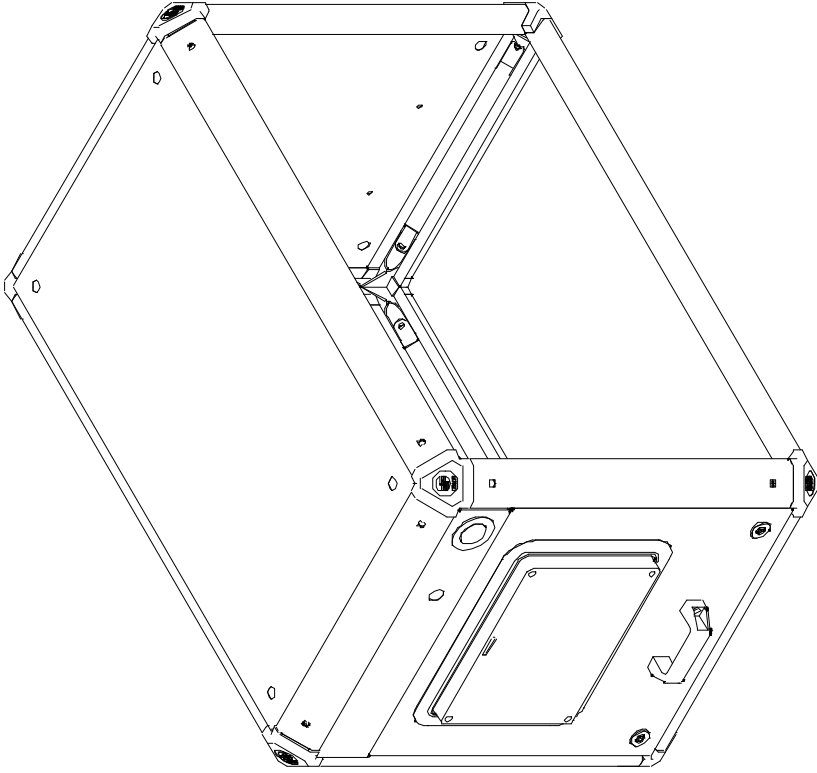
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



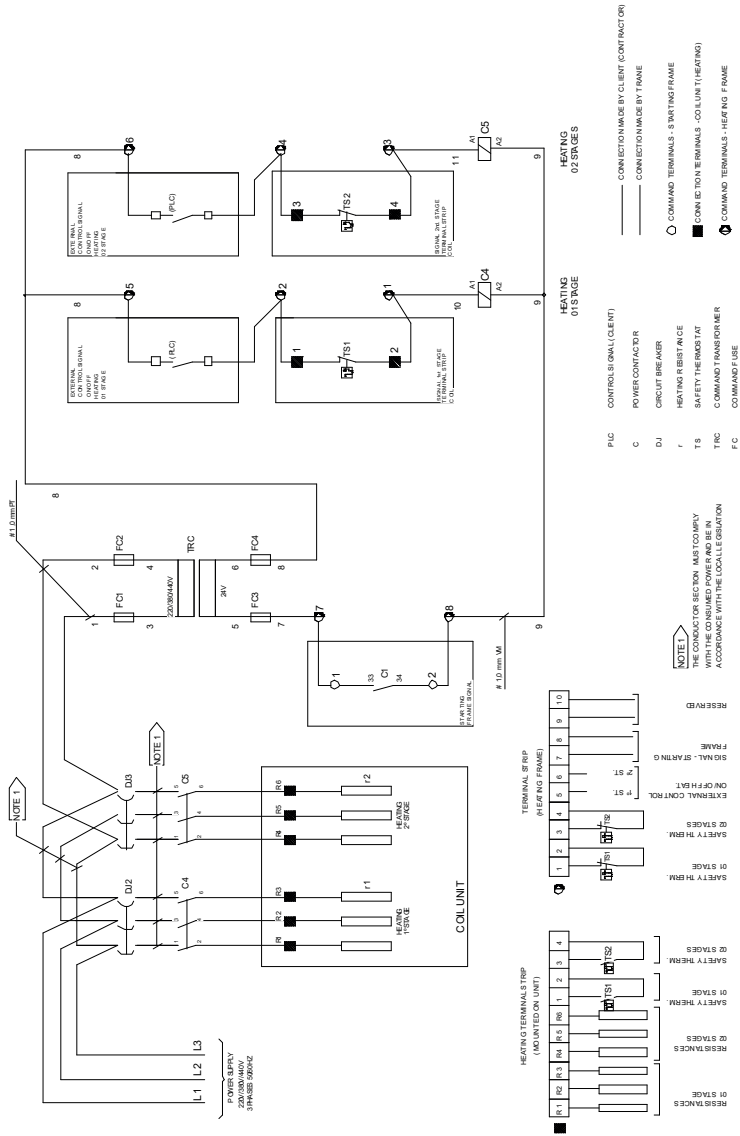
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

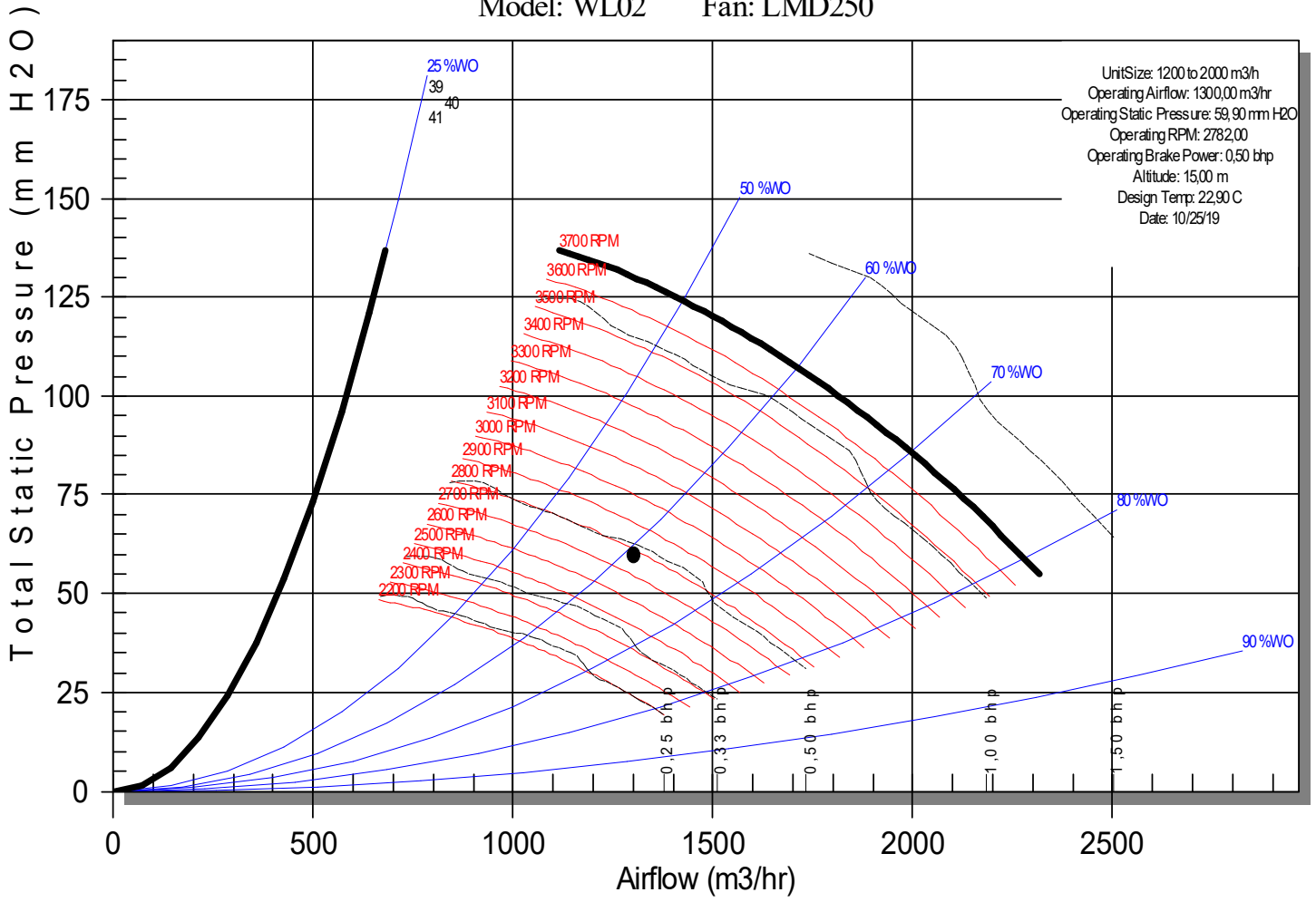
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-39

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-40
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGAECTFG00 Y00A8BWBH00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,67 mm H2O
Mixing Box Air Pressure Drop	2,51 mm H2O	Filter Air Pressure Drop	24,24 mm H2O

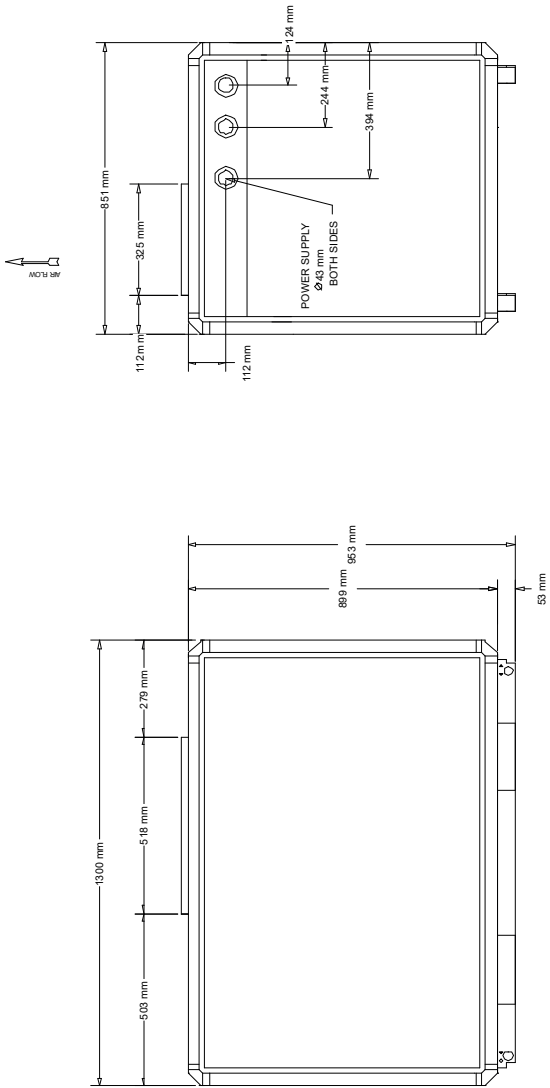
Coil			
Cooling Entering Dry Bulb	27,3 C	Cooling Entering Wet Bulb	21,5 C
Cooling Leaving Dry Bulb	9,8 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,46 m3/hr
Cooling Capacity	52,17 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 4.5 kw
Heating Capacity	9,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	13,8 C	Cooling Airflow	4650,00 m3/hr
Sensible Capacity	27,96 kW	Cooling Leaving Wet Bulb	9,7 C
Cooling Water Volume	15,53 L	Cooling Water Velocity	1,3 m/s
Cooling Water Pressure Drop	3602,66 mm H2O	Cooling Air Pressure Drop	19,64 mm H2O
Cooling Coil Wet Weight	251 kg	Actual Cooling Face Velocity	2,4 m/s
Electric Heat PD	3,66 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	90,70 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,16 bhp
Fan RPM	2034 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,5 m/s	Velocity Pressure	54,6 Pa

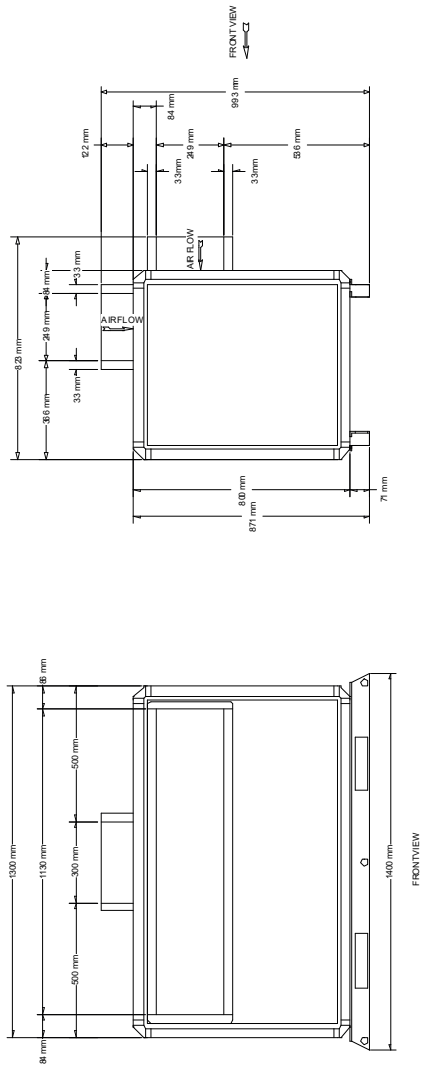
Humidifier	
Humidification	w/o Humidification / Not Applicable



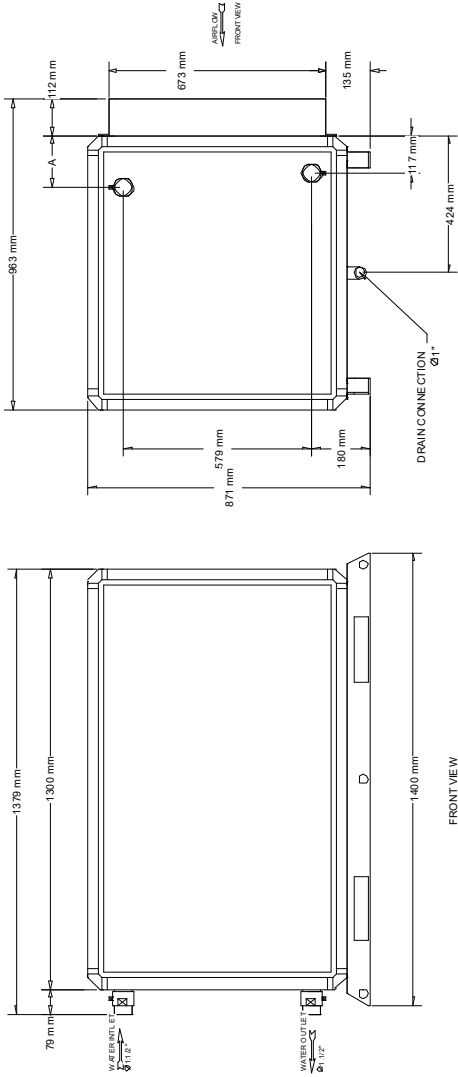
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

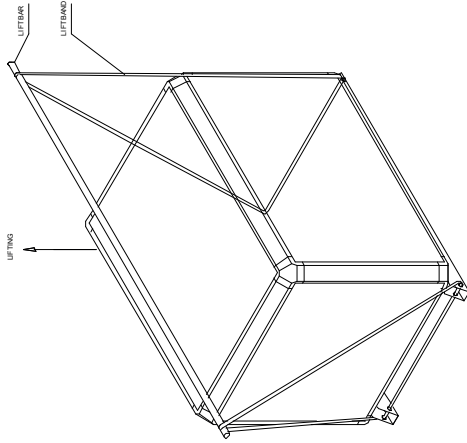


MIXER BOX SECTION
WAVE DOBLE 06

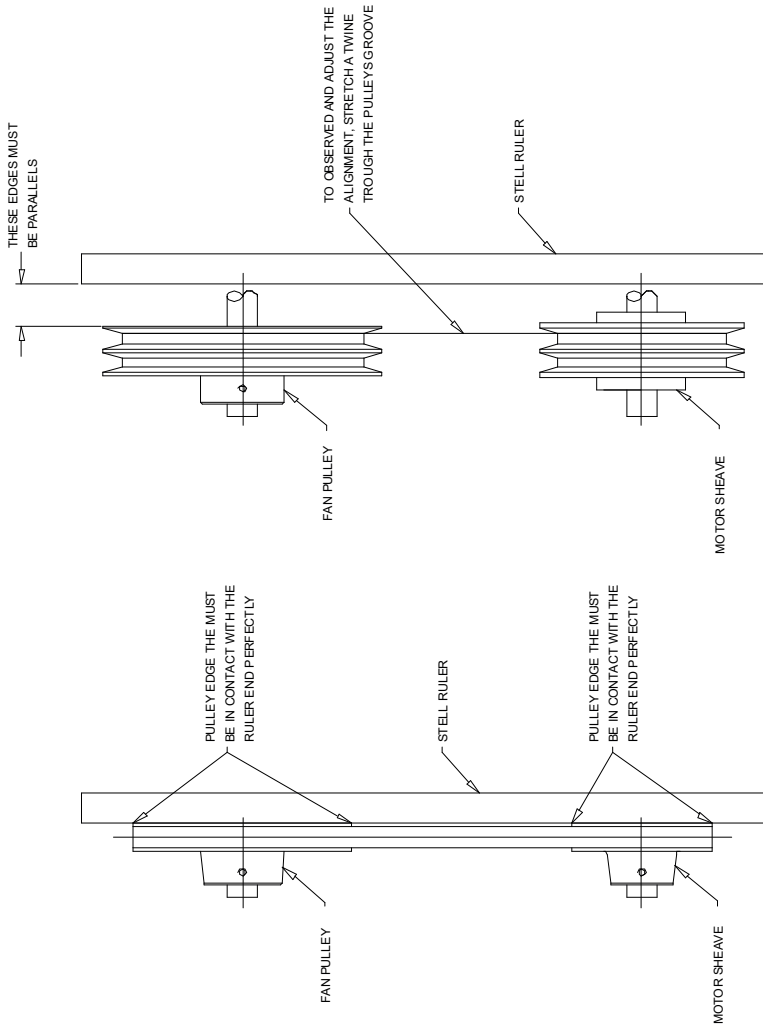


COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 06

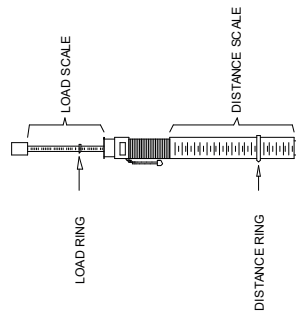
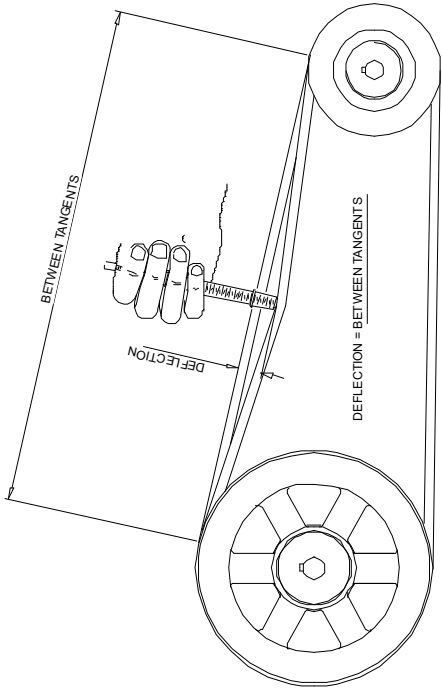
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



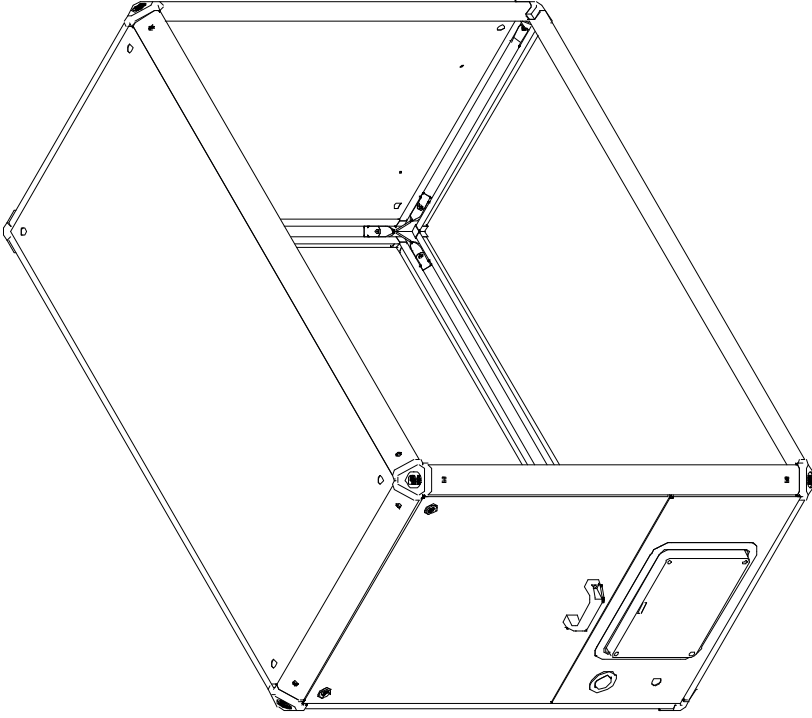
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



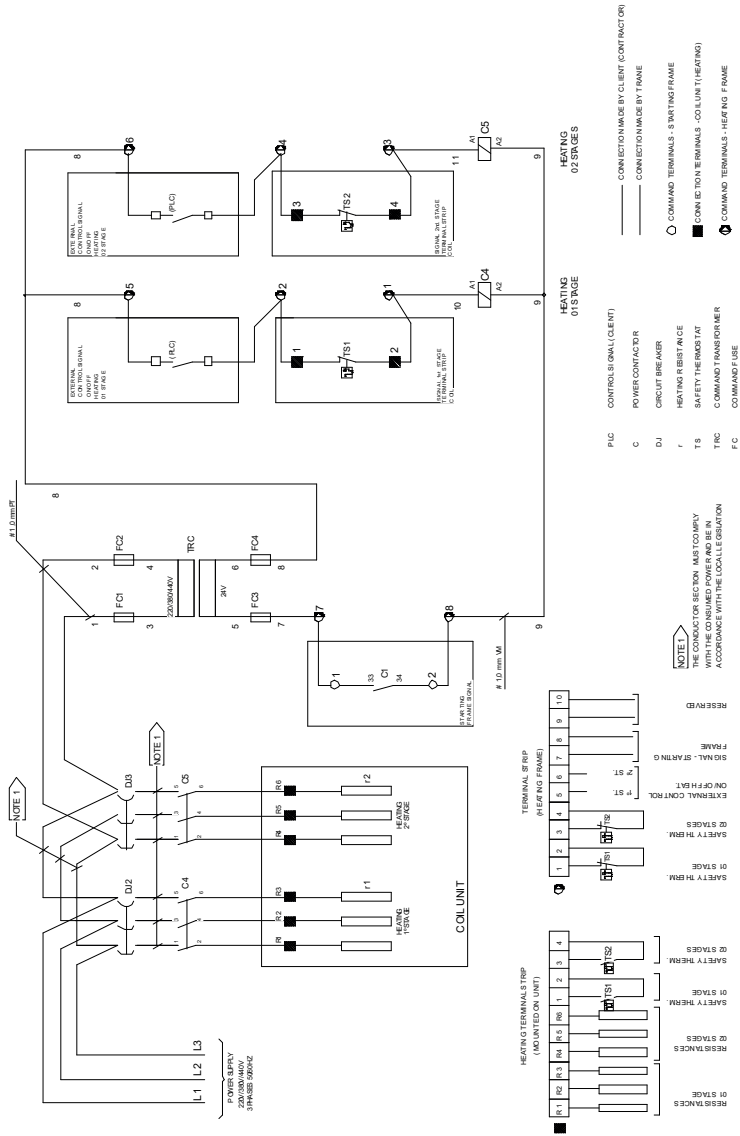
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

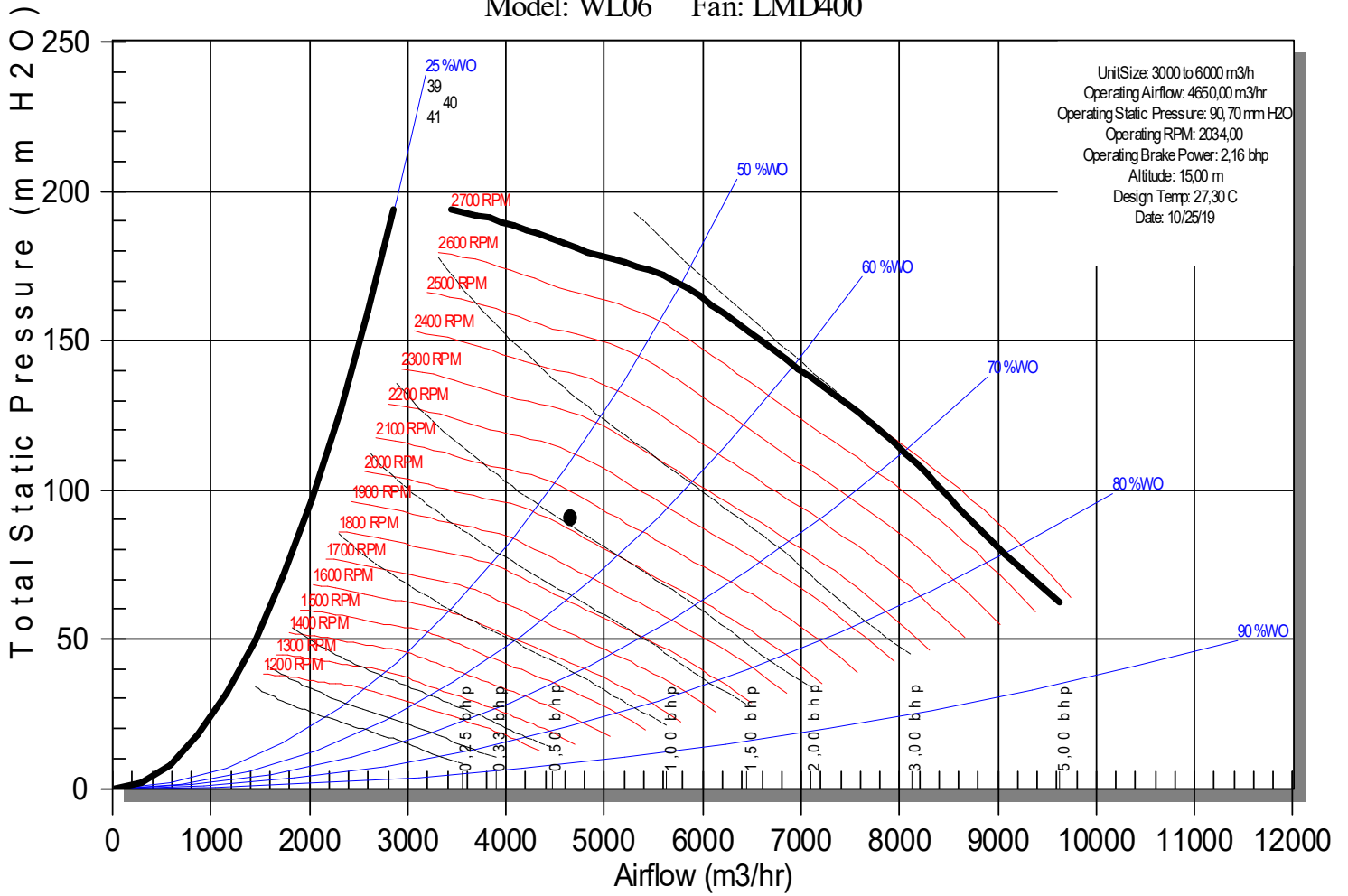
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-40

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-41
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGAEKTCA00 Y00A8WBAA001100 0300000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

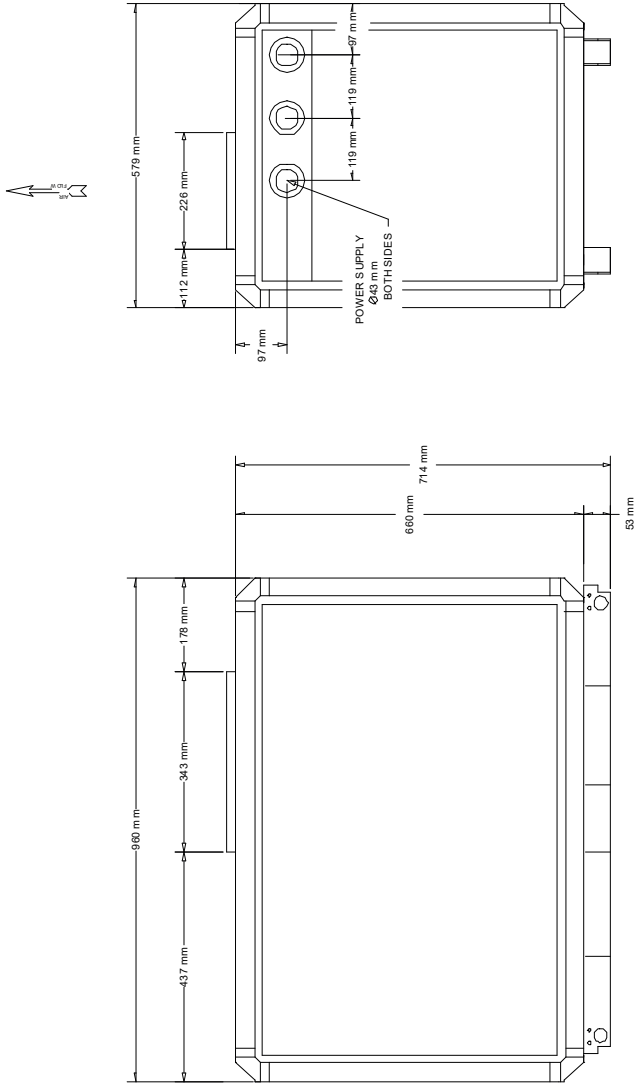
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	15,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

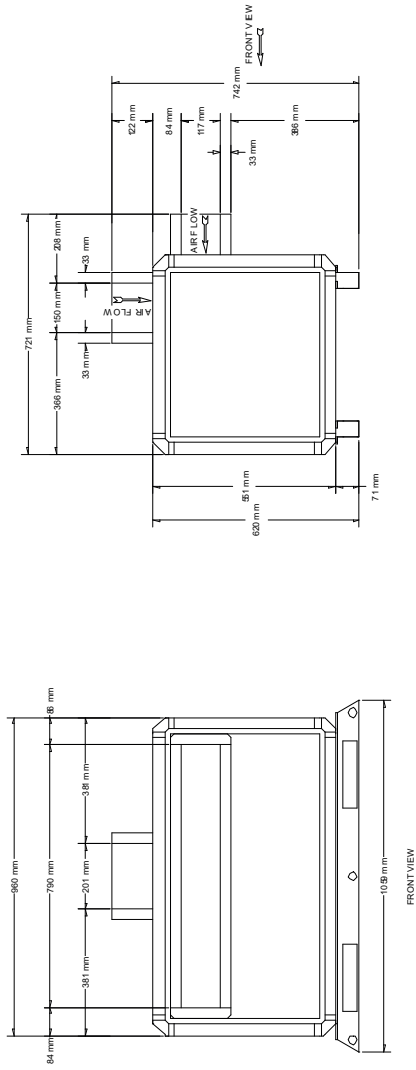
Humidifier	
Humidification	w/o Humidification / Not Applicable



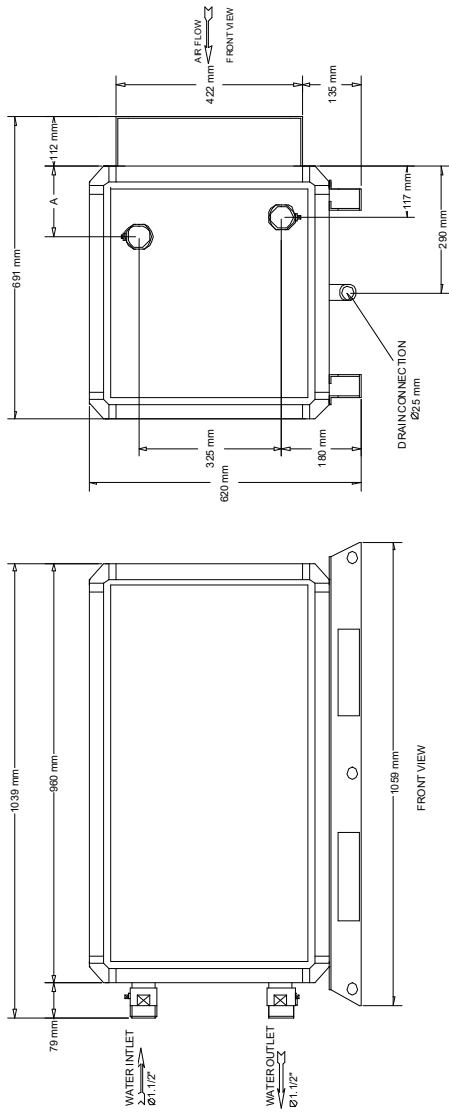
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

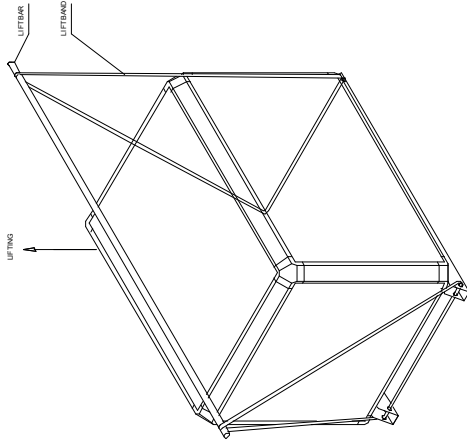


MIXER BOX SECTION
WAVE DOBLE 02

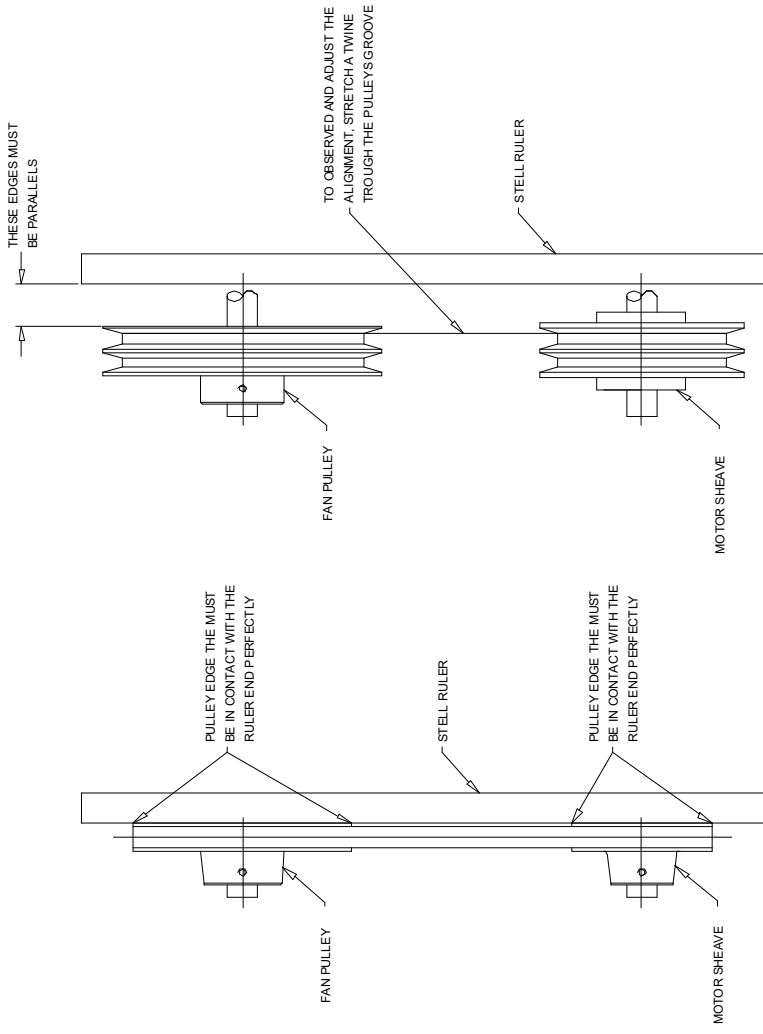


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

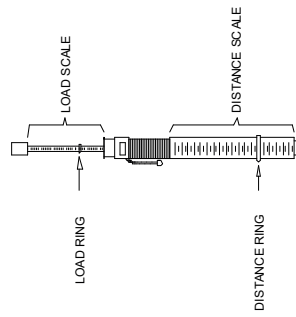
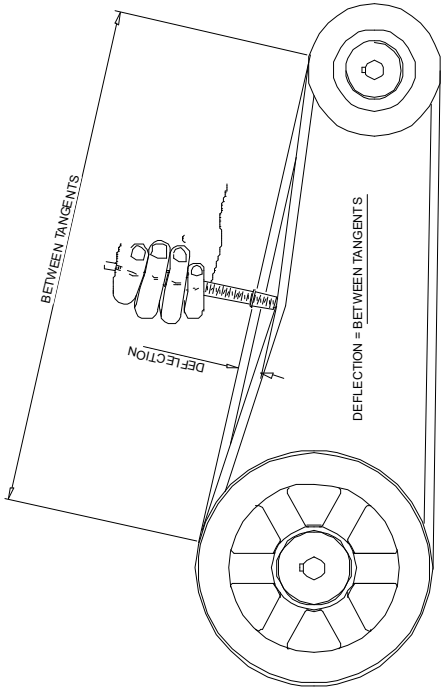
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 02



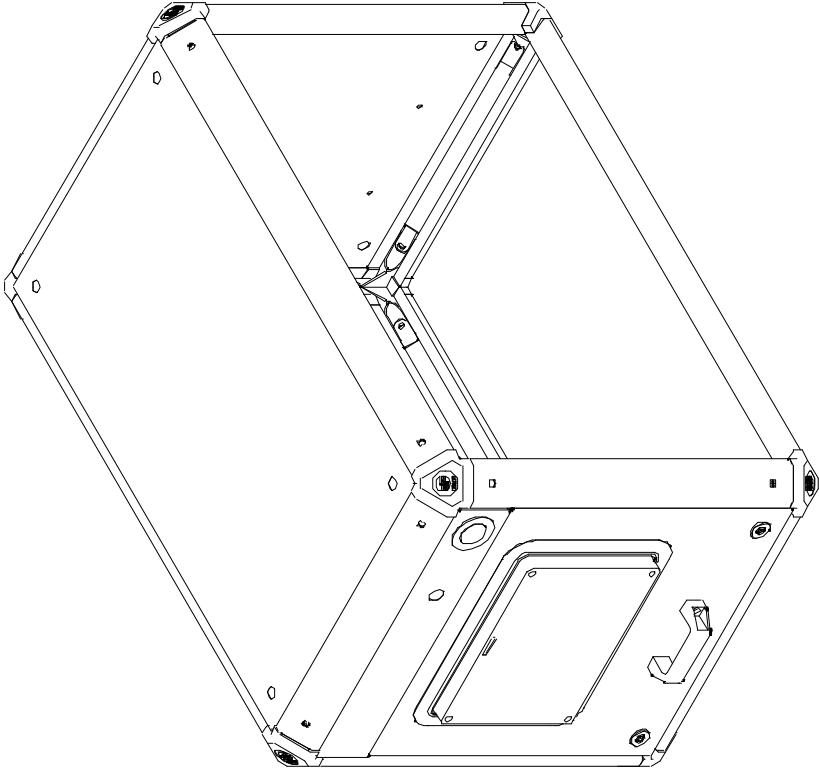
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

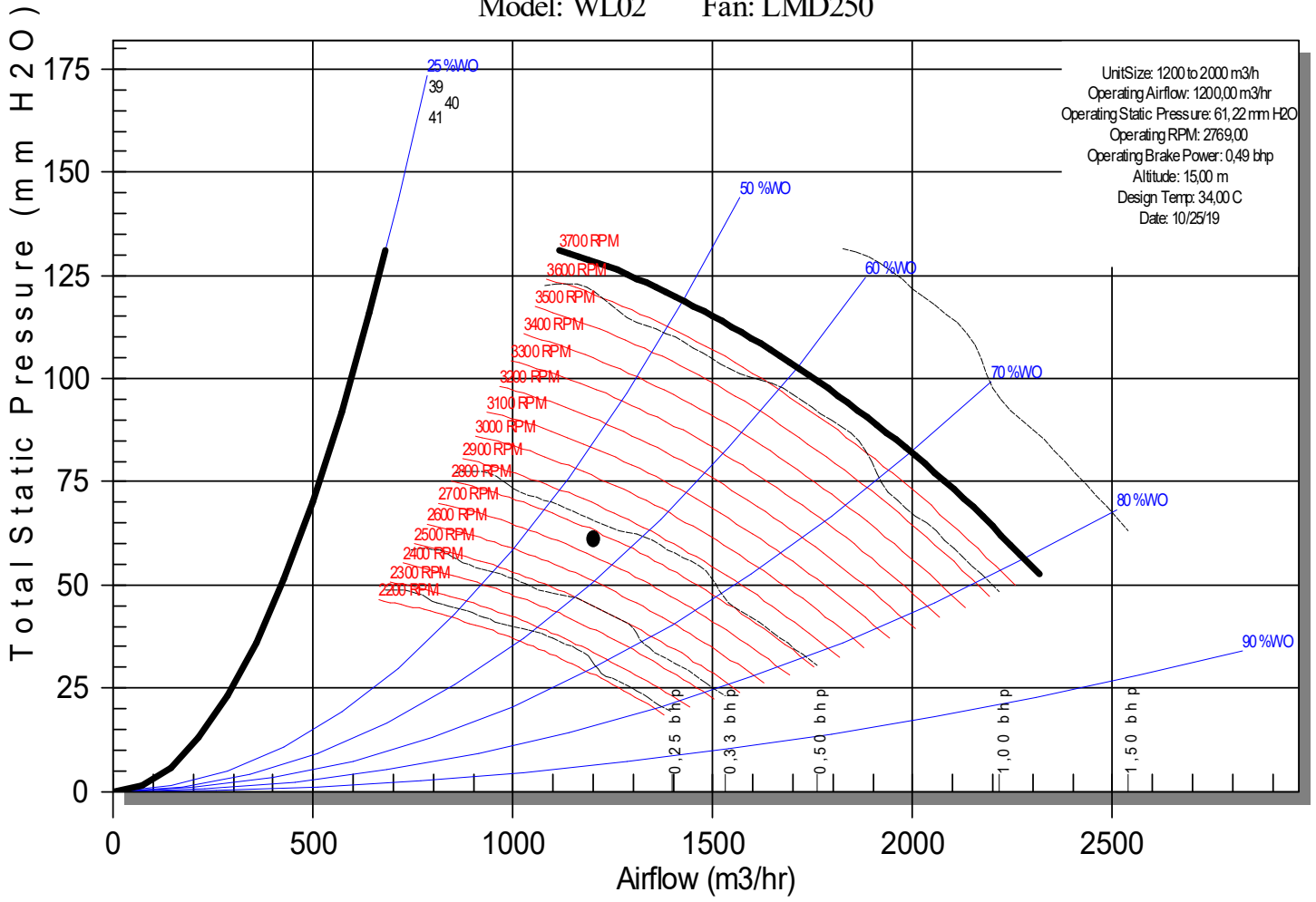
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-41

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-42
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGA EKTED00 Y00B8AWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,74 mm H2O
Mixing Box Air Pressure Drop	2,07 mm H2O	Filter Air Pressure Drop	21,79 mm H2O

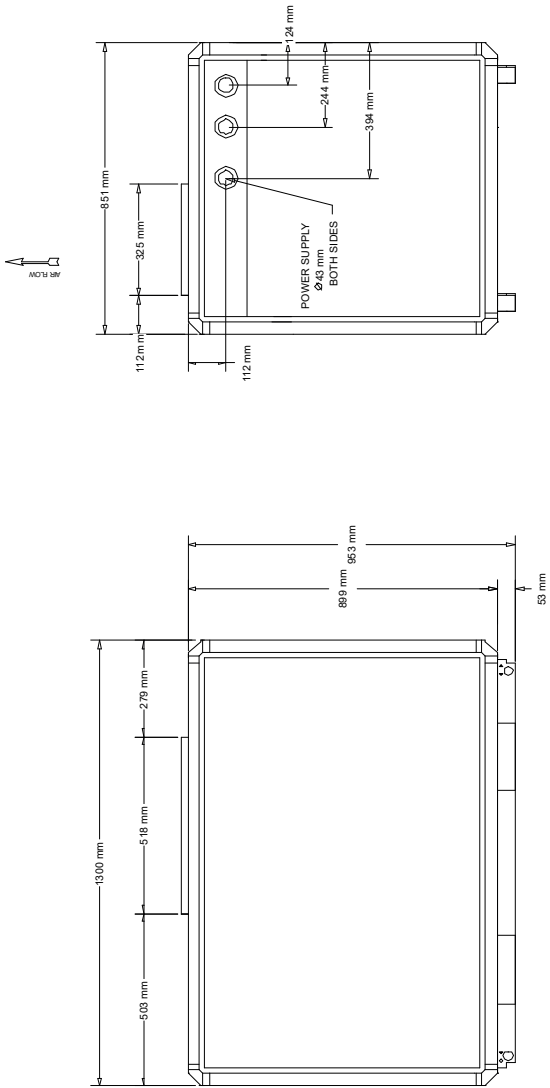
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	11,9 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	11,27 m3/hr
Cooling Capacity	78,87 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4430,00 m3/hr	Sensible Capacity	34,12 kW
Cooling Leaving Wet Bulb	11,8 C	Cooling Water Volume	21,98 L
Cooling Water Velocity	1,3 m/s	Cooling Water Pressure Drop	2800,30 mm H2O
Cooling Air Pressure Drop	18,35 mm H2O	Cooling Coil Wet Weight	272 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	80,95 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,83 bhp
Fan RPM	1945 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,1 m/s	Velocity Pressure	49,5 Pa

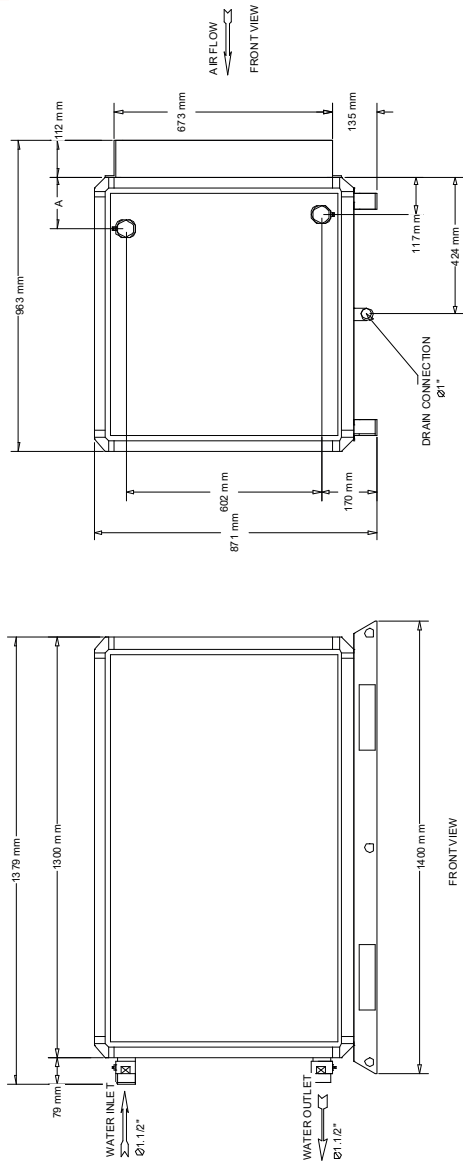
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

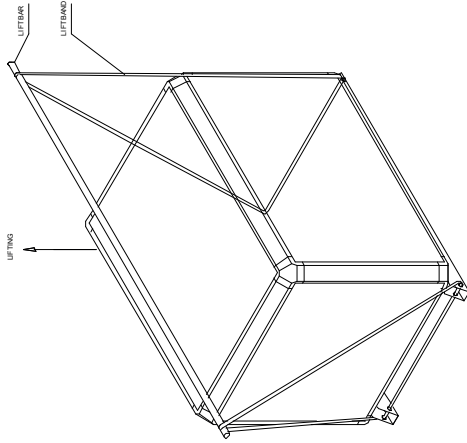


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

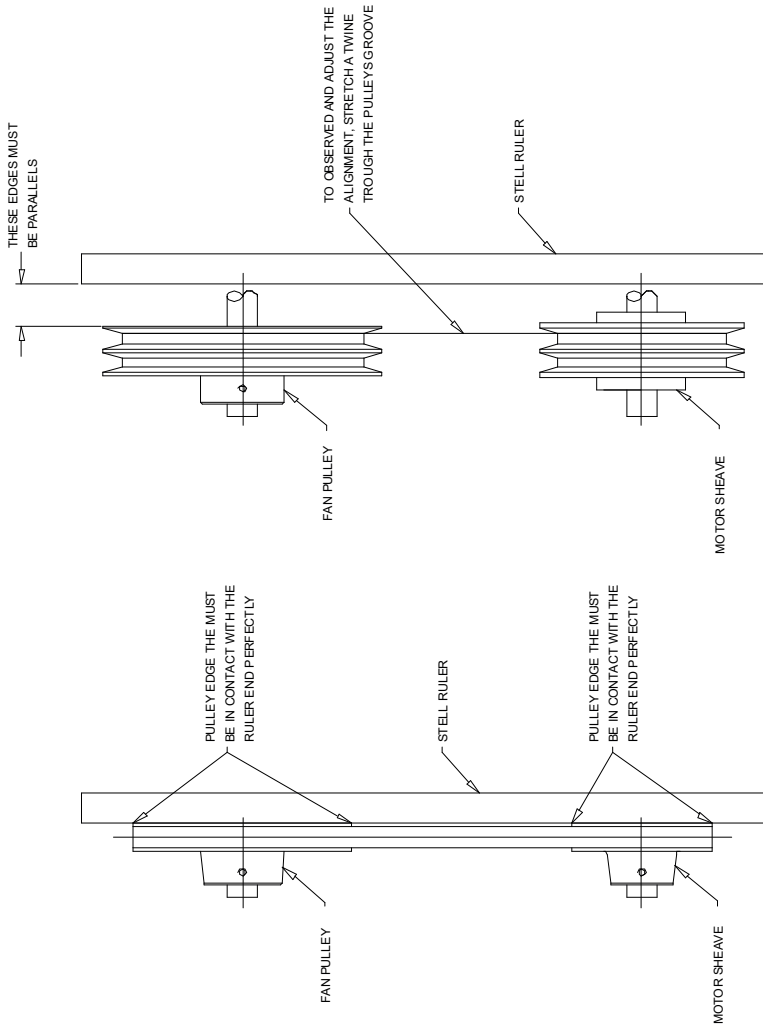


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

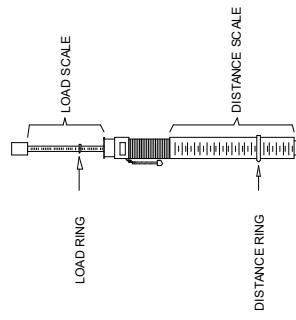
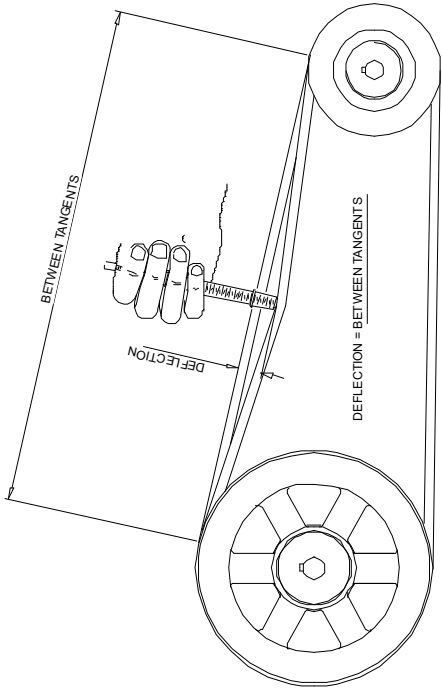
COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 06



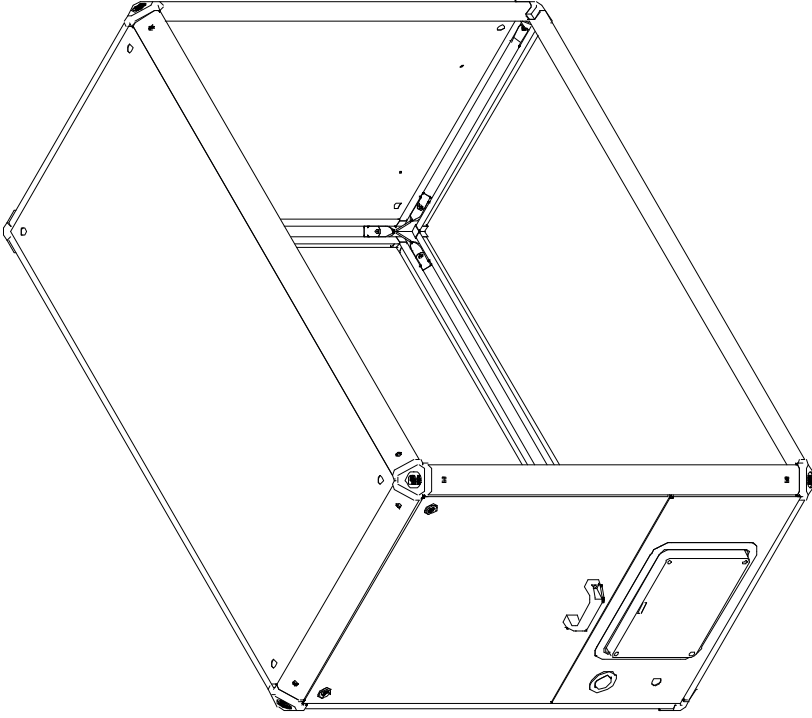
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

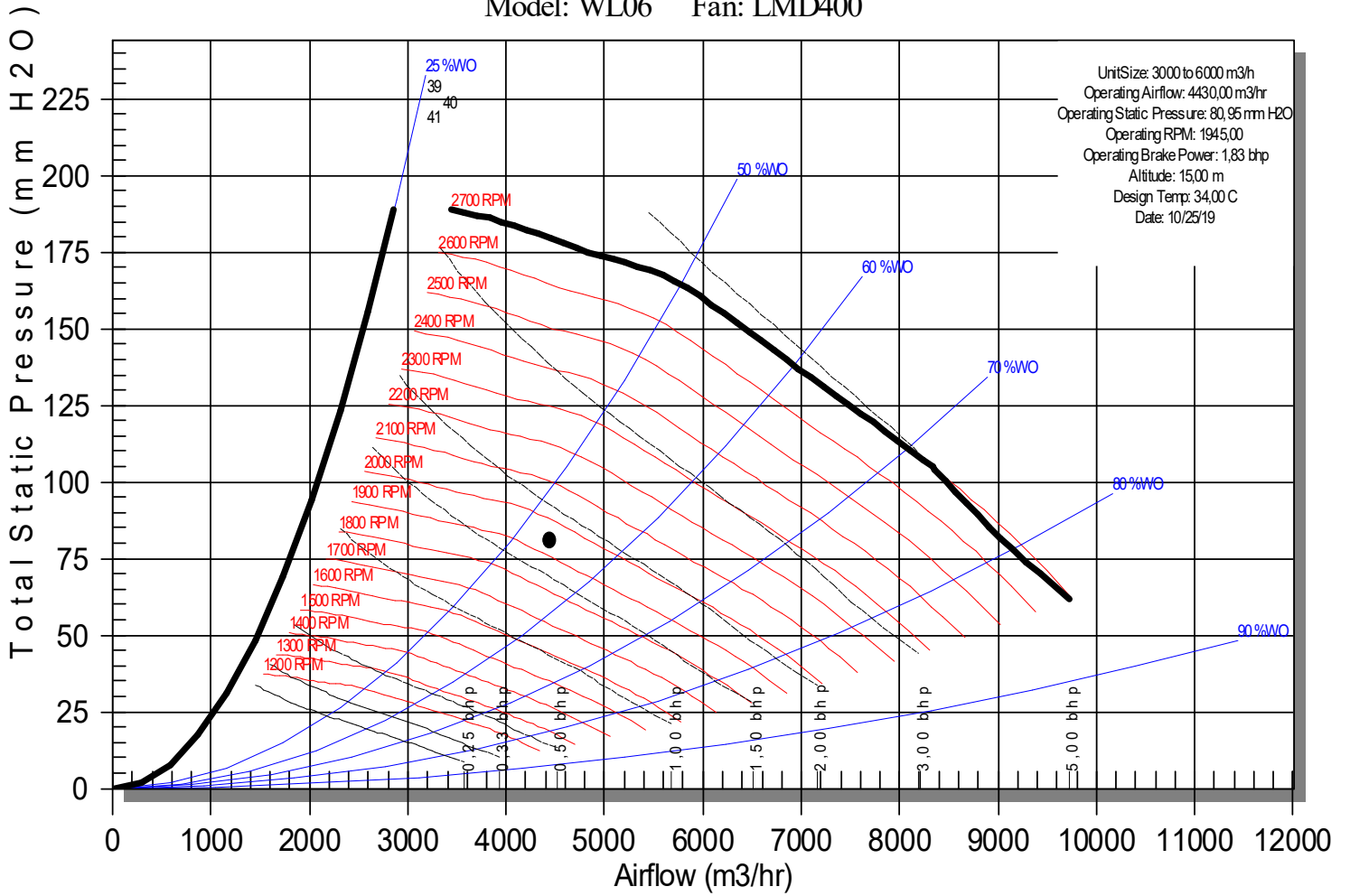
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-42

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-43
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA06AGDDK-FH00Y10A6BWB AH00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,00 mm H2O
Mixing Box Air Pressure Drop	3,20 mm H2O	Filter Air Pressure Drop	31,57 mm H2O

Coil			
Cooling Entering Dry Bulb	24,4 C	Cooling Entering Wet Bulb	18,3 C
Cooling Leaving Dry Bulb	12,0 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,55 m3/hr
Cooling Capacity	31,83 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 4.5 kw
Heating Capacity	9,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	12,0 C	Cooling Airflow	5250,00 m3/hr
Sensible Capacity	22,32 kW	Cooling Leaving Wet Bulb	11,8 C
Cooling Water Volume	12,39 L	Cooling Water Velocity	0,8 m/s
Cooling Water Pressure Drop	1183,18 mm H2O	Cooling Air Pressure Drop	16,84 mm H2O
Cooling Coil Wet Weight	192 kg	Actual Cooling Face Velocity	2,7 m/s
Electric Heat PD	4,93 mm H2O		

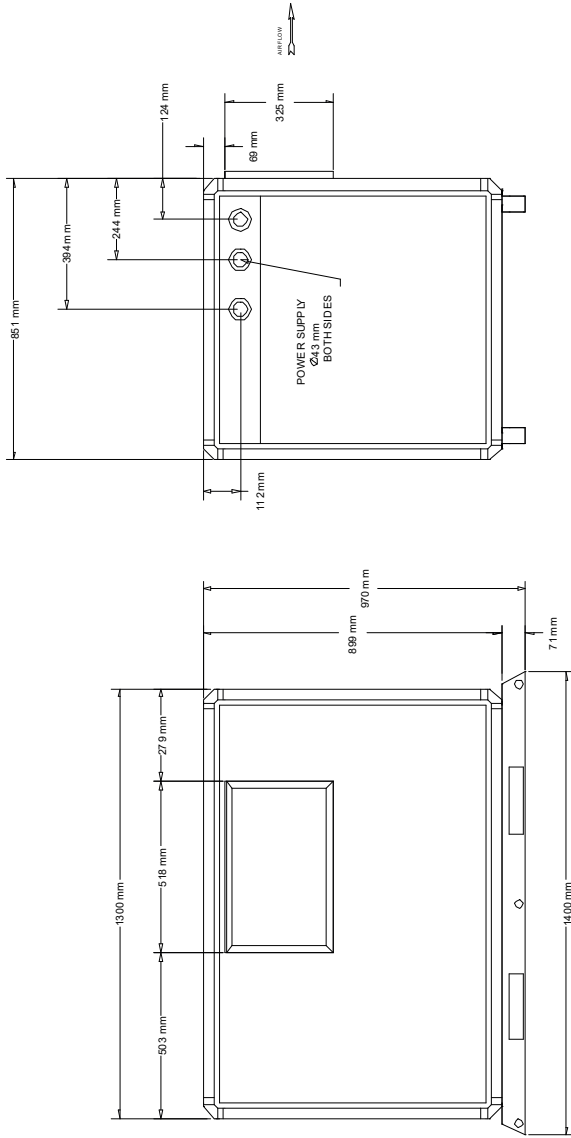
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	96,54 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,62 bhp
Fan RPM	2153 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	10,8 m/s	Velocity Pressure	69,6 Pa

Humidifier	
Humidification	w/o Humidification /

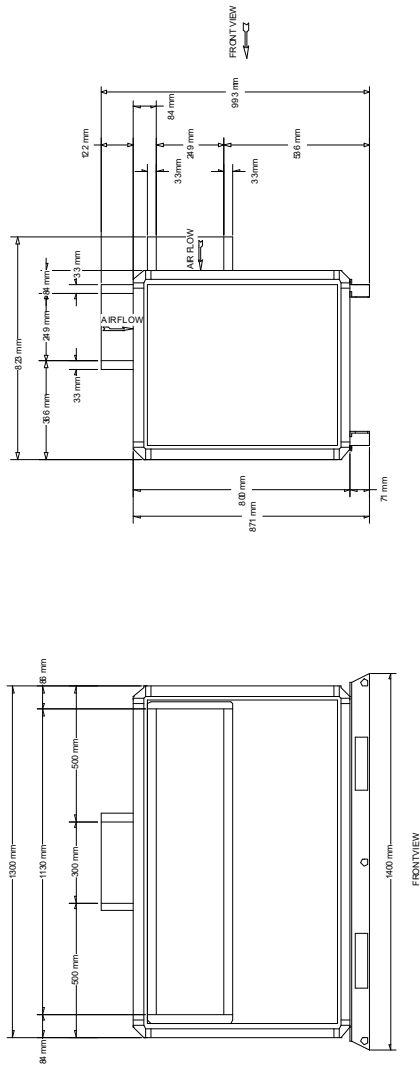


Not Applicable

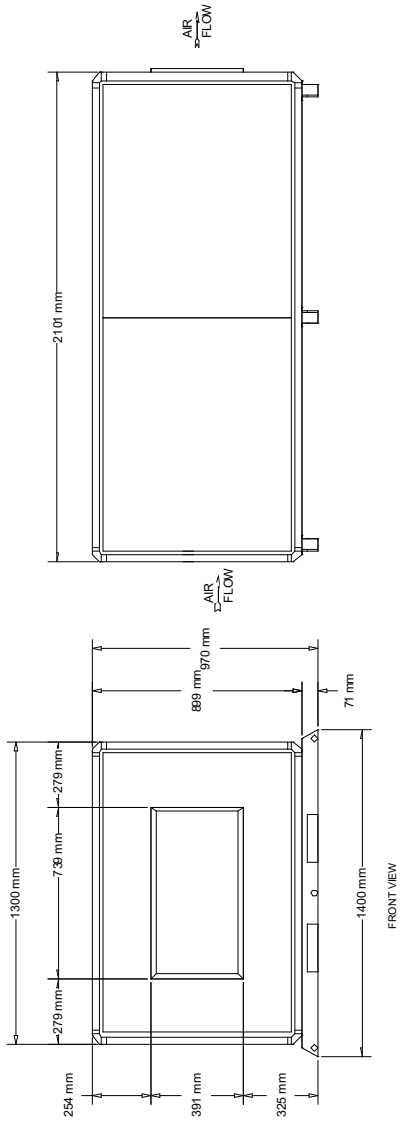
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



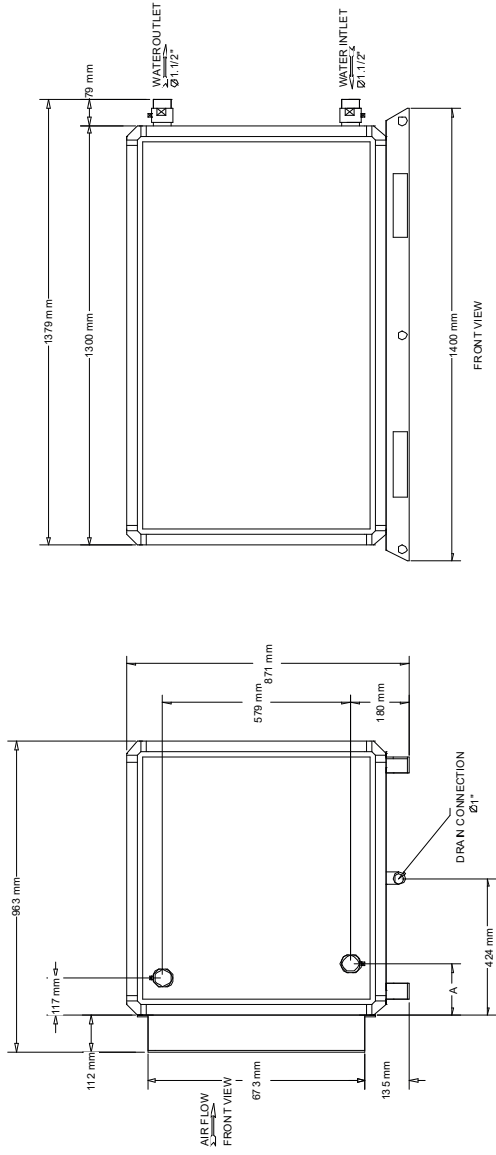
FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06



MIXER BOX SECTION
WAVE DOBLE 06

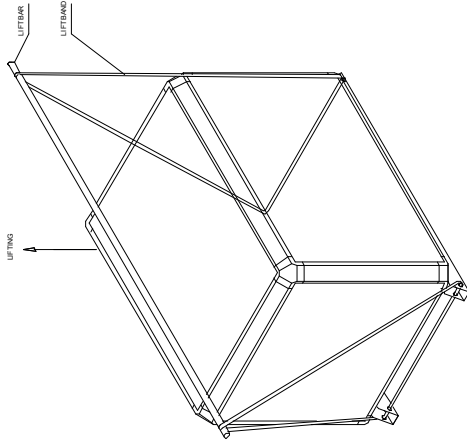


FINAL FILTER MODULE (LIMIT LOAD)
WAVE DOBLE 06

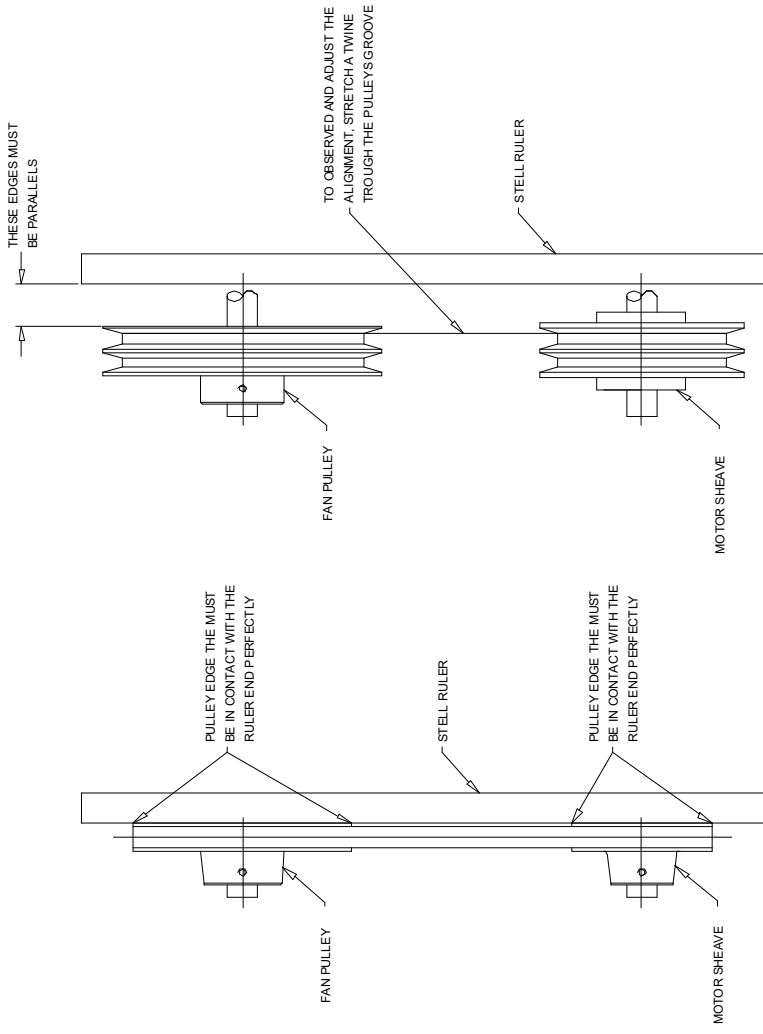


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 06

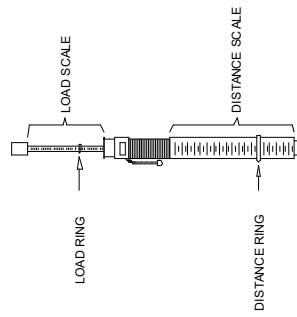
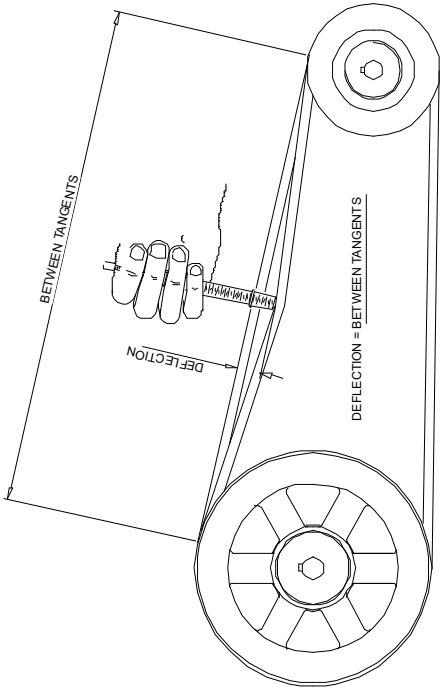
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



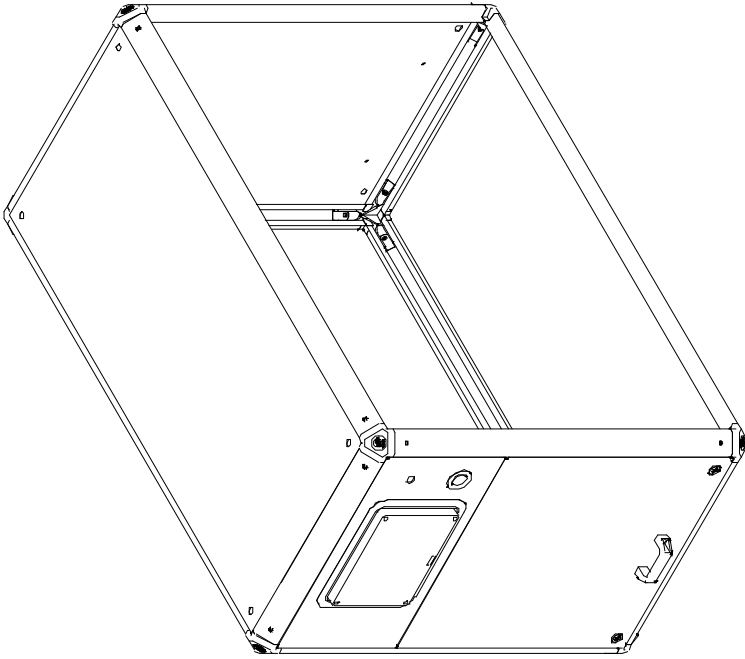
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



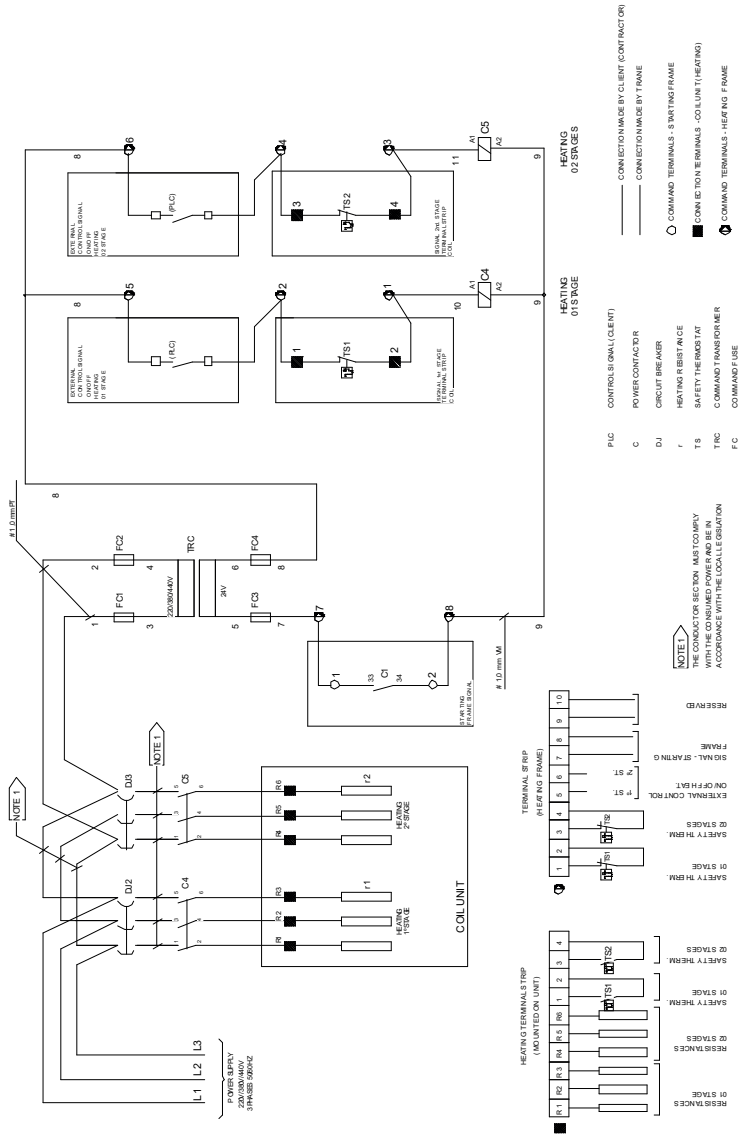
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

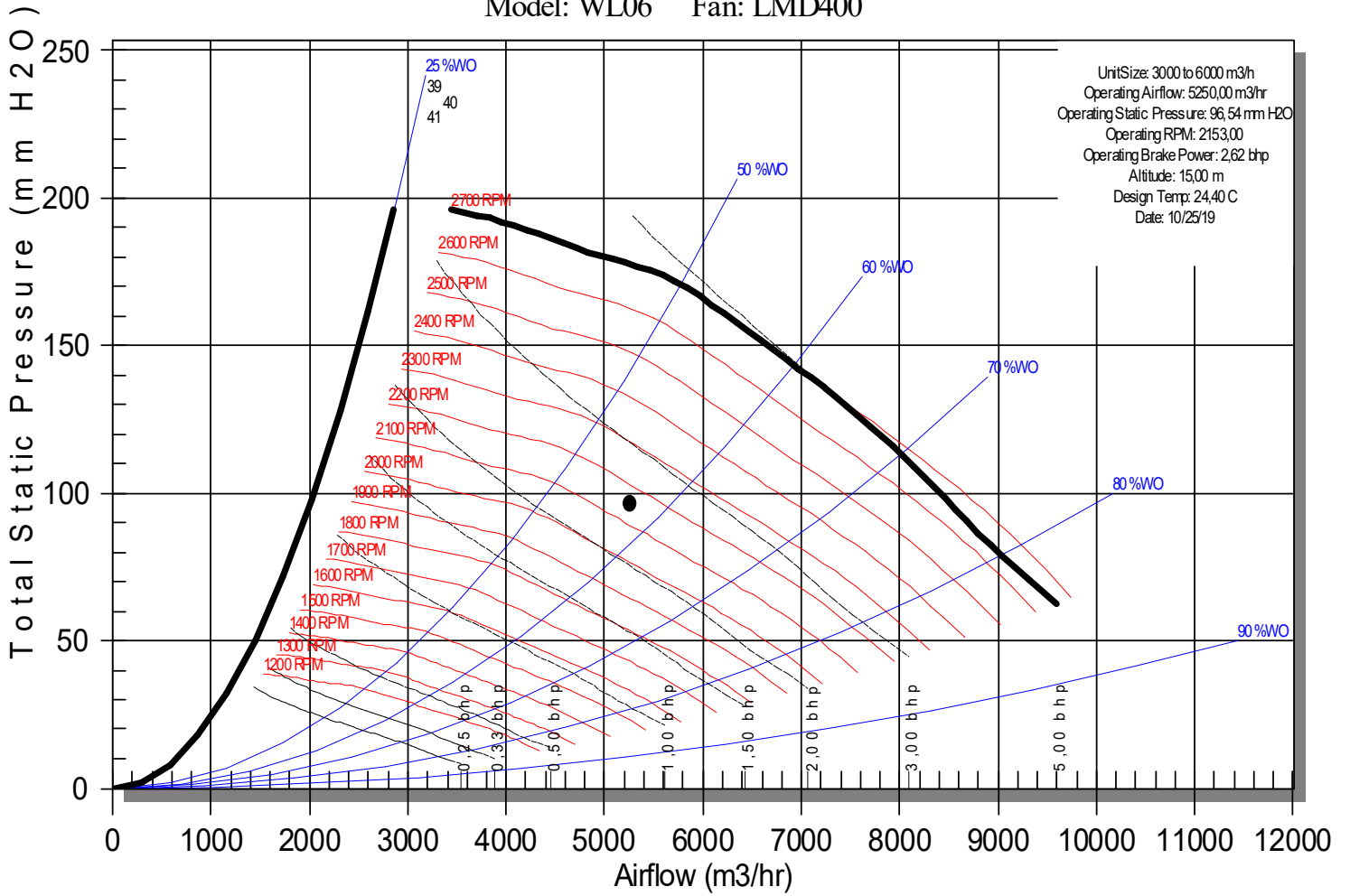
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-43

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-44
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA03AGAEKTC00 Y00B6A2BA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1500 to 3000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,32 mm H2O
Mixing Box Air Pressure Drop	1,72 mm H2O	Filter Air Pressure Drop	16,27 mm H2O

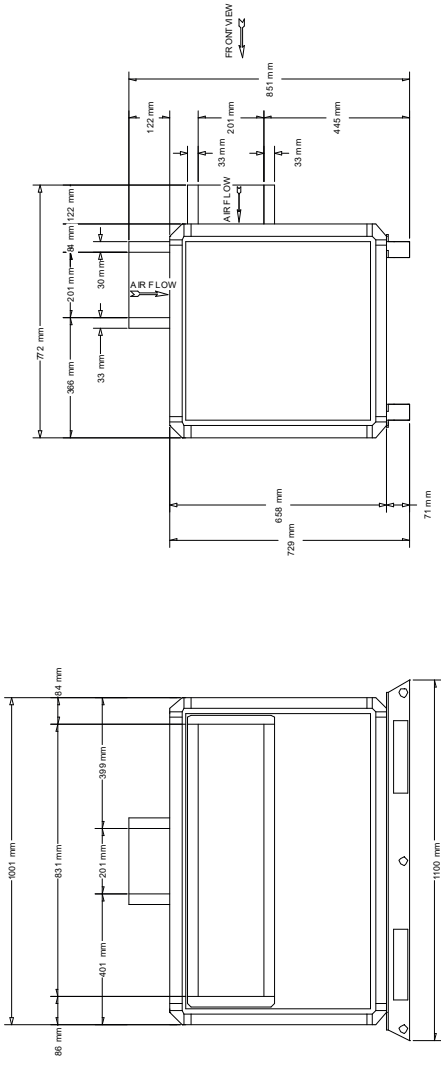
Coil			
Cooling Entering Dry Bulb	26,4 C	Cooling Entering Wet Bulb	20,0 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,19 m3/hr
Cooling Capacity	15,33 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	2050,00 m3/hr	Sensible Capacity	9,81 kW
Cooling Leaving Wet Bulb	12,3 C	Cooling Water Volume	8,92 L
Cooling Water Velocity	0,6 m/s	Cooling Water Pressure Drop	672,08 mm H2O
Cooling Air Pressure Drop	11,73 mm H2O	Cooling Coil Wet Weight	152 kg
Actual Cooling Face Velocity	2,0 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	67,05 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,86 bhp
Fan RPM	3195 rpm	Transmission Option	D
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	8,5 m/s	Velocity Pressure	43,6 Pa

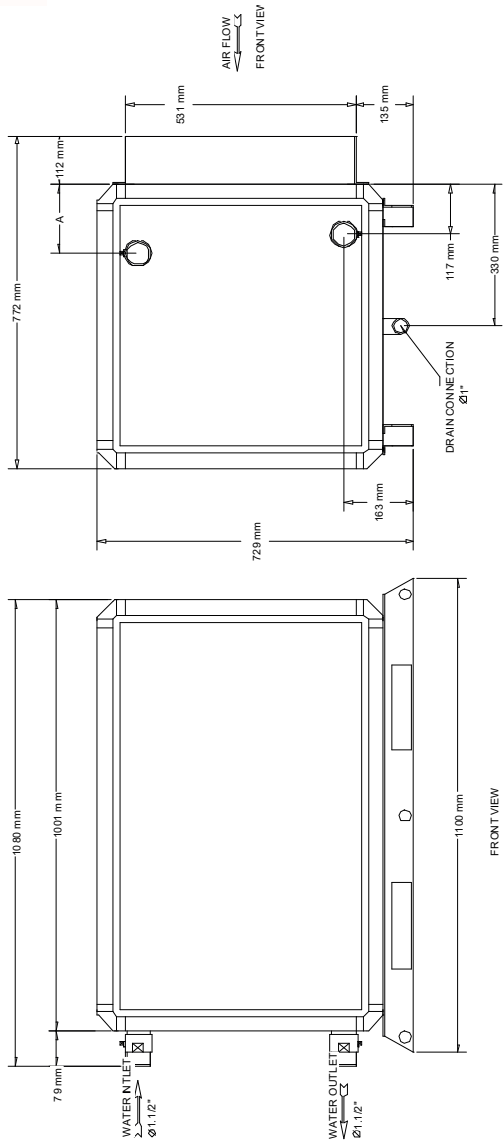
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		

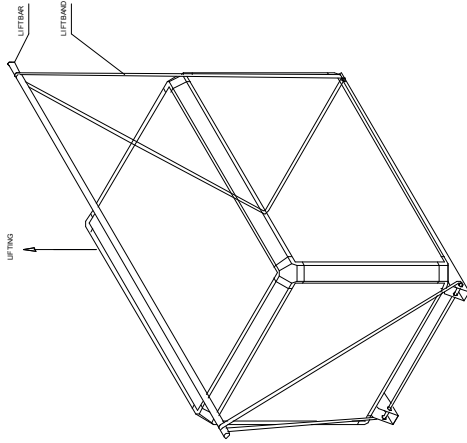


MIXER BOX SECTION
WAVE DOBLE 03

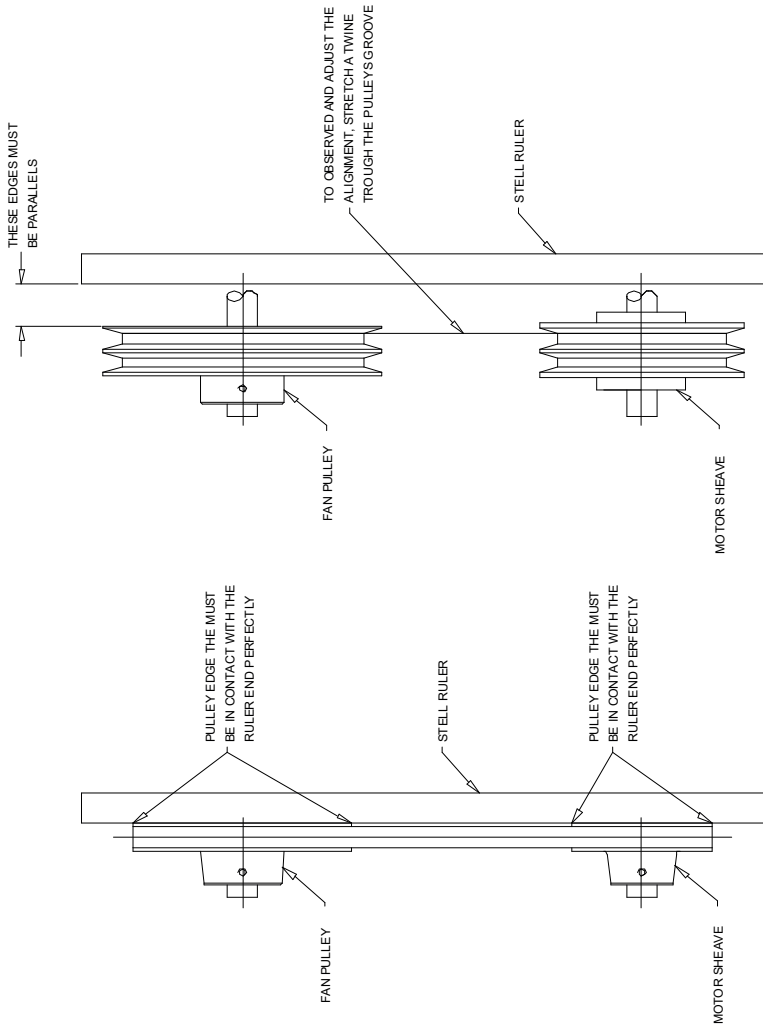


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

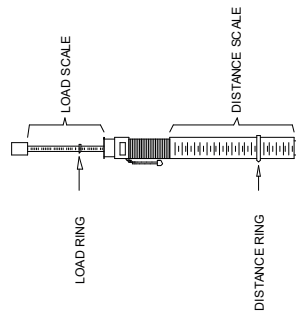
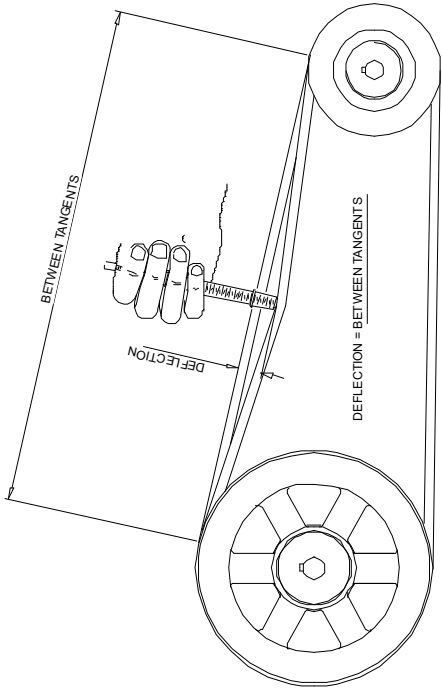
COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 03



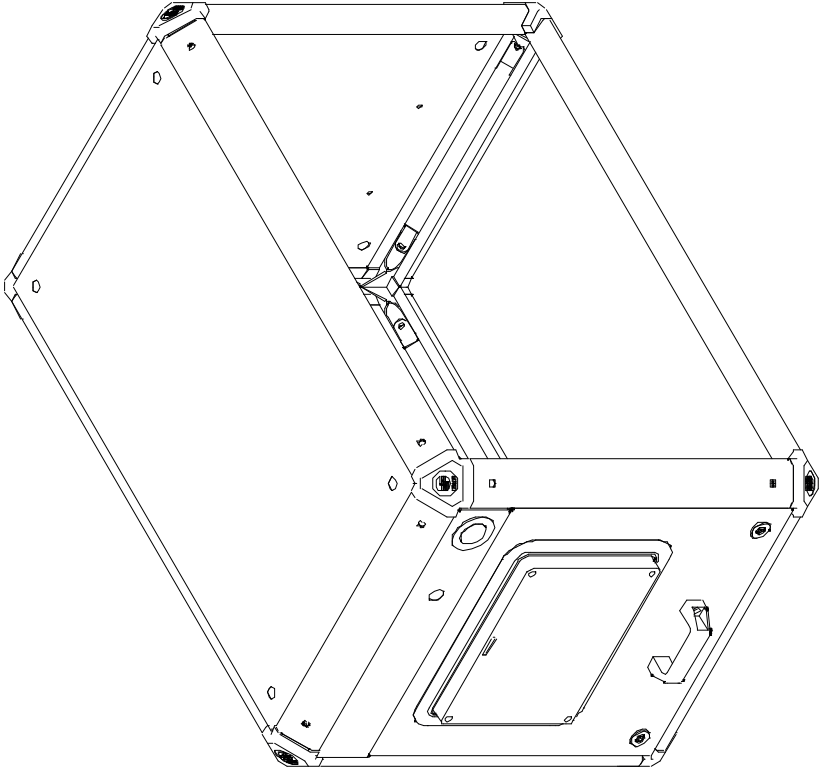
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

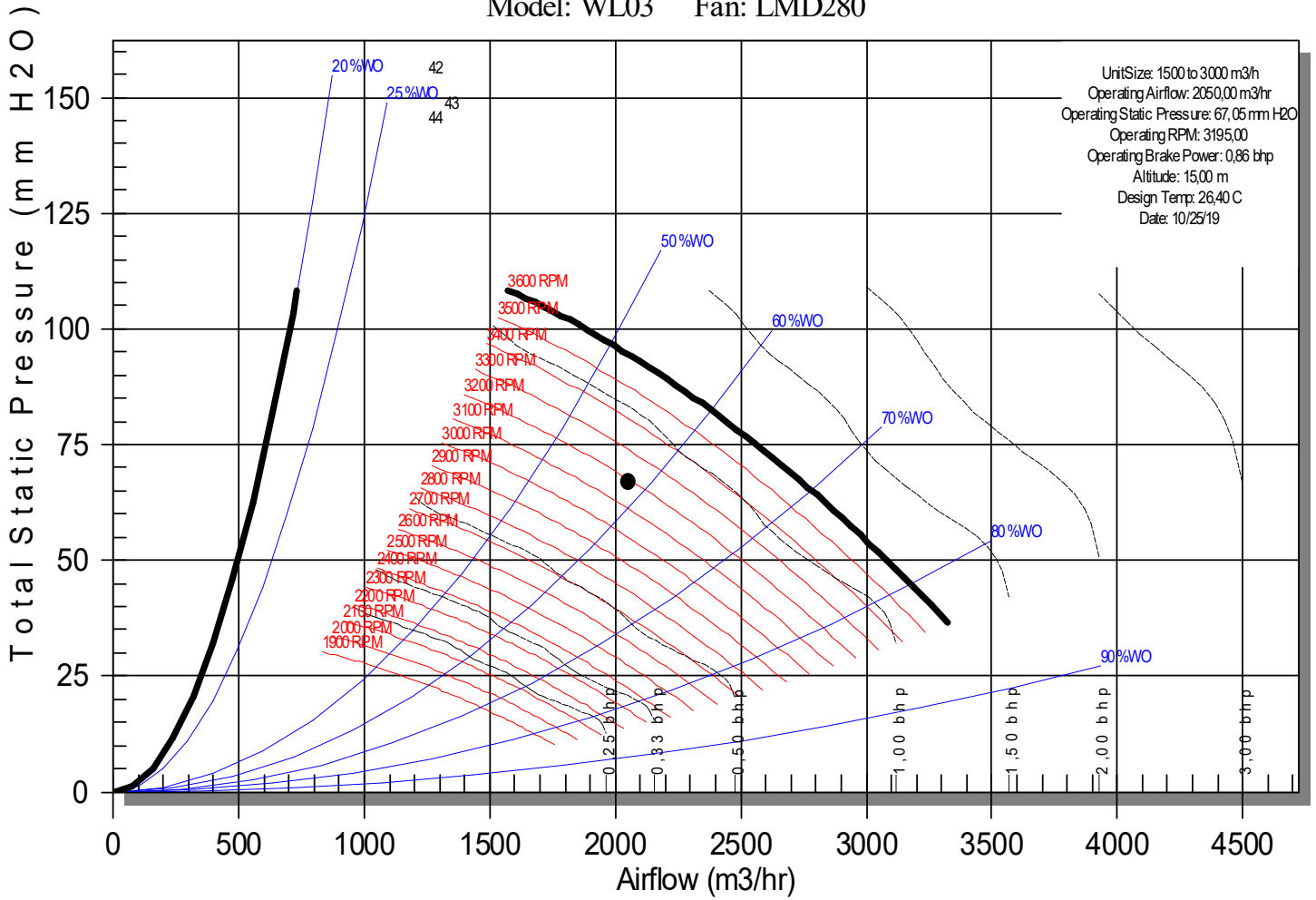
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-44

Model: WL03 Fan: LMD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-45A
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGADKTFD0 0Y00B6AWBAY00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,73 mm H2O
Mixing Box Air Pressure Drop	2,07 mm H2O	Filter Air Pressure Drop	20,88 mm H2O

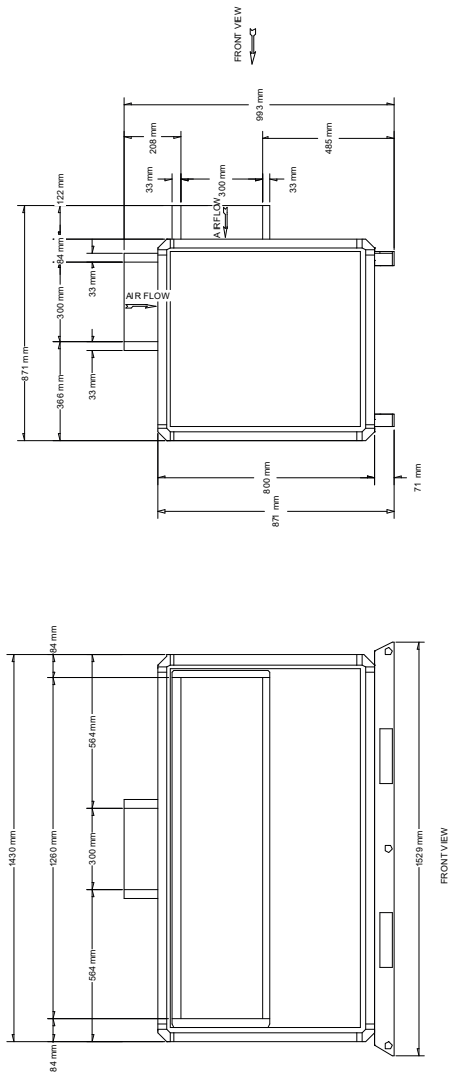
Coil			
Cooling Entering Dry Bulb	22,0 C	Cooling Entering Wet Bulb	15,4 C
Cooling Leaving Dry Bulb	11,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,93 m3/hr
Cooling Capacity	20,49 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 6 kw
Heating Capacity	10,50 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	11,6 C	Cooling Airflow	5820,00 m3/hr
Sensible Capacity	19,97 kW	Cooling Leaving Wet Bulb	11,3 C
Cooling Water Volume	21,28 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	230,23 mm H2O	Cooling Air Pressure Drop	9,92 mm H2O
Cooling Coil Wet Weight	221 kg	Actual Cooling Face Velocity	2,2 m/s
Electric Heat PD	2,96 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	74,57 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,38 bhp
Fan RPM	2084 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,6 m/s	Velocity Pressure	44,7 Pa

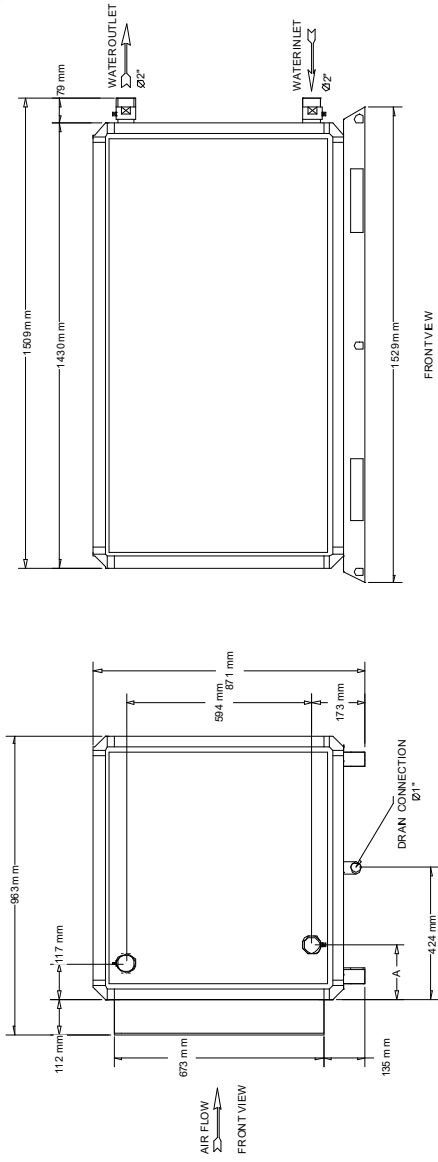
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

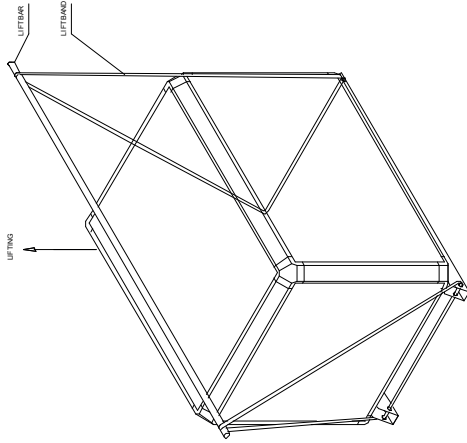


MIXER BOX SECTION
WAVE DOBLE 08

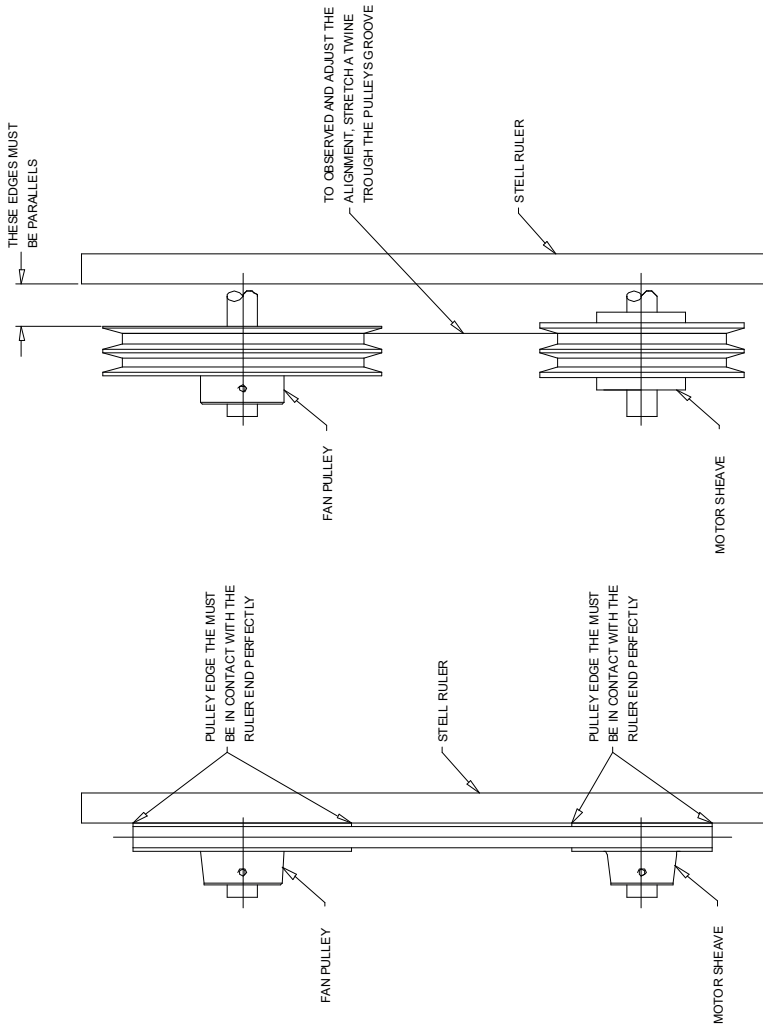


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 08

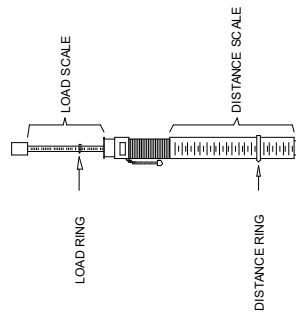
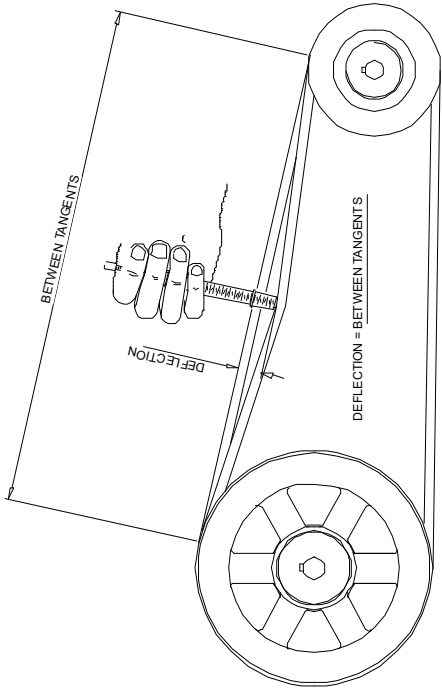
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



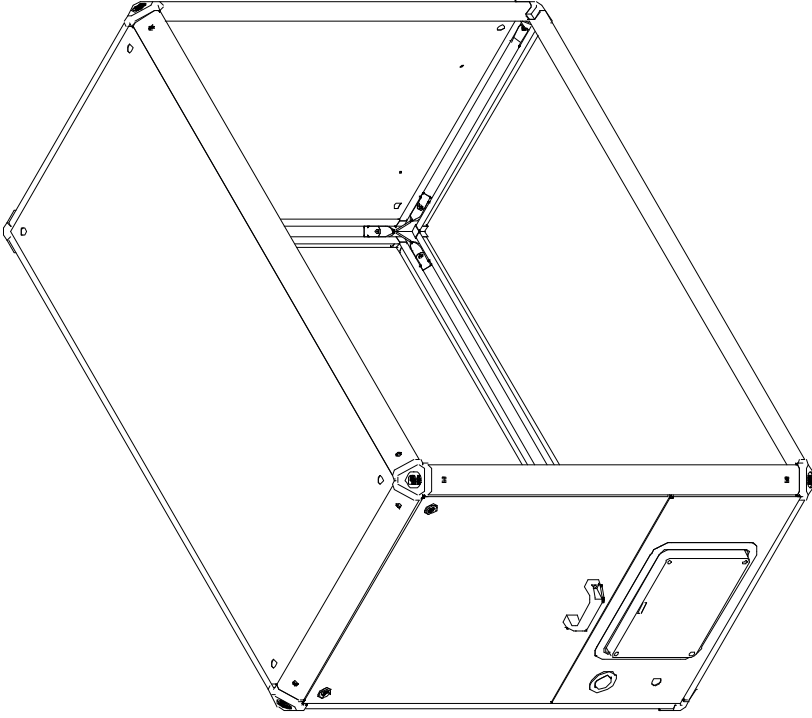
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



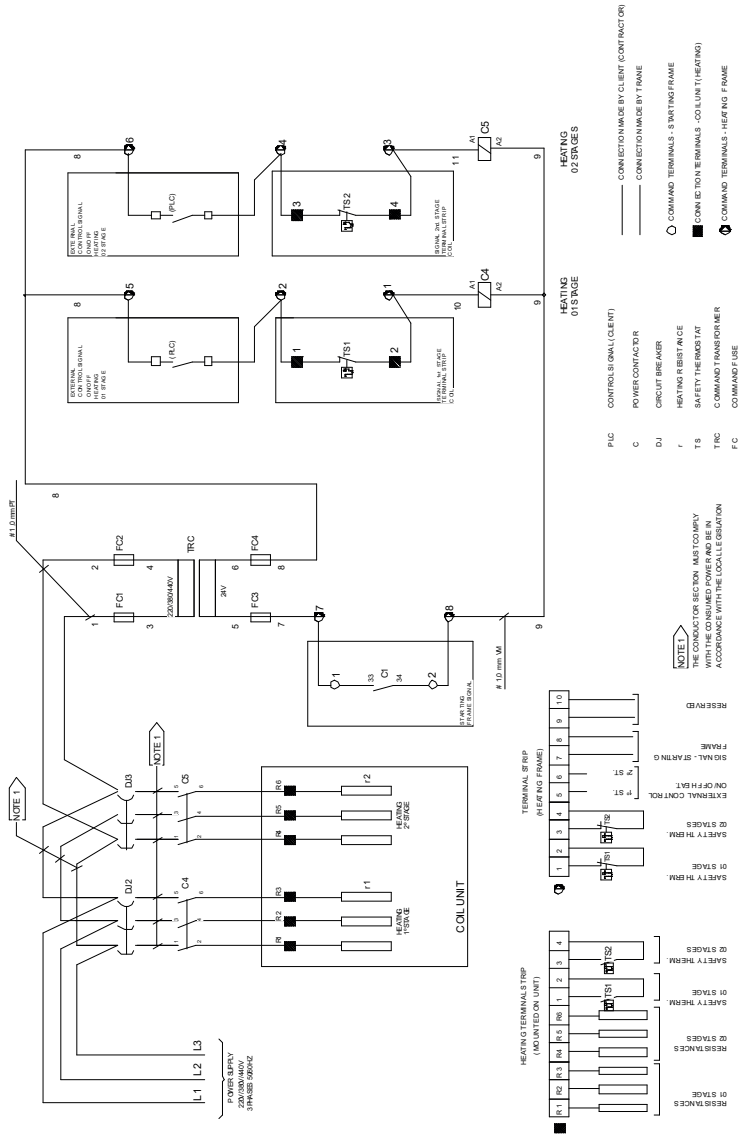
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

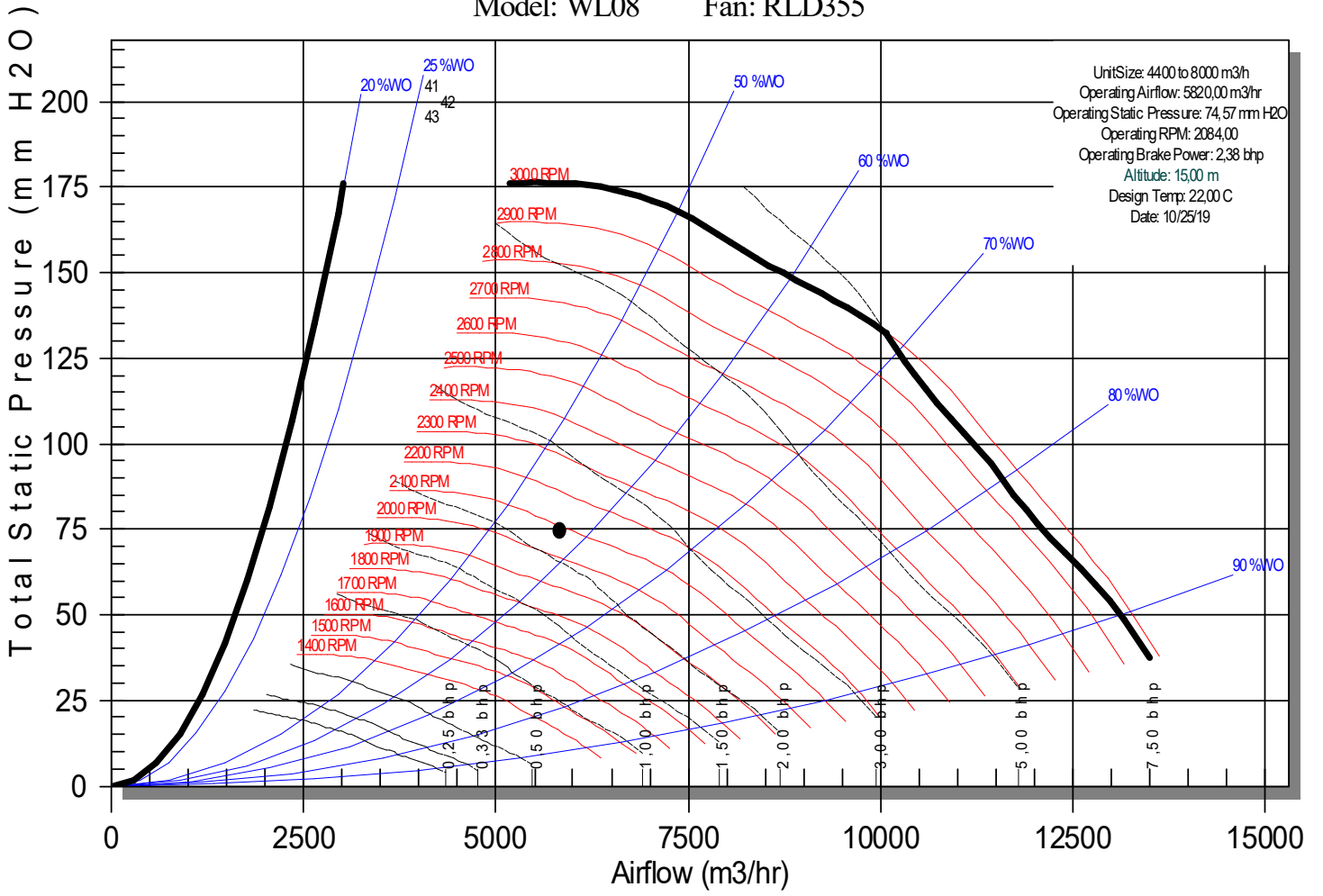
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-45A

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-45B
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGAEKTFD00 Y00B6AWBAY001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,73 mm H2O
Mixing Box Air Pressure Drop	2,07 mm H2O	Filter Air Pressure Drop	20,88 mm H2O

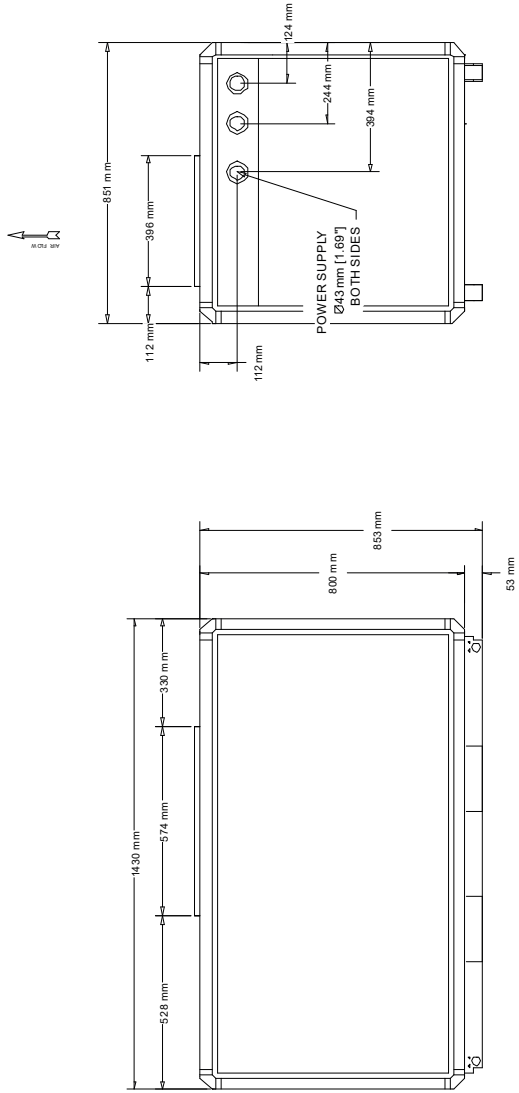
Coil			
Cooling Entering Dry Bulb	22,0 C	Cooling Entering Wet Bulb	15,4 C
Cooling Leaving Dry Bulb	11,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,93 m3/hr
Cooling Capacity	20,49 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 6 kw
Heating Capacity	10,50 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	11,6 C	Cooling Airflow	5820,00 m3/hr
Sensible Capacity	19,97 kW	Cooling Leaving Wet Bulb	11,3 C
Cooling Water Volume	21,28 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	230,23 mm H2O	Cooling Air Pressure Drop	9,92 mm H2O
Cooling Coil Wet Weight	221 kg	Actual Cooling Face Velocity	2,2 m/s
Electric Heat PD	2,96 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	74,57 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,38 bhp
Fan RPM	2084 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,6 m/s	Velocity Pressure	44,7 Pa

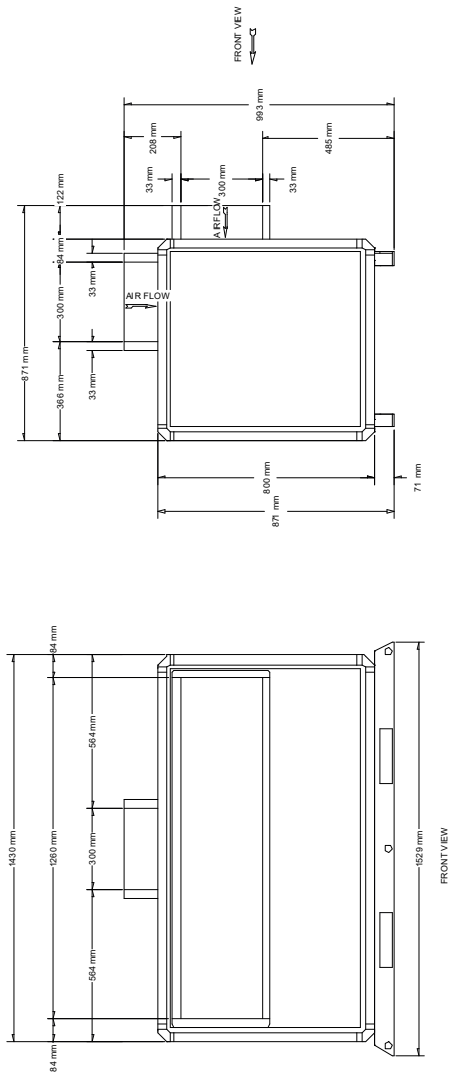
Humidifier	
Humidification	w/o Humidification / Not Applicable



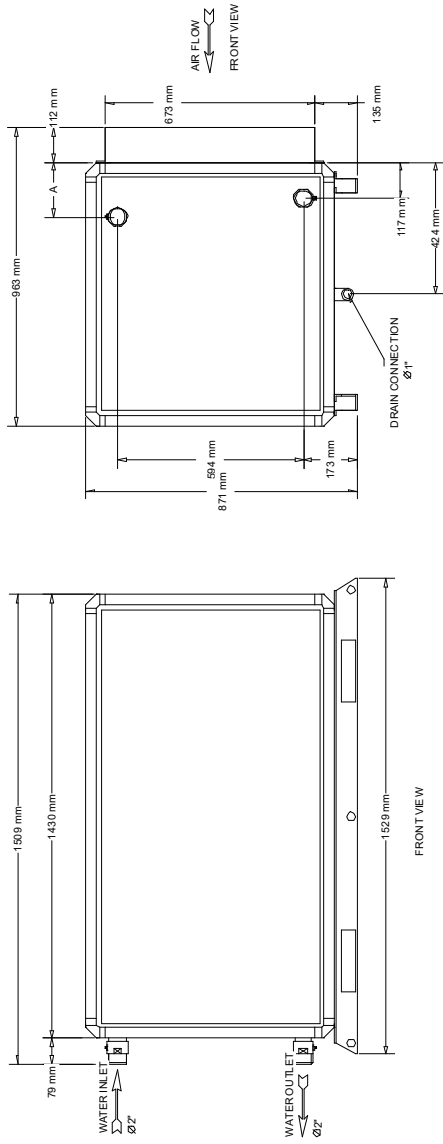
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 08

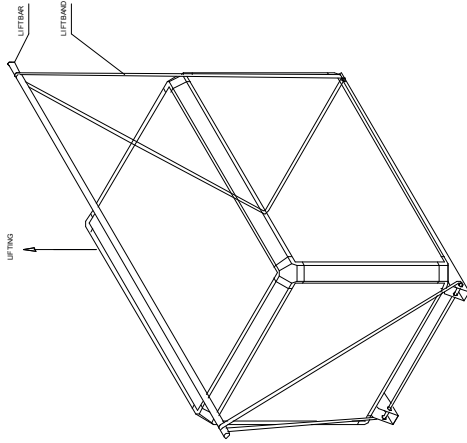


MIXER BOX SECTION
WAVE DOBLE 08

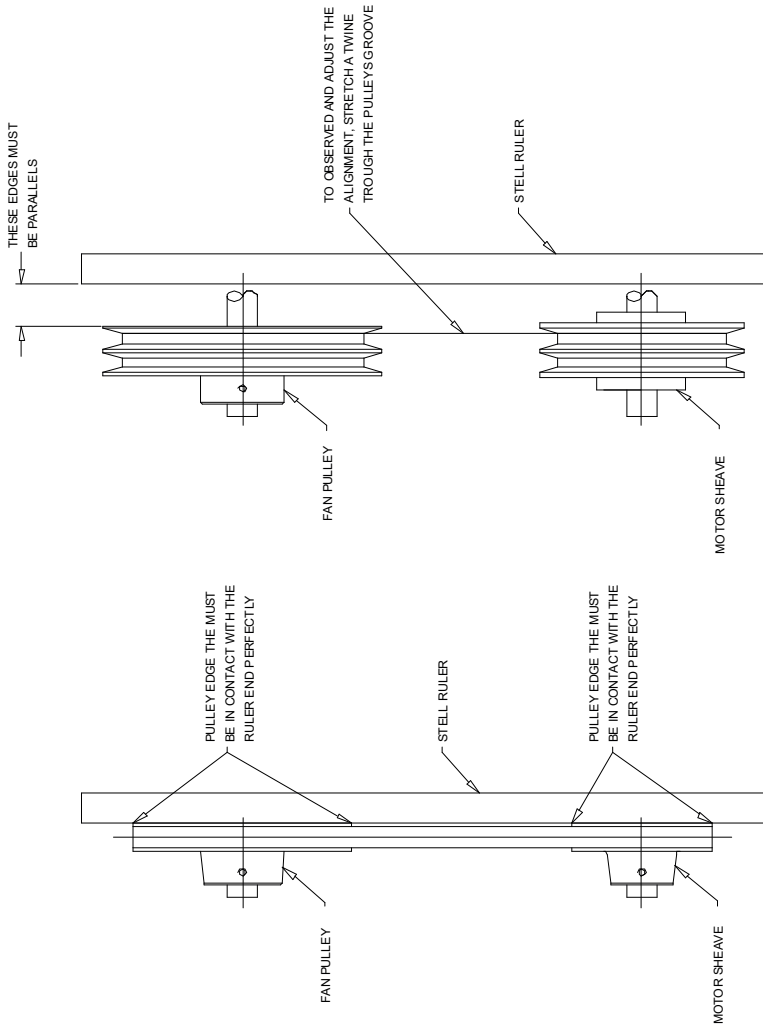


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 08

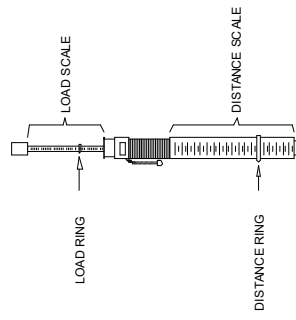
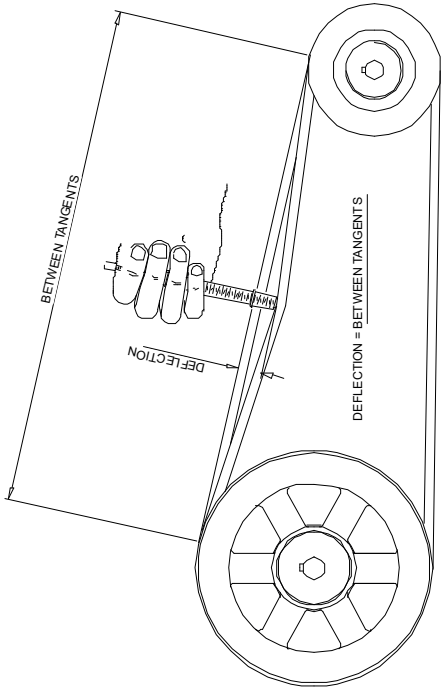
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



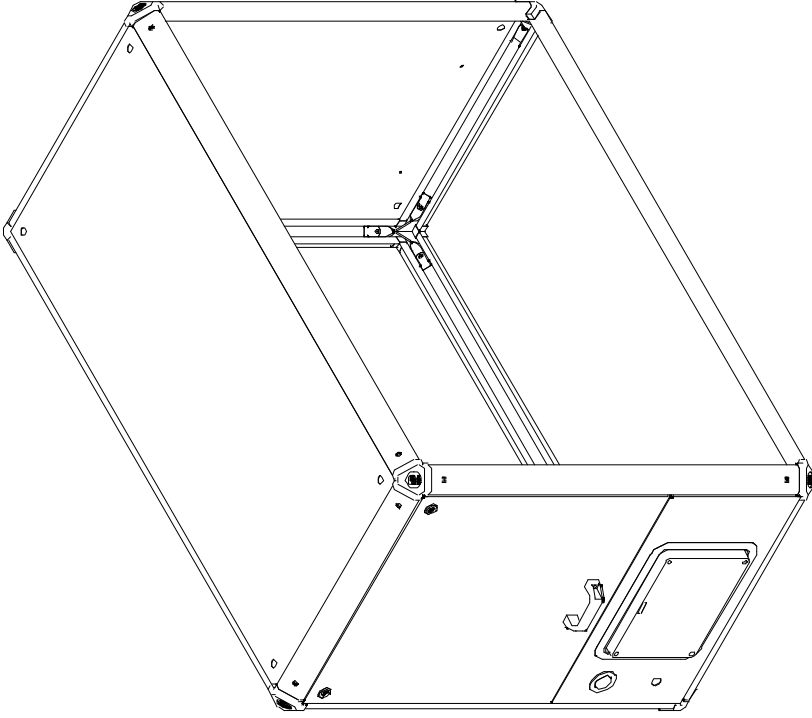
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

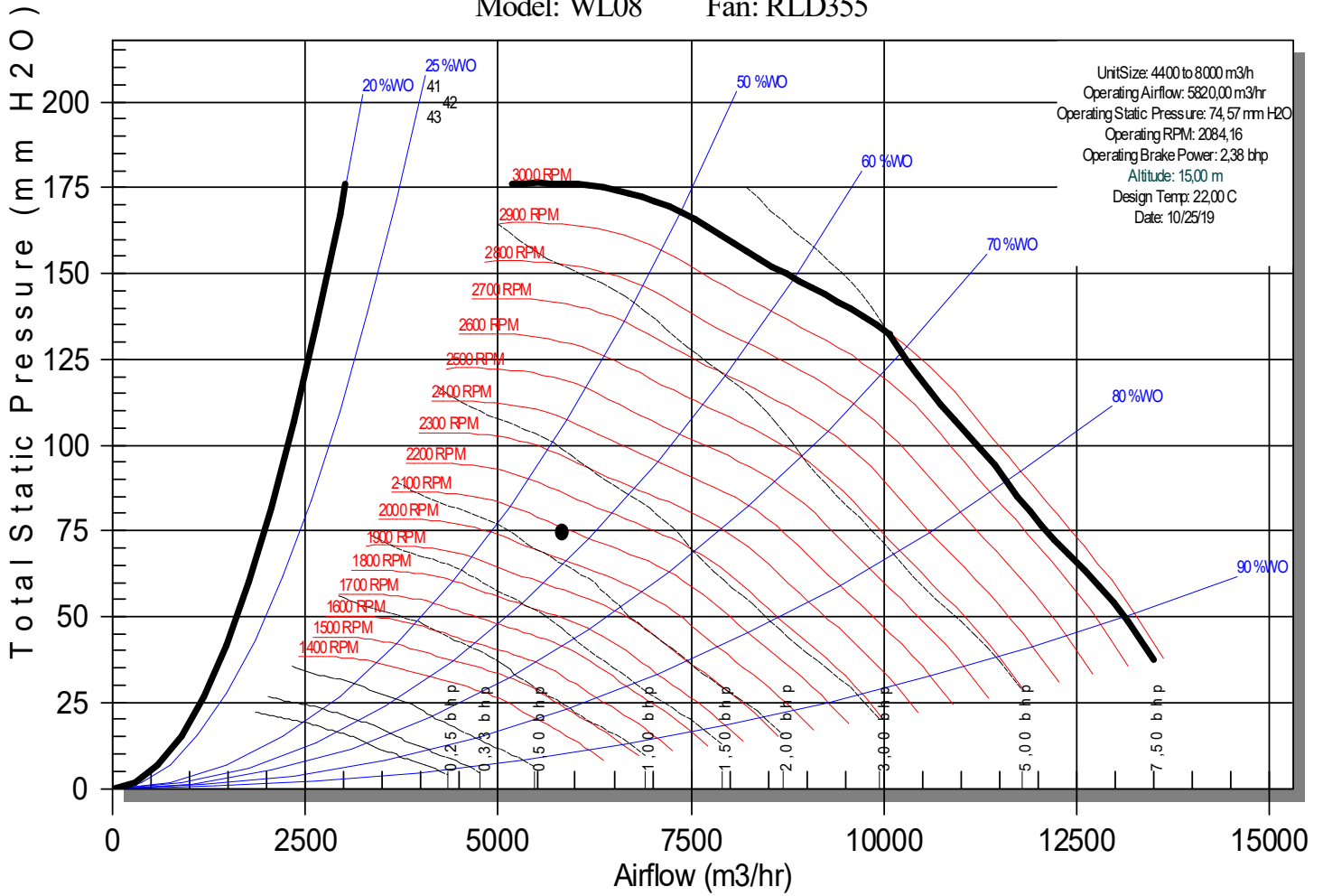
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-45B

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-46
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGAEK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	15,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

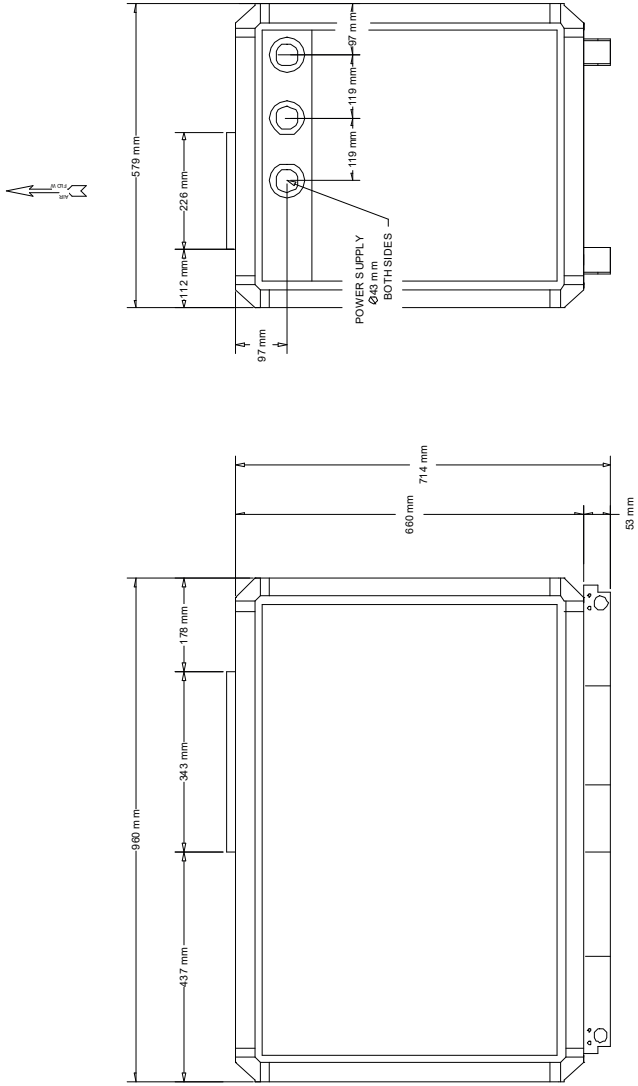
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

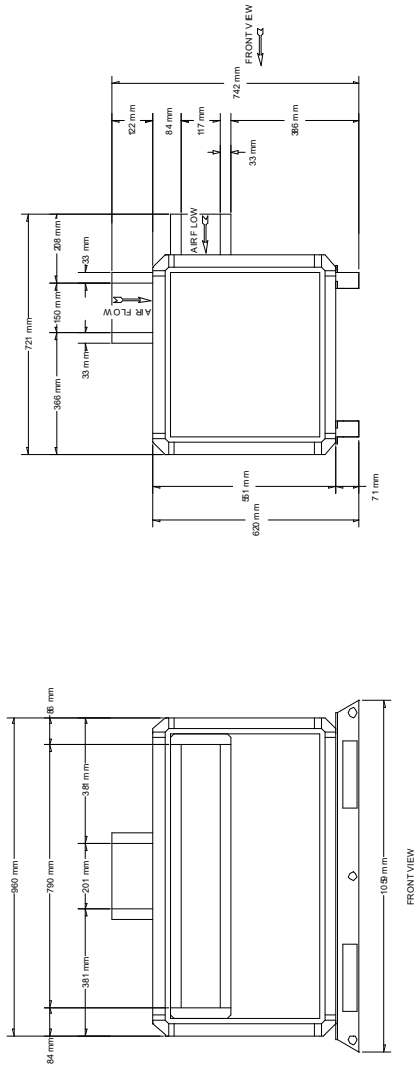


Not Applicable

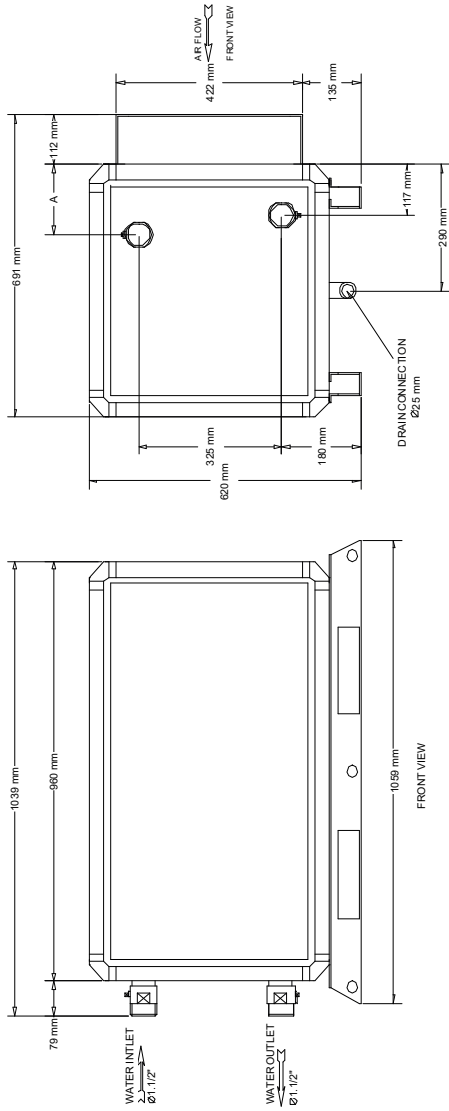
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

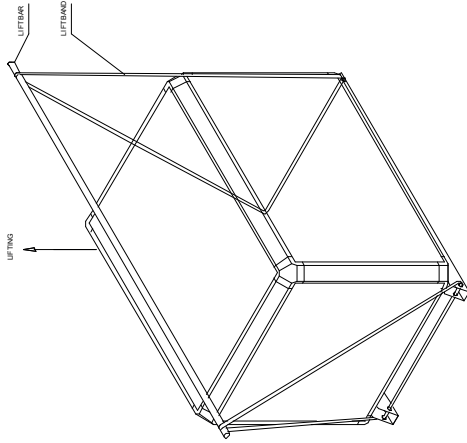


MIXER BOX SECTION
WAVE DOBLE 02

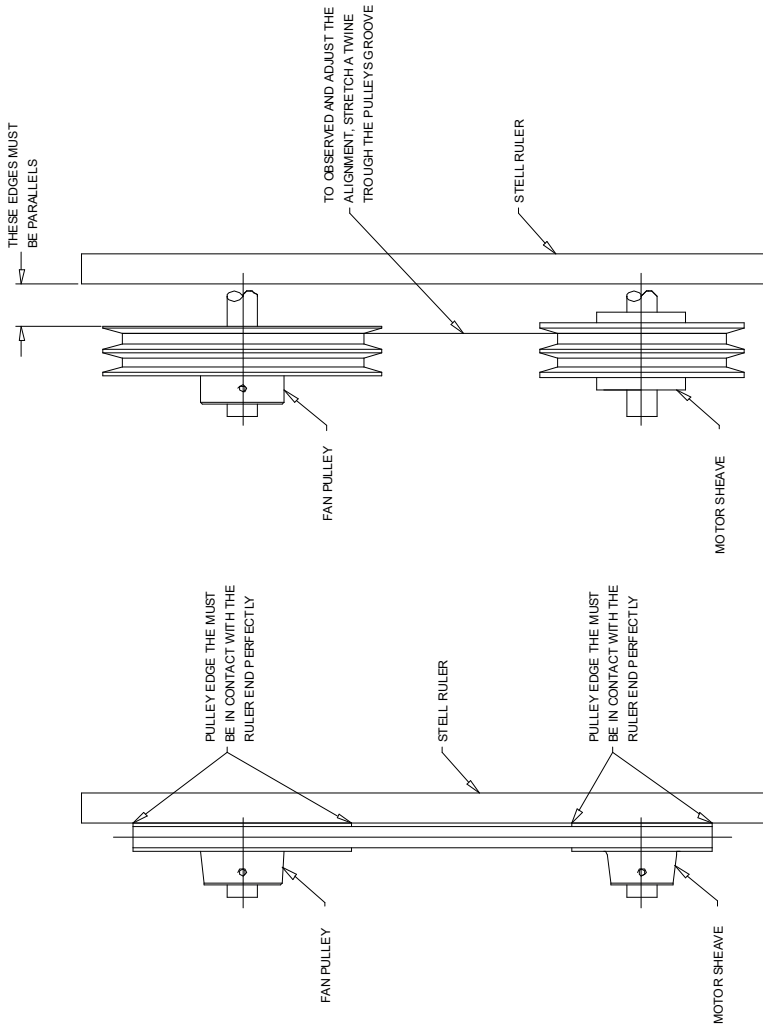


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

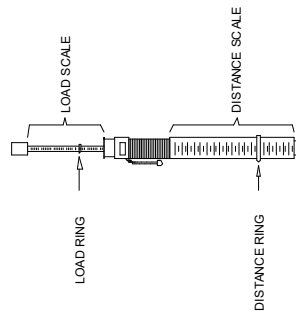
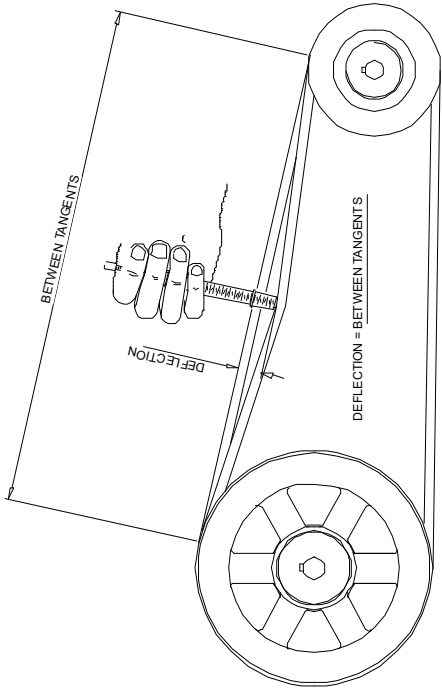
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 02



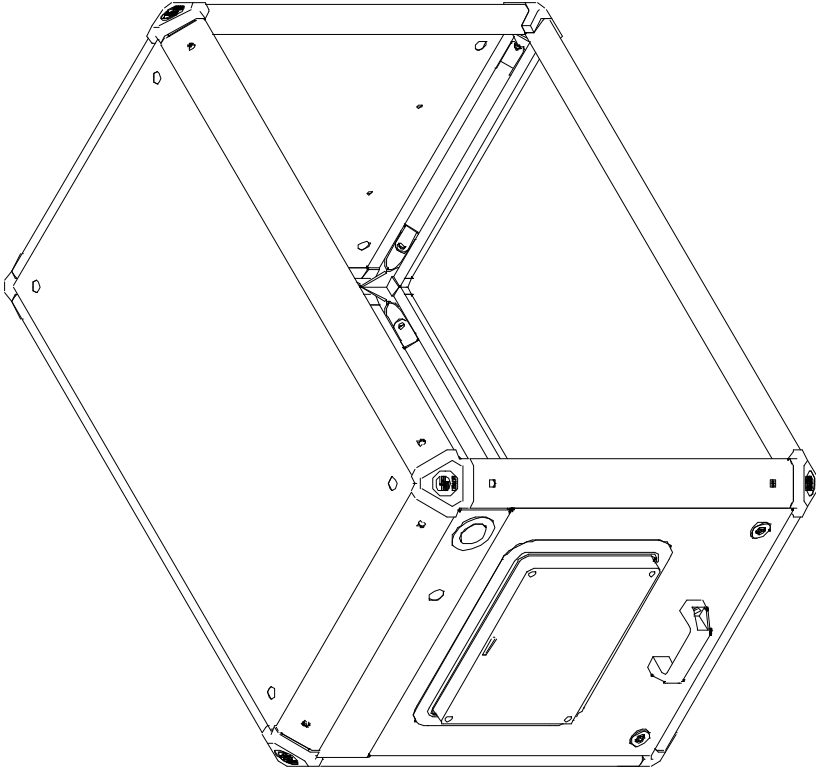
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

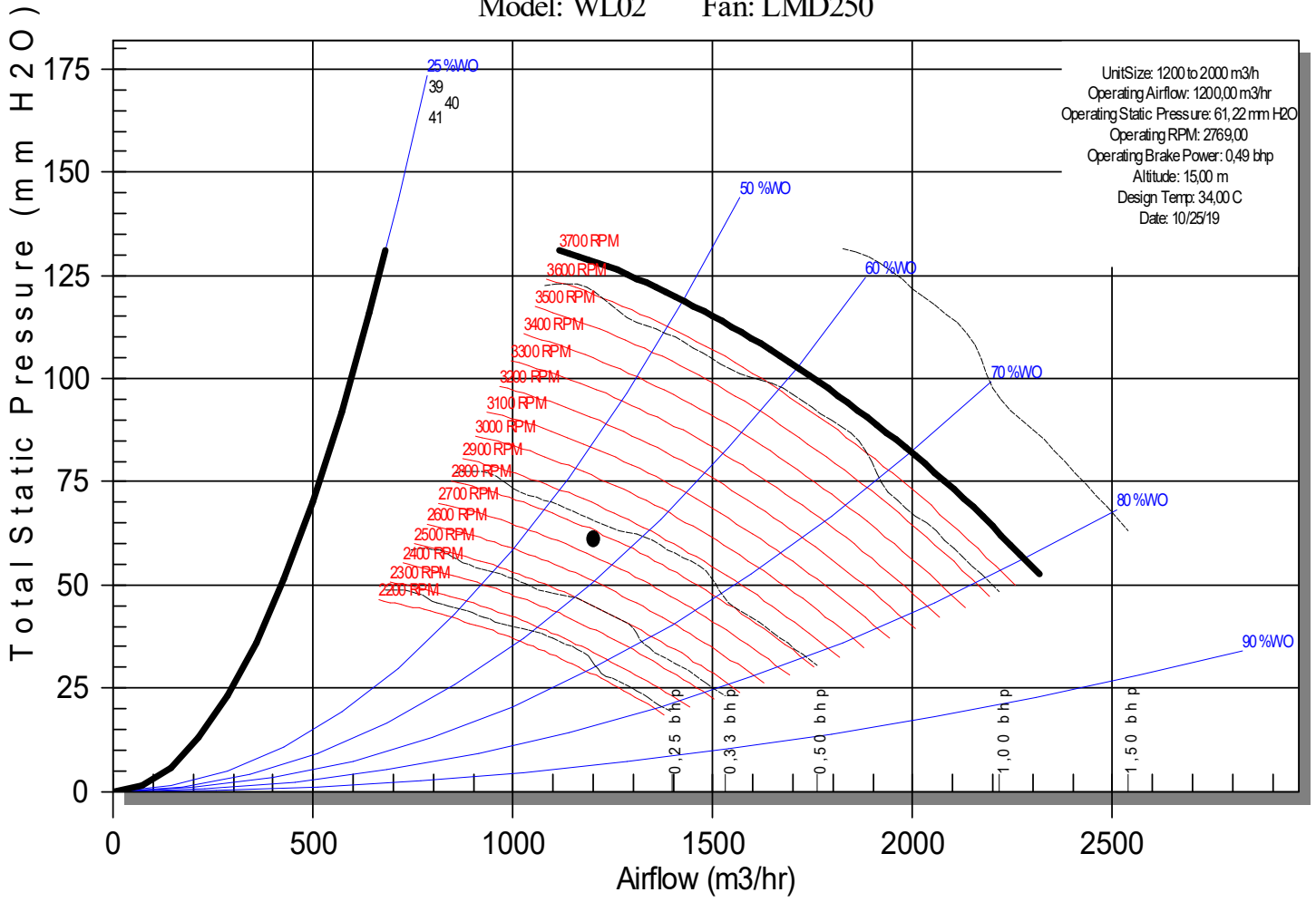
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-46

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-47*
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA03AGAEKTC00 Y00B8B2BA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1500 to 3000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	4,32 mm H2O
Mixing Box Air Pressure Drop	0,73 mm H2O	Filter Air Pressure Drop	8,07 mm H2O

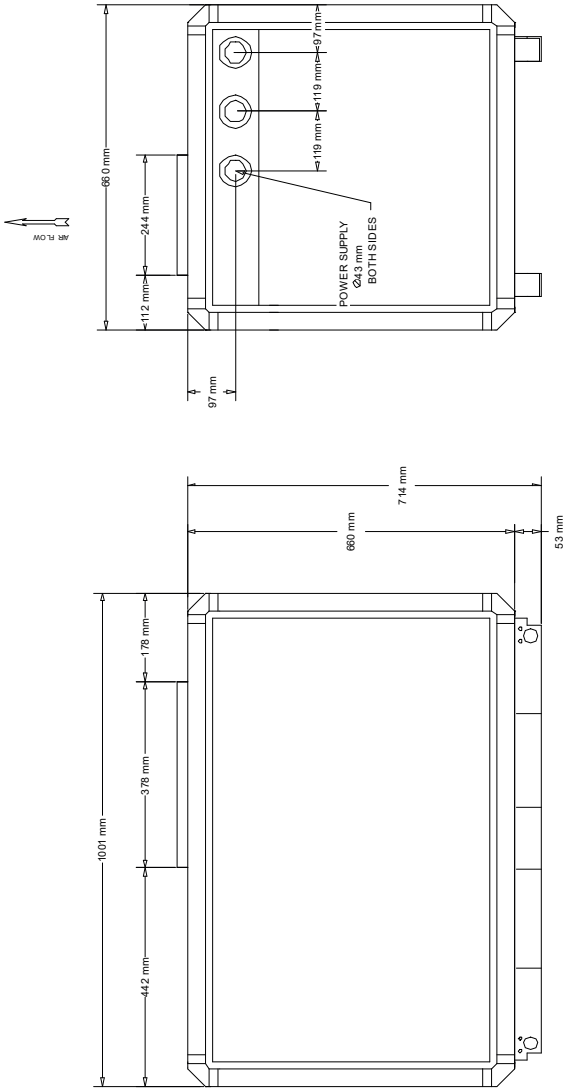
Coil			
Cooling Entering Dry Bulb	25,2 C	Cooling Entering Wet Bulb	19,4 C
Cooling Leaving Dry Bulb	9,0 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,02 m3/hr
Cooling Capacity	14,14 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	1500,00 m3/hr	Sensible Capacity	8,33 kW
Cooling Leaving Wet Bulb	8,9 C	Cooling Water Volume	11,44 L
Cooling Water Velocity	0,6 m/s	Cooling Water Pressure Drop	760,70 mm H2O
Cooling Air Pressure Drop	10,45 mm H2O	Cooling Coil Wet Weight	202 kg
Actual Cooling Face Velocity	1,5 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	53,57 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,50 bhp
Fan RPM	2688 rpm	Transmission Option	D
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,4 Pa

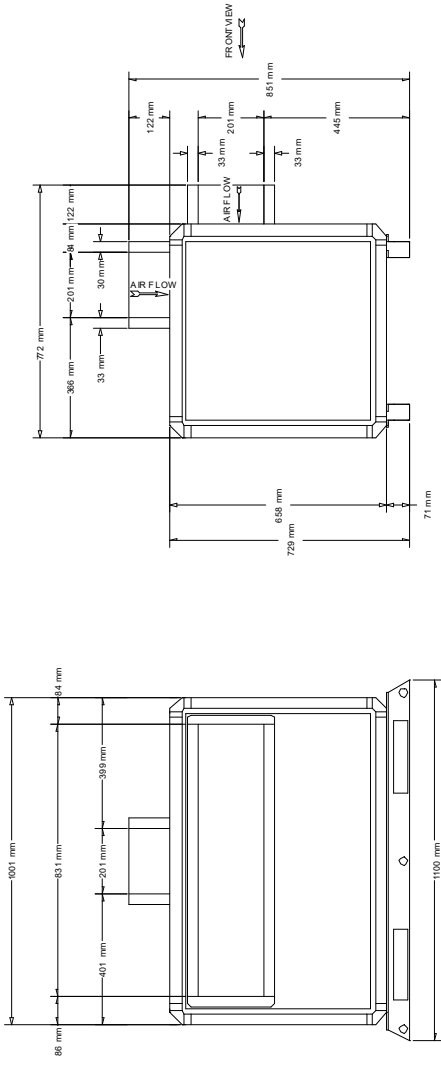
Humidifier	
Humidification	w/o Humidification / Not Applicable



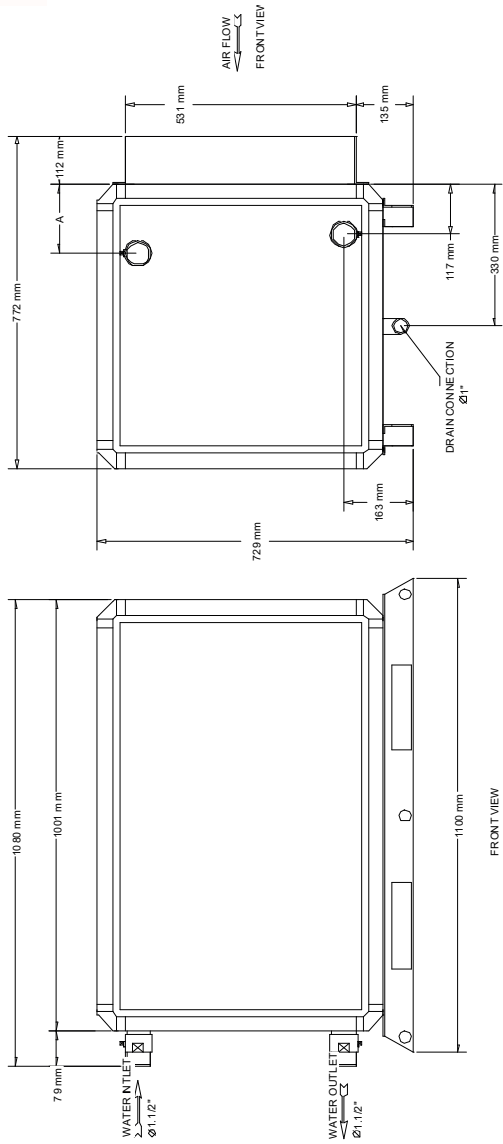
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 03

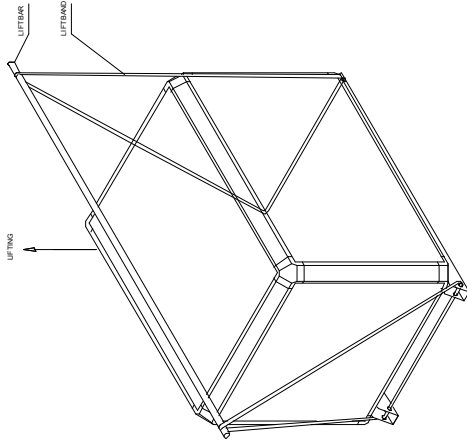


MIXER BOX SECTION
WAVE DOBLE 03

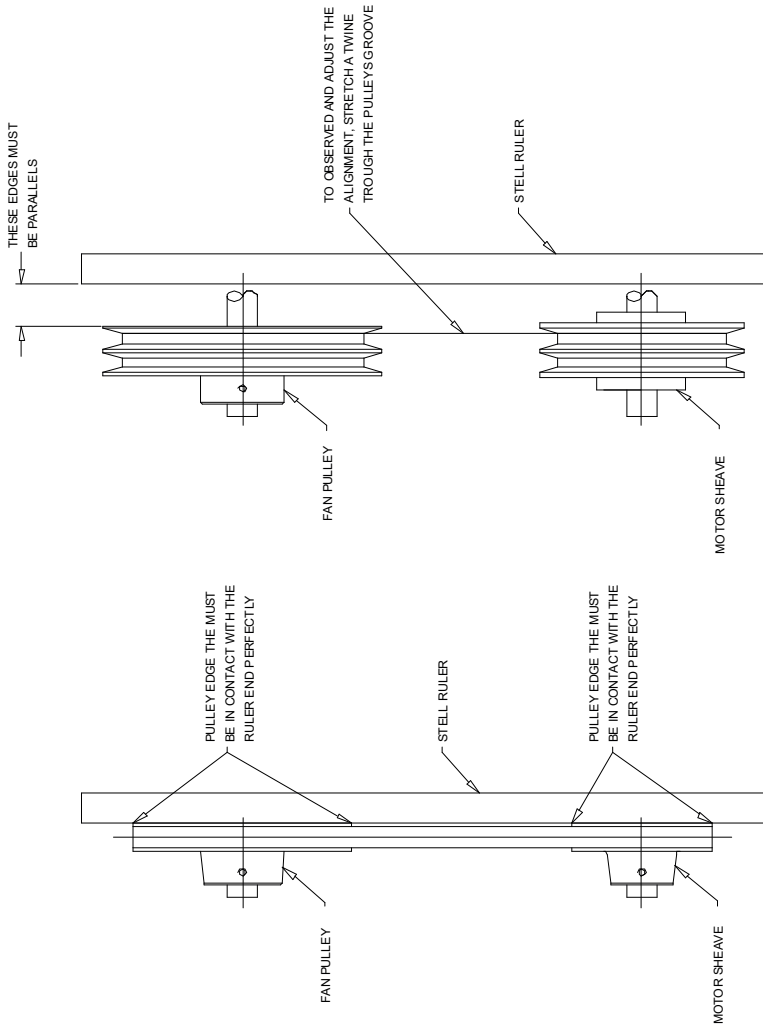


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

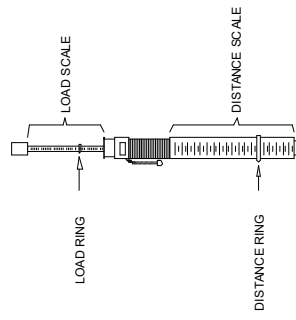
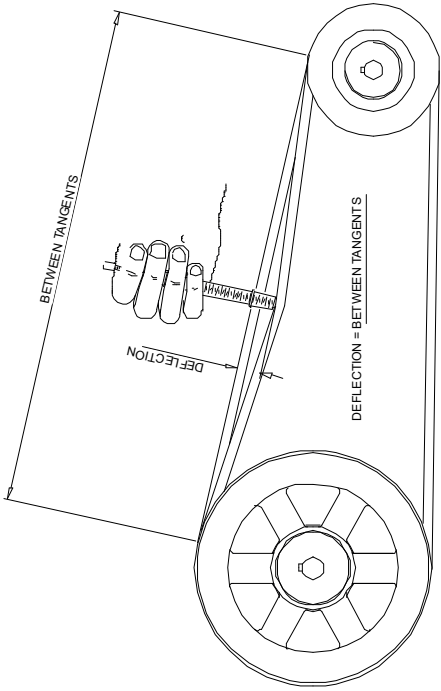
COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 03



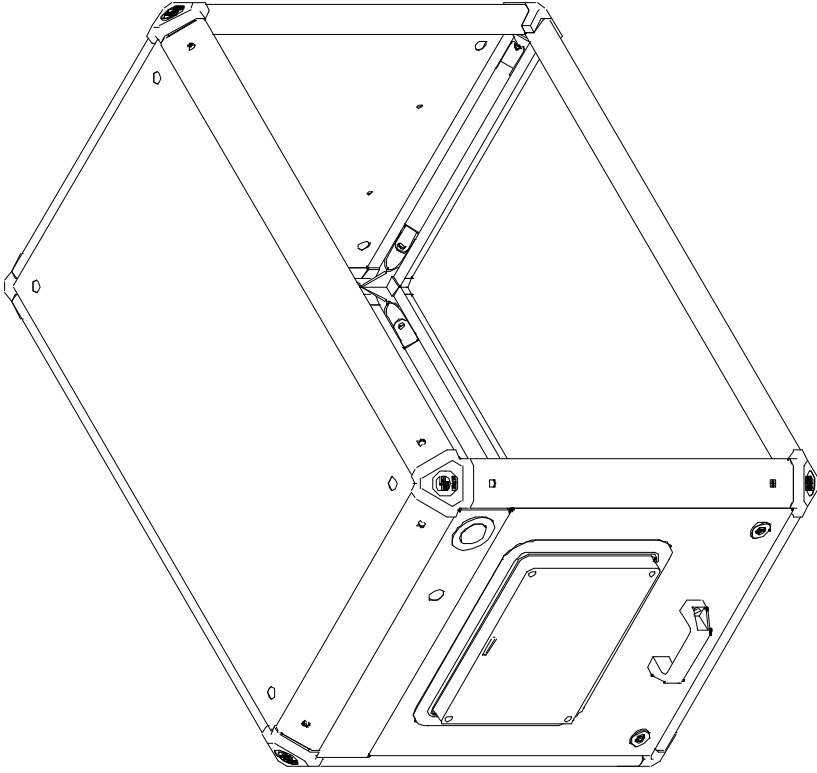
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

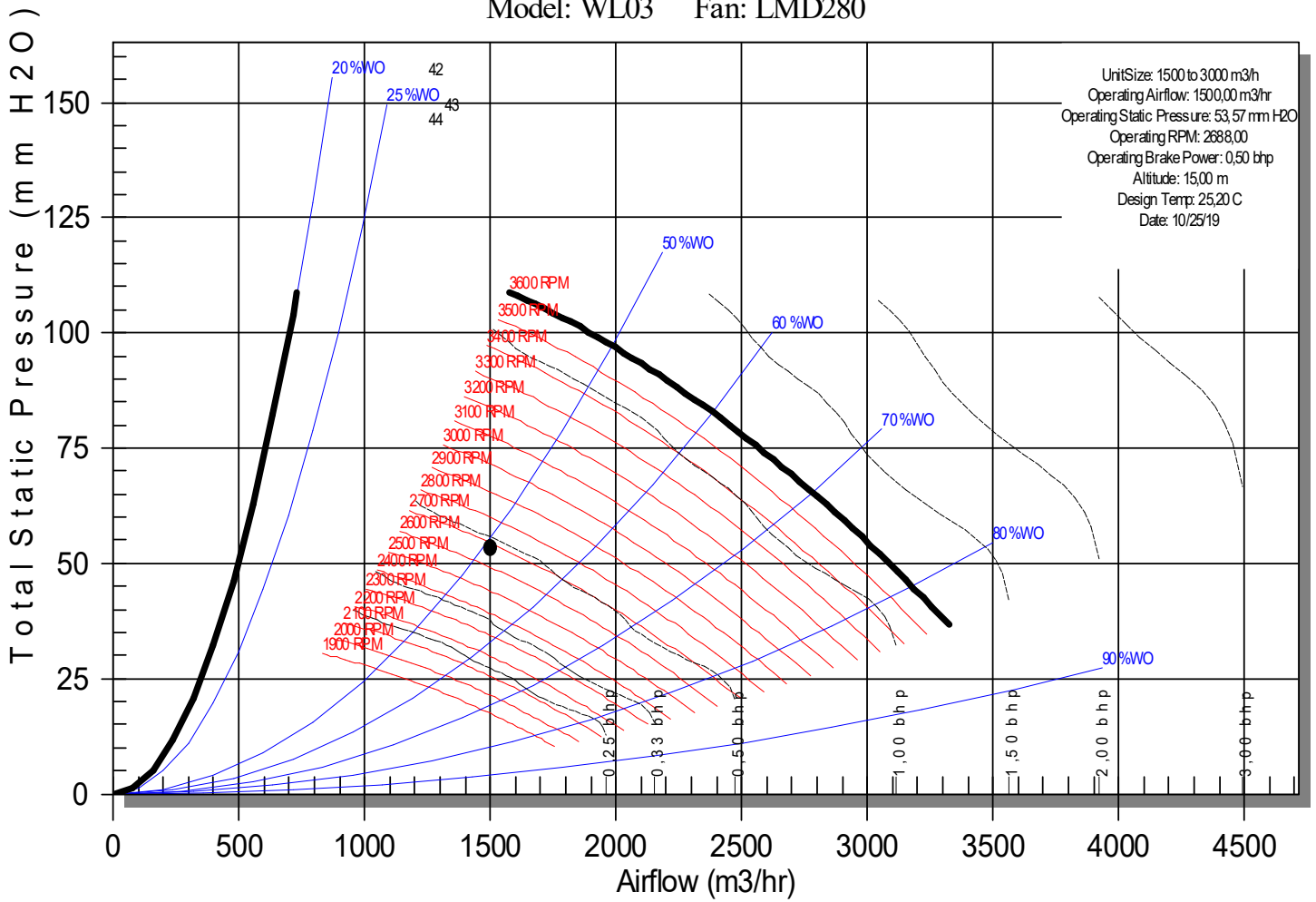
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-47*

Model: WL03 Fan: LMD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-48
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00B6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,04 mm H2O
Mixing Box Air Pressure Drop	2,14 mm H2O	Filter Air Pressure Drop	22,56 mm H2O

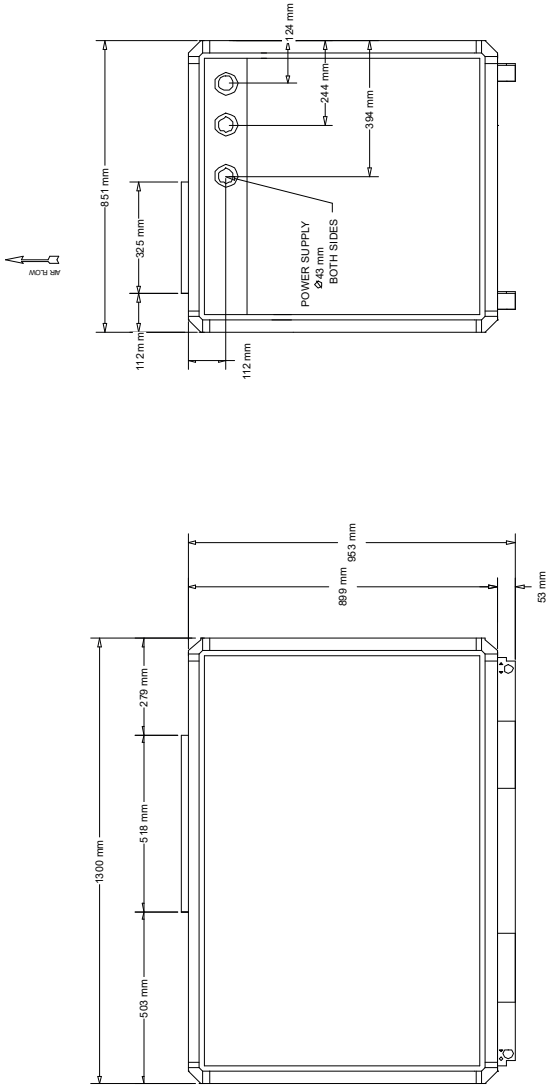
Coil			
Cooling Entering Dry Bulb	25,2 C	Cooling Entering Wet Bulb	18,6 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,74 m3/hr
Cooling Capacity	26,15 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4500,00 m3/hr	Sensible Capacity	19,62 kW
Cooling Leaving Wet Bulb	12,4 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	0,4 m/s	Cooling Water Pressure Drop	306,26 mm H2O
Cooling Air Pressure Drop	14,08 mm H2O	Cooling Coil Wet Weight	211 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	77,82 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,80 bhp
Fan RPM	1905 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,2 m/s	Velocity Pressure	51,1 Pa

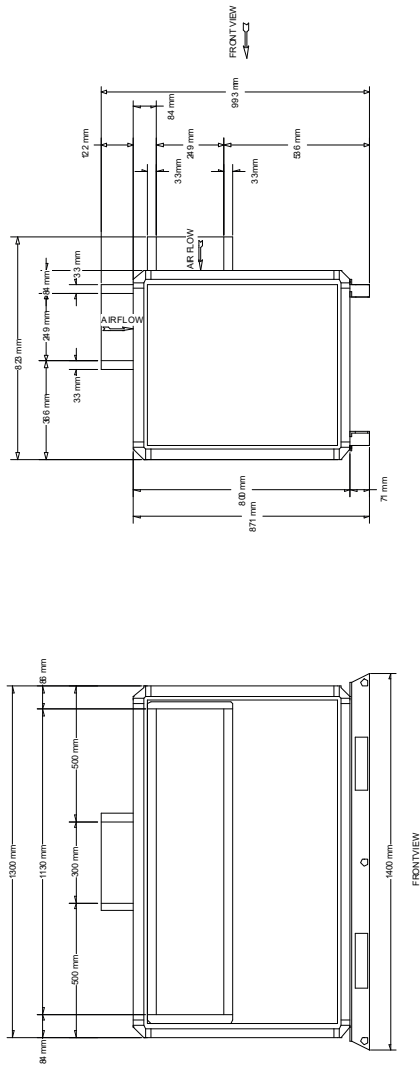
Humidifier	
Humidification	w/o Humidification / Not Applicable



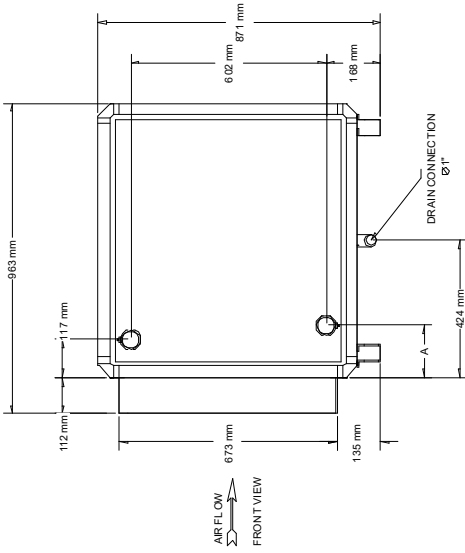
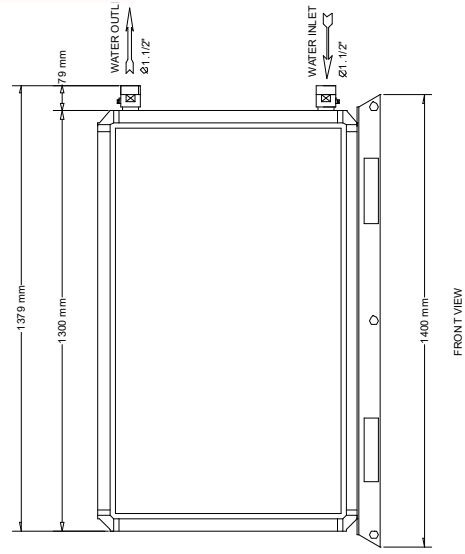
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

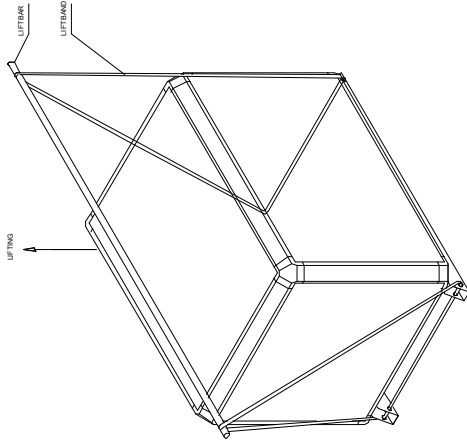


MIXER BOX SECTION
WAVE DOBLE 06

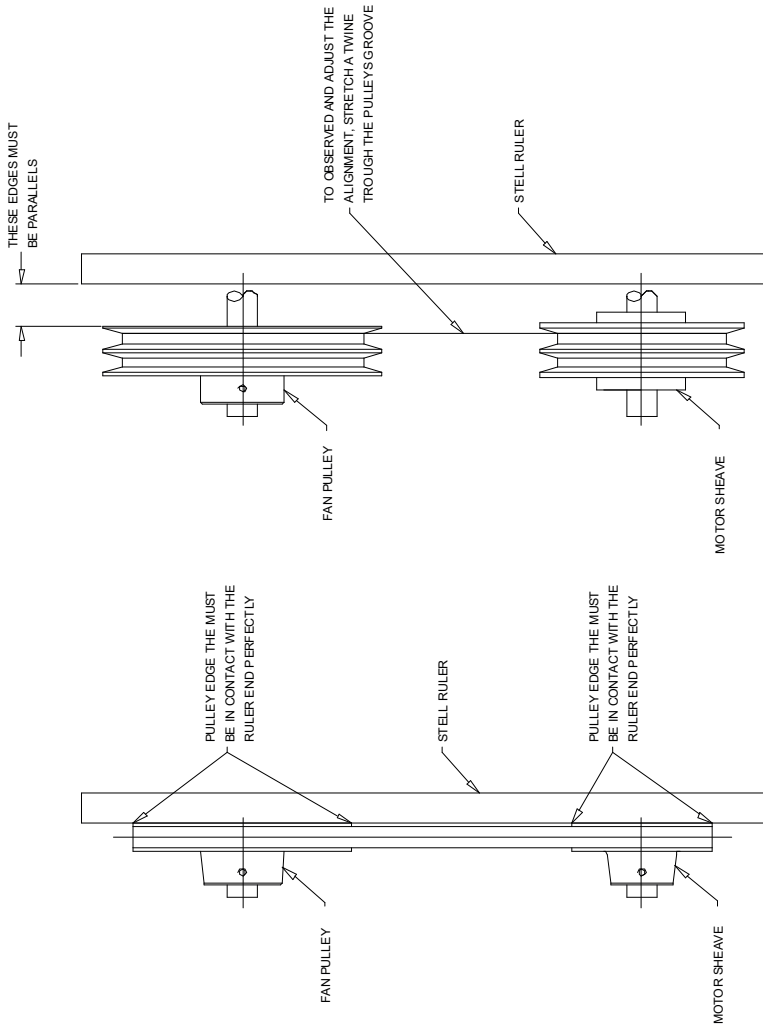


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06

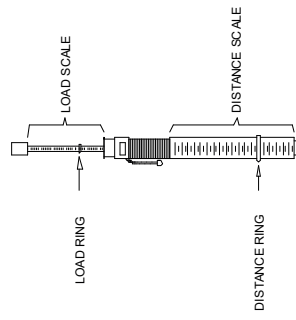
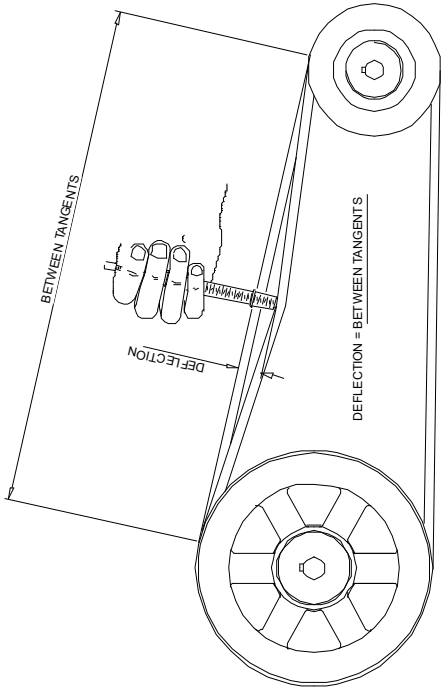
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



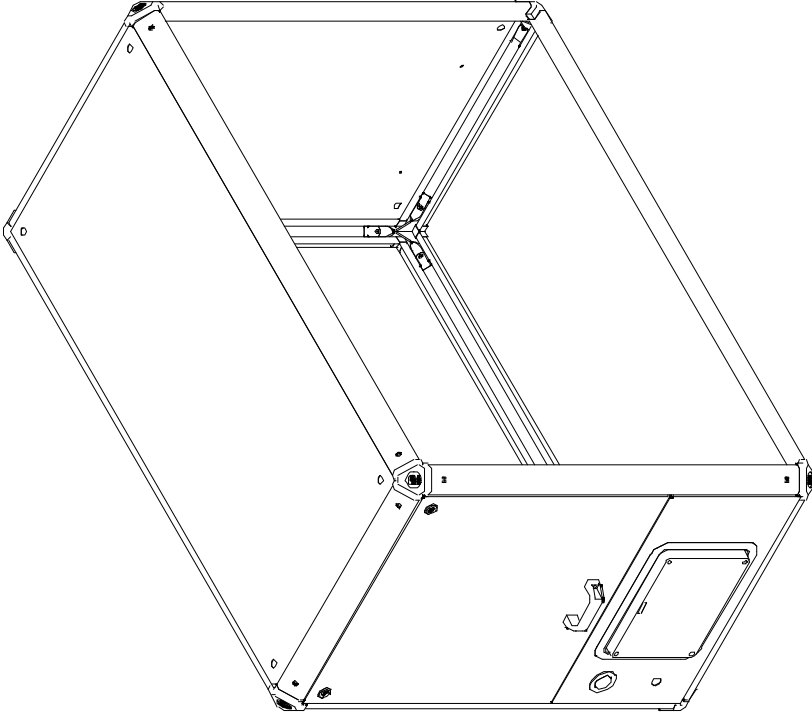
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

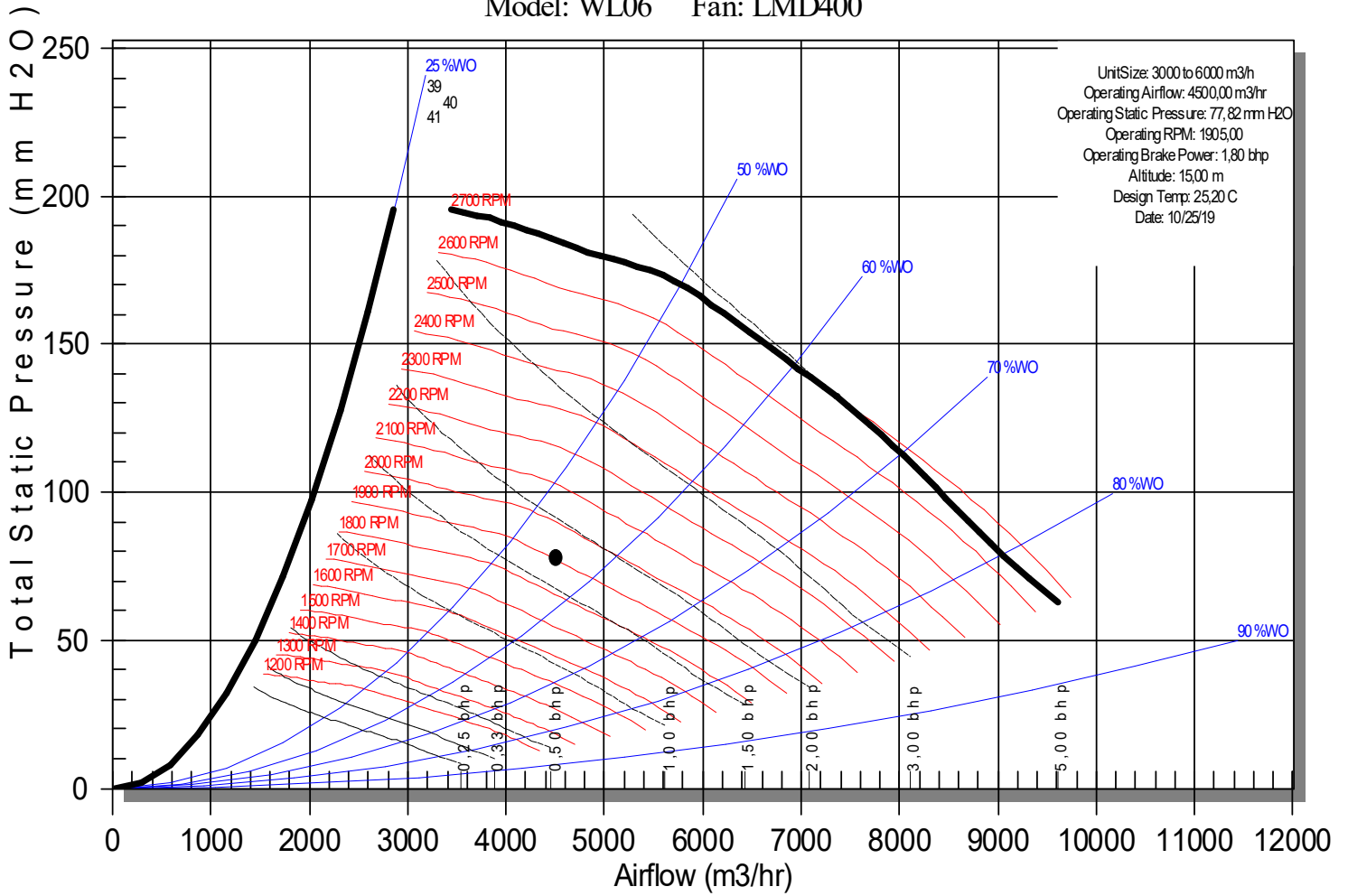
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-48

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-49
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGAEKTCA00 Y00A8WBAA001100 0300000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

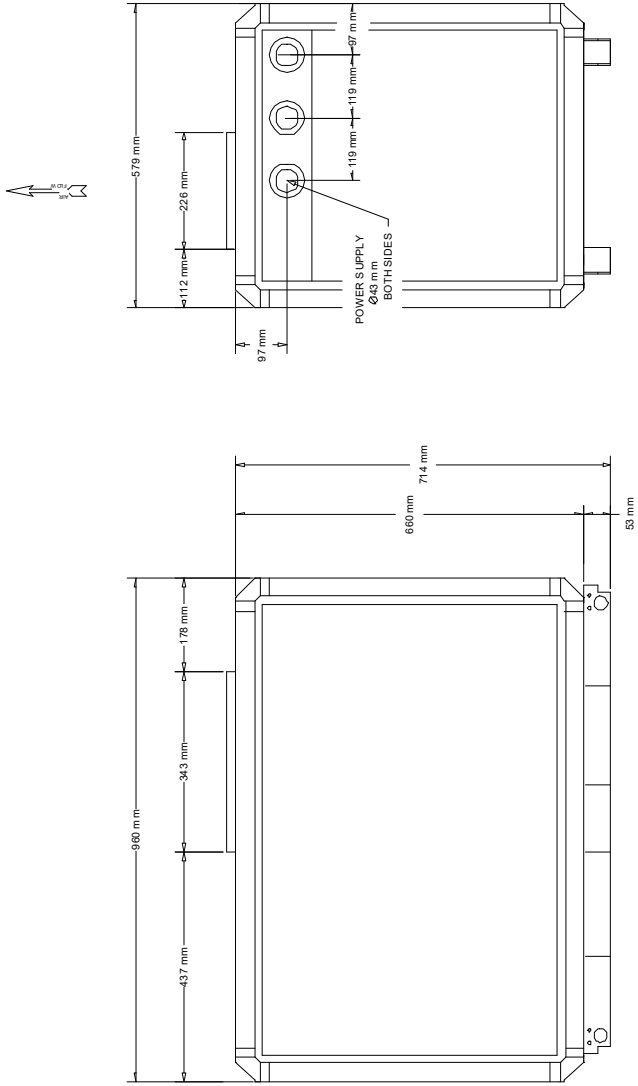
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	14,1 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

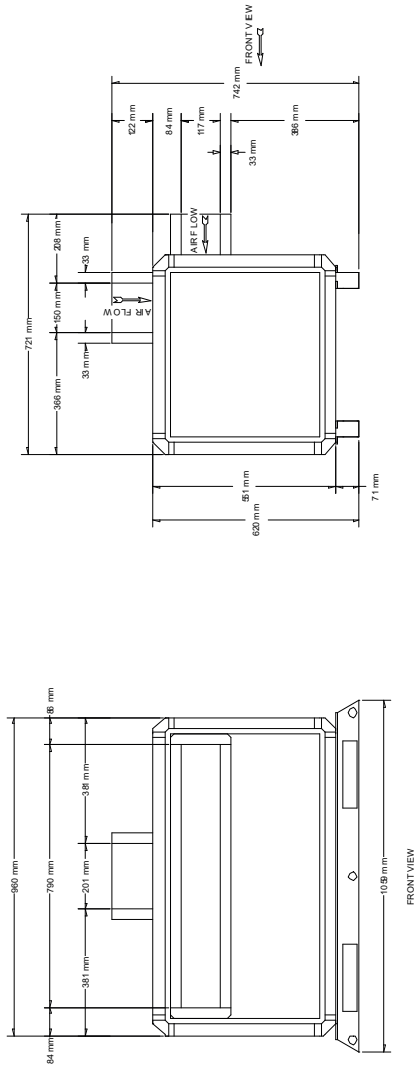
Humidifier	
Humidification	w/o Humidification / Not Applicable



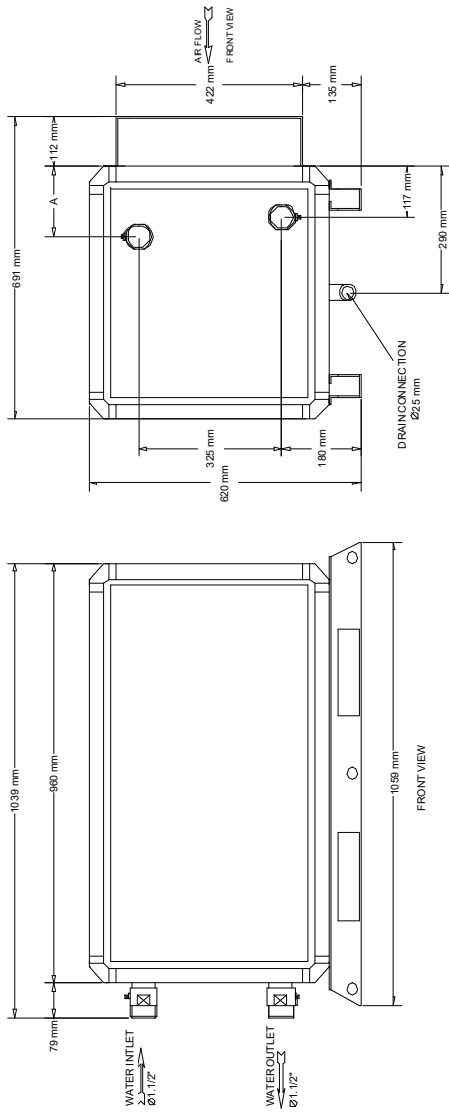
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

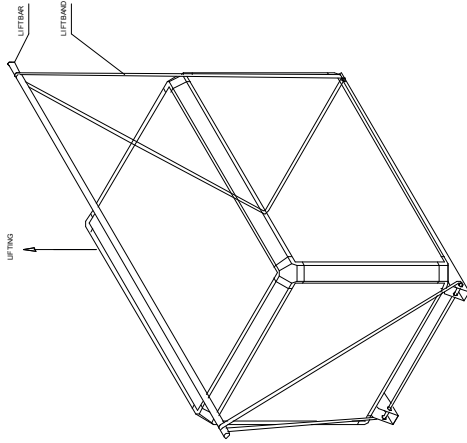


MIXER BOX SECTION
WAVE DOBLE 02

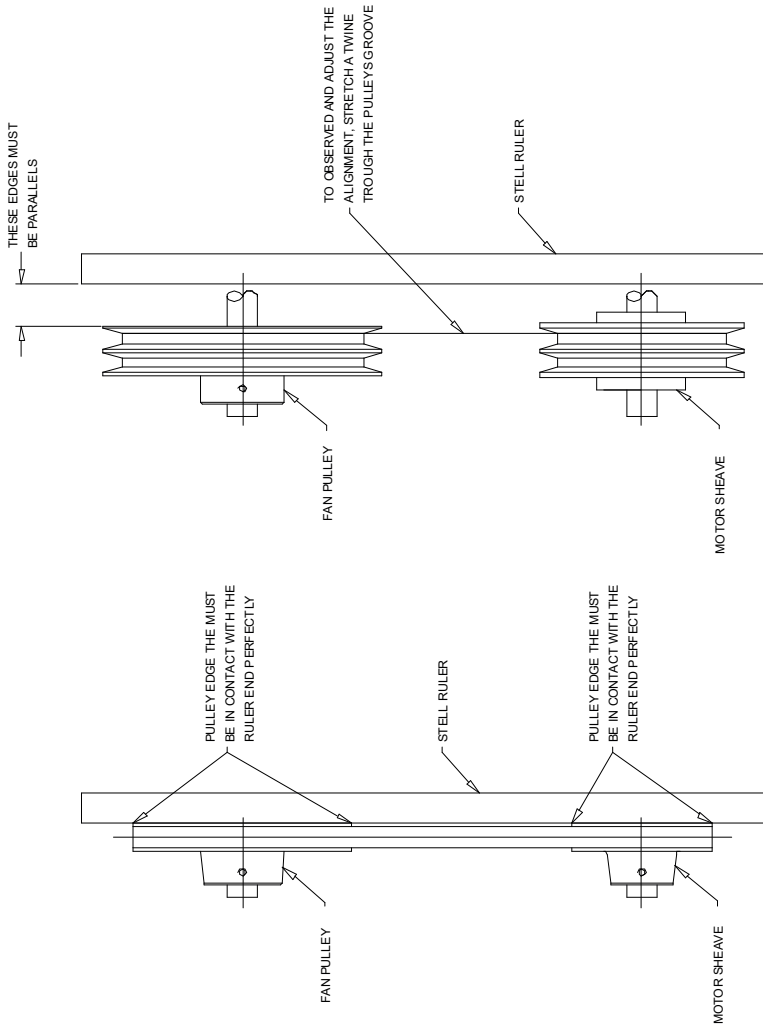


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

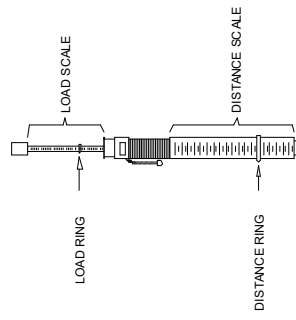
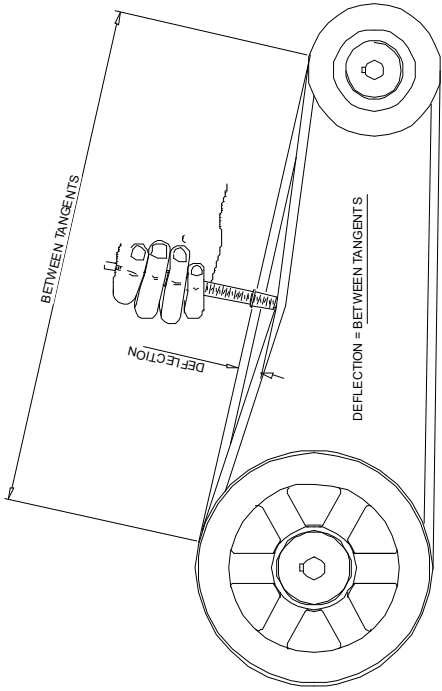
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 02



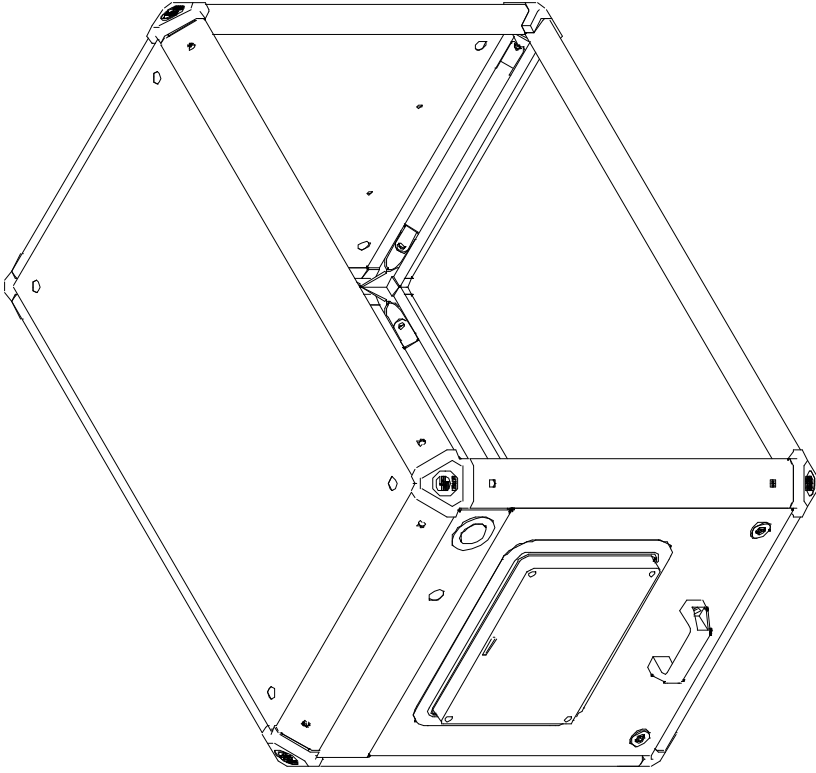
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



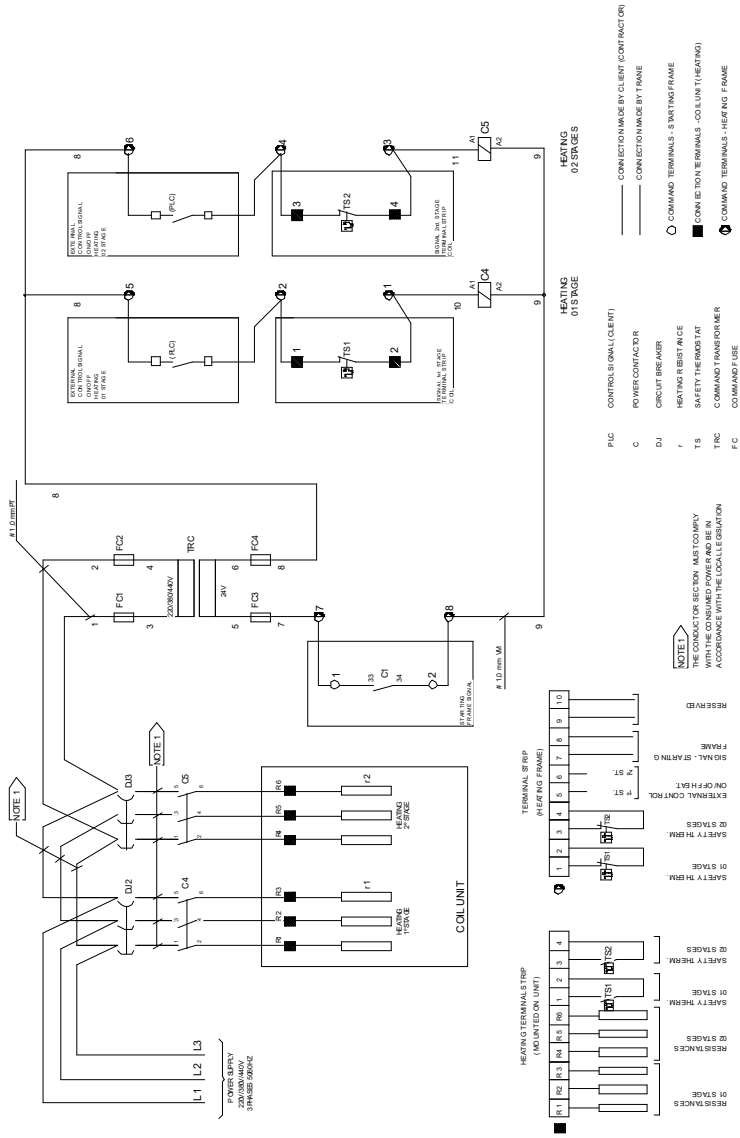
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

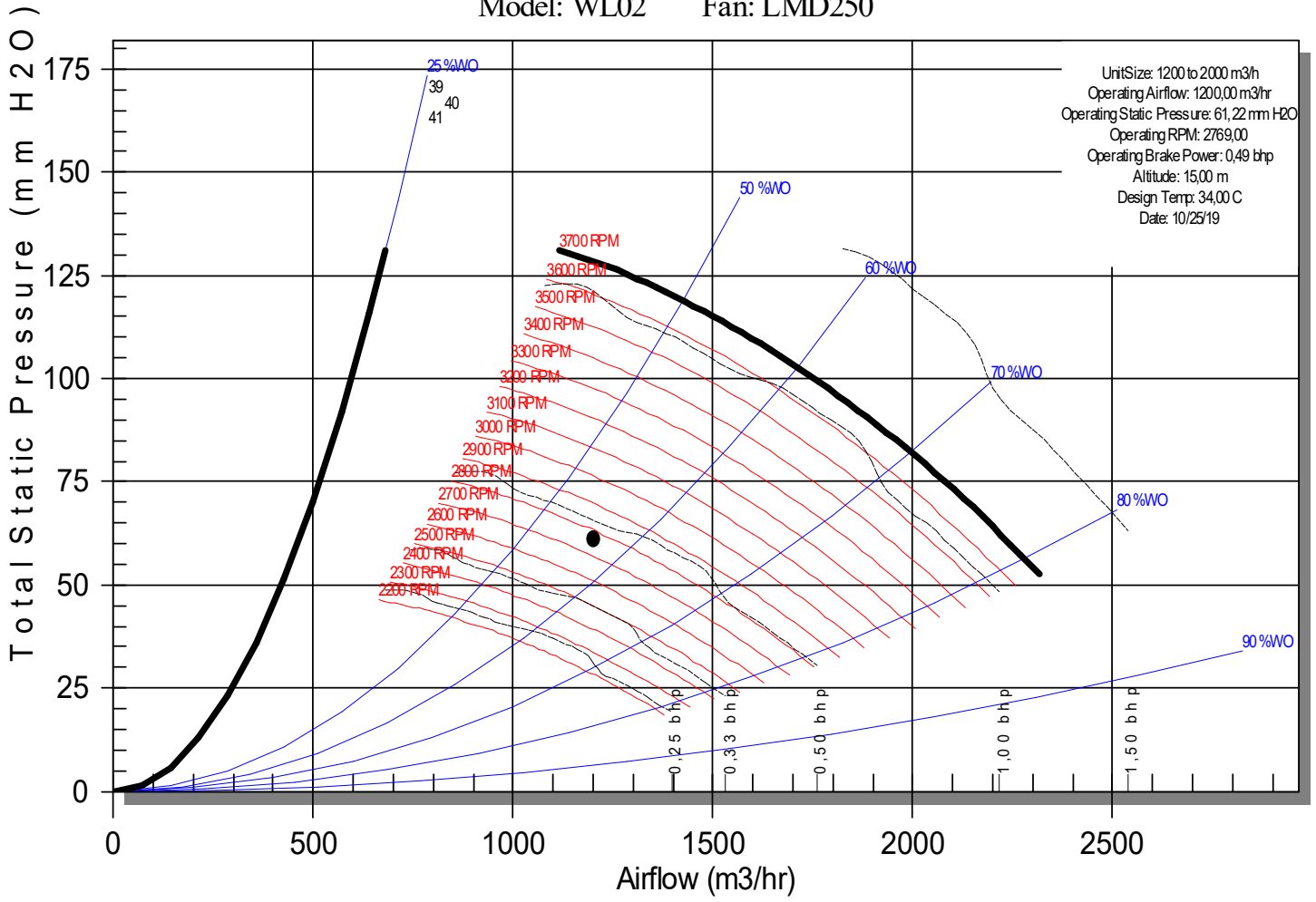
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-49

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-50A
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGADKTED0 0Y00A6BWBAG0011 0003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,16 mm H2O
Mixing Box Air Pressure Drop	2,17 mm H2O	Filter Air Pressure Drop	20,39 mm H2O

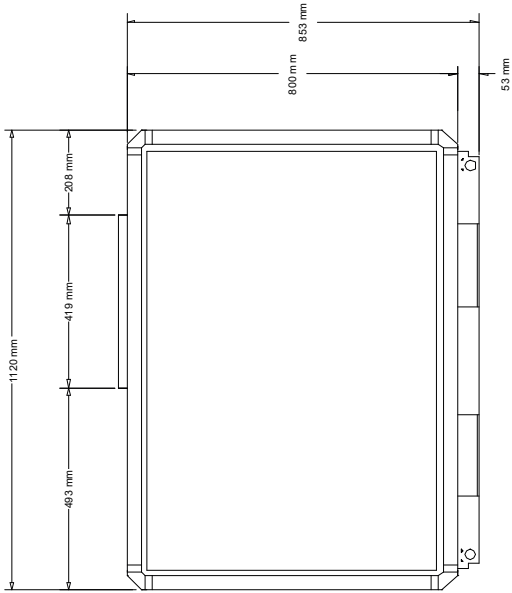
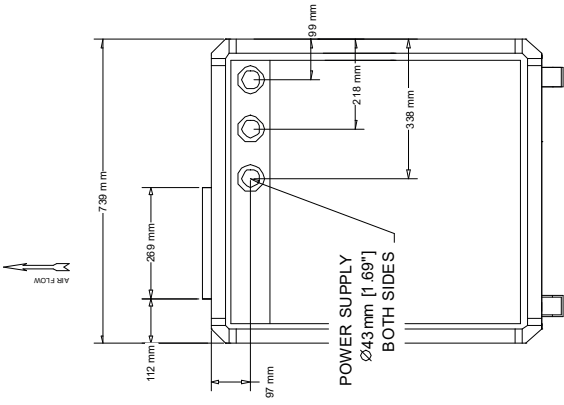
Coil			
Cooling Entering Dry Bulb	22,3 C	Cooling Entering Wet Bulb	15,8 C
Cooling Leaving Dry Bulb	12,2 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	1,42 m3/hr
Cooling Capacity	9,92 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 3 kw
Heating Capacity	6,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	12,2 C	Cooling Airflow	3000,00 m3/hr
Sensible Capacity	9,65 kW	Cooling Leaving Wet Bulb	12,1 C
Cooling Water Volume	8,04 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	172,24 mm H2O	Cooling Air Pressure Drop	10,06 mm H2O
Cooling Coil Wet Weight	154 kg	Actual Cooling Face Velocity	2,2 m/s
Electric Heat PD	3,11 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	74,89 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,28 bhp
Fan RPM	2535 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,2 Pa

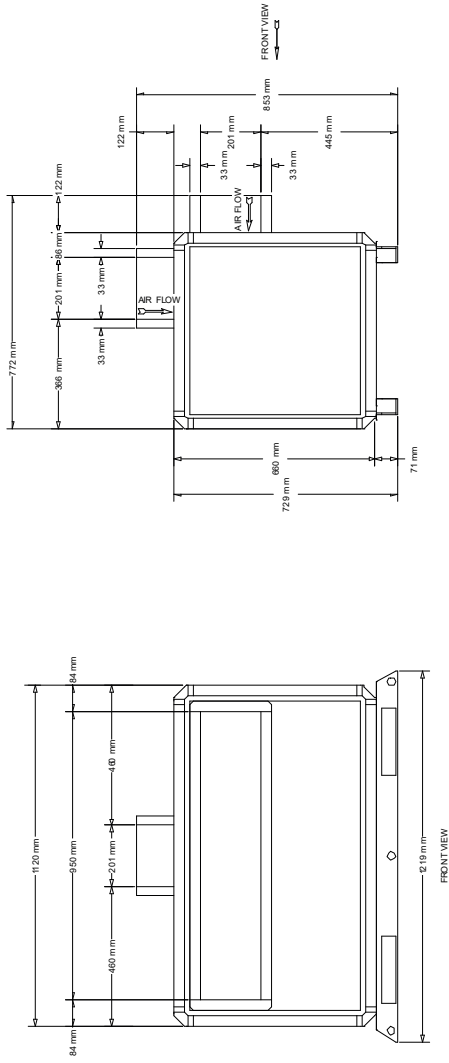
Humidifier	
Humidification	w/o Humidification / Not Applicable



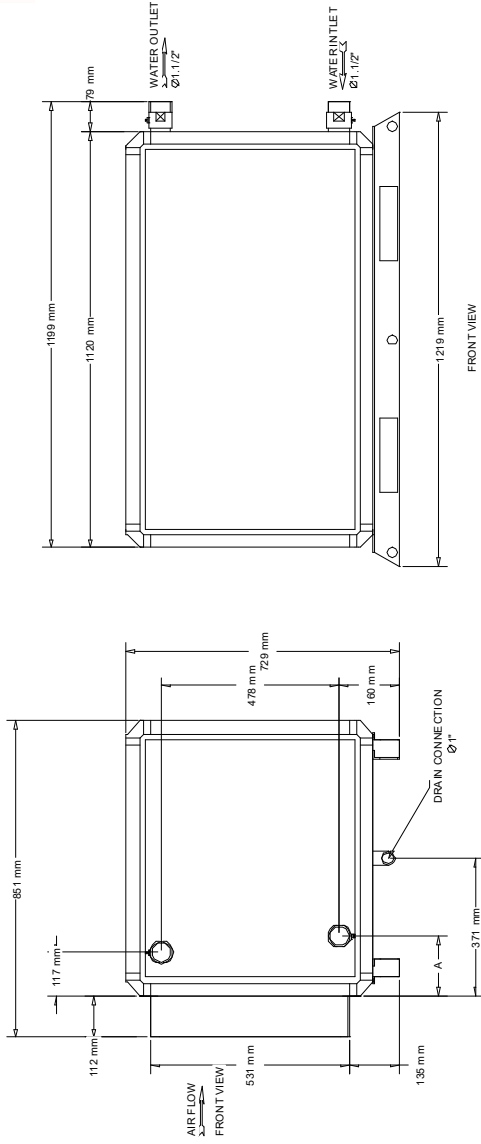
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

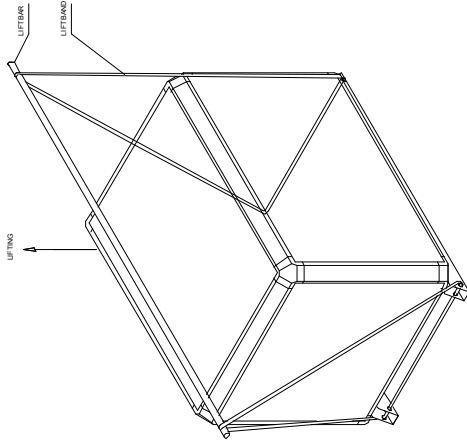


MIXER BOX SECTION
WAVE DOBLE 04

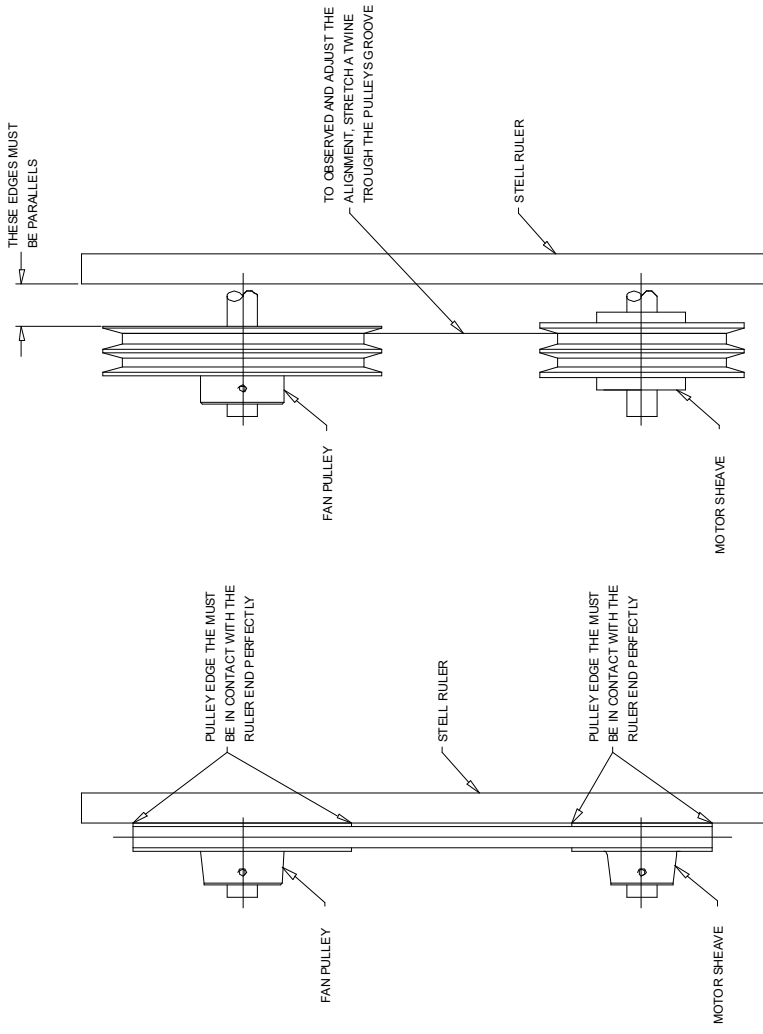


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 04

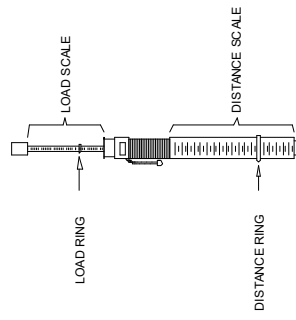
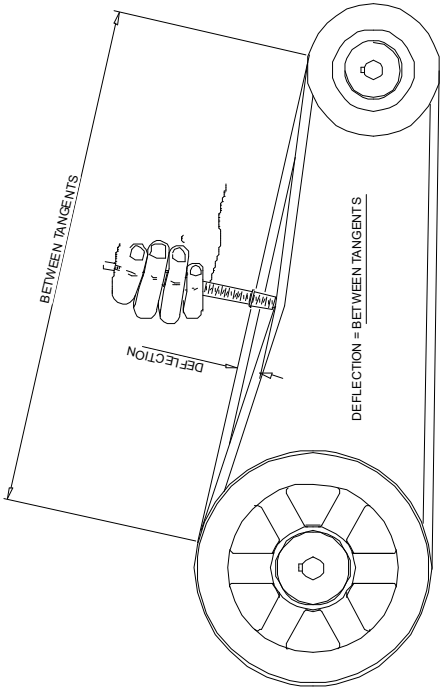
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



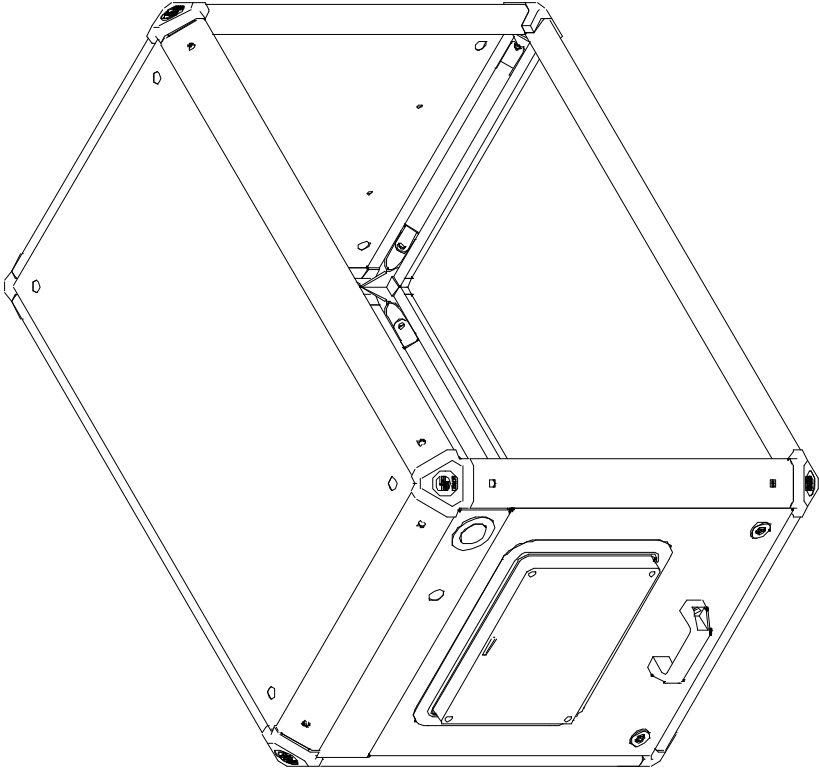
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



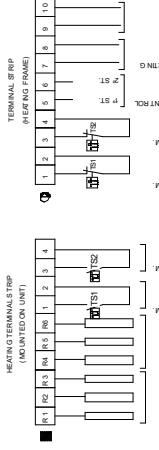
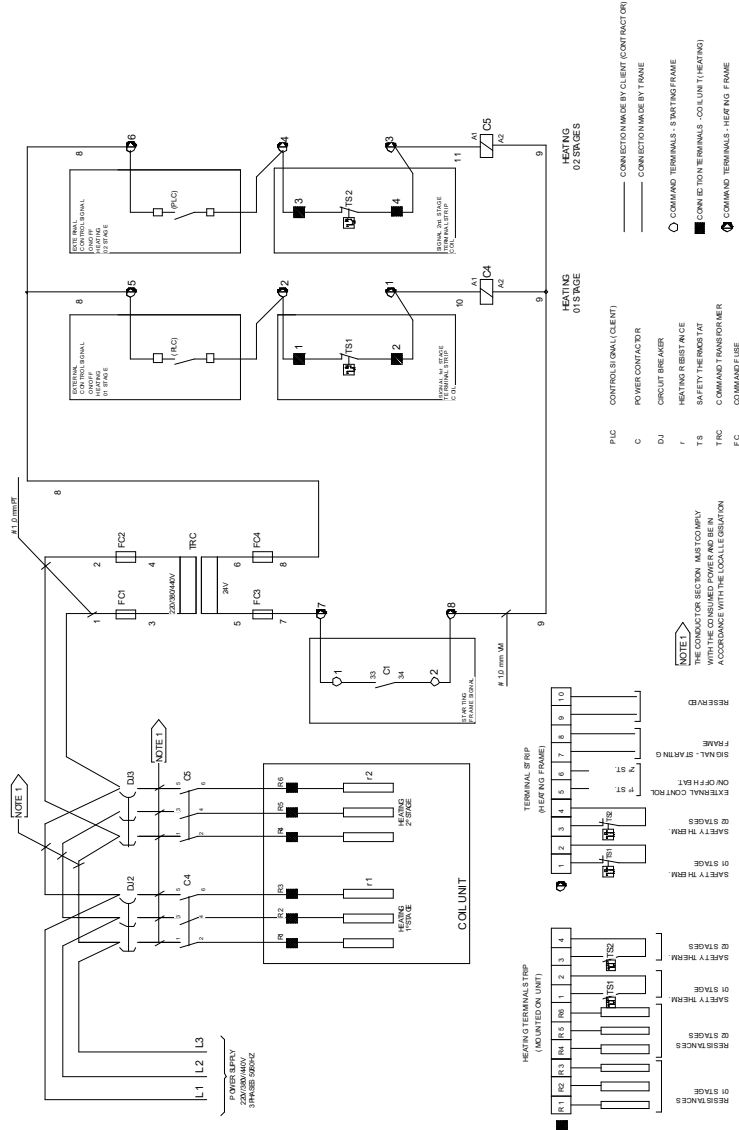
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



- P/C CONTROL SIGNAL (CLIENT)
- C POWER CONTACTOR
- DJ CIRCUIT BREAKER
- F HEATING RESISTANCE
- TS SAFETY THERMOSTAT
- TRC COMMAND TRANSFORMER
- FC COMMAND FUSE

- RESERV B
- FRAME
- SIGNAL - STARTING
- ON - FUSE
- EXTERNAL CONTROL
- SAFETY THERM
- O2 STAGES
- SAFETY THERM
- O1 STAGE
- SAFETY THERM
- O2 STAGES
- SAFETY THERM
- O1 STAGE
- SAFETY THERM
- O2 STAGES
- SAFETY THERM
- O1 STAGE
- SAFETY THERM
- O2 STAGES
- RESISTANCES
- O1 STAGE
- RESISTANCES
- O2 STAGES
- RESISTANCES
- O1 STAGE
- RESISTANCES
- O2 STAGES

HEART ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

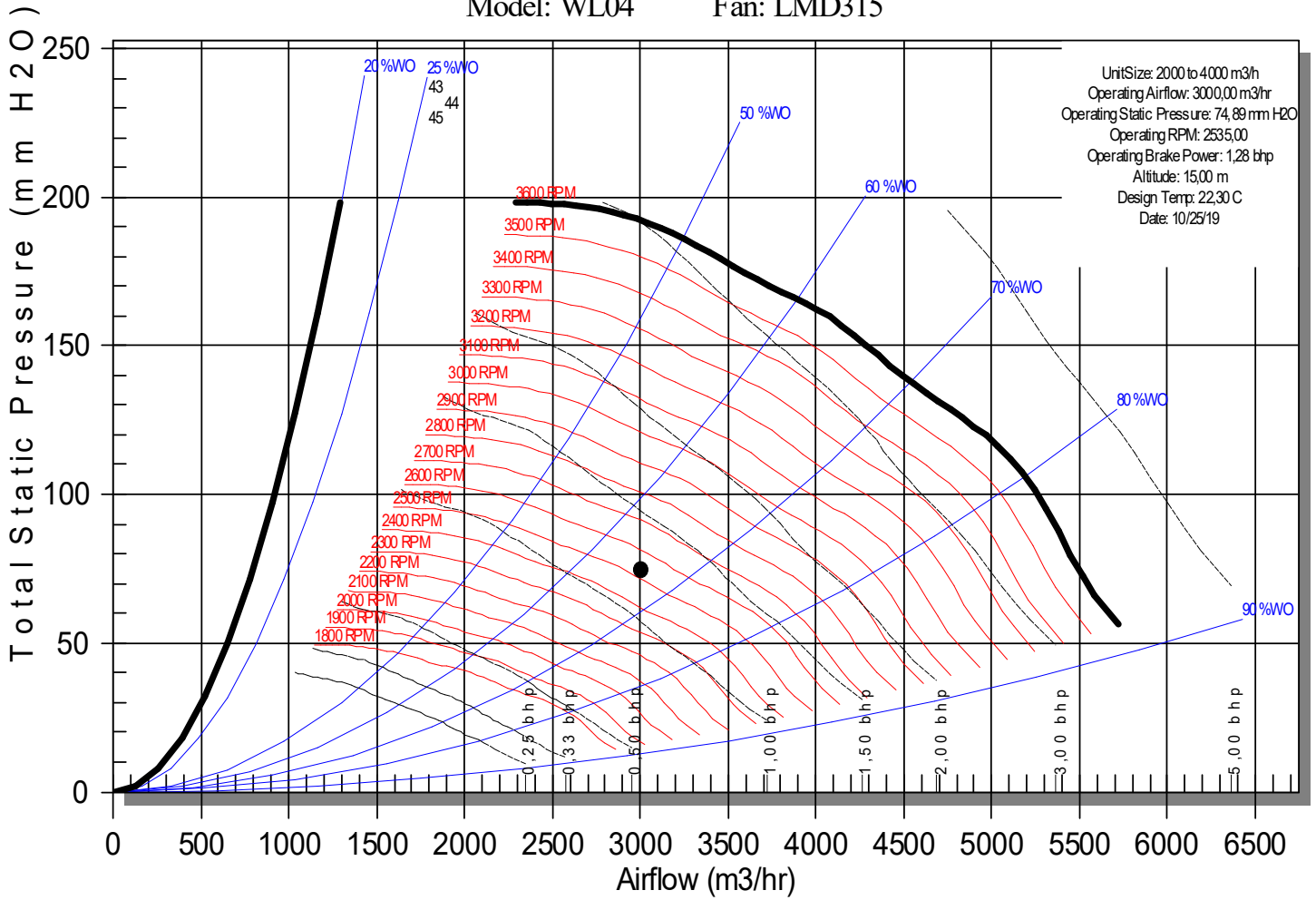
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-50A

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-50B
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGA EKTED00 Y00A6BWBAG00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,16 mm H2O
Mixing Box Air Pressure Drop	2,17 mm H2O	Filter Air Pressure Drop	20,39 mm H2O

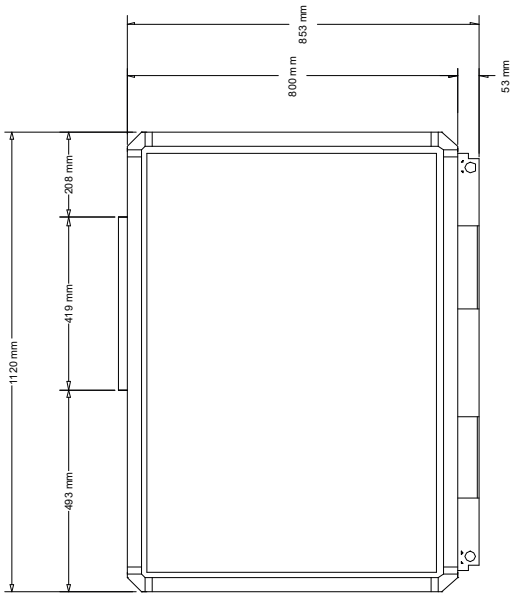
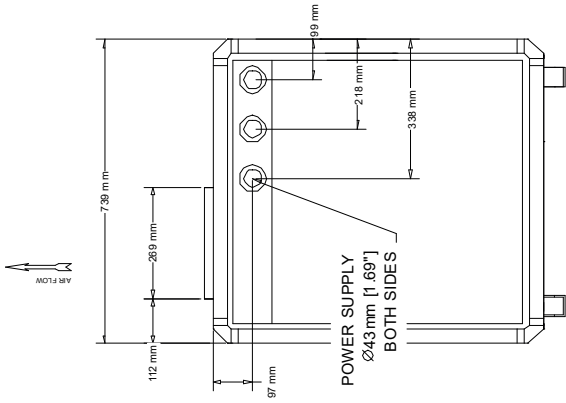
Coil			
Cooling Entering Dry Bulb	22,3 C	Cooling Entering Wet Bulb	15,8 C
Cooling Leaving Dry Bulb	12,2 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	1,42 m3/hr
Cooling Capacity	9,90 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 3 kw
Heating Capacity	6,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	12,2 C	Cooling Airflow	3000,00 m3/hr
Sensible Capacity	9,64 kW	Cooling Leaving Wet Bulb	12,1 C
Cooling Water Volume	8,04 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	171,72 mm H2O	Cooling Air Pressure Drop	10,06 mm H2O
Cooling Coil Wet Weight	154 kg	Actual Cooling Face Velocity	2,2 m/s
Electric Heat PD	3,11 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	74,89 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,28 bhp
Fan RPM	2535 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,2 Pa

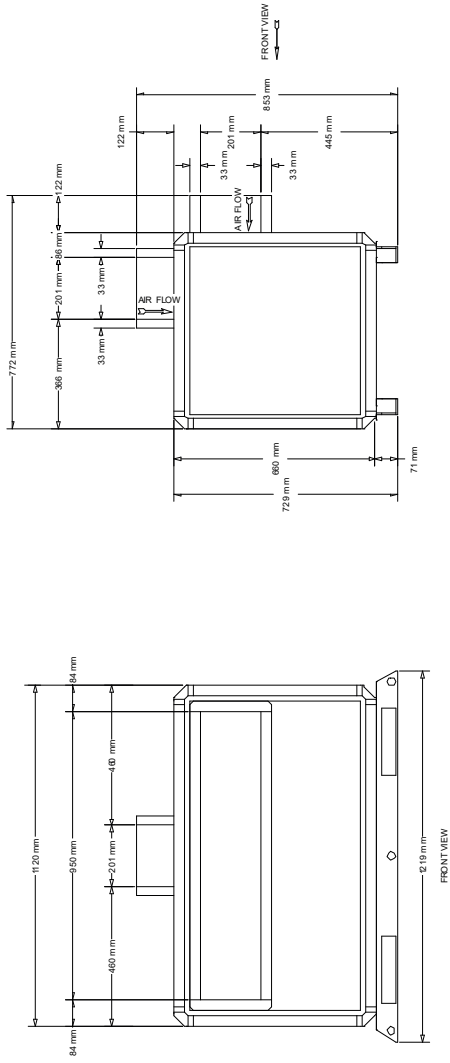
Humidifier	
Humidification	w/o Humidification / Not Applicable



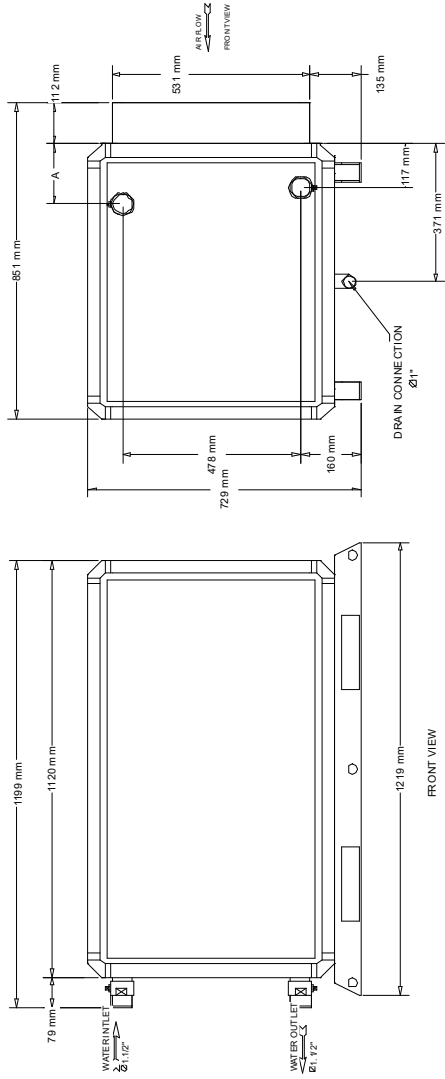
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

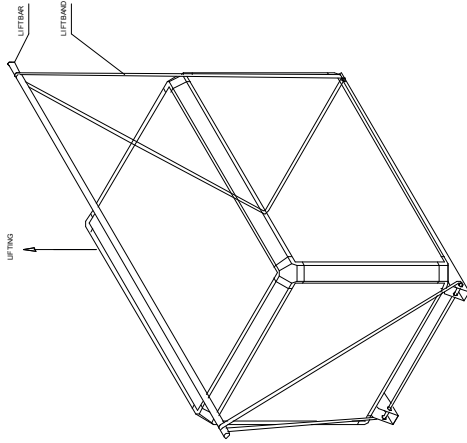


MIXER BOX SECTION
WAVE DOBLE 04

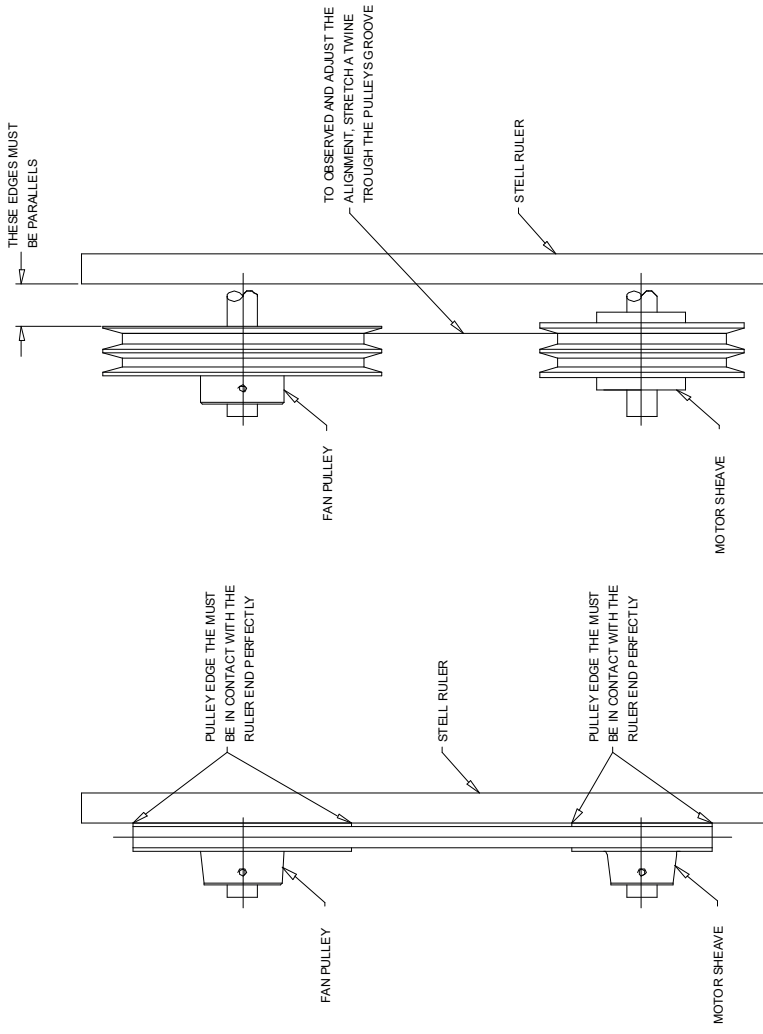


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

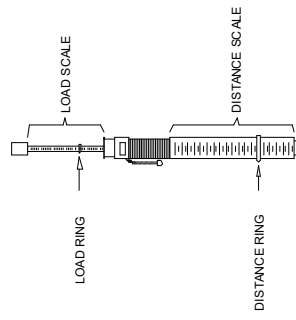
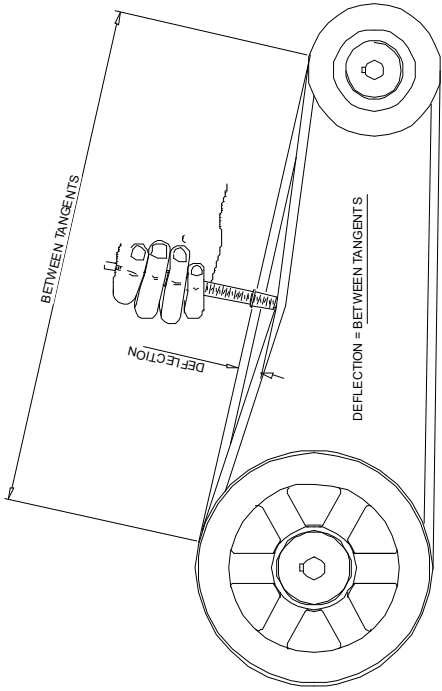
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 04



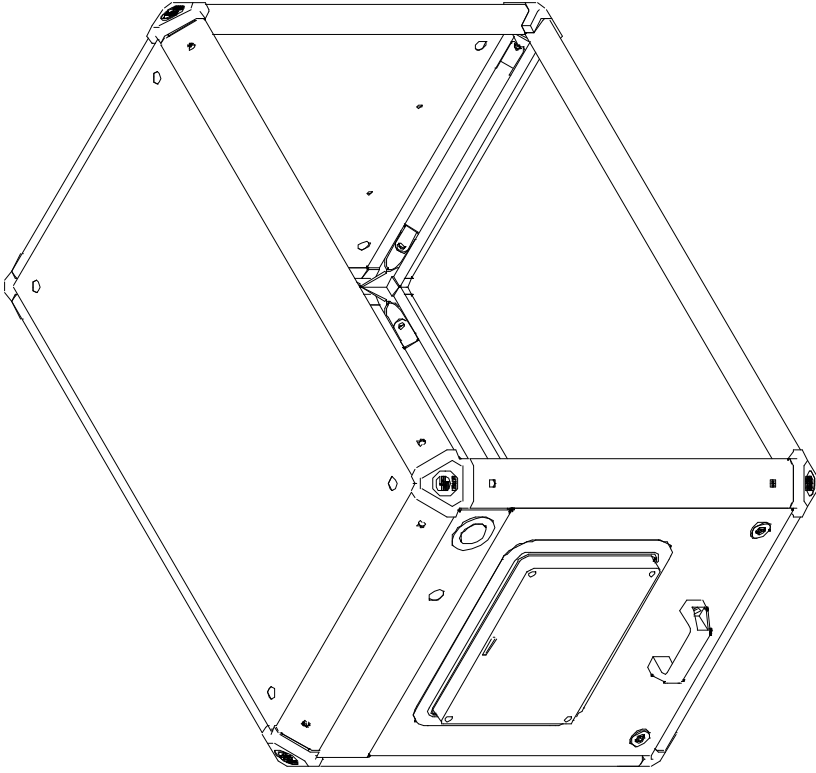
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

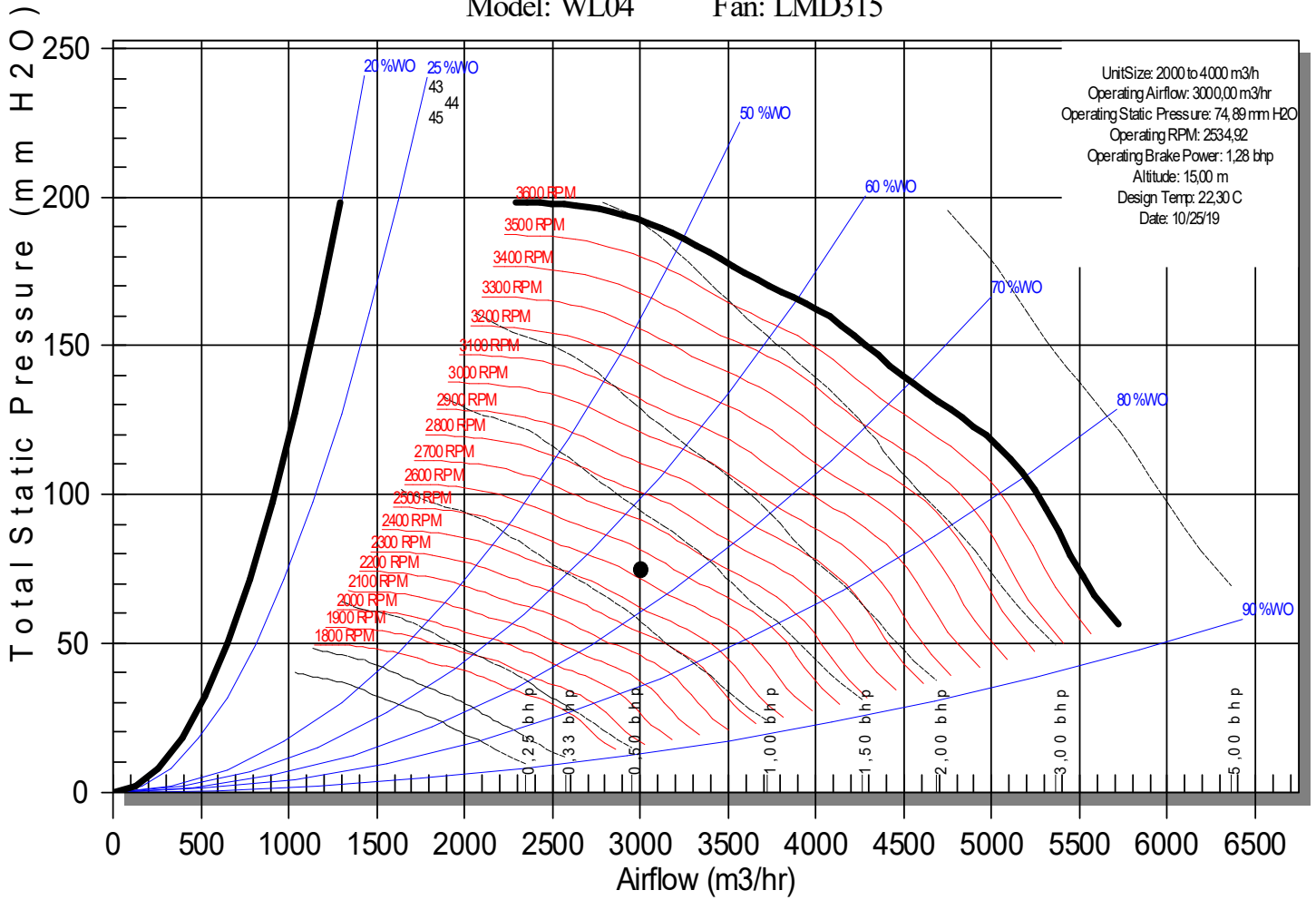
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-50B

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-51
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGADKTFD0 0Y00A8BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,30 mm H2O
Mixing Box Air Pressure Drop	2,20 mm H2O	Filter Air Pressure Drop	20,33 mm H2O

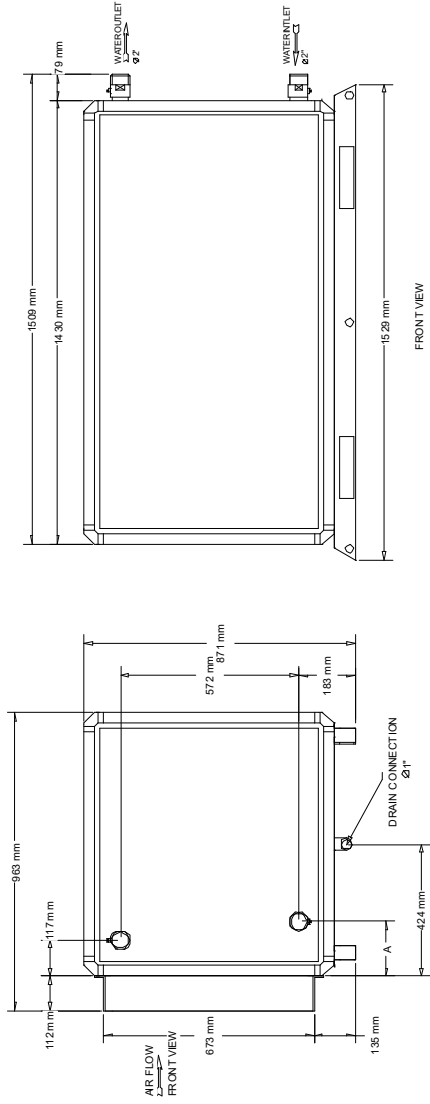
Coil			
Cooling Entering Dry Bulb	25,6 C	Cooling Entering Wet Bulb	19,7 C
Cooling Leaving Dry Bulb	9,2 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,98 m3/hr
Cooling Capacity	55,81 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	5750,00 m3/hr	Sensible Capacity	32,52 kW
Cooling Leaving Wet Bulb	9,1 C	Cooling Water Volume	19,15 L
Cooling Water Velocity	1,4 m/s	Cooling Water Pressure Drop	4788,73 mm H2O
Cooling Air Pressure Drop	17,87 mm H2O	Cooling Coil Wet Weight	266 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	79,71 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,51 bhp
Fan RPM	2142 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,5 m/s	Velocity Pressure	43,6 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable

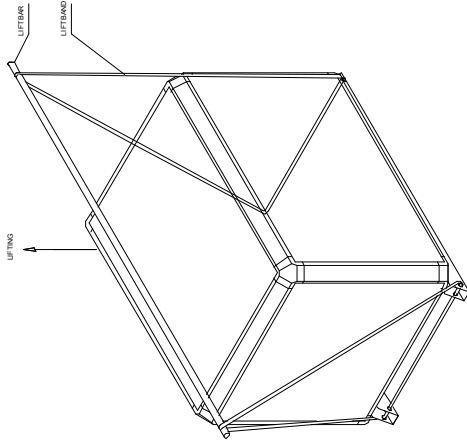


Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		

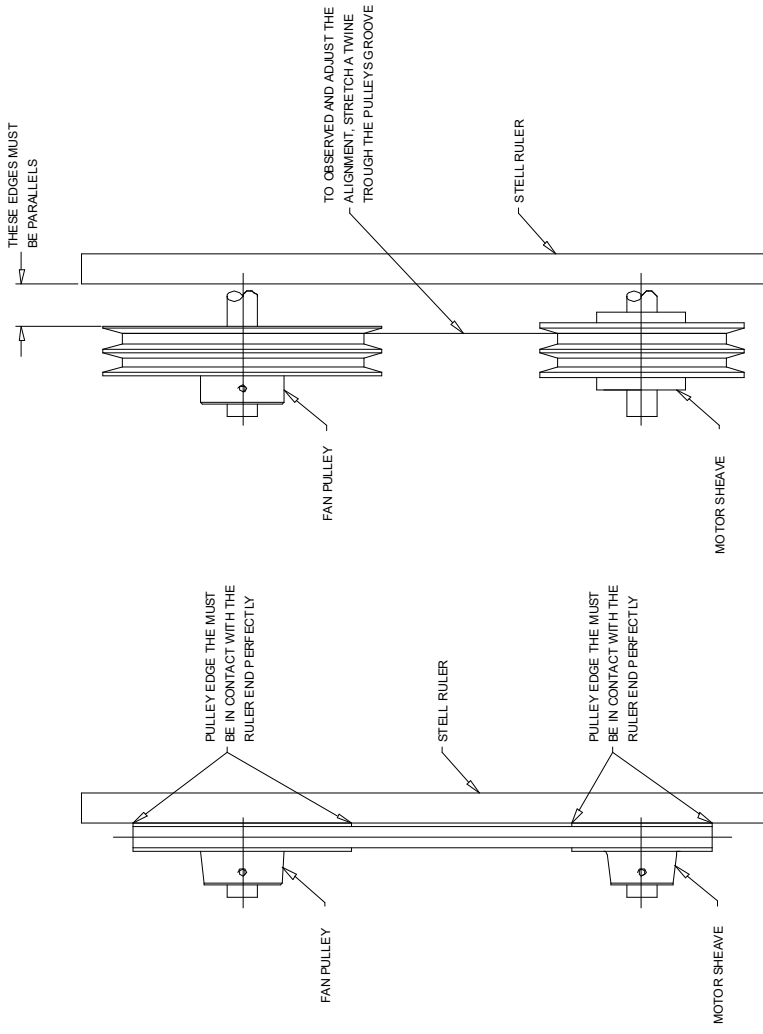


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 08

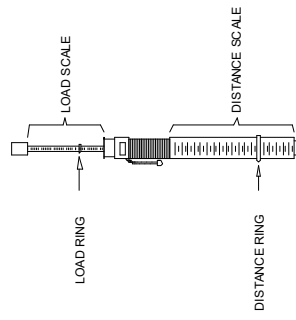
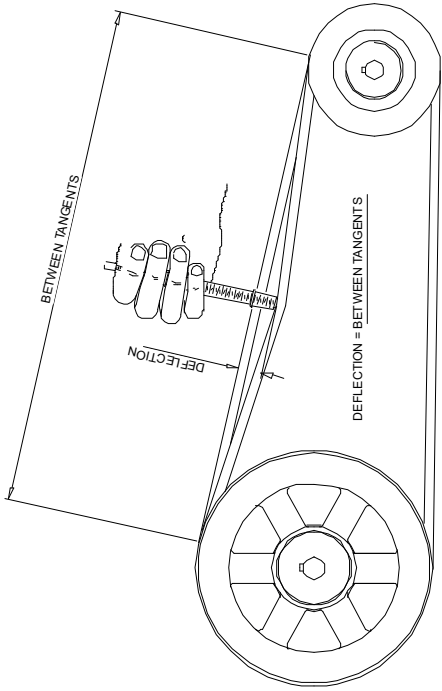
ROWS	A
3	176 mm
4	183 mm
6	227 mm
8	271 mm



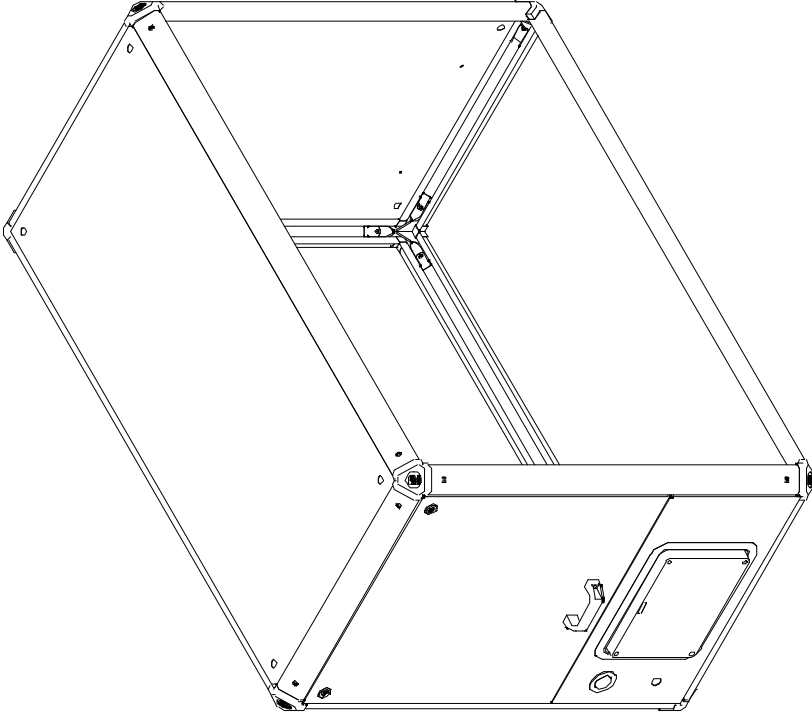
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

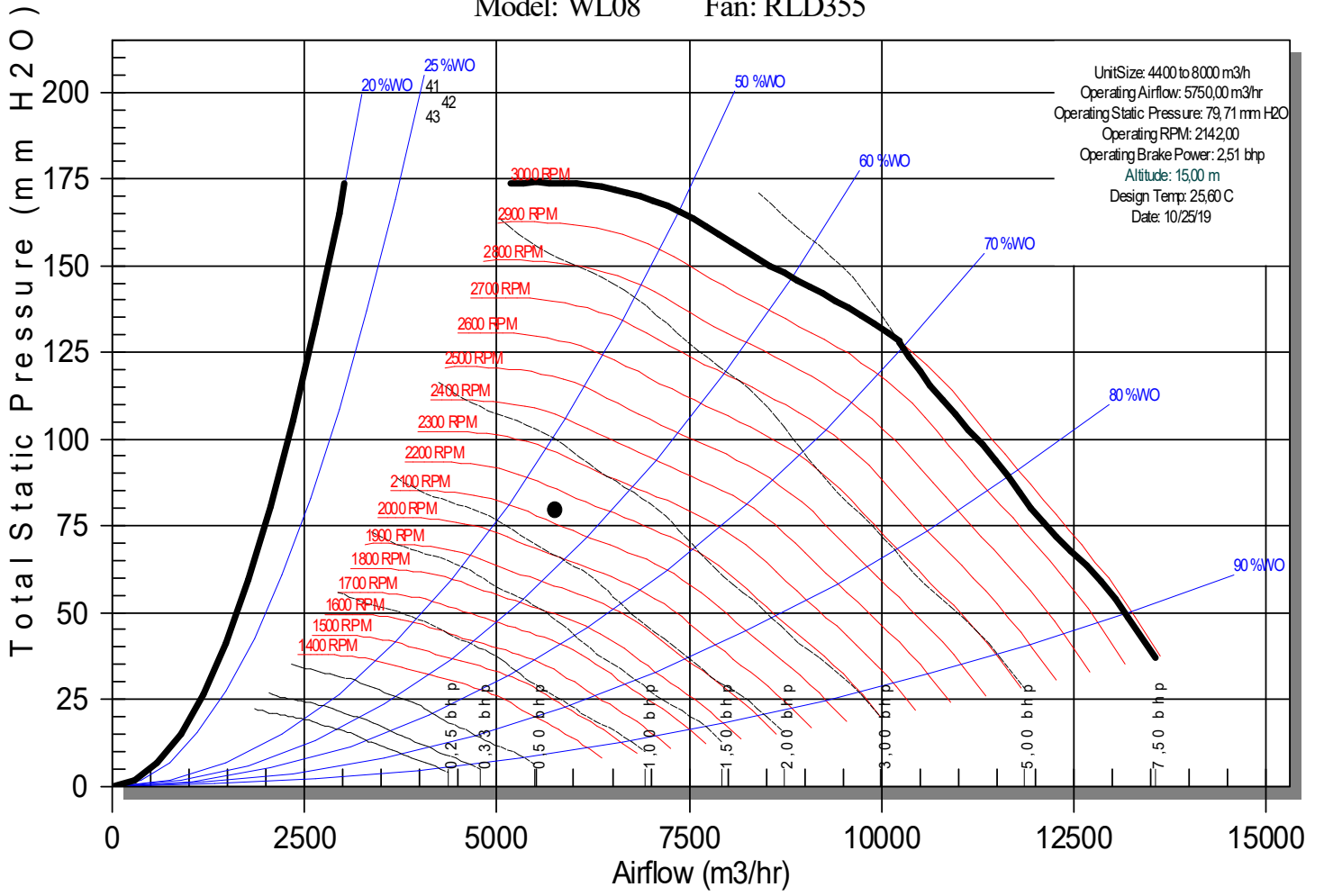
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-51

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-52
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA06AGDEK-FH00Y10B6AWBAH00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,62 mm H2O
Mixing Box Air Pressure Drop	3,11 mm H2O	Filter Air Pressure Drop	33,36 mm H2O

Coil			
Cooling Entering Dry Bulb	23,0 C	Cooling Entering Wet Bulb	16,7 C
Cooling Leaving Dry Bulb	13,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,58 m3/hr
Cooling Capacity	18,05 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 4.5 kw
Heating Capacity	9,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	13,3 C	Cooling Airflow	5385,00 m3/hr
Sensible Capacity	17,84 kW	Cooling Leaving Wet Bulb	13,0 C
Cooling Water Volume	17,23 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	156,64 mm H2O	Cooling Air Pressure Drop	14,01 mm H2O
Cooling Coil Wet Weight	207 kg	Actual Cooling Face Velocity	2,7 m/s
Electric Heat PD	4,74 mm H2O		

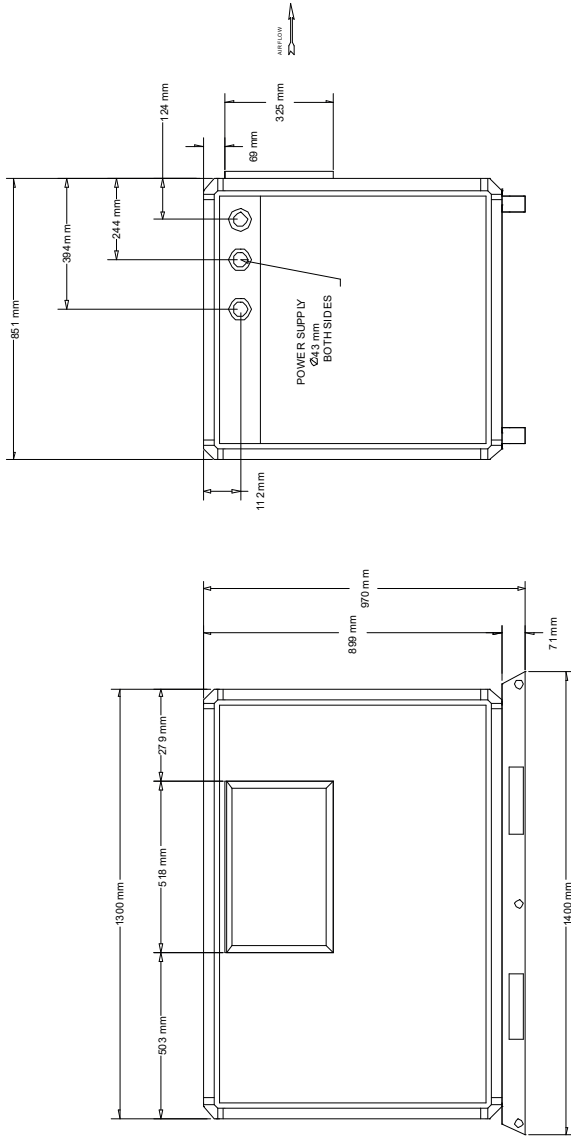
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	32,69 mm H2O	Total Static Pressure	97,54 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,72 bhp
Fan RPM	2175 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	11,0 m/s	Velocity Pressure	73,2 Pa

Humidifier	
Humidification	w/o Humidification /

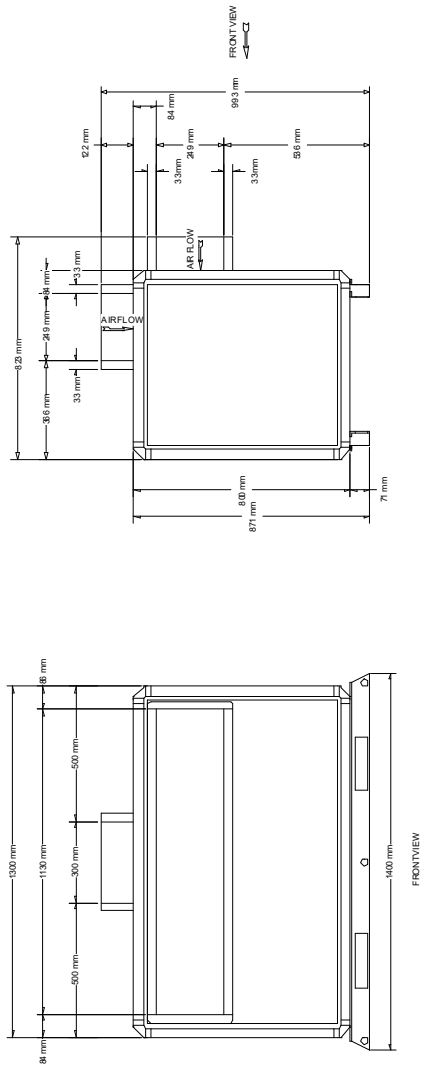


Not Applicable

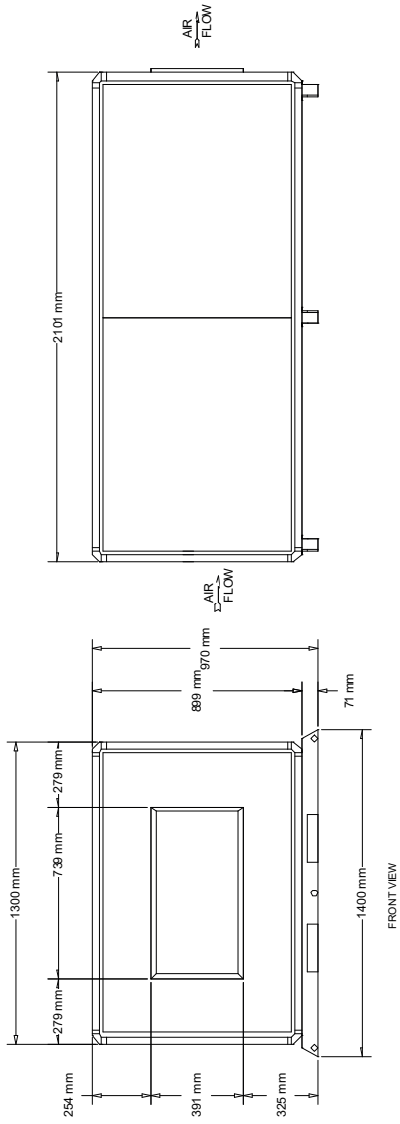
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



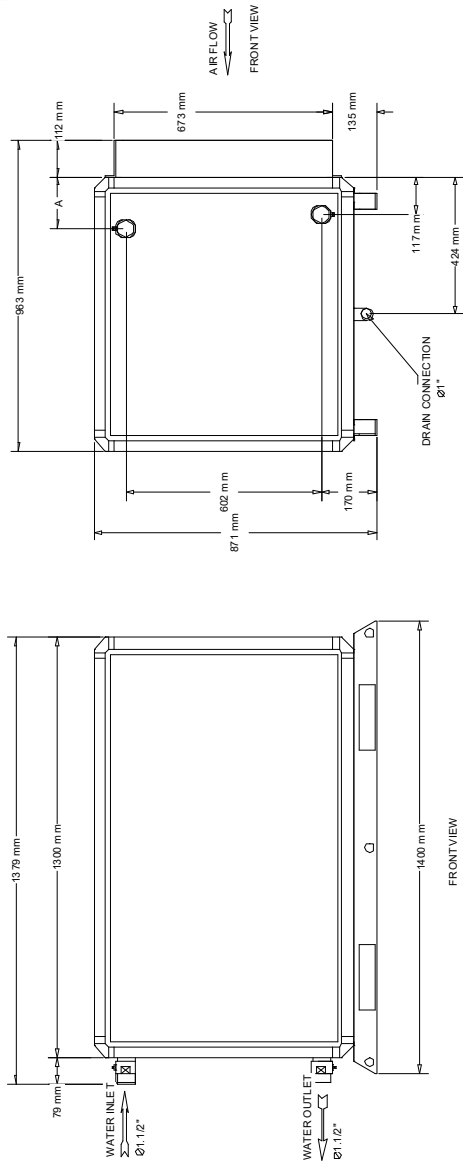
FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06



MIXER BOX SECTION
WAVE DOBLE 06

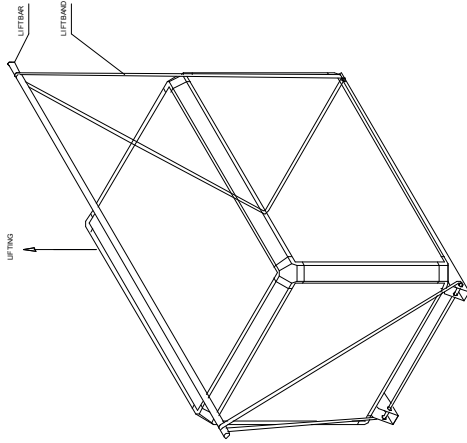


FINAL FILTER MODULE (LIMIT LOAD)
WAVE DOBLE 06

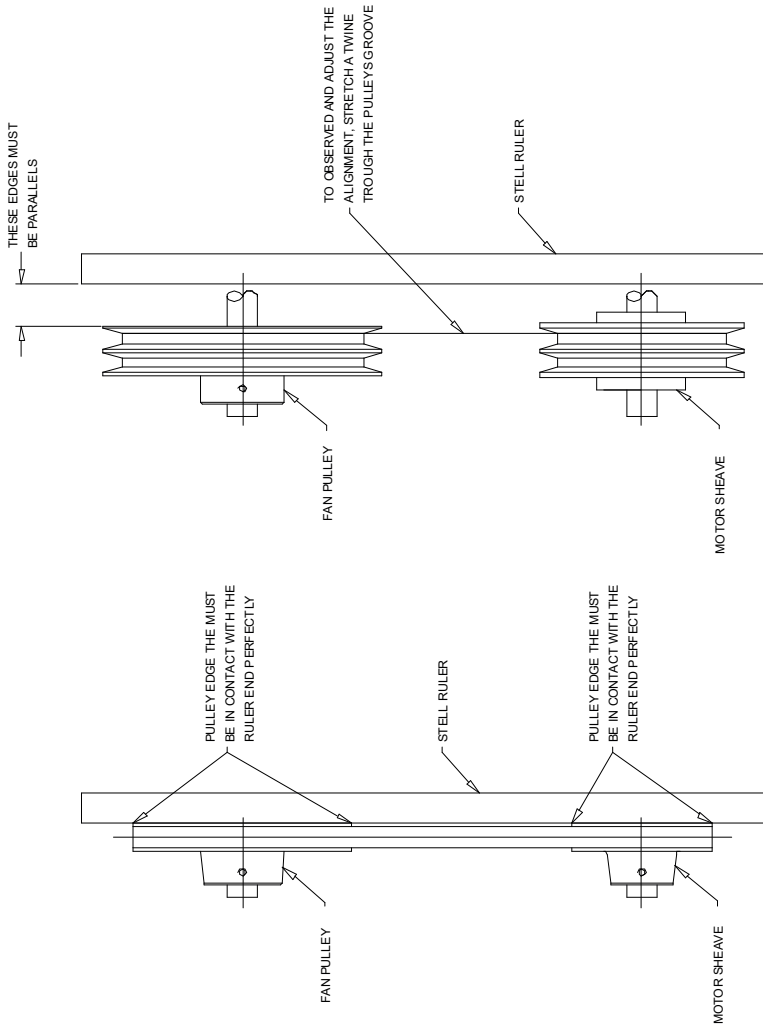


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

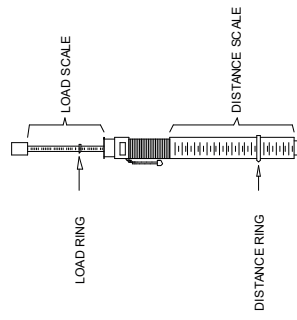
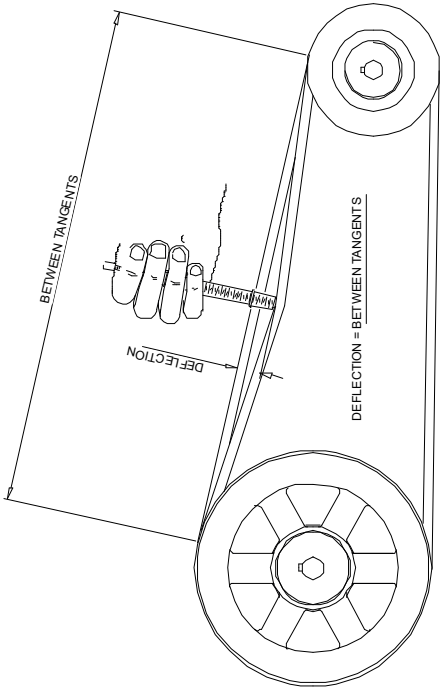
COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 06



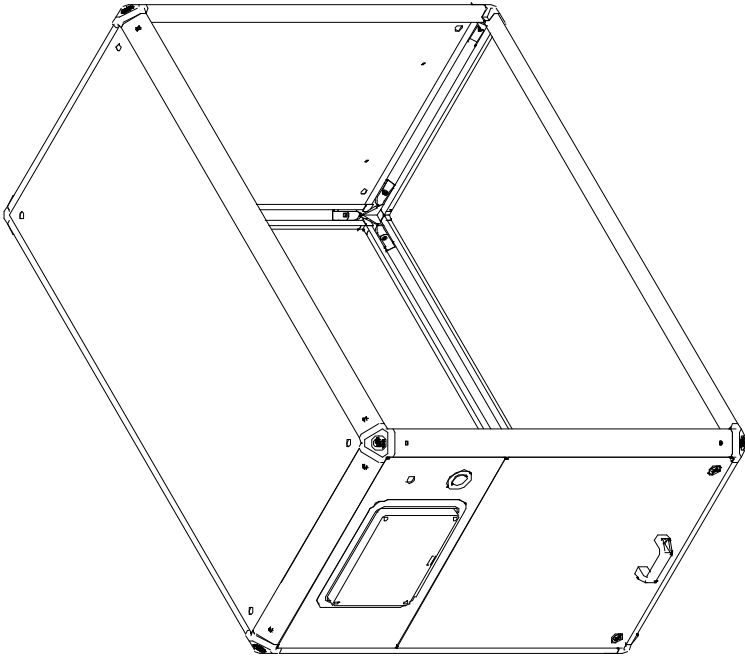
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

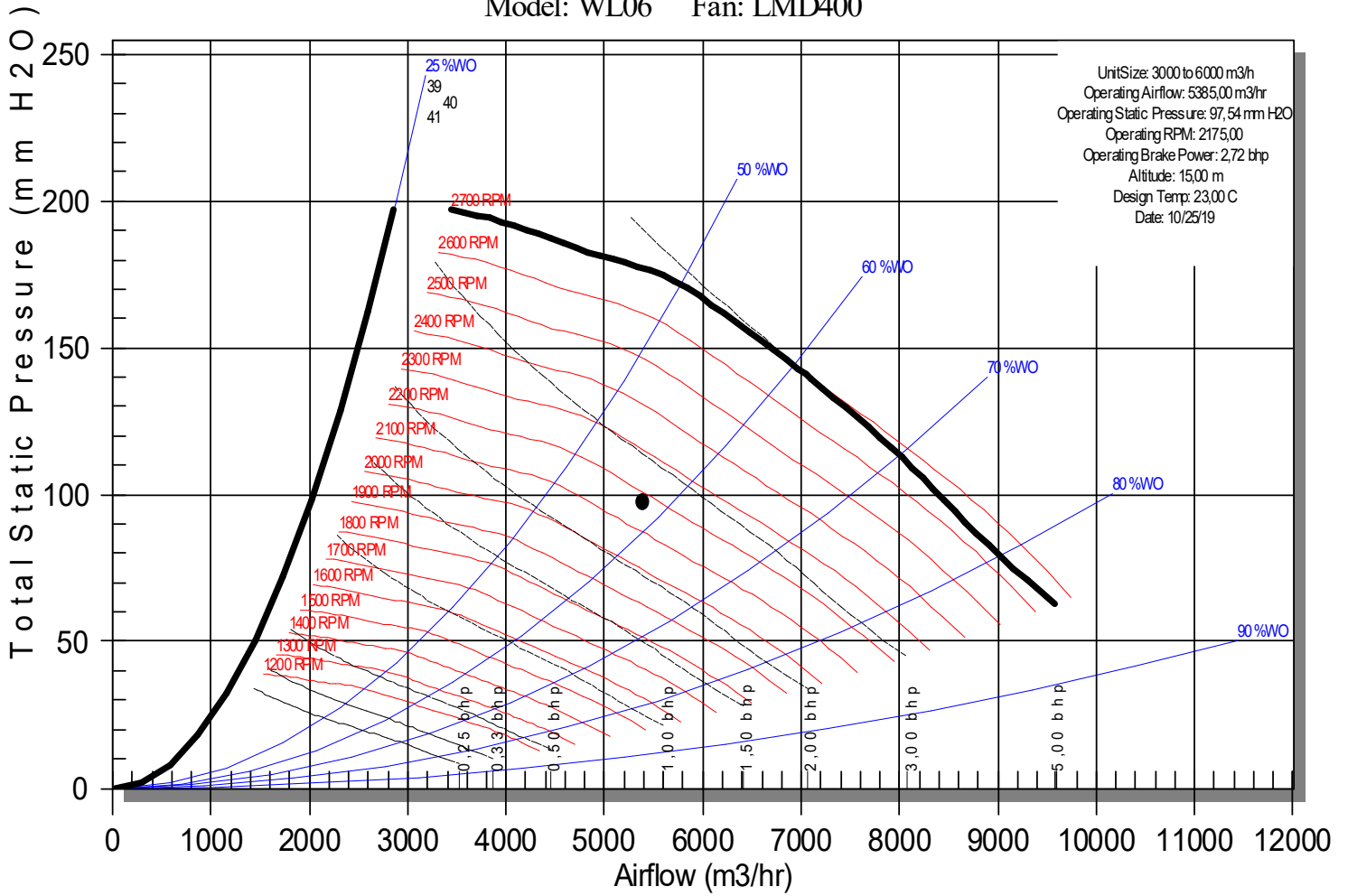
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-52

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-53
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA06AGDDK-FH00Y10B6AWBAH00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Aplicable	Cabinet Effect Loss	9,62 mm H2O
Mixing Box Air Pressure Drop	3,11 mm H2O	Filter Air Pressure Drop	33,36 mm H2O

Coil			
Cooling Entering Dry Bulb	23,0 C	Cooling Entering Wet Bulb	16,7 C
Cooling Leaving Dry Bulb	13,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,58 m3/hr
Cooling Capacity	18,05 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 4.5 kw
Heating Capacity	9,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	13,3 C	Cooling Airflow	5385,00 m3/hr
Sensible Capacity	17,84 kW	Cooling Leaving Wet Bulb	13,0 C
Cooling Water Volume	17,23 L	Cooling Water Velocity	0,3 m/s
Cooling Water Pressure Drop	156,64 mm H2O	Cooling Air Pressure Drop	14,01 mm H2O
Cooling Coil Wet Weight	207 kg	Actual Cooling Face Velocity	2,7 m/s
Electric Heat PD	4,74 mm H2O		

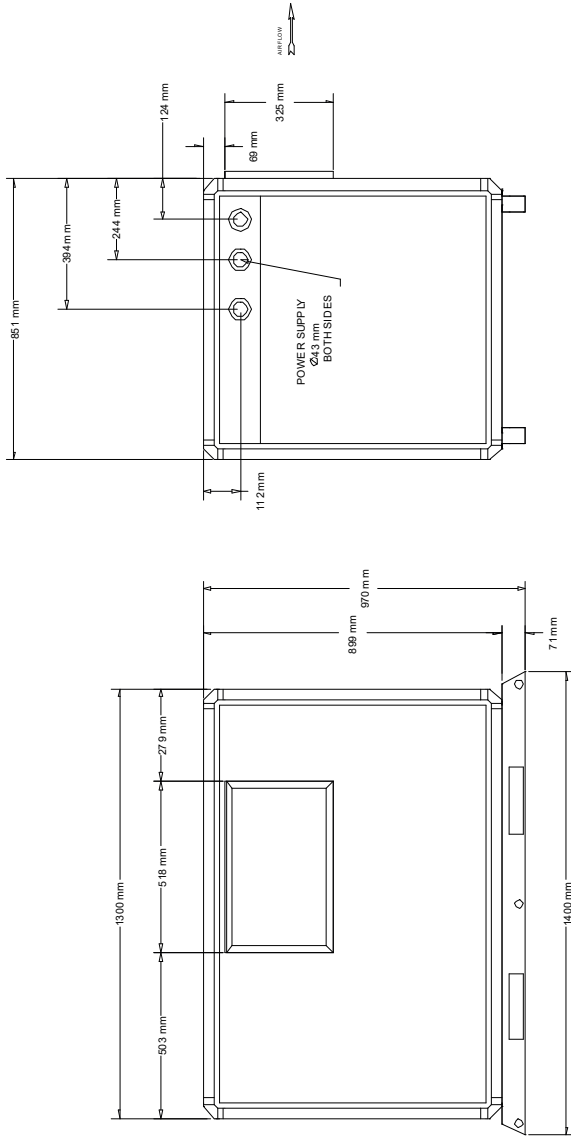
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	32,69 mm H2O	Total Static Pressure	97,54 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,72 bhp
Fan RPM	2175 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	11,0 m/s	Velocity Pressure	73,2 Pa

Humidifier	
Humidification	w/o Humidification /

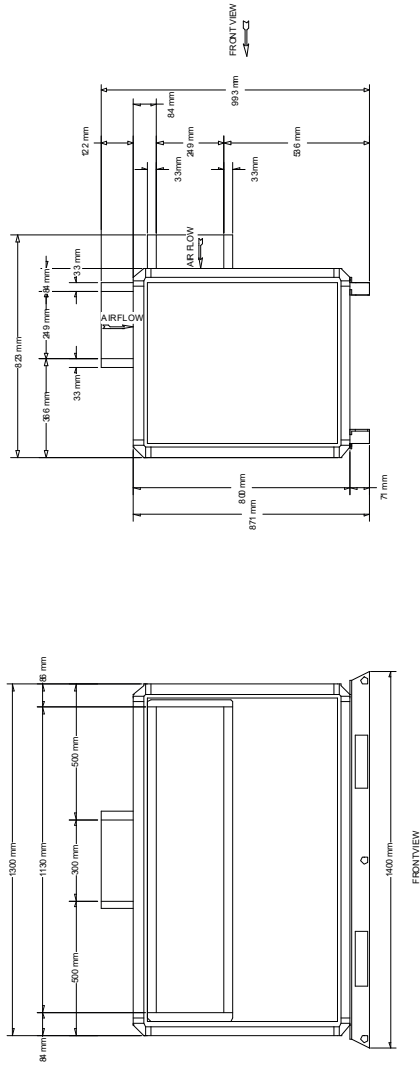


Not Applicable

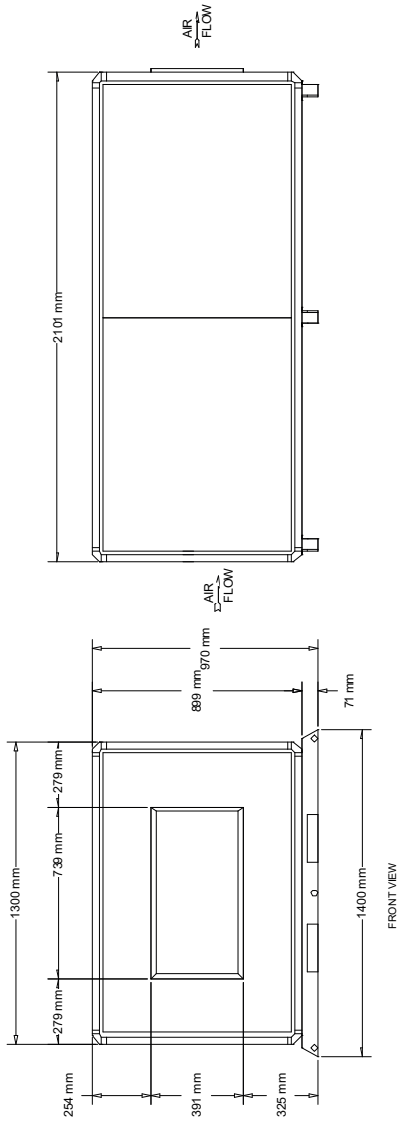
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



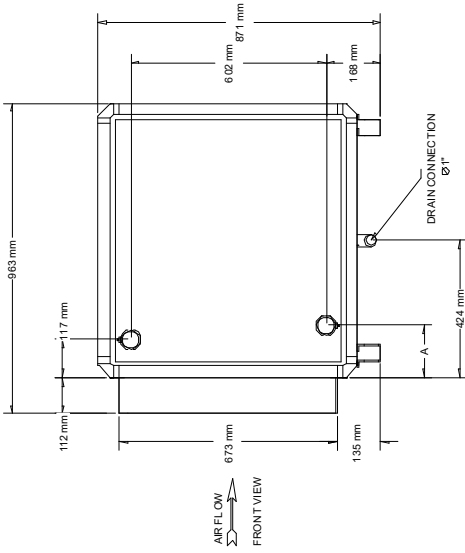
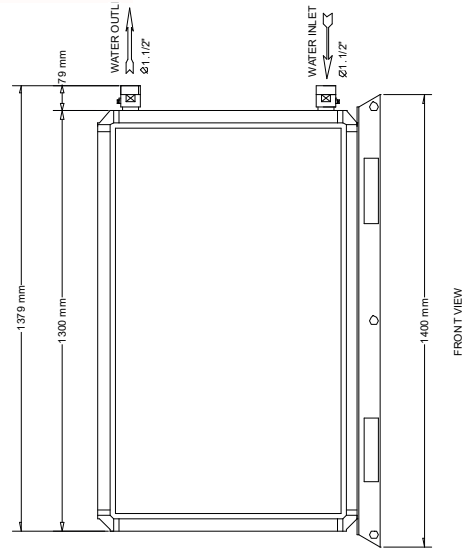
FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06



MIXER BOX SECTION
WAVE DOBLE 06

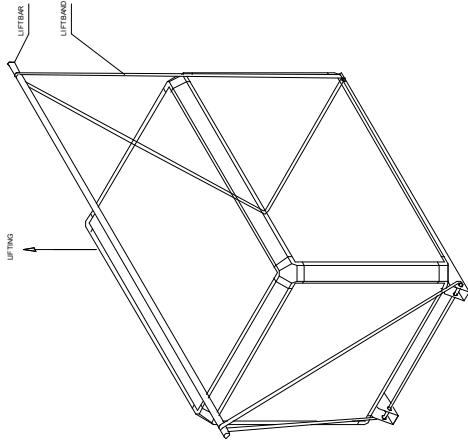


FINAL FILTER MODULE (LIMIT LOAD)
WAVE DOBLE 06

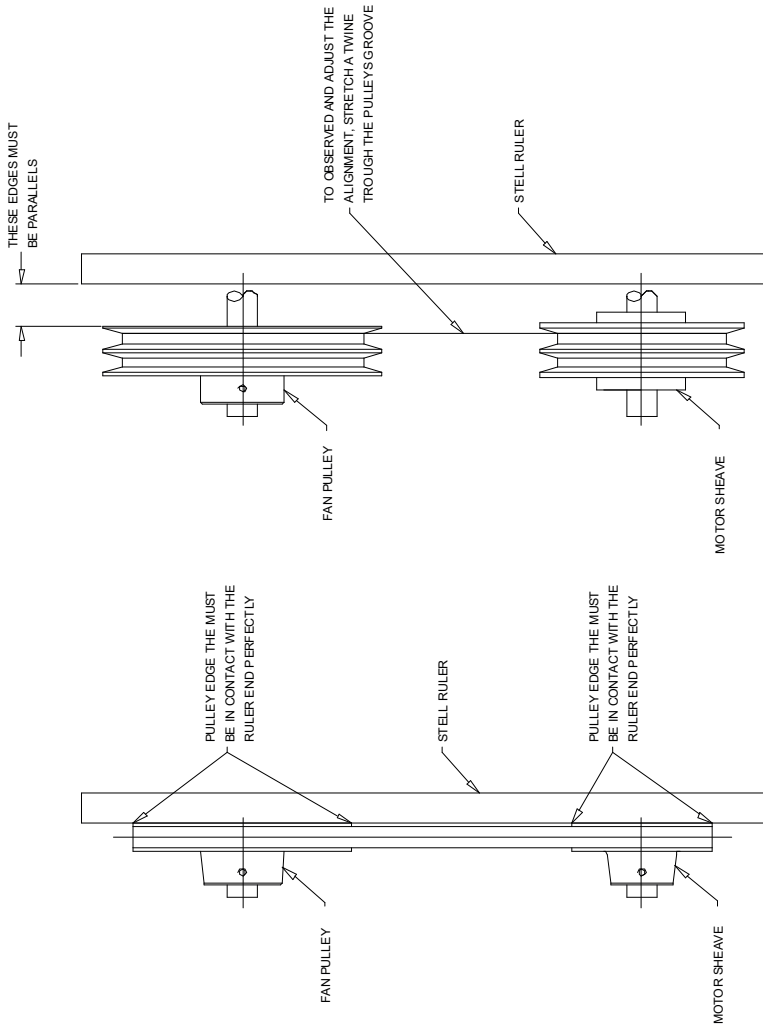


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06

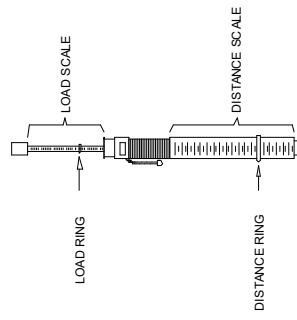
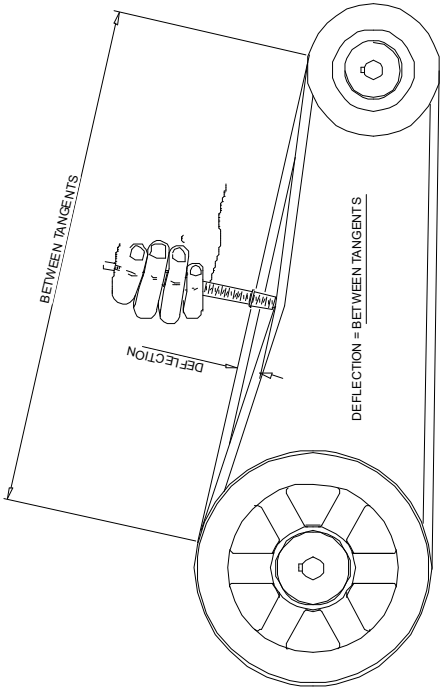
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



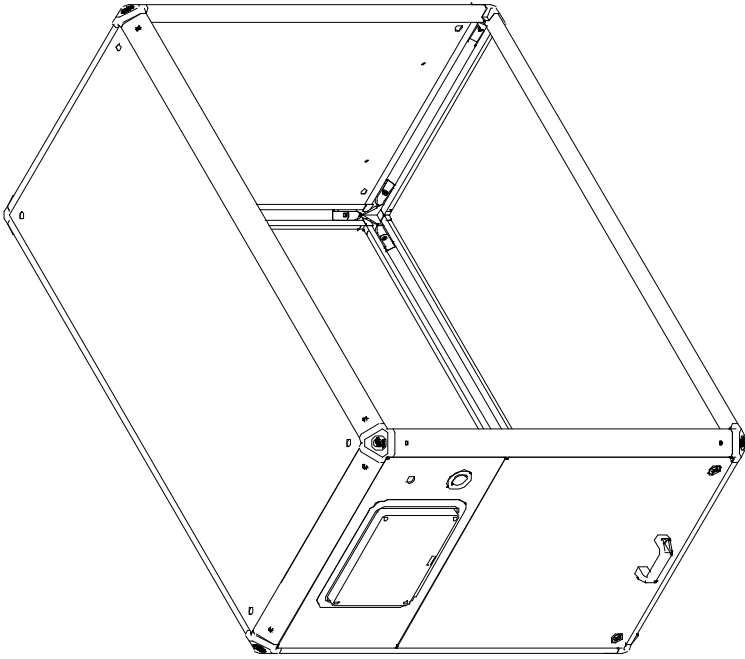
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

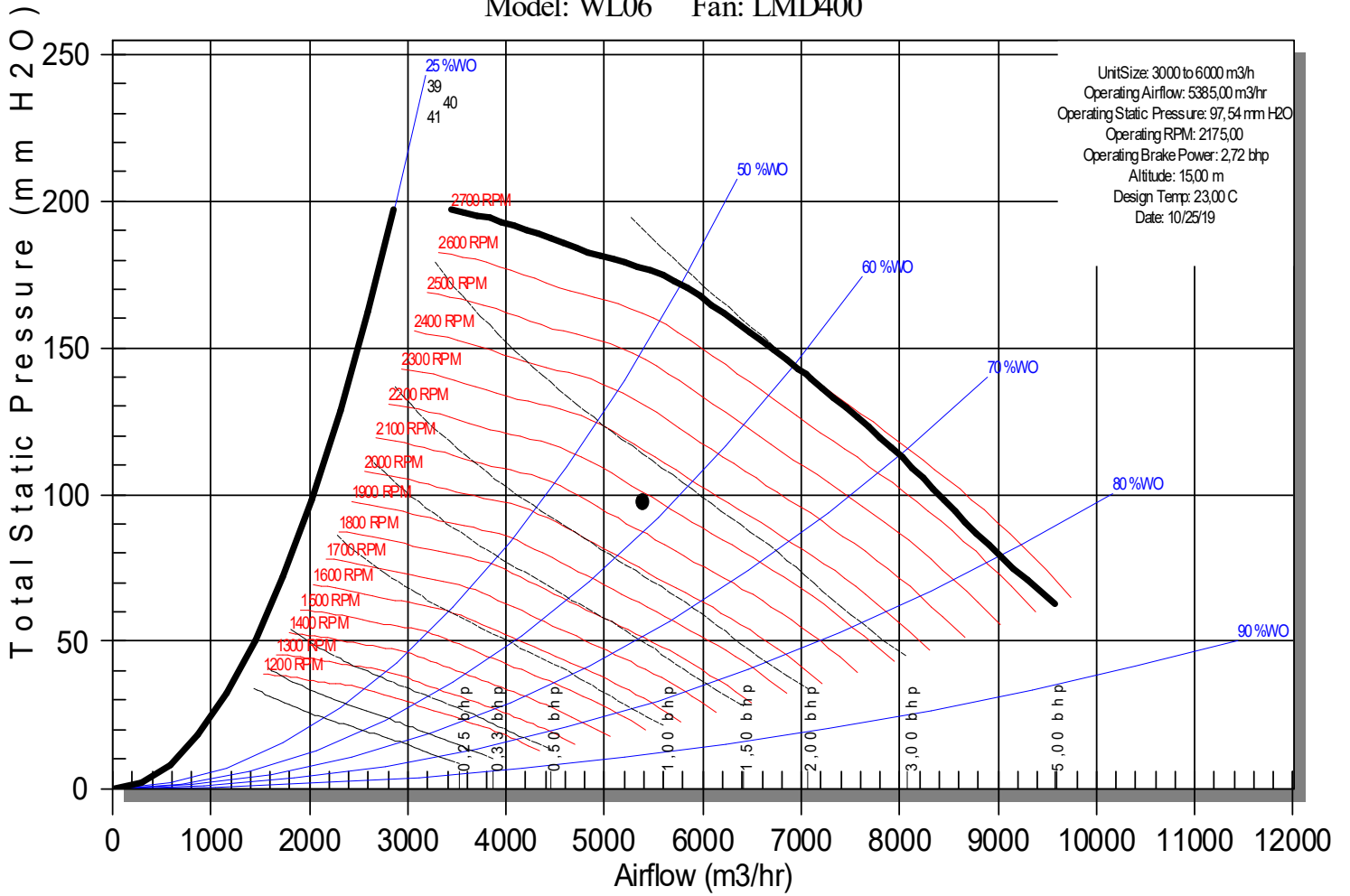
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-53

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-54
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA10AGADKTHGO 0Y00B6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	5500 to 10000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	12,68 mm H2O
Mixing Box Air Pressure Drop	2,92 mm H2O	Filter Air Pressure Drop	25,49 mm H2O

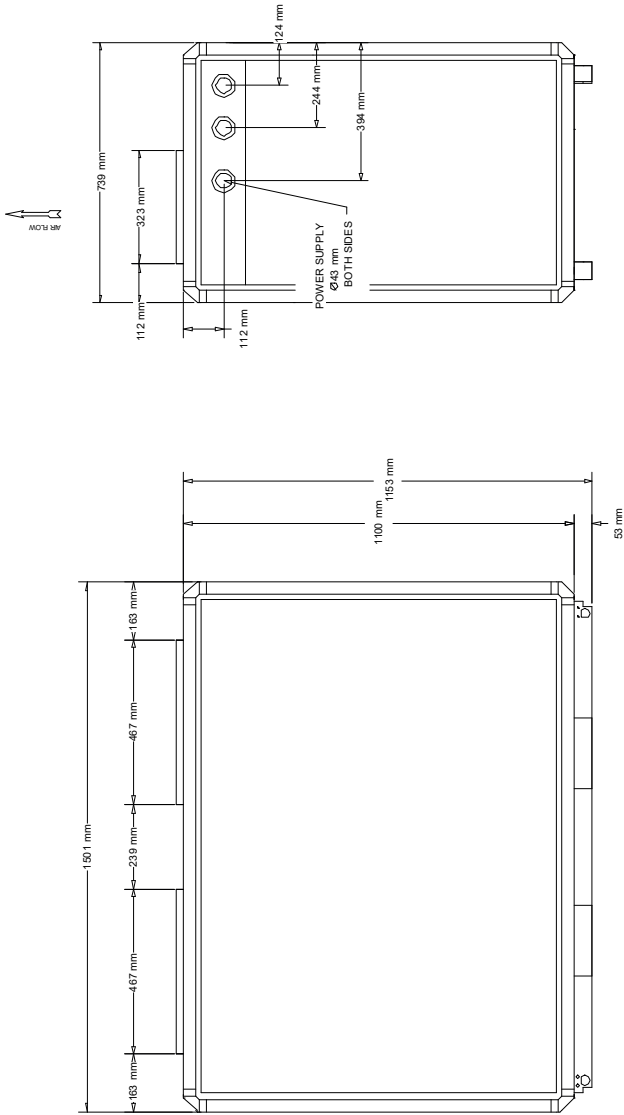
Coil			
Cooling Entering Dry Bulb	25,7 C	Cooling Entering Wet Bulb	19,8 C
Cooling Leaving Dry Bulb	12,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	8,65 m3/hr
Cooling Capacity	60,51 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	8350,00 m3/hr	Sensible Capacity	38,17 kW
Cooling Leaving Wet Bulb	12,2 C	Cooling Water Volume	28,74 L
Cooling Water Velocity	0,7 m/s	Cooling Water Pressure Drop	842,07 mm H2O
Cooling Air Pressure Drop	19,04 mm H2O	Cooling Coil Wet Weight	306 kg
Actual Cooling Face Velocity	2,6 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	90,13 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	4,48 bhp
Fan RPM	2923 rpm	Transmission Option	G
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	9,6 m/s	Velocity Pressure	55,9 Pa

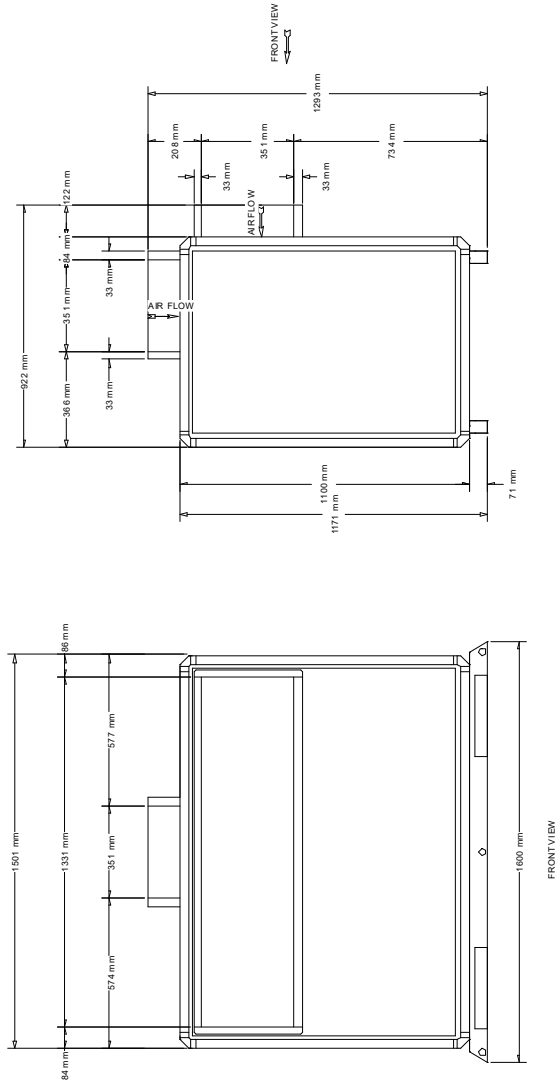
Humidifier	
Humidification	w/o Humidification / Not Applicable



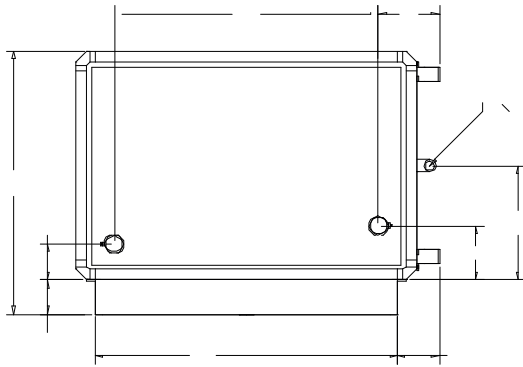
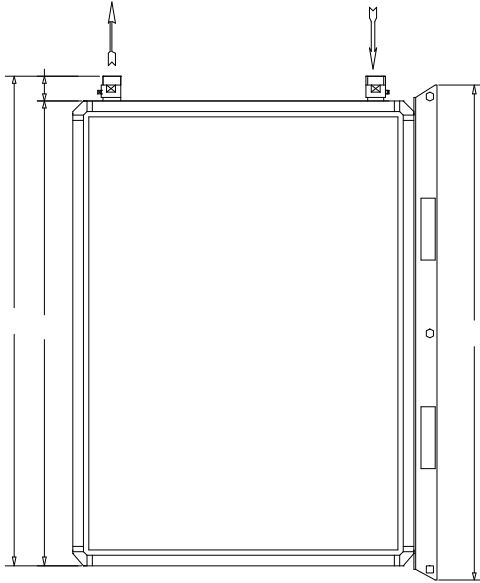
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

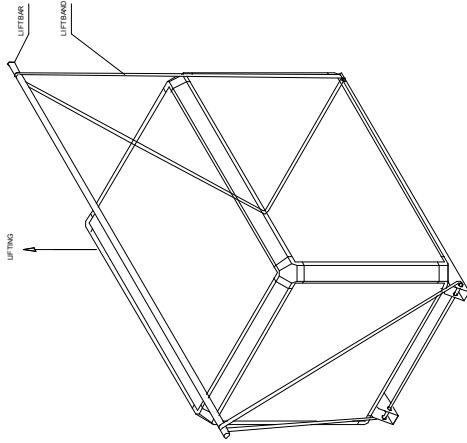


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 10

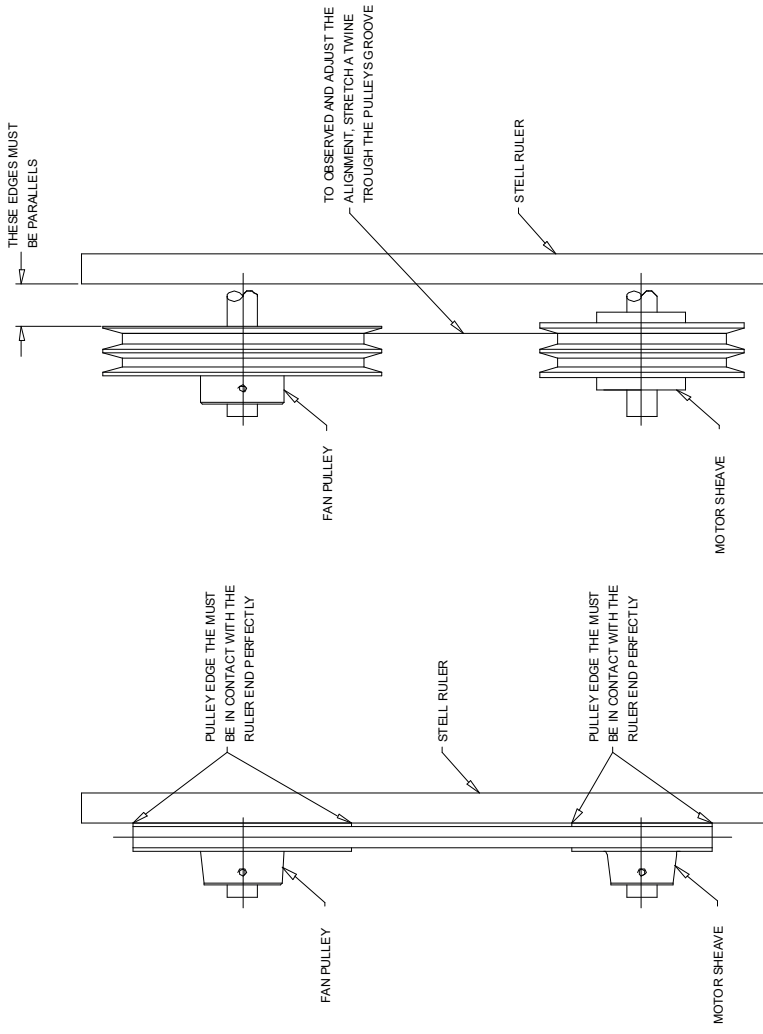


MIXER BOX SECTION
WAVE DOBLE 10

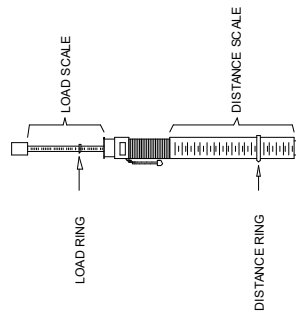
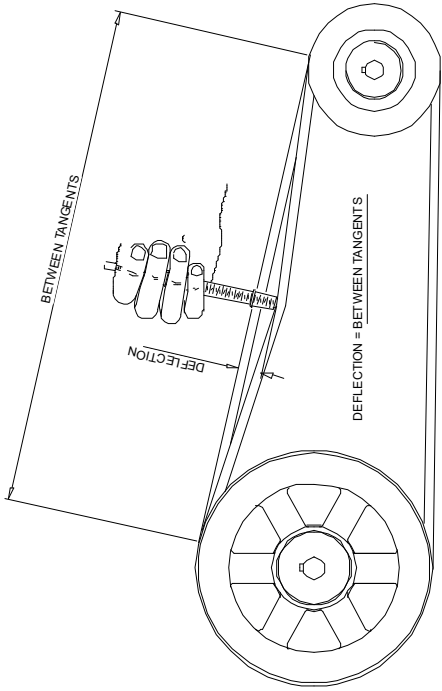




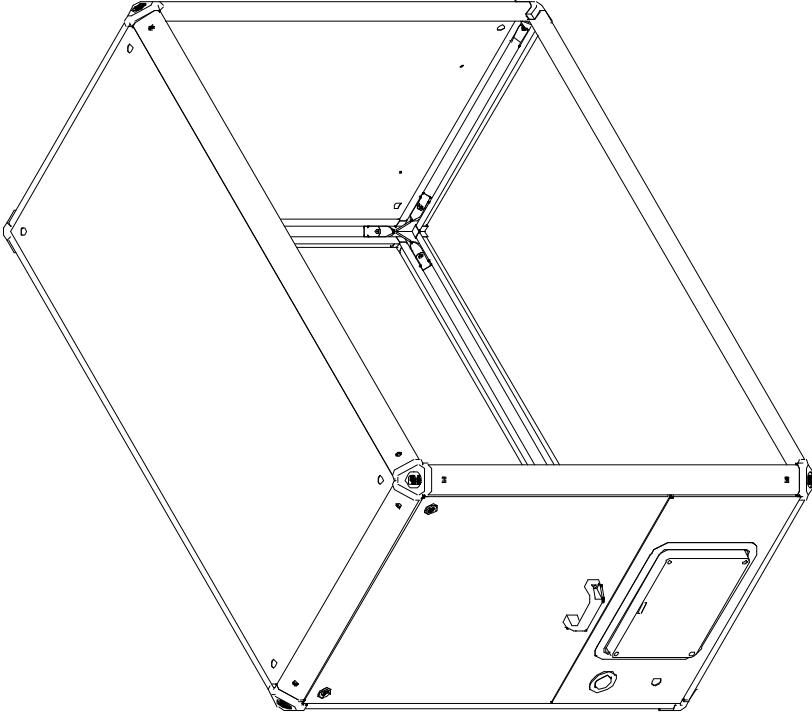
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

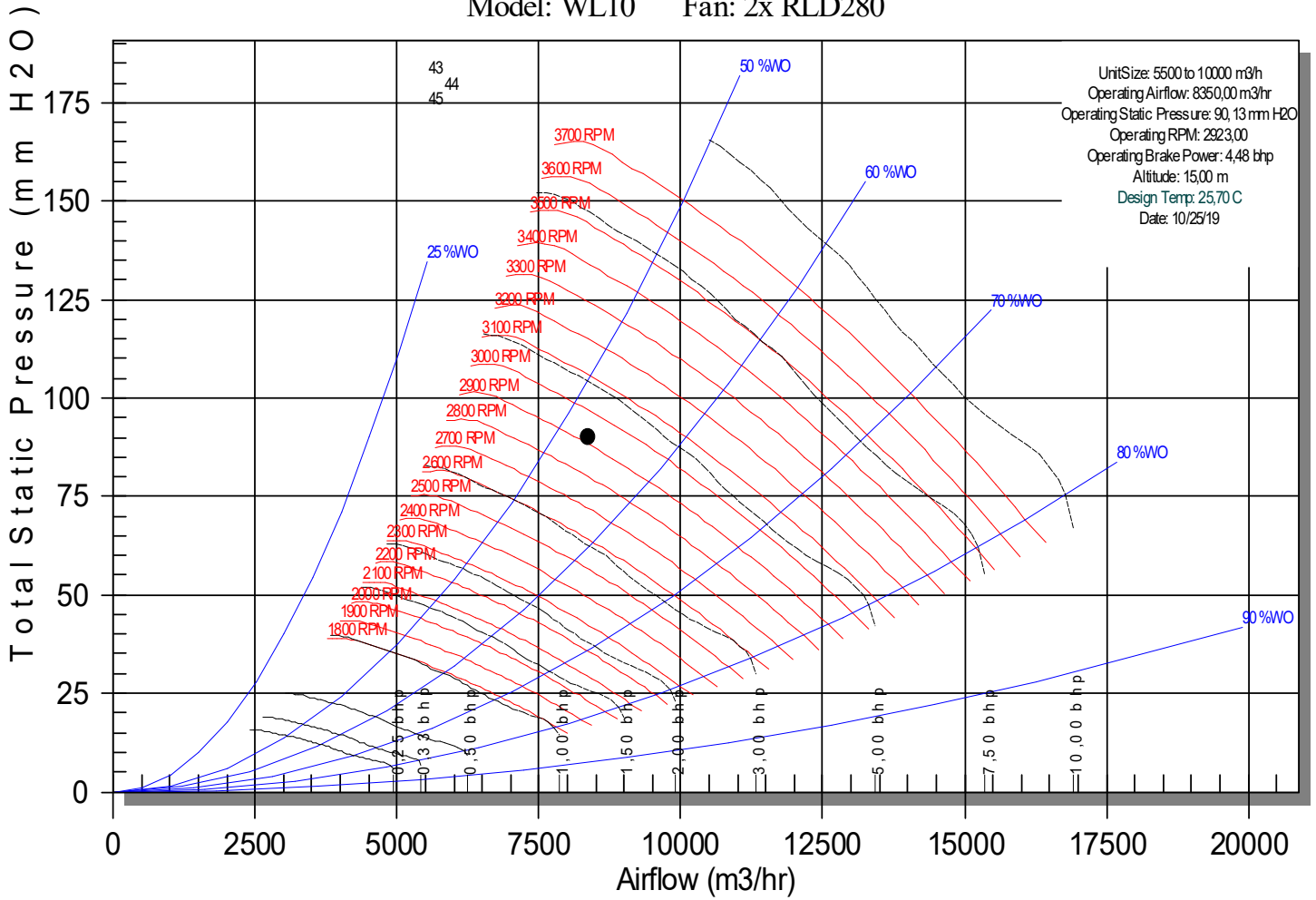
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-54

Model: WL10 Fan: 2x RLD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-55
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	14,1 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

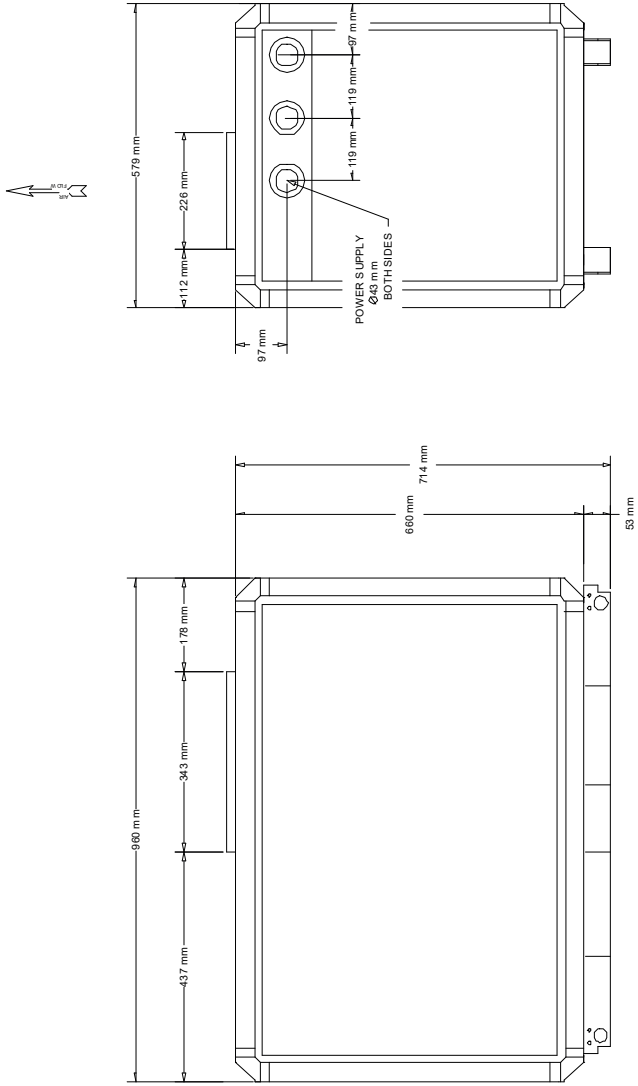
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

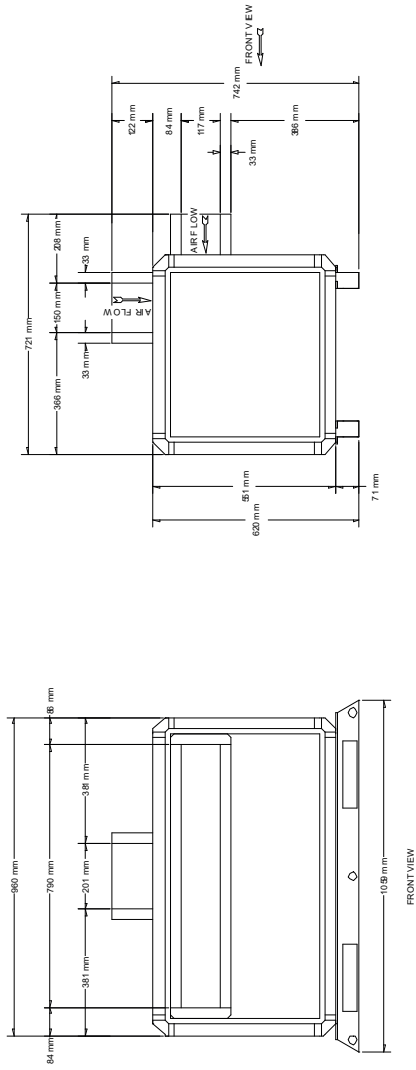


Not Applicable

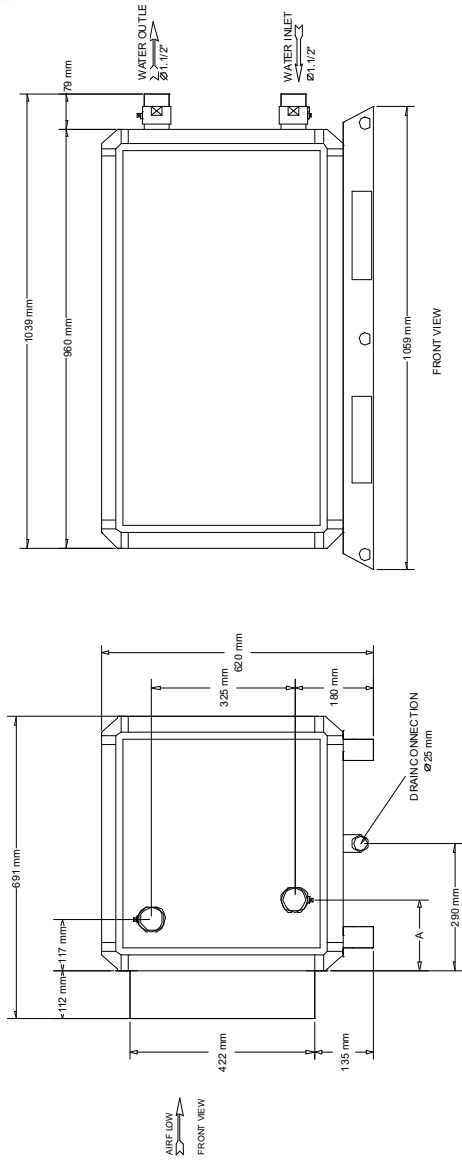
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

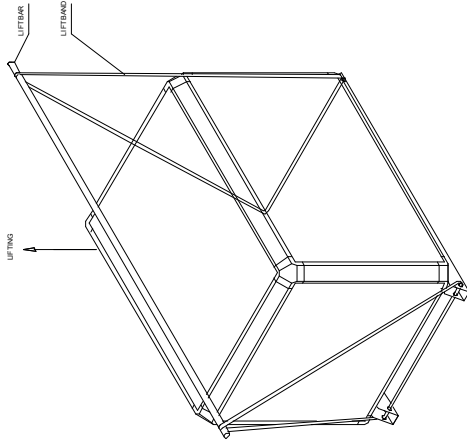


MIXER BOX SECTION
WAVE DOBLE 02

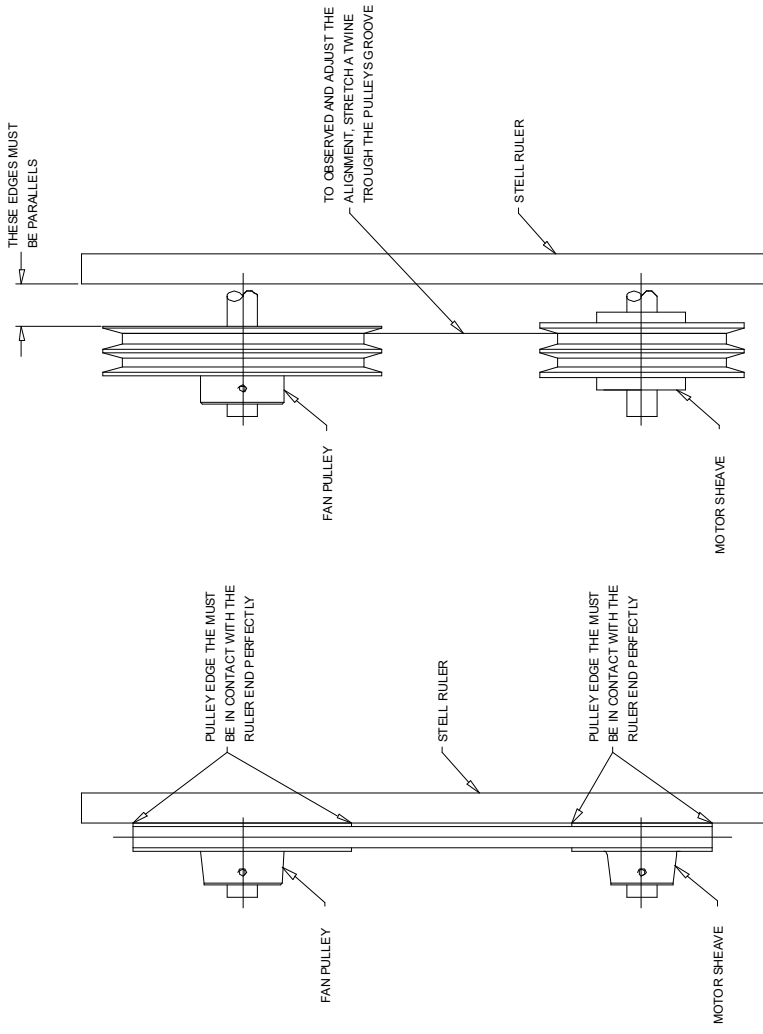


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

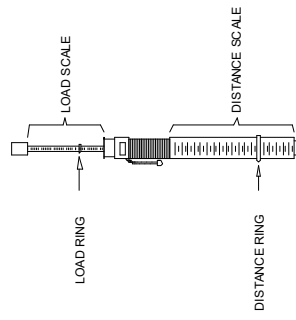
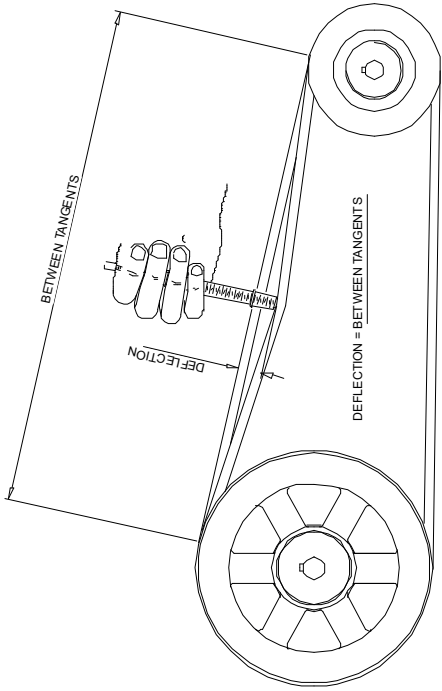
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



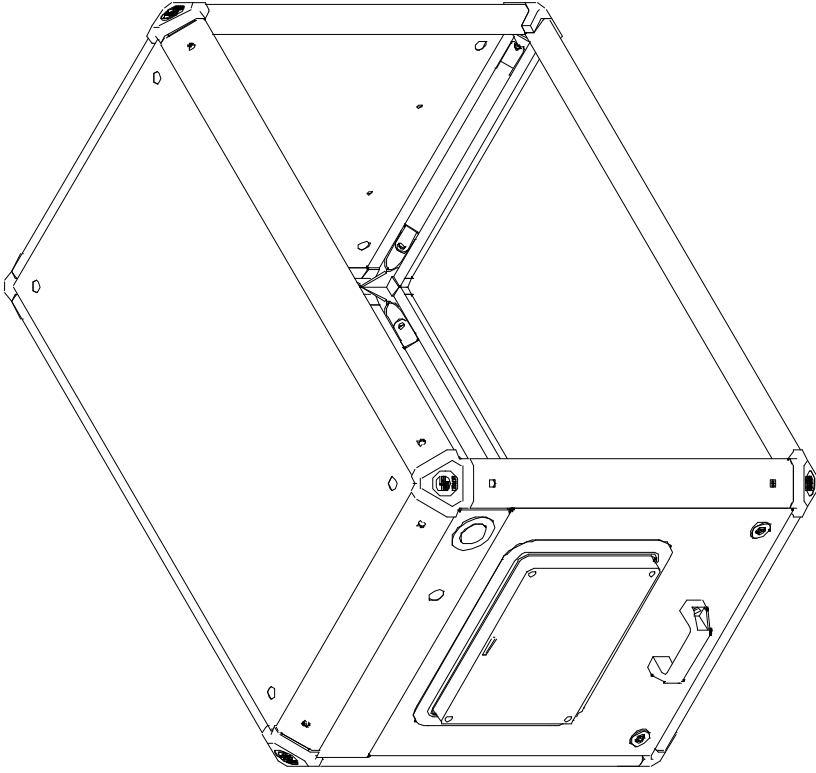
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



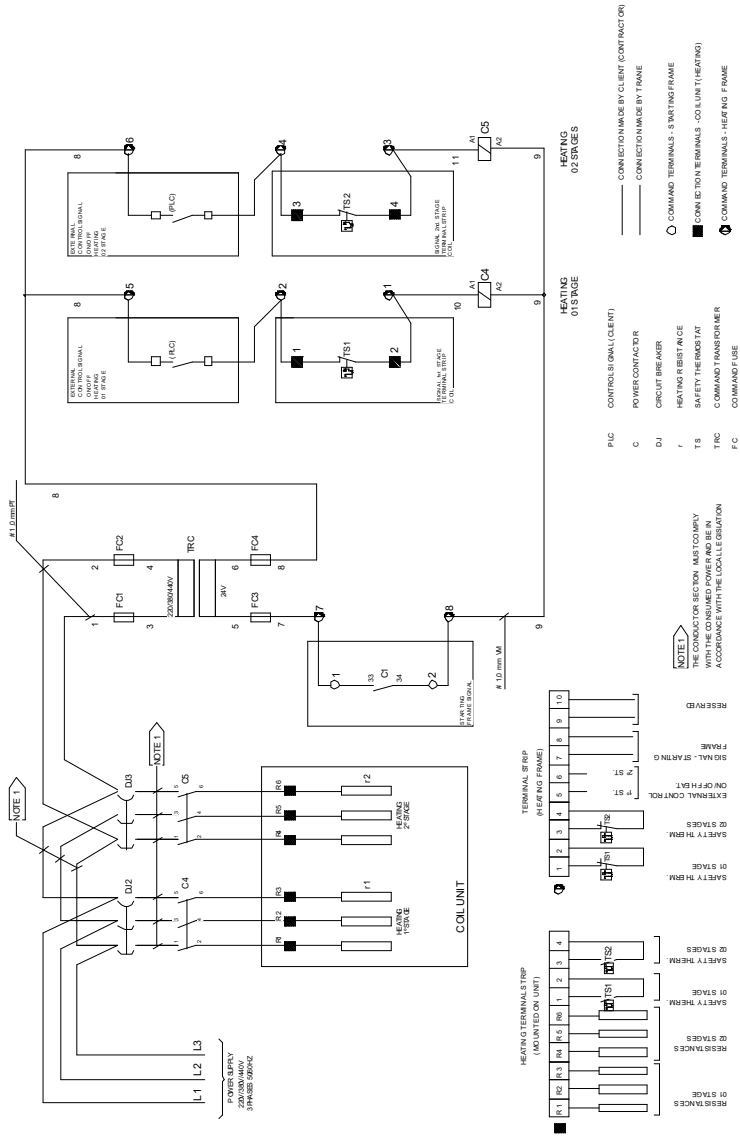
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

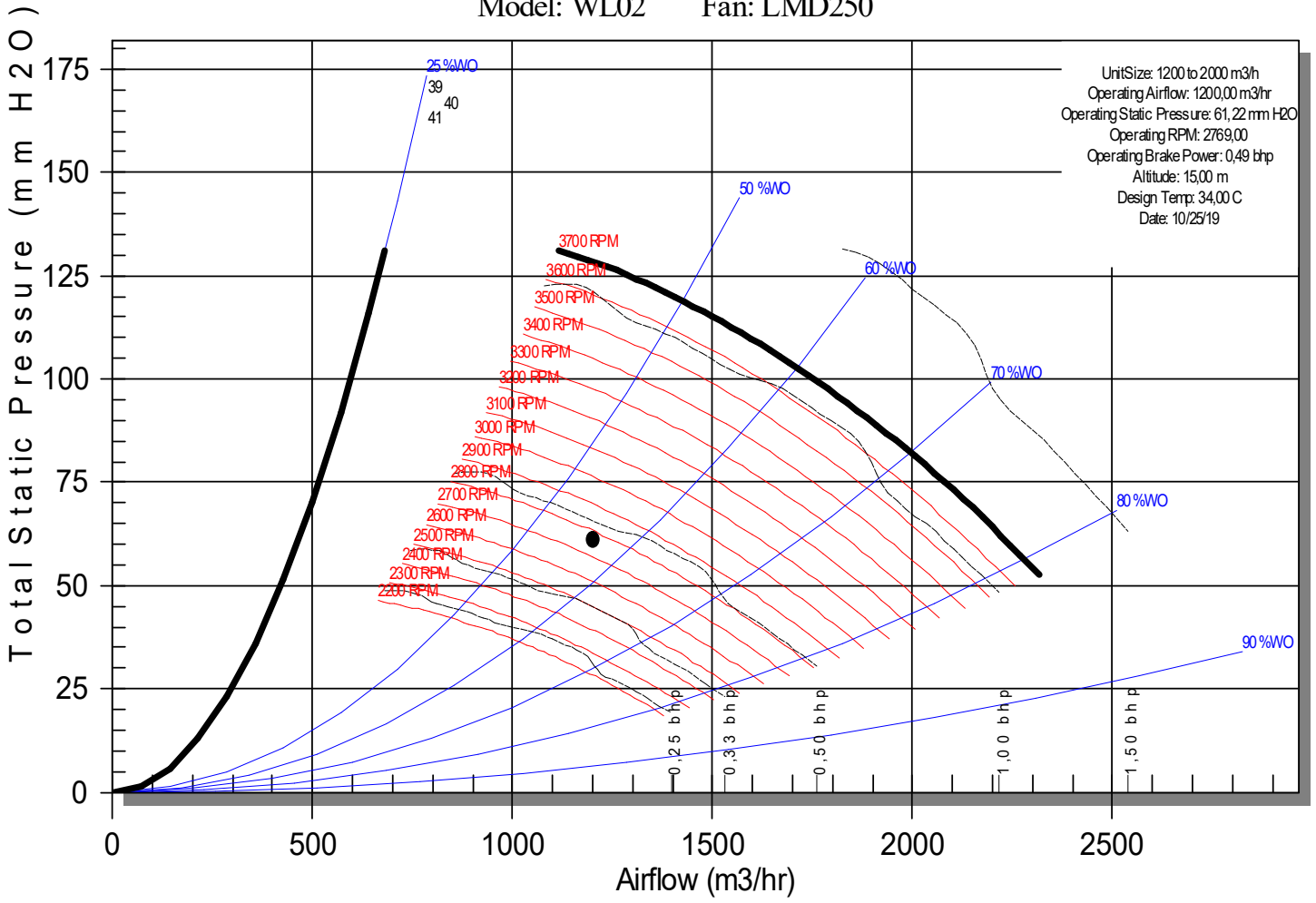
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-55

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-56
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	15,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

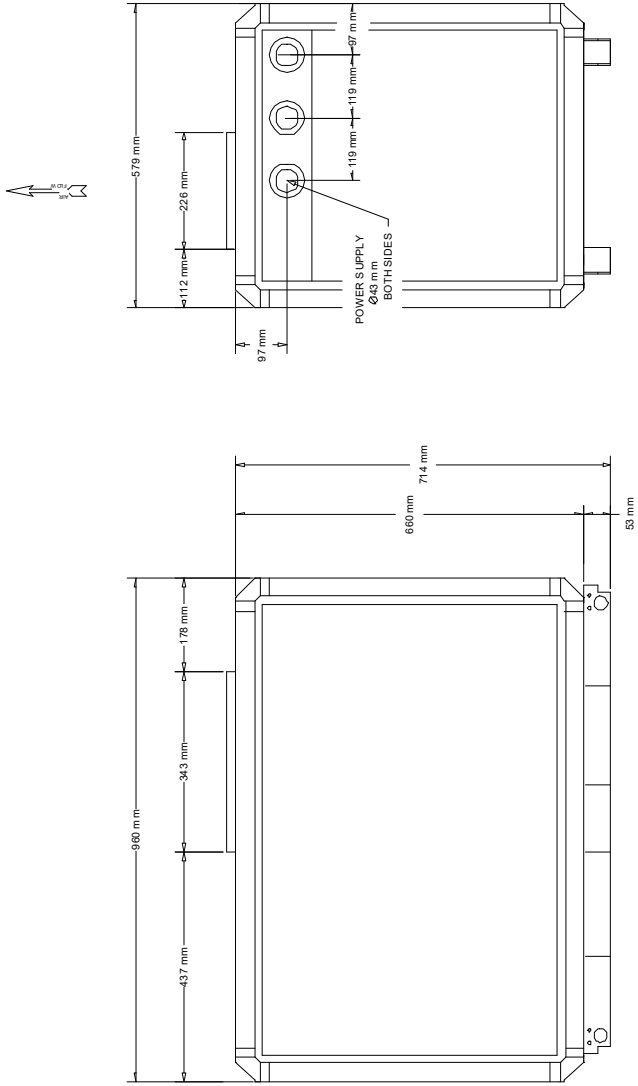
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

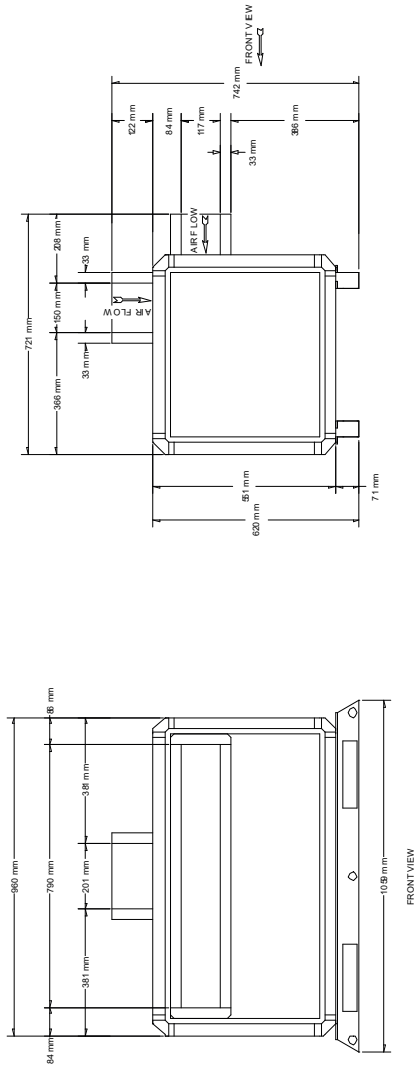


Not Applicable

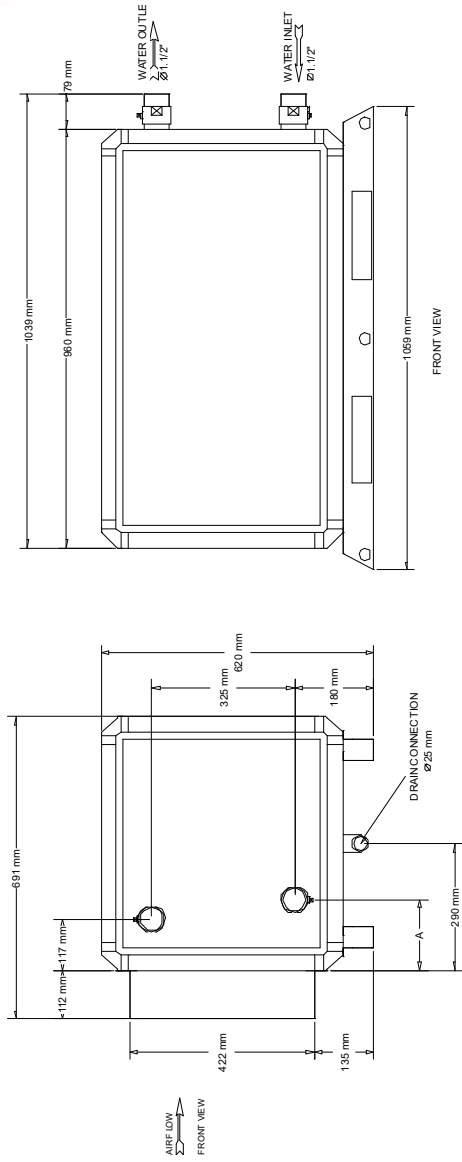
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

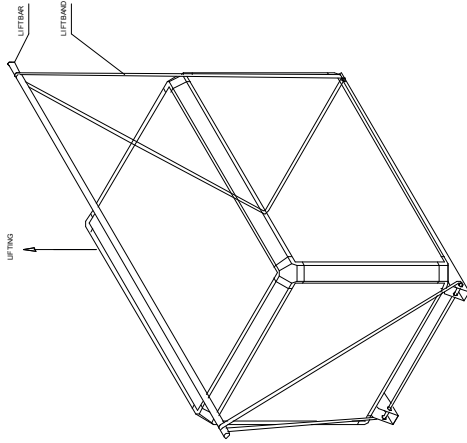


MIXER BOX SECTION
WAVE DOBLE 02

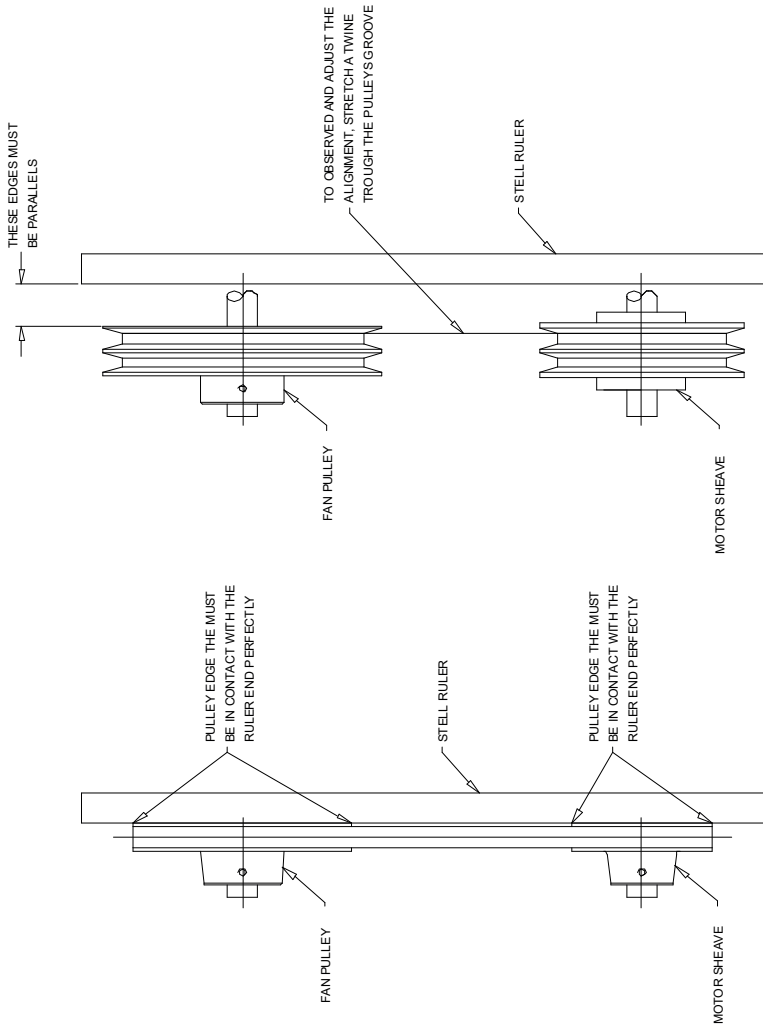


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

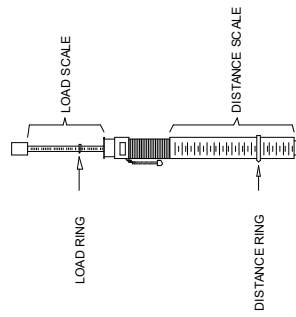
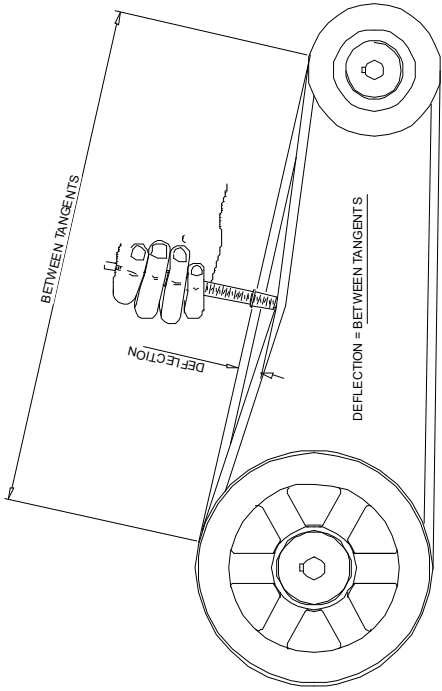
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



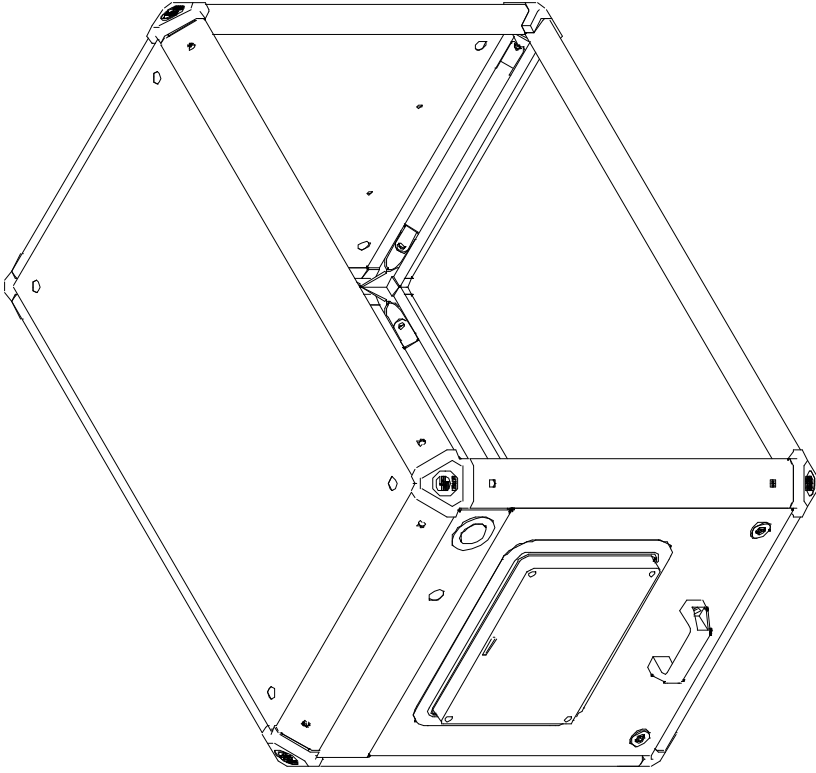
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



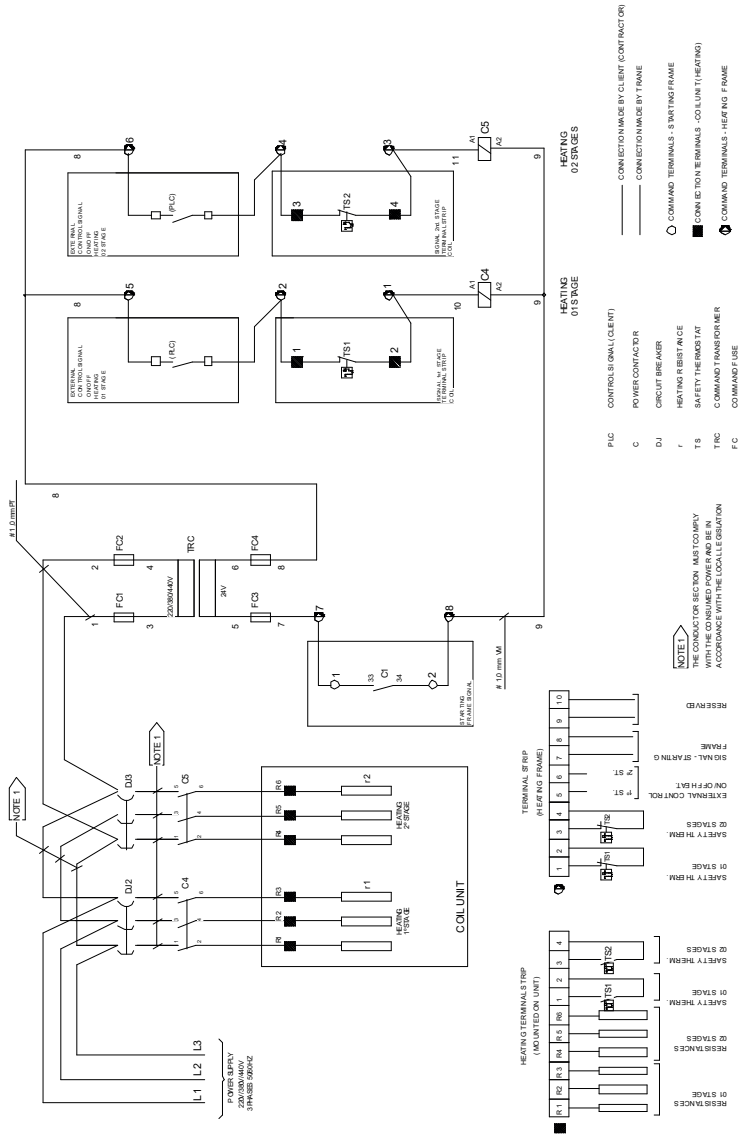
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

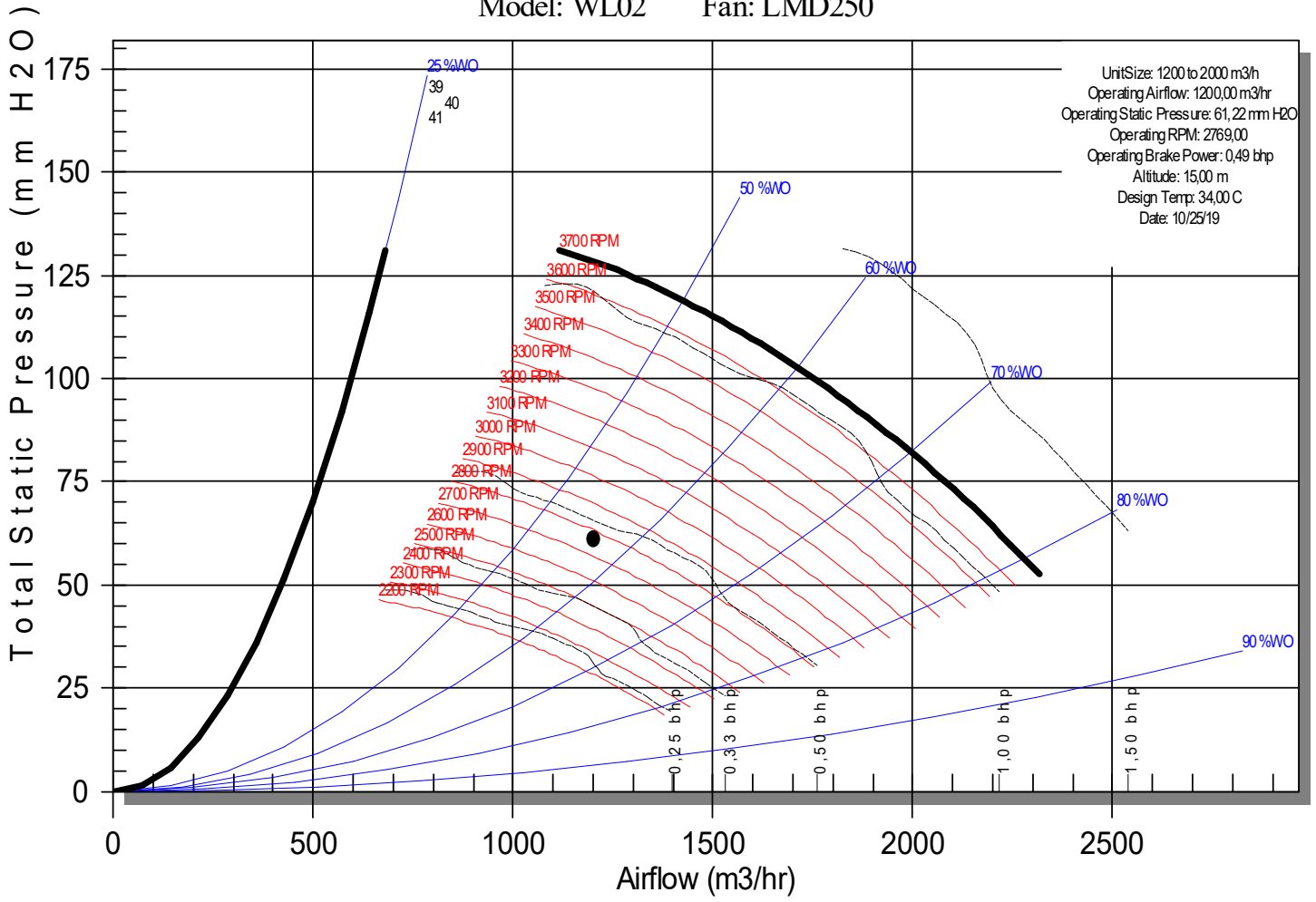
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-56

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-57
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,8 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

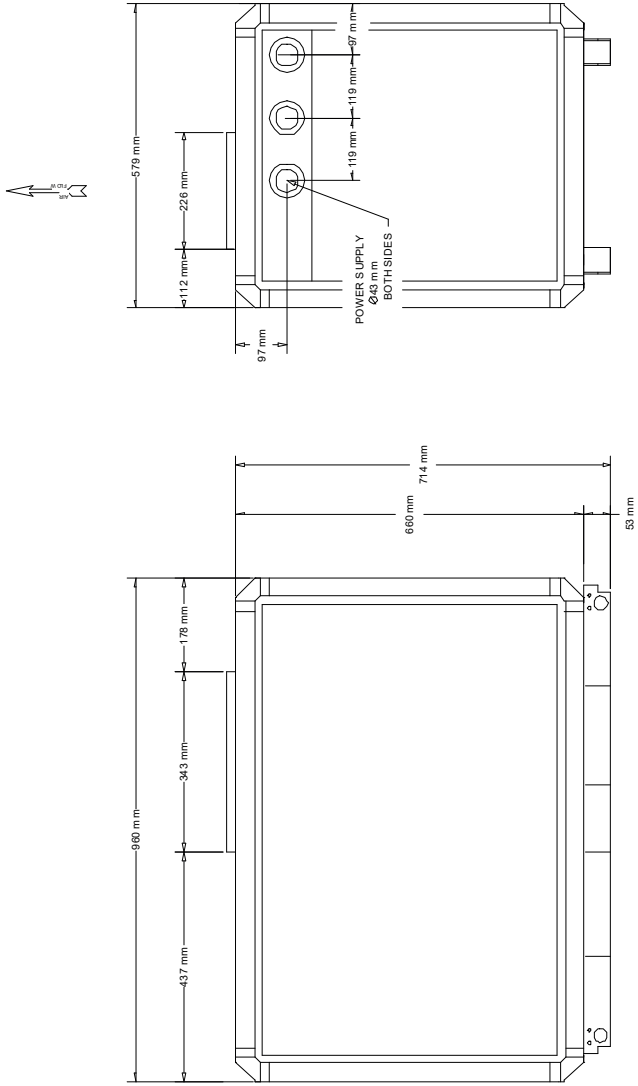
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

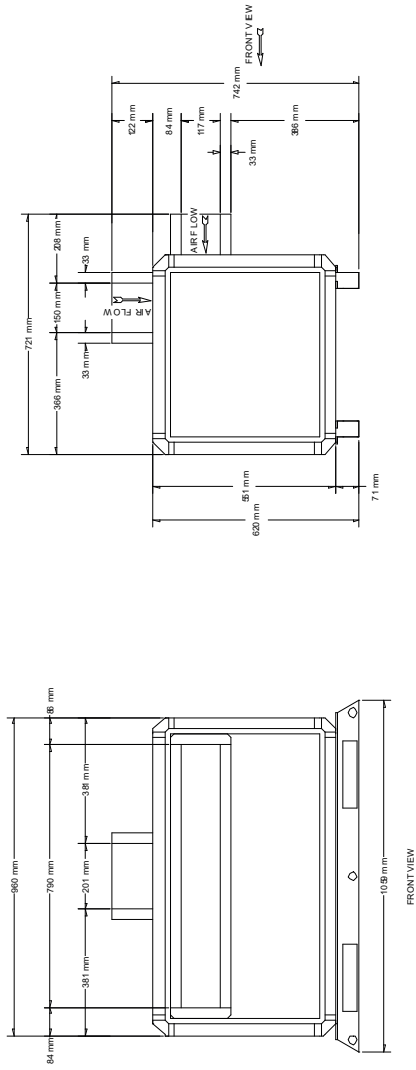


Not Applicable

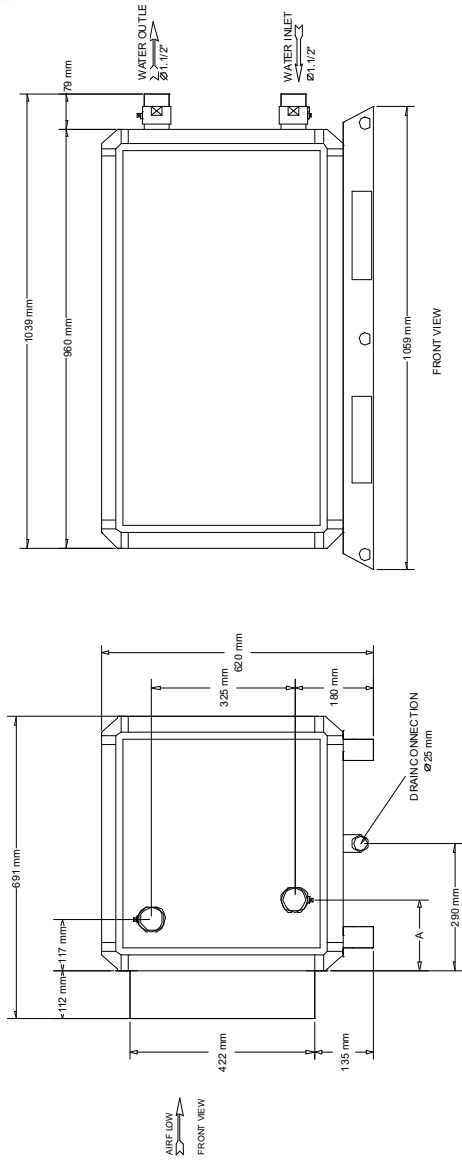
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

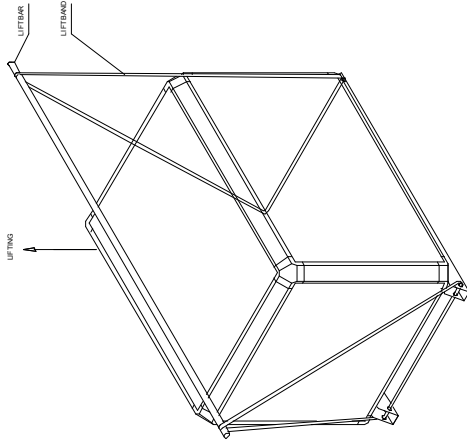


MIXER BOX SECTION
WAVE DOBLE 02

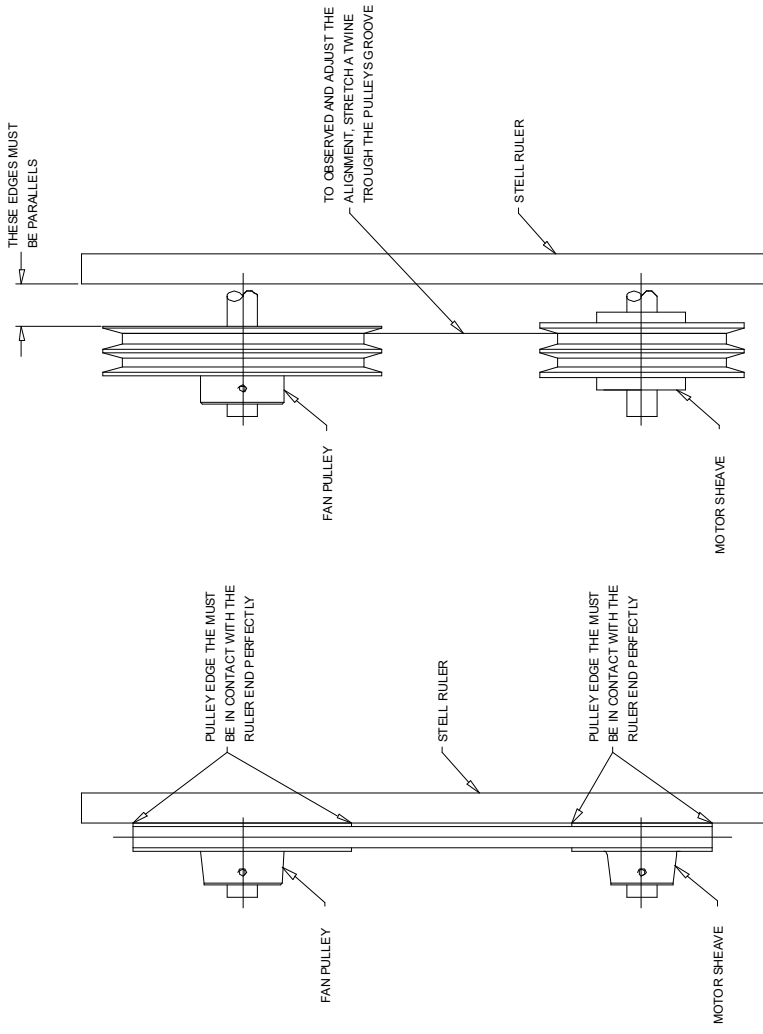


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

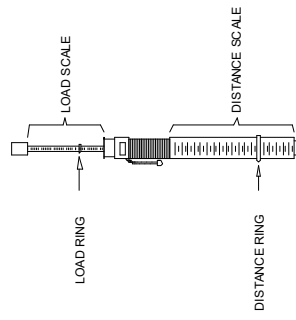
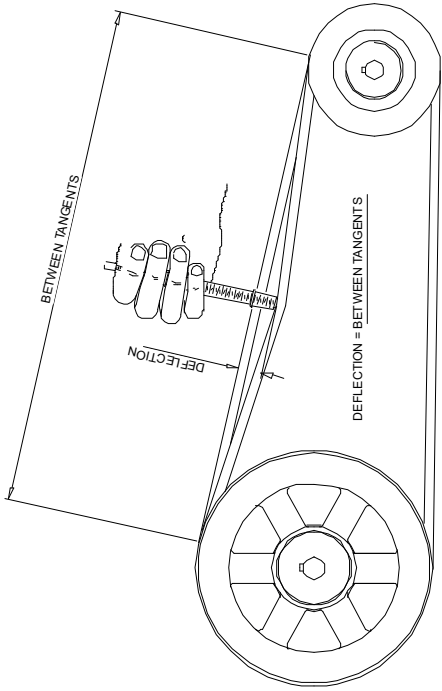
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



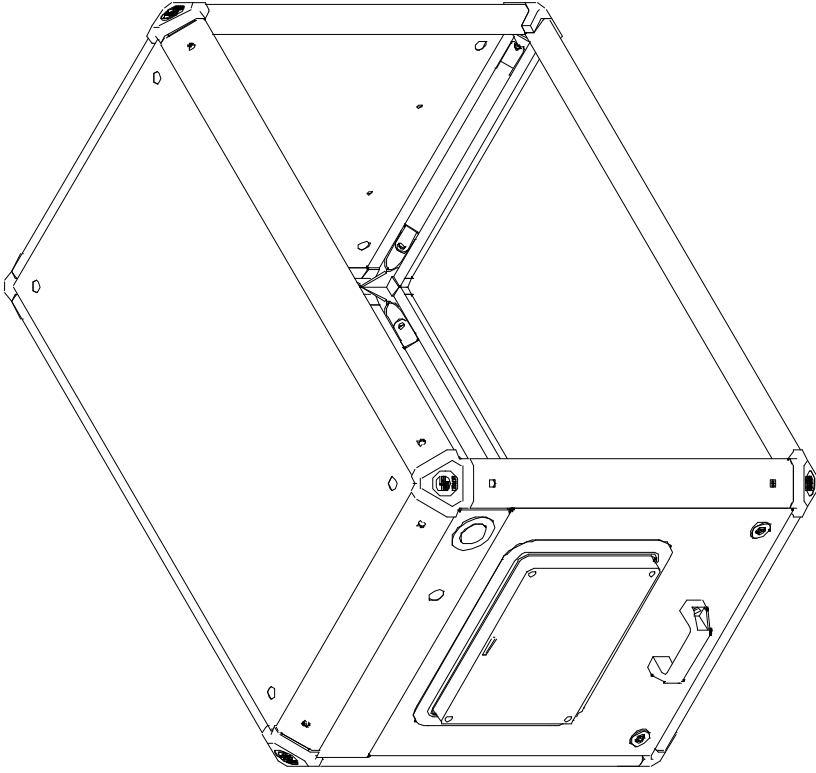
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



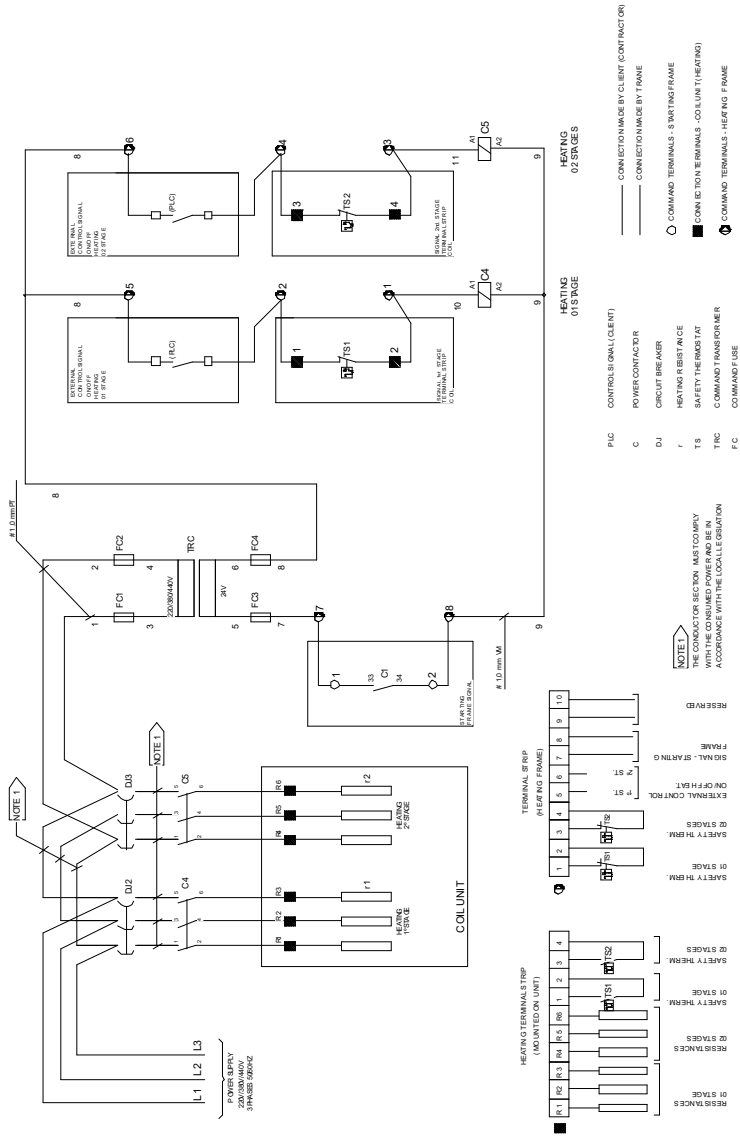
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

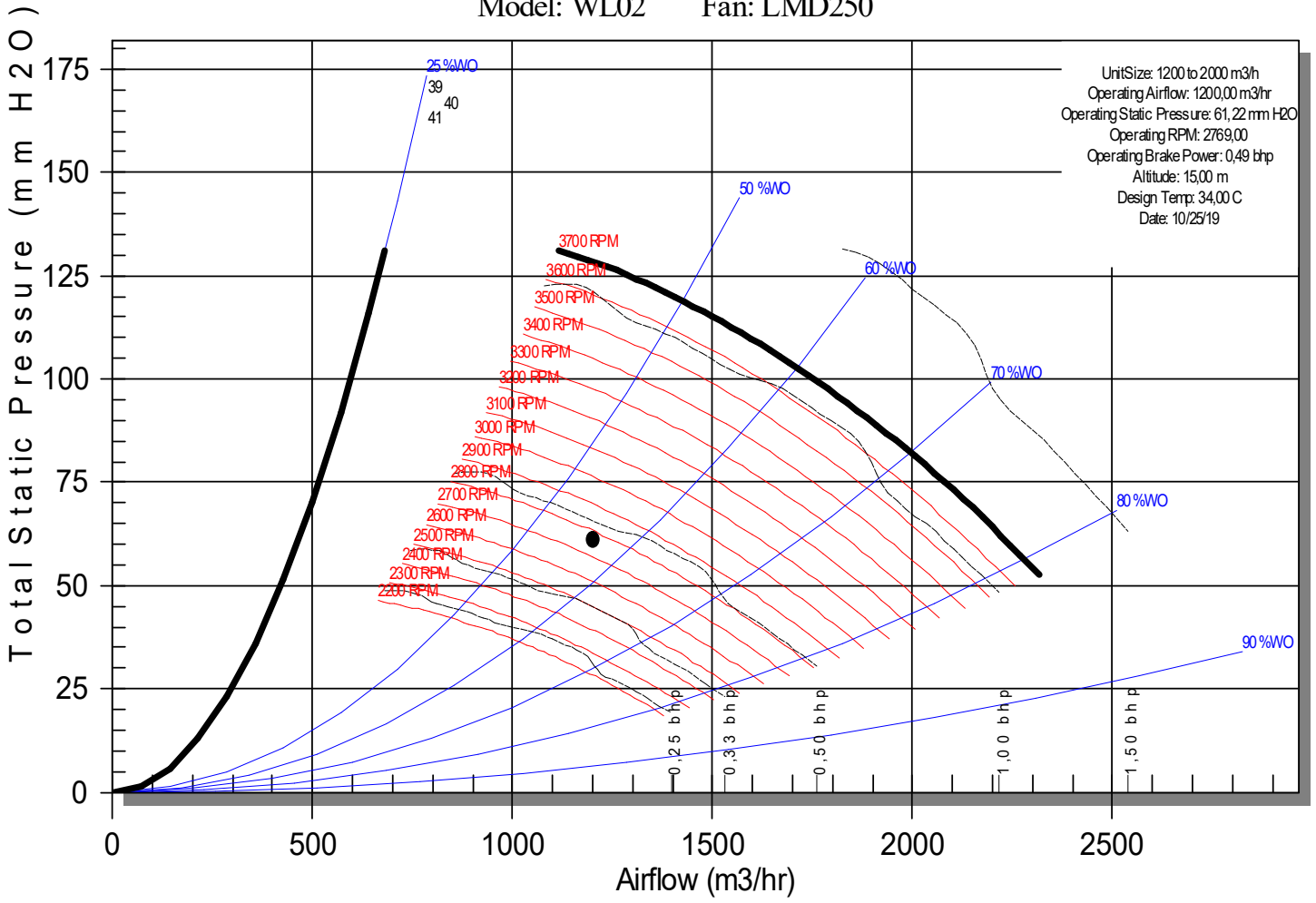
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-57

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-58
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTFGO 0Y00B8AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,70 mm H2O
Mixing Box Air Pressure Drop	2,51 mm H2O	Filter Air Pressure Drop	26,57 mm H2O

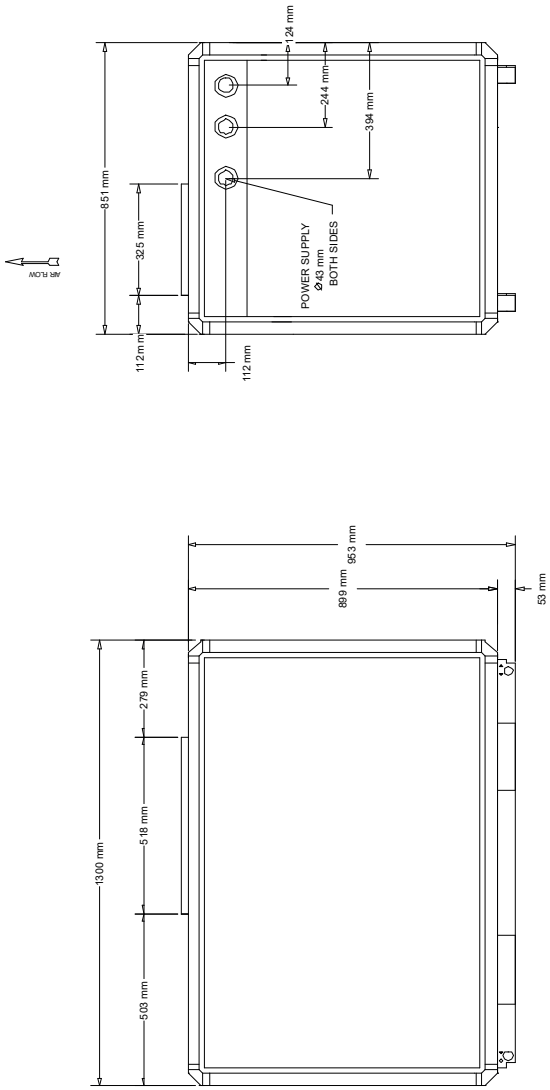
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	12,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	12,10 m3/hr
Cooling Capacity	84,62 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4850,00 m3/hr	Sensible Capacity	36,62 kW
Cooling Leaving Wet Bulb	12,3 C	Cooling Water Volume	21,98 L
Cooling Water Velocity	1,4 m/s	Cooling Water Pressure Drop	3184,54 mm H2O
Cooling Air Pressure Drop	20,99 mm H2O	Cooling Coil Wet Weight	272 kg
Actual Cooling Face Velocity	2,4 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Aplicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	90,77 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,26 bhp
Fan RPM	2081 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,9 m/s	Velocity Pressure	59,4 Pa

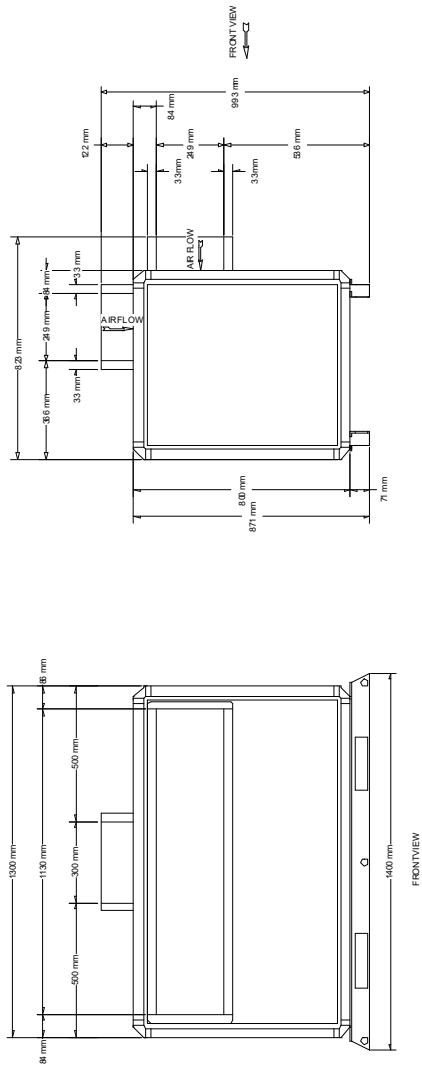
Humidifier	
Humidification	w/o Humidification / Not Applicable



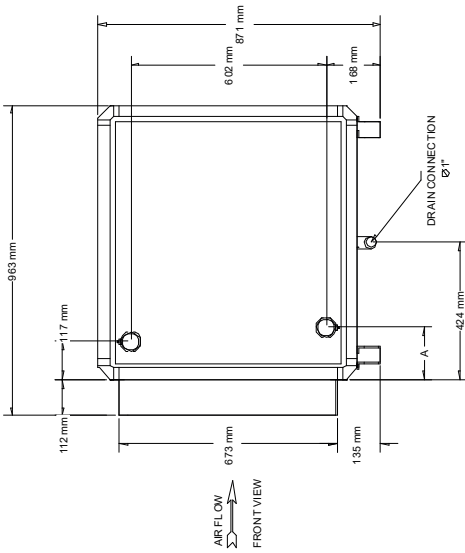
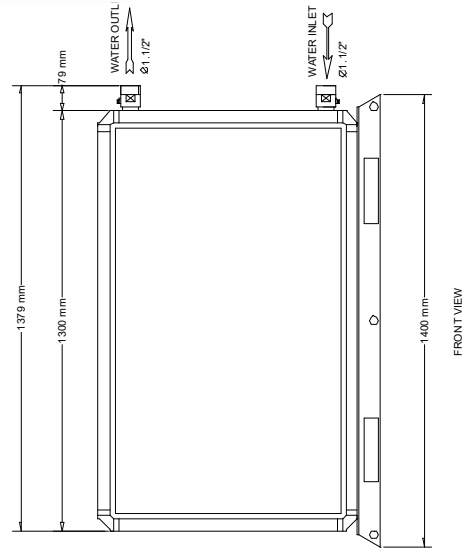
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

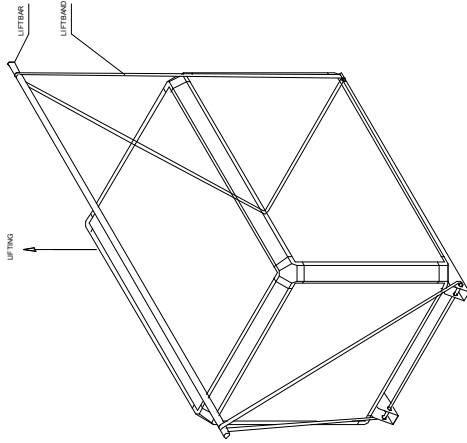


MIXER BOX SECTION
WAVE DOBLE 06

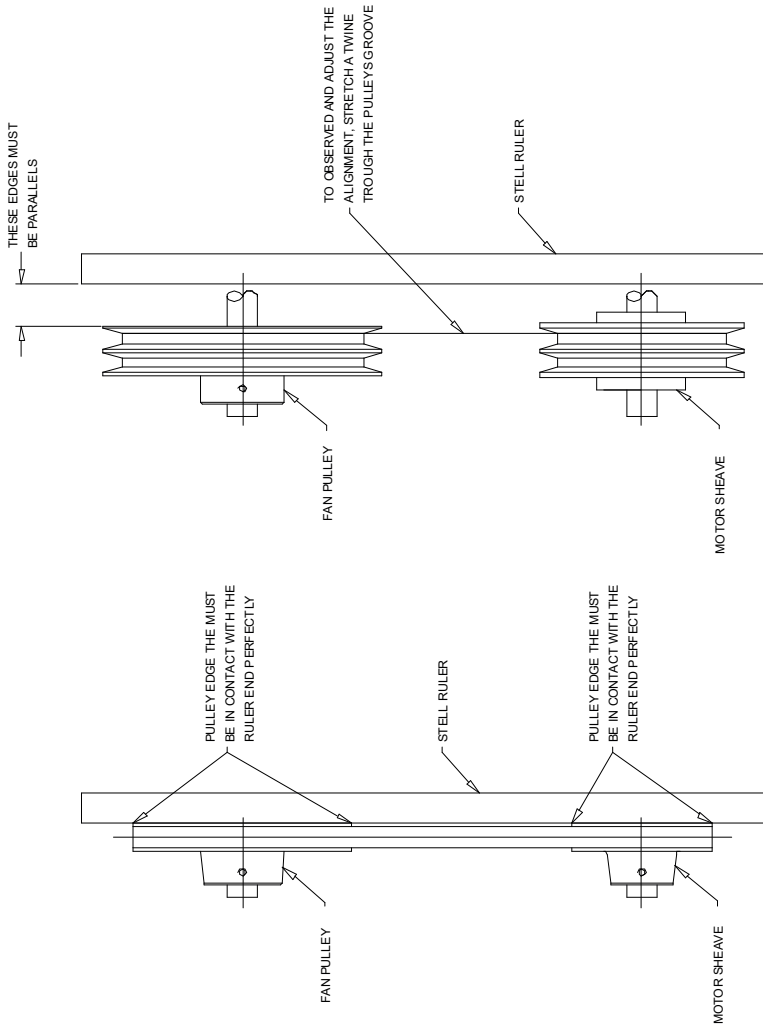


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06

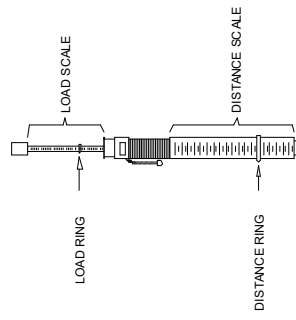
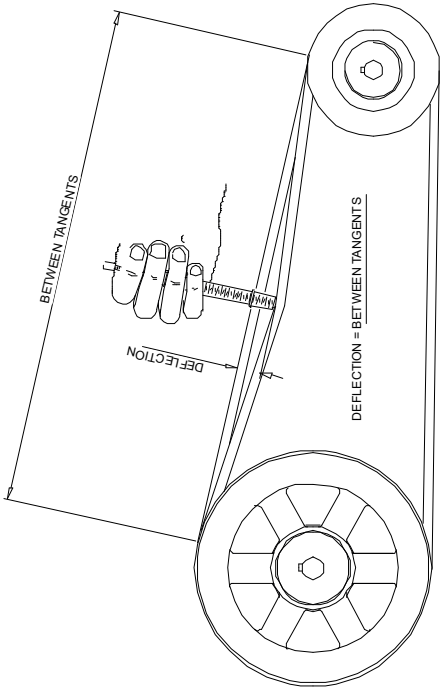
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



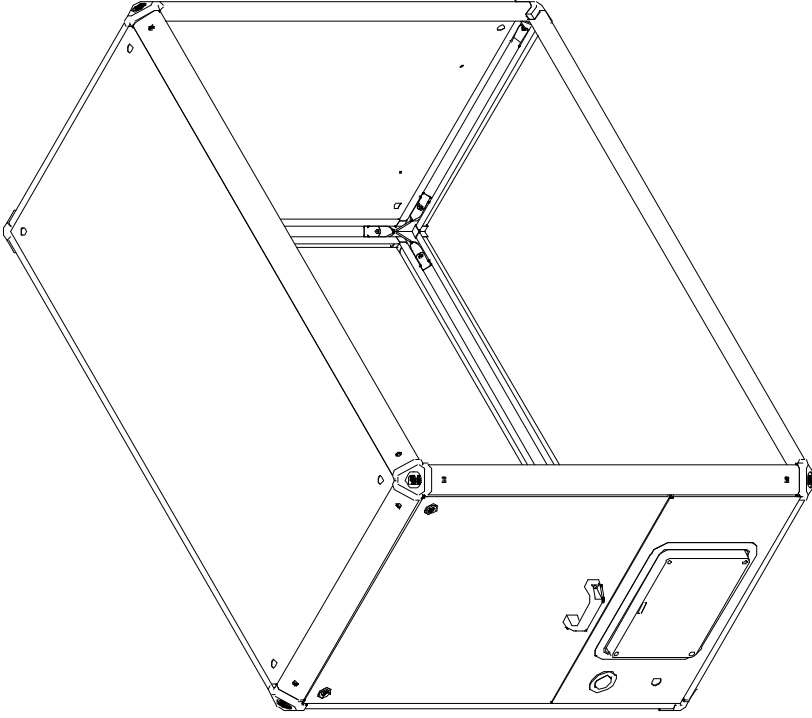
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

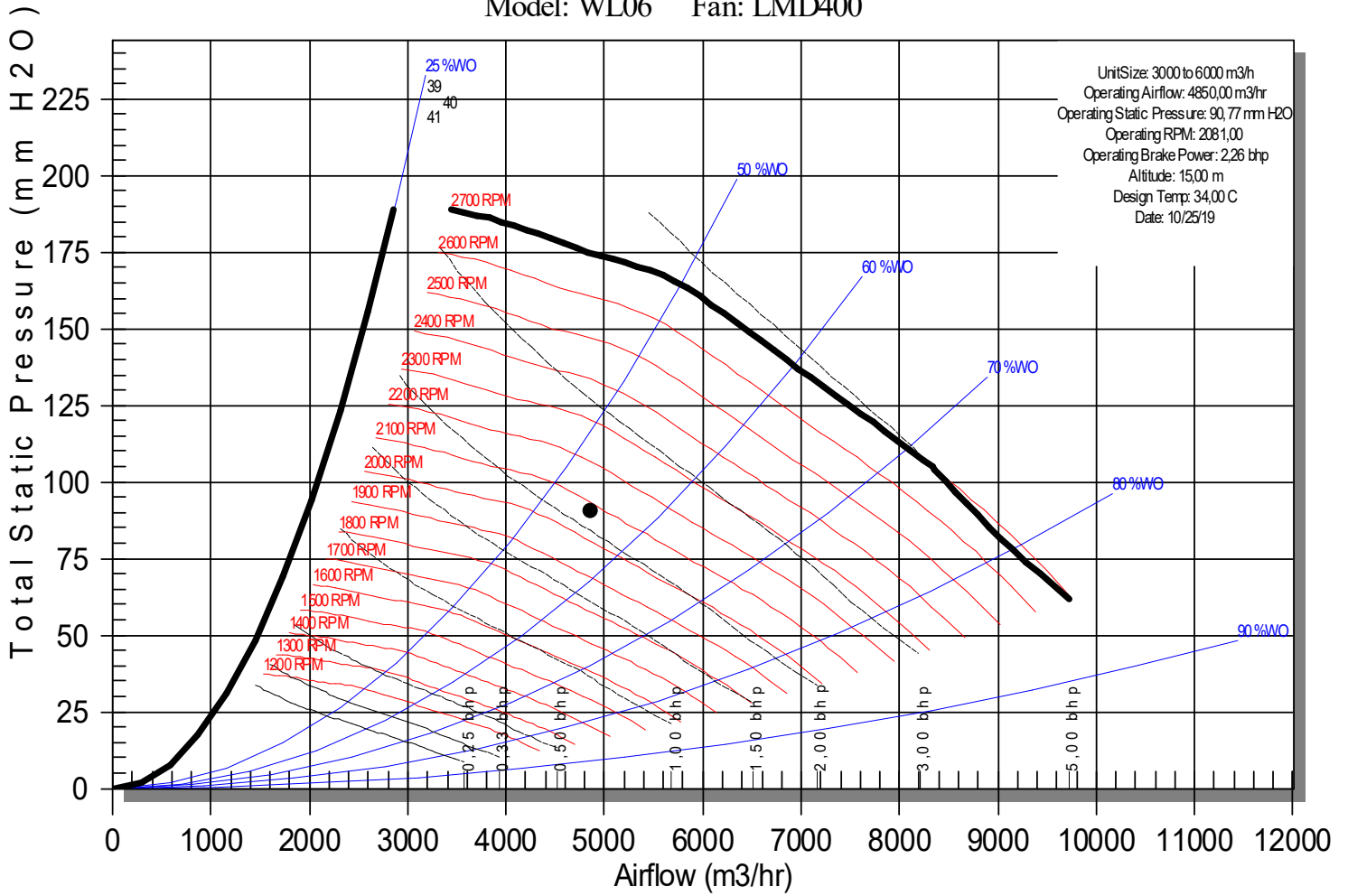
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-58

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-59
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA0011000-000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	15,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

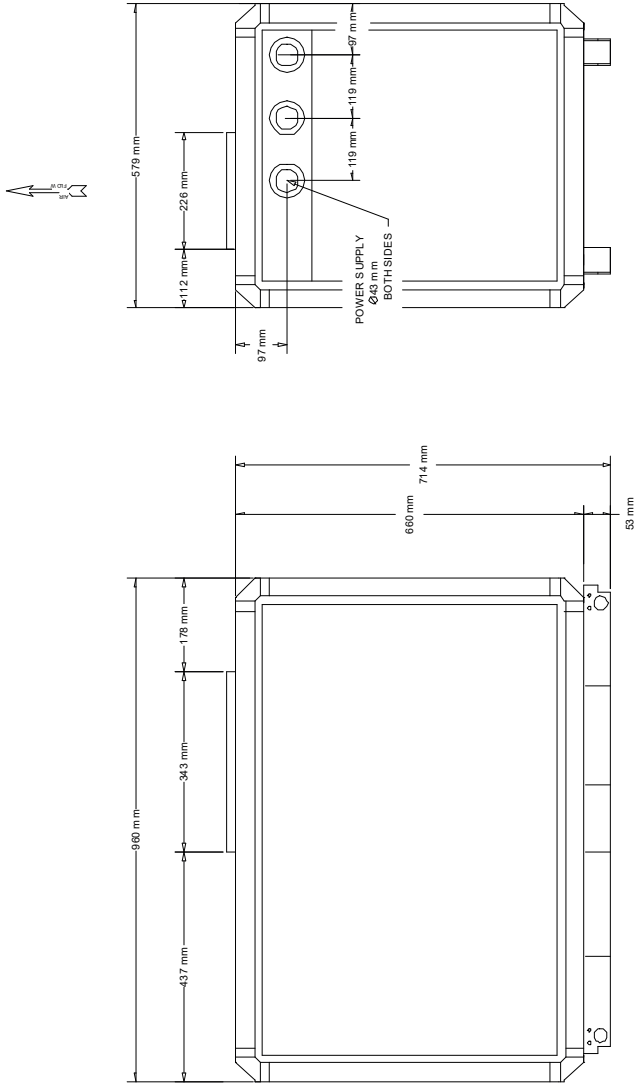
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

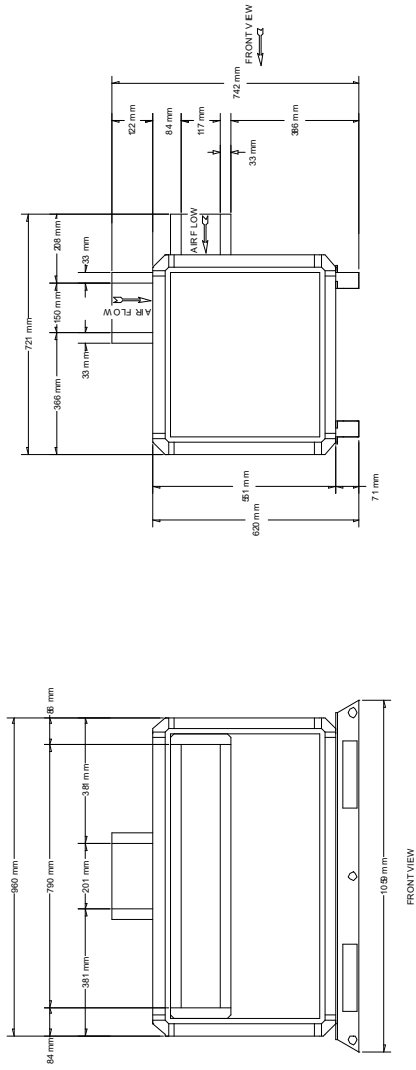


Not Applicable

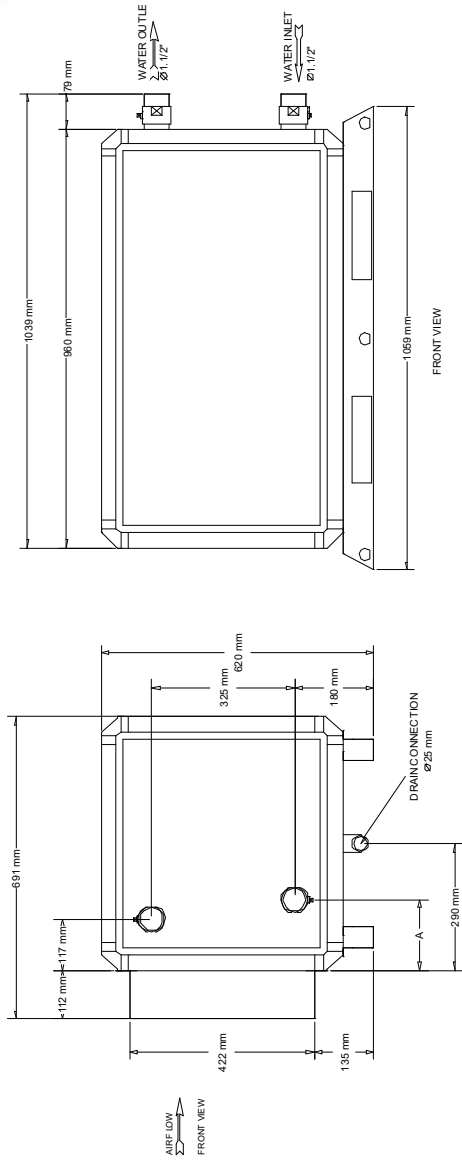
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 02

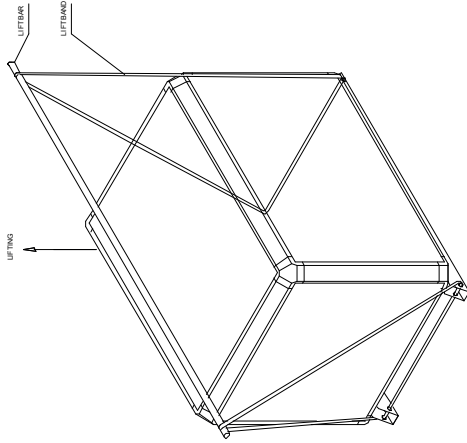


MIXER BOX SECTION
WAVE DOBLE 02

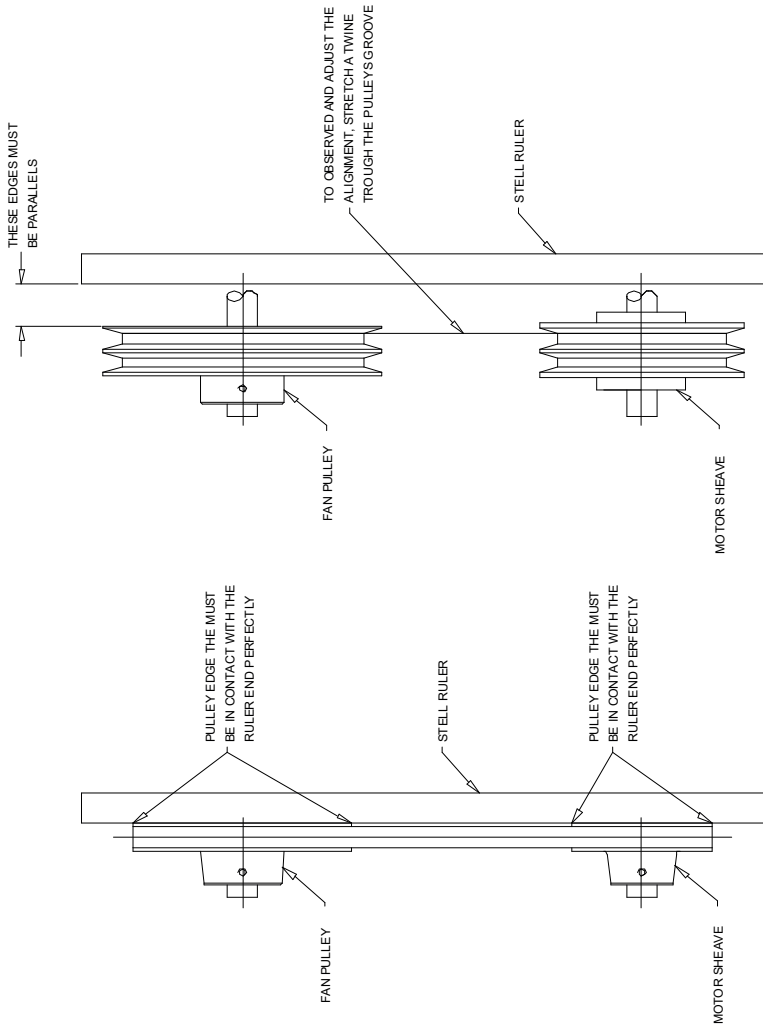


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

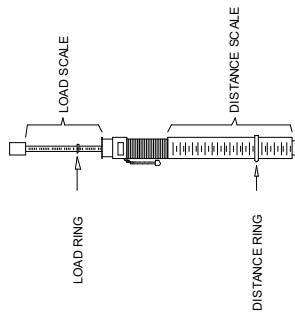
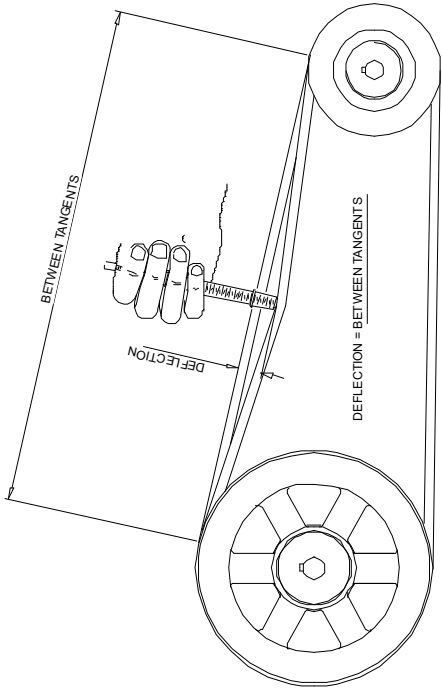
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



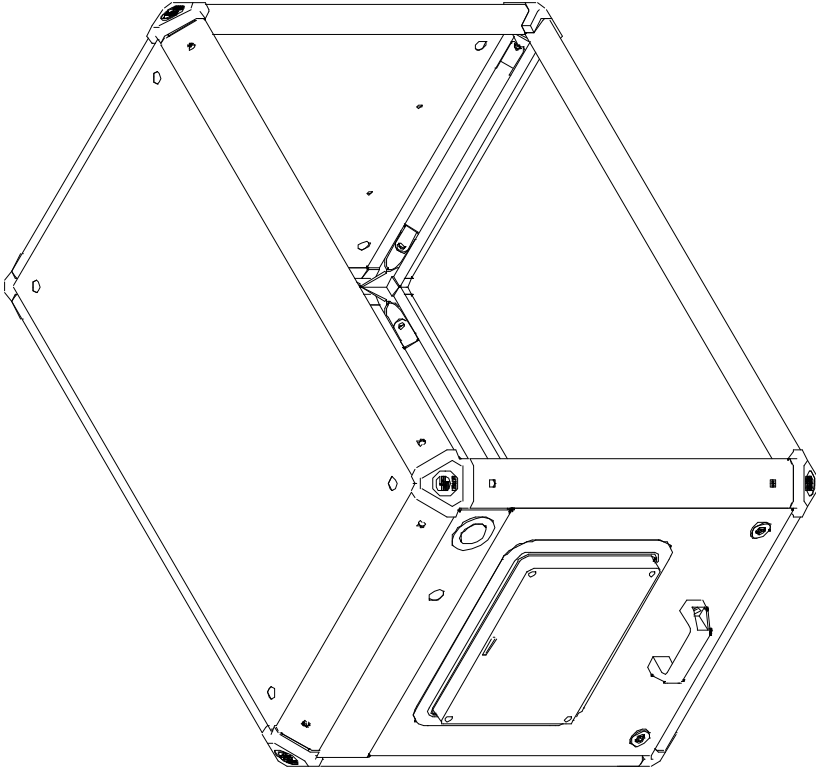
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

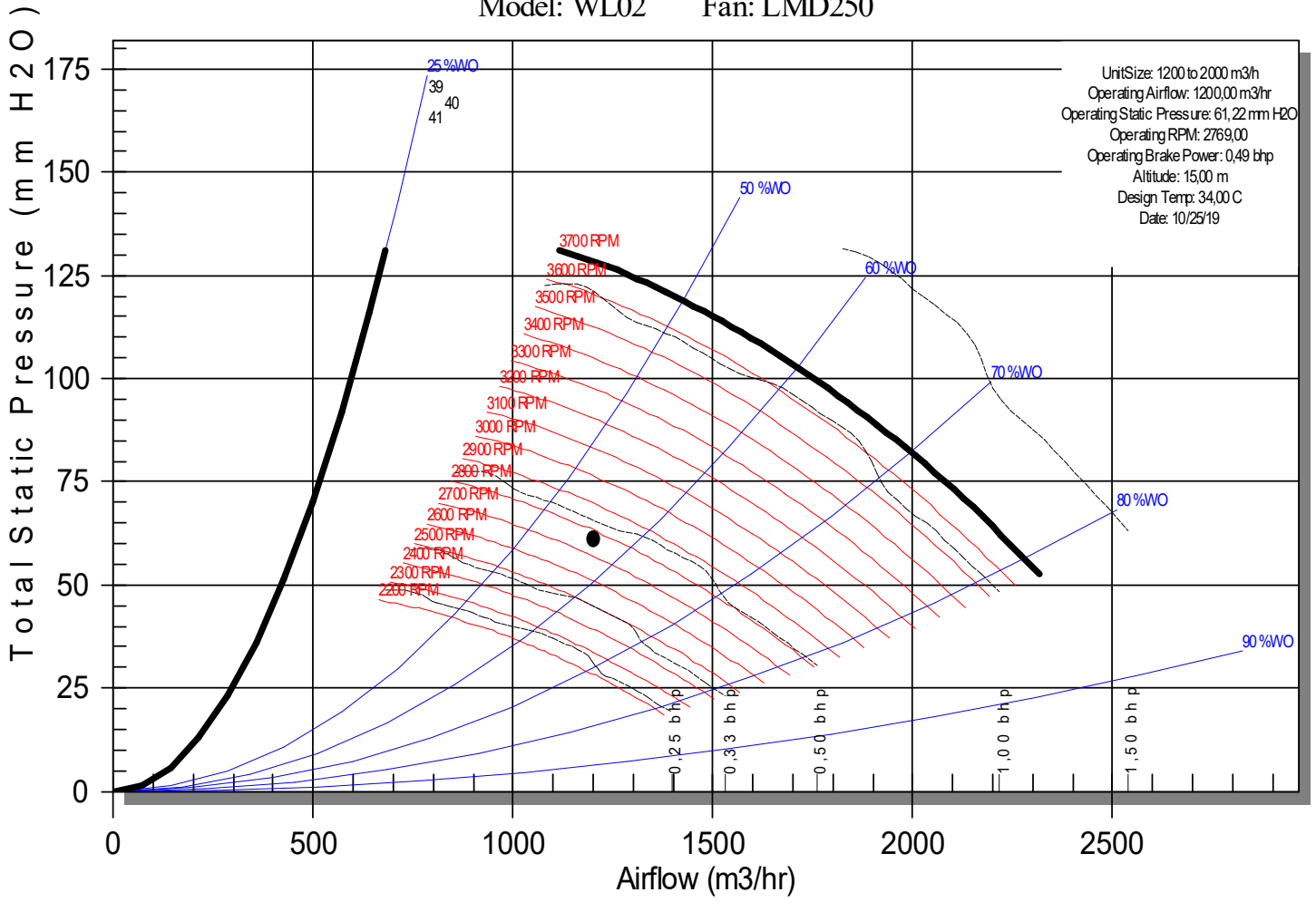
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-59

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-60
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	15,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

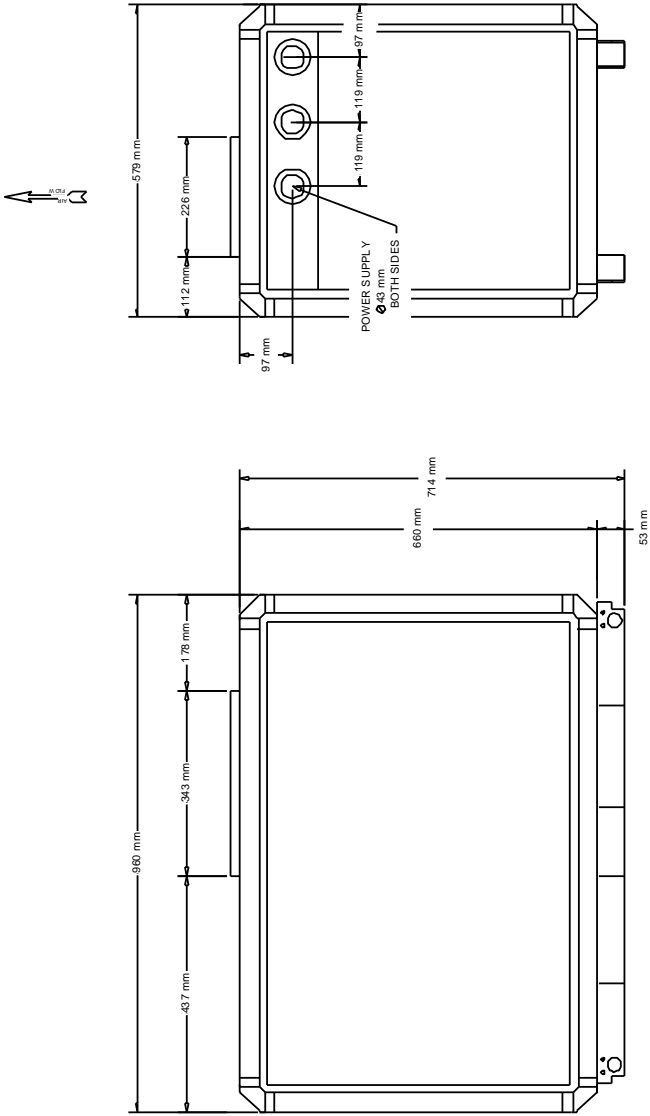
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

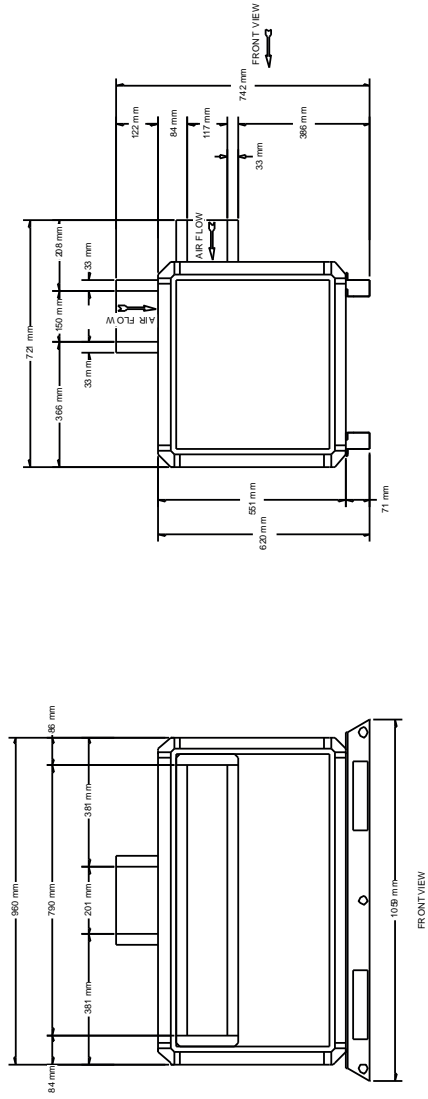


Not Applicable

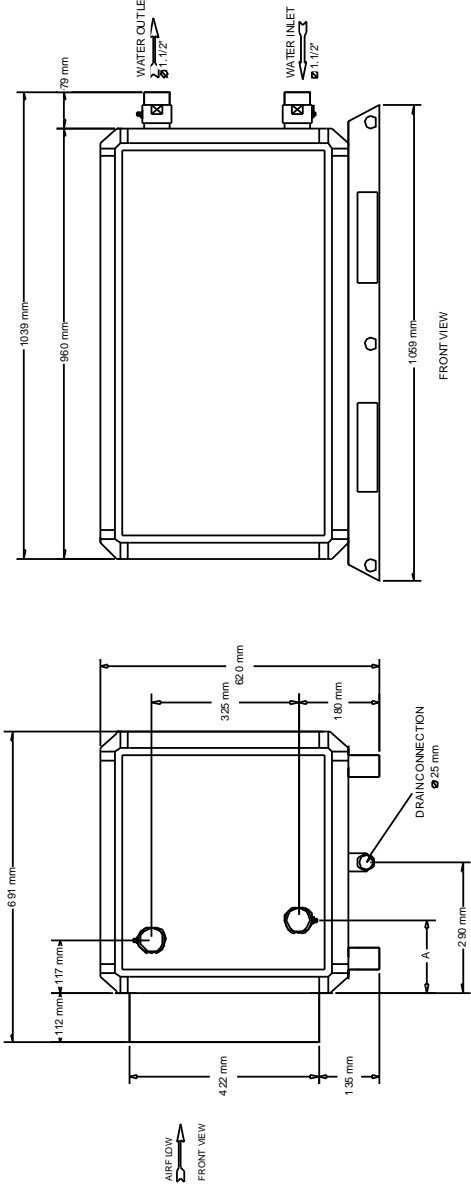
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

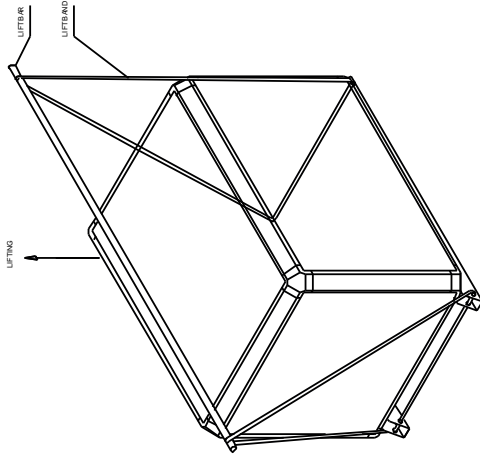


MIXER BOX SECTION
WAVE DOBLE 02

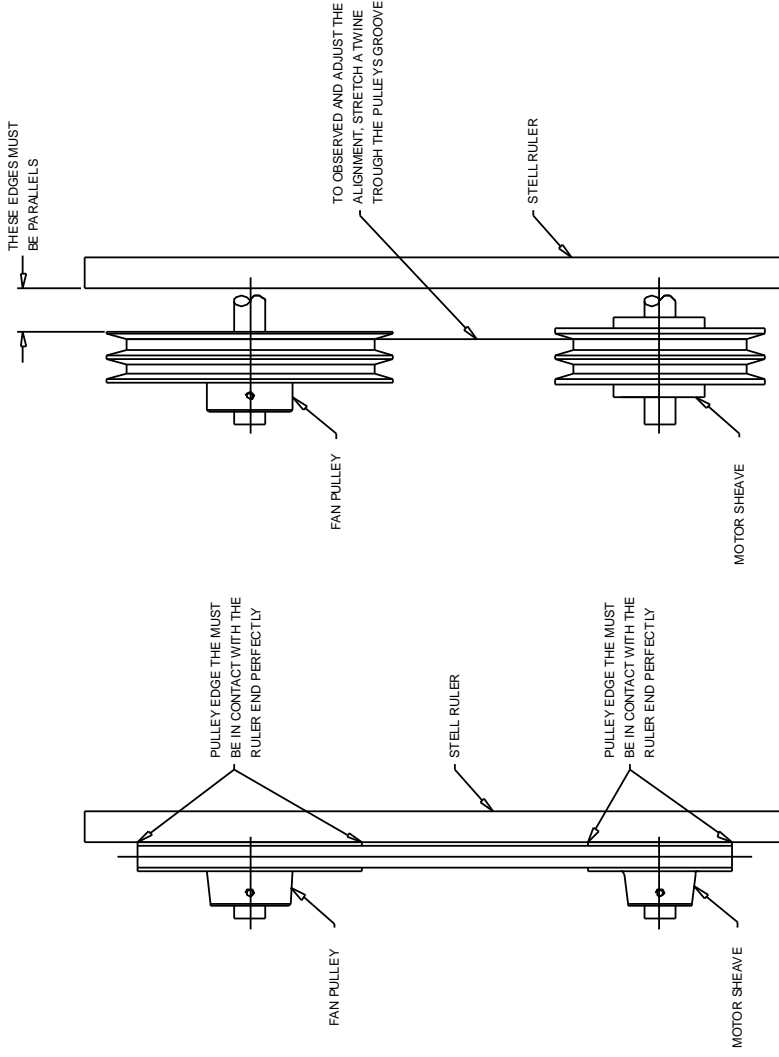


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

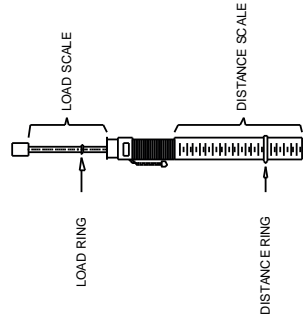
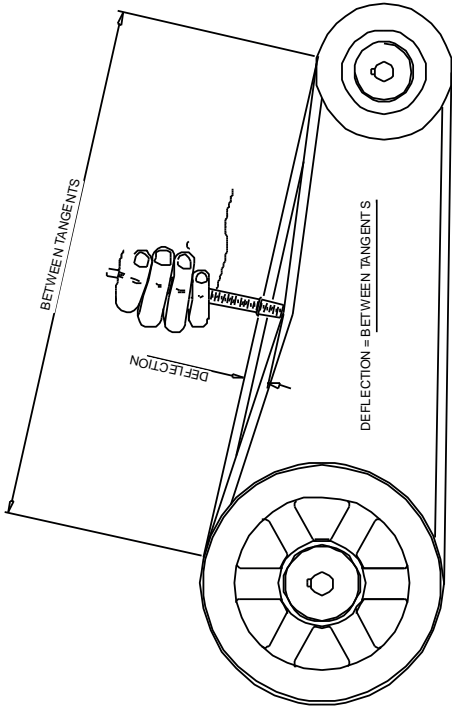
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



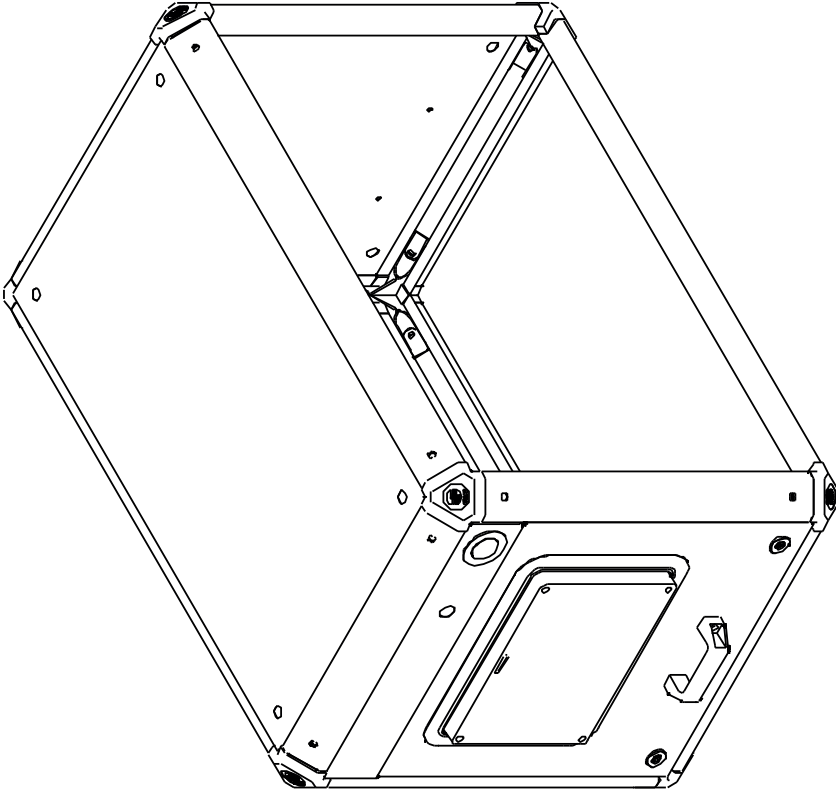
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



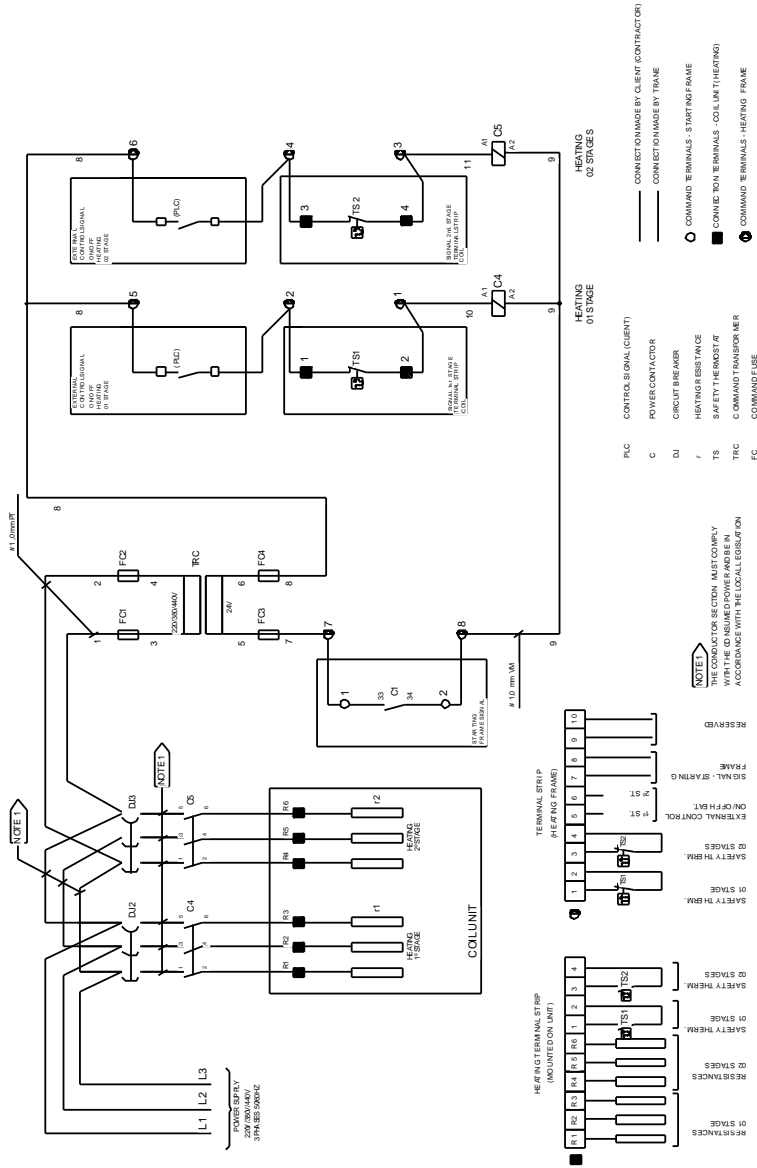
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

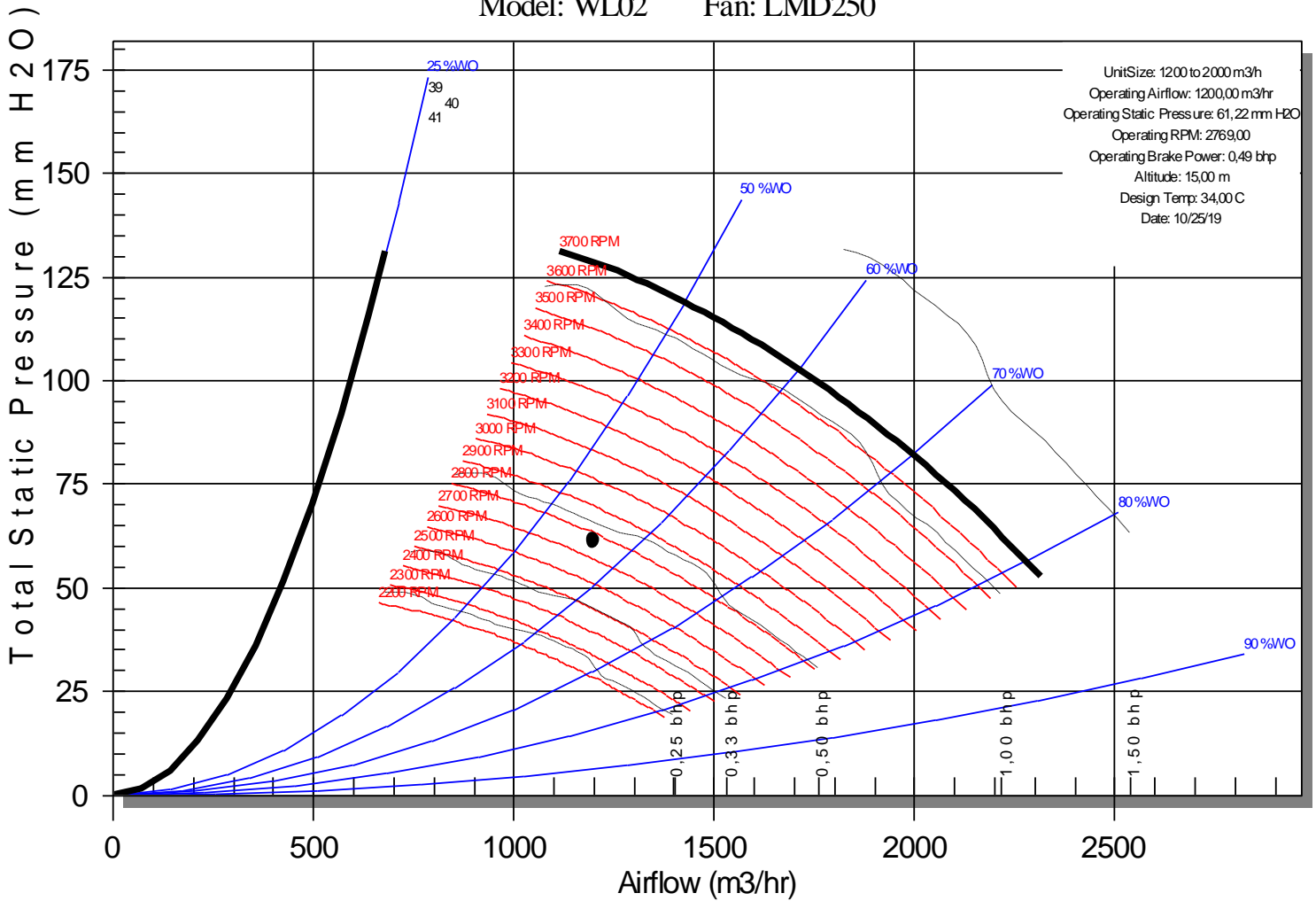
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-60

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-61
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGAECTFD00 Y00B8AWBAY001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,59 mm H2O
Mixing Box Air Pressure Drop	1,79 mm H2O	Filter Air Pressure Drop	18,07 mm H2O

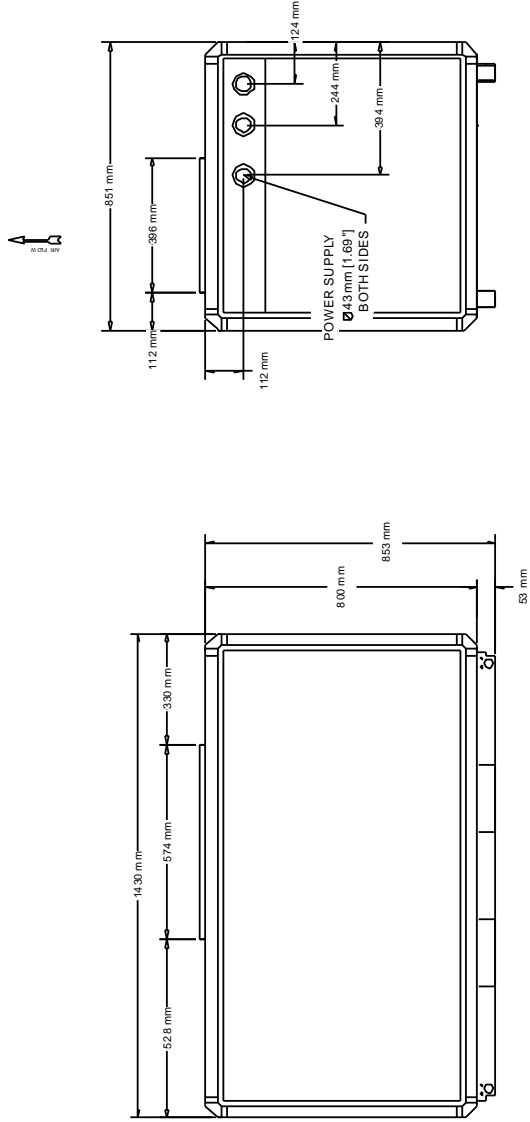
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	11,0 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	14,43 m3/hr
Cooling Capacity	100,92 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 6 kw
Heating Capacity	10,50 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	13,7 C	Cooling Airflow	5450,00 m3/hr
Sensible Capacity	43,65 kW	Cooling Leaving Wet Bulb	10,9 C
Cooling Water Volume	27,37 L	Cooling Water Velocity	1,7 m/s
Cooling Water Pressure Drop	5097,92 mm H2O	Cooling Air Pressure Drop	16,61 mm H2O
Cooling Coil Wet Weight	290 kg	Actual Cooling Face Velocity	2,0 m/s
Electric Heat PD	2,56 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	76,61 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,28 bhp
Fan RPM	2108 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,1 m/s	Velocity Pressure	39,2 Pa

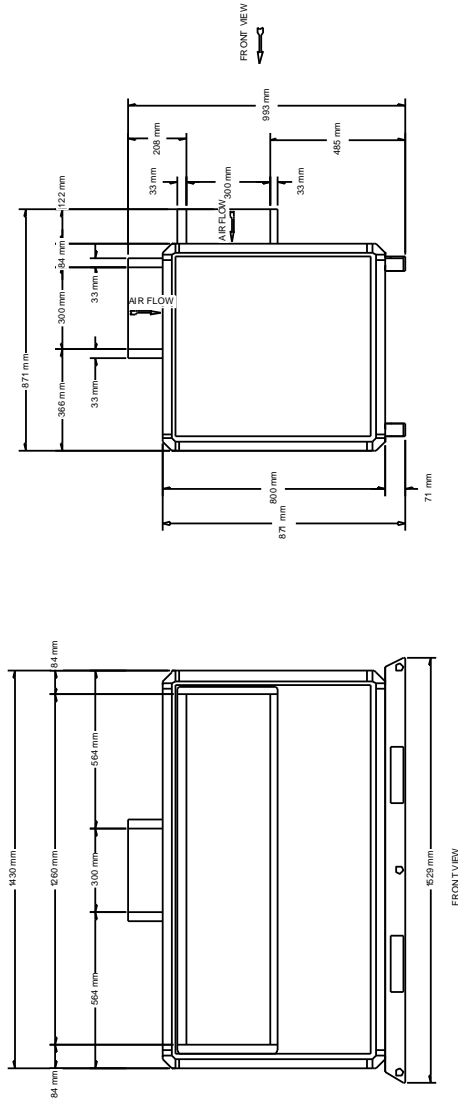
Humidifier	
Humidification	w/o Humidification / Not Applicable



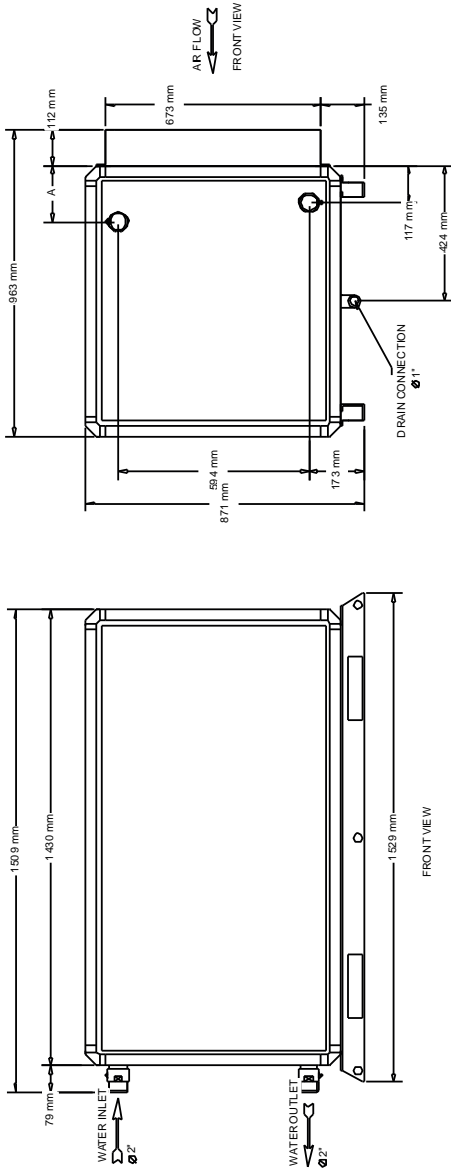
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 08

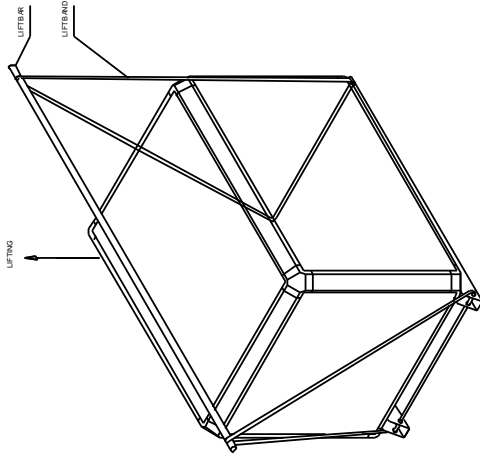


MIXER BOX SECTION
WAVE DOBLE 08

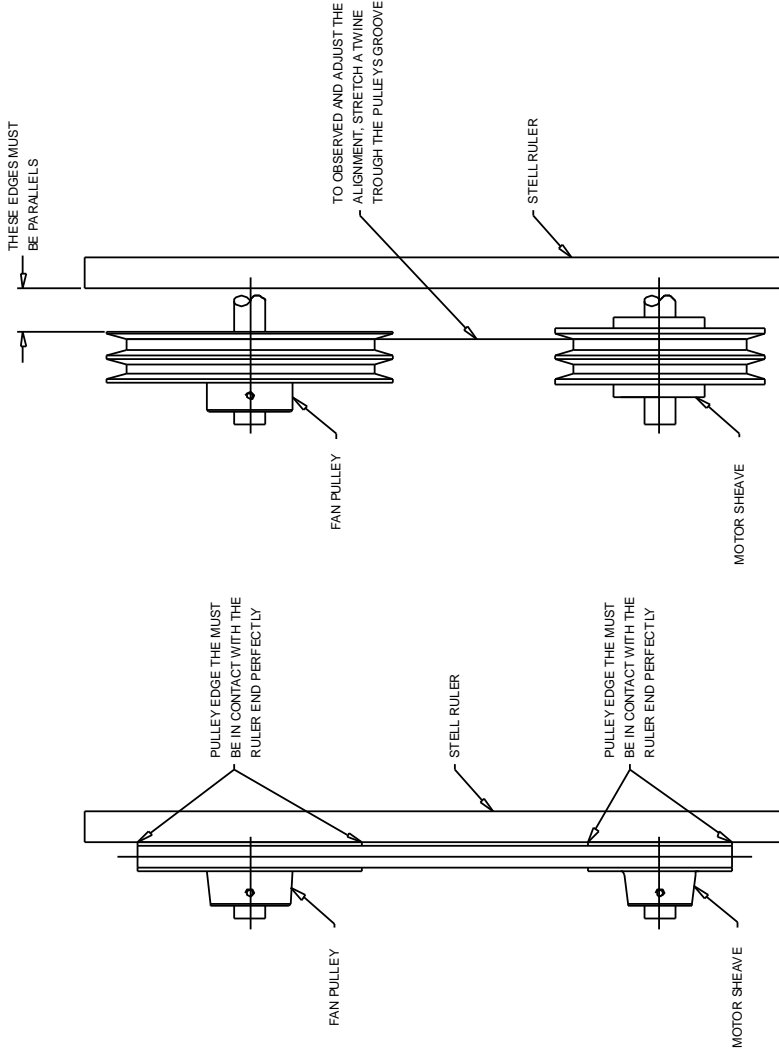


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 08

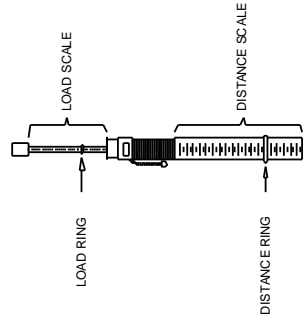
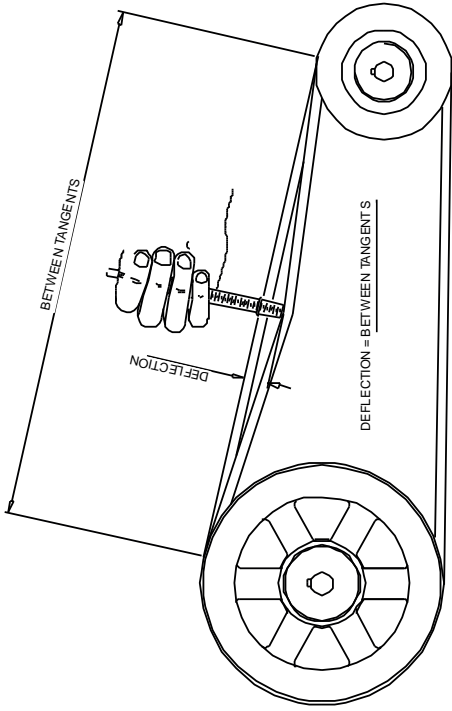
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



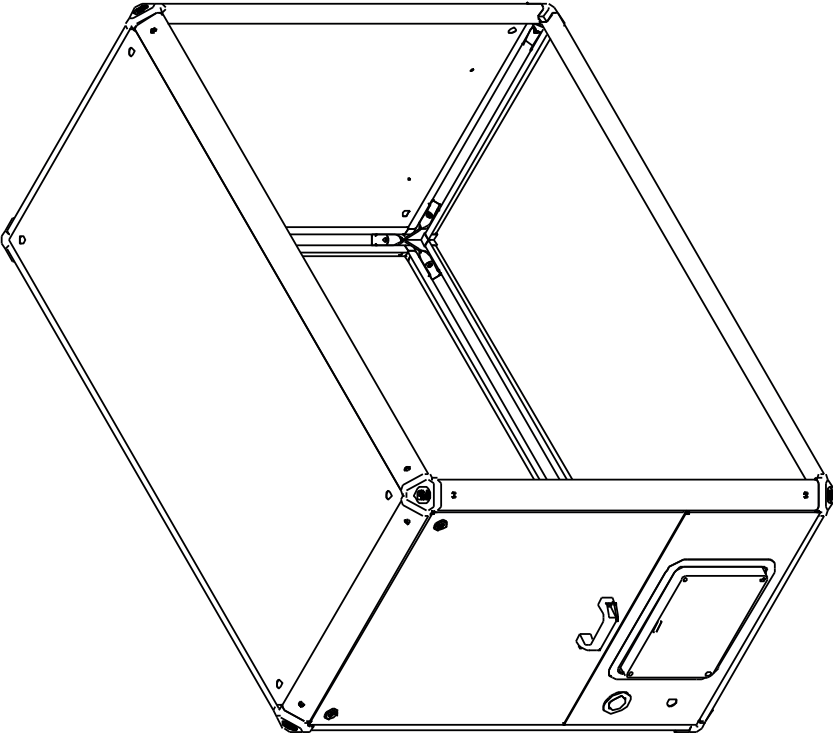
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



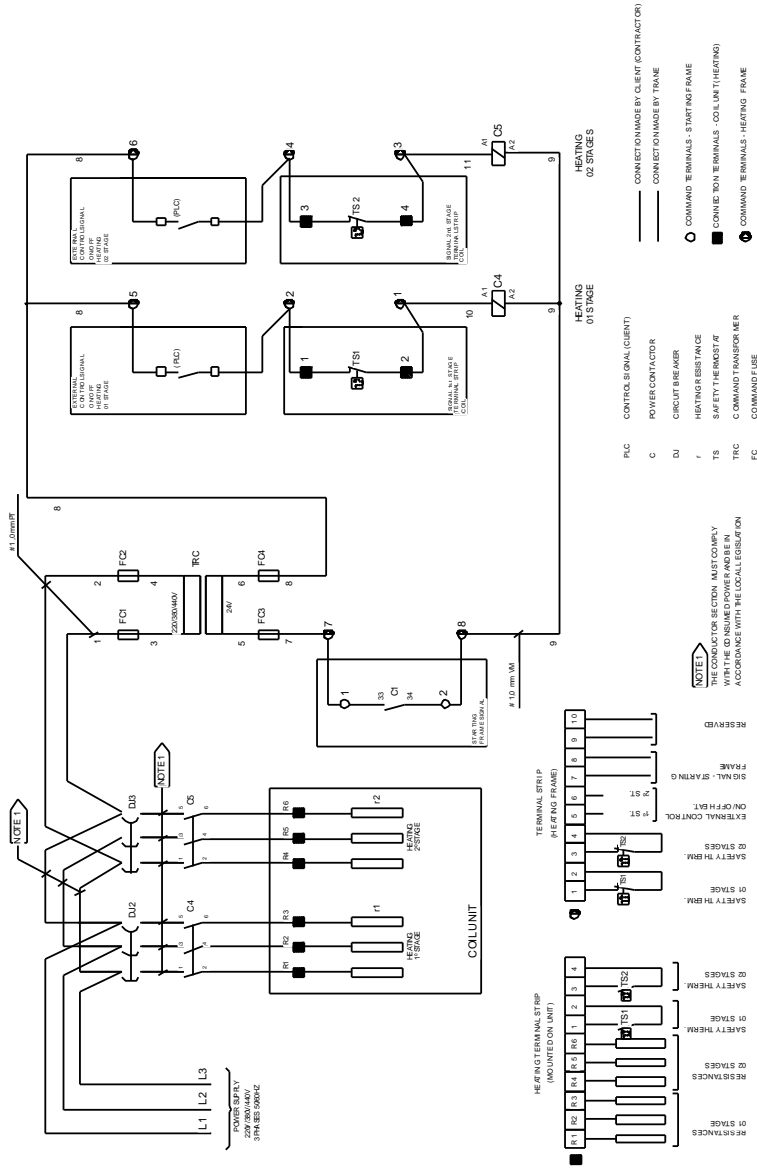
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

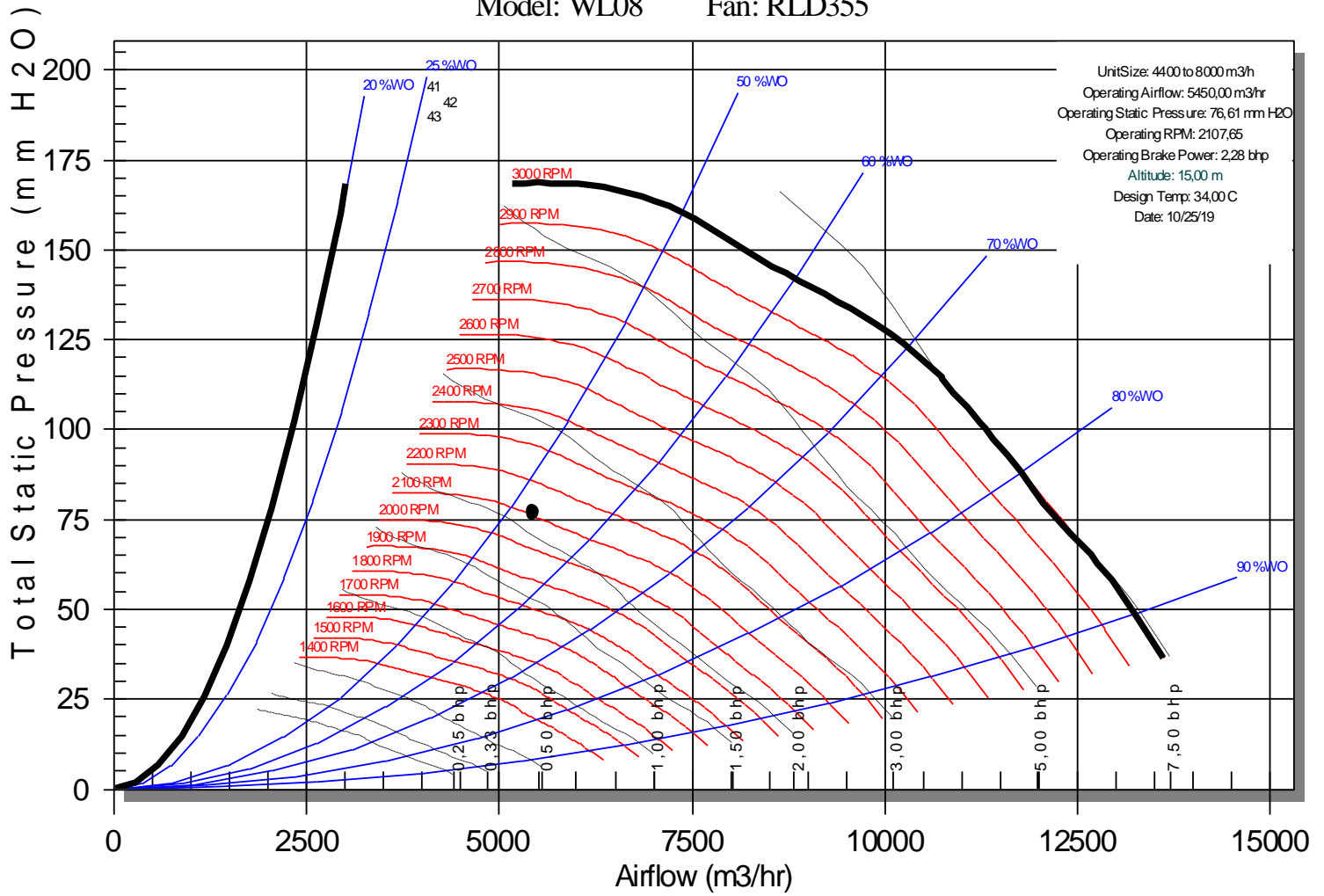
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-61

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-62
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKTCOA0 0Y00A8BWBAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

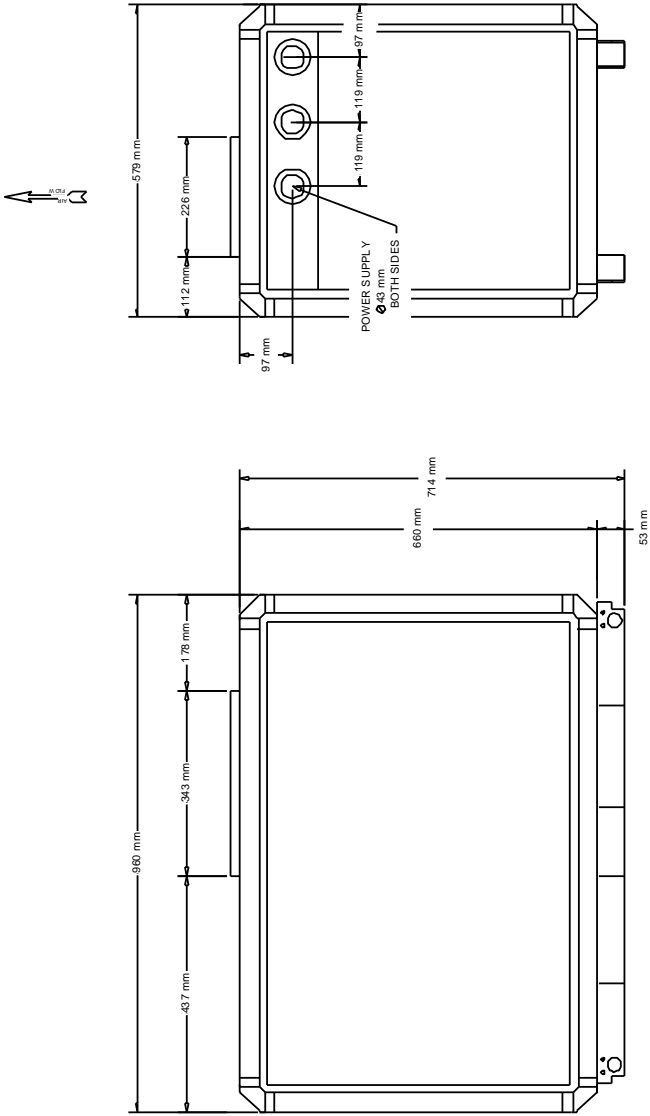
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,8 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

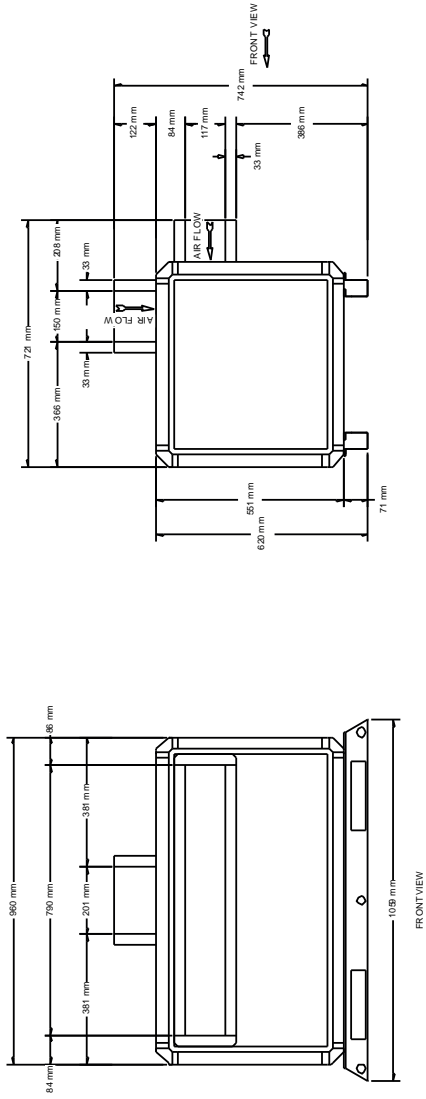
Humidifier	
Humidification	w/o Humidification / Not Applicable



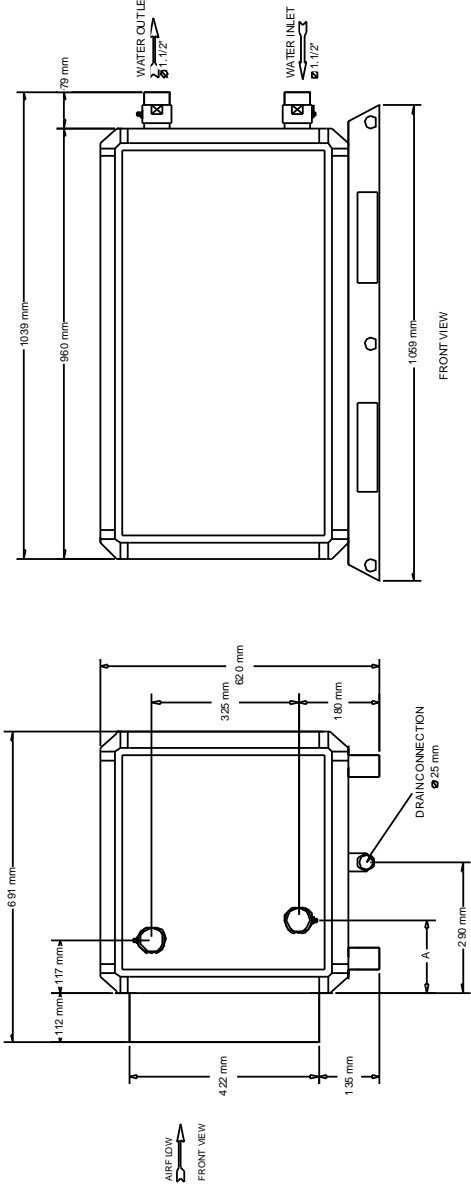
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

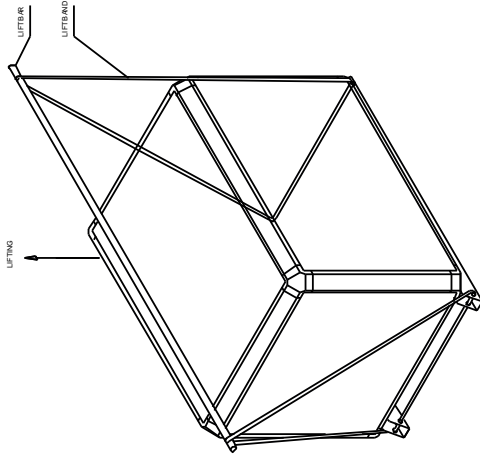


MIXER BOX SECTION
WAVE DOBLE 02

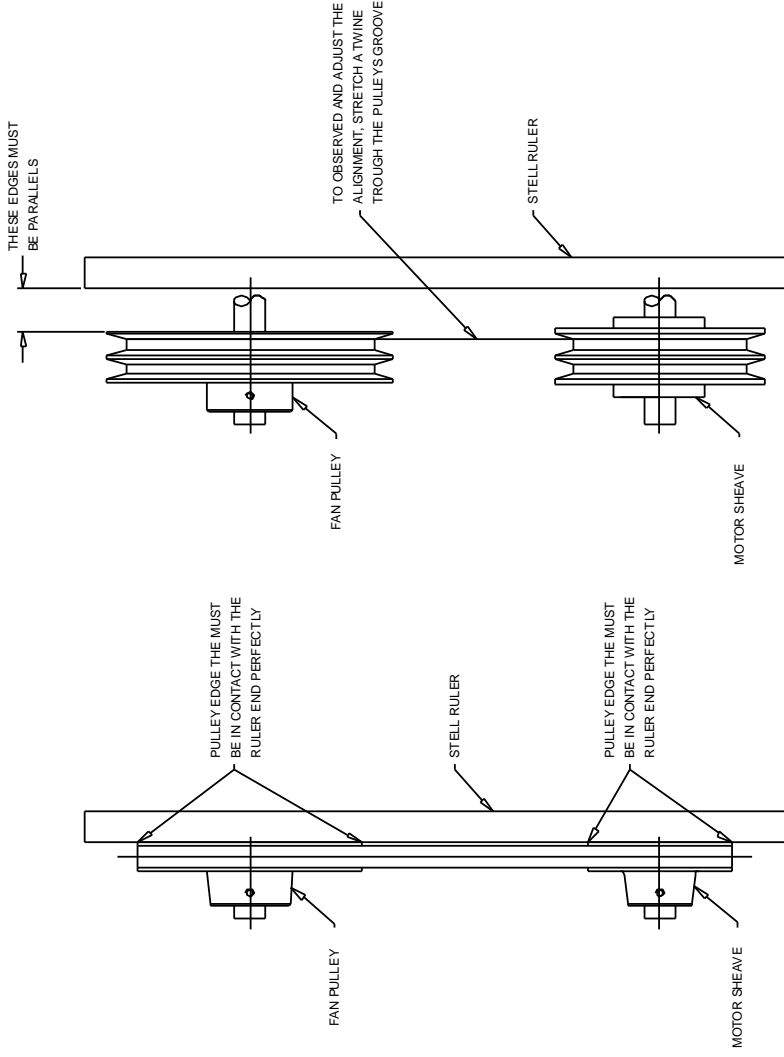


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

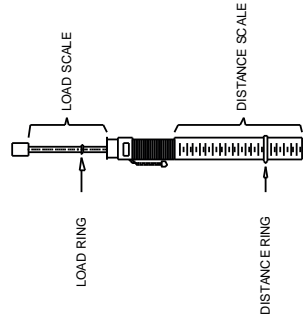
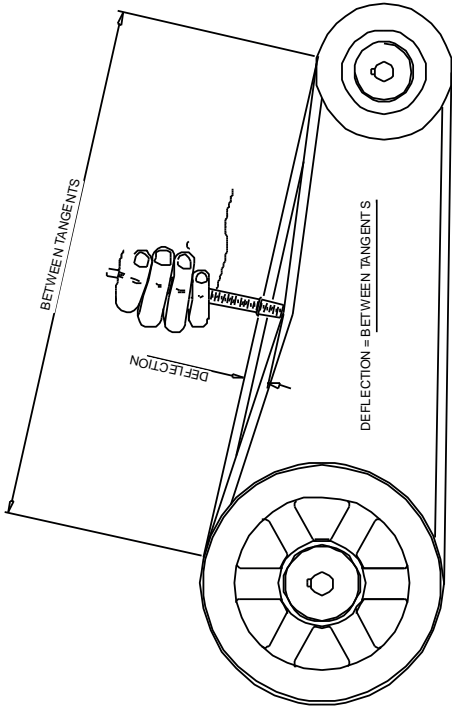
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



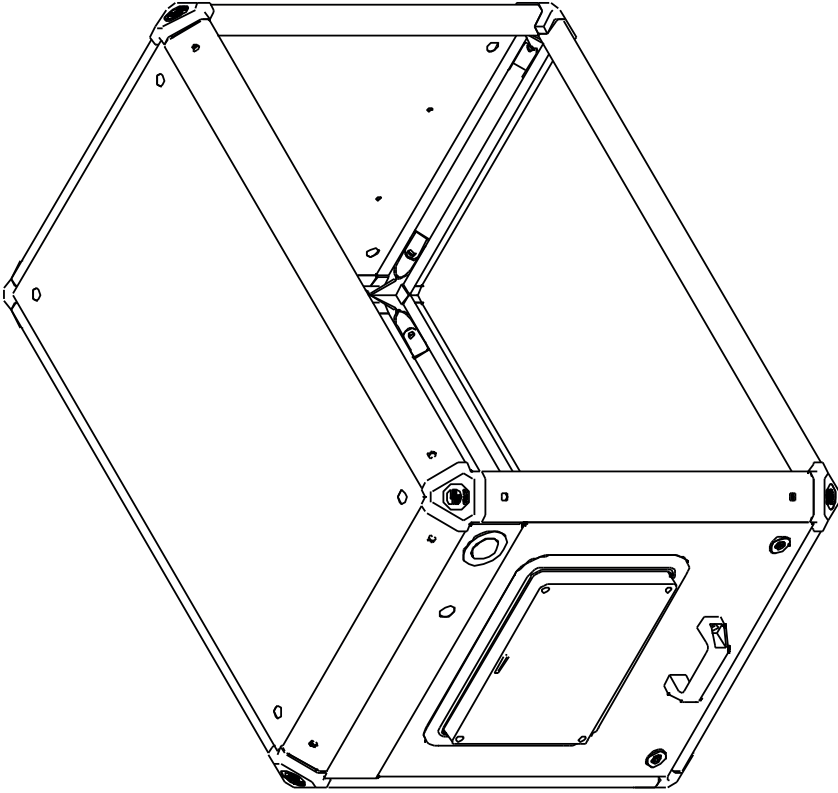
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



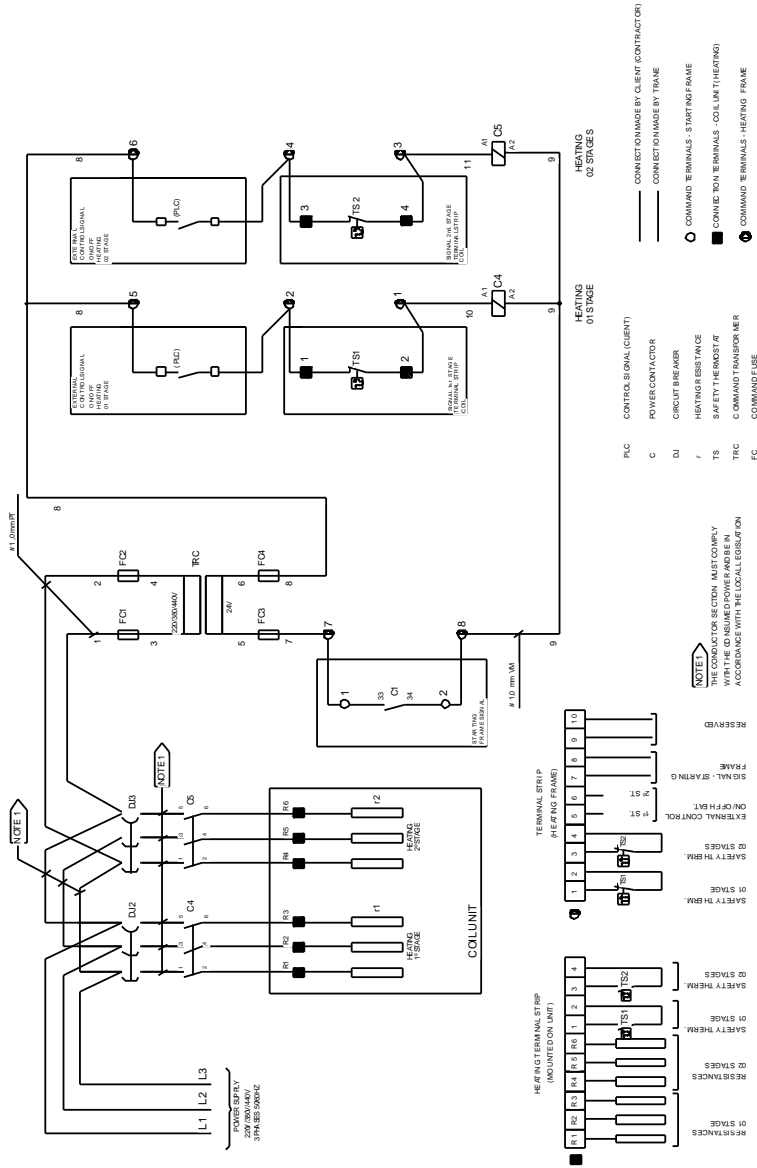
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

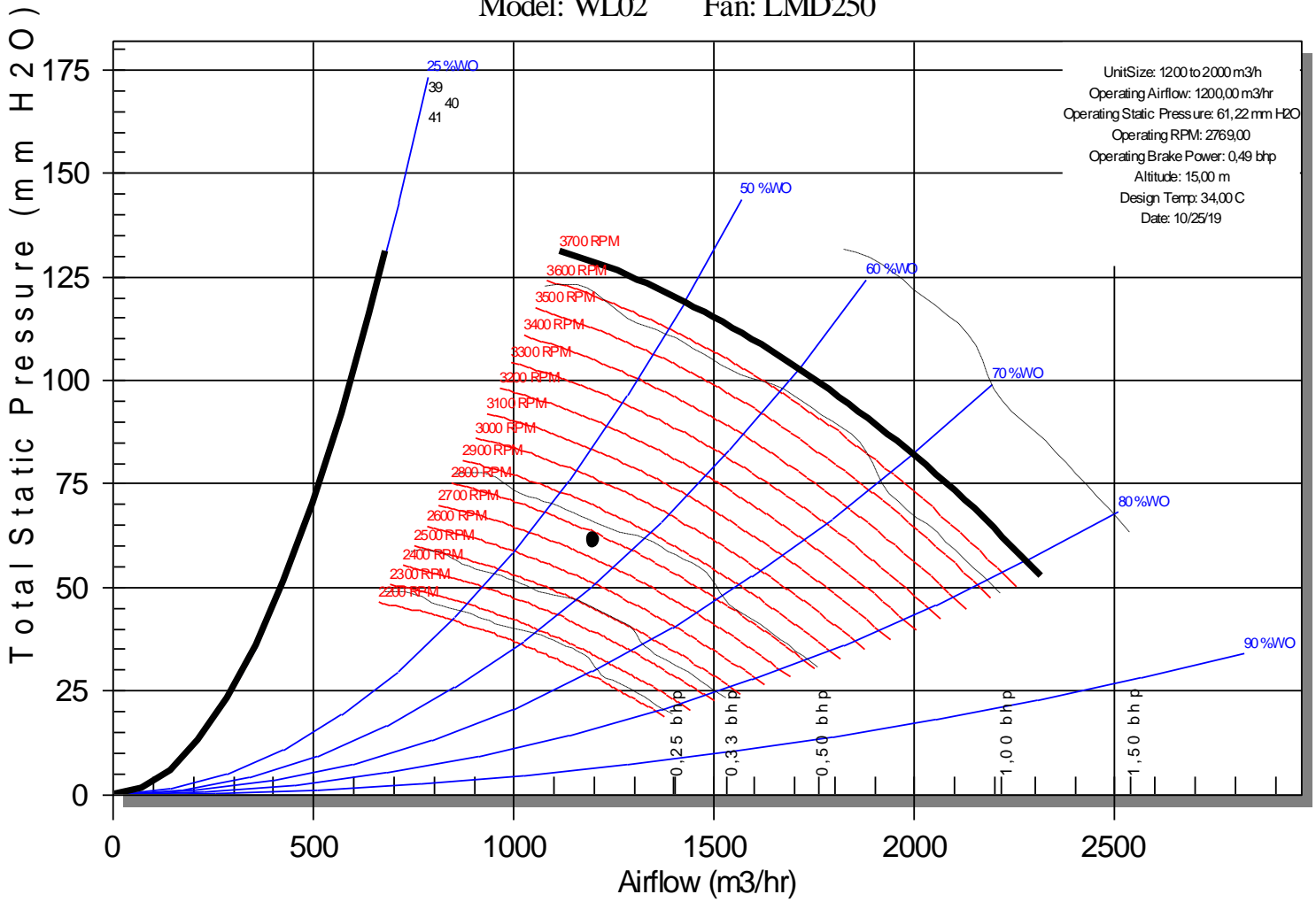
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-62

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-63
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKTC A0 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	4,71 mm H2O
Mixing Box Air Pressure Drop	0,90 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

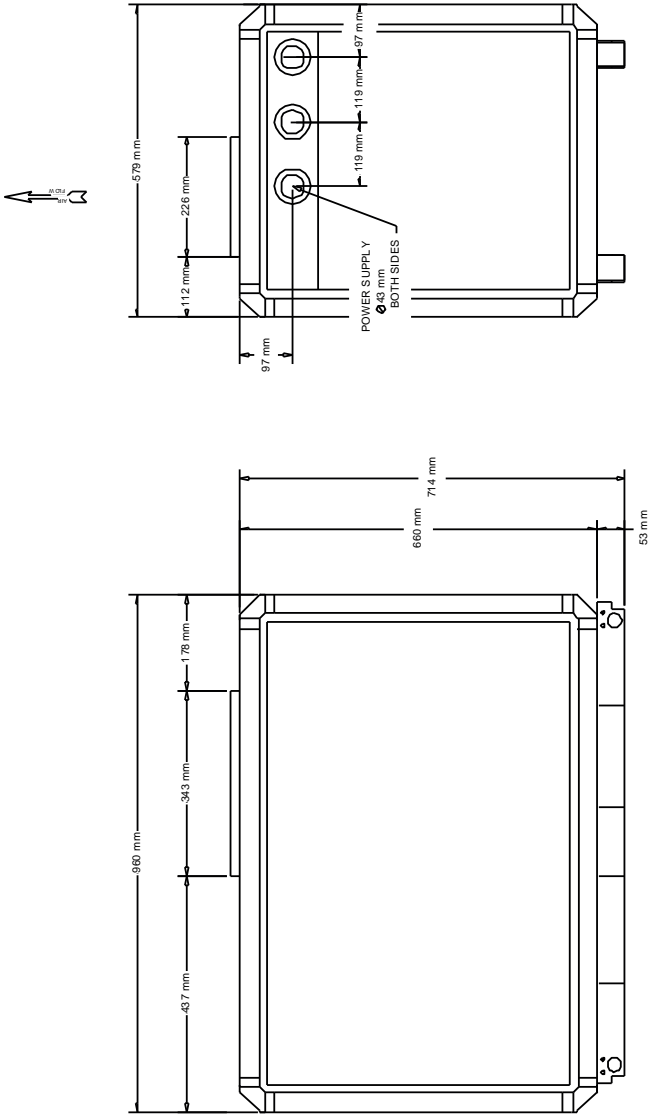
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	15,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,50 m3/hr
Cooling Capacity	17,50 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	1200,00 m3/hr	Sensible Capacity	7,69 kW
Cooling Leaving Wet Bulb	15,5 C	Cooling Water Volume	6,78 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	272,02 mm H2O
Cooling Air Pressure Drop	8,25 mm H2O	Cooling Coil Wet Weight	116 kg
Actual Cooling Face Velocity	1,6 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	55,56 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,43 bhp
Fan RPM	2678 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

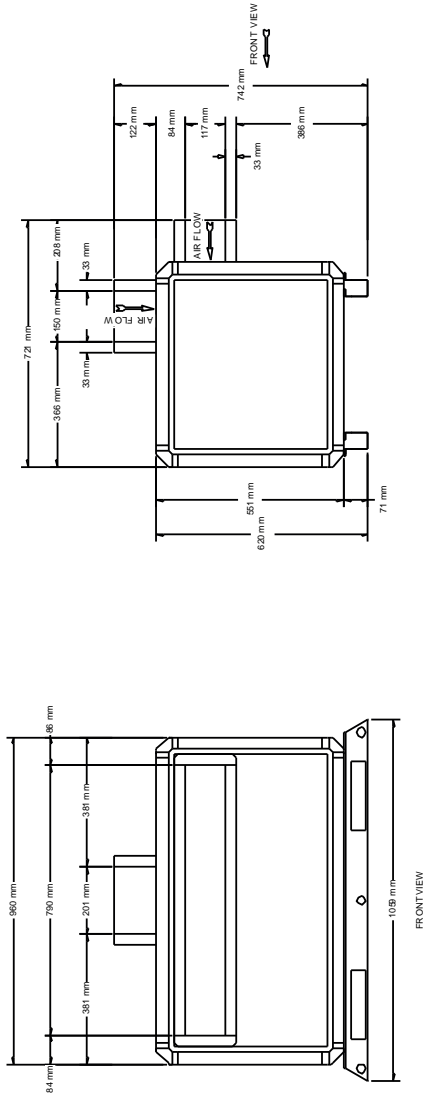
Humidifier	
Humidification	w/o Humidification / Not Applicable



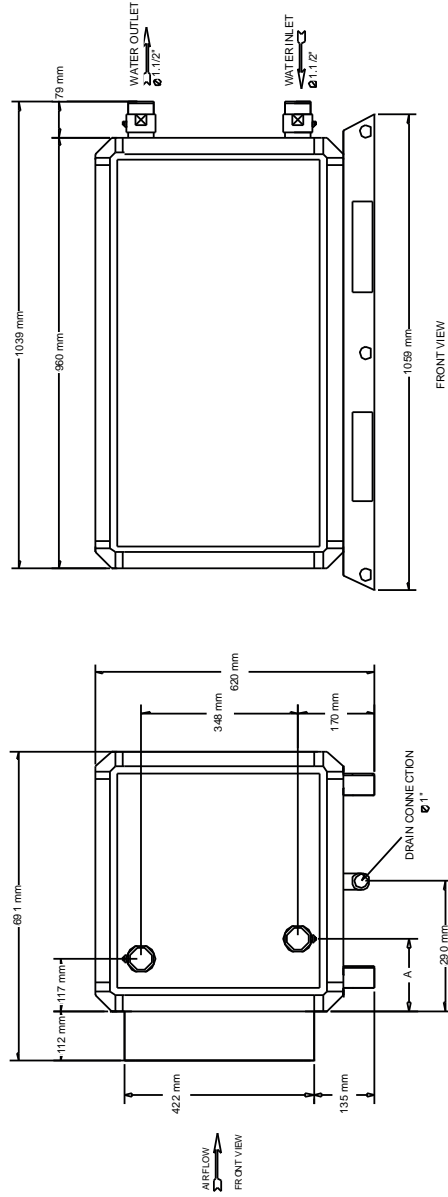
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

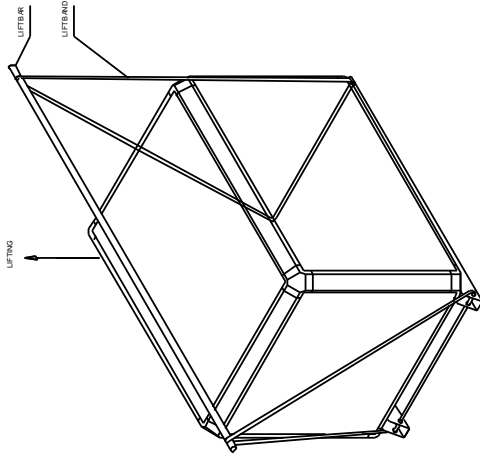


MIXER BOX SECTION
WAVE DOBLE 02

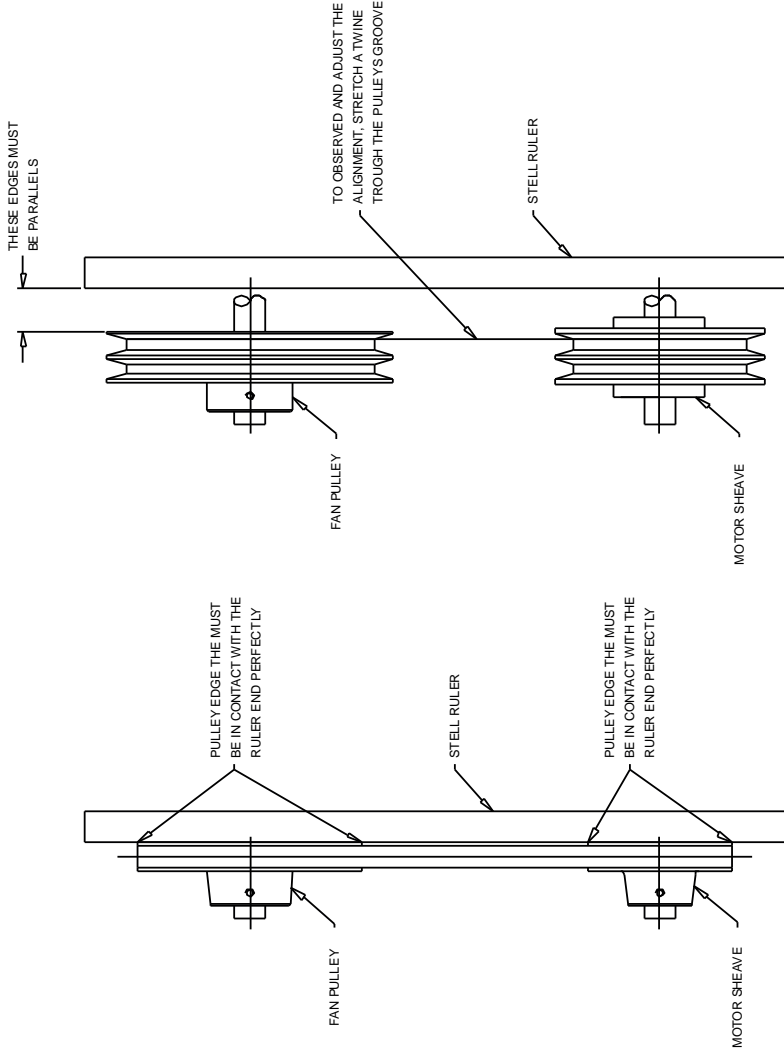


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 02

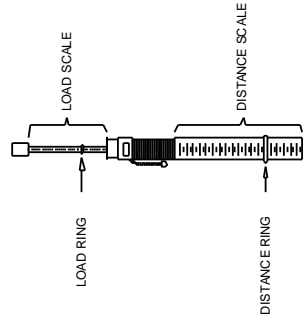
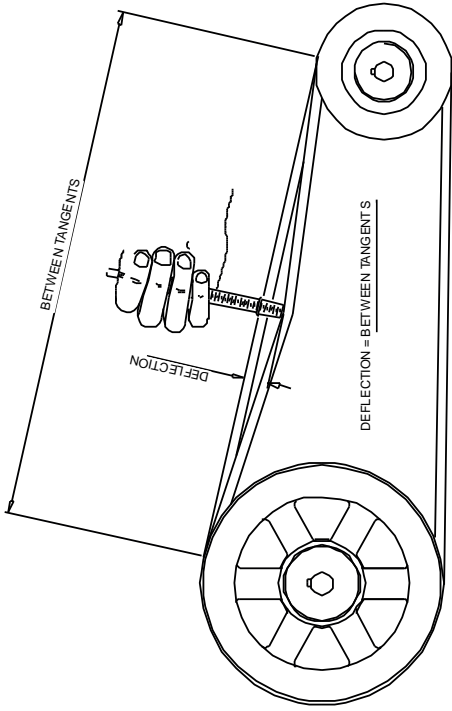
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



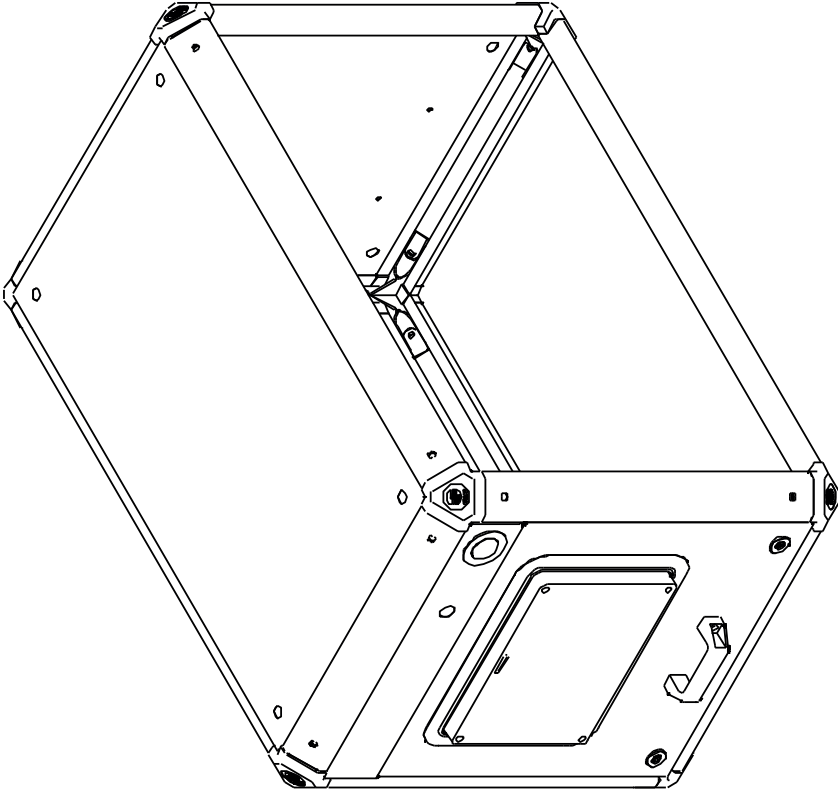
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

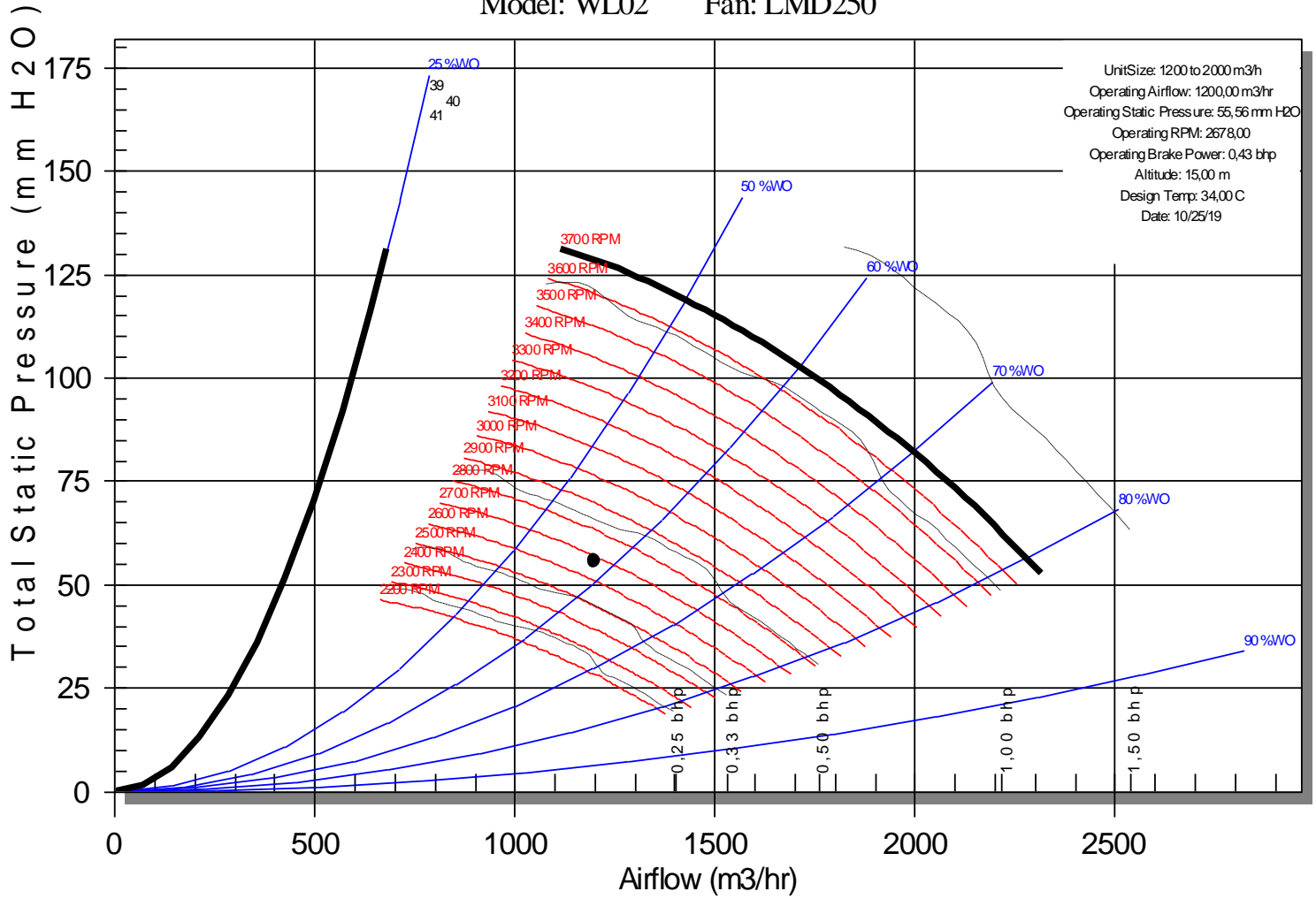
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-63

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-64
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,54 mm H2O
Mixing Box Air Pressure Drop	2,03 mm H2O	Filter Air Pressure Drop	21,31 mm H2O

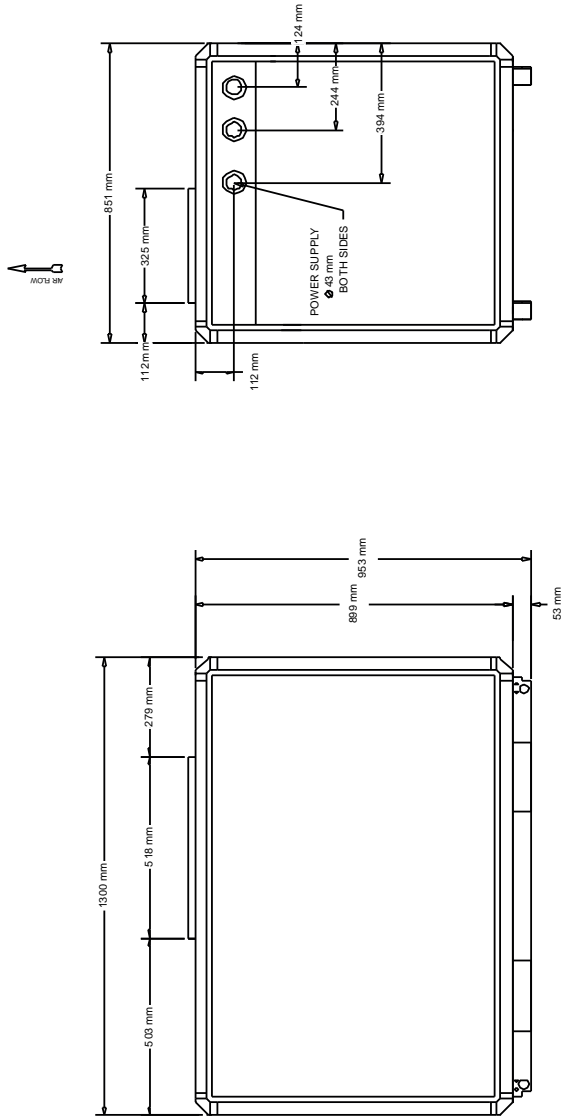
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	14,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	9,64 m3/hr
Cooling Capacity	67,46 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4385,00 m3/hr	Sensible Capacity	29,40 kW
Cooling Leaving Wet Bulb	14,6 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	1,1 m/s	Cooling Water Pressure Drop	1730,88 mm H2O
Cooling Air Pressure Drop	13,55 mm H2O	Cooling Coil Wet Weight	207 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	75,43 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,69 bhp
Fan RPM	1892 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,0 m/s	Velocity Pressure	48,5 Pa

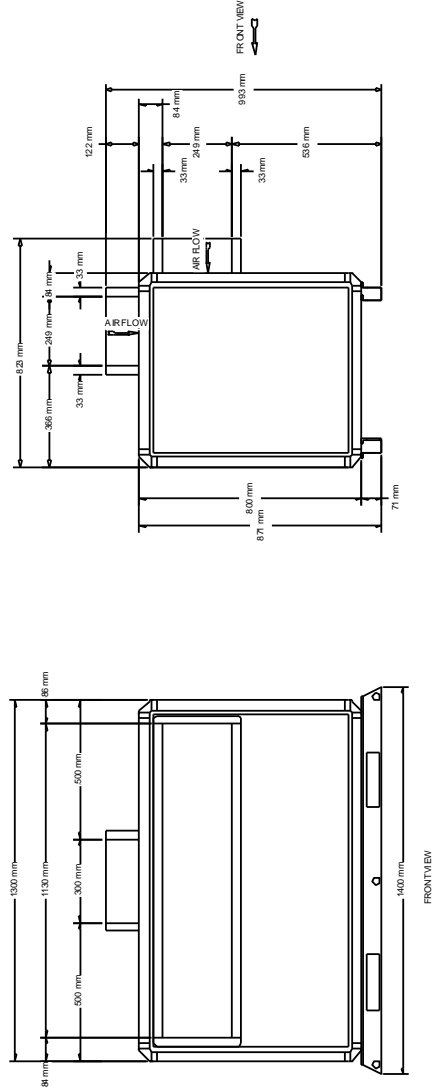
Humidifier	
Humidification	w/o Humidification / Not Applicable



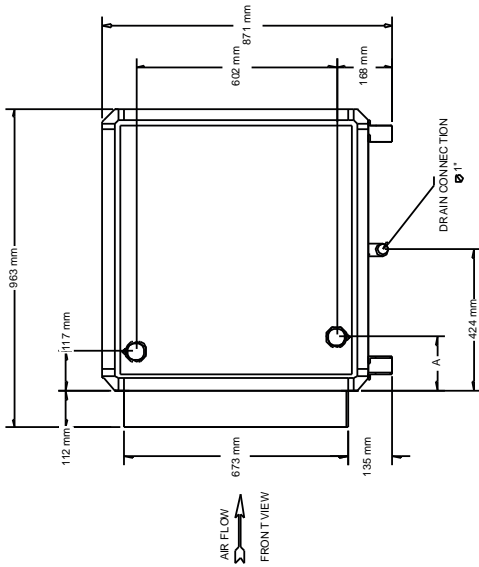
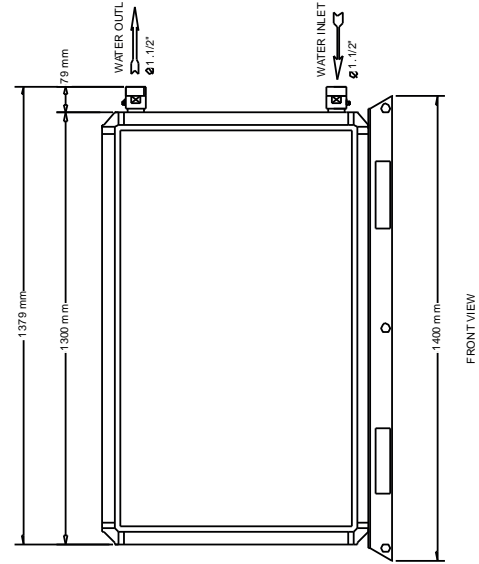
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit		Inverter	w/o Inverter / Not Applicable
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Damper Type (*See notes)	Damper manual	Optional - Capacitor	Not Applicable
Unit Destination	Local Market - Brazil	Optional - Coil Module	w/o Optional / Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable		
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

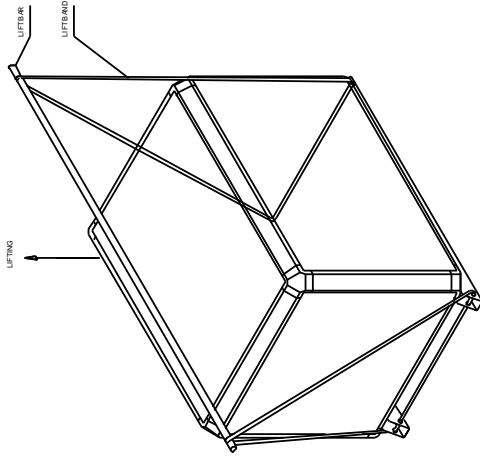


MIXER BOX SECTION
WAVE DOBLE 06

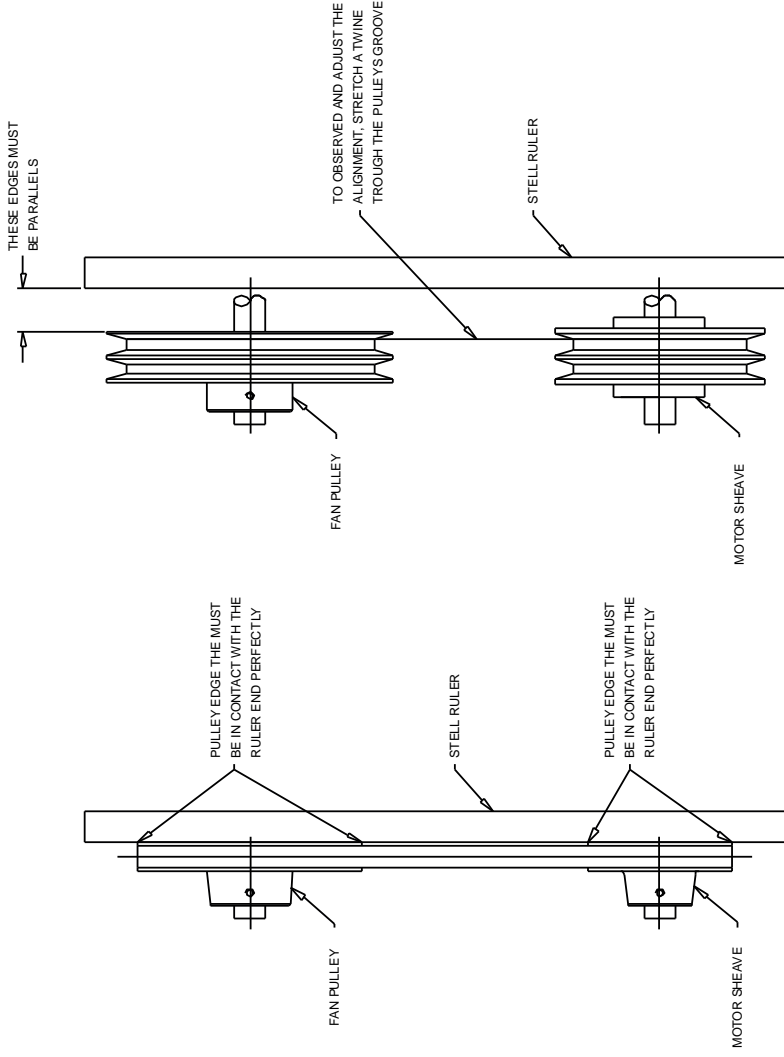


ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm

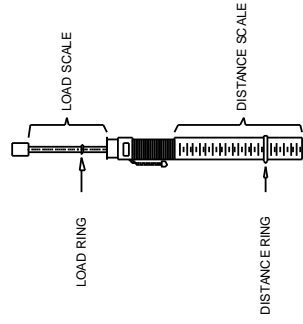
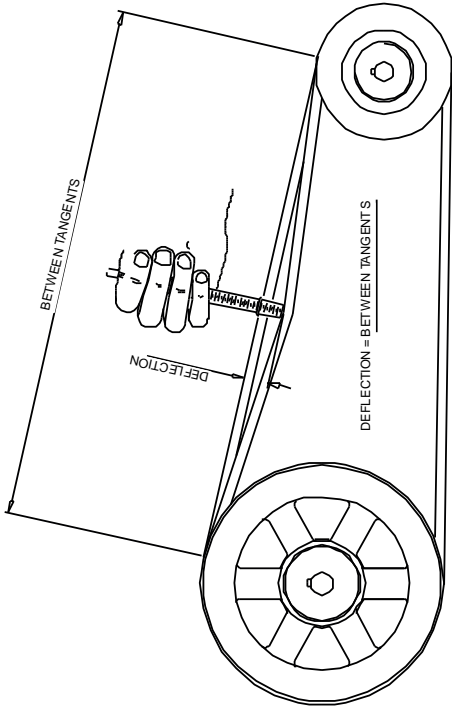
COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06



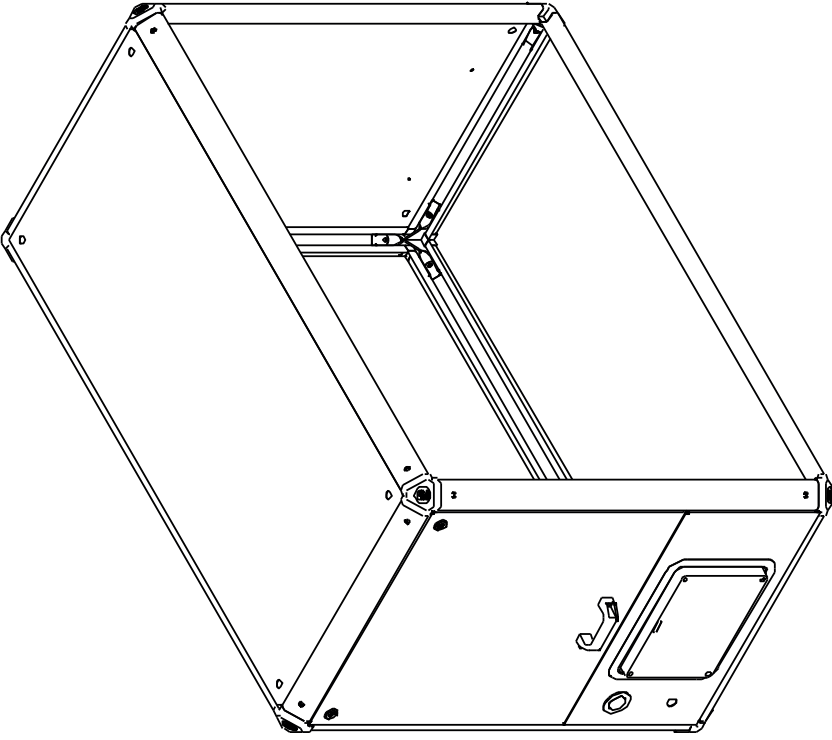
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-64

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-65
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADK-CA00Y00A8BWBA00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

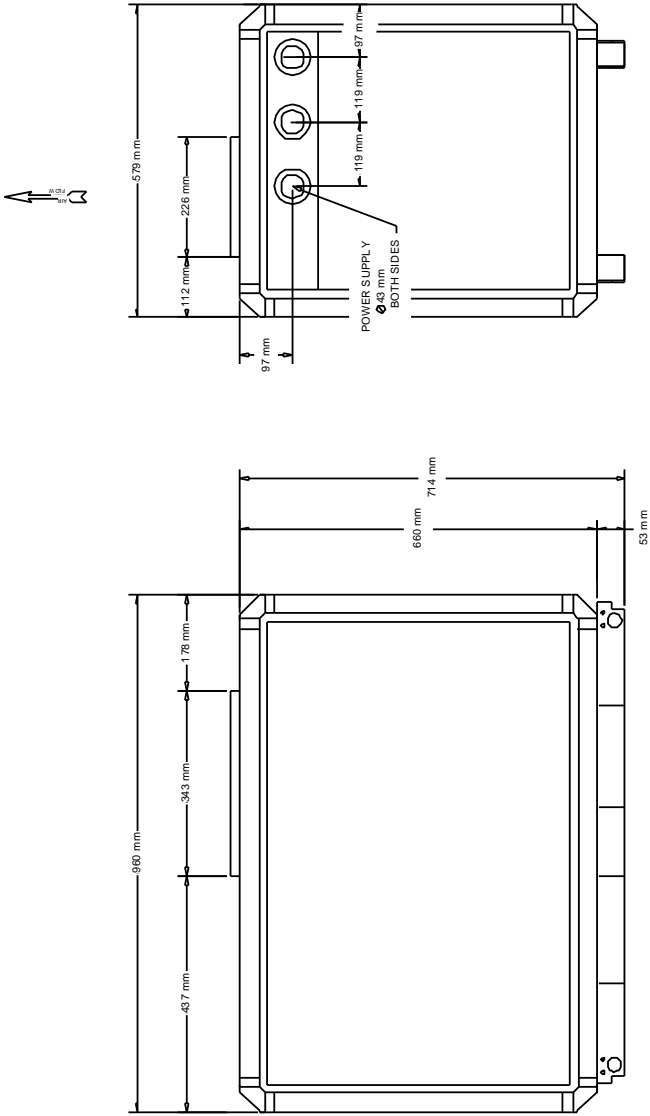
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

Humidifier	
Humidification	w/o Humidification /

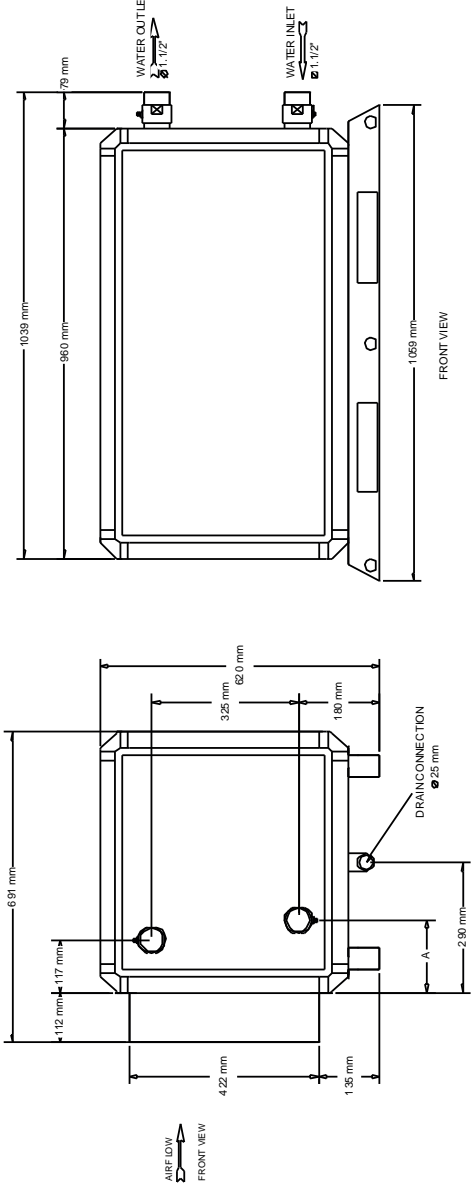


Not Applicable

Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard

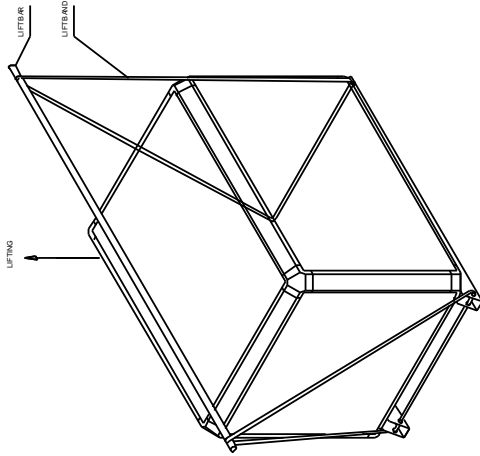


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

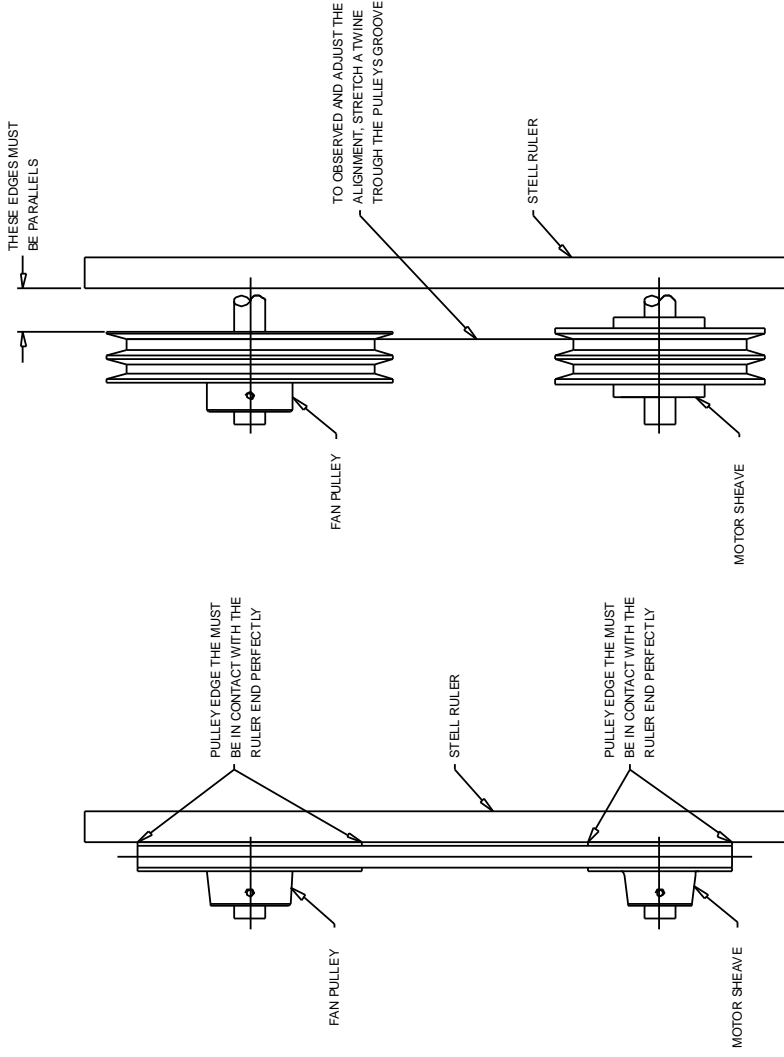


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

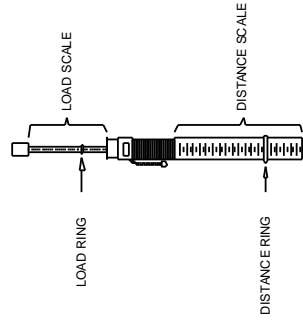
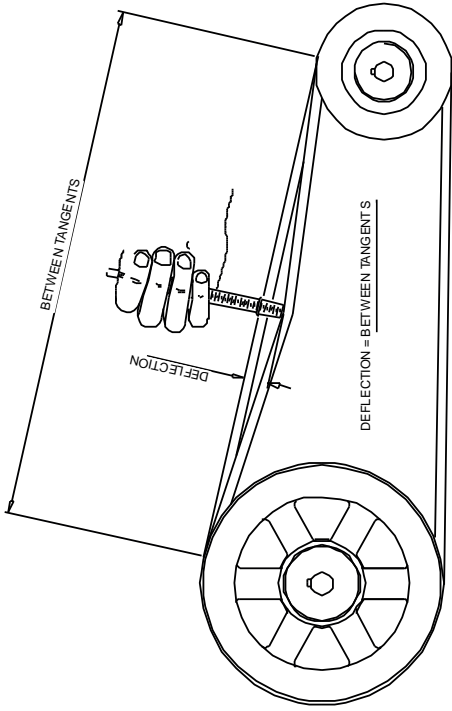
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



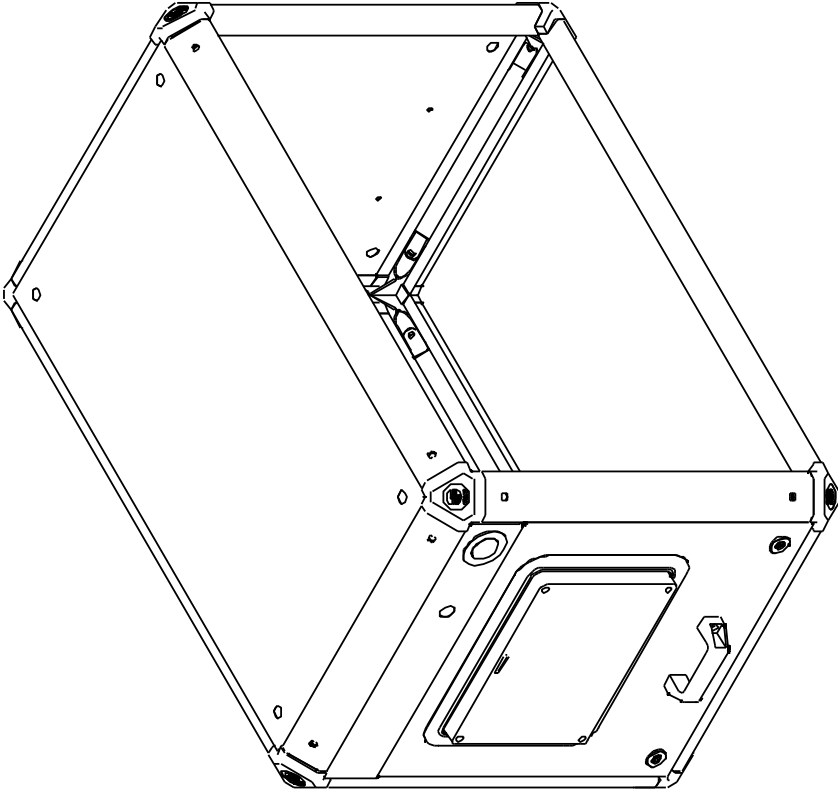
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



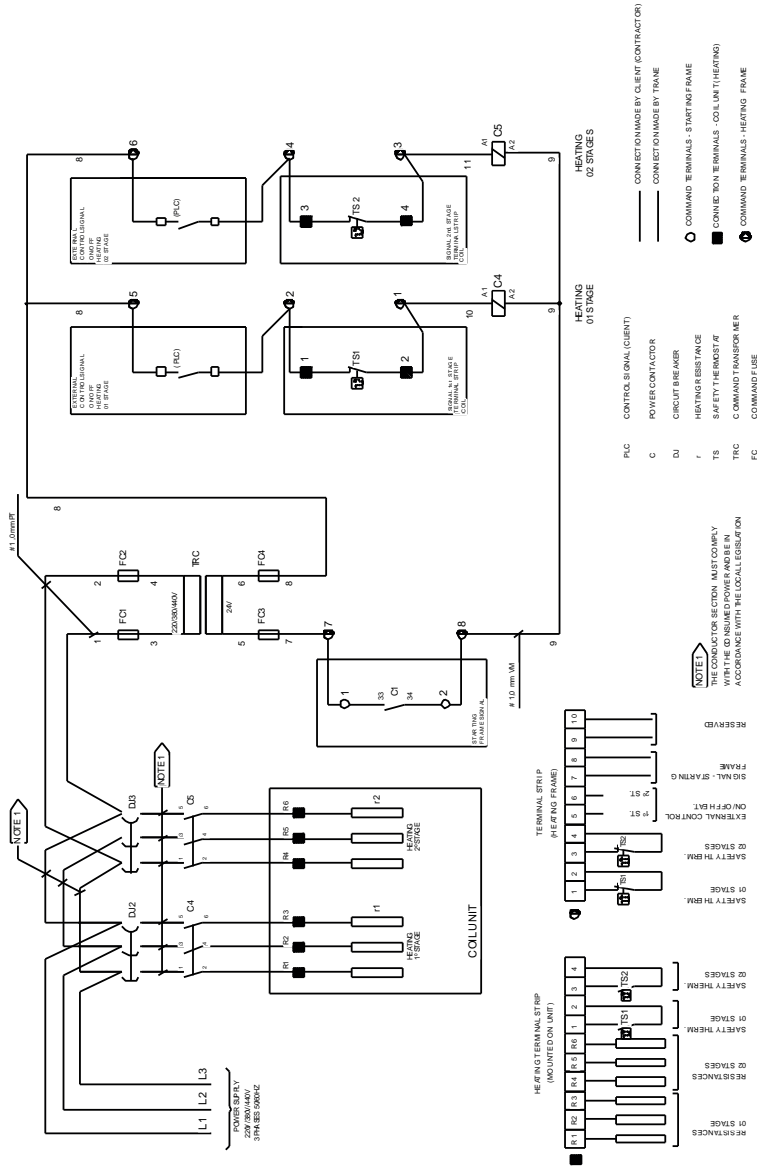
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

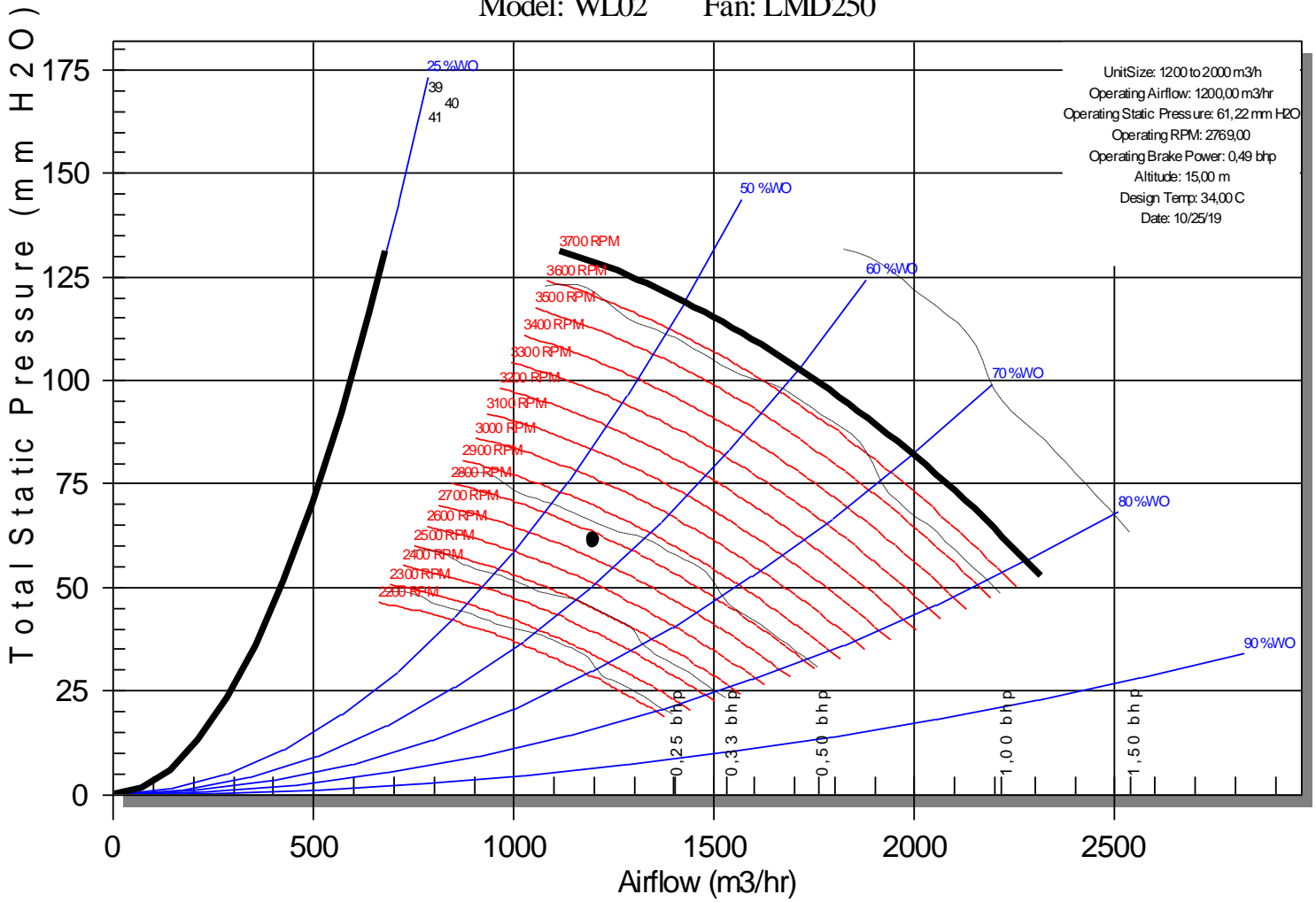
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-65

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-66
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA08AGD-K-FE00Y10B6AWBAY00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	6,57 mm H2O
Mixing Box Air Pressure Drop	2,25 mm H2O	Filter Air Pressure Drop	22,74 mm H2O

Coil			
Cooling Entering Dry Bulb	23,8 C	Cooling Entering Wet Bulb	17,6 C
Cooling Leaving Dry Bulb	12,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,39 m3/hr
Cooling Capacity	30,68 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Heat Options	2 x 6 kw	Heating Capacity	12,00 kW
Electric Heat Stages	2 Stage	Heating Entering Air Temperature	12,3 C
Cooling Airflow	6050,00 m3/hr	Sensible Capacity	23,76 kW
Cooling Leaving Wet Bulb	12,1 C	Cooling Water Volume	21,28 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	475,83 mm H2O
Cooling Air Pressure Drop	12,86 mm H2O	Cooling Coil Wet Weight	221 kg
Actual Cooling Face Velocity	2,3 m/s	Electric Heat PD	3,24 mm H2O

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	77,66 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,58 bhp
Fan RPM	2144 rpm	Transmission Option	E
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,0 m/s	Velocity Pressure	48,3 Pa

Humidifier	
Humidification	w/o Humidification /



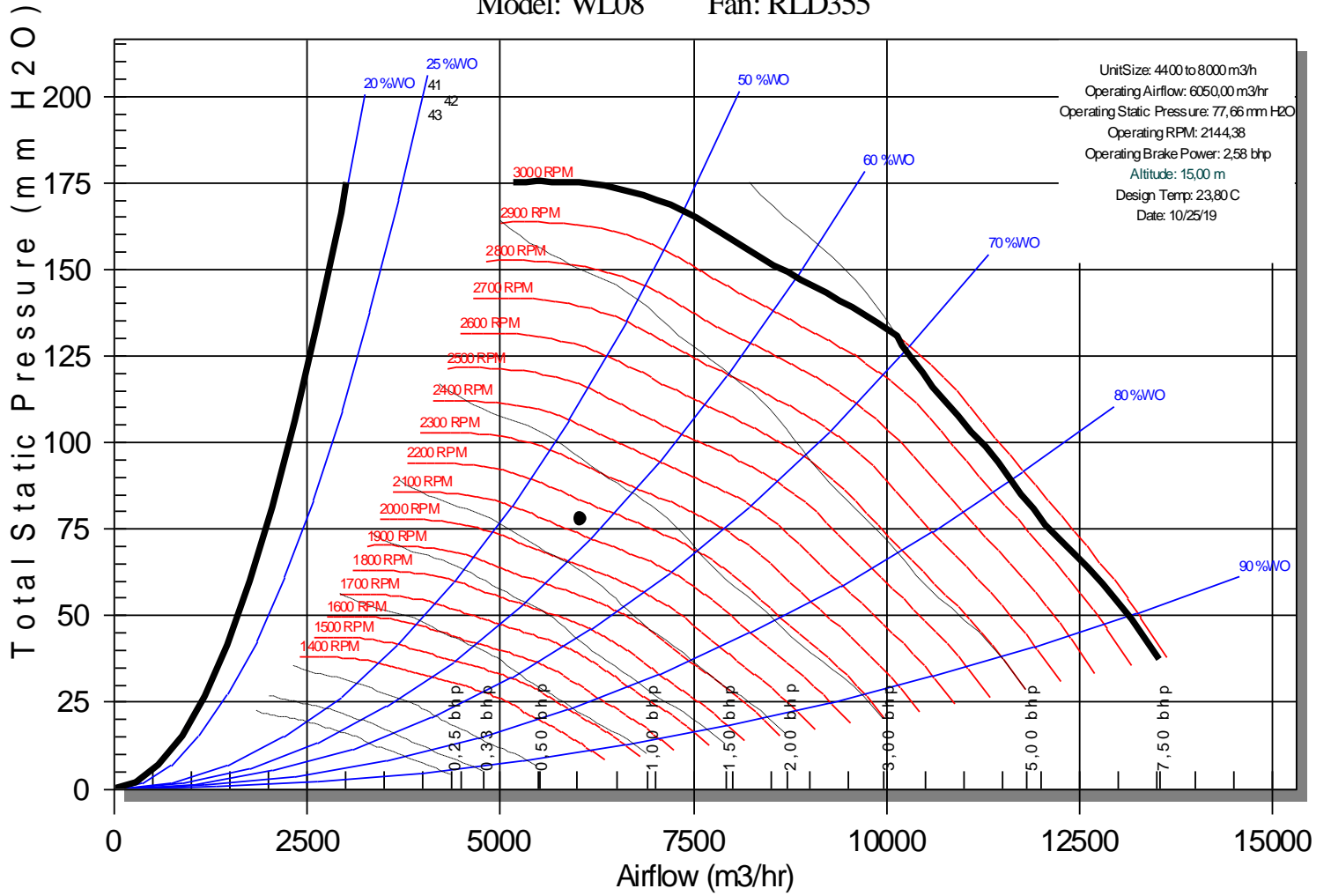
Not Applicable

Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



AH-2P-66

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-67
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA10AGADKTHGO 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	5500 to 10000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,99 mm H2O
Mixing Box Air Pressure Drop	2,57 mm H2O	Filter Air Pressure Drop	22,27 mm H2O

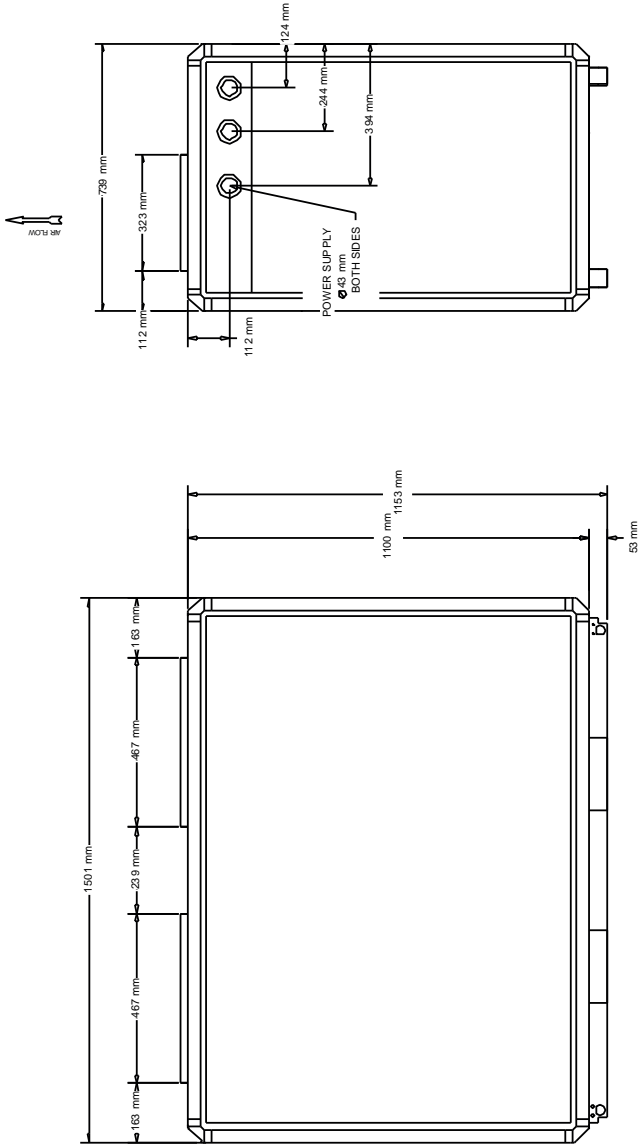
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	15,0 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	17,06 m3/hr
Cooling Capacity	119,33 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	7850,00 m3/hr	Sensible Capacity	52,04 kW
Cooling Leaving Wet Bulb	14,8 C	Cooling Water Volume	28,74 L
Cooling Water Velocity	1,4 m/s	Cooling Water Pressure Drop	2929,78 mm H2O
Cooling Air Pressure Drop	16,01 mm H2O	Cooling Coil Wet Weight	300 kg
Actual Cooling Face Velocity	2,4 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	81,84 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	3,83 bhp
Fan RPM	2805 rpm	Transmission Option	G
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	9,1 m/s	Velocity Pressure	49,4 Pa

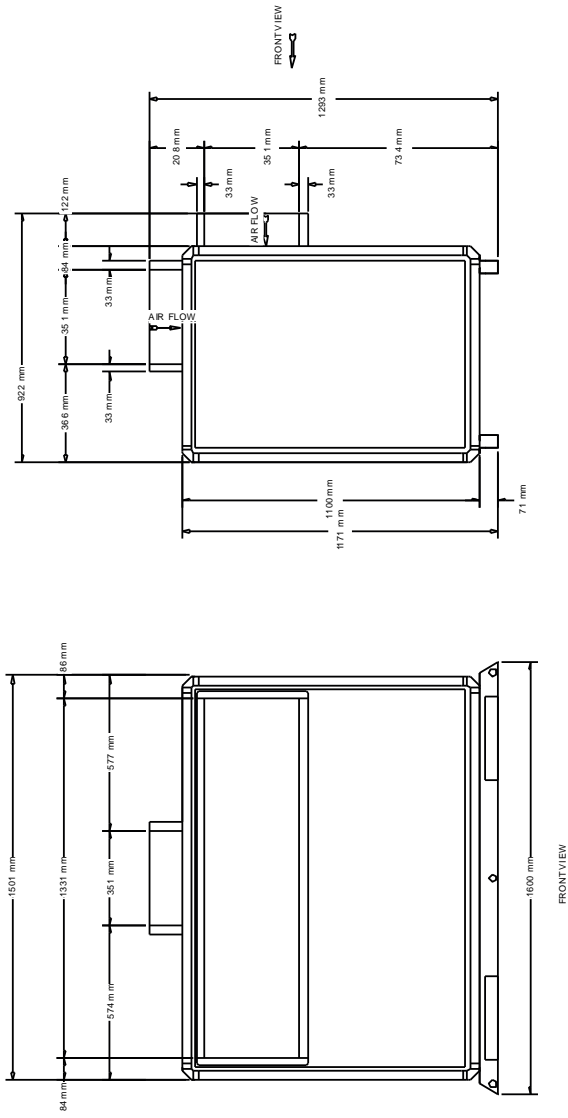
Humidifier	
Humidification	w/o Humidification / Not Applicable



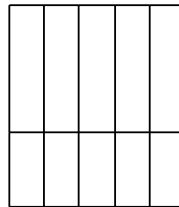
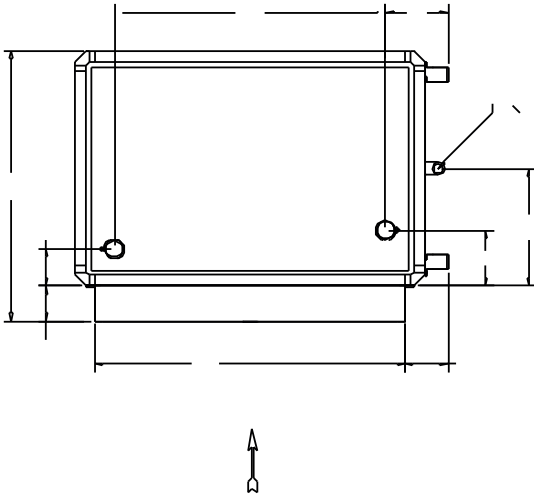
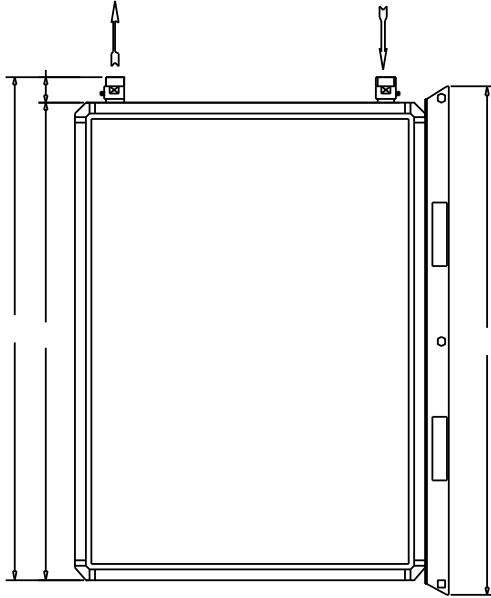
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

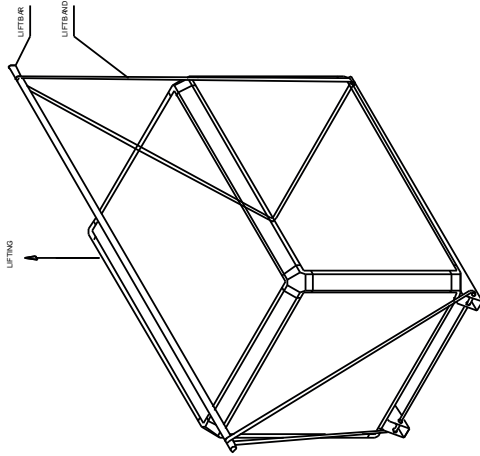


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 10

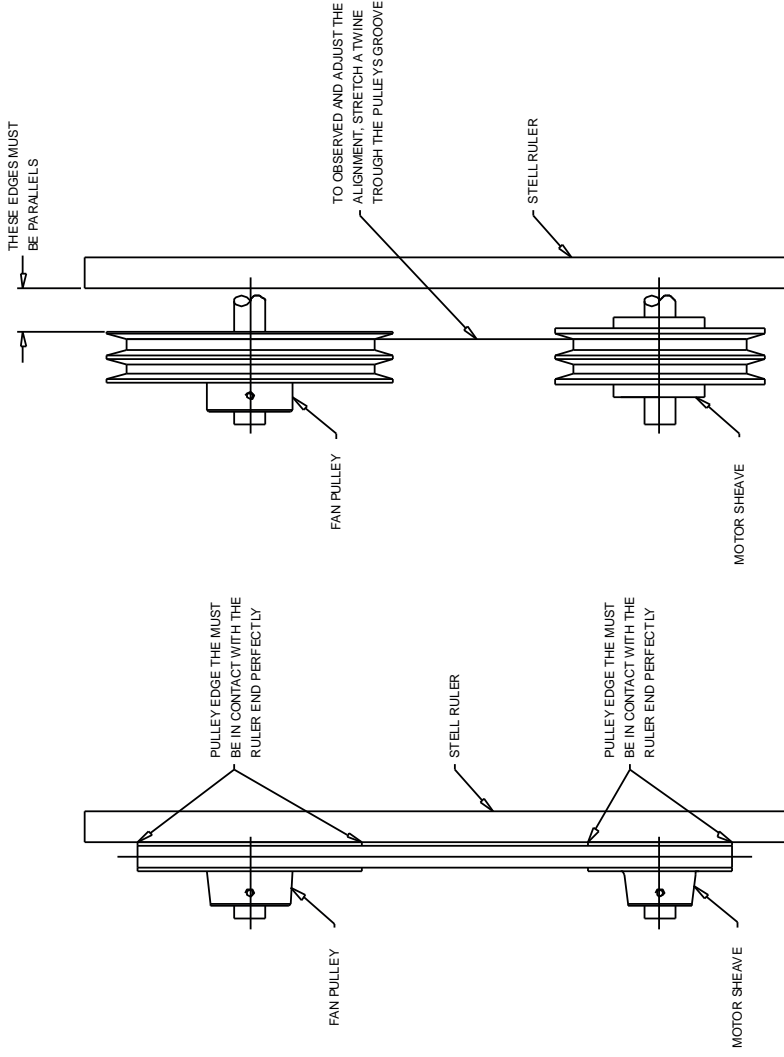


MIXER BOX SECTION
WAVE DOBLE 10

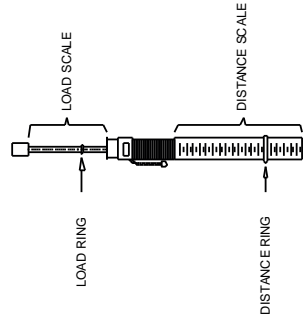
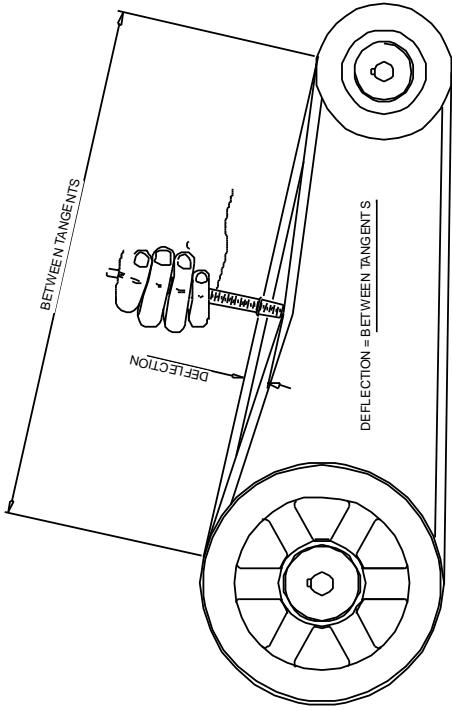




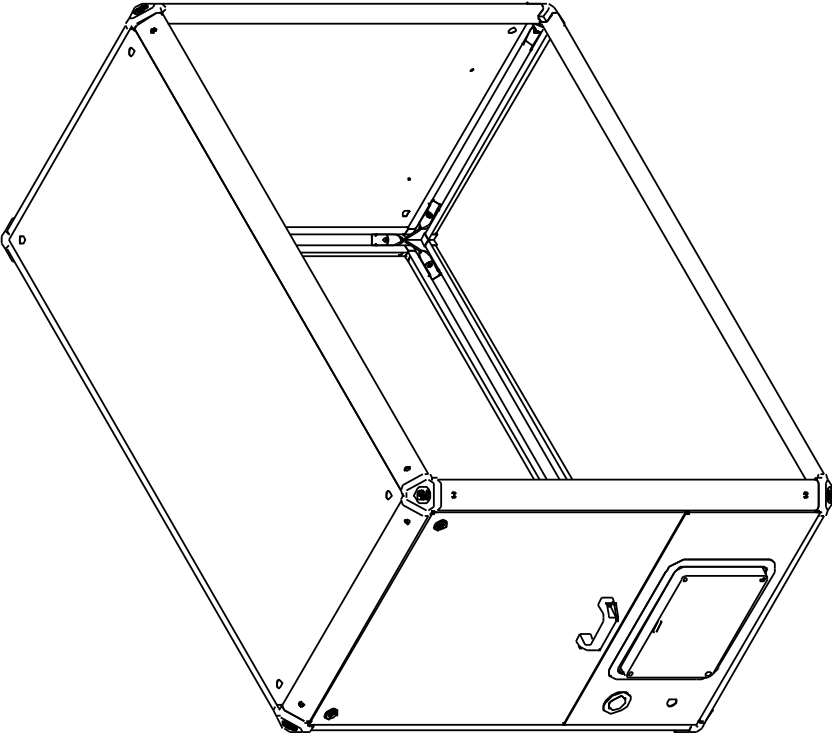
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

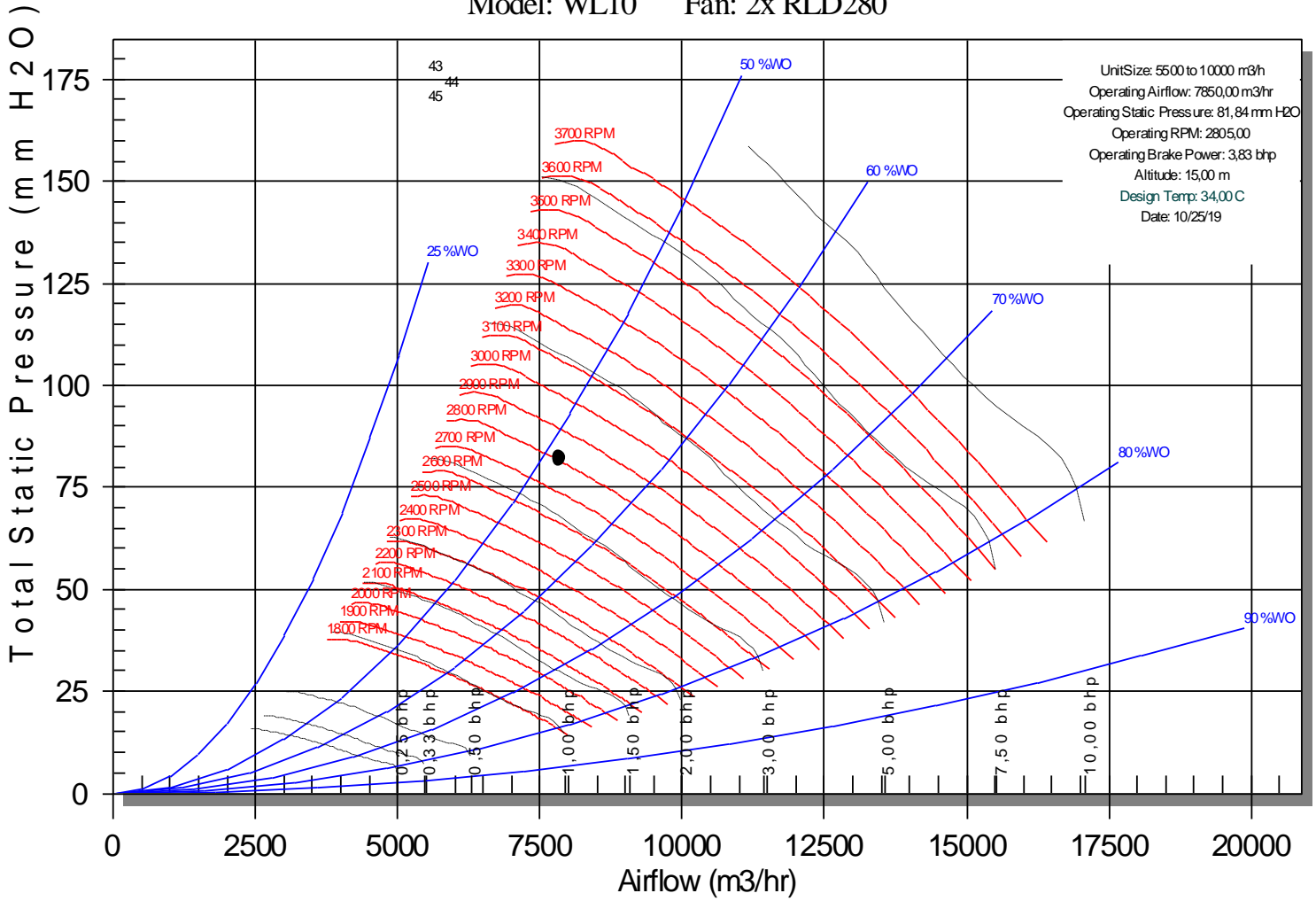
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-67

Model: WL10 Fan: 2x RLD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-68
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKTC A0 0Y00A8BWBAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

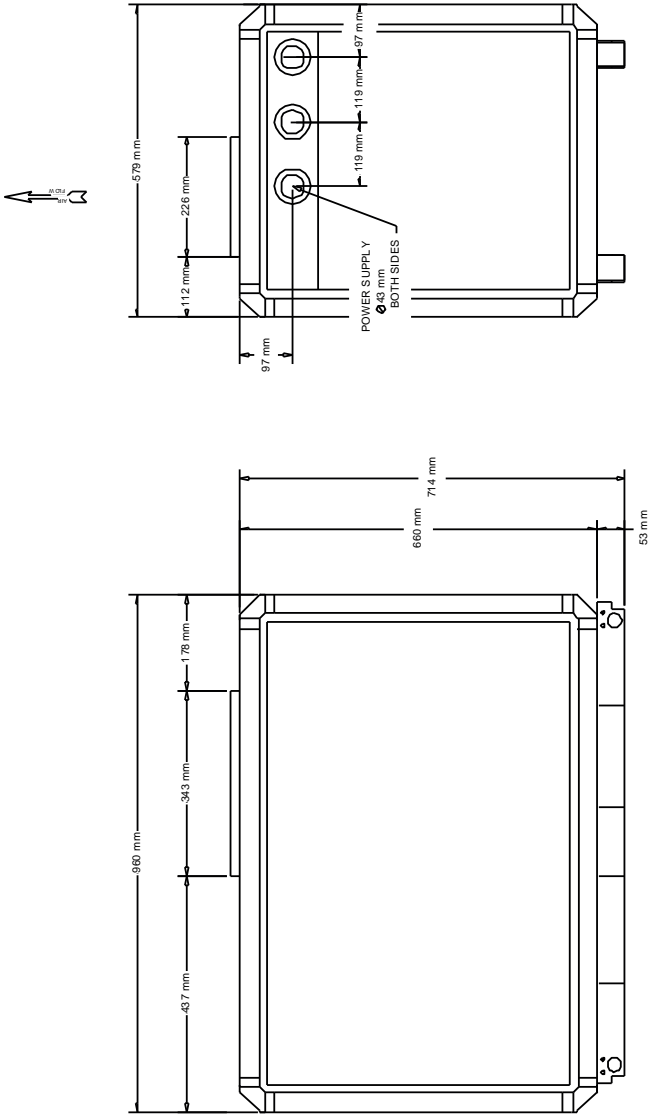
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,8 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

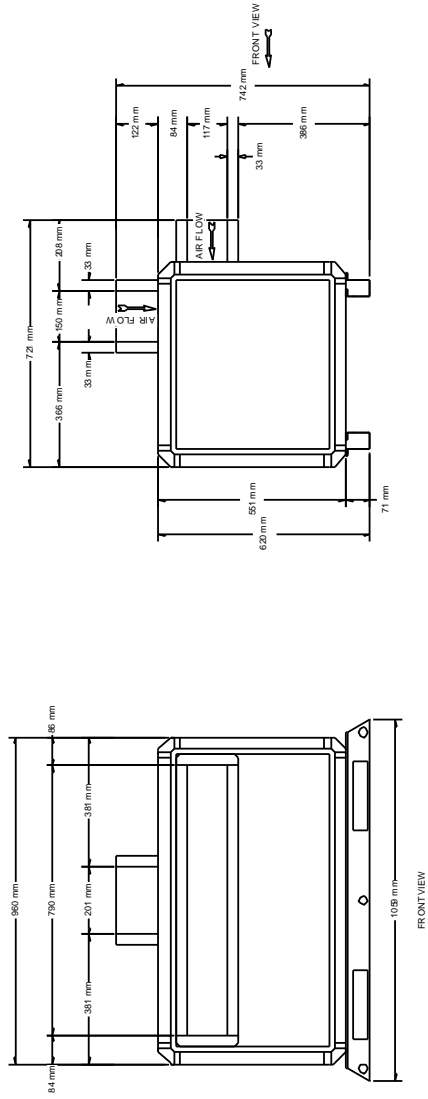
Humidifier	
Humidification	w/o Humidification / Not Applicable



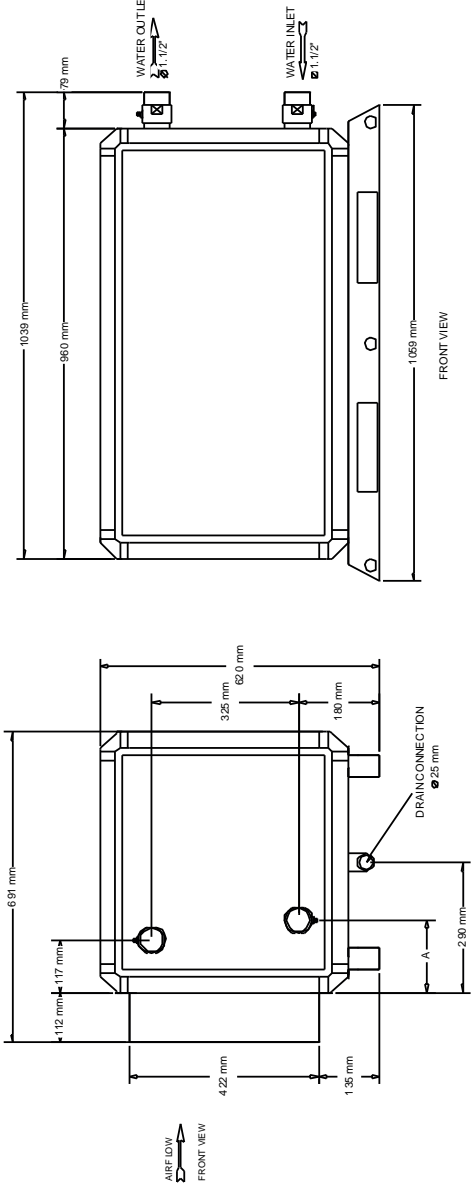
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

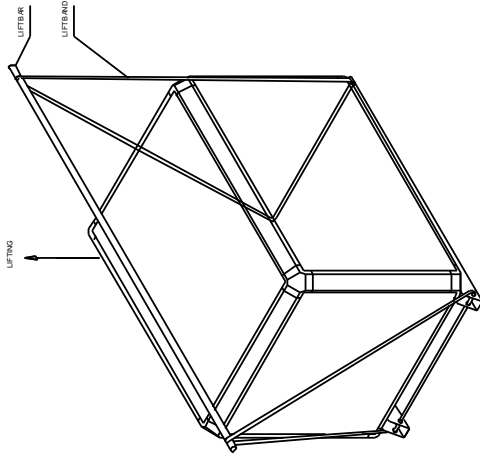


MIXER BOX SECTION
WAVE DOBLE 02

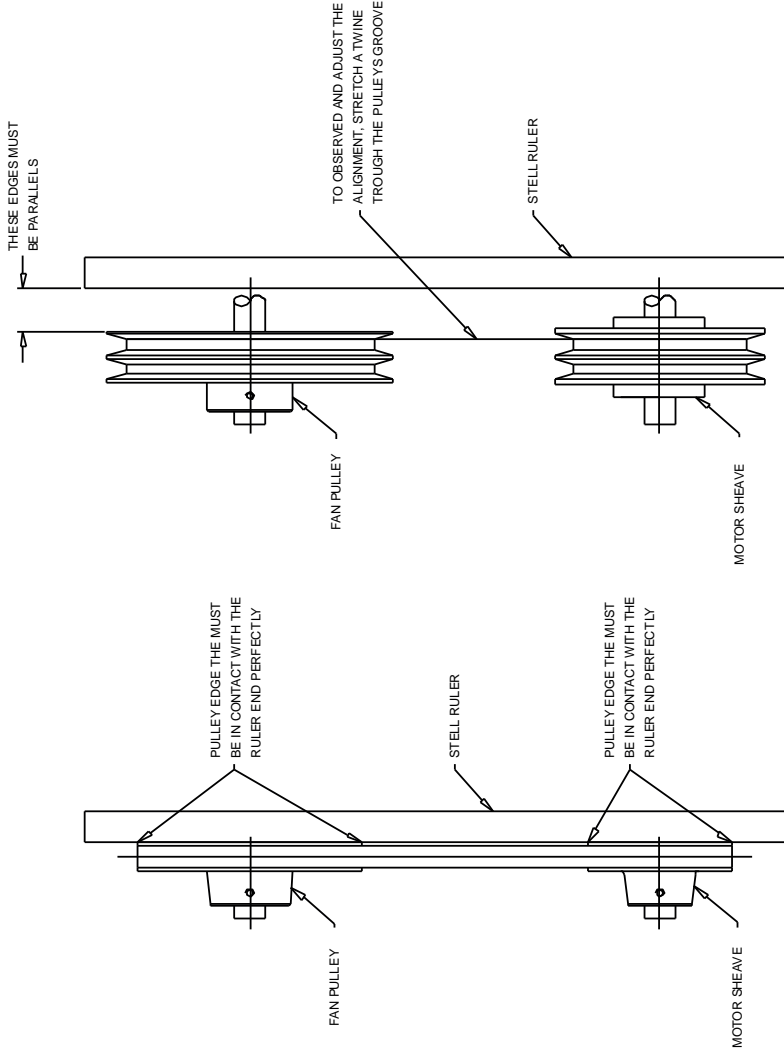


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

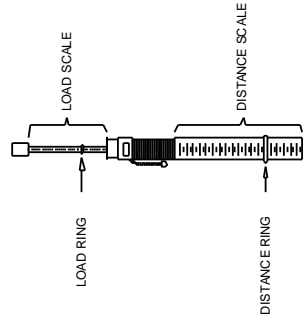
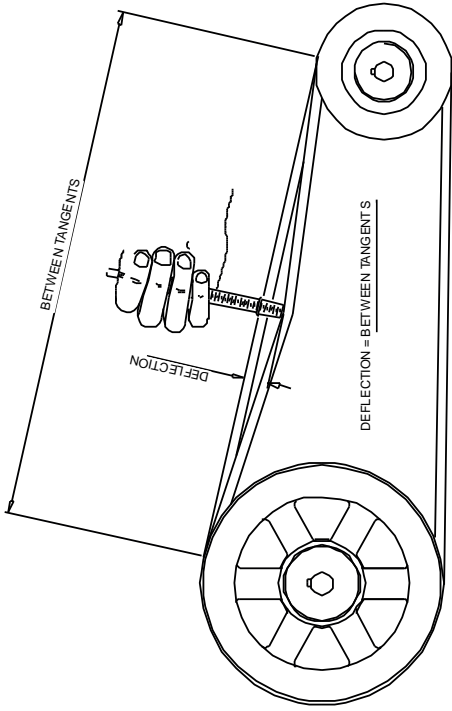
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



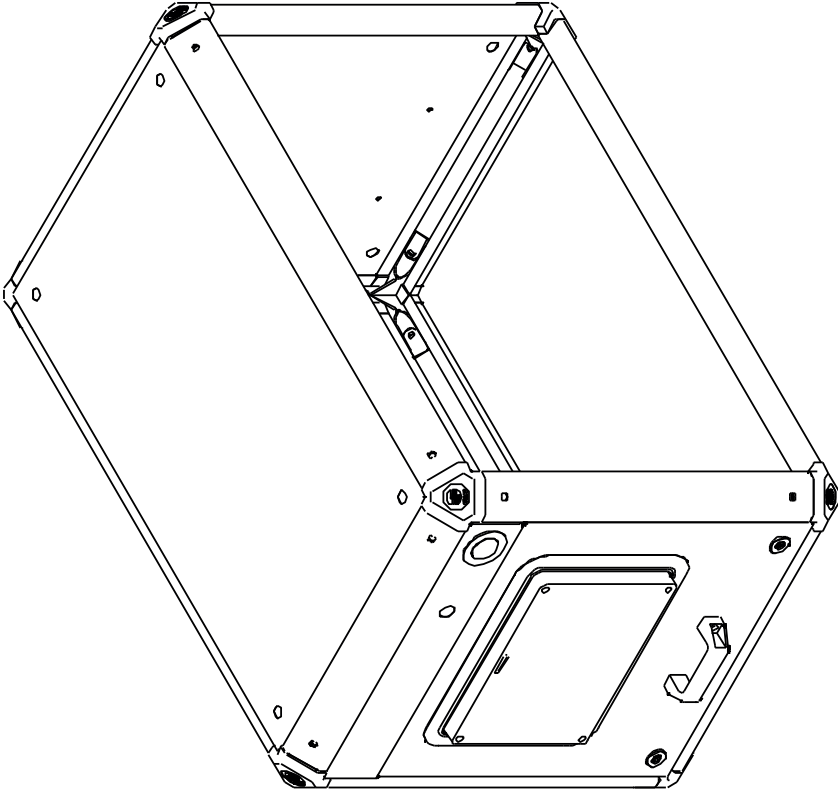
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

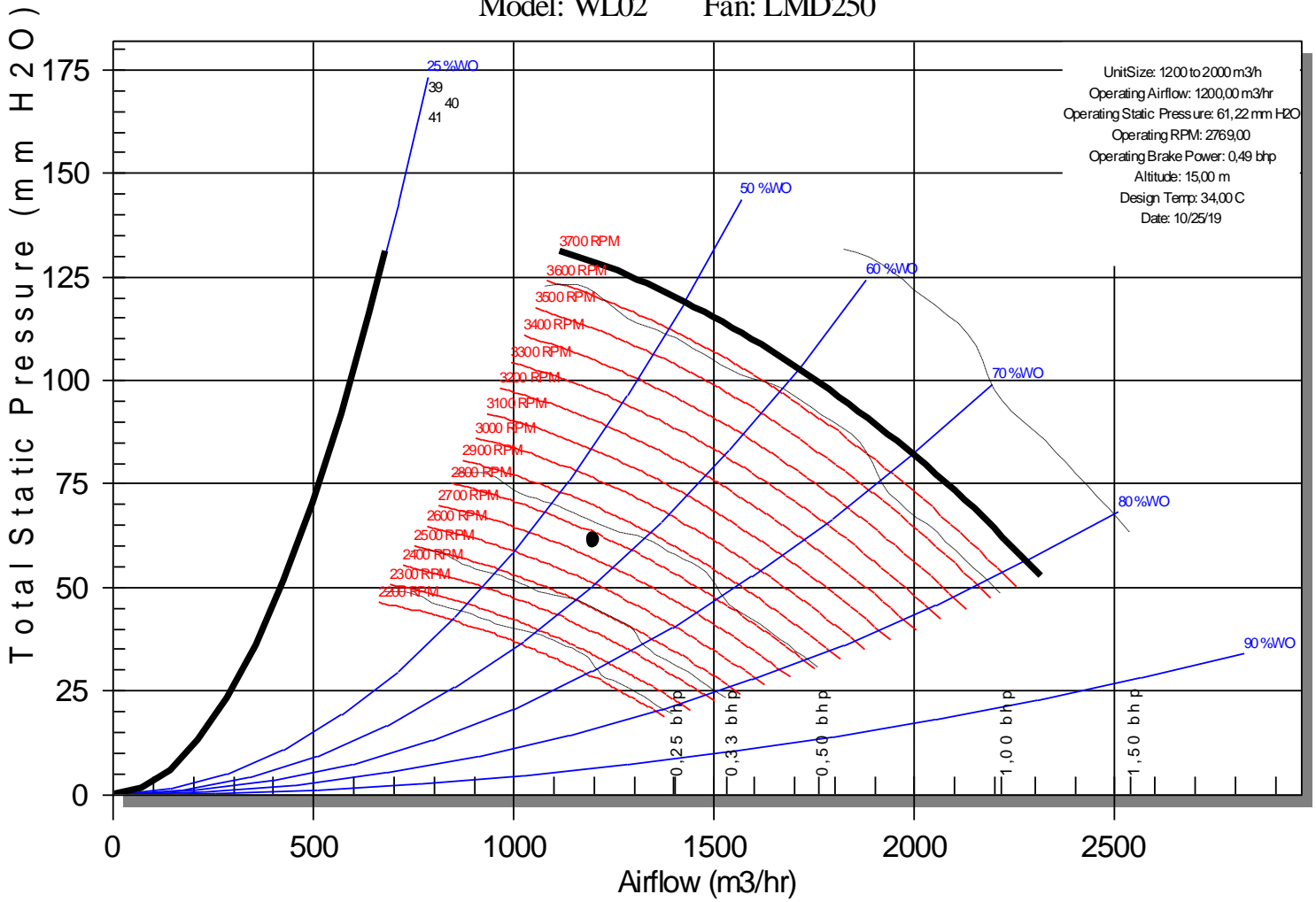
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-68

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-69
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGADKTED0 0Y00A8BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,65 mm H2O
Mixing Box Air Pressure Drop	1,81 mm H2O	Filter Air Pressure Drop	16,96 mm H2O

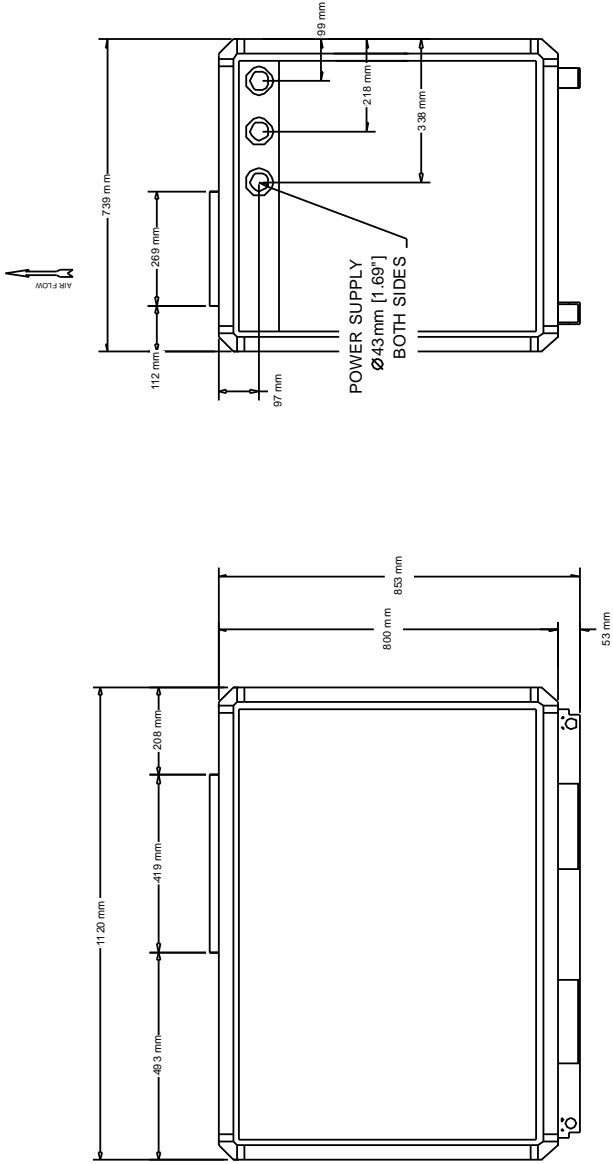
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	9,9 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,65 m3/hr
Cooling Capacity	53,53 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	2760,00 m3/hr	Sensible Capacity	23,18 kW
Cooling Leaving Wet Bulb	9,8 C	Cooling Water Volume	10,24 L
Cooling Water Velocity	1,6 m/s	Cooling Water Pressure Drop	4436,63 mm H2O
Cooling Air Pressure Drop	15,53 mm H2O	Cooling Coil Wet Weight	202 kg
Actual Cooling Face Velocity	2,0 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	71,95 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,11 bhp
Fan RPM	2464 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,0 m/s	Velocity Pressure	48,4 Pa

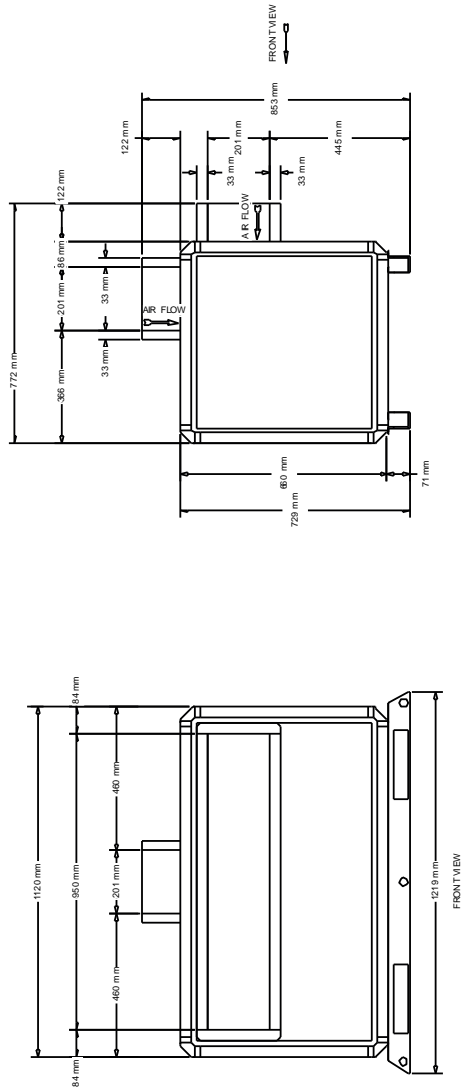
Humidifier	
Humidification	w/o Humidification / Not Applicable



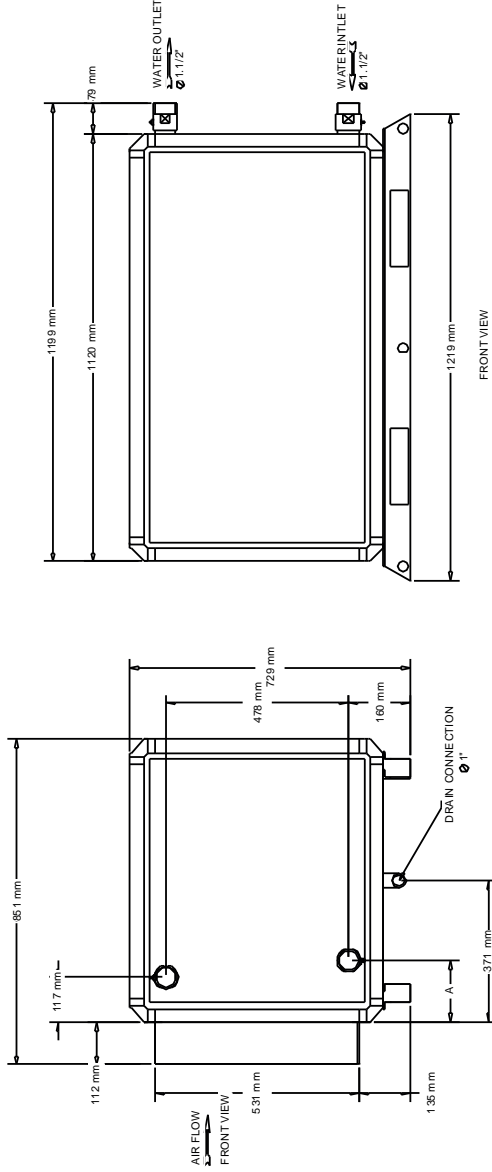
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

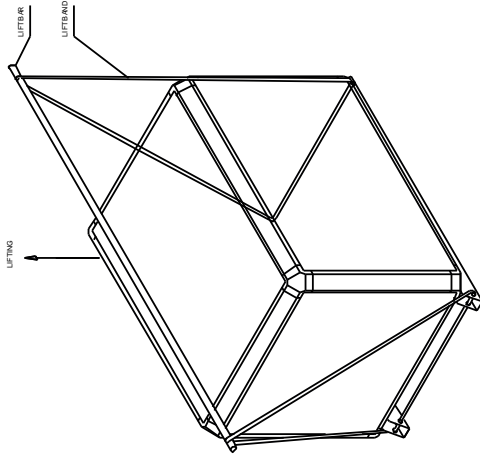


MIXER BOX SECTION
WAVE DOBLE 04

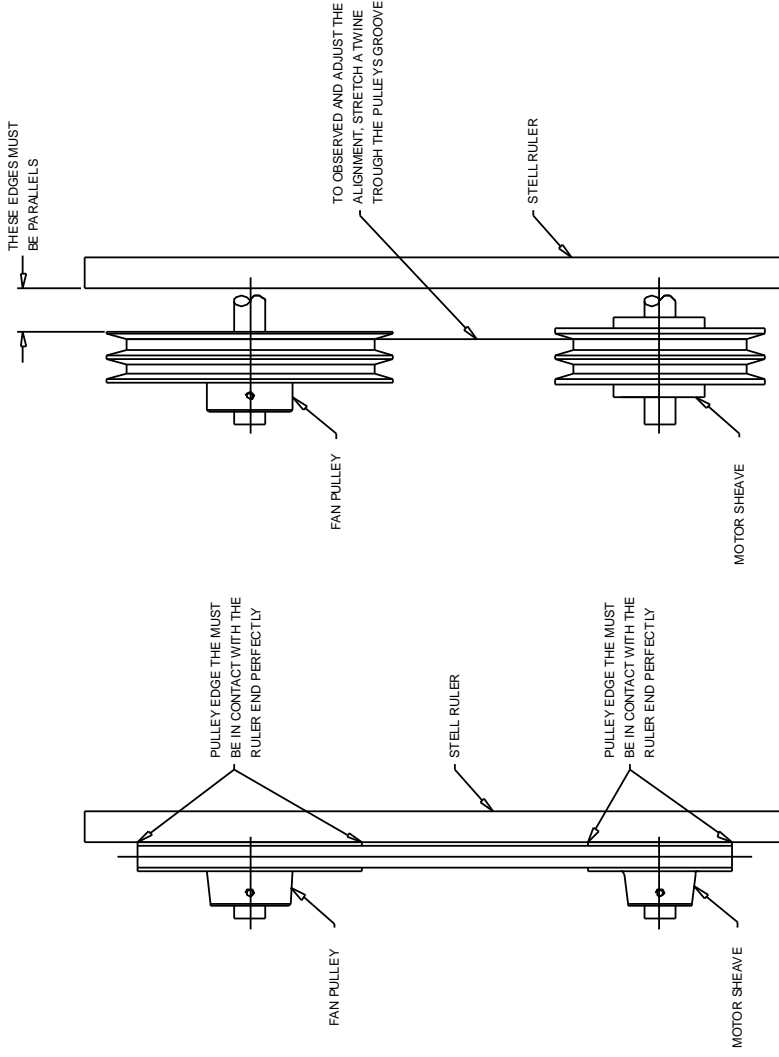


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 04

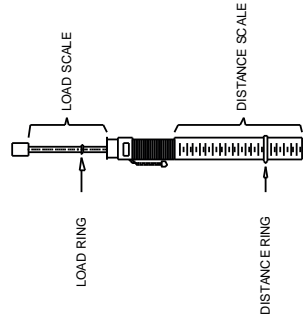
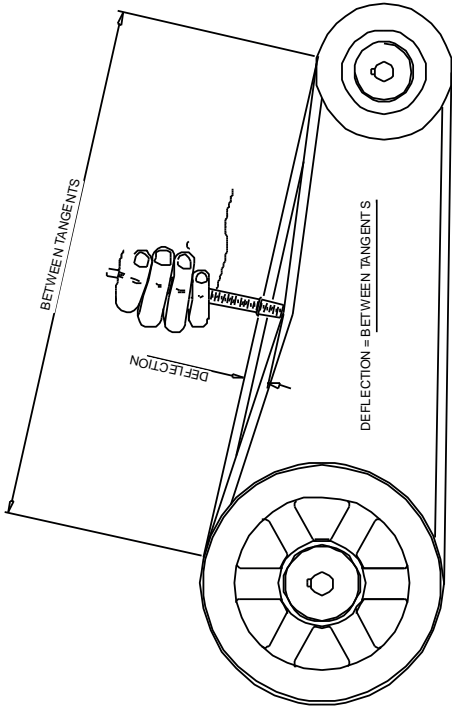
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



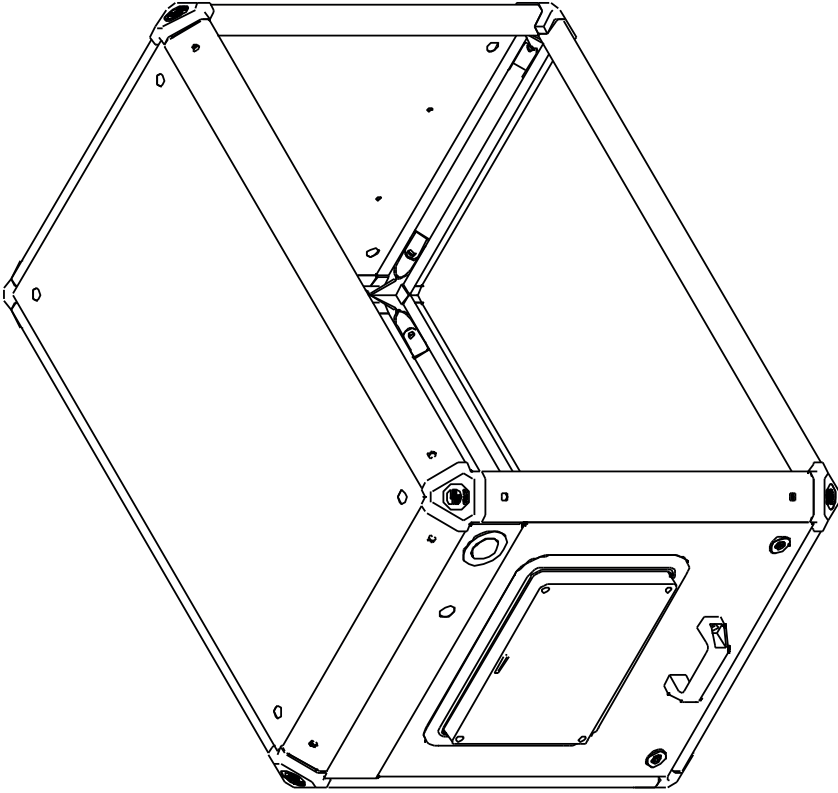
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

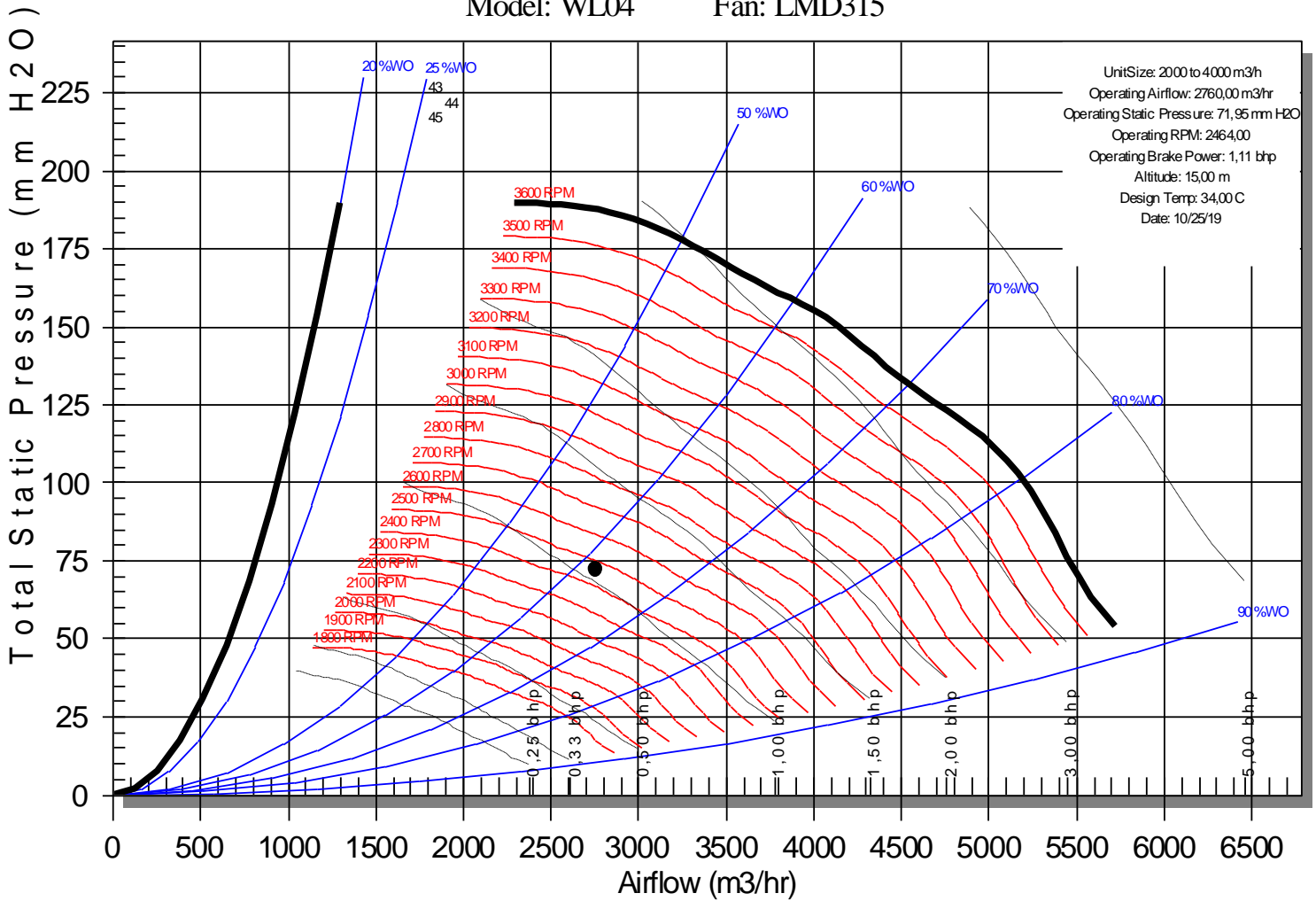
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-69

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-70
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA02AGADKTC A0 0Y00A8BWBAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1200 to 2000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,24 mm H2O
Mixing Box Air Pressure Drop	1,10 mm H2O	Filter Air Pressure Drop	11,70 mm H2O

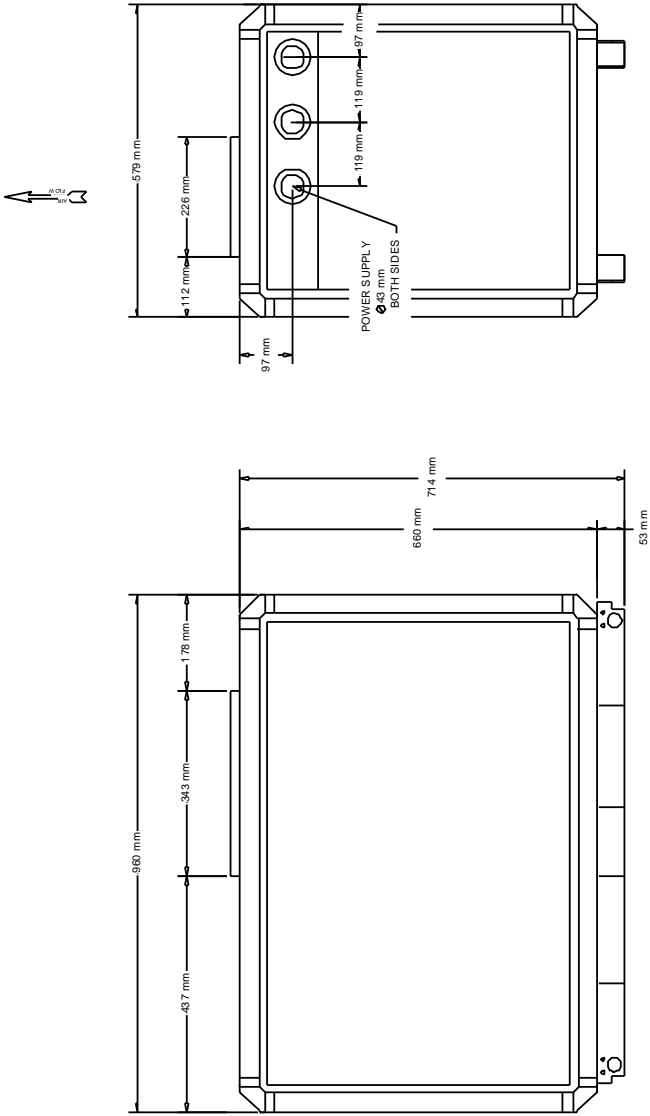
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	10,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,33 m3/hr
Cooling Capacity	23,26 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,6 C	Cooling Airflow	1200,00 m3/hr
Sensible Capacity	10,00 kW	Cooling Leaving Wet Bulb	9,9 C
Cooling Water Volume	5,93 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	1504,33 mm H2O	Cooling Air Pressure Drop	11,39 mm H2O
Cooling Coil Wet Weight	138 kg	Actual Cooling Face Velocity	1,7 m/s
Electric Heat PD	1,79 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	61,22 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,49 bhp
Fan RPM	2769 rpm	Transmission Option	A
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	6,2 m/s	Velocity Pressure	23,0 Pa

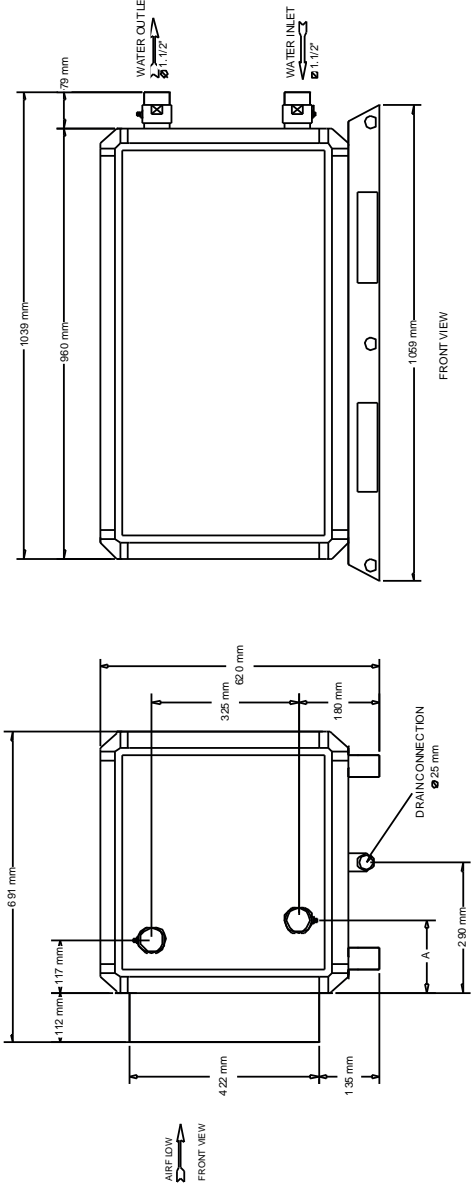
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

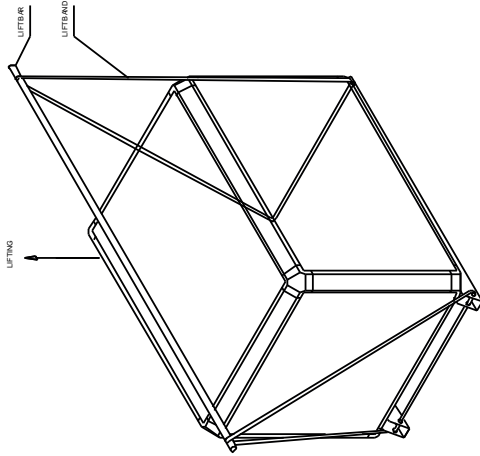


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 02

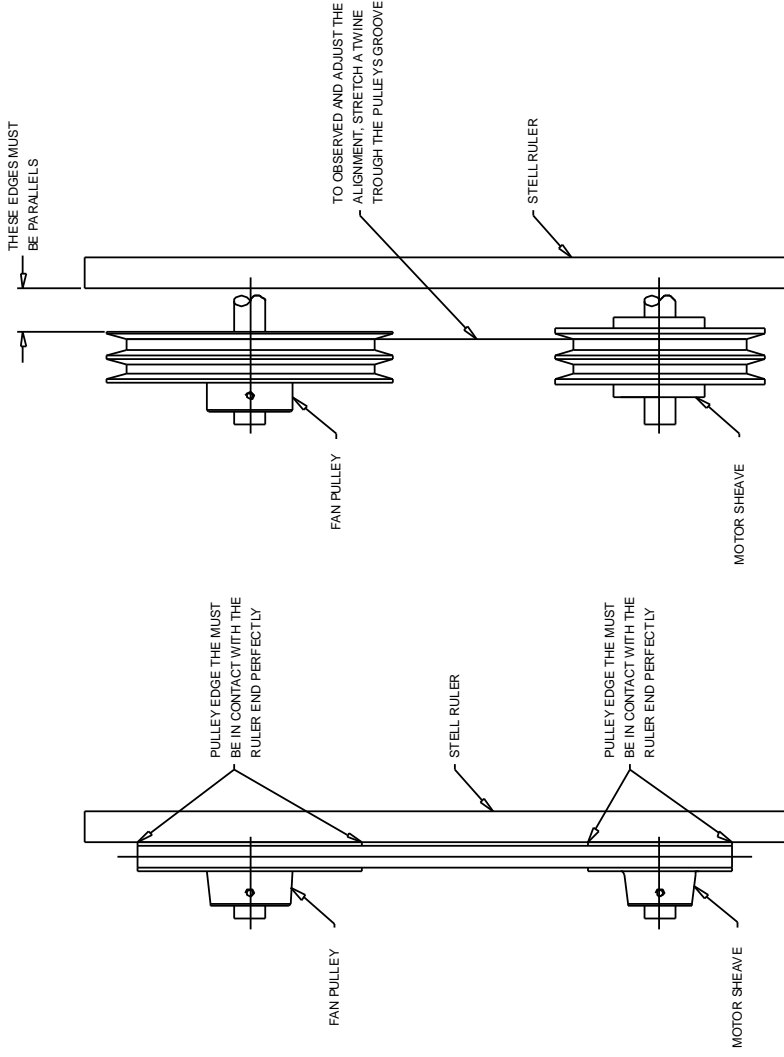


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 02

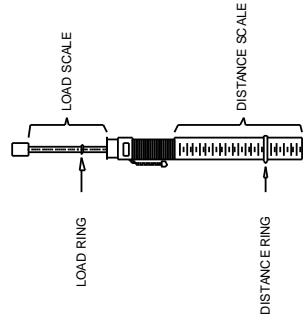
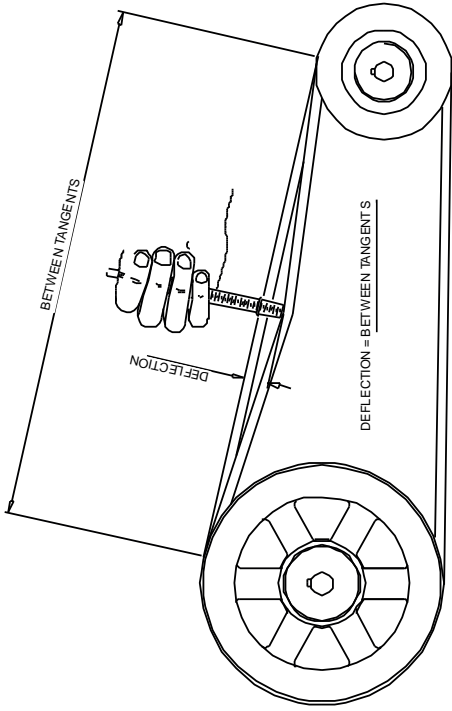
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



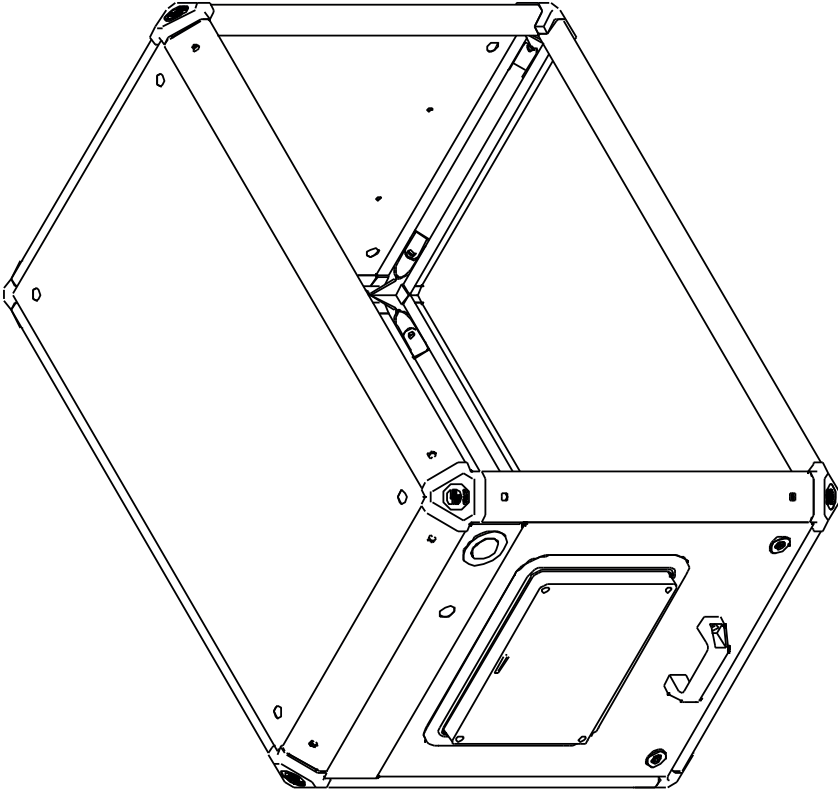
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



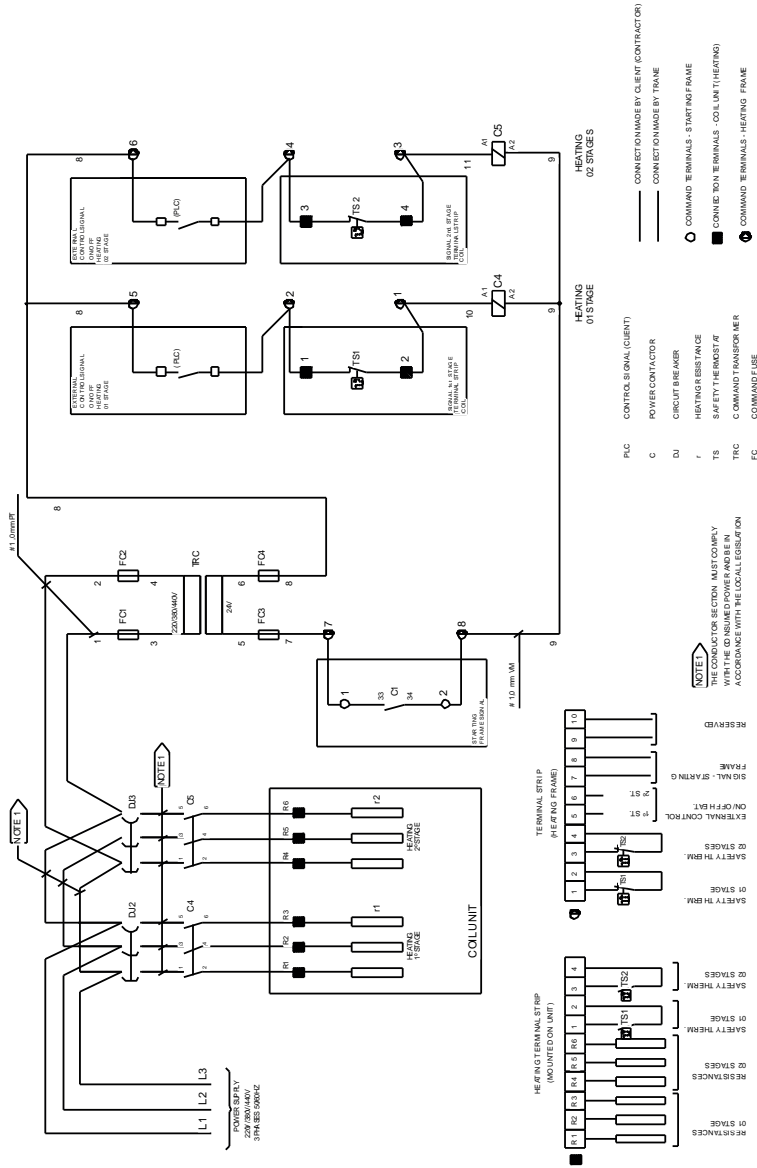
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

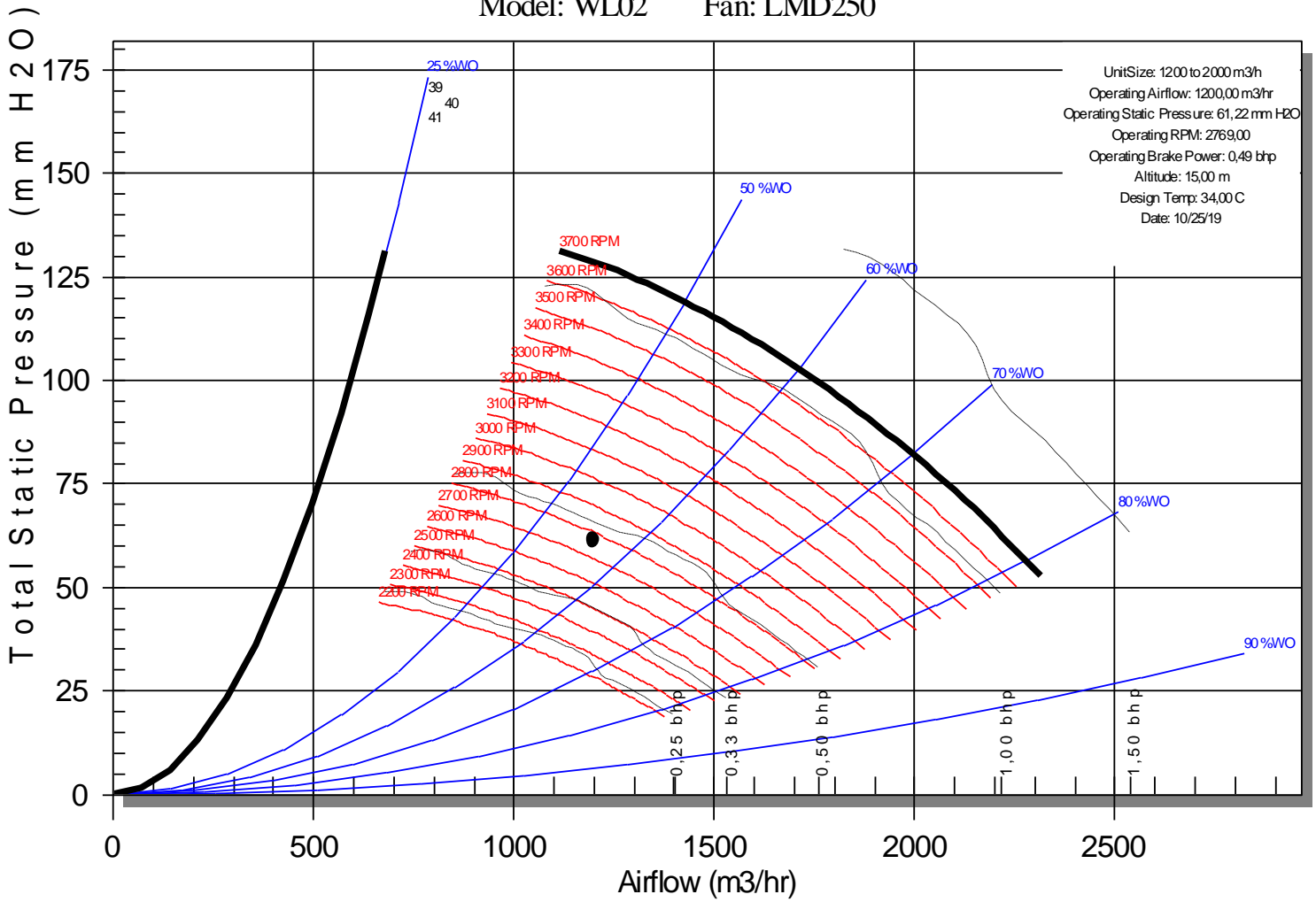
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-70

Model: WL02 Fan: LMD250





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-71
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTFG0 0Y00A6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	13,84 mm H2O
Mixing Box Air Pressure Drop	3,14 mm H2O	Filter Air Pressure Drop	30,92 mm H2O

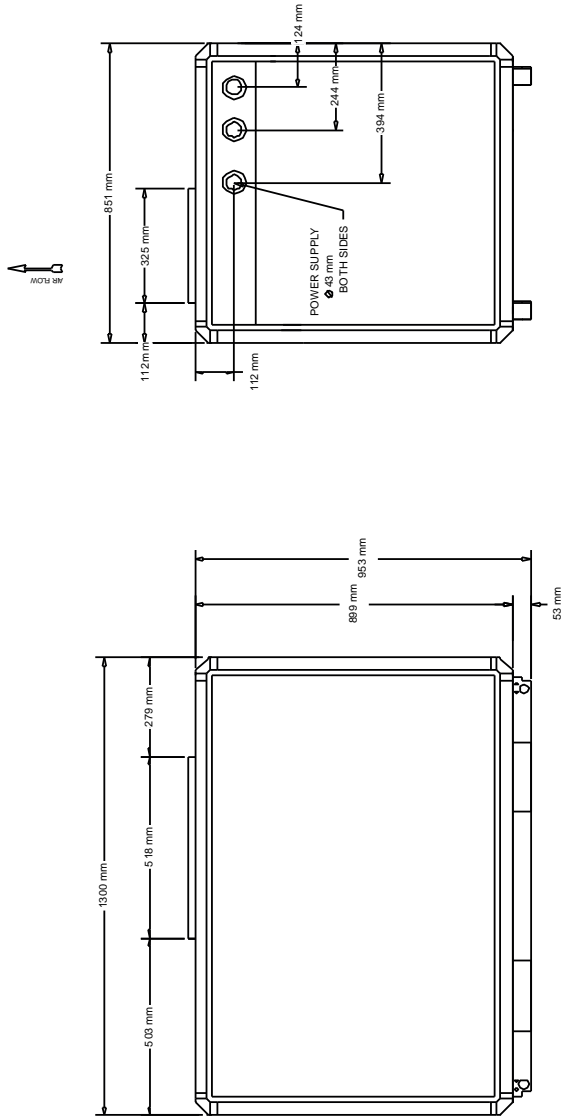
Coil			
Cooling Entering Dry Bulb	25,3 C	Cooling Entering Wet Bulb	19,4 C
Cooling Leaving Dry Bulb	12,0 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	5,31 m3/hr
Cooling Capacity	37,12 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	5200,00 m3/hr	Sensible Capacity	23,68 kW
Cooling Leaving Wet Bulb	11,9 C	Cooling Water Volume	12,39 L
Cooling Water Velocity	0,9 m/s	Cooling Water Pressure Drop	1562,43 mm H2O
Cooling Air Pressure Drop	17,12 mm H2O	Cooling Coil Wet Weight	192 kg
Actual Cooling Face Velocity	2,7 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	95,02 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,55 bhp
Fan RPM	2137 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	10,7 m/s	Velocity Pressure	68,2 Pa

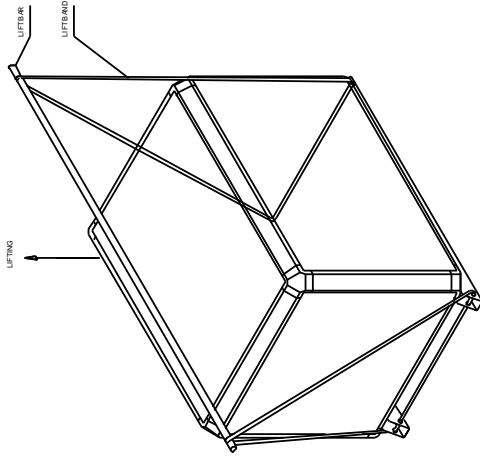
Humidifier	
Humidification	w/o Humidification / Not Applicable



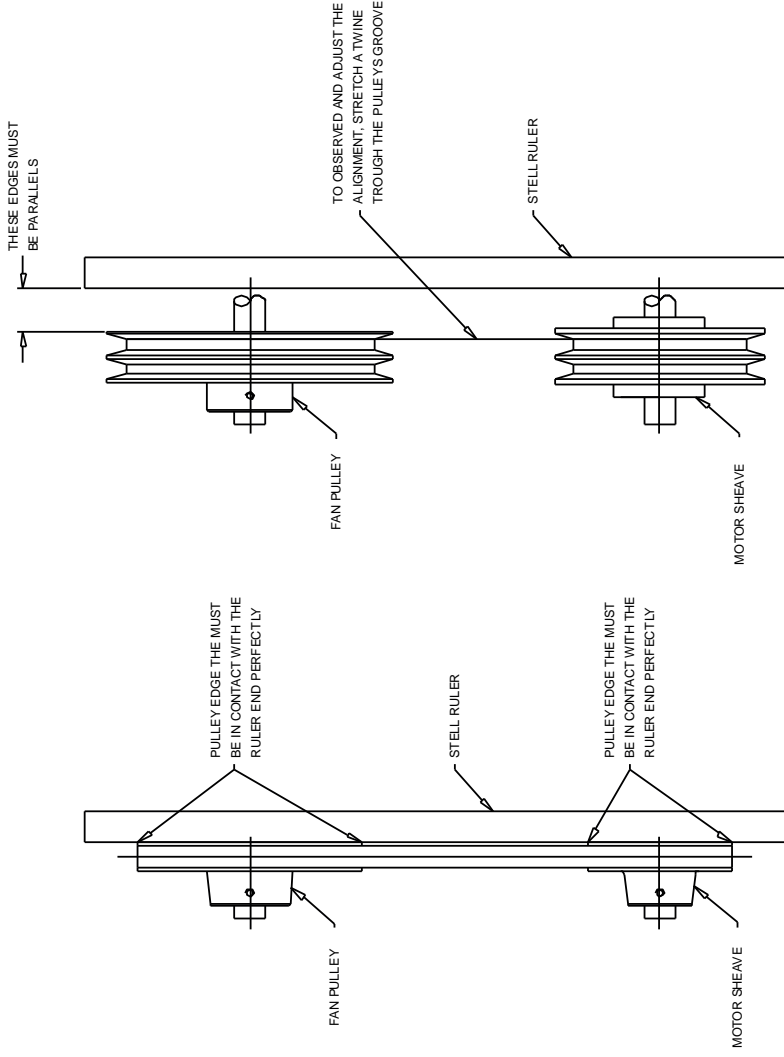
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



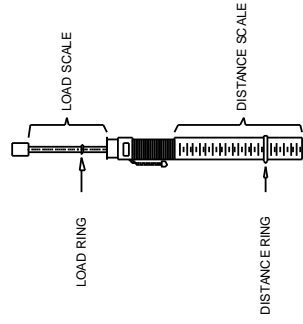
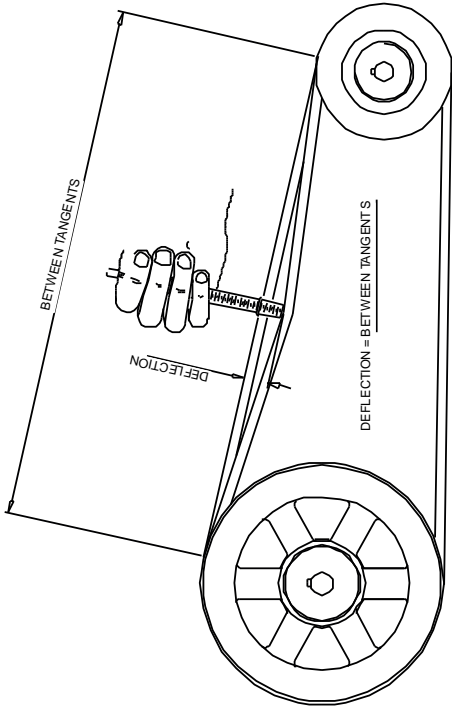
FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06



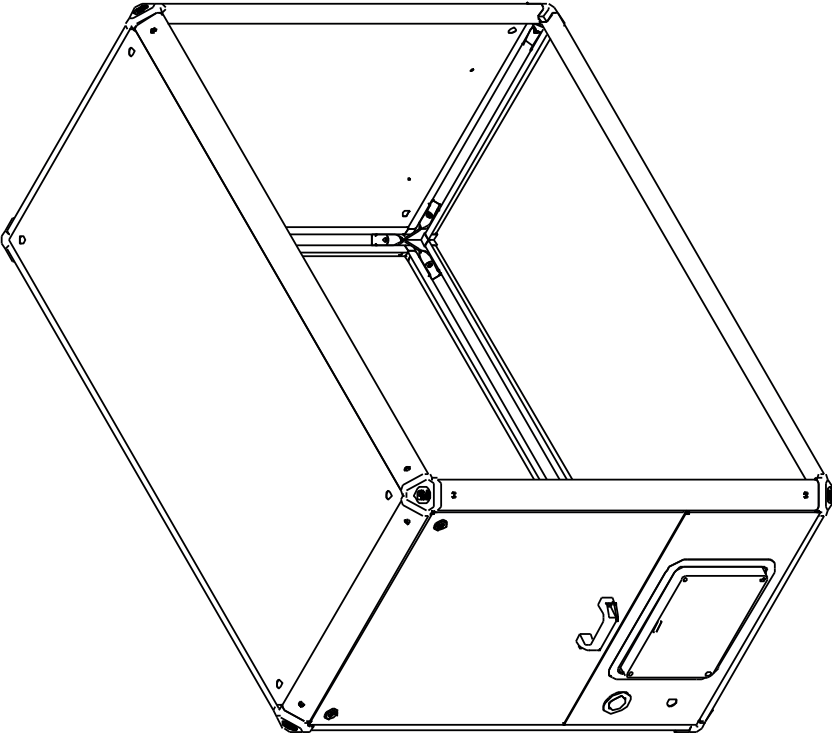
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

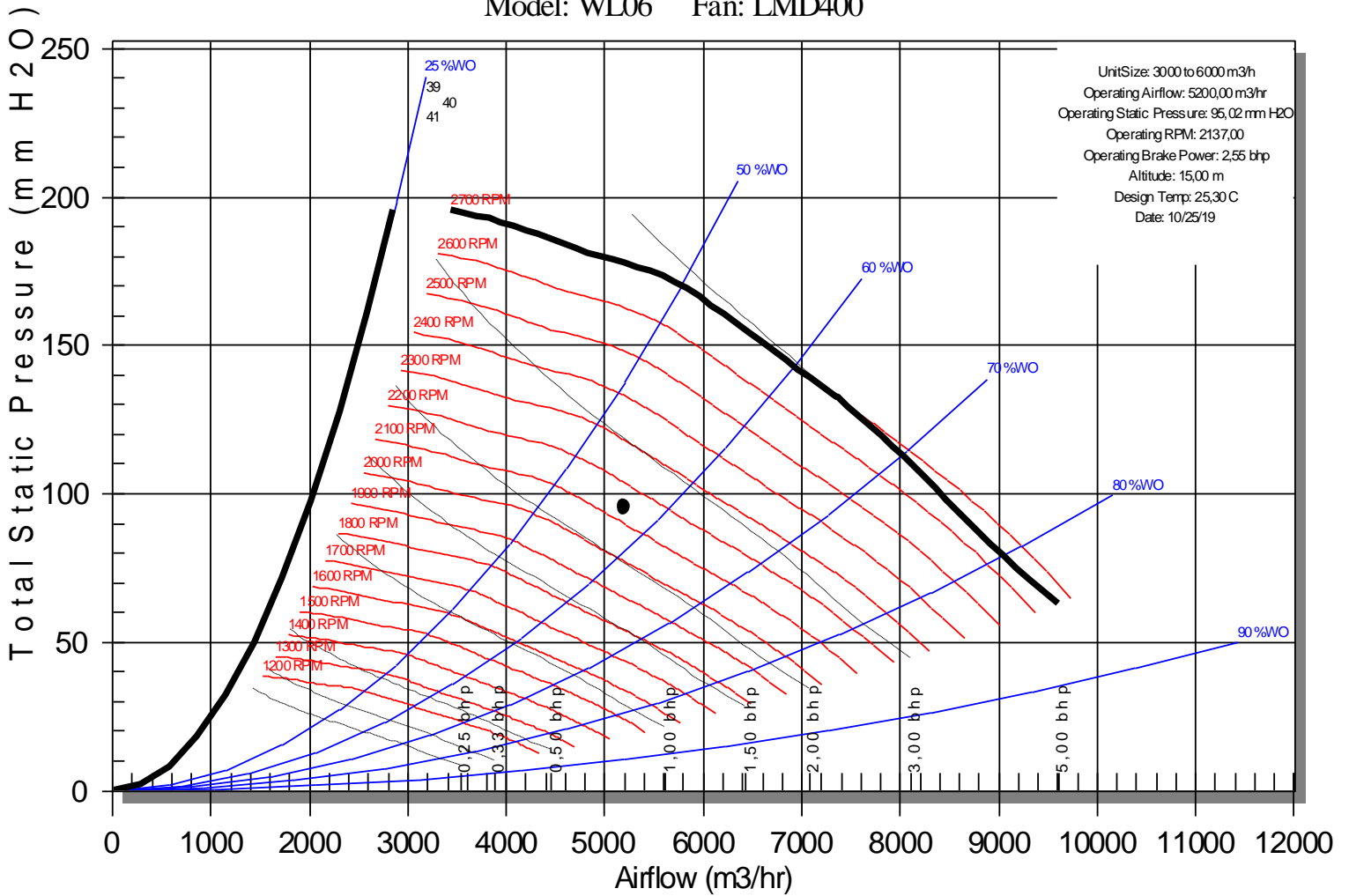
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-71

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-72A
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA03AGADKTCDO 0Y00B6A2BAA00110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1500 to 3000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	6,62 mm H2O
Mixing Box Air Pressure Drop	1,53 mm H2O	Filter Air Pressure Drop	14,56 mm H2O

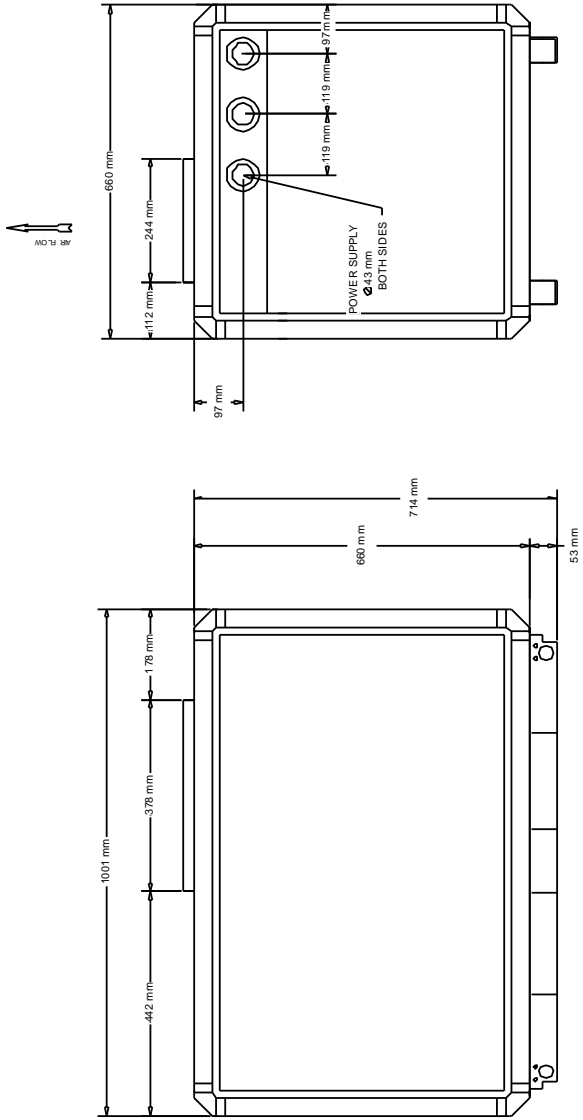
Coil			
Cooling Entering Dry Bulb	23,8 C	Cooling Entering Wet Bulb	17,7 C
Cooling Leaving Dry Bulb	12,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	1,48 m3/hr
Cooling Capacity	10,36 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,1 C	Cooling Airflow	1950,00 m3/hr
Sensible Capacity	7,84 kW	Cooling Leaving Wet Bulb	11,9 C
Cooling Water Volume	8,92 L	Cooling Water Velocity	0,4 m/s
Cooling Water Pressure Drop	337,64 mm H2O	Cooling Air Pressure Drop	9,94 mm H2O
Cooling Coil Wet Weight	152 kg	Actual Cooling Face Velocity	1,9 m/s
Electric Heat PD	2,24 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	64,89 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,78 bhp
Fan RPM	3099 rpm	Transmission Option	D
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	8,1 m/s	Velocity Pressure	39,5 Pa

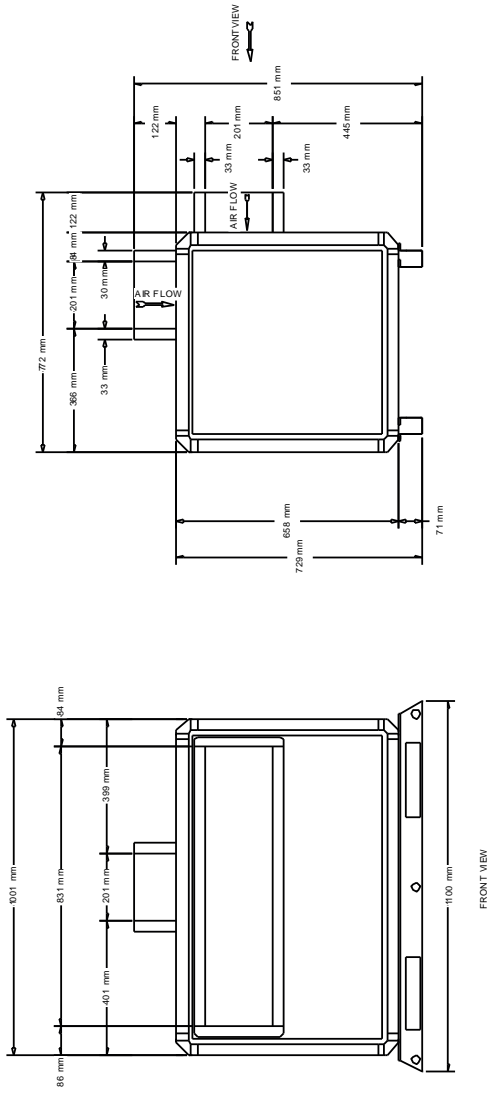
Humidifier	
Humidification	w/o Humidification / Not Applicable



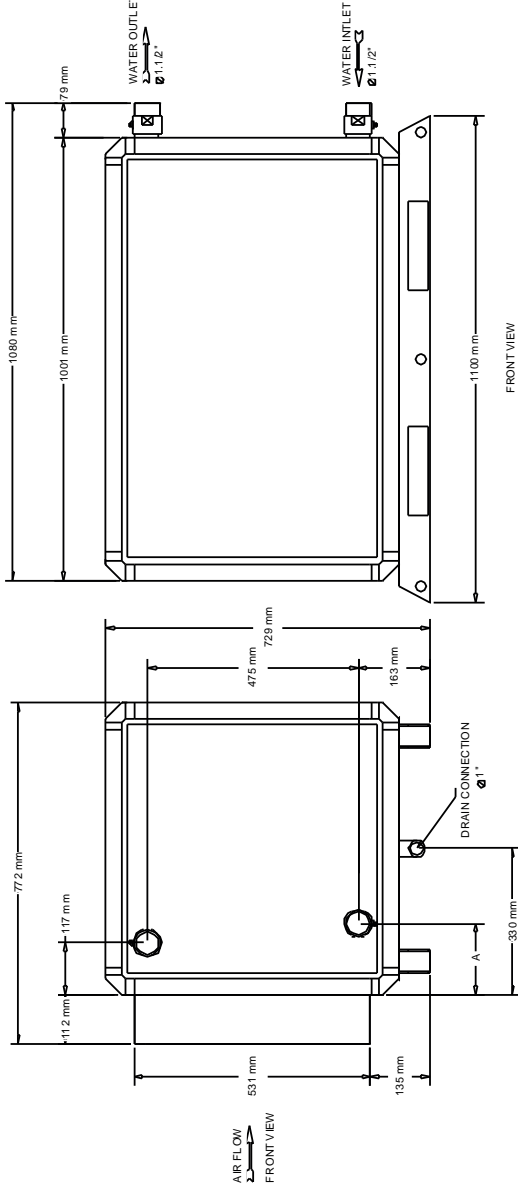
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 03

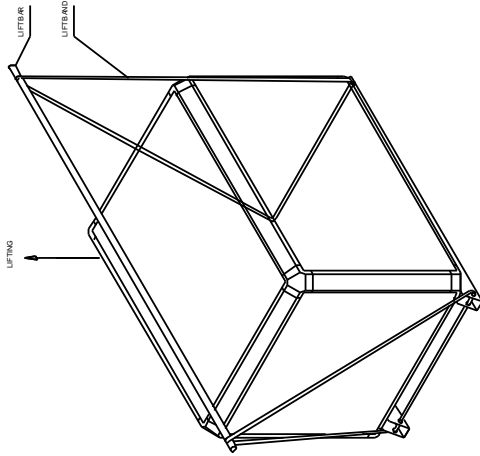


MIXER BOX SECTION
WAVE DOBLE 03

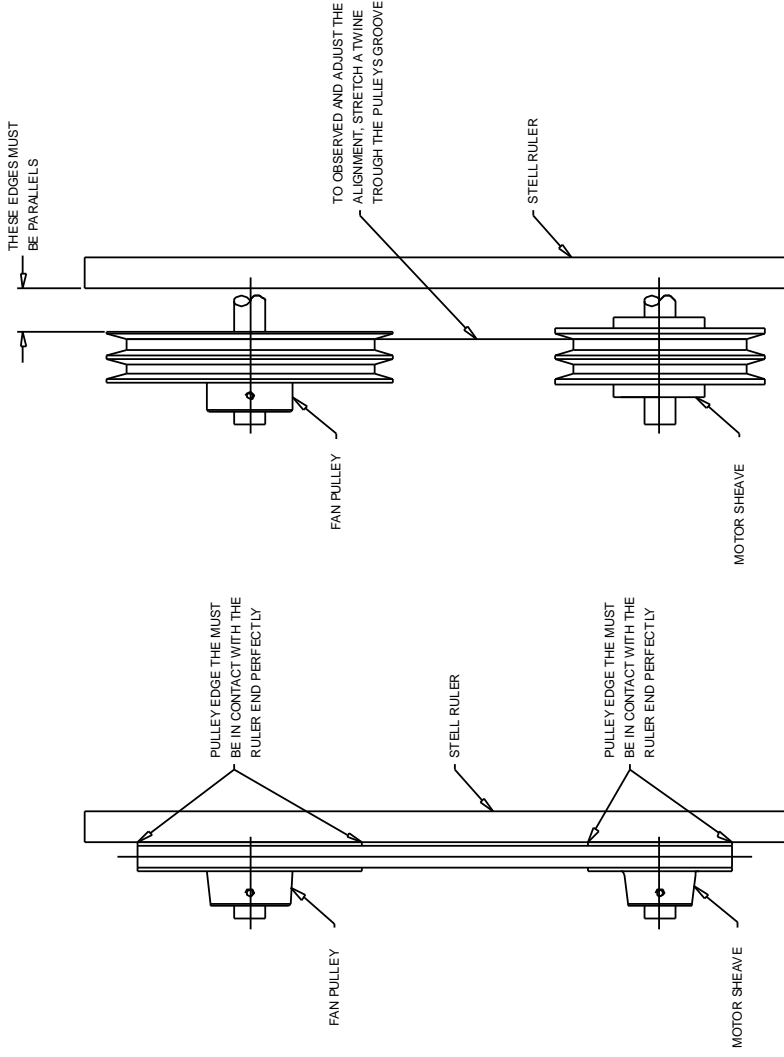


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 03

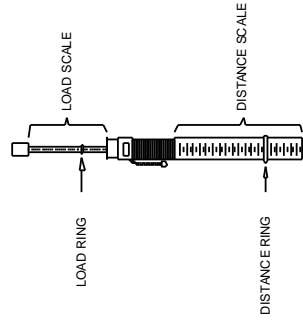
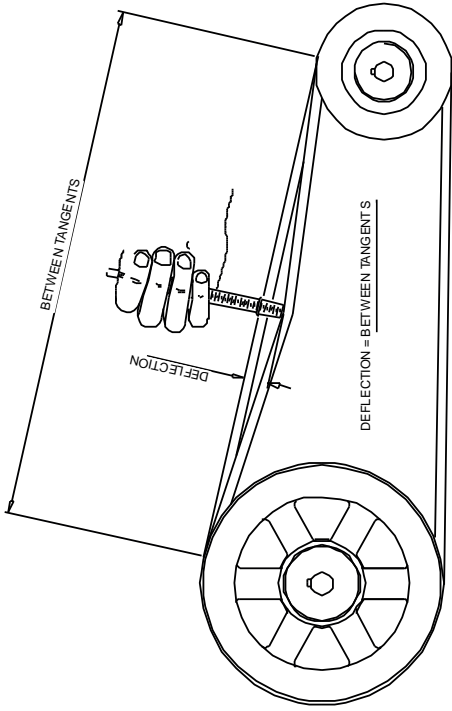
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



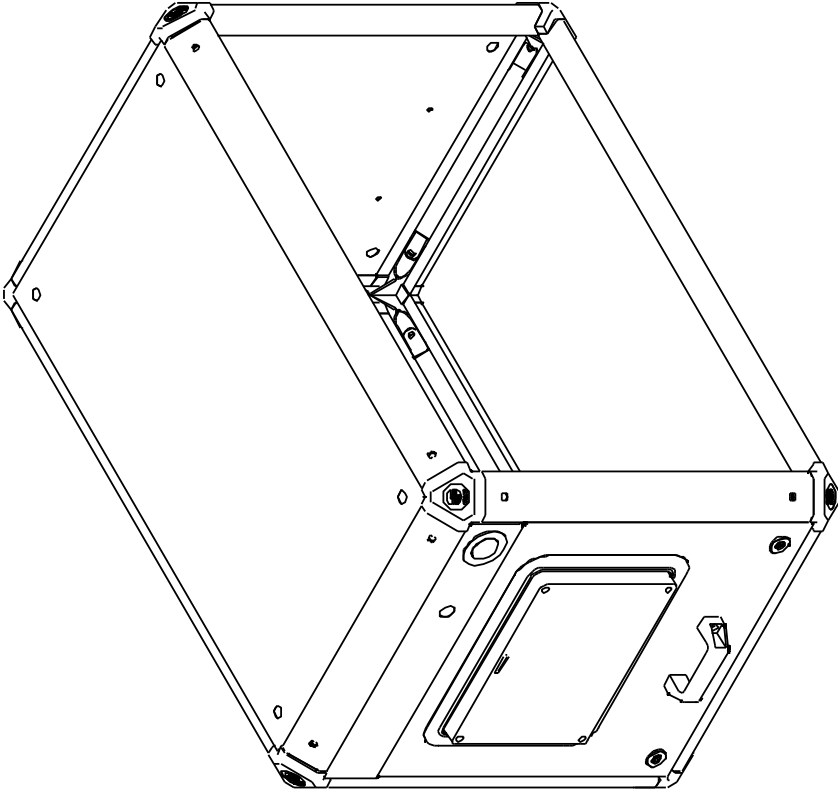
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



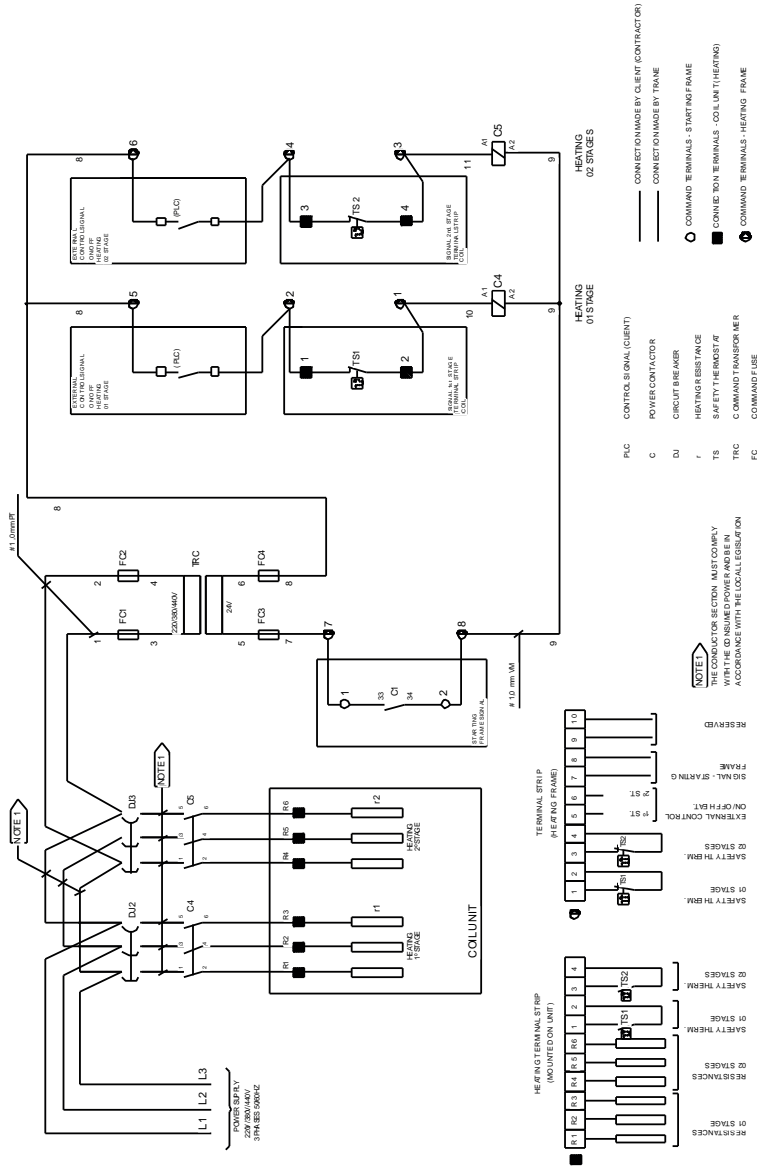
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

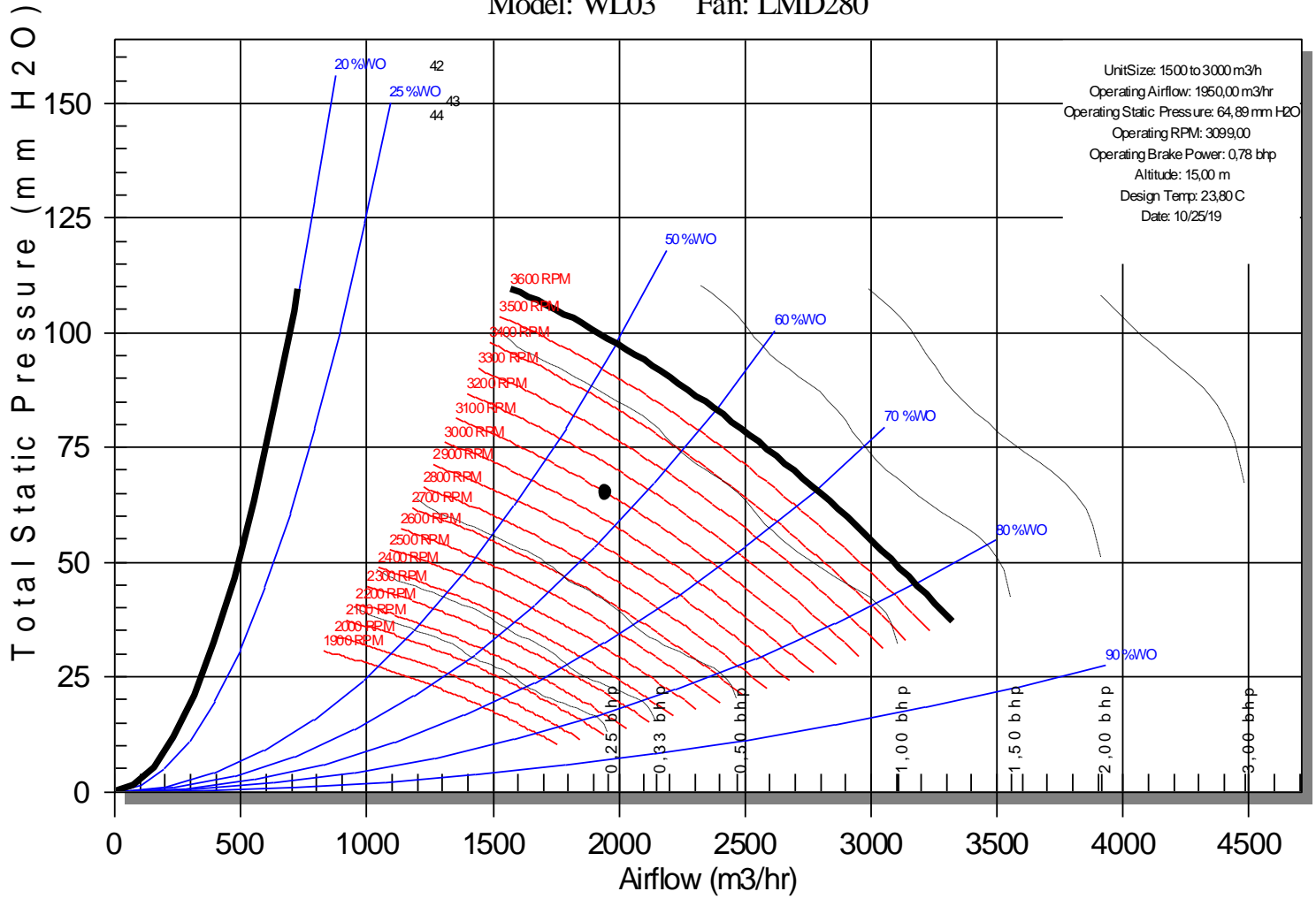
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-72A

Model: WL03 Fan: LMD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-72B
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA03AGAEKTC00 Y00B6A2BAA001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	1500 to 3000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	6,62 mm H2O
Mixing Box Air Pressure Drop	1,53 mm H2O	Filter Air Pressure Drop	14,56 mm H2O

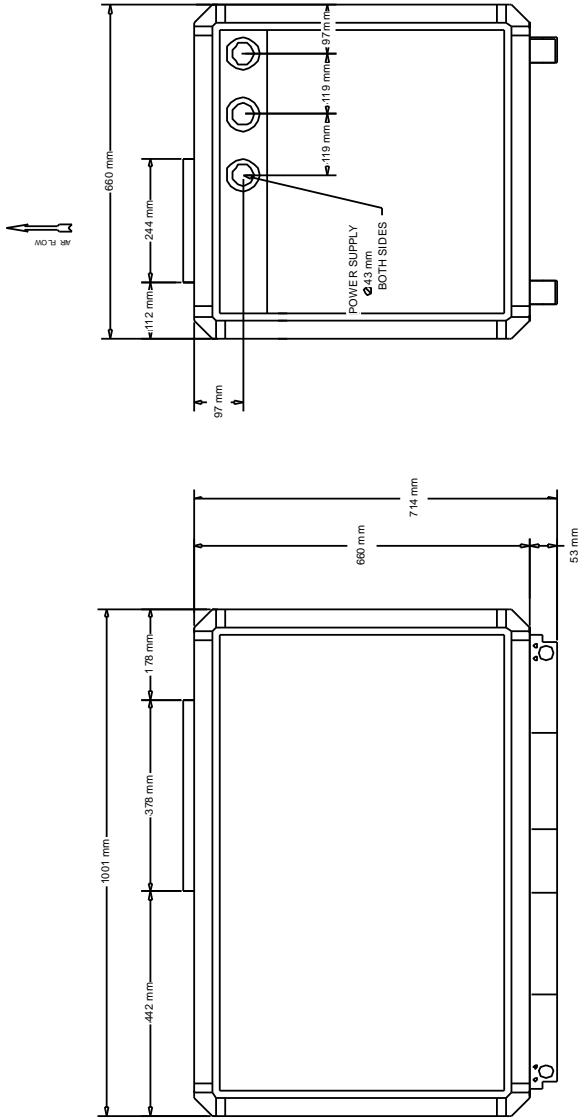
Coil			
Cooling Entering Dry Bulb	23,8 C	Cooling Entering Wet Bulb	17,7 C
Cooling Leaving Dry Bulb	12,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	1,48 m3/hr
Cooling Capacity	10,38 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	1 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	1 Stage
Heating Entering Air Temperature	12,1 C	Cooling Airflow	1950,00 m3/hr
Sensible Capacity	7,81 kW	Cooling Leaving Wet Bulb	11,9 C
Cooling Water Volume	8,92 L	Cooling Water Velocity	0,4 m/s
Cooling Water Pressure Drop	338,68 mm H2O	Cooling Air Pressure Drop	9,97 mm H2O
Cooling Coil Wet Weight	152 kg	Actual Cooling Face Velocity	1,9 m/s
Electric Heat PD	2,24 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	64,92 mm H2O
Motor HP	1.0 HP	Brake Horse Power	0,78 bhp
Fan RPM	3099 rpm	Transmission Option	D
Full Load Amps	1,89 A	Locked Rotor Amps	12,26 A
Outlet Velocity	8,1 m/s	Velocity Pressure	39,5 Pa

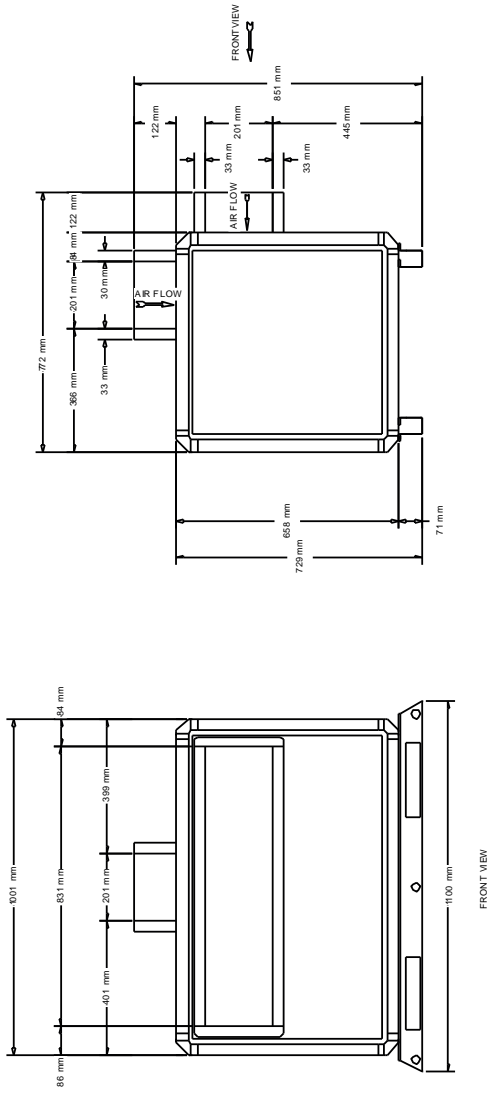
Humidifier	
Humidification	w/o Humidification / Not Applicable



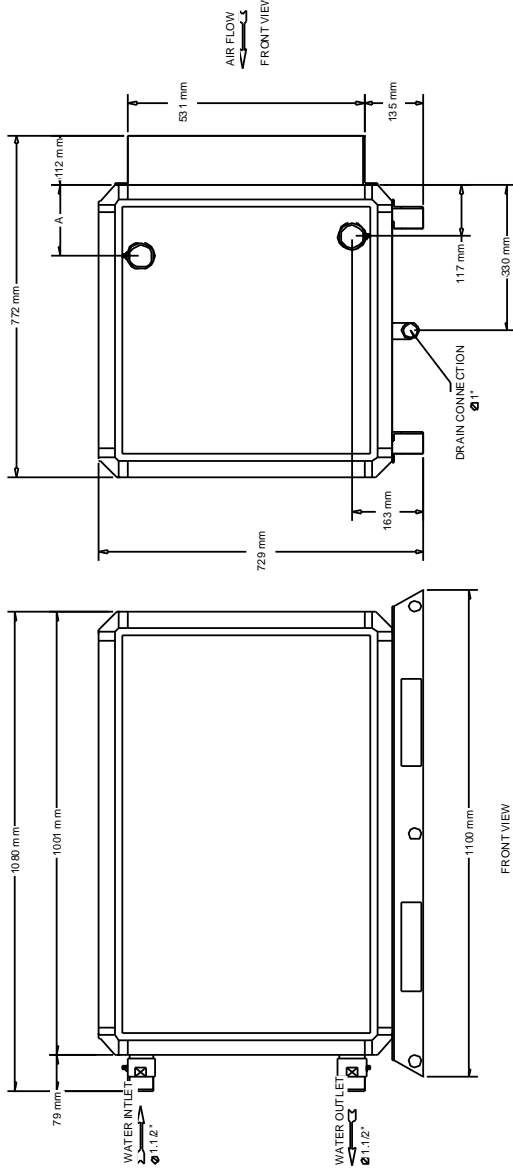
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 03

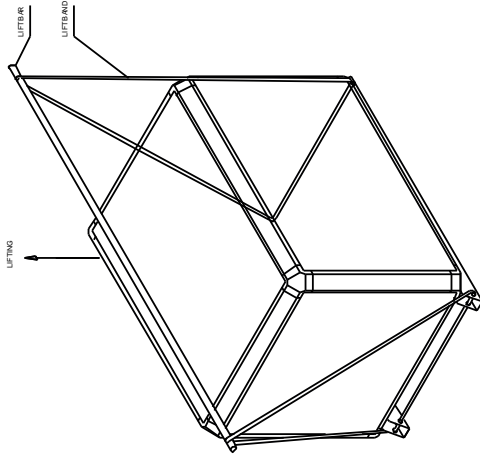


MIXER BOX SECTION
WAVE DOBLE 03

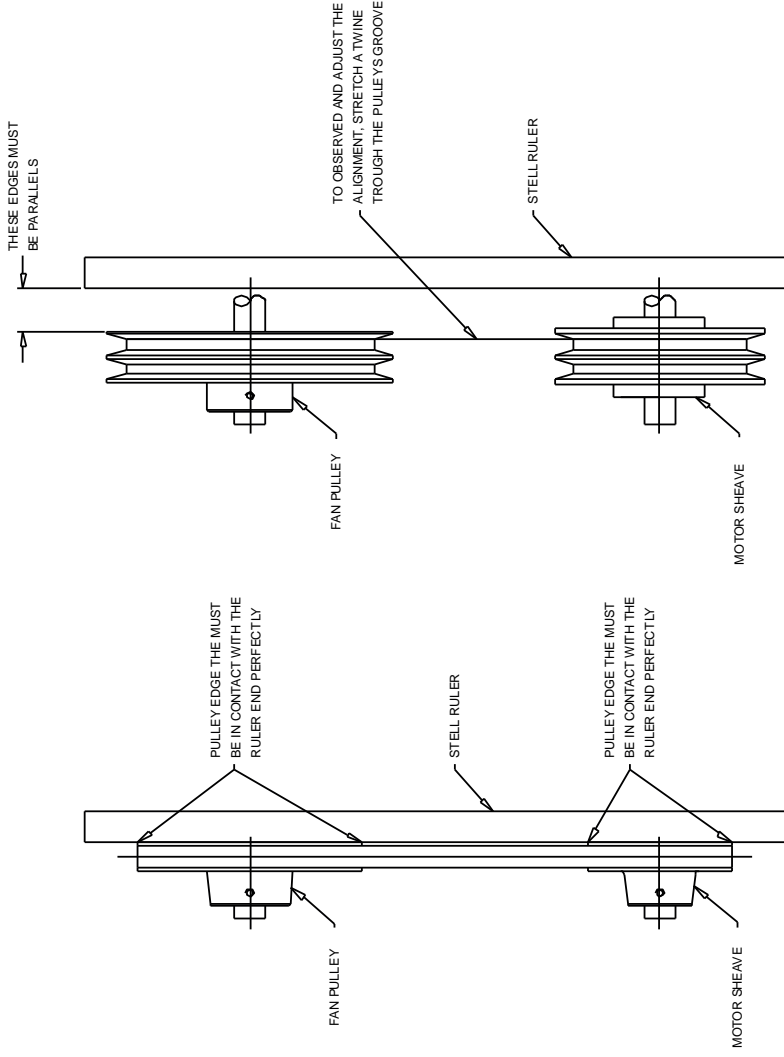


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 03

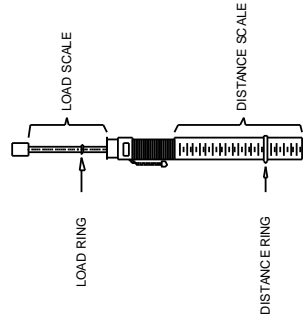
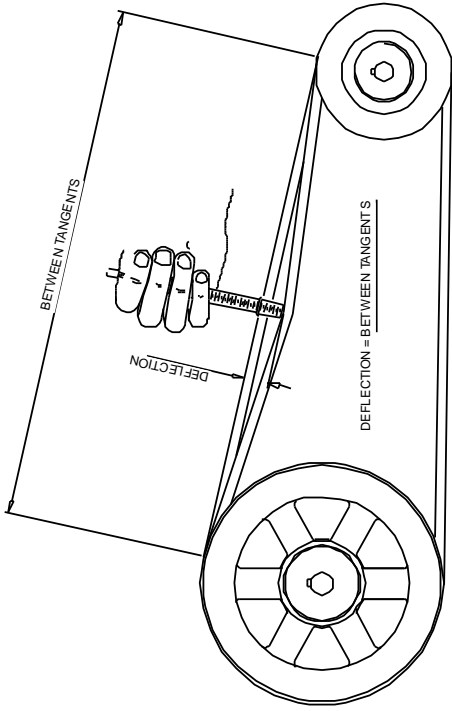
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



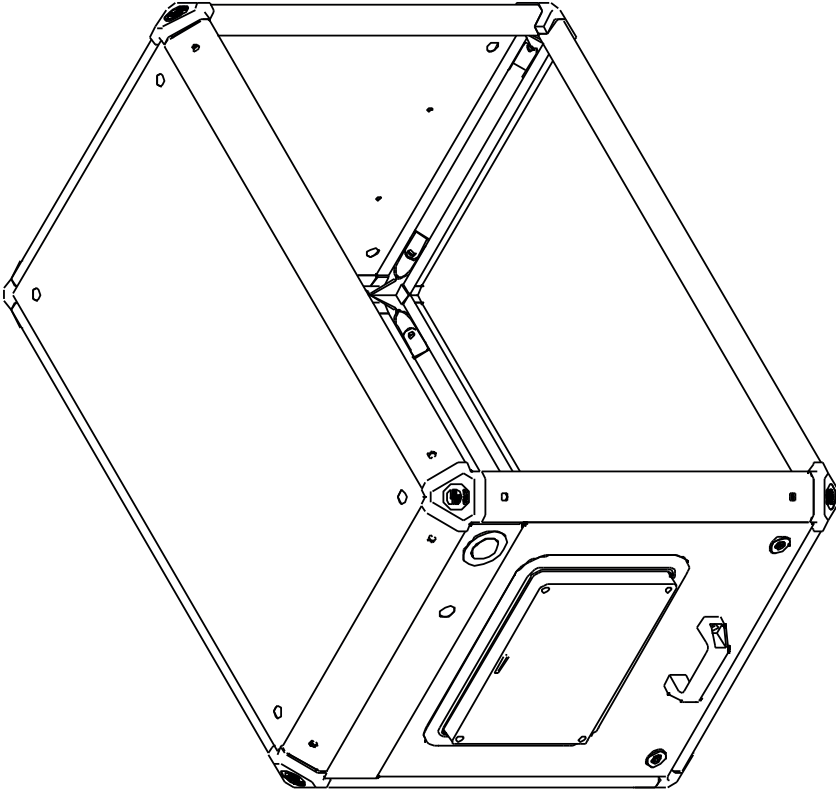
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



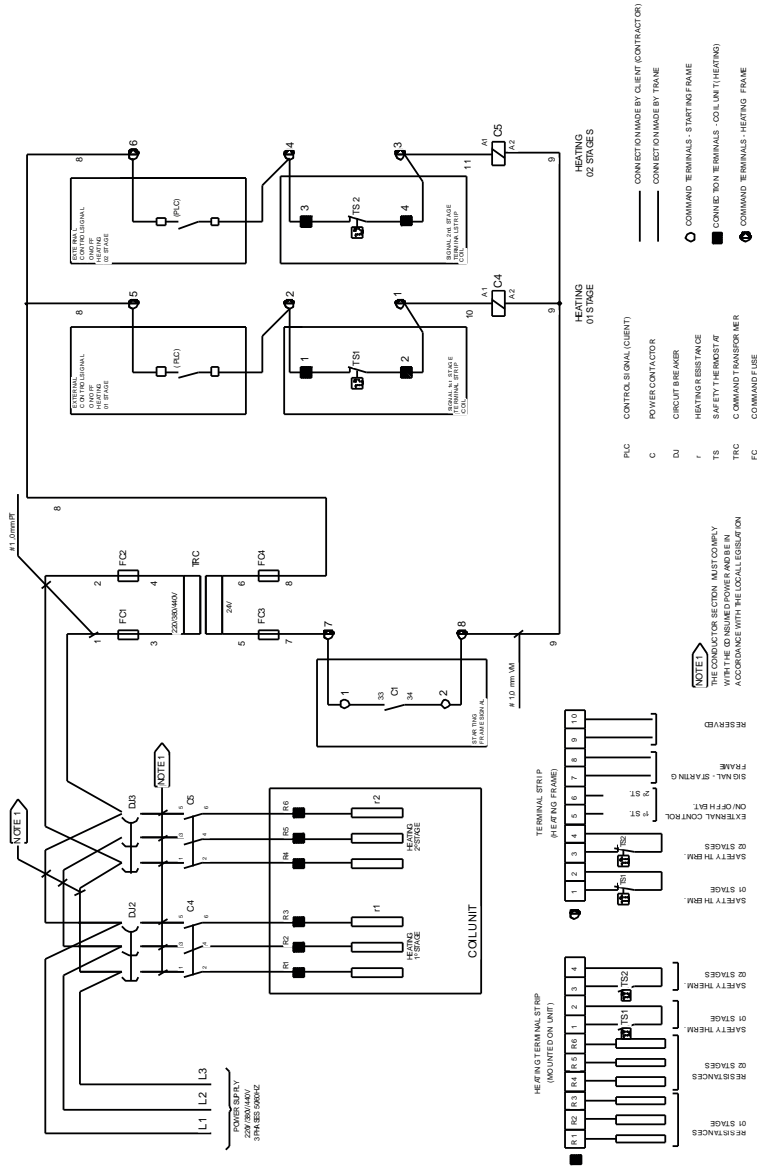
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

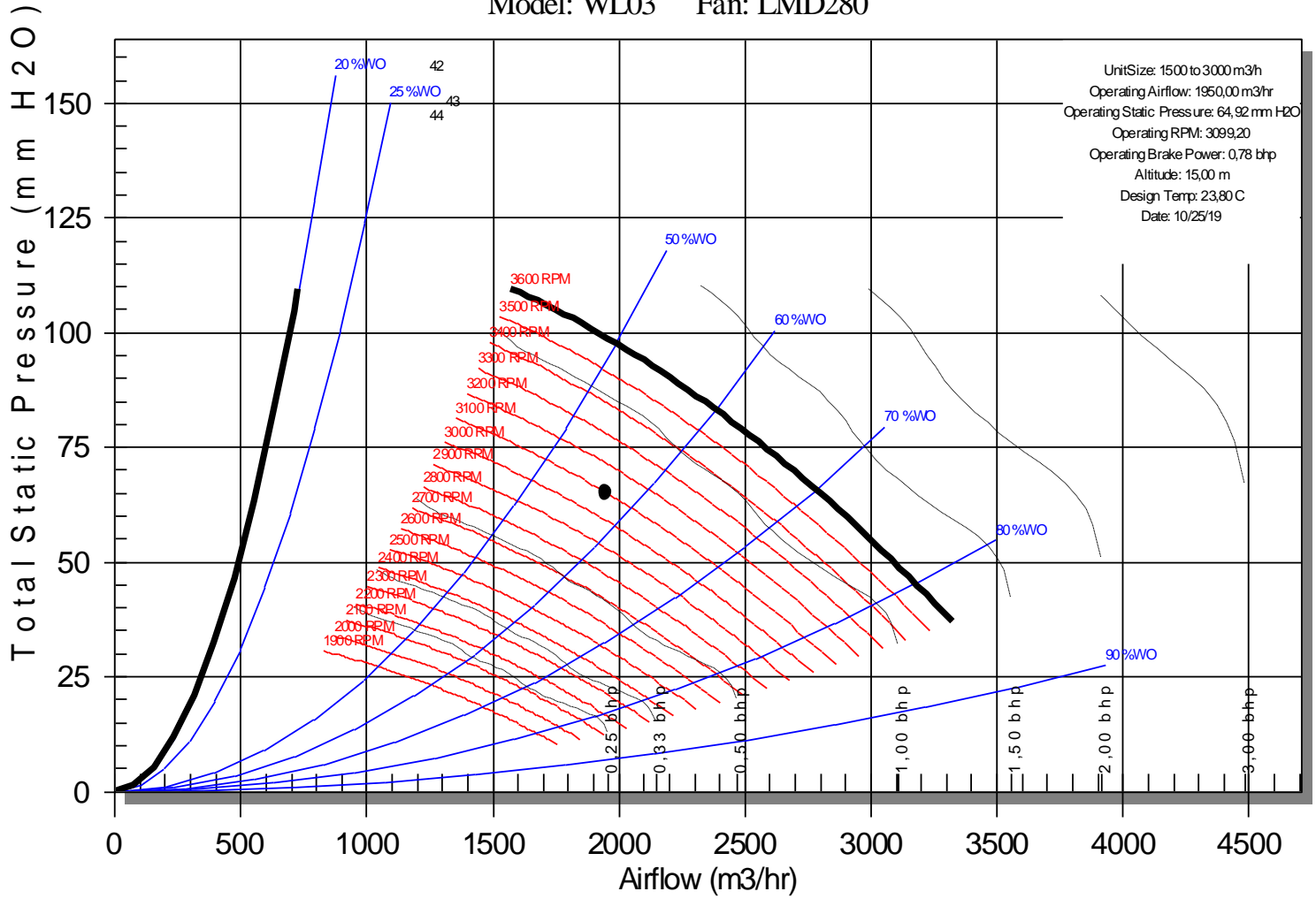
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-72B

Model: WL03 Fan: LMD280





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-73
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,61 mm H2O
Mixing Box Air Pressure Drop	2,04 mm H2O	Filter Air Pressure Drop	21,47 mm H2O

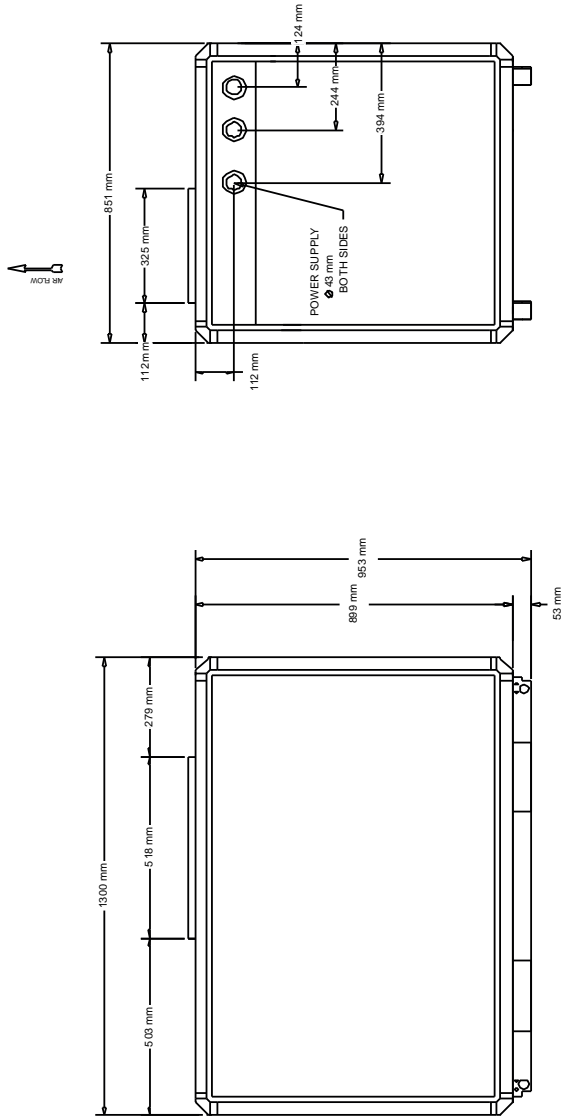
Coil			
Cooling Entering Dry Bulb	26,8 C	Cooling Entering Wet Bulb	20,5 C
Cooling Leaving Dry Bulb	13,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,43 m3/hr
Cooling Capacity	31,00 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4400,00 m3/hr	Sensible Capacity	19,97 kW
Cooling Leaving Wet Bulb	13,4 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	417,41 mm H2O
Cooling Air Pressure Drop	13,03 mm H2O	Cooling Coil Wet Weight	207 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	75,16 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,69 bhp
Fan RPM	1873 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,0 m/s	Velocity Pressure	48,9 Pa

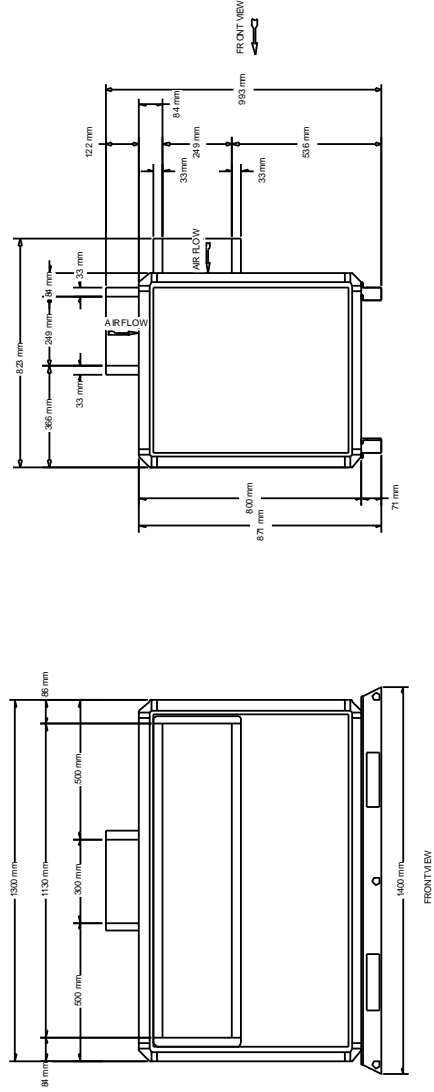
Humidifier	
Humidification	w/o Humidification / Not Applicable



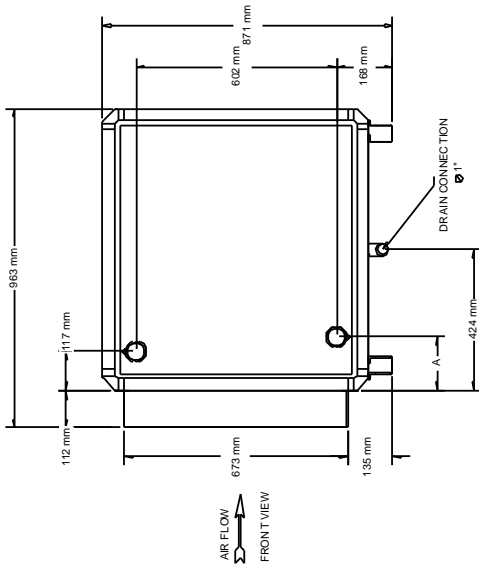
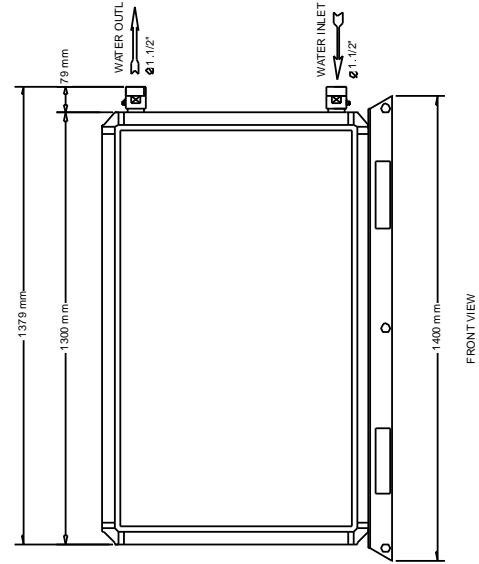
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

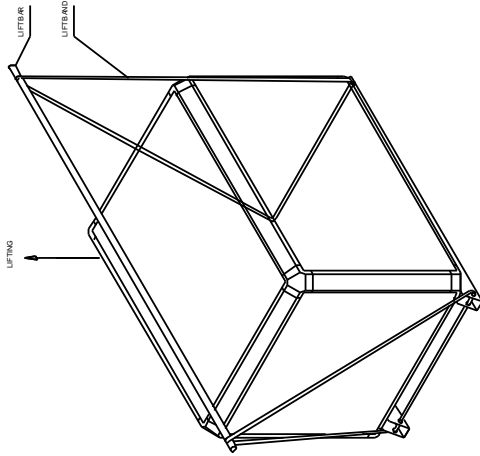


MIXER BOX SECTION
WAVE DOBLE 06

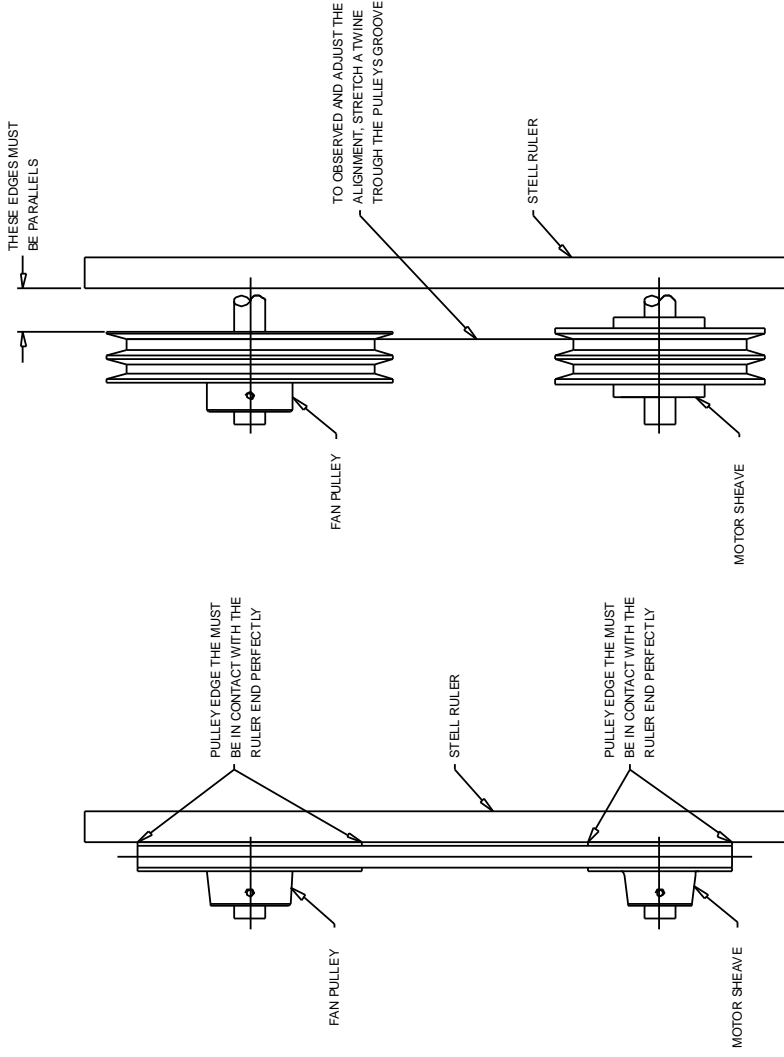


COIL SECTION
 RIGH HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06

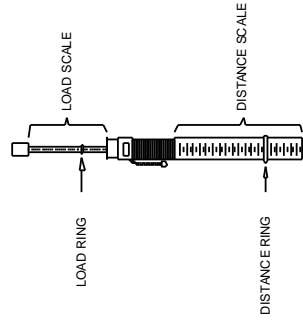
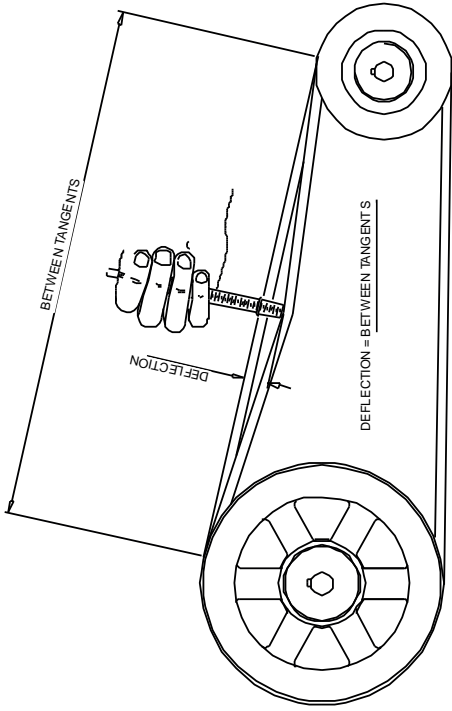
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



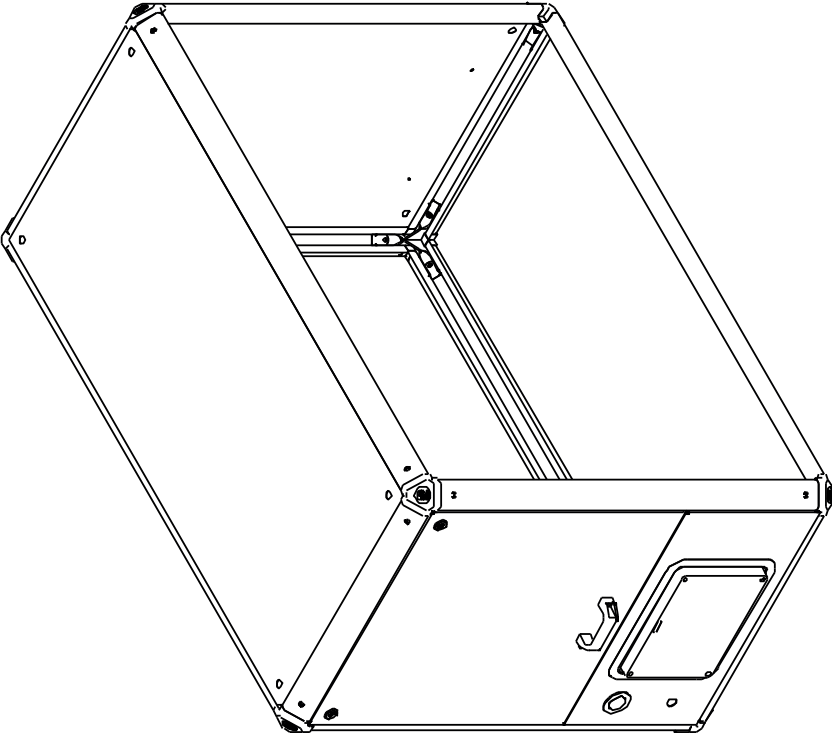
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

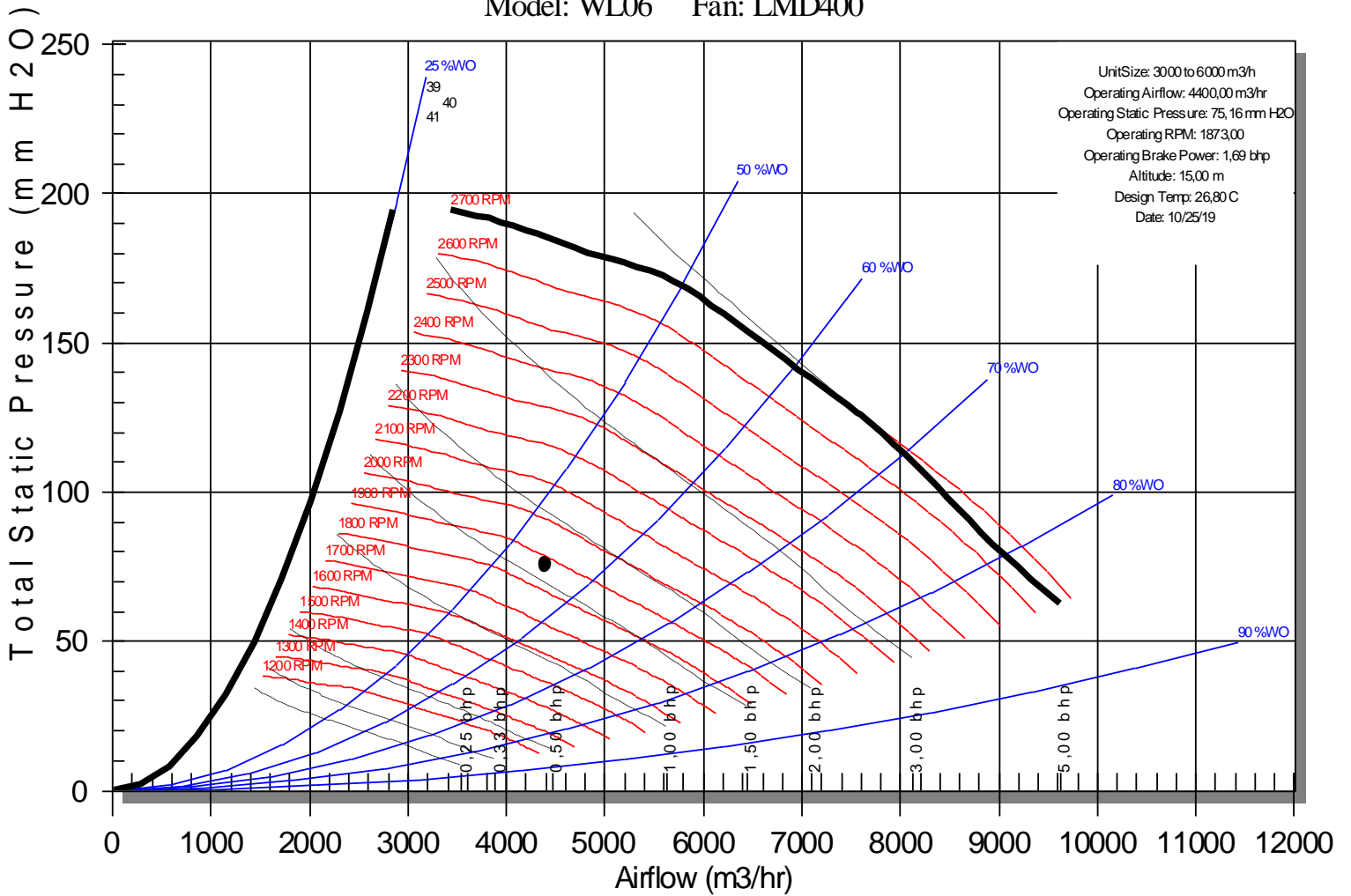
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-73

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-74
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA08AGDDK- HH00Y10B6AWBAY0 011000300000L000 000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,09 mm H2O
Mixing Box Air Pressure Drop	2,70 mm H2O	Filter Air Pressure Drop	27,50 mm H2O

Coil			
Cooling Entering Dry Bulb	23,9 C	Cooling Entering Wet Bulb	17,7 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,77 m3/hr
Cooling Capacity	33,39 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 6 kw
Heating Capacity	12,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	12,5 C	Cooling Airflow	6600,00 m3/hr
Sensible Capacity	25,66 kW	Cooling Leaving Wet Bulb	12,2 C
Cooling Water Volume	21,28 L	Cooling Water Velocity	0,5 m/s
Cooling Water Pressure Drop	554,56 mm H2O	Cooling Air Pressure Drop	14,78 mm H2O
Cooling Coil Wet Weight	221 kg	Actual Cooling Face Velocity	2,5 m/s
Electric Heat PD	3,99 mm H2O		

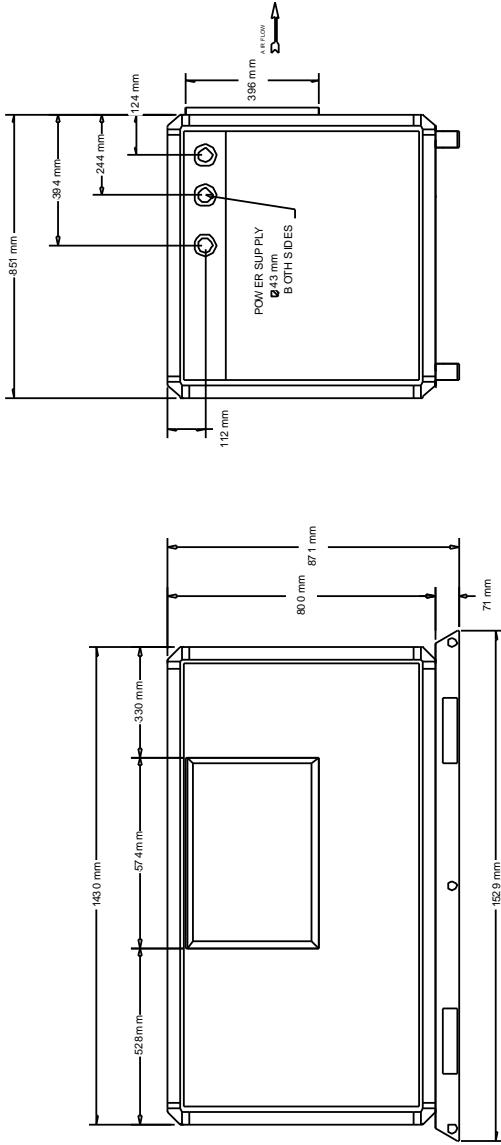
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	87,06 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	3,15 bhp
Fan RPM	2285 rpm	Transmission Option	H
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,4 Pa

Humidifier	
Humidification	w/o Humidification /

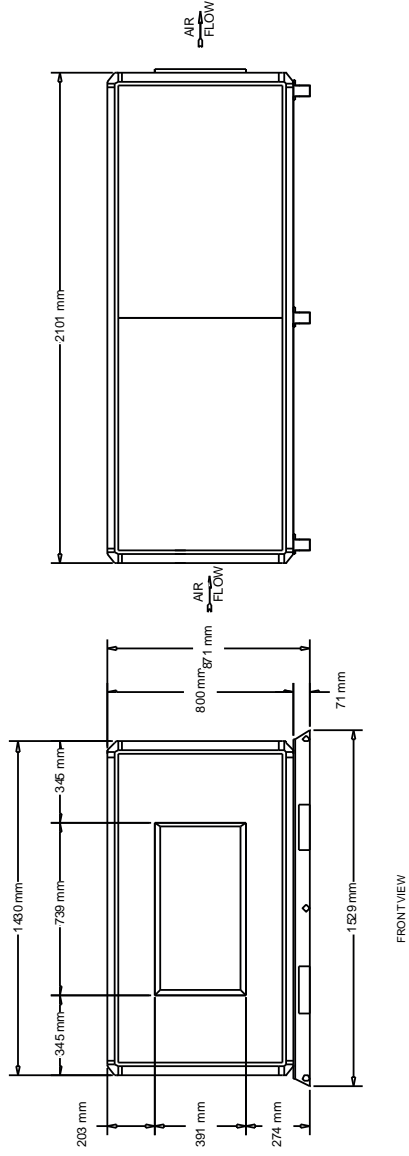


Not Applicable

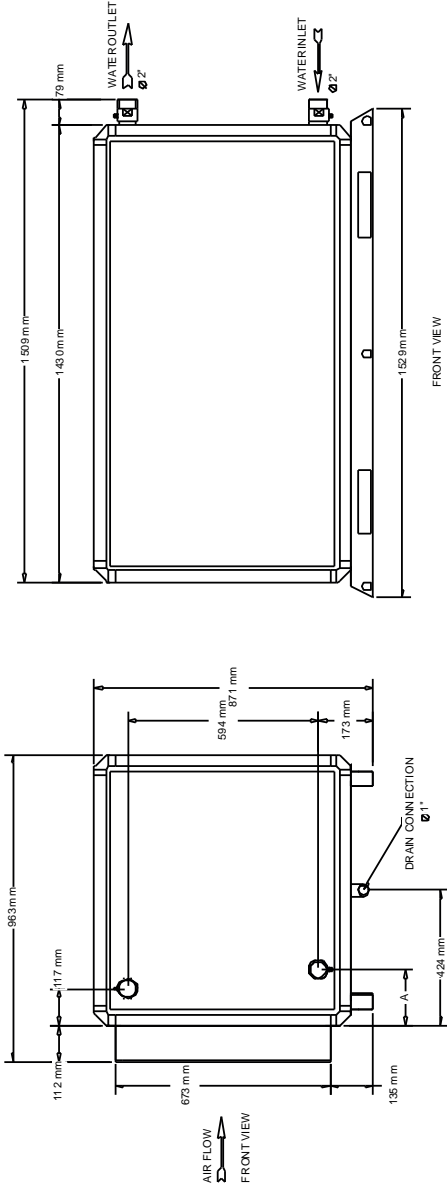
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 08

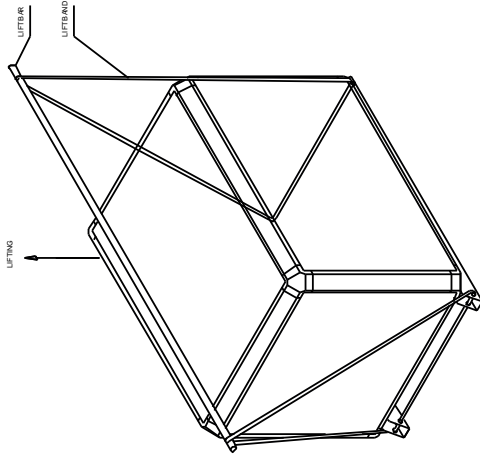


FINAL FILTER MODULE (LIMIT LOAD)
 WAVE DOBLE 08

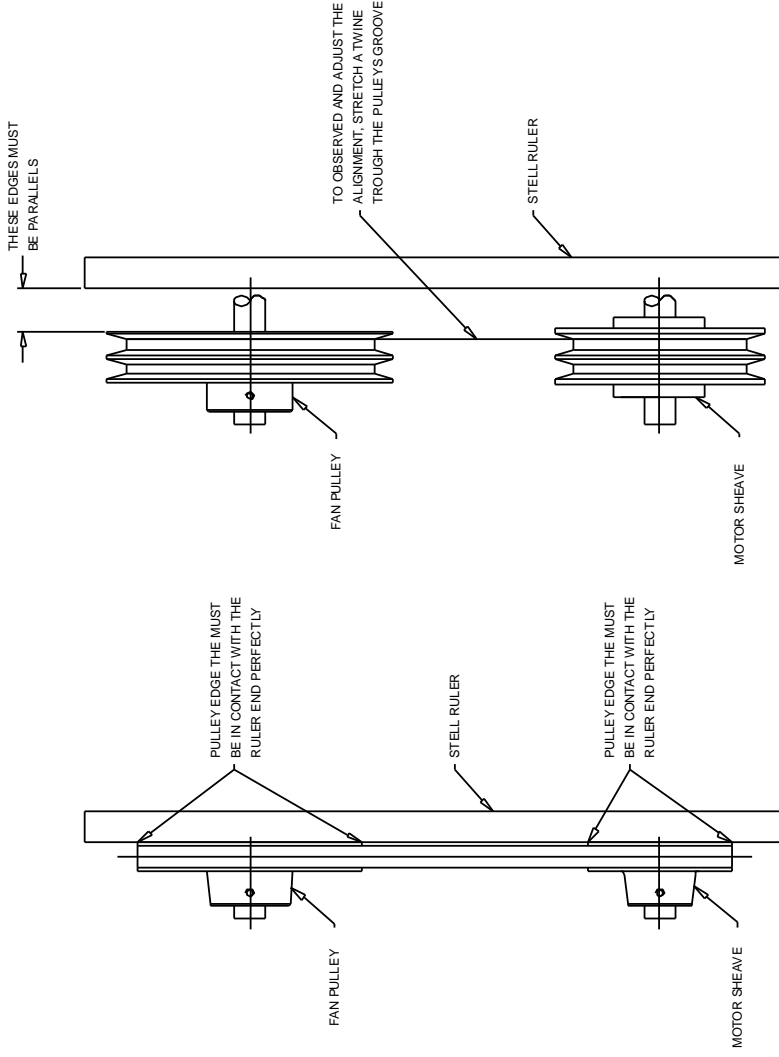


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 08

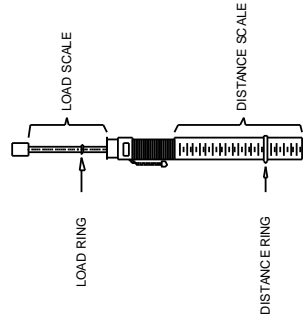
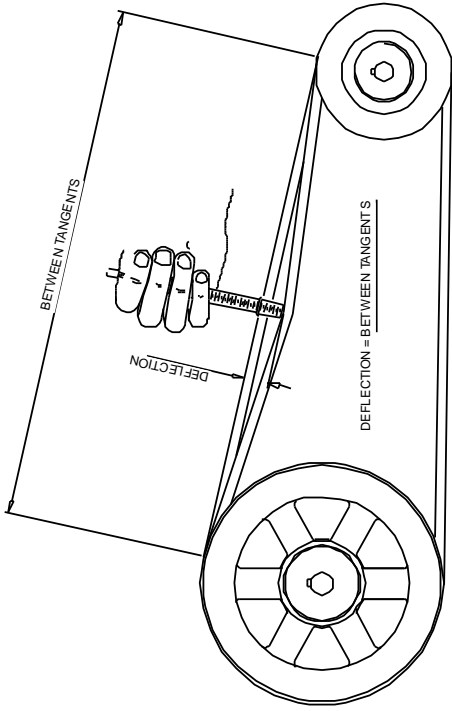
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



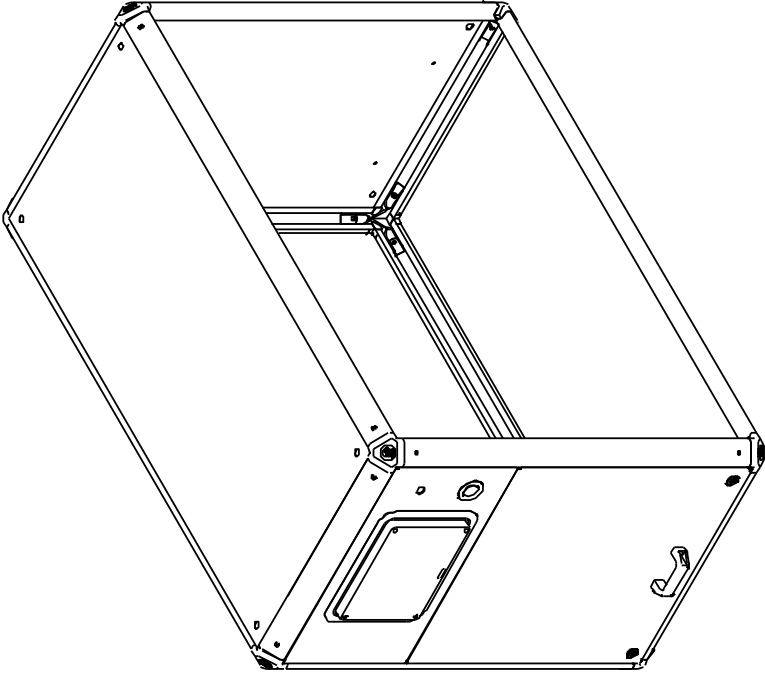
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



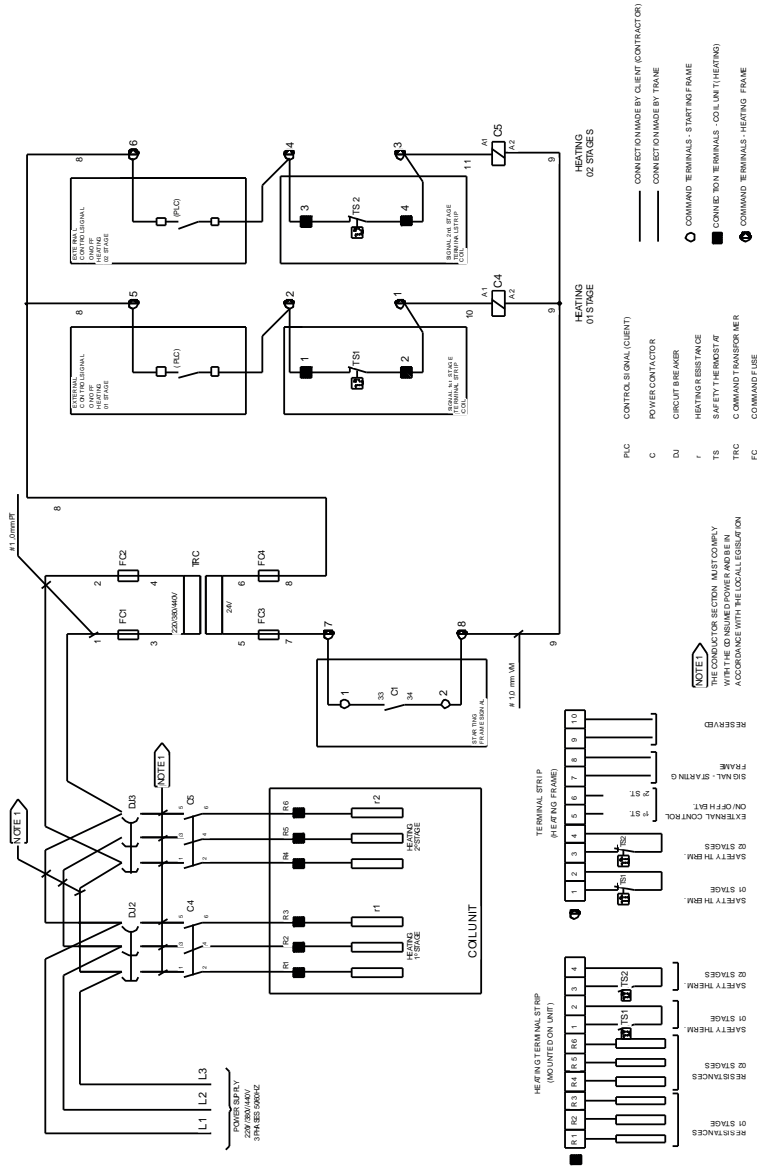
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

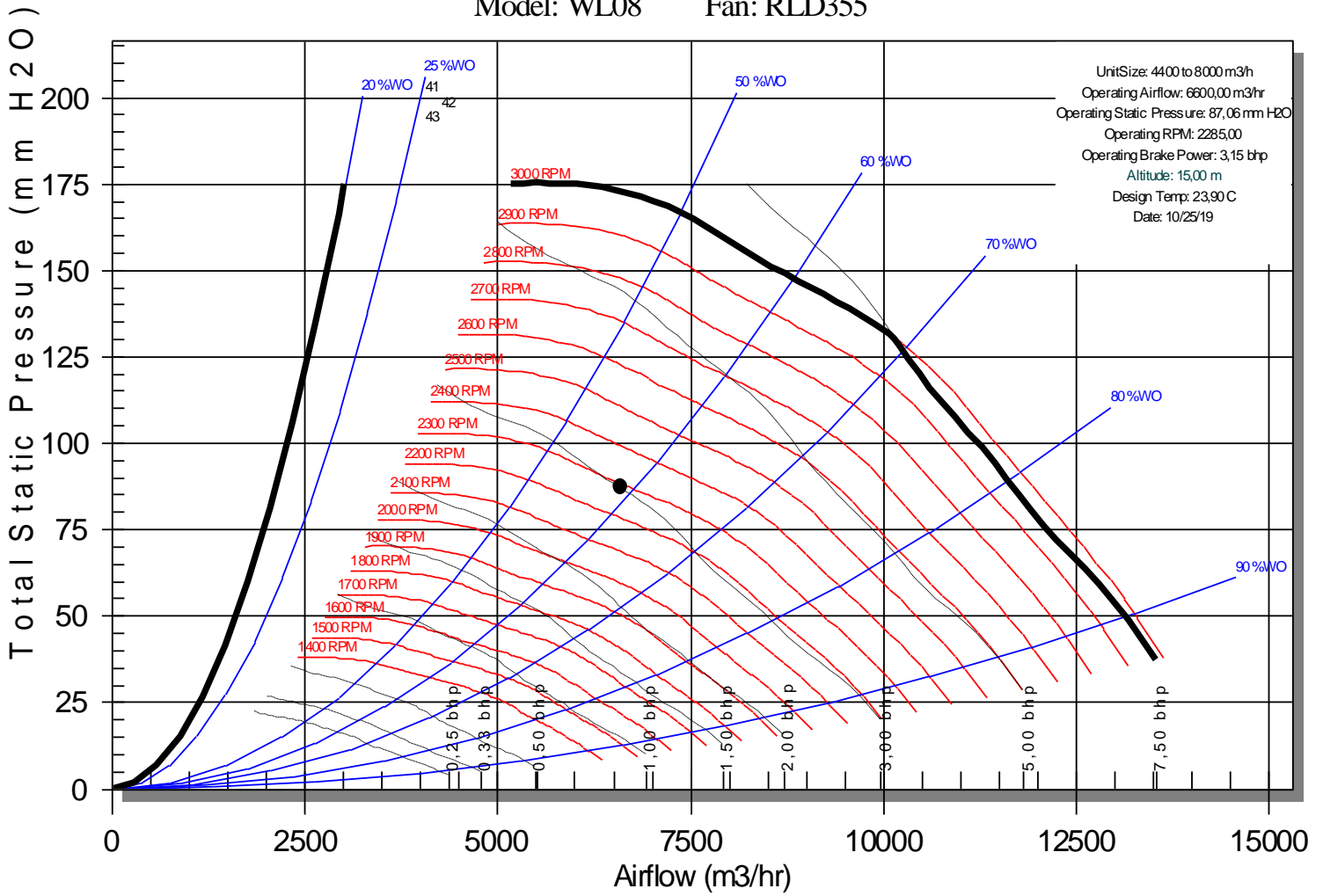
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-74

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-75
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA08AGDDK- FE00Y10A6BWBAY00 110003000000L0000 00
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	4,33 mm H2O
Mixing Box Air Pressure Drop	1,44 mm H2O	Filter Air Pressure Drop	13,47 mm H2O

Coil			
Cooling Entering Dry Bulb	23,4 C	Cooling Entering Wet Bulb	17,1 C
Cooling Leaving Dry Bulb	10,4 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,12 m3/hr
Cooling Capacity	28,85 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	2 x 6 kw
Heating Capacity	10,50 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	11,7 C	Cooling Airflow	4775,00 m3/hr
Sensible Capacity	21,20 kW	Cooling Leaving Wet Bulb	10,3 C
Cooling Water Volume	15,11 L	Cooling Water Velocity	0,7 m/s
Cooling Water Pressure Drop	1164,00 mm H2O	Cooling Air Pressure Drop	9,29 mm H2O
Cooling Coil Wet Weight	203 kg	Actual Cooling Face Velocity	1,9 m/s
Electric Heat PD	2,13 mm H2O		

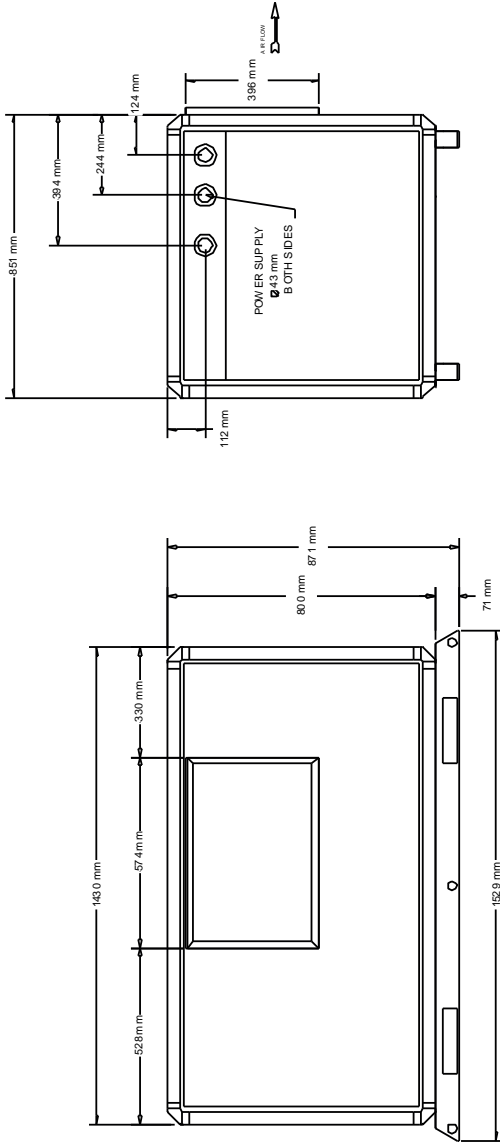
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	60,67 mm H2O
Motor HP	3.0 HP	Brake Horse Power	1,58 bhp
Fan RPM	1840 rpm	Transmission Option	E
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	7,1 m/s	Velocity Pressure	30,1 Pa

Humidifier	
Humidification	w/o Humidification /

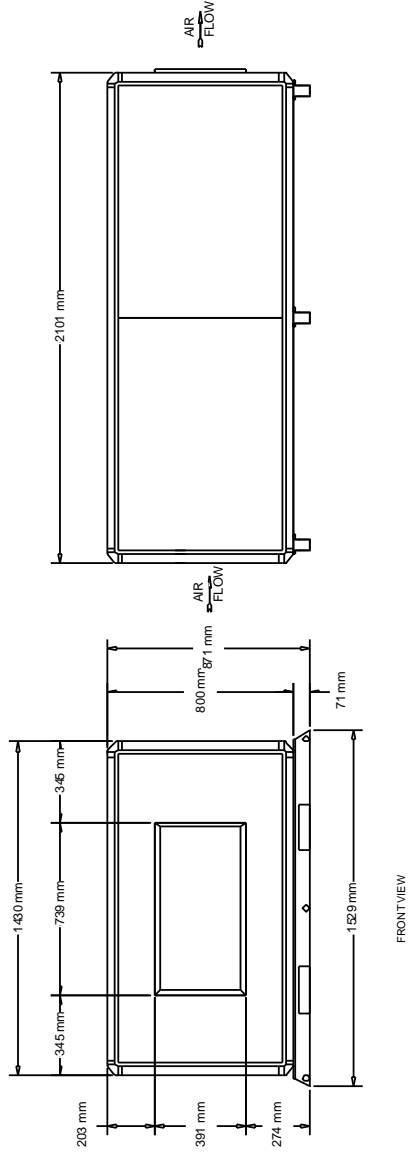


Not Applicable

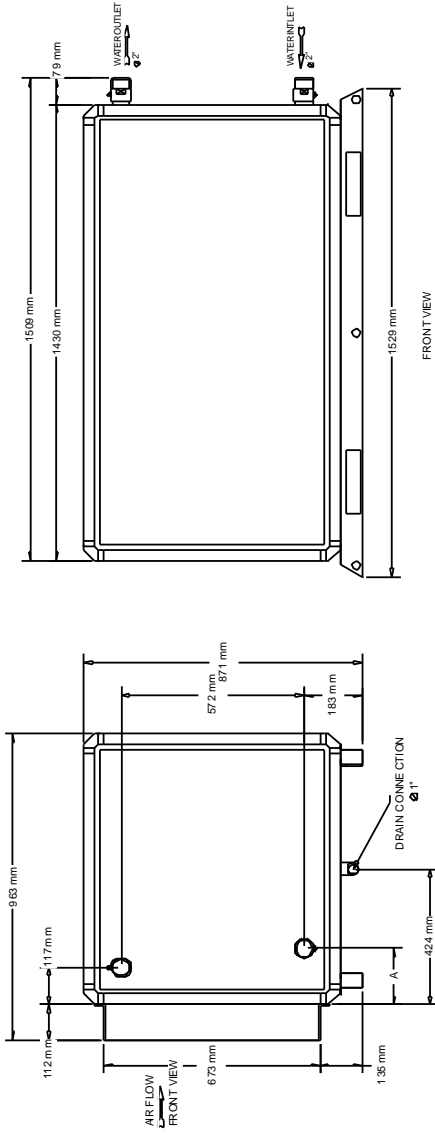
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 08

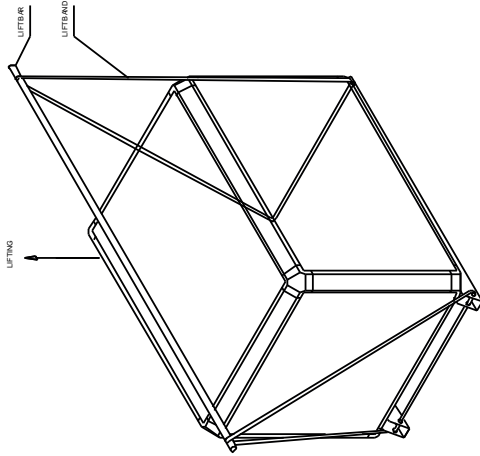


FINAL FILTER MODULE (LIMIT LOAD)
 WAVE DOBLE 08

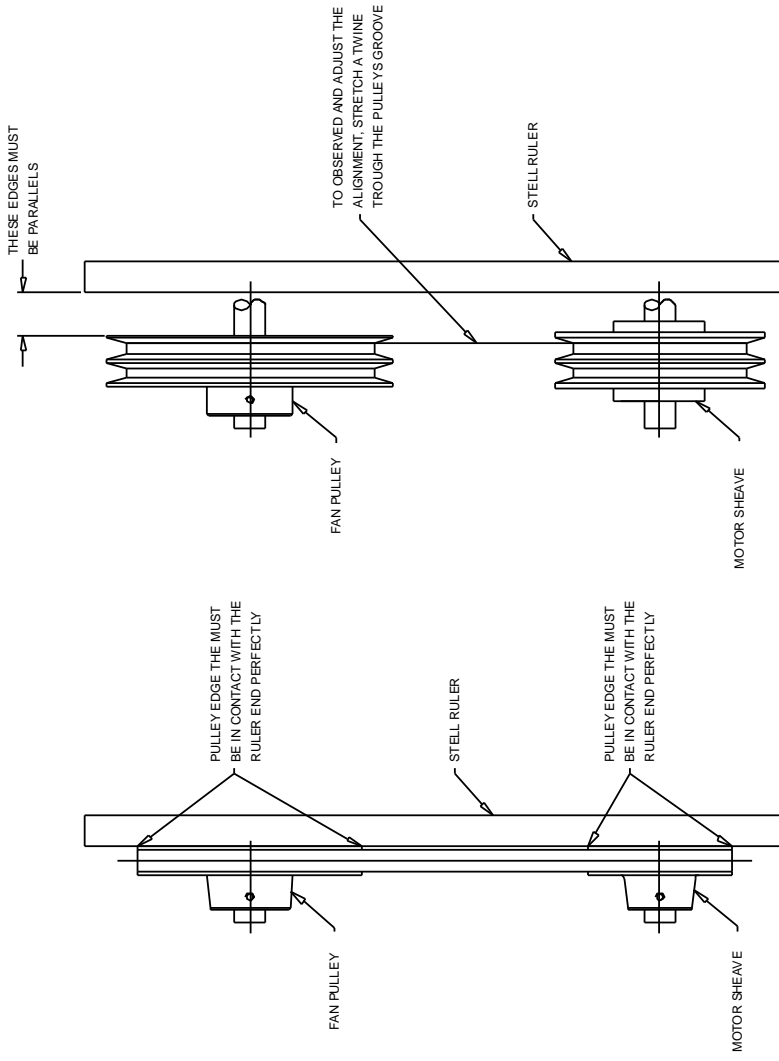


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 08

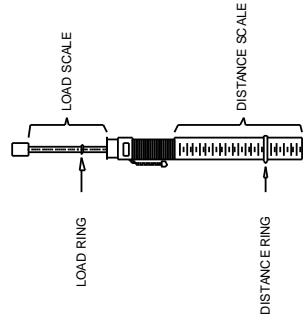
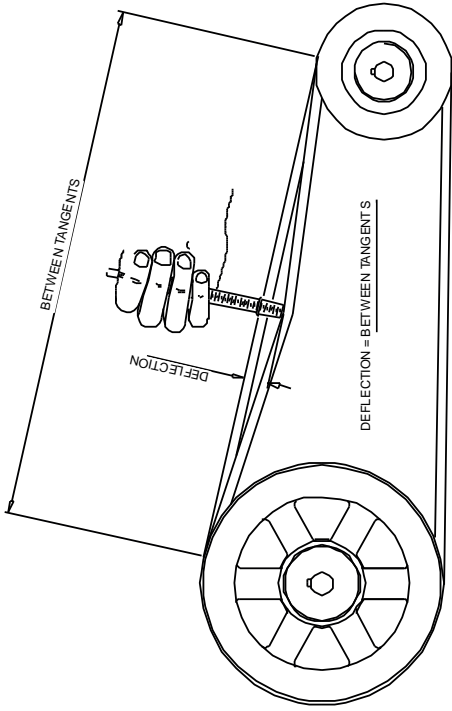
ROWS	A
3	176 mm
4	183 mm
6	227 mm
8	271 mm



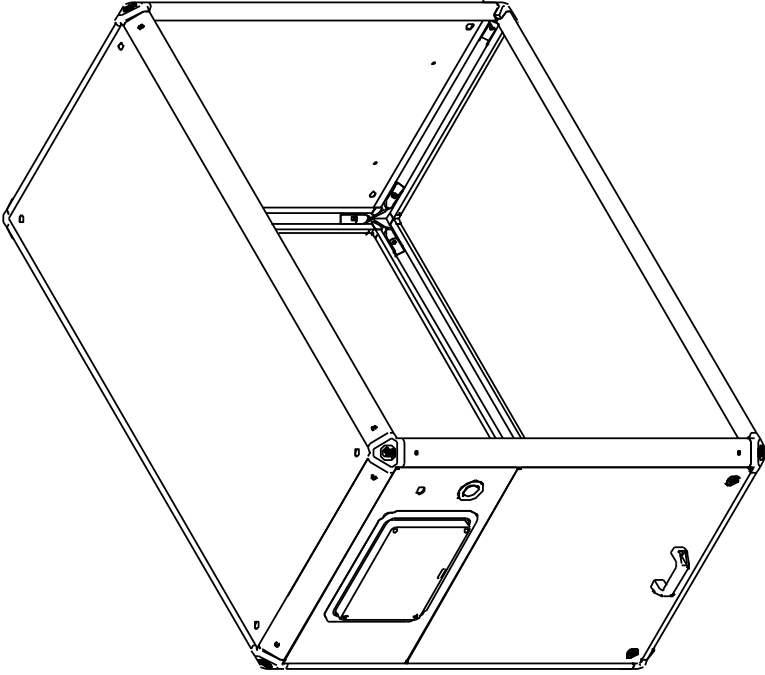
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



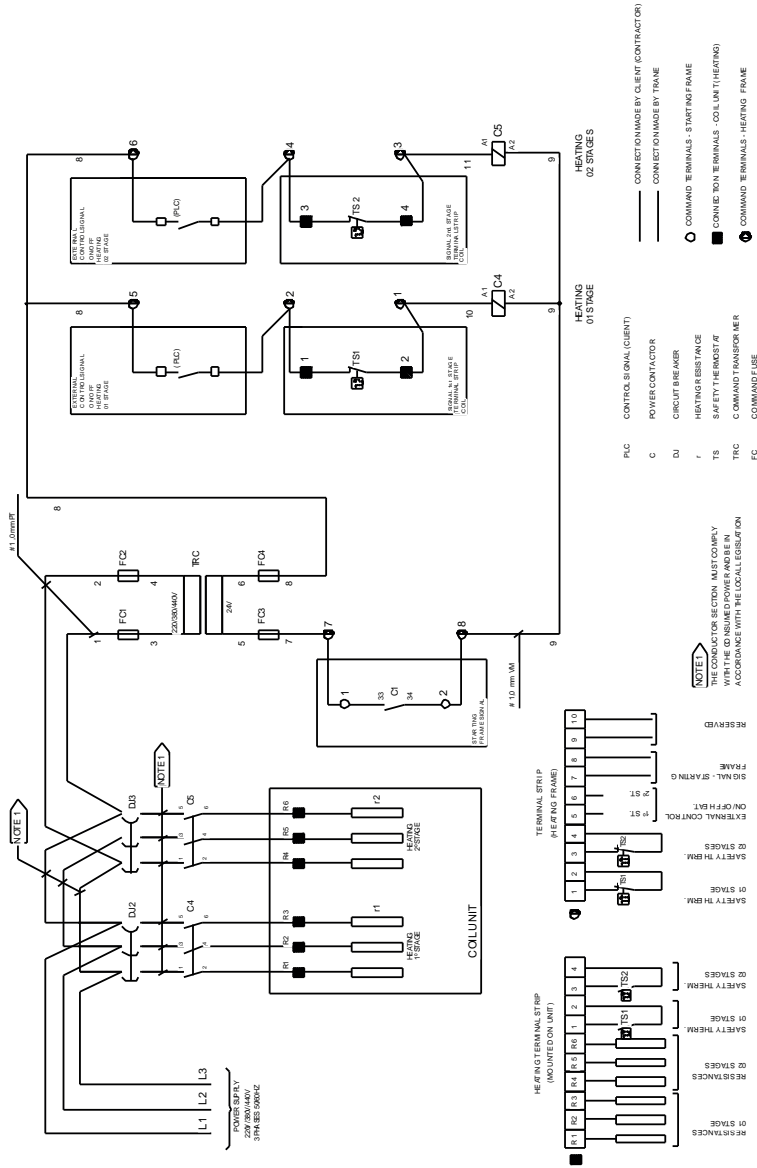
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

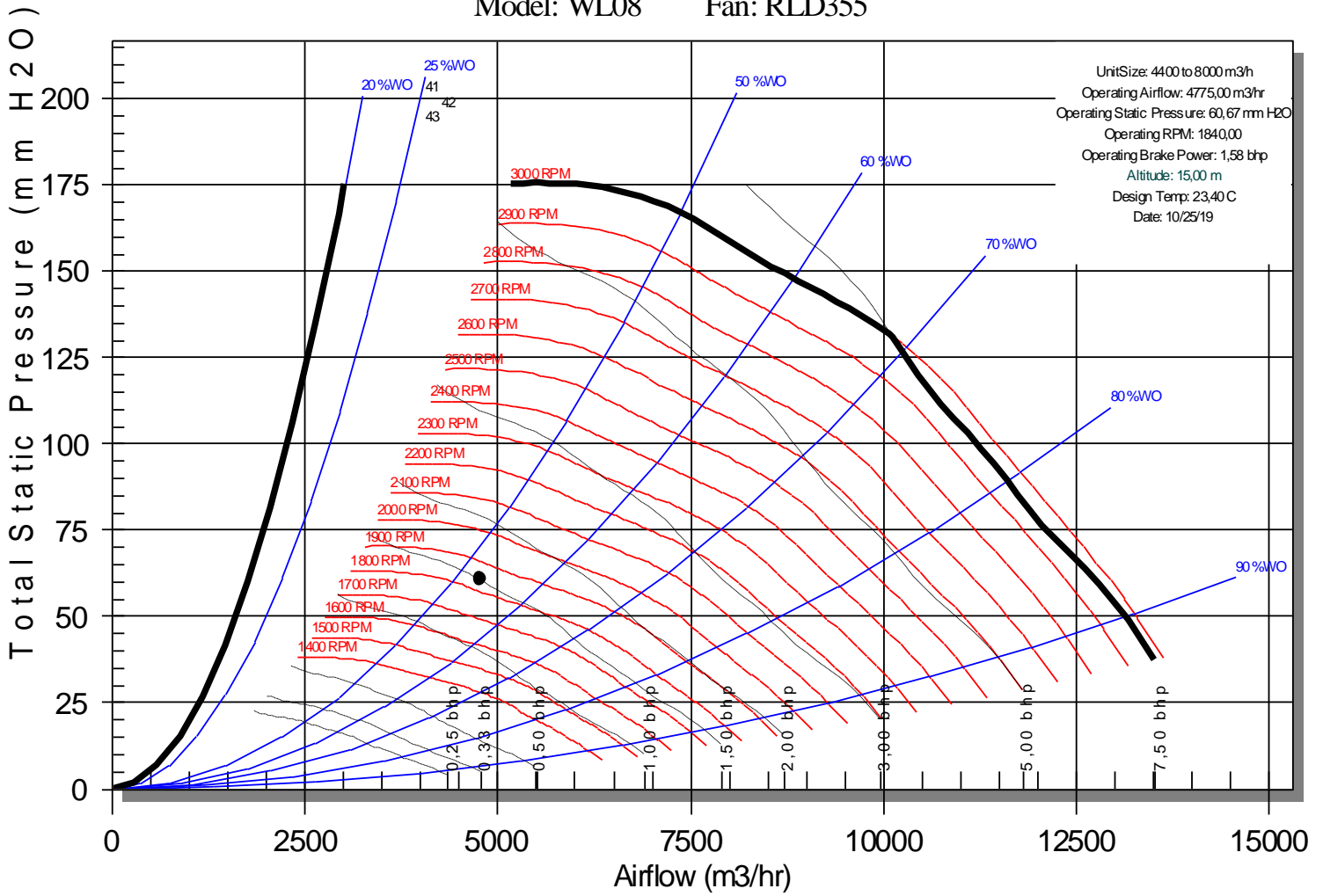
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-75

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-76
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA08AGDEK- HH00Y10B6AWBAY0 0110003000000L000 000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,09 mm H2O
Mixing Box Air Pressure Drop	2,70 mm H2O	Filter Air Pressure Drop	27,50 mm H2O

Coil			
Cooling Entering Dry Bulb	23,9 C	Cooling Entering Wet Bulb	17,7 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	4,77 m3/hr
Cooling Capacity	33,38 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 6 kw
Heating Capacity	12,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	12,5 C	Cooling Airflow	6600,00 m3/hr
Sensible Capacity	25,77 kW	Cooling Leaving Wet Bulb	12,2 C
Cooling Water Volume	21,28 L	Cooling Water Velocity	0,5 m/s
Cooling Water Pressure Drop	554,33 mm H2O	Cooling Air Pressure Drop	14,75 mm H2O
Cooling Coil Wet Weight	221 kg	Actual Cooling Face Velocity	2,5 m/s
Electric Heat PD	3,99 mm H2O		

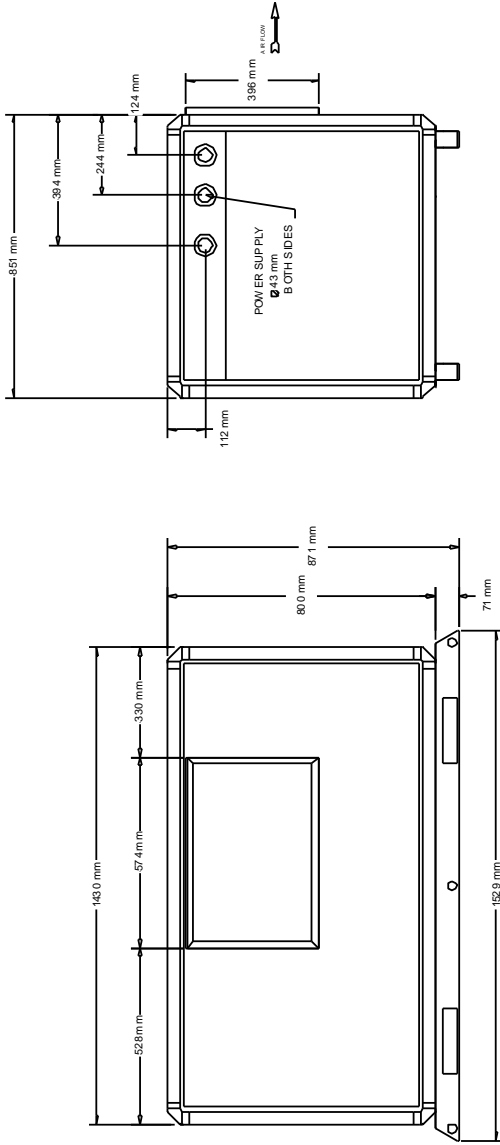
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	87,03 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	3,15 bhp
Fan RPM	2285 rpm	Transmission Option	H
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,4 Pa

Humidifier	
Humidification	w/o Humidification /

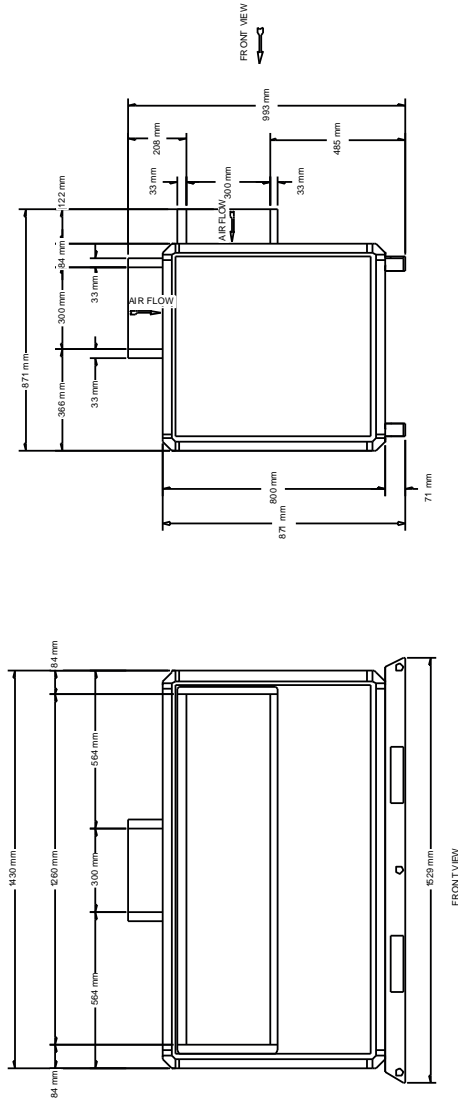


Not Applicable

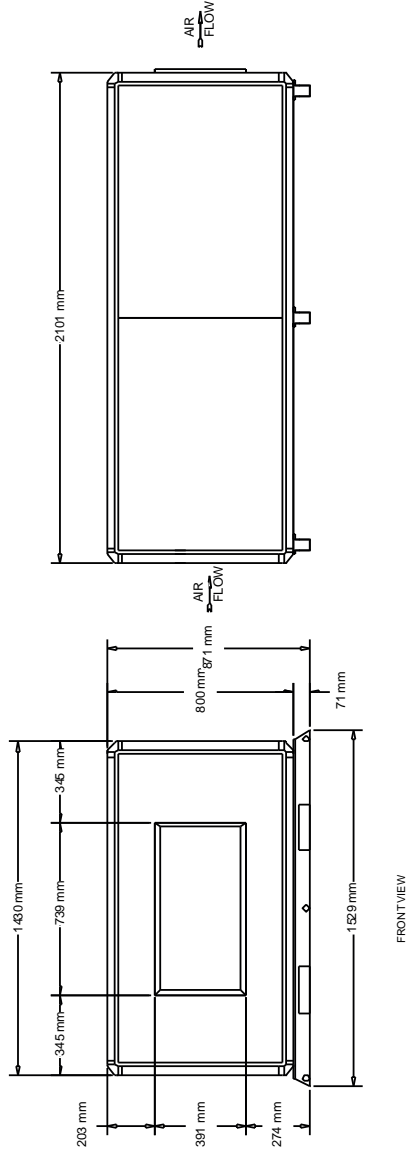
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



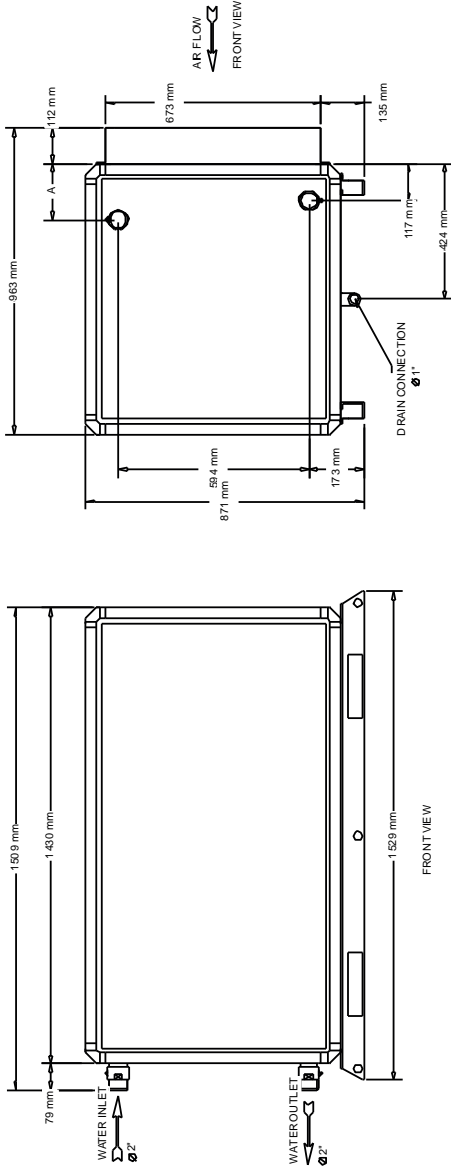
FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 08



MIXER BOX SECTION
WAVE DOBLE 08

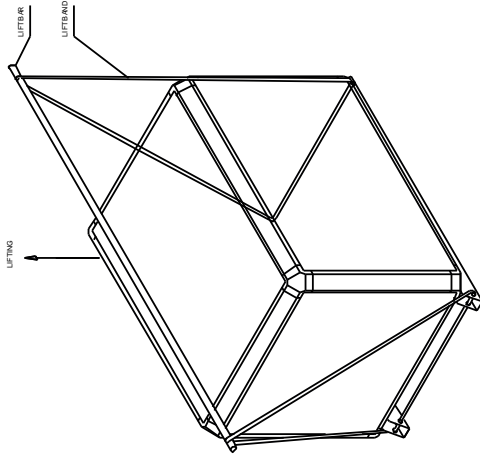


FINAL FILTER MODULE (LIMIT LOAD)
 WAVE DOBLE 08

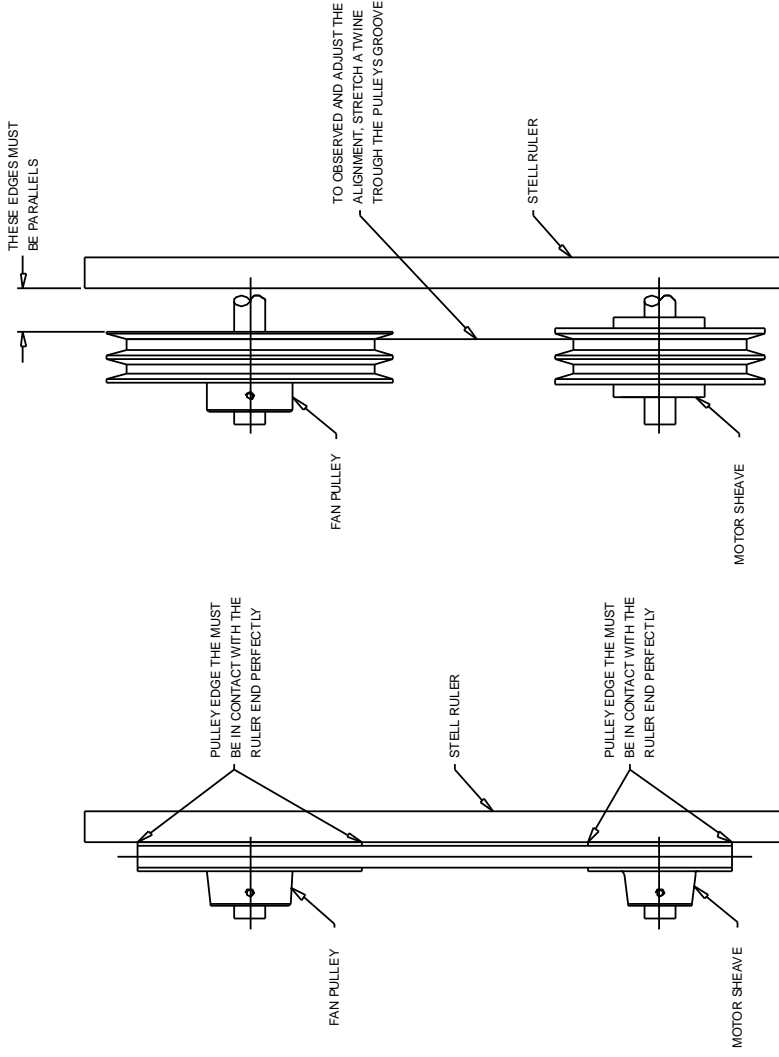


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 08

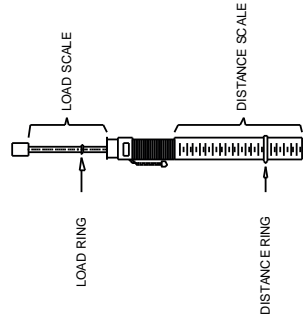
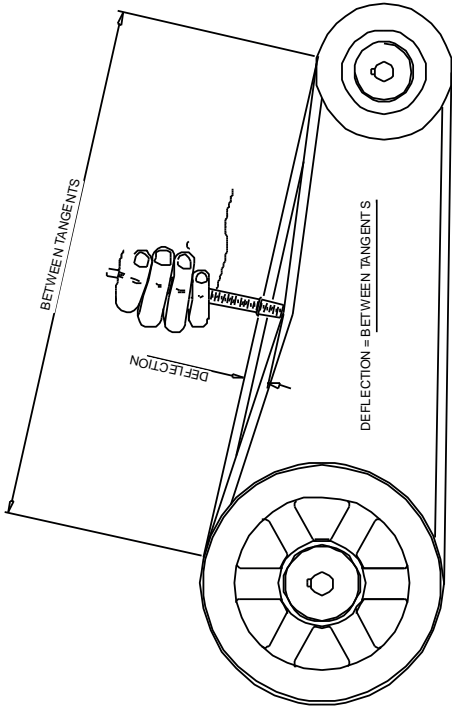
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



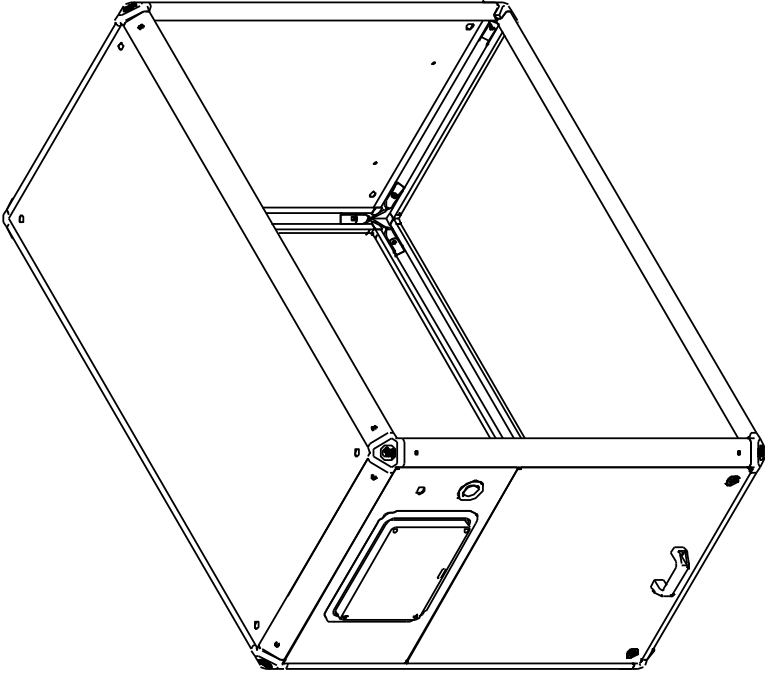
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

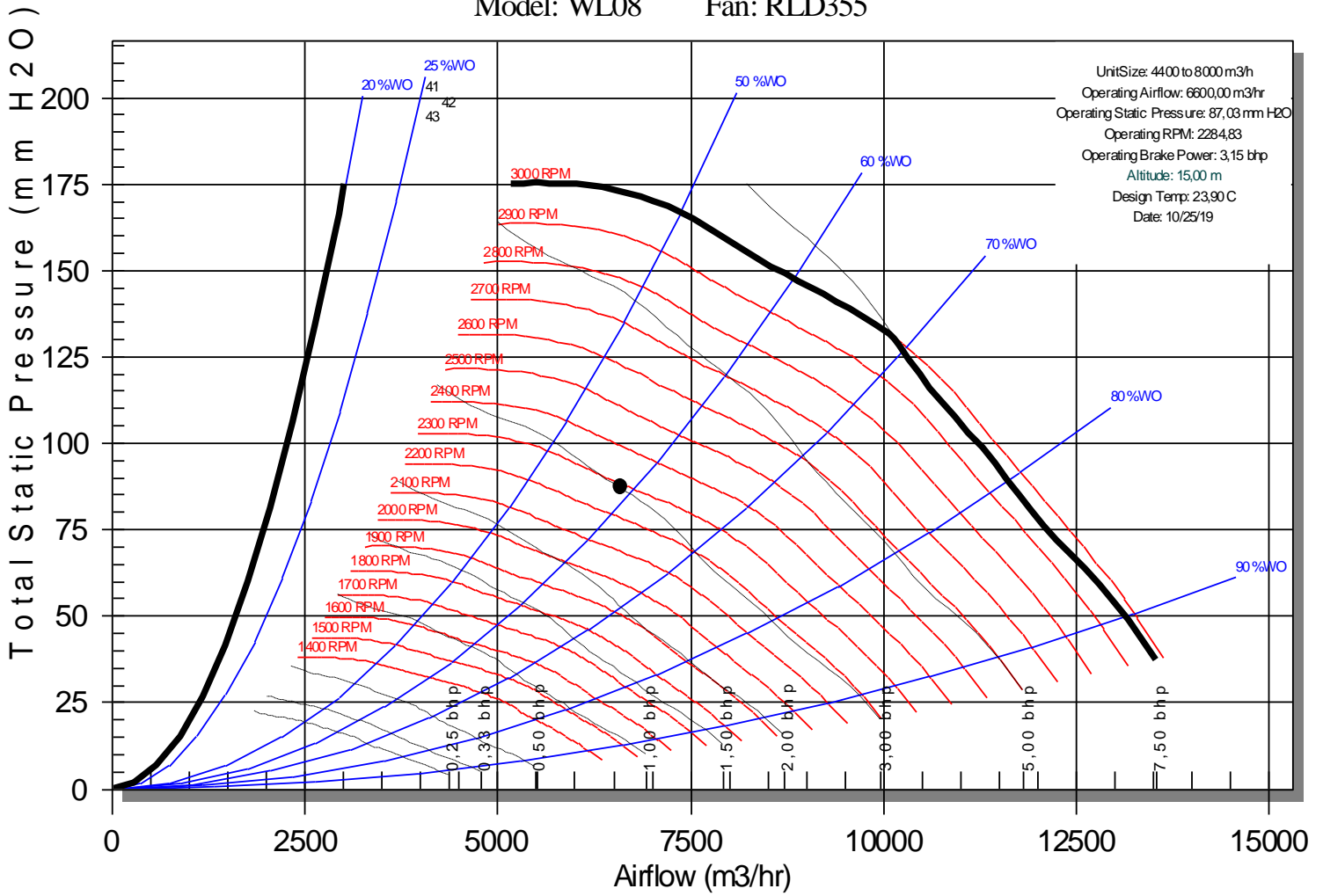
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-76

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-77
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA06AGDEK-FH00Y10A6BWAH00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,90 mm H2O
Mixing Box Air Pressure Drop	2,65 mm H2O	Filter Air Pressure Drop	25,68 mm H2O

Coil			
Cooling Entering Dry Bulb	23,4 C	Cooling Entering Wet Bulb	17,1 C
Cooling Leaving Dry Bulb	11,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	3,44 m3/hr
Cooling Capacity	24,04 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 4.5 kw
Heating Capacity	9,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	11,7 C	Cooling Airflow	4775,00 m3/hr
Sensible Capacity	19,14 kW	Cooling Leaving Wet Bulb	11,5 C
Cooling Water Volume	12,39 L	Cooling Water Velocity	0,6 m/s
Cooling Water Pressure Drop	714,00 mm H2O	Cooling Air Pressure Drop	13,77 mm H2O
Cooling Coil Wet Weight	192 kg	Actual Cooling Face Velocity	2,4 m/s
Electric Heat PD	3,90 mm H2O		

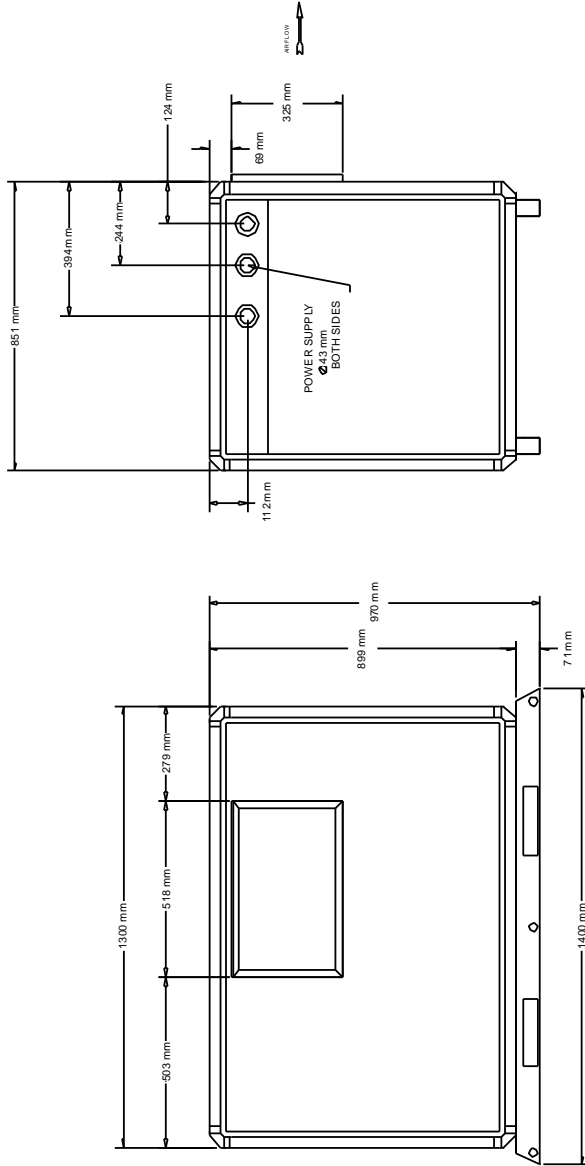
Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	83,91 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,07 bhp
Fan RPM	1989 rpm	Transmission Option	H
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,5 Pa

Humidifier	
Humidification	w/o Humidification /

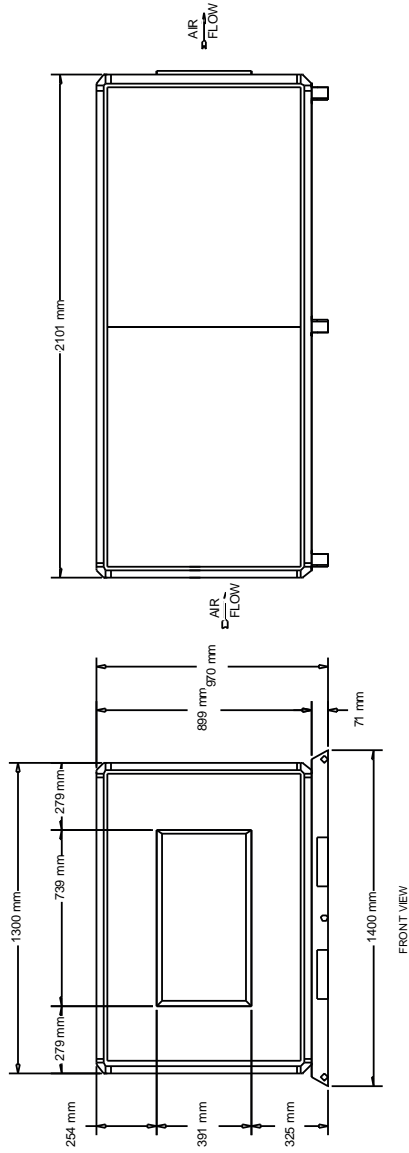


Not Applicable

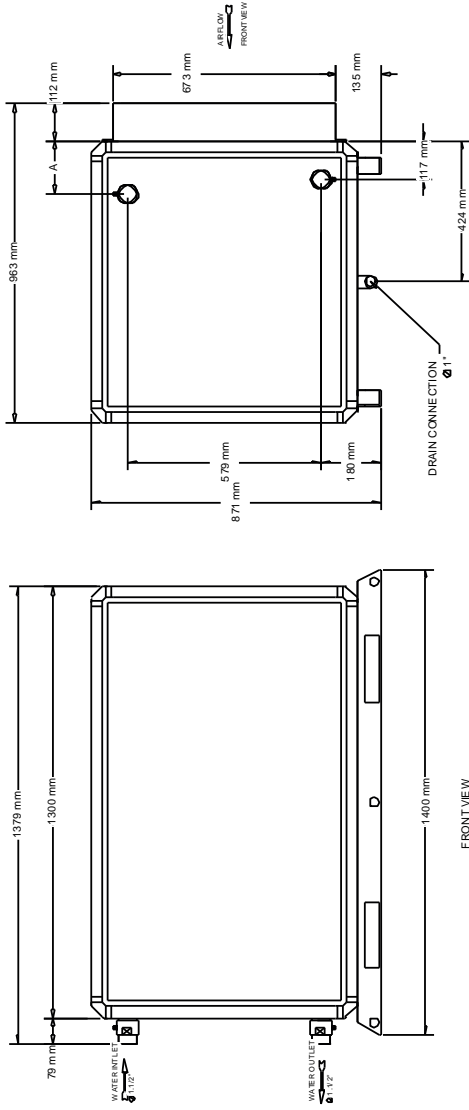
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



FAN SECTION - HORIZONTAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

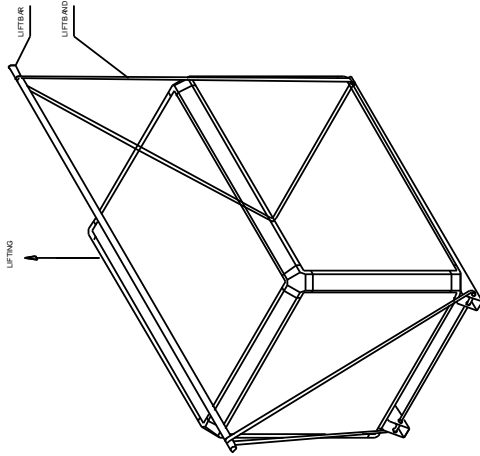


FINAL FILTER MODULE (LIMIT LOAD)
 WAVE DOBLE 06

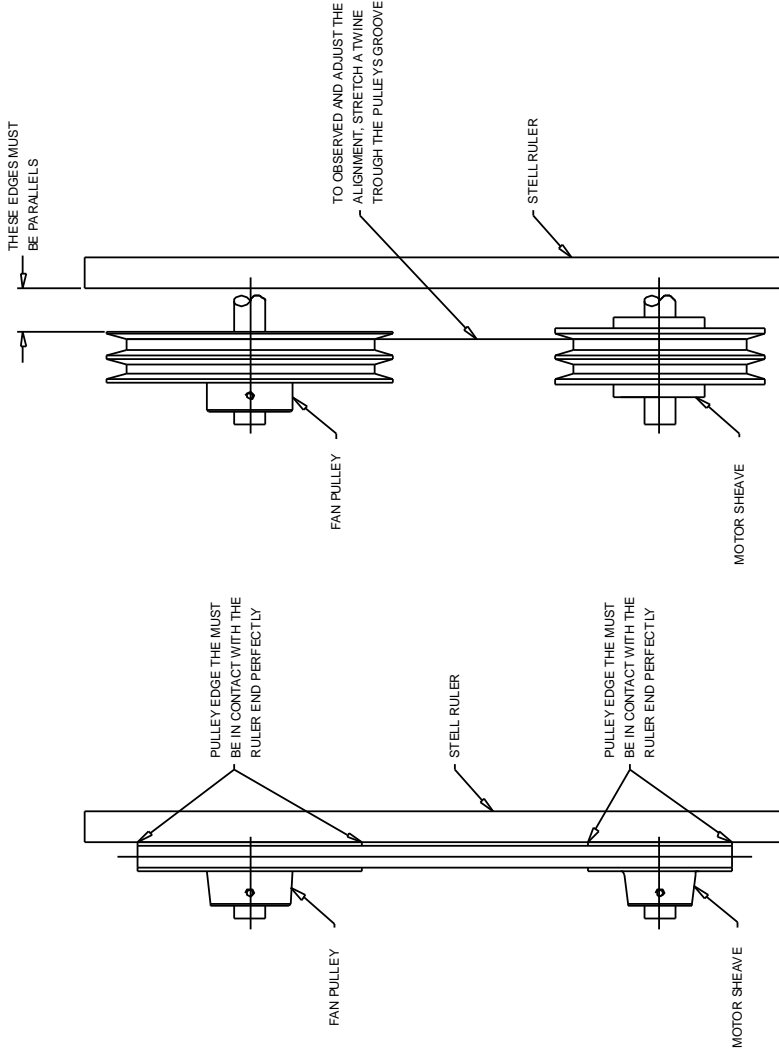


COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 06

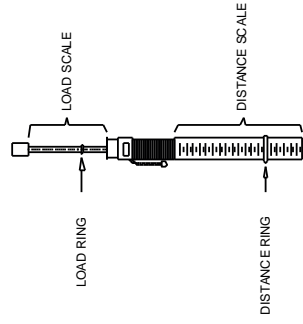
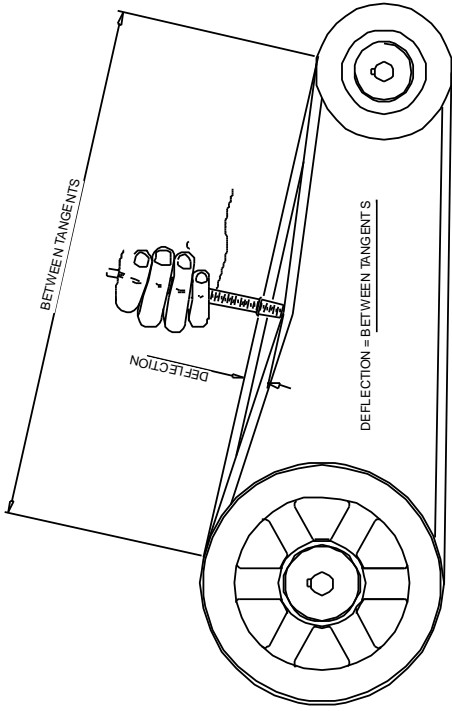
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



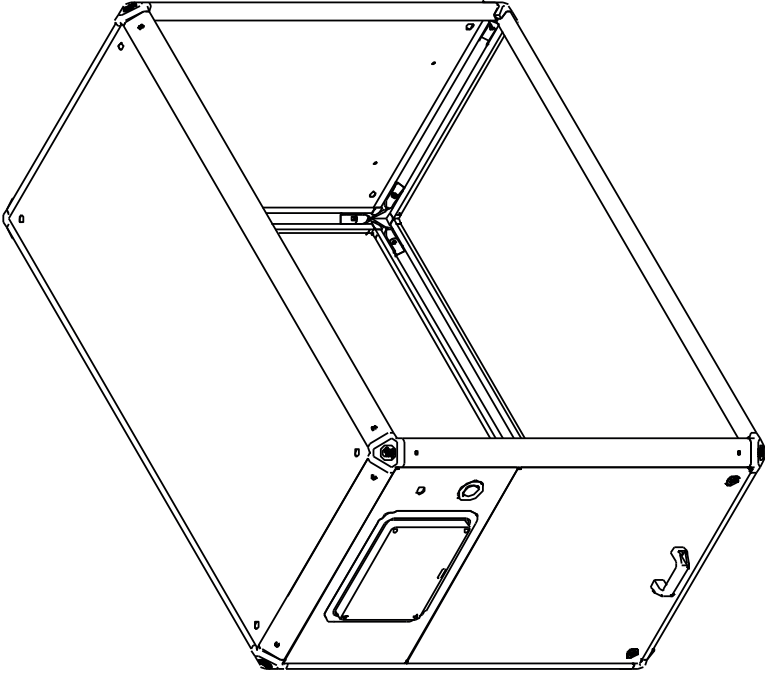
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



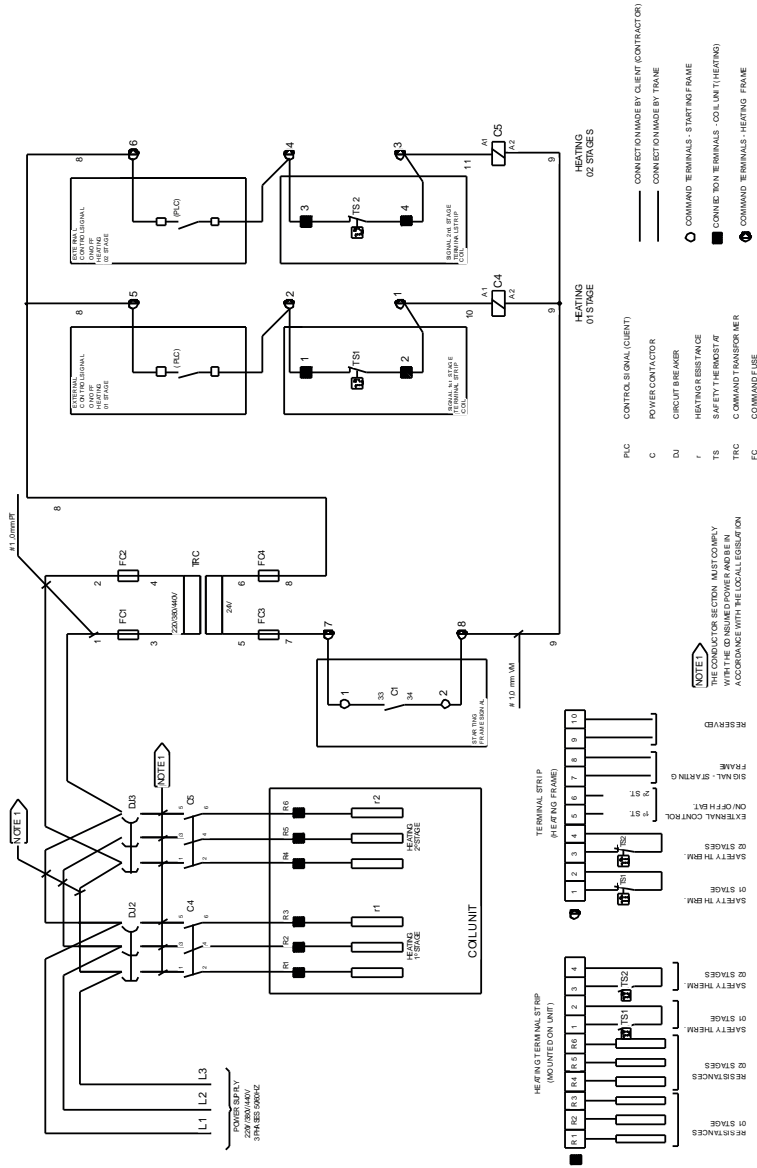
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

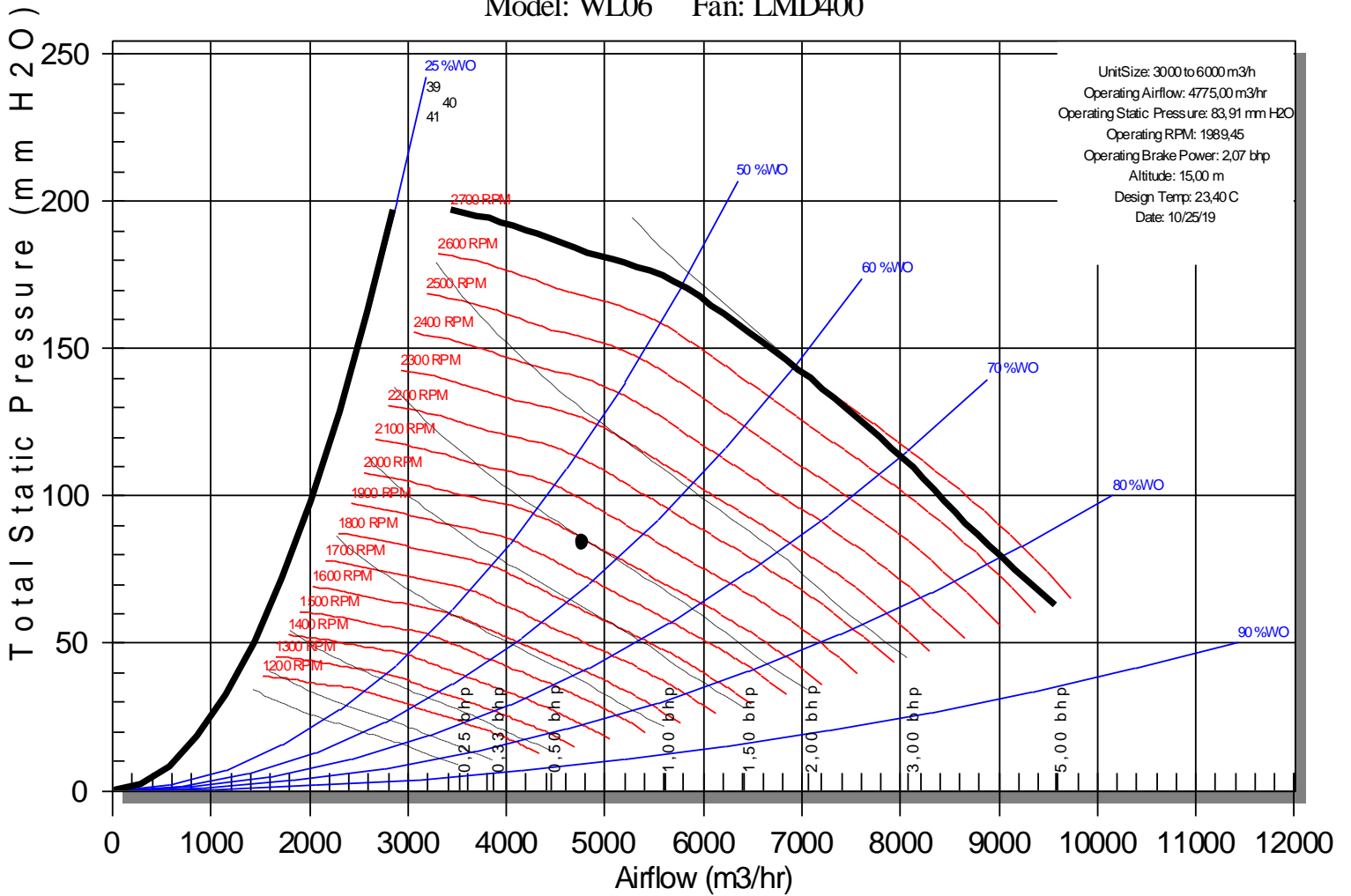
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-77

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-78
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGAEKTED00 Y00B6A2BAG001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,16 mm H2O
Mixing Box Air Pressure Drop	2,17 mm H2O	Filter Air Pressure Drop	20,39 mm H2O

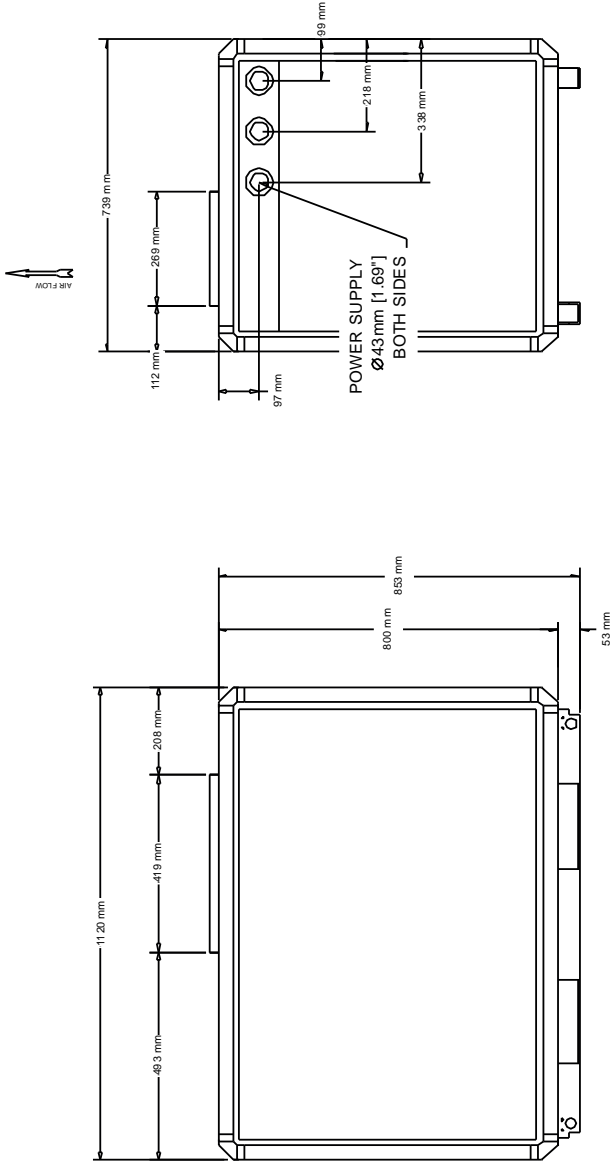
Coil			
Cooling Entering Dry Bulb	24,0 C	Cooling Entering Wet Bulb	17,9 C
Cooling Leaving Dry Bulb	11,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,51 m3/hr
Cooling Capacity	17,54 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	P1/2	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 3 kw
Heating Capacity	6,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	11,7 C	Cooling Airflow	3000,00 m3/hr
Sensible Capacity	12,62 kW	Cooling Leaving Wet Bulb	11,5 C
Cooling Water Volume	10,98 L	Cooling Water Velocity	0,7 m/s
Cooling Water Pressure Drop	1008,75 mm H2O	Cooling Air Pressure Drop	13,11 mm H2O
Cooling Coil Wet Weight	160 kg	Actual Cooling Face Velocity	2,2 m/s
Electric Heat PD	3,11 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	77,94 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,32 bhp
Fan RPM	2571 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,8 m/s	Velocity Pressure	57,2 Pa

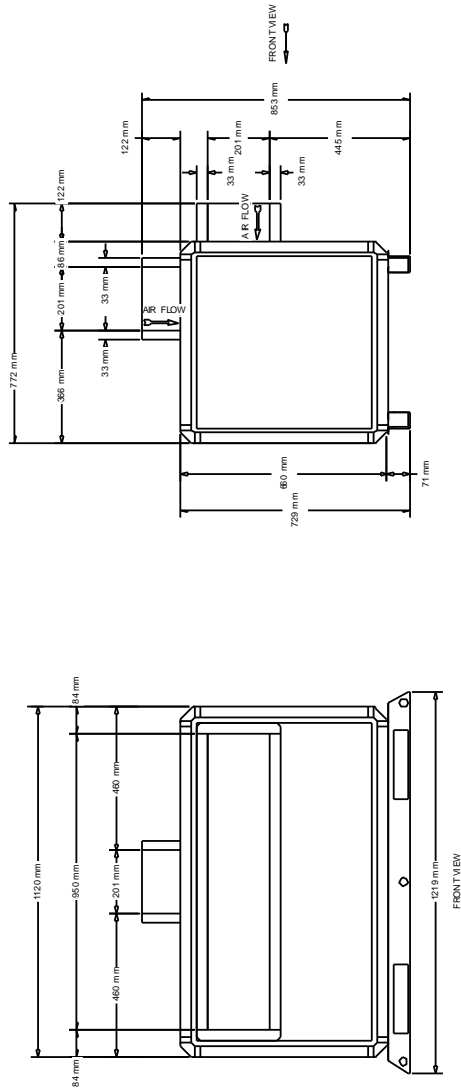
Humidifier	
Humidification	w/o Humidification / Not Applicable



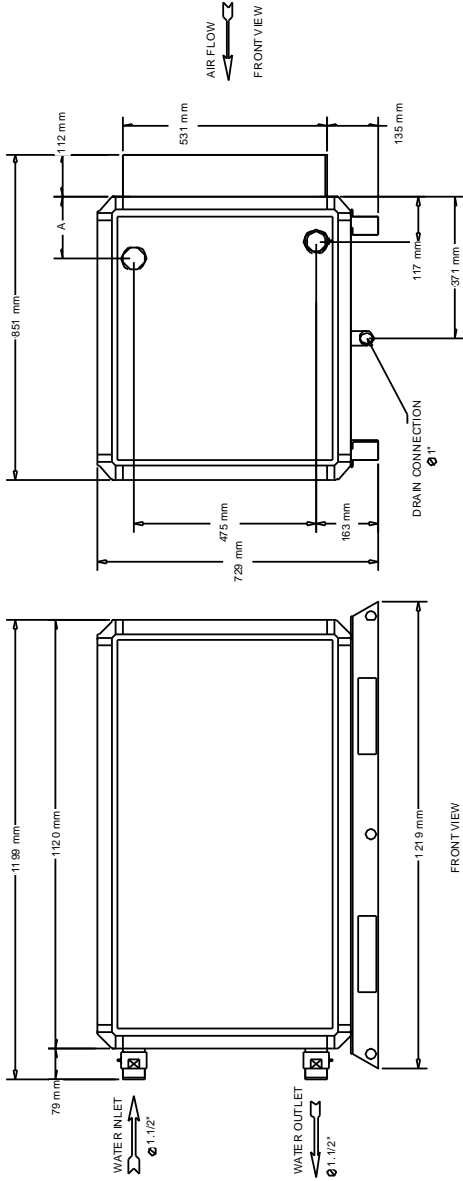
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

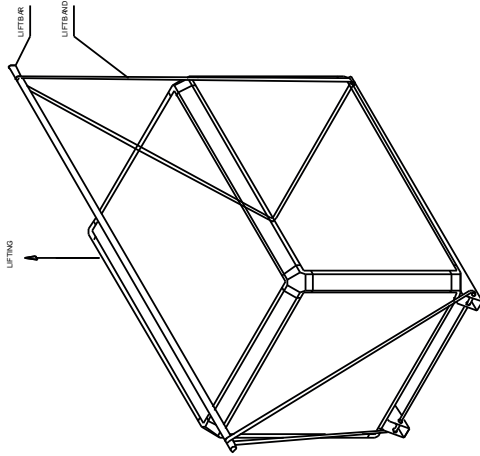


MIXER BOX SECTION
WAVE DOBLE 04

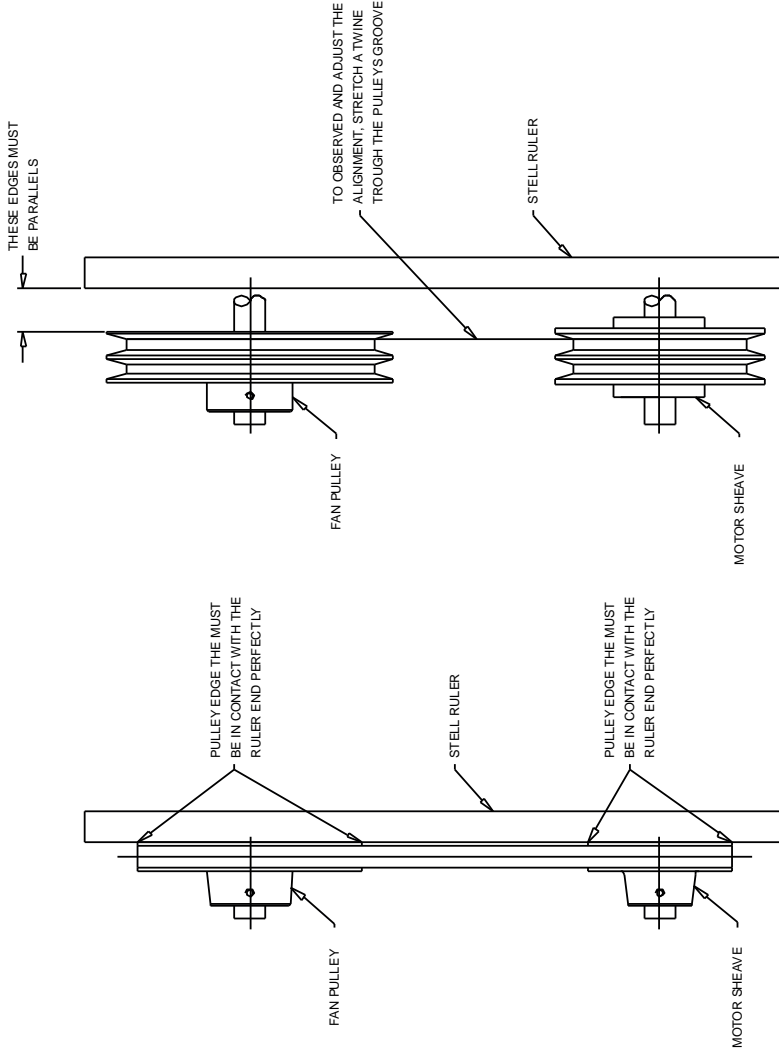


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 04

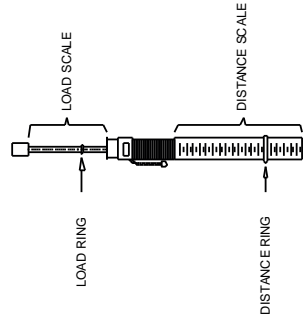
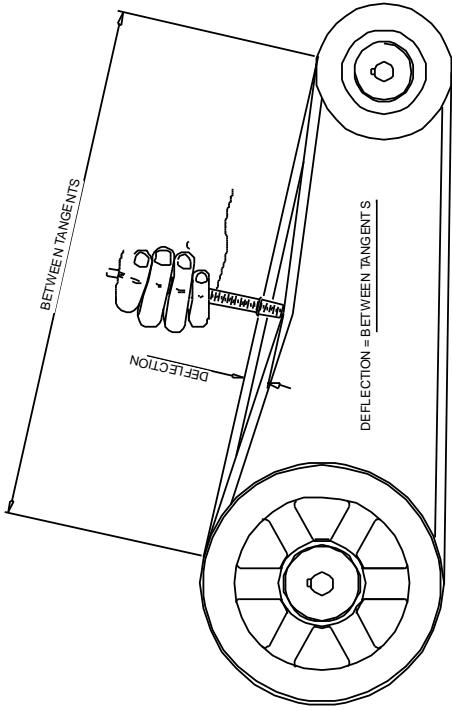
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



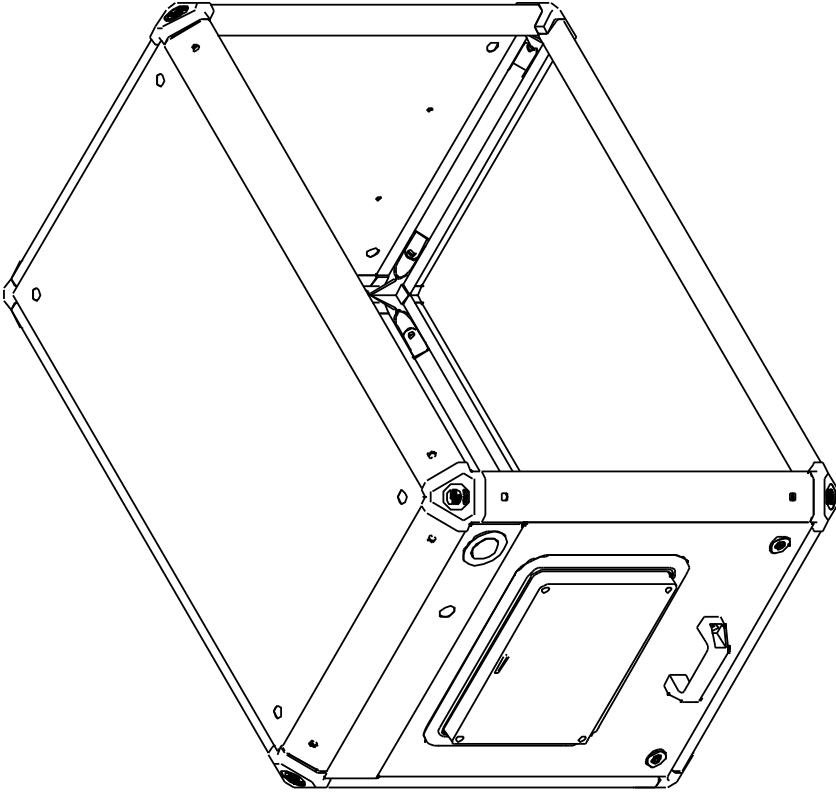
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



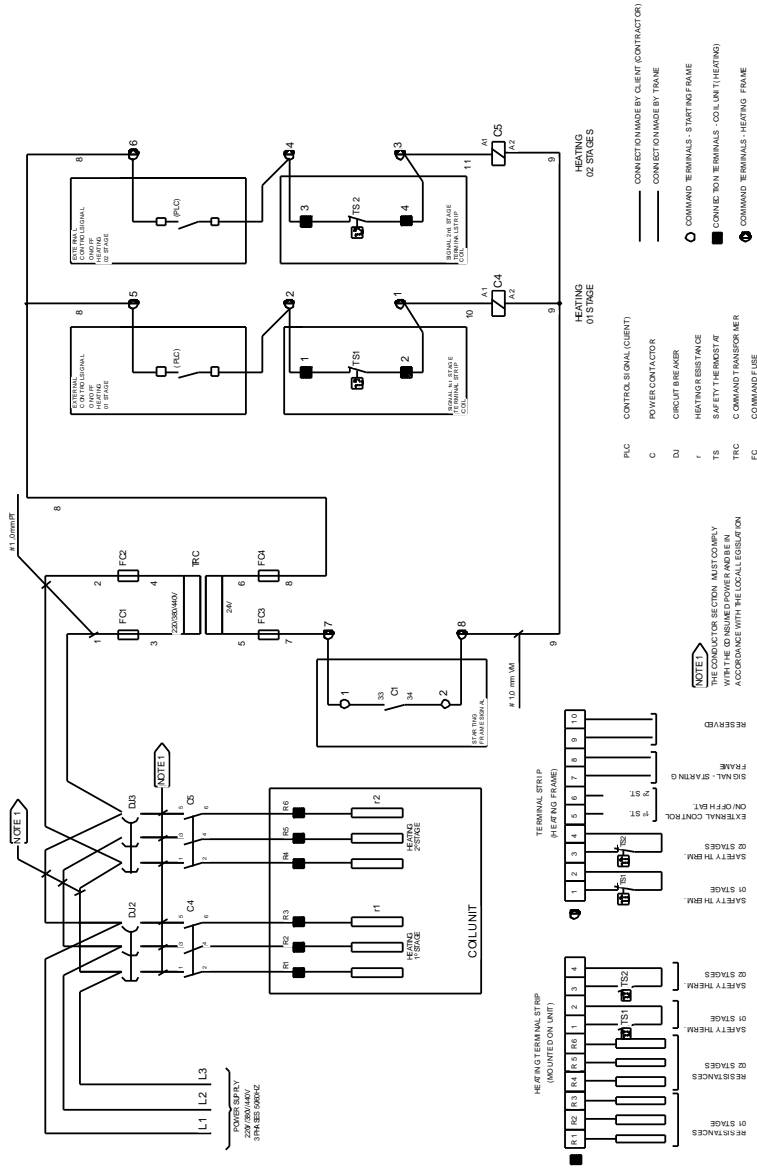
PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



HEAT ELECTRICAL DIAGRAM



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

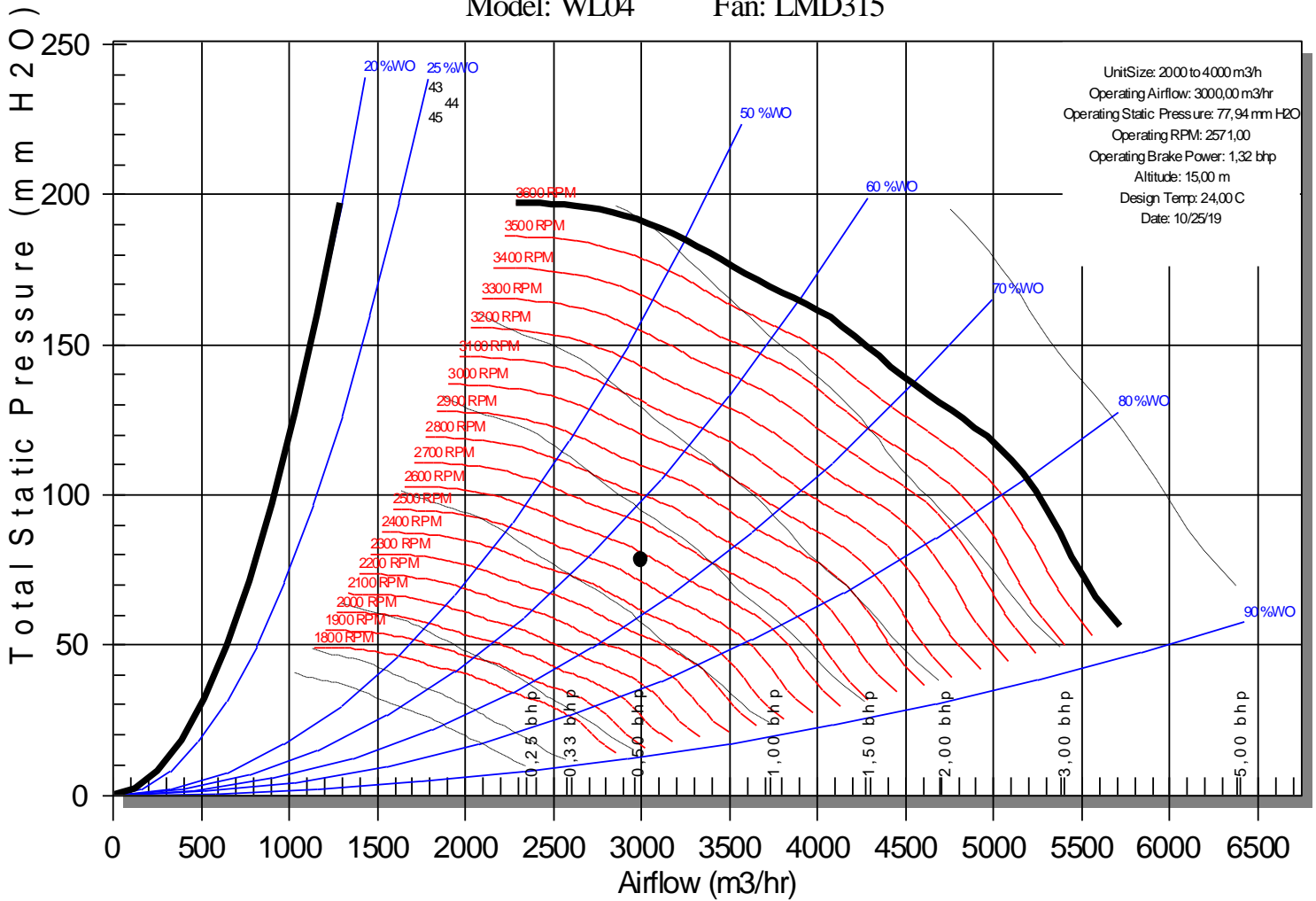
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-78

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-79
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00B6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,27 mm H2O
Mixing Box Air Pressure Drop	2,20 mm H2O	Filter Air Pressure Drop	23,11 mm H2O

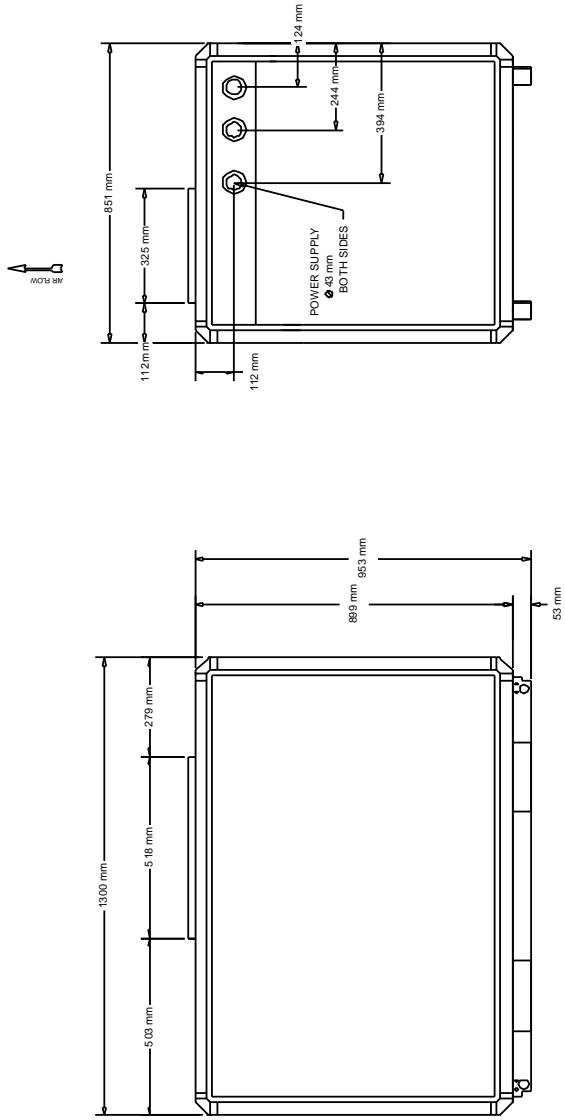
Coil			
Cooling Entering Dry Bulb	28,8 C	Cooling Entering Wet Bulb	22,6 C
Cooling Leaving Dry Bulb	12,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	6,75 m3/hr
Cooling Capacity	47,20 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4550,00 m3/hr	Sensible Capacity	25,36 kW
Cooling Leaving Wet Bulb	12,6 C	Cooling Water Volume	17,23 L
Cooling Water Velocity	0,8 m/s	Cooling Water Pressure Drop	898,36 mm H2O
Cooling Air Pressure Drop	15,89 mm H2O	Cooling Coil Wet Weight	211 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	80,46 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,88 bhp
Fan RPM	1943 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	9,3 m/s	Velocity Pressure	52,3 Pa

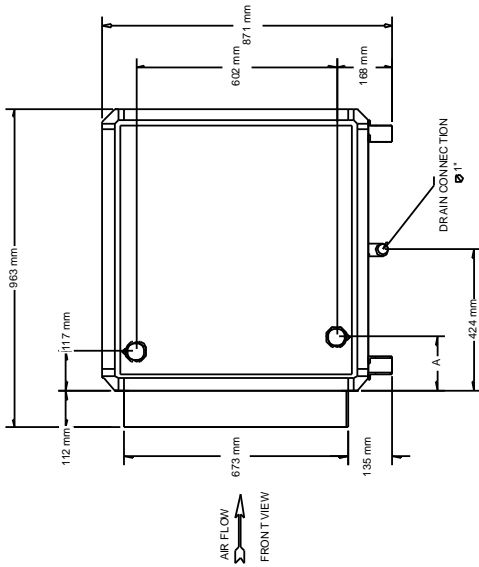
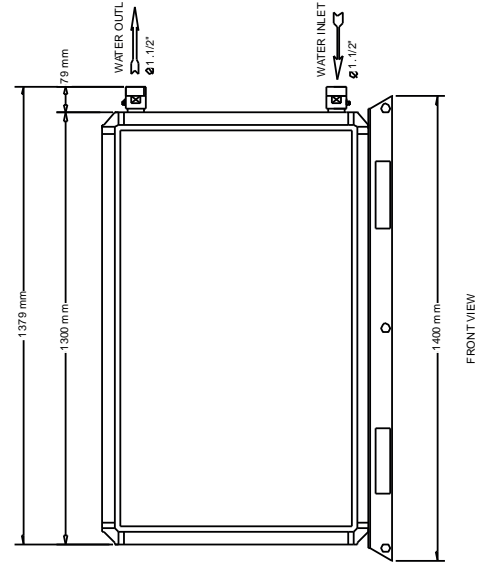
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

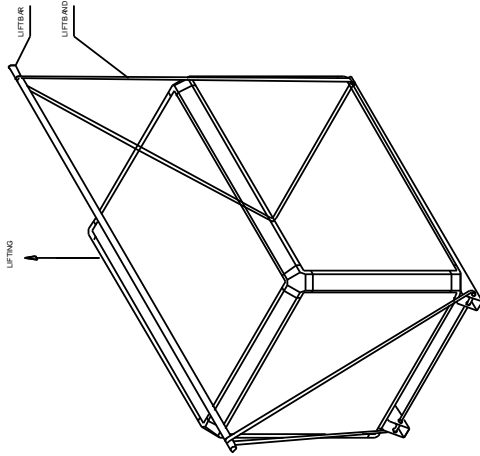


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

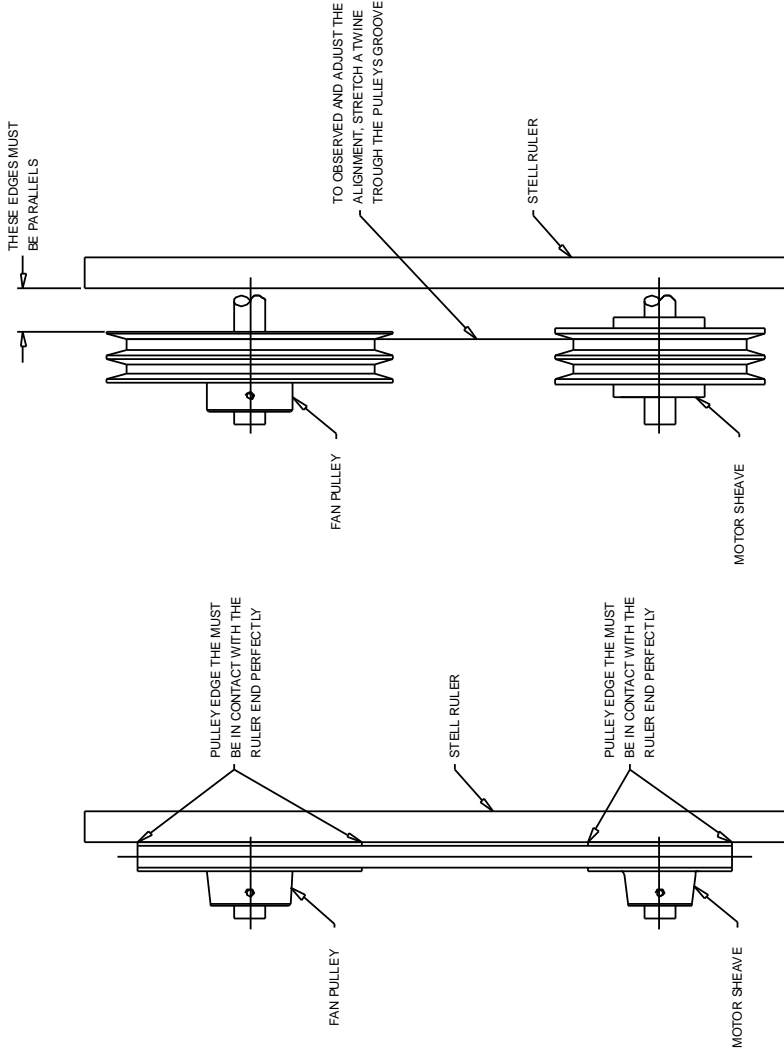


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 06

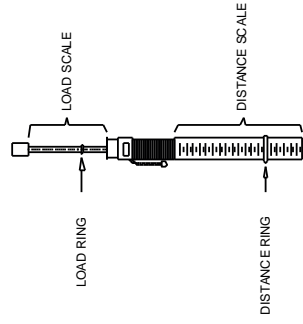
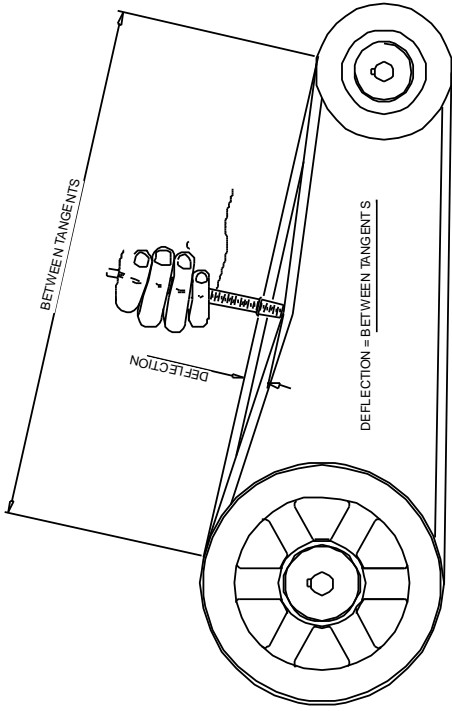
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



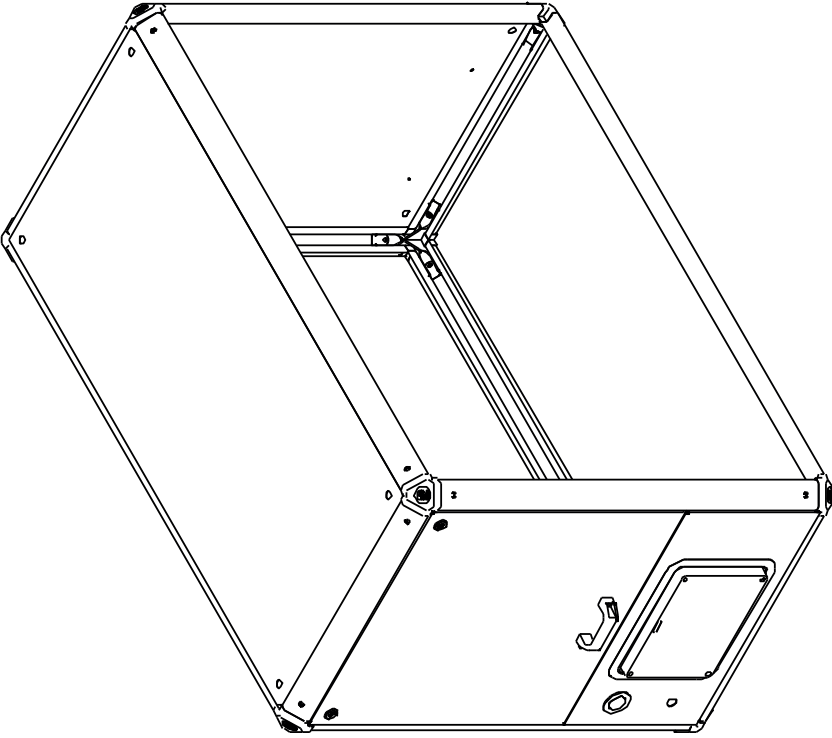
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

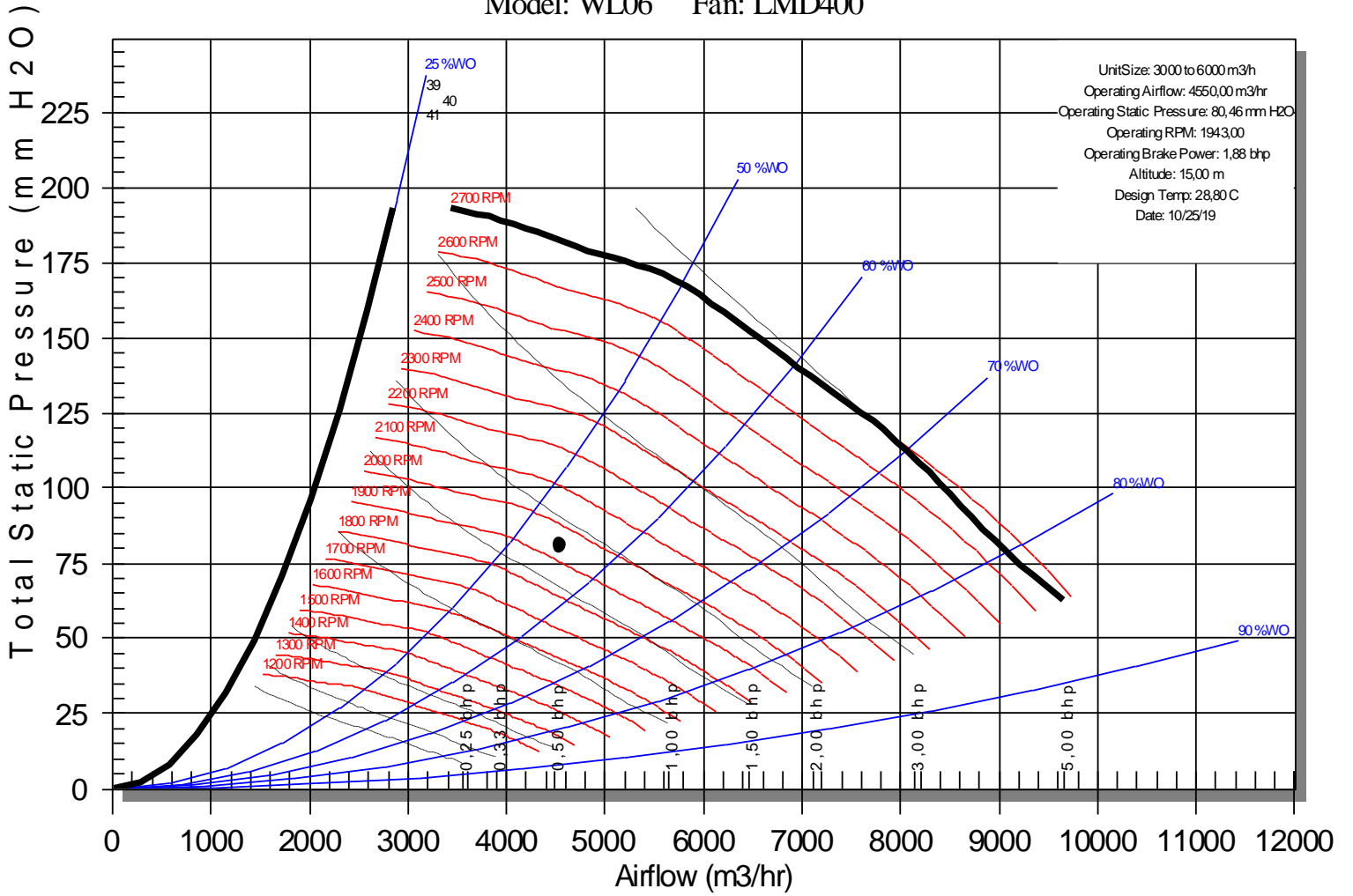
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-79

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-80A
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGADKTFD0 0B00B6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,13 mm H2O
Mixing Box Air Pressure Drop	2,17 mm H2O	Filter Air Pressure Drop	8,51 mm H2O

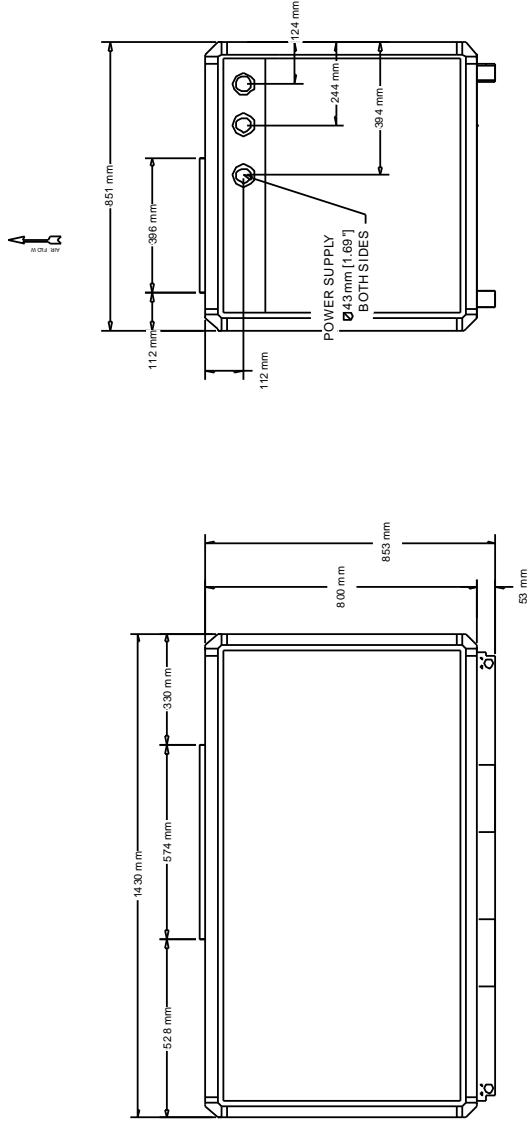
Coil			
Cooling Entering Dry Bulb	30,0 C	Cooling Entering Wet Bulb	22,0 C
Cooling Leaving Dry Bulb	11,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	8,82 m3/hr
Cooling Capacity	61,69 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	5940,00 m3/hr	Sensible Capacity	37,35 kW
Cooling Leaving Wet Bulb	11,6 C	Cooling Water Volume	21,28 L
Cooling Water Velocity	1,0 m/s	Cooling Water Pressure Drop	1689,73 mm H2O
Cooling Air Pressure Drop	15,53 mm H2O	Cooling Coil Wet Weight	226 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	65,34 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,13 bhp
Fan RPM	2016 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,8 m/s	Velocity Pressure	46,5 Pa

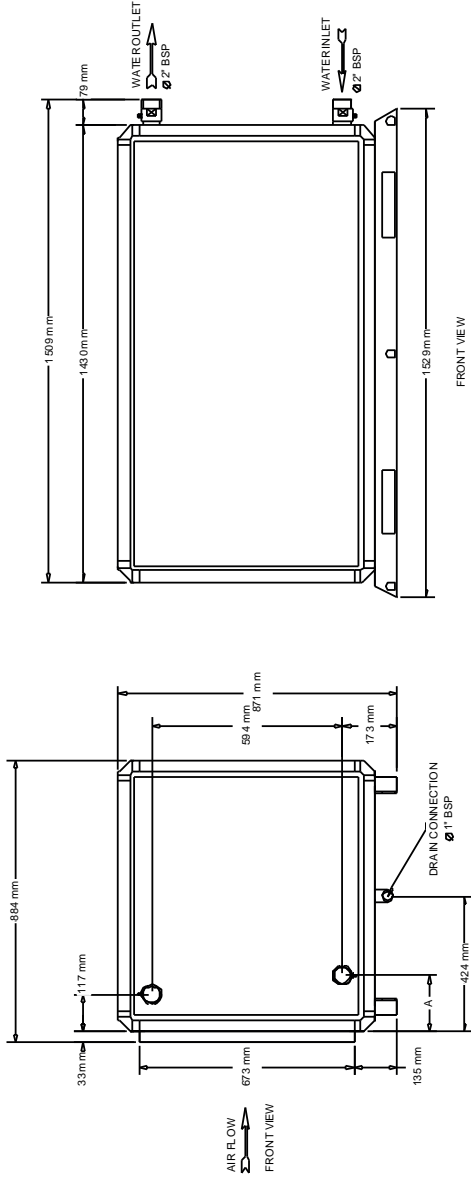
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

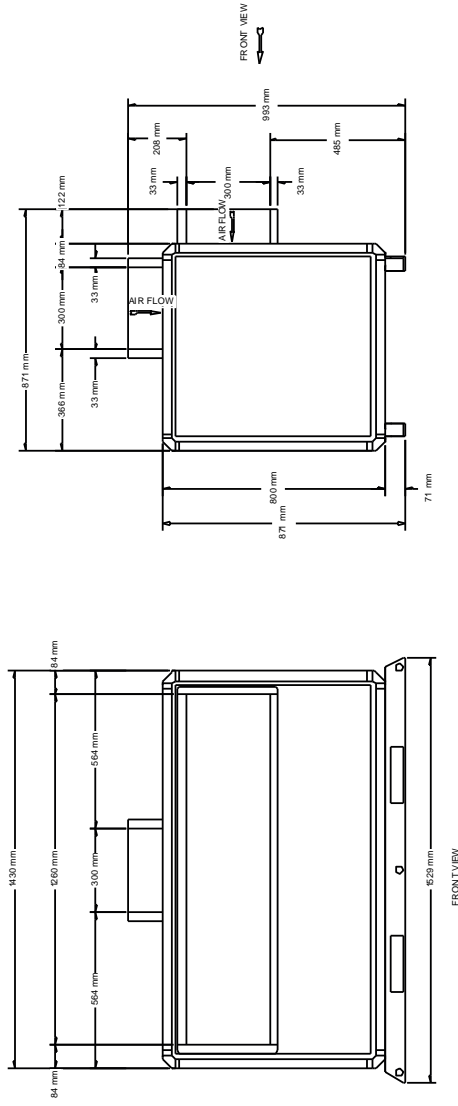


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 08

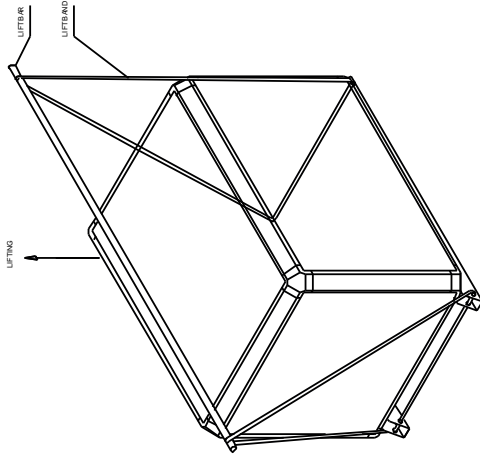


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 08

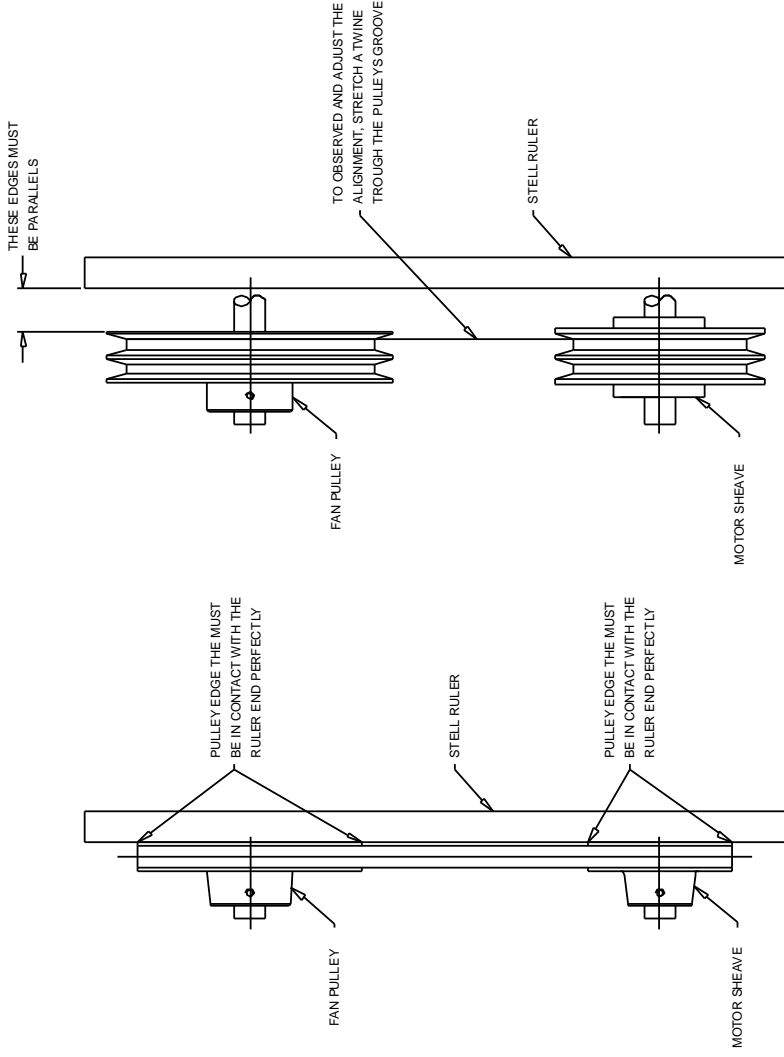
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



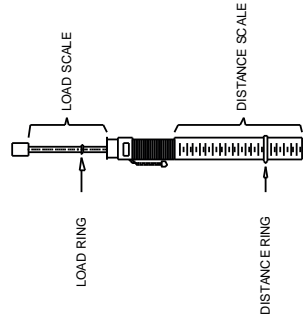
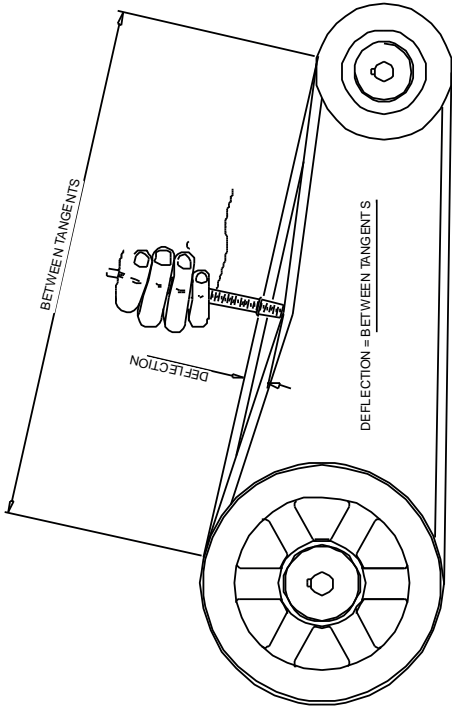
MIXER BOX SECTION
WAVE DOBLE 08



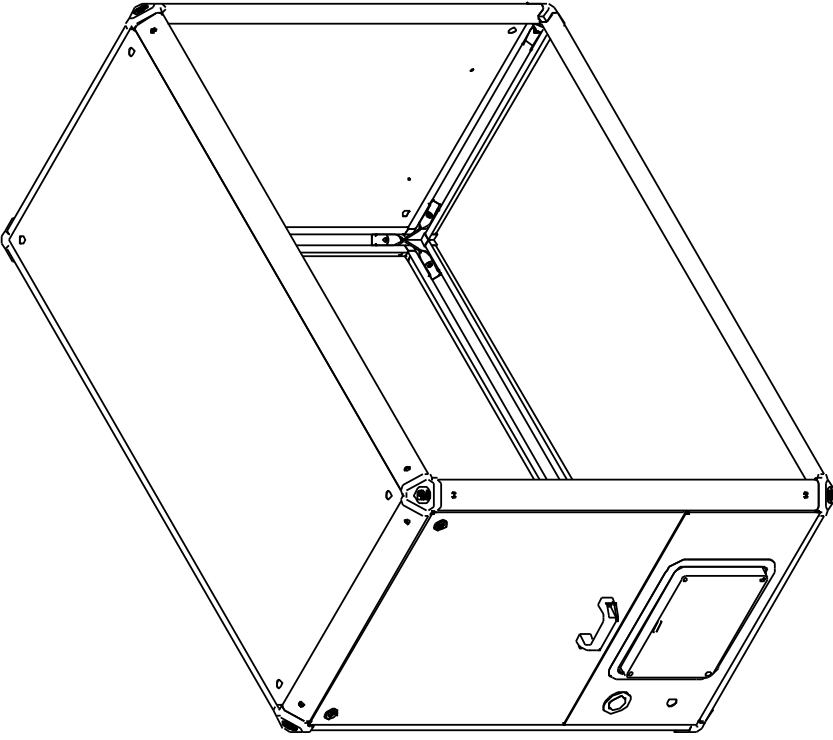
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

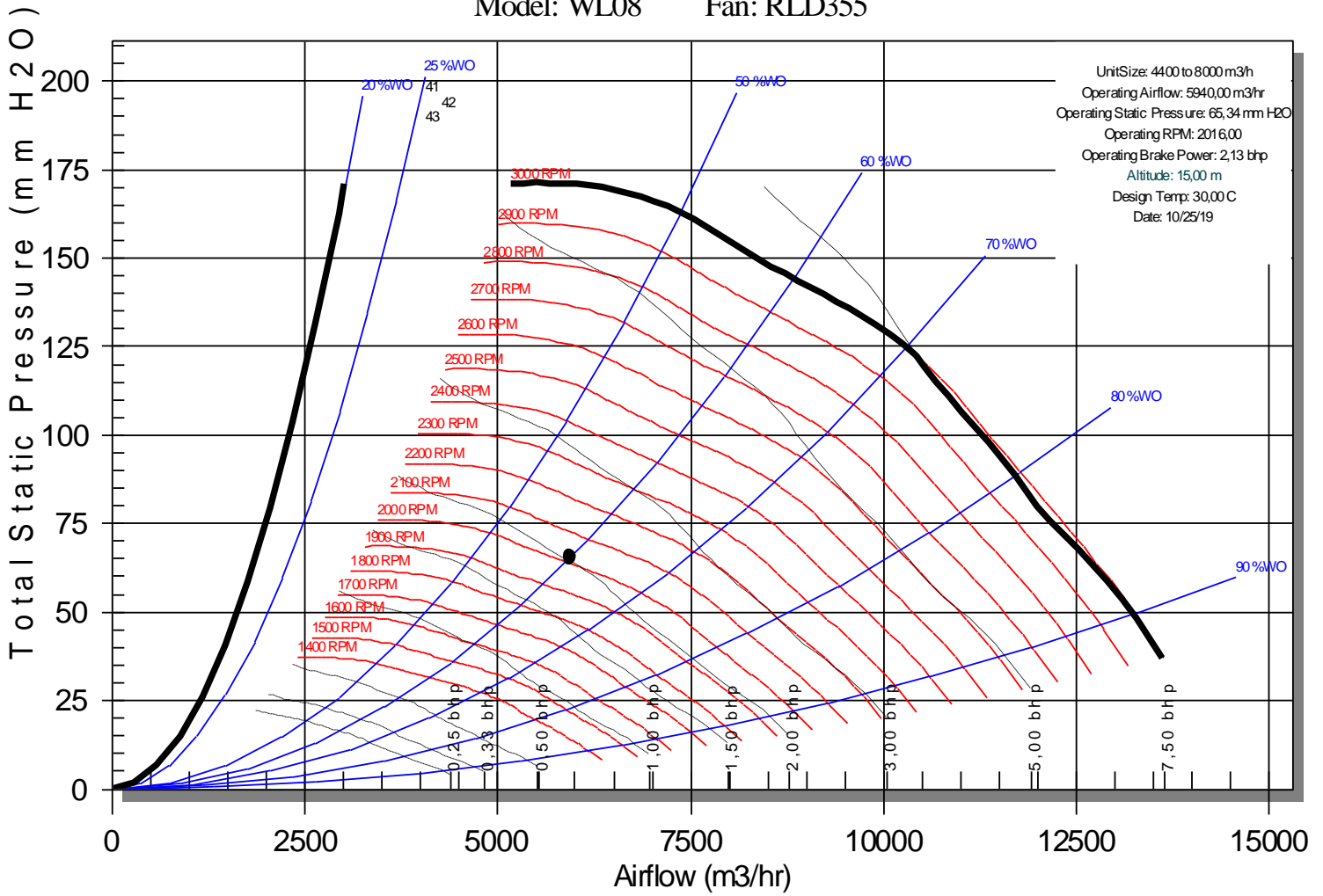
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-80A

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-80B
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA08AGADKTFD0 0B00B6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,13 mm H2O
Mixing Box Air Pressure Drop	2,17 mm H2O	Filter Air Pressure Drop	8,51 mm H2O

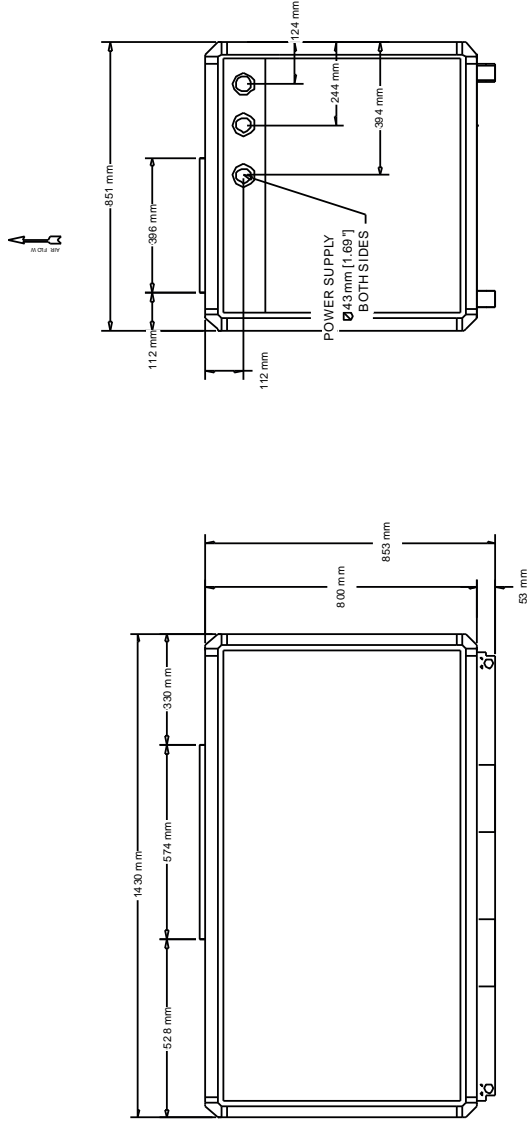
Coil			
Cooling Entering Dry Bulb	30,0 C	Cooling Entering Wet Bulb	22,0 C
Cooling Leaving Dry Bulb	11,7 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	8,82 m3/hr
Cooling Capacity	61,69 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	5940,00 m3/hr	Sensible Capacity	37,35 kW
Cooling Leaving Wet Bulb	11,6 C	Cooling Water Volume	21,28 L
Cooling Water Velocity	1,0 m/s	Cooling Water Pressure Drop	1689,73 mm H2O
Cooling Air Pressure Drop	15,53 mm H2O	Cooling Coil Wet Weight	226 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	65,34 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,13 bhp
Fan RPM	2016 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	8,8 m/s	Velocity Pressure	46,5 Pa

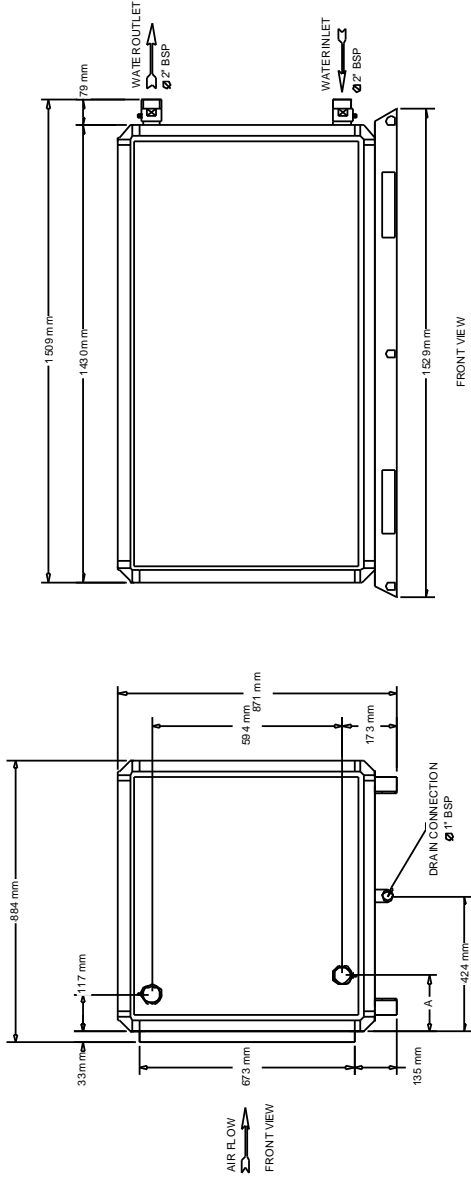
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

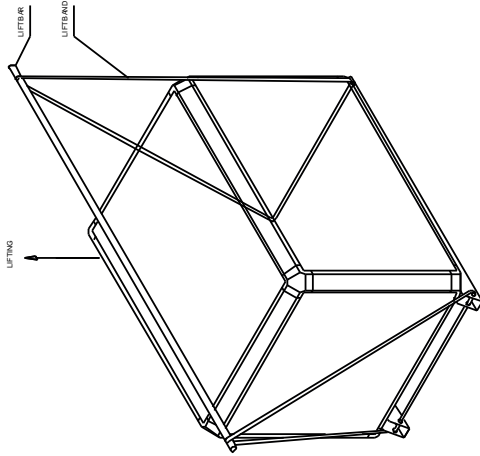


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
 WAVE DOBLE 08

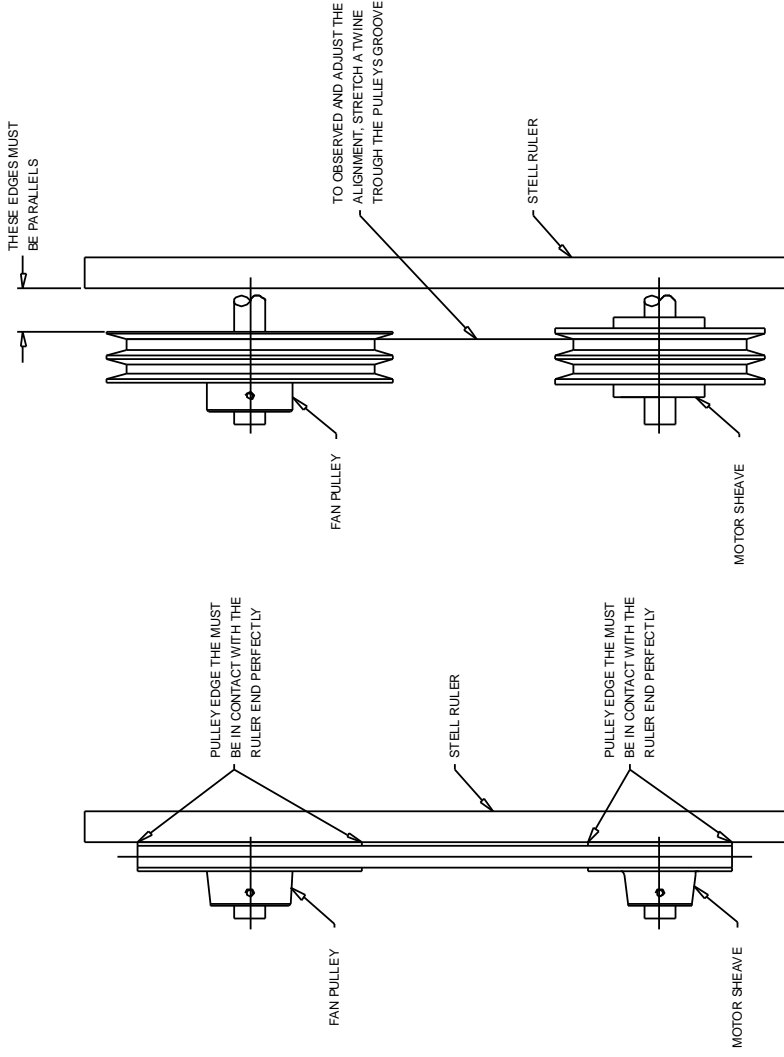


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 08

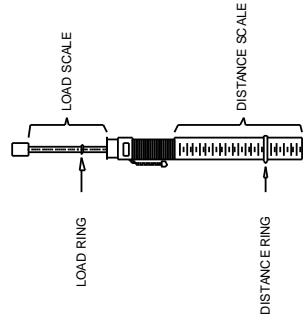
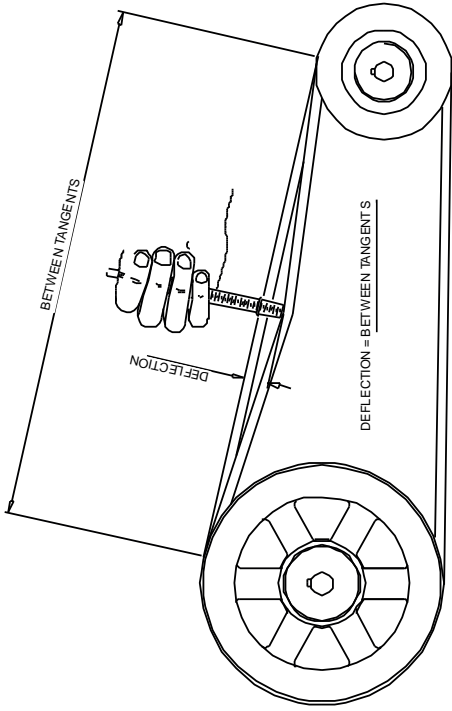
ROWS	A
3	171 mm
4	199 mm
6	254 mm
8	309 mm



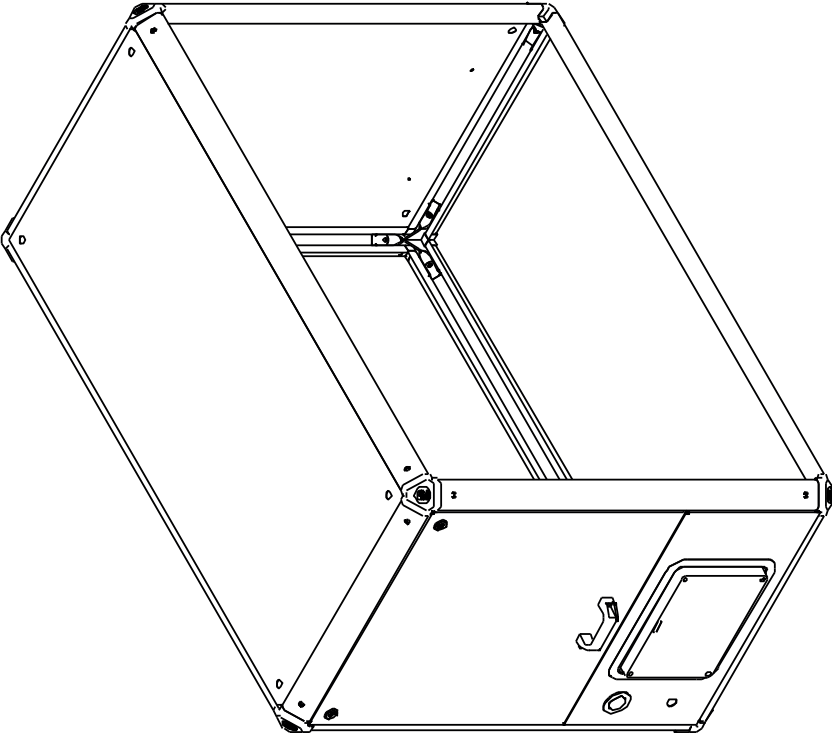
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

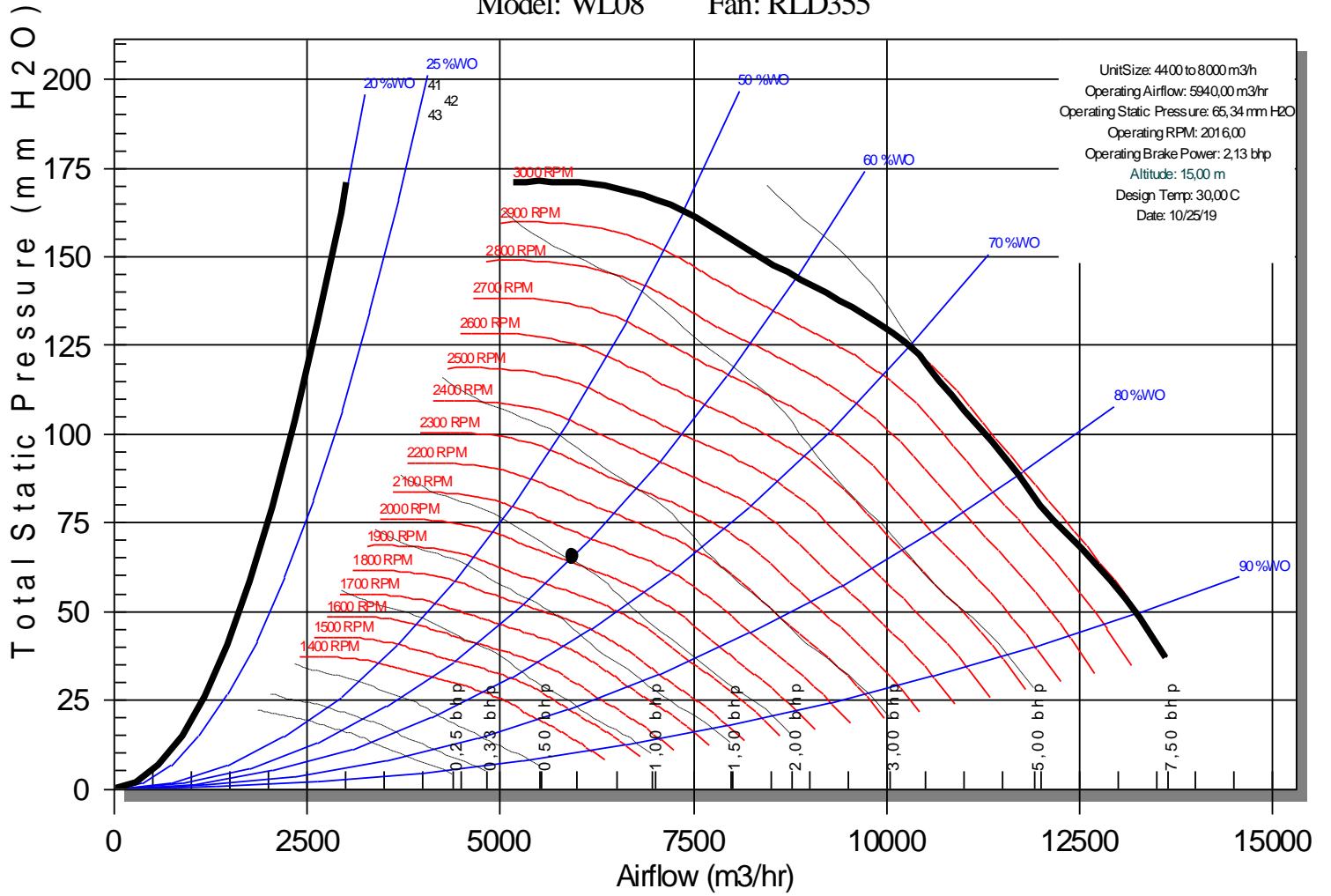
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-80B

Model: WL08

Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-81A*
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0B00A8BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,11 mm H2O
Mixing Box Air Pressure Drop	1,92 mm H2O	Filter Air Pressure Drop	7,30 mm H2O

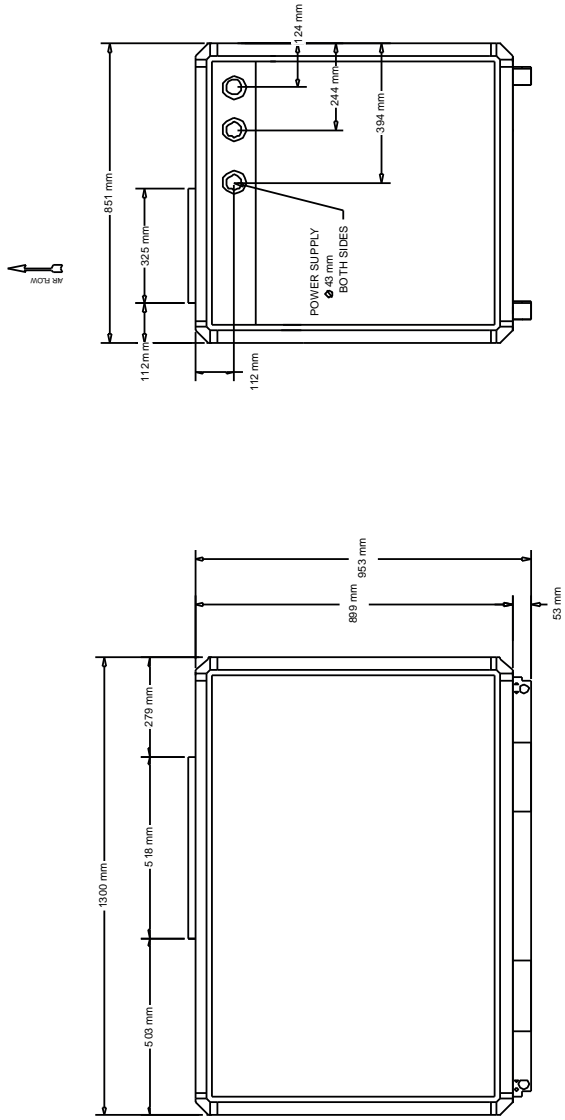
Coil			
Cooling Entering Dry Bulb	30,0 C	Cooling Entering Wet Bulb	22,0 C
Cooling Leaving Dry Bulb	9,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,11 m3/hr
Cooling Capacity	49,76 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4110,00 m3/hr	Sensible Capacity	28,98 kW
Cooling Leaving Wet Bulb	9,4 C	Cooling Water Volume	15,53 L
Cooling Water Velocity	1,2 m/s	Cooling Water Pressure Drop	3307,16 mm H2O
Cooling Air Pressure Drop	16,22 mm H2O	Cooling Coil Wet Weight	251 kg
Actual Cooling Face Velocity	2,1 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	63,56 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,34 bhp
Fan RPM	1737 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	8,4 m/s	Velocity Pressure	42,6 Pa

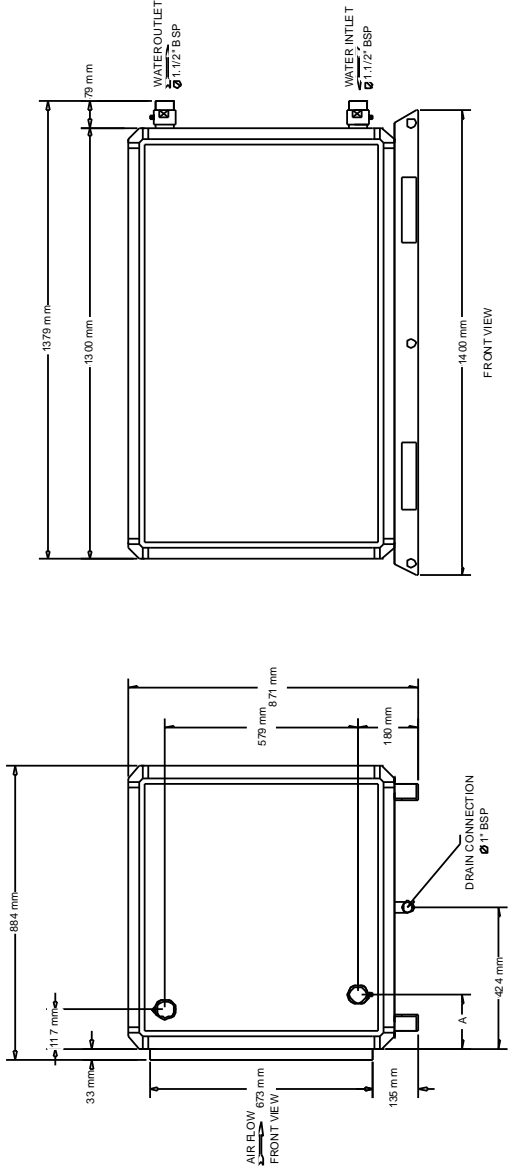
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

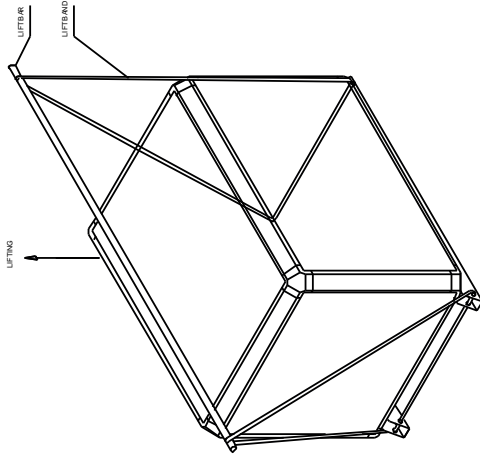


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

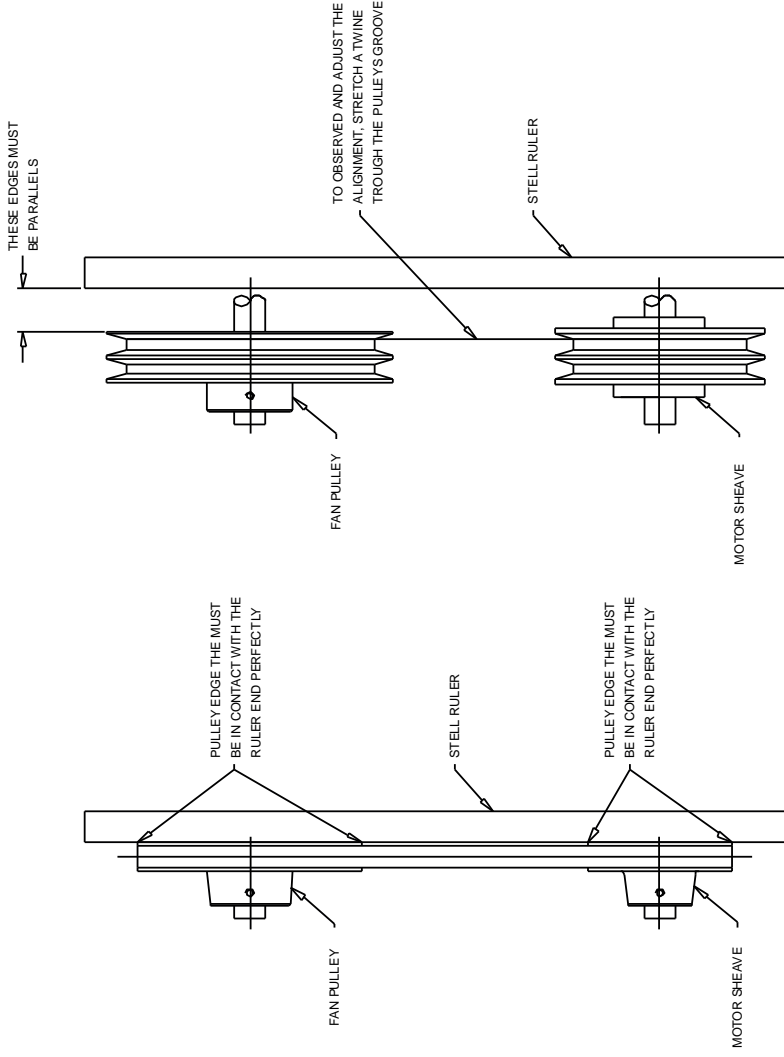


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 06

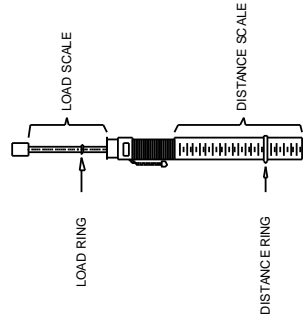
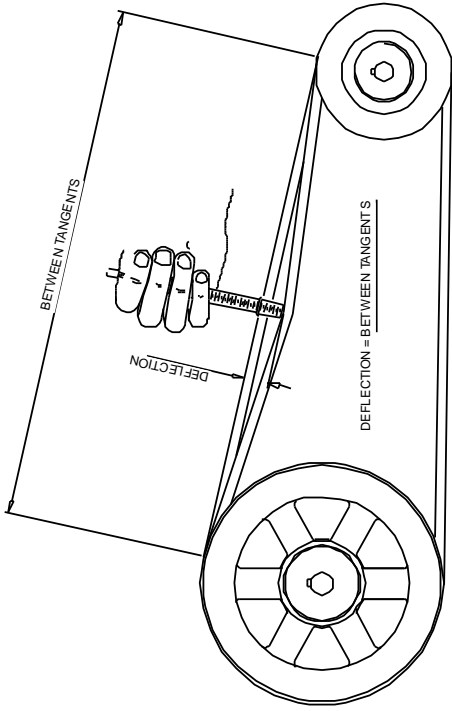
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



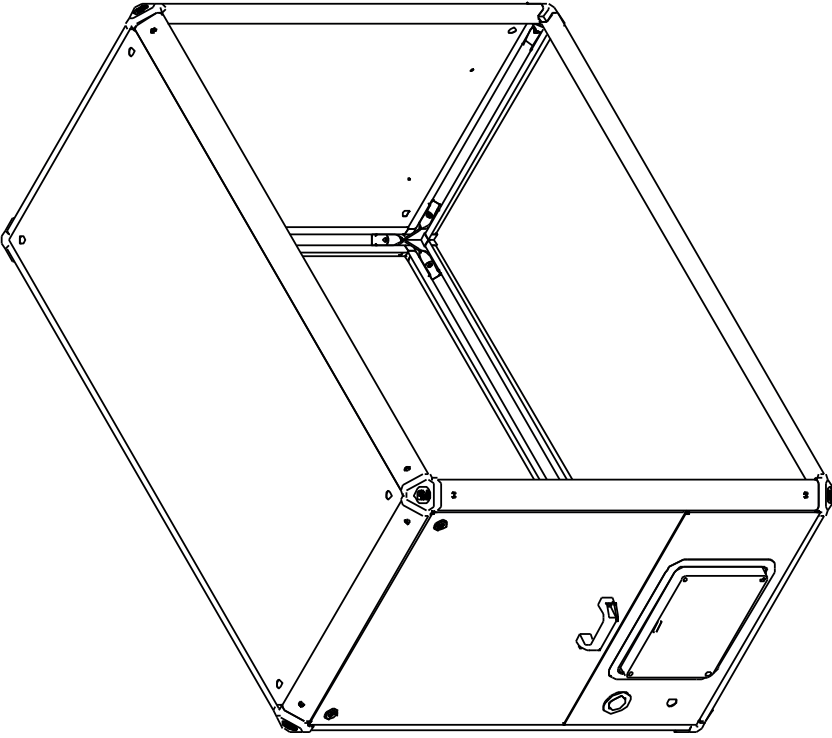
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

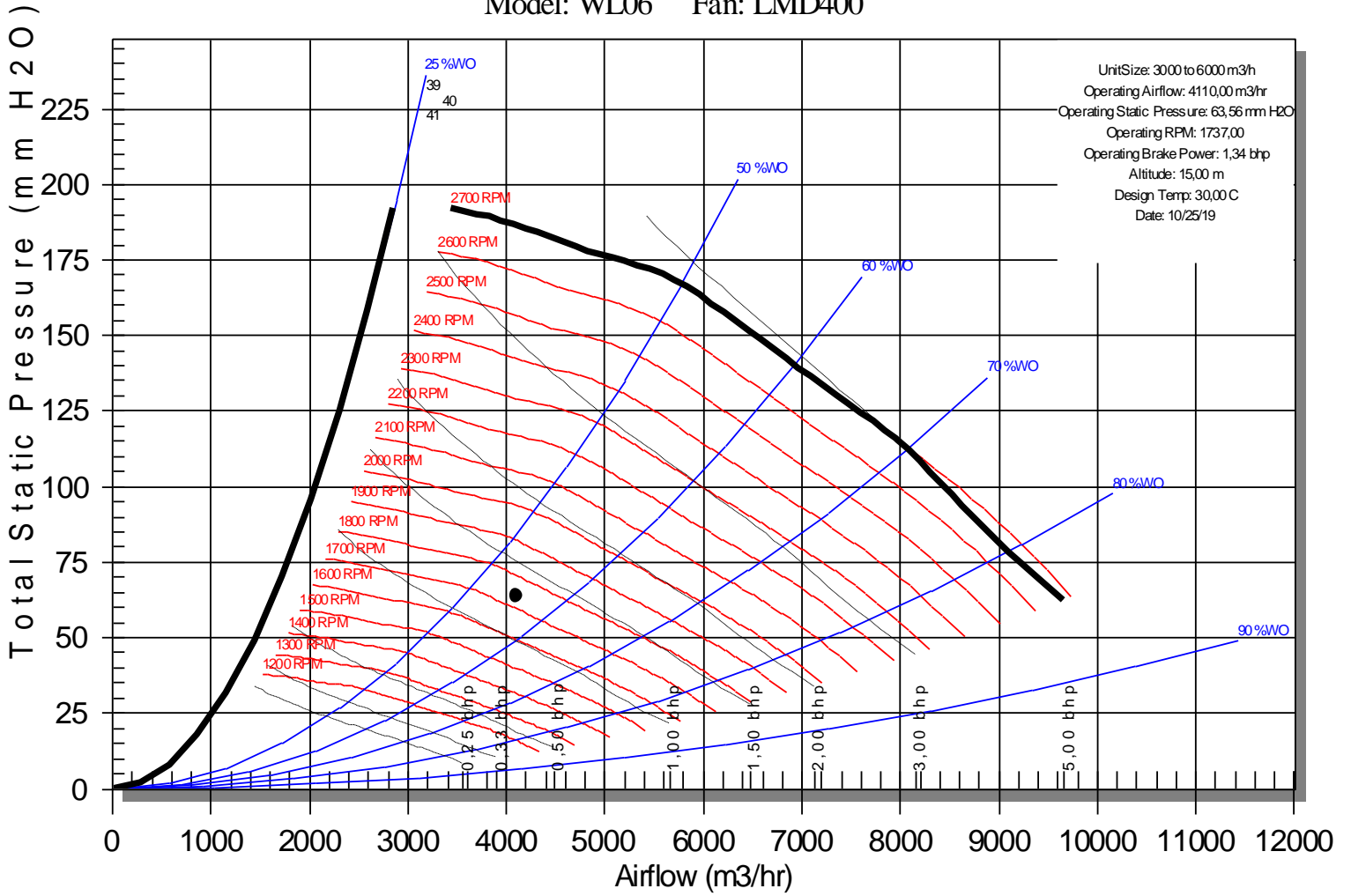
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-81A*

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-2P-81B*
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0B00A8BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,11 mm H2O
Mixing Box Air Pressure Drop	1,92 mm H2O	Filter Air Pressure Drop	7,30 mm H2O

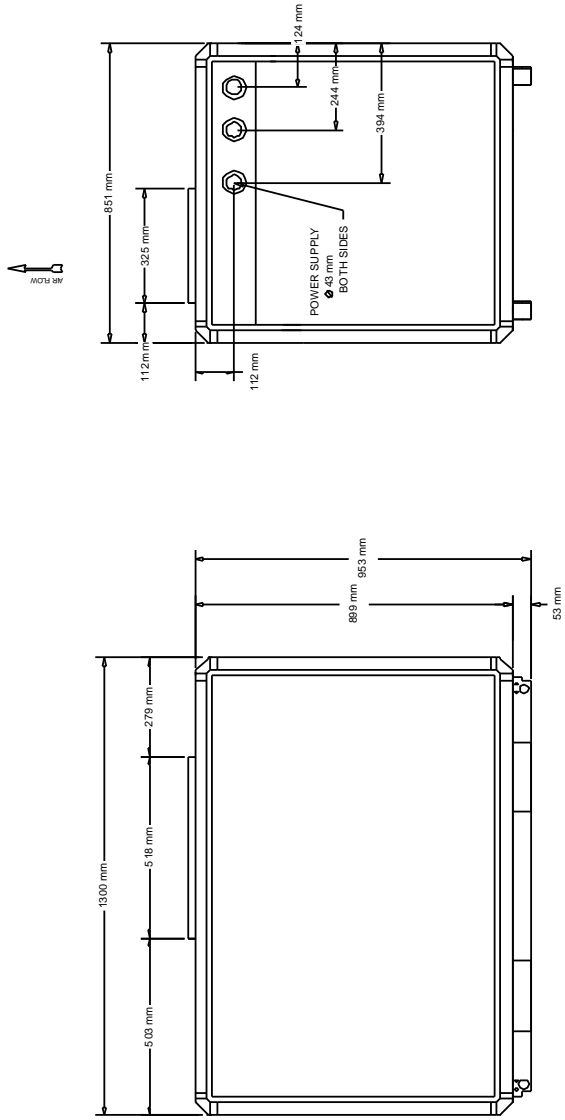
Coil			
Cooling Entering Dry Bulb	30,0 C	Cooling Entering Wet Bulb	22,0 C
Cooling Leaving Dry Bulb	9,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,11 m3/hr
Cooling Capacity	49,76 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4110,00 m3/hr	Sensible Capacity	28,98 kW
Cooling Leaving Wet Bulb	9,4 C	Cooling Water Volume	15,53 L
Cooling Water Velocity	1,2 m/s	Cooling Water Pressure Drop	3307,16 mm H2O
Cooling Air Pressure Drop	16,22 mm H2O	Cooling Coil Wet Weight	251 kg
Actual Cooling Face Velocity	2,1 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	63,56 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,34 bhp
Fan RPM	1737 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	8,4 m/s	Velocity Pressure	42,6 Pa

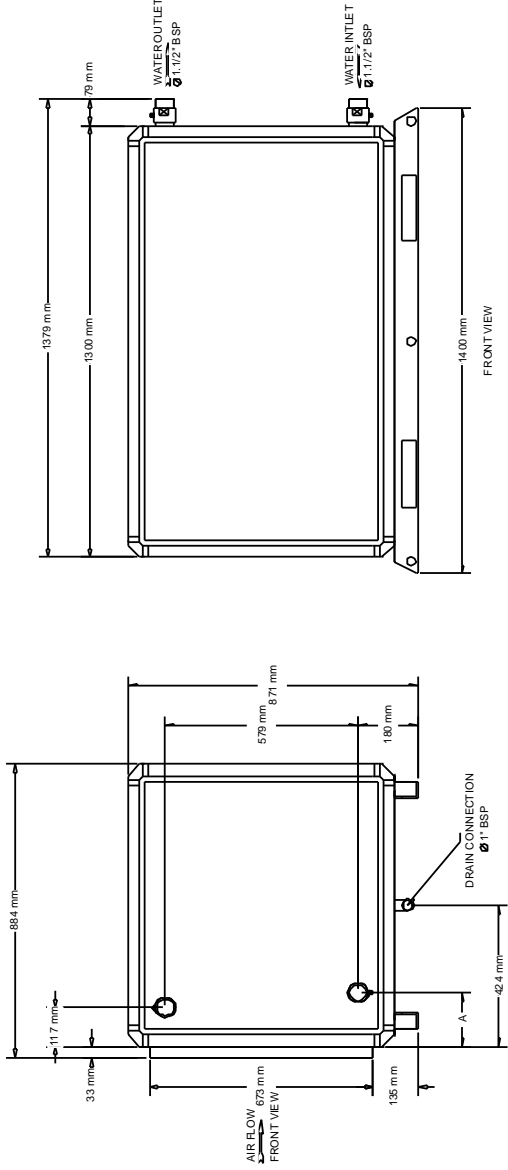
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

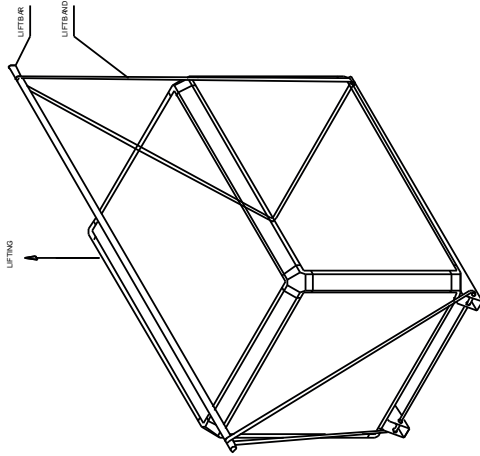


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

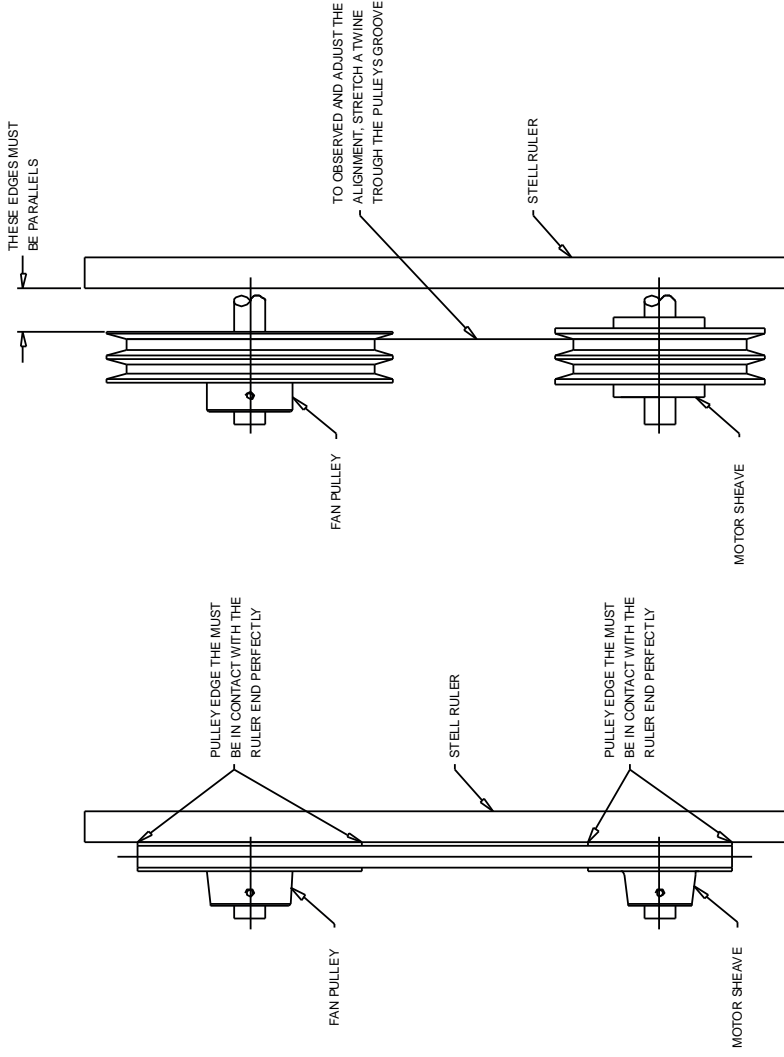


COIL SECTION
 RIGHT HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 06

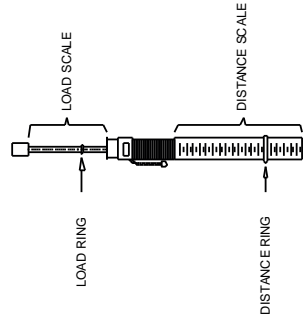
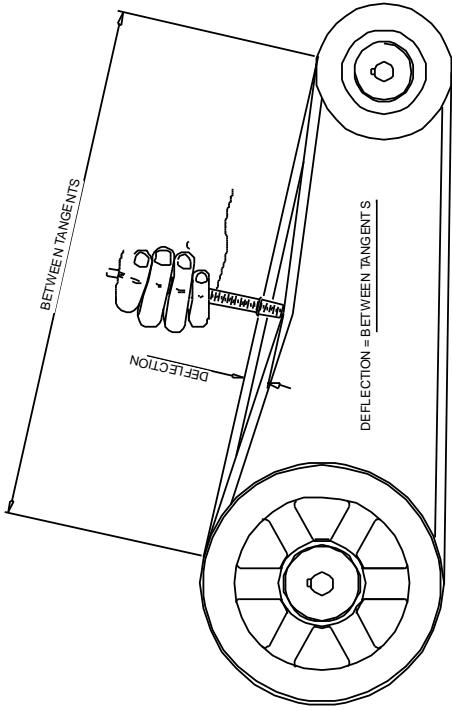
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



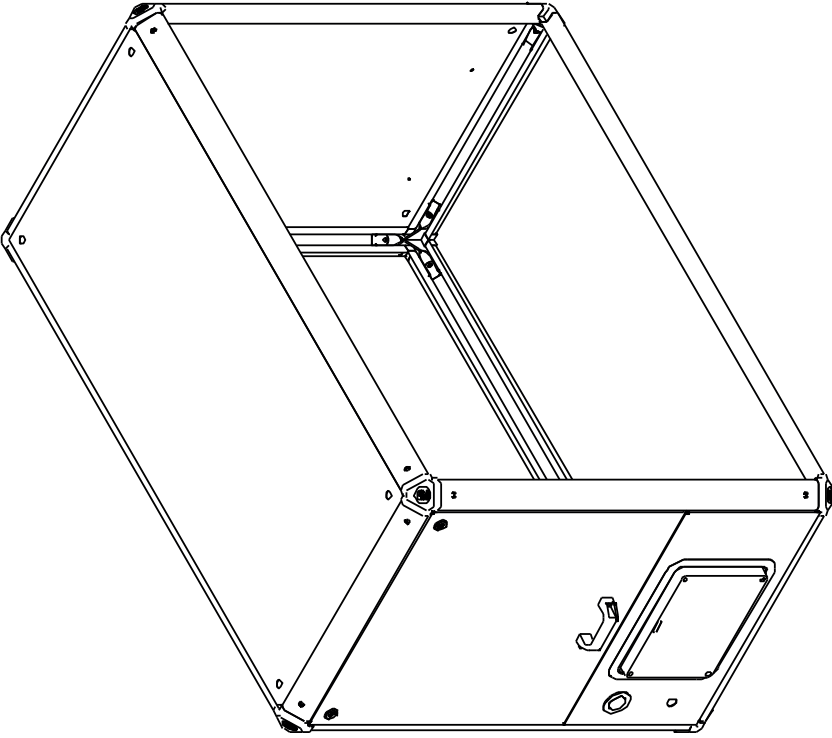
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

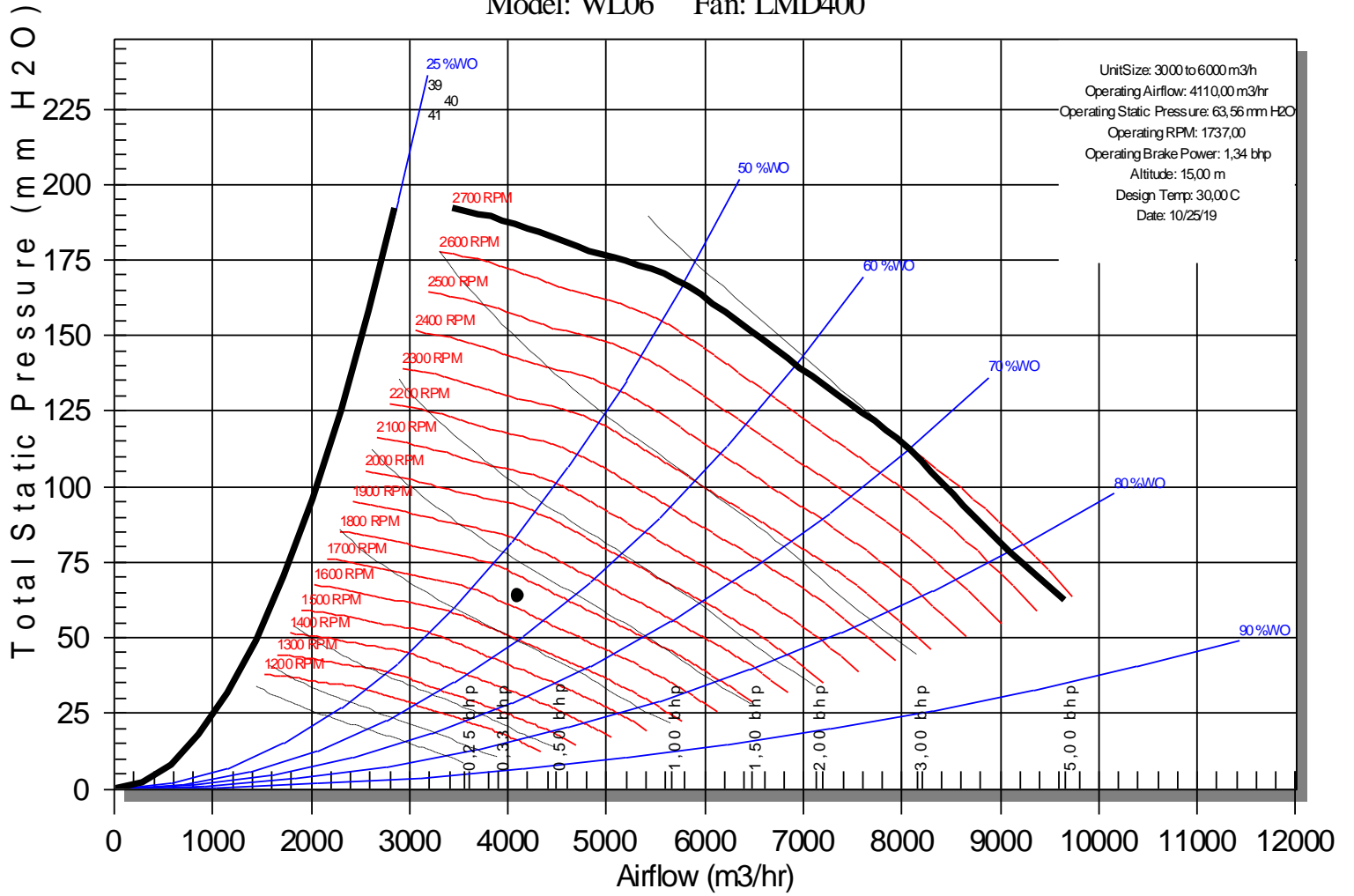
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-2P-81B*

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-01
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGADKTFG0 0Y00B6AWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	15,05 mm H2O
Mixing Box Air Pressure Drop	3,37 mm H2O	Filter Air Pressure Drop	32,60 mm H2O

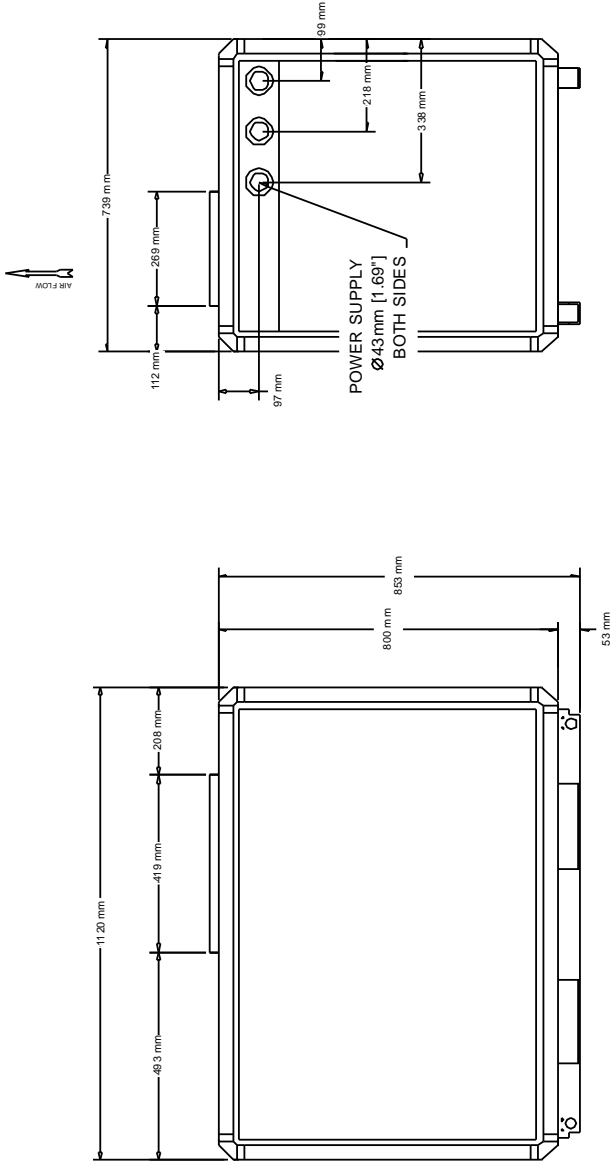
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	16,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,28 m3/hr
Cooling Capacity	50,90 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3720,00 m3/hr	Sensible Capacity	22,50 kW
Cooling Leaving Wet Bulb	16,4 C	Cooling Water Volume	10,99 L
Cooling Water Velocity	1,0 m/s	Cooling Water Pressure Drop	1388,57 mm H2O
Cooling Air Pressure Drop	19,45 mm H2O	Cooling Coil Wet Weight	160 kg
Actual Cooling Face Velocity	2,8 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	95,47 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,09 bhp
Fan RPM	3017 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	12,1 m/s	Velocity Pressure	88,0 Pa

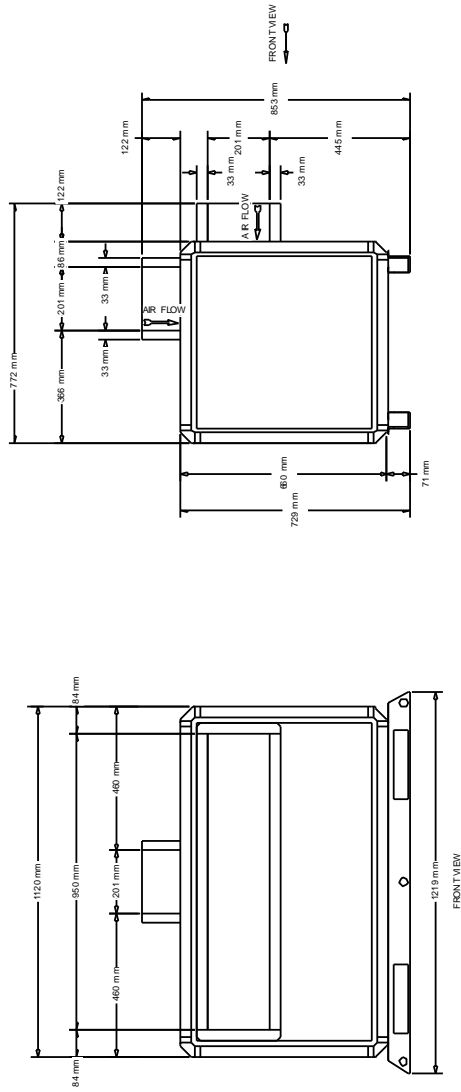
Humidifier	
Humidification	w/o Humidification / Not Applicable



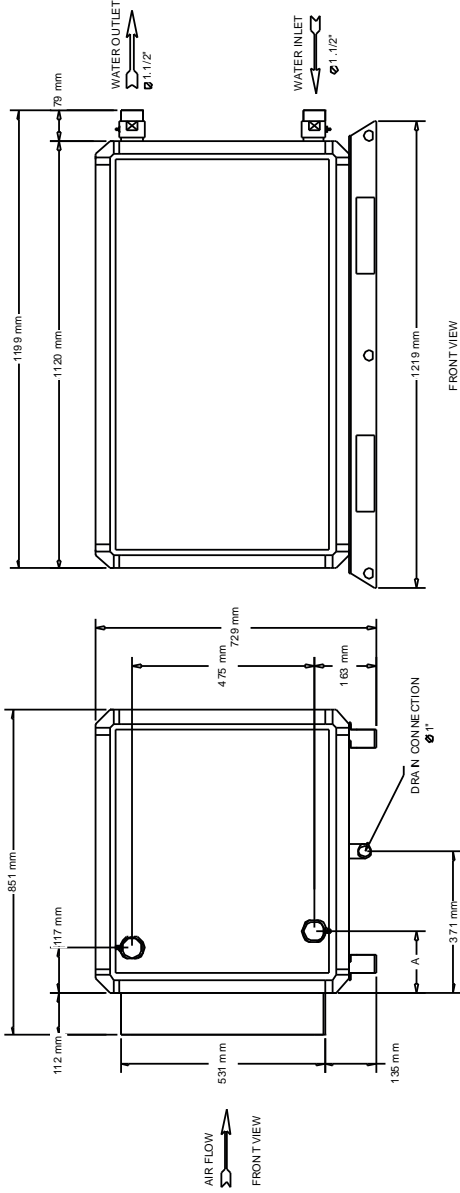
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

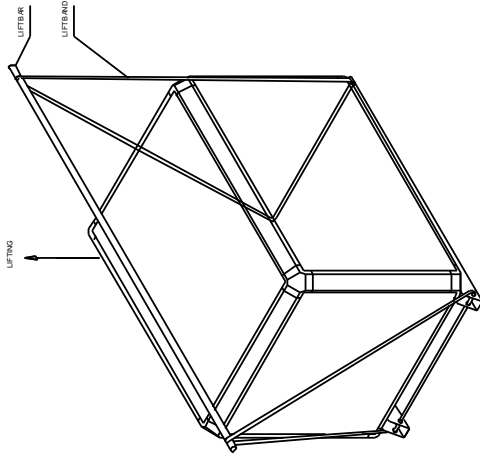


MIXER BOX SECTION
WAVE DOBLE 04

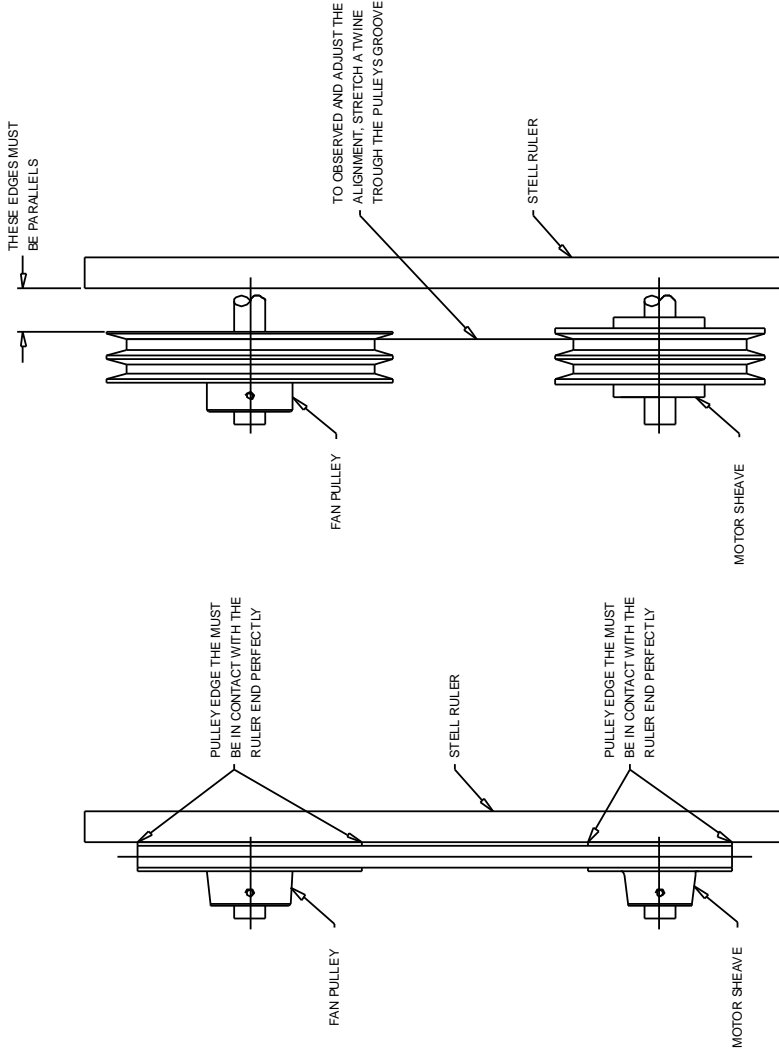


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 04

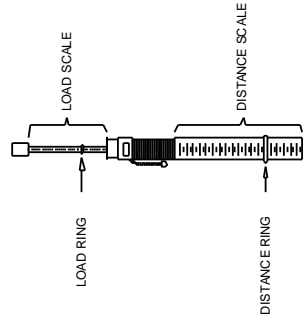
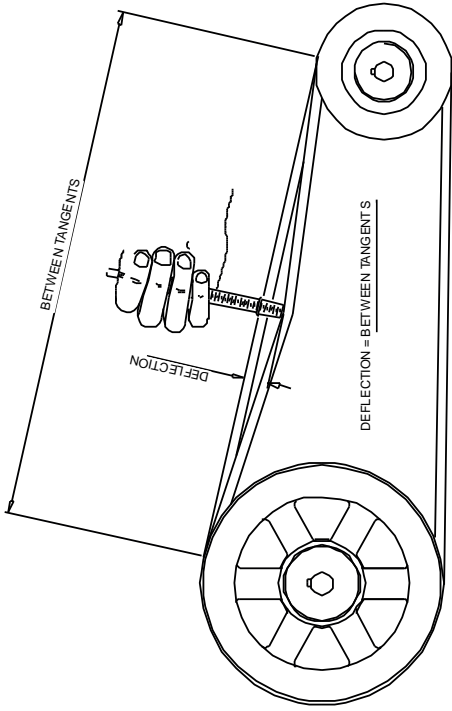
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



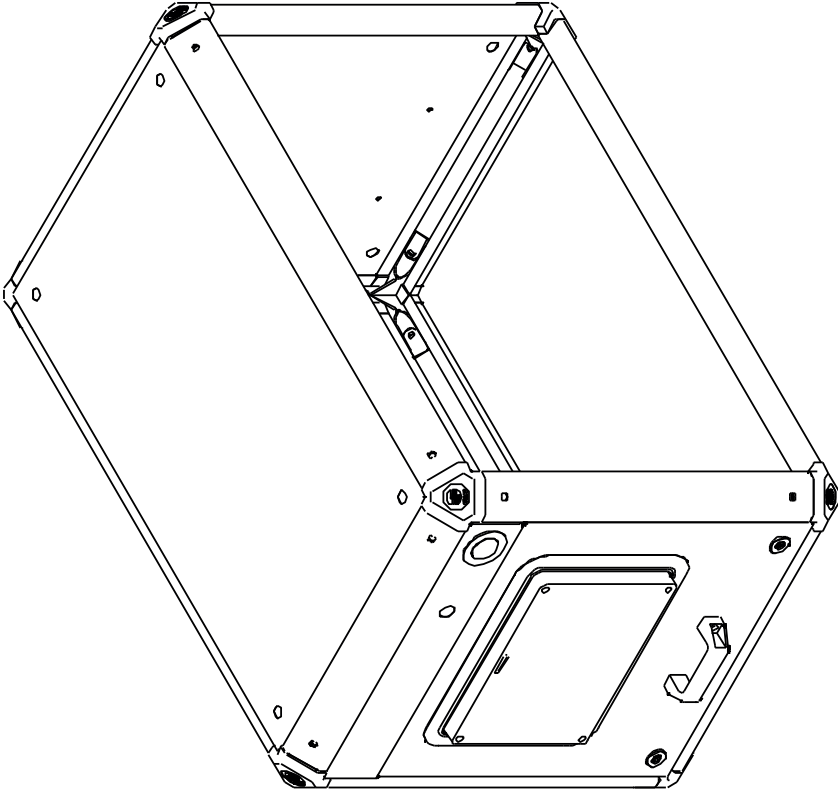
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

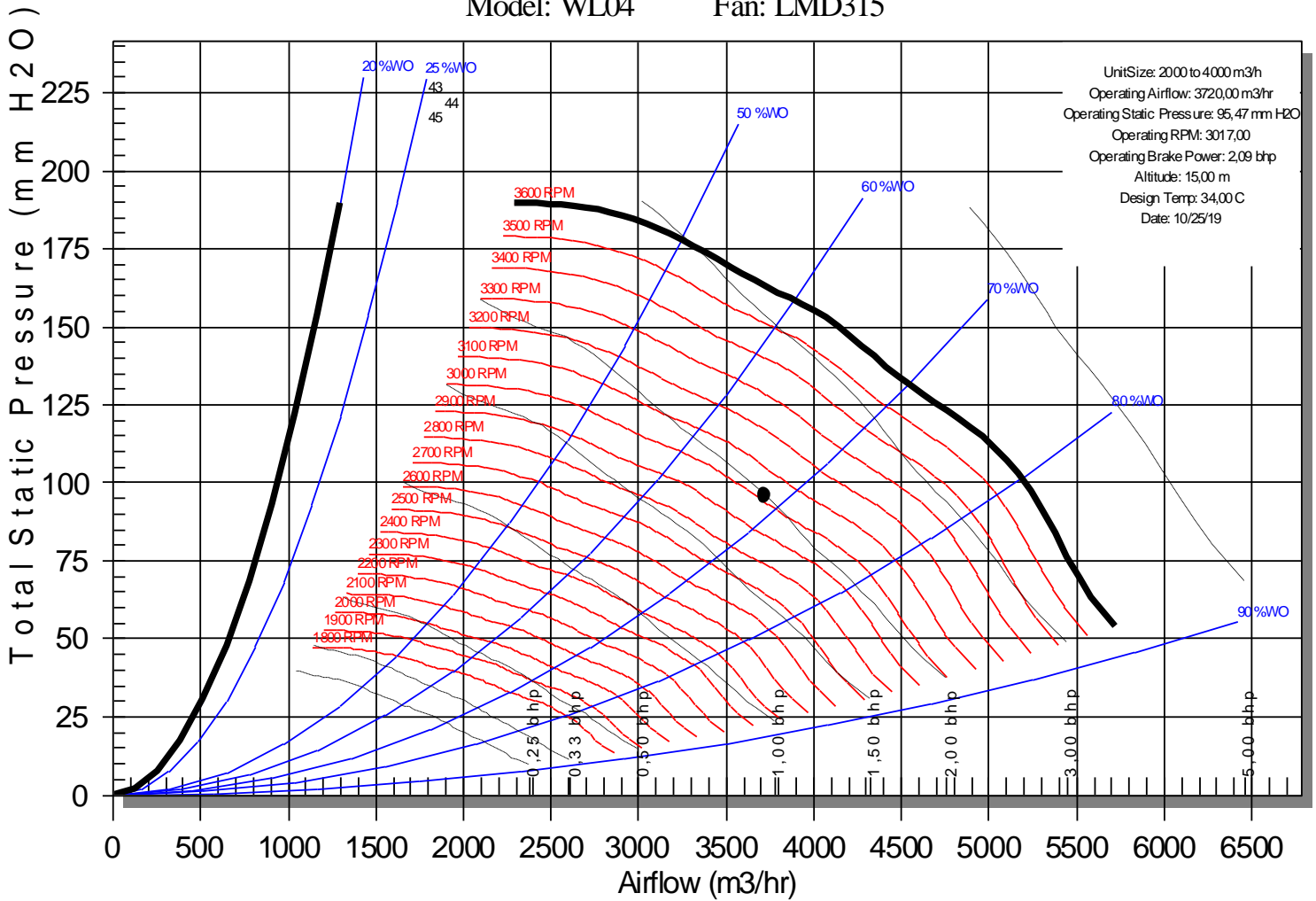
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-01

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-02
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGAEKTFG00 Y00B6AWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	14,57 mm H2O
Mixing Box Air Pressure Drop	3,28 mm H2O	Filter Air Pressure Drop	31,66 mm H2O

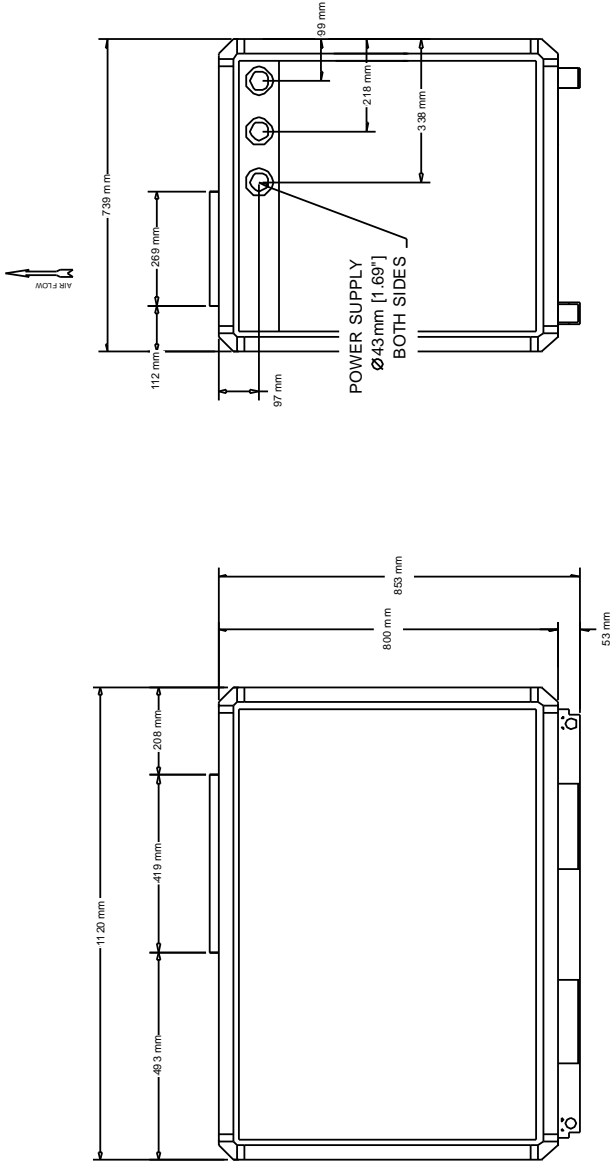
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	16,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,21 m3/hr
Cooling Capacity	50,45 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3670,00 m3/hr	Sensible Capacity	22,29 kW
Cooling Leaving Wet Bulb	16,4 C	Cooling Water Volume	10,99 L
Cooling Water Velocity	1,0 m/s	Cooling Water Pressure Drop	1366,29 mm H2O
Cooling Air Pressure Drop	19,08 mm H2O	Cooling Coil Wet Weight	160 kg
Actual Cooling Face Velocity	2,7 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	93,59 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,01 bhp
Fan RPM	2981 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	11,9 m/s	Velocity Pressure	85,6 Pa

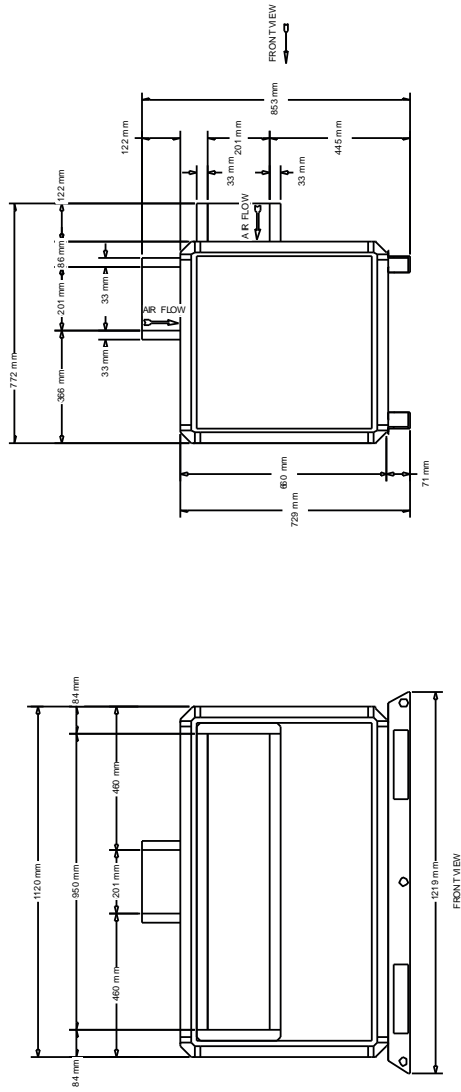
Humidifier	
Humidification	w/o Humidification / Not Applicable



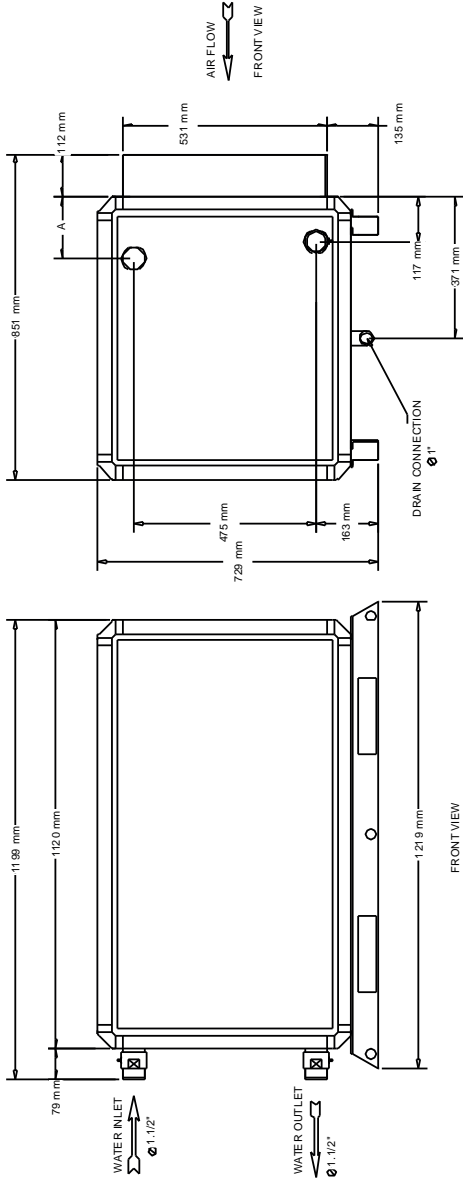
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

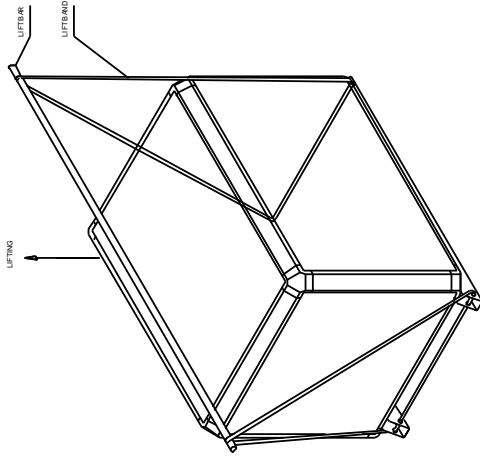


MIXER BOX SECTION
WAVE DOBLE 04

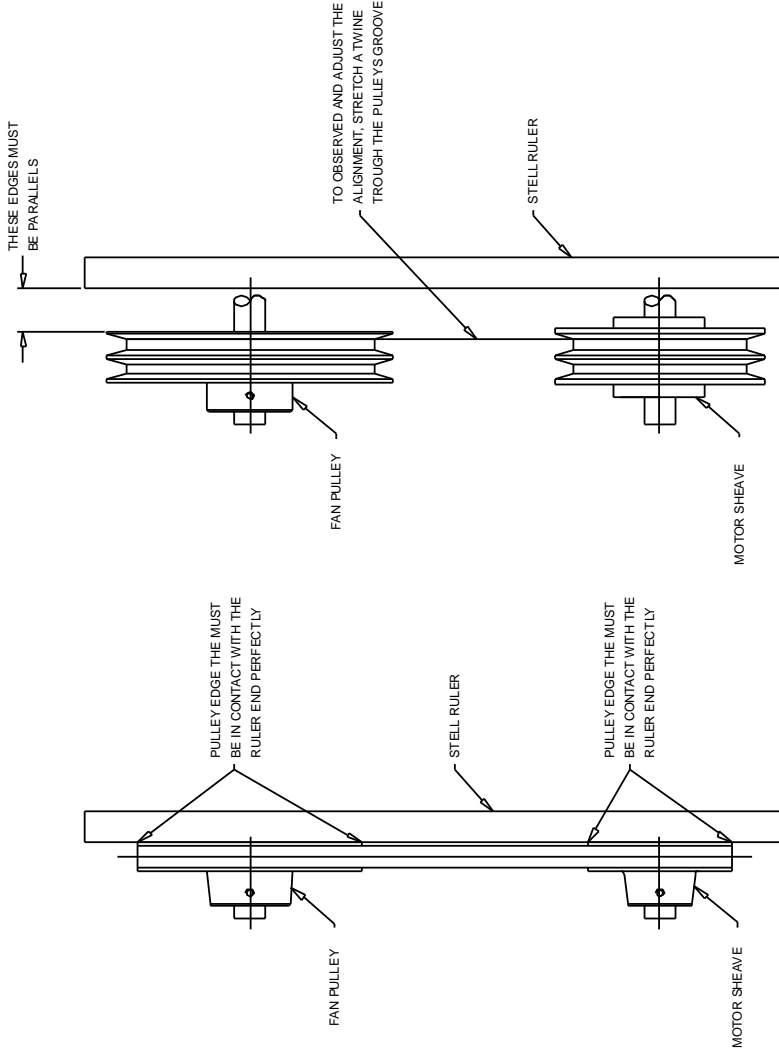


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 04

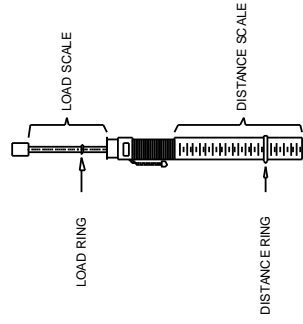
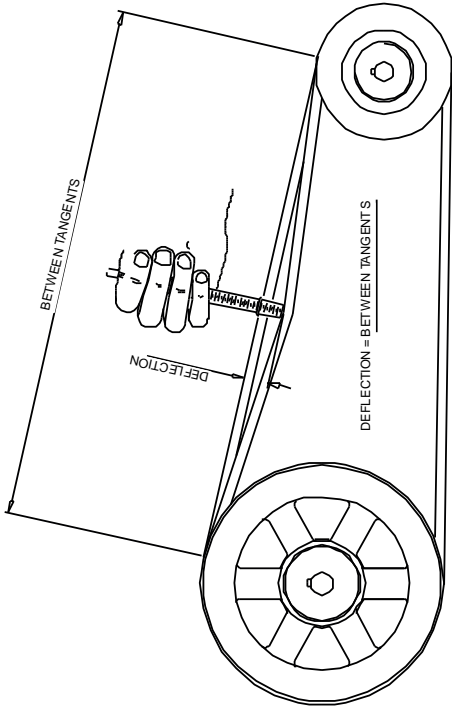
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



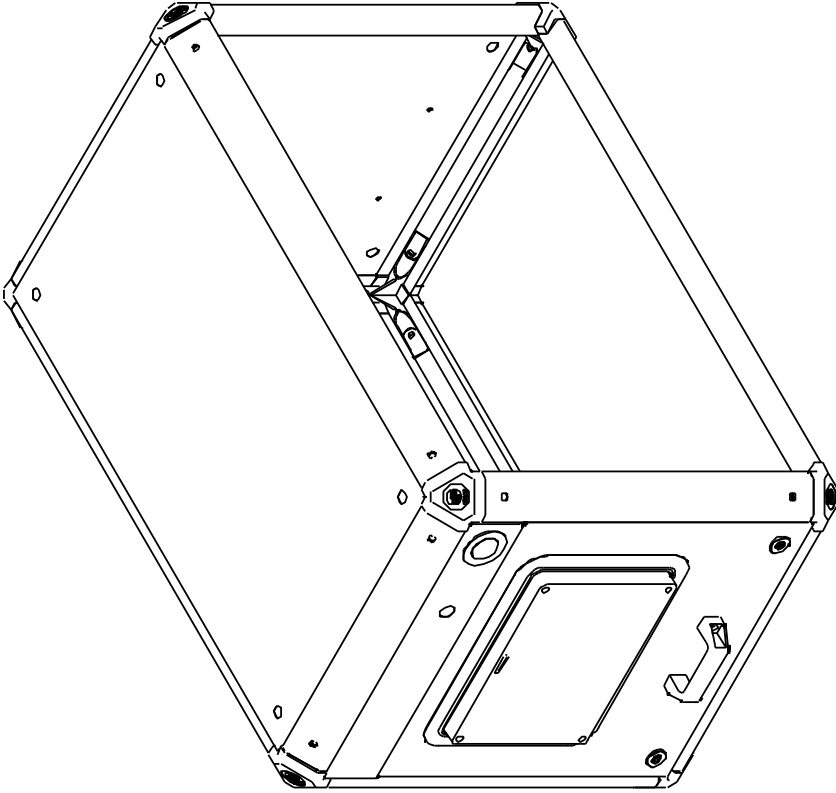
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

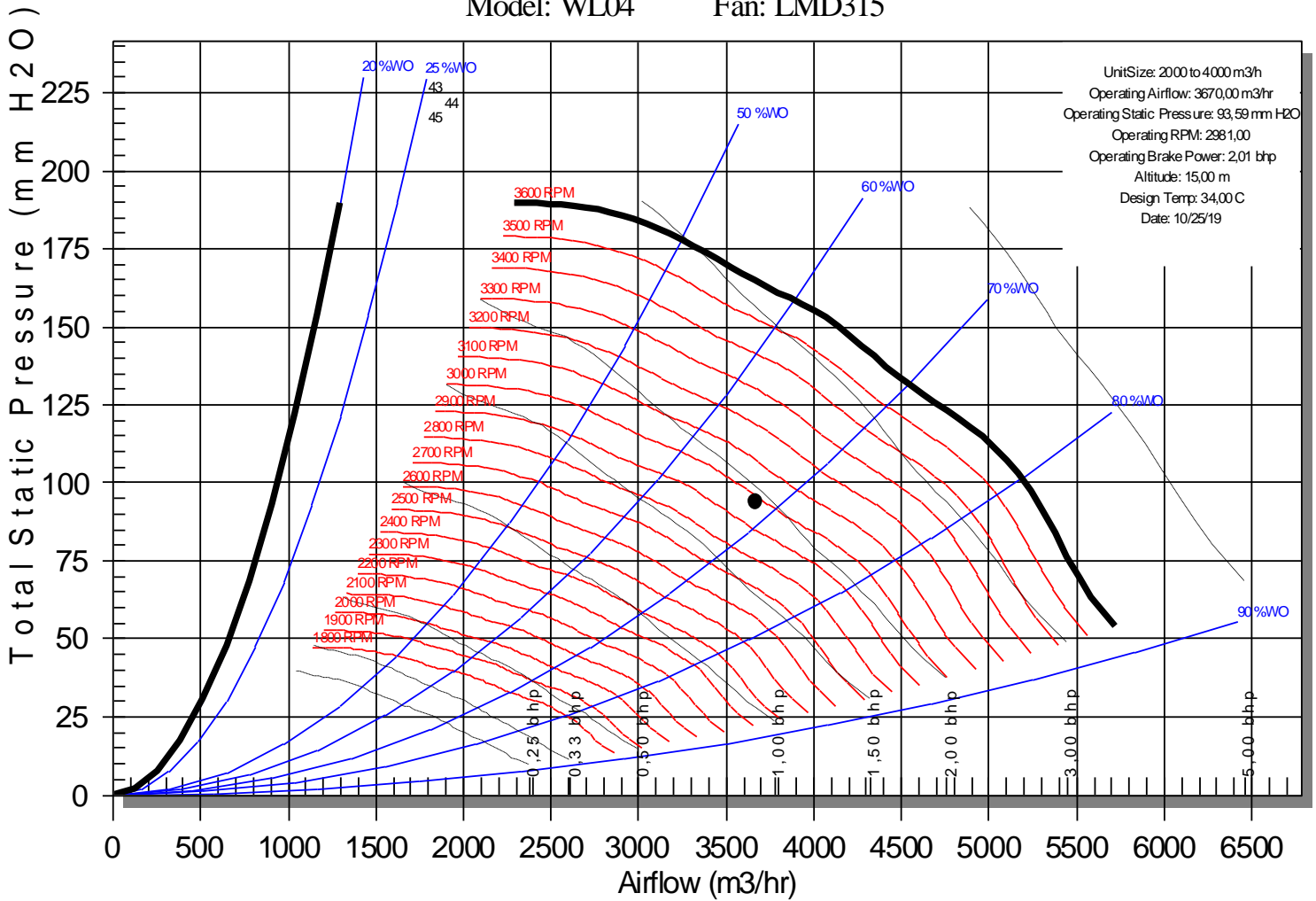
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-02

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-03
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00A6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,16 mm H2O
Mixing Box Air Pressure Drop	1,68 mm H2O	Filter Air Pressure Drop	16,17 mm H2O

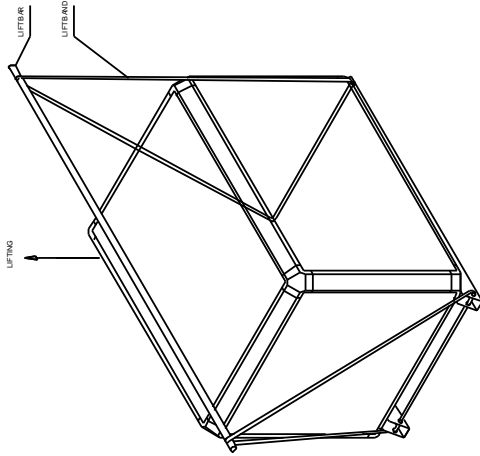
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	11,8 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	9,89 m3/hr
Cooling Capacity	69,21 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3870,00 m3/hr	Sensible Capacity	29,94 kW
Cooling Leaving Wet Bulb	11,7 C	Cooling Water Volume	12,39 L
Cooling Water Velocity	1,7 m/s	Cooling Water Pressure Drop	4847,79 mm H2O
Cooling Air Pressure Drop	11,08 mm H2O	Cooling Coil Wet Weight	192 kg
Actual Cooling Face Velocity	2,0 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	61,09 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,21 bhp
Fan RPM	1693 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	7,9 m/s	Velocity Pressure	37,8 Pa

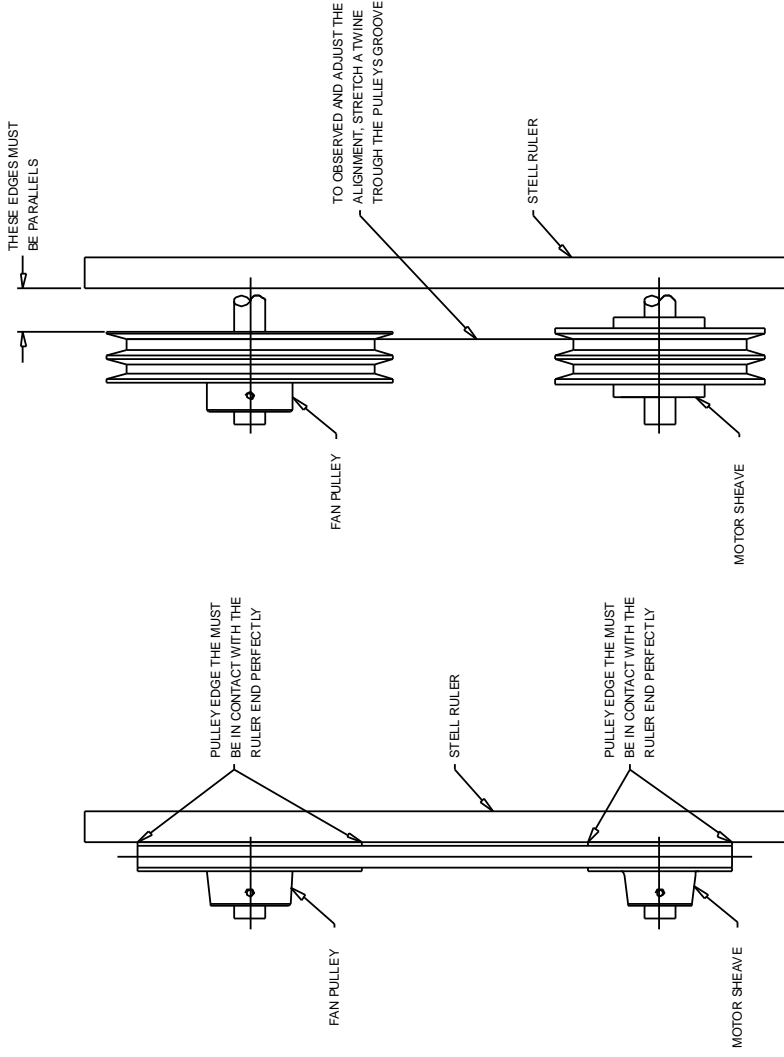
Humidifier	
Humidification	w/o Humidification / Not Applicable



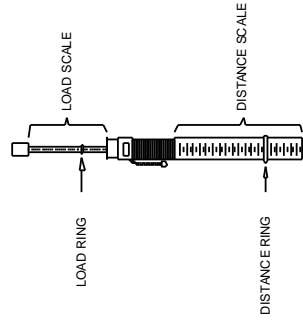
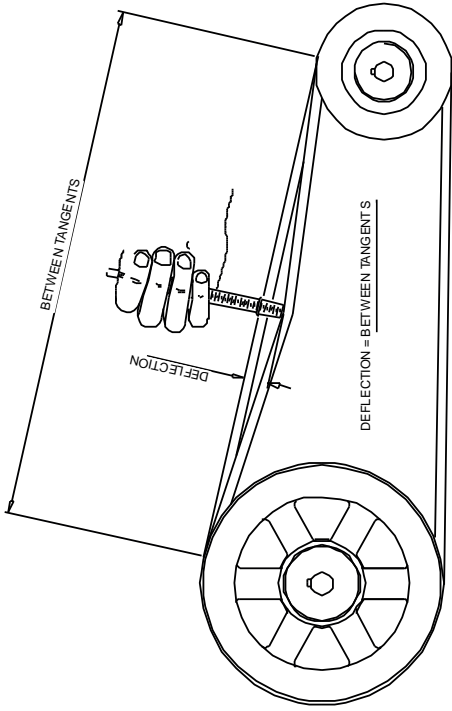
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



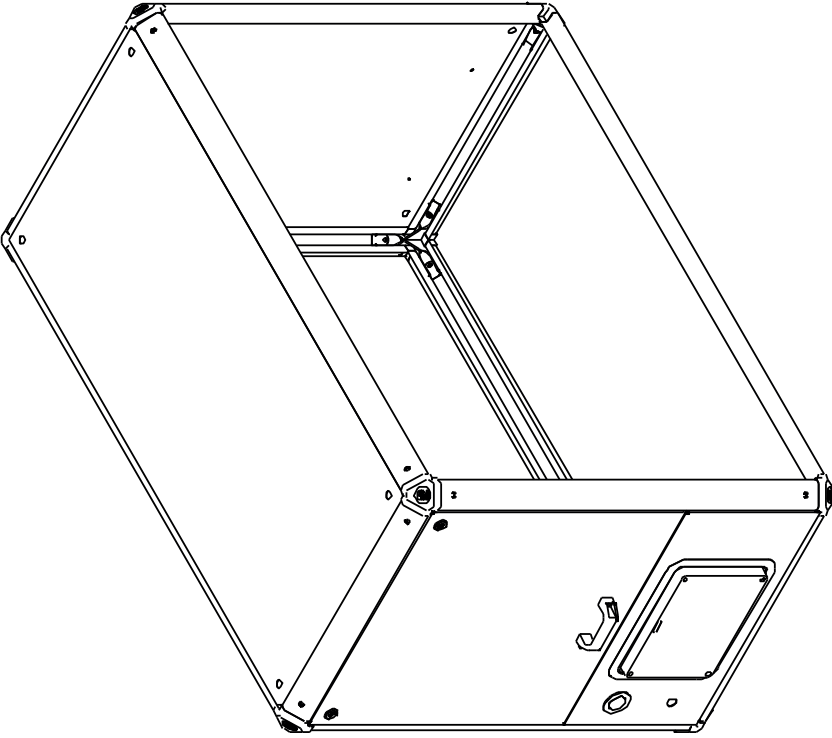
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

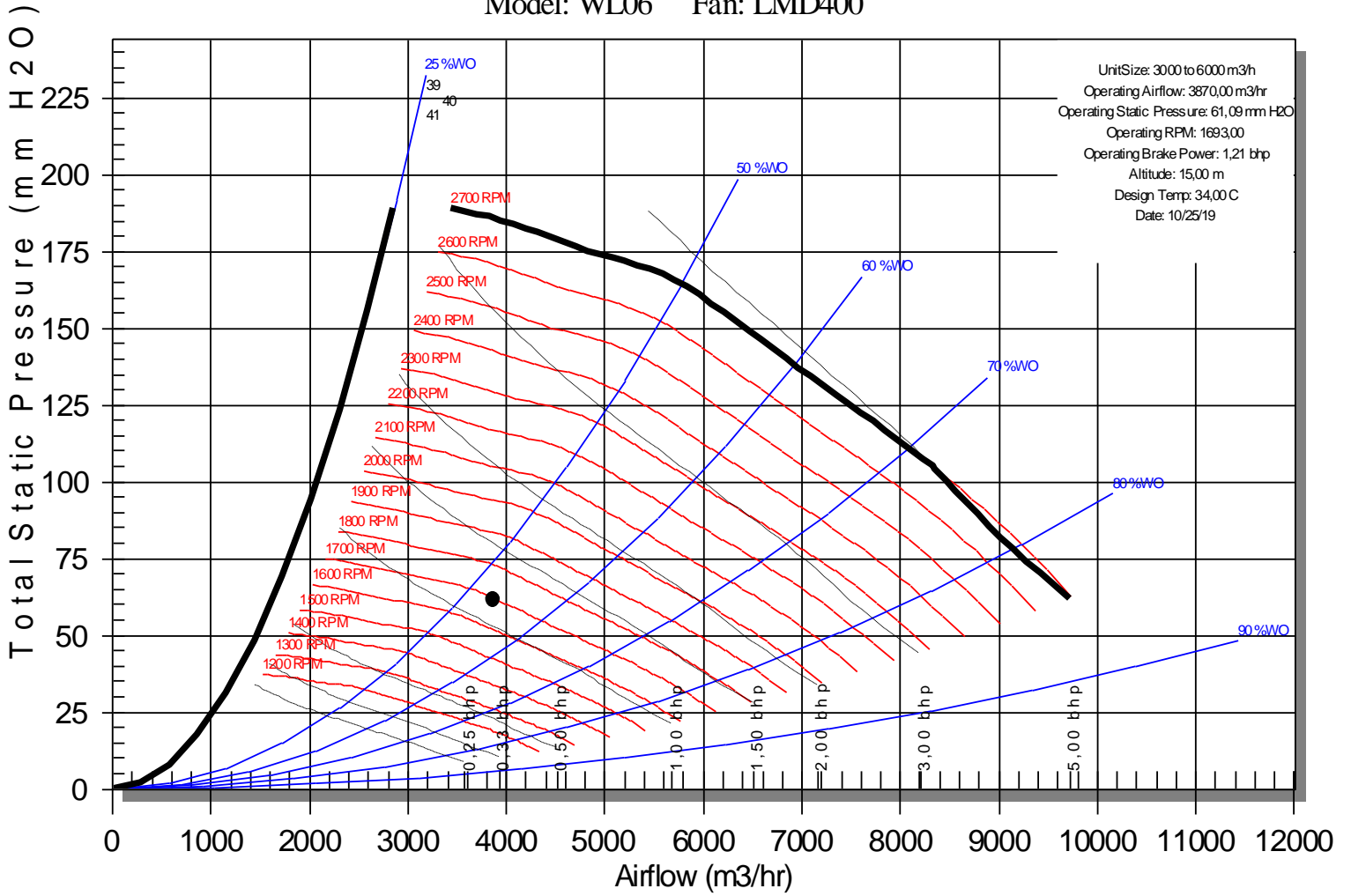
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-03

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-04
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGAEKTFG00 Y00B6AWBA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	14,57 mm H2O
Mixing Box Air Pressure Drop	3,28 mm H2O	Filter Air Pressure Drop	31,66 mm H2O

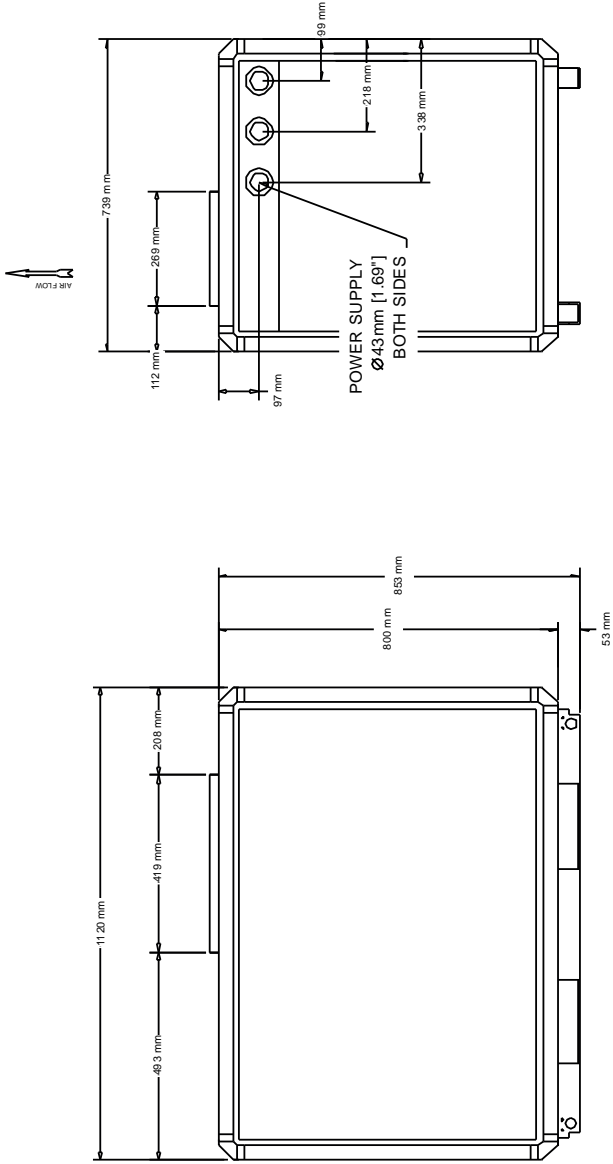
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	16,6 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	7,21 m3/hr
Cooling Capacity	50,45 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3670,00 m3/hr	Sensible Capacity	22,29 kW
Cooling Leaving Wet Bulb	16,4 C	Cooling Water Volume	10,99 L
Cooling Water Velocity	1,0 m/s	Cooling Water Pressure Drop	1366,29 mm H2O
Cooling Air Pressure Drop	19,08 mm H2O	Cooling Coil Wet Weight	160 kg
Actual Cooling Face Velocity	2,7 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	93,59 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,01 bhp
Fan RPM	2981 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	11,9 m/s	Velocity Pressure	85,6 Pa

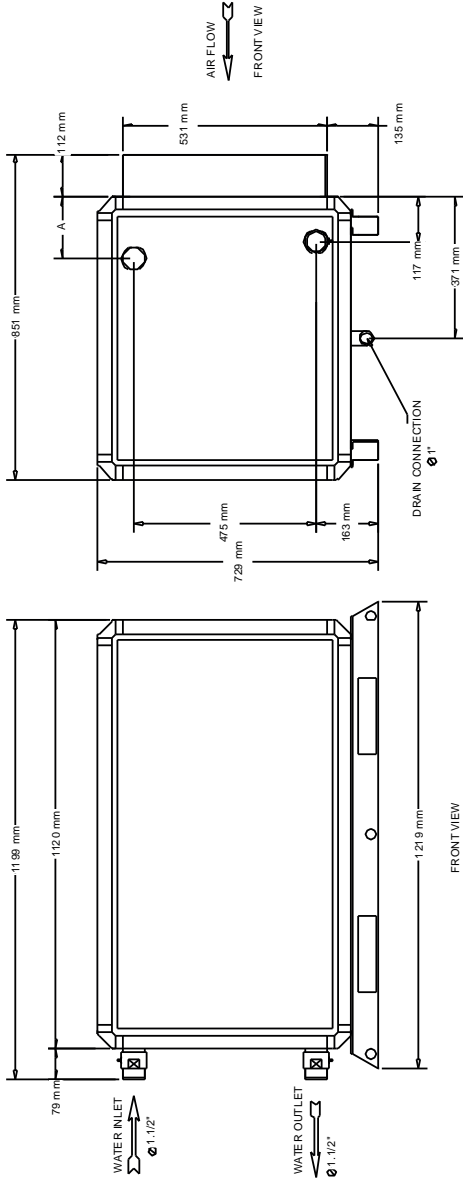
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

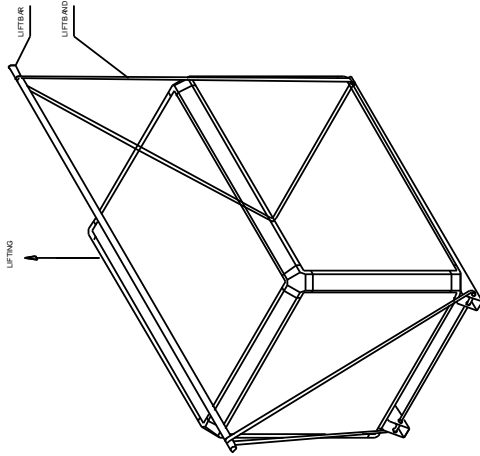


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

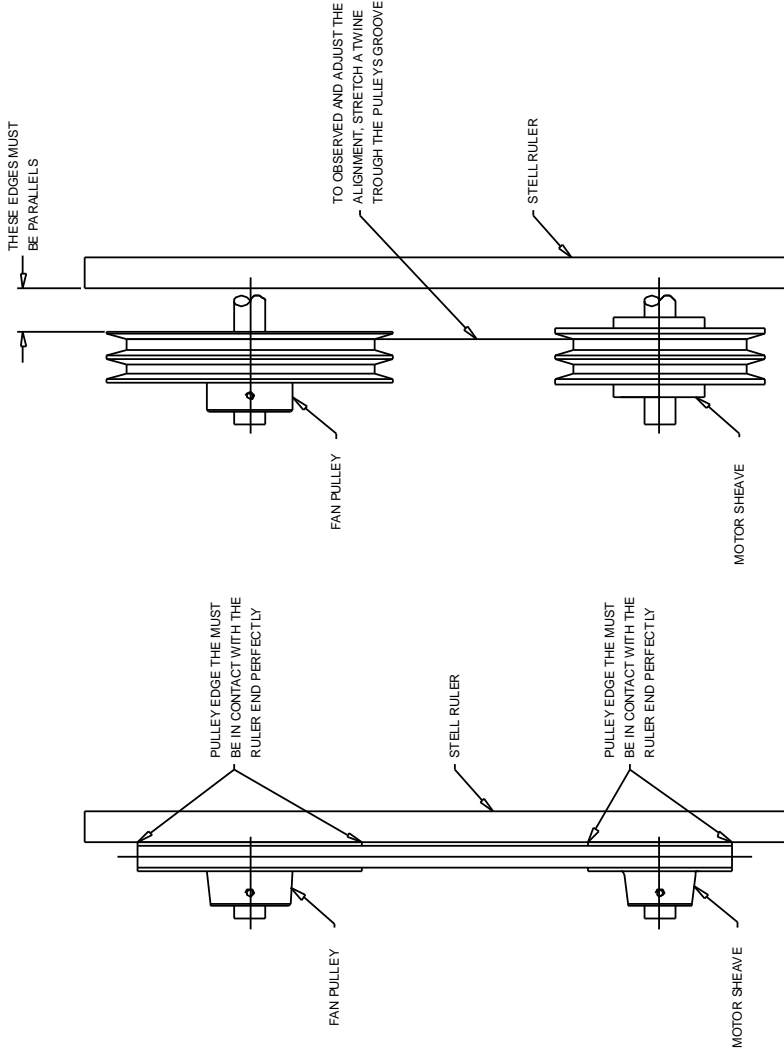


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 04

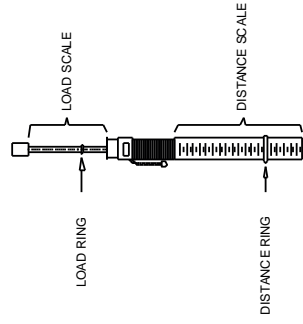
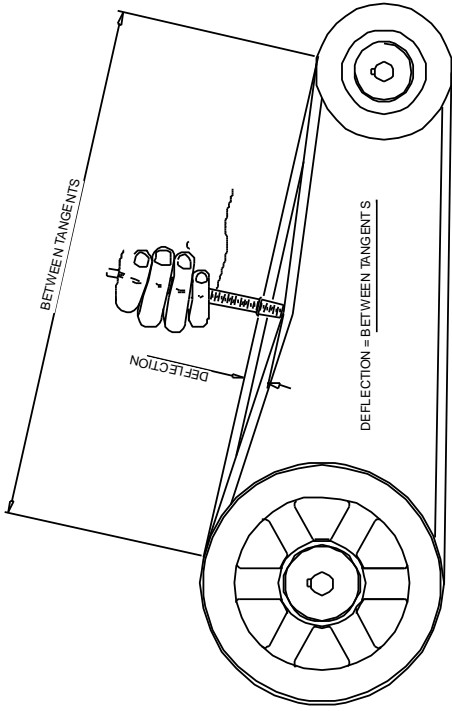
ROWS	A
3	172 mm
4	200 mm
6	255 mm
8	310 mm



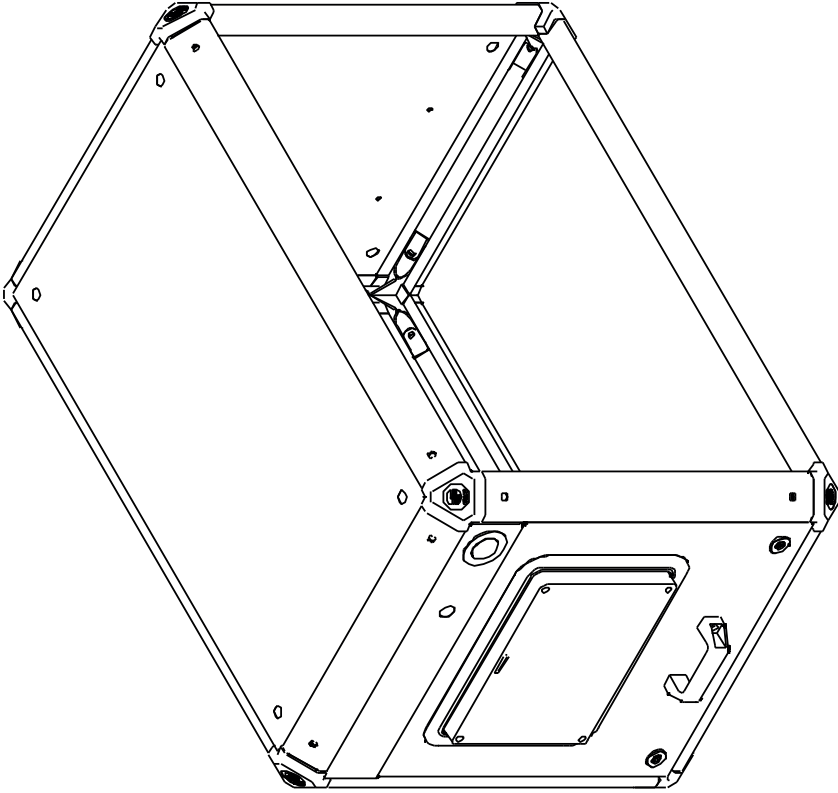
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

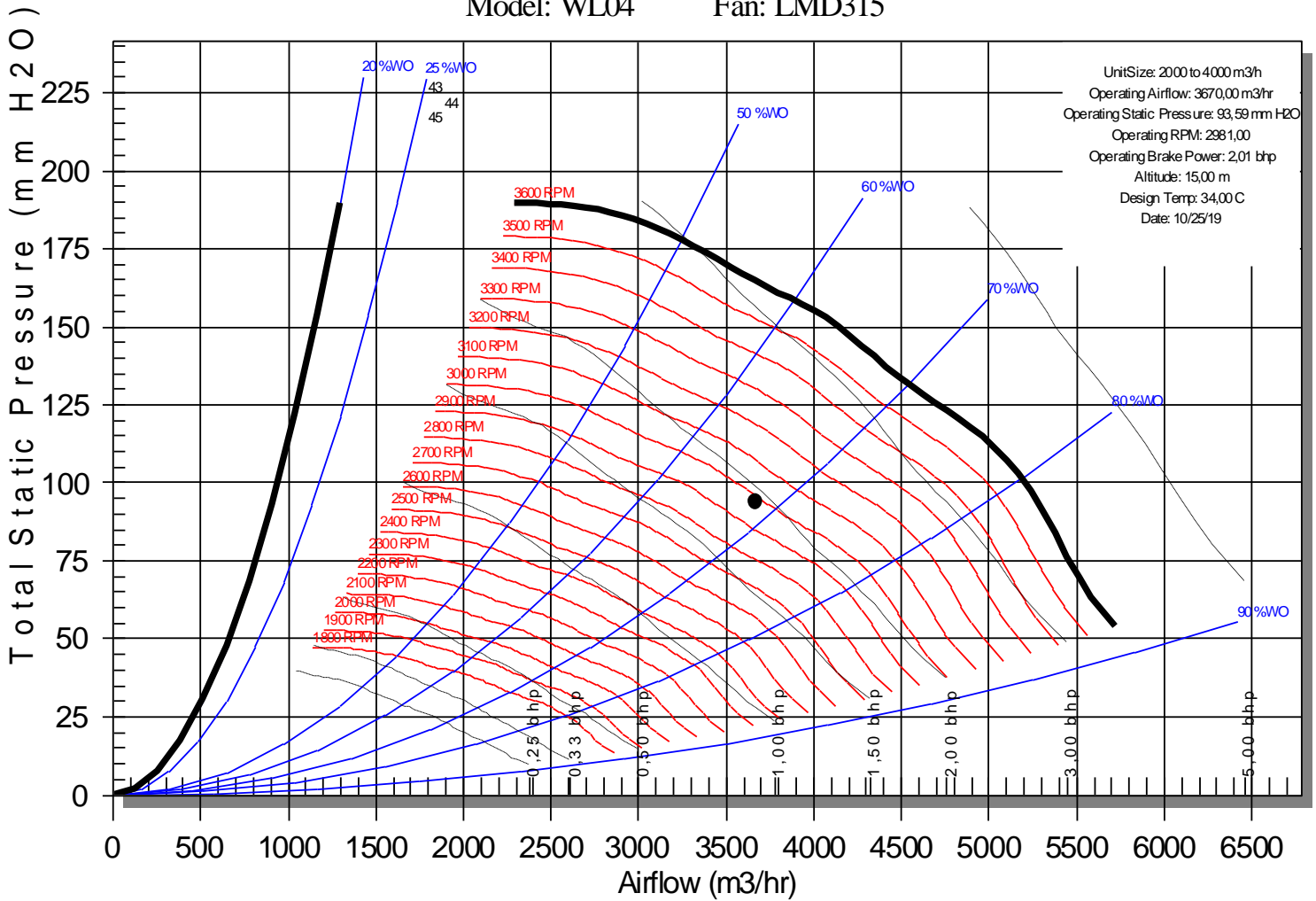
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-04

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-05
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA06AGADKTED0 0Y00A6BWBA000110 003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	3000 to 6000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	7,16 mm H2O
Mixing Box Air Pressure Drop	1,68 mm H2O	Filter Air Pressure Drop	16,17 mm H2O

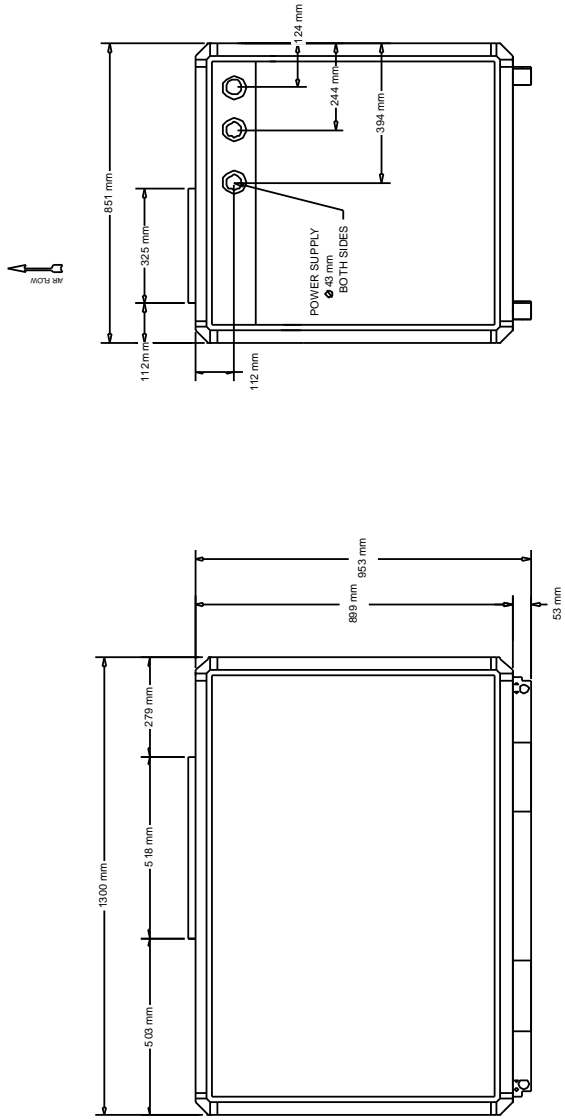
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	11,8 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	9,89 m3/hr
Cooling Capacity	69,21 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3870,00 m3/hr	Sensible Capacity	29,94 kW
Cooling Leaving Wet Bulb	11,7 C	Cooling Water Volume	12,39 L
Cooling Water Velocity	1,7 m/s	Cooling Water Pressure Drop	4847,79 mm H2O
Cooling Air Pressure Drop	11,08 mm H2O	Cooling Coil Wet Weight	192 kg
Actual Cooling Face Velocity	2,0 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	61,09 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,21 bhp
Fan RPM	1693 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	7,9 m/s	Velocity Pressure	37,8 Pa

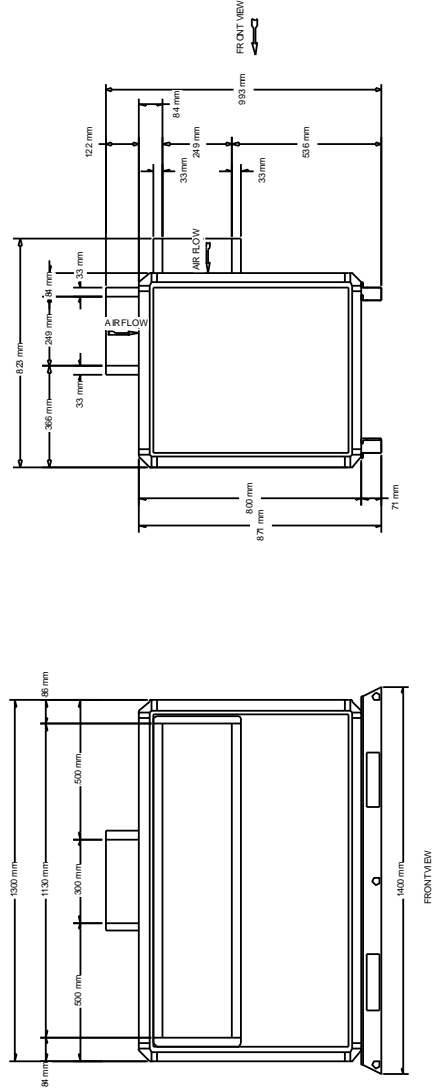
Humidifier	
Humidification	w/o Humidification / Not Applicable



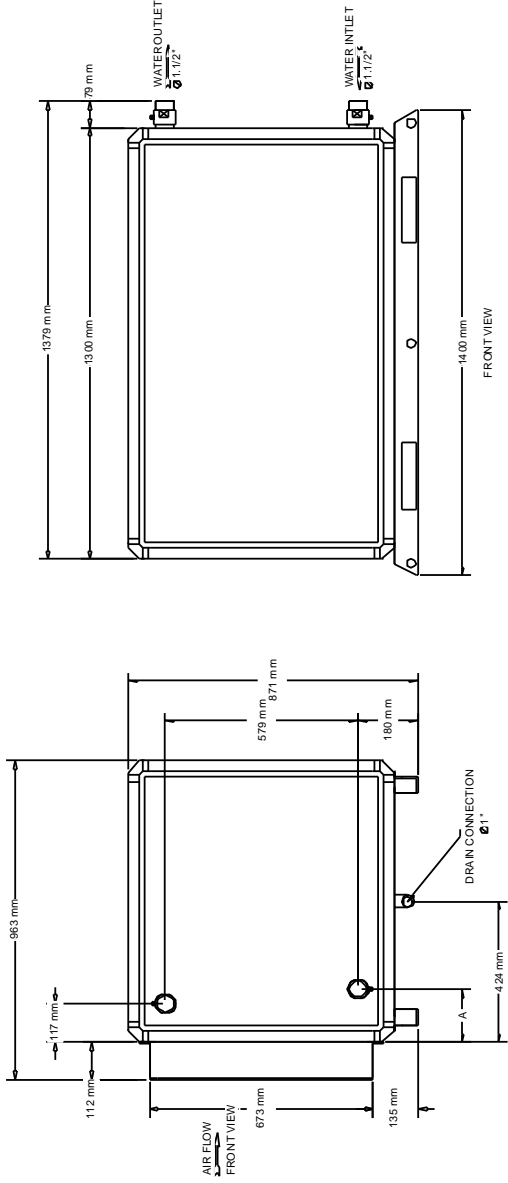
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		



FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 06

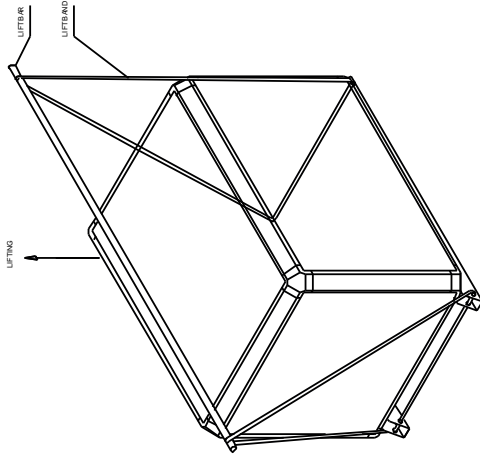


MIXER BOX SECTION
WAVE DOBLE 06

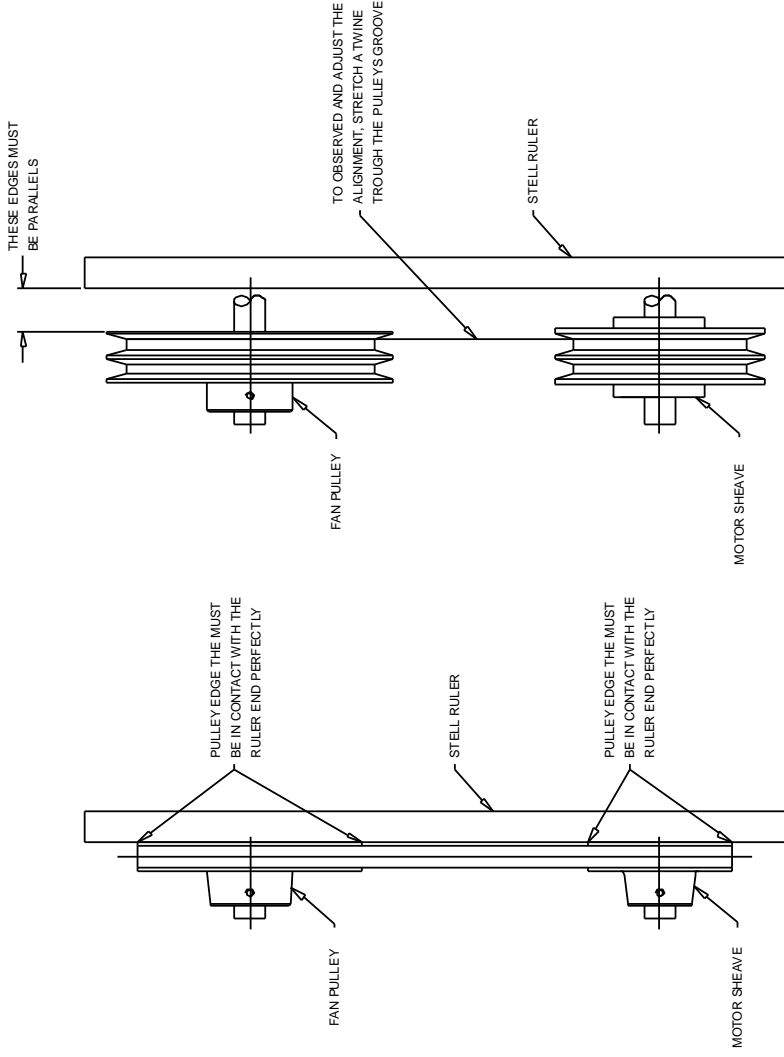


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 06

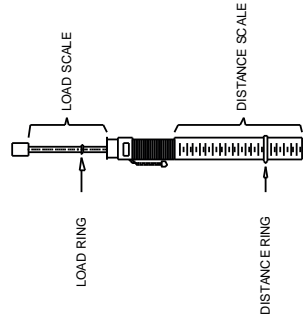
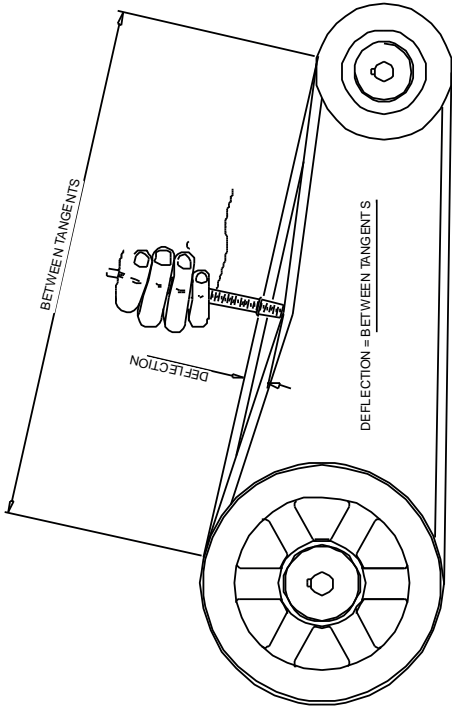
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



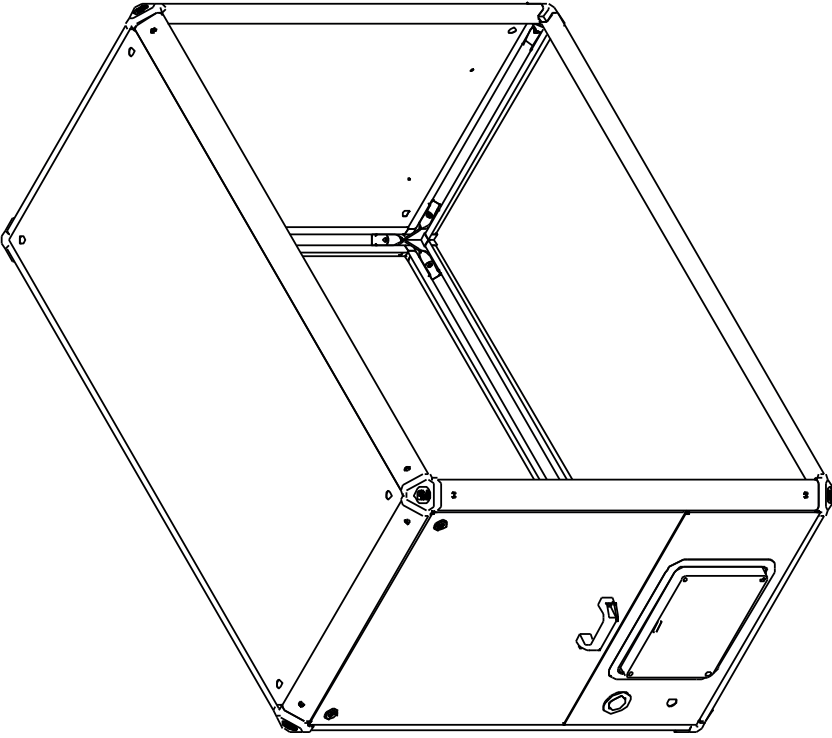
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

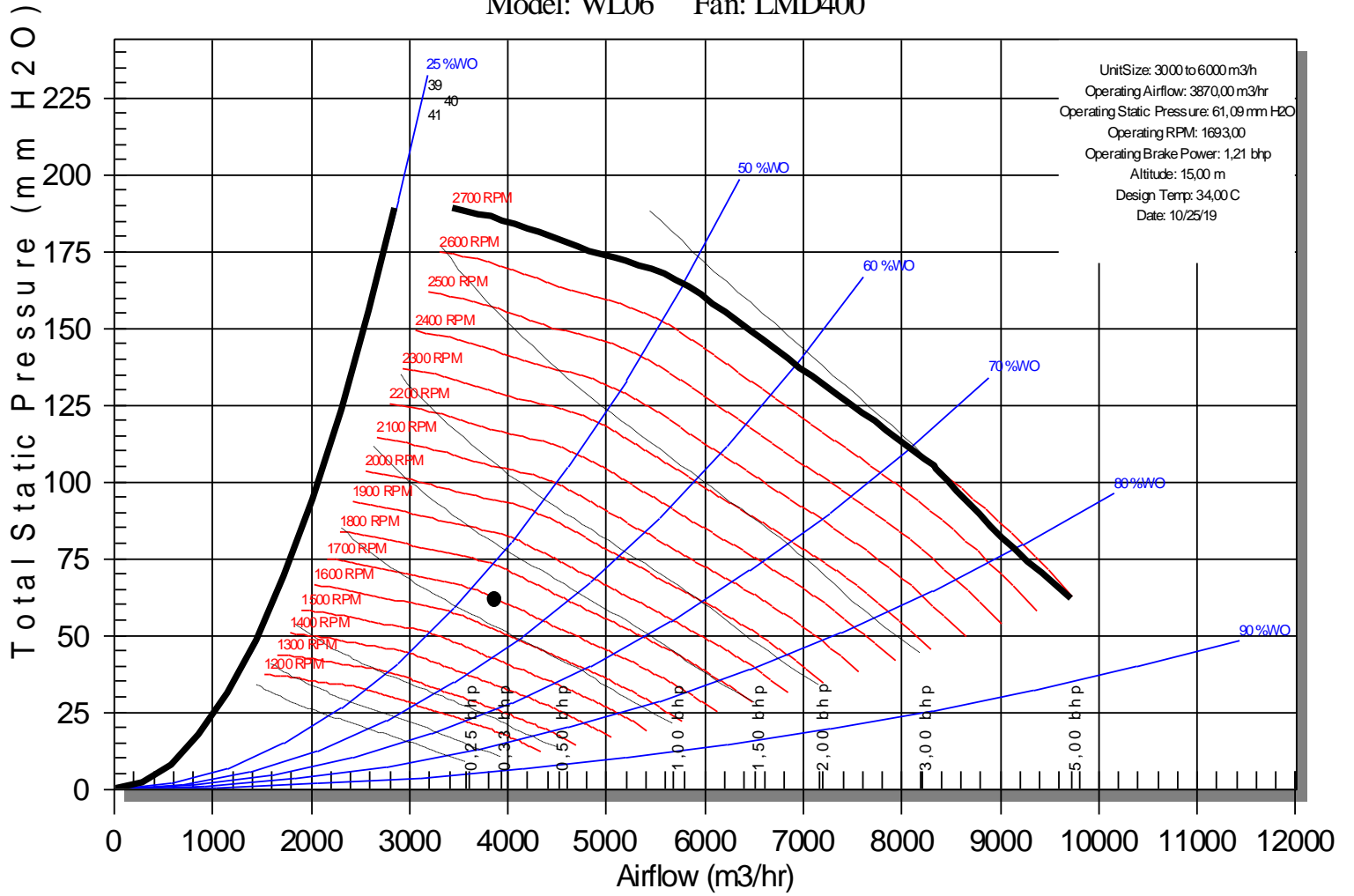
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-05

Model: WL06 Fan: LMD400





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-3P-06
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGAEKTFG00 Y00A6WBWA0001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	16,53 mm H2O
Mixing Box Air Pressure Drop	3,64 mm H2O	Filter Air Pressure Drop	35,52 mm H2O

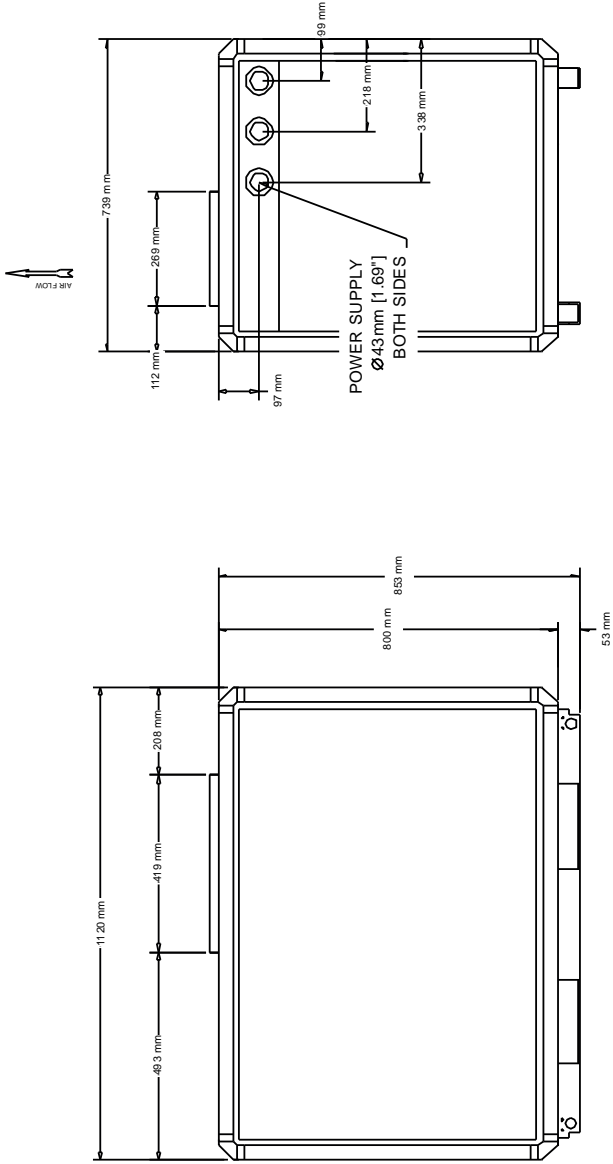
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	14,2 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	8,76 m3/hr
Cooling Capacity	61,29 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	3870,00 m3/hr	Sensible Capacity	26,65 kW
Cooling Leaving Wet Bulb	14,1 C	Cooling Water Volume	8,04 L
Cooling Water Velocity	1,8 m/s	Cooling Water Pressure Drop	4537,01 mm H2O
Cooling Air Pressure Drop	19,66 mm H2O	Cooling Coil Wet Weight	154 kg
Actual Cooling Face Velocity	2,9 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	100,35 mm H2O
Motor HP	3.0 HP	Brake Horse Power	2,30 bhp
Fan RPM	3112 rpm	Transmission Option	G
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	12,6 m/s	Velocity Pressure	95,2 Pa

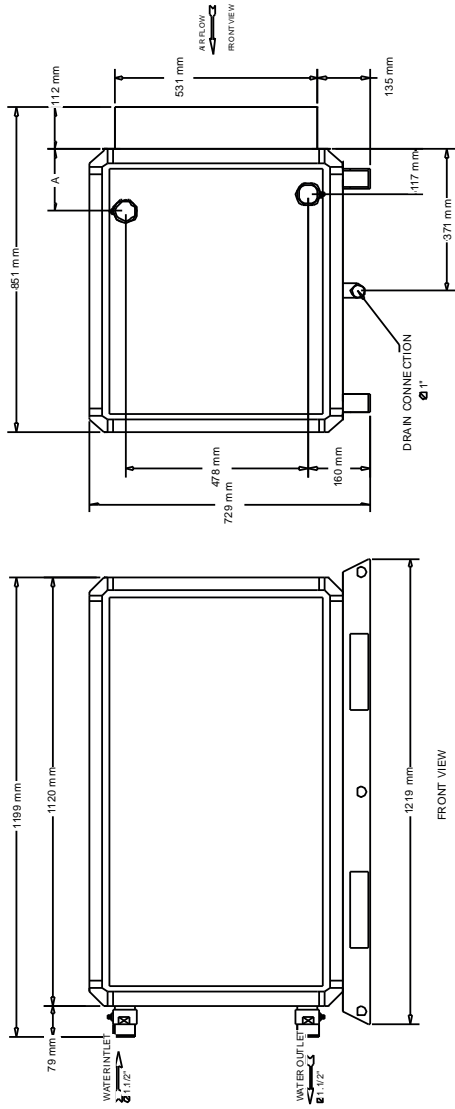
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit		Inverter	w/o Inverter / Not Applicable
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Damper Type (*See notes)	Damper manual	Optional - Capacitor	Not Applicable
Unit Destination	Local Market - Brazil	Optional - Coil Module	w/o Optional / Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable		
Special Product	Standard		

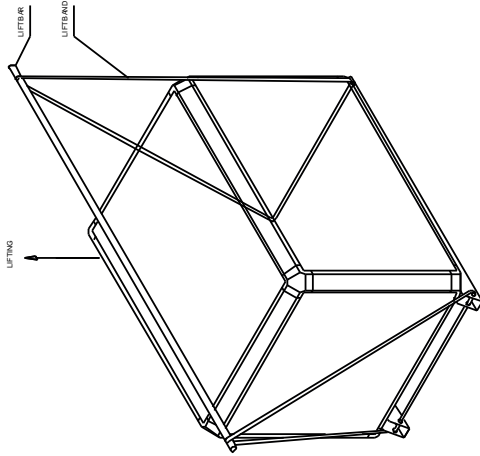


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 04

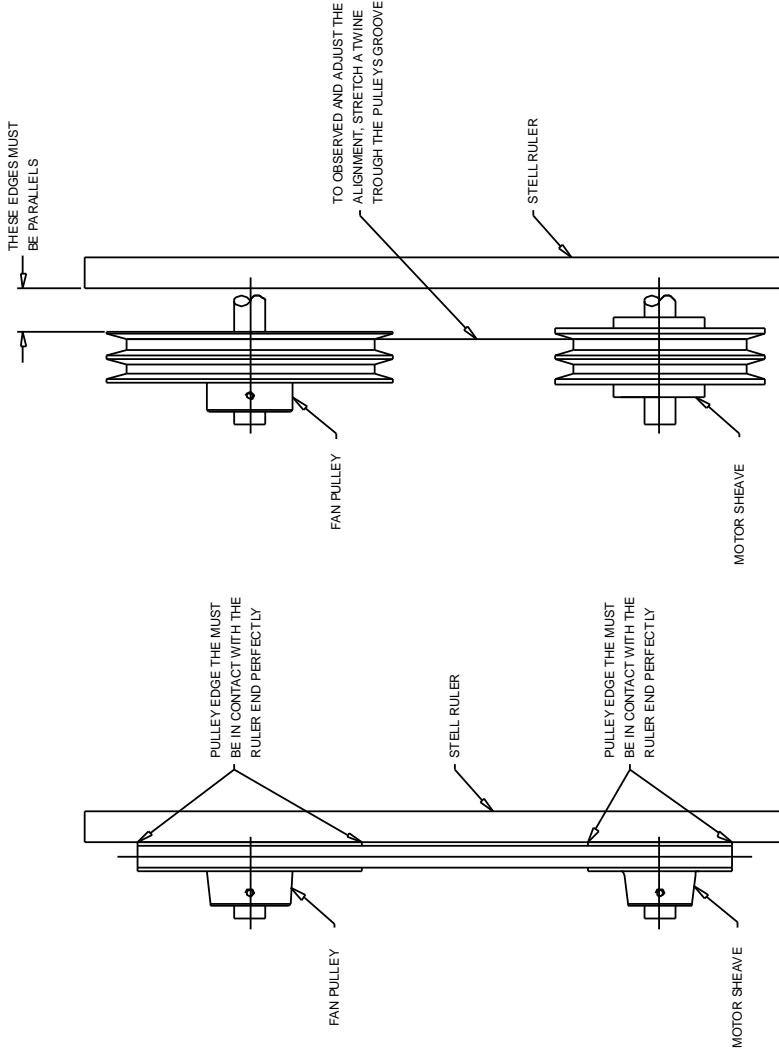


COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 04

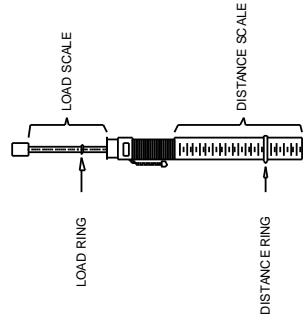
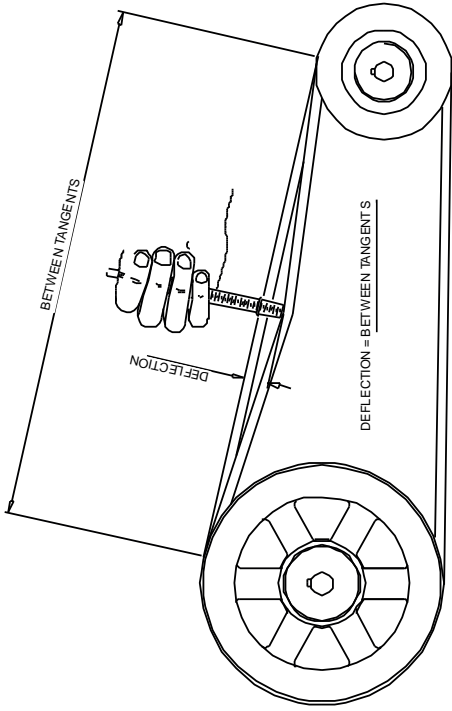
ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm



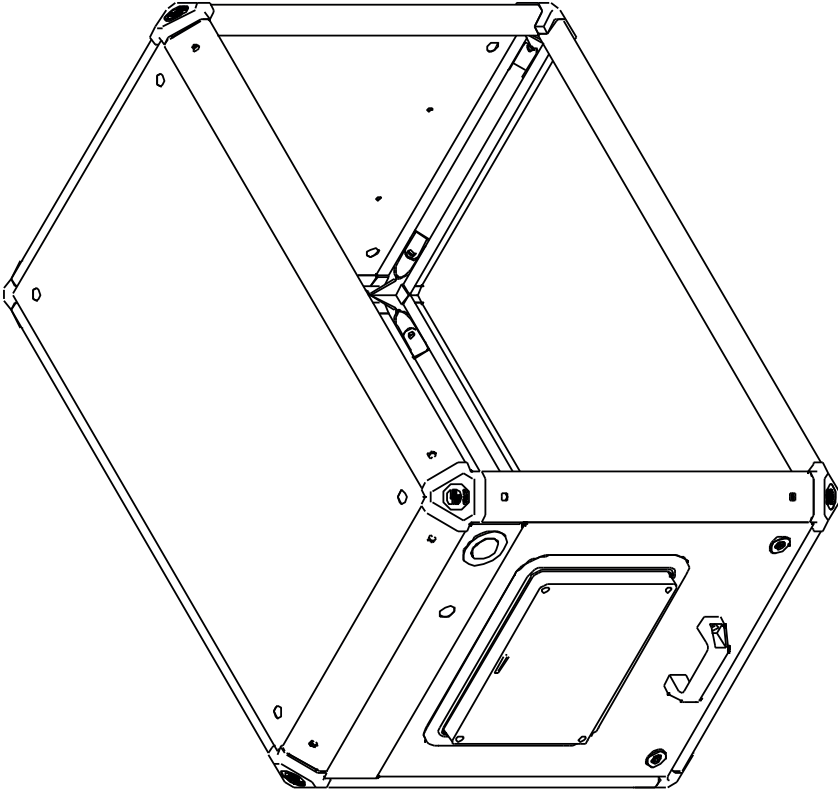
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

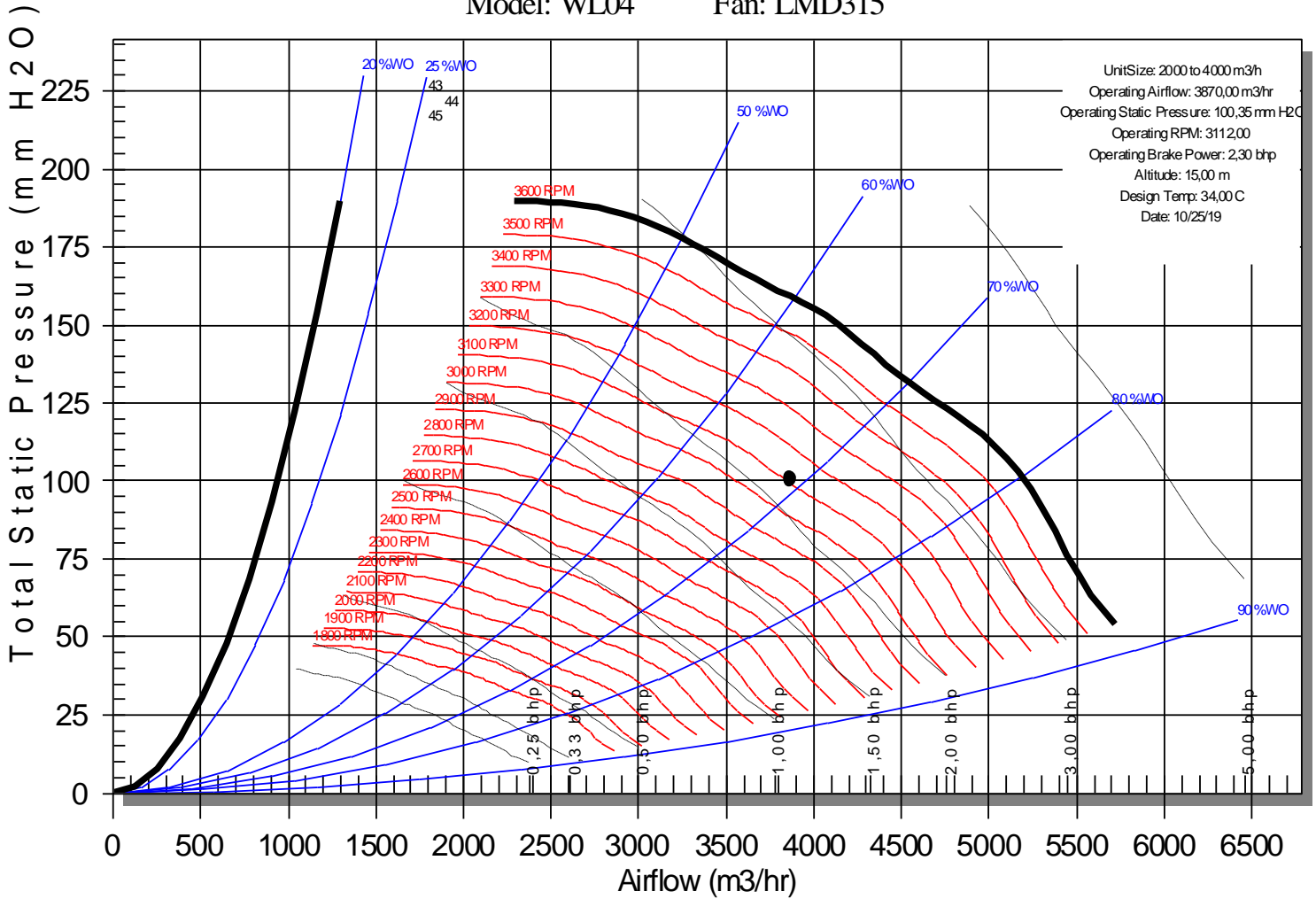
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-3P-06

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-01
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGD-KTEE00Y00A6BWBA000110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,52 mm H2O
Mixing Box Air Pressure Drop	2,82 mm H2O	Filter Air Pressure Drop	26,81 mm H2O

Coil			
Cooling Entering Dry Bulb	23,2 C	Cooling Entering Wet Bulb	16,9 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,00 m3/hr
Cooling Capacity	13,99 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Heat Options	w/o Heat / Not Applicable	Cooling Airflow	3400,00 m3/hr
Sensible Capacity	12,37 kW	Cooling Leaving Wet Bulb	12,4 C
Cooling Water Volume	8,04 L	Cooling Water Velocity	0,4 m/s
Cooling Water Pressure Drop	317,31 mm H2O	Cooling Air Pressure Drop	13,70 mm H2O
Cooling Coil Wet Weight	154 kg	Actual Cooling Face Velocity	2,5 m/s

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	81,85 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,64 bhp
Fan RPM	2746 rpm	Transmission Option	E
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	11,1 m/s	Velocity Pressure	73,5 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable



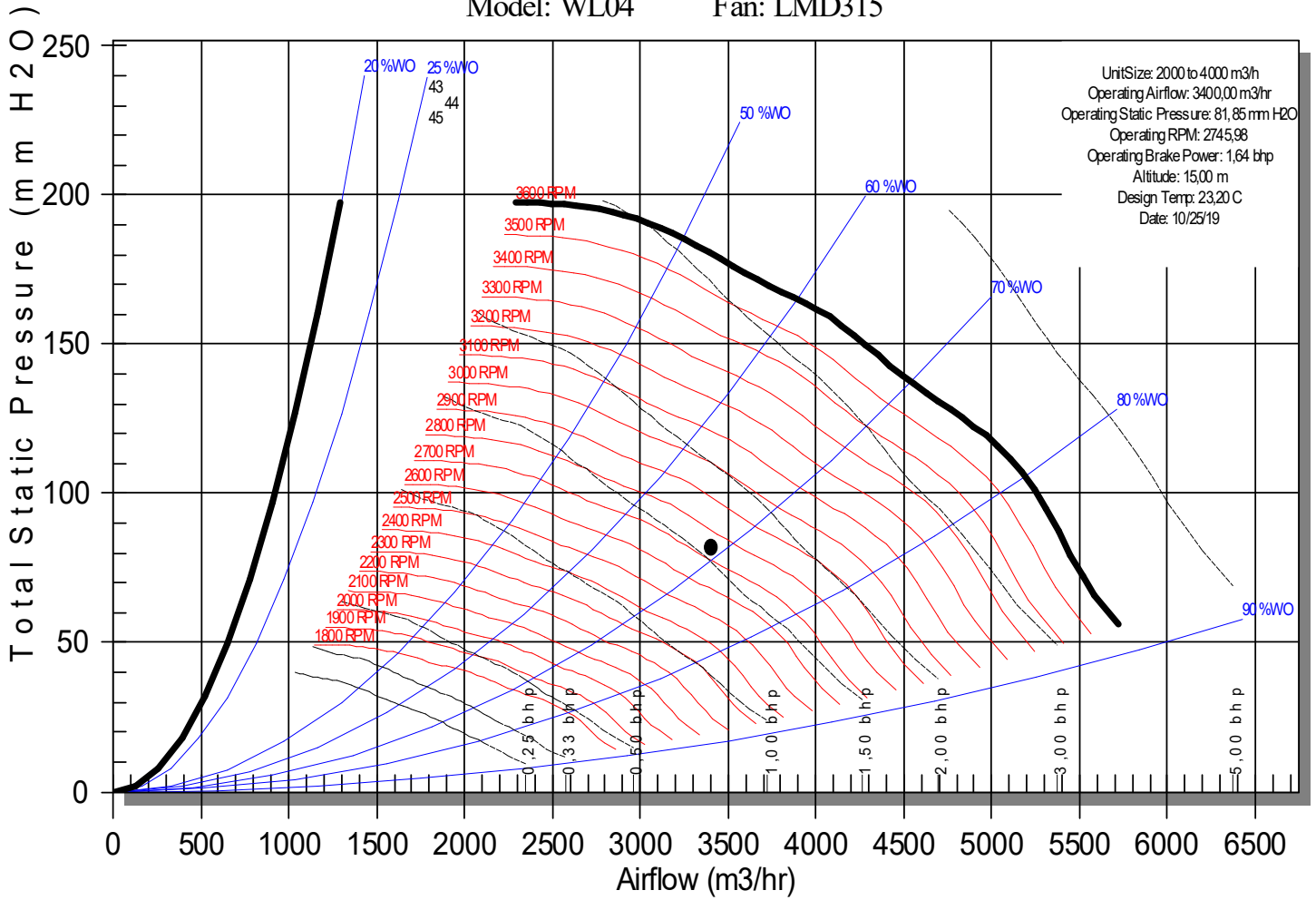
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



AH-TE-01

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-02
Address		Quantity	1
Sales Team	TIG	Model Number	WLKA04AGD-K-EE00Y10A6BWBAG00110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(K)Std. Mix Box, Coil, Fan, Final Filter
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	F8 (MERV 14) Bag filter	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	8,52 mm H2O
Mixing Box Air Pressure Drop	2,82 mm H2O	Filter Air Pressure Drop	26,81 mm H2O

Coil			
Cooling Entering Dry Bulb	23,2 C	Cooling Entering Wet Bulb	16,9 C
Cooling Leaving Dry Bulb	12,5 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,00 m3/hr
Cooling Capacity	13,99 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Heat Options	2 x 3 kw	Heating Capacity	6,00 kW
Electric Heat Stages	2 Stage	Heating Entering Air Temperature	11,8 C
Cooling Airflow	3400,00 m3/hr	Sensible Capacity	12,37 kW
Cooling Leaving Wet Bulb	12,4 C	Cooling Water Volume	8,04 L
Cooling Water Velocity	0,4 m/s	Cooling Water Pressure Drop	317,31 mm H2O
Cooling Air Pressure Drop	13,70 mm H2O	Cooling Coil Wet Weight	154 kg
Actual Cooling Face Velocity	2,5 m/s	Electric Heat PD	4,20 mm H2O

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	86,06 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,71 bhp
Fan RPM	2785 rpm	Transmission Option	E
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	11,1 m/s	Velocity Pressure	73,5 Pa

Humidifier	
Humidification	w/o Humidification /



Not Applicable

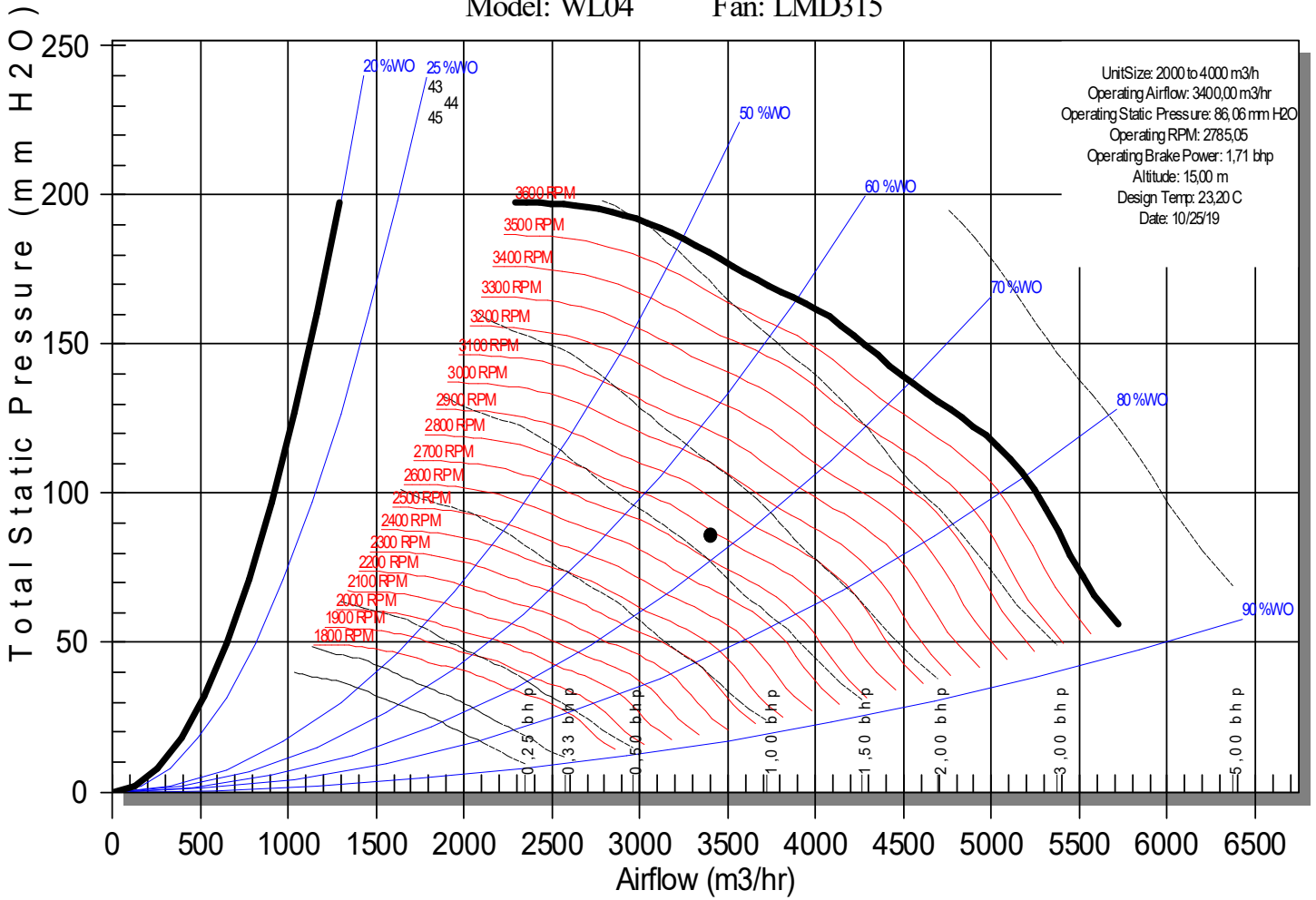
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Damper Type (*See notes)	Damper manual
Pressostat	w/o Pressostat / Not Applicable	Unit Destination	Local Market - Brazil
Optional - Capacitor	Not Applicable	Optional - Fan Module	w/o Optional / Not Applicable
Optional - Coil Module	w/o Optional / Not Applicable	Special Product	Standard



AH-TE-02

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-03
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGD-KTEE00Y00B8AWBA000110003000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Horizontal / Horizontal	Unit Size	2000 to 4000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,49 mm H2O
Mixing Box Air Pressure Drop	3,07 mm H2O	Filter Air Pressure Drop	29,46 mm H2O

Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	13,3 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	8,43 m3/hr
Cooling Capacity	58,97 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Heat Options	w/o Heat / Not Applicable	Cooling Airflow	3550,00 m3/hr
Sensible Capacity	25,58 kW	Cooling Leaving Wet Bulb	13,2 C
Cooling Water Volume	14,20 L	Cooling Water Velocity	1,2 m/s
Cooling Water Pressure Drop	2204,21 mm H2O	Cooling Air Pressure Drop	24,25 mm H2O
Cooling Coil Wet Weight	210 kg	Actual Cooling Face Velocity	2,6 m/s

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	25,00 mm H2O	Total Static Pressure	91,27 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,88 bhp
Fan RPM	2920 rpm	Transmission Option	E
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	11,5 m/s	Velocity Pressure	80,1 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable



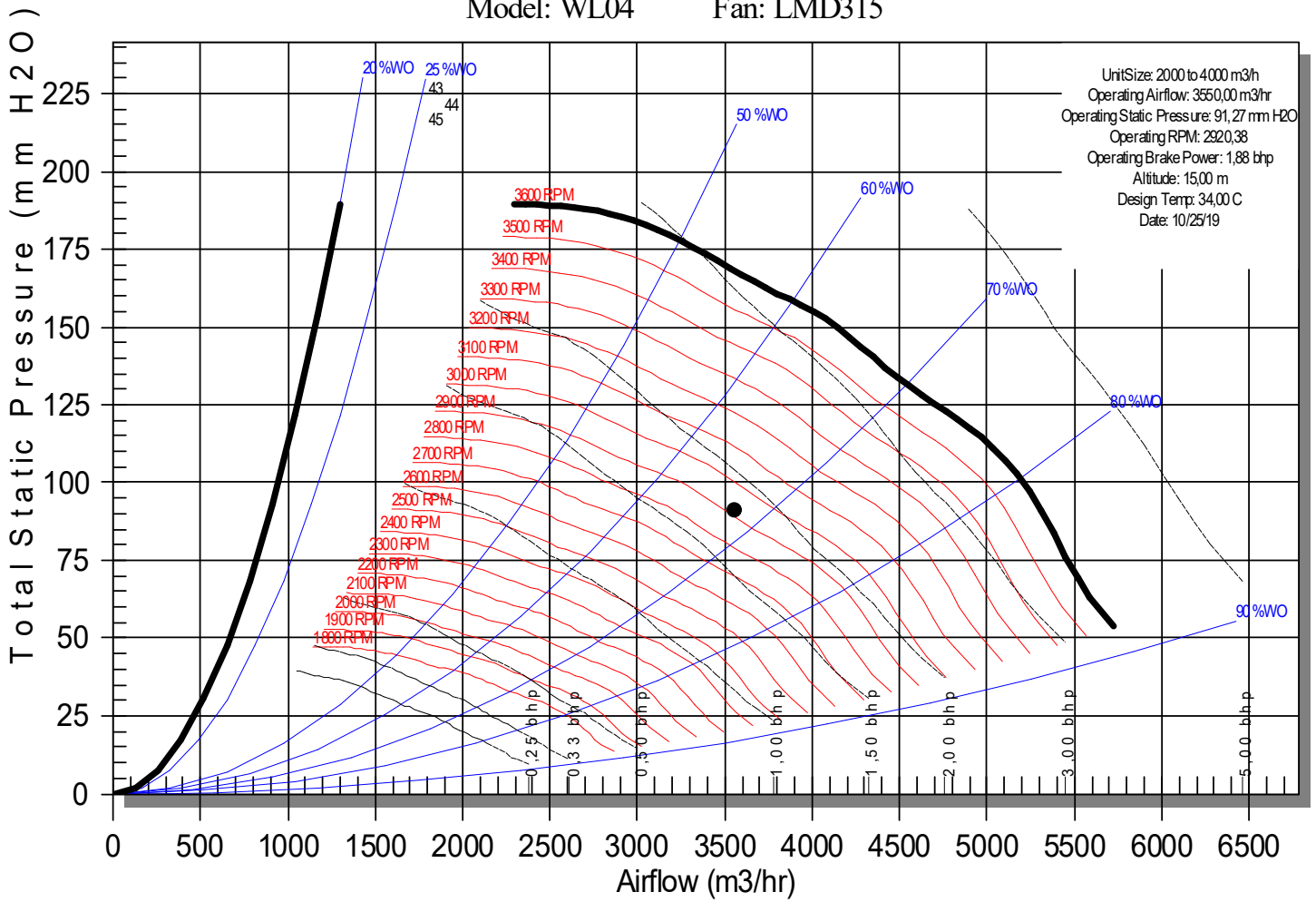
Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling	S + V + M	Starter Type	X-Type Starter
Service Digit			
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Aplicable	Optional - Coil Module	w/o Optional / Not Aplicable
Special Product	Standard		



AH-TE-03

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-04A
Address		Quantity	1
Sales Team	TIG	Model Number	WLPA12AGAEK- HA00B00B6AWBA00 011000- 000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(P) Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	6000 to 12000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,30 mm H2O
Mixing Box Air Pressure Drop	0,00 mm H2O	Filter Air Pressure Drop	7,55 mm H2O

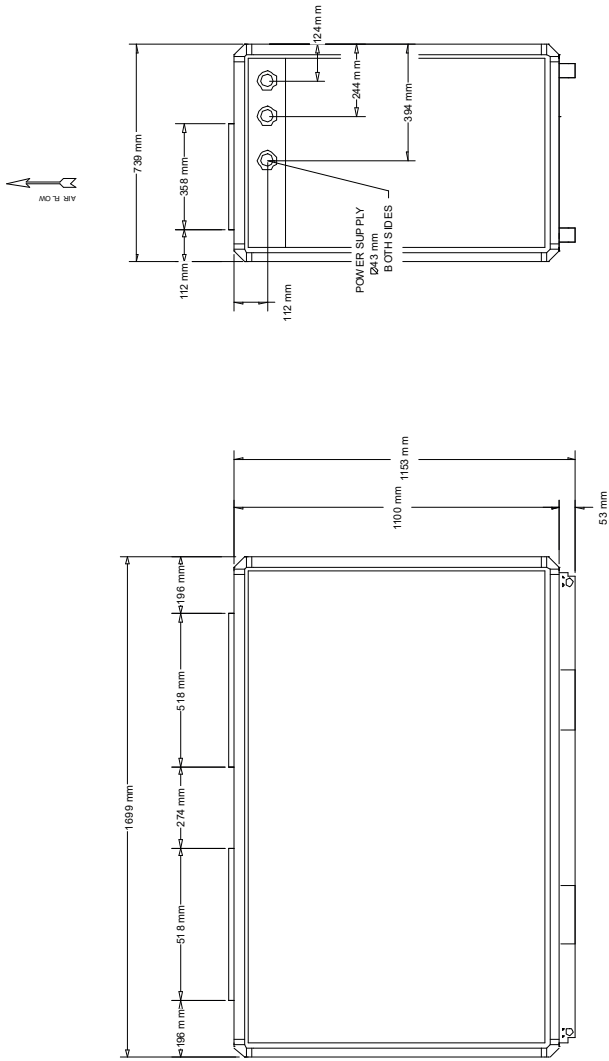
Coil			
Cooling Entering Dry Bulb	24,0 C	Cooling Entering Wet Bulb	17,0 C
Cooling Leaving Dry Bulb	11,9 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	6,06 m3/hr
Cooling Capacity	42,37 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	8750,00 m3/hr	Sensible Capacity	36,21 kW
Cooling Leaving Wet Bulb	11,6 C	Cooling Water Volume	32,86 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	487,27 mm H2O
Cooling Air Pressure Drop	11,99 mm H2O	Cooling Coil Wet Weight	314 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	58,83 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	2,87 bhp
Fan RPM	2136 rpm	Transmission Option	A
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	8,1 m/s	Velocity Pressure	39,7 Pa

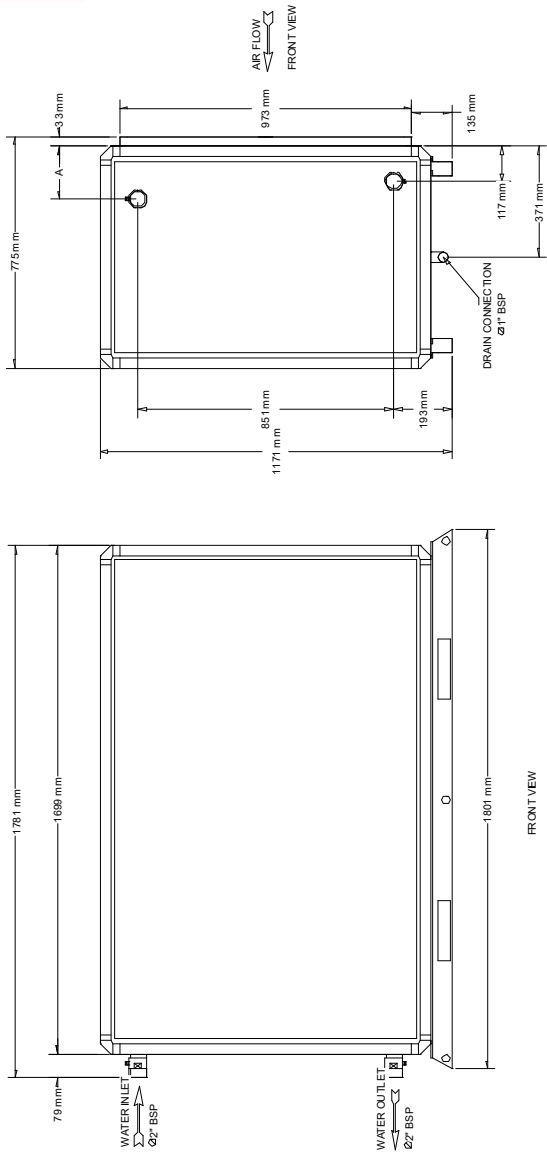
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

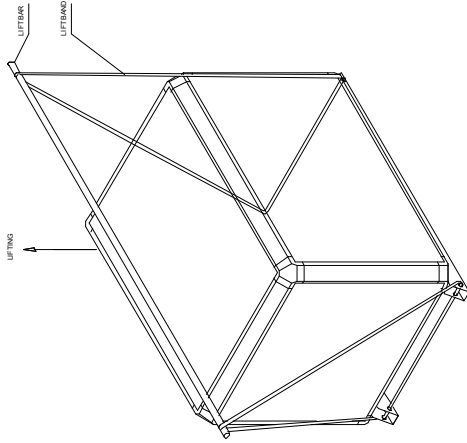


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 12

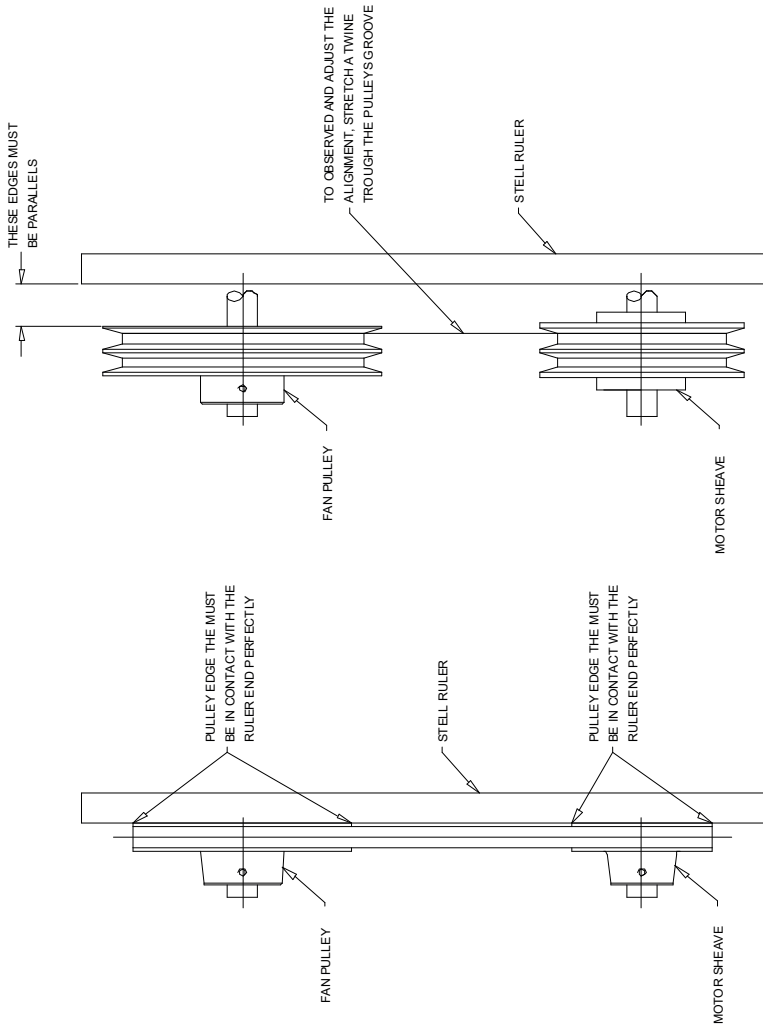


COIL SECTION
LEFT HAND CONNECTION
1/2" OD TUBE
WAVE DOBLE 12

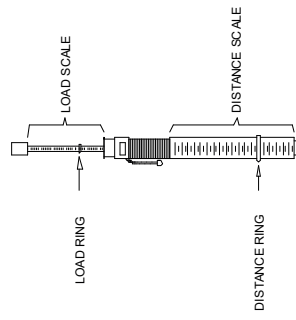
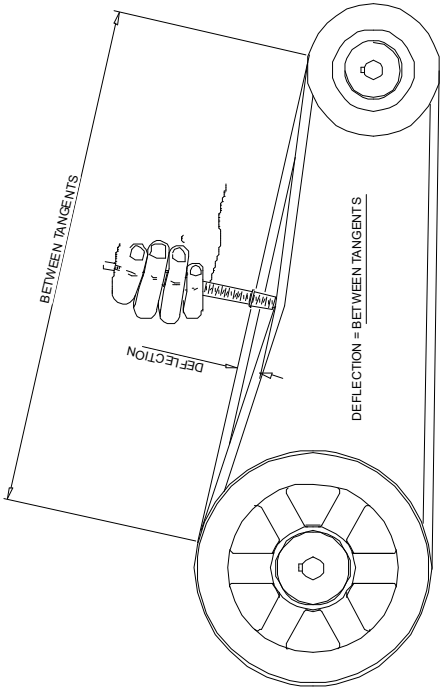
ROWS	A
3	172 mm
4	199 mm
6	255 mm
8	310 mm



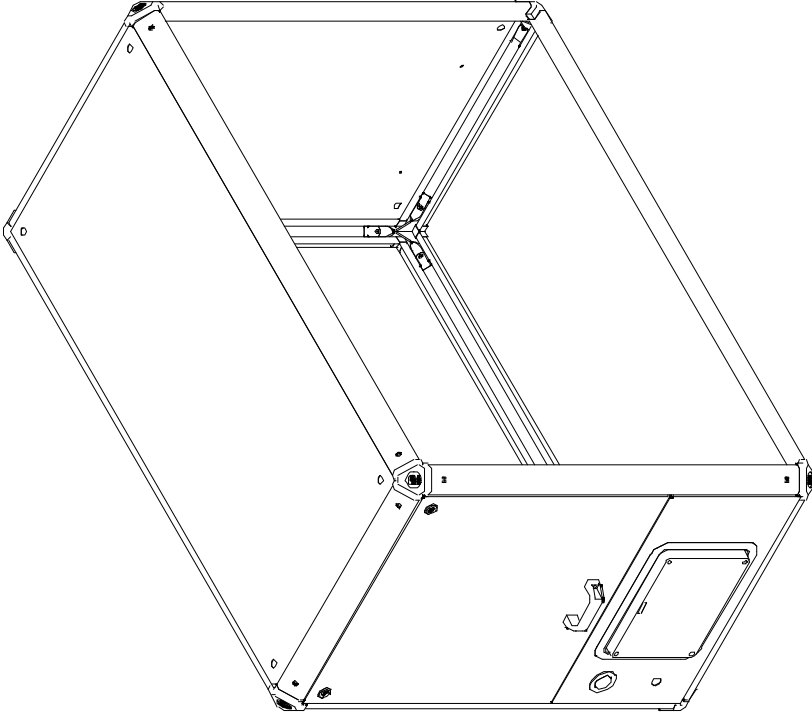
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

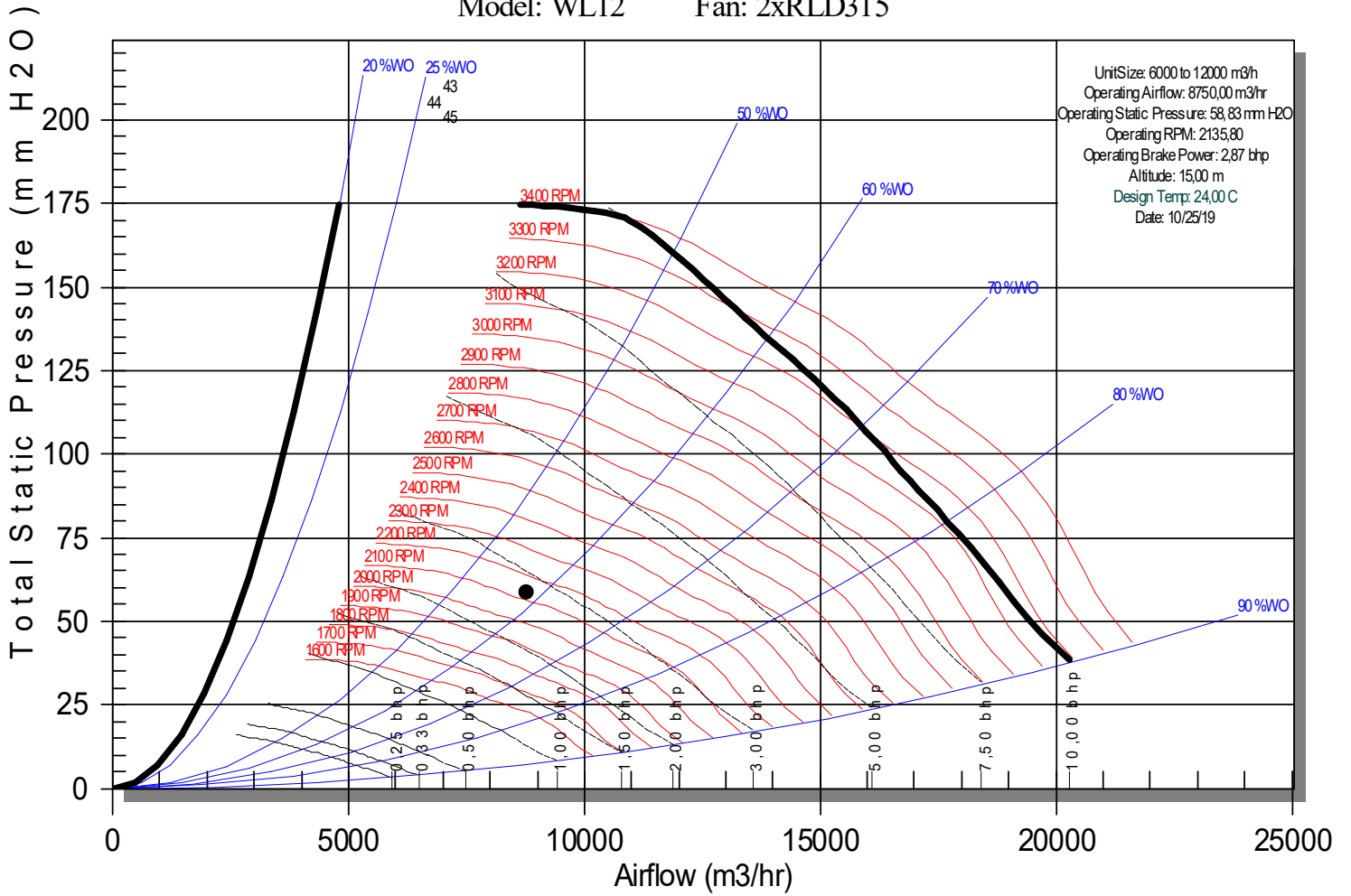
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-04A

Model: WL12

Fan: 2xRLD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-04B
Address		Quantity	1
Sales Team	TIG	Model Number	WLPA12AGADK- HA00B00B6AWBA00 011000- 000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(P) Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	6000 to 12000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	9,30 mm H2O
Mixing Box Air Pressure Drop	0,00 mm H2O	Filter Air Pressure Drop	7,55 mm H2O

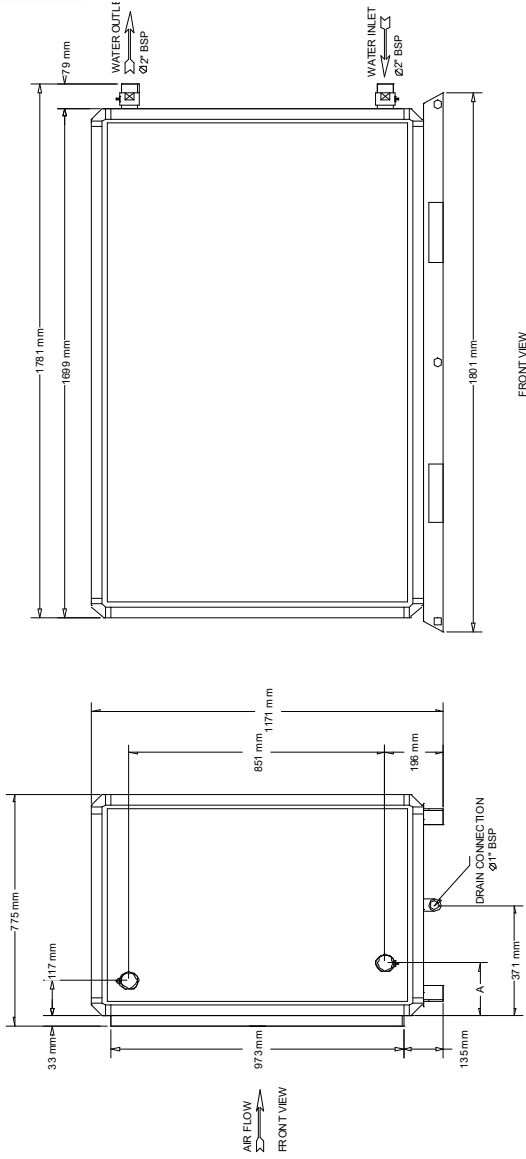
Coil			
Cooling Entering Dry Bulb	24,0 C	Cooling Entering Wet Bulb	17,0 C
Cooling Leaving Dry Bulb	11,9 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	6,06 m3/hr
Cooling Capacity	42,37 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	8750,00 m3/hr	Sensible Capacity	36,21 kW
Cooling Leaving Wet Bulb	11,6 C	Cooling Water Volume	32,86 L
Cooling Water Velocity	0,5 m/s	Cooling Water Pressure Drop	487,27 mm H2O
Cooling Air Pressure Drop	11,99 mm H2O	Cooling Coil Wet Weight	314 kg
Actual Cooling Face Velocity	2,2 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	58,83 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	2,87 bhp
Fan RPM	2136 rpm	Transmission Option	A
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	8,1 m/s	Velocity Pressure	39,7 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable

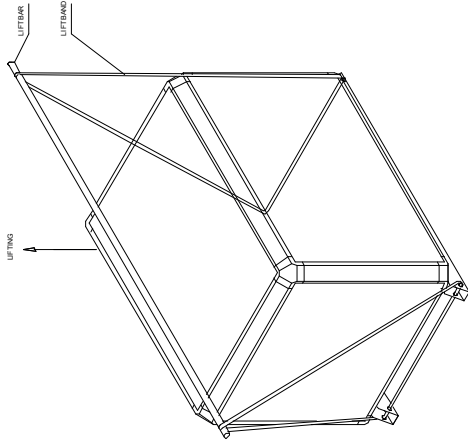


Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

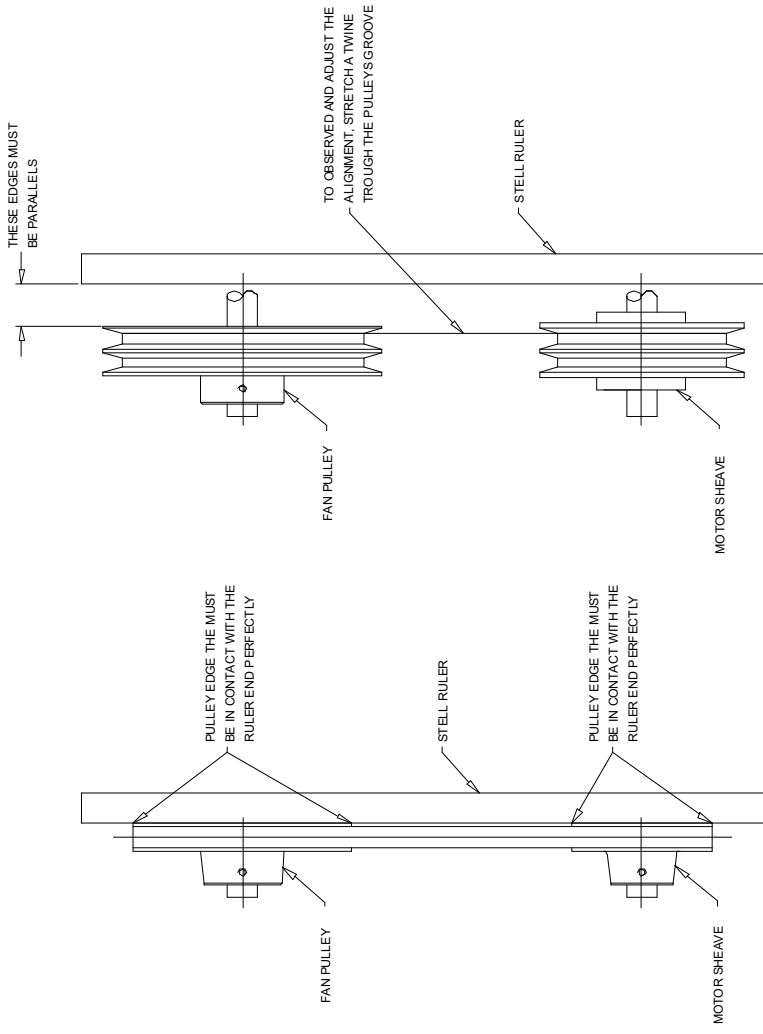


COIL SECTION
 RIGHT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 12

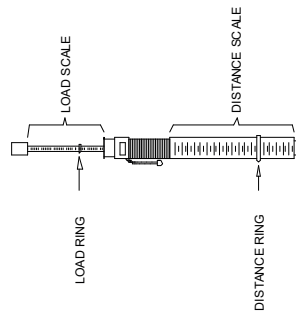
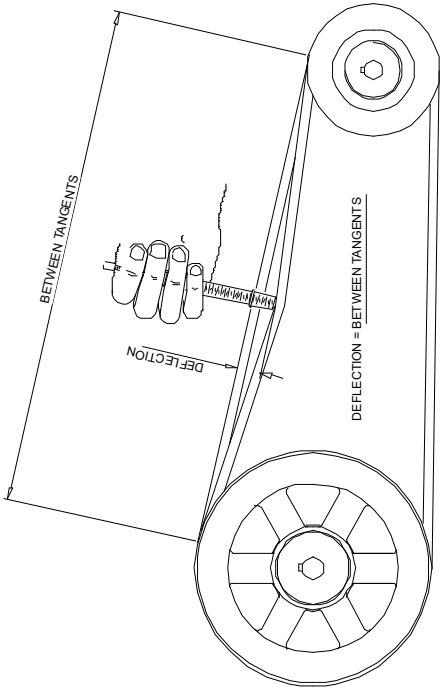
ROWS	A
3	172 mm
4	199 mm
6	255 mm
8	310 mm



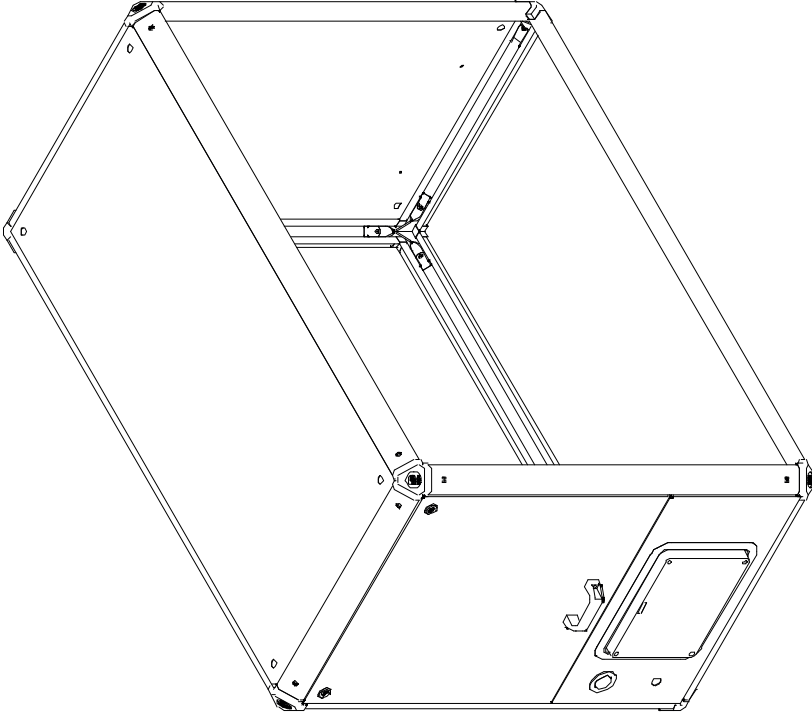
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

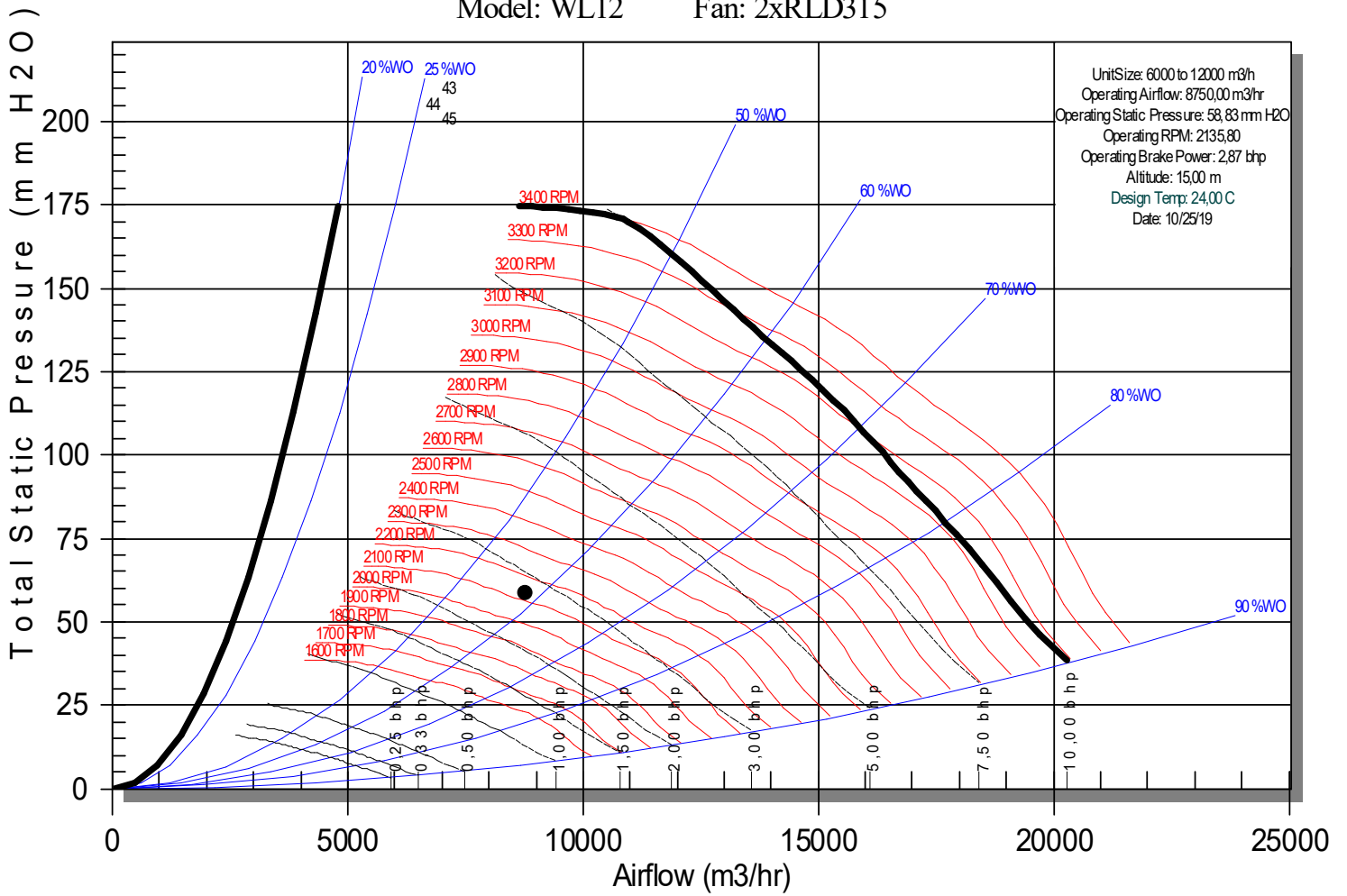
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-04B

Model: WL12 Fan: 2xRLD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-05
Address		Quantity	1
Sales Team	TIG	Model Number	WLTA04AGA EKTED00 B00A6B2BAG001100 03000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(T) Std. Mixing Box, Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	2000 to 4000 m3/h
Filter Condition	Dirty	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	5,82 mm H2O
Mixing Box Air Pressure Drop	1,29 mm H2O	Filter Air Pressure Drop	25,01 mm H2O

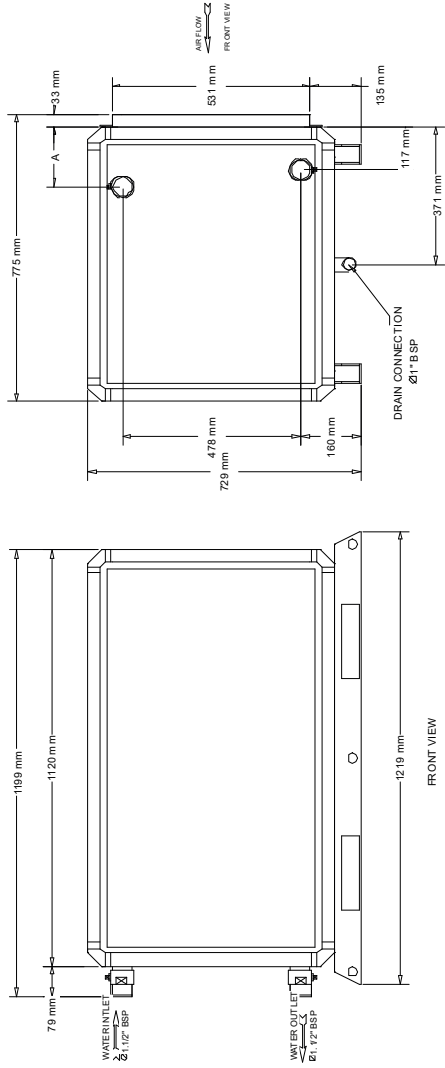
Coil			
Cooling Entering Dry Bulb	27,3 C	Cooling Entering Wet Bulb	17,0 C
Cooling Leaving Dry Bulb	9,1 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	2,36 m3/hr
Cooling Capacity	16,53 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	144 FPF
Circuit	P1/2	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	2 x 3 kw
Heating Capacity	3,00 kW	Electric Heat Stages	2 Stage
Heating Entering Air Temperature	10,3 C	Cooling Airflow	2400,00 m3/hr
Sensible Capacity	14,88 kW	Cooling Leaving Wet Bulb	9,0 C
Cooling Water Volume	8,07 L	Cooling Water Velocity	1,0 m/s
Cooling Water Pressure Drop	2439,89 mm H2O	Cooling Air Pressure Drop	8,01 mm H2O
Cooling Coil Wet Weight	154 kg	Actual Cooling Face Velocity	1,8 m/s
Electric Heat PD	1,97 mm H2O		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	72,10 mm H2O
Motor HP	2.0 HP	Brake Horse Power	1,13 bhp
Fan RPM	2350 rpm	Transmission Option	D
Full Load Amps	3,24 A	Locked Rotor Amps	26,27 A
Outlet Velocity	7,8 m/s	Velocity Pressure	36,6 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable

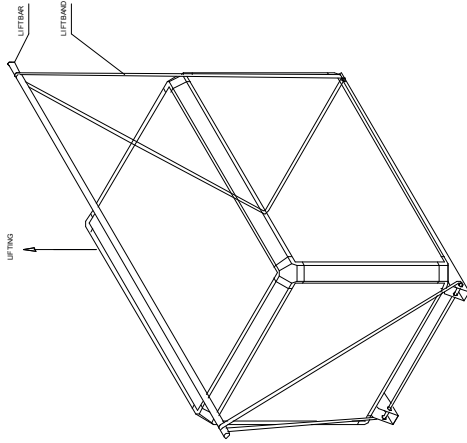


Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Factory Assembling Service Digit	S + V + M	Starter Type	X-Type Starter
Electrical Panel Options	w/o Electrical Panel / Not Applicable	Inverter	w/o Inverter / Not Applicable
Damper Type (*See notes)	Damper manual	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

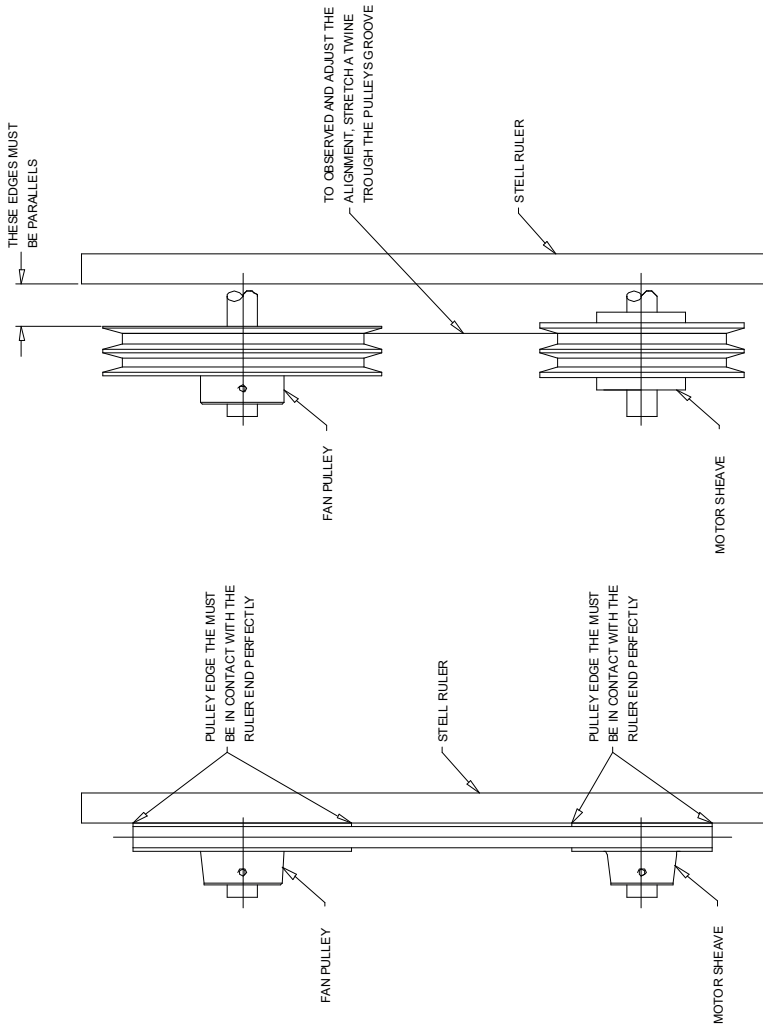


ROWS	A
3	162 mm
4	183 mm
6	228 mm
8	272 mm

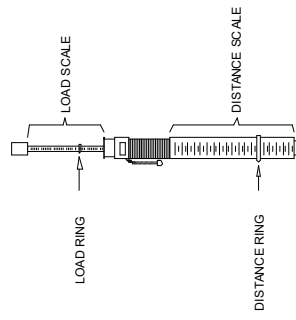
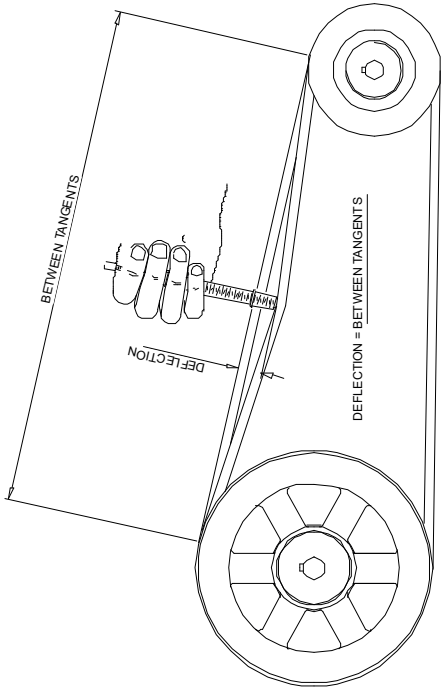
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 04



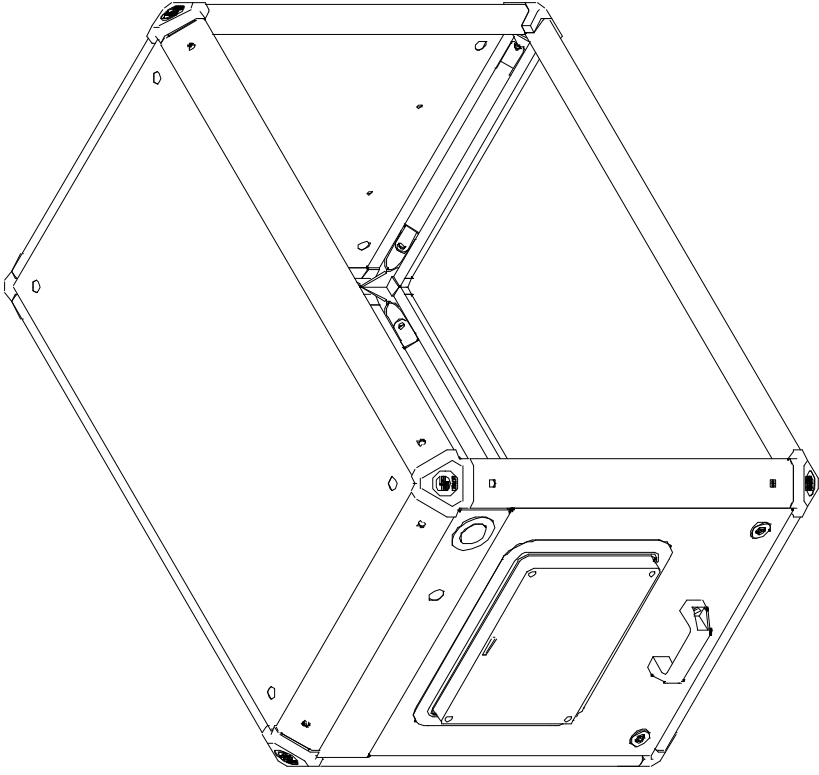
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

The MIXING BOX is manufactured in galvanized steel panels, pressed and screwed among themselves, internally covered with expanded polyurethane.

The Mixing Box is always mounted before the Coil Module.

This Mixing Box is a box where the fixation of external air and return air intake ducts can be made.

The Mixing Box Module can have dampers manufactured in galvanized steel, with opposite blades and an axis for manual or automatic air regulation driving, by damper.

When WAVE Doble is assembled with the Mixing Box, filters are integrated to the box.

On both sides, there are covers that provide access to the filters.

ELECTRICAL HEATING

Spiral-type heating resistances with Nickel-Chrome (80/20) alloy springs are mounted in a galvanized steel box and fastened between porcelain insulators.

They are protected by a safety thermostat with automatic rearming.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

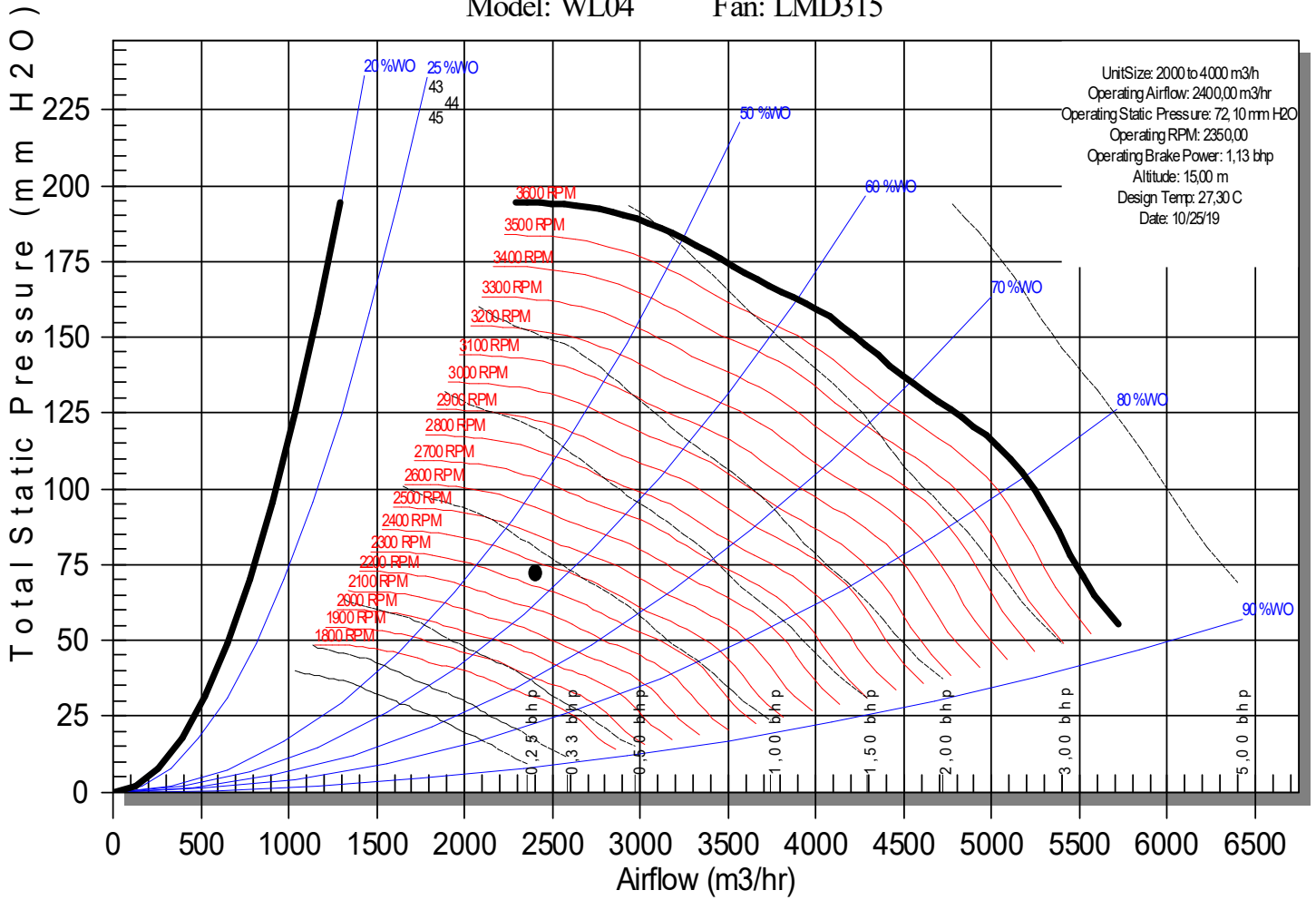
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-05

Model: WL04

Fan: LMD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-06*
Address		Quantity	1
Sales Team	TIG	Model Number	WLPA12AGAEK- HA00B00B6AWBA00 011000- 000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(P) Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	6000 to 12000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) Throwaway 1" (Std)
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	10,41 mm H2O
Mixing Box Air Pressure Drop	0,00 mm H2O	Filter Air Pressure Drop	8,35 mm H2O

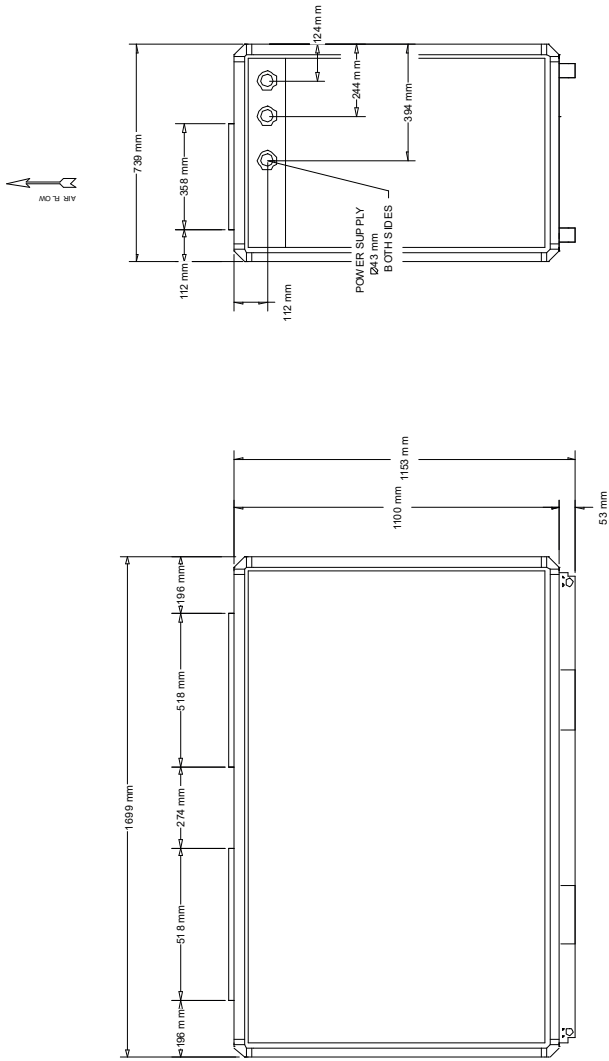
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	14,4 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	20,65 m3/hr
Cooling Capacity	144,44 kW	Fluid Type	Water
Row Options	6 rows	Fin Options	120 FPF
Circuit	W	Tube Diameter	1/2"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	9200,00 m3/hr	Sensible Capacity	62,79 kW
Cooling Leaving Wet Bulb	14,3 C	Cooling Water Volume	32,86 L
Cooling Water Velocity	1,7 m/s	Cooling Water Pressure Drop	4566,70 mm H2O
Cooling Air Pressure Drop	15,46 mm H2O	Cooling Coil Wet Weight	314 kg
Actual Cooling Face Velocity	2,4 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	64,23 mm H2O
Motor HP	5.0/5.5 HP	Brake Horse Power	3,28 bhp
Fan RPM	2266 rpm	Transmission Option	A
Full Load Amps	7,39 A	Locked Rotor Amps	64,99 A
Outlet Velocity	8,5 m/s	Velocity Pressure	43,9 Pa

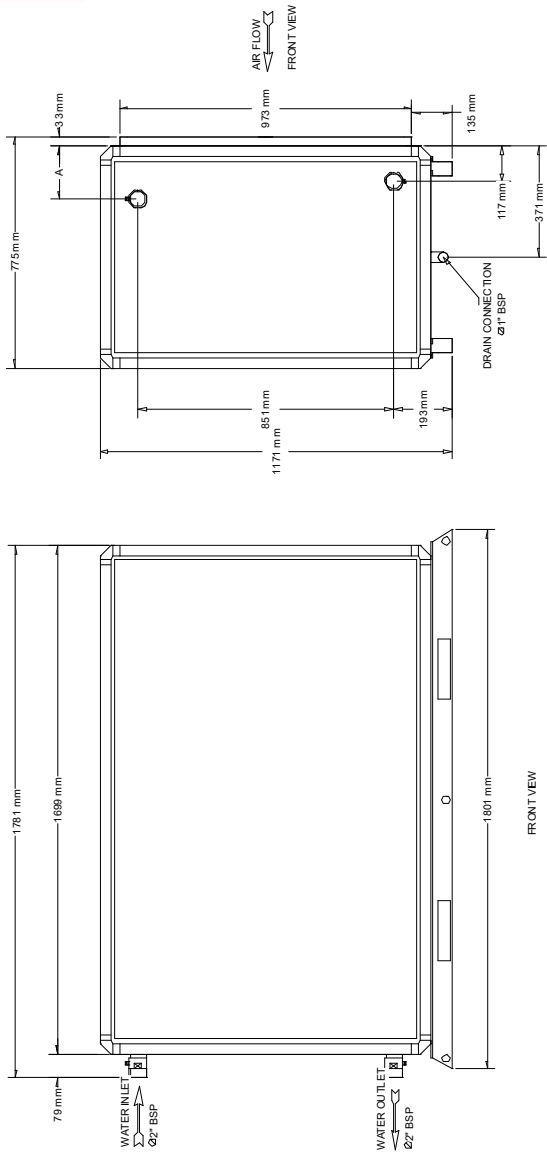
Humidifier	
Humidification	w/o Humidification / Not Applicable



Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

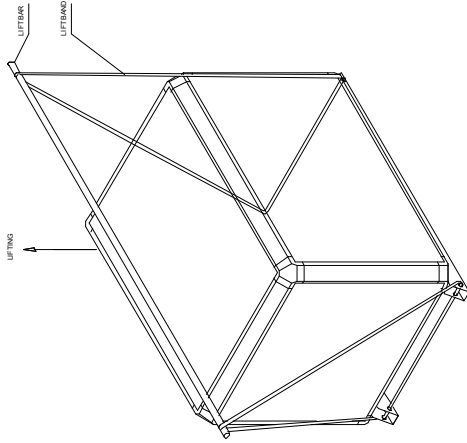


FAN SECTION - VERTICAL DISCHARGE (LIMIT LOAD)
WAVE DOBLE 12

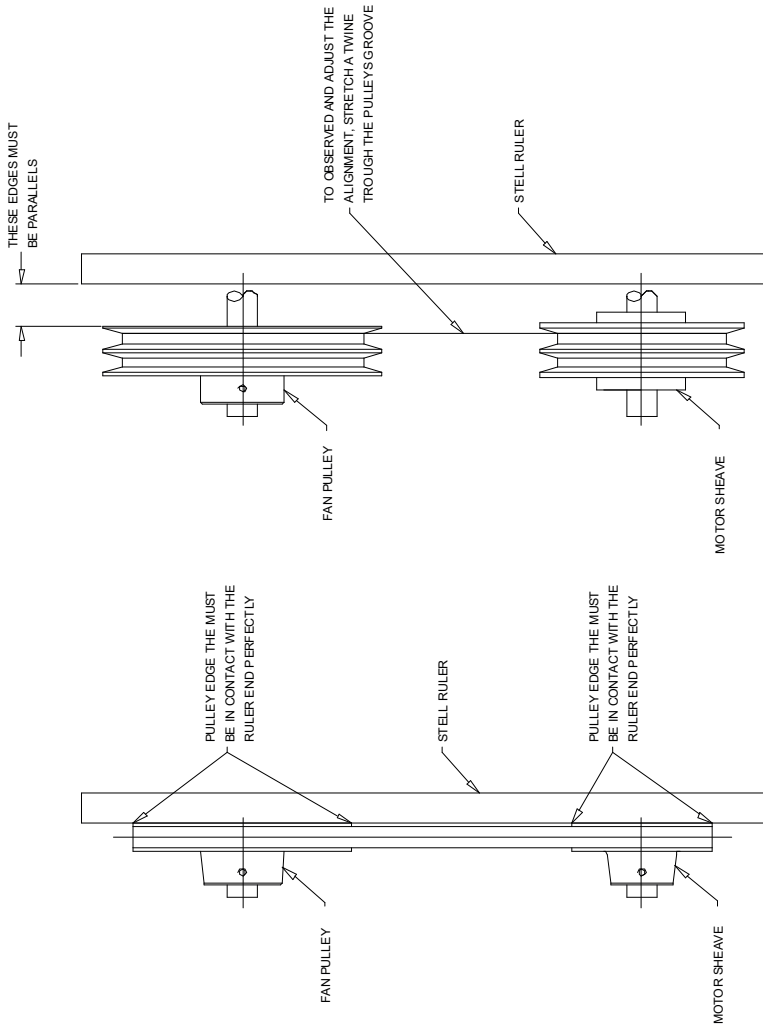


ROWS	A
3	172 mm
4	199 mm
6	255 mm
8	310 mm

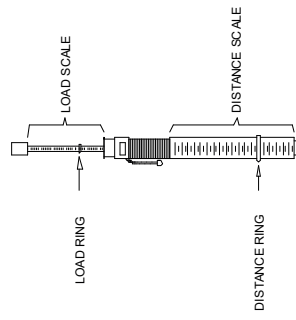
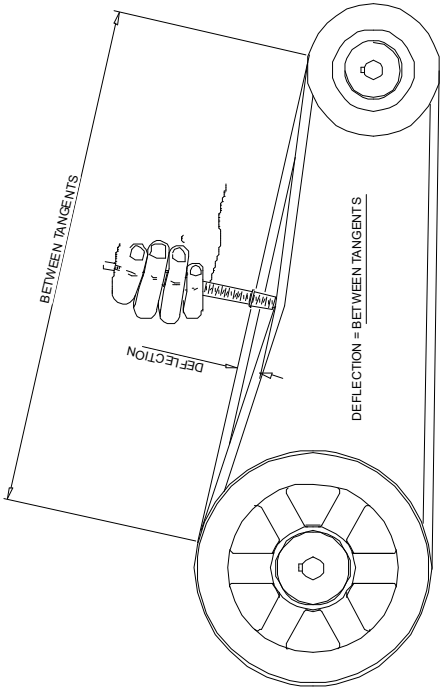
COIL SECTION
 LEFT HAND CONNECTION
 1/2" OD TUBE
 WAVE DOBLE 12



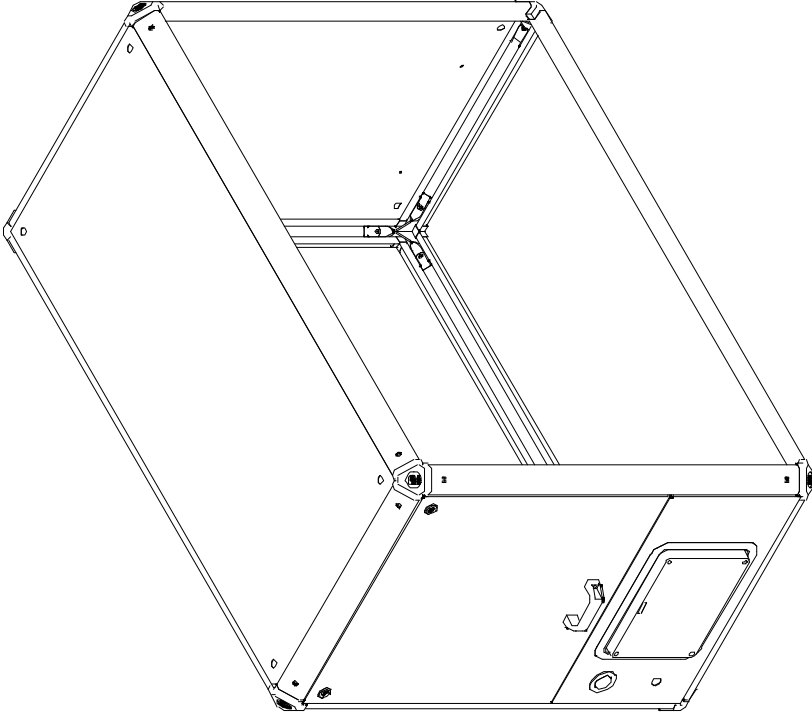
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

Temperature Sensor

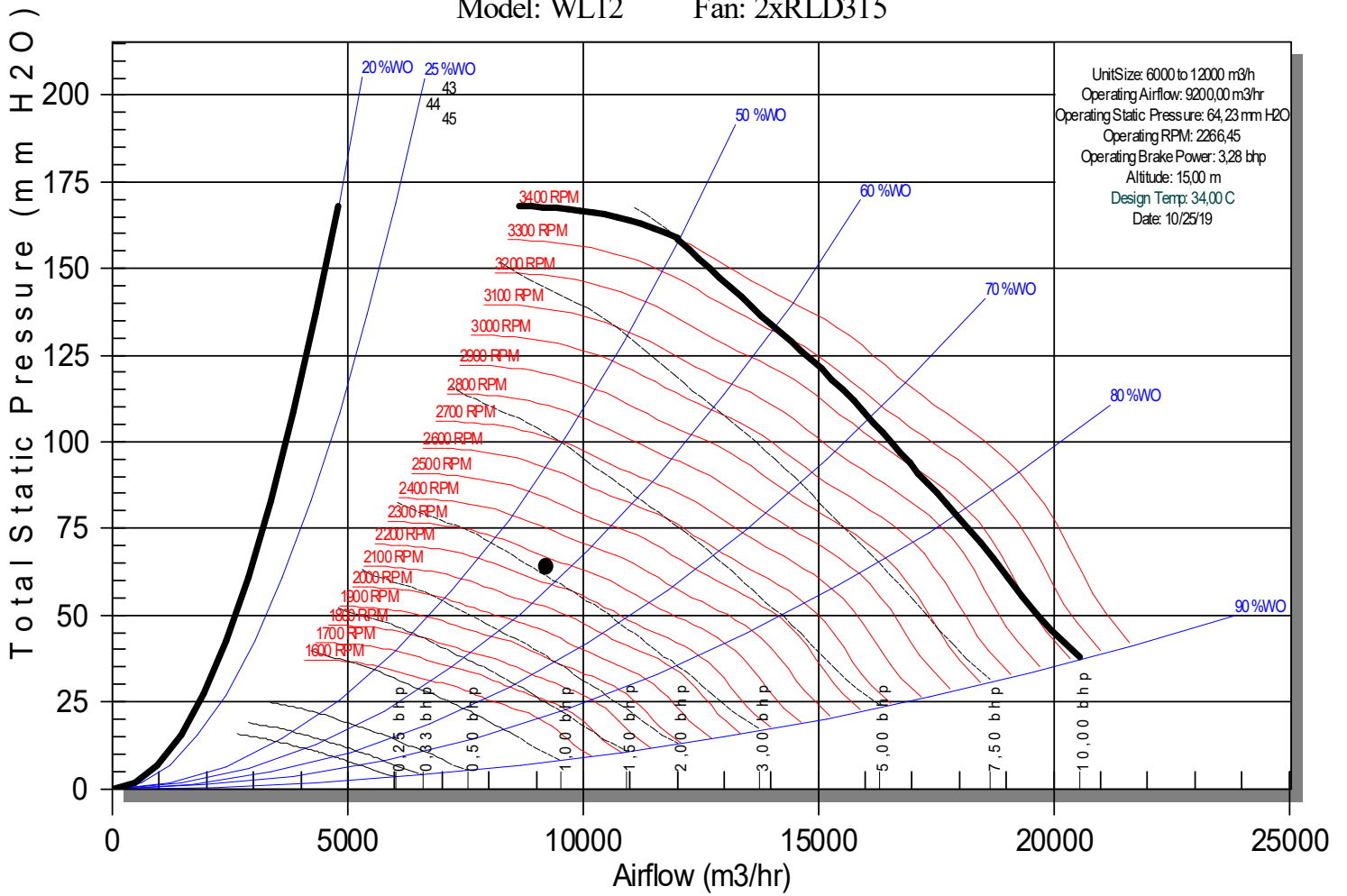
A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-06*

Model: WL12

Fan: 2xRLD315





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-07
Address		Quantity	1
Sales Team	TIG	Model Number	WLPA08AGAEK-FD00Y00A8BWBA00011000-000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(P) Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	6,57 mm H2O
Mixing Box Air Pressure Drop	0,00 mm H2O	Filter Air Pressure Drop	14,11 mm H2O

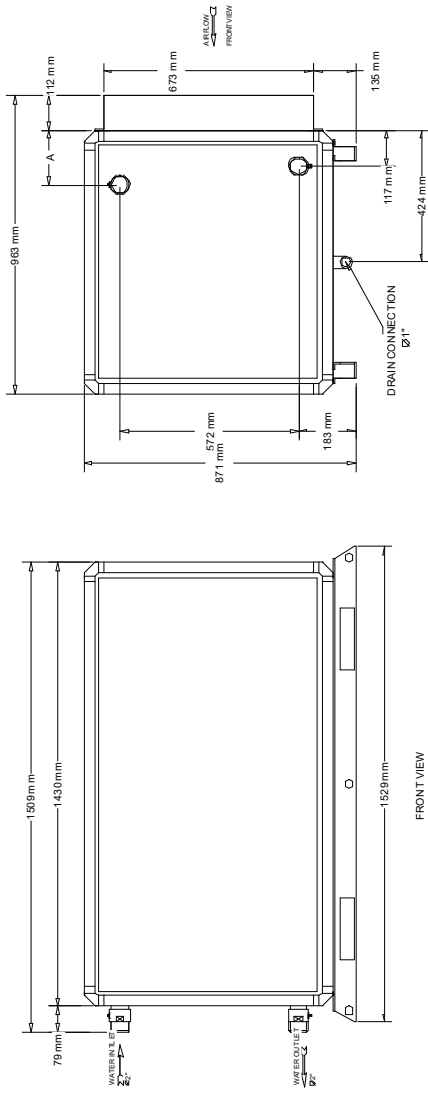
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	8,8 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	14,08 m3/hr
Cooling Capacity	98,50 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Left Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4875,00 m3/hr	Sensible Capacity	42,76 kW
Cooling Leaving Wet Bulb	8,7 C	Cooling Water Volume	19,15 L
Cooling Water Velocity	2,4 m/s	Cooling Water Pressure Drop	13326,59 mm H2O
Cooling Air Pressure Drop	13,84 mm H2O	Cooling Coil Wet Weight	266 kg
Actual Cooling Face Velocity	1,9 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	64,52 mm H2O
Motor HP	3.0 HP	Brake Horse Power	1,72 bhp
Fan RPM	1923 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	7,2 m/s	Velocity Pressure	31,3 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable

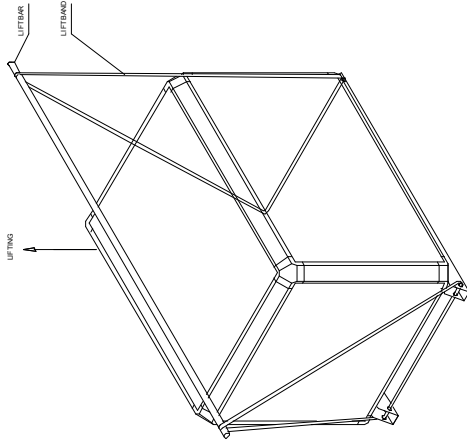


Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

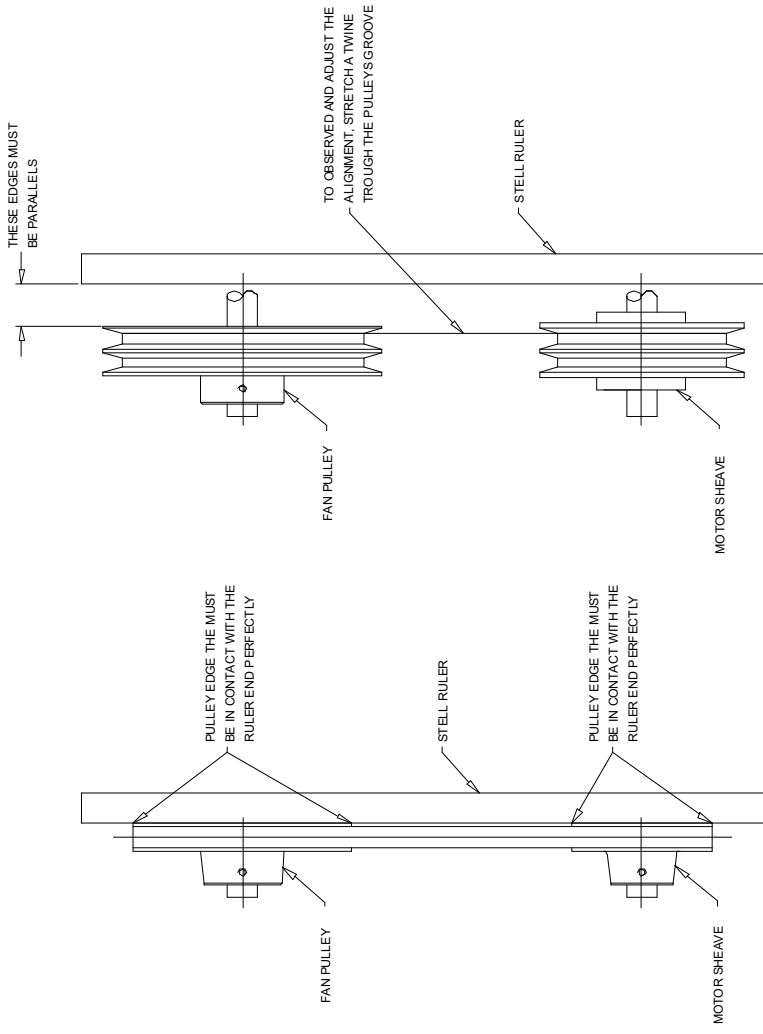


ROWS	A
3	176 mm
4	183 mm
6	227 mm
8	271 mm

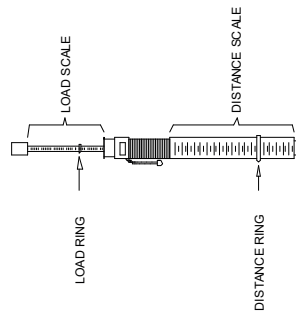
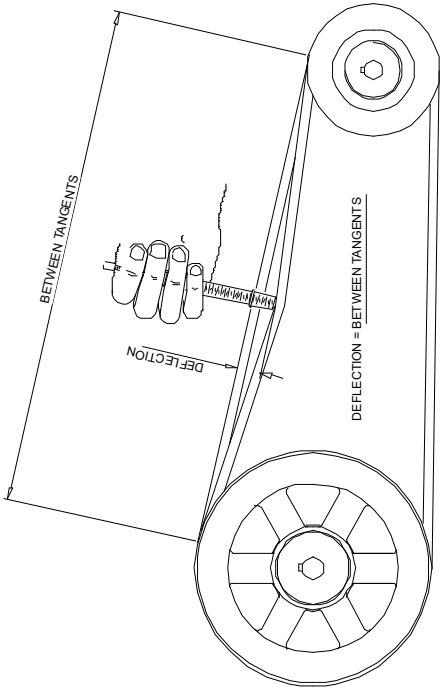
COIL SECTION
LEFT HAND CONNECTION
3/8" OD TUBE
WAVE DOBLE 08



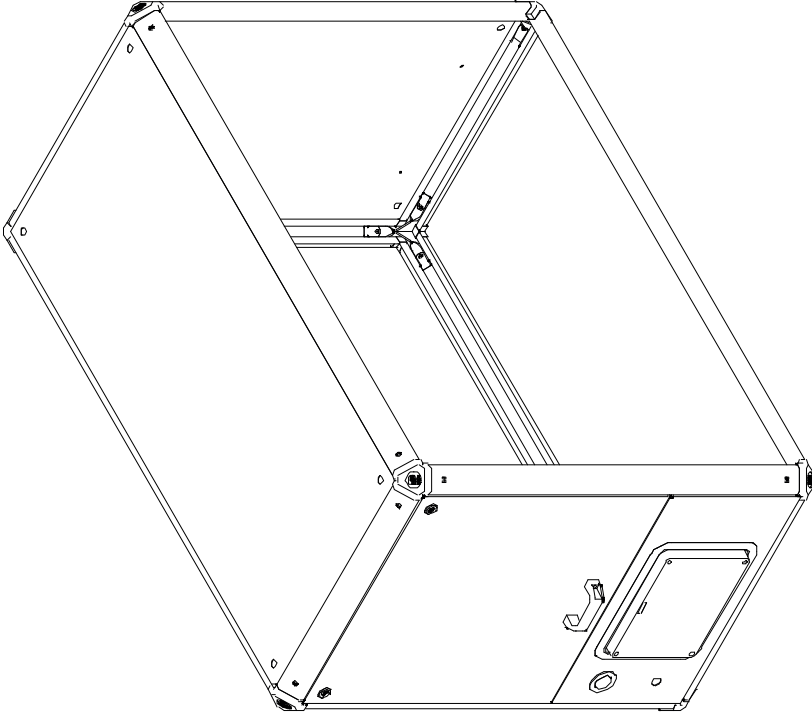
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

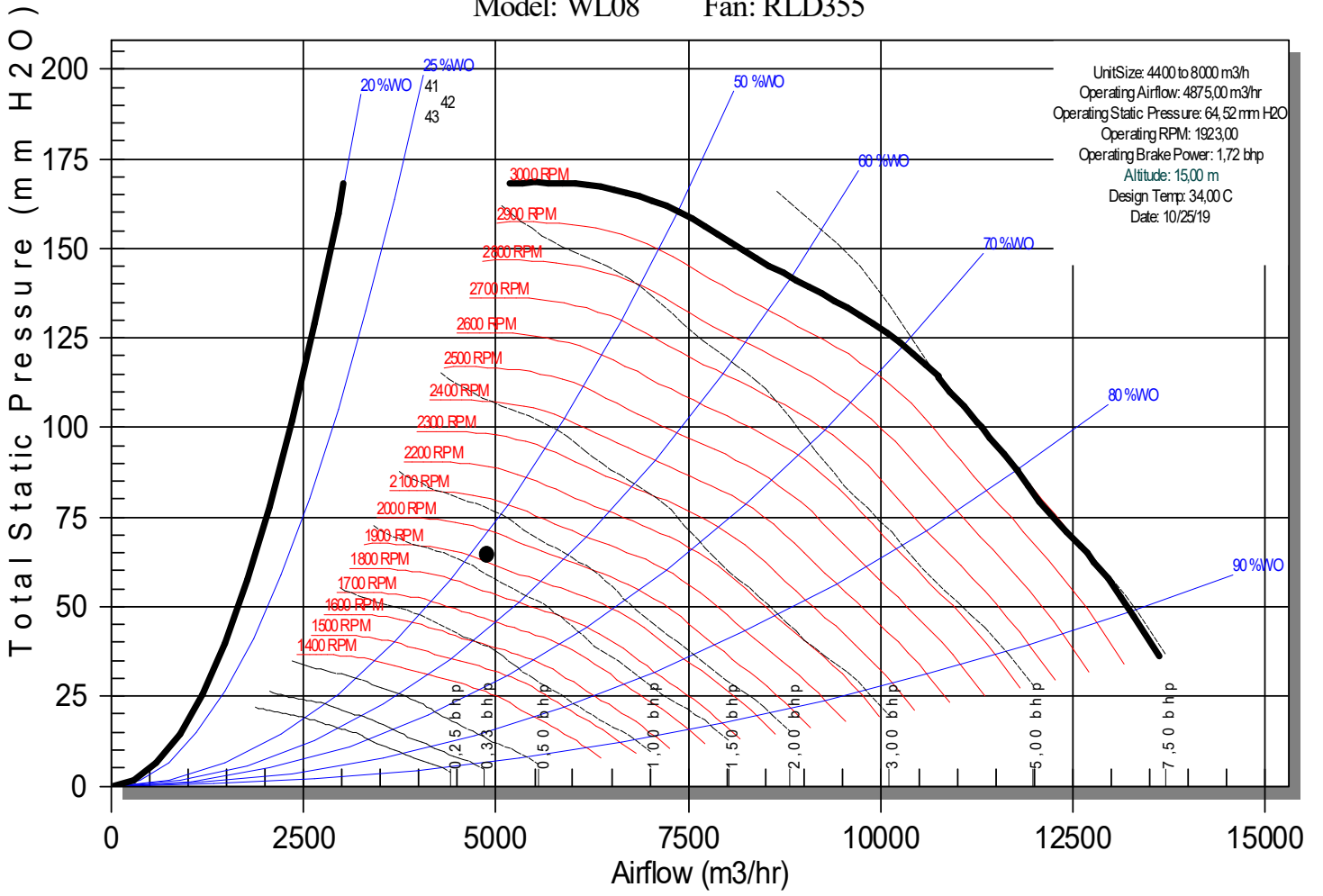
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-07

Model: WL08 Fan: RLD355





"WAVE Doble" Central Station Air Handler (Brazil)

Job Information			
Name	Job01	Tag	AH-TE-08
Address		Quantity	1
Sales Team	TIG	Model Number	WLPA08AGADK-FD00Y00A8BWBA00011000-000000L000000
Comments			

General			
Unit	Wave Doble (Backward-curved Fan)	Modules	(P) Coil & Fan
Cabinet Configuration / Air Discharge	Vertical / Vertical	Unit Size	4400 to 8000 m3/h
Filter Condition	Clean	Air Filter Coil Module	G4 (MERV 8) 1" + M5 (MERV 10) 2"
Air Filter - Final Filter Module	w/o Filter / Not Applicable	Elevation	15,0 m
Max. External Temperature	35,0 C	TraneConnect	UC400 w/ Temperature Sensor
Optional - General	w/o Optional / Not Applicable	Cabinet Effect Loss	6,57 mm H2O
Mixing Box Air Pressure Drop	0,00 mm H2O	Filter Air Pressure Drop	14,11 mm H2O

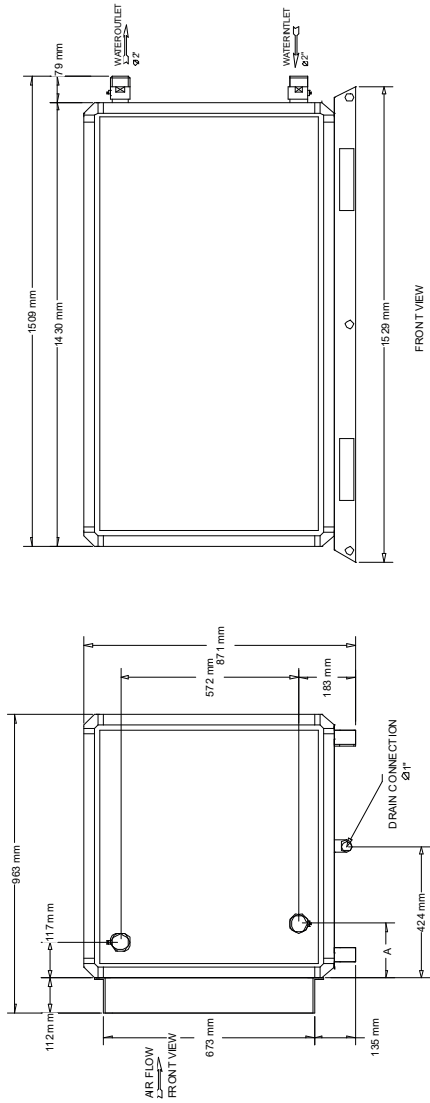
Coil			
Cooling Entering Dry Bulb	34,0 C	Cooling Entering Wet Bulb	27,5 C
Cooling Leaving Dry Bulb	8,8 C	Cooling Entering Water Temperature	6,0 C
Cooling Leaving Water Temperature	12,0 C	Cooling Water Flow Rate	14,08 m3/hr
Cooling Capacity	98,50 kW	Fluid Type	Water
Row Options	8 rows	Fin Options	144 FPF
Circuit	W	Tube Diameter	3/8"
Material Type	Standard	Water Connection	BSP
Water Connection Side	Right Side	Heat Options	w/o Heat / Not Applicable
Cooling Airflow	4875,00 m3/hr	Sensible Capacity	42,76 kW
Cooling Leaving Wet Bulb	8,7 C	Cooling Water Volume	19,15 L
Cooling Water Velocity	2,4 m/s	Cooling Water Pressure Drop	13326,59 mm H2O
Cooling Air Pressure Drop	13,84 mm H2O	Cooling Coil Wet Weight	266 kg
Actual Cooling Face Velocity	1,9 m/s		

Fan/Drive			
Electrical Option	380V/60Hz/3	Optional - Fan Motor	Not Applicable / STD. (See Notes)
External Static Pressure	30,00 mm H2O	Total Static Pressure	64,52 mm H2O
Motor HP	3.0 HP	Brake Horse Power	1,72 bhp
Fan RPM	1923 rpm	Transmission Option	D
Full Load Amps	4,67 A	Locked Rotor Amps	30,85 A
Outlet Velocity	7,2 m/s	Velocity Pressure	31,3 Pa

Humidifier	
Humidification	w/o Humidification / Not Applicable

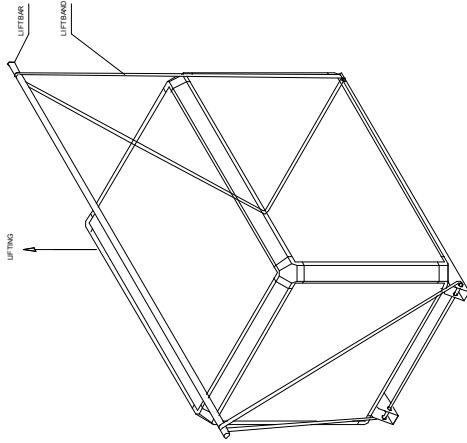


Base Unit			
Distribution Channel	Local (Brazil)	Design Sequence	Sequence A
Design Sequence (Minor Changes)	Sequence A	Service Digit	Digit G
Starter Type	X-Type Starter	Electrical Panel Options	w/o Electrical Panel / Not Applicable
Inverter	w/o Inverter / Not Applicable	Pressostat	w/o Pressostat / Not Applicable
Unit Destination	Local Market - Brazil	Optional - Capacitor	Not Applicable
Optional - Fan Module	w/o Optional / Not Applicable	Optional - Coil Module	w/o Optional / Not Applicable
Special Product	Standard		

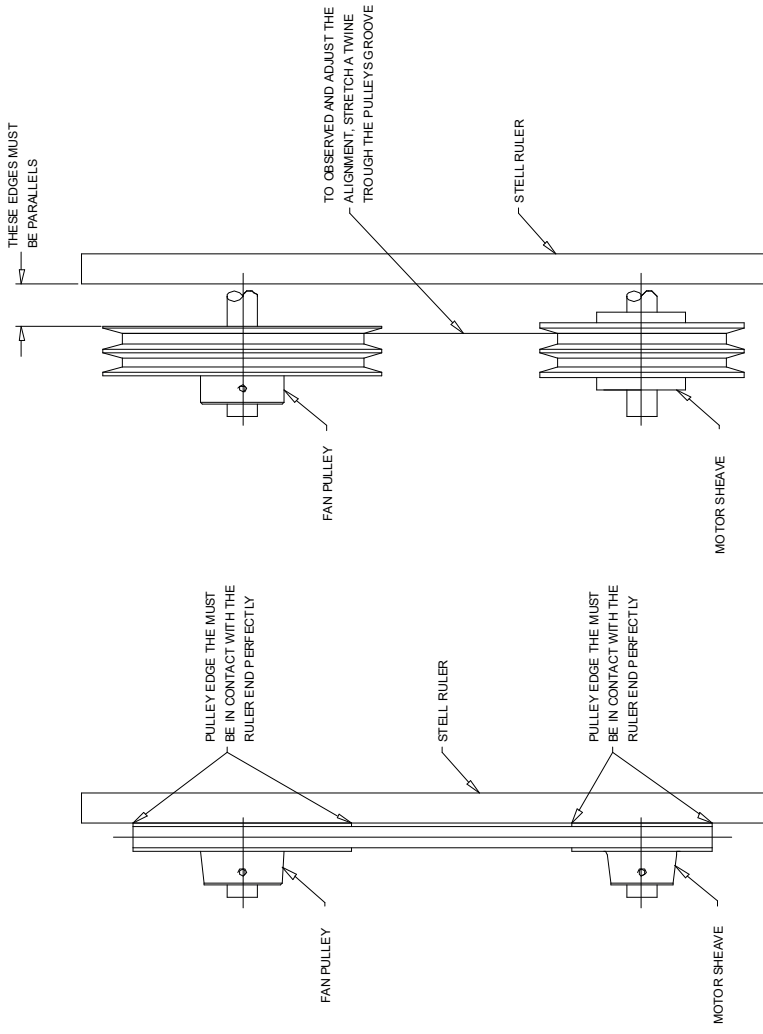


COIL SECTION
 RIGH HAND CONNECTION
 3/8" OD TUBE
 WAVE DOBLE 08

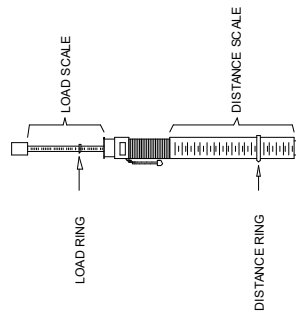
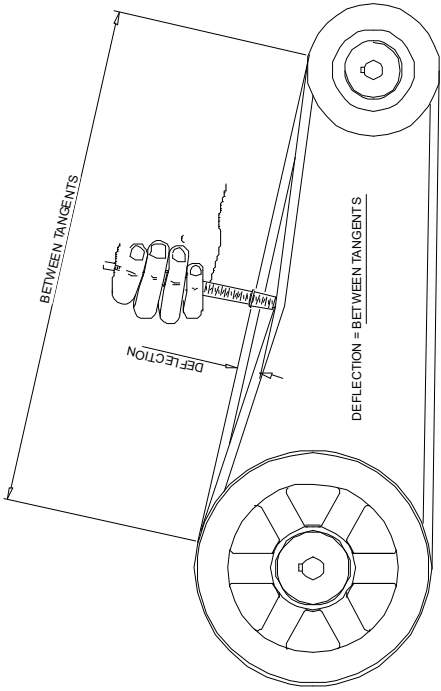
ROWS	A
3	176 mm
4	183 mm
6	227 mm
8	271 mm



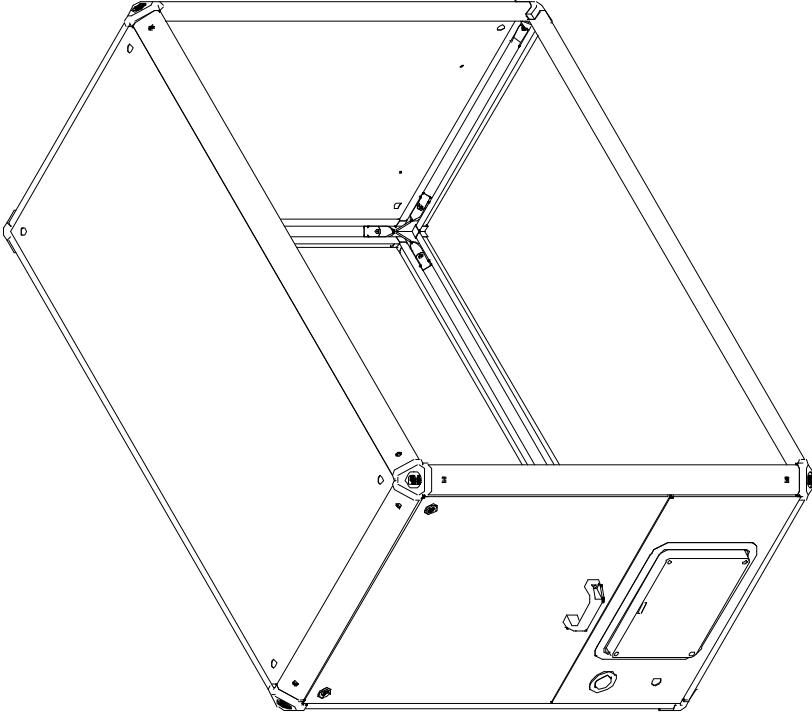
UNIT LIFTING - WITHOUT WOODEN PACKAGE
WAVE DOBLE



PULLEYS ALIGNMENTS INSTRUCTIONS



TENSION MEASURE DEVICE



TraneConnect
WAVE DOBLE



BACKWARD-CURVED FANS

Centrifugal fans with double suction and backward-curved. Built in galvanized steel, with a statically and dynamically balanced rotor, supported on self-aligning shielded bearings.

The fan is driven by sheaves and belts. The motor sheave is adjustable or fixed and the fan sheave is fixed.

COOLING COILS

High efficiency TRANE Wavy-3B coil; The coil is built in seamless copper tubes.

Copper tubes are mechanically expanded in aluminum fins for a perfect contact between fins and tubes.

Collectors are manufactured in seamless copper tubes, welded to the tubes.

Connections are made of steel, threaded and with inputs and outputs welded.

The group is framed by galvanized steel heads, forming a rigid and single structure.

Coils are submitted to explosion proof leak proof tests.

TraneConnect (UC400 Controller and Temperature Sensor)

Interface with the building automation system:

A building automation system can enable the device and change the set point temperature via BACnet MSTP protocol. In addition, information will be available via the protocol for monitoring equipment. If there is a building automation system or communication with this system is lost, the controller will operate in "stand alone" using local sensor to control and adjust the set point temperature.

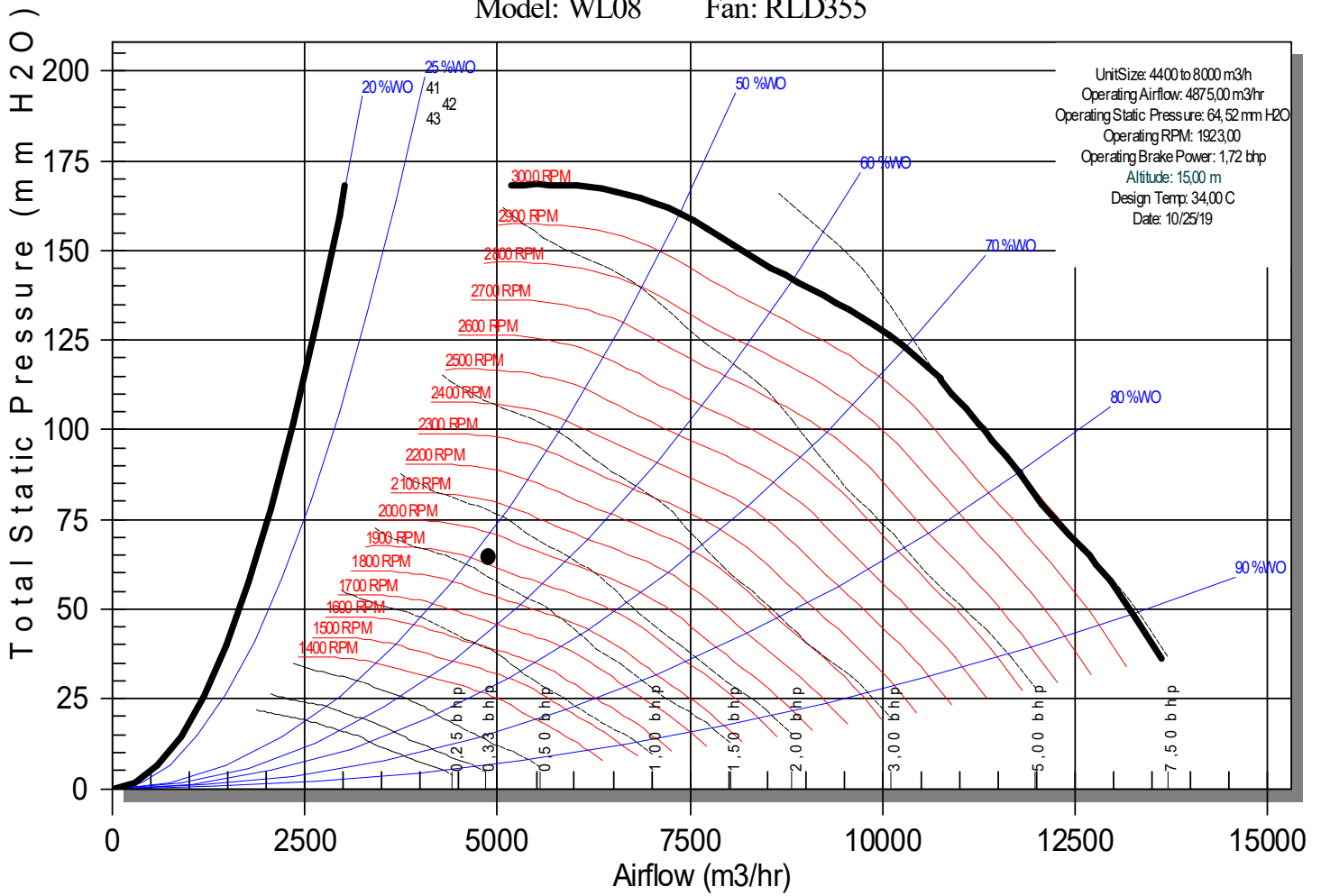
Temperature Sensor

A PID algorithm is used to control the ambient temperature will determine the optimal percentage of opening the water valve control to maintain a stable control range. The control will take into account the difference between the set point temperature and the temperature adjusted.



AH-TE-08

Model: WL08 Fan: RLD355





Lanterny Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lanterny.com.br - lanterny@lanterny.com.br

Cliente	BERLINERLUFT	Data	06/11/2019
Atenção		A nossa oferta	-
A sua referência		Descrição	AH-2P-11
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 2,11P 8NC			
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0 mm
Número de tubos por fileiras	18	Passo das aletas	2,11 mm
Número de fileiras	6	Número de circuitos	8
		Formato tubo	Circular
Capacidade		18368	W
Potencialidade sensível		12691	W
Potencialidade latente		5677	W
Relação da potência sensível / potência total		0,6909	
Quantidade de água produzida		8,21	kg/h
Superfície de troca		65,33	m ²
Coeficiente de transformação global		27	W kg/(m ² kJ)
Delta H Médio Logarítmico		10,54	kJ / kg
Material das aletas / Material dos tubos		Aluminio / Cobre	
Espessura das aletas		0,1300	mm
Volume interno da bateria		11,0	l
Diâmetro externo dos tubos		13,3	mm
Diâmetro interno dos tubos		12,6	mm
Número dos tubos saltados		0	
LADO VENTILAÇÃO			
Pressão atmosférica / altitude		1,01 / 0,00	bar A / m
Fluxo volumétrico de ar		3200,0	m ³ /h
Fluxo máximo de ar		3800	kg/h
Velocidade frontal na bateria		1,90	m/s
Densidade do ar na entrada		1,19	kg/m ³
Temperatura do ar na entrada		22,4	°C
Humidade relativa do ar na entrada		56,60	%
Humidade específica do ar na entrada		9,40	g/kg AS
Entalpia do ar na entrada		46,49	kJ / kg
Temperatura do ar na saída		10,7	°C
Humidade relativa do ar na saída		92,45	%
Humidade específica do ar na saída		7,30	g/kg AS
Entalpia do ar na saída		29,04	kJ / kg
Queda de pressão		106	Pa
Coeficiente de transformação parcial		60	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W
Espessura do gelo		0,00	mm
LADO DO FLUIDO			
Fluido		ÁGUA (1 bar A)	
Fluxo Volumétrico do fluido		2,6	m ³ /h
Fluxo máximo do fluido		2626	kg/h
Velocidade do fluido		0,73	m/s
Temperatura de entrada do fluido		6,0	°C
Temperatura de saída do fluido		12,0	°C
Queda de pressão total do lado do fluido		15,43	kPa
Coeficiente de transformação parcial		2888	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT	Data	06/11/2019
Atenção		A nossa oferta	-
A sua referência		Descrição	AH-2P-12
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 3,2P 8NC			
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0 mm
Número de tubos por fileiras	18	Passo das aletas	3,20 mm
Número de fileiras	6	Número de circuitos	8
		Formato tubo	Circular
Capacidade		15441	W
Potencialidade sensível		11054	W
Potencialidade latente		4387	W
Relação da potência sensível / potência total		0,7159	
Quantidade de água produzida		6,37	kg/h
Superfície de troca		44,34	m ²
Coeficiente de transformação global		29	W kg/(m ² kJ)
Delta H Médio Logarítmico		12,16	kJ / kg
Material das aletas / Material dos tubos		Aluminio / Cobre	
Espessura das aletas		0,1300	mm
Volume interno da bateria		11,0	l
Diâmetro externo dos tubos		13,3	mm
Diâmetro interno dos tubos		12,6	mm
Número dos tubos saltados		0	
LADO VENTILAÇÃO			
Pressão atmosférica / altitude		1,01 / 0,00	bar A / m
Fluxo volumétrico de ar		3250,0	m ³ /h
Fluxo máximo de ar		3859	kg/h
Velocidade frontal na bateria		1,93	m/s
Densidade do ar na entrada		1,19	kg/m ³
Temperatura do ar na entrada		22,4	°C
Humidade relativa do ar na entrada		56,60	%
Humidade específica do ar na entrada		9,40	g/kg AS
Entalpia do ar na entrada		46,49	kJ / kg
Temperatura do ar na saída		12,3	°C
Humidade relativa do ar na saída		88,51	%
Humidade específica do ar na saída		7,80	g/kg AS
Entalpia do ar na saída		32,03	kJ / kg
Queda de pressão		83	Pa
Coeficiente de transformação parcial		60	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W
Espessura do gelo		0,00	mm
LADO DO FLUIDO			
Fluido		ÁGUA (1 bar A)	
Fluxo Volumétrico do fluido		2,2	m ³ /h
Fluxo máximo do fluido		2208	kg/h
Velocidade do fluido		0,62	m/s
Temperatura de entrada do fluido		6,0	°C
Temperatura de saída do fluido		12,0	°C
Queda de pressão total do lado do fluido		11,37	kPa
Coeficiente de transformação parcial		2428	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT	Data	06/11/2019
Atenção		A nossa oferta	-
A sua referência		Descrição	AH-2P-20
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 2,11P 8NC			
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0 mm
Número de tubos por fileiras	18	Passo das aletas	2,11 mm
Número de fileiras	6	Número de circuitos	8
		Formato tubo	Circular
Capacidade		22114	W
Potencialidade sensível		15458	W
Potencialidade latente		6655	W
Relação da potência sensível / potência total		0,6990	
Quantidade de água produzida		9,64	kg/h
Superfície de troca		65,33	m ²
Coeficiente de transformação global		30	W kg/(m ² kJ)
Delta H Médio Logarítmico		11,13	kJ / kg
Material das aletas / Material dos tubos		Aluminio / Cobre	
Espessura das aletas		0,1300	mm
Volume interno da bateria		11,0	l
Diâmetro externo dos tubos		13,3	mm
Diâmetro interno dos tubos		12,6	mm
Número dos tubos saltados		0	
LADO VENTILAÇÃO			
Pressão atmosférica / altitude		1,01 / 0,00	bar A / m
Fluxo volumétrico de ar		4100,0	m ³ /h
Fluxo máximo de ar		4869	kg/h
Velocidade frontal na bateria		2,43	m/s
Densidade do ar na entrada		1,19	kg/m ³
Temperatura do ar na entrada		22,4	°C
Humidade relativa do ar na entrada		56,60	%
Humidade específica do ar na entrada		9,40	g/kg AS
Entalpia do ar na entrada		46,49	kJ / kg
Temperatura do ar na saída		11,2	°C
Humidade relativa do ar na saída		91,16	%
Humidade específica do ar na saída		7,50	g/kg AS
Entalpia do ar na saída		30,09	kJ / kg
Queda de pressão		160	Pa
Coeficiente de transformação parcial		70	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W
Espessura do gelo		0,00	mm
LADO DO FLUIDO			
Fluido		ÁGUA (1 bar A)	
Fluxo Volumétrico do fluido		3,2	m ³ /h
Fluxo máximo do fluido		3161	kg/h
Velocidade do fluido		0,88	m/s
Temperatura de entrada do fluido		6,0	°C
Temperatura de saída do fluido		12,0	°C
Queda de pressão total do lado do fluido		21,43	kPa
Coeficiente de transformação parcial		3461	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-21	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 26T 6NR 820A 2,3P 13NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	26	Passo das aletas	2,30	mm	
Número de fileiras	6	Número de circuitos	13	Formato tubo	Circular
Capacidade			26,39		kW
Potencialidade sensível			19,60		kW
Potencialidade latente			6,79		kW
Relação da potência sensível / potência total			0,7426		
Quantidade de água produzida			9,89		kg/h
Superfície de troca			87,01		m ²
Coeficiente de transformação global			28		W kg/(m ² kJ)
Delta H Médio Logarítmico			10,96		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			16,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			5750,0		m ³ /h
Fluxo máximo de ar			6839		kg/h
Velocidade frontal na bateria			2,36		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,0		°C
Humidade relativa do ar na entrada			55,50		%
Humidade específica do ar na entrada			9,00		g/kg AS
Entalpia do ar na entrada			45,03		kJ / kg
Temperatura do ar na saída			11,9		°C
Humidade relativa do ar na saída			88,55		%
Humidade específica do ar na saída			7,60		g/kg AS
Entalpia do ar na saída			31,09		kJ / kg
Queda de pressão			138		Pa
Coeficiente de transformação parcial			68		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			3,8		m ³ /h
Fluxo máximo do fluido			3773		kg/h
Velocidade do fluido			0,65		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			11,04		kPa
Coeficiente de transformação parcial			2558		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-22	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 2,11P 8NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	18	Passo das aletas	2,11	mm	
Número de fileiras	6	Número de circuitos	8		Formato tubo Circular
Capacidade			22114		W
Potencialidade sensível			15458		W
Potencialidade latente			6655		W
Relação da potência sensível / potência total			0,6990		
Quantidade de água produzida			9,64		kg/h
Superfície de troca			65,33		m ²
Coeficiente de transformação global			30		W kg/(m ² kJ)
Delta H Médio Logarítmico			11,13		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			11,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			4100,0		m ³ /h
Fluxo máximo de ar			4869		kg/h
Velocidade frontal na bateria			2,43		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,4		°C
Humidade relativa do ar na entrada			56,60		%
Humidade específica do ar na entrada			9,40		g/kg AS
Entalpia do ar na entrada			46,49		kJ / kg
Temperatura do ar na saída			11,2		°C
Humidade relativa do ar na saída			91,16		%
Humidade específica do ar na saída			7,50		g/kg AS
Entalpia do ar na saída			30,09		kJ / kg
Queda de pressão			160		Pa
Coeficiente de transformação parcial			70		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			3,2		m ³ /h
Fluxo máximo do fluido			3161		kg/h
Velocidade do fluido			0,88		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			21,43		kPa
Coeficiente de transformação parcial			3461		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-28	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 26T 6NR 820A 2,3P 13NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	26	Passo das aletas	2,30	mm	
Número de fileiras	6	Número de circuitos	13	Formato tubo	Circular
Capacidade			26,39		kW
Potencialidade sensível			19,60		kW
Potencialidade latente			6,79		kW
Relação da potência sensível / potência total			0,7426		
Quantidade de água produzida			9,89		kg/h
Superfície de troca			87,01		m ²
Coeficiente de transformação global			28		W kg/(m ² kJ)
Delta H Médio Logarítmico			10,96		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			16,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			5750,0		m ³ /h
Fluxo máximo de ar			6839		kg/h
Velocidade frontal na bateria			2,36		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,0		°C
Humidade relativa do ar na entrada			55,50		%
Humidade específica do ar na entrada			9,00		g/kg AS
Entalpia do ar na entrada			45,03		kJ / kg
Temperatura do ar na saída			11,9		°C
Humidade relativa do ar na saída			88,55		%
Humidade específica do ar na saída			7,60		g/kg AS
Entalpia do ar na saída			31,09		kJ / kg
Queda de pressão			138		Pa
Coeficiente de transformação parcial			68		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			3,8		m ³ /h
Fluxo máximo do fluido			3773		kg/h
Velocidade do fluido			0,65		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			11,04		kPa
Coeficiente de transformação parcial			2558		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-30	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 2,11P 8NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	18	Passo das aletas	2,11	mm	
Número de fileiras	6	Número de circuitos	8		Formato tubo Circular
Capacidade			22114		W
Potencialidade sensível			15458		W
Potencialidade latente			6655		W
Relação da potência sensível / potência total			0,6990		
Quantidade de água produzida			9,64		kg/h
Superfície de troca			65,33		m ²
Coeficiente de transformação global			30		W kg/(m ² kJ)
Delta H Médio Logarítmico			11,13		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			11,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			4100,0		m ³ /h
Fluxo máximo de ar			4869		kg/h
Velocidade frontal na bateria			2,43		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,4		°C
Humidade relativa do ar na entrada			56,60		%
Humidade específica do ar na entrada			9,40		g/kg AS
Entalpia do ar na entrada			46,49		kJ / kg
Temperatura do ar na saída			11,2		°C
Humidade relativa do ar na saída			91,16		%
Humidade específica do ar na saída			7,50		g/kg AS
Entalpia do ar na saída			30,09		kJ / kg
Queda de pressão			160		Pa
Coeficiente de transformação parcial			70		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			3,2		m ³ /h
Fluxo máximo do fluido			3161		kg/h
Velocidade do fluido			0,88		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			21,43		kPa
Coeficiente de transformação parcial			3461		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Lanterny Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lanterny.com.br - lanterny@lanterny.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-31	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 3,2P 6NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	18	Passo das aletas	3,20	mm	
Número de fileiras	6	Número de circuitos	6	Formato tubo	Circular
Capacidade			19,14		kW
Potencialidade sensível			13,72		kW
Potencialidade latente			5,42		kW
Relação da potência sensível / potência total			0,7166		
Quantidade de água produzida			7,88		kg/h
Superfície de troca			44,34		m ²
Coeficiente de transformação global			35		W kg/(m ² kJ)
Delta H Médio Logarítmico			12,19		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			11,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			4050,0		m ³ /h
Fluxo máximo de ar			4809		kg/h
Velocidade frontal na bateria			2,40		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,4		°C
Humidade relativa do ar na entrada			56,60		%
Humidade específica do ar na entrada			9,40		g/kg AS
Entalpia do ar na entrada			46,49		kJ / kg
Temperatura do ar na saída			12,4		°C
Humidade relativa do ar na saída			88,40		%
Humidade específica do ar na saída			7,80		g/kg AS
Entalpia do ar na saída			32,11		kJ / kg
Queda de pressão			120		Pa
Coeficiente de transformação parcial			68		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			2,7		m ³ /h
Fluxo máximo do fluido			2737		kg/h
Velocidade do fluido			1,02		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			37,02		kPa
Coeficiente de transformação parcial			3968		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT	Data	06/11/2019
Atenção		A nossa oferta	-
A sua referência		Descrição	AH-2P-32
BATERIA DE ARREFECIMENTO - 1_2_27_5 x 31_75 26T 6NR 820A 3,2P 13NC			
Geometria	1_2_27_5 x 31_75	Comprimento da bateria	820,0 mm
Número de tubos por fileiras	26	Passo das aletas	3,20 mm
Número de fileiras	6	Número de circuitos	13
		Formato tubo	Circular
Capacidade		21,10	kW
Potencialidade sensível		16,39	kW
Potencialidade latente		4,71	kW
Relação da potência sensível / potência total		0,7768	
Quantidade de água produzida		6,91	kg/h
Superfície de troca		64,04	m ²
Coeficiente de transformação global		28	W kg/(m ² kJ)
Delta H Médio Logarítmico		11,93	kJ / kg
Material das aletas / Material dos tubos		Aluminio / Cobre	
Espessura das aletas		0,1300	mm
Volume interno da bateria		16,0	l
Diâmetro externo dos tubos		13,3	mm
Diâmetro interno dos tubos		12,6	mm
Número dos tubos saltados		0	
LADO VENTILAÇÃO			
Pressão atmosférica / altitude		1,01 / 0,00	bar A / m
Fluxo volumétrico de ar		5200,0	m ³ /h
Fluxo máximo de ar		6708	kg/h
Velocidade frontal na bateria		2,13	m/s
Densidade do ar na entrada		1,29	kg/m ³
Temperatura do ar na entrada		21,9	°C
Humidade relativa do ar na entrada		55,40	%
Humidade específica do ar na entrada		8,90	g/kg AS
Entalpia do ar na entrada		44,75	kJ / kg
Temperatura do ar na saída		13,3	°C
Humidade relativa do ar na saída		84,48	%
Humidade específica do ar na saída		7,90	g/kg AS
Entalpia do ar na saída		33,37	kJ / kg
Queda de pressão		101	Pa
Coeficiente de transformação parcial		63	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W
Espessura do gelo		0,00	mm
LADO DO FLUIDO			
Fluido		ÁGUA (1 bar A)	
Fluxo Volumétrico do fluido		3,0	m ³ /h
Fluxo máximo do fluido		3016	kg/h
Velocidade do fluido		0,52	m/s
Temperatura de entrada do fluido		6,0	°C
Temperatura de saída do fluido		12,0	°C
Queda de pressão total do lado do fluido		7,4387	kPa
Coeficiente de transformação parcial		2028	W/(m ² K)
Coeficiente de sujidade		0,000000	(m ² K)/W



Lantery Ind. Com.
 Rua Paulo Emanoelli, 26 - Pinhal - Cabreúva
 Tel: +55 11 4529-3197
 Web: www.lantery.com.br - lantery@lantery.com.br

Cliente	BERLINERLUFT		Data	06/11/2019	
Atenção			A nossa oferta	-	
A sua referência			Descrição	AH-2P-33	
BATERIA DE ARREFECIMENTO - 1_2 27_5 x 31_75 18T 6NR 820A 2,11P 8NC					
Geometria	1_2 27_5 x 31_75	Comprimento da bateria	820,0	mm	
Número de tubos por fileiras	18	Passo das aletas	2,11	mm	
Número de fileiras	6	Número de circuitos	8		Formato tubo Circular
Capacidade			22,11		kW
Potencialidade sensível			15,59		kW
Potencialidade latente			6,52		kW
Relação da potência sensível / potência total			0,7052		
Quantidade de água produzida			9,44		kg/h
Superfície de troca			65,33		m ²
Coeficiente de transformação global			31		W kg/(m ² kJ)
Delta H Médio Logarítmico			11,05		kJ / kg
Material das aletas / Material dos tubos			Aluminio / Cobre		
Espessura das aletas			0,1300		mm
Volume interno da bateria			11,0		l
Diâmetro externo dos tubos			13,3		mm
Diâmetro interno dos tubos			12,6		mm
Número dos tubos saltados			0		
LADO VENTILAÇÃO					
Pressão atmosférica / altitude			1,01 / 0,00		bar A / m
Fluxo volumétrico de ar			4200,0		m ³ /h
Fluxo máximo de ar			4989		kg/h
Velocidade frontal na bateria			2,49		m/s
Densidade do ar na entrada			1,19		kg/m ³
Temperatura do ar na entrada			22,3		°C
Humidade relativa do ar na entrada			56,50		%
Humidade específica do ar na entrada			9,40		g/kg AS
Entalpia do ar na entrada			46,19		kJ / kg
Temperatura do ar na saída			11,3		°C
Humidade relativa do ar na saída			90,84		%
Humidade específica do ar na saída			7,50		g/kg AS
Entalpia do ar na saída			30,20		kJ / kg
Queda de pressão			166		Pa
Coeficiente de transformação parcial			71		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W
Espessura do gelo			0,00		mm
LADO DO FLUIDO					
Fluido	ÁGUA (1 bar A)				
Fluxo Volumétrico do fluido			3,2		m ³ /h
Fluxo máximo do fluido			3160		kg/h
Velocidade do fluido			0,88		m/s
Temperatura de entrada do fluido			6,0		°C
Temperatura de saída do fluido			12,0		°C
Queda de pressão total do lado do fluido			21,43		kPa
Coeficiente de transformação parcial			3461		W/(m ² K)
Coeficiente de sujidade			0,000000		(m ² K)/W



Chapa Standard (ST)

Constituídas de gesso, água, aditivos e papel cartão, as chapas ST Trevo Drywall são flexíveis, versáteis e produzidas de acordo com a norma NBR 14715-1.

Aplicações:

Indicadas para construção de paredes, forros e mobiliários, exclusivamente para áreas secas.

Destinado para:



Hotéis



Residências



Supermercados



Escolas



Hospitais



Shoppings



Edifícios
Comerciais e
Corporativos

Tabela de materiais:

Tipo Borda	Espessura mm	Largura mm	Comprimento mm	Peso kg/m ²	Embalagens peças/palet
Chapa ST - BR Standard	12,5	600	2.000	8,5	120
Chapa ST - BR Standard	12,5	1200	1.800 / 2.400	8,5	60
Chapa ST - BR Standard	15,0	1.200	2.400	12,0	60



Home / Produtos / Chapas Trevo Drywall / Chapa Resistente à Umidade (RU)



Chapa Resistente à Umidade (RU)

Com propriedades hidrofugantes, as chapas RU Trevo Drywall são indicadas para a aplicação em ambientes úmidos. Produtos igualmente fabricados de acordo com a NBR 14715-1.

Aplicações:

Pode ser utilizada em banheiros, cozinha, áreas de serviço, por tempo limitado de forma intermitente.

Destinado para:



Hotéis



Residências



Supermercados



Escolas



Hospitais



Shoppings



Edifícios
Comerciais e
Corporativos

Tabela de materiais:

Tipo Borda	Espessura mm	Largura mm	Comprimento mm	Peso kg/m ²	Embalagens peças/palet
Chapa RU - BR Resistente à umidade	12,5	1.200	1.800 / 2.400	8,5	60
Chapa RU - BR Resistente à umidade	15,0	1.200	1.800 / 2.400	12,0	60

FORROS MINERAIS OWA


INFORMAÇÕES ÚTEIS

CATÁLOGO

DOWNLOADS

Home | Linha de Produtos | Forros Minerais OWA | Forro Mineral Brilliante – NRC 0,70

Brilliante



Densidade
280 kg/m³

Peso
3,51 kg/m²

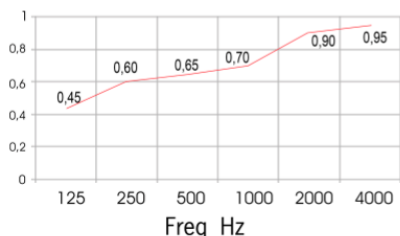
Coefficiente Térmico
0,057 W/m²°C

Cores e Texturas
Branca com suave véu de vidro e textura lisa

Características Técnicas

- Absorção Sonora ■
- NRC=0,70 | $\alpha_w=0,70$ ■
- SRA=0,80 Atenuação ■
- Sonora ■ CAC = 30 dB
- Resistência à Umidade ■
- Até 95% RH Reflexão à Luz ■
- 78% (ISO 7724-2, ISO 7724-3) ■
- Reação ao Fogo ■
- A2-s1,d0 EN 13501-1
- Classe II A ITiO e
- NBR16626 Classe 1
- ASTM E 84-97a

Curva de Absorção



*GRÁFICO CONFORME NORMA DIN EN ISO 354

Clique na imagem para ampliar



FORRO MINERAL BRILLIANTO – NRC 0,70

Opção acessível com boa performance acústica, visual claro e agradável devido a superfície revestida com suave véu de vidro e pintura branca lisa. Você pode facilmente instalar o forro Brilliante utilizando os perfis metálicos OWA. Placa acústica removível utilizada como forro para absorção e redução de ruídos, instalada com sistema de perfis T clicados, produzida em fibra mineral branca biossolúvel derivada de calcário, compostos naturais, livre de formaldeído, com pintura a base d'água e pigmentos naturais de ação bacteriostática e fungistática, respeitando a saúde e o meio ambiente e sendo recomendada para áreas administrativas, instituições de ensino, hospitais, aeroportos, cinemas, auditórios, entre outros. Os forros minerais OWA apresentam maior resistência mecânica devido à sua alta densidade e compactação, reduzindo-se os índices de quebras de bordas durante o transporte, armazenamento e instalação

Sustentabilidade

Os Forros Minerais OWA são resultados e pesquisa de longo prazo, que atendem todos os requisitos importantes para qualidade, segurança e meio ambiente, sendo certificados pelos selos: RAL – logo que endossa o respeito à saúde e garante a qualidade permanente de nossa fibra mineral e BLUE ANGEL – que classifica os Forros Minerais OWA como materiais de construção isentos de VOC's e, por este motivo, considerado um produto seguro ao meio ambiente e a saúde, contribuindo com créditos para certificação LEED e AQUA.

Créditos LEED:

- Consumo de energia
- Gerenciamento de resíduos
- Conteúdo reciclado:
- Declaração Ambiental de Produto – EPD
- Emissão de VOC's
- Iluminação natural e paisagem
- Performance Acústica – Absorção Sonora

Proteção à Saúde:

- Selo BLUE ANGEL
- Não emitem VOC's
- Resistente a fungos e bactérias (DIN 53739)

Proteção ao Meio Ambiente:

- 100% Recicláveis
- Produzido em pura fibra mineral branca biossolúvel e compostos naturais
- Não contém formaldeído



Qualidade e segurança

Os forros minerais OWA oferecem características de qualidade e segurança, apresentando ótima ação fungistática e bacteriostática, além de excelente reação ao fogo, sendo classificados como não combustíveis pelas rigorosas normas de segurança da Europa (EN13501-1), Estados Unidos (ASTM E84-97) e Brasil (NBR-16626). Utilizados em conjunto com sistemas de construção industrializados os forros minerais OWA podem apresentar até 120 minutos de proteção ao fogo**, conforme a norma EN13501-2. Consulte catálogo OWA 9500 – Proteção ao Fogo.

FORROS MINERAIS OWA

INFORMAÇÕES ÚTEIS

CATÁLOGO

DOWNLOADS

[Home](#) | [Linha de Produtos](#) | [Forros Minerais OWA](#) | [Forro Mineral Brillante - NRC 0,70](#)**Conforto acústico:**

- Elevada Absorção Sonora - α_w , NRC e SRA
- Atenuação Sonora - CAC e Dnfw
- Alta densidade e compactação

Reação ao Fogo:

- Norma NBR 16626 e IT10 - Classe IIA
- EN13501-1 A2-s1-d0 - Não Combustíveis
- ASTM E84 Classe 1

Bordas e Dimensões

S 3  1250 x 625 mm
625 x 625 mm

Garantia

A linha de forros minerais OWA oferece 10 anos de garantia - desde que as recomendações de instalação recomendadas pelo fabricante sejam respeitadas. Os forros minerais não são indicados para uso diretamente abaixo de coberturas metálicas ou de fibrocimento que não tenham adequada proteção térmica e ventilação no entreforro.

Transporte

- O transporte e armazenagem dos forros requer cuidados, como não apoiar as placas pelas bordas, estocar sempre sobre base seca e plana em local livre de intempéries. Consulte nosso guia de instalação
- Apenas retire o forro da embalagem quando a estrutura metálica de sustentação estiver finalizada

Armazenagem

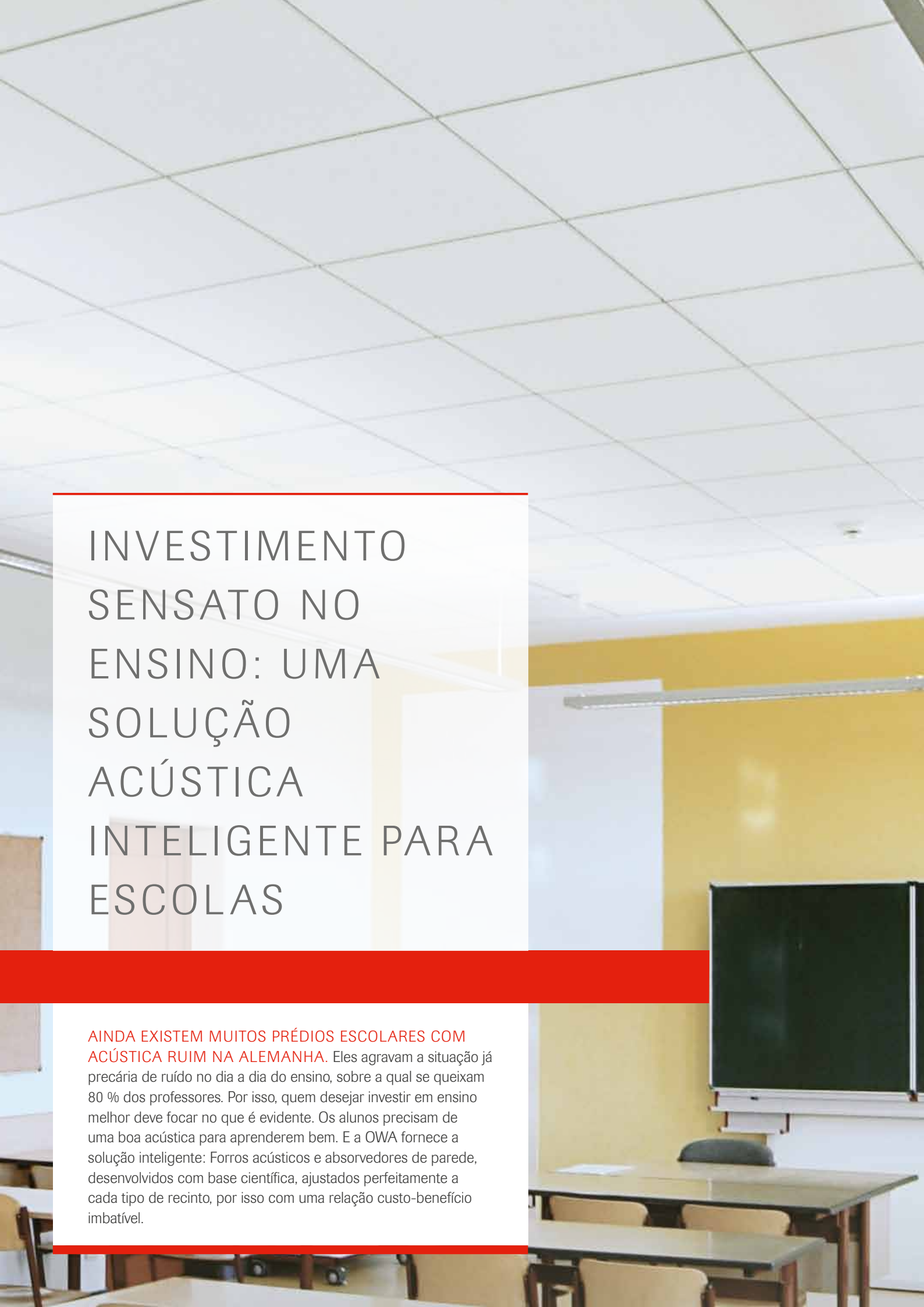
- Sobre piso ou pallet plano e seco
- Em local com temperatura ambiente, ventilados e sem poeira
- Com as caixas sempre na posição horizontal
- Com empilhamento máximo de 18 caixas, sendo possível acondicionar até 36 caixas de placas 1250 x 625 mm nos pallets de 1250 x 1250 mm.
- Protegidos de intempéries.



SOLUÇÕES ACÚSTICAS PARA ESCOLAS

OWAlifetime collection

OWA



INVESTIMENTO SENSATO NO ENSINO: UMA SOLUÇÃO ACÚSTICA INTELIGENTE PARA ESCOLAS

AINDA EXISTEM MUITOS PRÉDIOS ESCOLARES COM ACÚSTICA RUIM NA ALEMANHA. Eles agravam a situação já precária de ruído no dia a dia do ensino, sobre a qual se queixam 80 % dos professores. Por isso, quem desejar investir em ensino melhor deve focar no que é evidente. Os alunos precisam de uma boa acústica para aprenderem bem. E a OWA fornece a solução inteligente: Forros acústicos e absorvedores de parede, desenvolvidos com base científica, ajustados perfeitamente a cada tipo de recinto, por isso com uma relação custo-benefício imbatível.

Entender e otimizar a acústica ambiente

O parâmetro mais importante da acústica ambiente, o tempo de reverberação, indica quanto tempo um ruído „ressona“ no recinto. Quando o tempo de reverberação é longo demais, as sílabas subsequentes são encobertas ao falar, o que reduz significativamente a compreensão da fala. Para isso são usadas as soluções da OWA.

O tempo de reverberação correto é decisivo

Não basta, portanto, trabalhar sobre a absorção sonora, isto é, obter o maior valor possível de absorção sonora. A compreensão da fala no recinto é decidida principalmente pelo tempo de reverberação. Verificações científicas mostram que existem boas condições acústicas quando a absorção e a reflexão do som estão bem balanceadas.

Resultado da pesquisa OWA: Uma relação custo-benefício convincente

Décadas de trabalho desenvolvido e numerosos projetos de escolas da OWA comprovam: Muitas vezes menos é mais! Com apenas 55 % de forros absorvedores acústicos já podem ser atingidos os tempos de reverberação requeridos. Isso torna as nossas soluções muito eficientes e competitivas em preço.

Acústica e proteção contra incêndios: na OWA ambos são „best in class!“

Desempenho acústico otimizado sem concessões na proteção contra incêndios: com a OWA é assim. Os sistemas padronizados oferecem excelentes características de proteção contra incêndio, até F 90/ REI 90 ou F 120/ REI 180, Classe A (Norma NBR 9442).

À prova de impactos de bola e acusticamente absorvedores

Com o sistema de forros S 3 bws os ginásios esportivos são equipados à prova de impactos de bola e ao mesmo tempo possuem absorção sonora. Isso permite uma utilização para múltiplas finalidades, sem problemas.

Diversidade também no visual: Forros com opções de design

Desde forros acústicos padrão de baixo custo até forros com superfícies lisas e sem perfil aparente – com sistemas OWA é possível realizar numerosas versões de design.





ACÚSTICA,
PERFORMANCE
E DESIGN
REUNIDOS

ACÚSTICA COM PRECISÃO CONFORME NORMA DIN

A DIN 18041 diferencia entre dois tipos de recintos. Para o grupo A, relevante ao ensino ela define requisitos concretos, enquanto que para o grupo B ela apenas faz recomendações. O decisivo para um atendimento ponto a ponto dos requisitos ao grupo A é ter um parceiro que trabalha cientificamente, colocando o foco do seu desenvolvimento sobre o tempo de reverberação e que disponha de experiência fundamentada com instituições de ensino e todos os seus tipos de recintos: a OWA.



Recintos do grupo A

„Audibilidade a distâncias médias e grandes“

Música

- Salas para ensino de música com produção ativa de música e canto
- Sala para treinamento e apresentações musicais

Fala

- Auditórios
- Salão comunitário, recinto de aglomeração
- Recinto para testes musicais em escolas de música ou semelhantes.
- Ginásios de esportes e natação

Aula

- Sala de aula (exceto para música), sala de audição
- Sala de aula de música com apresentações audiovisuais
- Salas para grupos em jardins de infância, lares para idosos
- Salas para seminários, recintos para interação
- Auditórios
- Recinto para tele-ensino
- Recinto para reuniões e conferências
- Recinto para apresentações exclusivamente para utilização eletroacústica (por ex., pequenos teatros)

Esporte 1

- Ginásios de esportes e natação sem público

Esporte 2

- Ginásios de esportes e natação sem público para operação em várias categorias



Recintos do grupo B

„Audibilidade a curtas distâncias“

- Escritórios individuais, coletivos e panorâmicos
- Call-Center
- Recintos de vendas, restaurantes
- Salas de espera, bilheterias
- Salas de atendimento em escritórios de advocacia e consultórios médicos
- Escritórios de atendimento público
- Salas de cirurgia, tratamento e reabilitação
- Salas de leitura e atendimento em bibliotecas
- Áreas para workshops
- Áreas públicas, áreas para circulação de público
- Lobbies, recintos de exposição, escadarias

Cada escola tem os seus tipos de salas. E a OWA tem as melhores soluções

Salas de aula, salas de audição, salas para grupos, auditórios, salas para música, lobbies, corredores, rotas de fuga, cafeterias, cozinhas – Instituições de ensino têm muitos recintos diferentes. A OWA cobre todos eles – com precisão pontual e por isso sempre com preço competitivo, usando o conceito acústico certo. Com uma grande escolha de acabamentos e possibilidades de estilo.

Salas de aula, auditórios, creches

Recintos do grupo A conforme DIN 18041 com especificações para tempo de reverberação $T_{\text{especificado}}$ [s]

$$T_{\text{especificado}} \text{ [s]} = 0,32 \cdot \log(V) - 0,17 \text{ s}$$

Conceito da acústica do recinto:

Forro OWAcoustic® suspenso com grau de absorção sonora avaliado NRC de no mínimo 0,65 (0,70 em creches)

OWAcoustic® recomendações de design:

Cosmos/N (NRC = 0,65) Tonica (NRC = 0,75)
Constellation (NRC = 0,70) Bolero | Sinfonia (NRC = 0,85)
Piano (NRC = 0,80) Brillianto A (NRC = 0,90)



Lanchonete, cantina

Recintos do grupo B conforme DIN 18041, sem requisitos específicos ao tempo de reverberação.

Recomendações para o aumento da absorção do som.

Objetivo: Redução do nível de pressão sonora e do tempo de reverberação.

OWAcoustic® recomendações de design:

Constellation (NRC = 0,70)
Tonica (NRC = 0,75)
Piano (NRC = 0,80)
Bolero | Sinfonia (NRC = 0,85)





Auditórios

Recinto de finalidade múltipla do grupo A conforme DIN 18041, com especificação de tempo de reverberação para uso misto de fala e música.

Conceito da acústica do recinto:

São possíveis diferentes forros.

OWAcoustic® recomendações de design:

Sandila Micro (NRC = 0,65) Cosmos/N (NRC = 0,65)

Piano (NRC = 0,80)



Lobby, rota de fuga, escadaria

Recintos do grupo B conforme DIN 18041, sem requisitos específicos ao tempo de reverberação. Na „Diretriz para higiene de recintos internos em prédios escolares“ do Departamento Federal do Meio Ambiente (UBA – Alemanha) são definidas recomendações que objetivam menos a compreensibilidade da fala, mas mais a atenuação de ruídos que podem ser muito altos.

$$T_{\text{objetivo}} = V/1000\text{m}^3 + 0,8 \text{ [s]} \text{ para } V = 100 \text{ até } 800 \text{ m}^3$$

OWAcoustic® recomendações de design:

Sirius (NRC = 0,65)

Constellation (NRC = 0,70)

OWAplan monolítico (NRC = 0,65)



Ginásios esportivos

Recintos do grupo A conforme DIN 18041, com requisitos ao tempo de reverberação T^* (para $V = 2000$ até 8500 m^3).

$$T_{\text{objetivo}} \text{ [s]} = 1,27 \cdot \log(V) - 2,49 \text{ s (para aulas para um grupo)}$$

$$T_{\text{objetivo}} \text{ [s]} = 0,95 \cdot \log(V) - 1,74 \text{ s (para aulas para múltiplos grupos)}$$

Conceito da acústica do recinto:

Forro OWAcoustic® suspenso com grau de absorção sonora avaliado NRC de no mínimo 0,65 em combinação com o sistema à prova de arremesso de bola S 3 bws.

OWAcoustic® recomendações de design:

Cosmos/N (NRC = 0,65) Bolero | Sinfonia (NRC = 0,85)

Constellation (NRC = 0,70)

Soluções acústicas para escolas



Boa parceria para uma estadia saudável

Desde 01.01.2013 a Odenwald Faserplattenwerk GmbH (OWA) é o novo parceiro de produtos para o Instituto Sentinel Haus. A OWA providenciou o teste dos produtos OWAacoustic e com estes ela é parceira de produtos para a Alemanha. O fundamento de vida mais importante para as pessoas é o ar que respiramos. Devido ao nosso modo de vida, durante pelo menos 20 horas ao dia este ar é de recintos internos. Isso evidencia quão importante é a qualidade do ar interno para o bem estar físico. Por isso, o Departamento Federal do Meio Ambiente recomenda para recintos internos um valor máximo de 1000 µg/m³ para a carga de solventes (TVOC). Esse valor também é garantido pelo certificado de saúde SHI.

A OWA aplica a norma industrial alemã – DIN 18177

Em trabalho conjunto com a União WETEC a OWA participou consideravelmente na elaboração da nova DIN 18177 „Placas minerais produzidas pelo processo úmido - Valores característicos e procedimentos de teste“. A DIN 18177 regulamenta apenas a fabricação e as características das placas minerais e define requisitos para as placas minerais produzidas pelo processo úmido (“wet felt”). Além dos requisitos clássicos, como áreas de aplicação, indicações normativas, terminologia, símbolos e abreviaturas, requisitos gerais e especiais, procedimentos de teste, avaliação de conformidade, denominação das placas minerais, identificações, etc., a DIN 18177 regulamenta as seguintes classes:

- Emissões de componentes orgânicos voláteis (TVOC)
- Emissão de formaldeído
- Permeabilidade ao ar

Muitos produtos OWAacoustic® premium e smart estão classificados nas classes TVOC 1 e ficam abaixo mesmo dos valores limites especificados pela classificação ambiental “Blue Angel”. Assim como na emissão de componentes orgânicos voláteis (TVOC), muitos produtos OWAacoustic® premium e smart também ficam consideravelmente abaixo do valor limite para a emissão de formaldeído especificado pela classificação ambiental „Blue Angel”, de < 60 µg/m³. Dessa forma eles recaem na classe FH 1 conforme DIN 18177.

Placas com elevada permeabilidade ao ar acumulam muita poeira devido ao assim chamado efeito filtrante. Dessa forma fica prejudicado o efeito decorativo das placas de revestimento do recinto. Os produtos OWAacoustic® ao contrário, reduzem esse efeito devido à sua baixa permeabilidade ao ar, evitando assim a subsequente sujidade em sua superfície.



Odenwald Faserplattenwerk GmbH
Dr.-F.-A.-Freundt-Straße 3 | 63916 Amorbach
tel +49 93 73.2 01-0 | info@owa.de
www.owa-ceilings.com

Diadema- SP 05/01/2019

Classificação de Resíduos

FORRO MINERAL E PERFIS OWA

De acordo com a **RESOLUÇÃO CONAMA nº 307 Art. 3º Inciso II** que estabelece diretrizes, critérios e procedimentos para a gestão dos resíduos da construção civil, em obras de instalação, reforma ou demolição de forros suspensos, todos os componentes dos sistemas de forros suspensos (perfis metálicos, tirantes metálicos, suportes niveladores, placas de fibra mineral) fabricados e fornecidos pela OWA Odeanwald Faserplattenwerk GmbH são classificados como "**Classe C**". Os placas de fibra mineral OWA são classificados na posição "**17.06.04**" segundo o sistema EWC – European Waste Classification.

Na fabricação dos forros minerais OWA, utiliza-se matérias-primas naturais. Os principais ingredientes são: argila, perlita, lãs minerais e aglomerantes orgânicos. A OWA não utiliza amianto em seus produtos. As placas não têm formaldeído, tudo isso é comprovado pelos certificados Blue Angel e RAL.

Pela natureza de composição dos forros minerais OWA : fibra mineral branca bio-solúvel (proveniente de calcário+areia), com adição de perlita e argila, todos considerados não nocivos, não cancerígenos, atóxicos e inertes, atendem a classificação da CETESB como resíduos classe II – B - Não perigosos, que não alteram a potabilidade da água. Portanto as placas de forro mineral OWA podem ser recicladas ou na impossibilidade podem ser descartadas em aterro comum.

Orientação para Manutenção e Limpeza das Placas de Fibra Mineral e Owaplan OWA

Limpeza & Manutenção

Os forros minerais Owa não requerem mais manutenção do que tetos de gesso pintados, no entanto, quando é necessária a manutenção, alguns procedimentos devem ser seguidos para garantir a continuidade do alto desempenho e visual atraente.

Recomendamos a instalação sempre com equipe treinada e capacitada.

Poeira e sujeira solta podem ser facilmente removidas pela escovação ou com um aspirador de pó, como aqueles utilizados para a limpeza de sofás ou paredes. Certifique-se de limpar somente em uma direção, isto vai evitar o atrito de pó na superfície das placas de fibra mineral.

Depois da retirada do pó, marcas de lápis, manchas ou sujeira superficial podem ser facilmente removidas com uma borracha de resina comum. A maioria dos forros de fibra mineral OWA pode ser limpa com um pano úmido ou uma esponja umedecida em água contendo sabão neutro (a esponja deve conter o mínimo de água possível). Após a limpeza, o filme de sabão deve ser limpo com um pano ou esponja levemente umedecido em água limpa.

Pintura fora do Processo Industrial

A OWA não recomenda a repintura dos forros em fibra mineral, pois podem comprometer as características estéticas, de resistência ao fogo, desempenho acústico, estabilidade dimensional e reflexão de luz. Todas as garantias serão anuladas pela repintura do produto.

Outras dúvidas, acesse: www.owa.com.br



FOGO: EN 13501 - A
NORMA EUROPEIA

As normas europeias

As Normas Europeias Harmonizadas sobre o Fogo são um conjunto de normas que foram aceitas por todos os países da Comunidade Econômica Europeia. Isso permite aos fabricantes produzirem ou importarem produtos que foram testados de acordo com uma norma comum sem a necessidade de testes em cada Estado membro. Os testes com estas normas agora são aceitos em todos os países da CEE.

O cumprimento das normas e regulamentos europeus é obrigatório.

Todos os laboratórios de testes europeus certificados (“Organismos Notificados”) que estão registrados na EOTA (Organização Europeia de Aprovação Técnica) podem executar esses testes e emitir os resultados dos testes correspondentes (TTI – Teste de Tipo Inicial). Além disso, pode haver outros testes nacionais ou exigências de regulação para a construção que podem precisar ser observados.

A Declaração de Desempenho (DdP) e o “KIT” de etiqueta CE são os dois principais documentos que normalmente serão exigidos pelas autoridades oficiais locais para demonstrar que o sistema de forro vai cumprir os níveis de desempenho especificados. O uso de componentes além daqueles fornecidos pela OWA vai impedir a emissão de uma etiqueta KIT.



Reação ao fogo

Se o fogo puder encontrar materiais inflamáveis suficientes, ele vai se espalhar rapidamente por uma área. É, portanto, crucial utilizar materiais de combustibilidade limitada nas superfícies principais de um ambiente, como nos forros e paredes. O uso desses materiais pode reduzir drasticamente a velocidade com que as chamas se espalham em uma área, assim como minimizar sua contribuição para o incêndio.

A norma europeia EN 13501-1: Reação ao Fogo oferece uma série de critérios de desempenho para medir as características relacionadas ao fogo em materiais de construção. Estes incluem a propagação da chama e contribuição para o incêndio e também a geração de fumaça e produção de partículas quentes. A tabela abaixo fornece uma visão geral das classificações disponíveis.

Exigências adicionais		Classes europeias de acordo com a EN 13501-1
Sem fumaça	Sem partículas quentes caindo/escorrendo	
✓	✓	A1
✓	✓	A2-s1,d0
✓	✓	B-s1,d0 C-s1,d0
	✓	A2-s2,d0 A2-s3,d0 B, C-s2,d0 B, C-s3,d0
✓		A2-s1,d1 A2-s1,d2 B, C-s1,d1 B, C-s1,d2
		A2-s3,d2 B-s3,d2
✓	✓	D-s1,d0
	✓	D-s2,d0 D-s3,d0
		E E-d2 F
✓		D-s1,d2 D-s2,d2 D-s3,d2

As categorias adicionais são:

Fumaça | s1, s2, s3

s1 = pouca ou nenhuma geração de fumaça

s2 = média geração de fumaça

s3 = muita geração de fumaça

Partículas quentes | d0, d1, d2

d0 = sem partículas dentro de 600 segundos

d1 = partículas em formato de gota em 600 segundos mas que não queimam por mais de 10 segundos

d2 = diferente de d0 ou d1

País	Norma padrão	Classificação
Estados Membros da CE	EN 13501-1	A2-s1,d0 B-s1,d0
Suíça	Guia para regulamentos de fogo, 1976	VI q,3 virtualmente não inflamáveis, nível de fumaça baixo
EUA	ASTM E 84-97 a	class I

Resistência ao fogo

Classes de Resistência ao fogo EN 13501-2	Duração de resistência ao fogo em minutos
REI 30	≥ 30
REI 60	≥ 60
REI 90	≥ 90
REI 120	≥ 120
REI 180	≥ 180

Para as categorias europeias, a classificação de reação ao fogo sempre é dada separadamente.

Elementos estruturais baseados na EN 13501-2 compreendem todo o elemento estrutural e não apenas o forro suspenso. Isso pode consistir no telhado e forro suspenso ou no piso estrutural e forro suspenso. O elemento inteiro deve resistir ao impacto do fogo em sua habilidade estrutural pelo maior tempo possível. A duração de tempo que pode ser mantido é a duração de resistência ao fogo que será classificada em uma das classes indicadas.

Critérios de Teste

Durante os testes de resistência ao fogo o laboratório vai procurar por reações adversas e elaborar relatórios de acordo com os critérios-chave a seguir.

R. O elemento estrutural não deve entrar em colapso ou defletir além dos níveis permitidos quando sujeito à carga aplicada.

E. A integridade do ambiente deve ser mantida. Não é permitida a propagação de chamas.

I. A temperatura do lado não exposto do elemento estrutural não deve aumentar mais que 140 °K acima da temperatura média ambiente e não mais que 180 °K em nenhum outro local.

Se um dos critérios acima for excedido o teste é encerrado e a duração atingida antes da reprovação vai indicar a classificação apropriada de resistência ao fogo.

Devido à diversidade dos inúmeros elementos estruturais disponíveis atualmente, é impossível testar cada um deles individualmente. Por isso nós nos esforçamos em testar os piores cenários possíveis em cada tipo de construção genérica.

Os exemplos a seguir mostram construções dentro de uma câmara de testes.

A ilustração abaixo (fig. 1) mostra um exemplo de uma típica construção com viga de aço e o forro OWA embaixo.

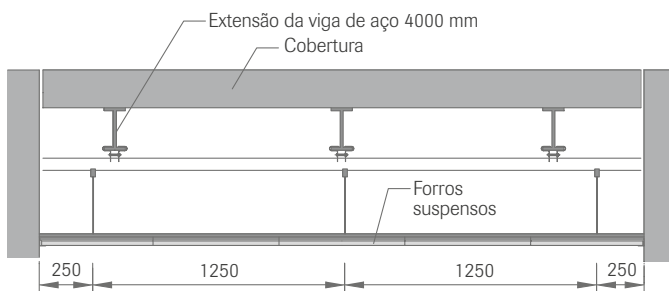


Fig. 1: Piso de viga de aço

Os Forros suspensos OWA também podem ser usados para oferecer resistência ao fogo em construções de madeira.

O exemplo abaixo (fig 2) mostra uma construção com piso de madeira e o forro OWA embaixo

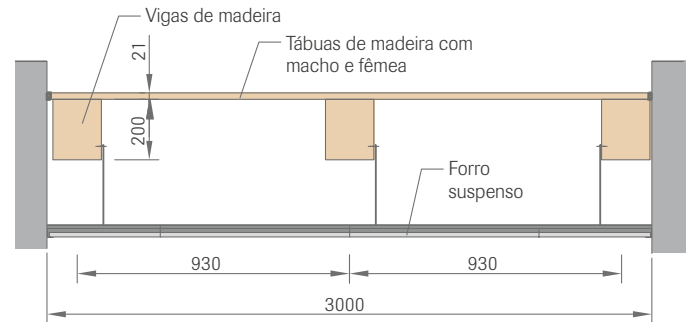


Fig. 2: Piso de madeira

A OWA testou a maioria das construções padrão para pisos e telhados com Forros OWAcoustic® na EN 13501-2 e atingiu até REI 180 conforme demonstrado na próxima tabela.

Aqui um forro OWAcoustic® é usado para oferecer resistência estrutural ao fogo e é importante que o forro seja construído da mesma maneira em que ele foi usado no teste. Caso não utilizar os mesmos componentes e layout pode invalidar qualquer certificação e impedir a emissão de uma declaração KIT.

Saídas de emergência e resgate frequentemente têm serviços contendo materiais inflamáveis instalados embaixo das lajes estruturais. Por esta razão, recomendamos o uso dos forros resistentes ao fogo e com autocontenção OWAcoustic® (veja a tabela nas páginas 6 e 7). Com esse tipo de forro é possível oferecer resistência ao fogo de EI 30 nos serviços vagos e na área abaixo. O uso desse sistema pode ajudar a oferecer saídas de emergência protegidas tanto do fogo como da fumaça.



No dia 1o de julho de 2013 a nova Regulação Europeia de Materiais de Construção (CPR) No. 305/2011 entrou em vigor e substituiu a antiga Diretiva de Materiais de Construção (CPD) 89/106/EU.

Parte da nova regulação é sobre o uso de etiquetas da CE para materiais de construção que são reguladas pelas Normas Europeias harmonizadas (hEN) ou por um Documento Europeu de Avaliação (EAD, anteriormente conhecido como "ETAG").

Além disso, uma "Declaração de Desempenho" (DdP) será emitida para todos os materiais de construção com etiquetas CE. Essa declaração mostrará diversos critérios chave de desempenho e um código único de identificação do tipo de produto. Isso substituiu o documento previamente conhecido como Declaração Europeia de Conformidade

A norma europeia harmonizada EN 13964 (Exigências para Forros Suspensos e Métodos de Testes), cobre uma variedade de exigências fundamentais, incluindo:




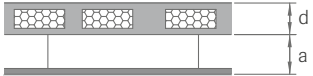


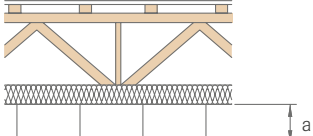


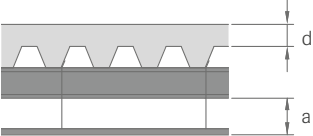


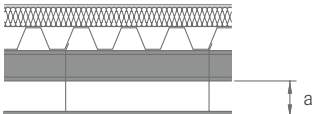





- Reação ao fogo
- Segurança Mecânica
- Acústica
- Outros
- Resistência ao fogo
- Higiene, saúde e ambiente
- Corrosão

Importante: Em caso de resistência ao fogo a etiqueta CE e o DdP para todo o kit (placas de forro + subconstrução) é obrigatória de acordo com a EN 13964 ZA 1.1

Construção de suporte de carga

		espessura mín. da laje (d)	altura mín. da cavidade (a) (plenum)	Tipo de forro suspenso Sistemas Premium OWA-construct®
	Piso de viga de aço KIT-16-01/2012 - S 3 KIT-16-01/2012 - S 3a	≥ 120 mm	≥ 200 mm	 S 3
	Piso de viga de aço KIT-11-01/2008	≥ 90 mm	≥ 250 mm	 S 3a
	Piso de viga de aço KIT-17-01/2013 - S 15 cliq	≥ 90 mm	≥ 230 mm	 S 15 cliq
	Piso de viga de aço KIT-18-01/2011 - S 15a cliq	≥ 100 mm	≥ 200 mm	 S 15a cliq
	Piso de viga de aço KIT-19-01/2011 - S 18p	≥ 100 mm	≥ 200 mm	 S 18p ■ = aglutinante
	Piso de viga de aço KIT-20-01/2013 - S 1	≥ 90 mm	≥ 185 mm	 S 1
	Piso de viga de aço KIT-15-01/2012 - S 9a	≥ 90 mm	≥ 285 mm	 S 9a
	Piso de viga de aço KIT-08-01/2008 - S 7	≥ 90 mm	≥ 250 mm	 S 7 OWAplan

Placas OWAacoustic®			Resistência ao fogo		Suspensão testada (distância máx.)			Características especiais
Módulo	Espessura	Linha do produto	Classificação mín.	Relatório de teste nº	Centro da perfil T principal	Centro dos pendurais	Pendural OWA-nº	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 120	No. 297270/7130/CPD ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
			REI 90	PB III/08-191-1Ä	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	REI 30 a ≥ 120 mm REI 60 a ≥ 150 mm
625 x 625 mm 600 x 600 mm	15 mm	premium	REI 90	PB 3.2/13-169-1 ... e demais relatórios	625 mm 600 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 90	No. 285878/6379/CPD ... e demais relatórios	625 mm 600 mm	1250 mm 1200 mm	ver página 11	
≤ 2050 (comprimento da placa) x 312,5 mm	15 mm	premium	REI 90	No. 285879/6380/CPD ... e demais relatórios	≤ 2130 mm	750 mm	ver página 11	perfil C nº 36/70
625 x 625 mm 600 x 600 mm	15 mm	premium	REI 90	PB 3.2/13-018-1 ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	20 mm	premium	REI 90	PB 3.2/13-142-1 ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
2400 x 1200 mm 1200 x 800 mm	20 mm	premium	REI 120	PB 3243/496/07 ... e demais relatórios	750 mm 750 mm	750 mm 750 mm	ver página 11	


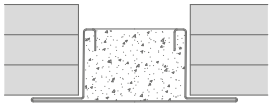
Construção de suporte de carga		espessura mín. da laje (d)	altura mín. da cavidade (a) (plenum)	Tipo de forro suspenso
	Piso de bloco reforçado KIT-21-01/2013 - S 3 KIT-21-01/2013 - S 3a	≥ 200 mm	≥ 250 mm	Sistemas Premium OWA-construct®  S 3  S 3a
	Laje oca de concreto reforçada KIT-10-01/2007 - S 3 KIT-10-01/2007 - S 3a	≥ 250 mm	≥ 250 mm	 S 3  S 3a
	Construção de telhado de madeira KIT-01-01/2005 - S 3 KIT-01-01/2005 - S 3a	-	≥ 250 mm	 S 3  S 3a
	Piso composto KIT-22-01/2009 - S 3 KIT-22-01/2009 - S 3a	≥ 70 mm	≥ 200 mm	 S 3  S 3a
	Construção de telhado de aço com isolamento de chapas de aço corrugado (Foamglas) KIT-13-01/2007 - S 3	-	≥ 570 mm	 S 3
	Construção de telhado de aço com isolamento de chapas de aço corrugado (Foamglas resp. espuma rígida) KIT-05-01/2005 - S 3	-	≥ 540 mm	 S 3
	Construção de telhado de aço com isolamento de chapas de aço corrugado + lã mineral KIT-23-01/2014 - S 3	-	≥ 600 mm	 S 3

Placas OWAacoustic®			Resistência ao fogo		Suspensão testada (distância máx.)			Características especiais
Módulo	Espessura	Linha do produto	Classificação mín.	Relatório de teste nº	Centro da perfil T principal	Centro dos pendurais	Pendural OWA-nº	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 120	No. 311867/8160/CPR ... e demais relatórios	1200 mm	900 mm	ver página 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 180	No. 234562/2488/CPD ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 30	PB 3222/3473-CR ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	14 mm nom. 15 mm	smart premium	REI 120	No. 281196/6048/CPD ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	14 mm nom.	smart	REI 90	PB 3611/427/07-CR ... e demais relatórios	625 mm 600 mm	1250 mm 1200 mm	ver página 11	
1250 x 625 mm 1200 x 600 mm	15 mm	premium	REI 30	PB 3691/3845-CR ... e demais relatórios	625 mm 600 mm	1250 mm 1200 mm	ver página 11	
625 x 625 mm 600 x 600 mm	15 mm	premium	REI 30	PB 3.2/14-140-1	625 mm 600 mm	1250 mm 1200 mm	ver página 11	

Construção de suporte de carga				Tipo de forro suspenso	
		espessura mín. da laje (d)	altura mín. da cavidade (a) (plenum)	Sistemas Premium OWA-construct®	
	Piso de madeira KIT-04-01/2005 - S 3	viga de madeira placa de piso de madeira 21 mm	≥ 248 mm		S 3
	Piso de madeira KIT-07-01/2008 - S 3	viga de madeira placa de compensado de madeira 18 mm Gesso Fermacell fireboard 12,5 mm	≥ 245 mm		S 3

Forro suspenso

El 30 unidades de proteção autocontida contra o fogo de acordo com a EN 13501-2

Forros com resistência ao fogo independente		Tipo de forro suspenso	
El 30 (a ↔ b) [a = acima, b = abaixo]		Sistemas premium OWAconstruct®	
	forro homogêneo OWAacoustic® resistência ao fogo F 30 barriere de cima abaixo placas desmontáveis	F 30 barriere B espaço livre, grade oculta, elemento desmontável, comprimento ≥ 1500 - 2250 mm	

Placas OWAacoustic®			Resistência ao fogo		Suspensão testada (distância máx.)			Características especiais
Módulo	Espessura	Linha do produto	Classificação mín.	Relatório de teste nº	Centro da perfil T principal	Centro dos pendurais	Pendural OWA-nº	
625 x 625 mm 600 x 600 mm + Placa + MINOWA® espessura 21 mm	15 mm	premium	REI 90	PB 900955 2000-Re/Ei MPA Stuttgart ... e demais relatórios	625 mm 600 mm	930 mm	17/45	
625 x 625 mm 600 x 600 mm	15 mm	premium	REI 30	2007 - Efectis RO 574 (E) ... e demais relatórios	1250 mm 1200 mm	1250 mm 1200 mm	ver página 11	

Placas OWAacoustic®/ elementos			Resistência ao fogo		Suspensão testada (distância máx.)			Características especiais
Módulo	Espessura	Linha do produto	Classificação mín.	Relatório de teste nº	Centro da perfil T principal	Centro dos pendurais	Pendural OWA-nº	
Largura: 300 mm, 312,5 mm Comprimento: 1800 mm, 2000 mm, 2250 mm	44 mm	premium	EI 30 a ↔ b	PB 3617/3831 PB 3619/3851 MPA Braunschweig ... e demais relatórios	vão livre e sistema bandraster ≤ 2300 mm	625 mm	79/75	perímetro da parede nº 51/25 Para maiores detalhes consulte o catálogo OWA nº 9915 e

Luminárias

Quando instalar luminárias embutidas em um forro resistente ao fogo OWAcoustic®, uma caixa contra incêndio deve ser instalada para garantir a continuidade da resistência ao fogo. É importante garantir que o desempenho da caixa contra incêndio seja igual àquele do forro OWAcoustic® instalado.

Luminárias embutidas



Forros padrão OWAcoustic®
(piso de viga de aço, construção de telhado de madeira, construção de telhado de aço, piso de madeira)

Forros OWAcoustic® com iluminação embutida oferecem a mesma resistência ao fogo que forros OWAcoustic® fechados, se a iluminação embutida estiver encaixada em uma caixa contra incêndio de 16 mm de espessura Minowa®.

Para maiores detalhes, consulte o Guia de instalação OWA no 9801 e.

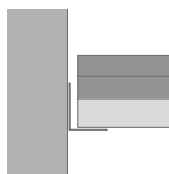
Placas OWAcoustic® premium de 40 mm de espessura, devem ser utilizadas com placas Minowa® de 40 mm. Para placas OWAcoustic® premium de 20 mm de espessura, deve-se utilizar placas Minowa® de 21 mm.

Consulte também o folheto de informações sobre Proteção contra Fogo.

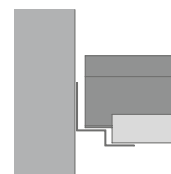
Espessura das placas OWAcoustic®	Espessura da Caixa contra Incêndio
14 mm	14,5 mm
15 mm	16 mm
20 mm	21 mm
≥ 40 mm	40 mm

Acabamento de Perímetro

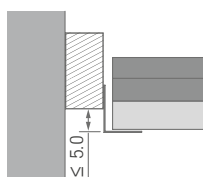
Para forros resistentes ao fogo, os acabamentos de perímetro devem ser instalados em conformidade com o relatório de teste correspondente. Somente fixadores de parede resistentes ao fogo devem ser usados (ETA – Aprovação Técnica Europeia). Centro do Fixador ≤ 250 mm.



Perímetro de parede padrão para todos os forros padrão

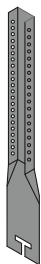


Perímetro de parede para forros Contura S 3a



Perímetro de parede com espaço estreito

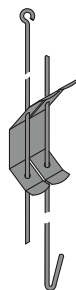
Pendurais e suspensões



nº 17/10
Pendurais Nonius
para sistemas **ocultos**



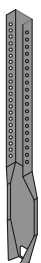
nº 11
Pendurais
para sistemas **expostos**



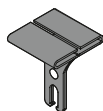
nº 12/.../...*
Pendurais de ajuste duplo
para sistemas **expostos**



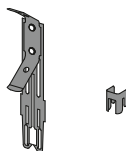
Arames pré-moldados
 $\varnothing \geq 2,0$ mm; As pontas dos
fixadores são presas pelo menos
3 vezes



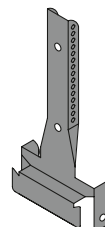
nº 17/45
Pendurais Nonius para
sistemas **expostos**



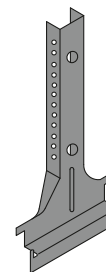
nº 90
Clips de suspensão, ajustáveis
para vigas de aço



nº 12/44*
Pendurais ajustáveis
do tipo "click"



nº 2001
OWAplan



nº 79/..
Pendurais Nonius
para **bandraster**

* **Pendurais ajustáveis** não devem ser usados com construções de madeira REI 90.

Fixações Superiores

Somente fixações superiores aprovadas adequadas ao substrato devem ser usadas (ETA – Aprovação Técnica Europeia).

Verificação

Para exigências de resistência ao fogo relacionadas aos forros OWAacoustic®, é recomendado que você detalhe o projeto para as exigências relevantes antes de comprar e instalar o forro.

Quando submeter um pedido, solicite os documentos do seu fornecedor e entregue uma lista preenchida. Isso é necessário para entregar os documentos corretos (DdP, declaração CE-KIT).

Os documentos de proteção contra o fogo OWA são válidos somente com o uso de placas OWAacoustic® e componentes originais dos sistemas OWAconstruct® (conforme testados).

Assistência Técnica

Este material oferece uma breve visão geral da Norma Europeia EN 13501 e como os Forros OWAacoustic® podem ajudar em suas exigências de resistência ao fogo.

Se você precisar de mais informações ou assistência em qualquer etapa do seu projeto de instalação de forro, por favor, fale conosco ou visite o nosso site.

Serviço de informação OWAconsult®:

Alemanha

tel +49 93 73.2 01-0

info@owaconsult.de

www.owa-ceilings.com

Garantias do Produto

As informações encontradas neste panfleto estão baseadas nas normas e dados disponíveis no momento da publicação. Qualquer desempenho, garantias ou afirmações fornecidas, expressas ou implícitas estão sujeitas ao uso exclusivo dos componentes OWA e à instalação desses componentes de acordo com as nossas recomendações. O não cumprimento destas condições resultará na anulação de qualquer requisição de desempenho ou garantias e isenção de qualquer responsabilidade. A OWA reserva o direito de realizar qualquer melhoria técnica em seus produtos, sistemas e serviços sem aviso prévio. **Todos os produtos e serviços são fornecidos em conformidade com nossos Termos e Condições de Venda atuais.** Salvo erros!



Erros e falhas de impressão não estão excluídos. Com a publicação desta edição, todos os folhetos anteriores ao no 500 são inválidos.

OWA

Odenwald Faserplattenwerk GmbH

Dr.-F.-A.-Freundt-Straße 3 | 63916 Amorbach

tel +49 93 73.2 01-0 | info@owa.de

www.owa-ceilings.com

OWA Ceilings LEED® Credit

Product Range: Suspended Acoustical Ceilings (tiles and sub-construction)

OWAcoustic® premium
OWAcoustic® smart
OWAconsult® collection
OWAconstruct®
OWAtecta®

OWA's Product range contribute to following LEED® Credits:

- Energy
- Waste management
- Recycled content
- Local Materials (is location dependent)
- Low-emitting Materials
- Daylight and views
- Acoustic performance

HPD's for painted and scrim laminated OWAcoustic mineral tiles are available on request.

USGBC LEED® Credits:

- **LEED® MR Credit 2: Construction Waste Management** – divert 50 % or 75 % from disposal.

OWA will provide verification of weight and plant return location for LEED® submittal.
Please contact your OWA environmental protection officer +49 9373 / 2 01-2 45 for more details.

OWAtecta metal tiles and OWAconstruct components could be fully recycled (100%)

- **LEED® MR Credit 4: Recycled Content**

OWA's product range has high recycled content levels contribute to LEED®.

LEED® recycled content value:

OWAcoustic® premium, OWAcoustic® smart, OWAconsult® collection

up to 54 % total recycled content

up to 42 % LEED® Recycled Content Value

An EPD for OWAcoustic® mineral tiles based on ISO 14025 is available on request.

OWAconstruct® / OWAtecta®

30 % total recycled content
 7 % post-industrial (pre-consumer)
 23 % post-consumer
 27 % LEED® Recycled Content Value

Post-consumer:

End-users can no longer use product for intended purpose.

Pre-consumer (post-industrial):

Industrial waste from manufacturing, exclude rework from the same process that created it.

- **LEED® MR Credit 5: Regional Materials**

Option 1: The manufacturing plant may be within 500 miles of your jobsite

Option 2: For products shipped by rail or water the following formula can be used:

(Distance by rail/3) + (Distance by inland waterway/2) + (Distance by sea/15) + (Distance by all other means) ≤ 500 miles

- **LEED® IEQ Credit 4: Low Emitting Materials**

Our product range meet the **State of Washington and California Section 01350 requirements** for low emissions. **Limit values for according to IEQ-Credit 3.2: Construction Indoor Air Quality before occupancy is 500 µg/m³ (VOC) and 27 ppb formaldehyde.**

Formaldehyde is not added during any production process.

See for further information the Credit IEQ 4.1 to 4.5.

OWAcoustic® product range has

TVOC:

class rooms: < 1,5 µg/m³ (after 11, 12 and 14 days)

office buildings: < 2 µg/m³ (after 11, 12 and 14 days)

Formaldehyde:

class rooms: 1,8 µg/m³ (after 11 days), 1,7 µg/m³ (after 12 days),
 1,6 µg/m³ (after 14 days) = 1,3 ppb

office buildings: 2 µg/m³ (after 11 days), 1,9 µg/m³ (after 12 days),
 1,8 µg/m³ (after 14 days) = 1,5 ppb

Low emitting products can be used as a possible innovation credit.

- **LEED® IEQ Credit 8.1: Daylight and Views - Daylight**

High LR (light reflectance) value from 78 % till 91 % (ISO 7724-2, ISO 7724-3, dependent on pattern) contributes to LEED®

Focal point ceiling

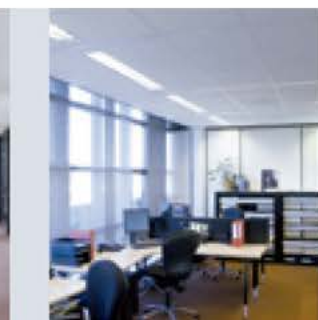
OWA



The Company
Products
Services



Opening up spaces



Shopping, conference and sports centres, office buildings, hotels, restaurants, airports, concert halls, museums, clinics – spaces for all kinds of functions. And also with the widest possible variety of ceiling design requirements.

You see them every day, but you usually don't notice them at first glance. Yet the type of ceiling overhead has a decisive impact on the overall effect of a particular space or room. A well-designed ceiling can open up a room, making it feel larger and more spacious.

Ceilings also play many important functional roles. Acoustics, lighting, HVAC and fire protection are important elements of any modern ceiling system. OWA has the know-how and the products to fulfil any and all of these requirements.

Why are we qualified? Because of our outstanding personnel, product quality and experience, derived from the thousands of projects we have had the privilege of completing in the course of our more than 60-year history as a company.

What makes us different? We are a family firm entering its third generation. Accordingly, we are strongly oriented to long-term values. Without compromising the flexibility needed to bring ideas to the market with great speed. For the benefit of our customers around the world.

In this brochure you can find out more about OWA, its products, its people and the values that drive our organisation. If after reading this brochure you look at your ceiling with a new perspective, then we have achieved our goal.

Especially if it happens to be an OWA ceiling.

Thank you very much!

Norbert Müller
Deputy Managing
Director

Jürgen Theobald
Managing Director

Maximilian von Funck
Managing Director

Norbert Müller

Jürgen Theobald

Maximilian von Funck





WHY WE DEVELOP SOLUTIONS INSTEAD OF PRODUCTS

In classic architecture, ceilings have a creative, ornamental and/or prestige function. Much more is required however for the architecture of our times. Ceilings have to optimise room acoustics. Ceilings have to integrate lighting and air-conditioning elements. Ceilings have to increase fire safety. All that, without allowing function to overshadow design.

Avantgarde in dry construction

OWA saw the coming trend as early as the 60's, when we became a player shaping the market for dry construction and acoustic products. OWA customers loved our (at the time) new lightweight, fire-resistant multi-purpose ceiling panels, which set a new standard for interior finishing.

Closed supply chain

OWA offers complete, technically sophisticated ceiling systems. We supply all the components, which fit together – panels, construction elements, accessories. This makes it easier to select the right system, minimising our customers' logistics.

Acoustic ceilings



Fire protection ceilings



Hygienic ceilings



Ceilings thought through



Installation made easy

Installation benefits: Single source for all components, better planning, high-availability, easy to install, certified safe from A to Z, and dependable service throughout the entire installation process.

Array of system selections

Advantage for planners and architects: Proven turnkey solutions fulfilling your planning specifications. From our attractively priced standard ceiling to high-end acoustical ceilings and clean room ceiling systems meeting the most sophisticated requirements for hygiene and fire safety.

Better fire protection

Unique safety enhancement offered by OWA: Complete kit systems consisting of OWA ceiling

tiles and OWAconstruct suspension systems offer one of the most comprehensive ranges of fire resistance certification on the market, representing both a milestone and a benchmark in dry construction.

Bio-soluble mineral wool – prerequisite for a healthy room environment

The secret to our product quality: bio-soluble mineral wool. OWA produces this special mixture of sand, recycled glass and limestone itself. The products are tested on an ongoing basis and regularly inspected by an independent institute. Our mineral wool meets all national and international standards, and bears the RAL Seal of Quality.

Clean room ceilings

Integrated air-conditioning elements

Integrated lighting



Extensive assortment



Suspension and installation
system OWAconstruct®



THE ADDED VALUE PROVIDED BY OUR ARRAY OF SYSTEMS

One reason for OWA's success is in our comprehensive product portfolio. Benefit for customers: It is extremely easy to identify the optimal solution from a technical, design and budget standpoint, for any conceivable application.

Finding, ordering, installing

The OWA product array offers tremendous variety, despite its basic simplicity and clear structuring.

OWAcoustic® premium is the name of our high-end ceiling panel product line geared towards the most sophisticated design, acoustic and fire protection requirements.

OWAcoustic® smart is the name of our winning product line for standard applications, combining light weight with outstanding fire protection performance.

The **OWAdeco®** line is for basic requirements, featuring light weight, attractive looks and very low prices.

The **OWAtecta®** line of metal ceiling panels is a designer's favourite because of the range of design variations offered.

The **OWAspectra®** line offers a spectrum of creative ceiling solutions involving new forms, colours, functions and materials.

OWA Functional Ceilings provide maximum functionality for a wide range of applications including in clinics, sound studios and clean rooms.

OWA Wall Absorbers are individually configurable elements with outstanding acoustic qualities that render room acoustics problems manageable. This solution is also attractive from an optical standpoint.

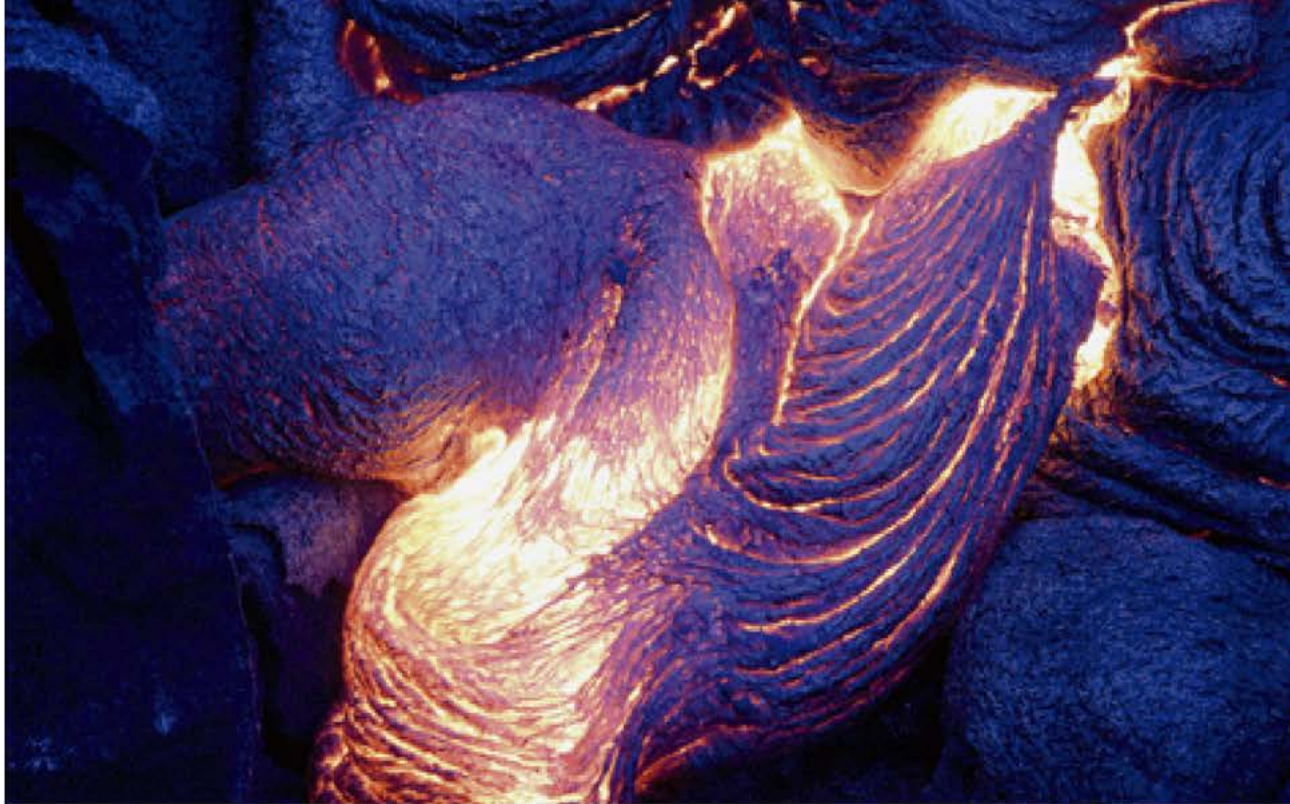
OWAconstruct® is a 7,000-component suspension installation system providing the ultimate in safety and dependability – certified fire resistant and bearing OWAcoustic® mineral wool panel certification

Ceiling grid system



Wall absorbers





OUR IDENTITY AND MOTIVATION

Odenwald Faserplattenwerk GmbH was founded by Friedrich-Karl Rogge in the town of Amorbach in the year 1948. OWA had grown into a major provider in the wood fibre acoustic and soundproof panel market by 1960, when Friedrich-Karl Rogge discovered a new material in America which had fascinating characteristics: mineral wool. He bought a license, then immediately went on to develop his own mineral wool panels featuring a host of innovations. Courage and a spirit of invention – traits that still characterise the family-run firm OWA today.

The OWAacoustic® brand

Just one year later, things started moving fast: In 1961 OWA became Europe's first supplier of mineral wool panels. OWAacoustic®, the ceiling system brand, was launched, soon to become established worldwide.

Proprietary production techniques

Milestone year 1977: The most modern facility for the production of mineral wool (for its day) began operation. OWA starts using volcanic basalt in production, yielding 'black wool' that was to become the hallmark and key material in OWAacoustic® products for over 20 years.

Friedrich-Karl Rogge



OWA site, 1948



Hot on quality

The natural resource basalt was the key material in OWA mineral wool panels for over 20 years. Until we found something even better ...

Basis for healthy building

1997: By switching to 'white wool' OWA aligned itself with the increasing market sensitivity to ecological issues. 'White wool' is made of a natural mixture of sand, recycled glass and limestone. Because of its bio-soluble properties, this mineral wool complies with all German and European regulations/standards for health and safety. Products are constantly checked and production closely monitored, in addition to inspections conducted by independent institutes.

Blue Angel

Our achievement: OWA was the first manufacturer in this industrial sector to receive the "Blue Angel" for low-emission building materials. This environmental label confirms that our mineral wool tiles are made of harmless raw materials and there-

fore can be used in sensitive areas such as schools, nurseries and hospitals. The label is valid for the three brands OWAacoustic® premium, OWAacoustic® smart and OWAdeco®.

Global ambitions

2010: It all got started with 60 employees, but today OWA is one of the region's largest employers with a workforce of 435. Our ambitions extend far beyond our region however, and even beyond Germany's borders. Distribution subsidiaries throughout the world accommodate rising demand for quality OWA ceilings. Together with a partner we have established a production facility for OWAconstruct suspension systems in China.

OWA site, 2006



Ceiling Headquarters



Dirk Rogge





Productive energy

White hot ducts:
Making mineral wool at the
speed of sound



Mineral wool:
Base product for proven
panel quality

TURNING IDEAS INTO CEILINGS

Mineral wool – a seemingly simple product. But to manufacture it, especially in OWA quality, takes specialised knowledge and lots of experience.

Hot and fast

The raw materials used in our mineral wool are melted together in a large vat at a temperature of 1,300 °C. The resulting molten lava is converted into white wool in a special sonic-speed process – the base material for quality OWA mineral wool ceiling products.

Ideas and recipes

Perlite is an igneous rock that can be expanded up to 20 times its volume, saving on transportation and energy costs. This is combined with our mineral wool, clay, water and starch as a binding agent and formed into boards on the advanced Fourdrinier machines. The water used in production process is filtered and re-used in a closed cycle to prevent pollution and ensure minimal usage.

High-end quality

During the final production phase the boards are cut to exact dimensions and the edges machined to ensure an accurate fit. The panel surfaces are sanded, primed and surface given the desired surface design along with several finishing coats of paint.

Uniquely OWA

Being a flexible, family-owned, medium sized enterprise run by engineers and inventors is beneficial for production. We develop all of our primary systems – ovens, processing equipment, Fourdrinier machines, dryers and production finishing lines – in-house, and optimise these on an ongoing basis. No other manufacturer has comparable production experience or expertise, which is why our product quality is so hard to imitate.



Raw board drying



A finished raw board exits the dryer

The Future Lab



HOW WE RESEARCH AND DEVELOP

OWA stands out from the crowd not least through its own R&D department. The top storey of our office tower in Amorbach, whose futuristic glass construction mirrors the Odenwald scenery, is a fitting environment in which to develop and test new products and solutions. It is in the nature of things that we work closely with OWAconsult®, our in-house consultancy, in doing this. After all, only a company that understands its customers from first to last can develop products that prove themselves on the market.

The challenge of creativity

The world we live and work in is becoming ever more individual, complex and flexible. This poses a challenge for architects, interior designers and product designers in equal measure. Strict environmental regulations not only complicate development work, but make it more exciting, too. In the process the boundaries between industries become blurred, trades join forces, and visionaries and practical minds alike are needed. We keenly follow this development since it raises the contribution we make with our ceilings. We always strive to develop the perfect solution to every requirement – optically, acoustically, and where fire performance and hygiene are key.

Innovations come out tops at OWA!

Welcome to the 7th floor! This is where we present our innovations including our new moveable, free standing absorbers, easy to

hang wall absorbers, futuristic suspended ceilings, ceiling tiles in novel designs, and ceiling constructions with supermodern functions, all designed to provide maximum reliability even in catastrophic circumstances such as an earthquake.

Signs of progress

OWA is certified to a number of national and international quality and environmental standards issued by the relevant testing institutions, and is preparing to qualify for others. Awards and prizes confirm our commitment and drive us on to make further enhancements. Our R&D is not locked away in some ivory tower, but stands for openness in all it does. We work closely with partners, including prestigious scientific institutions, standards bodies, architects, interior designers, engineers and practitioners from a number of trades.



Dodecahedron loud speaker for measuring reverberation time



Auralization: The computer simulated room that you can hear.



Guiding values

Rivium Crystal Building, Capelle A. D. Ijssel



THE ROLE OF DISTRIBUTION

South-western Germany is known for technological innovation and is home to a number of highly successful SMEs with international operations. OWA is one of them. We have succeeded in transferring our core commitment to innovation and the customer to our international business creating on the way, long lasting relationships and important business contacts.

Close to the customer

For us, sales are about more than big volume. It is also about serving the customer, wherever he or she may be located in the world. From our main plant in Amorbach we supply our distribution partners, most of whom maintain their own warehouses. Systems and accessories are put together in Amorbach on an order basis and rapidly, economically and reliably delivered. OWA has an extensive advisor network in place throughout Germany, able to assist anyone in need of advice on ceiling systems, including developers, officials, architects, installers and building materials dealers.

Global objectives

Exports account for over half of our revenue and is set to increase further. Rising demand has not caught us unprepared. As far back as the 60s we began building up a network of distribution subsidiaries and independent dealers, which now encompasses over 70 countries. In many countries we have subsidiaries with their own sales force to ensure optimal customer contact. These include: OWA UK, OWA France, OWA Benelux, OWA Poland, OWA Southern Africa and OWA China. And, like most happy families, sometimes there is a new member.



Stade de France, Paris



Tamara Bank, Indonesia



LEADING BY EXAMPLE

As architecture continues to push the limits of design and construction technology to the limit, the design team has to be aware of the environmental impact created by the project both during construction and the expected life of the building. OWA are playing a key role in minimising this impact by providing flexible, high quality, performance ceiling systems produced to strict environmental standards.

Central Plaza, Hong Kong



Airport Centre, Frankfurt



Eldorado Business Tower, São Paulo



Discoveries



LEED-ership

OWA ceiling systems do not pose any health risks, are lightweight, easy to work with and are produced in accordance with strict environmental standards. OWA thus meets the stringent standards of the LEED programme (Leadership in Energy and Environmental Design). This environmental certification programme for office and residential buildings, initiated in 2000 by the US Green Building Council is gaining increasing significance among investors and architects outside the US as well, and is on its way to becoming a

global standard for environmentally-compatible building construction.

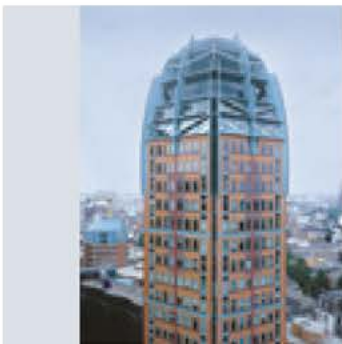
Raising the bar

In the course of our 60-year company history we have completed thousands of projects around the world. Many of these have been architecturally significant, such as the Frankfurt Airport Centre and the Hong Kong Central Plaza – projects that prove our stature and motivate us to continue to grow internationally.

Zurich Toren, Den Haag

Rank Xerox, Neuss

Oval Tower, Amsterdam





Sustainable progress



WHAT GROWTH MEANS TO US

As a family owned company we are not under pressure to generate short term returns for shareholders. This has allowed us to grow internationally at a considerable pace and ensure that we are on track to realise our long term business objectives of substantial, sustainable growth in a way that respects the environment and the people that live in it.

Quality management

There is always room to do everything just a little better. In keeping with this motto, we have implemented a quality management system integrating environmental, quality and workplace safety elements. These systems are EN ISO 9001:2008 (quality), EN ISO 14001:2004 (environment) and BS OHSAS 18001:2007 (safety at work) certified.

Protecting the environment

We feel that we have a responsibility to employ non-polluting production and work techniques, on both a large and small scale. Our new, cutting-edge heat recovery system for example has achieved a 20% reduction in energy consumption. The quality of our finished products also reflects sustainability-oriented development practices. OWA products can be used for a long time, and at the end of their life cycle can be fully recycled.

Our staff

We want to generate interest, develop talent and both promote and reward achievement. We offer secure jobs in the local area where our employees live. Despite global competition, we have avoided shifting production to cheaper regions. Instead we focus our attention on enhancing efficiency at our existing locations. We actively support and promote quality education and training, job security, fair remuneration and substantial benefits. The skills, motivation and dedication of our staff members make them real assets to our organisation. The average length of service at OWA is 18 years, which is unusually long for a medium-sized company. We are very proud of this record.



Control: Acoustical production on-screen



Final inspection: Every panel is checked



OWA

Focal point ceiling

The Company
Products
Services



OWA

Odenwald Faserplattenwerk GmbH

Dr.-F.-A.-Freundt-Straße 3

63916 Amorbach

Tel. +49 9373 2 01-0

Fax +49 9373 2 01-1 30

www.owa.de · E-Mail: info@owa.de

For a better world
Environmental protection and sustainability



OWA



4 | Our products



6 | Raw materials
and logistics



8 | Production



10 | People at OWA



12 | Making a statement



14 | Projects, successes



Healthy growth

When we think about environmental protection we view it from two perspectives. Firstly from the company's research and development of products and their possible effect on the global market and secondly as a manufacturer whose activities may have a direct influence on the environment. Both perspectives create their own environmental responsibilities and this brochure is intended to provide an overview of what we are doing to meet those responsibilities. As the population continues to rise, the world has become a rapidly changing, global market offering many new challenges and opportunities. Our vision is to meet this growth with sustainable, well managed development. We are providing innovative solutions for the "Green Architecture" of the modern world and encouraging responsible, organic growth within our organisation so we can achieve the declared aim of becoming a "Green" company.

Will you join us on the journey?

Green construction

OWA develops produces and sells complete ceiling systems. The demands placed on our products by planners, designers, architects, distributors and installers are diverse and numerous. Design, functionality, acoustics and fire resistance are some of the required key, product characteristics. One other question is becoming increasingly important: "What do OWA ceiling systems contribute to the sustainable design of the building?" In other words what do the products deliver in terms of air quality, comfort, ease of access and recycling?



Product Partnership for healthy indoor environments

Since the 1st January 2013, and after successful verification of the OWAcoustic range, OWA was accredited as a product partner with the Sentinel Haus Institute. Air is one of the most important aspects of life and the Institute's aim is to partner with building products that can contribute to a safe and healthy indoor environment. Today's way of life means that most of us will spend at least 20 hours a day inside a building of some sort so it is imperative to our wellbeing that the air quality is as high as possible. The German Federal Environment Agency recommends a maximum of 1000 g/m³ for solvents (TVOC). This value is also guaranteed by the SHI health pass.



You score well with OWA – according to DGNB and LEED®

The German Sustainable Building Council (DGNB) awards certificates according to a wide range of criteria, which are set out in 63 "statements". Less detailed, but well established as an international standard, is the LEED® (Leadership in Energy and Environmental Design) points system. OWA products meet both these standards. They pose no health risks and have attained a number of quality labels.



OWAconsult[®]
www.owaconsult.de

Worth its weight in platinum: OWAconsult[®] The importance we attach to “green” architecture and construction

consult[®], our own in-house consultancy department. When seeking accreditation to the LEED[®] Green Building rating system, BREEAM[®] or even the DNGB standard for sustainable building, we can provide you with the appropriate ceiling and acoustic solution. We can also answer any questions associated with composition, health and safety or disposal of OWA ceilings.

The feel-good factor

The design of a ceiling – materials, shapes, colours, surface texture, etc. – can have a key influence on the visual ambiance of a room. Similarly the acoustic performance of a ceiling can have a large impact on the sound quality of the room, as well as its effective use and comfort. Our products offer innovative single or composite solutions including ceiling canopies, natural look ceilings and flexible acoustic solution for the interior working environment of today and tomorrow ensuring people have a comfortable working environment now and in the future.

Quality reflecting new values

The less often a product has to be replaced, the better it is for the environment. Our ceiling systems are designed to remain impressive for the life of the building, retaining the original benefits of appearance, acoustics and fire performance.

Preserving nature

Sustainability is inextricably linked to a products performance and the properties of the materials used in its manufacture. OWA embraced the principle of sustainability long before it was considered to be an important aspect of a product's characteristic and uses naturally occurring, sustainable and recycled materials in its mineral wool manufacturing process. Mineral wool, the key constituents of OWA ceiling tiles, is one of today's most thoroughly researched and monitored building materials.



Rating: natural

OWA ceiling tiles are made of bio-soluble fibres derived from natural sources and recycled materials in differing proportions:

- > bio-soluble mineral wool 30% – 60%
- > organic binding agents 5% – 10%
- > solvent-free dispersions 0% – 5%
- > natural fillers (clay, perlite) 20% – 40%
- > recycled pulp 2% – 5%

Control of the entire supply chain, the shortest route to quality

OWA makes a difference: We produce our own mineral wool and for that reason have full control of the raw material supply chain. Working with selected suppliers, we ensure the shortest transport routes with over 80 % of our raw materials being sourced in Germany and most from the local area.



From ceiling to wall

OWA Ceiling tiles are 100 % recyclable so can be integrated into the building lifecycle programme. On removal they can be recycled. An example of re-use is as a filler in other construction products,

Green supply chain

Sustainable production means ensuring the entire supply chain operates according to our environmental principles and we select our suppliers of raw materials, energy and consumables such as packaging on this basis. For example, we require our clay suppliers to keep dust levels produced during extraction below the limits applicable in Germany, and hence at a level that poses no risk to health.

Protecting resources

With its product development OWA promotes the concept of “Green Architecture” but how good would the products be if they are not manufactured in accordance with standards of sustainable production? Of course the concept of “eco-friendly” production will always be fiction or rather a vision. However this does not prevent us from doing all we can to get as close as possible to a “Green Factory” – and with astounding results!



Certified to ISO 14001 and EN ISO 50001

We have received certification of compliance with the international environmental management standard ISO 14001 and ISO 50001. As well as adherence to all relevant legislation; this commits us to pursuing a continuous process of improvements with defined environmental objectives and constant monitoring. By implementing the ISO 50001 energy management system we can monitor our usage, identify areas where savings could be made and contribute to the conservation of natural resources.

LEED® Gold for OWA

Our “House of Ceilings” – the OWA head office and administration building, was recognised as a ground breaking design when it was built in 1999. In 2012 we had it assessed under the LEED® Green Building Rating System for existing buildings and achieved “GOLD” When built innovative technologies such as heating the building using energy recovered from the production plant and cooling using only water, were integrated into the design. Many of these innovations are still not standard features in today’s office buildings.

Breathe again at OWA?

Standing in front of a major industrial production facility, complete with “smoking” chimneys, visitors to our company HQ in Amorbach are frequently amazed by the quality of the air. In fact the exhaust smoke is virtually pure water vapour. After all Amorbach is a climatic spa, known for the health-giving properties of its air and we want to keep it that way!

More intelligence for less energy

Energy is a key element in the production of ceiling tiles. We use natural gas, the most efficient commercially available, fossil fuel, and are continuously improving our energy technology. When we built our 7 storey office building in 1998, we installed a heat recovery system in the mineral wool production facility to heat the building. This was so successful that in 2006 we installed a state of the art heat recovery system to make use of the waste heat from the dryers. This is used to heat our production areas and to pre-heat the air needed for combustion. This has resulted in a 20 % reduction in energy consumption and a dramatic drop in CO₂ emissions. In 2007 this innovation was recognised and we were presented with an environmental award by E-ON.

Water, clouds, clean solutions

Around 80 % of the water needed in the OWA plant is vaporised during the production process and can be seen as white clouds of pure water vapour above the plant in Amorbach. Of the remaining water, only 7 % is sent to a waste water treatment plant, the rest is recycled back into the production cycle.

Our noise stays inside

The production of mineral wool generates high levels of noise which is why the production plant has been sound-proofed. As a spa resort Amorbach stipulates strict environmental controls and, to ensure we are good neighbours, our production and logistics are organised to minimise noise. Delivery and loading times are carefully regulated and loading at night is not allowed.

New colour-mixing plant

Only by monitoring the whole production process is it possible to analyse and optimise processes quickly and precisely. That is why we have brought the technical heart of our tile finishing facility right up to date. This has resulted in significant savings in raw materials, more efficient handling of colours and batch checking, better reproduction, greater flexibility for customers' requirements and the ability to handle smaller runs thanks to optimised mixing technology.

Reuse of consumables

We are a major consumer of materials such as cardboard, cardboard packaging, foils and wood and use our buying power to support our environmental ethos. We predominantly use recycled paper and source the materials from suppliers who are committed to eco-friendly production. Almost all our consumables can be recycled.

Guiding values

If you want to make the world a little better you have to start with yourself. As a company, we acknowledge our responsibility, to our employees and to our global, regional and local environments. We are involved with the environment at all of our plant locations, especially Amorbach in the Odenwald, where we have had our registered Head Quarters for over 60 years.



We keep thinking (and acting)

OWA is a family firm entering its third generation. Maximising profits at any price, achieving short term shareholder returns, both are alien concepts for us, yet we continue to grow at a substantial pace. We see this as confirmation that we have the correct long term objectives.

Ground-breaking: our corporate guidelines

In 2011 we drew up a comprehensive set of regulations, representing a mutual commitment between management and employees to act in an ethical manner. Environmental protection and occupational safety are extremely important in our factory.

Occupational safety is environmental protection

Workplaces also represent environments. We offer our employees ergonomic working environments, wherever possible. Danger areas are secured and hazardous emissions prevented or controlled. Our on-site safety representative guarantees the highest standards of health and safety measures are maintained throughout the plant and regular training sessions ensure our employees are kept up to date with current safety at work measures.

For a vital location

OWA is the biggest employer in the southern Lower Main region. This commits us to regional involvement. We systematically strengthen the social, ecological and economic vitality around our plant – by supporting and funding environmental initiatives, clubs and charitable institutions.

Encouraging involvement, developing talent

We want to generate interest, develop talent and promote achievement. For that reason we place great importance on the further education and training of our employees. We want to give our young people long term job prospects by providing them with thorough training. The skills, motivation and dedication of our staff members make them real assets to our organisation. The average length of service at OWA is 18 years, which is an unusually long time for a medium-sized company.

Making our mark

OWA is certified to a number of national and international quality and environmental standards issued by the recognised testing institutions, and is preparing to qualify for others. Awards and prizes confirm our commitment and drive us on to make further improvements.



Blue Angel for OWAacoustic® ceiling tiles, OWAtecta® metal ceilings and OWAconstruct® suspension systems

This Eco label provides certification that the products poses no health risks and confirms that it contains no hazardous materials or adverse effect on the living environment.



DIN 18177

“Wet-process factory-produced mineral panels – characteristics and test methods” limits the emissions of formaldehyde and VOC.



TÜV certificates

ISO 9001:2008 (Quality)

ISO 14001:2004 (Environment)

BS OHSAS 18001:2007 (Occupational health and safety)

ISO 50001:2012 (Energy)



Fibre persistence certification, Fraunhofer Institute, Hanover

This confirms the bio-solubility of our mineral wool, in compliance with the Hazardous Materials and Chemicals Prohibition Ordinance and European Directive 97 / 69.



Asbestos-free certificate, GSA, Neuss-Norf

Certification confirming that our ceiling tiles contain no asbestos.



CE Mark

Our products comply with the EU Regulations. OWA was the first company in its sector to introduce the CE label in accordance with the European standard EN 13964.

Transparency in composition

OWAcoustic®-mineral ceiling tiles are free of asbestos and formaldehyde. A statement from the German Institute for Building Physics is available. The mineral wool used for the manufacture of the tiles is bio-soluble.



HQE® / LEED® / DGNB®



OWA products can also be used in buildings that must comply with the important requirements of the certification procedures for sustainable buildings.



RAL

The criteria for classification as a non-carcinogenic substance according to the Hazardous Materials Ordinance (annexll, no.5, bio-persistent fibres) and European Ordinance 1272/ 2008 (note Q) are satisfied and guaranteed by the “RAL Quality Mark for Mineral Wool”



E.ON Environment Award

Excellent! In 2007 OWA received the prestigious environmental award from Germany’s biggest energy provider for its innovative heat-recovery system.



**Institut Bauen
und Umwelt e.V.**

Environmental Product Declaration – EPD

An EPD makes statements about the use of energy and resources, and the extent to which a product contributes to the greenhouse effect, acid rain, over-fertilisation, destruction of the ozone layer and smog formation. It also gives details about technical properties which are required for the assessment of the performance of the product in a building, such as service life, heat and noise insulation, or its influence on the quality of the air inside the building. Together with WETEC (the Wet-felt Technical Committee), Odenwald Faserplattenwerk GmbH supports sustainable building by means of Environmental Product Declarations at the Building and Environment Institute [Institut Bauen und Umwelt e. V], as we also see it as our role to provide information about the origin of the raw materials, production and treatment processes and energy consumption, and to be aware of the effects on the environment so that these can be minimised in a continuous process of improvement. The EPD complies with the Europe-wide harmonised standard EN 15804.



ECOPROFIT in the Bavarian Lower Main region

Since 2008 we have been continuously involved in ECOPROFIT (Ecological Project for Integrated Environmental Protection) and are committed to promoting savings in energy and raw materials.



LEED® Gold for OWA

In 2012 we had our administration building assessed under the LEED® Green Building Rating System for existing buildings and achieved “GOLD”



Give example(s)

Everyone talks about sustainability – doing something is better! The use of OWA ceiling systems in sustainable building projects around the world confirms the effectiveness of our environmental product campaign. Hard facts and figures prove the success of our environmental measures in the plant. Last but not least, our project to re-establish the local wildlife habitat at the factory was completed in 2011 and proved just how much fun it can be to actively participate in an environmental project. It also showed that if you give nature a chance it will improve your quality of life and reward you handsomely.



Ceiling systems for “green” office building in São Paulo

The Eldorado Business Tower is the first building of its type in Brazil to be awarded Platinum certification, the highest level according to LEED®. OWA won the competition for ceiling systems because OWA mineral tiles are made of certified, bio-soluble mineral wool, free of asbestos and solvents, and as a result of their low emissions are classified as posing no risk to health (awarded the Blue Angel). 43,000 m² of OWAcooustic® ceiling tiles were installed in the offices and over 4000 m² of OWAcooustic® premium tiles in a concealed system was selected for the main entrance and lift lobby areas.



Environmental project at the Amorbach plant

The “Billbach” project, the realignment of the stream that runs through our company site, took two years. The measure was intended to improve flood protection and to create space for the extension of the factory. One deliberate side effect was the re-establishment of the wildlife habitat in the watercourse and bank areas. The scheme cost several million Euros to carry out and has already proved its worth. The initial measures passed their first test in a flood which occurred in 2011. A wide variety of new life has returned to the stream since the realignment and regeneration of the Billbach, including crayfish and the rare admiral butterflies. Employees and neighbours of the plant are equally delighted about their newly acquired relaxation zone.

For a better world

Environmental protection and sustainability



OWA

Odenwald Faserplattenwerk GmbH
Dr.-F.-A.-Freundt-Straße 3
63916 Amorbach
Tel. +49 9373 2 01-0
Fax +49 9373 2 01-1 30
www.owa.de · E-Mail: info@owa.de



The image features the letters 'OWA' in a bold, stylized font. The letters are filled with a red hatched texture and outlined in a darker red. They are set against a white background with a grid of thin, light red lines. The 'O' is a rounded rectangle with a vertical slot. The 'W' and 'A' are composed of several vertical and diagonal strokes, creating a complex, geometric appearance. The grid lines are horizontal and vertical, with some diagonal lines intersecting the letters.

Cuidados iniciais:

- Os Forros Minerais OWA devem ser armazenados em local limpo, seco e fechado, protegido de intempéries como chuva ou umidade excessiva.
- As placas deverão ser retiradas das caixas 24 horas antes da instalação, para que se ajustem às condições do interior do ambiente. Retirá-las do mesmo modo como foram embaladas, aos pares e com a face pintada voltada para dentro.
- É proibido utilizar os forros em ambientes que não tenham adequada proteção térmica e ventilação no entreforro, como coberturas metálicas ou telhas de fibrocimento.
- Sempre utilizar luvas tricotadas ao manusear as placas para não sujá-las.
- A movimentação dos forros requer cuidados, como não apoiar as placas pelas bordas.

Cuidados iniciais:

- O Forro Mineral OWA e seu sistema de suspensão não deverá servir de apoio para nenhum outro material. As luminárias e as demais instalações como ar condicionado, caixas de som, equipamentos embutidos no forro em geral, deverão ser instalados com fixação independente, como mostra a imagem abaixo:



Fixação independente

- As condições ambientais de temperatura e umidade relativa do ar deverão ser respeitadas conforme tabela abaixo, durante e após a instalação:

Linha	Temperatura Máxima	Umidade Relativa do Ar
Deco	42°C	90%
Smart	42°C	95%
Premium	49°C	95%

Cuidados iniciais:

- A área de instalação dos Forros Minerais OWA deve estar limpa e livre de intempéries, com ambiente seco e temperatura estável. O forro não pode ficar exposto diretamente à goteiras, nem a temperaturas ou níveis de umidade que produzem condensação nas placas.
- Os forros devem ser instalados somente após finalização dos processos de acabamento e pintura das paredes e do teto, e, também, após a devida fixação de caixilhos e vidros.
- O processo de pintura das placas de forro foi desenvolvido para manter suas características de absorção acústica e aspecto decorativo, o que dispensa a repintura do material. A OWA Sonex não recomenda a repintura da placa de forro mineral, pois pode comprometer seu desempenho acústico, resistência ao fogo, estabilidade dimensional e reflexão de luz. Tal procedimento acarretará na **perda total da garantia do material**.
- Em sistemas de instalação **Concealed (C) ou Oculto**, e **Teccor**, é recomendada a utilização de spots como luminárias por conta das bordas especiais das placas de forro mineral.

Materiais e equipamentos necessários:

Fornecidos:

- Forros Minerais OWA;
- Perfis metálicos (perfil principal, “travessão”, “travessinha”, cantoneira e barra estabilizadora) *;
- Tirantes #10 com olhal e reguladores de altura;

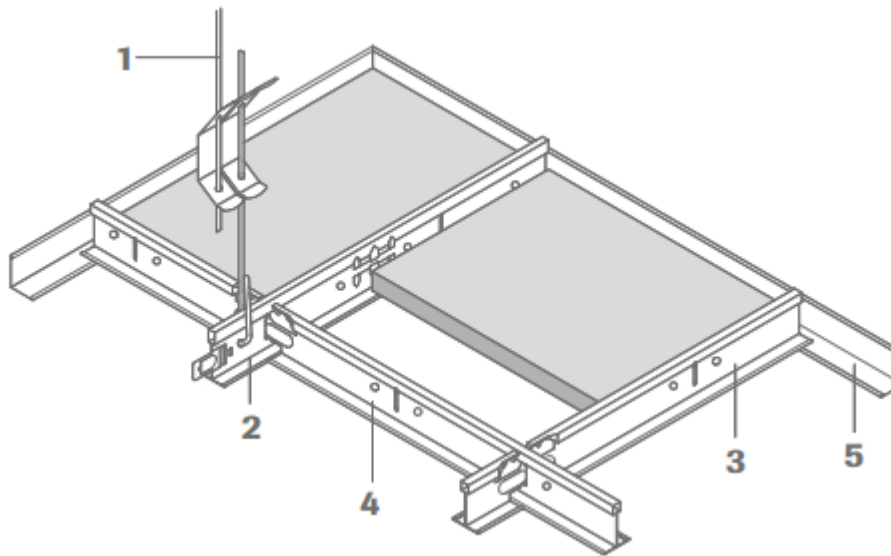
Não fornecidos:

- Furadeira;
- Trena;
- Giz de linha com fio marcador;
- Nível a laser;
- Estilete e serra copo para cortes circulares;
- Tesoura para corte de perfis;
- Parafusos S6 e buchas de nylon;

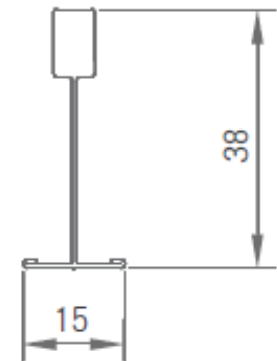
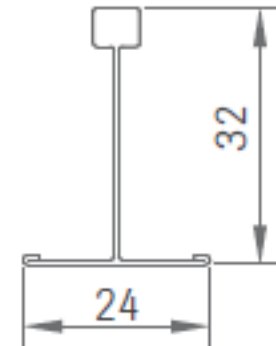
* Dependendo do sistema de montagem, alguns tipos de perfis não são utilizados!

Sistemas de montagem:

- Lay In (LI) – Sistemas S3 e S15 (Linhas Deco, Smart e Premium)

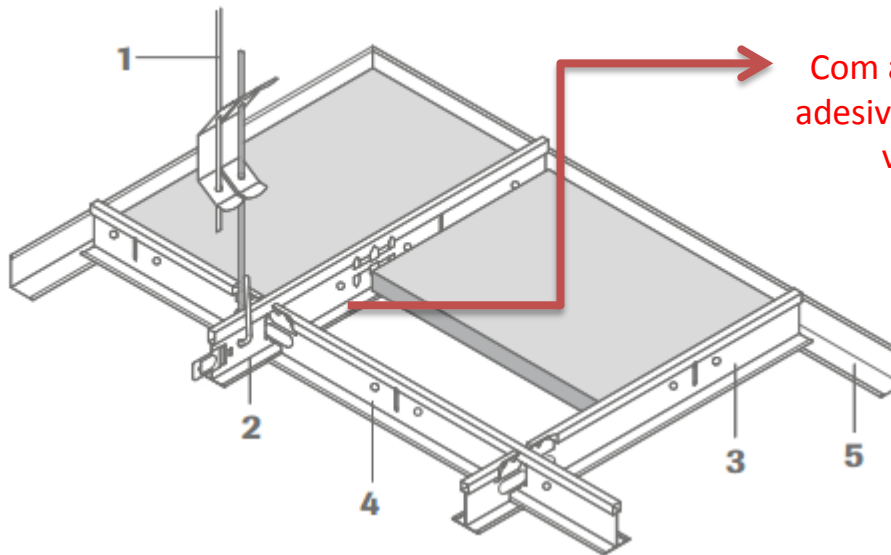


- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Travessinha
- 4 – Travessão
- 5 – Cantoneira

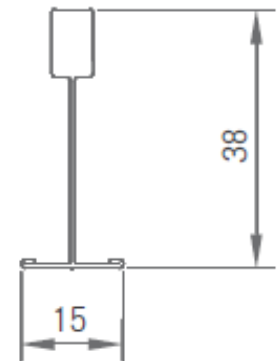
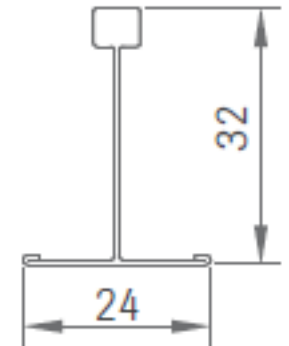


Sistemas de montagem:

- OWAlux “Estanque” – Sistemas S3 e S15 (Linha Premium)



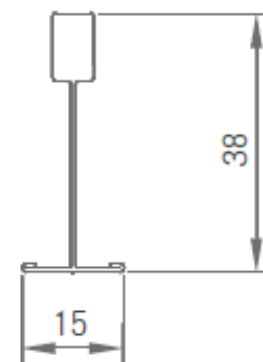
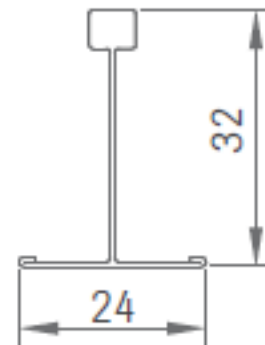
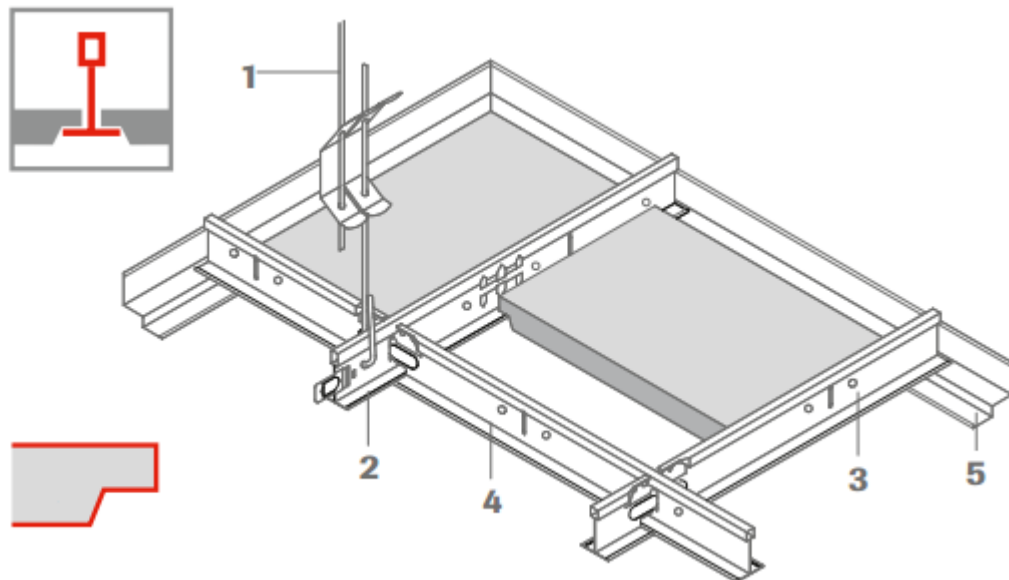
Com adição de silicone ou fita adesiva na base dos perfis, para vedação do sistema.



- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Travessinha
- 4 – Travessão
- 5 – Cantoneira

Sistemas de montagem:

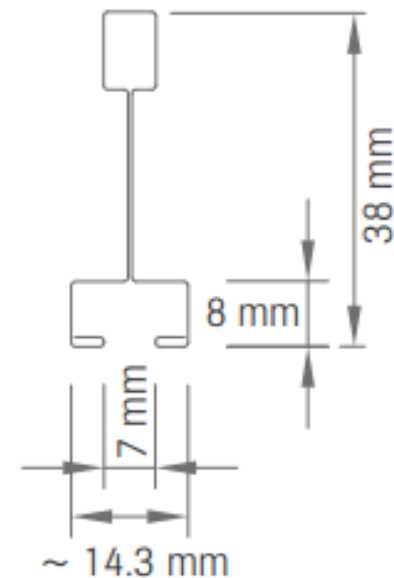
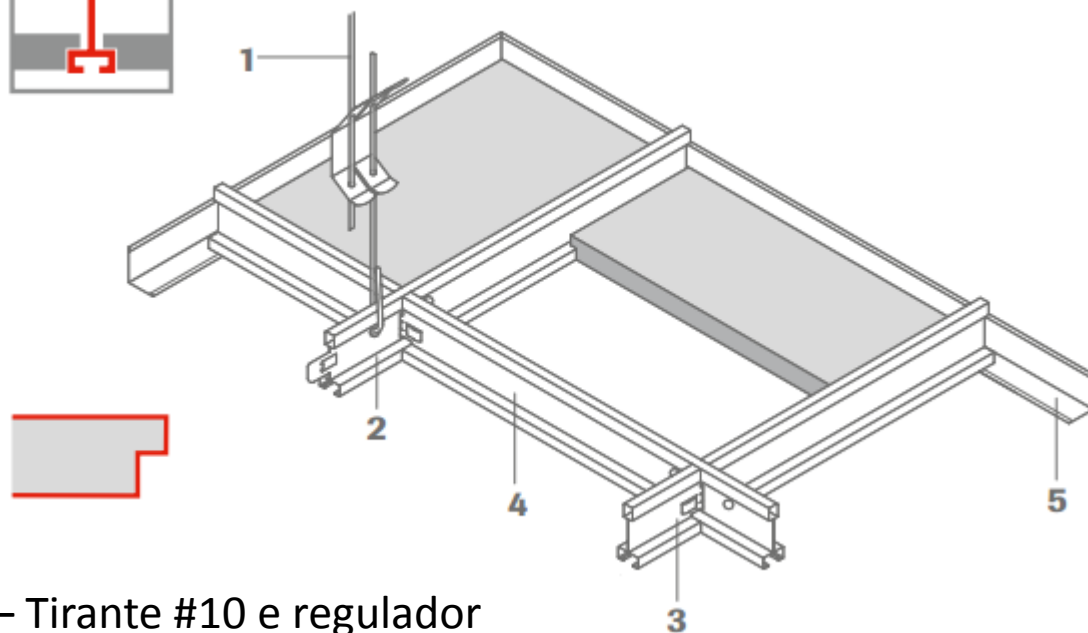
- Tegular – Sistemas S3a e S15a (Linhas Smart e Premium)



- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Travessinha
- 4 – Travessão
- 5 – Cantoneira

Sistemas de montagem:

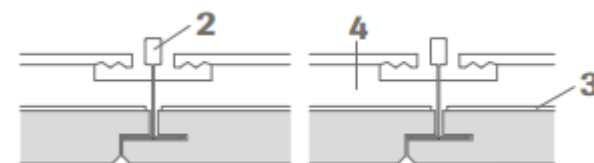
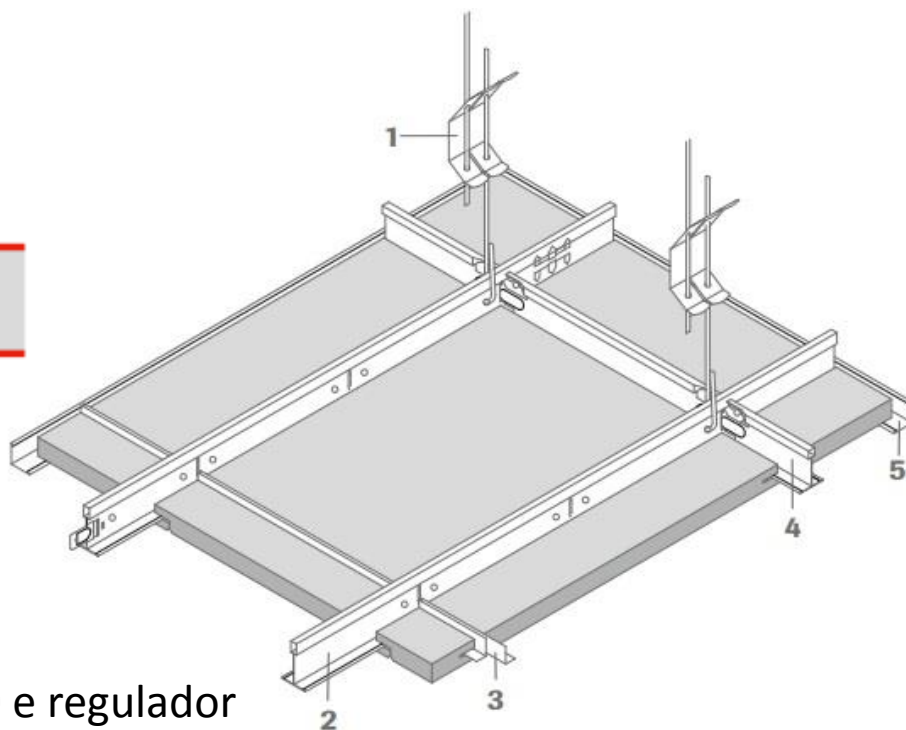
- OWAline – Sistema S15b (Linha Premium)



- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Travessinha
- 4 – Travessão
- 5 – Cantoneira

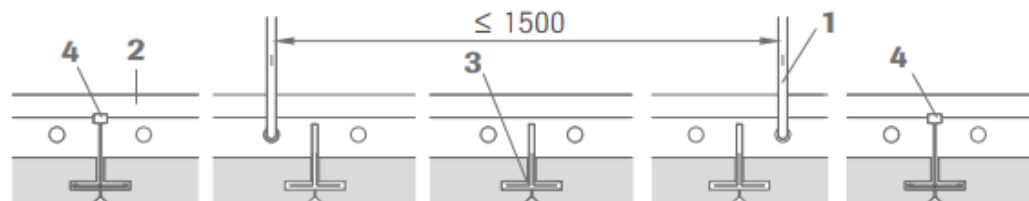
Sistemas de montagem:

- Concealed (C) ou Oculto – Sistema S9b (Linha Premium)



Seção do perfil principal

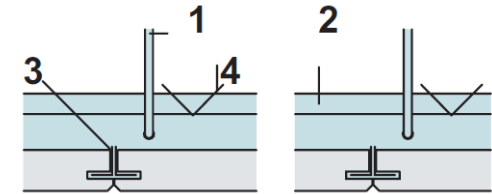
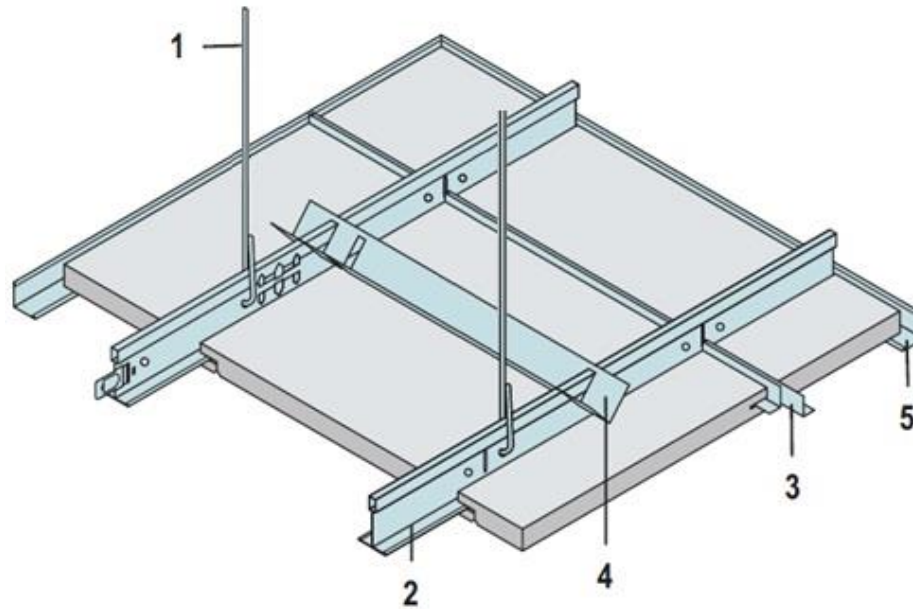
- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Perfil L
- 4 – Travessinha
- 5 – Cantoneira



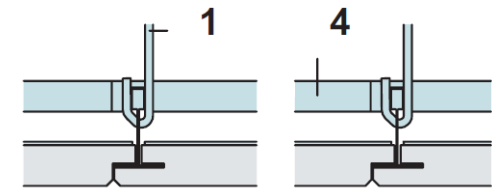
Seção do perfil L

Sistemas de montagem:

- Concealed (C) ou Oculto com barra estabilizadora (para salas pequenas)



Seção do perfil L

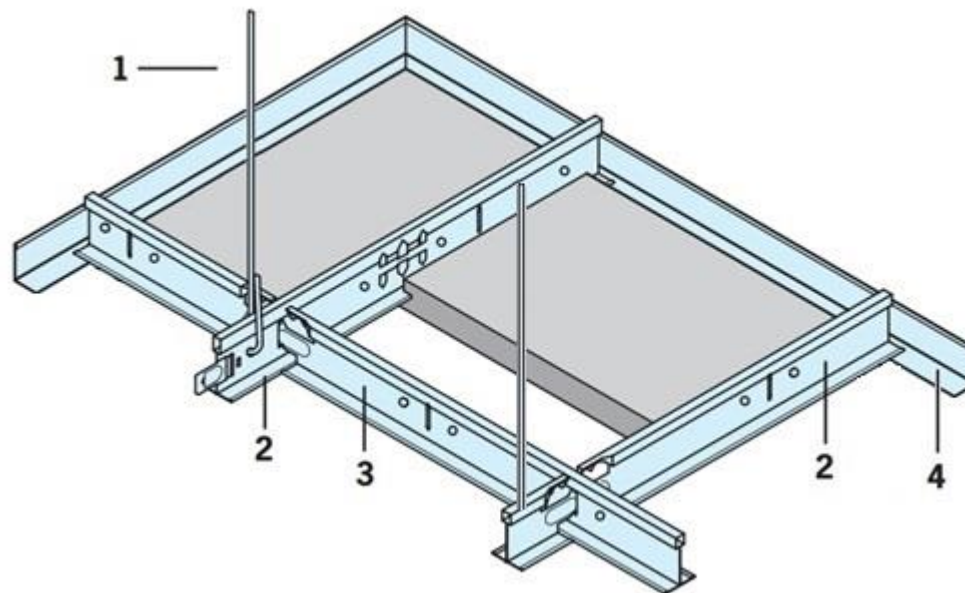
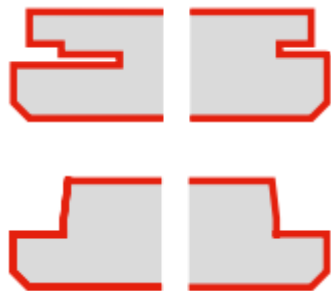


Seção do perfil principal

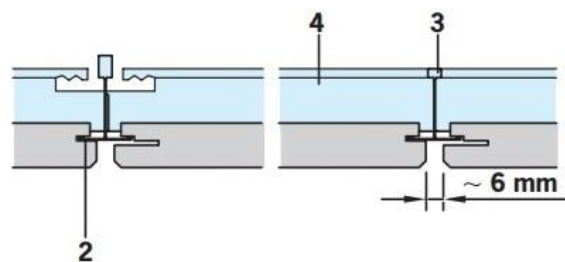
- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Perfil L
- 4 – Barra estabilizadora
- 5 – Cantoneira

Sistemas de montagem:

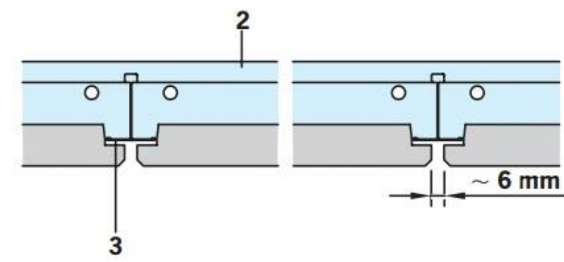
- Teccor – Sistema S19 (Linha Premium)



- 1 – Tirante #10 e regulador
- 2 – Perfil principal
- 3 – Travessinha
- 4 – Cantoneira



Seção do perfil principal



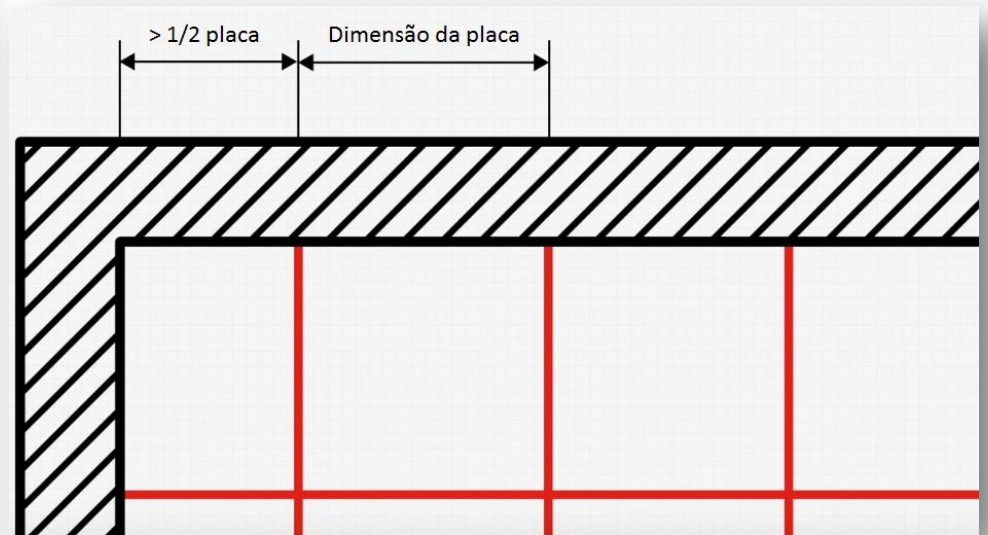
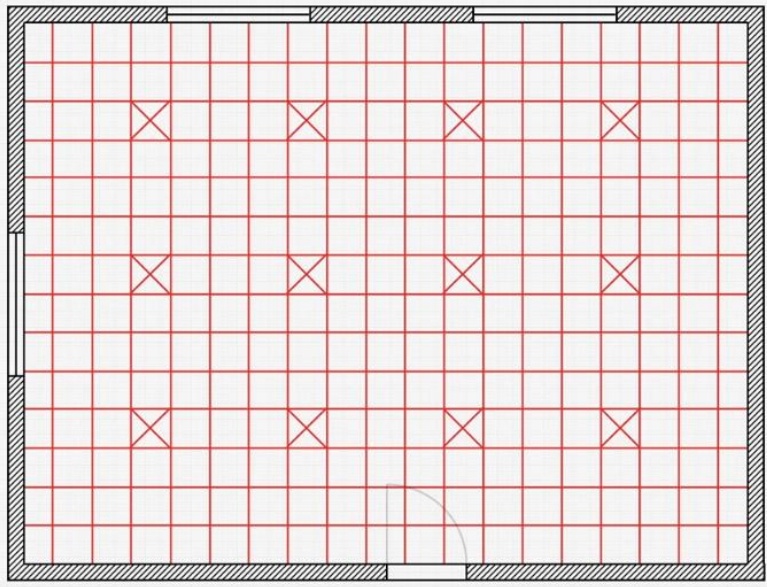
Seção da travessinha

Instalação:

- **Passo 1:**

Fazer a paginação das placas de Forro Mineral OWA de acordo com o ambiente. A modulação padrão dos forros é de **625 x 625 mm** ou **1250 x 625 mm**.

É recomendado fazer uma sanca de gesso ao redor do ambiente para permitir a colocação de placas inteiras (sem recorte), o que oferece melhor acabamento à instalação.



Instalação:

- **Passo 2:**

Verificado o esquadro do ambiente, marcar altura para o novo forro com auxílio do giz de linha ou do nível a laser, deixando no mínimo 10 cm livres entre a estrutura e a laje, ou qualquer outra instalação (dutos de instalações hidráulicas e elétricas).

Em áreas em que a facilidade de instalação e remoção das placas é importante, a distância recomendada é de pelo menos 12 cm livres!



Instalação:

- **Passo 3:**

Instalar as **cantoneiras de perímetro** na altura demarcada, com auxílio da furadeira, parafusos e buchas.



Instalação:

- **Passo 4:**

Marcar os pontos em que serão instalados os demais perfis metálicos, já considerando os recortes nos cantos e a modulação padrão das placas (625 x 625 mm ou 1250 x 625 mm).



Instalação:

- **Passo 5:**

Com auxílio do giz de linha ou nível a laser, marcar os pontos de fixação dos **tirantes**, alinhando com as marcações feitas anteriormente.

Os tirantes deverão estar espaçados entre si a cada 1000 mm no sentido do perfil principal.



Instalação:

- **Passo 6:**

Fixar os **tirantes** no teto de acordo com as marcações realizadas, com auxílio da furadeira, parafusos e buchas.

Em seguida, inserir os **reguladores de altura** nos tirantes e fixá-los aos **perfis principais**.



Instalação:

- **Passo 7:**

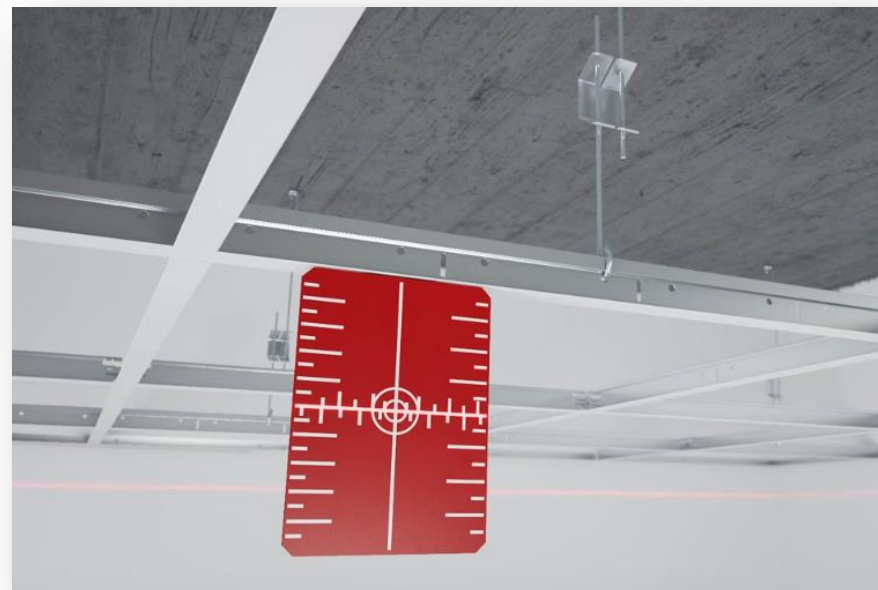
Após a fixação dos perfis principais nos reguladores de altura, clicar os **travessões nos perfis principais** e as **travessinhas nos travessões**, formando a grade de suspensão dos forros.

É importante ressaltar que ao utilizar placas com dimensão nominal de 625 x 625 mm, sempre deve-se optar por utilizar travessinhas como divisórias. Os perfis principais são necessários somente a cada 1250 mm.



Instalação:

- **Passo 8:**
Nivelar a grade de suspensão, com auxílio do nível.



Instalação:

- **Passo 9:**

Utilizando luvas tricotadas, iniciar a colocação das placas de forro mineral. Incline levemente a placa até que ela fique acima dos perfis, e desça apoiando-a sobre as bordas. Inicie pelas placas inteiras, deixando os recortes para o final, se houver.

As placas podem ser recortadas utilizando estilete, com auxílio de uma guia metálica. Para recortes circulares, utilizar serra copo.



Manutenção e limpeza:

- Poeira e sujeira soltas podem ser facilmente removidas dos Forros Minerais OWA com escovação (cerdas macias) ou com um espanador de pó. Certifique-se de limpar somente em uma direção, isso vai evitar o atrito de pó na superfície das placas.
- Depois da retirada do pó, marcas de lápis, manchas ou sujeira superficial podem ser removidas com uma borracha de resina comum. A maioria dos forros de fibra mineral OWA podem ser limpos com um pano úmido ou uma esponja umedecida em água contendo sabão neutro (a esponja deve conter o mínimo de água possível). Após a limpeza, o filme de sabão deve ser removido com um pano ou esponja levemente umedecido em água limpa.
- Não recomendamos a utilização de nenhum produto químico para limpeza.

Termo de Garantia de Produto - OWApplan

Leia cuidadosamente os seguintes termos e como eles são afetados pelas condições de instalação.

Todas as garantias OWA estão sujeitas ao uso em condições **normais** do forro OWApplan e de seu respectivo sistema de instalação, conforme abaixo:

Condições Gerais de Instalação e Garantia:

1. A instalação do forro OWApplan deverá ser realizada somente após a instalação de janelas e vidros.
2. Deverão ser respeitadas as condições ambientais como temperatura e umidade relativa do ar no ambiente de instalação, conforme tabela abaixo:

Local	Temperatura de Trabalho	Umidade Relativa do Ar durante instalação
Seco e sem goteiras	Entre 15°C e 49°C	Max. 75%

3. Não se deve utilizar forro OWApplan em ambientes que não tenham adequada proteção térmica e ventilação no entreforro, tais como: coberturas metálicas ou telhas de fibrocimento.
4. Antes da instalação, todos os componentes do forro OWApplan deverão ser mantidos numa área limpa, seca e fechada; protegida de intempéries (chuva ou umidade excessiva).
5. Após a instalação, as condições ambientais de umidade relativa do ar e temperatura deverão ser mantidas dentro dos limites especificados acima.
6. O forro OWApplan e os perfis metálicos não deverão ficar expostos diretamente á umidade na forma de goteiras nem a temperaturas ou níveis de umidade que produzam condensação, durante ou após a instalação.

7. O sistema de suspensão (perfis metálicos) em que as placas de forro são fixadas não deverão servir de apoio para nenhum outro material. As luminárias e as demais instalações como caixas de som, ar condicionado, e qualquer outro equipamentos que forem embutidos no forro, deverão ter fixação independente.
8. São consideradas condições **anormais** de uso do forro OWApplan: exposição a vapores químicos, agentes corrosivos (ex. cloro), vibrações, umidade proveniente de goteiras ou condensação em edifícios, umidade relativa do ar acima de 95% , temperaturas abaixo do ponto de congelamento, instalação do forro abaixo de telhas de amianto ou telha metálica, excesso de sujeira e acúmulo de pó, locais onde se exige manutenções constantes do forro.
9. Na eventualidade dos produtos estarem sujeitos ao uso em condições anormais, deverão ser imediatamente retirados e recolocados quando as condições de uso tiverem sido normalizadas.
10. Todos os produtos OWA deverão ser instalados e mantidos de acordo com as instruções de instalação descritas pela **Owa Brasil** para o produto, em vigência no momento da instalação e de acordo com as melhores praticas da indústria. No caso do forro OWApplan, somente equipes treinadas e qualificadas pela **OWA Brasil** podem efetuar a instalação.
11. Todos os produtos devem receber manutenção adequada para evitar o excesso de sujeira, o acúmulo de pó e demasiada umidade que podem gerar problemas de manchas e eventual proliferação de micro-organismos.
12. A OWA Brasil oferece 10 anos de garantia para suas placas de forro de fibra mineral e 5 anos para os perfis metálicos contra defeitos de fabricação e instalados sob condições normais. A garantia só é válida mediante apresentação de documento fiscal válido.
13. A OWA Brasil não autoriza qualquer pessoa a assumir ou estender em seu nome nenhuma outra responsabilidade ou obrigação de garantia que esteja em desacordo com este termo.



Manual de Serviço

Our energy working for you.™



**Power
Generation**

Controle

MCM3320
SYNC1320

Índice

1. INSTRUÇÕES DE SEGURANÇA IMPORTANTES	1
1.1 Estilos de Aviso, Cuidado e Observação Usados Nesse Manual	1
1.2 Precauções Gerais de Segurança	1
1.3 Temperaturas ambiente altas	2
1.4 Código de Segurança do Equipamento	2
1.5 As Peças em Movimento Podem Causar Acidentes Pessoais Graves ou Morte	2
1.6 Choque Elétrico Pode Provocar Acidentes Pessoais Graves ou Morte	2
1.7 Equipamento de Média Tensão (601 V a 15 kV)	3
1.8 Múltiplas fontes de alimentação elétrica	3
1.9 Não incline o equipamento	3
2. INTRODUÇÃO	5
2.1 Formação necessária para o serviço	5
2.2 Ferramentas necessárias para o serviço	5
2.3 Sobre este manual	6
2.3.1 Organização deste manual	6
2.4 Sobre o MCM3320	6
2.4.1 SYNC1320	6
2.4.2 Códigos e padrões	7
2.5 Como Obter Serviços	7
2.6 Lista de Abreviações	7
3. CONCEITOS BÁSICOS	9
3.1 Topologia do Sistema	9
3.1.1 Topologias	9
3.1.2 Componentes Típicos do Sistema (Barramento Isolado sem Disjuntor Principal do Grupo Gerador)	10
3.1.3 Componentes Típicos do Sistema (Barramento Isolado com Disjuntor Principal do Grupo Gerador)	11
3.1.4 Componentes Típicos do Sistema (Barramento Comum)	12
3.1.5 Componentes Típicos do Sistema (Par de Transferência)	13
3.1.6 Somente Sincronismo Principal	13
3.1.7 Modo de Componente	13
3.2 Tipo de Transição	14
3.2.1 Transição Aberta	14
3.2.2 Transição Fechada Lenta	14
3.2.3 Transição Fechada Rápida	14
3.2.4 Tipo de Transição Operacional de PTC	14
3.3 Estado do Sistema	14
3.4 Estado da Disponibilidade do Grupo Gerador	15
3.5 Número total de grupos geradores em operação	15
3.6 Capacidade total em operação	15
3.7 Capacidade total de demanda de carga em operação	15

3.8 Comando de Ativação de Cancelamento e de Cancelamento.....	16
3.9 Resumo das Configurações (Conceitos Básicos)	16
4. COMPONENTES	19
4.1 Placa base do MCM3320	19
4.1.1 Versão do hardware.....	19
4.1.2 Resumo de Conexões	20
4.1.3 Conexões CT1-CT6	20
4.1.4 Conexões de J14	21
4.1.5 Conexões de TB1	22
4.1.6 Conexões de TB2	23
4.1.7 Conexões de TB3	25
4.1.8 Conexões de TB6	26
4.1.9 Conexões de TB7	27
4.1.10 Conexões de TB8	28
4.1.11 Conexões de TB9	29
4.1.12 Conexões de TB10	31
4.1.13 Conexões de TB15	32
4.1.14 Modo Desligamento da Alimentação	34
4.1.15 Indicadores de Sistema e de Diagnóstico	35
4.1.16 Reparando Placas de Circuitos	37
4.2 Placa Base do SYNC1320.....	37
4.2.1 Resumo de Conexões	37
4.2.2 Conexões de TB1	38
4.2.3 Conexões de TB2	39
4.2.4 Conexões de TB3	40
4.2.5 Conexões de TB6	41
4.2.6 Conexões de TB7	42
4.2.7 Conexões de TB9	43
4.2.8 Conexões de TB10	44
4.2.9 Conexões de TB15	45
4.2.10 Modo Desligamento da Alimentação	46
4.2.11 Indicadores de Sistema e de Diagnóstico	46
4.2.12 Reparando Placas de Circuitos	48
4.3 Painel do Operador.....	49
4.3.1 Painel Traseiro	49
4.3.2 Painel Frontal	50
4.3.3 Versões de Software Compatíveis (Painel do Operador).....	51
4.3.4 Tela Principal	51
4.3.5 Níveis de Segurança.....	53
4.4 Dispositivo de Interface Suplementar (SID).....	55
4.4.1 Grupos Geradores por SID	55
4.4.2 Cargas por SID	55
4.4.3 SID Requerido.....	55
4.4.4 Cancelamento de SID Herdado (Antes da V2.00).....	56
4.4.5 Versões de Software Compatíveis (AUX 101).....	56

4.4.6 Configurando o AUX 101 e o AUX 102 com o MCM3320.....	56
4.4.7 Resumo dos Pontos de Monitoramento (AUX 101/102).....	56
4.4.8 Placa do AUX 101.....	58
4.4.9 Placa do AUX 102.....	64
4.4.10 Diagnóstico e Solução de Problemas	69
4.4.11 Conectando a um AUX 101 ou AUX 102 Utilizando o InPower	70
4.4.12 Reparando Placas de Circuitos	70
4.5 Gráficos de Barras.....	70
4.5.1 Percentagem de Corrente Barramento Grupo Gerador	70
4.5.2 Percentagem de Corrente da Rede Pública	70
4.5.3 Percentagem de kW Total Rede Pública.....	70
4.5.4 Versões de Software Compatíveis (Gráfico de Barras).....	70
4.5.5 Configurando um Gráfico de Barras	70
4.6 Sistema de Alerta Universal	72
4.6.1 Versões de Software Compatíveis (Sistema de Alerta Universal)	72
4.6.2 Sistema de Alerta de Estado Básico	72
4.6.3 Sistema de Alerta de Adição/Desconexão de Carga.....	77
4.6.4 Configurando um Sistema de Alerta utilizando o Painel do Operador	81
5. DISPONIBILIDADE DA FONTE.....	83
5.1 Sensores de Controle de Transferência de Energia (PTC).....	83
5.1.1 Sensor de Subtensão do Grupo Gerador	83
5.1.2 Sensor de Sobretensão do Grupo Gerador.....	84
5.1.3 Sensor de Frequência do Grupo Gerador	85
5.1.4 Sensor de Perda de Fase do Grupo Gerador	87
5.1.5 Sensor de Rotação de Fase do Grupo Gerador.....	87
5.1.6 Sensor de Subtensão da Rede Pública.....	87
5.1.7 Sensor de Sobretensão da Rede Pública.....	88
5.1.8 Sensor de Frequência da Rede Pública	89
5.1.9 Sensor de Perda de Fase da Rede Pública	91
5.1.10 Sensor de Rotação de Fase da Rede Pública	91
5.2 Disponibilidade do Grupo Gerador	91
5.2.1 Disponibilidade do Grupo Gerador (Aplicações Trifásicas em Topologias de Barramento Isolado sem Disjuntor Principal de Grupo Gerador e de Barramento Comum).....	91
5.2.2 Disponibilidade do Grupo Gerador (Aplicações Trifásicas em Topologias de Barramento Isolado com Disjuntor Principal de Grupo Gerador e de Par de Transferência).....	92
5.2.3 Sensor de Capacidade On-line do Grupo Gerador	92
5.3 Disponibilidade da Rede Pública	93
5.3.1 Disponibilidade da Rede Pública (Aplicações Trifásicas em Topologias de Barramento Comum e de Par de Transferência).....	93
5.3.2 Chave de Falha na Fonte da Rede Pública.....	93
5.4 Posição de Disjuntor Baseada na Corrente	93
5.5 Resumo das Configurações (Disponibilidade da Fonte)	94
6. ESTADO DO CONTROLE DE TRANSFERÊNCIA DE ENERGIA (PTC).....	97

6.1 Grupos Geradores Conectado.....	97
6.1.1 Conectando os Grupos Geradores.....	97
6.1.2 Desconectando os Grupos Geradores.....	97
6.1.3 Conexões do Grupo Gerador e Cancelamento de SID Herdado.....	98
6.1.4 Restrição de Disjuntor do Grupo Gerador.....	98
6.2 Rede Pública Conectada.....	98
6.2.1 Conectando a Rede Pública.....	98
6.2.2 Desconectando a Rede Pública.....	99
6.2.3 Restrição de Disjuntor Principal da Rede Pública.....	99
6.3 Resumo das Configurações (Estado de PTC).....	99
7. MODO DE OPERAÇÃO DO CONTROLE DE TRANSFERÊNCIA DE ENERGIA (PTC).....	101
7.1 Lógica de PTC e Disponibilidade da Fonte.....	101
7.2 Prioridade dos Modos de Operação de PTC.....	101
7.3 Falha da Rede Pública.....	101
7.3.1 Condições para Entrar na Falha de Rede Pública.....	101
7.3.2 Chave de Falha na Fonte da Rede Pública.....	101
7.3.3 Condições para Sair da Falha de Rede Pública.....	102
7.4 Cancelamento Normal.....	103
7.4.1 Condições para Entrar no Cancelamento Normal.....	103
7.4.2 Condições para Sair do Cancelamento Normal.....	103
7.5 Paralelo Estendido.....	103
7.5.1 Condições para Entrar em Paralelo Estendido.....	103
7.5.2 Chave de Paralelo Estendido.....	103
7.5.3 Condições para Sair de Paralelo Estendido.....	104
7.6 Teste.....	104
7.6.1 Condições para Entrar no Teste.....	104
7.6.2 Chave de Partida do Teste.....	104
7.6.3 Condições para Sair do Teste.....	105
7.7 Normal.....	105
7.7.1 Condições para Entrar em Normal.....	105
7.7.2 Condições para Sair de Normal.....	105
7.8 Resumo das Configurações (Modo de Operação PTC).....	105
8. CONTROLE DO DISJUNTOR.....	107
8.1 Modo de Operação Par de Transferência PTC.....	107
8.2 Controle do Disjuntor em Manual.....	107
8.3 Controle do Disjuntor em Falha na Rede Pública.....	108
8.4 Controle do Disjuntor em Cancelamento Normal.....	109
8.5 Controle do Disjuntor em Paralelo Estendido.....	110
8.6 Controle do Disjuntor em Teste.....	110
8.6.1 Comando de Teste com Carga.....	112
8.7 Controle do Disjuntor em Normal.....	112
8.7.1 Retransferência de Transição Aberta após Falha de Sincronização.....	114
8.8 Temporizadores.....	115
8.8.1 Retardo de Tempo para Transferir.....	115
8.8.2 Retardo de Tempo de Retransferência.....	115

8.8.3 Retardo de Tempo de Transição Programada	115
8.8.4 Temporizador Máximo Paralelo	115
8.8.5 Resumo das Configurações (Temporizadores de PTC).....	116
8.9 Restrições	116
8.9.1 Restrição Principal	116
8.9.2 Inibição de Transferência.....	116
8.9.3 Inibição de Retransferência	117
8.9.4 Chave de Cancelamento	118
8.9.5 Restrição de Disjuntor do Grupo Gerador	118
8.9.6 Restrição de Disjuntor Principal da Rede Pública	118
8.10 Ativar Falha ao Desconectar	119
8.11 Sinais de Saída para Disjuntores	119
8.12 Resumo das Configurações (Controle do Disjuntor)	120
9. CONTROLE DO GRUPO GERADOR	125
9.1 Modo de Operação do Grupo Gerador PTC	125
9.2 Controle do Grupo Gerador em Falha da Rede Pública, Paralelo Estendido e Teste	125
9.3 Controle do Grupo Gerador em Cancelamento Normal	125
9.4 Controle do Grupo Gerador em Normal	125
9.5 Retardo para Ligar.....	126
9.6 Retardo para Parar	126
9.7 Resumo das Configurações (Controle do Grupo Gerador).....	126
10. CONTROLE DE CARGAS.....	129
10.1 Pinos Associados.....	129
10.2 Paralelo Estendido.....	129
10.2.1 Condições para Controle de Carga em Paralelo Estendido	129
10.2.2 Controle de kW	130
10.2.3 Controle de kVAR	133
10.2.4 Tempo de Subida de Carga em Paralelo Estendido	135
10.2.5 Métodos de Circuito Aberto e Métodos de Circuito Fechado	135
10.2.6 Subida de Carga durante Paralelo Estendido	137
10.2.7 Resumo das Configurações (Controle de Carga em kW)	138
10.2.8 Resumo das Configurações (Controle de Carga em kVAR)	141
10.3 Transição Fechada Lenta	145
10.3.1 Controle de Carga Durante Transições Fechadas Lentas	145
10.4 Controle de Carga em Outros Momentos.....	145
10.5 Ativar Saída de Controle de Carga por Versão do Hardware	146
10.5.1 Código 1534 - Load Control Output Event (Evento de Saída de Controle de Carga).....	146
11. SINCRONIZADOR.....	147
11.1 Estado do Sincronizador.....	147
11.1.1 Ativar Bloqueio Falha de Sincronização	147
11.1.2 Restrição Principal	147
11.2 Correspondência de Frequência.....	148
11.2.1 Correspondência de Fase.....	148

11.2.2	Frequência de Deslizamento	148
11.2.3	Circuito Proporcional Integral (PI).....	149
11.3	Correspondência de Tensão.....	149
11.3.1	Offset de Teste de Correspondência da Tensão.....	150
11.3.2	Proteção de Partilha de Carga kVAR e Falha de Correspondência da Tensão.....	150
11.3.3	Circuito Proporcional Integral (PI).....	151
11.4	Fechamento de Verificação do Sincronizador Permitido.....	151
11.4.1	Fechamento Permissivo Admitido	151
11.5	Resumo das Configurações (Sincronizador).....	152
12.	ADIÇÃO/DESCONEXÃO DE CARGA.....	155
12.1	Ativar Adição/Desconexão de Carga.....	155
12.2	Cargas por SID	155
12.2.1	SID Indisponível e Conexão/Desconexão de Carga	155
12.3	Níveis de adição de carga	155
12.4	Níveis de consumo de carga	155
12.5	Adição de Carga e Disjuntor Principal de Grupo Gerador	156
12.6	Estado de Operação de Adição/Desconexão de Carga.....	156
12.7	Adição de Carga Automática	156
12.7.1	Capacidade On-line Necessária	157
12.7.2	Condições para Adição de Carga Automática.....	158
12.7.3	Adição de Carga Automática e Cancelamento de SID Herdado.....	158
12.8	Consumo Automático de Carga.....	158
12.8.1	Condições para Desconexão de Carga Automática.....	159
12.8.2	Desconexão de Carga Automática durante Transferências de Transição Aberta	159
12.8.3	Desconexão de Carga de Retransferência de Transição Aberta	159
12.9	Condições para Adição/Desconexão de Carga Manual	159
12.10	Adição de Carga da Rede Pública	160
12.10.1	Condições para Adição de Carga da Rede Pública	160
12.11	Número Máximo de Cargas por Versão de Firmware	160
12.12	Sinais de Saída para Disjuntores de Alimentação	161
12.13	Sinais de Saída para Chaves de Transferência Automáticas (ATS).....	161
12.14	Resumo das Configurações (Adição/Desconexão de Carga)	161
13.	DEMANDA DE CARGA.....	163
13.1	Ativar Demanda de Carga	163
13.2	Grupos Geradores por SID.....	163
13.2.1	SID Indisponível e Demanda de Carga	163
13.3	Suporte de Grupo Gerador para Demanda de Carga em Paralelo Estendido.....	164
13.4	Retardo de Tempo Inicial.....	164
13.5	Quando um Grupo Gerador é Desligado.....	164
13.5.1	Percentual de Desligamento.....	164
13.5.2	Limiar de Desligamento	164
13.5.3	Percentual de Desligamento ou Limiar de Desligamento.....	165
13.5.4	Retardo de Desligamento	165

13.5.5 Capacidade On-line Mínima	165
13.6 Quando um Grupo Gerador é Reiniciado	166
13.6.1 Percentual de Reinício	166
13.6.2 Relação entre o percentual de desligamento e o percentual de reinício	166
13.6.3 Limiar de Reinício	167
13.6.4 Relação entre o Limiar de Desligamento e o Limiar de Reinício	167
13.6.5 Retardo para Reinício	168
13.7 Qual Grupo Gerador é Desligado ou Reiniciado	168
13.7.1 Método de Sequência Fixa	168
13.7.2 Exemplo: Método de Sequência Fixa	168
13.7.3 Configurando uma Sequência Fixa no InPower	169
13.7.4 Método de Horas de Operação	169
13.7.5 Fonte das Horas de Operação para o Método de Horas de Operação	170
13.7.6 Exemplo: Método de Horas de Operação	170
13.7.7 Tempo On-line do Grupo Gerador	171
13.7.8 Tempo de Falha do Grupo Gerador	171
13.8 Demanda de Carga e Sobrecarga do Grupo Gerador	172
13.9 Resumo das Configurações (Demanda de Carga).....	172
14. PROGRAMADOR.....	175
14.1 Relógio de Tempo Real	175
14.1.1 Horário de Verão.....	175
14.1.2 Ativar Horário de Verão	175
14.1.3 Resumo das Configurações (Relógio de Tempo Real).....	176
14.1.4 Código 1689 - Real-time Clock Power Interrupt (Quebra de Energia no Relógio de Tempo Real).....	176
14.1.5 Efeitos do Código 1689.....	176
14.2 Ativar Programador.....	176
14.2.1 Ativar Alterações Automáticas do Programador do Sistema.....	177
14.3 Programas agendados.....	177
14.4 Exceções	178
14.5 Especificações do Programador.....	178
14.6 Resumo das Configurações (Programador).....	179
15. MODO MANUAL.....	181
15.1 Condições para Entrar no Modo Manual.....	181
15.2 Condições para Sair do Modo Manual	181
15.3 Chave Manual/Automática.....	181
15.4 Monitoramento da Posição do Disjuntor em Modo Manual.....	181
15.5 Compromisso com a Transferência no Modo Manual.....	182
15.6 Controle do Disjuntor em Modo Manual	182
15.6.1 Retardo de Tempo de Transição Programada	182
15.6.2 Temporizador Máximo Paralelo em Modo Manual	183
15.6.3 Restrição Principal	183
15.6.4 Restrição de Disjuntor do Grupo Gerador	183
15.6.5 Restrição de Disjuntor Principal da Rede Pública	183
15.6.6 Ativar Falha ao Desconectar.....	184

15.7	Controle do Grupo Gerador em Modo Manual	184
15.8	Controle de Cargas em Modo Manual.....	184
15.8.1	Controle de Carga em Outros Momentos.....	184
15.9	Status do Sincronizador no Modo Manual.....	185
15.9.1	Chave de Ativação do Sincronizador.....	185
15.10	Adição/Desconexão de Carga em Modo Manual	185
15.11	Demanda de Carga em Modo Manual	185
15.12	Programador em Modo Manua	185
15.13	Resumo das Configurações (Modo Manual)	186
16.	SOMENTE SINCRONISMO PRINCIPAL	187
16.1	Disponibilidade do Grupo Gerador (Aplicações Trifásicas em Modo Somente Sincronismo Principal ou Componente).....	187
16.2	Disponibilidade da Rede Pública (Aplicações Trifásicas em Modo Somente Sincronismo Principal ou Componente).....	187
16.3	Estado de PTC e Modo de Operação de PTC em Modo Somente Sincronismo Principal.....	187
16.4	Estado do Sincronizador em Modo Somente Sincronismo Principal e Componente.....	187
16.5	Status do Sincronizador no Modo Manual.....	188
16.5.1	Chave de Ativação do Sincronizador.....	188
16.6	Verificação do Sincronizador em Modo Somente Sincronismo Principal ou Componente	188
17.	SYNC1320.....	189
17.1	Disponibilidade do Grupo Gerador (Aplicações Monofásicas).....	189
17.2	Disponibilidade da Rede Pública (Aplicações Monofásicas).....	189
17.3	Sincronizador no SYNC1320.....	189
18.	MODO DE COMPONENTE.....	191
18.1	Disponibilidade do Grupo Gerador (Aplicações Trifásicas em Modo Somente Sincronismo Principal ou Componente).....	191
18.2	Disponibilidade da Rede Pública (Aplicações Trifásicas em Modo Somente Sincronismo Principal ou Componente).....	191
18.3	Estado de PTC e Modo de Operação de PTC em Modo Componente	191
18.4	Estado do Sincronizador em Modo Somente Sincronismo Principal e Componente.....	191
18.5	Status do Sincronizador no Modo Manual.....	192
18.5.1	Chave de Ativação do Sincronizador.....	192
18.6	Verificação do Sincronizador em Modo Somente Sincronismo Principal ou Componente	192
18.7	Controle de Cargas em Modo Componente.....	193
18.8	Controle de Cargas Baseado no Estado de PTC e no Modo de Operação de PTC	193
18.9	Controle de Cargas em Modo Manual.....	193
19.	DIAGNÓSTICO E SOLUÇÃO DE PROBLEMAS	195
19.1	Eventos	195
19.1.1	Código 1222 - Não em Automático.....	195
19.1.2	Código 1483 - Alarme Comum	195

19.1.3 Código 1534 - Load Control Output Event (Evento de Saída de Controle de Carga).....	195
19.1.4 Código 1916 - Evento Sincronizado	195
19.1.5 Código 2328 - Evento Barramento de Rede Pública Disponível.....	195
19.1.6 Código 2332 - Evento Barramento de Rede Pública Conectada	195
19.1.7 Código 2333 - Evento Barramento de Grupo Gerador Conectado	195
19.1.8 Código 2779 - Evento Rede Pública sem Carga	195
19.1.9 Código 2781 - Evento Grupo Gerador sem Carga	196
19.1.10 Código 2965 - Evento Barramento de Grupo Gerador Disponível.....	196
19.1.11 Código 2971 - Evento Teste/Paralelo Estendido.....	196
19.1.12 Código 3226 - Evento Carga de Base de Barramento Grupo Gerador.....	196
19.1.13 Código 3227 - Evento Corte de Pico da Rede Pública	196
19.2 Falhas	196
19.2.1 Reinício de Falha	196
19.2.2 Status de Bloqueio do Sistema.....	197
19.2.3 Condições para Status de Bloqueio do Sistema	197
19.3 Procedimentos de Diagnóstico e Solução de Problemas.....	198
19.3.1 Nenhum Código - AUX 101 Não Comunica	198
19.3.2 Nenhum Código - Códigos de Falha não Corrigidos.....	199
19.3.3 Nenhum Código - Medição do Barramento do Grupo Gerador Incorreta.....	199
19.3.4 Nenhum Código - Medição de Corrente de Rede Pública Incorreta	200
19.3.5 Nenhum Código - Painel do Operador não está Comunicando	200
19.3.6 Código 343 - Falha de Hardware do MCM3320.....	201
19.3.7 Código 353 - Erro de escrita EEPROM	201
19.3.8 Código 441 - Low Battery Voltage (Tensão Baixa na Bateria).....	202
19.3.9 Código 442 - High Battery Voltage (Tensão Alta da Bateria).....	203
19.3.10 Código 1121 - Fail to Disconnect (Falha ao Desconectar).....	204
19.3.11 Código 1219 - Utility Main Breaker Tripped (Disjuntor Principal Rede Pública Desarmado).....	204
19.3.12 Código 1223 - Utility Bus Frequency (Frequência do Barramento da Rede Pública).....	205
19.3.13 Código 1224 - Generator Set Bus Over Voltage (Sobretensão do Barramento do Grupo Gerador)	207
19.3.14 Código 1225 - Generator Set Bus Under Voltage (Subtensão do Barramento do Grupo Gerador)	210
19.3.15 Código 1226 - Generator Set Bus Frequency (Frequência de Barramento do Grupo Gerador)	213
19.3.16 Código 1328 - Generator Set Main Breaker Tripped (Disjuntor Principal do Grupo Gerador Desarmado).....	215
19.3.17 Código 1335 - AC Metering Out of Range (Medição CA Fora do Intervalo).....	216
19.3.18 Código 1444 - Generator Set Bus Overload (Sobrecarga do Barramento do Grupo Gerador)	219
19.3.19 Código 1452 - Generator Set Main Breaker Fail to Close (Falha ao Fechar Disjuntor Principal do Grupo Gerador) (Barramento Isolado sem Disjuntor Principal do Grupo Gerador ou Barramento Comum).....	221
19.3.20 Código 1452 - Generator Set Main Breaker Fail to Close (Falha ao Fechar Disjuntor Principal do Grupo Gerador) (Barramento Isolado com Disjuntor Principal do Grupo Gerador ou Par de Transferência)	222

19.3.21 Código 1453 - Generator Set Main Breaker Fail to Open (Falha ao Abrir Disjuntor Principal Grupo Gerador) (Barramento Isolado sem Disjuntor Principal do Grupo Gerador ou Barramento Isolado com Disjuntor Principal do Grupo Gerador)	224
19.3.22 Código 1453 - Generator Set Main Breaker Fail to Open (Falha ao Abrir Disjuntor Principal do Grupo Gerador) (Barramento Isolado com Disjuntor Principal do Grupo Gerador ou Par de Transferência)	225
19.3.23 Código 1454 - Generator Set Main Breaker Position Contact (Contato de posição do disjuntor principal do grupo gerador)	227
19.3.24 Código 1455 - Utility Main Breaker Position Contact (Contato de Posição do Disjuntor Principal da Rede Pública) (Barramento Isolado sem Disjuntor Principal do Grupo Gerador ou Barramento Isolado com Disjuntor Principal do Grupo Gerador)	230
19.3.25 Código 1455 - Utility Main Breaker Position Contact (Contato de Posição do Disjuntor Principal da Rede Pública) (Barramento Comum ou Par de Transferência).....	231
19.3.26 Código 1456 - Synchronizer Output Limit (Limite de Saída do Sincronizador).....	233
19.3.27 Código 1457 - Fail to Synchronize Warning (Alerta de Falha de Sincronização)	234
19.3.28 Código 1458 - Synchronizer Phase Rotation Mismatch (Não Correspondência de Rotação de Fase do Sincronizador).....	236
19.3.29 Código 1541 - Generator Set Failed to Come Online (Não foi Possível Colocar Grupo Gerador On-line).....	237
19.3.30 Código 1689 - Real-time Clock Power Interrupt (Quebra de Energia no Relógio de Tempo Real)	239
19.3.31 Código 1912 - Utility Bus Loss of Phase (Perda de Fase do Barramento da Rede Pública)	239
19.3.32 Código 1913 - Generator Set Bus Loss of Phase (Perda de Fase Barramento do Grupo Gerador)	240
19.3.33 Código 1914 - Utility Bus Phase Rotation (Rotação de Fase do Barramento da Rede Pública)	242
19.3.34 Código 1915 - Generator Set Bus Phase Rotation (Rotação de Fase do Barramento do Grupo Gerador)	243
19.3.35 Código 1989 - kW Load Control Output Limit (Limite de Saída do Controle de Cargas kW).....	245
19.3.36 Código 1991 - kVAR Load Control Output Limit (Limite de Saída do Controle de Cargas kVAR).....	247
19.3.37 Código 1999 - Maximum Parallel Time (Tempo Máximo em Paralelo).....	248
19.3.38 Código 2331 - Utility Bus Under Voltage (Subtensão do Barramento da Rede Pública).....	249
19.3.39 Código 2358 - Utility Bus Over Voltage (Sobretensão do Barramento da Rede Pública).....	252
19.3.40 Código 2396 - Utility Main Breaker Fail to Close (Falha ao Fechar o Disjuntor Principal da Rede Pública)	254
19.3.41 Código 2397 - Utility Main Breaker Fail to Open (Falha ao Abrir o Disjuntor Principal da Rede Pública)	256
19.3.42 Código 2416 - Calibration Checksum (Soma de Verificação de Calibração).....	259
19.3.43 Código 2647 - Load Demand Setup Warning (Aviso de Configuração de Demanda de Carga).....	259

19.3.44 Código 2648 - Remote I/O Comm Failure Warning (Alerta de Falha de Comunicação E/S Remota).....	260
19.3.45 Código 2939 - Modbus Communication Failure Warning (Alerta de Falha de Comunicação Modbus).....	262
19.3.46 Código 3924 - Utility Reverse kW Fault (Falha de kW Invertido da Rede Pública).....	263
19.3.47 Código 4137 - Advanced Grid Protection Fault (Falha de Proteção de Grelha Avançada).....	263
20. LISTA DE PEÇAS.....	265
21. INSTALAÇÕES DE FABRICAÇÃO	267
21.1 Como Obter Serviços.....	267
APÊNDICE A. DESENHOS DE INTERCONEXÃO	269
A.1 0630-3133 (Desenho de Interconexão do MCM3320).....	271
A.2 0630-3136 (Desenho de Interconexão do SYNC1320)	299
APÊNDICE B. DIAGRAMAS DE SEQUÊNCIA	303
B.1 Diagramas de Sequência	305

Esta página foi deixada em branco intencionalmente.



1 Instruções de Segurança Importantes

GUARDE ESTAS INSTRUÇÕES - Este manual contém instruções importantes que devem ser seguidas durante a instalação, operação e manutenção do equipamento.

A operação será segura e eficiente somente se o equipamento for corretamente operado e mantido. Muitos acidentes são causados quando se deixa de seguir regras e precauções que são fundamentais.

1.1 Estilos de Aviso, Cuidado e Observação Usados Nesse Manual

Os símbolos e estilos de segurança a seguir, encontrados em todo esse manual, indicam condições potencialmente perigosas para o operador, o pessoal de serviço e o equipamento.



PERIGO: *Alerta para um perigo que resultará em acidentes pessoais graves ou morte.*



ALERTA: *Alerta para um perigo que poderá resultar em acidentes pessoais graves ou morte.*



CAUTELA: *Alerta para um perigo ou uma prática não segura que pode resultar em danos no produto ou na propriedade.*



NOTA: Um pequeno texto com informações que acrescentam o texto atual.

1.2 Precauções Gerais de Segurança

- Mantenha um extintor de incêndio multiclasse ABC sempre à mão. Incêndios Classe A envolvem materiais combustíveis comuns como madeira e tecido; incêndios Classe B, combustíveis e combustíveis líquidos inflamáveis e vapores de combustíveis; incêndios Classe C, equipamentos elétricos energizados. (ref. NFPA Nº 10).
- Mantenha o equipamento e a área próxima limpos e sem obstruções. Impeça o acúmulo de materiais sobre o produto. Remova qualquer equipamento não utilizado e mantenha o chão limpo e seco.
- Não armazene líquidos inflamáveis como combustível, limpadores, óleo etc., próximos ao equipamento. Poderá ocorrer incêndio ou explosão.
- Não trabalhe com o grupo gerador quando estiver com fadiga física ou mental ou após o consumo de álcool ou drogas, o que torna insegura a operação do equipamento.
- Verifique se todas as proteções, elementos de fixação, suportes, portas e painéis estão presos e seguros.
- Use equipamento de proteção pessoal apropriado, como óculos de segurança, luvas e calçados ao trabalhar com este equipamento.

1.3 Temperaturas ambiente altas



ALERTA: *Se a temperatura ambiente for alta, algumas superfícies poderão ficar quentes. O contato com superfícies quentes pode causar queimaduras e ferimentos. Certifique-se de que esteja usando equipamento de proteção pessoal adequado antes de tocar no equipamento.*

1.4 Código de Segurança do Equipamento

Antes de operar o equipamento, leia os manuais e familiarize-se com eles e com o equipamento. **A operação será segura e eficiente somente se o equipamento for corretamente operado e mantido.** Muitos acidentes são causados quando se deixa de seguir regras e precauções que são fundamentais.



ALERTA: *Operação e manutenção inadequadas podem causar ferimentos graves ou perda de vidas e bens. Leia e siga todas as Precauções de Segurança, Avisos e Cuidados ao longo deste manual e a documentação fornecida com o seu equipamento.*



ALERTA: *O levantamento e o reposicionamento do equipamento só deve ser realizado por meio de equipamento de elevação, manilhas e barras de propagador adequados, em conformidade com as diretrizes e as leis locais, por pessoal devidamente treinado e experiente. O levantamento incorreto de peças pode ocasionar acidentes pessoais graves, morte e/ou danos ao equipamento. Para obter mais informações, contate seu distribuidor autorizado.*

1.5 As Peças em Movimento Podem Causar Acidentes Pessoais Graves ou Morte

- Mantenha mãos, roupas e joias afastadas de qualquer peça em movimento.
- Certifique-se de que os elementos de fixação no equipamento estão firmes. Aperte suportes e braçadeiras, mantenha proteções instaladas.
- Não use roupas ou joias folgadas nas proximidades de peças em movimento ou ao trabalhar em equipamento elétrico. Roupas e joias folgadas podem ficar presas em peças em movimento.

1.6 Choque Elétrico Pode Provocar Acidentes Pessoais Graves ou Morte

- Desligue a alimentação elétrica antes de remover proteções ou tocar no equipamento elétrico. Use tapetes de borracha isolante colocados em plataformas de madeira sobre pisos que sejam de metal ou concreto quando estiver ao redor de equipamento elétrico. Não use roupas úmidas (particularmente sapatos molhados) nem deixe que a superfície da pele fique úmida ao manusear qualquer equipamento elétrico. Não use joias. As joias podem causar curtos em contatos elétricos e provocar choques ou queimaduras.
- Tenha o máximo cuidado ao trabalhar com componentes elétricos. Altas tensões podem provocar acidentes pessoais ou morte. **NÃO** mexer indevidamente em chaves de travamento.

- Seguir todas as normas de eletricidade estaduais e locais aplicáveis. As instalações elétricas deverão ser feitas por um eletricitista qualificado e licenciado. Identificar e bloquear chaves abertas para evitar seu fechamento acidental.

1.7 Equipamento de Média Tensão (601 V a 15 kV)

- A média tensão age de forma diferente da baixa tensão. O trabalho realizado em equipamento de média tensão requer equipamento e treinamento especiais. A operação e manutenção precisam ser feitas somente por pessoas treinadas e com experiência para trabalhar nesses equipamentos. O uso ou a aplicação de procedimentos inadequados pode ocasionar acidentes pessoais graves ou morte.
- Não trabalhe em equipamento energizado. Não permita a presença de pessoas não autorizadas nas proximidades de equipamento energizado. Devido à natureza do equipamento de média tensão, a tensão induzida permanece mesmo após o equipamento ter sido desligado da fonte de alimentação. Planeje o tempo de manutenção com pessoal autorizado para que o equipamento possa ser desenergizado e aterrado com segurança.

1.8 Múltiplas fontes de alimentação elétrica



ALERTA: *O equipamento pode ter mais do que uma fonte de energia elétrica. Desconectar uma fonte sem desconectar as restantes representa um risco de choque elétrico que pode resultar em acidentes pessoais graves ou morte. Antes de trabalhar no equipamento, desconecte todas as fontes de energia elétrica e verifique se todas as fontes de energia elétrica foram removidas.*

1.9 Não incline o equipamento



ALERTA: *Inclinar o equipamento pode causar danos ao equipamento, acidentes pessoais ou morte. Mantenha o equipamento em uma superfície nivelada, certifique-se de que as proteções e os elementos de fixação estão colocados e não incline o equipamento.*

Esta página foi deixada em branco intencionalmente.



2 Introdução



ALERTA: *Conexões das saídas elétricas do gerador incorretamente conectadas podem causar danos ao equipamento, lesões pessoais graves ou morte, por isso devem ser feitas por um electricista treinado e experiente, de acordo com as instruções de instalação e com todas as normas aplicáveis.*



ALERTA: *Instalações incorretas podem causar danos ao equipamento, lesões pessoais graves ou morte, por isso todas as instalações devem ser feitas por um técnico treinado e experiente, de acordo com as instruções de instalação e com todas as normas aplicáveis.*

2.1 Formação necessária para o serviço



ALERTA: *Muitos procedimentos de diagnóstico e solução de problemas ou substituições de peças apresentam perigos que podem resultar em danos ao equipamento e acidentes pessoais graves ou morte. Somente pessoal de serviço experiente e treinado com conhecimentos dos riscos de combustíveis, eletricidade e maquinário deve executar procedimentos de serviço. Revisar a seção Precauções de Segurança deste manual.*

Somente técnicos de serviço qualificados e usando o equipamento de proteção individual adequado devem trabalhar com o equipamento. Contate o seu distribuidor autorizado para obter mais informações sobre como se tornar um técnico de serviço qualificado.

Além disso, deverá ter os seguintes conhecimentos básicos sobre o local.

- Uma compreensão básica do sistema de distribuição de energia em seu local
- Uma compreensão básica das cargas em seu local
- Conhecimento dos códigos e dos padrões aplicáveis em seu local
- As licenças solicitadas para realizar o trabalho em seu local

Deverá ainda ler todos os manuais fornecidos com o produto e com outros equipamentos do sistema de distribuição de energia como, por exemplo, grupos geradores, chaves de transferência automática e disjuntores. Você deve estar familiarizado com os avisos e os procedimentos operacionais. Contate o seu distribuidor autorizado para obter mais informações sobre literaturas relacionadas a este produto ou equipamentos no sistema de distribuição de energia.

2.2 Ferramentas necessárias para o serviço

- Equipamento de proteção individual
- Medidor de RMS real para medida precisa das pequenas tensões CA e CC
- Medidor de rotação de fase
- Ferramentas para descascamento e conexão de fios
- InPower™ (ferramenta de serviço baseada em PC)
- ModScan (ou outras ferramentas para monitoramento de redes Modbus)
- Quaisquer ferramentas solicitadas para códigos e padrões do local

2.3 Sobre este manual

Este manual fornece informações para ajudar a manter o MCM3320 de modo seguro e correto.

- Hardware
- Principais recursos
- Solução de problemas dos códigos e sintomas
- Planta de engenharia e diagramas de sequência

Este manual não fornece informações sobre operação, instalação ou garantia. Também não fornece informações sobre outros componentes do sistema de distribuição de energia. Entre em contato com seu distribuidor para obter qualquer uma dessas informações.

2.3.1 Organização deste manual

- Do [Capítulo 1](#) ao [Capítulo 3](#) encontrará informações importantes para todos os leitores.
- [Capítulo 4](#) fornece informações sobre o hardware.
- Do [Capítulo 5](#) ao [Capítulo 14](#) encontrará uma descrição dos principais recursos do MCM3320 quando este está funcionando como controlador principal em paralelo. Estes capítulos são aplicáveis se a topologia for Barramento Isolado sem Disjuntor Principal do Grupo Gerador, Barramento Isolado com Disjuntor Principal do Grupo Gerador, Barramento Comum ou Par de Transferência, e quando o MCM3320 estiver funcionando em modo Automático.
- Do [Capítulo 15](#) ao [Capítulo 18](#) se explora as diferenças existentes no MCM3320 quando a topologia é Somente Sincronismo Principal ou Modo de Componente, ou quando o MCM3320 está funcionando em modo Manual. Esses capítulos também apresentam o SYNC1320 comparando-o com o MCM3320.
- Do [Capítulo 19](#) ao [Capítulo 20](#) encontrará informações básicas de solução de problemas e sobre peças.
- Os apêndices apresentam as plantas de engenharia e os diagramas de sequência para sua referência.

2.4 Sobre o MCM3320

O MCM3320 (Módulo de Controle Principal) é um controlador principal em paralelo. Ele foi projetado para gerenciar os sistemas de distribuição de energia com:

- Grupos geradores de associação em paralelo da Cummins Power Generation
- Várias cargas

Para gerir estes sistemas, o MCM3320 dispõe de recursos como um controle de disjuntor, partida/parada do grupo gerador, controle de carga, sincronismo, adicionar/desconectar carga e demanda de carga.

Em alternativa, o MCM3320 pode ser usado como componente em sistemas mais complexos. Enquanto componente, o MCM3320 permite sincronismo e controle de carga.

2.4.1 SYNC1320

O SYNC1320 é um MCM3320 no qual a topologia é Somente Sincronismo Principal.

A placa base do SYNC1320 é uma placa base do MCM3320 desocupada. A desocupação reduz as capacidades do SYNC1320 por comparação com um MCM3320 em modo Somente Sincronismo Principal.

- Sem detecção de corrente
- Sem conexões Modbus
- Sem conexões PCCNet, incluindo o painel do operador

Começando pela versão de software 1.29, o SYNC1320 pode ser utilizado em aplicações monofásicas, bem como em aplicações trifásicas. Isso tem impacto no sincronizador, que apenas suporta aplicações trifásicas no MCM3320. Além disso, quando o SYNC1320 é utilizado em aplicações monofásicas, a disponibilidade da fonte é diferente.

Consulte 0900-0662 para obter mais informações sobre o SYNC1320.

2.4.2 Códigos e padrões

O MCM3320 atende ou excede os requisitos destes códigos e padrões.

- Conforme UL508
- Marca CE
- EN 61000-2
- EN 61000-4
- ISO 7637, pulsos #2, 3a, 3b, 5, 7

O MCM3320 foi desenhado e fabricado em instalações certificadas ISO9001.

2.5 Como Obter Serviços

Quando um produto precisa de serviços, contate o distribuidor da Cummins Power Generation mais próximo. Para encontrar o distribuidor local da Cummins Power Generation, consulte www.cumminspower.com e selecione Localizador de Distribuidores. Ao entrar em contato com o distribuidor, sempre forneça o número completo do modelo, as especificações e o número de série, como mostrado na plaqueta de identificação.

2.6 Lista de Abreviações

Esta lista não é completa. Ela não identifica, por exemplo, unidades de medida, acrônimos que estão apenas em parâmetros, nomes de eventos/falhas ou nomes de peças/acessórios.

TABELA 1. LISTA DE ABREVIÇÕES

Abreviação	Descrição
CA	Corrente Alternada
ATS	Chave de Transferência Automática
CB	Disjuntor
CE	Conformidade para a Comunidade Europeia
CT	Transformador de Corrente

Abreviação	Descrição
CSA	Associação de Normas Canadenses
CSV	Valores Separados por Vírgulas
CC	Corrente Contínua
DHCP	Protocolo de Configuração Dinâmica de Hosts
DMC	Controle Mestre Digital
DNS	Servidor de Nomes de Domínio
FTP	Protocolo de Transferência de Ficheiros
HMI	Interface Homem-máquina
IEC	Comissão Eletrotécnica Internacional
IP	Protocolo de Internet
LAN	Rede Local
MCM	Módulo de Controle Mestre
NAT	Conversão de Endereços de Rede
NEC	Código Elétrico Nacional
NFPA	Agência Nacional de Proteção Contra Incêndio
OSHPD	Office of Statewide Health Planning and Development
PC	Computador Pessoal
PCC	Controle PowerCommand®
PT	Transformador de Tensão
PTC	Controle de Transferência de Energia
RMS	Valor Quadrático Médio
RSL	Lista de Peças Sobressalentes Recomendadas
RTU	Unidade de Terminal Remoto
TCP	Protocolo de Controle de Transmissão
TDEN	Retardo de Tempo de Emergência para Normal
TDMP	Retardo de Tempo Máximo Paralelo
TDNE	Retardo de Tempo de Normal para Emergência
TDPT	Retardo de Tempo de Transição Programada
UL	Laboratórios Subscritores
UPS	Fonte de Alimentação Ininterrupta
USB	Barramento Serial Universal
WAN	Rede de Longa Distância

3 Conceitos Básicos

3.1 Topologia do Sistema

Se o MCM3320 for utilizado como controlador principal, *System Topology* (Topologia do sistema) será a topologia do sistema de distribuição de energia. Se o MCM3320 tiver outra função, *System Topology* (Topologia do sistema) determinará a função que o MCM3320 tem no sistema de distribuição de energia.



NOTA: Esta configuração só pode ser alterada se o MCM3320 estiver em modo Manual.

3.1.1 Topologias

A topologia é baseada na presença ou ausência de um disjuntor principal de rede pública e de um disjuntor principal de grupo gerador.

TABELA 2. TOPOLOGIA BASEADA NA PRESENÇA DE DISJUNTOR PRINCIPAL DE REDE PÚBLICA E DE DISJUNTOR PRINCIPAL DE GRUPO GERADOR

Disjuntor Principal de Rede Pública	Disjuntor Principal de Grupo Gerador	Topologia
Não	Não	Barramento Isolado sem Disjuntor Principal do Grupo Gerador
Não	Sim	Barramento Isolado com Disjuntor Principal de Grupo Gerador
Sim	Não	Barramento Comum
Sim	Sim	Par de Transferência

3.1.2 Componentes Típicos do Sistema (Barramento Isolado sem Disjuntor Principal do Grupo Gerador)

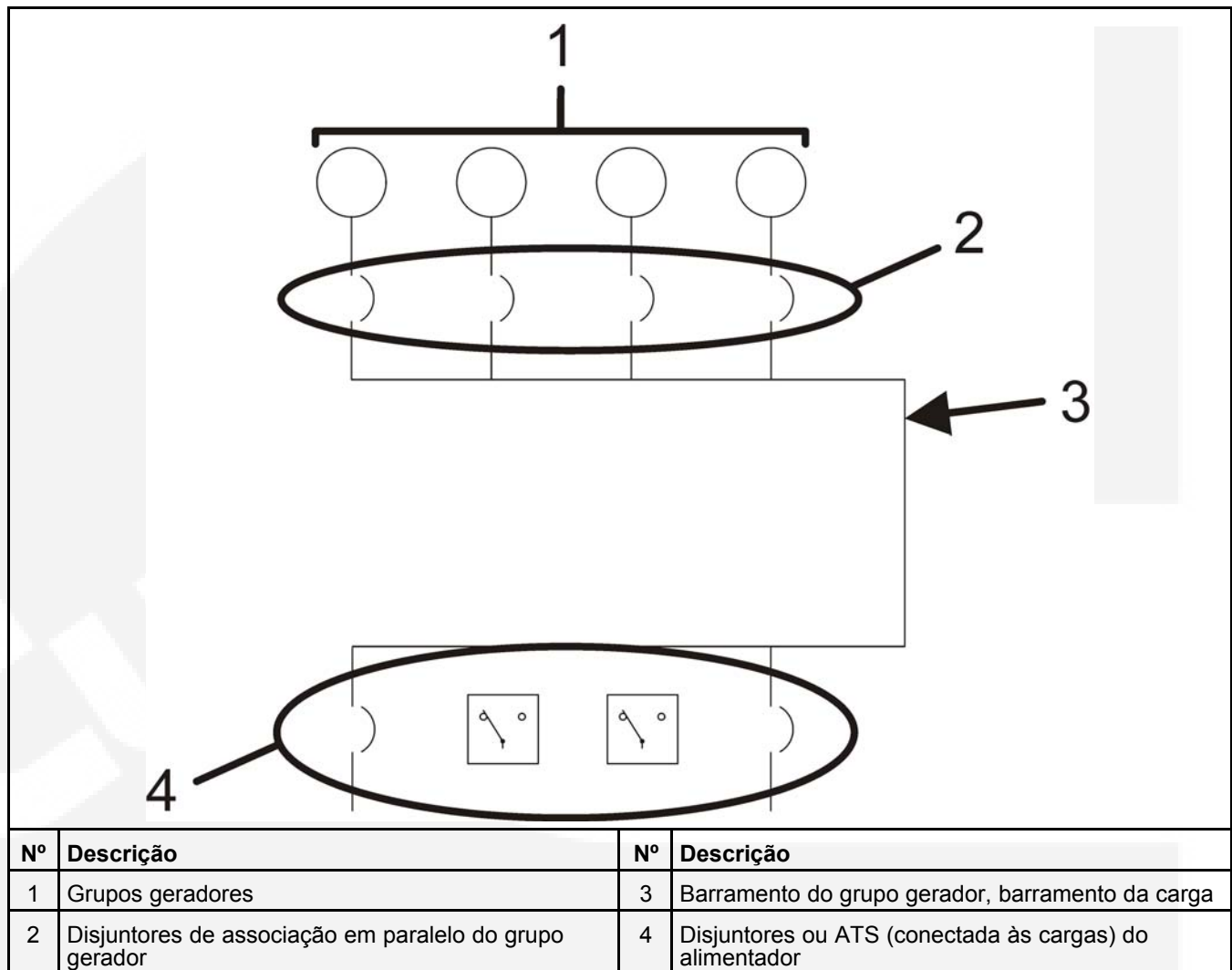


FIGURA 1. COMPONENTES TÍPICOS DO SISTEMA (BARRAMENTO ISOLADO SEM DISJUNTOR PRINCIPAL DO GRUPO GERADOR)

3.1.3 Componentes Típicos do Sistema (Barramento Isolado com Disjuntor Principal do Grupo Gerador)

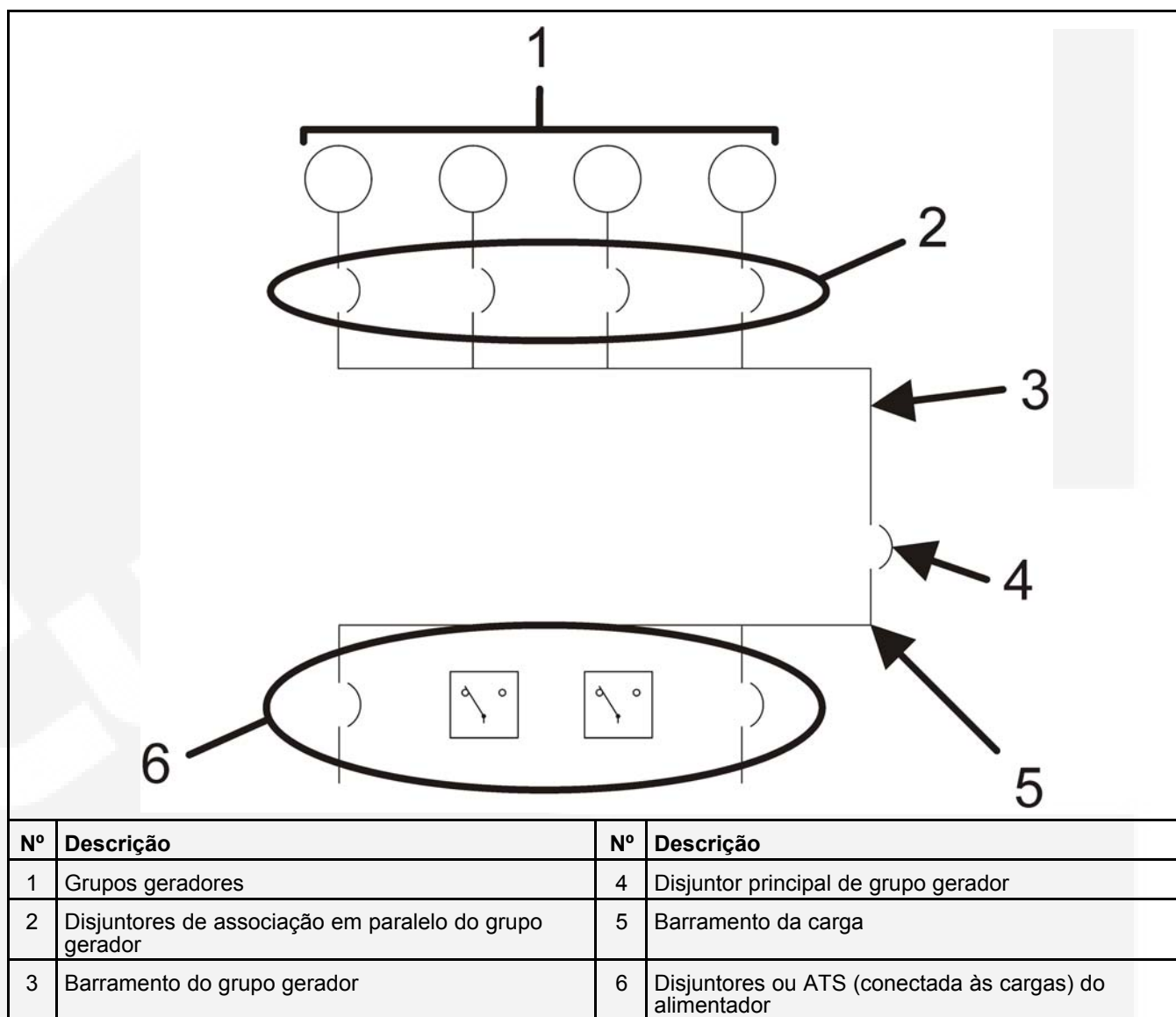


FIGURA 2. COMPONENTES TÍPICOS DO SISTEMA (BARRAMENTO ISOLADO COM DISJUNTOR PRINCIPAL DO GRUPO GERADOR)

3.1.4 Componentes Típicos do Sistema (Barramento Comum)

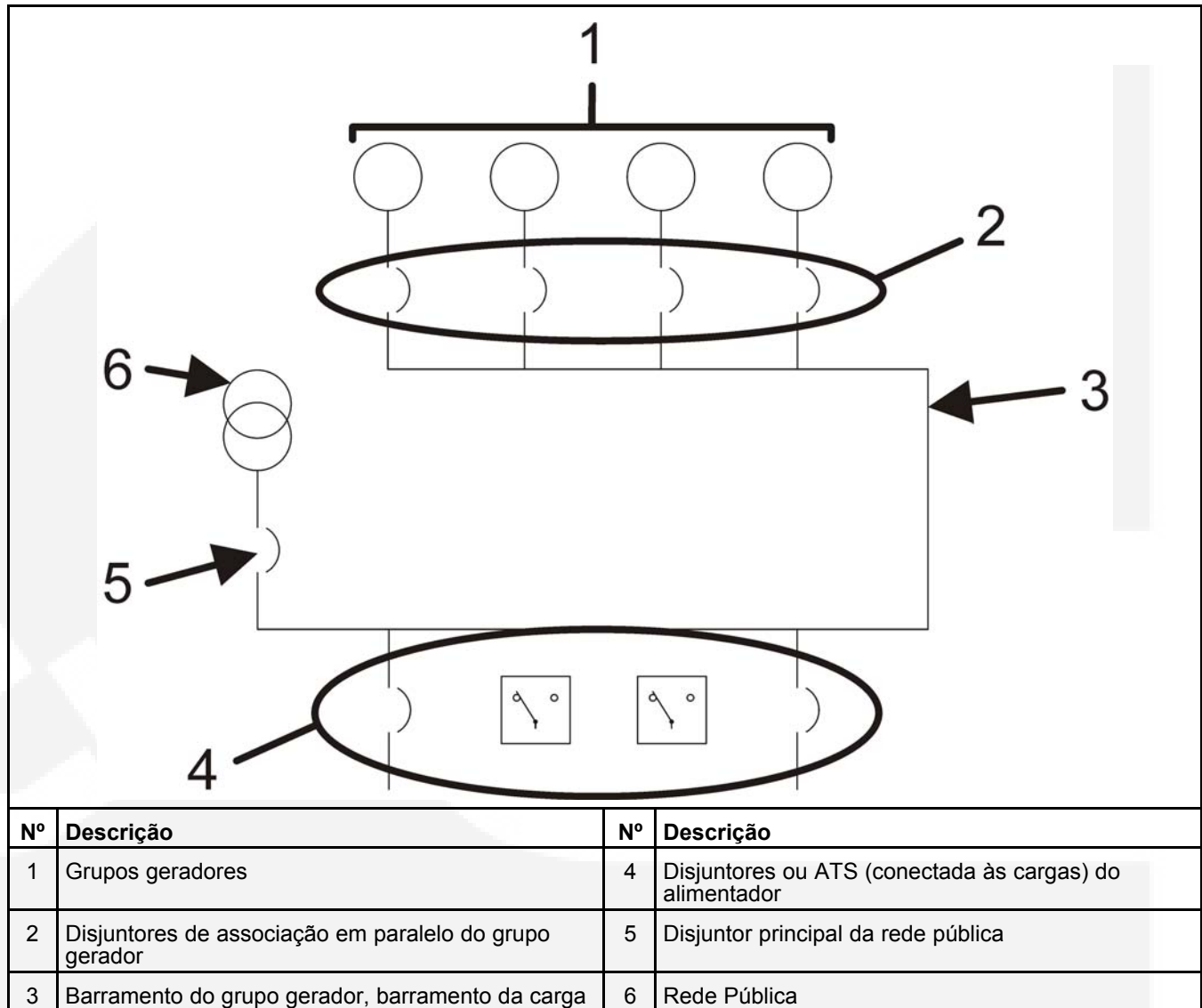


FIGURA 3. COMPONENTES TÍPICOS DO SISTEMA (BARRAMENTO COMUM)

3.1.5 Componentes Típicos do Sistema (Par de Transferência)

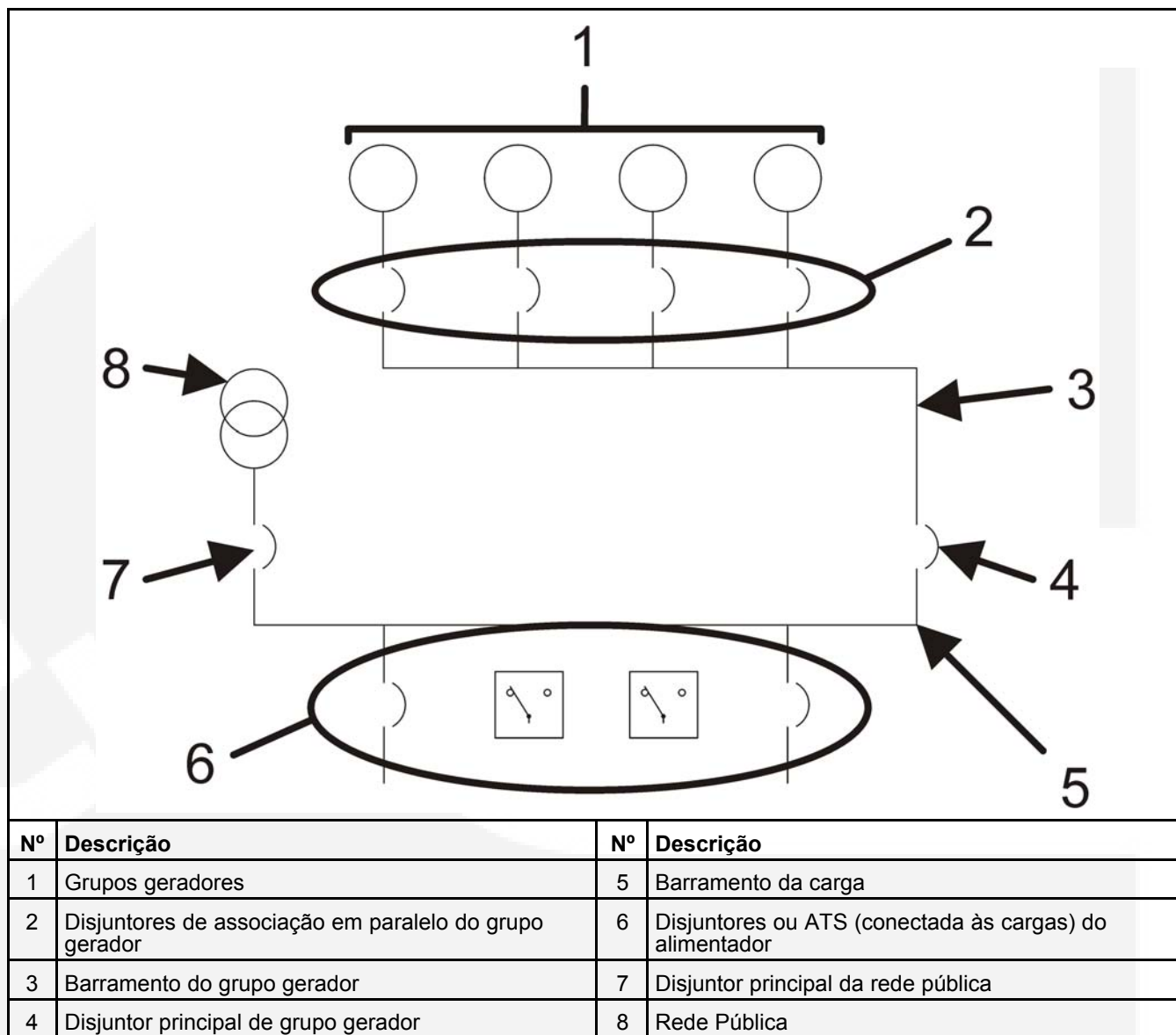


FIGURA 4. COMPONENTES TÍPICOS DO SISTEMA (PAR DE TRANSFERÊNCIA)

3.1.6 Somente Sincronismo Principal

Se a topologia for Somente Sincronismo Principal, o sincronizador estará disponível. Outros recursos não estarão ativos.

3.1.7 Modo de Componente

Se a topologia for Modo de Componente, estarão disponíveis o sincronizador e o controle de carga. Outros recursos não estarão ativos.

3.2 Tipo de Transição

Transition Type (Tipo de transição) se refere ao modo como as cargas são transferidas de uma fonte para outra fonte.

3.2.1 Transição Aberta

Transferência do tipo "break-before-make" de uma carga, de uma fonte para outra. A energia será interrompida.

3.2.2 Transição Fechada Lenta

Uma transição fechada lenta é uma transferência do tipo "make-before-break" de uma carga, de uma fonte para outra. Quando a segunda carga está conectada em paralelo à primeira, a carga da primeira fonte é gradualmente reduzida até ficar abaixo de um limiar específico, e nesse ponto é desconectada.

A energia não será interrompida. As duas fontes têm de estar em paralelo para esse tipo de transferência.

3.2.3 Transição Fechada Rápida

Uma transição fechada rápida é uma transferência do tipo "make-before-break" de uma carga, de uma fonte para outra. A energia não será interrompida e as cargas não sobem nem descem. As duas fontes têm de estar em paralelo para esse tipo de transferência. As fontes não estarão em paralelo por mais de 100 ms.

3.2.4 Tipo de Transição Operacional de PTC

PTC Operating Transition Type (Tipo de transição operacional de PTC) determina o modo como o MCM3320 está atualmente transferindo as cargas de uma fonte para outra fonte. É idêntico a *Transition Type* (Tipo de transição) exceto nas seguintes situações.

- Se a topologia for Barramento Isolado sem Disjuntor Principal do Grupo Gerador, Barramento Isolado com Disjuntor Principal do Grupo Gerador ou Somente Sincronismo Principal, o *PTC Operating Transition Type* (Tipo de transição operacional de PTC) será Transição Aberta.
- Se a topologia for Barramento Comum e o *Transition Type* (Tipo de transição) for Transição Fechada Rápida, o *PTC Operating Transition Type* (Tipo de transição operacional de PTC) será Transição Fechada Lenta.
- Se o *PTC Operating Mode* (Modo operacional de PTC) for Paralelo Estendido, o *PTC Operating Transition Type* (Tipo de transição operacional de PTC) será Transição Fechada Lenta.

3.3 Estado do Sistema

System State (Estado do sistema) descreve a função principal do MCM3320 em qualquer momento. Por exemplo, o MCM3320 pode estar sincronizando os grupos geradores com o utilitário, aguardando que os temporizadores expirem, funcionando em paralelo estendido, em modo normal, etc.

System State (Estado do sistema) não afeta a operação do MCM3320. O seu fim é meramente descritivo. Está disponível através de uma conexão em rede como PCCNet, Modbus ou InPower.

3.4 Estado da Disponibilidade do Grupo Gerador

O *GenX Availability State* (Estado da Disponibilidade do Gerador X), em que X identifica o grupo gerador, identifica a disponibilidade atual do grupo gerador. Utilizado pela demanda de carga e pelos alertas.

TABELA 3. ESTADO DA DISPONIBILIDADE DO GERADOR X

Estado	Descrição
Gen Does Not Exist (O gerador não existe)	A <i>Taxa de kW do GenX</i> está configurada como 0.
Offline (Fora de operação)	Os grupos geradores não deveriam estar funcionando ou este grupo gerador foi desconectado por demanda de carga.
Waiting for Gen (Aguardando o gerador)	Este grupo gerador está iniciando ou reiniciando. Todas estas condições são atendidas. <ul style="list-style-type: none"> Os grupos geradores estão em execução. Este grupo gerador não foi desconectado por demanda de carga. O disjuntor de circuito paralelo deste gerador está aberto.
Online (Em operação)	O disjuntor de circuito paralelo deste gerador está fechado.
Failed (Falha)	Não foi possível este grupo gerador ficar em operação. Consulte o Código 1541.

3.5 Número total de grupos geradores em operação

Total Number of Gensets Online (Número total de grupos geradores em operação) é o número de grupos geradores cujos disjuntores de circuito paralelo foram fechados.

3.6 Capacidade total em operação

Total Online Capacity (Capacidade total em operação) é a soma das taxas dos grupos geradores cujos disjuntores de circuito paralelo estão fechados.

3.7 Capacidade total de demanda de carga em operação

Total Load Demand Online Capacity (Capacidade total de demanda de carga em operação) inclui a capacidade incluída em *Total Online Capacity* (Capacidade total em operação) e ainda a soma das taxas dos grupos geradores que foram iniciados ou reiniciados, mas que ainda não estão em operação.

Esta capacidade é utilizada pela demanda de carga para evitar reiniciar outro grupo gerador até que um grupo gerador previamente reiniciado feche seu disjuntor de circuito paralelo ou não consiga ficar em operação.

Se um grupo gerador não conseguir ficar em operação (Código 1541), esse não será incluído na *Total Load Demand Online Capacity* (Capacidade total de demanda de carga em operação).

3.8 Comando de Ativação de Cancelamento e de Cancelamento

Muitas configurações têm um comando de ativação de cancelamento e de cancelamento associado. Se a ativação de cancelamento estiver configurada como Ativada, o comando de cancelamento se torna no valor ativo para a configuração associada. Se a ativação de cancelamento estiver configurada como Desativada, o comando de cancelamento é ignorado e o valor medido ou o valor calculado se torna no valor ativo para a configuração associada.

Habitualmente, o comando de ativação de cancelamento e de cancelamento é utilizado para testes. Estes dois comandos poderão ainda estar disponíveis através de conexões em rede como PCCNet, Modbus ou InPower.

3.9 Resumo das Configurações (Conceitos Básicos)

TABELA 4. RESUMO DAS CONFIGURAÇÕES (CONCEITOS BÁSICOS)

Configuração	Descrição
System Topology (Topologia do sistema)	Especifica a função do MCM3320 ou a topologia do sistema. Valores possíveis: Somente Sincronismo Principal, Barramento Isolado sem GM, Barramento Isolado com GM, Barramento Comum, Par de Transferência, Modo de Componente (Padrão: Somente Sincronismo Principal)
Transition Type (Tipo de transição)	Especifica o tipo de transição quando as cargas são transferidas de uma fonte para outra. Valores possíveis: Transição Aberta, Transição Fechada Rápida, Transição Fechada Lenta (Padrão: Transição Aberta)

TABELA 5. RESUMO DOS PONTOS DE MONITORAMENTO (CONTROLE DO GRUPO GERADOR)

Configuração	Descrição
PTC Operating Transition Type (Tipo de transição operacional de PTC)	Indica o modo como as cargas estão sendo atualmente transferidas de uma fonte para outra fonte. Habitualmente, é idêntico a <i>Transition Type</i> (Tipo de transição).
Systema State (Estado do Sistema)	Indica a função principal do MCM3320 em qualquer momento. Esta configuração não afeta a operação do MCM3320. O seu fim é meramente descritivo. Valores possíveis: Not Available (Não Disponível), TD Start (Iniciar TD), TD Stop (Parar TD), TD Programmed Transition (Transição Programada TD), TD Transfer (Transferência TD), TD Retransfer (Retransferência TD), Synchronizing (Sincronização), Sync Check OK (Verificação de Sincronização OK), Inhibit (Restrição), Unassigned (Não atribuído), Ramp Unload (Descarga Subida), Ramp Load (Carga Subida), Manual, Utility Failure (Falha na Rede Pública), Test (Teste), Standby (Emergência), Factory Test (Teste de Fábrica), Extended Parallel (Paralelo Estendido)
GenX Availability State (X = 1-16) (Estado da disponibilidade do gerador X)	Indica a disponibilidade atual do grupo gerador. Utilizado pela demanda de carga e pelos alertas. Valores possíveis: Gen Does Not Exist (O Gerador não existe), Offline (Fora de operação), Waiting For Gen (Aguardando o gerador), Online (Em operação), Failed (Falha)
Total Number of Gensets Online (Número total de grupos geradores em operação)	Indica o número de grupos geradores cujos disjuntores de circuito paralelo foram fechados.
Total Online Capacity (Capacidade total em operação)	Indica a soma das taxas dos grupos geradores cujos disjuntores de circuito paralelo estão fechados.
Total Load Demand Online Capacity (Capacidade total de demanda de carga em operação)	A capacidade incluída em <i>Total Online Capacity</i> (Capacidade total em operação) e ainda a soma das taxas dos grupos geradores que foram iniciados ou reiniciados, mas que ainda não estão em operação. Esta capacidade é utilizada pela demanda de carga para evitar reiniciar outro grupo gerador até que um grupo gerador previamente reiniciado feche seu disjuntor de circuito paralelo ou não consiga ficar em operação.

Esta página foi deixada em branco intencionalmente.



4 Componentes

4.1 Placa base do MCM3320

Esta placa de circuitos contém o microprocessador e o software operacional.

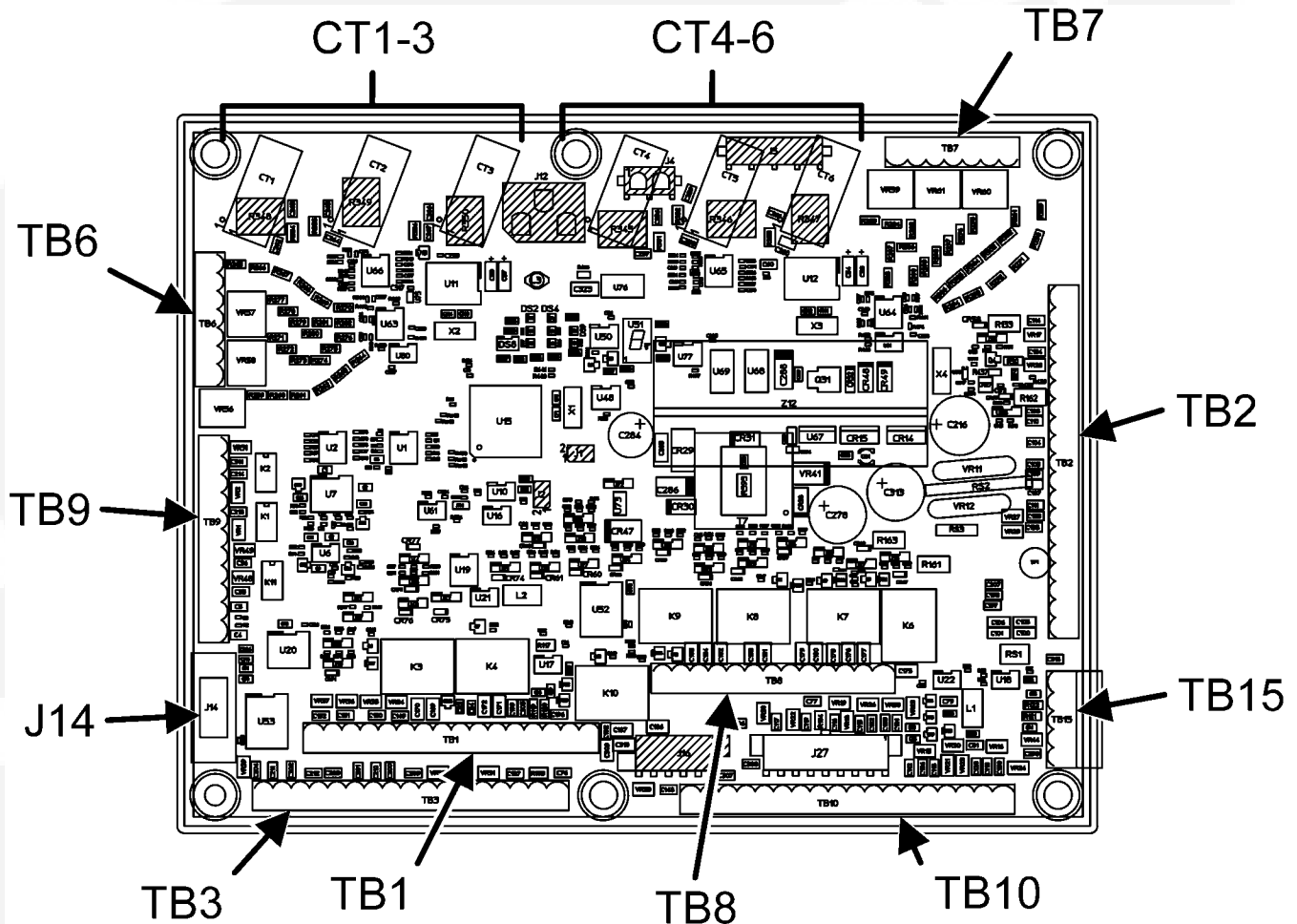


FIGURA 5. PLACA BASE DO MCM3320

4.1.1 Versão do hardware

Hardware Version (Versão do hardware) indica a revisão da placa base do MCM3320.

TABELA 6. HARDWARE VERSION (VERSÃO DO HARDWARE)

Hardware Version (Versão do hardware)	Revisão do hardware
0	desconhecida
1	A ou B
2	C
3	D

Hardware Version (Versão do hardware)	Revisão do hardware
4	SYNC1320
255	erro de hardware

4.1.2 Resumo de Conexões

TABELA 7. RESUMO DE CONEXÕES

Conexão	Descrição
CT1-CT6	Deteção atual
J14	Modbus
TB1	PCCNet, entradas de chave
TB2	Alimentação, entradas de chave, saídas configuráveis
TB3	Demanda de carga, restrições, saídas configuráveis
TB6	Deteção de tensão do barramento do grupo gerador
TB7	Deteção de tensão da rede pública
TB8	Controle de disjuntor, partida remota do grupo gerador
TB9	Entradas analógicas, saídas analógicas
TB10	Status do disjuntor
TB15	Modbus, InPower

4.1.3 Conexões CT1-CT6

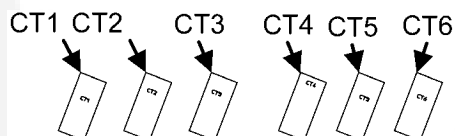


FIGURA 6. CT1-CT6

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 8. ATRIBUIÇÕES CT1-CT6: DETECÇÃO DE CORRENTE

Pino	Descrição	Função / Conecta-se a
CT1	Corrente Barramento Grupo Gerador L1	Barramento Grupo Gerador L1
CT2	Corrente Barramento Grupo Gerador L2	Barramento Grupo Gerador L2
CT3	Corrente Barramento Grupo Gerador L3	Barramento Grupo Gerador L3
CT4	Corrente Rede Pública L1	Rede Pública L1
CT5	Corrente Rede Pública L2	Rede Pública L2
CT6	Corrente Rede Pública L3	Rede Pública L3

Direcione a fiação secundária do transformador de corrente externo (CT) através do CT de modo a que a corrente passe pela entrada integrada no CT em 1 quando a fonte medida estiver fornecendo energia.

4.1.3.1 Calibrar as medições de tensão e corrente

A calibração afeta os valores de tensão e corrente utilizados em todos os seus cálculos como, por exemplo, potência e energia, controle de carga e sincronização. A calibração também afeta os valores fornecidos através de conexões de rede como, por exemplo, PCCNet, Modbus ou InPower.



NOTA: Utilize um medidor RMS autêntico e calibrado para verificar a saída efetiva.

Habitualmente, as telas de configuração do InPower são utilizadas no processo de calibração.

Calibre a tensão e a corrente separadamente para o barramento do grupo gerador e para a rede pública. É possível calibrar os valores para cada fonte.

- Corrente em cada fase
- Tensão linha a linha entre cada par de fases (a tensão linha a neutro é calculada com base na tensão linha a linha calculada).

Não é possível calibrar a medição da frequência.

4.1.4 Conexões de J14



FIGURA 7. PINOS DE J14

O conector possui a mesma orientação que na [Figura 5](#).

Este conector DB9 para comunicações RS-232 pode ser utilizado por dispositivos Modbus. Utilize um cabo "null modem" com "handshake" (controle de fluxo) parcial.



NOTA: É necessário desconectar o J14 antes de poder conectar uma ferramenta de serviço baseada em PC ao TB15.

4.1.4.1 Conexões do DB9

As conexões padrão do DB9 são mostradas abaixo:

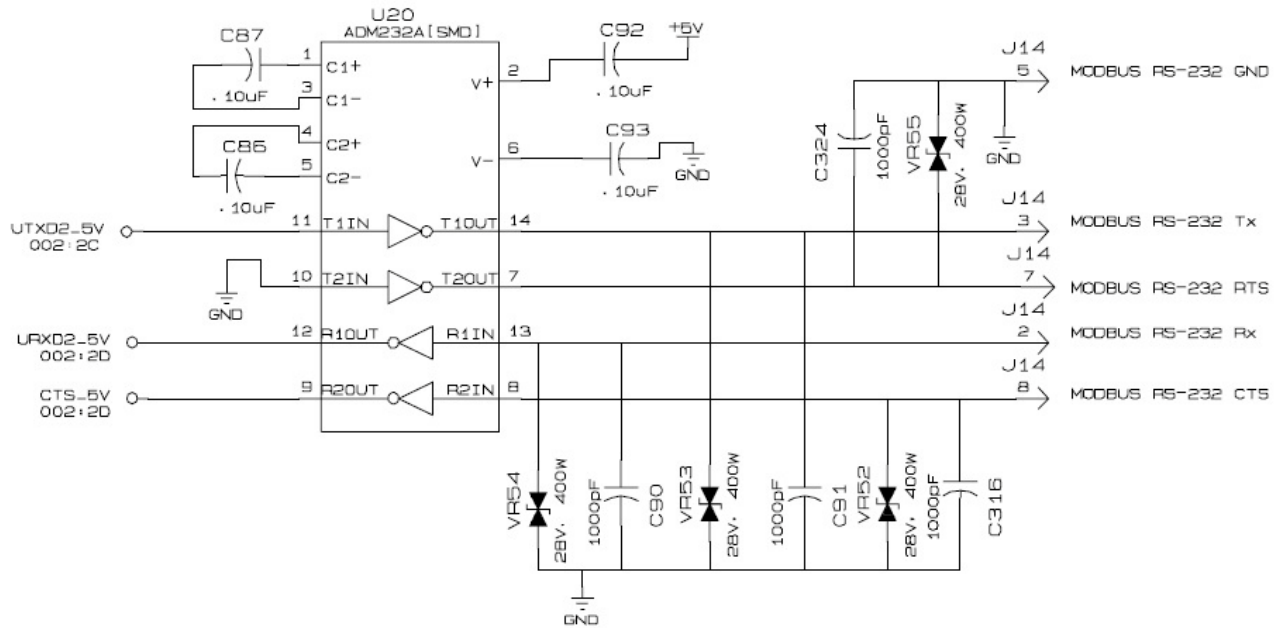


FIGURA 8. CONEXÕES DO DB9

4.1.5 Conexões de TB1

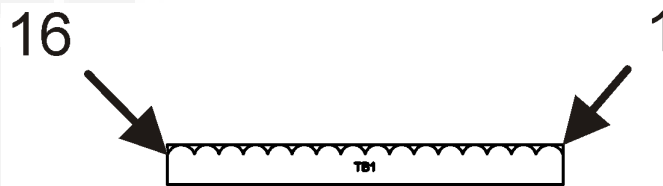


FIGURA 9. PINOS DE TB1

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 9. ATRIBUIÇÕES DO PINO DE TB1: PCCNET, ENTRADAS DE CHAVE

Pino	Descrição	Função / Conecta-se a
TB1-1	B+ com fusível	Fonte de Alimentação para HMI 211
TB1-2	PCCNet A	Dados de Rede A
TB1-3	PCCNet B	Dados de Rede B
TB1-4	Blindagem PCCNet	Blindagem de chicote PCCNet
TB1-5	N/D	
TB1-6	N/D	
TB1-7	N/D	
TB1-8	N/D	
TB1-9	N/D	
TB1-10	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave

Pino	Descrição	Função / Conecta-se a
TB1-11	Habilita Sincronizador	Habilita a sincronização quando o controle está em modo Manual ou em modo Somente Sincronismo Principal
TB1-12	N/D	
TB1-13	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB1-14	Cancelamento	Força a ocorrência de uma transferência ou retransferência o mais rapidamente possível; cancela a restrição de transferência, a restrição de retransferência, o retardo de tempo da transferência e o o retardo de tempo da retransferência
TB1-15	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB1-16	Falha na Fonte da Rede Pública	Indica que a rede pública falhou; utilizado em aplicações nas quais um dispositivo externo determina a disponibilidade da fonte

4.1.5.1 Entradas Discretas

Entradas discretas são entradas que podem estar ativas ou inativas.

Os estados podem ser mapeados para nomes diferentes como, por exemplo, parada/partida ou abrir disjuntor/fechar disjuntor.

4.1.5.2 Voláteis para Entradas Discretas

Muitas entradas discretas possuem voláteis associados. O volátil é uma fonte de software para a entrada discreta. Se o volátil for configurado para seu valor ativo, a entrada discreta ficará ativa. Se o volátil for configurado para seu valor inativo, a entrada discreta ficará inativa se nenhuma das outras fontes, como as fontes de hardware, estiverem ativas.

Os voláteis poderão estar disponíveis através de uma conexão em rede como PCCNet, Modbus ou InPower.

4.1.6 Conexões de TB2

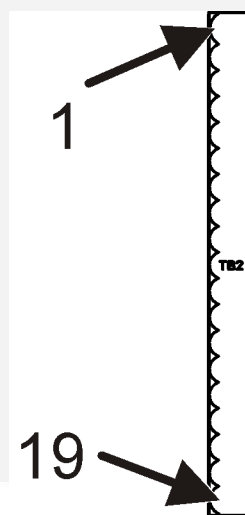


FIGURA 10. PINOS DE TB2

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 10. ATRIBUIÇÕES DO PINO DE TB2: ALIMENTAÇÃO, ENTRADAS DE CHAVE, SAÍDAS CONFIGURÁVEIS

Pino	Descrição	Função / Conecta-se a
TB2-1	Iniciar Teste	Inicia e pára um teste do sistema
TB2-2	Bateria –	Retorno bateria 1 ou bateria 2
TB2-3	Bateria –	Retorno bateria 1 ou bateria 2
TB2-4	Iniciar paralelo estendido	Sinal para iniciar paralelo estendido
TB2-5	Bateria –	Retorno bateria 1 ou bateria 2
TB2-6	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB2-7	Bateria –	Retorno bateria 1 ou bateria 2
TB2-8	Bateria 1 +	Alimentação bateria 1 (+)
TB2-9	Bateria 1 +	Alimentação bateria 1 (+)
TB2-10	Alimentação da Bobina de Relé B+	B+ Chaveado
TB2-11	Bateria 2 +	Alimentação bateria 2 (+)
TB2-12	Bateria 2 +	Alimentação bateria 2 (+)
TB2-13	N/D	
TB2-14	Reinício de Falha	Reinicia falhas; se estiver ativo por 5 segundos, exibe códigos de falha no visor de sete segmentos
TB2-15	Saída Configurável Nº 1	Seu valor padrão é Alerta Comum; tem em vista acionar uma bobina de relé
TB2-16	Saída Configurável Nº 2	Seu valor padrão é Falha de Sincronização; tem em vista acionar uma bobina de relé
TB2-17	Saída Configurável Nº 3	Seu valor padrão é Gerador Disponível; tem em vista acionar uma bobina de relé
TB2-18	Saída Configurável Nº 4	Seu valor padrão é Rede Pública Disponível; tem em vista acionar uma bobina de relé
TB2-19	Aterramento do Chassi	Conectado por fio curto ao chassi metálico aterrado.

Só uma bateria é necessária; utilize a segunda bateria para obter redundância.

TB2-15, TB2-16, TB2-17 e TB2-18 são acionadores do lado inferior.

TABELA 11. ESPECIFICAÇÕES DE ACIONADOR DO LADO INFERIOR

Descrição	Valor
Tensão máxima	30 VCC
Corrente máxima	250 mA
Corrente inicial máxima	3 A
Corrente de fuga (estado desativado)	100 uA

4.1.6.1 Saídas Configuráveis

As saídas configuráveis são saídas discretas cujo estado depende de um código de evento ou código de falha especificado. Se o evento ou falha especificada estiver ativa, a saída configurável está ativa. Se o evento ou falha especificada estiver inativa, a saída configurável está inativa.

4.1.7 Conexões de TB3

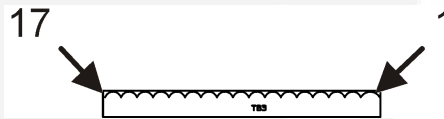


FIGURA 11. PINOS DE TB3

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 12. ATRIBUIÇÕES DO PINO DE TB3: DEMANDA DE CARGA, RESTRIÇÕES, SAÍDAS CONFIGURÁVEIS

Pino	Descrição	Função / Conecta-se a
TB3-1	Ativar Controle de Carga	Conecta-se à posição do disjuntor de circuito da rede pública nos controles do grupo gerador; indica aos controles do grupo gerador quando os grupos geradores estão em paralelo com a rede pública
TB3-2	Demanda de Carga Grupo Gerador 1	Conecta-se à entrada da demanda de carga no grupo gerador 1
TB3-3	N/D	
TB3-4	N/D	
TB3-5	N/D	
TB3-6	Inibição de Transferência	Inibe a transferência de cargas para os grupos geradores; em algumas situações, é ignorado; não é idêntico à restrição do disjuntor de circuito paralelo do grupo gerador
TB3-7	Inibição de Retransferência	Inibe a transferência de cargas para a rede pública; em algumas situações, é ignorado; não é idêntico à restrição do disjuntor de circuito paralelo da rede pública
TB3-8	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB3-9	Demanda de Carga Grupo Gerador 2	Conecta-se à entrada da demanda de carga no grupo gerador 2
TB3-10	Demanda de Carga Grupo Gerador 3	Conecta-se à entrada da demanda de carga no grupo gerador 3
TB3-11	Demanda de Carga Grupo Gerador 4	Conecta-se à entrada da demanda de carga no grupo gerador 4
TB3-12	Saída Configurável N° 5	Seu valor padrão é Falha ao Desconectar; tem em vista acionar uma bobina de relé
TB3-13	Saída Configurável N° 6	Seu valor padrão é Sincronizado; tem em vista acionar uma bobina de relé

Pino	Descrição	Função / Conecta-se a
TB3-14	Saída Configurável N° 7	Seu valor padrão é Limite Saída de Sincronização; tem em vista acionar uma bobina de relé
TB3-15	Saída Configurável N° 8	Seu valor padrão é Falha de Hardware; tem em vista acionar uma bobina de relé
TB3-16	Restrição de Disjuntor de Circuito Paralelo do Grupo Gerador	Conecta-se à entrada de restrição de disjuntor de circuito paralelo do grupo gerador nos controles do grupo gerador
TB3-17	Restrição Principal	Utilizado quando existem múltiplos MCM3320s em um sistema; restrição principal para controle de disjuntor e sincronizador; aterre/retorne este sinal para ativar a restrição

TB3-12, TB3-13, TB3-14 e TB3-15 são acionadores do lado inferior.

TABELA 13. ESPECIFICAÇÕES DE ACIONADOR DO LADO INFERIOR

Descrição	Valor
Tensão máxima	30 VCC
Corrente máxima	250 mA
Corrente inicial máxima	3 A
Corrente de fuga (estado desativado)	100 μ A

4.1.7.1 Saídas Discretas

Saídas discretas são saídas que podem estar ativas ou inativas.

Os estados podem ser mapeados para nomes diferentes como, por exemplo, acionador desligado/acionador ligado ou abrir disjuntor/fechar disjuntor.

4.1.8 Conexões de TB6

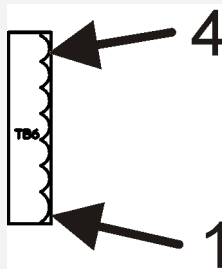


FIGURA 12. PINOS DE TB6

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 14. ATRIBUIÇÕES DO PINO DE TB6: TENSÃO DO BARRAMENTO DO GRUPO GERADOR

Pino	Descrição	Função / Conecta-se a
TB6-1	Tensão Barramento Grupo Gerador L1	até 480 VCA (linha a linha)
TB6-2	Tensão Barramento Grupo Gerador L2	até 480 VCA (linha a linha)
TB6-3	Tensão Barramento Grupo Gerador L3	até 480 VCA (linha a linha)

Pino	Descrição	Função / Conecta-se a
TB6-4	Tensão Barramento Grupo Gerador Neutro	até 480 VCA (linha a linha)

Se a tensão nominal do barramento do grupo gerador for superior a 480 VCA (linha a linha), são necessários transformadores de tensão (PTs) para reduzir a tensão para menos de 480 VCA (linha a linha) antes de entrar no controle.

4.1.8.1 Calibrar as medições de tensão e corrente

A calibração afeta os valores de tensão e corrente utilizados em todos os seus cálculos como, por exemplo, potência e energia, controle de carga e sincronização. A calibração também afeta os valores fornecidos através de conexões de rede como, por exemplo, PCCNet, Modbus ou InPower.



NOTA: Utilize um medidor RMS autêntico e calibrado para verificar a saída efetiva.

Habitualmente, as telas de configuração do InPower são utilizadas no processo de calibração.

Calibre a tensão e a corrente separadamente para o barramento do grupo gerador e para a rede pública. É possível calibrar os valores para cada fonte.

- Corrente em cada fase
- Tensão linha a linha entre cada par de fases (a tensão linha a neutro é calculada com base na tensão linha a linha calculada).

Não é possível calibrar a medição da frequência.

4.1.9 Conexões de TB7

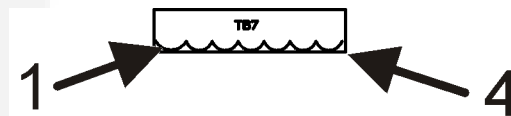


FIGURA 13. PINOS DE TB7

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 15. ATRIBUIÇÕES DO PINO DE TB7: TENSÃO DA REDE PÚBLICA

Pino	Descrição	Função / Conecta-se a
TB7-1	Tensão da Rede Pública L1	até 480 VCA (linha a linha)
TB7-2	Tensão da Rede Pública L2	até 480 VCA (linha a linha)
TB7-3	Tensão da Rede Pública L3	até 480 VCA (linha a linha)
TB7-4	Tensão da Rede Pública Neutra	até 480 VCA (linha a linha)

Se a tensão da rede pública for superior a 480 VCA (linha a linha), são necessários transformadores de tensão (PTs) para reduzir a tensão para menos de 480 VCA (linha a linha) antes de entrar no controle.

4.1.10 Conexões de TB8

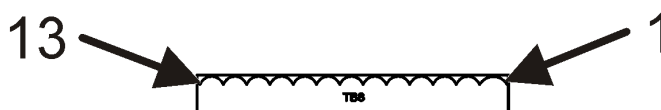


FIGURA 14. PINOS DE TB8

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 16. ATRIBUIÇÕES DO PINO DE TB8: CONTROLE DE DISJUNTOR, PARTIDA REMOTA DO GRUPO GERADOR

Pino	Descrição	Função / Conecta-se a
TB8-1	N/D	
TB8-2	Fechar Disjuntor Principal do Grupo Gerador 1	Fecha o disjuntor principal do grupo gerador; contatos normalmente abertos
TB8-3	Fechar Disjuntor Principal do Grupo Gerador 2	Fecha o disjuntor principal do grupo gerador; contatos normalmente abertos
TB8-4	N/D	
TB8-5	Abrir Disjuntor Principal do Grupo Gerador 1	Abre o disjuntor principal do grupo gerador; contatos normalmente abertos
TB8-6	Abrir Disjuntor Principal do Grupo Gerador 2	Abre o disjuntor principal do grupo gerador; contatos normalmente abertos
TB8-7	Relé de Partida do Grupo Gerador Normalmente fechado	Dá a partida nos grupos geradores
TB8-8	Relé de Partida do Grupo Gerador Comum	Dá a partida nos grupos geradores
TB8-9	Relé de Partida do Grupo Gerador Normalmente aberto	Inicia os grupos geradores; conectar em paralelo para sinais de partida remotos do grupo gerador
TB8-10	Fechar Disjuntor Principal Rede Pública 1	Fecha o disjuntor principal da rede pública; contatos normalmente abertos
TB8-11	Fechar Disjuntor Principal Rede Pública 2	Fecha o disjuntor principal da rede pública; contatos normalmente abertos
TB8-12	Abrir Disjuntor Principal Rede Pública 1	Abre o disjuntor principal da rede pública; contatos normalmente abertos
TB8-13	Abrir Disjuntor Principal Rede Pública 2	Abre o disjuntor principal da rede pública; contatos normalmente abertos

TABELA 17. ESPECIFICAÇÕES DE FECHAMENTO DO DISJUNTOR

Descrição	Valor
Tensão máxima	30 VCC ou 250 VCA
Corrente máxima	8 A (resistivo) 3,5 A (indutivo)
Constante de tempo (L/R)	7 ms

TABELA 18. ESPECIFICAÇÕES DE ABERTURA DO DISJUNTOR

Descrição	Valor
Tensão máxima	30 VCC
Corrente máxima	8 A (resistivo) 3,5 A (indutivo)
Constante de tempo (L/R)	7 ms

4.1.11 Conexões de TB9

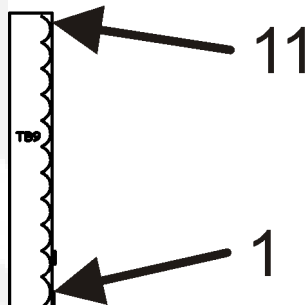


FIGURA 15. PINOS DE TB9

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 19. ATRIBUIÇÕES DO PINO DE TB9: ENTRADAS/SAÍDAS ANALÓGICAS

Pino	Descrição	Função / Conecta-se a
TB9-1	Ponto de Ajuste da Carga em kW	Configura o ponto de ajuste em kW para a carga base ou para cortes de picos de demanda (peak shave); entrada analógica de 0-5 VCC; 1 VCC corresponde a 0% da carga, 4,5 VCC corresponde a 110% da carga
TB9-2	Retorno Analógico	Retorno de sinal para entradas analógicas
TB9-3	Ponto de Ajuste de Carga em kVAR	Configura o ponto de ajuste em kVAR ou o ponto de ajuste em fator de potência para a carga base ou para cortes de picos de demanda; entrada analógica de 0-5 VCC Se este for o ponto de ajuste em kVAR, 1 VCC corresponde a 0% da carga, 4,5 VCC corresponde a 110% da carga. Se este for o ponto de ajuste em fator de potência, corresponde ao que o ponto de ajuste em kVAR teria sido. Por exemplo, se o ponto de ajuste da carga em kVAR tivesse sido de 80%, o ponto de ajuste em fator de potência será 0,80. O ponto de ajuste em fator de potência está limitado a 0,7-1,0. Se o sinal de entrada estiver fora deste intervalo, o ponto de ajuste em fator de potência será configurado como 0,7 ou 1,0, consoante o caso.

Pino	Descrição	Função / Conecta-se a
TB9-4	Controle de Carga Principal em kW	Conectado em paralelo aos pontos de ajuste da carga em kW do grupo gerador; configura o nível de controle de carga em kW do grupo gerador; utilize um cabo de par trançado com blindagem; saída analógica de 0-5 VCC; 1 VCC corresponde a 0% da carga, 4,5 VCC corresponde a 110% da carga
TB9-5	Controle de Carga Principal em kVAR	Conectado em paralelo aos pontos de ajuste da carga em kVAR do grupo gerador; configura o nível de controle de carga em kW do grupo gerador; utilize um cabo de par trançado com blindagem; saída analógica de 0-5 VCC; 1 VCC corresponde a 0% da carga, 4,5 VCC corresponde a 110% da carga
TB9-6	Retorno Analógico	Retorno de sinal para entradas analógicas
TB9-7	N/D	
TB9-8	Polarização de Frequência Principal +	Conectado à linha de compartilhamento de carga em kW do grupo gerador; sincroniza os grupos geradores com a rede pública; entrada/saída analógica de -2,5~5 VCC
TB9-9	Retorno Analógico	Retorno de sinal para entradas analógicas
TB9-10	Polarização de Tensão Principal +	Conectado à linha de compartilhamento de carga em kVAR do grupo gerador; sincroniza os grupos geradores com a rede pública; entrada/saída analógica de -2,5~5 VCC
TB9-11	N/D	

4.1.11.1 Entrada Analógica

Entradas analógicas são entradas que podem ter um intervalo de valores.

Enquanto as entradas analógicas se baseiam em uma tensão de entrada, o valor pode ter um significado diferente como, por exemplo, a corrente ou uma porcentagem da tensão nominal.

4.1.11.1.1 Valores de Processo de Entradas Analógicas

O valor de processo de uma entrada analógica é o valor da entrada analógica que é utilizado em qualquer cálculo ou operação. O valor exibido não é o da entrada analógica.

4.1.11.1.2 Valores Exibidos de Entradas Analógicas

Os valores exibidos de uma entrada analógica são os valores da entrada analógica que são exibidos. Não são os valores da entrada analógica utilizados em quaisquer cálculos ou operações. Habitualmente, os valores exibidos são atualizados com menor frequência que o valor utilizado em cálculos e operações.

Uma entrada analógica pode ter diferentes tipos de valores exibidos.

- Valor exibido de tensão: este é o valor atual da entrada para técnicos, por exemplo, no InPower.
- Valor exibido de unidades de engenharia: este é o valor atual da entrada para operadores, por exemplo, no painel do operador.
- Valor de amostra bruto: este valor é a saída do processo de amostragem que converte o sinal analógico em um sinal digital. Não é afetado pelos comandos de ativação de cancelamento e de cancelamento como os restantes tipos são.

4.1.11.2 Saídas Analógicas

Saídas analógicas são saídas que podem ter um intervalo de valores.

Embora as saídas analógicas se baseiem em uma tensão de saída, o valor pode ter um significado diferente para o dispositivo ao qual está conectado.

4.1.11.2.1 Valores de Previsão de Saída

As saídas analógicas têm um valor de previsão de saída associado a elas. O valor de previsão de saída é o nível de tensão que a saída analógica associada deveria ter.

Este valor pode ser utilizado para testes.

4.1.12 Conexões de TB10

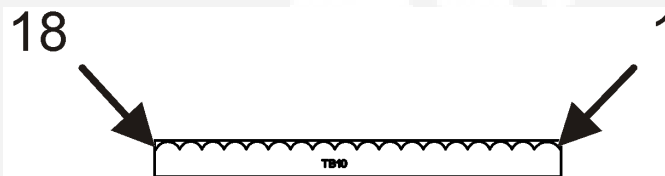


FIGURA 16. PINOS DE TB10

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 20. ATRIBUIÇÕES DO PINO DE TB10: STATUS DO DISJUNTOR

Pino	Descrição	Função / Conecta-se a
TB10-1	Disjuntor Principal do Grupo Gerador Posição A	Entrada para a posição do contato "A" para o disjuntor principal do grupo gerador
TB10-2	Disjuntor Principal do Grupo Gerador Posição B	Entrada para a posição do contato "B" para o disjuntor principal do grupo gerador
TB10-3	Disjuntor Principal do Grupo Gerador Desarmado	Entrada que indica se o disjuntor principal do grupo gerador está desarmado ou não
TB10-4	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB10-5	Restrição de Disjuntor do Grupo Gerador	Entrada do cliente; abre o disjuntor principal do grupo gerador ou restringe disjuntores em paralelo, conforme a topologia
TB10-6	Auto/Manual	Configura o modo de operação do MCM3320
TB10-7	Disjuntor Principal Rede Pública Posição A	Entrada para a posição do contato "A" para o disjuntor principal da rede pública
TB10-8	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB10-9	Disjuntor Principal Rede Pública Posição B	Entrada para a posição do contato "B" para o disjuntor principal da rede pública
TB10-10	Disjuntor Principal Rede Pública Desarmado	Entrada que indica se o disjuntor principal da rede pública está desarmado ou não
TB10-11	Restrição de Disjuntor Principal da Rede Pública	Entrada do cliente; abre o disjuntor principal da rede pública
TB10-12	Disjuntor de Circuito Paralelo de Grupo Gerador 1 Posição A	Entrada para a posição do contato "A" para o disjuntor de circuito paralelo do grupo gerador 1
TB10-13	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave

Pino	Descrição	Função / Conecta-se a
TB10-14	Disjuntor de Circuito Paralelo de Grupo Gerador 2 Posição A	Entrada para a posição do contato "A" para o disjuntor de circuito paralelo do grupo gerador 2
TB10-15	Disjuntor de Circuito Paralelo de Grupo Gerador 3 Posição A	Entrada para a posição do contato "A" para o disjuntor de circuito paralelo do grupo gerador 3
TB10-16	Disjuntor de Circuito Paralelo de Grupo Gerador 4 Posição A	Entrada para a posição do contato "A" para o disjuntor de circuito paralelo do grupo gerador 4
TB10-17	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB10-18	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave

4.1.13 Conexões de TB15

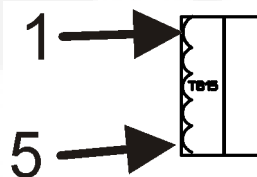



FIGURA 17. PINOS DE TB15

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 21. ATRIBUIÇÕES DO PINO DE TB15: MODBUS, FERRAMENTA DE SERVIÇO

Pino	Descrição	Função / Conecta-se a
TB15-1	Blindagem RS-485	Blindagem de rede
TB15-2	B+ com fusível (0,25 A)	Conectado a dispositivos externos de baixa potência como, por exemplo, um conversor RS-232 para RS-485 ou um simples mostrador
TB15-3	RS-485 Dados A	Dados de rede A
TB15-4	RS-485 Dados B	Dados de rede B
TB15-5	N/D	

4.1.13.1 Conexão RS-485 Dupla Função

 **NOTA:** É necessário desconectar o J14 antes de poder conectar uma ferramenta de serviço baseada em PC ao TB15.

Esta conexão RS-485 pode ser usada pelo Modbus ou por uma ferramenta de serviço baseada em PC (MON).

 **NOTA:** Utilize o J14 se pretender conectar ao controle com uma ferramenta de serviço baseada em PC sem desconectar qualquer dispositivo Modbus conectado em TB15.

Se o controle estiver usando Modbus na conexão RS-485, o controle mudará para MON se ocorrerem os seguintes eventos.

1. O controle recebe 5 pacotes Modbus inválidos consecutivos, ou o buffer receptor está cheio.
2. O controle não recebe nenhum pacote Modbus válido durante 5 segundos.

Se o controle estiver usando MON na conexão RS-485, o controle mudará para Modbus se ocorrerem os seguintes eventos.

1. O controle recebe 5 pacotes MON inválidos consecutivos.
2. O controle não recebe nenhum pacote MON válido durante 5 segundos.

4.1.13.2 Conexões Modbus



NOTA: Consultar <http://www.modbus.org> para obter mais informações sobre o Modbus e especificações atualizadas de fio.

O controle deve ser conectado a dispositivos externos através do protocolo Modbus RTU (Remote Terminal Unit) em um barramento RS-485 principal/auxiliar de fio duplo. Com essa configuração, o dispositivo externo será o principal e o controle será o auxiliar.

Um Modbus por Cabo de Linha Serial precisa ser blindado. Uma extremidade da blindagem precisa ser conectada a aterramento de proteção.

Uma conexão RS-485 de quatro fios pode ser convertida em uma conexão RS-485 de fio duplo ligando os pares RX/TX entre si.

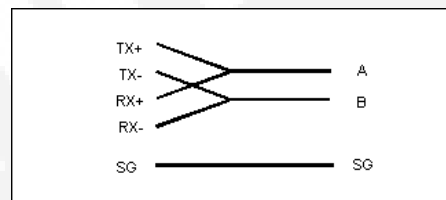


FIGURA 18. CONVERTER CONEXÕES RS-485 DE QUATRO FIOS EM CONEXÕES RS-485 DE FIO DUPLO

Se converter uma conexão RS-485 de quatro fios em uma conexão RS-485 de fio duplo, deve se certificar de que o bit de partida, o bit de parada, a velocidade e o controle de fluxo estejam sincronizados. Consultar <http://www.modbus.org> para obter mais informações.

4.1.13.3 InPower

O InPower™ é uma ferramenta de serviço, manutenção e diagnóstico baseada no Windows. Essa ferramenta disponibiliza funções de serviço eletrônico, incluindo: ajustes de aferições e configurações, monitorização, gráfico de linhas, registo de dados, visualização de falhas e informações sobre capacidade.



NOTA: PowerCommand é marca registrada da Cummins Inc.

A ferramenta InPower também pode ser utilizada para salvar as aferições e as configurações de um dispositivo em um arquivo. As configurações armazenadas podem ser visualizadas offline, podendo ser utilizadas para configurar várias instalações do mesmo tipo de controlador do aplicativo.

Cada uma das cópias do InPower é empacotada e instalada separadamente. Não pode ser instalado mais de um produto InPower em um mesmo PC.

4.1.13.4 Conectando um MCM3320

O controle mestre do MCM3320 necessita de um conversor de dados de RS-232 para RS-485 e de um cabo dedicado. [Figura 19](#) mostra a conexão InPower do MCM3320.

Tem à sua disposição o kit com o número 541-1199 para utilização com o MCM3320. Esse kit inclui o conversor de dados de RS-232 para RS-485 e o cabo utilizado para esse aplicativo.

Se o PC de serviço não dispuser de uma porta serial, poderá necessitar também de um conversor USB para serial.

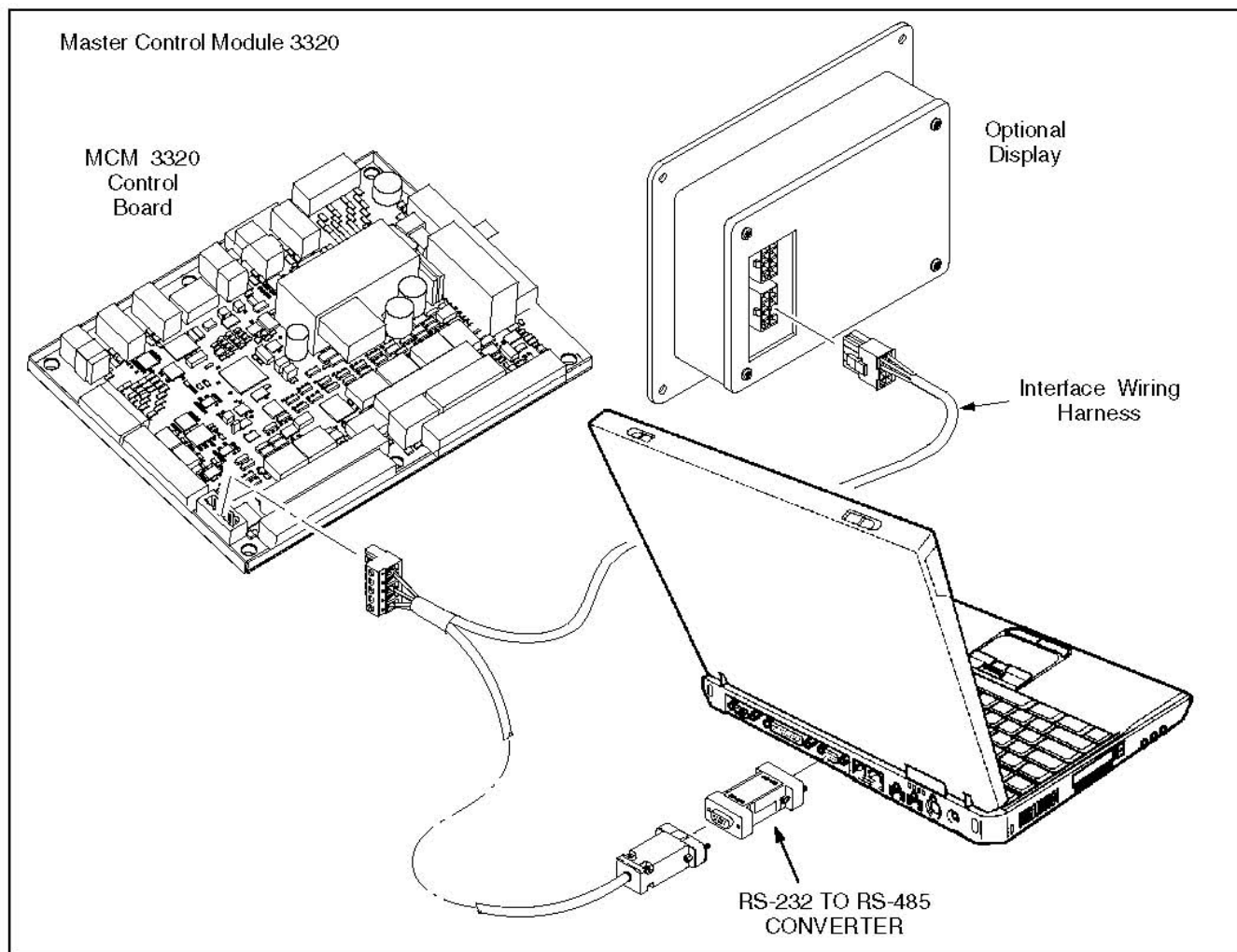


FIGURA 19. CONEXÃO SERIAL INPOWER COM CONTROLE MCM3320

4.1.13.5 Configurando o MCM3320

Tem duas formas de configurar o MCM3320 no InPower.

- Utilizando as pastas do gerenciador de dispositivos, da mesma forma que configura qualquer dispositivo.
- Utilizando as telas de configuração do MCM3320. Clique com o botão direito do mouse no dispositivo para abrir essas telas.

4.1.14 Modo Desligamento da Alimentação

O controle não suporta o modo de desligamento da alimentação, nem o modo de desativação. Mantém-se sempre ativo.

4.1.15 Indicadores de Sistema e de Diagnóstico

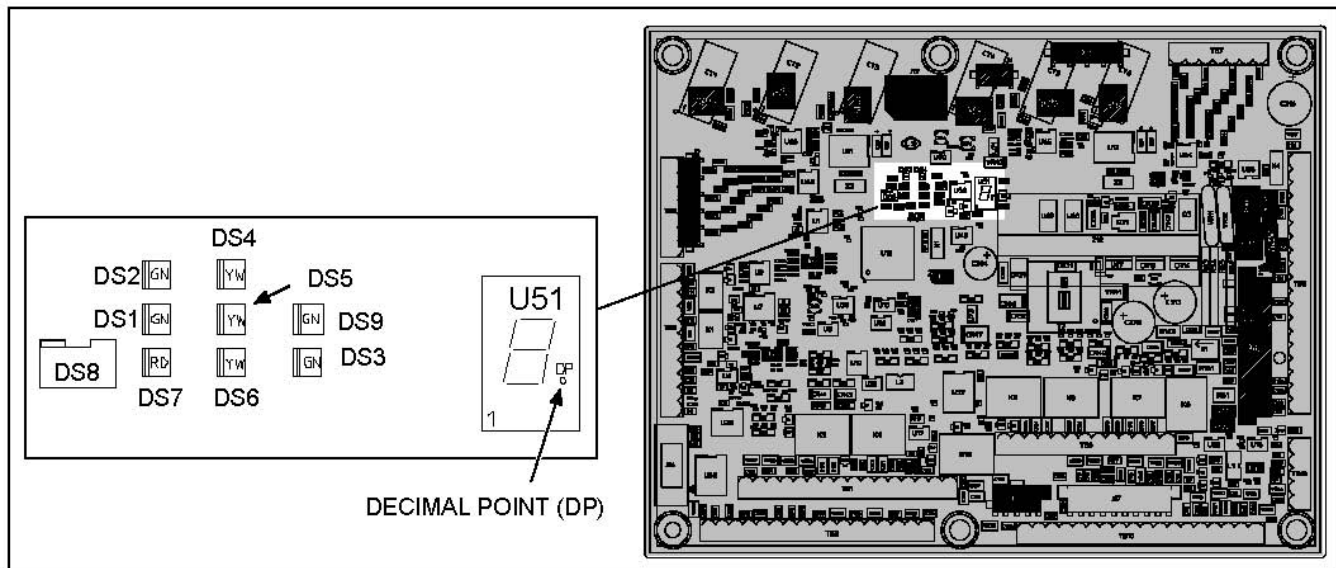


FIGURA 20. INDICADORES DE SISTEMA E DE DIAGNÓSTICO

TABELA 22. INDICADORES DE SISTEMA E DE DIAGNÓSTICO

Indicador	Nome	Descrição
DS1	Rede Pública Disponível	A rede pública está disponível.
DS2	Rede Pública Conectada	A rede pública está conectada às cargas.
DS3	Pulsação	Pisca de modo regular quando a placa está funcionando normalmente.
DS4	Grupo Gerador Conectado	Os grupos geradores estão conectados às cargas.
DS5	Grupo Gerador Disponível	Os grupos geradores estão disponíveis.
DS6	Alarme Comum	Pelo menos uma falha está ativa.
DS7	Não Em Auto	O controle está em modo Manual.
DS8	Sincronizador	(Verde intermitente) O sistema está tentando sincronizar os grupos geradores com a rede pública. <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Não Permitido. O código 1457 (Alerta de Falha de Sincronização) está inativo.
		(Verde) O sistema está pronto para conectar uma das fontes às cargas. <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Permitido. O código 1457 (Alerta de Falha de Sincronização) está inativo.
		(Vermelho) Código 1457 (Alerta de Falha de Sincronização) está inativo.

Indicador	Nome	Descrição
DS9	Atividade Modbus	O controle está recebendo um pacote Modbus ou está enviando um pacote Modbus. Além disso, este indicador estará ligado durante os 5 segundos de espera antes de alterar os protocolos de comunicação em TB15.

U51 exibe informações diferentes conforme o modo. O modo é indicado pelo ponto decimal no canto inferior direito. Para colocar U51 no modo Sistema, pressione o interruptor de correção da falha (TB2-14) durante menos de cinco segundos. Para colocar U51 no modo Diagnóstico, pressione o interruptor de correção da falha (TB2-14) durante pelo menos cinco segundos.

TABELA 23. INFORMAÇÕES DE U51

Modo	Ponto Decimal	Mostrador
Sistema	desligado	Códigos de <i>System State</i> (Estado do Sistema) (Tabela 38)
Diagnóstico	ligado	Códigos de falhas ativas

Alguns códigos de *System State* (Estado do Sistema) não estão disponíveis em todas as topologias.

TABELA 24. CÓDIGOS U51 DE SYSTEM STATE (ESTADO DO SISTEMA)

Código	Descrição
1	Retardo de Tempo para Partir
2	Retardo de Tempo para Parar
3	Transição Programada de Retardo de Tempo (TDPT)
4	Retardo de Tempo Normal para Emergência (TDNE)
5	Retardo de Tempo Emergência para Normal (TDEN)
6	Sincronizando (O sincronizador está funcionando e <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Não Permitido.)
7	Verificação sincronizador OK (<i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Permitido.)
8	Restrição
A	Descarga subida
b	Carga subida
C	Modo Manual
d	Falha na rede pública
E	Teste
H	Paralelo estendido
J	Emergência (<i>PTC Operating Mode</i> (Modo operacional de PTC) é Normal e os outros códigos de atividade não são aplicáveis.)
-	Não disponível

4.1.16 Reparando Placas de Circuitos



ALERTA: *Tentativas de reparar placas de circuitos poderão provocar danos ao equipamento, acidentes pessoais ou morte. Substitua placas de circuitos defeituosas. Não tente reparar placas de circuitos defeituosas.*

4.2 Placa Base do SYNC1320

Esta placa de circuitos contém o microprocessador e o software operacional.

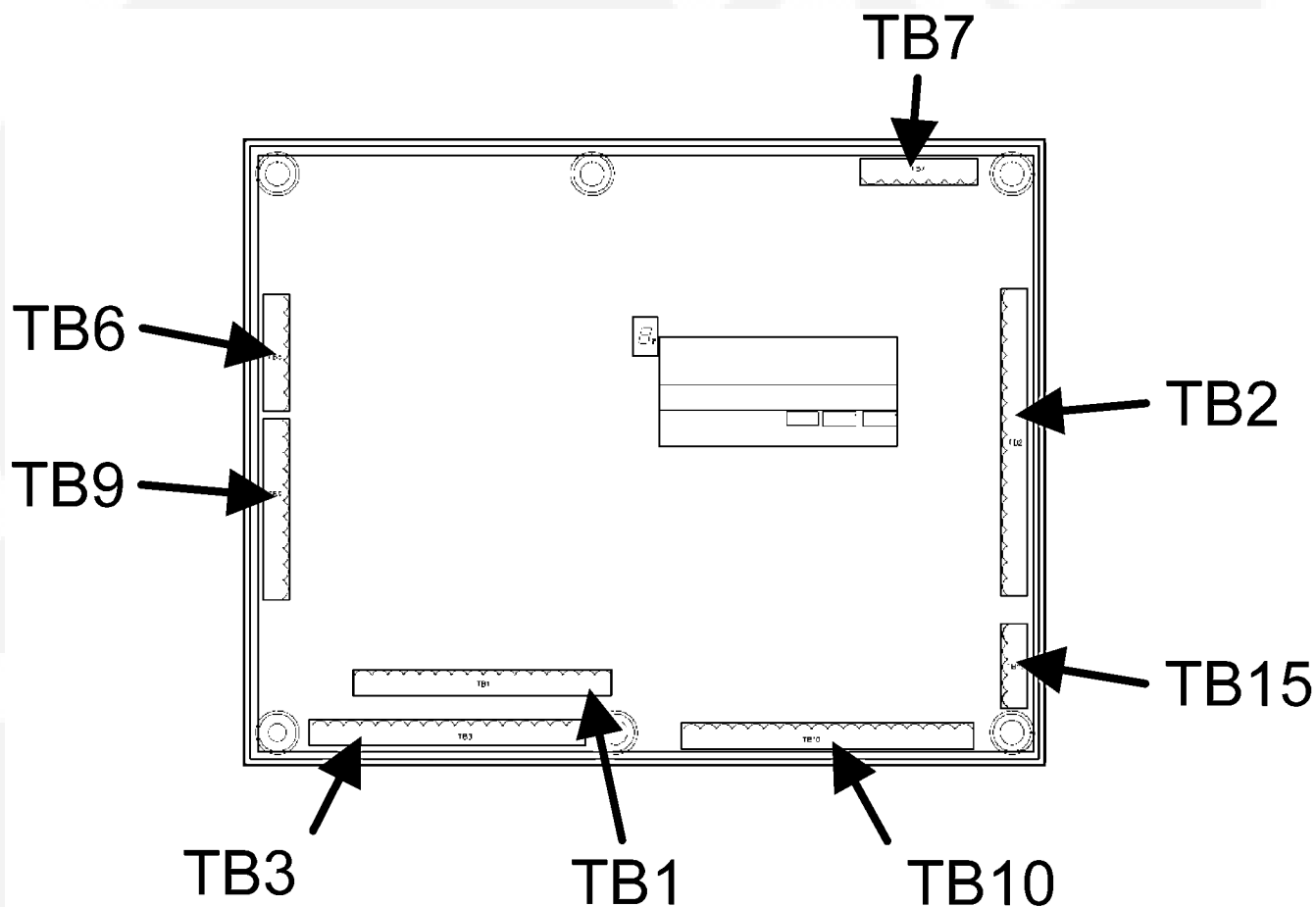


FIGURA 21. PLACA BASE DO SYNC1320

4.2.1 Resumo de Conexões

TABELA 25. RESUMO DE CONEXÕES

Conexão	Descrição
TB1	Chave de habilitação do sincronizador
TB2	Alimentação, correção de falha, saídas configuráveis
TB3	Saídas configuráveis
TB6	Detecção de tensão do barramento do grupo gerador
TB7	Detecção de tensão da rede pública

Conexão	Descrição
TB9	Entradas analógicas, saídas analógicas
TB10	Chave auto/manual
TB15	InPower

4.2.2 Conexões de TB1

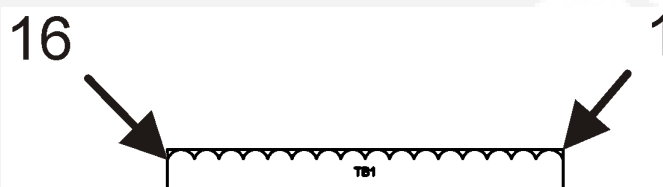


FIGURA 22. PINOS DE TB1

O conector possui a mesma orientação que na [Figura 21](#).

TABELA 26. ATRIBUIÇÕES DO PINO DE TB1: INTERRUPTOR DE HABILITAÇÃO DO SINCRONIZADOR

Pino	Descrição	Função / Conecta-se a
TB1-1	N/D	
TB1-2	N/D	
TB1-3	N/D	
TB1-4	N/D	
TB1-5	N/D	
TB1-6	N/D	
TB1-7	N/D	
TB1-8	N/D	
TB1-9	N/D	
TB1-10	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB1-11	Habilita Sincronizador	Habilita a sincronização quando o controle está em modo Manual ou em modo Somente Sincronismo Principal
TB1-12	N/D	
TB1-13	N/D	
TB1-14	N/D	
TB1-15	N/D	
TB1-16	N/D	

4.2.2.1 Entradas Discretas

Entradas discretas são entradas que podem estar ativas ou inativas.

Os estados podem ser mapeados para nomes diferentes como, por exemplo, parada/partida ou abrir disjuntor/fechar disjuntor.

4.2.2.2 Voláteis para Entradas Discretas

Muitas entradas discretas possuem voláteis associados. O volátil é uma fonte de software para a entrada discreta. Se o volátil for configurado para seu valor ativo, a entrada discreta ficará ativa. Se o volátil for configurado para seu valor inativo, a entrada discreta ficará inativa se nenhuma das outras fontes, como as fontes de hardware, estiverem ativas.

Os voláteis poderão estar disponíveis através de uma conexão em rede como PCCNet, Modbus ou InPower.

4.2.3 Conexões de TB2

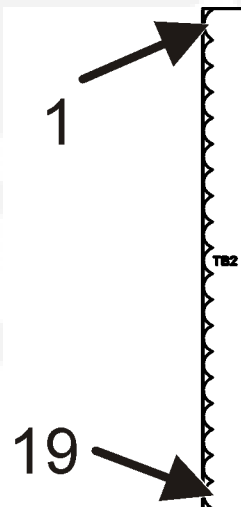


FIGURA 23. PINOS DE TB2

O conector possui a mesma orientação que na [Figura 21](#).

TABELA 27. ATRIBUIÇÕES DO PINO DE TB2: ALIMENTAÇÃO, CORREÇÃO DE FALHA, SAÍDAS CONFIGURÁVEIS

Pino	Descrição	Função / Conecta-se a
TB2-1	N/D	
TB2-2	Bateria –	Retorno bateria 1 ou bateria 2
TB2-3	Bateria –	Retorno bateria 1 ou bateria 2
TB2-4	N/D	
TB2-5	Bateria –	Retorno bateria 1 ou bateria 2
TB2-6	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB2-7	Bateria –	Retorno bateria 1 ou bateria 2
TB2-8	Bateria 1 +	Alimentação bateria 1 (+)
TB2-9	Bateria 1 +	Alimentação bateria 1 (+)
TB2-10	Alimentação da Bobina de Relé B+	B+ Chaveado
TB2-11	Bateria 2 +	Alimentação bateria 2 (+)
TB2-12	Bateria 2 +	Alimentação bateria 2 (+)
TB2-13	N/D	

Pino	Descrição	Função / Conecta-se a
TB2-14	Reinício de Falha	Reinicia falhas; se estiver ativo por 5 segundos, exibe códigos de falha no visor de sete segmentos
TB2-15	Saída Configurável N° 1	Seu valor padrão é Alerta Comum; tem em vista acionar uma bobina de relé
TB2-16	Saída Configurável N° 2	Seu valor padrão é Falha de Sincronização; tem em vista acionar uma bobina de relé
TB2-17	Saída Configurável N° 3	Seu valor padrão é Gerador Disponível; tem em vista acionar uma bobina de relé
TB2-18	Saída Configurável N° 4	Seu valor padrão é Rede Pública Disponível; tem em vista acionar uma bobina de relé
TB2-19	Aterramento do Chassi	

Só uma bateria é necessária; utilize a segunda bateria para obter redundância.

TB2-15, TB2-16, TB2-17 e TB2-18 são acionadores do lado inferior.

TABELA 28. ESPECIFICAÇÕES DE ACIONADOR DO LADO INFERIOR

Descrição	Valor
Tensão máxima	30 VCC
Corrente máxima	250 mA
Corrente inicial máxima	3 A
Corrente de fuga (estado desativado)	100 μ A

4.2.3.1 Saídas Configuráveis

As saídas configuráveis são saídas discretas cujo estado depende de um código de evento ou código de falha especificado. Se o evento ou falha especificada estiver ativa, a saída configurável está ativa. Se o evento ou falha especificada estiver inativa, a saída configurável está inativa.

4.2.4 Conexões de TB3



FIGURA 24. PINOS DE TB3

O conector possui a mesma orientação que na [Figura 21](#).

TABELA 29. ATRIBUIÇÕES DO PINO DE TB3: SAÍDAS CONFIGURÁVEIS

Pino	Descrição	Função / Conecta-se a
TB3-1	N/D	
TB3-2	N/D	
TB3-3	N/D	
TB3-4	N/D	

Pino	Descrição	Função / Conecta-se a
TB3-5	N/D	
TB3-6	N/D	
TB3-7	N/D	
TB3-8	N/D	
TB3-9	N/D	
TB3-10	N/D	
TB3-11	N/D	
TB3-12	Saída Configurável N° 5	Seu valor padrão é Falha ao Desconectar; tem em vista acionar uma bobina de relé
TB3-13	Saída Configurável N° 6	Seu valor padrão é Sincronizado; tem em vista acionar uma bobina de relé
TB3-14	Saída Configurável N° 7	Seu valor padrão é Limite Saída de Sincronização; tem em vista acionar uma bobina de relé
TB3-15	Saída Configurável N° 8	Seu valor padrão é Falha de Hardware; tem em vista acionar uma bobina de relé
TB3-16	N/D	
TB3-17	N/D	

TB3-12, TB3-13, TB3-14 e TB3-15 são acionadores do lado inferior.

TABELA 30. ESPECIFICAÇÕES DE ACIONADOR DO LADO INFERIOR

Descrição	Valor
Tensão máxima	30 VCC
Corrente máxima	250 mA
Corrente inicial máxima	3 A
Corrente de fuga (estado desativado)	100 μ A

4.2.5 Conexões de TB6

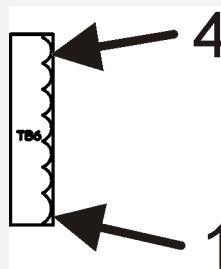


FIGURA 25. PINOS DE TB6

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 31. ATRIBUIÇÕES DO PINO DE TB6: TENSÃO DO BARRAMENTO DO GRUPO GERADOR

Pino	Descrição	Função / Conecta-se a
TB6-1	Tensão Barramento Grupo Gerador L1	até 480 VCA (linha a linha)
TB6-2	Tensão Barramento Grupo Gerador L2	até 480 VCA (linha a linha)
TB6-3	Tensão Barramento Grupo Gerador L3	até 480 VCA (linha a linha)
TB6-4	Tensão Barramento Grupo Gerador Neutro	até 480 VCA (linha a linha)

Se a tensão nominal do barramento do grupo gerador for superior a 480 VCA (linha a linha), são necessários transformadores de tensão (PTs) para reduzir a tensão para menos de 480 VCA (linha a linha) antes de entrar no controle.

4.2.5.1 Calibrar as medições de tensão e corrente

A calibração afeta os valores de tensão e corrente utilizados em todos os seus cálculos como, por exemplo, potência e energia, controle de carga e sincronização. A calibração também afeta os valores fornecidos através de conexões de rede como, por exemplo, PCCNet, Modbus ou InPower.



NOTA: Utilize um medidor RMS autêntico e calibrado para verificar a saída efetiva.

Habitualmente, as telas de configuração do InPower são utilizadas no processo de calibração.

Calibre a tensão e a corrente separadamente para o barramento do grupo gerador e para a rede pública. É possível calibrar os valores para cada fonte.

- Corrente em cada fase
- Tensão linha a linha entre cada par de fases (a tensão linha a neutro é calculada com base na tensão linha a linha calculada).

Não é possível calibrar a medição da frequência.

4.2.6 Conexões de TB7

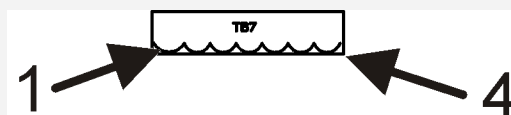


FIGURA 26. PINOS DE TB7

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 32. ATRIBUIÇÕES DO PINO DE TB7: TENSÃO DA REDE PÚBLICA

Pino	Descrição	Função / Conecta-se a
TB7-1	Tensão da Rede Pública L1	até 480 VCA (linha a linha)
TB7-2	Tensão da Rede Pública L2	até 480 VCA (linha a linha)
TB7-3	Tensão da Rede Pública L3	até 480 VCA (linha a linha)
TB7-4	Tensão da Rede Pública Neutra	até 480 VCA (linha a linha)

Se a tensão da rede pública for superior a 480 VCA (linha a linha), são necessários transformadores de tensão (PTs) para reduzir a tensão para menos de 480 VCA (linha a linha) antes de entrar no controle.

4.2.7 Conexões de TB9

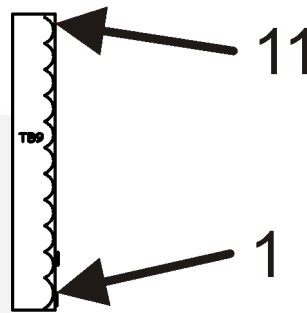


FIGURA 27. PINOS DE TB9

O conector possui a mesma orientação que na [Figura 21](#).

TABELA 33. ATRIBUIÇÕES DO PINO DE TB9: ENTRADAS/SAÍDAS ANALÓGICAS

Pino	Descrição	Função / Conecta-se a
TB9-1	N/D	
TB9-2	N/D	
TB9-3	N/D	
TB9-4	N/D	
TB9-5	N/D	
TB9-6	N/D	
TB9-7	N/D	
TB9-8	Polarização de Frequência Principal +	Conectado à linha de compartilhamento de carga em kW do grupo gerador; sincroniza os grupos geradores com a rede pública; entrada/saída analógica de -2,5~5 VCC
TB9-9	Retorno Analógico	Retorno de sinal para entradas analógicas
TB9-10	Polarização de Tensão Principal +	Conectado à linha de compartilhamento de carga em kVAR do grupo gerador; sincroniza os grupos geradores com a rede pública; entrada/saída analógica de -2,5~5 VCC
TB9-11	N/D	

4.2.7.1 Entrada Analógica

Entradas analógicas são entradas que podem ter um intervalo de valores.

Enquanto as entradas analógicas se baseiam em uma tensão de entrada, o valor pode ter um significado diferente como, por exemplo, a corrente ou uma porcentagem da tensão nominal.

4.2.7.1.1 Valores de Processo de Entradas Analógicas

O valor de processo de uma entrada analógica é o valor da entrada analógica que é utilizado em qualquer cálculo ou operação. O valor exibido não é o da entrada analógica.

4.2.7.1.2 Valores Exibidos de Entradas Analógicas

Os valores exibidos de uma entrada analógica são os valores da entrada analógica que são exibidos. Não são os valores da entrada analógica utilizados em quaisquer cálculos ou operações. Habitualmente, os valores exibidos são atualizados com menor frequência que o valor utilizado em cálculos e operações.

Uma entrada analógica pode ter diferentes tipos de valores exibidos.

- Valor exibido de tensão: este é o valor atual da entrada para técnicos, por exemplo, no InPower.
- Valor exibido de unidades de engenharia: este é o valor atual da entrada para operadores, por exemplo, no painel do operador.
- Valor de amostra bruto: este valor é a saída do processo de amostragem que converte o sinal analógico em um sinal digital. Não é afetado pelos comandos de ativação de cancelamento e de cancelamento como os restantes tipos são.

4.2.7.2 Saídas Analógicas

Saídas analógicas são saídas que podem ter um intervalo de valores.

Embora as saídas analógicas se baseiem em uma tensão de saída, o valor pode ter um significado diferente para o dispositivo ao qual está conectado.

4.2.7.2.1 Sinais de Saídas para Entradas Analógicas

O sinal de saída de uma entrada analógica é um sinal modulado por largura de pulso (PWM). O sinal PWM tem uma frequência de 4 kHz. Se este sinal for amostrado mais rapidamente que isso, a medição da tensão poderá ser incorreta.

4.2.7.2.2 Valores de Previsão de Saída

As saídas analógicas têm um valor de previsão de saída associado a elas. O valor de previsão de saída é o nível de tensão que a saída analógica associada deveria ter.

Este valor pode ser utilizado para testes.

4.2.8 Conexões de TB10

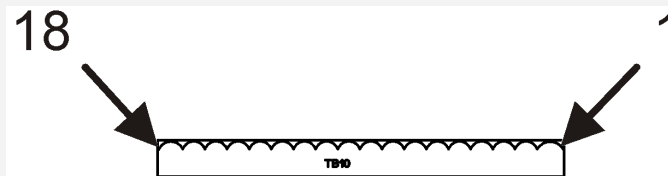


FIGURA 28. PINOS DE TB10

O conector possui a mesma orientação que na [Figura 21](#).

TABELA 34. ATRIBUIÇÕES DO PINO TB10: INTERRUPTOR AUTO/MANUAL

Pino	Descrição	Função / Conecta-se a
TB10-1	N/D	
TB10-2	N/D	
TB10-3	N/D	

Pino	Descrição	Função / Conecta-se a
TB10-4	N/D	
TB10-5	N/D	
TB10-6	Auto/Manual	Configura o modo de operação do MCM3320
TB10-7	N/D	
TB10-8	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB10-9	N/D	
TB10-10	N/D	
TB10-11	N/D	
TB10-12	N/D	
TB10-13	N/D	
TB10-14	N/D	
TB10-15	N/D	
TB10-16	N/D	
TB10-17	Retorno de Entrada Discreta	Retorno de sinal para entradas de chave
TB10-18	N/D	

4.2.9 Conexões de TB15

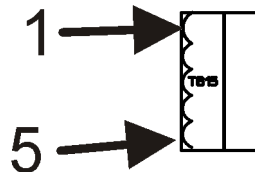


FIGURA 29. PINOS DE TB15

O conector possui a mesma orientação que na [Figura 5](#).

TABELA 35. ATRIBUIÇÕES DO PINO DE TB15: MODBUS, FERRAMENTA DE SERVIÇO

Pino	Descrição	Função / Conecta-se a
TB15-1	Blindagem RS-485	Blindagem de rede
TB15-2	B+ com fusível (0,25 A)	Conectado a dispositivos externos de baixa potência como, por exemplo, um conversor RS-232 para RS-485 ou um simples mostrador
TB15-3	RS-485 Dados A	Dados de rede A
TB15-4	RS-485 Dados B	Dados de rede B
TB15-5	N/D	

4.2.9.1 InPower

O InPower™ é uma ferramenta de serviço, manutenção e diagnóstico baseada no Windows. Essa ferramenta disponibiliza funções de serviço eletrônico, incluindo: ajustes de aferições e configurações, monitorização, gráfico de linhas, registo de dados, visualização de falhas e informações sobre capacidade.



NOTA: PowerCommand é marca registrada da Cummins Inc.

A ferramenta InPower também pode ser utilizada para salvar as aferições e as configurações de um dispositivo em um arquivo. As configurações armazenadas podem ser visualizadas offline, podendo ser utilizadas para configurar várias instalações do mesmo tipo de controlador do aplicativo.

Cada uma das cópias do InPower é empacotada e instalada separadamente. Não pode ser instalado mais de um produto InPower em um mesmo PC.

4.2.9.2 Conectando um SYNC1320

Conecte ao SYNC1320 do mesmo modo que conecta a um MCM3320 em TB15.

4.2.9.3 Configurando o SYNC1320

Existem dois métodos para configurar o SYNC1320 no InPower.

- Utilize as pastas no explorador do dispositivo, do mesmo modo que configura qualquer dispositivo.
- Utilize as telas de configuração do SYNC1320. Clique com o botão direito do mouse no dispositivo para abrir essas telas.

4.2.10 Modo Desligamento da Alimentação

O controle não suporta o modo de desligamento da alimentação, nem o modo de desativação. Mantém-se sempre ativo.

4.2.11 Indicadores de Sistema e de Diagnóstico

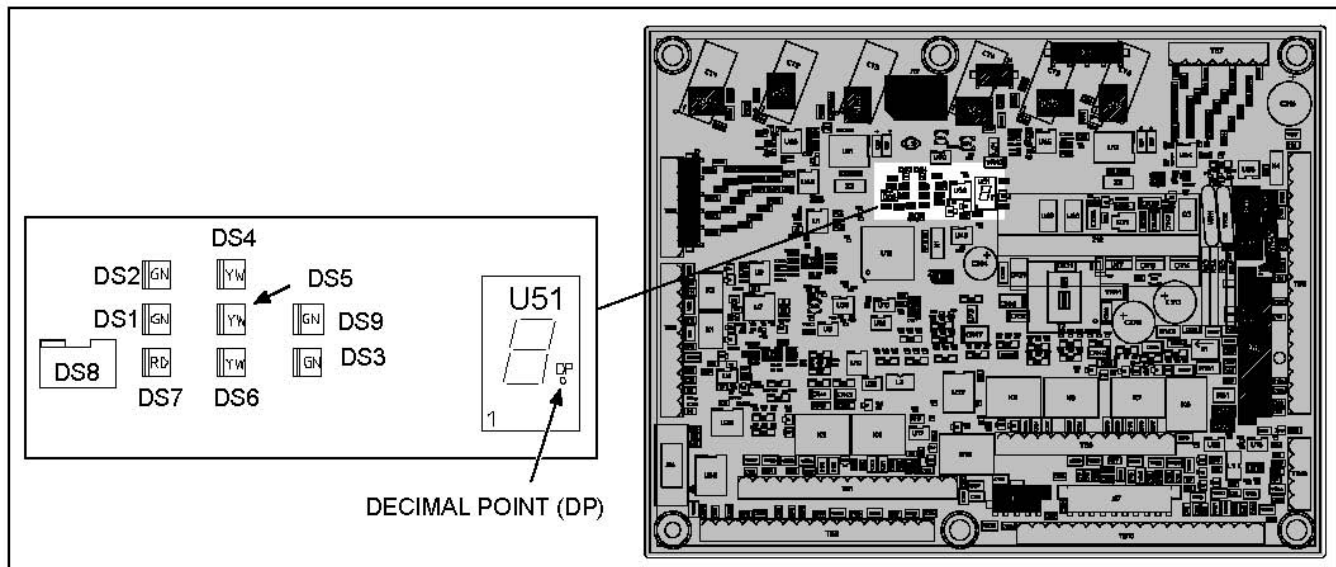


FIGURA 30. INDICADORES DE SISTEMA E DE DIAGNÓSTICO

TABELA 36. INDICADORES DE SISTEMA E DE DIAGNÓSTICO

Indicador	Nome	Descrição
DS1	Rede Pública Disponível	A rede pública está disponível.
DS2	Rede Pública Conectada	A rede pública está conectada às cargas.
DS3	Pulsação	Pisca de modo regular quando a placa está funcionando normalmente.
DS4	Grupo Gerador Conectado	Os grupos geradores estão conectados às cargas.
DS5	Grupo Gerador Disponível	Os grupos geradores estão disponíveis.
DS6	Alarme Comum	Pelo menos uma falha está ativa.
DS7	Não Em Auto	O controle está em modo Manual.
DS8	Sincronizador	(Verde intermitente) O sistema está tentando sincronizar os grupos geradores com a rede pública. <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Não Permitido. O código 1457 (Alerta de Falha de Sincronização) está inativo.
		(Verde) O sistema está pronto para conectar uma das fontes às cargas. <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Permitido. O código 1457 (Alerta de Falha de Sincronização) está inativo.
		(Vermelho) Código 1457 (Alerta de Falha de Sincronização) está inativo.
DS9	Atividade Modbus	O controle está recebendo um pacote Modbus ou está enviando um pacote Modbus. Além disso, este indicador estará ligado durante os 5 segundos de espera antes de alterar os protocolos de comunicação em TB15.

U51 exibe informações diferentes conforme o modo. O modo é indicado pelo ponto decimal no canto inferior direito. Para colocar U51 no modo Sistema, pressione o interruptor de correção da falha (TB2-14) durante menos de cinco segundos. Para colocar U51 no modo Diagnóstico, pressione o interruptor de correção da falha (TB2-14) durante pelo menos cinco segundos.

TABELA 37. INFORMAÇÕES DE U51

Modo	Ponto Decimal	Mostrador
Sistema	desligado	Códigos de <i>System State</i> (Estado do Sistema) (Tabela 38)
Diagnóstico	ligado	Códigos de falhas ativas

Alguns códigos de *System State* (Estado do Sistema) não estão disponíveis em todas as topologias.

TABELA 38. CÓDIGOS U51 DE SYSTEM STATE (ESTADO DO SISTEMA)

Código	Descrição
1	Retardo de Tempo para Partir
2	Retardo de Tempo para Parar
3	Transição Programada de Retardo de Tempo (TDPT)
4	Retardo de Tempo Normal para Emergência (TDNE)
5	Retardo de Tempo Emergência para Normal (TDEN)
6	Sincronizando (O sincronizador está funcionando e <i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Não Permitido.)
7	Verificação sincronizador OK (<i>Sync Check Close Allowed</i> (Fechamento de Verificação do Sincronizador Permitido) está como Permitido.)
8	Restrição
A	Descarga subida
b	Carga subida
C	Modo Manual
d	Falha na rede pública
E	Teste
H	Paralelo estendido
J	Emergência (<i>PTC Operating Mode</i> (Modo operacional de PTC) é Normal e os outros códigos de atividade não são aplicáveis.)
-	Não disponível

4.2.12 Reparando Placas de Circuitos



ALERTA: *Tentativas de reparar placas de circuitos poderão provocar danos ao equipamento, acidentes pessoais ou morte. Substitua placas de circuitos defeituosas. Não tente reparar placas de circuitos defeituosas.*

4.3 Painel do Operador

4.3.1 Painel Traseiro

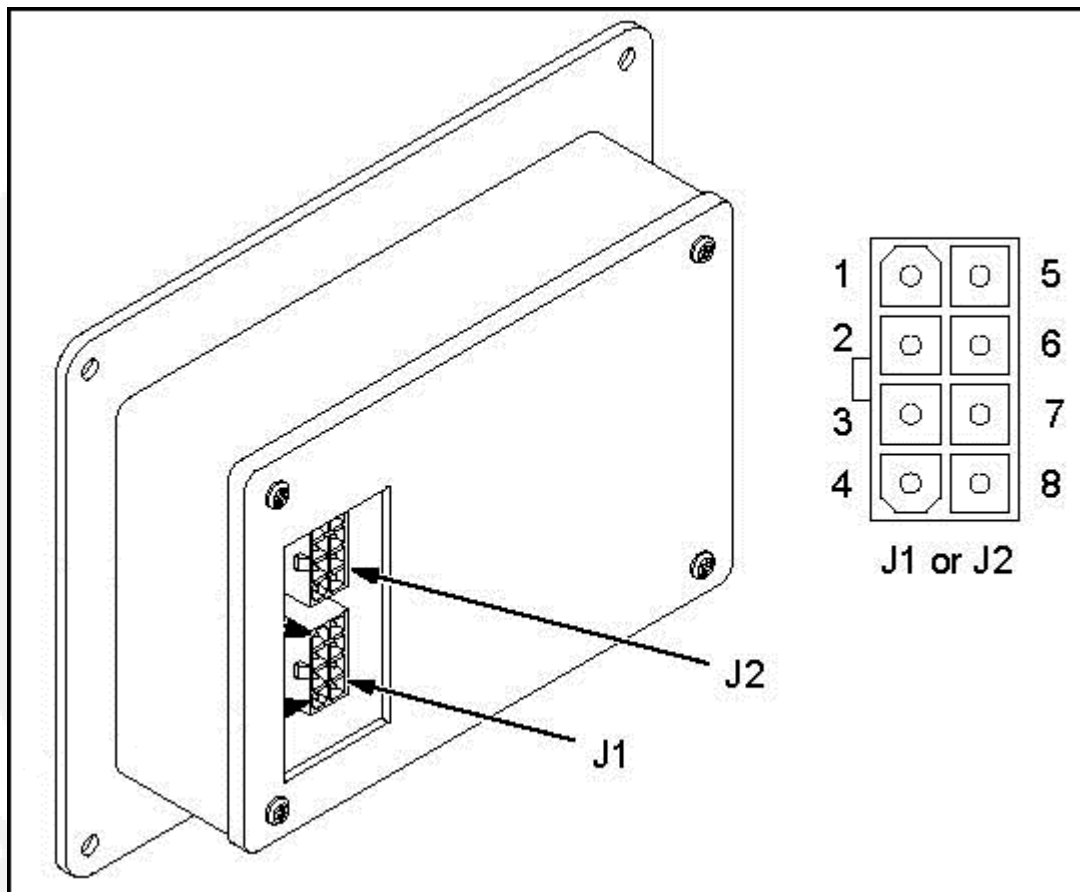


FIGURA 31. PAINEL TRASEIRO

4.3.1.1 Conexões J1/J2

J1 e J2 são idênticos. Qualquer um desses conectores pode ser utilizado para conectar ao MCM3320. O outro conector pode ser utilizado para conectar dispositivos adicionais à rede PCCNet.

TABELA 39. ATRIBUIÇÕES DO PINO J1/J2

Pino	Descrição
1	RS-485 Dados A
2	RS-485 Dados B
3	B+ com fusível (0,25 A), conectado a dispositivos externos de baixa potência como, por exemplo, um conversor RS-232 para RS-485 ou um simples mostrador
4	Não utilizado
5	Retorno de B+ com fusível
6	Não utilizado
7	Não utilizado

Pino	Descrição
8	Não utilizado

4.3.2 Painel Frontal

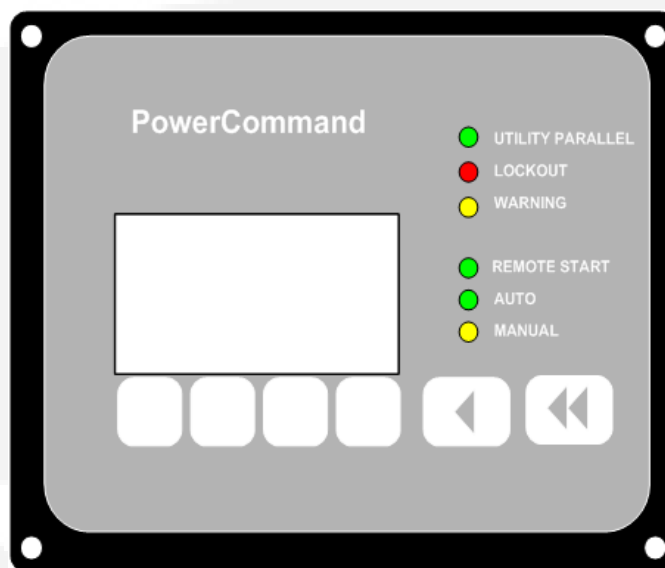


FIGURA 32. PAINEL FRONTAL

4.3.2.1 Resumo dos Indicadores

TABELA 40. RESUMO DOS INDICADORES

Indicador	Descrição
Utility Parallel (Rede pública paralelo)	<i>PTC State</i> (Estado de PTC) é Paralelo.
Lockout (Bloqueio)	<i>System Lockout Status</i> (Status de bloqueio do sistema) está Ativo.
Warning (Alerta)	Código 1483 (Alarme Comum) está ativo.
Remote Start (Partida Remota)	O relé de partida do grupo gerador (TB8-7, TB-8, TB8-9) está ativo.
Auto (Automático)	<i>Auto/Manual Sw</i> (Chave Automática/Manual) está como Automática.
Manual	<i>Auto/Manual Sw</i> (Chave Automática/Manual) está como Automática.

4.3.2.2 Resumo dos Botões

TABELA 41. RESUMO DOS BOTÕES

Botão	Descrição
Botões de tecla (4)	As funções destes botões poderão variar conforme a tela. Alguns botões poderão não ter qualquer função numa determinada tela.
◀	Pressione este botão para retornar à tela anterior.

Botão	Descrição
◀◀	Pressione este botão para retornar à tela principal.

4.3.3 Versões de Software Compatíveis (Painel do Operador)

TABELA 42. VERSÕES DE SOFTWARE COMPATÍVEIS (PAINEL DO OPERADOR)

MCM3320	Painel do Operador
V2.01 ou posterior	V1.20 ou posterior

4.3.4 Tela Principal

A tela principal exibe o estado do sistema. Depende da topologia.

4.3.4.1 Tela Principal (Modo Somente Sincronismo Principal ou Componente)

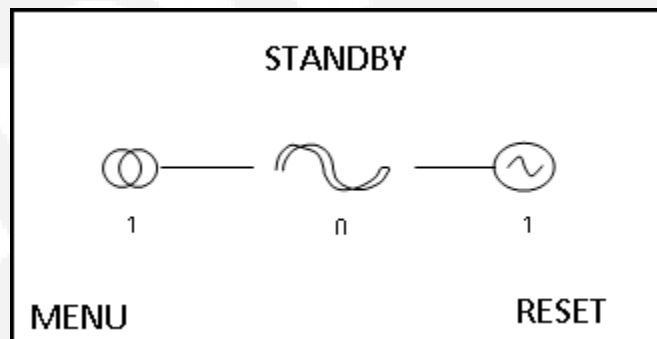


FIGURA 33. EXEMPLO: TELA PRINCIPAL (MODO SOMENTE SINCRONISMO PRINCIPAL OU COMPONENTE)

O topo da tela exibe o *System State* (Estado do Sistema).

A seção do meio da tela indica se a rede pública está disponível, ou não, se o sincronizador está funcionando e se os grupos geradores estão disponíveis.

Os botões de tecla permitem acessar outras telas ou efetuar uma correção de falha.

4.3.4.2 Tela Principal (Barramento Isolado sem Disjuntor Principal do Grupo Gerador ou Barramento Isolado com Disjuntor Principal do Grupo Gerador)

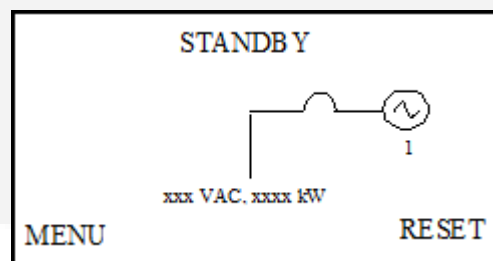


FIGURA 34. EXEMPLO: TELA PRINCIPAL (BARRAMENTO ISOLADO SEM DISJUNTOR PRINCIPAL DO GRUPO GERADOR OU BARRAMENTO ISOLADO COM DISJUNTOR PRINCIPAL DO GRUPO GERADOR)

O topo da tela exibe o *System State* (Estado do Sistema).

A seção do meio da tela indica se os grupo geradores estão disponíveis, ou não, e se os grupos geradores estão conectados às cargas, ou não. Se os grupos geradores estiverem disponíveis e conectados às cargas, a tela exibirá ainda a tensão média linha a linha e a potência real fornecida pelos grupos geradores.

Os botões de tecla permitem acessar outras telas ou efetuar uma correção de falha.

4.3.4.3 Tela Principal (Barramento Comum ou Par de Transferência)

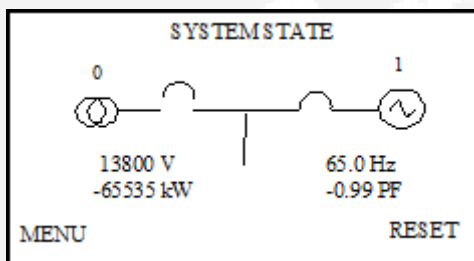


FIGURA 35. EXEMPLO: TELA PRINCIPAL (BARRAMENTO COMUM OU PAR DE TRANSFERÊNCIA)

O topo da tela exibe o *System State* (Estado do Sistema). Se *System State* (Estado do Sistema) indicar que um temporizador está funcionando, a tela exibirá ainda o tempo restante.

A seção do meio da tela indica se os grupo geradores estão disponíveis, ou não, se a rede pública está disponível, se os grupos geradores estão conectados às cargas, e se a rede pública está conectada às cargas. Além disso, a tela exibe informações adicionais conforme o estado do sistema.

- Se *PTC State* (Estado de PTC) for Paralelo, a tela exibirá a tensão média linha a linha da rede pública, a frequência dos grupos geradores e a potência real fornecida por cada fonte.
- Se *PTC State* (Estado de PTC) for Não Conectado e nenhum temporizador estiver funcionando no topo da tela, a tela exibirá a tensão média linha a linha e a frequência de cada fonte, bem como a diferença de fase entre fontes.
- Se o sincronizador estiver funcionando e nenhum temporizador estiver funcionando no topo da tela, a tela exibirá a tensão média linha a linha e a frequência de cada fonte, bem como a diferença de fase entre fontes.
- Caso contrário, a tela exibirá a tensão média linha a linha, a potência real, a frequência e o fator de potência da fonte que está conectada às cargas.

Os botões de tecla permitem acessar outras telas ou efetuar uma correção de falha.

4.3.4.4 Aviso de Falha

Quando uma falha fica ativa, o painel do operador anuncia a falha. A falha será exibida até que a tela seja alterada, pressionando um dos botões adequados.

A falha é exibida somente uma vez, independentemente do tempo que se mantém ativa. Quando a tela se altera, a falha não é mais exibida, mas se mantém ativa. As telas de Falha podem ser utilizadas para observar a falha e para corrigir a falha depois que ela é anunciada.

Se estiver mais do que uma falha ativa, cada falha será anunciada em separado, começando pela falha gerada mais recentemente.

4.3.4.5 Telas de Controle

Estas telas se destinam a ser utilizadas para operar o sistema após a configuração inicial. Por exemplo, é possível iniciar testes ou executar o sistema em modo paralelo estendido.

4.3.4.6 Telas de Ajuste

Estas telas incluem a maior parte das configurações disponíveis no painel do operador. Poderão ser utilizadas para a configuração inicial, solução de problemas e recursos, como o programador, que habitualmente são configurados uma só vez.

4.3.4.7 Telas de Monitoramento

Estas telas exibem o estado do sistema e do MCM3320. Em algumas telas é necessário o nível de segurança de técnico para limpar os contadores ou redefinir valores.

4.3.4.8 Telas de Falha

Estas telas fornecem informações sobre eventos e falhas. A partir delas, é possível ainda reiniciar falhas.

4.3.4.9 Telas de Sobre

Estas telas fornecem informações sobre a versão de software utilizada pelos diferentes dispositivos do sistema. Permitem ainda consultar o tempo de atividade do controlador.

4.3.5 Níveis de Segurança

TABELA 43. NÍVEIS DE SEGURANÇA

Nível	Descrição
0	Convidado
1	Operador
2	Técnico
3	Fábrica

O convidado é o nível padrão de segurança.

Outros níveis de segurança exigem um nome de usuário e uma senha.

4.3.5.1 Senhas

TABELA 44. SENHAS

Nível	Senha
0	nenhuma
1	574
2	1209
3	não disponível

4.3.5.2 Logoff automático

O painel do operador retorna automaticamente ao nível de segurança de convidado 15 minutos depois que a senha é introduzida corretamente.

4.3.5.3 Nível de segurança exigido para cada tela

As telas de nível superior estão disponíveis em todos os níveis de segurança. Algumas telas de nível inferior requerem senhas.



NOTA: Se alguma tela não estiver listada abaixo, significa que está disponível em todos os níveis de segurança.

TABELA 45. NÍVEL DE SEGURANÇA EXIGIDO PARA TELAS DE CONTROLE

Tela	Nível de Segurança
Test, Settings (Teste, Configurações)	1
Extended Parallel, Settings (Paralelo Estendido, Configurações)	1
Load Demand (Demanda de Carga)	1
Load Add/Shed (Adição/desconexão de carga)	1

TABELA 46. NÍVEL DE SEGURANÇA EXIGIDO PARA TELAS DE AJUSTE

Tela	Nível de Segurança
AC Meter Adjustments (Ajustes do Medidor de CA)	2
AC Meter Setup (Configuração do Medidor de CA)	2
Disjuntores (Breakers)	2
Communication (Comunicações)	1
Saídas Configuráveis (Configurable Outputs)	2
Load Control (Controle de Cargas)	2
Power Transfer Control (PTC) (Controle de Transferência de Energia)	1
Synchronizer Check (Verificação do Sincronizador)	2
Synchronizer Adjustments (Ajustes do Sincronizador)	2
System (Sistema)	2
Scheduler (Programador)	1
Display (Mostrador)	1
Load Demand (Demanda de Carga)	2
Load Add/Shed (Adição/desconexão de carga)	2
Generator Set Bus Overload (Sobrecarga do Barramento do Grupo Gerador)	2
Annunciator Configuration (Configuração do Sistema de Alerta)	2

TABELA 47. NÍVEL DE SEGURANÇA EXIGIDO PARA TELAS DE MONITORAMENTO

Tela	Nível de Segurança
AC Meter Adjustments, Generator Set Energy (Ajustes do Medidor de CA, Energia do Grupo Gerador)	2
AC Meter Adjustments, Utility Energy (Ajustes do Medidor de CA, Energia da Rede Pública)	2
Communication (Comunicações)	2

4.4 Dispositivo de Interface Suplementar (SID)

Um dispositivo de interface suplementar (SID) é a combinação de um AUX 101 e de seu parceiro AUX 102. Cada SID é a interface para uma dada gama de grupos geradores e para uma dada gama de cargas.

4.4.1 Grupos Geradores por SID

TABELA 48. GRUPOS GERADORES POR SID

SID	Grupos Geradores
nenhum	1-4
SID1	5-8
SID2	9-12
SID3	13-16

4.4.2 Cargas por SID



NOTA: Os SID estão conectados a cargas, não a níveis de adição de carga ou níveis de desconexão de carga.

TABELA 49. CARGAS POR SID

SID	Cargas
SID0	1-6
SID1	7-10
SID2	11-14
SID3	15-18

4.4.3 SID Requerido

É necessário um SID se alguma dessas condições for atendida.

- *Gen N kW Rating* (Taxa de kW do Gerador N) não é igual a zero, em que N representa qualquer grupo gerador da gama desse SID.
- *Load Add Shed Enable* (Ativar Adição e Desconexão de Cargas) está Ativado e *Load N Device Type* (Tipo de Dispositivo da Carga N) não é igual a Nenhum, em que N representa qualquer carga da gama desse SID.

Se for necessário um SID, o MCM tem de conseguir comunicar com o AUX 101 e o AUX 102. Se não conseguir comunicar, o MCM não pode controlar os grupos geradores e as cargas aos quais o SID está conectado e alguns recursos poderão não estar ativos.

4.4.4 Cancelamento de SID Herdado (Antes da V2.00)

Antes da versão de firmware V2.00, era possível configurar mais que quatro grupos geradores no MCM, embora o MCM só pudesse detectar quatro disjuntores em paralelo. Para suportar esta configuração, alguns disjuntores em paralelo eram conectados em paralelo entre eles ao mesmo conjunto de pinos no MCM, permitindo ao MCM saber quando pelo menos um deles estava fechado.

A partir da versão V2.00, não é mais possível ter um número diferente de grupos geradores e de disjuntores em paralelo. Se estiver instalada a versão de firmware V2.00 ou posterior em um sistema herdado que tenha mais que quatro grupos geradores e os disjuntores em paralelo do grupo gerador estiverem conectados em paralelo à entrada de posição do disjuntor principal do grupo gerador, configure *Legacy SID Override* (Cancelamento de SID Herdado) como Ativado. Nesse caso, não é necessário nenhum SID.

4.4.5 Versões de Software Compatíveis (AUX 101)

TABELA 50. VERSÕES DE SOFTWARE COMPATÍVEIS (AUX 101)

MCM3320	AUX 101
V2.00 ou posterior	V1.48 ou posterior

4.4.6 Configurando o AUX 101 e o AUX 102 com o MCM3320

Configure os grupos geradores e as cargas no MCM3320. Se o número de grupos geradores ou de cargas necessitar um AUX 101 e um AUX 102, o MCM3320 requer que o AUX 101 e o AUX 102 estejam conectados de um modo específico, conforme indicado nos diagramas de fiação.

4.4.7 Resumo dos Pontos de Monitoramento (AUX 101/102)

TABELA 51. RESUMO DOS PONTOS DE MONITORAMENTO (AUX 101/102)

Configuração	Descrição
SIDX Status (Estado do SIDX) (X = 0-3)	(Software v2.00 e posterior) Indica o estado das comunicações entre o MCM3320 e o AUX 101. Valores possíveis: Missing (Em falta), Good (Bom), Connecting (Conectando), No Exp Board (Sem Placa de Expansão), Not Applicable (Não Aplicável)
PCCnet Communications Status (Estado Comunicações PCCnet)	(Antes da versão v2.00 do software) Indica o estado das comunicações entre o MCM3320 e o AUX 101. Valores possíveis: Failed (Falhou), Good (Bom), Wait (Em Espera)
PCCNet Status (Estado de PCCNet)	(v2.00 e posterior) Indica o estado das comunicações PCCNet. Valores possíveis: No Connection (Sem Conexão), Connecting (Conectando), Connected (Conectado)

Configuração	Descrição
Expansion Board CommunicationsX (Comunicações Placa de ExpansãoX) (X = em branco, 1, 2, 3)	Indica se o AUX 102 é detectado ou não. Valores possíveis: Disabled (Desativado), Enabled (Ativado)
AUX101 Software Version (Versão de Software AUX101) (X = em branco, 1, 2, 3)	Indica a versão do software que o AUX 101 está executando.
Node Count for Remote IO (Contagem de Nós para IO Remoto)	Indica o número de AUX 101 que o MCM3320 vê na rede PCCNet.
Load X Input 1 (Entrada 1 Carga X) (X = 1-18)	Se o tipo de carga for ATS, indica se a fonte de emergência está conectada ou não. Se o tipo de carga for Breaker (Disjuntor), indica a posição do contato A. Valores possíveis: Not Available (Não Disponível), Open (Aberto), Closed (Fechado)
Load X Input 1 (Entrada 2 Carga X) (X = 1-18)	Se o tipo de carga for ATS, indica se a fonte normal está conectada ou não. Se o tipo de carga for Breaker (Disjuntor), indica a posição do contato de desarmamento de sobrecorrente. Valores possíveis: Not Available (Não Disponível), Open (Aberto), Closed (Fechado)
SIDX Input (Entrada SIDX) (X = 0-3)	Fornece o estado das entradas do AUX 101/102 conforme recebido pelo MCM3320. Este é o pacote recebido pelo MCM3320, enquanto as configurações de <i>Load X Input</i> (Entrada da Carga X) indicam os valores não empacotados.
SIDX Output 1/2 (Saída 1/2 do SIDX) (X = 0-3)	Controla o estado das saídas do AUX 101/102 conforme requerido pelo MCM3320. Este é o pacote efetivo enviado pelo MCM3320.

4.4.8 Placa do AUX 101

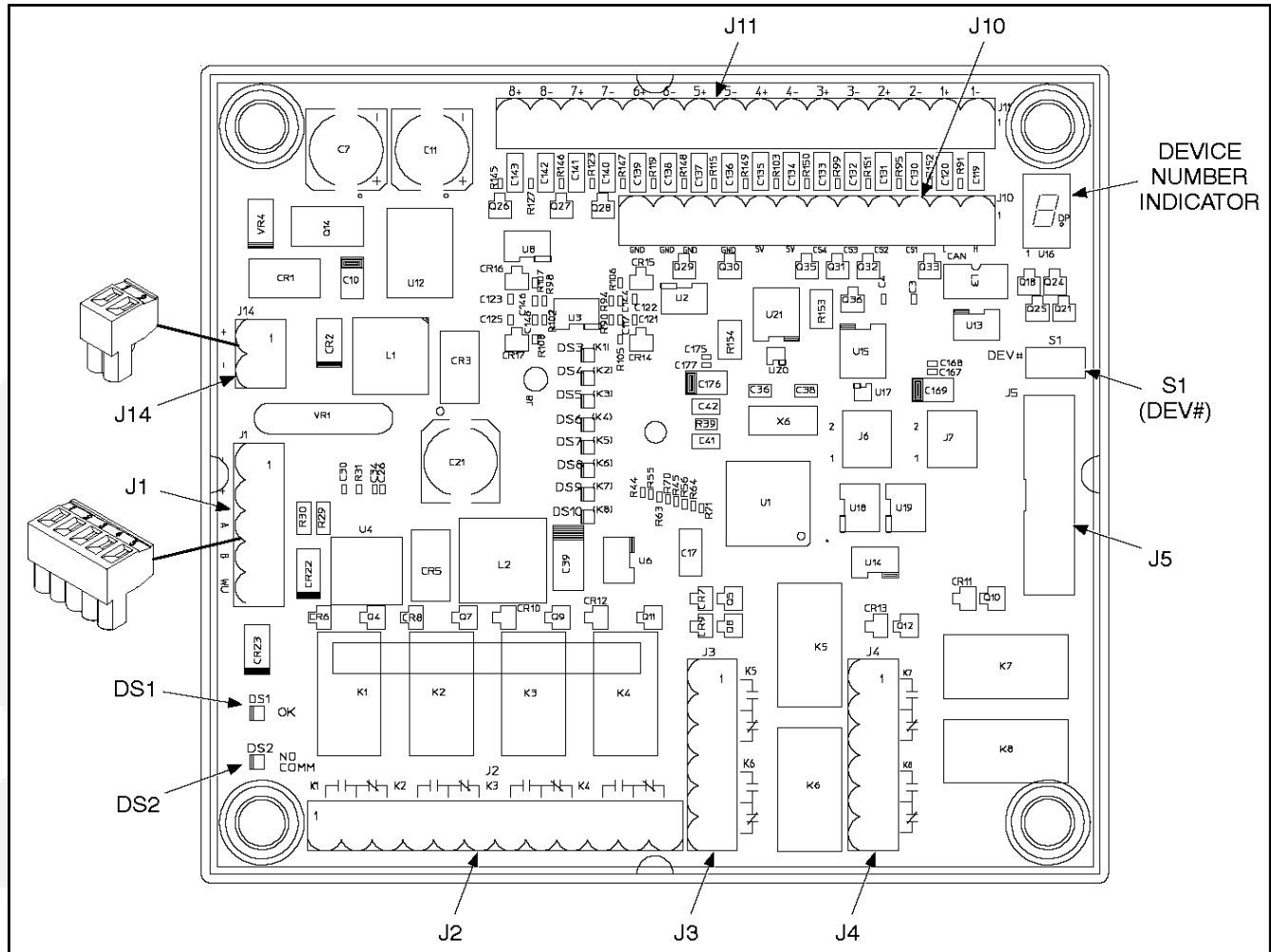


FIGURA 36. PLACA DO AUX 101

4.4.8.1 S1 do AUX 101

O botão S1 pode ser usado para alterar o número do dispositivo do AUX 101.

4.4.8.2 Indicador do Número do Dispositivo do AUX 101

O indicador do número do dispositivo do AUX 101 exibe o número do dispositivo desse AUX 101 específico em uma rede PCCNet.

O número de dispositivo tem de ser único nessa rede PCCNet.

4.4.8.3 Número do Dispositivo do AUX 101 por SID

TABELA 52. NÚMERO DO DISPOSITIVO DO AUX 101 POR SID

SID	Número do Dispositivo do AUX 101
SID0	0
SID1	1

SID	Número do Dispositivo do AUX 101
SID2	2
SID3	3

4.4.8.4 Alterando o Número do Dispositivo do AUX 101

1. Pressionar e manter pressionado S1 por pelo menos cinco segundos. No indicador do número do dispositivo do AUX 101, um pequeno ponto deve aparecer ao lado do número do dispositivo atual.
2. Pressionar e soltar S1 até o número desejado ser exibido.
3. Esperar 5 segundos. Após 5 segundos de inatividade, o novo número do dispositivo é definido e o ponto deve desaparecer.
4. Desconectar e reconectar o J14 para desligar e religar o AUX 101.

4.4.8.5 Indicadores do AUX 101

TABELA 53. INDICADORES DO AUX 101

Indicador	SID0	SID1	SID2	SID3
DS1	Ligado se o AUX 101 estiver conectado a uma rede PCCNet e estiver operando normalmente.			
DS2	Ligado se o AUX 101 não estiver conectado à rede PCCNet.			
DS3	adicionar carga 1	adicionar carga 7	adicionar carga 11	adicionar carga 15
DS4	desconectar carga 1	desconectar carga 7	desconectar carga 11	desconectar carga 15
DS5	adicionar carga 2	adicionar carga 8	adicionar carga 12	adicionar carga 16
DS6	desconectar carga 2	desconectar carga 8	desconectar carga 12	desconectar carga 16
DS7	adicionar carga 3	adicionar carga 9	adicionar carga 13	adicionar carga 17
DS8	desconectar carga 3	desconectar carga 9	desconectar carga 13	desconectar carga 17
DS9	adicionar carga 4	adicionar carga 10	adicionar carga 14	adicionar carga 18
DS10	desconectar carga 4	desconectar carga 10	desconectar carga 14	desconectar carga 18

4.4.8.6 Conectores do AUX 101

TABELA 54. CONECTORES DO AUX 101

Conector	SID0	SID1	SID2	SID3
J1	Conexão ao controlador			
J2	adicionar/desconectar carga 1 e carga 2	adicionar/desconectar carga 7 e carga 8	adicionar/desconectar carga 11 e carga 12	adicionar/desconectar carga 15 e carga 16
J3	adicionar/desconectar carga 3	adicionar/desconectar carga 9	adicionar/desconectar carga 13	adicionar/desconectar carga 17
J4	adicionar/desconectar carga 4	adicionar/desconectar carga 10	adicionar/desconectar carga 14	adicionar/desconectar carga 18
J5	Conexão ao AUX 102			
J11	carga entrada 1-4	carga entrada 7-10	carga entrada 11-14	carga entrada 15-18

Conector	SID0	SID1	SID2	SID3
J14	Fonte de alimentação			

J10 não está conectado em aplicações do MCM3320.

4.4.8.7 J1 do AUX 101

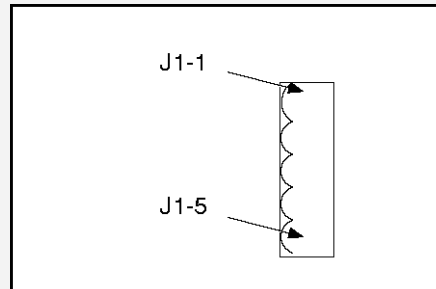


FIGURA 37. J1 DO AUX 101

TABELA 55. J1 DO AUX 101

Pino	Descrição
J1-1	Potência de saída B-
J1-2	Potência de saída B+
J1-3	PCCNet A
J1-4	PCCNet B
J1-5	Ativação do Sistema

4.4.8.8 J2 do AUX 101

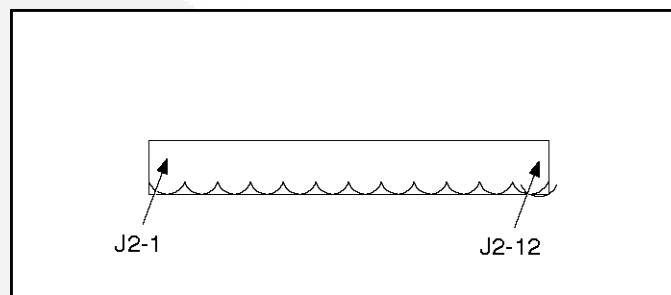


FIGURA 38. J2 DO AUX 101

TABELA 56. J2 DO AUX 101

Pino	Contato	SID0	SID1	SID2	SID3
J2-1	normalmente aberto	adicionar carga 1	adicionar carga 7	adicionar carga 11	adicionar carga 15
J2-2	comum				
J2-3	normalmente fechado				

Pino	Contato	SID0	SID1	SID2	SID3
J2-4	normalmente aberto	desconectar carga 1	desconectar carga 7	desconectar carga 11	desconectar carga 15
J2-5	comum				
J2-6	normalmente fechado				
J2-7	normalmente aberto	adicionar carga 2	adicionar carga 8	adicionar carga 12	adicionar carga 16
J2-8	comum				
J2-9	normalmente fechado				
J2-10	normalmente aberto	desconectar carga 2	desconectar carga 8	desconectar carga 12	desconectar carga 16
J2-11	comum				
J2-12	normalmente fechado				

4.4.8.9 J3 do AUX 101

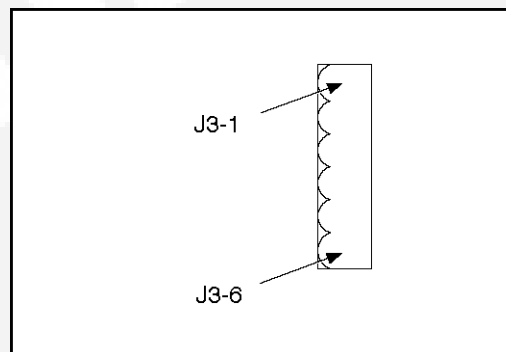


FIGURA 39. J3 DO AUX 101

TABELA 57. J3 DO AUX 101

Pino	Contato	SID0	SID1	SID2	SID3
J3-1	normalmente aberto	adicionar carga 3	adicionar carga 9	adicionar carga 13	adicionar carga 17
J3-2	comum				
J3-3	normalmente fechado				
J3-4	normalmente aberto	desconectar carga 3	desconectar carga 9	desconectar carga 13	desconectar carga 17
J3-5	comum				
J3-6	normalmente fechado				

4.4.8.10 J4 do AUX 101

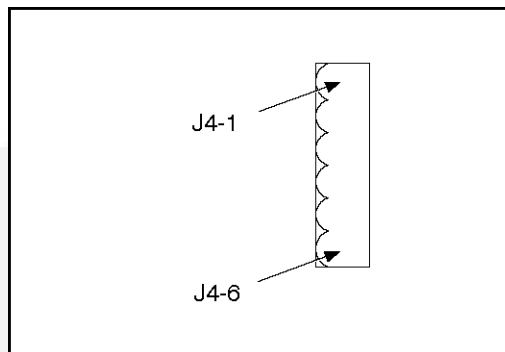


FIGURA 40. J4 DO AUX 101

TABELA 58. J4 DO AUX 101

Pino	Contato	SID0	SID1	SID2	SID3
J4-1	normalmente aberto	adicionar carga 4	adicionar carga 10	adicionar carga 14	adicionar carga 18
J4-2	comum				
J4-3	normalmente fechado				
J4-4	normalmente aberto	desconectar carga 4	desconectar carga 10	desconectar carga 14	desconectar carga 18
J4-5	comum				
J4-6	normalmente fechado				

4.4.8.11 J5 do AUX 101

Se o AUX 101 estiver conectado a um AUX 102, ele estará conectado ao J6 no AUX 102.

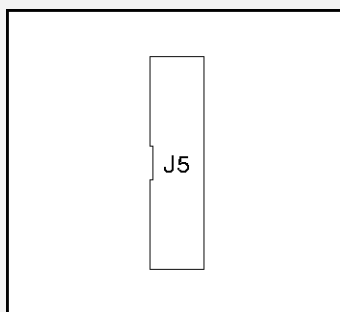


FIGURA 41. J5 DO AUX 101

Não há descrição de pino para o J5 do AUX 101.

4.4.8.12 J11 do AUX 101

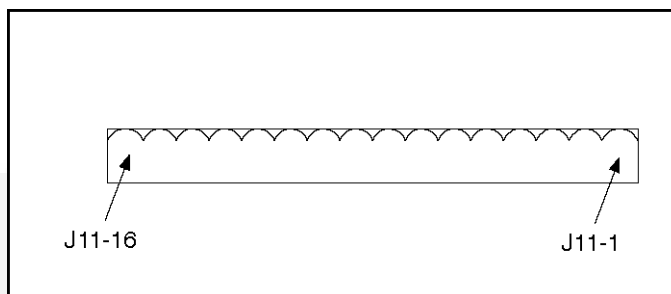


FIGURA 42. J11 DO AUX 101

TABELA 59. J11 DO AUX 101

Pino	Contato	SID0	SID1	SID2	SID3
J11-1	entrada de referência	carga 1	carga 7	carga 11	carga 15
J11-2	posição A ou fonte normal				
J11-3	entrada de referência				
J11-4	desarmamento ou fonte de emergência				
J11-5	entrada de referência	carga 2	carga 8	carga 12	carga 16
J11-6	posição A ou fonte normal				
J11-7	entrada de referência				
J11-8	desarmamento ou fonte de emergência				
J11-9	entrada de referência	carga 3	carga 9	carga 13	carga 17
J11-10	posição A ou fonte normal				
J11-11	entrada de referência				
J11-12	desarmamento ou fonte de emergência				
J11-13	entrada de referência	carga 4	carga 10	carga 14	carga 18
J11-14	posição A ou fonte normal				
J11-15	entrada de referência				

Pino	Contato	SID0	SID1	SID2	SID3
J11-16	desarmamento ou fonte de emergência				

4.4.8.13 J14 do AUX 101

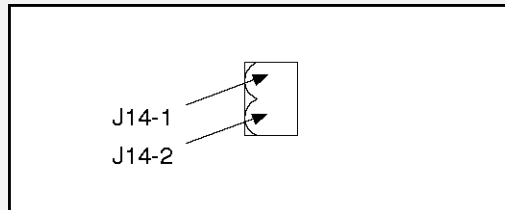


FIGURA 43. J14 DO AUX 101

TABELA 60. J14 DO AUX 101

Pino	Descrição
J14-1	Potência de entrada B+
J14-2	Potência de entrada B-

4.4.9 Placa do AUX 102

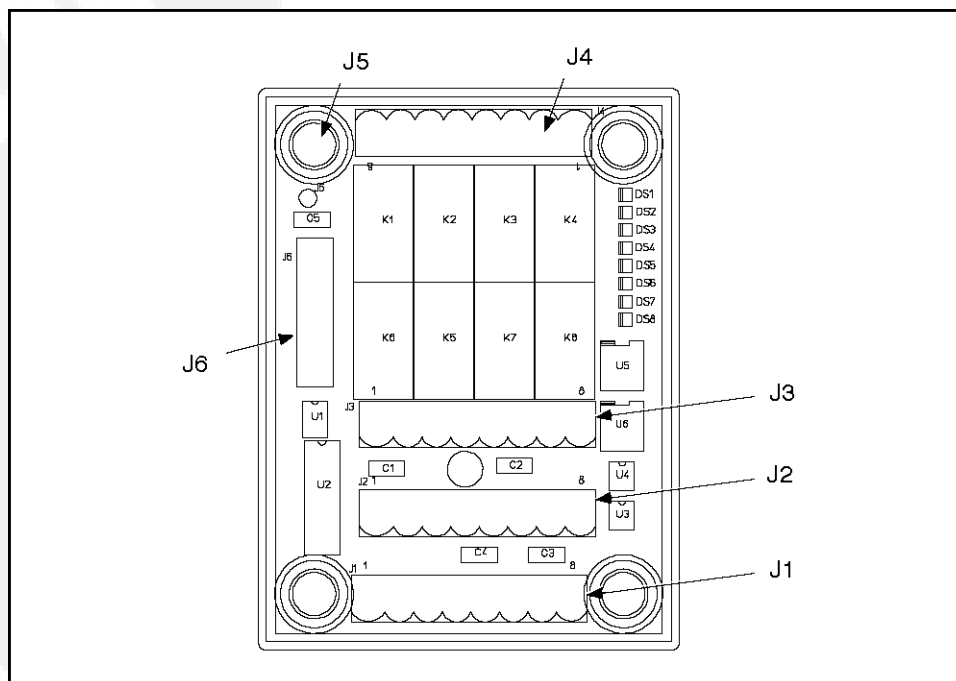


FIGURA 44. PLACA DO AUX 102

4.4.9.1 Indicadores do AUX 102

TABELA 61. INDICADORES DO AUX 102

Indicador	SID0	SID1	SID2	SID3
DS1	adicionar carga 5	demanda de carga grupo gerador 5	demanda de carga grupo gerador 9	demanda de carga grupo gerador 13
DS2	desconectar carga 5	demanda de carga grupo gerador 6	demanda de carga grupo gerador 10	demanda de carga grupo gerador 14
DS3	adicionar carga 6	demanda de carga grupo gerador 7	demanda de carga grupo gerador 11	demanda de carga grupo gerador 15
DS4	desconectar carga 6	demanda de carga grupo gerador 8	demanda de carga grupo gerador 12	demanda de carga grupo gerador 16
DS5	não utilizado			
DS6	não utilizado			
DS7	não utilizado			
DS8	não utilizado			

4.4.9.2 Conectores do AUX 102

TABELA 62. CONECTORES DO AUX 102

Conector	SID0	SID1	SID2	SID3
J1	adicionar/desconectar carga 5-6, normalmente aberto	demanda de carga grupos geradores 5-8, normalmente aberto	demanda de carga grupos geradores 9-12, normalmente aberto	demanda de carga grupos geradores 13-16, normalmente aberto
J2	adicionar/desconectar carga 5-6, comum	demanda de carga grupos geradores 5-8, comum	demanda de carga grupos geradores 9-12, comum	demanda de carga grupos geradores 13-16, comum
J3	adicionar/desconectar carga 5-6, normalmente fechado	demanda de carga grupos geradores 5-8, normalmente fechado	demanda de carga grupos geradores 9-12, normalmente fechado	demanda de carga grupos geradores 13-16, normalmente fechado
J4	entrada carga 5-6	posição de disjuntor de circuito paralelo de grupo geradores 5-8	posição de disjuntor de circuito paralelo de grupo geradores 9-12	posição de disjuntor de circuito paralelo de grupo geradores 13-16
J5	Aterramento do Chassi			
J6	Conexão ao AUX 101			

4.4.9.3 J1 do AUX 102

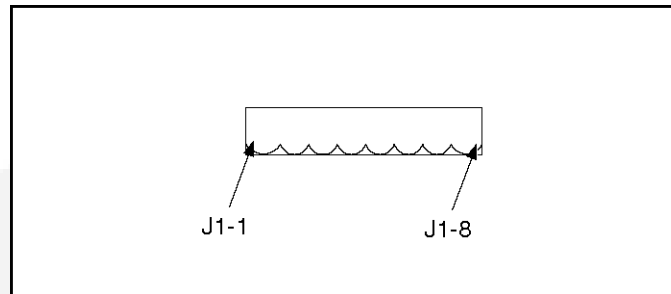


FIGURA 45. J1 DO AUX 102

J1 fornece contatos normalmente abertos para os relés de saída.

TABELA 63. J1 DO AUX 102

Pino	SID0	SID1	SID2	SID3
J1-1	adicionar carga 5	demanda de carga grupo gerador 5	demanda de carga grupo gerador 9	demanda de carga grupo gerador 13
J1-2	desconectar carga 5	demanda de carga grupo gerador 6	demanda de carga grupo gerador 10	demanda de carga grupo gerador 14
J1-3	adicionar carga 6	demanda de carga grupo gerador 7	demanda de carga grupo gerador 11	demanda de carga grupo gerador 15
J1-4	desconectar carga 6	demanda de carga grupo gerador 8	demanda de carga grupo gerador 12	demanda de carga grupo gerador 18
J1-5	não utilizado			
J1-6	não utilizado			
J1-7	não utilizado			
J1-8	não utilizado			

4.4.9.4 J2 do AUX 102

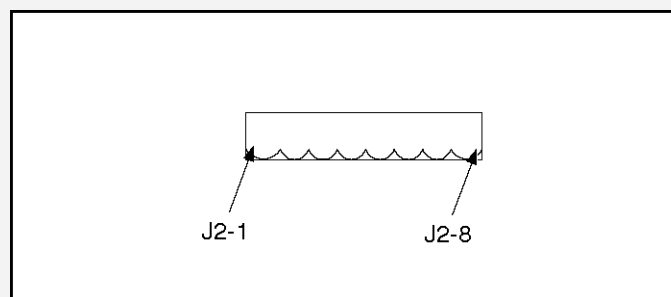
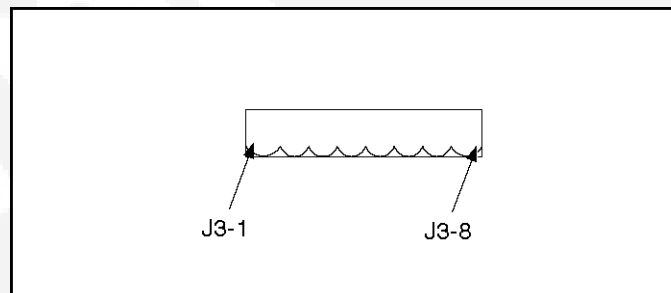


FIGURA 46. J2 DO AUX 102

J2 fornece contatos comuns para os relés de saída.

TABELA 64. J2 DO AUX 102

Pino	SID0	SID1	SID2	SID3
J2-1	adicionar carga 5	demanda de carga grupo gerador 5	demanda de carga grupo gerador 9	demanda de carga grupo gerador 13
J2-2	desconectar carga 5	demanda de carga grupo gerador 6	demanda de carga grupo gerador 10	demanda de carga grupo gerador 14
J2-3	adicionar carga 6	demanda de carga grupo gerador 7	demanda de carga grupo gerador 11	demanda de carga grupo gerador 15
J2-4	desconectar carga 6	demanda de carga grupo gerador 8	demanda de carga grupo gerador 12	demanda de carga grupo gerador 18
J2-5	não utilizado			
J2-6	não utilizado			
J2-7	não utilizado			
J2-8	não utilizado			

4.4.9.5 J3 do AUX 102**FIGURA 47. J3 DO AUX 102**

J3 fornece contatos normalmente fechados para relés de saída.

TABELA 65. J3 DO AUX 102

Pino	SID0	SID1	SID2	SID3
J3-1	adicionar carga 5	demanda de carga grupo gerador 5	demanda de carga grupo gerador 9	demanda de carga grupo gerador 13
J3-2	desconectar carga 5	demanda de carga grupo gerador 6	demanda de carga grupo gerador 10	demanda de carga grupo gerador 14
J3-3	adicionar carga 6	demanda de carga grupo gerador 7	demanda de carga grupo gerador 11	demanda de carga grupo gerador 15
J3-4	desconectar carga 6	demanda de carga grupo gerador 8	demanda de carga grupo gerador 12	demanda de carga grupo gerador 18
J3-5	não utilizado			
J3-6	não utilizado			
J3-7	não utilizado			
J3-8	não utilizado			

4.4.9.6 J4 do AUX 102

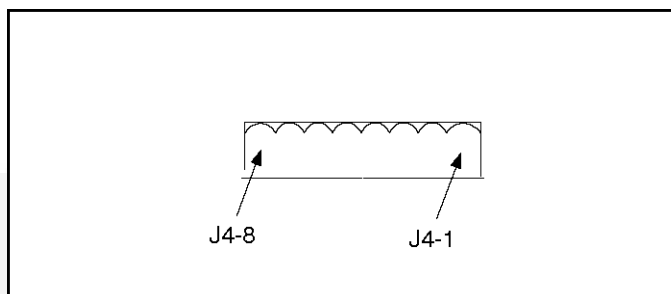


FIGURA 48. J4 DO AUX 102

TABELA 66. J4 DO AUX 102

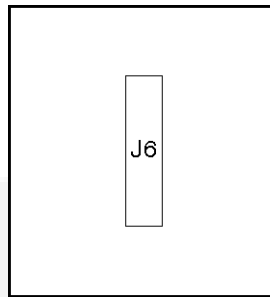
Pino	SID0	SID1	SID2	SID3
J4-1	carga 5 posição A ou fonte normal conectada	posição de disjuntor de circuito paralelo de grupo gerador 5	posição de disjuntor de circuito paralelo de grupo gerador 9	posição de disjuntor de circuito paralelo de grupo gerador 13
J4-2	entrada de referência			
J4-3	desarmamento de carga 5 ou fonte de emergência conectada	posição de disjuntor de circuito paralelo de grupo gerador 6	posição de disjuntor de circuito paralelo de grupo gerador 10	posição de disjuntor de circuito paralelo de grupo gerador 14
J4-4	entrada de referência			
J4-5	carga 6 posição A ou fonte normal conectada	posição de disjuntor de circuito paralelo de grupo gerador 7	posição de disjuntor de circuito paralelo de grupo gerador 11	posição de disjuntor de circuito paralelo de grupo gerador 15
J4-6	entrada de referência			
J4-7	desarmamento de carga 6 ou fonte de emergência conectada	posição de disjuntor de circuito paralelo de grupo gerador 8	posição de disjuntor de circuito paralelo de grupo gerador 12	posição de disjuntor de circuito paralelo de grupo gerador 16
J4-8	entrada de referência			

4.4.9.7 J5 do AUX

O J5 está conectado a um bom aterramento.

4.4.9.8 J6 do AUX 102

Este está conectado ao J5 no AUX 101.

**FIGURA 49. J6 DO AUX 102**

Não há descrição de pino para o J6 do AUX 102.

4.4.10 Diagnóstico e Solução de Problemas

4.4.10.1 DS1 e DS2 estão Desconectados

DS1 e DS2 estão desconectados, mas a placa deverá ter energia.

A. Verificando as Conexões de Energia

Certifique-se de que os fios de alimentação de energia estão conectados firmemente.

B. Verificando os Fios

Meça a resistência de cada fio.

Se a resistência for superior a 10 Ω , verifique os fusíveis e os disjuntores do chicote. Caso contrário, substitua o fio.

C. Verificando a Alimentação de Energia

Meça a tensão fornecida pela alimentação de energia.

Se a tensão estiver fora do intervalo permitido, solucione eventuais problemas na alimentação de energia.

4.4.10.2 DS2 está Conectado

DS2 está conectado, mas a placa deverá estar conectada a uma rede PCCNet.

A. Verificando as Conexões PCCNet

Certifique-se de que os fios PCCNet estejam firmemente conectados ao J1-3 (PCCNet A) e ao J1-4 (PCCNet B).

B. Verificando os Fios

Meça a resistência de cada fio.

Se a resistência for maior do que 10 Ω , substitua o fio.

C. Verificando o Dispositivo Conectado à Placa

Se o dispositivo não estiver comunicando na porta, solucione o problema de dispositivo.

4.4.11 Conectando a um AUX 101 ou AUX 102 Utilizando o InPower

Pode utilizar o InPower para atualizar o firmware do AUX 101 ou do AUX 102. Conecte ao AUX 101 utilizando o J1.

Não pode conectar diretamente a um AUX 102 utilizando o InPower. Deverá antes conectar ao AUX 101 ao qual o AUX 102 está conectado.

4.4.12 Reparando Placas de Circuitos



ALERTA: *Tentativas de reparar placas de circuitos poderão provocar danos ao equipamento, acidentes pessoais ou morte. Substitua placas de circuitos defeituosas. Não tente reparar placas de circuitos defeituosas.*

4.5 Gráficos de Barras

O MCM indica aos gráficos de barras que indicador deve estar aceso para cada valor.

O MCM suporta dois gráficos de barras: um para o barramento do grupo gerador e outro para o barramento da rede pública.

4.5.1 Percentagem de Corrente Barramento Grupo Gerador

Este valor pressupõe que 100% de corrente é igual a *Total System Capacity* (Capacidade Total do Sistema) / ($\sqrt{3}$ x *Genset Nominal Voltage* (Tensão Nominal Grupo Gerador) x 0,8).

O cálculo não utiliza o fator de potência medido. Em vez disso, utiliza um fator de potência de 0,8.

4.5.2 Percentagem de Corrente da Rede Pública

Utility Available Current (Corrente Disponível Rede Pública) deve estar configurado como 100% de corrente.

4.5.3 Percentagem de kW Total Rede Pública

Total Utility Capacity (Capacidade Total Rede Pública) deve estar configurado como 100% da energia real nominal.

4.5.4 Versões de Software Compatíveis (Gráfico de Barras)

TABELA 67. VERSÕES DE SOFTWARE COMPATÍVEIS (GRÁFICO DE BARRAS)

MCM3320	Gráfico de Barras
V2.01 ou posterior	V1.80 ou posterior

4.5.5 Configurando um Gráfico de Barras

1. Na parte de trás do gráfico de barras, pressione o botão S1 e mantenha-o pressionado até que um ou mais indicadores se acendam no canto inferior direito da parte frontal do gráfico de barras. Normalmente, terá de manter o botão S1 pressionado por cerca de cinco segundos.

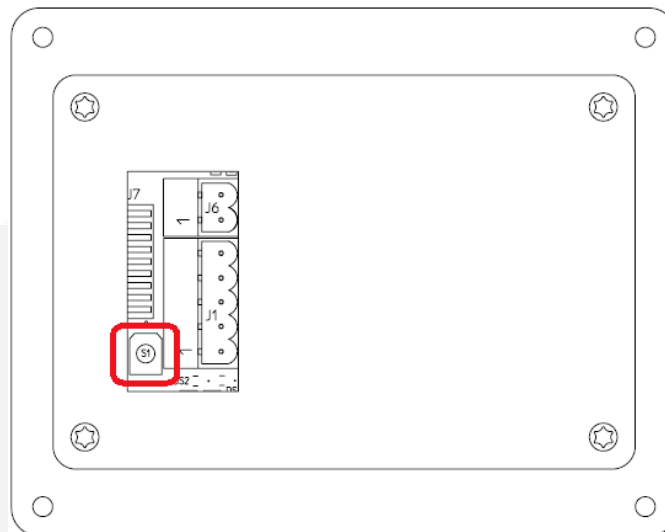


FIGURA 50. BOTÃO S1 (PARTE DE TRÁS DO GRÁFICO DE BARRAS)

- Quando um ou mais indicadores se acenderem, pressione o botão S1 uma vez para alterar o número de indicadores que estão acesos. Mantenha o botão S1 pressionado até que o número de indicadores seja o correto para a aplicação.



NOTA: Se não pressionar o botão S1 por 5 segundos, o gráfico de barras retorna à operação normal. Retorne ao passo 1.

TABELA 68. APLICAÇÃO DO GRÁFICO DE BARRAS COM BASE NO NÚMERO DE INDICADORES

Número de Indicadores	Aplicação
1	Barramento do grupo gerador
2	Barramento da rede pública

- Quando o número de indicadores estiver correto, aguarde 5 segundos para que o gráfico de barras retorne à operação normal.

Se estiver configurando um gráfico de barras para o barramento da rede pública, siga também esses passos.

- Conecte o InPower ao MCM3320.
- No InPower, clique com o botão direito do mouse em MCM3320 e selecione **MCM3320 Setup...** (Configuração do MCM3320). As telas de configuração do MCM3320 deverão ser exibidas.
- Nas telas de configuração do MCM3320, vá para **Meter setup** (Configuração do medidor).

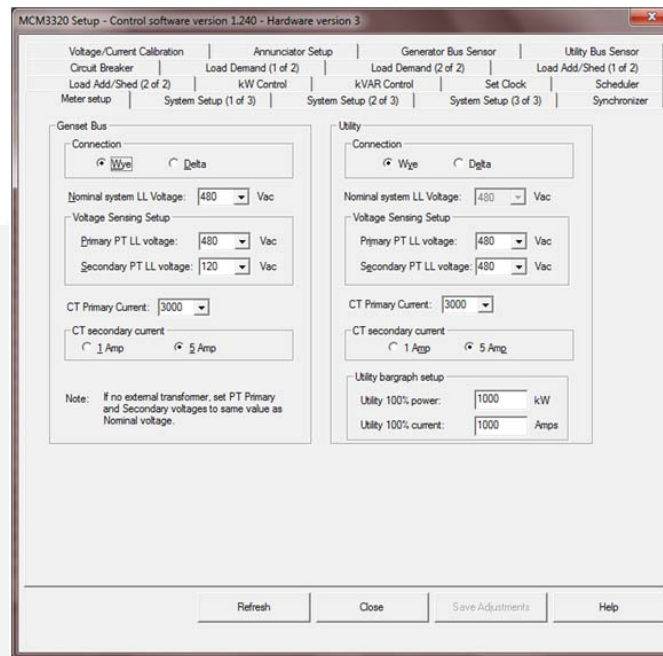


FIGURA 51. TELA DE CONFIGURAÇÃO DO MEDIDOR

4. Na seção **Utility bargraph setup** (Configuração do gráfico de barras da rede pública), configure a escala do gráfico de barras.
5. Salve as alterações.

Este passo não é necessário se configurar um gráfico de barras para o barramento do grupo gerador.

4.6 Sistema de Alerta Universal

O MCM configura o sistema de alerta universal e lhe transmite que indicadores devem estar ligados.

O MCM não suporta os relés de cliente no sistema de alerta universal.

4.6.1 Versões de Software Compatíveis (Sistema de Alerta Universal)

TABELA 69. VERSÕES DE SOFTWARE COMPATÍVEIS (SISTEMA DE ALERTA UNIVERSAL)

MCM3320	Sistema de Alerta Universal
V2.01 ou posterior	V2.10 ou posterior

4.6.2 Sistema de Alerta de Estado Básico

Este sistema de alerta exibe o estado geral do sistema, incluindo a disponibilidade da fonte, as conexões da fonte, os grupos geradores em operação, etc.