Airfinity™ XL

Models IH / IC
Large Packaged Rooftop Units
140 to 270 kW
R410A – R454B Refrigerant



October 2022 **RT-SVX060D-GB**

TRANE TECHNOLOGIES

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Original instructions

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General information

Foreword

These instructions are given as a guide to good practice in the installation, start-up, operation, and maintenance by the user, of Trane Airfinity rooftop units. They do not contain full service procedures necessary for the continued successful operation of this equipment. The services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company. Read this manual thoroughly before unit start-up.

Units are assembled, pressure tested, dehydrated, charged and tested in accordance with factory standard before shipment.

Warnings and Cautions

Warnings and Cautions appear at appropriate sections throughout this manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

WARNING! Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION! Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or for equipment or property-damage-only accidents.

Safety Recommendations

To avoid death, injury, equipment or property damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter “Installation”. Insure to do note exceed test pressure by using appropriate device.

2. Disconnect the main power supply before any servicing on the unit.

3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

4. To avoid any risk, it is recommended to place the unit on an area with restricted access.

Reception

On arrival, inspect the unit before signing the delivery note. Specify any visible damage on the delivery note, and send a registered letter of protest to the last carrier of the goods within 7 days of delivery.

Notify the local TRANE sales office at the same time. The delivery note must be clearly signed and countersigned by the driver.

Any concealed damage shall be notified by a registered letter of protest to the last carrier of the goods within 7 days of delivery. Notify the local TRANE sales office at the same time.

Important notice: No shipping claims will be accepted by TRANE if the above mentioned procedure is not respected. For more information, refer to the general sales conditions of your local TRANE sales office.

Note: Unit inspection in France. Delay to send registered letter in case of visible and concealed damage is only 72 hours.

Loose Parts Inventory

Check all the accessories and loose parts that are shipped with the unit against the shipping list. Included in these items will be the all kind of sensors, thermostat and electrical diagrams, service literature, which are placed inside the control panel and/or indoor section for shipment.

Warranty

Warranty is based on the general terms and conditions of the manufacturer. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer’s instructions or recommendations is not covered by the warranty obligation. If the user does not conform to the rules of this manual, it may entail cancellation of warranty and liabilities by the manufacturer.

Refrigerant

Consult the addendum to Manuals for units with refrigerant, for conformity to the Pressure Equipment Directive (PED) 2014/68/EU and Machinery Directive 2006/42/EC.

Maintenance Contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Storage

Take precautions to prevent condensate formation inside the unit's electrical components and motors when:

a. The unit is stored before it is installed; or,

b. The unit is set on the roof curb and temporary auxiliary heat is provided in the building.

Isolate all side panel service entrances and base pan openings (e.g., conduit holes, Supply Air and Return Air openings, and flue openings) to minimize ambient air from entering the unit until it is ready for start-up.

Do not use the unit's heater as temporary heat without completing the start-up procedures detailed under "Unit Start-Up".

- Units charged with refrigerant should not be stored where temperatures exceed 68°C.
- At least every three months, attach a gauge and manually check the pressure in the refrigerant circuit.
- If the refrigerant pressure is below 13 bar (R410A) / 12.5 bar (R454B) at 20°C or 10 bar (R410A) / 9.5 bar (R454B) at 10°C, call a qualified service organization or Trane Sales Office.

The Trane Company will not assume responsibility for equipment damage resulting from accumulation of condensate on the unit electrical components.

Training

To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

Unit Model Number Description

Digit 1 - Manufacturing location
E = Epinal France

Digit 2 - Unit model
I = Airfinity

Digit 3 - Unit type
C = Cooling Only
H = Reversible Heat Pump

Digit 4-5-6 Unit size
140
150
170
190
220
250
270

Digit 7 - Efficiency level
S = Standard efficiency

Digit 8 - Refrigerant
A = R410A Factory Full Refrigerant Charge
8 = R410A Factory Refrigerant Pre-charge
2 = Nitrogen Charge (for units R410A)
B = R454B Factory Full Refrigerant Charge
3 = Nitrogen Charge (for units R454B)

Digit 9 - Unit voltage
E = 400 V - 3 Ph - 50 Hz

Digit 10 - Design Sequence

Digit 11 - Design Sequence

Digit 12 - Auxiliary Heat
X = Without
W = Hot Water Coil
E = Electric Heater
L = Modulating Gas Burner,126 kW
S = Modulating Gas Burner,160 kW
H = Modulating Gas Burner,194 kW

Digit 13 - Gas type
X = Without
1 = Propane Gas
2 = Natural Gas (G20)
3 = Natural Gas (G25)

Digit 14 - Airflow configuration
D = Down Supply & Down Return
H = Horizontal Supply & Horizontal Return
I = Down Supply & Horizontal Return
J = Horizontal Supply & Down Return

Digit 15 - Available static pressure
1 = Standard External Static Pressure
2 = High External Static Pressure

Digit 16 - Operating map (cooling mode)
A = Standard Ambient

Digit 17 - Free cooling (Economizer)
X = Without (full recirculation)
A = Temperature Control
B = Enthalpy Control

Digit 18 - Heat Recovery Module
X = Without
R = Configured for Rotary Wheel
B = Configured for Rotary Wheel High Airflow

Digit 19 - Dehumidification
X = Without
A = Dehumidification Control

Digit 20 - Outdoor coil treatment
B = Without
E = With

Digit 21 - Indoor coil treatment
1 = Without
2 = With

Digit 22 - Filtration
A = G4 (50 mm) Filters
B = G4 (50 mm) + F7 (100 mm) filters
C = G4 (50 mm) + F9 (100 mm) filters
D = F5 (50 mm) + F7 (100 mm) filters

Digit 23 - Temperature Zone sensor
X = Without
A = Duct-Mounted Zone Sensor
B = Wall-Mounted Zone Sensor

Digit 24 - Room User Interface
X = Without
A = Wall-Mounted Interface THS04
B = Conventional Thermostat
C = Wall Mounted Interface PGD1

Digit 25 - CO_2 sensor
X = Without
1 = CO_2 Sensor Duct-Mounted
2 = CO_2 Sensor Wall-Mounted

Digit 26 - Factory assigned
X = Without
1 = With

Digit 27 - Airflow Measurement
X = Without
A = Airflow Measurement and Display

Digit 28 - Dirty filter detection
X = Without
1 = With

Digit 29 - Network protection relay
X = Phase Reversal Protection
A = PhaseReversal and Asymmetry Protection

Unit Model Number Description

Digit 30 - Literature Language
A = Bulgarian
B = Spanish
C = German
D = English
E = French
H = Dutch
J = Italian
K = Finish
L = Danish
M = Swedish
N = Turkish
P = Polish
R = Russian
T = Czech
U = Greek
V = Portuguese
W = Slovene
Y = Romanian
Z = Norwegian
1 = Slovak
2 = Croatian
3 = Hungarian

Digit 31 - Building Pressurization Control
X = Without
1 = Barometric Relief Damper
3 = Exhaust Fan EC
4 = Configured for Return Roofcurb

Digit 32 - not used
X = Without
1 = Configured for Multi-Directional Roofcurb

Digit 33 - External Customer Input/Output
X = Without
1 = With Custom I/O

Digit 34 - Multi-Rooftop Control
X = Without
C = With Tracer Concierge Comfort
T = With Tracer Concierge Comfort with Display

Digit 35 - Communication interface
X = Without
1 = ModBus Communication Interface
2 = LonTalk® Communications Interface
3 = BACnet (MSTP)

Digit 36 - Not used
X = Without
1 = With Refrigerant Leak Detector

Digit 37 - Compressor Starter Type
X = Across theLine
A = Soft Starter

Digit 38 - Service User Interface
X = Without
1 = Service Terminal PGD

Digit 39 - Fire Thermostat
X = Without
1 = With

Digit 40 - Droplet Eliminator
X = Without
A = With Droplet Eliminator

Digit 41 - Factory Manufacturing
B = Epinal, France (Thermocold)
E = Epinal, France
F = Epinal, France (ICS)

Digit 42 - Not used

Digit 43 - Downflow Direct Ducts Connection
X = Without
A = With Direct Duct Connection

Digit 44 - Condenser Guard Grill
X = Without
A = With Condenser Guard Grill

Digit 45 - Condenser Guard Grill
X = Without
A = With Export Packaging

Digit 46 - Condenser Guard Grill
X = Standard
S = Special Design

IC General Data

		IC140	IC150	IC170	IC190	IC220	IC250	IC270
Cooling Mode								
Net Cooling Capacity R410A (1)	kW	141.1	154.9	171.9	197.0	213.6	234.1	247.4
Total Power Input R410A (1)	kW	42.8	50.2	57.9	68.9	80.5	87.2	93.8
Net Cooling Capacity R454B (1)	kW	139.7	153.4	169.9	194.6	212.3	233.7	247.7
Total Power Input R454B (1)	kW	41.2	47.6	54.6	64.7	75.3	82.2	88.9
Electric Heater								
Number of capacity step	Nb	2	2	2	2	2	2	2
Capacity Steps (1)	kW	37,5/37,5	37,5/37,5	62,5/37,5	62,5/37,5	75/37,5	75/37,5	75/37,5
Gas burner: Low Heat								
Gas burner type		PCH132	PCH132	PCH132	PCH132	PCH132	PCH132	PCH132
Max. burner heat output G20 (Hi)	kW	130	130	130	130	130	130	130
Max. useful heat output G20	kW	126	126	126	126	126	126	126
Max. efficiency G20 (Hi)	%	96.8	96.8	96.8	96.8	96.8	96.8	96.8
Min. burner heat output G20 (Hi)	kW	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Min. useful heat output G20	kW	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Min. efficiency G20 (Hi)	%	108.1	108.1	108.1	108.1	108.1	108.1	108.1
Modulation	%	11% to 100%						
Max. condensation (30%Qn)	l/h	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Gas connection ø		UNI/ISO 228/1-G 1½"						
Gas burner: Standard Heat								
Gas burner type		PCH162	PCH162	PCH162	PCH162	PCH162	PCH162	PCH162
Max. burner heat output G20 (Hi)	kW	164	164	164	164	164	164	164
Max. useful heat output G20	kW	160	160	160	160	160	160	160
Max. efficiency G20 (Hi)	%	97.6	97.6	97.6	97.6	97.6	97.6	97.6
Min. burner heat output G20 (Hi)	kW	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Min. useful heat output G20	kW	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Min. efficiency G20 (Hi)	%	108.4	108.4	108.4	108.4	108.4	108.4	108.4
Modulation	%	11% to 100%						
Max. condensation (30%Qn)	l/h	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Gas connection ø		UNI/ISO 228/1-G 1½"						
Gas burner: High Heat								
Gas burner type		PCH212	PCH212	PCH212	PCH212	PCH212	PCH212	PCH212
Max. burner heat output G20 (Hi)	kW	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Max. useful heat output G20	kW	194.3	194.3	194.3	194.3	194.3	194.3	194.3
Efficiency G20 (Hi)	%	97.2	97.2	97.2	97.2	97.2	97.2	97.2
Min. burner heat output G20 (Hi)	kW	21	21	21	21	21	21	21
Min. useful heat output G20	kW	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Min. efficiency G20 (Hi)	%	108.4	108.4	108.4	108.4	108.4	108.4	108.4
Modulation	%	11% to 100%						
Max. condensation (30%Qn)	l/h	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Gas connection ø		UNI/ISO 228/1-G 1½"						
Hot Water Coil								
Type		Fins & Tubes						
Net Heating Capacity	kW	154.80	162.48	169.06	184.80	194	194	194
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m^2	1.39	1.39	1.39	1.39	1.39	1.39	1.39
Rows/Fin Series	#/FPF	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144
Number of Tubes in the height		32	32	32	32	32	32	32
Drain Connection outside diameter	mm	DN34	DN34	DN34	DN34	DN34	DN34	DN34

IC General Data

		IC140	IC150	IC170	IC190	IC220	IC250	IC270
Electrical Data (2) (3)								
Main Power Supply	V/Ph/ Hz	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50
Unit Max Amps	A	118	128	154	170	203	224	239
Unit Start Up Amps (without soft starter)	A	250	296	331	384	417	484	578
Unit Start Up Amps (with soft starter)	A	195	227	255	293	326	372	434
Maximum Short Circuit rating for 0,3 sec	kA	15	15	15	15	15	15	15
Disconnect swich								
Disconnect swich (standard unit)		Sirco 250A	Sirco 250A	Sirco 250A	Sirco 315A	Sirco 315A	Sirco 400A	Sirco 400A
Cross section max (standard unit)	mm^2	150	150	150	240	240	240	240
Disconnect swich (unit with electrical heater option)		Sirco 500A	Sirco 500A	Sirco 500A	Sirco 630A	Sirco 630A	Sirco 630A	Sirco 630A
Cross section max (unit with electrical heater option)	mm^2	240	240	240	2x300	2x300	2x300	2x300
Disconnect swich (unit with other options that electrical heater)		Sirco 400A	Sirco 400A	Sirco 400A	Sirco 500A	Sirco 500A	Sirco 500A	Sirco 500A
Cross section max (unit with electrical heater option)	mm^2	240	240	240	240	240	240	240
Electric data with option (2) (3)								
Electric Heater	A	108	108	144	144	162	162	162
Indoor fan : Oversized	A	11.1	11.1	9.0	14.8	0.0	0.0	0.0
Exhaust Fan	A	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Return Roofcurb	A	13.2	13.2	13.2	22.0	22.0	22.0	22.0
Heat Recovery (not included current for oversized fan)	A	12.9	12.9	12.9	12.9	12.9	12.9	12.9
Heat Recovery - High airflow (not included current for oversized fan)	A	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Gas burner - modulation - 132 kW	A	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Gas burner - modulation - 162 kW	A	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Gas burner - modulation - 212 kW	A	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Frame								
Frame	#	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Compressor								
Number of Circuits	#	2	2	2	2	2	2	2
Number of Compressor per Circuits	#	2	2	2	2	2	2	2
Type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Model		DSH140-4/ DSH140-4	DSH161-4/ DSH161-4	DSH184-4/ DSH184-4	DSH184-4/ DSH240-4	DSH240-4/ DSH240-4	DSH240-4/ DSH295-4	DSH295-4/ DSH295-4
Max Amps per Compressor	A	22,9 / 22,9	25,55 / 25,55	29,29 / 29,29	29,29 / 38,55	38,55 / 38,55	38,55 / 46,02	46,02 / 46,02
Locked Rotor Amps per Compressor	A	147 / 147	158 / 158	197 / 197	197 / 215	215 / 215	215 / 260	260 / 260
Oil & Refrigerant (6)								
Oil quantity per compressors CMP1 / CMP2 (6)	l	3,3 / 3,3	3,3 / 3,3	3,6 / 3,6	3,6 / 6,7	6,7 / 6,7	6,7 / 6,7	6,7 / 6,7
Oil quantity ckt1/ckt2 (6)	l	6,6 / 6,6	6,6 / 6,6	7,2 / 7,2	10,3 / 10,3	13,4 / 13,4	13,4 / 13,4	13,4 / 13,4
Internal Free Volume CMP1 / CMP2	l	14,3 / 14,3	14,3 / 14,3	14,6 / 14,6	14,6 / 31,0	14,6 / 31,0	31,0 / 31,0	31,0 / 31,0
Refrigerant load per circuit (kg CKT1/ kg CKT2) R410A	kg	10,0/10,0	10,0/10,0	10,5/10,5	10,5/10,5	11,5/11,5	12,0/12,0	12,0/12,0
Refrigerant load per circuit (kg CKT1/ kg CKT2) R454B	kg	8,5/8,5	8,5/8,5	9,0/9,0	9,0/9,0	10,0/10,0	10,5/10,5	10,5/10,5
Outdoor Coil								
Type		MCHE	MCHE	MCHE	MCHE	MCHE	MCHE	MCHE
Face Area	m^2	3.28	3.28	3.28	3.28	3.28	4.61	4.61
Fine per foot	fpf	23	23	23	23	23	23	23
Number of Tubes in the height / MCHE passes					155 (127-28)			

IC General Data

		IC140	IC150	IC170	IC190	IC220	IC250	IC270
Indoor Coil								
Type					Fins & Tubes			
Tube Size	Inches	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″
Face Area	m^2	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Rows/Fin Series	#/FPF	3 / 168	3 / 168	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168
Drain Connection outside diameter	mm	34	34	34	34	34	34	34
Indoor Fan								
Standard								
Type		Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model		K3G500PA 2377	K3G500PA 2377	K3G500PB 3377	K3G500PA 2377	K3G500PB 3377	K3G500PB 3377	K3G500PB 3377
Minimum Airflow	m^3/h	19200	20800	22400	26400	28800	33600	36800
Nominal Airflow	m^3/h	24000	26000	28000	33000	36000	42000	44000
Maximal Airflow	m^3/h	28800	31200	33600	39600	40000	44000	44000
Number	#	3	3	3	4	4	4	4
Diameter	mm	500	500	500	500	500	500	500
Drive Type		EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Max Motor Power per fan	kW	3.5	3.5	5.7	3.5	5.7	5.7	5.7
Motor Max Amps per fan	A	5.3	5.3	9	5.3	9	9	9
Max motor RPM	RPM	1900	1900	2250	1900	2250	2250	2250
Available Static Pressure	Pa	400	400	400	400	400	400	400
Oversized								
Type		Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model					K3G500PB3377			
Minimum Airflow	m^3/h	19200	20800	22400	26400	28800	33600	36800
Nominal Airflow	m^3/h	24000	26000	28000	33000	36000	42000	44000
Maximal Airflow	m^3/h	28800	31200	33600	39600	40000	44000	44000
Number	#	3	3	4	4	4	4	4
Diameter	mm	500	500	500	500	500	500	500
Drive Type		EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Max Motor Power per fan	kW	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Motor Max Amps per fan	A	9	9	9	9	9	9	9
Max motor RPM	RPM	2250	2250	2250	2250	2250	2250	2250
Available Static Pressure	Pa	800	800	800	800	800	800	800
Outdoor Fan								
Standard Ambient Fan								
Type					Axial / Above / AC motor			
Model AC motor			GPF3B3PM132SS8			GPF3B3PM132SS6		
Nominal Airflow / ckt	m^3/h	26780	26780	26780	33408	33408	47742	47742
Number of fan / ckt	#	2	2	2	2	2	3	3
Diameter	mm	800	800	800	800	800	800	800
Motor Power per fan	kW	0.75	0.75	0.75	1.57	1.57	1.57	1.57
Motor Max Amps per fan	A	1.81	1.81	1.81	3.26	3.26	3.26	3.26
Motor RPM	rpm	705	705	705	930	930	930	930
Filter								
Filter type prefiltration layer 50mm					G4 or M5			
Filtration type layer 100mm		F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9
Number of Filters / layer		12	12	12	12	12	12	12
Filter Size	mm	500x625	500x625	500x625	500x625	500x625	500x625	500x625
Physical Data for Standard Unit (4)								
Length (include fresh air hood)	mm	6224	6224	6224	6224	6224	7118	7118
Gas unit extra lenght	mm	1357	1357	1357	1357	1357	1357	1357
Width	mm	2350	2350	2350	2350	2350	2350	2350
Height	mm	2274	2274	2274	2274	2274	2274	2274
Operating Weight (Downflow Without Auxiliary Heat)	kg	2237	2245	2313	2438	2517	2762	2767

IC General Data

		IC140	IC150	IC170	IC190	IC220	IC250	IC270
Options Extra Lenght & Extra weight (4)								
Hot Water Coil	kg	60	60	60	60	60	60	60
Electric Heater	kg	26	26	26	26	26	26	26
Gas Burner low Heat	kg	382	382	382	382	382	382	382
Gas Burner Standard Heat	kg	434	434	434	434	434	434	434
Gas Burner High Heat	kg	474	474	474	474	474	474	474
Energy Recovery Module Standard	kg	646	646	646	646	646	646	646
Energy Recovery Module 100% FA	kg	695	695	695	695	695	695	695
Exhaust Fan EC	kg	127	127	127	127	127	127	127
Energy Recovery Module (ERM)								
HRW Airfinity XL								
Wheel type		Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy
Wheel Diameter	mm	1800	1800	1800	1800	1800	1800	1800
Wave height	mm	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Exhaust Fans type					K3G500PB3377			
Quantity Exhaust Fans		1	1	1	1	1	1	1
Length x Width x Height	mm				1750x1180x1510			
Weight	kg	663	663	663	663	663	663	663
HRW Airfinity XL High Airflow								
Wheel type		Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy
Supplier Ref					SE1-HL-WV-1800-CS			
Wheel Diameter	mm	1800	1800	1800	1800	1800	1800	1800
Wave height	mm	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Exhaust Fans type					K3G500PB3377			
Quantity Exhaust Fans		2	2	2	2	2	2	2
Length x Width x Height	mm				1750x1180x1510			
Weight	kg	711	711	711	711	711	711	711

(1) Indicative performances. For detailled performances, consult order write up (OWU).
(2) Under 400V/50Hz/3Ph.
(3) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(4) Indicative data. For details consult lifting and handling instructions in document package shipped with the unit.
(5) Value referenced to Cat G20 - for other refer to burner IOM manual.
(6) OIL058E or OIL057E are European reference for POE oil and can be mixed in any proportion with OIL00078 or OIL00080 (same oil with US reference on compressor nameplate).

IH General Data

		IH140	IH150	IH170	IH190	IH220	IH250	IH270
Cooling Mode								
Net Cooling Capacity R410A (1)	kW	139.4	153.2	162.9	187.9	202.4	221.5	237.4
Total Power Input R454B (1)	kW	42.8	50.4	57.1	69.1	81.9	90.3	99.6
Net Cooling capacity R454B (1)	kW	137.2	150.1	161.0	185.2	200.7	223.4	239.8
Total Power Input R454B (1)	kW	42.2	48.8	55.7	66.8	78.9	88.5	97.9
Heating Mode								
Net Heating Capacity R410A (1)	kW	136.3	152.5	169.6	196.3	218.9	254.7	273.2
Total Power Input R410A (1)	kW	38.5	44.6	49.8	62.3	72.4	92.9	101.4
Net Heating Capacity R454B (1)	kW	135.5	152.5	166.2	194.9	218.2	249.1	267.6
Total Power Input R454B (1)	kW	38.1	43.1	47.5	59.7	69.1	86.5	94.8
Electric Heater								
Number of capacity step	Nb	2	2	2	2	2	2	2
Capacity Steps (1)	kW	37,5/37,5	37,5/37,5	62,5/37,5	62,5/37,5	75/37,5	75/37,5	75/37,5
Gas burner: Low Heat								
Gas burner type		PCH132	PCH132	PCH132	PCH132	PCH132	PCH132	PCH132
Max. burner heat output G20 (Hi)	kW	130	130	130	130	130	130	130
Max. useful heat output G20	kW	126	126	126	126	126	126	126
Max. efficiency G20 (Hi)	%	96.8	96.8	96.8	96.8	96.8	96.8	96.8
Min. burner heat output G20 (Hi)	kW	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Min. useful heat output G20	kW	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Min. efficiency G20 (Hi)	%	108.1	108.1	108.1	108.1	108.1	108.1	108.1
Modulation	%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%
Max. condensation (30%Qn)	l/h	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Gas connection ø		UNI/ISO 228/1-G 1½"						
Gas burner: Standard Heat								
Gas burner type		PCH162	PCH162	PCH162	PCH162	PCH162	PCH162	PCH162
Max. burner heat output G20 (Hi)	kW	164	164	164	164	164	164	164
Max. useful heat output G20	kW	160	160	160	160	160	160	160
Max. efficiency G20 (Hi)	%	97.6	97.6	97.6	97.6	97.6	97.6	97.6
Min. burner heat output G20 (Hi)	kW	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Min. useful heat output G20	kW	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Min. efficiency G20 (Hi)	%	108.4	108.4	108.4	108.4	108.4	108.4	108.4
Modulation	%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%
Max. condensation (30%Qn)	l/h	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Gas connection ø		UNI/ISO 228/1-G 1½"						
Gas burner: High Heat								
Gas burner type		PCH212	PCH212	PCH212	PCH212	PCH212	PCH212	PCH212
Max. burner heat output G20 (Hi)	kW	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Max. useful heat output G20	kW	194.3	194.3	194.3	194.3	194.3	194.3	194.3
Efficiency G20 (Hi)	%	97.2	97.2	97.2	97.2	97.2	97.2	97.2
Min. burner heat output G20 (Hi)	kW	21	21	21	21	21	21	21
Min. useful heat output G20	kW	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Min. efficiency G20 (Hi)	%	108.4	108.4	108.4	108.4	108.4	108.4	108.4
Modulation	%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%	11% to 100%
Max. condensation (30%Qn)	l/h	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Gas connection ø		UNI/ISO 228/1-G 1½"						

IH General Data

		IH140	IH150	IH170	IH190	IH220	IH250	IH270
Hot Water Coil								
Net Heating Capacity	kW	155	162	169	185	194	194	194
Type		Fins & Tubes	Fins & Tubes	Fins & Tubes	Fins & Tubes	Fins & Tubes	Fins & Tubes	Fins & Tubes
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m2	1.39	1.39	1.39	1.39	1.39	1.39	1.39
Rows/Fin Series	#/FPF	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144
Number of Tubes in the height		32	32	32	32	32	32	32
Electrical Data								
Main Power Supply	V/Ph/ Hz				400 / 3 /50			
Unit Max Amps	A	118	128	154	170	203	224	239
Unit Start Up Amps (without soft starter)	A	250	296	331	384	417	484	578
Unit Start Up Amps (with soft starter)	A	195	227	255	293	326	372	434
Maximum Short Circuit rating for 0,3 sec	kA	15	15	15	15	15	15	15
Disconnect swich								
Disconnect swich (standard unit)		Sirco 250A	Sirco 250A	Sirco 250A	Sirco 315A	Sirco 315A	Sirco 400A	Sirco 400A
Cross section max (standard unit)	mm²	150	150	150	240	240	240	240
Disconnect swich (unit with electrical heater option)		Sirco 500A	Sirco 500A	Sirco 500A	Sirco 630A	Sirco 630A	Sirco 630A	Sirco 630A
Cross section max (unit with electrical heater option)	mm²	240	240	240	2x300	2x300	2x300	2x300
Disconnect swich (unit with other options that electrical heater)		Sirco 400A	Sirco 400A	Sirco 400A	Sirco 500A	Sirco 500A	Sirco 500A	Sirco 500A
Cross section max (unit with electrical heater option)	mm²	240	240	240	240	240	240	240
Extra Amps								
Electric Heater	A	108	108	144	144	162	162	162
Indoor fan : Oversized	A	11.1	11.1	9.0	14.8	0.0	0.0	0.0
Exhaust Fan	A	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Return Roofcurb	A	13.2	13.2	13.2	22.0	22.0	22.0	22.0
Heat Recovery (not included current for oversized fan)	A	12.9	12.9	12.9	12.9	12.9	12.9	12.9
Heat Recovery - High airflow (not included current for oversized fan)	A	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Gas burner - modulation - 132kW	A	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Gas burner - modulation - 162kW	A	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Gas burner - modulation - 212kW	A	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Frame								
Frame	#	2	2	2	2	2	2	2
Compressor								
Number of Circuits	#	2	2	2	2	2	2	2
Number of Compressor per Circuits	#	2	2	2	2	2	2	2
Type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Model		DSH140/ DSH140	DSH161 / DSH161	DSH184 / DSH184	DSH184 / DSH240	DSH240/ DSH240	DSH240/ DSH295	DSH295/ DSH295
Max Amps per Compressor	A	22,9 / 22,9	25,55 / 25,55	29,29 / 29,29	29,29 / 38,55	38,55 / 38,55	38,55 / 46,02	46,02 / 46,02
Locked Rotor Amps per Compressor	A	147 / 147	158 / 158	197 / 197	197 / 215	215 / 215	215 / 260	260 / 260

IH General Data

		IH140	IH150	IH170	IH190	IH220	IH250	IH270
Oil & Refrigerant (6)								
Oil quantity per compressors CMP1 / CMP2	l	3,3 / 3,3	3,3 / 3,3	3,6 / 3,6	3,6 / 6,7	6,7 / 6,7	6,7 / 6,7	6,7 / 6,7
Oil quantity ckt1/ckt2 (6)	l	6,6 / 6,6	6,6 / 6,6	7,2 / 7,2	10,3 / 10,3	13,4 / 13,4	13,4 / 13,4	13,4 / 13,4
Internal Free Volume CMP1 / CMP2	l	14,3 / 14,3	14,3 / 14,3	14,6 / 14,6	14,6 / 31,0	14,6 / 31,0	31,0 / 31,0	31,0 / 31,0
Refrigerant load per circuit (kg CKT1/ kg CKT2) R410A	kg	20,0/20,0	20,0/20,0	20,0/20,0	21,5/21,5	21,5/21,5	25,0 / 25,0	25,0 / 25,0
Refrigerant load per circuit (kg CKT1/ kg CKT2) R454B	kg	16,0/16,0	16,0/16,0	16,0/16,0	17,0/17,0	17,0/17,0	20,0/20,0	20,0/20,0
Outdoor Coil								
Type					Fins & Tubes			
Tube Size	Inches	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"
Face Area	m2	3.9	3.9	3.9	3.9	3.9	5.52	5.52
Rows/Fin Series	#/FPF	2/192	2/192	3/192	3/192	3/192	3/192	3/192
Indoor Coil								
Type					Fins & Tubes			
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m2	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Rows/Fin Series	#/FPF	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168
Drain Connection outside diameter	mm	34	34	34	34	34	34	34
Indoor Fan								
Standard								
Type					Plug Fans			
Model		K3G500PA 2377	K3G500PA 2377	K3G500PB 3377	K3G500PA 2377	K3G500PB 3377	K3G500PB 3377	K3G500PB 3377
Minimum Airflow	m3/h	19200	20800	22400	26400	28800	33600	36800
Nominal Airflow	m3/h	24000	26000	28000	33000	36000	42000	44000
Maximal Airflow	m3/h	28800	31200	33600	39600	40000	44000	44000
Number	#	3	3	3	4	4	4	4
Diameter	mm	500	500	500	500	500	500	500
Drive Type		EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Max Motor Power per fan	kW	3.5	3.5	5.7	3.5	5.7	5.7	5.7
Motor Max Amps per fan	A	5.3	5.3	9	5.3	9	9	9
Max motor RPM	RPM	1900	1900	2250	1900	2250	2250	2250
Available Static Pressure	Pa	400	400	400	400	400	400	400
Oversized								
Type		Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model					K3G500PB3377			
Minimum Airflow	m3/h	19200	20800	22400	26400	28800	33600	36800
Nominal Airflow	m3/h	24000	26000	28000	33000	36000	42000	44000
Maximal Airflow	m3/h	28800	31200	33600	39600	40000	44000	44000
Number	#	3	3	4	4	4	4	4
Diameter	mm	500	500	500	500	500	500	500
Drive Type		EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Max Motor Power per fan	kW	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Motor Max Amps per fan	A	9	9	9	9	9	9	9
Max motor RPM	RPM	2250	2250	2250	2250	2250	2250	2250
Available Static Pressure	Pa	800	800	800	800	800	800	800
Outdoor Fan								
Standard Ambient Fan								
Type					Axial / Above / AC			
Model AC motor			GPF3B3PM132SS8			GPF3B3PM132SS6		
Nominal Airflow / ckt	m3/h	26780	26780	26780	33408	33408	47742	47742
Number of fan / ckt	#	2	2	2	2	2	3	3
Diameter	mm	800	800	800	800	800	800	800
Motor Power per fan	kW	0.75	0.75	0.75	1.57	1.57	1.57	1.57
Motor Max Amps per fan	A	1.81	1.81	1.81	3.26	3.26	3.26	3.26
Motor RPM	rpm	705	705	705	930	930	930	930

IH General Data

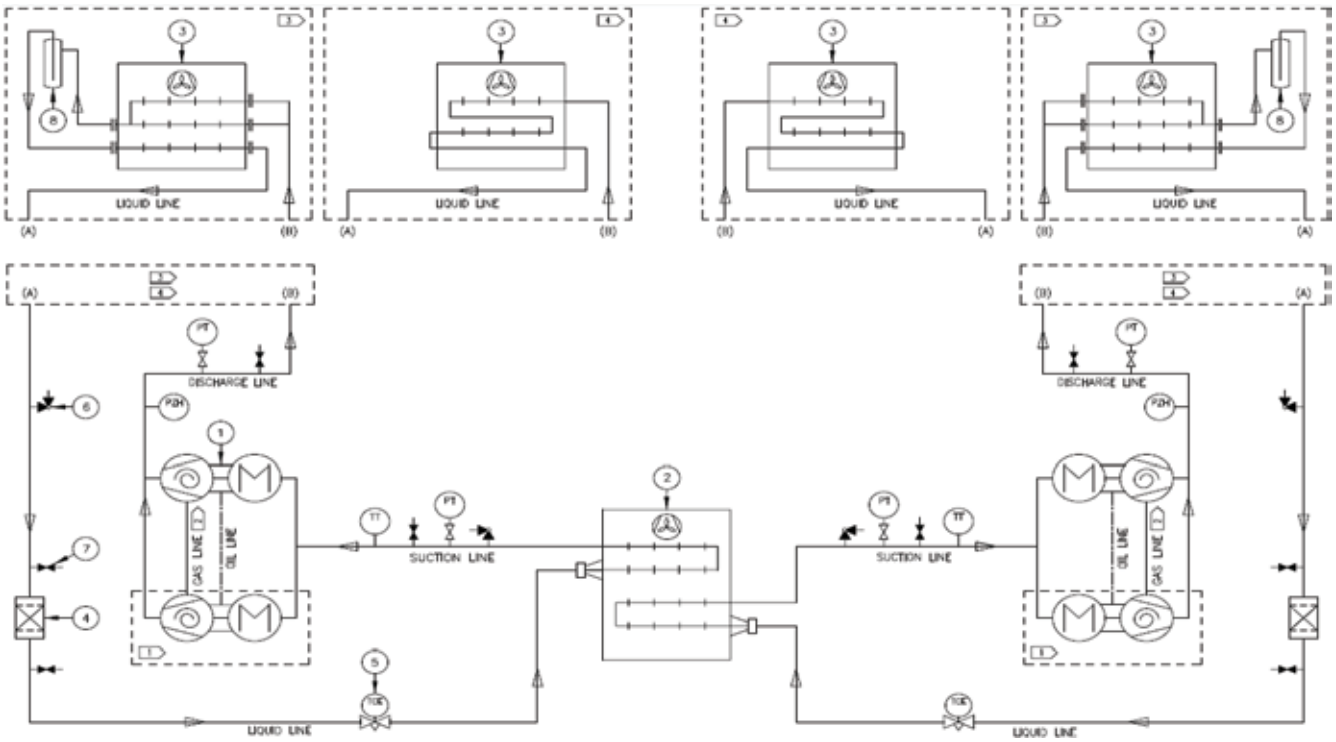
		IH140	IH150	IH170	IH190	IH220	IH250	IH270
Filter								
Filter type prefiltration layer 50mm		G4 or F5	G4 or F5	G4 or F5	G4 or F5	G4 or F5	G4 or F5	G4 or F5
Filtration type layer 100mm		F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9	F7 or F9
Number of Filters / layer		12	12	12	12	12	12	12
Filter Size	mm	500x625	500x625	500x625	500x625	500x625	500x625	500x625
Physical Data for Standard Unit								
Length (include fresh air hood)	mm	6224	6224	6224	6224	6224	7118	7118
Gas unit extra lenght	mm	1357	1357	1357	1357	1357	1357	1357
Width	mm	2350	2350	2350	2350	2350	2350	2350
Height	mm	2274	2274	2274	2274	2274	2274	2274
Operating Weight (Downflow Without Auxiliary Heat)	kg	2397	2405	2463	2574	2646	2841	2844
Options Extra Length & Extra weight								
Hot Water Coil	kg	60	60	60	60	60	60	60
Electric Heater	kg	26	26	26	26	26	26	26
Gas Burner low Heat	kg	382	382	382	382	382	382	382
Gas Burner Standard Heat	kg	434	434	434	434	434	434	434
Gas Burner High Heat	kg	474	474	474	474	474	474	474
Energy Recovery Module Standard	kg	646	646	646	646	646	646	646
Energy Recovery Module 100% FA	kg	695	695	695	695	695	695	695
Exhaust Fan	kg	127	127	127	127	127	127	127
Energy Recovery Module (ERM)								
HRW Airfinity XL								
Wheel type		Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy
Wheel Diameter	mm	1800	1800	1800	1800	1800	1800	1800
Wave height	mm	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Exhaust Fans type					K3G500PB3377			
Quantity Exhaust Fans		1	1	1	1	1	1	1
Length x Width x Height	mm				1750x1180x1510			
Weight	kg	663	663	663	663	663	663	663
HRW Airfinity XL High Airflow								
Wheel type		Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy	Enthalpy
Supplier Ref					SE1-HL-WV-1800-CS			
Wheel Diameter	mm	1800	1800	1800	1800	1800	1800	1800
Wave height	mm	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Exhaust Fans type					K3G500PB3377			
Quantity Exhaust Fans		2	2	2	2	2	2	2
Length x Width x Height	mm				1750x1180x1510			
Weight	kg	711	711	711	711	711	711	711

(1) Indicative performances. For detailled performances, consult order write up (OWU).
(2) Under 400V/50Hz/3Ph.
(3) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(4) Indicative data. For details consult lifting and handling instructions in document package shipped with the unit.
(5) Value referenced to Cat G20 - for other refer to burner IOM manual.
(6) OIL058E or OIL057E are European reference for POE oil and can be mixed in any proportion with OIL00078 or OIL00080 (same oil with US reference on compressor nameplate).

Unit Operating Principle

UNIT SYNOPTIC

Figure 1: Airfinity XL IC units



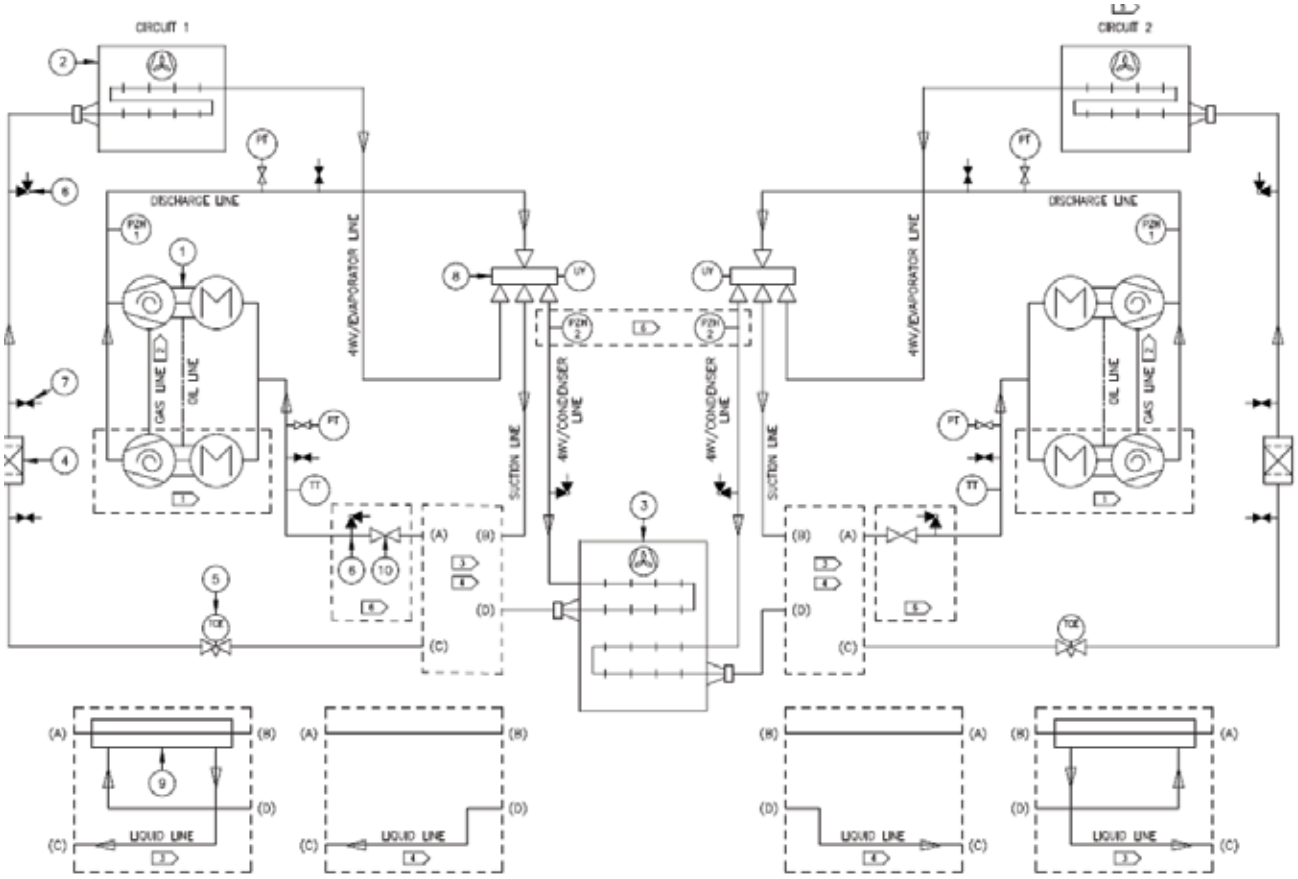
ITEM	DESIGNATION
1	SCROLL COMPRESSOR
2	EVAPORATOR (FINS & TUBES HEAT EXCHANGER)
3	CONDENSER
4	FILTER DRIER
5	ELECTRONIC EXPANSION VALVE
6	SERVICE VALVE
7	SCHRAEDER VALVE
8	RECEIVER

ITEM	DESIGNATION
PT	PRESSURE TRANSDUCER
P2H	HIGH PRESSURE SWITCH
TT	TEMPERATURE SENSOR
TCE	ELECTRONIC EXPANSION VALVE

———	REFRIGERANT LINE
— — —	OIL LINE

1 ALL SIZES EXCEPT IC 39–49–59–64–74–84.
2 ONLY FOR SIZES IC 40–50–60–65–75–85.
3 MICRO CHANNEL HEAT EXCHANGER.
4 FINS & TUBES HEAT EXCHANGER.

Figure 2: Airfinity XL IH units



ITEM	DESIGNATION
1	SCROLL COMPRESSOR
2	EVAPORATOR (FINS & TUBES HEAT EXCHANGER)
3	CONDENSER (FINS & TUBES HEAT EXCHANGER)
4	BIFLOW FILTER DRIER
5	ELECTRONIC EXPANSION VALVE
6	SERVICE VALVE
7	SCHRAEDER VALVE
8	4 WAY REVERSING VALVE
9	SUCTION/LIQUID HEAT EXCHANGER (TUBE IN TUBE EXCHANGER)
10	BALL VALVE

ITEM	DESIGNATION
PT	PRESSURE TRANSDUCER
PZH 1	HIGH PRESSURE SWITCH (COOLING MODE)
PZH 2	HIGH PRESSURE SWITCH (HEATING MODE)
TT	TEMPERATURE SENSOR
TOE	ELECTRONIC EXPANSION VALVE
UY	SOLENOID

———	REFRIGERANT LINE
— — —	OIL LINE

1. ALL SIZES EXCEPT IH 39–49–59–64–74–84 & IH 21–31–41–51–61–71.
2. ONLY FOR SIZES IH 40–50–60–65–75–85.
3. ONLY FOR SIZES IH 38 R410A & IH 21–31–41–51–61–71 R410A.
4. ALL SIZES EXCEPT IH 38 R410A & IH 21–31–41–51–61–71 R410A.
5. ALL SIZES EXCEPT IH 38 & IH 21–31–41–51–61–71.
6. ONLY FOR SIZES IH 100–110–130 R454B & IH 140–150–170–190–220–250–270 R454B.

Installation

General information: The installation must conform to all local standards and regulations.

Reception of Units

Unit Handling

The unit is supplied on wooden blocks. It is recommended to check the machine's condition upon reception.

There are two ways to handle the unit:

1) Handle the machine using a forklift, in accordance with applicable safety regulations. Handling of the unit is prohibited unless forks are longer than the length of the unit.
2) Use a lifting beam correctly adjusted to fit the unit.

The units are supplied on the truck but are not unloaded. A lifting lug is provided on each corner of the unit's base to facilitate handling. 4 shackles and 4 slings are required.

Use a lifting beam to prevent the cables pressing too hard on top of the unit during lifting.

Important: For unit to fit on the roof curb the wooden blocks must be removed.

Lifting and moving Instructions

It is recommended to use the special built-in rigging points shown in the diagram and the following instructions:

1 - Detailed lifting instructions will be shared along with unit documentation package.

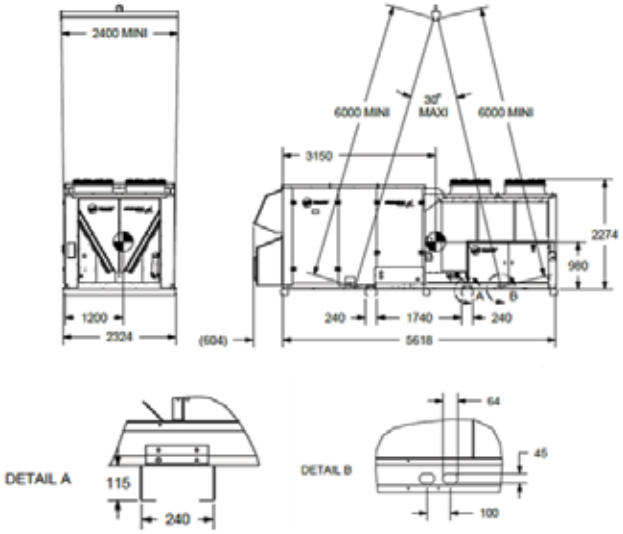
2 - Use the four rigging points which are built into the unit.

3 - Slings and a spreader bar are to be provided by the rigger.

4 - The minimum lifting capacity of each sling (with an angle of 30° max) as the spreader bar must be equal or higher than tabulated unit shipping weight.

5 - Caution : This unit must be lifted and handled with care. Avoid shocks while handing.

Figure 2 - Schematic of Lifting drawing



Roof Curb Installation

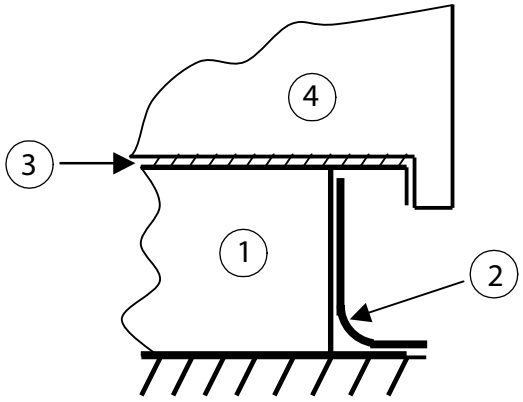
Roof curb option is not developed by Trane. However it is possible to use specific roof curb developed case by case for down flow units. The roof curb should support the unit and should ensure water tightness.

Instructions for the roofcurb assembly and installation

In order to insure watertighness of the roofcurb assembly, it is important to respect the schematics below and to consult the booklet for roofcurb assembly shipped with the roofcurb module. Be sure that gasket is positioned on the roofcurb and without damage before unit positioning.

To avoid any property damage or personal injury, it is the installer's responsibility to make sure that the installation will not impair the function of this curb, or the unit to be installed; and that the roofcurb and unit must be completely sealed, preventing any water or air leakage damage.

Figure 3 - Waterproofing



1. Roofcurb
2. Roof membrane
3. Seal
4. Rooftop

Installing the Unit

The structure accommodating the unit(s) must be designed to support the equipment in operation, as a minimum. Refer to submittals drawings supplied with the unit for dimensions, weight and clearance requirement around unit.

Unit support

Install the unit on a flat foundation strong enough to support unit loading and level (within 5 mm across the length and width of the unit).If the unit is to be roof mounted check the building codes for weight distribution requirements

Location and clearances

Choose a location that will enable air to circulate freely in the condenser coil and allow air to be discharged above the fans. The clearance distances for air circulation and maintenance are indicated in the submittals drawings.

Placing and rigging

The rooftop units are designed to be installed outdoor and must be positioned horizontally (vertical air discharge off the condenser).

Slab mount

For ground level installation, the unit base should be adequately supported and hold the unit near level.

In areas where snowfall is common, the unit must be elevated enough to ensure that the bottom of the outdoor coil is above the height of the expected snow accumulation.

Where severely cold temperatures are a consideration, elevation of the unit is again recommended to ensure that defrost water does not create an ice build up that will interfere with unit operation. In addition, runoff water from roofs, etc... must not be allowed to fall on the outdoor coil; any blockage of airflow through the coil can be detrimental to unit operation and reliability.

The manufacturer suggests that the bottom of the outdoor coil be raised 30cm above grade or roof to prevent possible ice build-up problems.

The unit frame structure is not designed to be supported by four points (mounting on spring isolators for instance).

The unit must therefore rest on its whole base.

Installation

Unit overall view

Figure 4 - Example of outdoor section

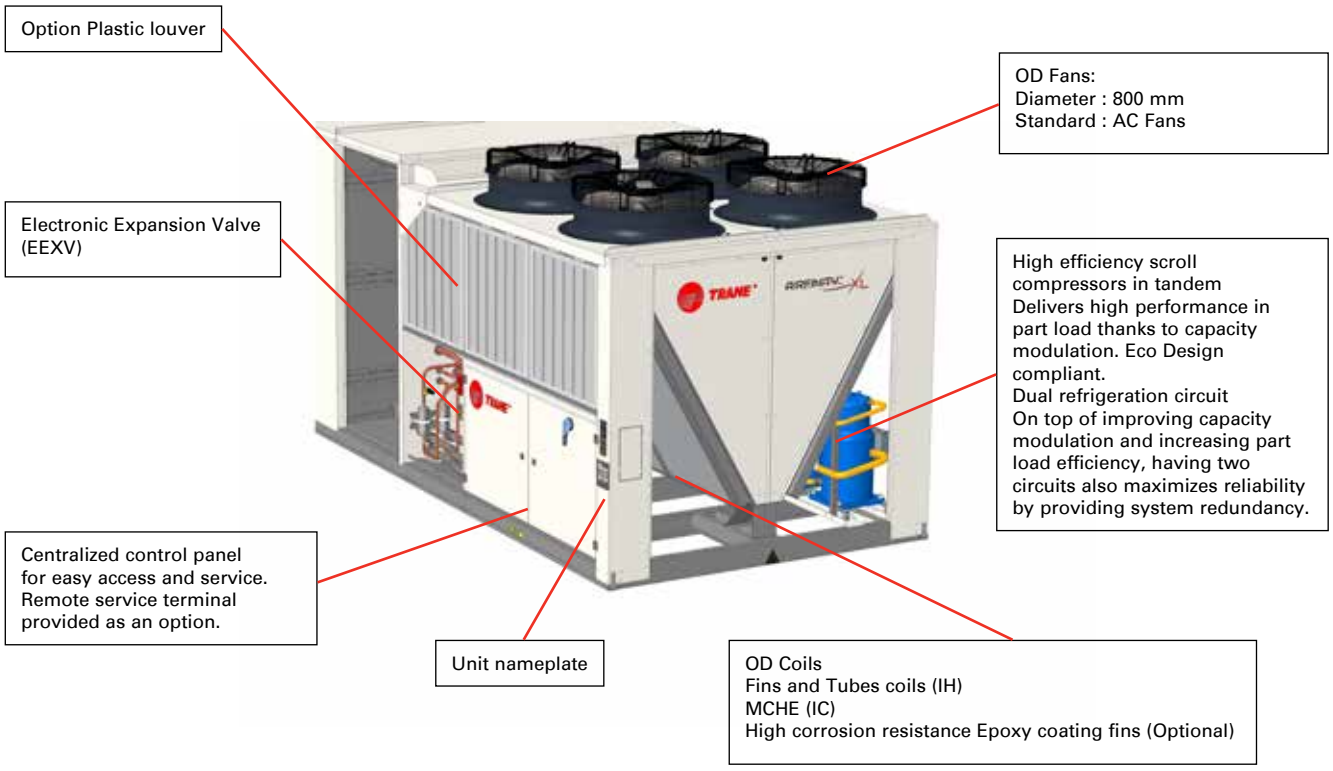
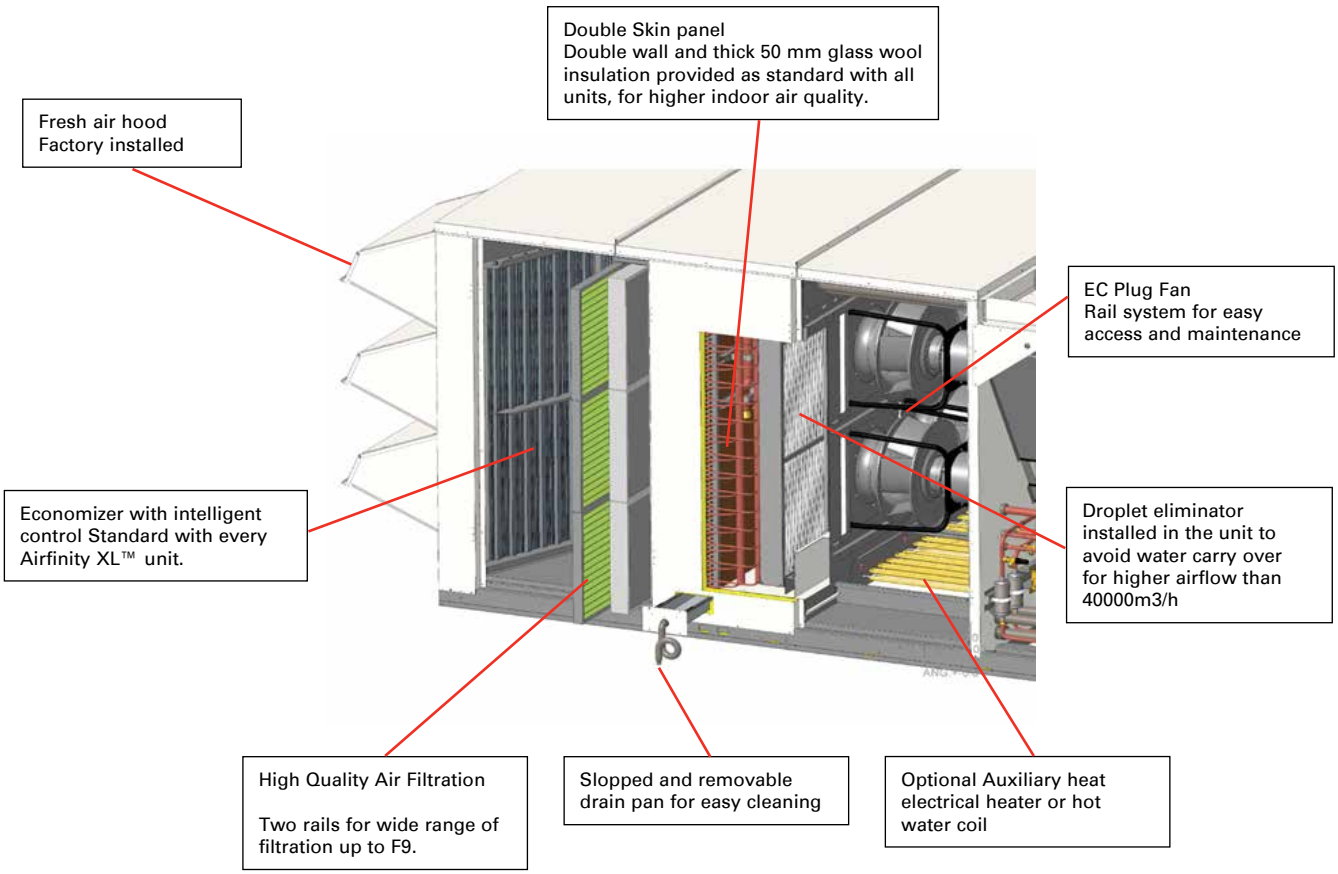


Figure 5 - Indoor section



Dimensions/Weights and Clearance

This information is supplied in the document package shipped with the unit.

Connection of Duct Network

Supply and return openings have curb flanges provided for easy duct installation. It is recommended to insulate the circumference of the curb after the unit is mounted to prevent condensation.

CAUTION! All ductwork must be run and attached to the curb flanges before the unit is set into place.

Guidelines for ductwork construction

- Connections to the unit should be made with 7.5 cm canvas connectors to minimize noise and vibration transmission.
- Elbows with turning vanes or splitters recommended to minimize air noise and resistance.
- The first elbow in the ductwork leaving the unit should be no closer than 60 cm from the unit, to minimize noise and resistance.

Attaching horizontal ductwork to unit

- All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of 5 cm of insulation with a vapour barrier. The outside ductwork must be waterproof between the unit and the building.
- When attaching ductwork to a horizontal unit, provide a flexible watertight connection to prevent noise transmission from the unit to the duct. The flexible connection must be indoors and made out of heavy canvas.

Note: Do not draw the canvas taut between the solid ducts.

Condensate Drain Piping

Each unit is equipped with a 1 1/4″ female drainage connector. A P trap is supplied and must be connected to the drainage as shown in Figure 5.

Slope the drainage pipe down at least 1% to ensure an adequate condensate flow.

Check all the condensate drainage pipe fittings comply with the applicable construction regulations and waste disposal standards.

Figure 6 - Supplied trap installation

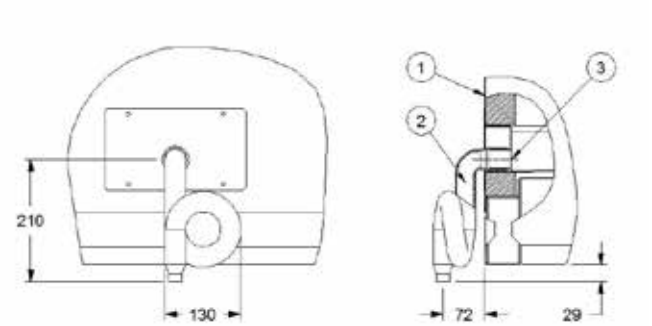
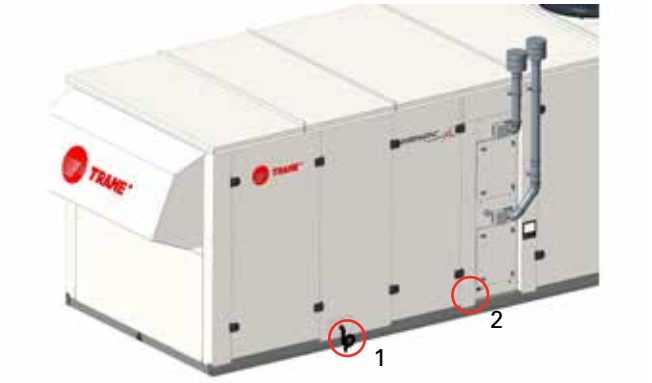


Figure 7 - Drain piping location

1: Removable unit drain pan
2: Gas burner drain pan



Installation

Filter installation

Access to the filter cells is done via the filter access door. Filter support can be slided laterally.

Each unit is shipped with this available filter combination:

G4 (65 % Coarse) is standard installation by default

G4 (65 % Coarse) + F7 (ePM1 55 %)

G4 (65 % Coarse) + F9 (ePM1 80 %)

M5 (85 % Coarse) + F7 (ePM1 55 %)

Note: F7 (ePM1 55 %) + F9 (ePM1 80 %) combination is not allowed.

Each unit has 2 rails of filter. There are 12 air filters per rail of each unit.

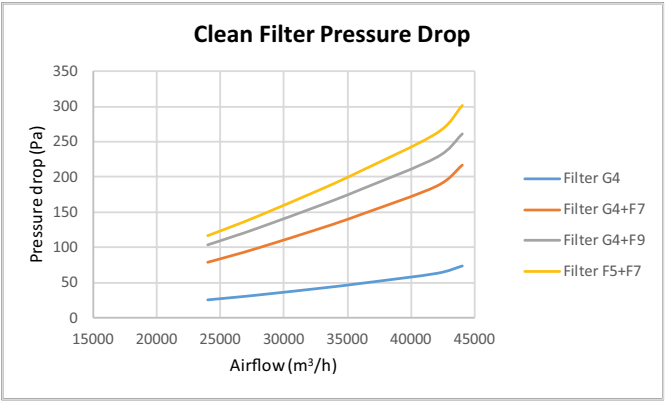
Per rail:

Frame 4: 12 air filters of 500 x 625 mm (L x H)

Frame 5: 12 air filters of 500 x 625 mm (L x H)

There is 4 different types of filters which are place on rails of 50 mm or 100 mm upstream of the indoor coil.

Figure 8 - Filter Pressure Drop



Recommended clog filter switch delta pressure value is 200 Pa with a maximum of 250 Pa according to available static pressure.

Note: See table to have the specific airflow range for different unit sizes.

Supply plug fan airflow adjustment

1) Order write up (OWU) indicate design airflow, supply and design air pressure drop.
2) Verify on site supply fan airflow. It should match OWU design airflow.
3) If on site airflow is different from OWU design airflow the actual supply and design air pressure drop should be different from design values, Trane service technician should be mandated to perform air flow adjustment and optimization.

Supply fan Airflow measurement option

The airflow measurement option when selected is associated with an air differential pressure sensor which measures the pressure difference before the inlet nozzle and inside the inlet nozzle.

Unit air flow can be calculated on the basis of the differential pressure (difference in pressure of the static pressures) in keeping with the following equation:

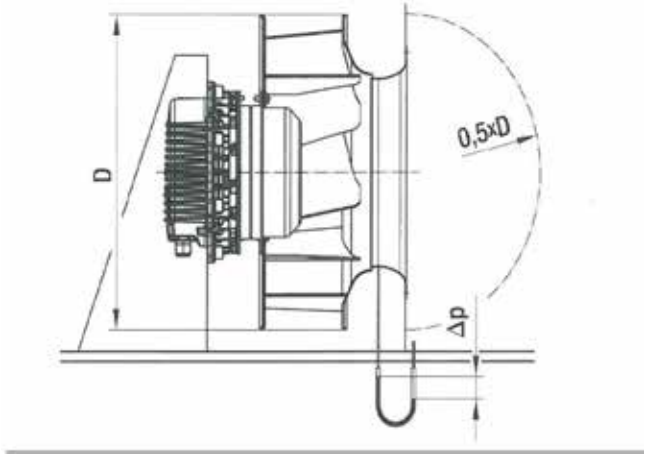
$$Qv = k.\sqrt{\Delta P}.N$$

Qv in [m^3/h] and Δp in [Pa]

N - number of fans

k - takes into account the specific nozzle characteristics.

Connection on the unit side is acomplished via a pre-mounted T tube connector. This tube connector is suited for pneumatic hoses with an internal diameter of 4 mm.



k factors:

Fan diameter	400	450	500
k-factor	188	240	281

According to the option chosen, airflow or fan RPM can be read directly on the optional display or should be determined by connecting a pressure drop meter to the pre mounted T connector.

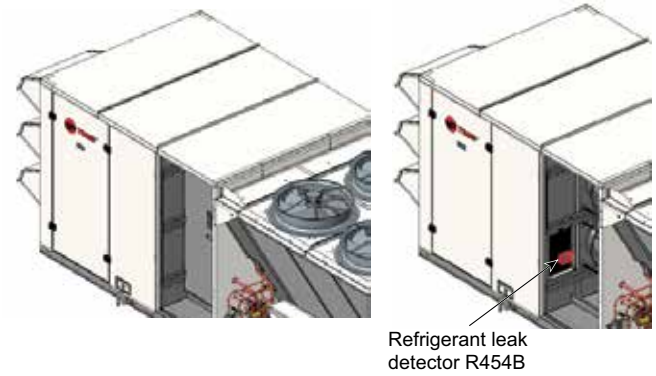
Setup is -20%/+30% variation versus factory setting (190m^3h-1/kW @ 250 Pa).

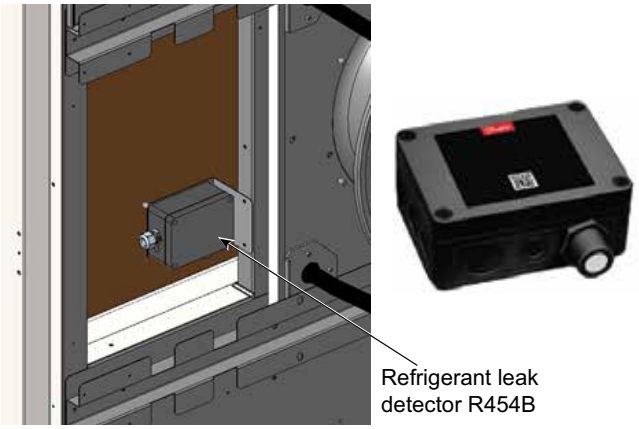
Refrigerant leak detector R454B

Refrigerant leak detector R454B is supplied and wired in each unit selected with refrigerant R454B. Along with this option, each unit selected with R454B is also equipped by default by an airflow rate sensor from security point of view.

Refrigerant leak detector is installed between indoor coil and indoor fans on the bottom, close to the door panel which may have access to the indoor fans. See pictures below.

The sensor is set to LFL (Lower Flammable Limit) about 0.5 % (500 ppm) at 23°C ambient temperature and RH 50%. Value of LFL is not adjustable





Installation

Gas Pipework Installation

Installation of gas piping (to be performed by the contractor)

The installation rules for public buildings shall be followed: refer to the brochure in the “Journal Officiel” number 1477-1 (France only).

The gas supply piping and the gas stop valve shall be dimensioned to guarantee the gas supply pressure at the unit’s inlet when it is functioning at full capacity.

It is recommended to install one expansion valve as close as possible to each installed unit. The piping must be self-supporting before the final branch connection to the unit. Allow for a dust trap (filter) upstream of the connection to the unit. Search for gas pipe leaks using tensio-active product such as “Teepol” or “1000 bulles” or another equivalent method. Soapy water must not be used.

WARNING!
Never use a flame to search for leaks. The required gas pressures at the unit’s inlet connection are specified in table «Marking Category of gas section in different countries»

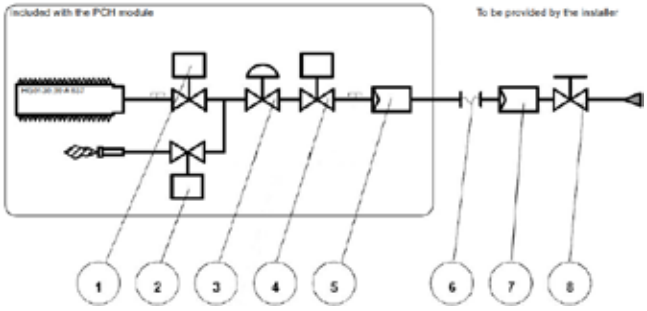
CAUTION!
The piping must not exert any stress on the branch connection to the burner.

The heating system must be isolated by the gas stop valve on the gas supply piping during the pressure tests, as soon as the pressure exceeds 0.060 bar (60 mbar).

If pressure greater than 0.060 bar is applied to the gas valve inlet the unit may be damaged. In this case it is mandatory to add a pressure reducer.

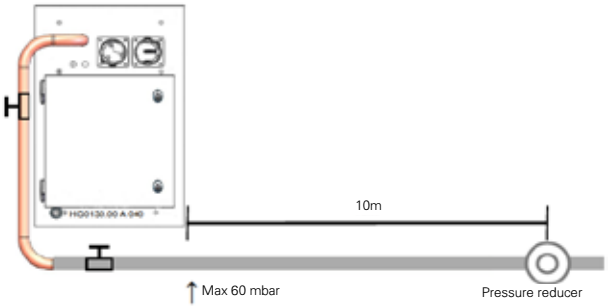
Connect condensation pipe for modulating burner.
2 stages burner is not supposed produce condensate and the small amount of condensate possibly produced in particular working conditions will in case evaporate

Figure 9 - Typical Gas Supply pipework



KEY

1	Main burner gas solenoid valve
2	Pilot burner gas solenoid valve
3	Pressure stabiliser
4	Safety gas solenoid valve
5	Gas filter (small section)
6	Anti-vibration joint
7	Gas filter (large section)
8	Gas valve



Gas connection Ø : male UNI/ISO 228/1 G3/4” tightening torque 150Nm → all range

Smoke outlet features

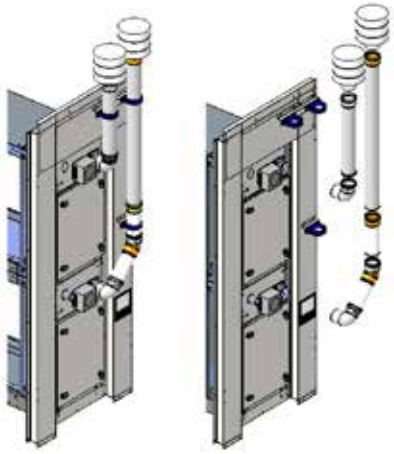
Unit is shipped with an outlet adaptor for connection to exhaust pipe. If there is no exhaust pipe used, a terminal feature located on the accessories should be installed.

Note: Exhaust pipe material has to be chosen carefully to avoid corrosion.

Figure 10 - Exhaust gas terminal installation



PCH 132



PCH 162 - PCH 212

General Electrical Recommendations

Electrical Parts

When reviewing this manual keep in mind.

- All field-installed wiring must be in accordance with local regulations, CE directives and guidelines. Be sure to satisfy proper equipment grounding requirements according CE.
- The following standardized values - Maximum Amps - Short Circuit Amps - Starting Amps are displayed on unit nameplate.
- All field-installed wiring must be checked for proper terminations, and for possible shorts or grounds.

Note: always refer to wiring diagrams shipped with unit or unit submittal for specific electrical schematic and connection information.

WARNING Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

Important!

Do not allow conduit to interfere with other components, structural members or equipment. Control voltage (230 V) wiring in conduit must be separate from conduit carrying low voltage (<30V) wiring. To prevent control malfunctions, do not run low voltage wiring (<30V) in conduit with conductors carrying more than 30 volts.

CAUTION!

Inverters are equipped with integrated filters.
They are not compatible with insulated neutral load earthing arrangements.

WARNING! High voltage!

Any contact with electric components , even after the unit has been switched off, can cause serious injury or death. Wait at least 5 minutes after switching off the unit, until the current dissipates.

Installer-Supplied Components

Customer wiring interface connections are shown in the electrical schematics and connection diagrams that are shipped with the unit. The installer must provide the following components if not ordered with the unit:

- Power supply wiring (in conduit) for all field-wired connections.
- All control (interconnecting) wiring (in conduit) for field supplied devices.
- Circuit breakers.

Grounding

Be sure to ground the unit and differential protection should be suited for industrial machinery with current leak which can be higher than 300 mA (several motors and frequency drives).

CAUTION!

To avoid corrosion, overheating or general damage, at terminal connections of power supply wiring, unit is designed for copper mono-conductors only. In case of multiconductor cable, an intermediate connection box must be added. For cable with alternative material, bi-material connecting devices are mandatory. Cable routing inside control panel should be made case by case by installer.

WARNING Ground Wire!

All field-installed wiring must be completed by qualified personnel. All field-installed wiring must comply with local codes and regulations. Failure to follow this instruction could result in death or serious injury.
All power supply wiring must be sized and selected accordingly by the project engineer in accordance with local codes and regulations.

WARNING!

The Warning Label which is displayed on the equipment and shown on wiring diagrams and schematics. Strict adherence to these warnings must be observed. Failure to do so may result in personal injury or death.

CAUTION!

Units must not be linked to the neutral wiring of the installation. Units are compatible with the following neutral operating conditions:

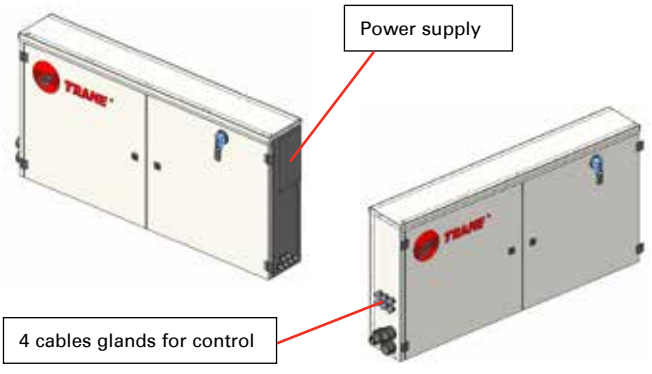
TNS	IT	TNC	TT
Standard**	Special	Special	Standard*

* Differential protection should be suited for industrial machinery with current leak which can be higher than 300 mA (several motors and frequency drives).
Neutral wire not distributed.

** Neutral wire not distributed

Electrical Connections

The electric panel is located on the length of the indoor section behind the plug fan section. The unit is designed to run with 400V (+/-10%) - 50 Hz (+/-1%) - 3 ph.



Installation

CAUTION! After completion of wiring, check all electrical connections, and ensure all connections are tight. Replace and secure all electrical box covers and access doors before leaving unit or connecting power to circuit supplying unit.

Scroll compressors

Proper phasing of the electrical power wiring is critical for proper operation and reliability of the scroll compressor and fans.

Proper rotation of the scroll compressor must be established before the unit is started. This is accomplished by confirming that the electrical phase sequence of the power supply is correct. The motor is internally connected for clockwise rotation with the inlet power supply phased A, B, C.

The direction of rotation may be reversed by interchanging any two of the line wires. It is this possible interchange of wiring that makes a phase sequence indicator necessary if the operator is to quickly determine the phase rotation of the compressor motor.

The “ABC” indicator on the face of the phase indicator will glow if phase is ABC for terminals L1, L2, and L3.

Blink Code for motor protector with status LED

The blink code facilitate trouble-shooting on site. It provides Information on the actual status of the motor protector.

Functional Description:

A red/green twin LED mounted on the printed circuit board generates the blink code, which is then made visible on the front housing of the module via an optic guide. A solid green LED denotes a fault-free condition; a blinking red LED indicates an identifiable fault condition.

Blink Code:

The blink code consists of different on / off times of the red Led.

The cycle is repeated continuously

Fault	LED on	LED off	LED on	LED off
PTC overheat	approx. 40 ms	approx. 460 ms	approx. 40 ms	approx. 460 ms
PTC reset delay active	approx. 80 ms	approx. 920 ms	approx. 80 ms	approx. 920 ms
phase loss	approx. 500 ms	approx. 500 ms	approx. 500 ms	approx. 500 ms
wrong phase sequence	approx. 120 ms	approx. 120 ms	approx. 120 ms	approx. 400 ms

Energy Recovery Module Installation

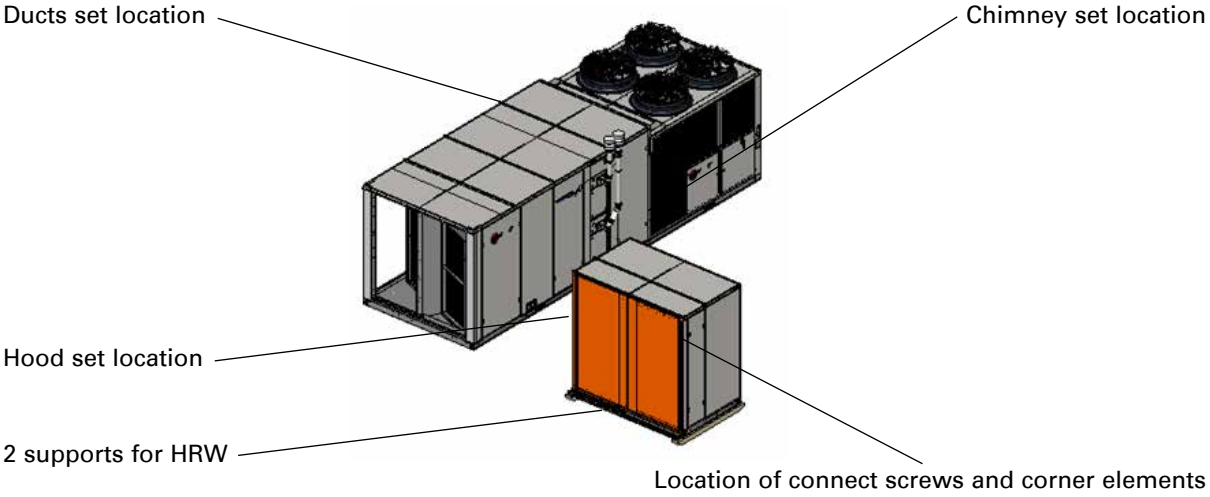
Energy Recovery Module is a module that transfers heat (cool and warm) from exhaust air to fresh air. It is an add-on module that includes heat exchanger (rotary wheel), exhaust fan, filter and dampers.

The module is shipped separately and connected to the rooftop on job site. The module is fully controlled and powered by the rooftop itself.

Free cooling mode is still available.

Assembly of module should be done according to the instructions below and with the help of submittal and electrical drawing shipped with the unit.

Horizontal Flow



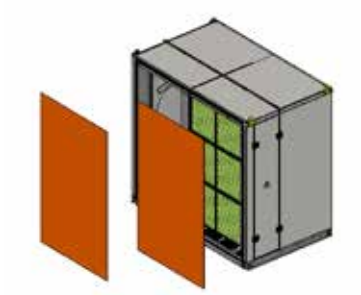
HRW Module



Step 1: HRW module



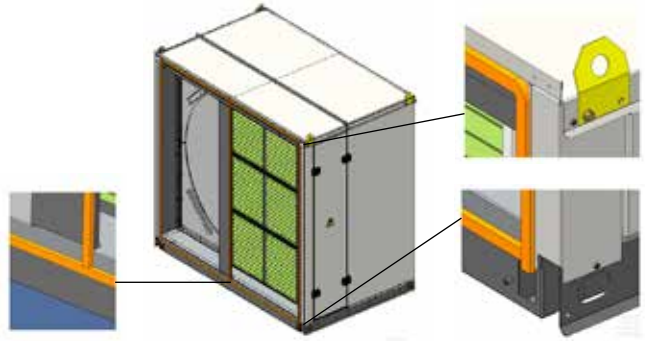
Step 2: Remove 2 supports



Step 3: Remove 2 Alkilux plates and set 5 screws M8 and 2 corner elements



Step 4: Remove 2 wood parts

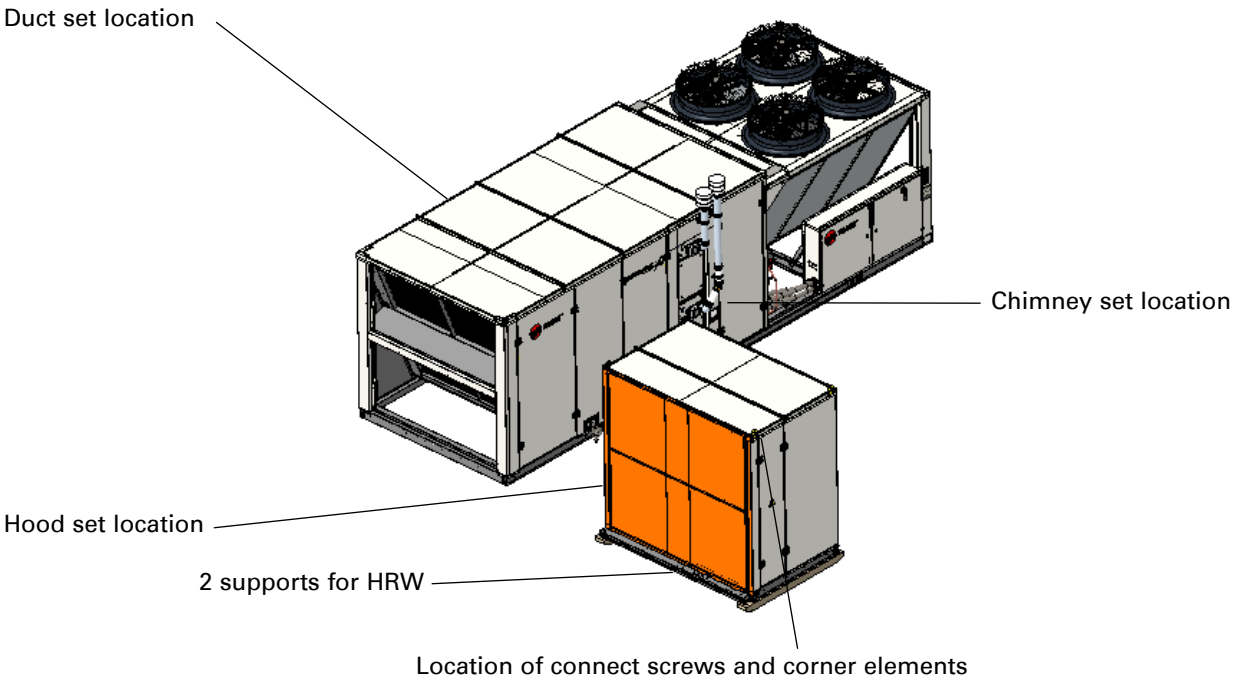


Gasket is located on all the faces in junction with the main unit.

Installation

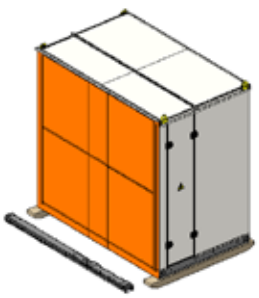
Down Flow

HRW Module





Step 1: HRM module



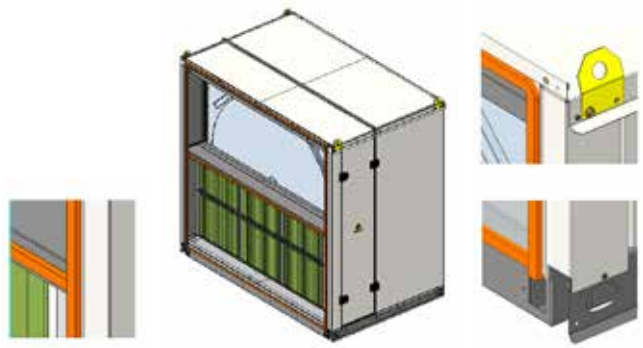
Step 2: Remove 2 supports



Step 3: Remove 2 Alkilux plates and set of 5 screws M8 and 2 corner elements



Step 4: Remove 2 wood parts

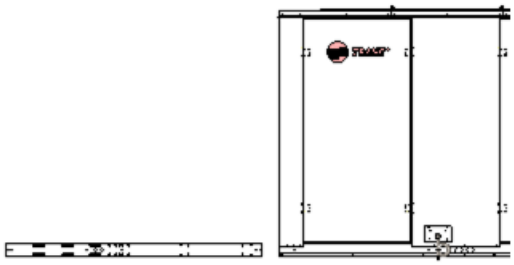


Gasket is located on all the faces in junction with the main unit.

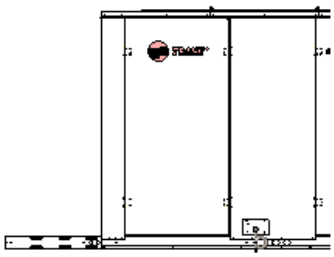
HRW Module Preparation

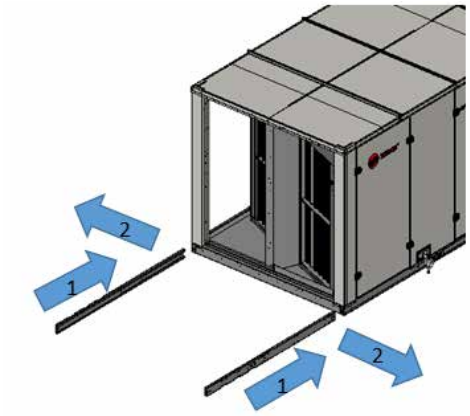
Horizontal flow

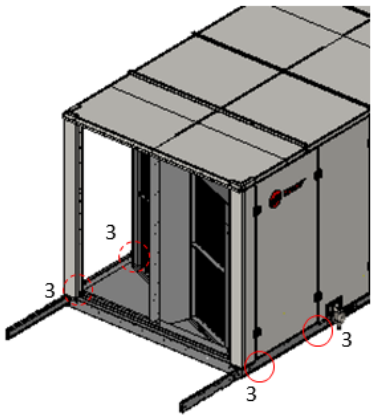
Step 1: positioning of 2 HRW supports (4 screws and washers)

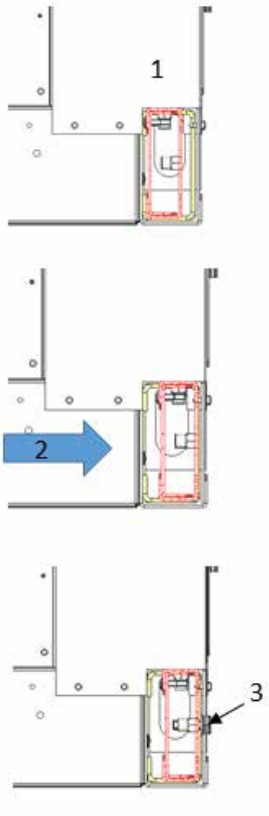


Step 2: fixing of 2 HRW supports



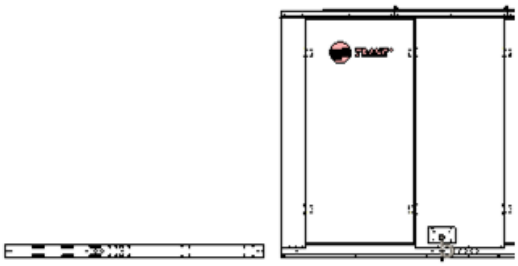






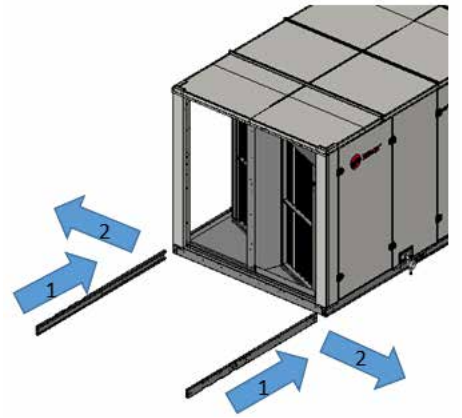
Down flow

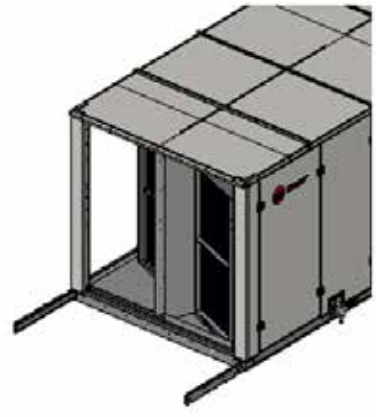
Step 1: positioning of 2 HRW supports



Step 2: fixing of 2 HRW supports 5 4 screws and washers)







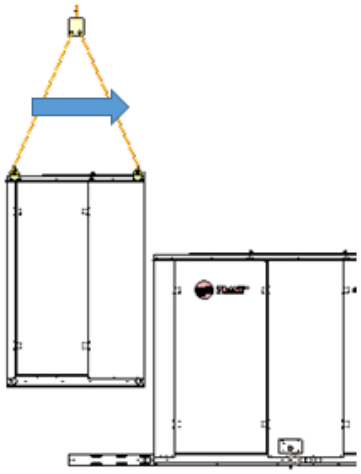


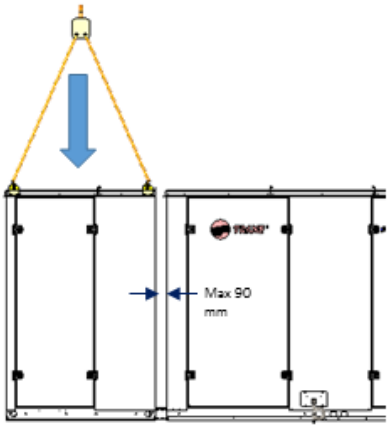
Installation

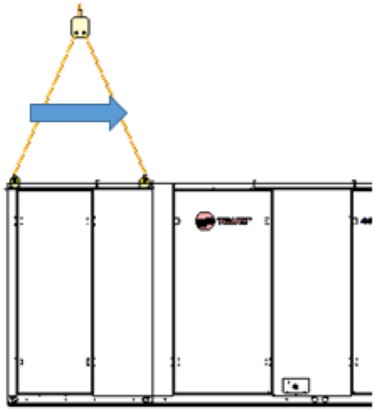
HRW Module Installation

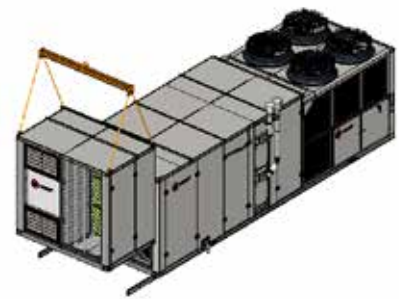
For details refer to handling drawing supplied with unit.

Horizontal flow

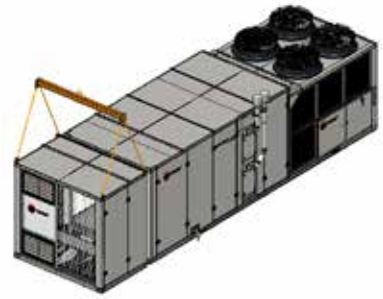




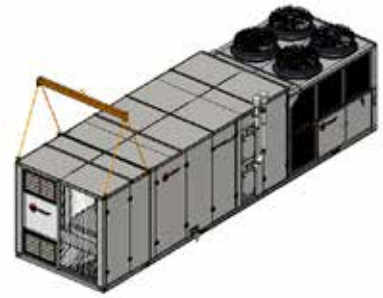




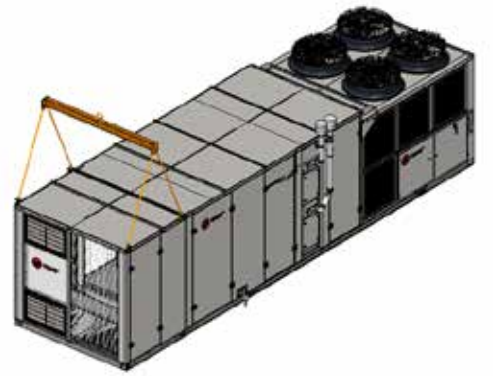
Step 1: Locate HRW module to 90 mm of the unit



Step 2 : Lay down on the 2 supports



Step 3 : Make a close contact to the unit to crush the seal.





Detail A

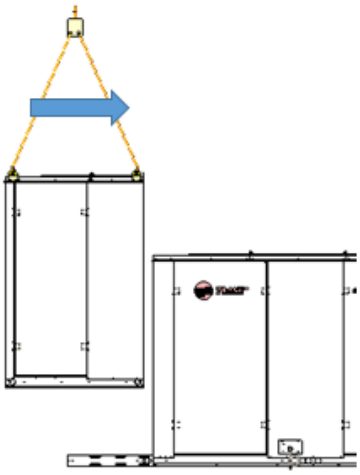


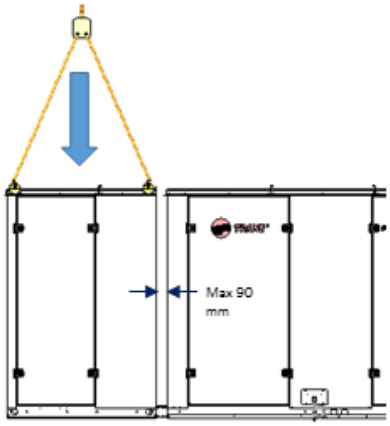
5 screw M8

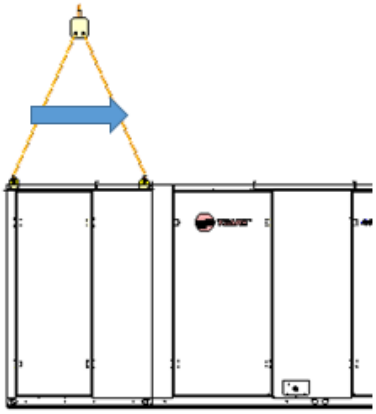


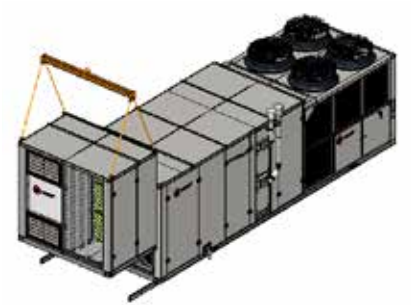
Detail B

Down flow

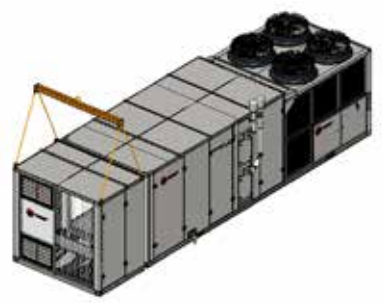




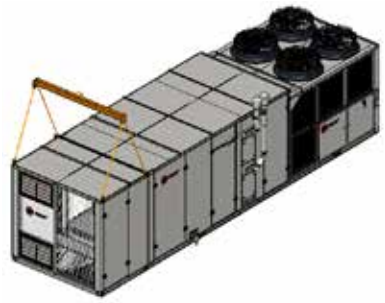




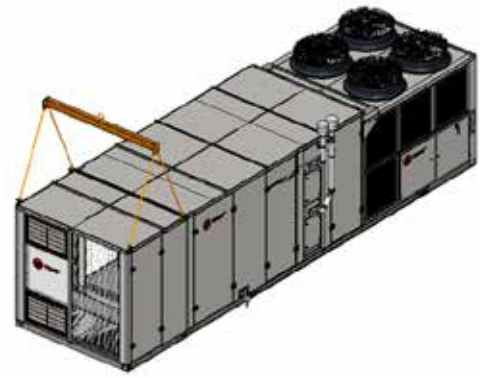
Step 1: Locate HRW module to 90 mm of the unit



Step 2: Lay down on the 2 supports



Step 3: Make a close contact to the unit to crush the seal.





Detail A



5 screw M8



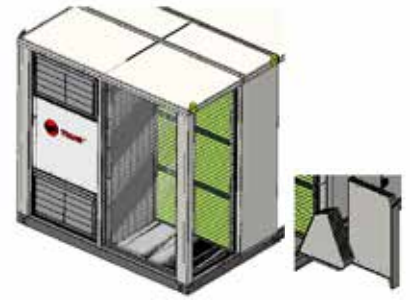
Detail B

Installation

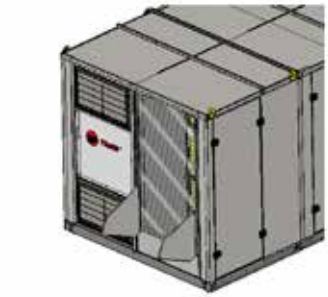
Fresh Air Hood Installation

Fresh air hood assembly steps

Horizontal flow



Step 1: Remove sheet metal hood set.



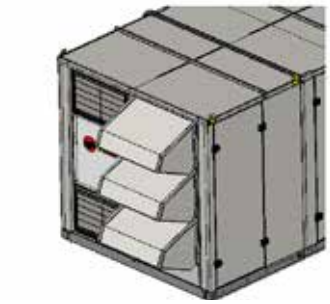
Step 2: Position side flange with corner on the outside



Step 3: position the cover hood



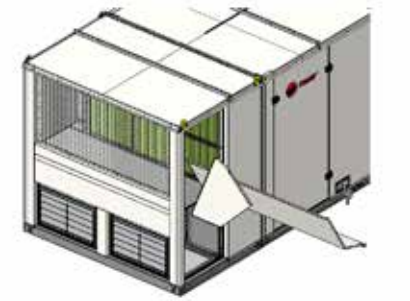
Step 4: Repeat the steps 2 and 3 for the second hood



Step 5: Repeat the steps 2 and 3 for the third hood

Note: Fresh air hood is installed by plant for Horizontal flow unit.

Down flow



Step 1: Remove sheet metal hood set.



Step 2: Position side flange with corner on the outside

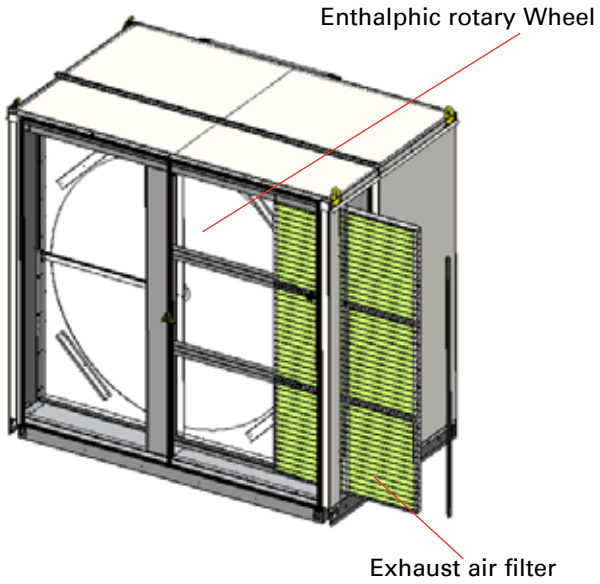


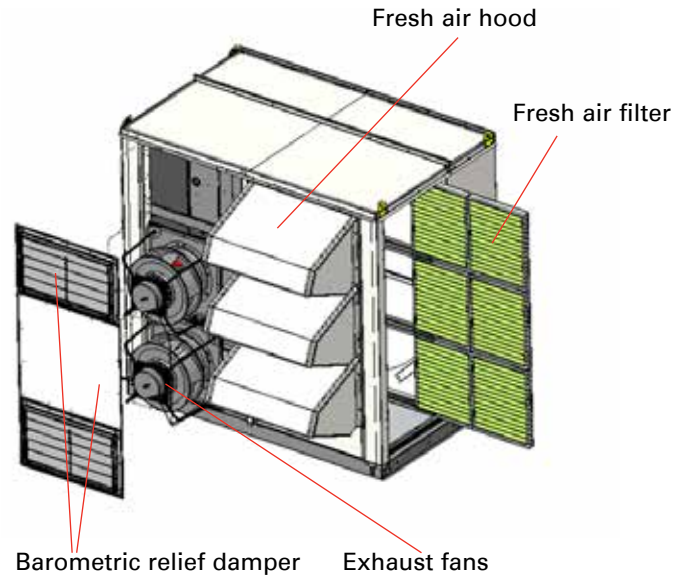
Step 3: position the cover hood

Note: Fresh air hood is installed on job site for down flow unit.

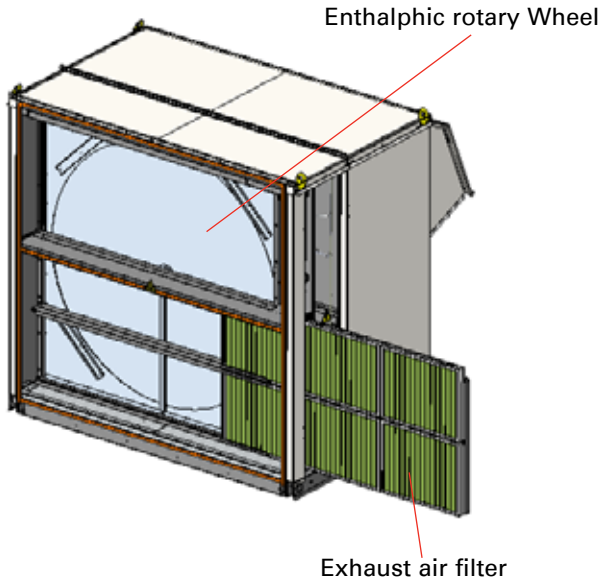
Heat Recovery Module

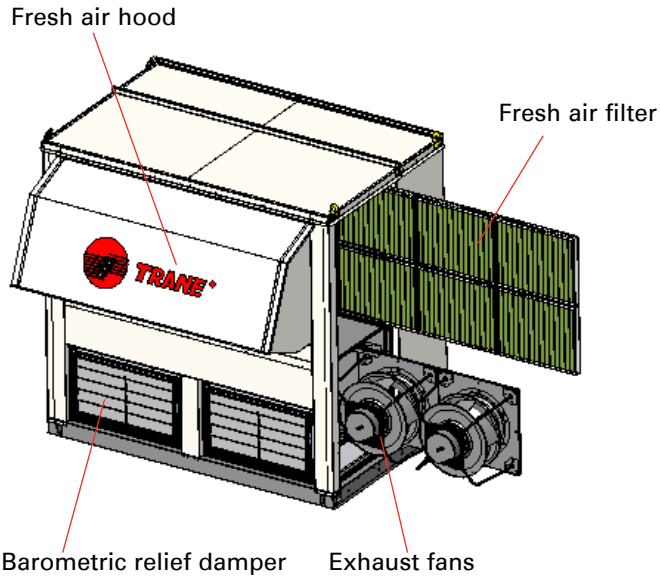
Horizontal flow





Down flow





Installation

Figure 11 - Unit gas with HRW horizontal flow and down fl

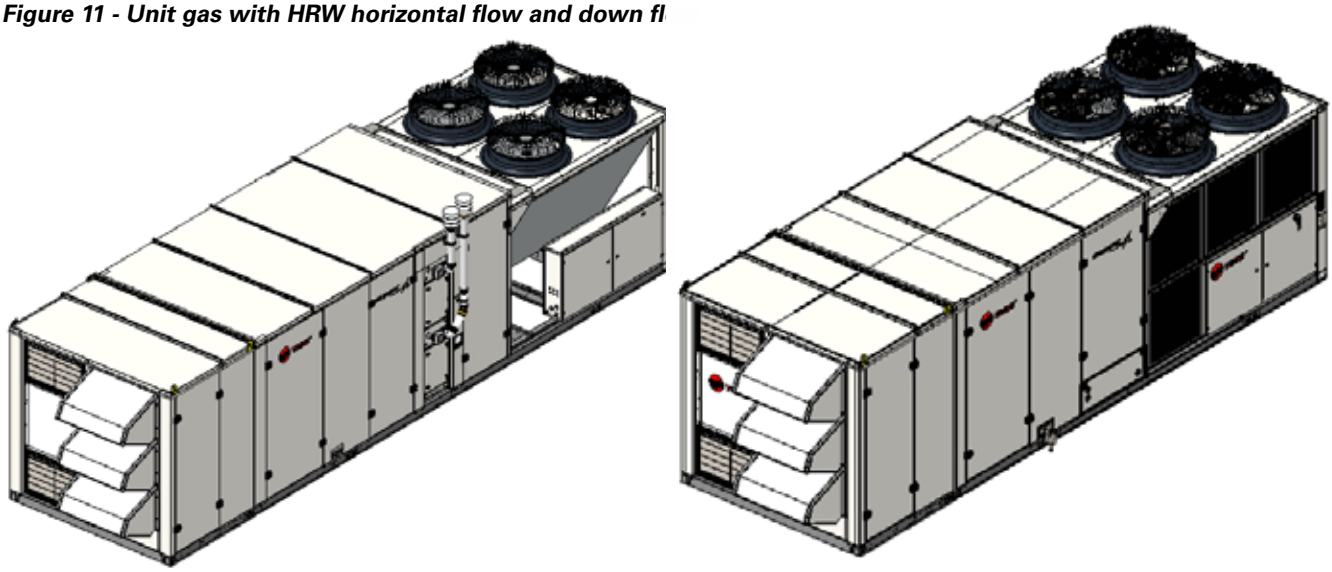
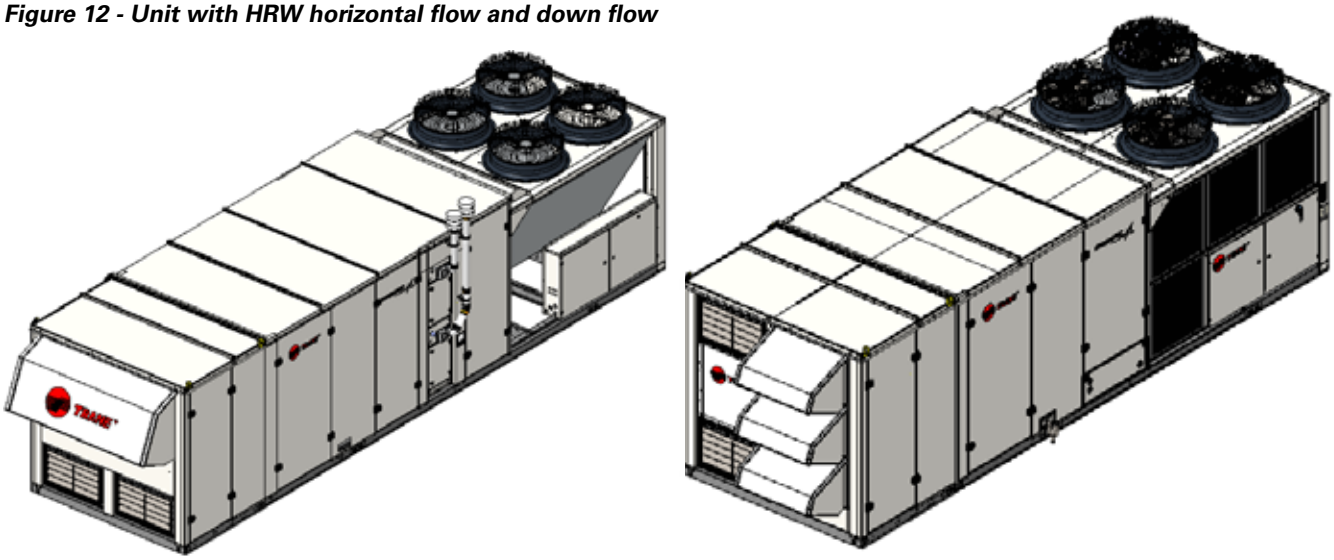
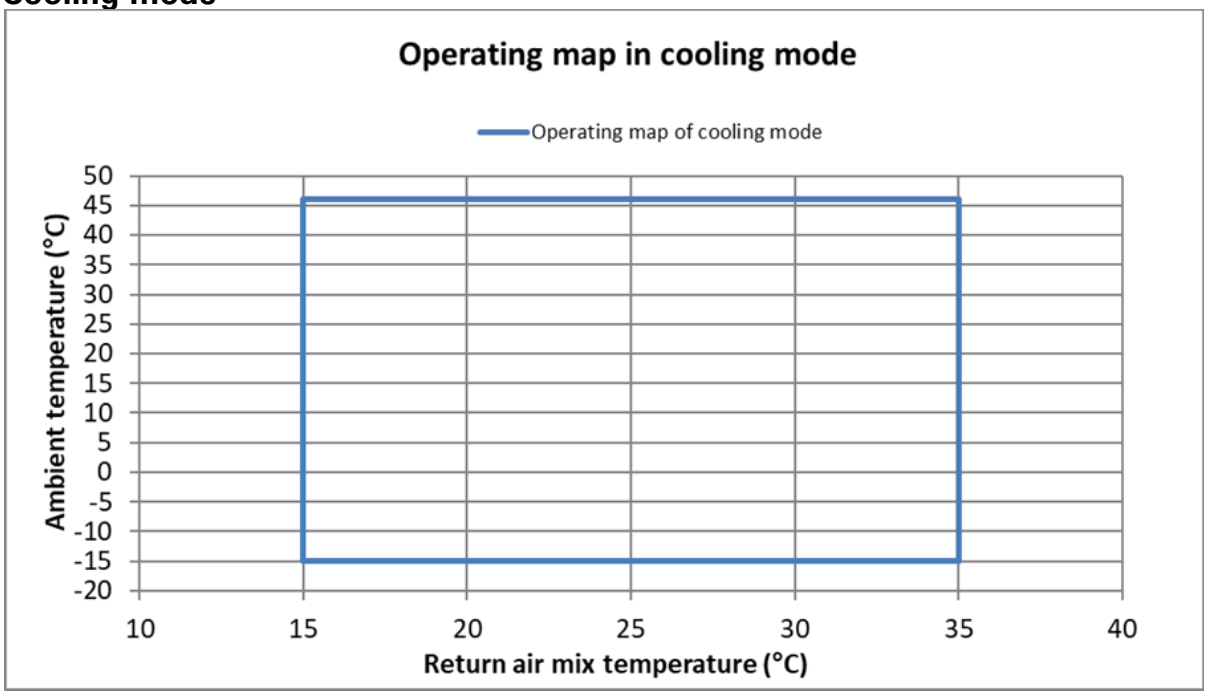


Figure 12 - Unit with HRW horizontal flow and down flow

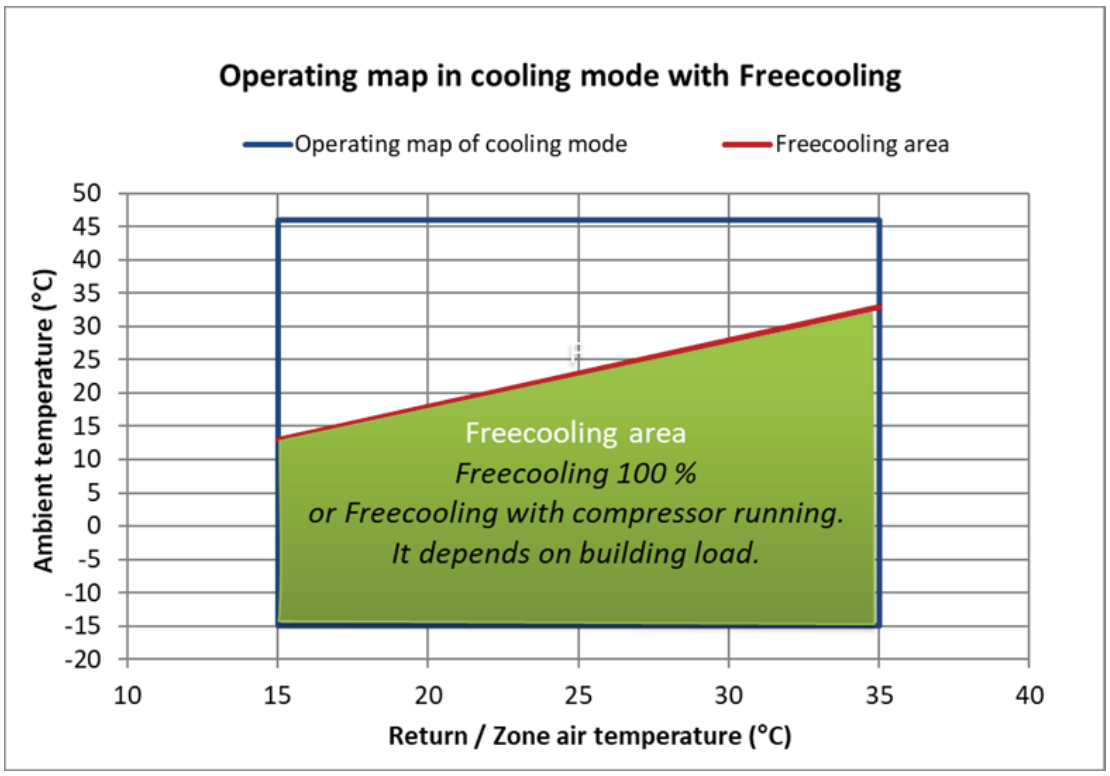


Operating Map

Cooling mode



Minimum Outdoor Temperature = -15 °C
Maximum Outdoor Temperature = 46 °C
Maximum Indoor Coil Mixed Temperature = 35°C
Minimum Indoor Coil Mixed Temperature = 15 °C



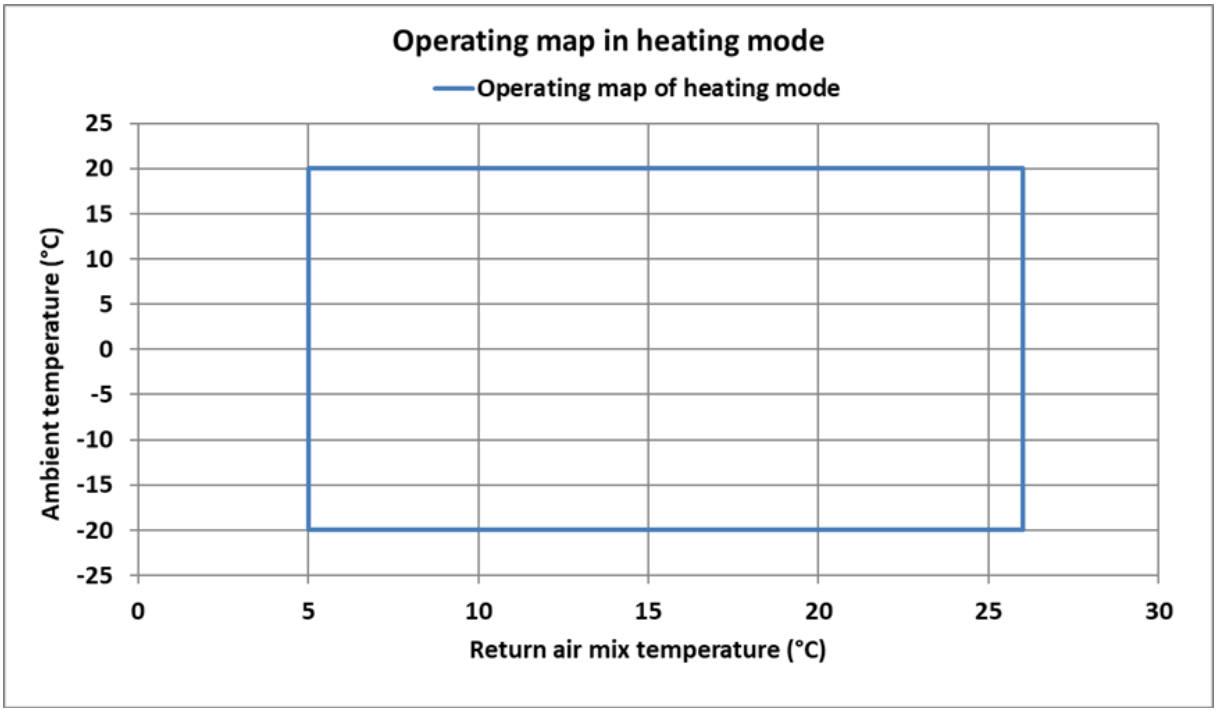
Freecooling area:

Outdoor temperature 13 °C & Return / Zone temperature 15 °C

Outdoor temperature 33 °C & Return / Zone temperature 35 °C

Operating Map

Heating mode



Note: Trane Rooftop can operated until an ambient temperature of -20°C if the unit operated in steady conditions.

Minimum Outdoor Temperature = -20°C
Maximum Outdoor Temperature = 20°C
Maximum Indoor Coil Mixed Temperature = 26°C
Minimum indoor Coil Mixed Temperature = 5°C

Free cooling economizer unit is supplied with economizer and fresh air hood as a standard feature. Fresh air percentage can vary from 0 to 100%.

An economizer consists of:

- A motorized damper with separate fresh air and return air sections.
- A fresh air hood with a grill delivered folded in the unit.
- All necessary sensors for free cooling operation.

The mechanical opening of the damper is managed by the actuator which is adjusted by Trane controller.

Damper is activated in free cooling mode and may be further controlled by temperature control with return and outdoor air sensors or by enthalpy control with addition to temperature sensor of return and outdoor humidity sensor.

Fresh air hood installation

Figure 13 - Fresh air hood assembly steps

Horizontal Flow

Step 1: Remove sheet metal hood



Step 2: Position the flange with corner on the outside



Step 3: position the cover hood



Step 4: Repeat the steps 2 and 3



Step 5: Repeat the steps 2 and 3



Down Flow

Step 1: Remove sheet metal hood



Step 2: Position side flange with corner on the outside



Step 3: position the cover hood



Building Pressurization Control

Barometric Relief

The barometric relief allows to minimize overpressure in the building caused by the introduction of fresh air. This option is typically installed when fresh air intake is below 25% of the nominal air flow and when the return air pressure drop is below 25Pa.

Barometric damper is integrated as standard into economizer option on downflow and not compatible with heat recovery module unit only.

When the pressure of the building increase, the dampers open and relieve air to the outside.

If the return air duct pressure drop is higher than the building overpressure, the dampers will not open.

If the return air duct pressure drop is lower than the building overpressure, the dampers will open and relieve air outside of the building.

Figure 14 - Barometric relief



Options

Exhaust Fans

The exhaust plug fans EC are used to minimize the overpressure in the building caused by the introduction of fresh air.

This option is typically used when the fresh air intake needed is between 40 to 50% of the nominal air flow or when the return air duct pressure drop is higher than 25Pa (<70Pa or 150Pa according to option selected).

This option includes hoods, gravity dampers and axial fans.

Optional service Terminal allow to adjust exhaust fans EC start and stop value according to fresh air damper position.

When the supply air fan is ON, the exhaust fans EC turn on whenever the position of the fresh air dampers meet or exceed the exhaust fan EC set point. (If the potentiometer is set at 40%, the exhaust fans EC will start when the fresh air dampers will meet or exceed 40% opening).

Operation

- When the exhaust fans EC are OFF :

- The barometric dampers open when the air pressure inside the building increases.
  As the building pressure increases, the pressure in the unit return section also increases, opening the dampers and relieving the air.
- If return air pressure drop>building overpressure ($\Delta P > Pb - Patm$) → barometric damper is closed.
- If return air pressure drop<building overpressure ($\Delta P < Pb - Patm$) → barometric damper opens and a maximum of 25% of the nominal airflow can be exhausted.

- When the exhaust fans EC turn ON :

- Around 50% of airflow can be exhausted, depending on the pressure drop in the return air duct.
- The two fans work always together, on stage ON-OFF.
- Each fan has two speeds, which makes 2 configurable speeds by changing the wiring on site.
- The exhaust fan EC is started when fresh air dampers meet or exceed a preset percentage of fresh air.

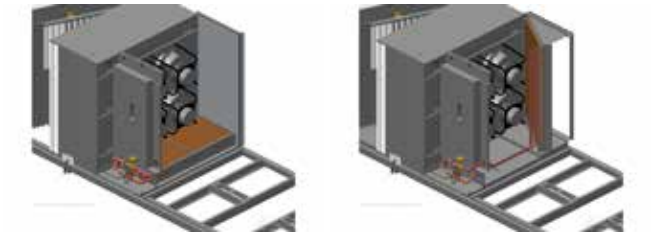
Configured for Return roofcurb (ESP=250 PA)

Figure 15 - Exhaust fan



Hot Water Coil (HWC)

Figure 16 - Hot water coil location in the unit (Downflow and horizontal supply air flow



HWC applies when additional heat is required. Hot water comes from external boiler or other device. HWC provides heating with a coil located after indoor coil and offer full modulation heating control through the use of a 3 ways valve. Control is based on mixed air temperature and zone temperature.

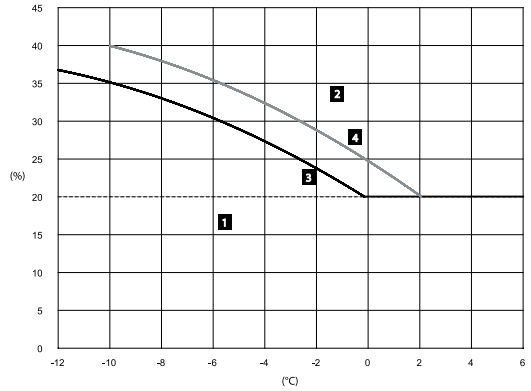
Factory setting is given to heat pump operation. Hot water is called in addition. Priority can be switched on site.

Antifreeze opens the 3 ways valve when the coil temperature is closed to the freezing point (2°C).

In antifreeze mode, unit operating, indoor fan is stopped and the unit locked out in manual reset. Fresh air damper is closed and the modulating valve opens. The freeze protection works with manual reset.

Important notice: it is important that the pump circulating hot water is permanently working to avoid water to freeze in the coil. Otherwise, in order to prevent water from freezing in the coil period, it is recommended to use ethylene glycol. The service of a used can cause scaling deposits, erosion or corrosion. Insulation and proceed to heater wire installation on all the water piping likely to be exposed to freezing temperatures in order to avoid freeze up the coil and heat losses. The water distribution network must be fitted with vents in places where air is likely to be trapped.

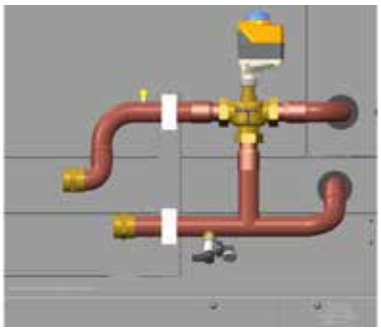
Figure 17 - Glycol percentage recommendation curve



1 = Critical risks of freezing
2 = Efficient freeze protection
3 = Ethylene glycol
4 = Propylene glycol
% = Glycol percentage (mass concentration)
°C = Glycol or water temperature

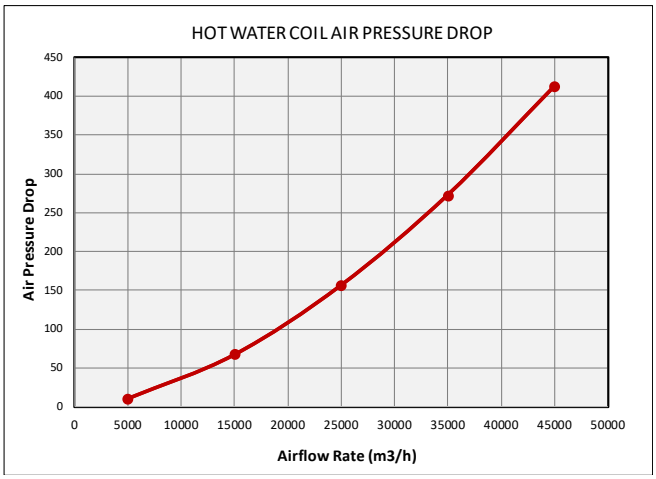
Water connection dimensions and characteristics

Figure 18 - Hot water coil view and connections



The hot water coil is factory mounted and placed in the discharge section. Two holes are provided to connect the hot water coil. The tubes for entering and leaving water are equipped with a threaded female connection.

Figure 19 - Hot Water Coil Pressure Drop



Options

Electric Heater

Electric heater are fitted on the supply fan discharge.

Heaters have two heating stages and provided with two types of overheat thermostats:

- Automatic reset thermostats which stop the electric heater when air temperature rises to 65°C.
- The manual reset thermostat which stops the unit when the air temperature rises to 128°C.

Figure 20 - Electric Heater Pressure Drop

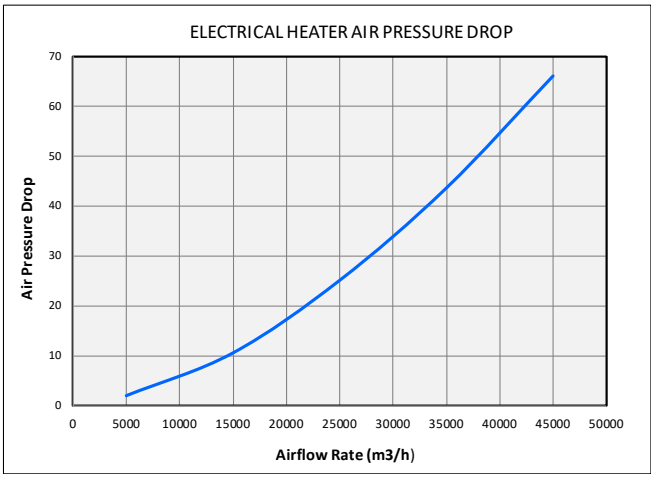
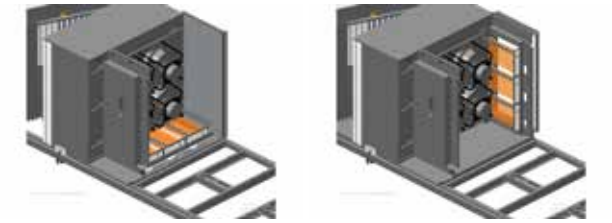


Figure 21 - Electric heaters installed on the unit (Downflow and horizontal supply air flow)



Burner module

PCH : premix burner with a condensing heat exchanger

Figure 22 - Modulating (PCH) gas valves and variable speed combustion blower

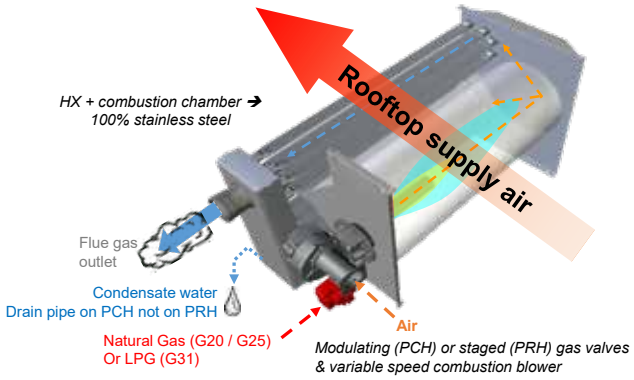
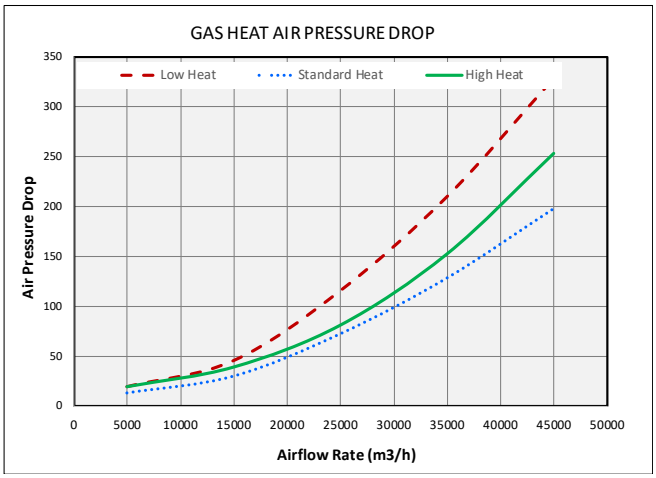


Figure 23 - Gas heat air pressure drop



Assembly procedure of fan block

All ERC specific electrical components are located in the electrical box. Electrical connections of exhaust fan must be performed on site.

CH536 + module extension

Control Hardware Modules

The main CH536 module allows the control of the heat pump, the indoor EC fan and the outdoor fan.

3 extension module can be used :
- 1 module for auxiliary heat, economizer enthalpy, exhaust fan and for ERP.
- 1 module for heat recovery.
- 1 extension module to manage customer options.

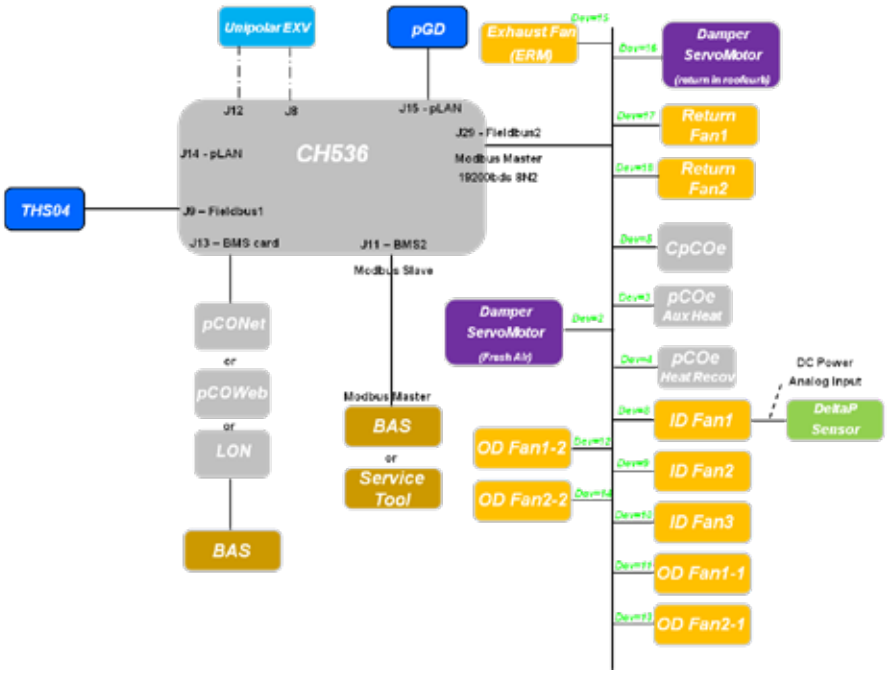
Figure 24 - CH536 main module



Control Hardware Bus

This diagram is for information. For details refer to wiring diagram shipped with the unit.

Figure 25 - Control Hardware Bus



Service Terminal

The service terminal is an option to the customer, easily plugged to unit through cable. The controller is composed of six different buttons and a graphical display. This view of plug-and-play service and the controller allows personal service to read and modify some parameters of the device as setpoints (cooling and heating), airflow, alarm and warning display.

It includes scrolling menus and explanation of full text.

Figure 26 - Optional display



Controls

Zone temperature source

The zone temperature source are summarized in the table below by hierarchy order.

Source	Condition
1. BAS	BAS command enabled & Value in validity range [-10°C; +50°C]
2. Zone Temp Sensor	Ad-hoc Config enabled & Value in validity range [-10°C; +50°C]
3. Zone Temp THS04	THS04 installed & Ad-hoc Config enabled & Value in validity range [-10°C; +50°C]
4. Conventional Thermostat	Ad-hoc config enabled
4. Return Air Temp	Value in validity range [-10°C; +50°C]

CO_2 sensor

CO_2 sensor can be either in air return duct or wall mounted. It maintains a CO_2 concentration below a preset value to ensure acceptable comfort.

Controls the opening of the fresh air damper of the economizer. The outside air damper will modulate in order to maintain the CO_2 concentration below the setpoint.

To open damper it should combine the amount of desired fresh air and the free cooling mode to modulate from 0 to 100% maximum opening of the dampers. It is possible to preset a minimum opening during commissioning.

The CO_2 sensor is set for 0-10V analog outputs and provide sensing of carbon dioxide over a range of 0-2000 ppm. The sensor requires a 24 VDC power supply. Consult wiring diagram supplied with the unit for details.

The resolution of analog outputs reaches 10 ppm CO_2. The information is then sent to the controller CH536 to control the opening position of the fresh air damper.

Avoid locating the duct sensor on surfaces with an uncooled, unheated area behind them or in “dead” spot behind doors or in corners. The CO_2 wall mounted sensor should be placed on a flat surface, 1.4 m from the floor in an area of the room where there is free air circulation.

CO_2 sensor maintenance

This CO_2 sensor has excellent stability and requires no maintenance. In most environments the recommended calibration interval is five years. A trained service technician can use a portable CO_2 meter to certify sensor calibration. If, when checking the sensor, the reading differs too much from the reference value, the sensor can be recalibrated in the field. A calibration kit, software, and calibration gases are required. If certified accuracy is required, the sensor must be calibrated against accurate and traceable calibration gases in a laboratory. Consult Trane BAS for further details.

Fire thermostat

U12 is the dedicated I/O. Optional fire thermostat should be configured if present according to wiring diagram.

Clogged filter detector

This device is mounted in the filter section. The sensor measures the difference in pressure before and after the filter section. The information is sent to the optional service terminal or the BMS.

Smoke Detector

Installation: This device is used to detect smoke in the air stream. Detector is delivered by trane and must be installed by the customer to comply with local regulation. The detector must be connected to the central panel according the wiring diagram.

Operation: When smoke is detected, it shuts off the unit, and an alarm is activated in the controller to inform the user through the local or remote control.

Other accessories available

- DTS : duct mounted wired temperature sensor

The duct mounted sensor - mainly for unit with auxiliary heat - must be installed away of any duct singularities and generally at 2 m of any duct elbow or duct inside element both upstream and downstream.

- TZS01 : wall mounted wired temperature sensor

- THP05 : wall mounted thermostat

Refer to separate documentation for more information.

Alarm and Warnings

Alarms stop the unit or reduce the heating/cooling capacity. Alarm can be either manual reset (requires human intervention to re-start the unit) or automatic reset.

Warning run the unit in fall-back mode.

Example : if outdoor air humidity sensor is not working, the economizer runs in dry-bulb mode.

Events are accessible through optional local service terminal which display the current events and display history of past events (up to 99 alarms and 99 warnings).

Refrigerant leak detector R454B

When a refrigerant leak of R454B is detected (concentration > 500 ppm) during a unit operation then the control algorithm switches off immediately all compressors, an auxiliary heater, closes EEV, opens fresh air on 100 % and keeps running outdoor, indoor fans and exhaust fans (if installed) at least for 10 min.

A corresponding alarm will be displayed on the service terminal.

It is not possible to reset the alarm during the 10 min of the ventilation, not possible to run the compressors or an auxiliary heater during this period.

After 10 min left is possible to reset the alarm if the concentration < 500 ppm and to run the unit again. But it is highly recommended to verify refrigeration circuit, to find a refrigerant leak. In case of a leak the unit probably cannot start again because of low refrigerant charge in the system. Do not forget to verify both refrigerant circuits of Duplex units.

It is highly recommended to verify both refrigerant circuits, and to repair impacted refrigerant circuit, even if there is the second refrigerant circuit (duplex unit) which should not be impacted.

When the unit is in OFF mode, and a refrigerant leak is detected, then only an alarm is displayed on the service terminal, and no ventilation is running. Then it is necessary to verify physically the refrigerant circuit. It is not possible to run the unit.

Customer option module

For Customer option module refer to wiring diagram supplied with the unit for detailled information.

Customer option module

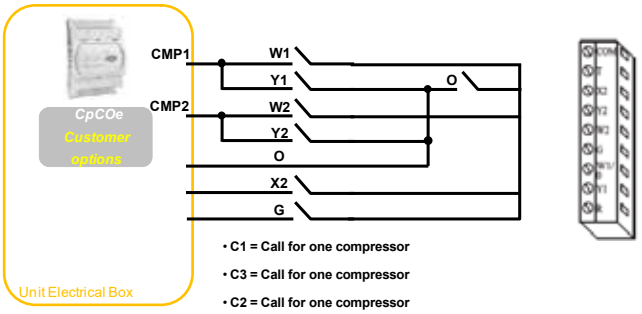
Input/Output are defined with the optional service terminal. Outputs are only with dry contacts.

List of I/Os through universal pins

External Control (Digital In)	Emergency Stop		
	External Auto / Off	Takes precedence over THS04	
	Circuit1 Disable		
	Circuit2 Disable		
	Compressor 1A Disable		
	Compressor 1B Disable		
	Compressor 2A Disable		
	Compressor 2B Disable		
	Occupancy Sensor		
	Timed Override occupied initiate		
	Timed Override occupied terminate		
	Aux. Heat Disable		
	Mech to Aux Heating changeover		
	Pressurize override		
	Purge override		
	Exhaust override		
	CMP1 *	Conventional Thermostat	open = OFF / closed = ON
	CMP2 *	Conventional Thermostat	
	CMP3 *	Conventional Thermostat	
	CMP4 *	Conventional Thermostat	
	SOV *	Conventional Thermostat	
	AuxHeat1 *	Conventional Thermostat	
	AuxHeat2 *	Conventional Thermostat	
	IDFan *	Conventional Thermostat	
	Firestat		

The main module should be configured with the appropriate I/O.

Operation with a conventional thermostat



- C1 = Call for one compressor
- C3 = Call for one compressor
- C2 = Call for one compressor
- C4 = Call for one compressor
- O = Switchover Valve (On=cooling ; Off=Heating (HP))
- X1 = Call for Aux. Heat 1
- X2 = Call for Aux. Heat 2
- G = Call for supply fan
- F = 0 – 10V signal to control supply fan speed
- R = 24VAC power to thermostat

For overall wiring, consult wiring diagram supplied with the unit.

Active Unit Mode	Conv Th	O control
OFF	Inactive	-
Auto	Active	enabled
Heat	Active	disabled
Cool	Active	disabled

Economizer control

Demand Control Ventilation

The 10 I/O for economizer allow 4 strategies for Demand control ventilation

#1: Fixed Ventilation (design ventilation)

It is based on design occupancy of the zone.

Occupied standby setpoint = 0.6L/s per m^2 (ASHRAE62.1) x Surface

Occupied setpoint = 4.72L/s per person (ASHRAE62.1) x DesignOccupants# + Occupied standby setpoint

#2: Occupancy-based ventilation – requires an occupancy sensor

During occupied hours, depending on occupancy sensor, we can switch between 2 setpoints

No people detected: Occupied Standby Setpoint = 0.6L/s per m^2 x Surface

People detected: Occupied Setpoint = 4.72L/s per person x DesignOccupants# + Occupied Standby Setpoint

#3: CO_2-based ventilation – requires a space CO_2 level information (sensor or BAS)

Modulates between Occupied setpoint and Occupied Standby setpoint with Damper control.

Emergency Ventilation override

Three possible external requests, with following priority order

1. Pressurize
2. Purge
3. Exhaust

When those override modes are activated, heating or cooling are turned OFF. If they were ON, the emergency stop mode is used.

Those override modes can be activated through local request or BAS.

Emergency override command:

1. Normal
2. Pressurize
3. Depressurize
4. Purge
5. Shutdown
6. Fire

Table 1 - Override mode

Override mode	Pressurize	Purge	Exhaust (Depressurize)	Smoke Detector	Shutdown (Emergency Stop/ Firestat)
ID Fan	ON - Full Speed	ON - Full Speed	OFF	OFF	OFF
OA Damper	Open 100%	Open 100%	Close 0%	Open 100%	Close 0%
Exhaust Fan	OFF	ON	ON	OFF	OFF
Heat/Cool	OFF	OFF	OFF	OFF	OFF

Opening Airflow Damper

The mechanical opening of the damper is managed by the actuator which is adjusted by Trane controller. In Free cooling mode, fresh air flow can be adjusted through optional terminal but the maximum opening airflow damper minimum position is set at 50% by default and maximum factory setting is 95%. At installation, Minimum Fresh Air Percentage during occupied time have to be adjusted.

Operation

Test Procedures

Operating checklist before start-up

- Review submittals for rooftop and accessories as well as main wiring diagrams and options shipped with the unit
- Unit is level, with sufficient clearance all round
- Duct network is correctly sized according to the unit configuration, insulated, and water-tight
- Condensate drainage line is correctly sized, equipped with a trap, and sloped
- Filters are in position, of correct size and quantity and clean
- Wiring is correctly sized and connected in accordance with wiring diagrams
- Power supply lines are protected by recommended fuses and correctly earthed
- Thermostat is correctly wired and positioned
- Unit is checked for refrigerant charge and leaks
- Indoor and outdoor fans rotate freely and are fixed on shafts
- Supply fan rotation speed is set
- Access panels and doors are replaced to prevent air entering and risks of injury
- When ball valve is present on the refrigerant suction line, to check if the valve is open before starting the unit.

WARNING! If any operating checks must be performed with the unit operating, it is the technician's responsibility to recognize any possible hazards and proceed in a safe manner. Failure to do so could result in severe personal injury or death due to electrical shock or contact with moving parts.

Power-up initialization

CAUTION! Before proceeding with any test procedure or operation, make sure that crankcase heaters have been energized for at least 8 hours.

Starting the unit in cooling mode

Before start-up, ensure that all power cables are tightened.

Verify that the unit airflow rate is adjusted.

Operating pressures

After the unit has operated in cooling mode for a short period of time, install pressure gauges on the gauge ports of the discharge and suction line valves.

Note: Always route refrigerant hoses through the port hole provided and ensure that the compressor access panel is in place.

Final installation checklist

- Are all power cables tightened?
  Check torque of power cables contact !
- Is the condenser fan and indoor blower operating correctly, i.e. correct rotation and without undue noise?
- Are the compressors operating correctly and has the system been checked for leaks?
- Have the voltage and running currents been checked to determine if they are within limits?
- Have the air discharge grilles been adjusted to balance the system?
- Has the ductwork been checked for air leaks and any condensation?
- Has the air temperature rise been checked?
- Has the indoor airflow been checked and adjusted if necessary?
- Has the unit been checked for tubing and sheet metal rattles or any unusual noises?
- Are all covers and panels in place and properly fastened?

To keep the unit operating safely and efficiently, the manufacturer recommends that a qualified service technician check the entire system at least once each year, or more frequently if conditions warrant.

Upon power initialization, the control performs self-diagnostic checks to insure that all internal controls are functioning. It checks the configuration parameters against the components connected to the system.

Gas Burner first start

The PCH burners are supplied with factory settings according to model number gas selection. They are tested for the gas specified on the burner nameplate.

However it is required to

- Check the gas category
- Check the gas intake pressure on the gas valve
- Perform the combustion analysis to verify that the level of flue gases corresponds to the data contained in general data table or in manufacturer IOM manual.

When turned on for the first time, the pilot burner may not ignite due to air kept in gas hose. There is the need to reset the equipment and repeat the operation until gas hose is purged and it ignites.

Consult electrical drawing and supplier IOM shipped with the unit.

Figure 27 - Example of PCH burner

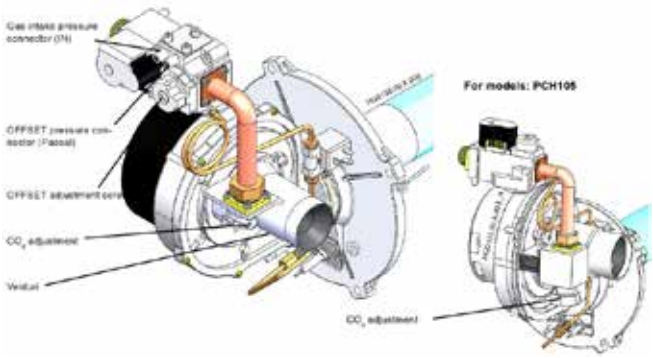


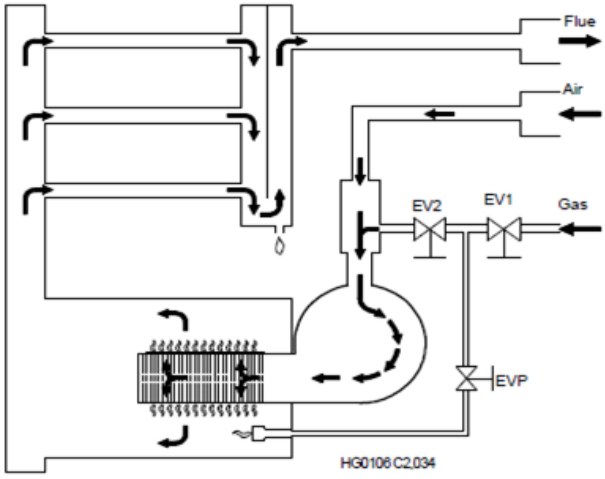
Table 2 - Marking Category of gas section in different countries

CATEGORY		G20	G25	G31
II_{2Esi3P}			FR	
	mbar	*20*	*25*	*37*
$II_{2H3B/P}$			**DK, FI, GR, SE, NO, IT, CZ, EE, LT, SI, AL, MK, BG, RO, HR, TR**	
	mbar	*20*	*-*	*30*
$II_{2H3B/P}$			**AT, CH**	
	mbar	*20*	*-*	*50*
$II_{2HS3B/P}$			**HU**	
	mbar	*25*	*-*	*-*
$II_{2L3B/P}$			**NL**	
	mbar	*-*	*25*	*30/37/50*
II_{2H3P}			**ES, GB, IE, PT, SK**	
	mbar	*20*	*-*	*37*
$I_{2E(S)}$			**BE < 70kW**	
	mbar	*20*	*25*	*-*
$I_{2E(R)}$			**BE > 70kW**	
	mbar	*20*	*25*	*-*
$II_{2ELwLs3B/P}$			**PL**	
	mbar	*20*	*-*	*37*
II_{2E3P}			**LU**	
	mbar	*20*	*-*	*30/37/50*
$II_{2ELL3B/P}$			**DE**	
	mbar	*20*	*20*	*50*
I_{3P}			**BE**	
	mbar	*-*	*-*	*37*
I_{2H}			**LV**	
	mbar	*20*	*-*	*-*

Premix burner working cycle

1. Heat request signal coming from CH536
2. Burner fan starts to pre-wash combustion chamber
3. EV1 and EVP gas valves open to allow gas to feed pilot burner
4. Start up electrode gives ignition sparks on pilot burner
5. EV2 main gas valve opens to gas feed main burner
6. Combustion starts thanks to pilot flame ignition
7. Pilot and main burners work together for a shor time, then the electronic boards close EVP and stops the pilot

Figure 28 - Premix burner of working cycle



Interface panel



PCH
Red 3 digit LCD display
Module status (rdy, On, Off, Fxx...)
3 levels menu:
- I/O (Input/Output)
- PAR (parameters)
- Flt (Faults)



PRH
Green light : power supply
red lights : faults - diagnostics available by pressing button for more than 5 sec.
Reset button
Summer/winter button

Maintenance

End user Routine Maintenance

Some of the periodic maintenance functions for the unit can be undertaken by the end user. This includes replacing (disposable) or cleaning (permanent) air filters, cleaning unit cabinet, cleaning the condenser coil, and carrying out a general unit inspection on a regular basis.

WARNING! Disconnect the power supply before removing access panels to service the unit. Failure to disconnect power before attempting any servicing can result in severe injury or death.

Air filters

It is very important for the central duct system air filters to be kept clean.
These should be inspected at least once a month when the system is in constant operation (in new buildings, the filters should be checked every week for the first four weeks). If disposable-type filters are used, they should only be replaced with ones of the same type and size.
The economizer fresh air filter should be inspected (washed if needed) at least once a month.

Note: Do not attempt to clean disposable filters. Permanent filters can be cleaned by washing with a mild detergent and water. Ensure that the filters are thoroughly dry before reinstalling them in the unit (or duct system).

Note: Replace permanent filters when required or at least annually if washing fails to clean them, or they show signs of deterioration. Be sure to use the same type and size as were originally installed.

Condenser coil

Unfiltered air circulates through the unit's condenser coil and can cause the coil's surface to become clogged with dust, dirt, etc. To clean the coil, brush the coil surface in the direction of the fins with a soft bristled brush.

Keep all vegetation away from the condenser coil area.

Hot water coil (option)

Stop the unit. Do not disconnect the main supply to the unit. This will permit the anti-frost protection to continue to operate, and avoid water to freeze-up in the coil.

Service Technician Maintenance

Before the cooling season, your service technician may examine the following areas of your unit:

- Filters, for cleaning or replacement
- Motors and drives system components
- Economizer gaskets, for replacement if necessary
- Condenser coils, for cleaning
- Safety controls, for mechanical cleaning
- Electrical components and wiring, for replacement and tightening of connections as necessary
- Condensate drain, for cleaning
- Unit duct connections, to ensure they are physically sound and sealed to the unit casing
- Unit mounting support, to ensure that it is sound
- The unit, to ensure there is no obvious deterioration

Before the heating season, your service technician may examine the following areas of your unit:

- The unit, to ensure that the condenser coil can receive the required airflow (that the condenser fan grille is not obstructed)
- The control panel wiring, to verify that all electrical connections are tight, and that wire insulation is intact

Troubleshooting Alarm and Warnings

The optional control display has the ability to provide the service personnel with some unit diagnostics and system status information.

1. Step the system through all of the available modes, and verify operation of all outputs, controls, and modes. If a problem in operation is noted in any mode, proceed to troubleshooting search.
2. Refer to the individual component test procedures if other microelectronic components are suspect.
3. In additon review carefully the components which can lead to the alarm: temperature sensor, zone temperature sensor, clogged filter switch

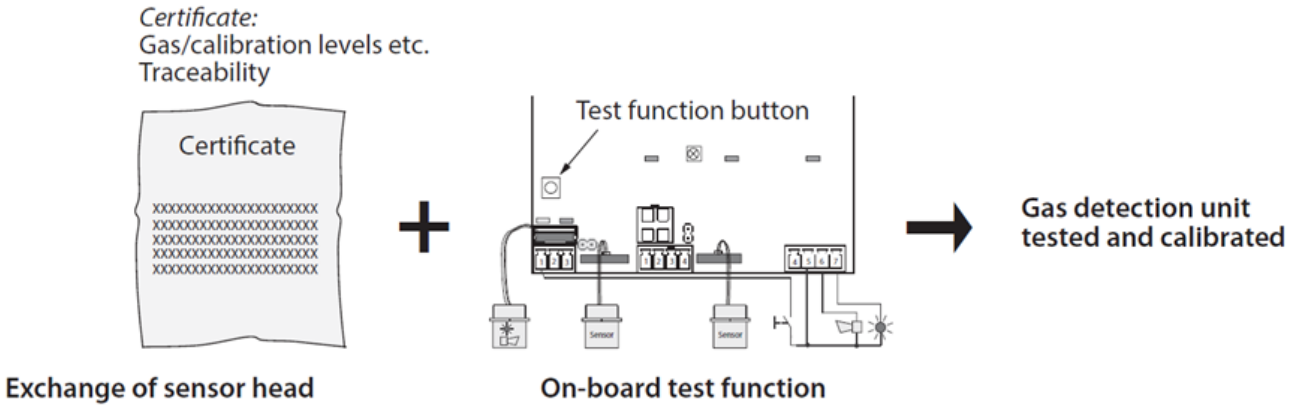
Refrigerant leak detector R454B calibration

Calibration of this component must be done every year. It is important to ensure proper accuracy and operation of the detector.

There are two different methods to fulfill the calibration requirements:

Replacing the sensor head with a new factory pre-calibrated sensor It is necessary to make an order of this sensor head as spare part.

After sensor head exchange, the detector must be tested with the on-board test button function, which simulates alarm signals and relay activation, to ensure all electrical components are functional.



This method is preferred due to the following factors:

- As sensors have a limited lifetime, this method basically ensures that the customer has a gas detector as good as new after replacing the sensor head.
- The method is typically more efficient and cost effective compared to calibration carried out on site.

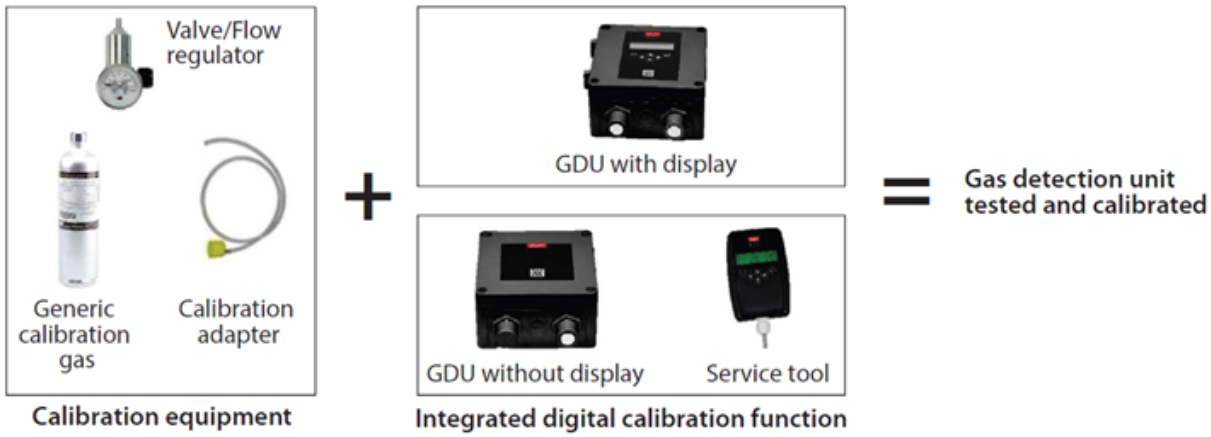
Performing a calibration to the sensor using calibration gas (gas mixture with known target gas concentration)

Test equipment and basic competence in Calibration is required to carry out this method.

Calibration equipment for Gas Detection Units (GDU) consists of:

- Valve/Flow regulator.
- Gas cylinder with the correct calibration gas for each refrigerant and concentration (ppm).
- Calibration adapter.

In order to execute the calibration function, the gas detector unit needs to be equipped with a display or connection to either the service tool or the PC tool.



Recommended service routine frequencies

As a commitment to our customers, we have created a wide service network staffed with experienced factory authorized technicians. At Trane we offer all the benefits of after sales service direct from the manufacturer and we are committed to our mission statement to provide efficient customer care.

We would be delighted to discuss your individual requirement with you. For further information regarding Trane maintenance agreements please contact your local TRANE sales office.

RECOMMENDED YEARLY SERVICE ROUTINE FREQUENCIES

Year	Commissioning	500 / 1000 hr Visit	Annual Maintenance	Inspection Visit
1	X	X		XX
2			X	XXX
3			X	XXX
4			X	XXX
5			X	XXX
6			X	XXX
7			X	XXX
8			X	XXX
9			X	XXX
10			X	XXX
+10			Every year	3 Every year

This timetable is applicable to units operating in normal conditions with an average of 4000 hours per year.
If operating conditions are abnormally severe, an individual timetable must be made for that unit.

Maintenance routine

Commissioning
- Check installation of equipment/pre-commission.
- Configure unit control module.
- Calibrate controls.
- Check operational set points and performance.
- Check operation of all safety devices.
- Megger the motor compressor windings.
- Check unit operation.
- Record operating temperatures pressures, amperages and voltage.
- Carry out leak test.
- Fill the start up log sheet and review with the operator.

Gas Heat
- Check operation of gas train components.
- Check burner sequence of operation.
- Check combustion blower assembly.
- Check gas pressure to unit.
- Inspect flame condition.
- Carry out flue gas analysis

Electric Heat
- Inspect all electrical connections.
- Verify correct operation of heating elements.

Hot Water/Steam
- Inspect valves and traps.
- Verify operation of heating

500/1000 hours visit
- Visit at the end of running in period.
- Replace compressor oil on all circuit's.
- Replace liquid line drier cores on each circuit (if applicable).
- Carry out leak test.
- Inspect contacts and tighten terminals.
- Record operating pressures, amperages and voltage.
- Check condition of evaporator & condenser coils.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Fill out the 500/1000 hours visit log sheet and review with the operator.
- Carry out flue gas analysis (Gas Heating).
- Log book to be stamped validating 500/1000hr. visit

Inspection visit
- Carry out leak test.
- Inspect contacts and tighten terminals.
- Record operating pressures, amperages and voltage.
- Check condition of evaporator & condenser coils.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Carry out flue gas analysis (Gas Heating).
- Complete log sheet and review with the operator.

Annual Maintenance
- Check operational set points and performance.
- Calibrate controls.
- Check operation of all safety devices.
- Inspect contacts & tighten terminals.
- Megger the motor compressor windings.
- Record operating pressures, amperages and voltage.
- Carry out leak test.
- Check configuration of unit control module.
- Replace line drier cores on each circuit (if applicable).
- Carry out system analysis.
- Change the oil as required based upon results of the Trane laboratory analysis.
- Lubricate motors/dampers/bearings (where applicable).
- Check condition of evaporator & condenser coils.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Complete annual maintenance visit log sheet and review with the operator.

Gas Heat
- Check operation of gas train components.
- Check burner sequence of operation.
- Check combustion blower assembly clean if required.
- Check gas pressure to unit.
- Inspect flame condition.
- Carry out flue gas analysis.

Electric Heat
- Inspect all electrical connections.
- Verify correct operation of heating elements

Hot Water/Steam
- Inspect valves and traps.
- Verify operation of heating.
- Inspect coil.

Refrigerant leak detector R454B
- Calibration has to be carried out every year.

Additional services

Oil analysis

Trane Oil Analysis is a predictive tool used to detect minor issues before they become major problems. It also reduces failure detection time and allows planning for appropriate maintenance. Oil changes can be reduced by half resulting in lower operating costs and a lower impact on the environment.

Refrigerant analysis

This Service includes a thorough analysis for contamination and solution upgrade. It is recommended that this analysis be performed every six months.

Trane Select Agreements

Trane Select Agreements are programs tailored to your needs, your business and your application. They offer four different levels of coverage. From preventive maintenance plans to fully comprehensive solutions, you have the option of selecting the coverage that best suits your requirements.

5 years motor-compressor warranty

This Service will provide a 5 years part and labor warranty for the motor compressor only. This Service is only available for units covered by a 5 years Maintenance Contract.

Energy enhancement

With Trane Building Advantage you can now explore cost effective ways to optimize the energy efficiency of your existing system and generate immediate savings. Energy management solutions are not only for new systems or buildings. Trane Building Advantage offers solutions designed to unlock energy savings in your existing system.

Trane - by Trane Technologies (NYSE: TT), a global climate innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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