



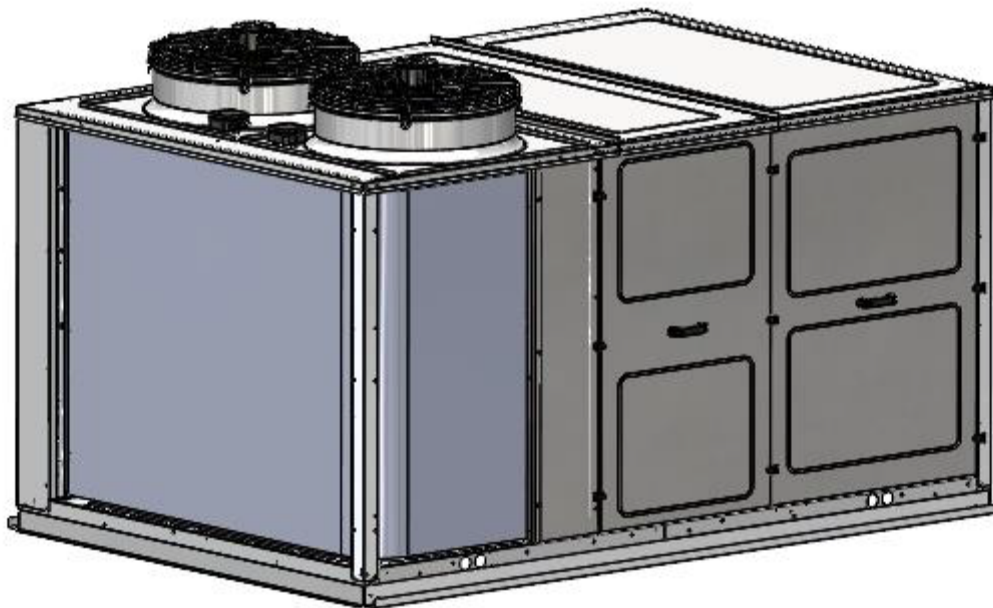
# Installation Operation Maintenance

Airfinity™ S rooftop units

Models EIH – Reversible heat pump

14 - 36 kW

R454B Refrigerant



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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 not 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 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.

## General information

### 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 12.5 bar (R454B) at 20°C or 9.5 bar (R454B) at 10°C, call a qualified service.

Organization 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 1-2-3 Unit size

EIC = Europe- Airfinity- Cooling only  
EIH = Europe- Airfinity- Reversible heat pump

## Digit 4-5-6 Unit Nominal Capacity

017 = 17 kW reversible  
019 = 19 kW reversible  
023 = 23 kW reversible  
027 = 27 kW reversible  
030 = 30 kW reversible  
036 = 36 kW reversible  
051 = 50 kW Heat Pump only  
061 = 60 kW Heat Pump only

## Digit 7 - Efficiency level

S = Adaptive Frequency Drive

## Digit 8 - Refrigerant

B = R454B (Full factory refrigerant charge)  
3 = Nitrogen charge (for R454B)

## Digit 9 - Unit voltage

E = 400 V - 3 Ph - 50 Hz

## Digit 10 - not used

## Digit 11 - Design sequence

A = Initial design  
From B to K = Sequence

## Digit 12 - Auxiliary Heat

X = Without  
W = Hot water coil  
E = Electric heater  
M = Modulating gas burner  
P = Preheat coil

## Digit 13 - Supply Air Direction

D = Downflow supply  
H = Horizontal supply  
U = Up Flow Supply

## Digit 14 - Return Air Direction

K = Downflow return  
L = Horizontal return  
M = Up Flow Supply

## Digit 15 - Available static pressure

1 = Standard External Static Pressure (250Pa)  
2 = High External Static Pressure (500Pa)  
3 = Standard External Static Pressure (250Pa) (NCT)  
4 = High External Static Pressure (500Pa) (NCT)

## Digit 16 - Operating map (cooling mode)

A = Standard ambient  
L = Low ambient

## Digit 17 - Free cooling (Economizer)

X = Without (full recirculation)  
A = Dry bulb control  
B = Enthalpy control

## Digit 18 - Heat Recovery Module

X = Without  
B = Configured for Rotary Wheel with High Outdoor/Exhaust Airflow  
R = Configured for rotary wheel  
T = Thermodynamic circuit with AC fans  
F = Thermodynamic heat recovery with EC fan  
U = Thermodynamic circuit with EC fans  
M = Configured for Rotary Wheel with High Outdoor/Exhaust Airflow (NCT)  
N = Configured for rotary wheel (NCT)  
P = Thermodynamic circuit with EC fans (NCT)

## Digit 19 - Dehumidification

X = Without  
A = With

## 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  
E = Electrostatic filters

## Digit 23 - Temperature Zone sensor

X = Without  
A = Duct-mounted zone sensor  
B = Wall mounted zone sensor  
C = Wireless zone sensor

## Digit 24 - Room User Interface

X = Without  
A = Wall-mounted interface THP05  
B = Conventional thermostat Not used  
C = PGD wall-mounted interface (PGDE)

## Digit 25 - CO<sub>2</sub> sensor

X = Without  
1 = CO<sub>2</sub> sensor duct-mounted  
2 = CO<sub>2</sub> sensor wall-mounted

## Digit 26 - Smoke detector

X = Without  
1 = With

**Digit 27 - Airflow Measurement**

X = Not used

A = Airflow measurement and display

**Digit 28 - Dirty filter detection**

X = Without

1 = With

**Digit 29 - Network protection relay**

X = Phase reversal protection

A = Phase reversal and asymmetry protection

**Digit 30 - Literature Language**

A = Bulgarian

B = Spanish

C = German

D = English

E = French

H = Dutch

J = Italian

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

2 = Exhaust fan AC

3 = Exhaust Fan EC

4 = Configured for return roofcurb (ESP = 250Pa)

5 = Exhaust fan EC (NCT)

6 = Configured for return roofcurb (ESP = 250Pa) (NCT)

**Digit 32 - Roofcurb**

X = Not used

1 = With roofcurb

**Digit 33 - External Customer Input/Output**

X = Without

1 = With Custom I/O

**Digit 34 - Multi-Rooftop Control**

X = Without

A = With Master/slave control

C = With Tracer Concierge comfort

T = With Tracer Concierge Comfort with Display (Recommended)

**Digit 35 - Communication interface**

X = Without

1 = ModBus communication interface

2 = LonTalk communications interface Not used

3 = BACnet (MSTP)

4 = BacNet IP

**Digit 36 – Refrigerant leak detector**

X = Not used

1 = With

**Digit 37 - Compressor Starter Type**

X = Across the line

A = Soft starter

**Digit 38 - Service User Interface**

X = Without

1 = Service terminal TD7

2 = Remote service control

**Digit 39 - Fire Thermostat**

X = Without

A = With

**Digit 40 – Droplet Eliminator**

X = Without

A = With

**Digit 41 – Factory (New)**

T = Bari, Trane

I = Bari, ICS

Z = Bari, Thermocold

**Digit 42 – Marking**

B = CE Marking

U = UKCA Marking

**Digit 43 – Downflow direct ducts connection**

X = Without

1 = With

**Digit 44 - Condenser Guard grill**

X = Without

A = With

**Digit 45 - Export Packaging**

X = Without

A = With

**Digit 46 - Special design**

X = Standard

**Digit 47 - External ventilation override**

X = Without

A = With

**Digit 48 - Special design**

X = Without

A = With Programmable Relays

**Digit 49 - External Setpoint**

X = W/ External Setpoint

**Digit 50 - Not used**

X = Not used

**Digit 51 - Not used**

X = Not used

**Digit 52 - Not used**

X = Not used

**Digit 53 - Not used**

X = Not used

**Digit 54 - Not used**

X = Not used

**Digit 55 - Special design**

X = Standard

S = Special design

# IH General Data

Table 1 – Single compressor circuit

		IH017	IH019	IH023	IH027	IH030	IH036	IH051	IH061
<b>Cooling Mode – IH Units</b>									
Net Cooling Capacity R454B (1)	kW	16,3	18,7	22,6	25,3	30,2	35,8	35,8	60,0
Total Power Input R454B (1)	kW	5,8	6,0	7,7	9,4	9,9	12,6	13,2	20.1
<b>Heating Mode – IH Units</b>									
Net Heating Capacity R454B (1)	kW	15,5	18,3	22,9	26,1	31,6	38,1	50,0	59,0
Total Power Input R454B (1)	kW	4,2	4,9	6,2	7,6	8,5	10,6	14,6	18.2
<b>Electric Heater</b>									
Number of capacity step	#	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0
Capacity Steps (1)	kW	8,8	8,8	13,3	13,3	14/21,2	14/21,2	12.5 / 12.5	12.5 / 25
<b>Electrical Data (2) (3)</b>									
Main Power Supply	V/Ph/Hz								
Unit Max Amps	A	17,1	17,1	19,4	22,2	21,5	21,6	46,0	50,0
Maximum Short Circuit rating for 0,3 sec	kA	15,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0
Max power cable cross section (Standard unit)	mm2	10,0	10,0	10,0	35,0	35,0	35,0	50,0	50,0
Max power cable cross section (full optional)	mm2	35,0	35,0	35,0	35,0	70,0	70,0	150,0	150,0
Disconnect switch std unit		ABB OT63F3	ABB OT63F3	ABB OT63F3	ABB OT80F3	ABB OT125F3	ABB OT125F3	Sirco 125A	Sirco 125A
Disconnect switch unit with option (heat recovery, Exhaust fan, Return Fan, Auxiliary heat)		-	-	-	-	-	-	Sirco 250A	Sirco 250A
<b>Electrical data of options (2) (3)</b>									
Electric Heater	A	13,5	13,5	20,3	20,3	30,5	30,5	36.1	54.1
Indoor fan: Oversized	A	5,5	5,5	5,5	5,5	5,9	5,9	4.3	0.0
Exhaust Fan EC	A	2,4	2,4	2,4	2,4	2,4	2,4	5.2	5.2
Return Roofcurb	A	-	-	-	-	-	-	5.3	5.3
Heat Recovery (not included current for oversized fan)	A	-	-	-	-	-	-	7.5	7.5
Gas burner (modulating)	A	-	-	-	-	-	-	0.3	0.3
<b>Frame</b>									
Frame		Frame1	Frame1	Frame2	Frame2	Frame3	Frame3	Frame S1	Frame S1
<b>Compressor</b>									
Number of Circuits	#	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Number of Compressor per Circuits	#	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Type									
Model (R454B)		VZH035CG	VZH035CG	VZH044CG	VZH052CG	VZH052CG	VZH065CG	CDS803/VZH117	CDS803/VZH117
Max Amps per Compressor	A	8,9	8,9	8,8	10,5	10,5	13,0	-	-
Locked Rotor Amps per Compressor	A	12,4	12,4	15,5	22.6	22.6	27.2	-	-
<b>Oil Refrigerant &amp;</b>									
Oil type	#								
Oil quantity per compressors (6)	l	1,4	1,4	1,4	1,4	3,8	3,8	4.1	4.1
Refrigerant charge IH R454B	kg	6,0	6,0	8,0	8,0	10,0	10,0	14,0	14,0
<b>Outdoor Coil - IH</b>									

Type									
Tube Size	Inches	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"
Face Area	m2	1,4	1,4	2046,0	2046,0	2502,0	2502,0	2952,0	2952,0
Rows/Fin Series	#/FPF	3 / 192	3 / 192	3 / 192	3 / 192	3 / 192	3 / 192	3 / 192	\
Number of Tubes in the height		40,0	40,0	48,0	48,0	48,0	48,0	48,0	48,0
<b>Indoor Coil</b>									
Type									
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m2	0,8	0,8	1,3	1,3	1,5	1,5	1841,0	1841,0
Rows/Fin Series	#/FPF	3 / 168	3 / 168	3 / 168	3 / 168	3 / 168	3 / 168	4 / 168	4 / 168
Number of Tubes in the height		32,0	32,0	39,0	39,0	39,0	39,0	48,0	48,0
Drain Connection No./Size	mm	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0
<b>Hot Water Coil</b>									
Type		Fins&Tubes-HWC01	Fins&Tubes-HWC02	Fins&Tubes-HWC01	Fins&Tubes-HWC01	Fins&Tubes-HWC01	Fins&Tubes-HWC01	Fins & Tubes	Fins & Tubes
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m2	0,7	0,7	0,9	0,9	1,2	1,2	0.769	0.769
Rows/Fin Series	#/FPF	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144
Number of Tubes in the height		25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
<b>Indoor Fan</b>									
<b>Standard</b>									
Type	#								
Model	#	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	R3G450PA3103 EBM-PAPST	R3G450PA3103 EBM-PAPST	K3G500PA2371	K3G500PB3301
Minimum Airflow	m3/h	-	-	-	-	-	-	7720,0	9264,0
Nominal Airflow	m3/h	6980,0	6980,0	6980,0	6980,0	8430,0	8430,0	9650,0	11580,0
Maximal Airflow	m3/h	-	-	-	-	-	-	12545,0	15054,0
Number	#	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Diameter	mm	500,0	500,0	500,0	500,0	500,0	500,0	500,0	500,0
Drive Type	#								
Motor Power (Eurovent condition)	kW	3,6	3,6	3,6	3,6	4,5	4,5	1200,0	1848,0
Motor Max Amps per fan	A	5,5	5,5	5,5	5,5	6,8	6,8	5,3	9,0
Motor RPM at nominal flow rate	RPM	2800,0	2800,0	2800,0	2800,0	2480,0	2480,0	1411,0	1650,0
Available Static Pressure at nominal flow rate	Pa	1242,0	1242,0	1242,0	1242,0	1275,0	1275,0	250,0	250,0
<b>Oversized</b>									
Type	#								
Model	#	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G500PA2803 EBM-PAPST	K3G500PA2803 EBM-PAPST	K3G500PB3301	K3G500PB3301
Minimum Airflow	m3/h	-	-	-	-	-	-	9264,0	9573,0
Nominal Airflow	m3/h	9005,0	9005,0	9005,0	9005,0	9005,0	9005,0	11580,0	11966,0
Maximal Airflow	m3/h	-	-	-	-	-	-	15054,0	15556,0
Number	#	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Diameter	mm	500,0	500,0	500,0	500,0	500,0	500,0	500,0	500,0
Drive Type	#								
Motor Power (Eurovent condition)	kW	3,6	3,6	3,6	3,6	3,8	3,8	1,9	2,0
Motor Max Amps per fan	A	5,5	5,5	5,5	5,5	5,9	5,9	9,0	9,0
Motor RPM at nominal flow rate	rpm	2800,0	2800,0	2800,0	2800,0	1890,0	1890,0	1650,0	1699,0
Available Static Pressure at nominal flow rate	Pa	1242,0	1242,0	1242,0	1242,0	981,0	981,0	500,0	500,0
<b>Outdoor Fan</b>									
<b>Standard Ambient</b>									
Type	#	Axial fan	Axial fan	Axial fan	Axial fan	Axial fan	Axial fan	Axial / Below / AC	Axial / Below / AC
Model	#	ODS630C-150B4.EC.V-TRIZ2	ODS630C-150B4.EC.V-TRIZ2	ODS630C-150B4.EC.V-TRIZ2	ODS630C-150B4.EC.V-TRIZ2	ODS630C-150B4.EC.V-TRIZ2	ODS630C-150B4.EC.V-TRIZ2	GPF3B3PM132SS8	GPF3B3PM132SS8



Nominal Airflow / ckt	m3/h	-	-	-	-	-	-	24884,0	24879,0
Number of fan / ckt	#	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0
Diameter	mm	650,0	650,0	650,0	650,0	650,0	650,0	800,0	800,0
Motor Power per fan	kW	0,6	0,6	0,6	0,6	0,6	0,6	0.75	0.75
Motor Max Amps per fan	A	2,4	2,4	2,4	2,4	2,4	2,4	1.81	1.81
Motor RPM	rpm	950,0	950,0	950,0	950,0	950,0	950,0	705.0	705.0
<b>Physical Data for Standard Unit (4)</b>									
Length	mm	2580,0	2775,0	2775,0	2775,0	3220,0	3220,0	2830,0	2830,0
Width	mm	1617,0	1825,0	1825,0	1825,0	2254,0	2254,0	2250,0	2250,0
Height	mm	1397,0	1601,0	1601,0	1601,0	1722,0	1722,0	1565,0	1565,0
IH Operating Weight (Downflow Without Auxilliary Heat)	kg	445,0	550,0	550,0	550,0	730,0	730,0	966,0	966,0
IH Shipping Weight(Downflow Without Auxilliary Heat)	kg	501,0	606,0	606,0	606,0	786,0	786,0	1022,0	1022,0
<b>Options Extra Weight (4)</b>									
Hot Water Coil	kg	40,0	40,0	44,0	44,0	50,0	50,0	48,0	48,0
Electric Heater	kg	5,0	5,0	6,0	6,0	8,0	8,0	26,0	26,0
Gas Burner: modulating condensing	kg	-	-	-	-	-	-	90,0	90,0
Energy Recovery Module	kg	-	-	-	-	-	-	375,0	375,0
Exhaust Fan EC	kg	13,0	13,0	13,0	13,0	13,0	13,0	25,0	25,0
Barometric damper	kg	-	-	-	-	-	-	84,0	84,0
<b>Energy Recovery Module (ERM)</b>									
Max Exhaust Air @ ESP=400Pa	m3/h	-	-	-	-	-	-	9500,0	9500,0
Max Fresh Air @ Wheel PD=300Pa	m3/h	-	-	-	-	-	-	18000,0	18000,0
Min Wheel Airflow	m3/h	-	-	-	-	-	-	2500,0	2500,0
Exchanger Wheel Diameter	mm	-	-	-	-	-	-	1200,0	1200,0
Exhaust Air Fan Diameter	mm	-	-	-	-	-	-	400,0	400,0
Exhaust Air Fan Motor Power	kW	-	-	-	-	-	-	3.4	3.4
Length x Width x Height	mm	-	-	-	-	-	-	1750x1175x1575	1750x1175x1575
Weight	kg	-	-	-	-	-	-	396,0	396,0
<b>Gas Burner</b>									
Gas burner type - modulating condensing	#	-	-	-	-	-	-	PCH065	PCH065
Thermal output (Hi) [Min-Max]	kW	-	-	-	-	-	-	12,40 - 65,0	12,40 - 65,0
Useful heat output [Min-Max]	kW	-	-	-	-	-	-	13,40 - 62,93	13,40 - 62,93
Gas Flow [Min-Max] (5)	m3/h	-	-	-	-	-	-	1,31 - 6,88	1,31 - 6,88
Gas Connection Pipe Diameter	mm	-	-	-	-	-	-	"UNI/ISO 228/1 G3/4""	"UNI/ISO 228/1 G3/4""

(1) Indicative performances. For detailed 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 Gas 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 USreference on compressor nameplate).

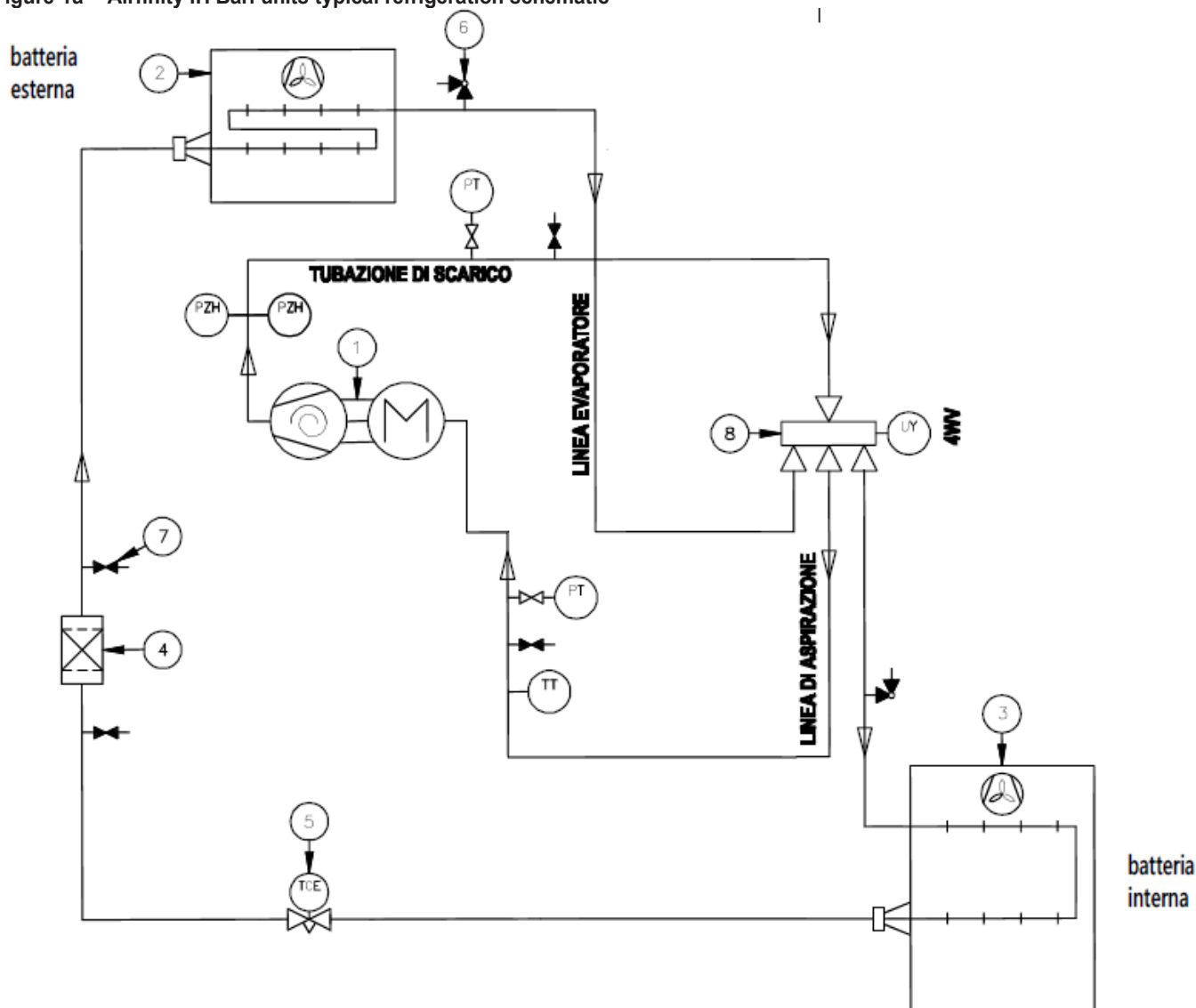
(7) IH unit only.

(8) The ERM data is only for Digit -18 R.

# Unit Operating Principle

## UNIT SYNOPTIC

Figure 1a – Airfinity IH Bari units typical refrigeration schematic



REF.	DENOMINATION	REF.	DENOMINATION
1	Scroll compressor	PT	Pressure transducer
2	Evaporator (fin and tube heat exchanger)	PZH	High pressure switch
3	Condenser (fin and tube heat exchanger)	TT	Temperature sensor
4	Bidirectional filter drier	TCE	Electronic expansion valve
5	Electronic expansion valve	UY	Solenoid
6	Service valve		
7	Schrader valve		
8	4-way valve		

Figure 1b – Airfinity IC Epinal units typical refrigeration schematic

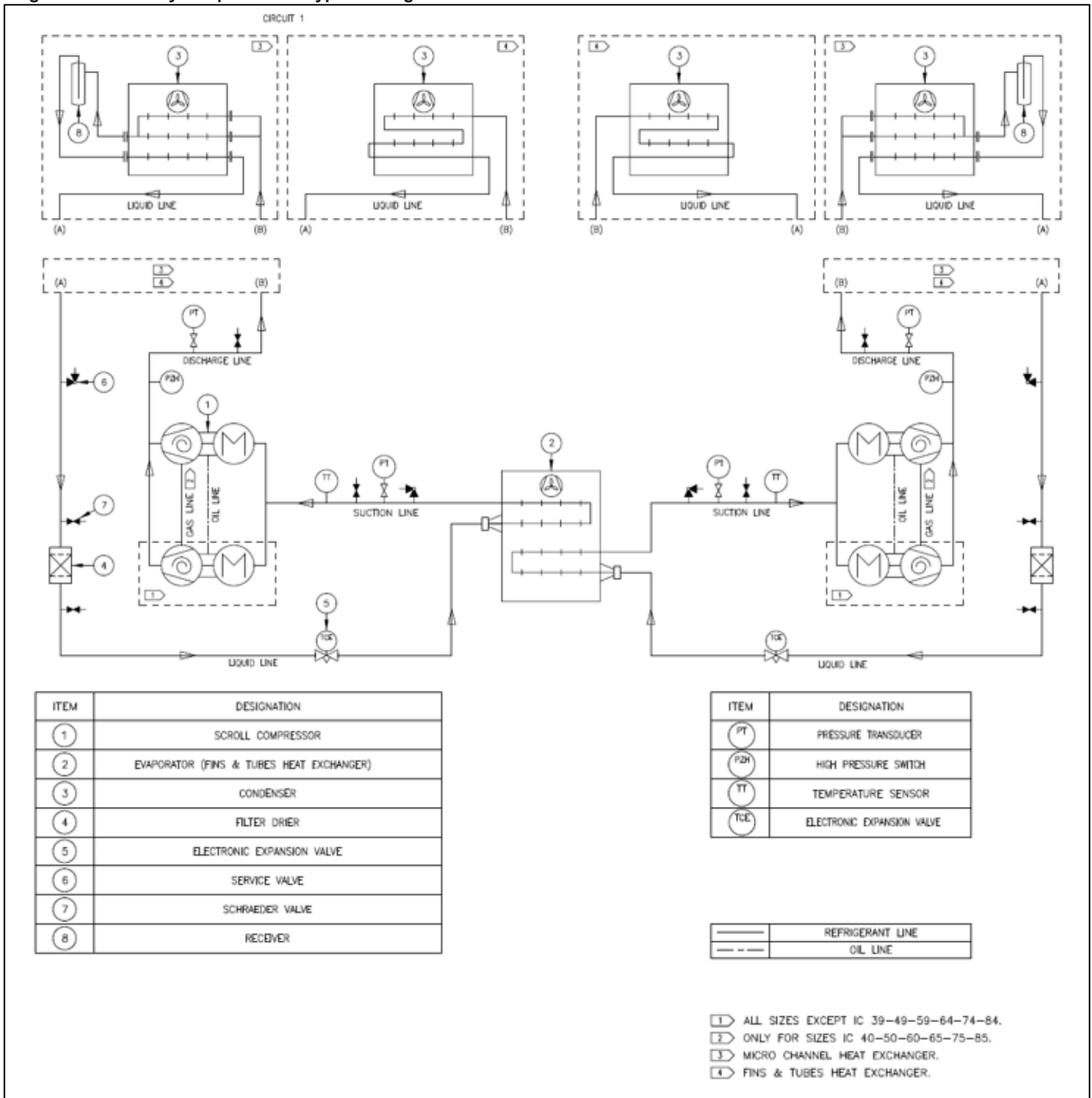
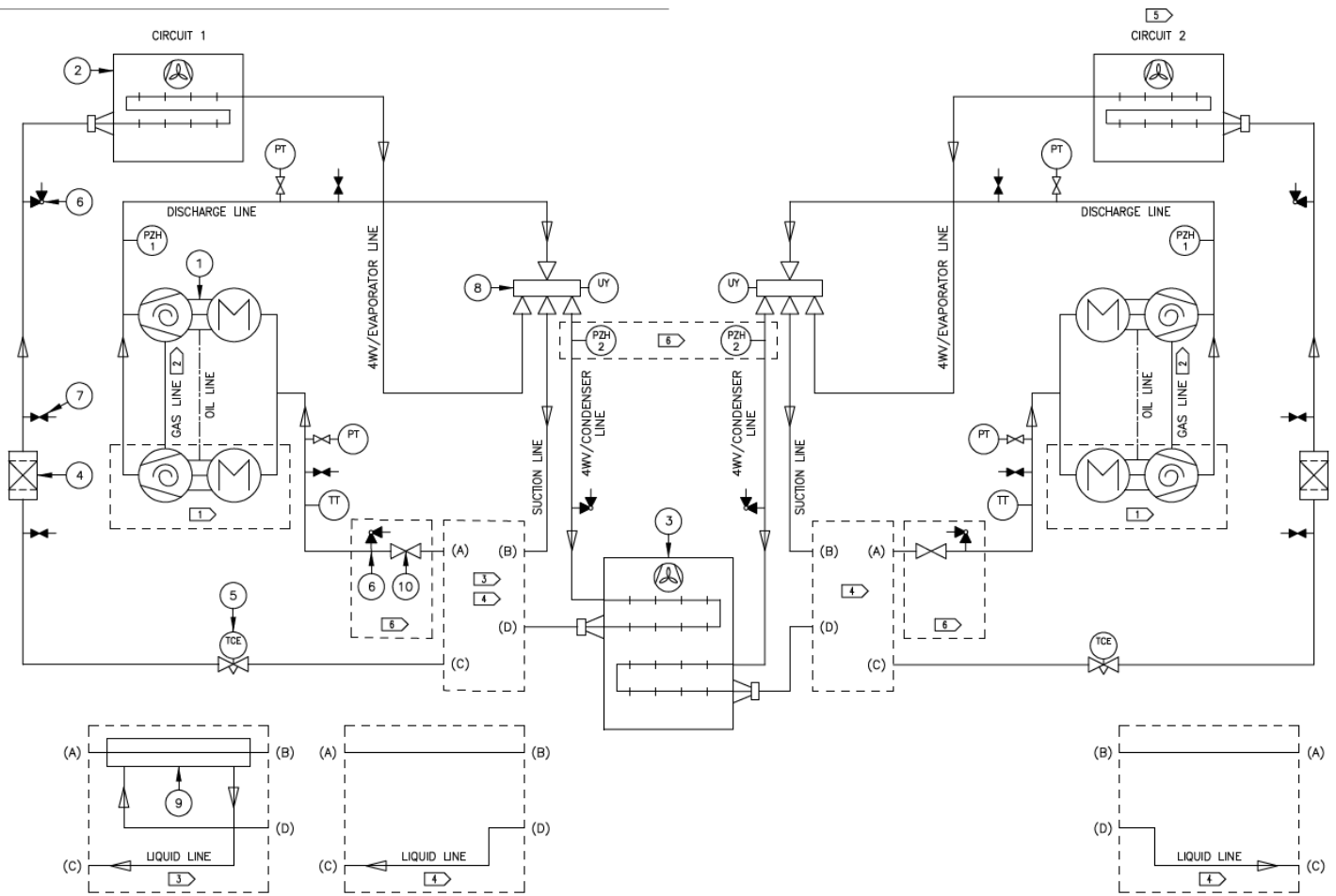


Figure 1c – Airfinity IH Epinal units typical refrigeration schematic



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
TCE	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 21-31-41-51-61-71 R410A.
- 4 ALL SIZES EXCEPT 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.

REFRIGERANT FLOW DIRECTION IS SHOWN FOR HEATING MODE.

# 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 (not recommended as there is a risk of damage if not done carefully).
2. Use a lifting beam correctly adjusted to fit the unit (recommended).

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

Specific lifting method is recommended as follows:

1. The units are supplied with four lifting points.
2. Slings and spreader bar to be provided by rigger and attached to the four lifting points.
3. Minimum rated lifting capacity (vertical) of each sling and spreader bar shall be no less than the unit shipping weight.
4. Caution: The unit must be lifted with the utmost care. Avoid shock load by lifting slowly and evenly.
5. Remove slings and spreader bars when installation is completed.

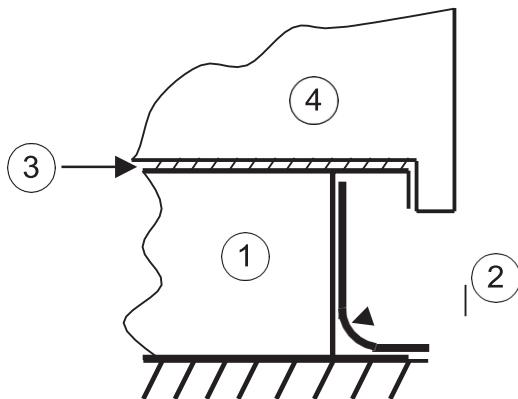
The detailed handling, lifting instructions including all weights and sling lengths are given on the specific drawings and instructions shipped with the unit.

**Instructions for the roofcurb assembly and installation with curb dimensions are provided with each roofcurb kit.**

In order to ensure watertightness 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 4 - 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 submittal's 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 submittal's drawings.

### Placing and rigging

The rooftop units are designed to be installed outdoors 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 buildup 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 top 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.

## Dimensions/Weights and Clearance

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

## Connection of Duct Network

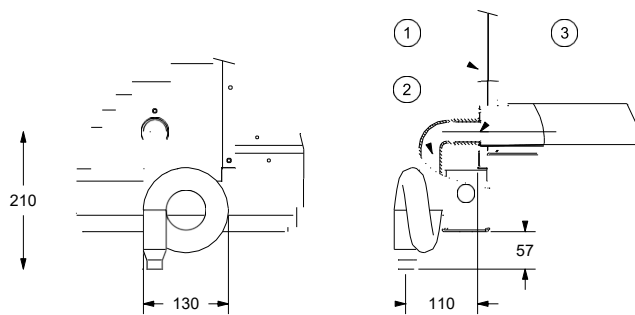
Supply and return openings have curb flanges provided for easy duct installation. It is recommended to insulate the circumference of the curb after the unit is mounted to prevent condensation.

**CAUTION!** All ductworks 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 7.5cm 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 60cm from the unit, to minimize noise and resistance.

Figure 7 - Supplied trap



1. Panel enclosure
2. Atmosphere pressure
3. Static drain

## Attaching horizontal ductwork to unit

- All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use minimum of 5cm of insulation with a vapor barrier. The outside ductwork must be weather proofed 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 ducts. The flexible connection must be indoors and made from heavy canvas.

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

## Condensate Drain Piping

Each unit is equipped with a diameter 35 mm male drainage connector. A P trap is supplied and must be connected to the drainage as shown in Figure 7.

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.

## Filter installation

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

The number and the size of the filter cells are determined by the frame of the unit. Each unit has 2 rails of filter.

Frame 1: 4 filters of 400x500

Frame 2: 4 filters of 500x625

Frame 3: 6 filters of 500x500

There are 3 different types of filters which are place on rails of 50 mm or 100 mm upstream of the indoor coil. Recommended clog filter switch delta pressure value is 200 Pa with a maximum of 250 Pa according to available static pressure.

## Supply plug fan airflow adjustment

1. Order writes 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 airflow 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.

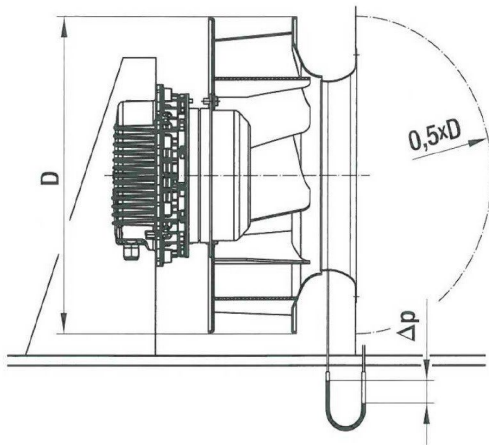
Unit air flow can be calculated based on the differential pressure (difference in pressure of the static pressures) in keeping with the following equation:

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

$Qv$  in [m<sup>3</sup>/h] and  $\Delta p$  in [Pa]

$N$  number of fans considers the specific nozzle characteristics.

Connection on the unit side is accomplished 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<sup>3</sup>h-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 with the airflow rate measurement option, to have an additional level of security.

On Airfinity One-unit, refrigerant leak detector is installed at the bottom in the indoor section, between the indoor coil and the damper. It is placed close to the door panel to have accessibility for maintenance (see pictures below).

The detector alarm limit is set to a refrigerant concentration of 500 ppm, equivalent to approximately 0.5% of LFL (Lower Flammable Limit). The alarm limit is a factory preset and it is not adjustable.

Refrigerant leak detector R454B



## 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 External electric heaters!**

If the unit is equipped with external electric heating wires to avoid ice making on the battery. This implies an electrical risk due to the voltage at 400V of the connections. These components are connected to the KA contactor into the panel.

Do not touch the wires coming out the panel, or cut it or modify any part of these circuits. Trane doesn't assume responsibility for any operation carried out by unauthorized personnel.

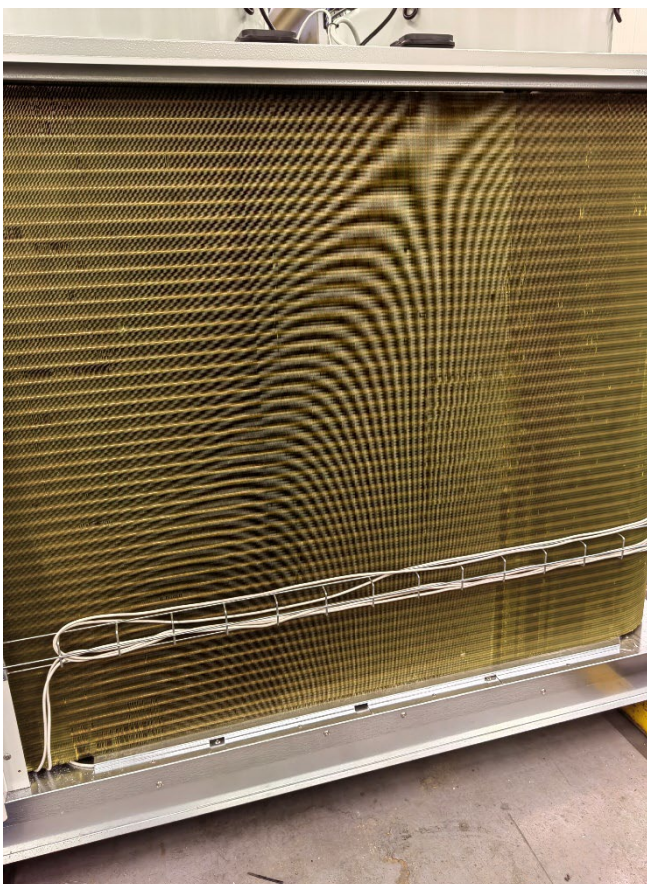


Figure 5 – Heating electrical wires

### **WARNING Hazardous Voltage!**

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot 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. Power voltage (230/400V) 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 30V.

### **CAUTION!**

Inverters are equipped with integrated filters.

They are not compatible with insulated neutral load earthing arrangements.

### **WARNING! Hazardous Voltage with Capacitor!**

Disconnect all electric power, including remote disconnects and discharge all motor start/run and AFD (Adaptive Frequency TM Drive) capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

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.

For variable frequency drives or other energy storing components provided by TRANE or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharges capacitors. Verify with an appropriate voltmeter that all capacitors have discharged.

DC bus capacitors retain hazardous voltages after input power has been disconnected. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. After disconnecting input power, wait five (5) minutes.

For units which are equipped with EC fans and wait twenty (20) minutes for units which are equipped with variable frequency drive (0V DC) before touching any internal components. Failure to follow these instructions could result in death or serious injury.

### **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 in 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	TNC	TT
Standard**	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.

### 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 + GND.

#### CAUTION!

Be sure that layout of electrical conduit is remote enough from hot components (burner, electrical heater...).

**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.

Oil Injection Valve: This is specific for Scroll compressor with variable frequency drive (VFD).

#### Compressor drive:

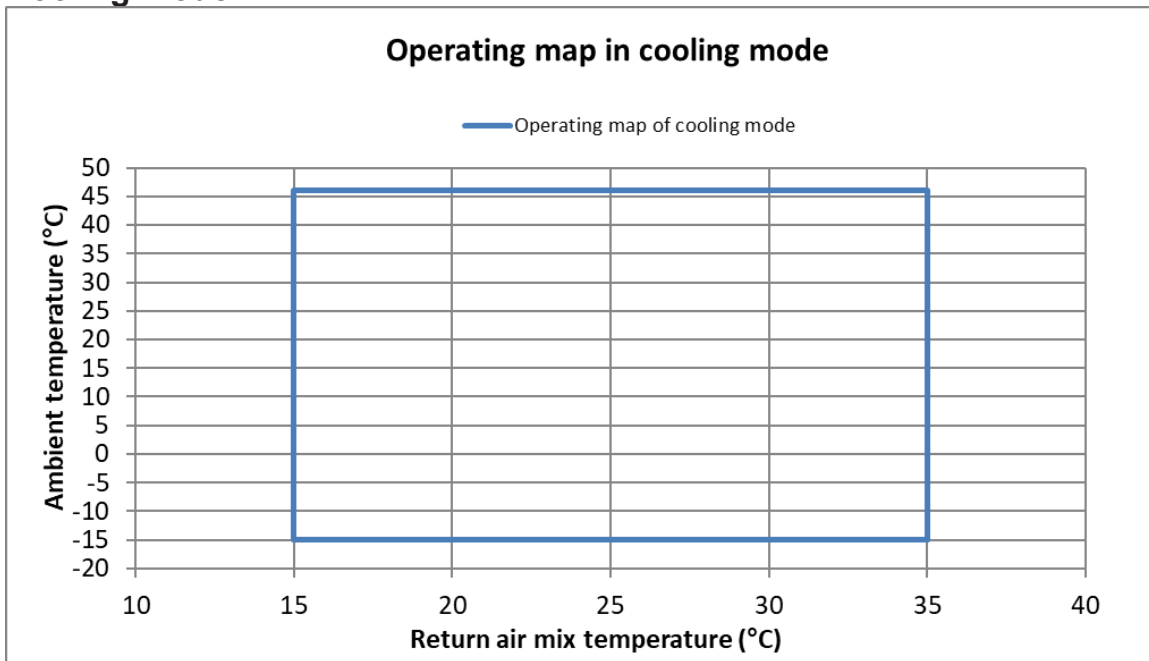
In case of replacement, configuration will be done by TRANE service. There is no human interface and the configuration is done via RS485 Modbus.

Drive cabinet is cooled by a fan on the bottom behind the door. Air entering from the bottom through a grid with filter and leaving from the top through a grid with filter.

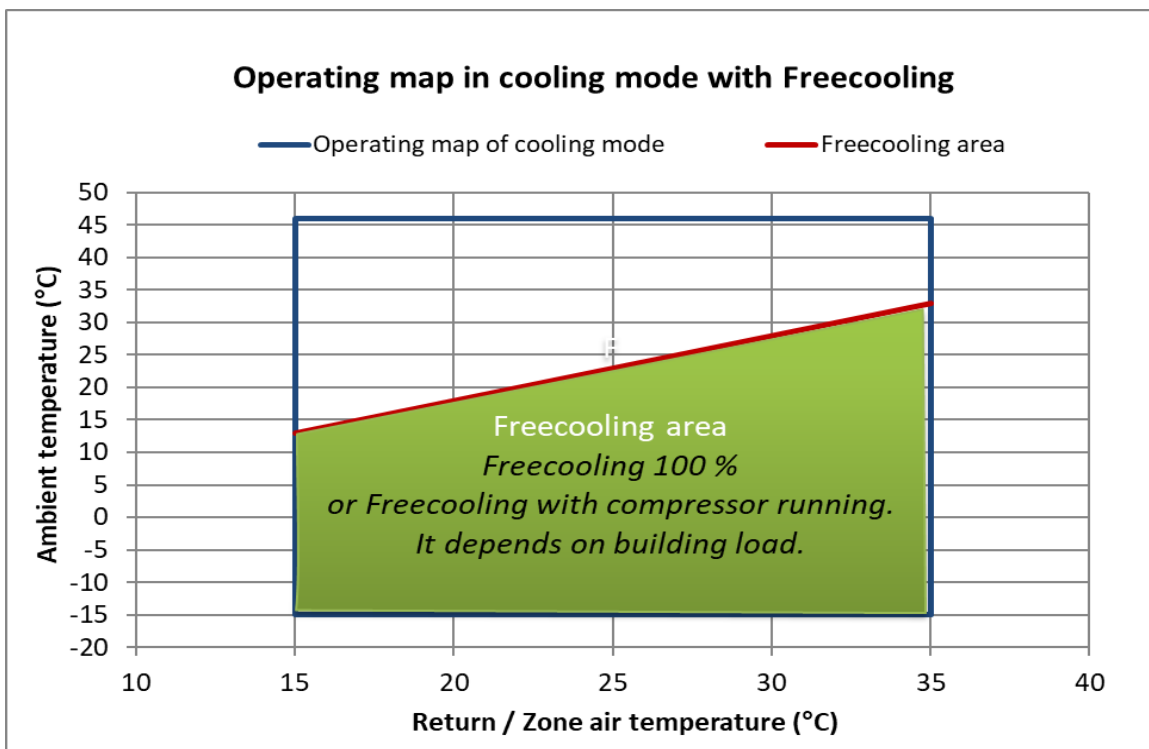
Filter maintenance: clean or change the drive filters if necessary.

# Operating Map

## Cooling mode

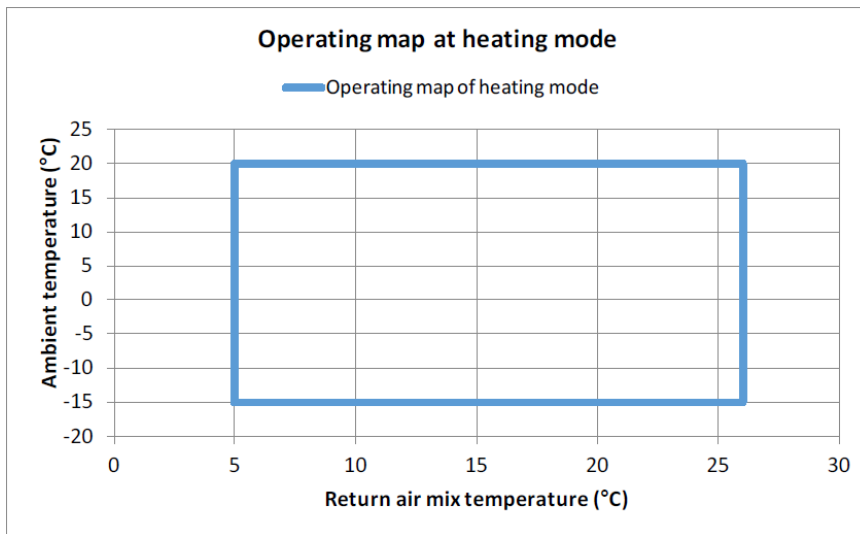


Minimum Outdoor Temperature = -15 °C  
 Maximum Outdoor Temperature = 46 °C  
 Minimum Indoor Coil Mixed Temperature = 15°C  
 Maximum Indoor Coil Mixed Temperature = 35°C



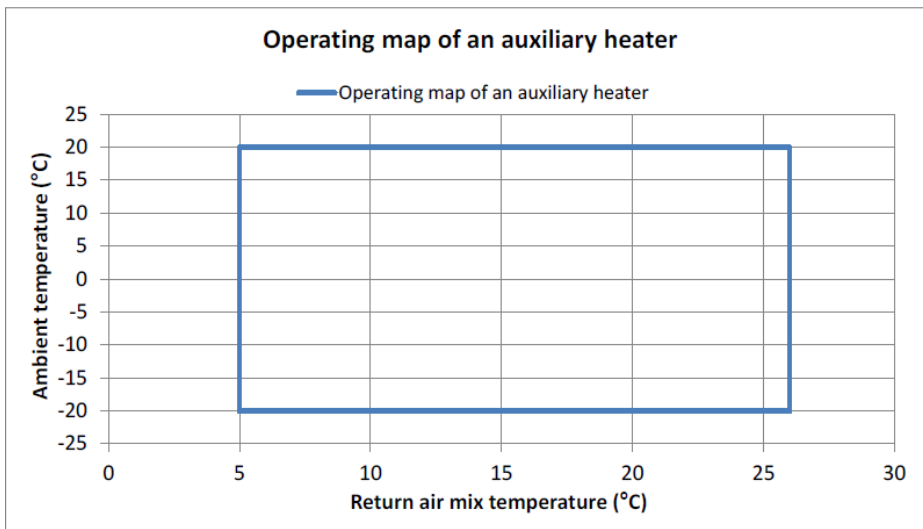
Freecooling area:  
 Outdoor temperature 13 °C & Return / Zone temperature 15 °C  
 Outdoor temperature 33 °C & Return / Zone temperature 35 °C

## Heating mode



Maximum Outdoor Temperature (@ Eurovent) = 20°C  
Minimum Outdoor Temperature = -15°C  
Maximum Indoor Coil Entering Temperature = 26°C  
Minimum indoor Coil Entering Temperature = 5°C

## Auxiliary Heating mode



Maximum Outdoor Temperature (@ Eurovent) = 20°C  
Minimum Outdoor Temperature = -20°C  
Maximum Indoor Coil Entering Temperature = 26°C  
Minimum indoor Coil Entering Temperature = 5°C

# Options

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.

## Exhaust Fans

The exhaust axial fans 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 start and stop value according to fresh air damper position.

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

### Operation

- When the exhaust fans 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 ( $\Delta P > P_b - P_{atm}$ ) → barometric damper is closed.
  - If return air pressure drop < building overpressure ( $\Delta P < P_b - P_{atm}$ ) → barometric damper opens and a maximum of 25% of the nominal airflow can be exhausted.
- When the exhaust fans 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 is started when fresh air dampers meet or exceed a preset percentage of fresh air.

Configured for Return roof curb (ESP=250 PA).

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.

## Exhaust Fan EC

The exhaust fans EC are used to minimize overpressure in the building caused by the introduction of fresh air. This option is typically used when large fresh air intake needed (40 to 50% of the nominal airflow) or when the return air duct pressure drop is higher than 70Pa. This option includes hoods, gravity dampers and EC Exhaust fans. Exhaust fans speed has to be adjusted during the commissioning using the optional service Terminal to balance building pressure.

### Installation:

- The Exhaust fan module is delivered dismounted on the same pallet than the main unit. (See fig ....)
- The Exhaust module as to be installed on the exhaust section. (See fig...)
- The exhaust module electrical wiring has to be connected to the main unit. (See fig)

### Exhaust fan speed setting:

- Step 1 : adjust the unit fan speed @ the nominal flow rate using the optional service terminal.
- Step 2 : adjust the exhaust fans speed using optional service terminal to reach right amount of exhaust air.

### Hot Water Coil (HWC)

HWC applies when additional heat is required. Hot water comes from external boiler or other device. HWC provides heating with a coil located after the 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 protection opens the 3 ways valve when the In antifreeze mode, unit operating, indoor fan is stopped and unit locked out in manual reset. Fresh air damper is closed and the modulating valves open. The freeze protection works with manual reset.

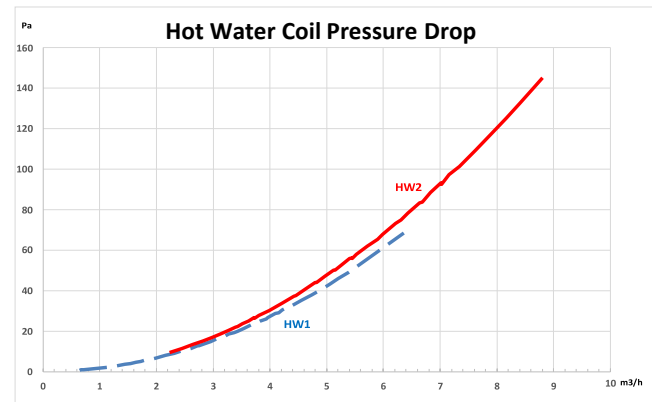
**Important notice: it is important that the pump circulating hot water is permanently working to avoid water to freeze in the coil. Otherwise, in order to prevent water from freezing in the coil during unoccupied period or shutdown limited period, it is recommended to use ethylene glycol. The service of awater treatment specialist is recommended as water used can cause scaling deposits, erosion or corrosion.**

Insulate and proceed to heater wire installation on all the water piping likely to be exposed to freezing temperatures in order to avoid freeze up of the coil and heat losses. The water distribution network must be fitted with vents in places where air is likely to be trapped.

### Water connections dimensions and characteristics

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 22



### Electric Heater

Electric heaters 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 the air temperature rises to 65°C. Automatic reset at 32°C.
- The manual reset thermostat which stops the unit when the air temperature rises to 128°C.

## **Heat Recovery Module**

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

The module is shipped separately and connected to the rooftop on the jobsite. The module is fully controlled and powered by the rooftop itself. Free cooling mode is still available.

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



# Controls

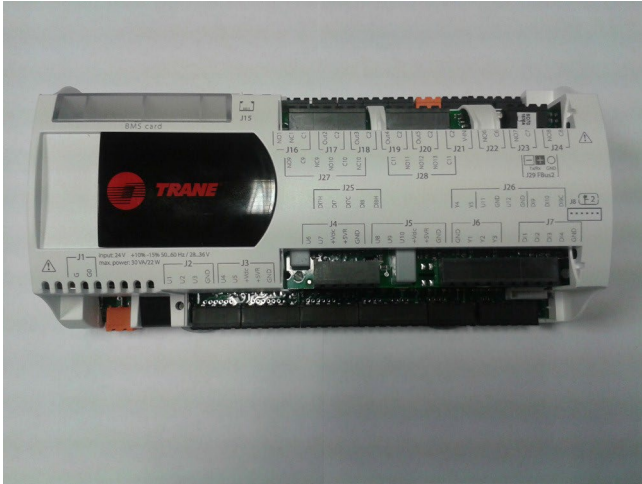
## Control Hardware Modules

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 40 - CH536 main module



## 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.

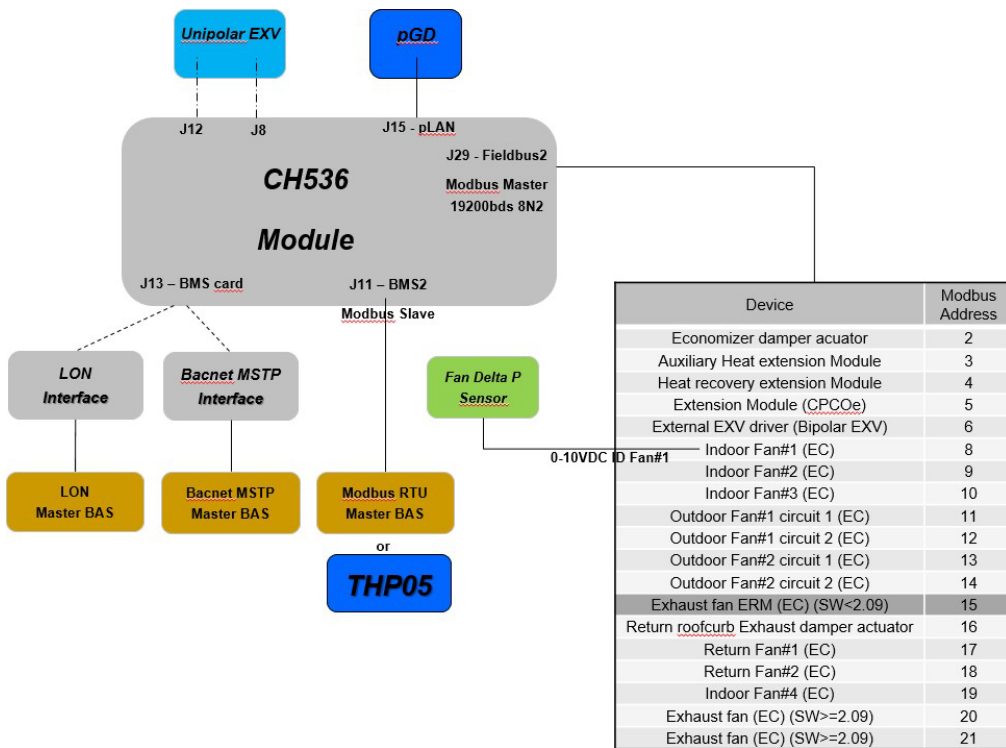
Figure 42 - Optional display



## Control Hardware Bus

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

Figure 41 - Control Hardware Bus



## 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<sub>2</sub> sensor

CO<sub>2</sub> sensor can be either in air return duct or wall mounted. It maintains a CO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub>. 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<sub>2</sub> 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<sub>2</sub> sensor maintenance

This CO<sub>2</sub> 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<sub>2</sub> 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

This device is used to detect smoke in the air stream. It includes a factory mounted detector located in the supply chamber panel. When smoke is detected, it shuts off the unit.

## 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.

## 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, the 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 ventilation. It is not possible to run the compressors or an auxiliary heater during this period.

After 10 min it 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 and look for 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, 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 detailed information.

## Customer option module

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

### List of I/O through universal pins

DESCRIPTION	COMMAND
Emergency stop	/
Auto / external off	/
Disable circuit 1	/
Disable circuit 2	Not available
Disable comp. 1A	/
Disable comp. 1B	Not available
Disable comp. 2A	Not available
Disable comp. 1B	Not available
Presence sensor	/
Destabilization heat sensor	/
Commutation from MECH to auxiliary heating	/
Override of pressurization	/
Override of cleaning	/
Override of discharge	/
CMP1 *	C1
CMP2 *	C2
CMP3 *	C3
CMP4 *	C4
SOV *	O
AuxHeat1 *	X1
AuxHeat2 *	X2
IDFan *	F
Firestat *	R

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

## Operation with a conventional thermostat

For unit with variable speed controller:

Mechanical cooling command compressor start and stop use CMP1 input.

Mechanical heating command compressor start and stop use CMP1+O.

In both modes, the modulation of the compressor speed will be automatically adjusted based on return airtemperature measure and cooling/heating setpoint.

·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

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

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

## Economizer control Demand Control Ventilation

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

1: Fixed Ventilation (design ventilation).

It is based on design occupancy of the zone.

Occupied standby setpoint =  $0.6\text{L/s per m}^2$  (ASHRAE62.1) x Surface.

Occupied setpoint =  $4.72\text{L/s per person}$  (ASHRAE62.1) x Design Occupants# + 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 =  $0.6\text{L/s per m}^2$  x Surface.

People detected: Occupied Setpoint =  $4.72\text{L/s per person}$  x Design Occupants# + Occupied Standby Setpoint.

3: CO<sub>2</sub>-based ventilation – requires a space CO<sub>2</sub> 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

## 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 must be adjusted.

**Table 6 - 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

# 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 ensure that all internal controls are functioning. It checks the configuration parameters against the components connected to the system.

# 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 and drive box 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 can provide the service personnel with some unit diagnostics and system status information.

1. Step the system through all 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 addition, review carefully the components which can lead to the alarm: temperature sensor, zone temperature sensor, clogged filter switch





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 startup 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 circuits.
- 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).
- Logbook 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.

## Refrigerant leak detector R454B

- Calibration must 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.

## 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.

## EC fans

NOTE: If the built-in device is switched off for a long time in a dry environment it is important to do this run one hour at full speed at least every four months. If the built-in appliance is shut down for a long time in a humid environment (e.g., outdoors), it is important to run it for at least three hours at full speed every month, so that the bearings are in movement and that the condensate having possibly entered the interior can evaporate.

Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services and parts.  
For more information visit [www.Trane.eu](http://www.Trane.eu)

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

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