Installation, Operation, and Maintenance

Aifinity™ Compact with AFD Rooftop Units

Models EIH - Reversible Heat Pump

Capacity: 14 - 87 kW

Refrigerant: R-454B

April 2025

RT-SVX098A-GB

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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 Airfinity™ compact with AFD 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”. Ensure 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.

Figure 1 - Warning pictograms

1 = Risk that unit is powered up
2 = Risk hazard due to fan rotation
3 = Risk hazard of burns on compressors or refrigeration piping
4 = Unit contains refrigerant gas. See specific warnings.
5 = Risk of residual voltage when speed drive, capacitor or softstarter options are present
6 = Unit under pressure
7 = Risk to cut, particularly on heat exchanger fins
8 = Read instructions before installation
9 = Disconnect all electric power before servicing
10 = Read technical instructions

Reception

On arrival,

- Inspect the unit before signing the delivery note.
- Specify any visible damage on the delivery note.
- Notify the local manufacturer sales office at the same time.

Note: The delivery note must be clearly signed after inspection and countersigned by the driver.

Also send a registered letter of protest to the last carrier of the goods within 7 days of delivery.

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

Important Notice: No shipping claims will be accepted by manufacturer if the above mentioned procedure is not respected.

For more information, refer to the general sales conditions of your local manufacturer sales office.

Note: For unit’s delivered in France, scheduled time for unit inspection and notifying through 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. Do not place elements inside the control box during unit operation, it could damage internal components.

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 12.5 bar (R-454B) at 20°C or 9.5 bar (R-454B) at 10°C, call a qualified service organization or manufacturer sales office.

The manufacturer 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.

Outdoor Coil

There are 3 different types of outdoor coils for heat pump units (IH).

- Blue fin technology
- Aluminum fins
- Gold Epoxy coating

Blue fin technology uses standard for outdoor coil.

Gold Epoxy coating on the outdoor coil is dedicated to the region close to an ocean or a sea because of corrosion coming from salted air.

Unit Model Number Description

Digit 1 – Manufacturing Location
E = Europe

Digit 2 – Unit Model
I = Airfinity

Digit 3 – Unit Type
H = Reversible Heat pump

Digit 4 – 5 – 6 Unit Nominal Capacity
017 = 17 Nominal Kilowatts
019 = 19 Nominal Kilowatts
023 = 23 Nominal Kilowatts
027 = 27 Nominal Kilowatts
030 = 30 Nominal Kilowatts
036 = 36 Nominal Kilowatts
045 = 45 Nominal Kilowatts
052 = 52 Nominal Kilowatts
062 = 62 Nominal Kilowatts
072 = 72 Nominal Kilowatts
078 = 78 Nominal Kilowatts

Digit 7 – Efficiency Level
A = Adaptive Frequency Drive

Digit 8 – Refrigerant
B = R-454B (Full factory refrigerant charge)
3= Nitrogen charge (for R-454B)

Digit 9 – Voltage
D = 400 V / 3 Ph / 50 Hz

Digit 10 – Not used

Digit 11 – Not used

Digit 12 – Auxiliary Heat
X = Without
W = Hot water coil
E = Electric heater

Digit 13 – Return Airflow Configuration
D = Down Return
H = Horizontal return

Digit 14 – Supply Airflow Configuration
D = Downflow Supply
H = Horizontal Supply
U = Up flow Supply

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 Air flow
T = Energy recovery circuit with AC fan
U = Energy recovery circuit with EC fan
F = Thermodynamic heat recovery

Digit 19 – Dehumidification
X = Without
A = Dehumidification control

Digit 20 – Outdoor Coil Treatment
B = Without
E = With Coil treatment

Digit 21 – Indoor Coil Treatment
1 = Without
2 = With Coil treatment

Digit 22 – Filtration
A = 65% Coarse (G4)
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 THP05

Digit 25 – CO_2 Sensor
X = Without
1 = CO2 sensor duct-mounted
2 = CO2 sensor wall-mounted

Digit 26 – Smoke Detector
X = Without
1 = With

Digit 27 – Airflow Measurement
A = Airflow measurement and display

Digit 28 – Dirty Filter Detection
X = Without
1 = With Dirty filter detection

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
K = Finnish
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

Unit Model Number Description

Digit 31– Building Pressurization Control
X = Without
1 = Barometric relief damper
2 = Exhaust Fan AC
3 = Exhaust Fan EC

Digit 32 – Not used

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 (Recommended)

Digit 35 – Communication Interface
X = Without
1 = ModBus communication interface
3 = BACnet (MSTP)
4 = BACnet (IP)
5 = ModBus TCP

Digit 36 – Refrigerant Leak Detector
1 = With refrigerant leak detector

Digit 37 – Compressor Starter Type
X = Across the line

Digit 38 – Service User Interface
X = Without
1 = Service terminal

Digit 39 – Fire Thermostat
X = Without
A = With fire thermostat

Digit 40 – Droplet Eliminator
X = Without

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 Donnection
X = Without

Digit 44 – Condenser Guard Grill
X = Without
A = With condenser guard grill

Digit 45 – Export Packaging
X = Without
A = With export packaging

Digit 46 – Acoustic Package
X = Standard
1 = with Acoustic Package

Digit 47 – External Ventilation Override
X = Without
A = With External Ventilation Override

Digit 48 – Programmable Relay
X = Without
1 = With Programmable Relay

Digit 49 – External Setpoint
X = Not Used
A = With External Setpoint Control

Digit 50 – Pre heating
X = Not Used
1 = Hot Water Pre Heat Coil

Digit 51 – Energy Meter
X = Not Used
A = With Energy Meter

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 to IH036)

		IH017	IH019	IH023	IH027	IH030	IH036
Cooling Mode – IH Units							
Net Cooling Capacity R-454B (1)	kW	15,7	17,6	22,0	25,1	29,4	34,2
Total Power Input R-454B (1)	kW	6,1	6,4	8,0	10,0	10,0	12,6
Heating Mode – IH Units							
Net Heating Capacity R-454B (1)	kW	15,0	16,7	21,9	25,7	28,4	33,9
Total Power Input R-454B (1)	kW	4,8	5,2	6,8	8,4	8,4	10,2
SEER	-	4,4	4,3	4,2	4,2	5,2	4,9
SCOOP	-	3,2	3,2	3,2	3,2	3,2	3,2
Number of capacity step	#	1,0	1,0	1,0	1,0	2,0	2,0
Capacity Steps (1)	kW	8,8	8,8	13,3	13,3	14/21,2	14/21,2
Electrical Data (2) (3) - base unit							
Main Power Supply	V/Ph/Hz	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50
Unit Max power	kW	10,5	11,7	13,7	16,7	17,4	20,7
Unit Max Amps	A	18,4	20	22,9	29,0	32,3	37,5
Maximum Short Circuit rating for 0,3 sec	kA	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
Max power cable cross section (full optional)	mm2	35,0	35,0	35,0	35,0	70,0	70,0
Disconnect switch std unit		ABB OT63F3	ABB OT63F3	ABB OT63F3	ABB OT80F3	ABB OT125F3	ABB OT125F3
Disconnect switch unit with option (heat recovery, Exhaust fan, Return Fan,Auxiliary heat)		n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Electrical data of options (2) (3)							
Electric Heater	A	13,5	13,5	20,3	20,3	30,5	30,5
Indoor fan: Oversized	A	5,5	5,5	5,5	5,5	9,0	9,0
Exhaust Fan EC	A	2,1	2,1	2,1	2,1	2,1	2,1
Return Roofcurb	A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Heat Recovery (not included current for oversized fan)	A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Gas burner (modulating)	A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Frame							
Frame		Frame1	Frame1	Frame2	Frame2	Frame3	Frame3
Compressor							
Number of Circuits	#	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
Type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Model (R-454B)		VZH035CG	VZH035CG	VZH044CG	VZH052CG	VZH052CG	VZH065CG
Max Amps per Compressor	A	11.2	11.62	14.2	17.05	18.4	23.4
Locked Rotor Amps per Compressor	A	12.4	12.4	15.5	22.6	22.6	27.1
Oil and Refrigerant							
Oil type	#	POE46-RL46HB (215PZ)	POE46-RL46HB (215PZ)	POE46-RL46HB (215PZ)	POE46-RL46HB (215PZ)	POE46-RL46HB (215PZ)	POE46-RL46HB (215PZ)
Oil quantity per compressors (6)	l	1,4	1,4	1,4	1.7	1.7	1.7
Refrigerant charge IH R-454B	kg	6,0	6,0	8,0	8,0	10,0	10,0
Outdoor Coil - IH							
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"
Face Area	m2	1,4	2,046	2,046	2,046	2,5	2,5
Rows/Fin Series	#/FPF	2 / 168	2 / 168	2 / 168	2 / 168	3 / 168	3 / 168
Number of Tubes in the height		40,0	48,0	48,0	48,0	48,0	48,0

Table 1 – Single Compressor Circuit (IH017 to IH036) (continued)

		IH017	IH019	IH023	IH027	IH030	IH036
Indoor Coil							
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"
Face Area	m2	0,8	1,2	1,2	1,2	1,5	1,5
Rows/Fin Series	#/FPF	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168
Number of Tubes in the height		32,0	39,0	39,0	39,0	39,0	39,0
Drain Connection No./Size	mm	35,0	35,0	35,0	35,0	35,0	35,0
Hot Water Coil							
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	3/8''	3/8''	3/8''	3/8''	3/8''	3/8''
Face Area	m2	0,7	0,9	0,9	0,9	1,2	1,2
Rows/Fin Series	#/FPF	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
Indoor Fan							
Standard							
Type	#	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model	#	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	K3G400PA2703 EBM-PAPST	K3G500PA2371	K3G500PA2371
Minimum Airflow	m3/h	2880,0	3360,0	4000,0	4400,0	5280,0	6240,0
Nominal Airflow	m3/h	3600,0	4200,0	5000,0	5500,0	6600,0	7800,0
Maximal Airflow	m3/h	4680,0	5460,0	6500,0	7150,0	8580,0	10140,0
Number	#	1,0	1,0	1,0	1,0	1,0	1,0
Diameter	mm	400,0	400,0	400,0	400,0	500,0	500,0
Drive Type	#	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Motor Power (Eurovent condition)	kW	3,6	3,6	3,6	3,6	3,4	3,4
Motor Max Amps per fan	A	5,5	5,5	5,5	5,5	5,3	5,3
Motor RPM at nominal flow rate	RPM	2800,0	2800,0	2800,0	2800,0	2480,0	2480,0
Available Static Pressure at nominal flow rate	Pa	250,0	250,0	250,0	250,0	250,0	250,0
Oversized							
Type	#	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model	#	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G400PA2703-EBM-PAPST	K3G500PB3301	K3G500PB3301
Minimum Airflow	m3/h	2880,0	3360,0	4000,0	4400,0	5280,0	6240,0
Nominal Airflow	m3/h	3600,0	4200,0	5000,0	5500,0	6600,0	7800,0
Maximal Airflow	m3/h	4680,0	5460,0	6500,0	7150,0	8580,0	10140,0
Number	#	1,0	1,0	1,0	1,0	1,0	1,0
Diameter	mm	400,0	400,0	400,0	400,0	500	500
Drive Type	#	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Motor Power (Eurovent condition)	kW	3,6	3,6	3,6	3,6	5.7	5.7
Motor Max Amps per fan	A	5,5	5,5	5,5	5,5	9,0	9,0
Motor RPM at nominal flow rate	rpm	2800,0	2800,0	2800,0	2800,0	1650,0	1650,0
Available Static Pressure at nominal flow rate	Pa	500,0	500,0	500,0	500,0	500,0	500,0
Outdoor Fan							
Standard Ambient							
Type	#	Axial fan EC	Axial fan EC	Axial fan EC	Axial fan EC	Axial fan EC	Axial fan EC
Model	#	ODS630C-150B4. EC.V-TRIZ2	S3G800LS2607	S3G800LS2607	S3G800LS2607	S3G800LS2607	S3G800LS2607
Nominal Airflow / ckt	m3/h	n.d.	16090,0	16090,0	16090,0	16090,0	16090,0
Number of fan / ckt	#	1,0	1,0	1,0	1,0	1	1
Diameter	mm	650,0	800,0	800,0	800,0	800,0	800,0
Motor Power per fan	kW	0,5	1.7	1.8	1.9	1.1	1.11

IH General Data

Table 1 – Single Compressor Circuit (IH017 to IH036) (continued)

		IH017	IH019	IH023	IH027	IH030	IH036
Motor Max Amps per fan	A	2.3	2,7	2,7	2,7	2,7	2,7
Motor RPM	rpm	950,0					
Physical Data for Standard Unit (4)							
Length	mm	2580,0	2775,0	2775,0	2775,0	3220,0	3220,0
Width	mm	1617,0	1825,0	1825,0	1825,0	2254,0	2254,0
Height	mm	1397,0	1601,0	1601,0	1601,0	1722,0	1722,0
IH Operating Weight (Downflow Without Auxiliary Heat)	kg	445,0	550,0	550,0	550,0	730,0	730,0
IH Shipping Weight (Downflow Without Auxiliary Heat)	kg	501,0	606,0	606,0	606,0	786,0	786,0
Options Extra Weight (4)							
Hot Water Coil	kg	40,0	40,0	44,0	44,0	50,0	50,0
Electric Heater	kg	5,0	5,0	6,0	6,0	8,0	8,0
Pre heat with Hot Water Coil	kg	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Energy Recovery Module	kg	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Energy Recovery Circuit [ERC]	kg	-	-	-	-	-	-
Exhaust Fan EC	kg	13,0	13,0	13,0	13,0	13,0	13,0
Barometric damper	kg	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Energy Recovery Module (ERM)							
Max Exhaust Air @ ESP=400Pa	m3/h	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Max Fresh Air @ Wheel PD=300Pa	m3/h	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Min Wheel Airflow	m3/h	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Exchanger Wheel Diameter	mm	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Exhaust Air Fan Diameter	mm	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Exhaust Air Fan Motor Power	kW	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Length x Width x Height (9)	mm	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Weight	kg	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Gas Burner							
Gas burner type - modulating condensing	#	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Thermal output (Hi) [Min-Max]	kW	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Useful heat output [Min-Max]	kW	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Gas Flow [Min-Max] (5)	m3/h	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Gas Connection Pipe Diameter	mm	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

(1) Indicative performances. For detailed performances, consult order write up (OWU).
(2) Under 400V/50Hz/3Ph.
(3) Electrical and 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 US reference on compressor nameplate).
(7) IH unit only.
(8) The ERM data is only for Digit -18 R.
(9) Dimension refered for entire unit with ERM without fresh air hood.

Table 2 – Single Compressor Circuit (IH045 to IH078)

		IH045	IH052	IH062	IH072	IH078
Cooling Mode – IH Units						
Net Cooling Capacity R-454B (1)	kW	51.4	57	66.1	78.4	87
Total Power Input R-454B (1)	kW	15.2	15.9	19.7	23.7	28.3
Heating Mode – IH Units						
Net Heating Capacity R-454B(1)	kW	46.4	51.9	61.4	76	87
Total Power Input R-454B (1)	kW	13.4	14.1	17.9	23.3	26.5
SEER	-	5.75	5.81	5.64	5.64	5.37
SCOOP	-	3.57	3.59	3.57	3.5	3.35
Number of capacity step	#	2,0	2,0	2,0	2,0	2,0
Capacity Steps (1)	kW	28,2/42,4	28,2/42,4	28,2/42,4	40,2/60,3	40,2/60,3
Electrical Data (2) (3) - base unit						
Main Power Supply	V/Ph/Hz	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50	400 / 3 /50
Unit Max power	kW	27.02	30.03	32.33	39.35	41.1
Unit Max Amps	A	43.7	47.1	50.49	61.86	64.07
Maximum Short Circuit rating for 0,3 sec	kA	15,0	15,0	15,0	15,0	15,0
Max power cable cross section (Standard unit)	mm2	35,0	35,0	35,0	35,0	35,0
Max power cable cross section (full optional)	mm2	70,0	70,0	70,0	70,0	70,0
Disconnect switch std unit		ABB OT125F3	ABB OT125F3	ABB OT125F3	ABB OT125F3	ABB OT125F3
Disconnect switch unit with option (heat recovery, Exhaust fan, Return Fan,Auxiliary heat)		n.d.	n.d.	n.d.	n.d.	n.d.
Electrical data of options (2) (3)						
Electric Heater	A	61.3	61.3	61.3	87	87
Indoor fan: Oversized	A	7.4	7.4	7.4	7.4	7.4
Exhaust Fan EC	A	11	11	11	11	11
Return Roofcurb	A	n.d.	n.d.	n.d.	n.d.	n.d.
Heat Recovery (not included current for oversized fan)	A	7.5	7.5	7.5	7.5	7.5
Gas burner (modulating)	A	n.d.	n.d.	n.d.	n.d.	n.d.
Frame						
Frame		Frame4	Frame4	Frame4	Frame4	Frame4
Compressor						
Number of Circuits	#	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
Type		Scroll	Scroll	Scroll	Scroll	Scroll
Model (R-454B)		VZH088CG	VZH117CG	VZH117CG	VZH170CG	VZH170CG
Max Amps per Compressor	A	27	33.8	33.8	47.4	47.4
Locked Rotor Amps per Compressor	A	31.5	41.5	41.5	58.5	58.5
Oil and Refrigerant						
Oil type	#	OIL58E/OIL57E	OIL58E/OIL57E	OIL58E/OIL57E	OIL58E/OIL57E	OIL58E/OIL57E
Oil quantity per compressors (6)	l	3.8	4.1	4.1	7.7	7.7
Refrigerant charge IH R-454B	kg	22	22	22	21	21
Outdoor Coil - IH						
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	5/16"	5/16"	5/16"	5/16"	5/16"
Face Area	m2	4.7	4.7	4.7	4.7	4.7
Rows/Fin Series	#/FPF	3 / 168	3 / 168	3 / 168	3 / 192	3 / 192
Number of Tubes in the height		48,0	48,0	48,0	48,0	48,0

IH General Data

Table 2 – Single Compressor Circuit (IH045 to IH078) (continued)

		IH045	IH052	IH062	IH072	IH078
Indoor Coil						
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	3/8"	3/8"	3/8"	3/8"	3/8"
Face Area	m2	2.52	2.52	2.52	2.52	2.52
Rows/Fin Series	#/FPF	4 / 168	4 / 168	4 / 168	4 / 168	4 / 168
Number of Tubes in the height		54	54	54	54	54
Drain Connection No./Size	mm	35,0	35,0	35,0	35,0	35,0
Hot Water Coil						
Type		Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes	Fins and Tubes
Tube Size	Inches	3/8''	3/8''	3/8''	3/8''	3/8''
Face Area	m2	2.11	2.11	2.11	2.11	2.11
Rows/Fin Series	#/FPF	2 / 144	2 / 144	2 / 144	2 / 144	2 / 144
Number of Tubes in the height		50	50	50	50	50
Indoor Fan						
Standard						
Type	#	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model	#	K3G500PA2371	K3G500PA2371	K3G500PA2371	K3G500PA2371	K3G500PA2371
Minimum Airflow	m3/h	7200	8320	9600	11680	13760
Nominal Airflow	m3/h	9000	10400	12000	14600	17200
Maximal Airflow	m3/h	11700	13520	15600	18980	22360
Number	#	2	2	2	2	2
Diameter	mm	500,0	500,0	500,0	500,0	500,0
Drive Type	#	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Motor Power (Eurovent condition)	kW	3,4	3,4	3,4	3,4	3,4
Motor Max Amps per fan	A	5,3	5,3	5,3	5,3	5,3
Motor RPM at nominal flow rate	RPM	1280	1380	1500	1685	1910
Available Static Pressure at nominal flow rate	Pa	250,0	250,0	250,0	250,0	250,0
Oversized						
Type	#	Plug Fans	Plug Fans	Plug Fans	Plug Fans	Plug Fans
Model	#	K3G500PB3301	K3G500PB3301	K3G500PB3301	K3G500PB3301	K3G500PB3301
Minimum Airflow	m3/h	7200	8320	9600	11680	13760
Nominal Airflow	m3/h	9000	10400	12000	14600	17200
Maximal Airflow	m3/h	11700	13520	15600	18980	22360
Number	#	2	2	2	2	2
Diameter	mm	500	500	500	500	500
Drive Type	#	EC Motors	EC Motors	EC Motors	EC Motors	EC Motors
Motor Power (Eurovent condition)	kW	5.7	5.7	5.7	5.7	5.7
Motor Max Amps per fan	A	9,0	9,0	9,0	9,0	9,0
Motor RPM at nominal flow rate	rpm	1610	1690	1780	1950	2150
Available Static Pressure at nominal flow rate	Pa	600	600	600	600	600
Outdoor Fan						
Standard Ambient						
Type	#	Axial fan EC	Axial fan EC	Axial fan EC	Axial fan EC	Axial fan EC
Model	#	S3G800LS2607	S3G800LS2607	S3G800LS2607	S3G800LS2607	S3G800LS2607
Nominal Airflow / ckt	m3/h	38200	38200	38200	38200	38200
Number of fan / ckt	#	1	1	1	1	1
Diameter	mm	800,0	800,0	800,0	800,0	800,0
Motor Power per fan	kW	1.11	1.11	1.11	1.11	1.11
Motor Max Amps per fan	A	2.9	2.9	2.9	2.9	2.9
Motor RPM	rpm	900	900	1020	1020	1020

Table 2 – Single Compressor Circuit (IH045 to IH078) (continued)

		IH045	IH052	IH062	IH072	IH078
Physical Data for Standard Unit (4)						
Length	mm	3466	3466	3466	3466	3466
Width	mm	2235	2235	2235	2235	2235
Height	mm	2270	2270	2270	2270	2270
IH Operating Weight (Downflow Without Auxiliary Heat)	kg	1297	1312	1312	1371	1371
IH Shipping Weight (Downflow Without Auxiliary Heat)	kg	1307	1322	1322	1381	1381
Options Extra Weight (4)						
Hot Water Coil	kg	90	90	90	90	90
Electric Heater	kg	20	20	20	20	20
Pre heat with Hot Water Coil	kg	70	70	70	70	70
Energy Recovery Module	kg	552	552	552	552	552
Energy Recovery Circuit [ERC]	kg	361	361	361	361	361
Exhaust Fan EC	kg	126	126	126	126	126
Barometric damper	kg	30	30	30	30	30
Energy Recovery Module (ERM)						
Max Exhaust Air @ ESP=400Pa	m3/h	11700	13520	15600	17800	17800
Max Fresh Air @ Wheel PD=300Pa	m3/h	11700	13520	15600	18700	18700
Min Wheel Airflow	m3/h	2500	2500	2500	2500	2500
Exchanger Wheel Diameter	mm	1200	1200	1200	1200	1200
Exhaust Air Fan Diameter	mm	500	500	500	500	500
Exhaust Air Fan Motor Power	kW	6.9	6.9	6.9	6.9	6.9
Length x Width x Height (9)	mm	4774 x 2236 x 2232	4774 x 2236 x 2232	4774 x 2236 x 2232	4774 x 2236 x 2232	4774 x 2236 x 2232
Weight	kg	552	552	552	552	552
Energy Recovery Circuit [ERC]						
Cooling Mode						
Net Cooling Capacity (ERC only)	kW	17.54619	17.9219	18.93362	18.62859	18.88827
Total ERC Power Input	kW	5.202952	5.108951	5.024888	5.027677	5.080518
"Net Cooling Capacity (ERC + IH standard)"	kW	51.90837	59.28548	69.43439	84.14492	94.12309
Total Power Input (ERC + IH standard)	kW	17.19663	18.02393	22.11775	27.03322	32.40133
Heating Mode						
Net Heating Capacity (ERC only)	kW	17.49451	17.70233	17.88831	17.8327	18.13821
Total ERC Power Input	kW	3.351068	3.35792	3.377502	3.457868	3.571179
"Net Heating Capacity (ERC + IH standard)"	kW	47.77019	54.49926	63.37451	76.03852	84.78884
Total Power Input (ERC + IH standard)	kW	13.00901	13.4921	16.67207	20.23834	24.07752
Exhaust Fans and Air Management						
Number of Exhaust Fans		2	2	2	2	2
Exhaust Air AC Fans Type		Axial / AC	Axial / AC	Axial / AC	Axial / AC	Axial / AC
Exhaust Air AC Fans Model		W4D450CO1401	W4D450CO1401	W4D450CO1401	W4D450CO1401	W4D450CO1401
Exhaust Air AC Fans Diameter	mm	450	450	450	450	450
Exhaust Air EC Fans Type		Plenum /EC	Plenum /EC	Plenum /EC	Plenum /EC	Plenum /EC
Exhaust Air EC Fans Model		K3G400PA2777	K3G400PA2777	K3G400PA2777	K3G400PA2777	K3G400PA2777
Exhaust Air EC Fans Diameter	mm	400	400	400	400	400
"Maximum Return Air Pressure Drop - AC (without Return Roofcurb)"	Pa	150	150	150	150	150
"Maximum Return Air Pressure Drop - EC (without Return Roofcurb)"	Pa	400	400	400	400	400

IH General Data

Table 2 – Single Compressor Circuit (IH045 to IH078 (continued)

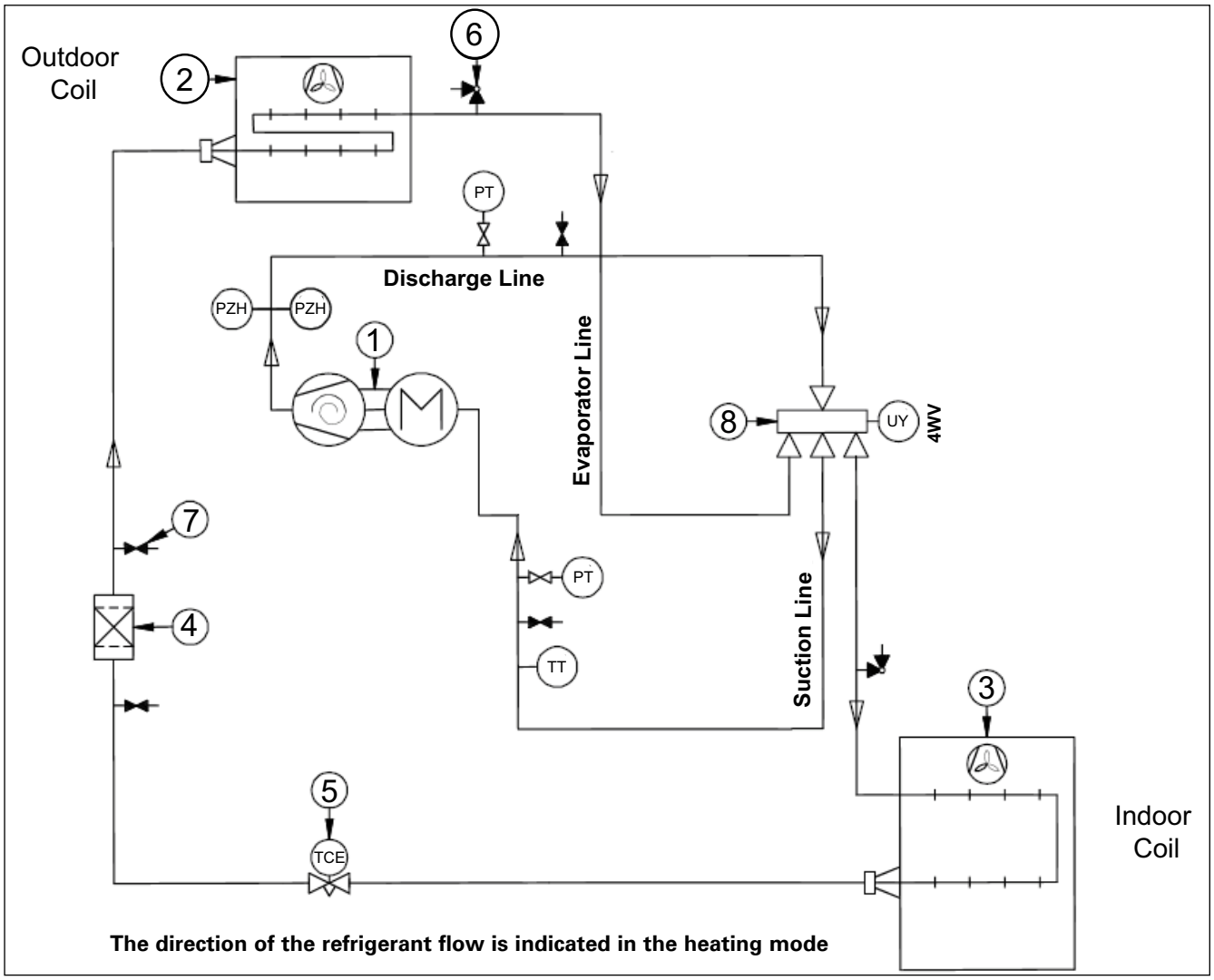
		IH045	IH052	IH062	IH072	IH078
"Maximum Additional Air Pressure Drop (indoor coil)"	Pa	10	15	15	20	20
Oil and Refrigerant						
ERC Circuit Refrigerant Charge	kg	3.2	3.2	3.2	3.2	3.2
ERC Circuit Oil Quantity	l	1.57	1.57	1.57	1.57	1.57
Dimensiond and weights						
"Length x Width x Height (ERC + IH standard)"	mm	4445 x 2236 x 2232	4445 x 2236 x 2232	4445 x 2236 x 2232	4445 x 2236 x 2232	4445 x 2236 x 2232
Weight (ERC + IH standard)	kg	361	361	361	361	361
Gas Burner						
Gas burner type - modulating condensing	#	n.d.	n.d.	n.d.	n.d.	n.d.
Thermal output (Hi) [Min-Max]	kW	n.d.	n.d.	n.d.	n.d.	n.d.
Useful heat output [Min-Max]	kW	n.d.	n.d.	n.d.	n.d.	n.d.
Gas Flow [Min-Max] (5)	m3/h	n.d.	n.d.	n.d.	n.d.	n.d.
Gas Connection Pipe Diameter	mm	n.d.	n.d.	n.d.	n.d.	n.d.

(1) Indicative performances. For detailed performances, consult order write up (OWU).
(2) Under 400V/50Hz/3Ph.
(3) Electrical and 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 US reference on compressor nameplate).
(7) IH unit only.
(8) The ERM data is only for Digit -18 R.
(9) Dimension refered for entire unit with ERM without fresh air hood.

Unit Operating Principle

Unit Synoptic

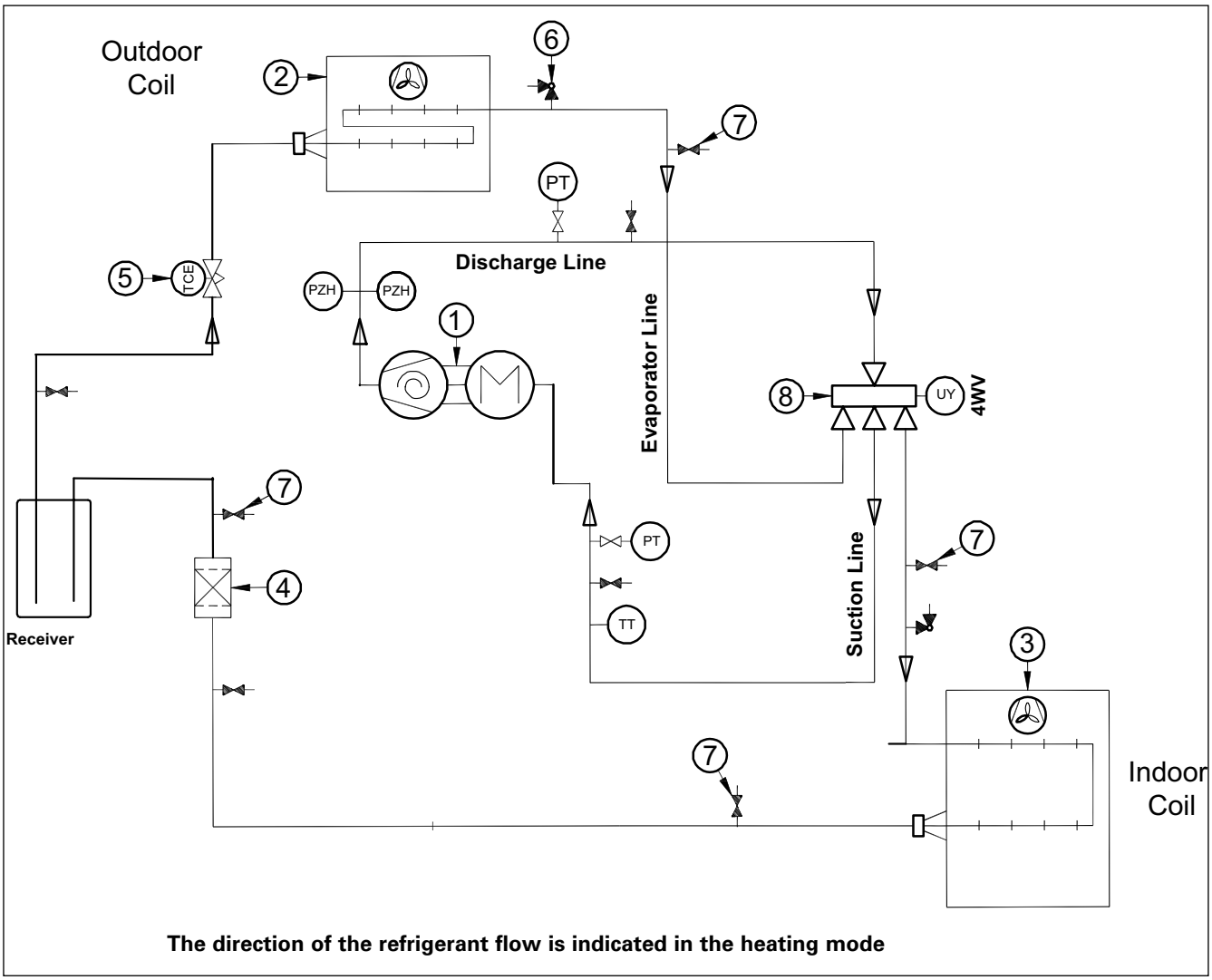
Figure 2 – Airfinity compact with AFD rooftop units - 017- 019- 023- 027- units typical refrigeration schematic



Item.	Description	Item.	Description
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		

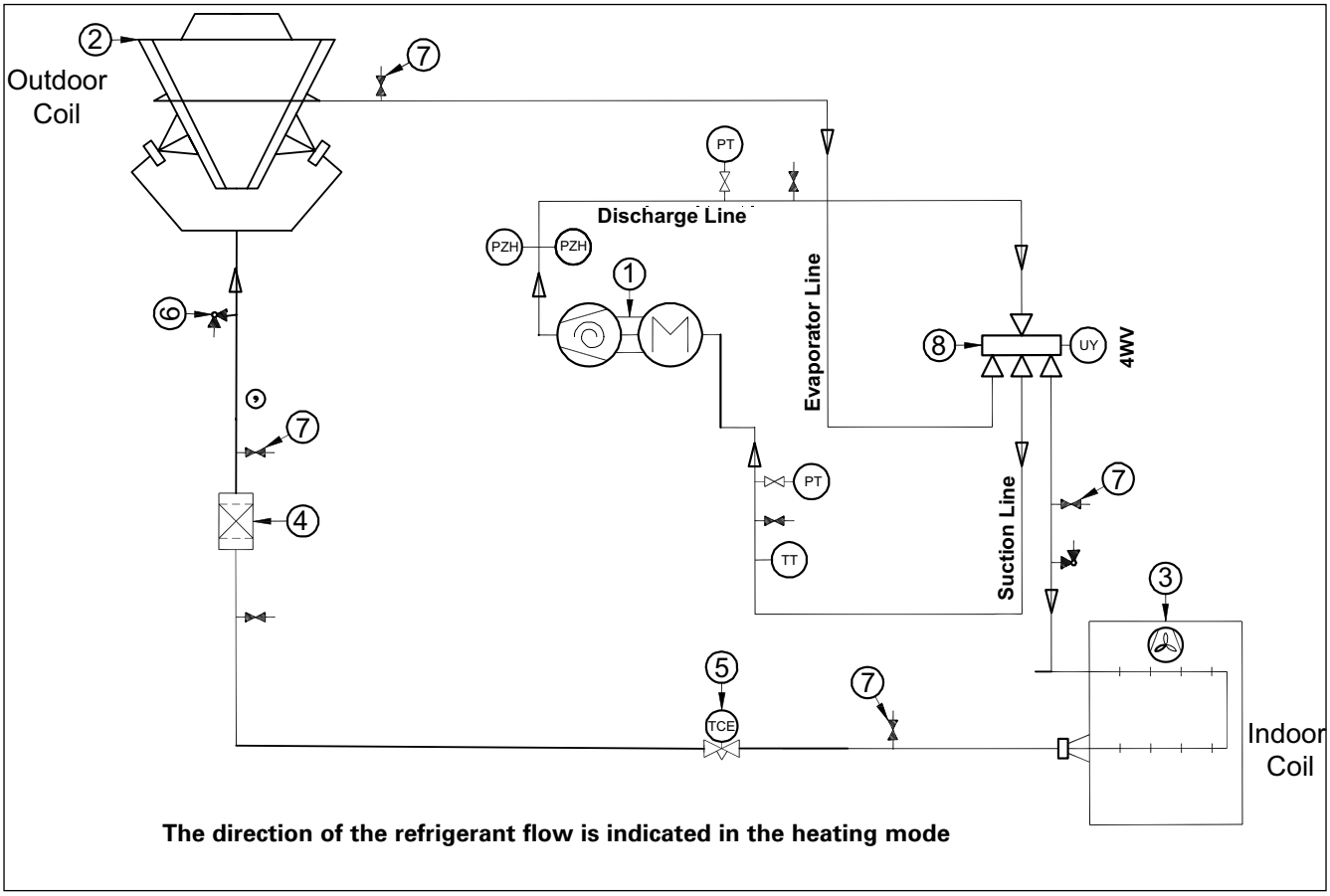
Unit Operating Principle

Figure 3 – Airfinity compact with AFD rooftop units - 030- 036- units typical refrigeration schematic



Item.	Description	Item.	Description
1	Scroll compressor	PT	Pressure transducer
2	Evaporator (heat exchanger with shell and tube fins)	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 4 – Airfinity compact with AFD rooftop units - 045- 052- 062- 072- 078- units typical refrigeration schematic



Item.	Description	Item.	Description
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		

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.

   CAUTION!

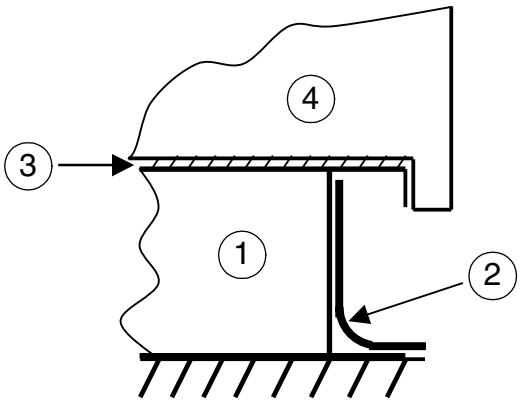
   The unit must be lifted with the utmost care. Avoid shock load by lifting slowly and evenly.
4. Remove slings and spreader bars when installation is completed.

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

In order to ensure watertightness of the roofcurb assembly, it is important to refer 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 5 - 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.

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 60cm 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 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 out of heavy canvas.

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

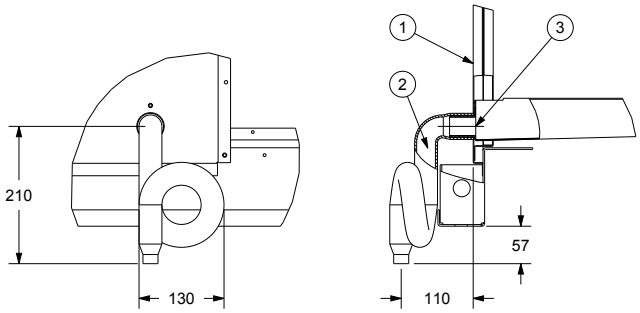
Condensate Drain Piping

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 “Attaching Horizontal Ductwork to Unit”.

Slope the drainage pipe down at least 1 percent 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



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

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.

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

Per Rail

3 filters of 500 x 625

There is 3 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 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, manufacturer 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 airflow can be calculated on the basis of the differential pressure (difference in pressure of the static pressures) in keeping with the following equation:

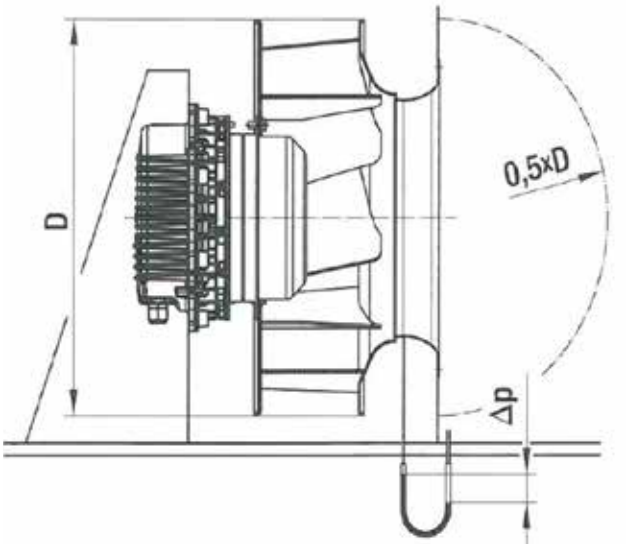
$$Qv = k.\sqrt{\Delta P}.N$$

Qv in [m^3/h] and Δp in [Pa]

N number of fans considers the specific nozzle characteristics.

k takes into account the specific nozzle characteristics.

Connection on the unit side is accomplished via a pre-mounted 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 differential pressure meter to the pre mounted connector.

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

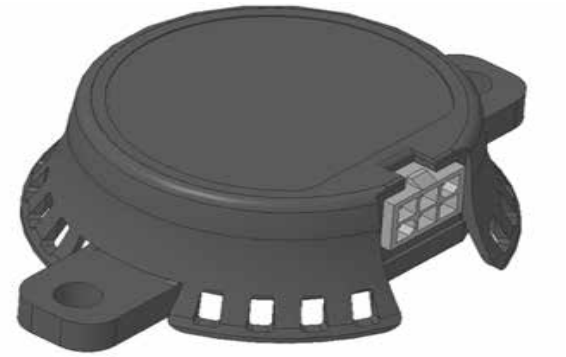
Refrigerant Leak Detector R-454B

Refrigerant leak detector R-454B is supplied and wired in each unit selected with refrigerant R-454B. Along with this option, each unit selected with R-454B is also equipped by default with the airflow rate measurement option, to have an additional level of security.

On Airfinity compact with AFD rooftop units, refrigerant leak detector is installed at the bottom in the indoor section close to the indoor coil. It is placed close to the door panel in order to have accessibility for maintenance (see the following images).

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

Figure 7 - Refrigerant leak detectors



Note: Depending on the configuration one of the above leak detectors is used.

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: Refer wiring diagrams shipped with unit or unit submittal for specific electrical schematic and connection information.

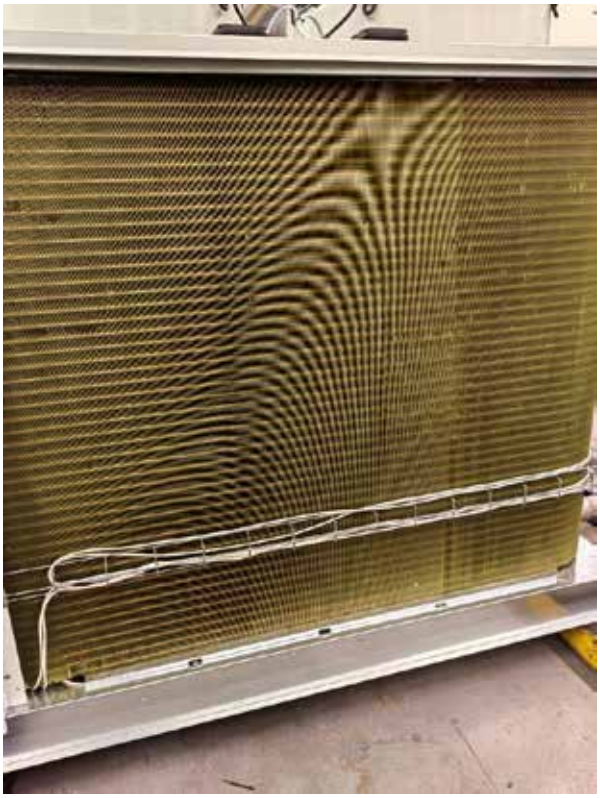
WARNING External electric heaters!

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. Manufacturer doesn't assumes responsibility for any operation carried out by unauthorized personnel.

Note: Electric heaters are applicable for sizes up to IH036.

Figure 8 - Electric heater



WARNING Hazardous Voltage!

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

Important!

Do not allow conduit to interfere with other components, structural members or equipment. Control voltage (230 V/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™ 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 manufacturer 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 death or serious injury.

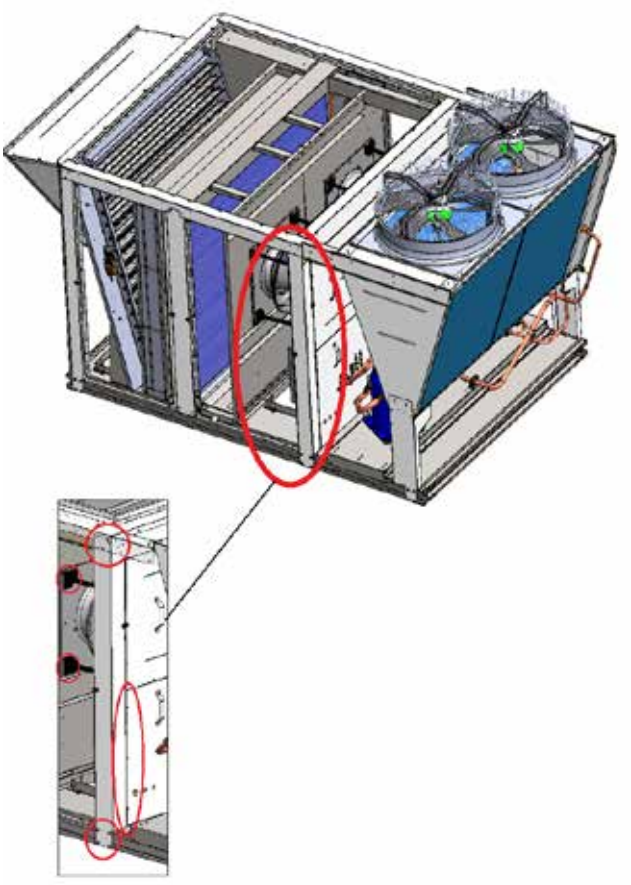
Disassemble the Internal Fans

To disassemble the internal fans

1. Remove the upright by unscrewing the screws in the highlighted areas.

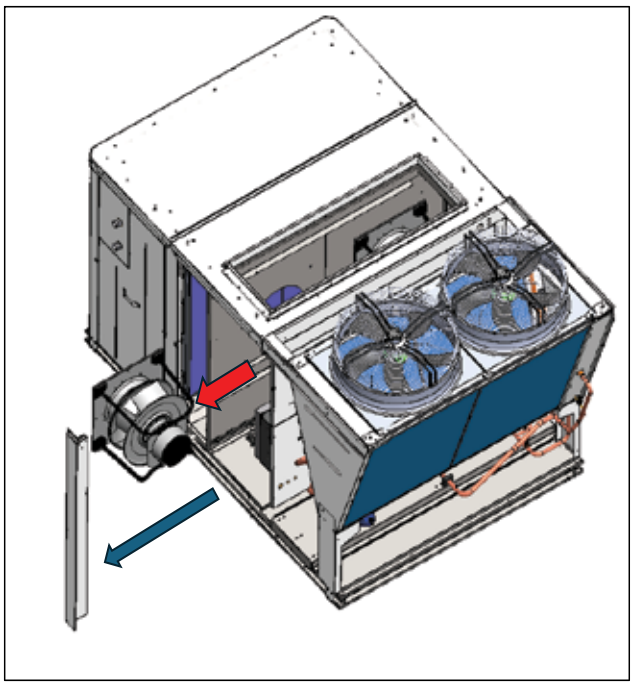
Installation

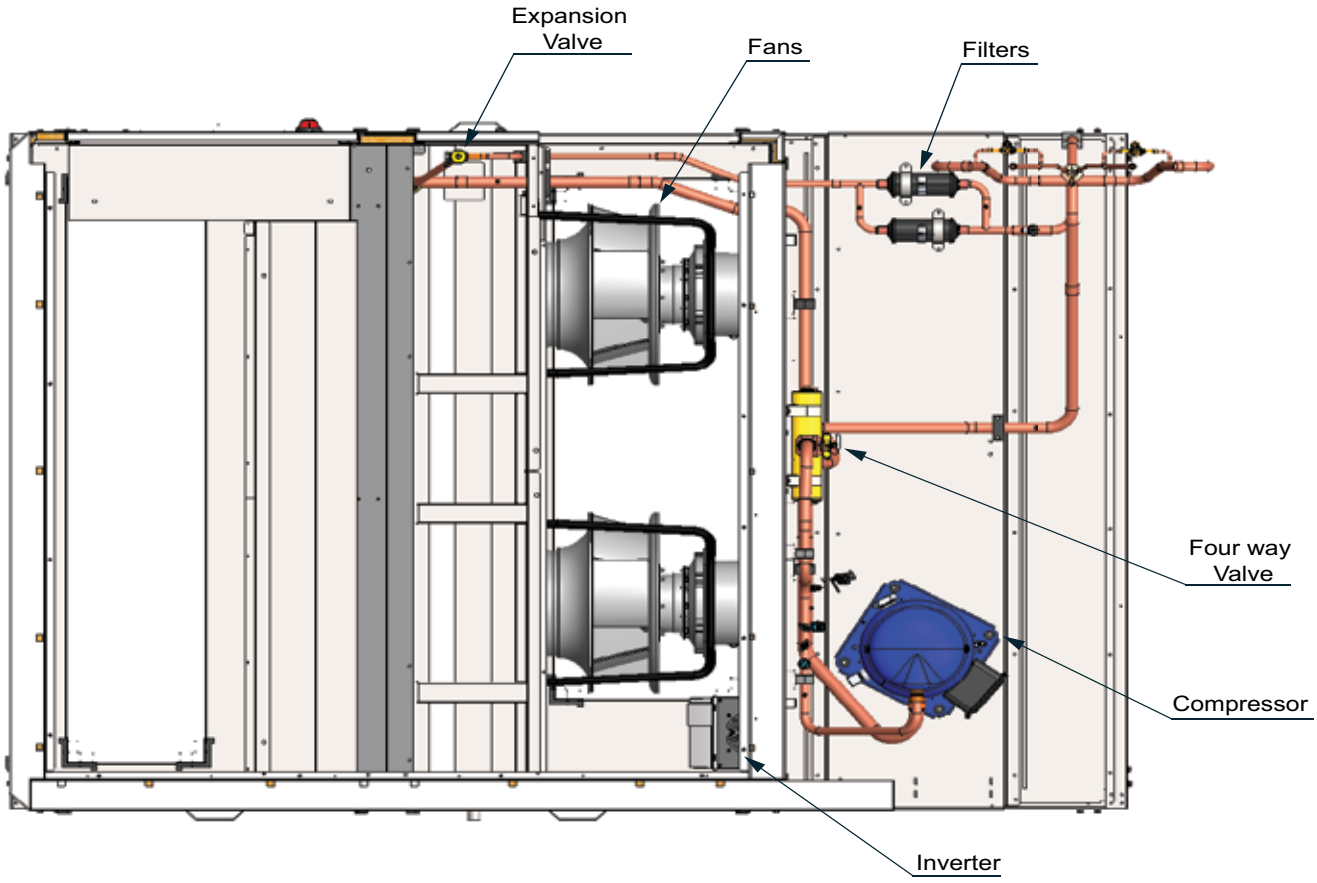
Figure 9 - Internal fan disassembly



2. Remove the side panel, the post (blue arrow) and then pull out the fans (red arrow)

Figure 10 - Internal fan disassembly





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 ith 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.

** Neutral wire not distributed

Electrical Connections

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 (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

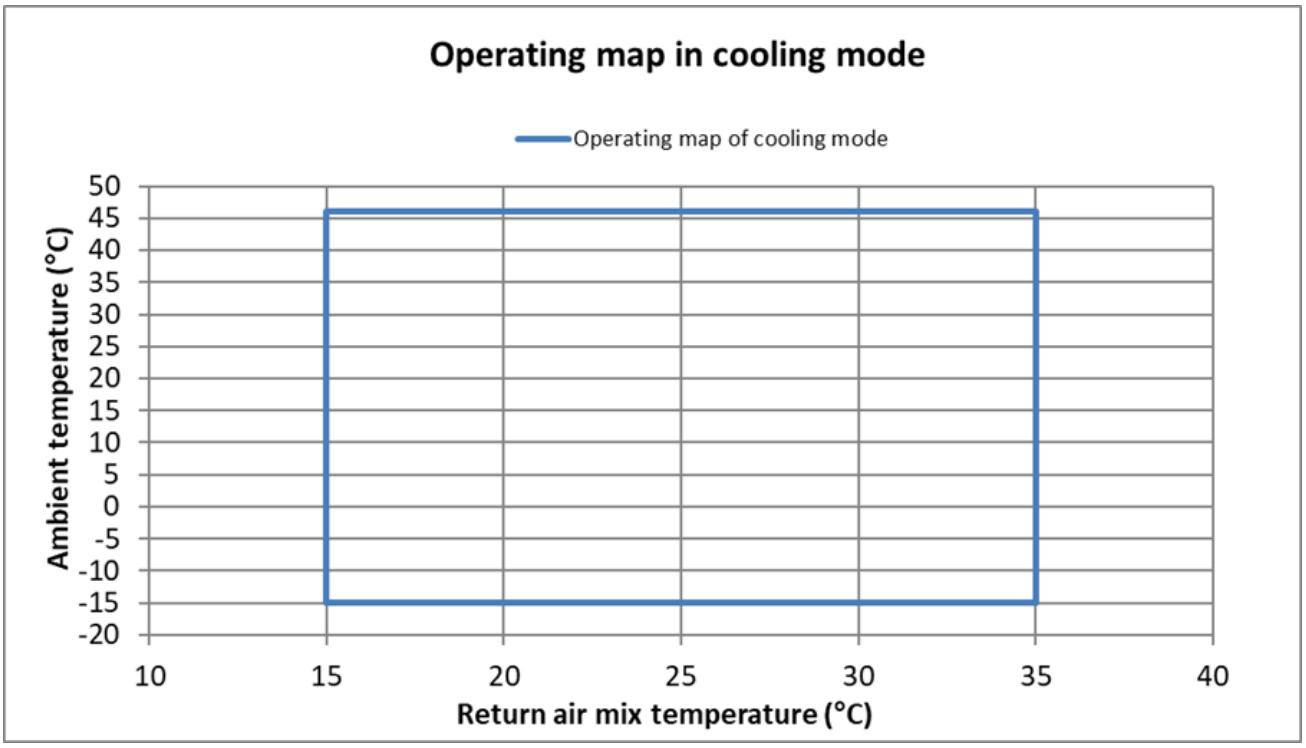
In case of replacement, configuration will be done by manufacturer service. There is no human interface and the configuration is done via RS485 Modbus.

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.

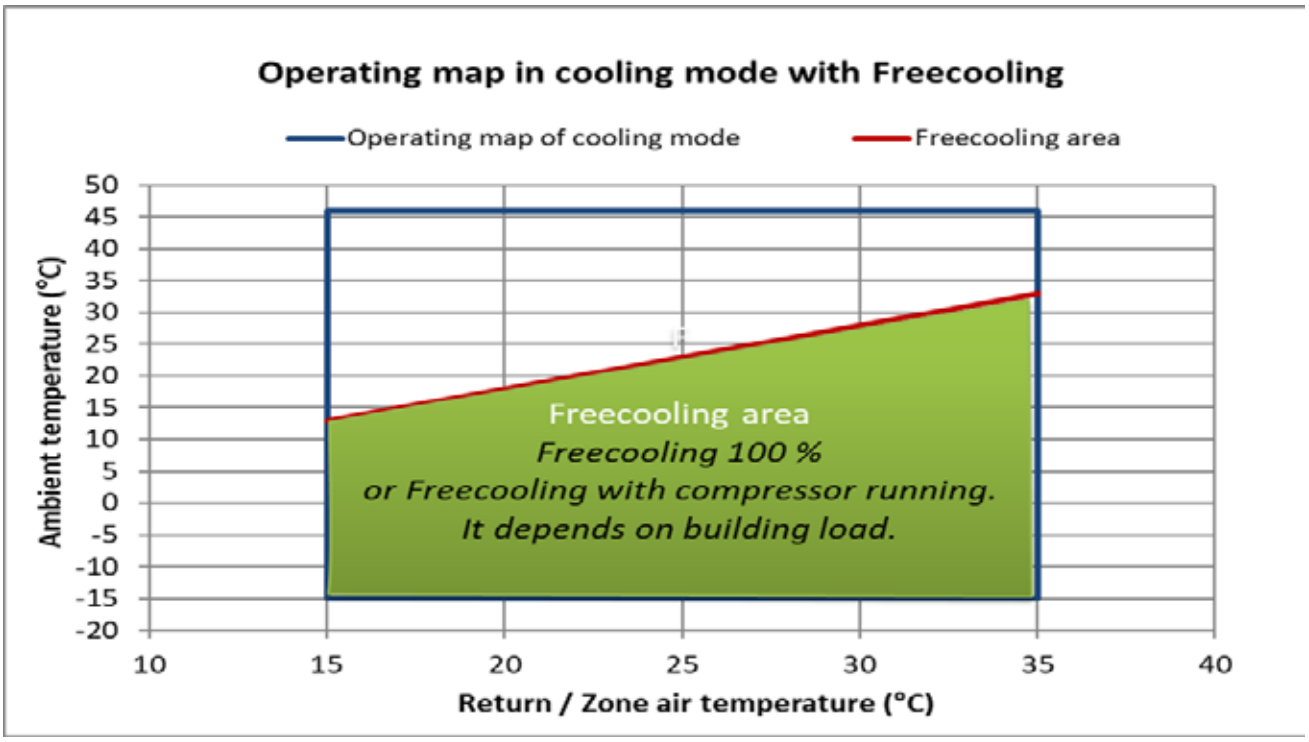
Filter maintenance: clean or change the drive filters if necessary.

Operating Map

Cooling Mode

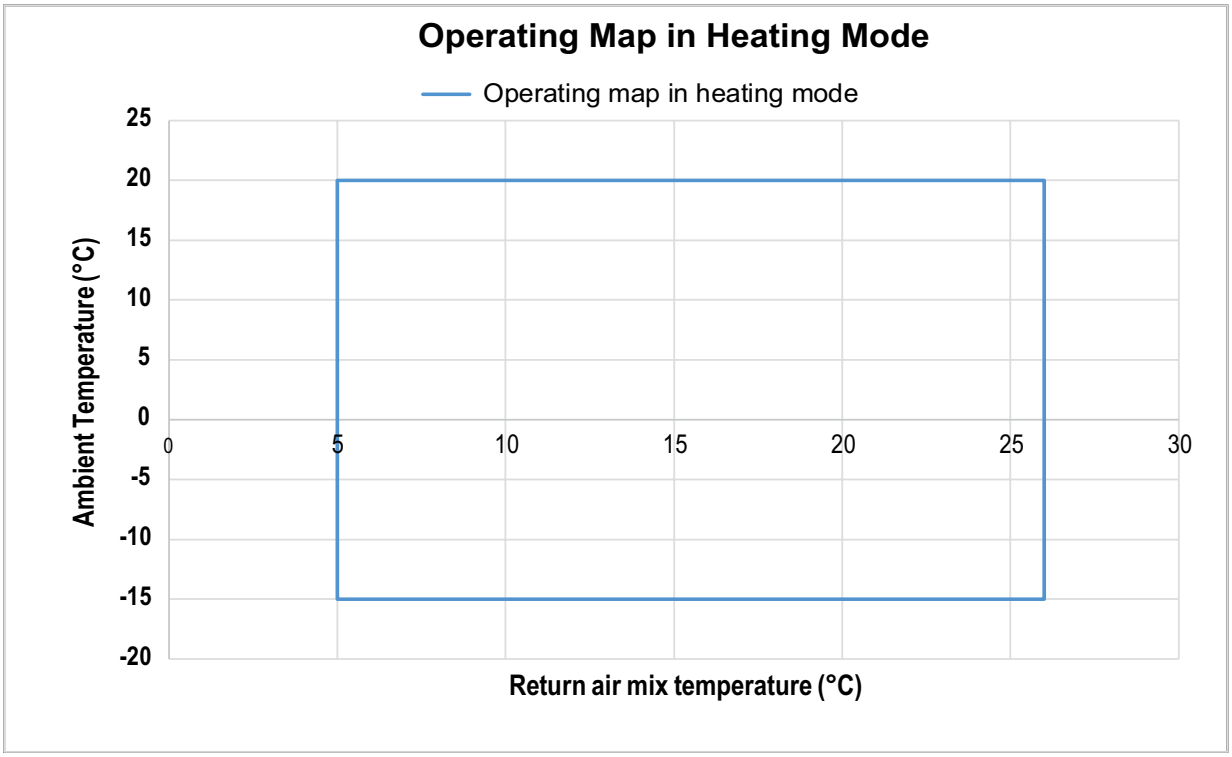


Minimum Outdoor Temperature = -15°C.
Maximum Outdoor Temperature = 46°C.
Minimum Indoor Coil Mixed Temperature = 15°C.
Maximum Indoor Coil Mixed Temperature = 35°C.



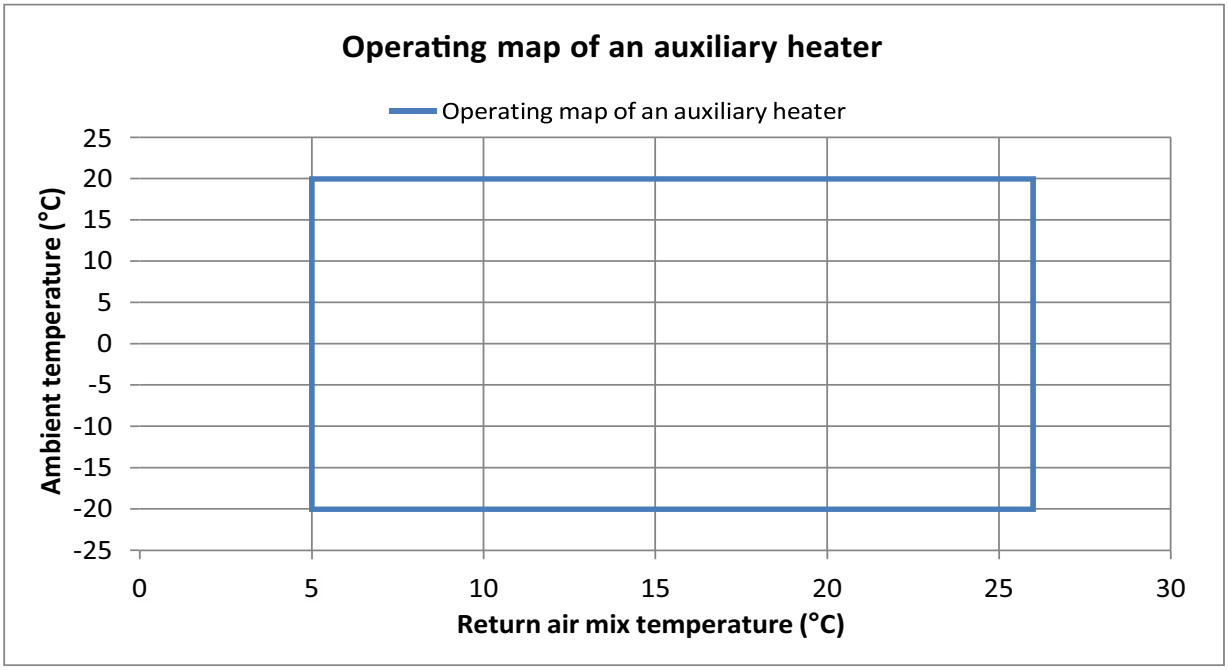
Free cooling area:
Outdoor temperature 13°C and Return/Zone temperature 15°C.
Outdoor temperature 33°C and Return / Zone temperature 35°C.

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 airflow 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 ($\Delta P > Pb - Patm$) → barometric damper is closed.
  - –If return air pressure drop<building overpressure ($\Delta P < Pb - Patm$) → barometric damper opens and a maximum of 25 percent 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 two 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 roofcurb (ESP=250 PA).

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

Exhaust Fan Speed Setting

1. Adjust the unit fan speed at the nominal flow rate using the optional service terminal.
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 coil temperature is closed to the freezing point (2°C). 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 a water 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.

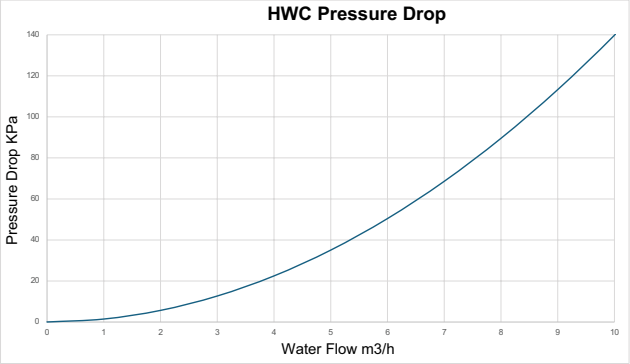
CAUTION Proper Water Treatment! The use of untreated or improperly treated water in the unit may result in scaling, erosion, corrosion, algae or slime. It is recommended that the service of a qualified water treatment specialist be engaged to determine what water treatment, if any, is required. Manufacturer assumes no responsibility for equipment failures which results from untreated or improperly treated water or saline or brackish water.

Dirt, scale, products of corrosion and other foreign material will adversely affect heat transfer between the water and system components. Foreign matter in the chilled water system can also increase pressure drop and consequently, reduce water flow. Proper water treatment must be determined locally, depending on the type of system and local water characteristics. Manufacturer is not responsible for damage to or malfunctioning of equipment caused by failure to treat water or by improperly treated water.

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 11 - Hot water coil pressure drop



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.

Options

Energy Recovery Wheel [ERW]

Heat Recovery Wheel 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 rotary heat exchanger (rotory wheel), exhaust fan, 2 stages of filters and barometric relief dampers.

The exhaust fans ensures airflow extraction in order to keep a constant exhaust airflow. It works in parallel with indoor fan. It's purpose is to overcome the pressure drop caused by heat recovery wheel, filters and, and the return duct pressure drop. Fan's motor is insulation class F and ingress protection marking IP54.

Figure 12 - Energy recovery wheel [ERW] config

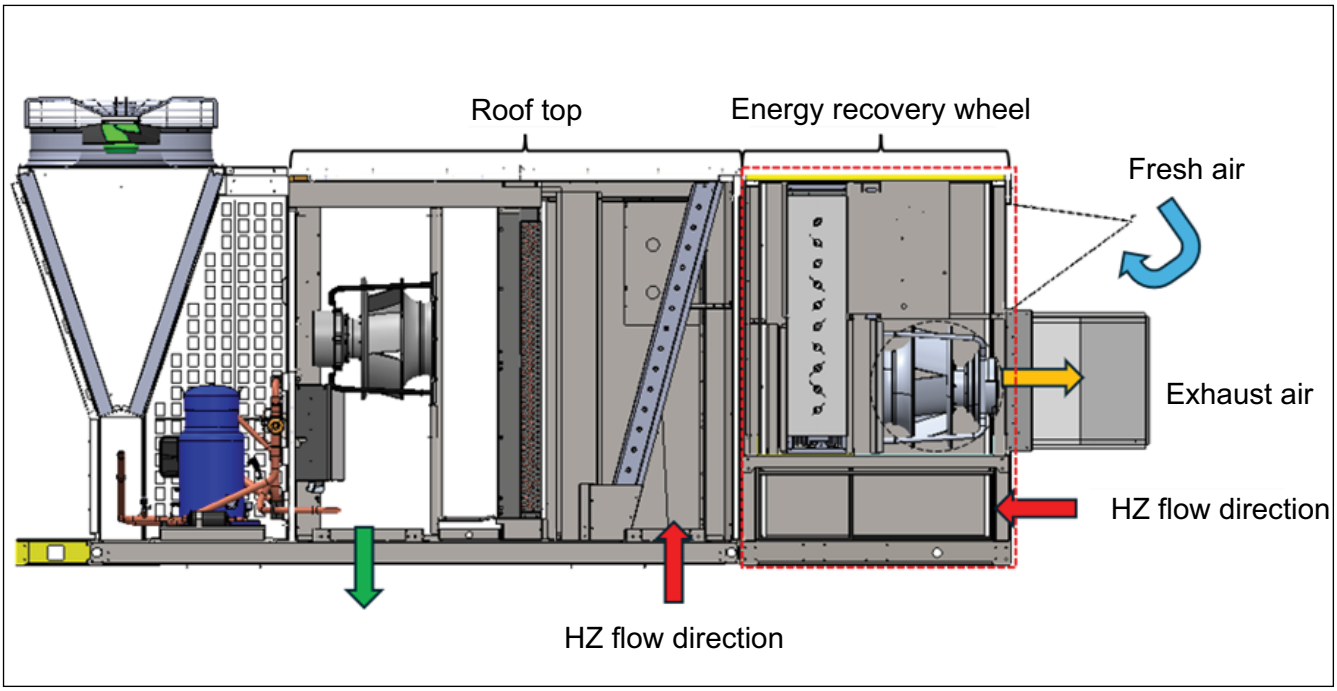
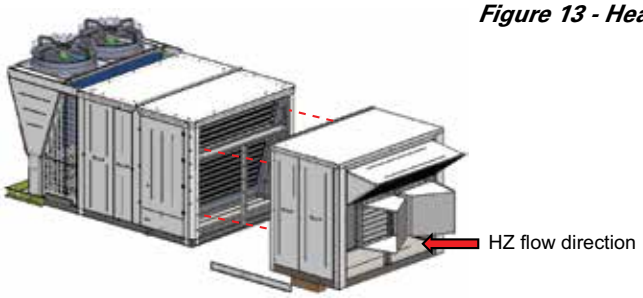
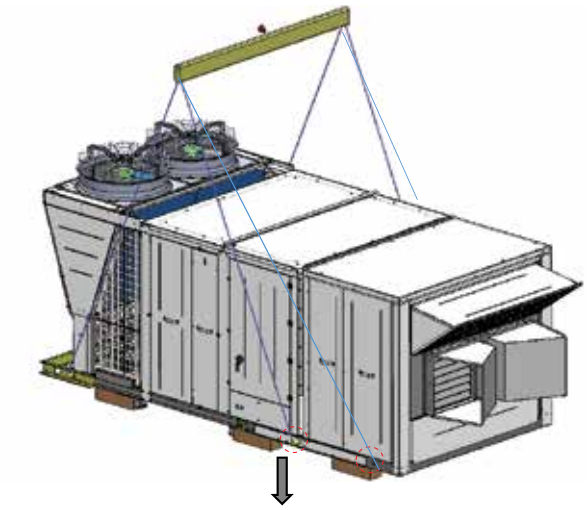


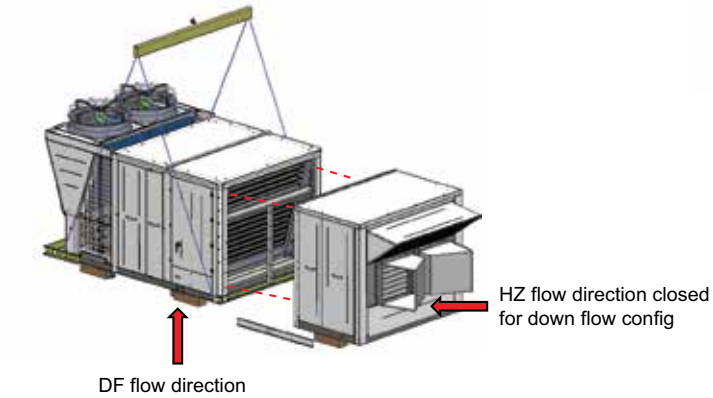
Figure 13 - Heat Recovery Module supporting and assembly on a rooftop





Heat Recovery Module supporting and assembly on a rooftop

Figure 14 - Down flow direction



Installation

The module shall be assembled with the unit at the factory and subsequently installed on the rooftop in the assembled state. V angle rails hold the corner posts of unit and ERW together and the base C-rails hold the base of unit and module together.

Lifting

The ERW module comes assembled to the unit. 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).

Follow the same process of lifting the unit with ERW module as done for unit alone. Following has to be considered in addition to that

– The base is provided with holes for lifting beam in six locations as shown in"Figure 13 - Heat Recovery Module supporting and assembly on a rooftop" on page 28. Cables are connected to the lifting beam at one side and spreader bar on the other end.

– Use a lifting beam to prevent the cables pressing too hard on top of the unit during lifting. Insert the lifting rod through the hole (shown in figure) in the base rail.

Please follow the same instruction as for unit alone lifting

Downflow configuration

The open section below the barometric damper is the return air intake opening for horizontal configuration. This section would be closed for downflow configuration (refer "Figure 14 - Down flow direction" on page 28).

Leg for ERW section

It is advised for customer to add a Leg (as shown in the "Figure 16 - Leg for ERW section" on page 29) to support the ERW section. This would be done post installation of unit with ERW module on the rooftop.

Figure 15 - Lifting with roofcurb

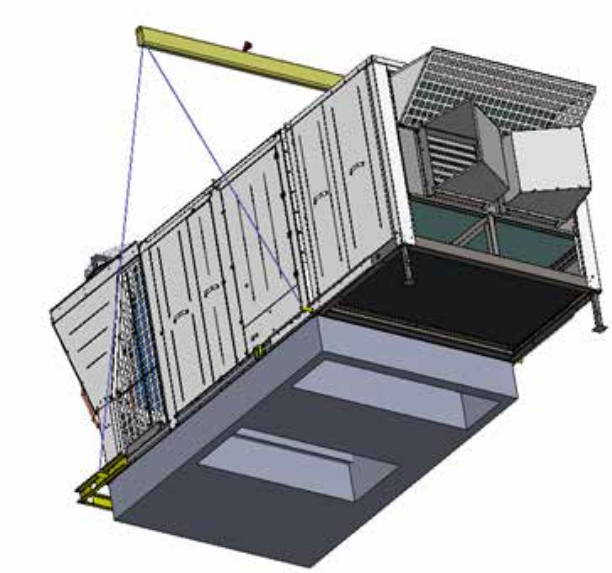
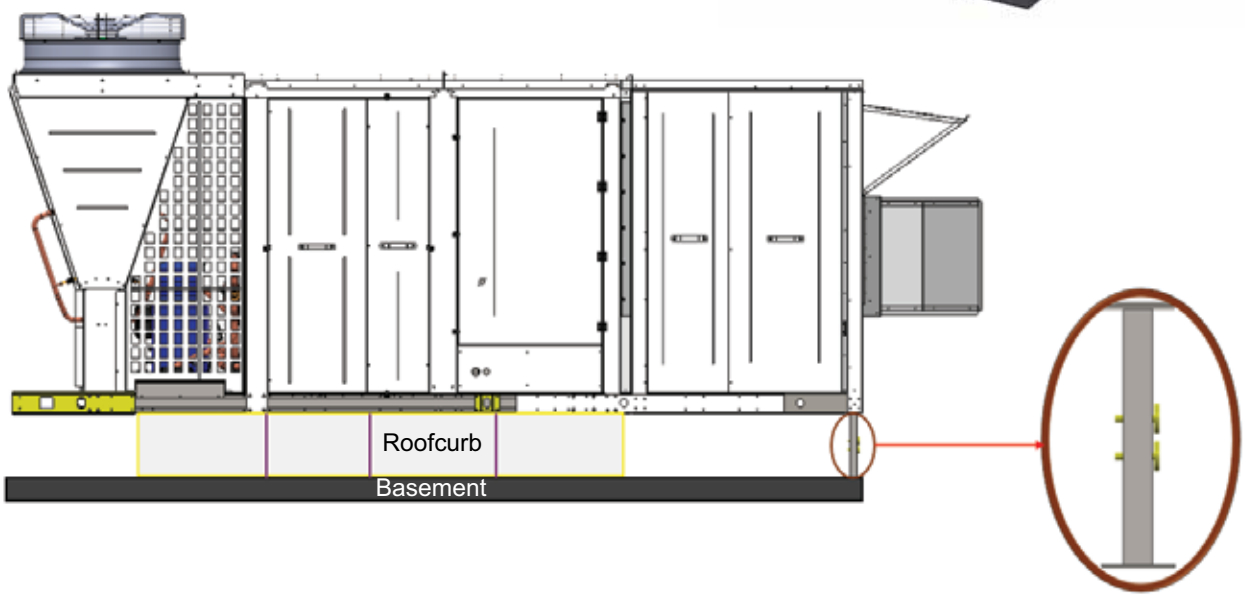


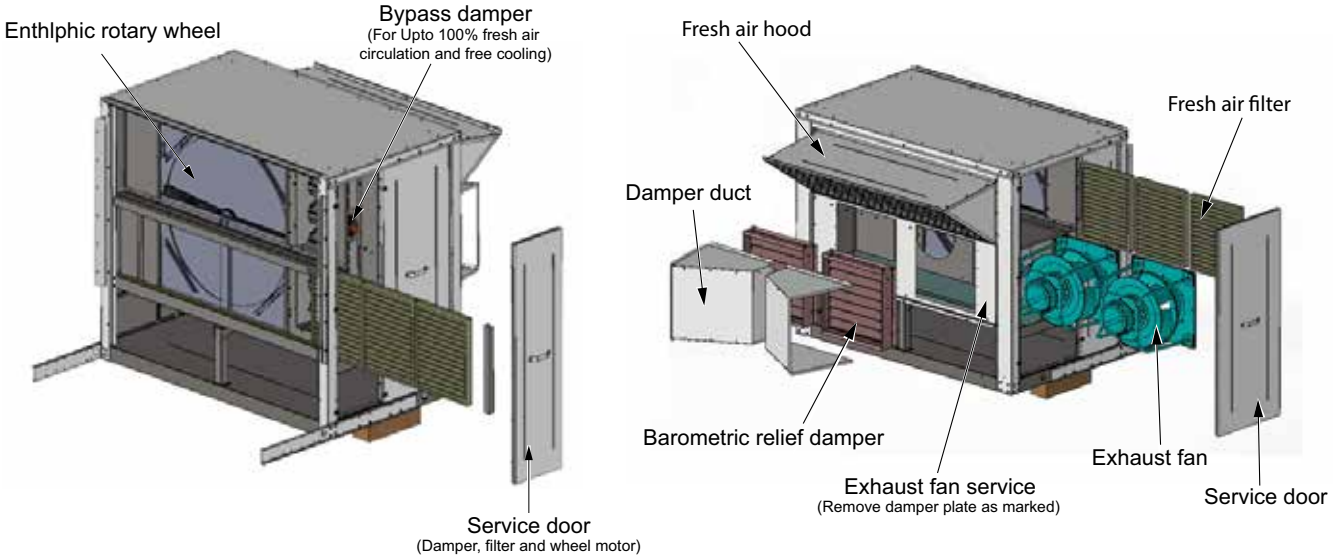
Figure 16 - Leg for ERW section



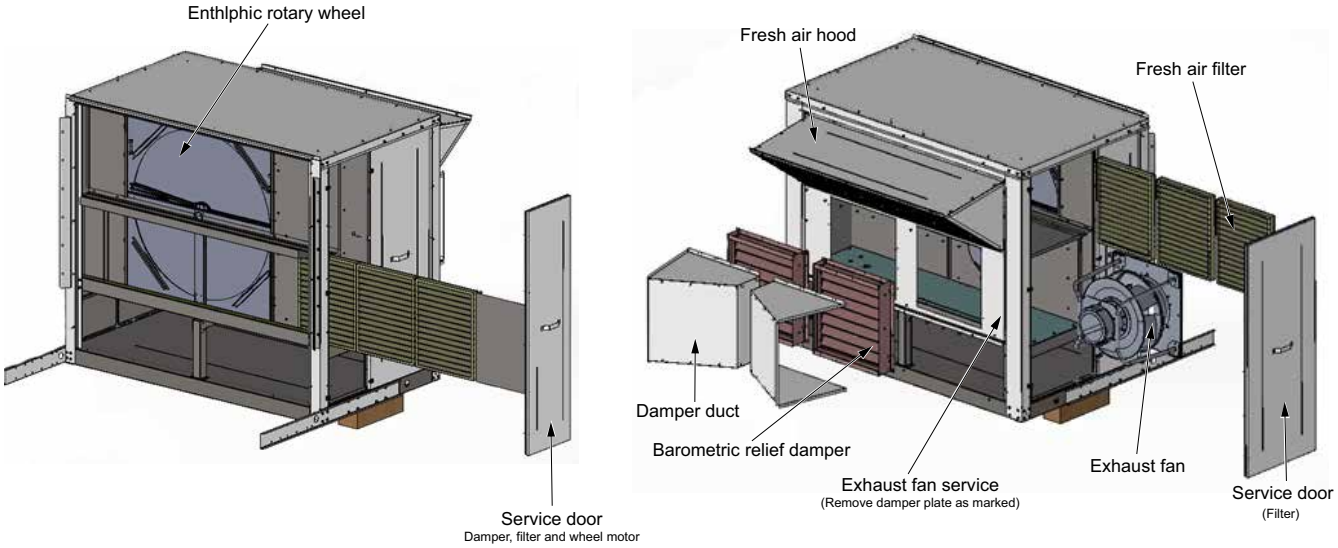
Optional support leg for ERW module

Options

Servicing / Maintenance



Airfinity Heat Recovery Module composition



Airfinity Heat Recovery Module composition

Standard Air Flow Configuration Option

Filter removal

Remove the service door present in the rear end of the unit (side opposite to control box) to access the filter rack. Remove the block off first. Now the filter panels can be removed by sliding it through the filter rack.

Barometric damper removal

Remove the screws holding the barometric damper hood and then remove the screws holding the barometric damper.

Fan removal

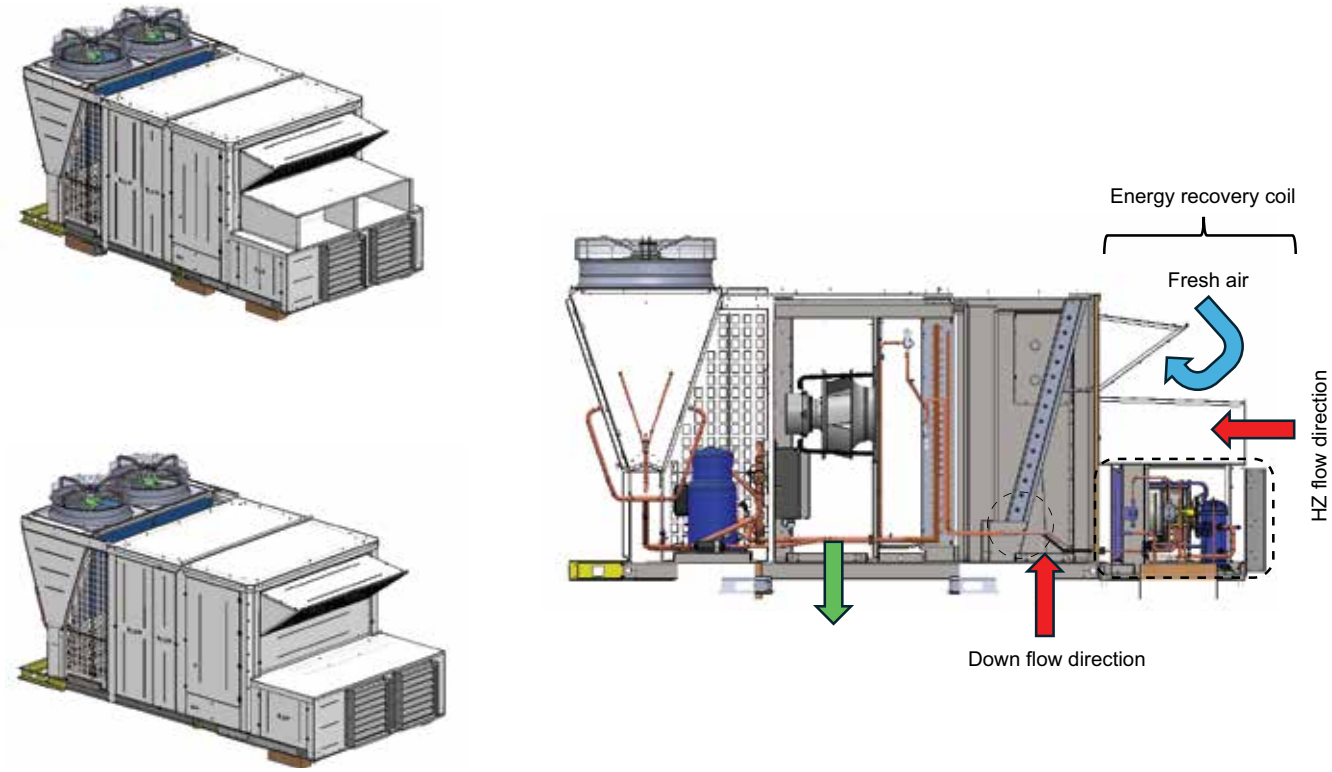
Remove the barometric damper (refer barometric damper removal section) and the plate holding barometric damper. This would provide access to the fan mounting screws. Remove the fan mounting screws and pull the fan out through this section.

High Air Flow Configuration Option

Same as Standard airflow configuration.

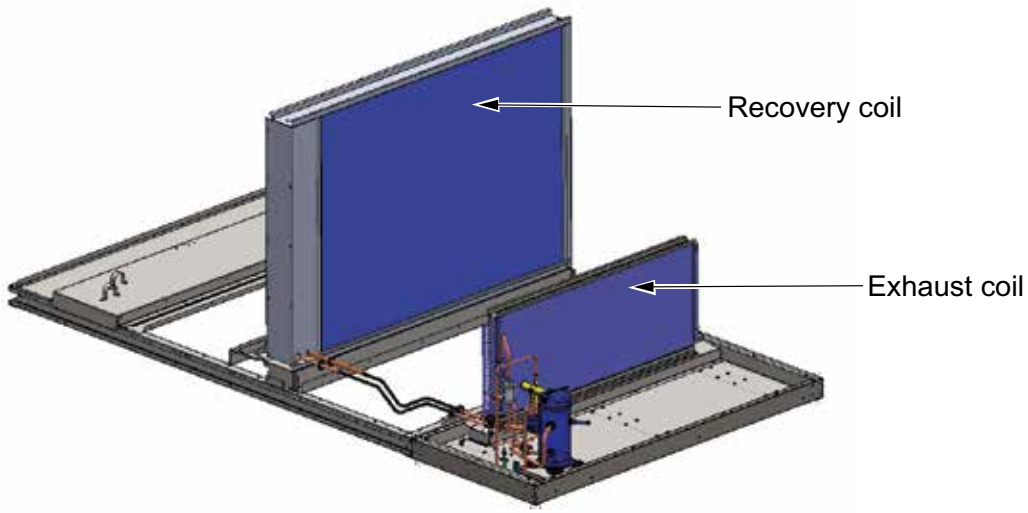
Energy Recovery Circuit [ERC]

Figure 17 - Energy recovery circuit [ERC] config



ERC consists of an additional refrigeration circuit, which recovers energy from the exhaust air to preheat, or precool the fresh air. This results in a reduction of compressor's shaft work required to heat or cool the building.

Figure 18 - Heat exchanger



Above image shows the layout of components which are part of the ERC module. ERC includes a compressor, 2 heat exchanger refrigerant / air and exhaust fan and all components, with the exception of the recovery coil, are integrated into a separate cabinet box.

Options

Installation

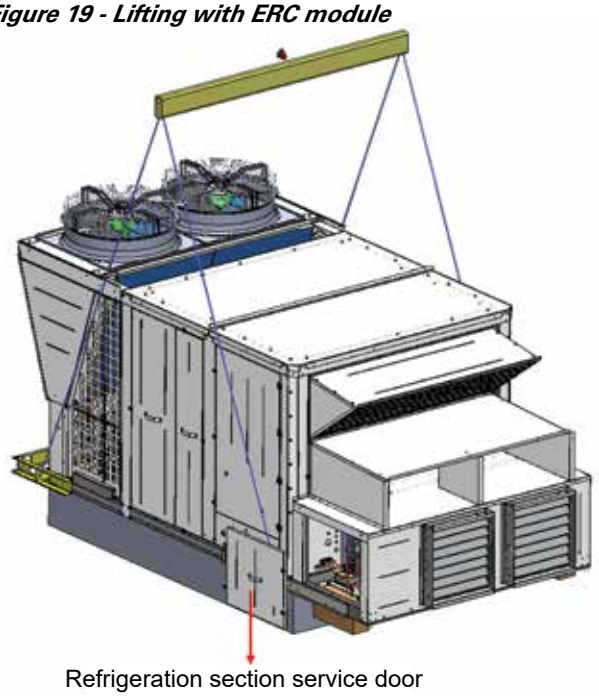
Lifting

The ERC module comes assembled to the unit. It is recommended to check the machine's condition upon reception.

There are two ways to handle the unit:

3. 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).
4. Use a lifting beam correctly adjusted to fit the unit (recommended).

Figure 19 - Lifting with ERC module



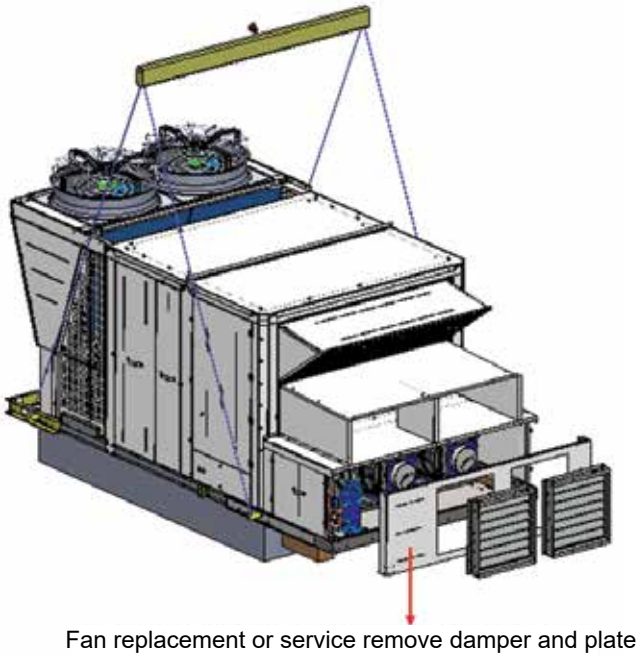
Refrigeration section service door

Follow the same process of lifting the unit with ERC module as done for unit alone. Following has to be considered in addition to that

- Use the same holes, which are used for lifting the unit, for adding the lifting beam which would be used to lift the unit with ERC module.(Refer "Figure 19 - Lifting with ERC module" on page 32).
- Use a lifting beam to prevent the cables pressing too hard on top of the unit during lifting. Insert the lifting rod through the hole (shown in figure) in the base rail.

Please follow the same instruction as for unit alone lifting.

Figure 20 - Damper and plate removal

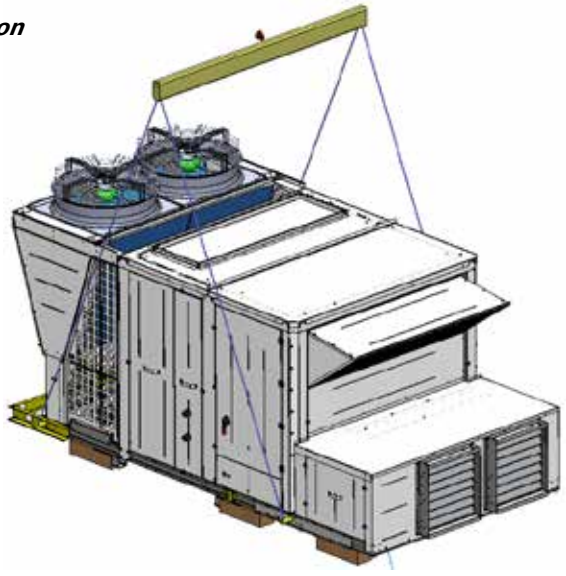


Fan replacement or service remove damper and plate

Downflow configuration

The open section above the barometric damper is the return air intake opening for horizontal configuration. This section would be closed for downflow configuration (refer "Figure 21 - Downflow configuration" on page 32).

Figure 21 - Downflow configuration



Leg for ERC Section

It is advised for customer to add a Leg (Similar ERW support) to support the ERC section. This would be done post installation of unit with ERC module on the rooftop.

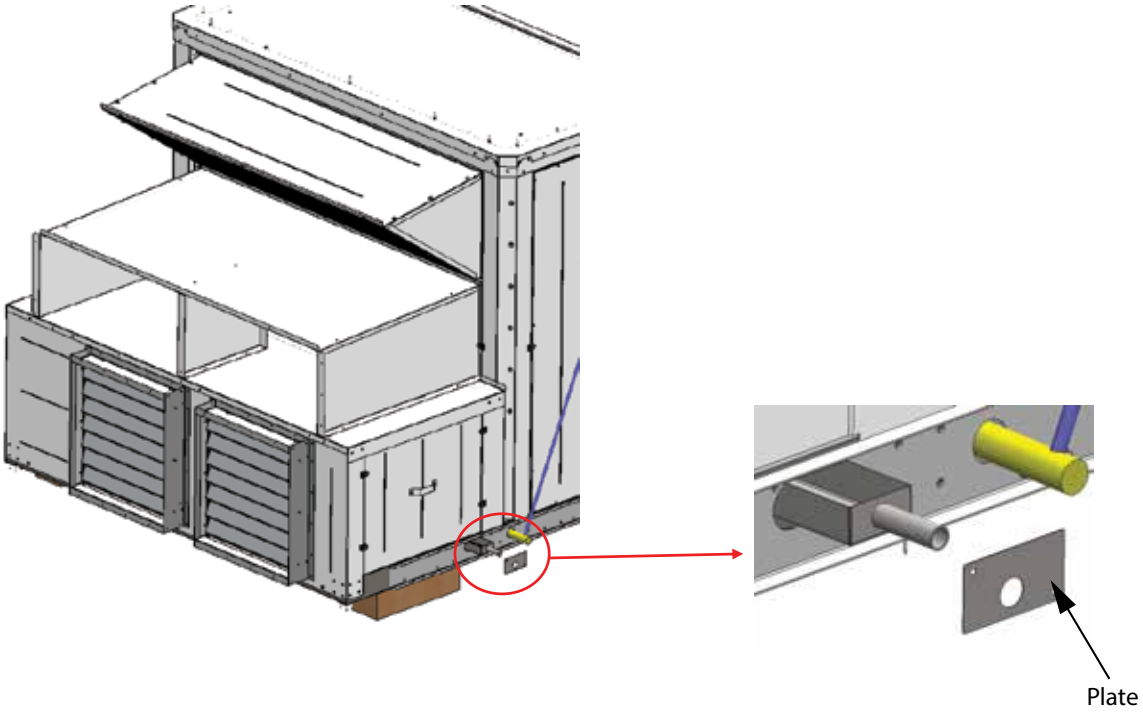
Servicing/ Maintenance

Compressor Removal

Remove the refrigeration section service door (Refer the image above) to access the compressor. Remove the compressor mounting screws and lift the compressor out of the section.

Drain Pan Removal

Remove the screws holding the cover on the base rail. Slide it through the tube of drain pan. After the cover removal drain can be slid out by pulling it. It may be needed to lift the drain pan a little before pulling it out.



Barometric Damper Removal

Remove the screws holding the barometric damper to remove damper.

Fan Removal

Remove the barometric damper (refer barometric damper removal section) and the plate holding barometric damper. This would provide access to the fan mounting screws. Remove the fan mounting screws and pull the fan out through this section

Options

Exhaust Options

WIthout Baro damper option [Digit 31 =x]

Figure 22 - 13D, 17A - Without baro damper for DF option

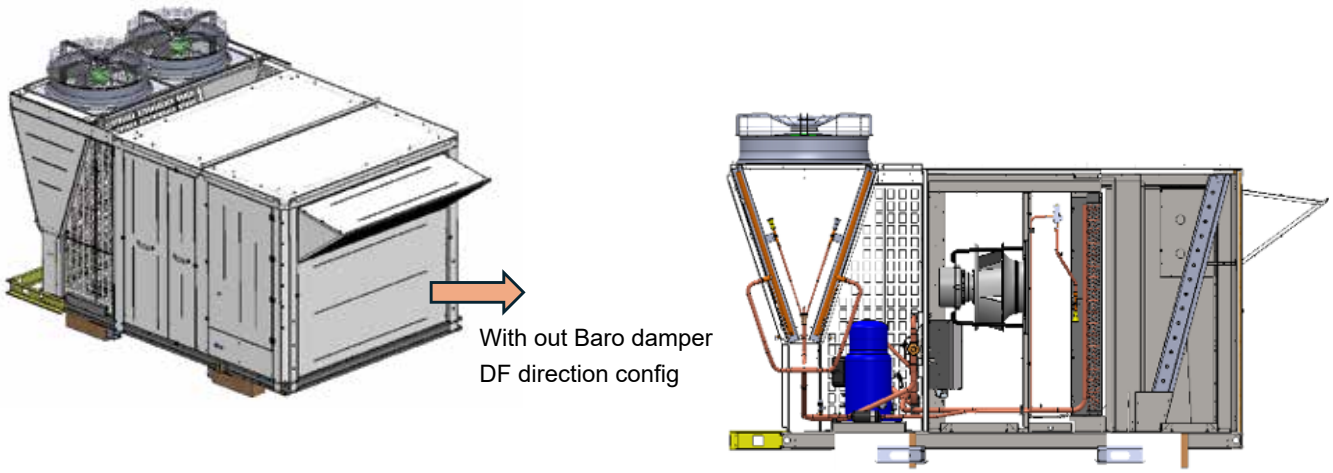
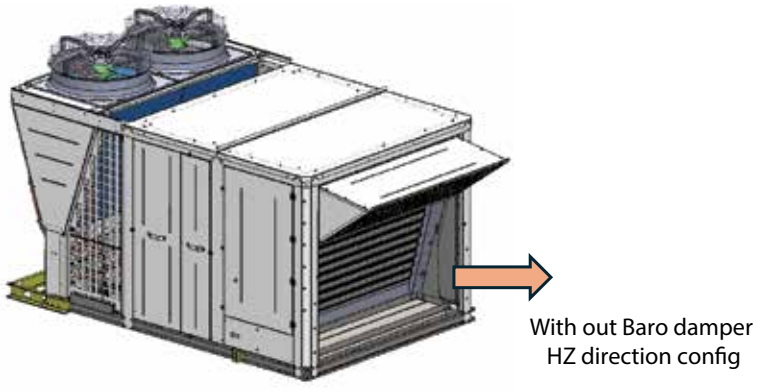


Figure 23 - 13H, 17A - Without baro damper for HZ flow



The side of the unit with fresh air hood (as shown in “Figure 23 - 13H, 17A - Without baro damper for HZ flow” on page 34) would be completely covered with a plate for units without barometric damper for downflow configuration. These plate are held on to the unit at corner post using screws.

Figure 24 - 13D and 31 - 1, 17A - With baro damper for DF option

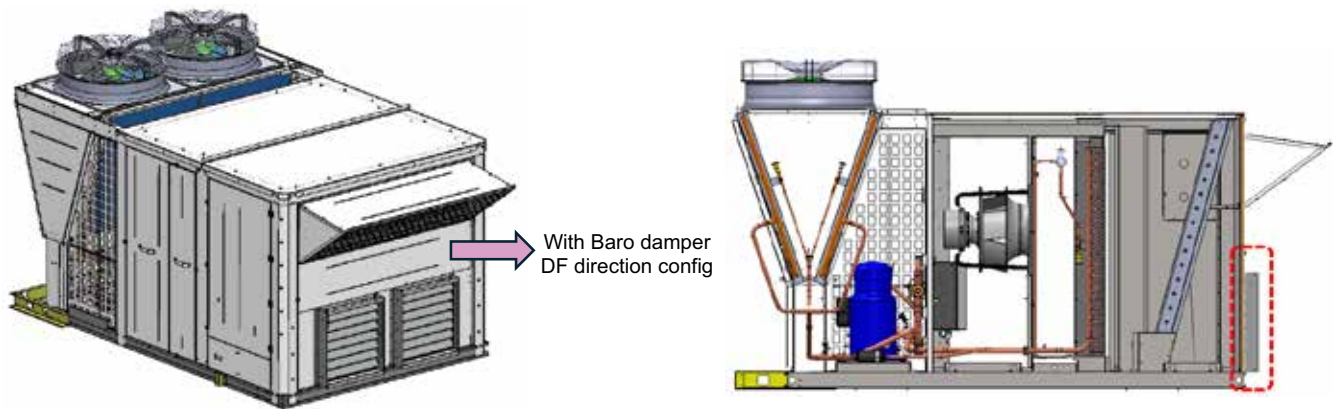
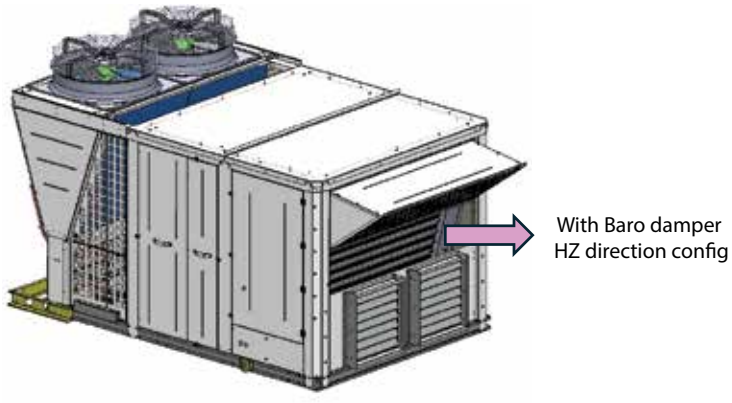


Figure 25 - 13H, 17A, 31-1 - With baro damper for HZ flow

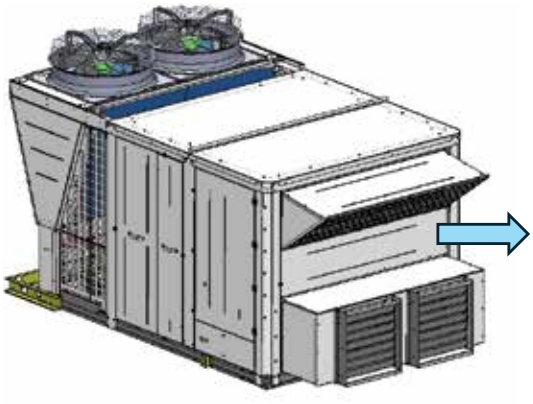


The side of unit with fresh air hood (refer "Figure 25 - 13H, 17A, 31-1 - With baro damper for HZ flow" on page 35) would be covered with a plate in the center and Barometric damper at the bottom for units with barometric option for dowflow configuration. These plates and barometeric damper are held on to the unit at corner post and base using screws.

Options

WIth AC and EC Exhaust Fan Option [Digit 31 =2 ,3]

Figure 26 - 13D, 31 - 2/3 - Exhaust option DF



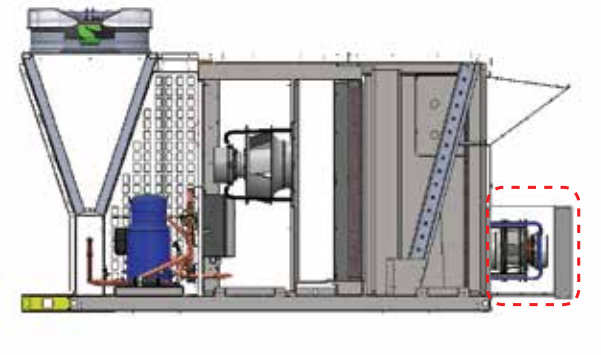


Figure 27 - 13H, 31 - 2/3 - Exhaust option HZ flow

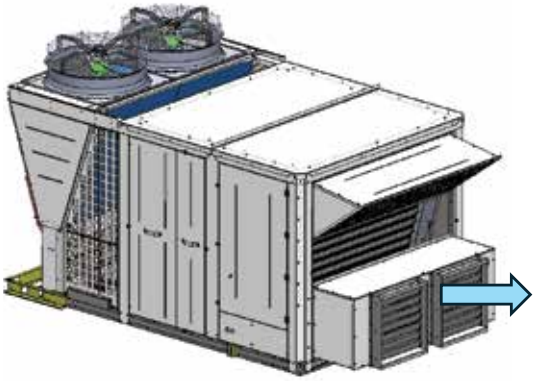


Figure 28 - 13H,31-3-EC fan option

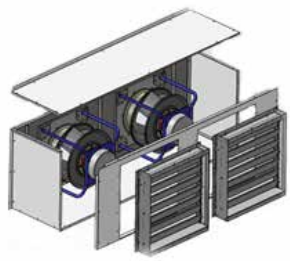


Figure 29 - 13H,31-3-AC fan option

The side of the unit with fresh air hood (refer “Figure 27 - 13H, 31 - 2/3 - Exhaust option HZ flow” on page 36) would be covered with a plate in the center and a cabinet box with exhaust fan and Barometric damper at the bottom for units with powered exhaust option for dowflow configuration. These plates and cabinet box module are held on to the unit at corner post and base using screws.

Controls

CH536 Controller

Note: CH536 Controller are used for size upto IH036.

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:

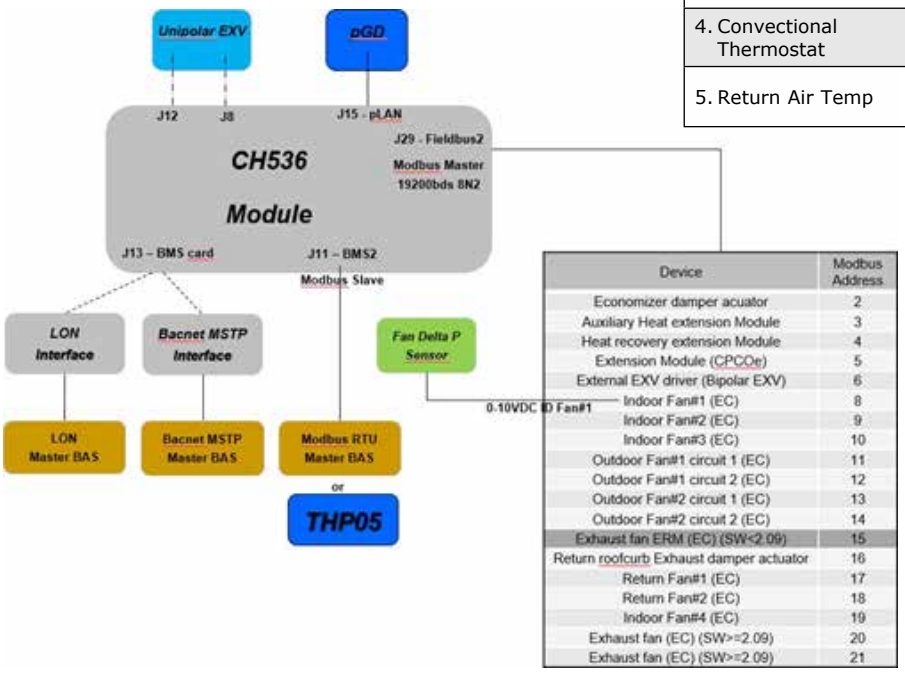
- 1 module for auxiliary heat, economizer enthalpy, exhaust fan and for ERP.
- 1 module for heat recovery.
- 1 extension module to manage customer options.

Figure 30 - CH536 main module

Control Hardware Bus

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

Figure 31 - Control Hardware Bus



Device	Modbus Address
Economizer damper acuator	2
Auxiliary Heat extension Module	3
Heat recovery extension Module	4
Extension Module (CPCOe)	5
External EXV driver (Bipolar EXV)	6
Indoor Fan#1 (EC)	8
Indoor Fan#2 (EC)	9
Indoor Fan#3 (EC)	10
Outdoor Fan#1 circuit 1 (EC)	11
Outdoor Fan#1 circuit 2 (EC)	12
Outdoor Fan#2 circuit 1 (EC)	13
Outdoor Fan#2 circuit 2 (EC)	14
Exhaust fan ERM (EC) (SW<2.09)	15
Return roofcurb Exhaust damper actuator	16
Return Fan#1 (EC)	17
Return Fan#2 (EC)	18
Indoor Fan#4 (EC)	19
Exhaust fan (EC) (SW>=2.09)	20
Exhaust fan (EC) (SW>=2.09)	21

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 32 - Optional display

Zone Temperature Source

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

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

Controls

Symbio Controller

Note: Symbio Controller are used for size IH045 to IH078.

Controls/Tracer® TD-7 Operator Interface

Control Overview

Airfinity compact with AFD rooftop units use the following control/interface components:

- Tracer® Symbio™ 800 Controller
- Tracer TD-7 Operator Interface

Communication Interfaces

There are four connections on the Tracer® Symbio™ 800 that support the communication interface:

- BACnet® MS/TP
- BACnet® IP
- MODBUS RTU
- MODBUS TCP

Tracer TD-7 Operator Interface

Operator Interface

Information is tailored to operators, service technicians and owners. When operating a rooftop, there is specific information you need on a day-to-day basis, like set points, limits, diagnostic information, and reports. Day-to-day operational information is presented at the display. Logically organized groups of information-rooftop mode of operation, active diagnostics, settings and reports put information conveniently at your fingertips.

Tracer TU

The TD-7 operator interface allows for daily operation tasks and setpoint changes. However to adequately service the Airfinity rooftop units, Tracer® TU service tool is required (Non-qualified personnel, contact your local manufacturer sales office for software purchase information). Tracer TU adds a level of sophistication that improves service technician effectiveness and minimizes rooftop downtime. This portable PC-based service-tool software supports service and maintenance tasks.

Main Symbio™ 800 control instructions are described in user guide RT-SVU014* document.

Zone Temperature Source

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

Source	Condition
1. BAS	BAS command enabled and Value in validity range [-10°C; +50°C]
2. Air-FI® Wireless Zone Temp Sensor	Ad-hoc Config enabled and Value in validity range [-10°C; +50°C]
3. External Zone Temperature wired sensor	Sensor installed and Ad-hoc Config enabled and Value in validity range [-10°C; +50°C]
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 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 manufacturer 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 control 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 R-454B

When a refrigerant leak of R-454B 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 air temperature 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 = 0.6L/s per m2 (ASHRAE62.1) x Surface.

Occupied setpoint = 4.72L/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 = 0.6L/s per m2 x Surface.

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

3. CO2-based ventilation – requires a space CO2 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 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 a ball valve is present on the refrigerant suction line, 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.

ERC First Start and Control

- Check ERC compressor rotation.
- Power indoor fans and set to design supply airflow.
- Set return roofcurb fans (if present) to design airflow.
- Power exhaust fans and check correct rotation.
- In both heating and cooling mode, ERC compressor has priority to start.
- ERC compressor is not authorised to start when indoor air temperature is outside its operating map or fresh air rate is under 20%.
- Outside operating conditions, ERC does not start, and unit control is as usual.
- When ERC becomes available its compressor gets loading priority.

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.

During winter conditions, it is imperative to ensure that the coils and fans remain snow-free, as accumulation of snow can hinder the proper functioning and efficiency of the unit.

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, 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 addition, review carefully the components which can lead to the alarm: temperature sensor, zone temperature sensor, clogged filter switch.

Refrigerant Leak Detector R-454B Calibration

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

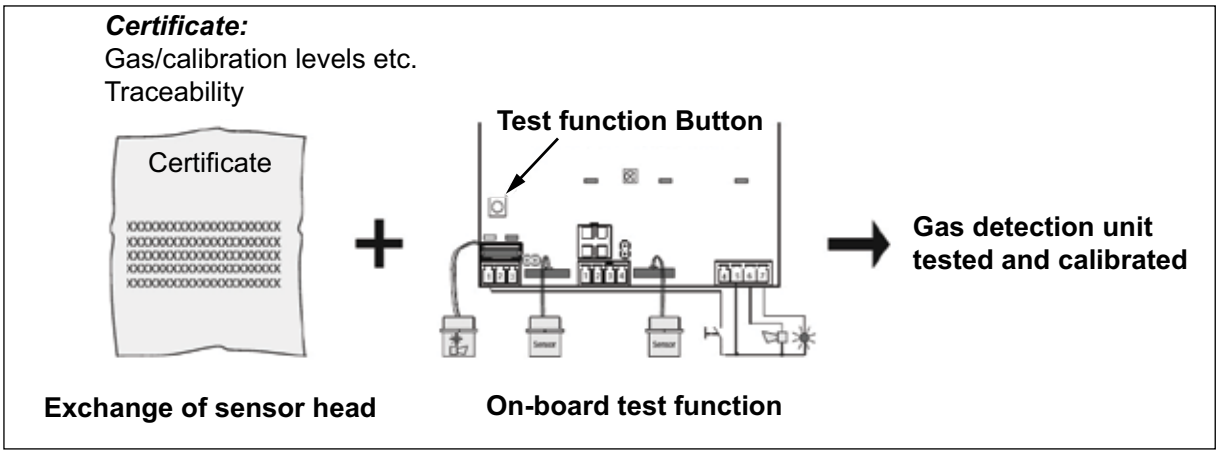
There are two different methods to fulfill the calibration requirements:

- **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.

Maintenance



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.

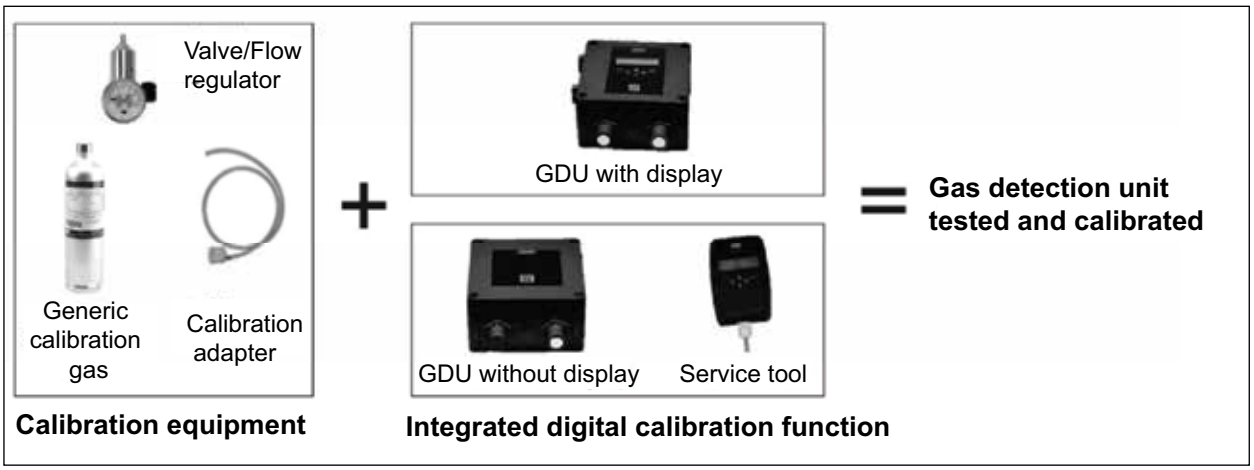
- **Performing a calibration to the sensor using calibration gas (gas mixture with known target gas concentration)**

  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.



Add a sentence, that system can have both leak detector and the image shown is for an example.

Recommended Service Routine Frequencies

As a commitment to our customers, we have created a wide service network staffed with experienced factory authorized technicians. 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 maintenance agreements please contact your local manufacturer 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	Every 3 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.

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 and 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.
- 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 and condenser coils.
- Check operation of machines/compare conditions of operation against original commissioning data.
- 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 and 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 manufacturer laboratory analysis.
- Lubricate motors/dampers/bearings (where applicable).
- Check condition of evaporator and 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 R-454B

Calibration must be carried out every year.

Additional Services

Oil Analysis

Manufacturer 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.

Manufacturer Select Agreements

Manufacturer 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 Manufacturer 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. Manufacturer 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 – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit trane.eu or tranetechnologies.com.

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