ENVIRONMENTAL
CLIMATE CONTROL
EQUIPMENT
& SOLUTIONS






FCU
FAN COIL UNIT

Fan Coil Units

For Marine and Oil & Gas applications

MADE IN FRANCE

www.ett-hvac.com

CONTENTS

General description

The **ETT** packaged unit is delivered ready to operate. Its full aluminium structure (frame and casing) ensures an excellent corrosion protection (20-year anti- corrosion guarantee).

Aluminium promotes the REFURBISHING of machines for a second life: Aluminium allows our machines to be refurbished for a second life, unlike a steel structure.

Environmental impact :

The Ultima Green Line is environmentally responsible and uses the R32, a refrigerant with low environmental impact:

- ✓ Zero ozone depletion (ODP)
- ✓ Global Warming Potential (GWP) of 675

Our technical choices have a major impact on the environment

- **DECARBONATION:**

ETT is committed to an ambitious approach to reducing Greenhouse Gas Emissions:

- Reducing the energy consumption of our machines
- Fluid refrigerants with low GWP
- Energy monitoring & AI
- Adiabatic cooling
- Development of machine retrofits

- **ALUMINIUM: PERFORMANCE AND DURABILITY!**
  - Lightweight: 3 times lighter than steel
  - Corrosion resistant and long lifespan
  - Thermal performance
  - 100% recyclable indefinitely
  - Facilitates the refurbishing of our machines

- **ECO-DESIGN:**

Our technologies are designed with sustainability in mind, reducing their environmental impact throughout their life cycle.

- **LOW-POLLUTION MANUFACTURING PROCESS:**
  - Selective sorting: 80% recovery rate
  - No paint or solvents

- **END OF MACHINE LIFE:**

In compliance with regulations, ETT is a member of the Ecologic eco-organisation for the end-of-life processing of machines, which are 98% recyclable.

EcoLogic

- **ETT CERTIFICATIONS**

- **CSR assessment: ECOVADIS Gold Medal** for our CSR approach

- **Iso 14001 & Iso 9001 certification** for our Quality and Environmental Management system

- **Certificate of competence for handling refrigerants**

- **Membership of the UN Global Compact**

- **Qualiopi certification** for our training centre

As a positive-impact company, ETT contributes to a more sustainable world through our decarbonising products and services.

CE In addition, each unit is delivered with an certificate of conformity to EU standards and complies with the following standards:

- Machinery Directive 2006/42/EC - Operator's safety
- Low Voltage Directive (LVD) 2014/35/EU - Electricity
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Regulation (EU) 2016/426 – Gas appliances
- Standard NF EN 60204 -1- Electrical appliances
- Standard EN 378-2 : 2017 – Safety and environmental requirements
- PED Directive 2014/68/EU (in accordance with Articles 2.10, 2.11, 3.4, 5a and 5d of Annex 1) - Pressure equipment
- EcoDesign regulations ErP UE 2281/2016

20-year guarantee against corrosion frame - casing

ENERGY SAVING

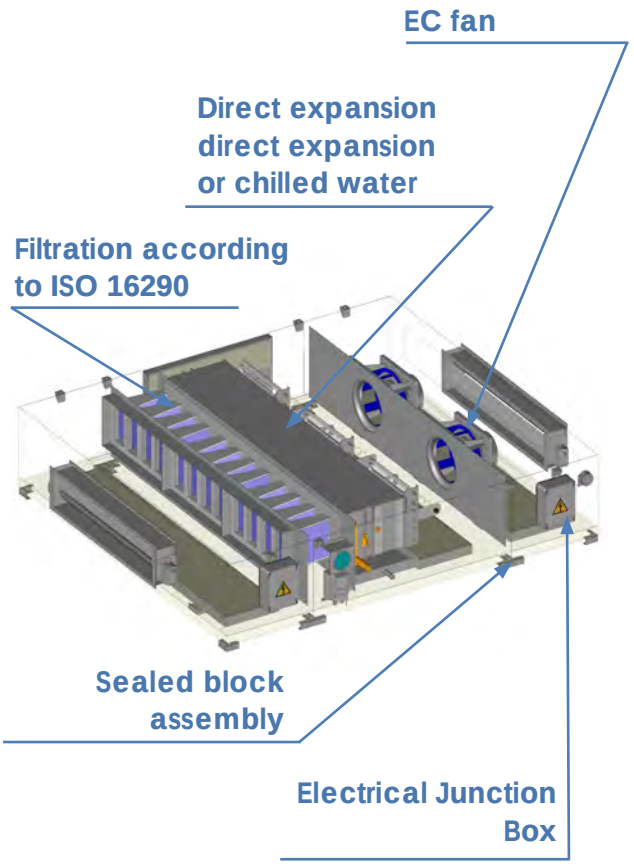
ENVIRONMENTAL ATTITUDE

SERVICE LINK

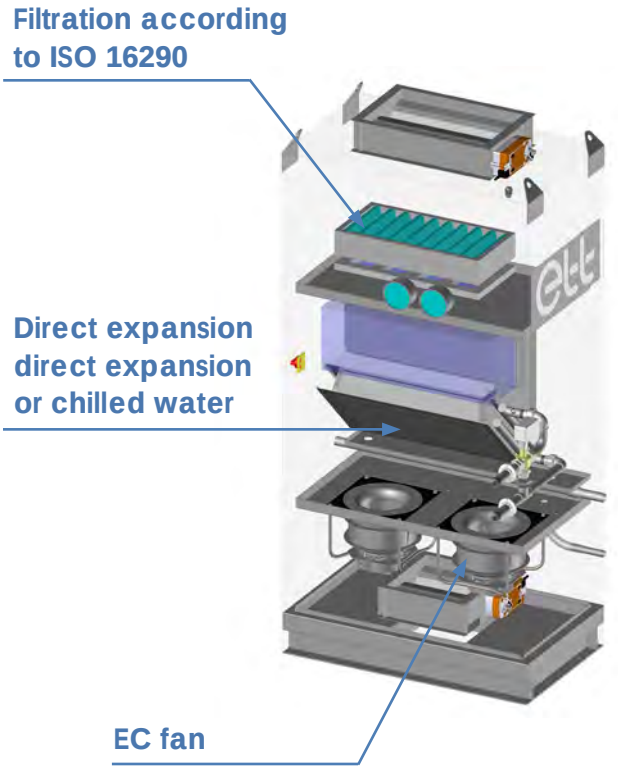
Specialities of the FCU range

- This compact range is tailored to the requirements of the Oil & Gas market and offers a standard base while offering many options for oil and gas operators.
- Offered with AG3 aluminium base, it can also be constructed from AG4 Marine aluminium or 316 L stainless steel (grade 1.4404).
- Designed for R134a refrigerant, it is also available with all the latest refrigerants currently in use, as well as with chilled water.
- Maximum compactness to fit in a design of the E-houses with ceiling or false floor mounting
- This range can be ATEX certified
- Designed primarily for indoor installation, its construction mode allows it to be placed outdoors as well
- Capability to operate in dehumidification mode

Horizontal version



Vertical version



Unit description

ALUMINIUM FRAME-CASING ASSEMBLY

- **Rigid, compact and lightweight packaged unit**, perfectly weather-resistant, with a 20-year anti corrosion guarantee on casing.
- **Aluminium vertical panels and roof** AG3 grade (AG4 as an option).
- **Access through removable panels** for easy maintenance. Panels are closed with square locks. Doors tightness is keeping by a flexible gasket under compression, providing ideal elasticity day after day.
- **Internal sound and thermal insulation of the walls** provided by glass wool thickness 50mm classified M0.
- **The optional 2-damper mixing box** including a motorised fresh air damper with bird proof grid and a motorised return air damper to ensure the desired proportions and optimise "Free Cooling phases. The dampers have extruded aluminium blades with low pressure drop, sealing class 3. The damper frame is made of aluminium.
- **Assembly** of the different blocks by simple compression systems. All the necessary A4 screws are delivered with the units.

AIR ASSEMBLY

- **Eco-concept filtration easily dismantled thickness 48, 98 or 292 mm**easily dismantled – efficiency of ISO Coarse 65 % at e PM1 80 % according to ISO16890 (G4 to F9 according to EN 779: 2012). With pressure switch controlled fouling.
- **The supply air fan** respects EuP 2013 / ErP 2021 directives.
- **The EC (freewheel) motor** is used to:
  - o Reduce kickback during start-up for textile ducts (soft start mode)
  - o Maximum rotation speed regulation according to pressure drops on site.

- **Internal exchanger:** Coil made with copper pipes and aluminium fins and frame. This coil can be supplied with hot or chilled water to ensure a heating or cooling operation.

ADDITIONAL SECTION DEDICATED TO HEATING

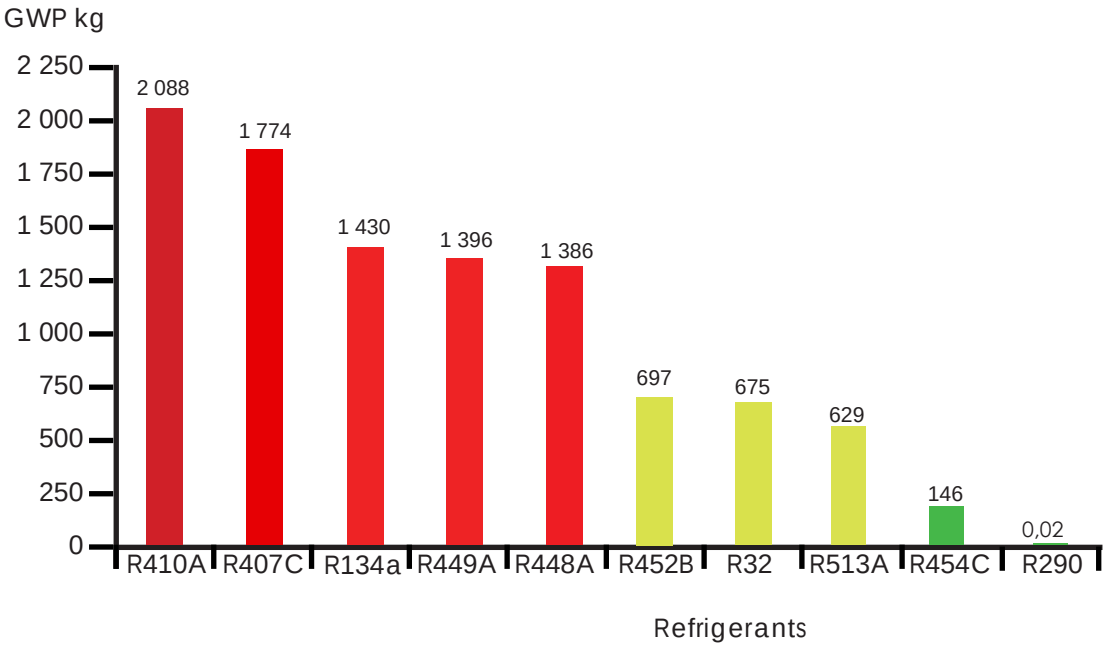
- **Electric coil** consisting of 2 sequential stages.

MORE ACCESSIBILITY FOR SIMPLIFIED MAINTENANCE

- **Detachable hinge**designed for use on insulated doors. Enabling universal mounting on the right and left, opening angle 180°. When the door is in the open position, the intelligent quick release function allows the door and its mounting to be removed without using a tool. The hinge is mounted on the surface of the casing and door using screws.

- **Latch hinge** specially designed for insulated and pressurized doors. The hinge creates 6mm compression and allows the doors to be opened 180° in either direction, or removed completely. The two-step safe opening process allows the cabinet to be depressurized before fully opening. A separate click will tell you if the door is open or closed. For added stability, mounting bracket is available. Meets the requirements of the sealing level L1 standard DIN EN 1886.

Available refrigerants

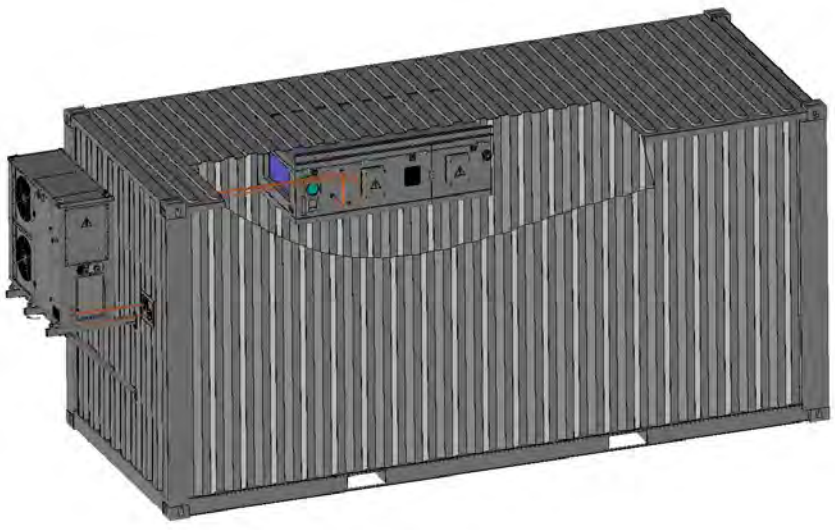


Example of application

As standard, these units are designed for R134a refrigerant. According to customer specifications, the type of refrigerant can be adapted to each project.

As a forerunner in the field of air conditioning, ETT has developed ranges of units operating with low GWP fluids.

M-ACCU/FC U INTEGRATION ON ELECTRIC SHELTER



Performance EN1886

The energy quality and performance of our equipment is guaranteed by compliance with the EN1886 standard. The design of the FCU was designed to be closer to the values required.

Since the units are generally located in the air conditioning room, thermal waste has little importance on the performances of the installation.

On a 1.6 type FCU, the difference in losses is 10 Watt between a T1 and T3 transmittance unit.

REMINDER OF THE EN1886 STANDARD

Mechanical resistance of the casing

Strength class of the casing	**D1**	D2	D3
Max. Relative deviation mm x m^{-1}	**04:00**	10:00	OVER 10

Airtightness of the envelope

Air leak class of the box section at -400Pa	**L1**	L2	L3
Maximum leakage rate (f_{400}) l x s^{-1} x m^{-2}	**0.15**	0.44	01:32

Air leak class of the casing	**L1**	L2	L3
Maximum leakage rate (f_{700}) l x s^{-1} x m^{-2}	**0.22**	0.63	1.90

Filter bypass leak

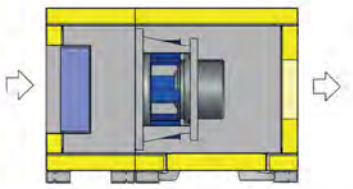
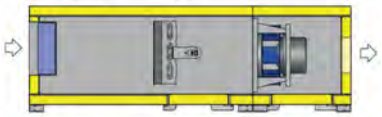
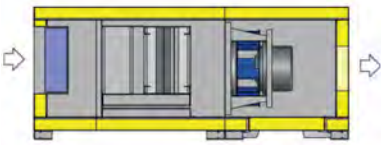
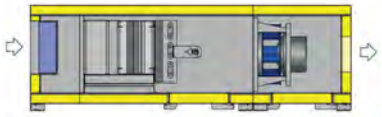
Leakage class of the filter bypass	**F9**	F8	F7	F6	G1 to F5
Maximum filter leakage rate at bypass k in % of volume flow	**0.50**	1	2	4	6

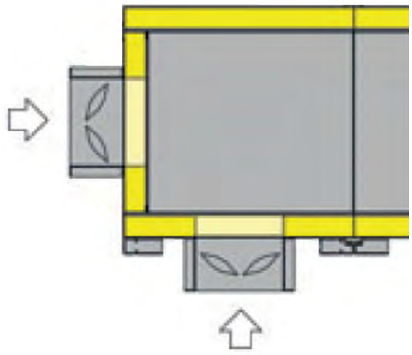
Thermal performance of the envelope

Heat transmission	T1	T2	**T3**	T4	T5
(U) W/m^2 x K-1	U<=0.5	0.5<U<=1	**1<U<=1.4**	1.4<U<=2	No requirement

Thermal bridging factor	TB1	TB2	**TB3**	TB4	TB5
(kb) W x m^{-2} x K-1	0.75<Kb<=1	0.6<Kb<=0.75	**0.45<Kb<=0.6**	0.3<Kb<=0.45	No requirement

Layouts and dimensions

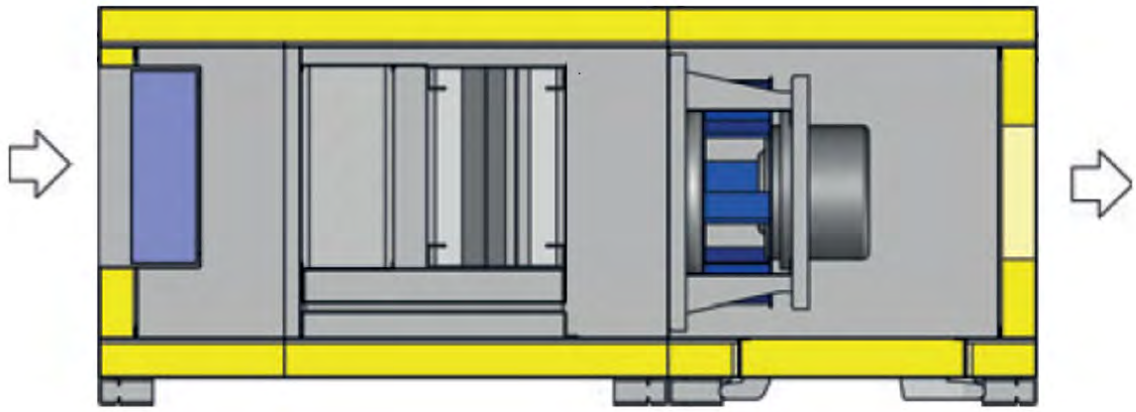
LAYOUTS	DESCRIPTION	UNITS	1.6	3.2	4.8
• **Layout 1** 	Filter(s) section (48mm, 98mm or 292mm) Plug fan(s) section	Length (mm)	930	930	930
		Width (mm)	900	1,500	2,100
		Height (mm)	608	608	608
		Surface (m²)	3.9	5.7	7.6
		Weight (kg)	110	130	160
• **Layout 2** 	Filter(s) section (48mm, 98mm or 292mm) Electric coil section Plug fan(s) section	Length (mm)	1,880	1,880	1,880
		Width (mm)	900	1,500	2,100
		Height (mm)	608	608	608
		Surface (m²)	6.8	9.8	12.7
		Weight (kg)	180	210	260
• **Layout 3** 	Filter(s) section (48mm, 98mm or 292mm) Direct expansion coil section or chilled water coil section Droplet separator Plug fan(s) section	Length (mm)	1,580	1,580	1,580
		Width (mm)	900	1,500	2,100
		Height (mm)	608	608	608
		Surface (m²)	5.9	8.5	11.1
		Weight (kg)	165	195	240
• **Layout 4** 	Filter(s) section (48mm, 98mm or 292mm) Direct expansion coil section or chilled water coil section Droplet separator Electric coil section Plug fan(s) section	Length (mm)	1,880	1,880	1,880
		Width (mm)	900	1,500	2,100
		Height (mm)	608	608	608
		Surface (m²)	6.8	9.8	12.7
		Weight (kg)	215	250	310

Mixing box	Layouts	Features			
		Series	1.6	3.2	4.8
Mixing box designed to house 2 dampers 	**1**	Length (mm)	1,525	1,525	1,525
		Surface (m²)	5.7	8.3	10.8
		Weight (kg)	160	190	230
	2	Length (mm)	2,475	2,475	2,475
		Surface (m²)	8.6	12.3	16.0
		Weight (kg)	230	265	325
	3	Length (mm)	2,175	2,175	2,175
		Surface (m²)	7.7	11.0	14.3
		Weight (kg)	215	255	310
	4	Length (mm)	2,475	2,475	2,475
		Surface (m²)	8.6	12.3	16.0
		Weight (kg)	270	315	390

FCU units description

Range 1 : H / V : **H**orizontal or **V**ertical versions
Range 2 : 1 / 2 / 3 / 4 : Casing layout
Range 3 : 1.6 / 3.2 / 4.8 : Size of the casings (air flow rate *1,000m³/h)
Range 4 and + : Options

Example : FCU **H 3-4.8 AG4**



DESCRIPTIF

- Filter(s) section (48mm ou 98mm ou 292mm)
- Direct expansion coil section or chilled water coil section
- Droplet separator
- Plug fan(s) section

Features	
Series	**4.8**
Length (mm)	1,580
Width (mm)	2,100
Height (mm)	608
Surface (m²)	11.1
Weight (kg)	240

FCU units technical features

	DESCRIPTION	UNIT	1.6	3.2	4.8
REFRIGERATION/HYDRAULIC	Rated air flow rate for 200Pa[2]	m³/h	1600	3200	4800
	Min./Max. air flow rate(1)	m³/h	500/2500	1000/4000	2 000/6000
	HEATING BY HOT WATER				
	Exchanger air inlet at -7°C 95% RH inlet/outlet 90°/70°	kW	43.97	87.92	131.86
	Exchanger inlet air at -7°C 95% RH inlet/outlet 45°/35°C	kW	23.39	46.78	70.16
	Exchanger air inlet at 20°C 50% RH inlet/outlet 90°/70°	kW	28.4	56.79	85.17
	Exchanger inlet air at 20°C 50% RH inlet/outlet 45°/35°C	kW	09.03	18.06	27.08
	CHILLED WATER COOLING				
	Exchanger inlet air at 27°C 47% RH inlet/outlet 7°/12°C	kW	9.75	19.5	29.26
	DIRECT EXPANSION COOLING				
	Exchanger air inlet at 27°C 47% RH evaporation temperature 5°C	kW	10.34	20.98	31.7
	Exchanger air inlet at 27°C 47% RH evaporation temperature 8°C	kW	08.36	16.93	25.65
ELECTRIC FANS	Rated installed electrical power	W	1000	2000	2000
	Electrical power input at 200 Pa	W	450	900	1324
	Rated/Starting current with 200 Pa	A	0.92/0.92	1.84/1.84	2.5/2.5
	Electrical power input at 400 Pa	W	618	1236	1716
	Rated/Starting current with 400 Pa	A	1.19/1.19	2.38/2.38	3.08/3.08
GENERAL	**OPERATING LIMITS IN COOLING MODE (DIRECT EXPANSION)**				
	Maximum outside temperature[3]	°C	+45	+45	+45
	Minimum outside temperature [3]	°C	+15	+15	+15
	Minimum internal coil inlet temperature	°C	+18	+18	+18
	OPERATING LIMITS IN HEATING MODE (DIRECT EXPANSION)				
	Minimum outside temperature	°C	-15	-15	-15
	Minimum internal coil inlet temperature	°C	+12	+12	+12
NOISE	Sound power at 200 Pa[4]	dB(A)	80	83	86.2
	Sound power at 400 Pa[4]	dB(A)	83.8	86.8	87.9
FILTRATION	Filters efficiency	-	ISO Coarse 65% (G4)		
	Filters dimensions & number	mm	1 x 595 x 292	2 x 595 x 292	3 x 595 x 292
DIMENSIONS	Dimension of units	L x l x h	See Page 8		
	Unit weight without any option	kg	See Page 8		

(1)An air flow above the nominal air flow requires the use of drop separators.
(2) Out of electrical resistances capacity. Pressure drop calculated with G4 filter, 6 row DX battery, drop separator and electric battery.
(3) For inside conditions: +27°C DB / +19°C WB at rated air flow rate.
(4) Unit not connected with ducting.

The above data is based on configuration 4.

Summary of pressure losses

AT RATED AND MAXIMUM FLOW RATES

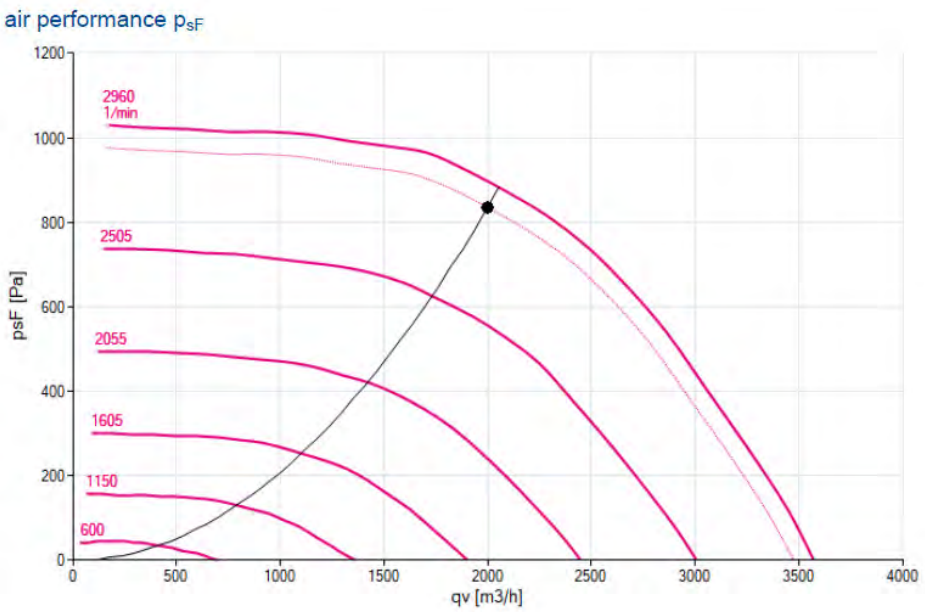
		1.6		3.2		4.8	
	UNIT	Rated flow rate	Max. flow rate	Rated flow rate	Max. flow rate	Rated flow rate	Max. flow rate
		1600 m³/h	2500 m³/h	3200 m³/h	4000 m³/h	4800 m³/h	6000 m³/h
Return air grid	**Pa**	52	80	52	80	52	80
Damper 10°	**Pa**	5	7	5	7	5	7
ISO Coarse 65% filter (G4) type initial fouling	**Pa**	60	75	60	75	60	75
ISO Coarse 65% filter (G4) type final fouling recommended	**Pa**	150	150	150	150	150	150
ISO ePM1 50% filter (F7) type initial fouling	**Pa**	65	90	65	90	65	90
ISO ePM1 50% filter (F7) type final fouling recommended	**Pa**	250	250	250	250	250	250
DX 6-row coil	**Pa**	136	192	139	193	138	192
Drift eliminator	**Pa**	36	58	36	58	36	58
Electric heater	**Pa**	20	20	20	20	20	20
Supply air grid	**Pa**	52	80	52	80	52	80
Total	**Pa**	701	837	704	838	703	837
Fan total pressure	**Pa**	900	820	900	820	900	820
Available pressure	**Pa**	198.7	-17 (*)	196.1	-18 (*)	196.8	-16.7 (*)

(*) in the configuration with all options and maximum flow rate, the standard fan may not be appropriate if an available pressure is requested (negative pressure according to table above). Contact the factory.

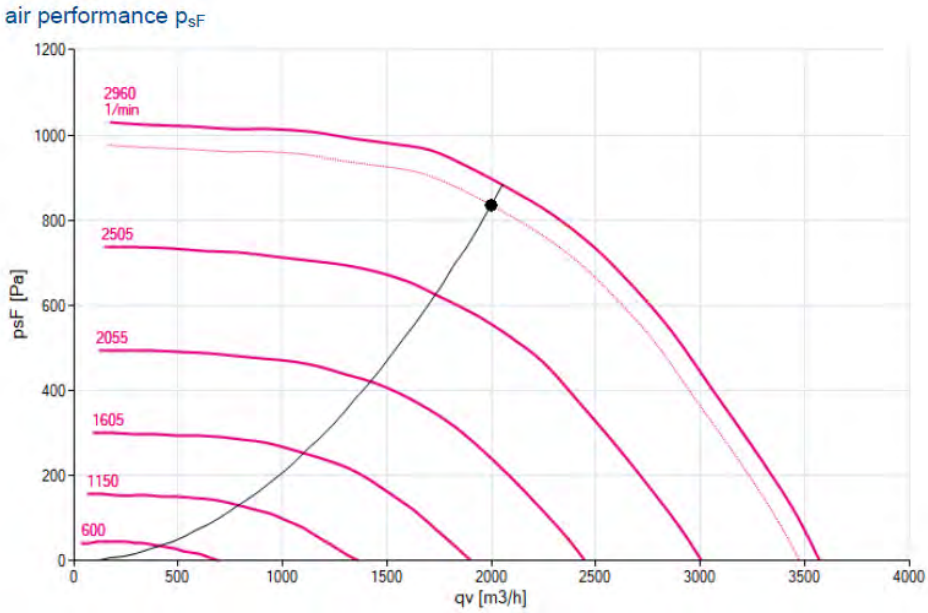
- Flow measured and controlled by an analogue pressure sensor,
- Free wheel fan, 1 or 2 fan(s) depending on direct coupled model with EC type motor.
- Optional AC motor with frequency inverter.

Fan Package

FAN CURVE (MODEL 1.6):

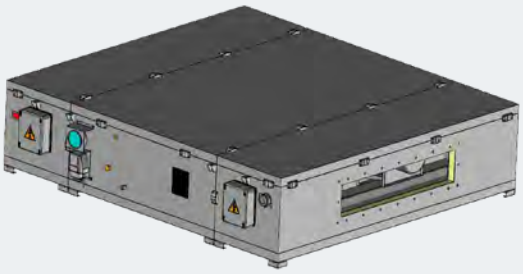


CURVE WITH TWO FANS IN PARALLEL (MODELS 3.2 AND 4.8)



Connections

CONNECTION OPTIONS AT SUPPLY AIR

Module with supply air connection in accordance with ISO 15138	
Module with supply air insulation damper	
Module with aluminium double deflection nozzles	
Module with Flat Fitting for connection of 200 mm diameter supply ducts	

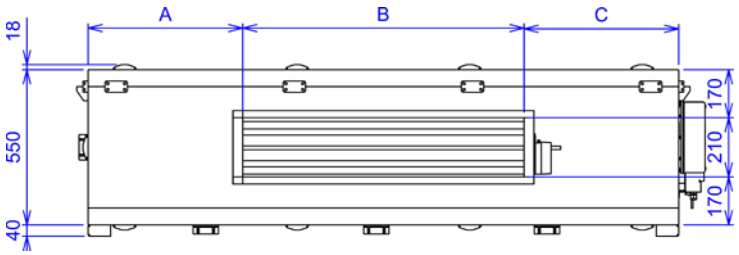
CONFIGURATIONS

Battery interfaces on the right as standard, on the left as an option. To be specified at the order.

Connections

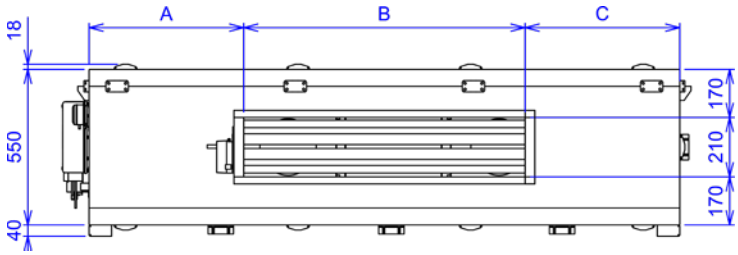
DUCT CONNECTION WITH DAMPER ON SUPPLY OR RETURN AIR

SIZE	A	B	C
1.6	200	500	200
3.2	400	700	400
4.8	550	1000	550



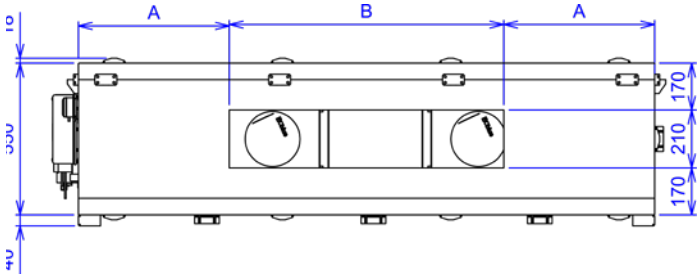
SUPPLY AIR DAMPER

SIZE	A	B	C
1.6	200	500	200
3.2	400	700	400
4.8	550	1000	550



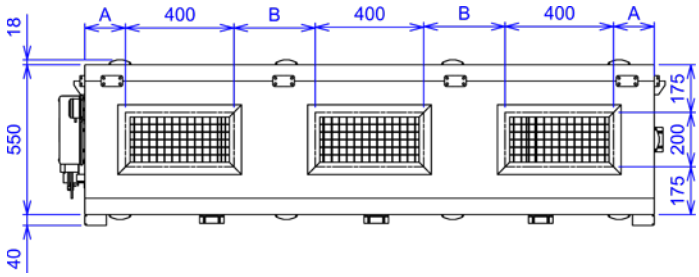
DUCT CONNECTION

SIZE	A	B	C
1.6	200	500	200
3.2	400	700	400
4.8	550	1 000	550



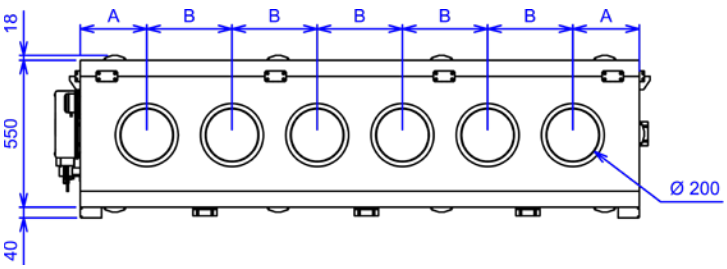
SUPPLY AIR VENT(S)

SIZE	A	B	C
1.6	250	-	1
3.2	200	300	2
4.8	150	300	3



PAP ON SUPPLY AIR

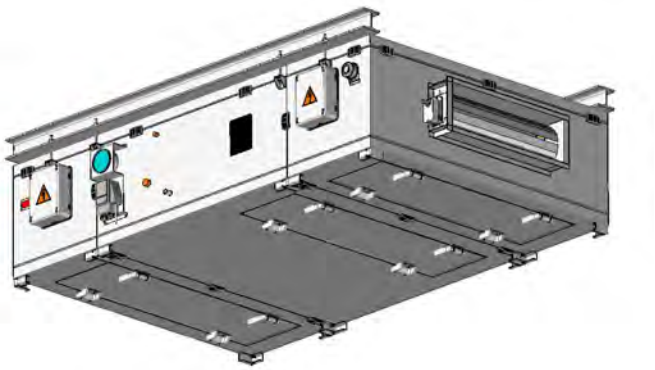
SIZE	A	B	C
1.6	290	320	2
3.2	270	320	4
4.8	250	320	6



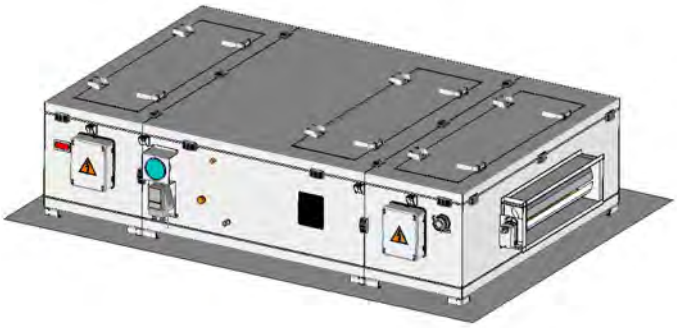
Connections

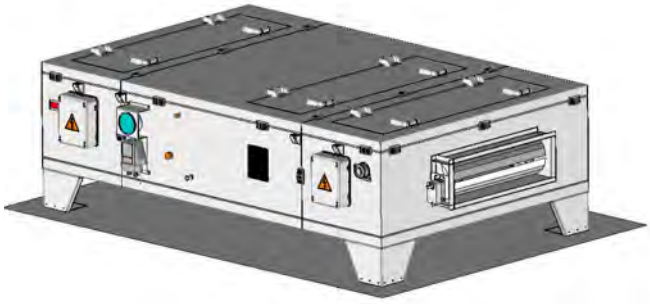
DIFFERENT AVAILABLE MOUNTING TYPES

- Ceiling mounted with access from below



- Floor mounting with or without feet and top access.





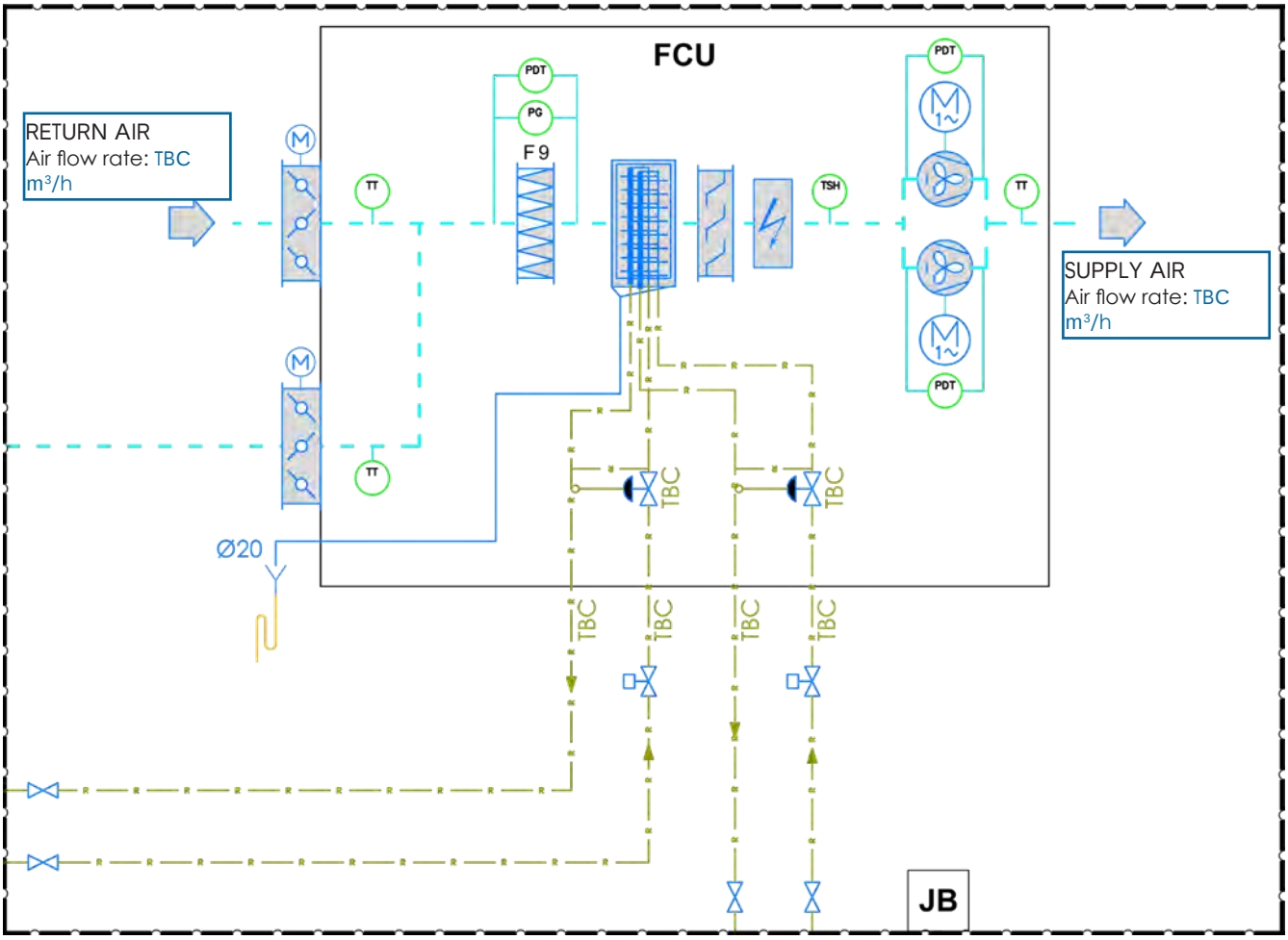
- Vertical mounting with or without feet and front access.

Main options

Frame - Casing	▪ AG4 aluminium casing (Marine) ▪ 316L stainless steel casing ▪ Casing painting ▪ Specific nameplate
Air handling	▪ Heresite coating on the evaporator coil ▪ Electrofin protection on the evaporator battery ▪ ATEX certified units (Zones 1 & 2)
Thermodynamics	▪ R410A (GWP 2088) ▪ R32 (GWP 675) ▪ R513A (GWP 631) ▪ R515B (GWP 288) ▪ R290 (GWP 0.02 - propane)
ELECTRICAL	Specific voltage: ▪ 230V – 50Hz ▪ 230V – 60Hz ▪ 400V-50Hz ▪ 440V-60Hz ▪ 690V-50Hz
Installation	▪ Anti-vibration mounts ▪ Threaded rods for support ▪ On-site commissioning ▪ Special FCU support for OFFSHORE applications ▪ MCT frame (ATEX or non ATEX) ▪ Refrigeration piping assembly ▪ Refrigeration piping supported with tube tracks
Documentation	▪ Refrigerating piping size calculation and design ▪ Specific FAT (Factory Acceptance Test) ▪ Specific documentation
Control	▪ Dehumidification functions ▪ (without heat recovery) ▪ Average room temperature (4 sensors)

Request pricing documentation for FAT (Factory Acceptance Test)

Generic P&ID



Certifications

On request, all our units can be certified

Abbreviations

LP	Low Pressure
COP	Coefficient of Performance
AHU	Air Handling Unit
ETT	Energie Transfert Thermique
FAT	Factory Acceptance Test
FCU	Fan Coil Unit
GWP	Global Warming Potential
HP	High pressure
RH	Relative humidity
HVAC	Heating, Ventilation, Air Conditioning
MCT	Multi Cable Transit
P&ID	Piping & Instrument Diagram
ON/ OFF	ON/OFF

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