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AIR COMPACT

Instruction manual



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TEXTES ORIGINAUX : VERSION FRANÇAISE



For your safety, we recommend the use of PPE (Personal Protective Equipment)

1 - RECEIPT OF THE UNIT

The installation and maintenance operations must be performed by qualified and experienced personnel. Follow the operating precautions to the letter when working on the unit. Labels have been placed on the unit to remind you of the safety instructions.
As a general rule, follow all applicable safety regulations and standards.
Damage to the AIR COMPACT air handling unit will be disregarded in the event of failure to follow the instructions in this document.

Each air conditioner has a name plate bearing an identification number. This number must be quoted in all correspondence.

1.1 Delivery/Reservations

In accordance with Article 133-3 of the French Code of Commerce, the recipient is entirely responsible for checking the condition of the goods received. In the event of missing items, the customer must provide the exact number of parcels delivered. Any damaged or missing items must be specified on the delivery note in the presence of the driver before signing the delivery note. These comments must be confirmed to the carrier by registered letter within two business days, and a copy of this letter must be sent to the manufacturer. The comments "conditional" and "pending unwrapping" shall have no value. The client must unwrap the goods in the presence of the driver. Claims must be made at the time of delivery and be described in detail.

1.2 Storage precautions

If the unit is not to be installed immediately, it must be protected from the elements; storage in the packaging is recommended.

1.3 Packaging

The unit is packed on a pallet covered by shrink wrap film. Any additional casings may be packed on the same pallet, under the same film.

1.4 Handling

The entire pallet and contents must be handled with care using a forklift truck or manual stacker.

2 - SAFETY INSTRUCTIONS

2.1 General safety instructions

The following must be performed before any work on the air handling unit:

- The power must be switched off (proximity switch)
- Electrical equipment must be switched off (electric heater with fan delay, humidifier, etc.)
- The fan must be stopped (WARNING: it may take several minutes to stop completely)
- Work must be carried out by an accredited technician.

2.2 Field of application

The Air Compact is only designed for AIR HANDLING applications.

Outdoor AHU: -20°C / + 40°C (excluding water)

Indoor AHU: -25°C / + 60°C MAX

Cold fluids: fluid inlet temperature > 5°C

Hot fluids: the specifications are given on the manufacturer's name plate (temperature and pressure).

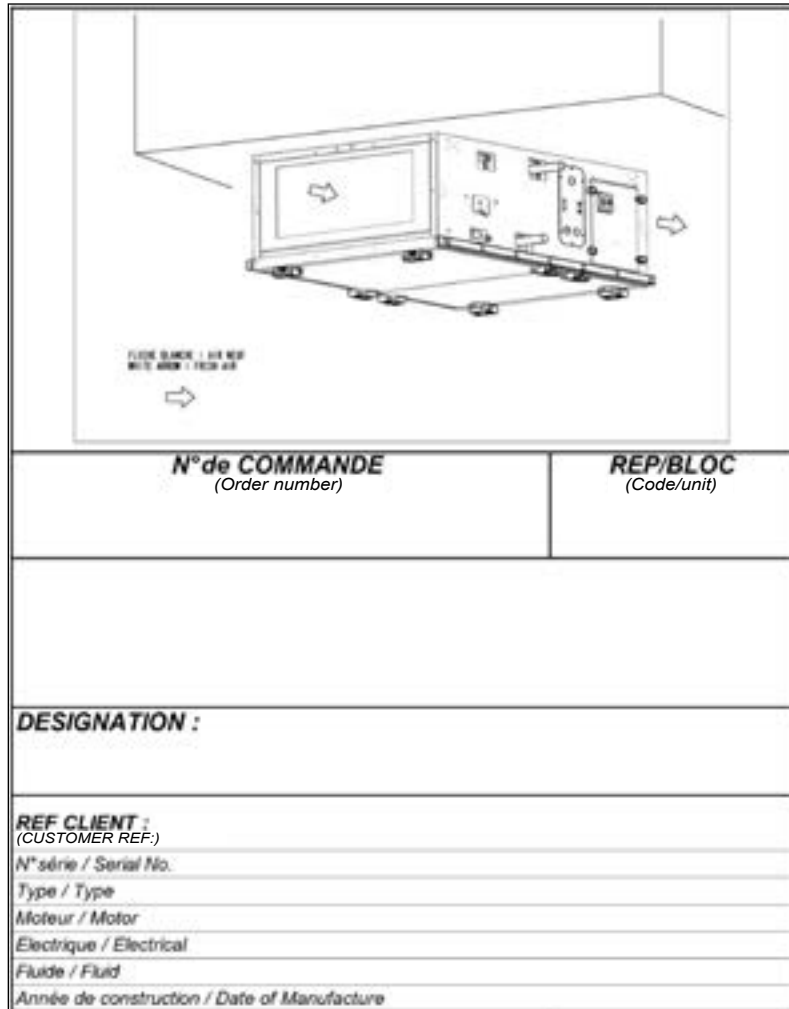


Comply with the type of fluid given on the name plate

3 - DESCRIPTION OF THE UNIT

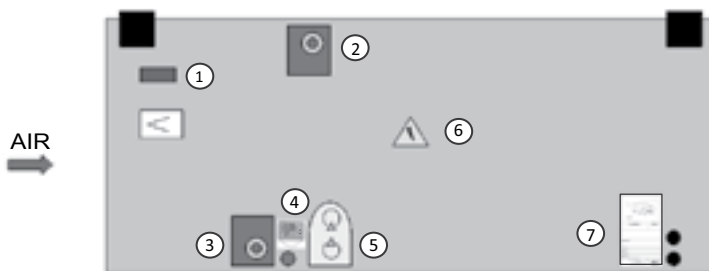
3.1 Fixed name plate

This is fixed on the unit and shows the unit's specifications as well as the order number and code.



3.2 Pictograms

Connection side (right-hand orientation):



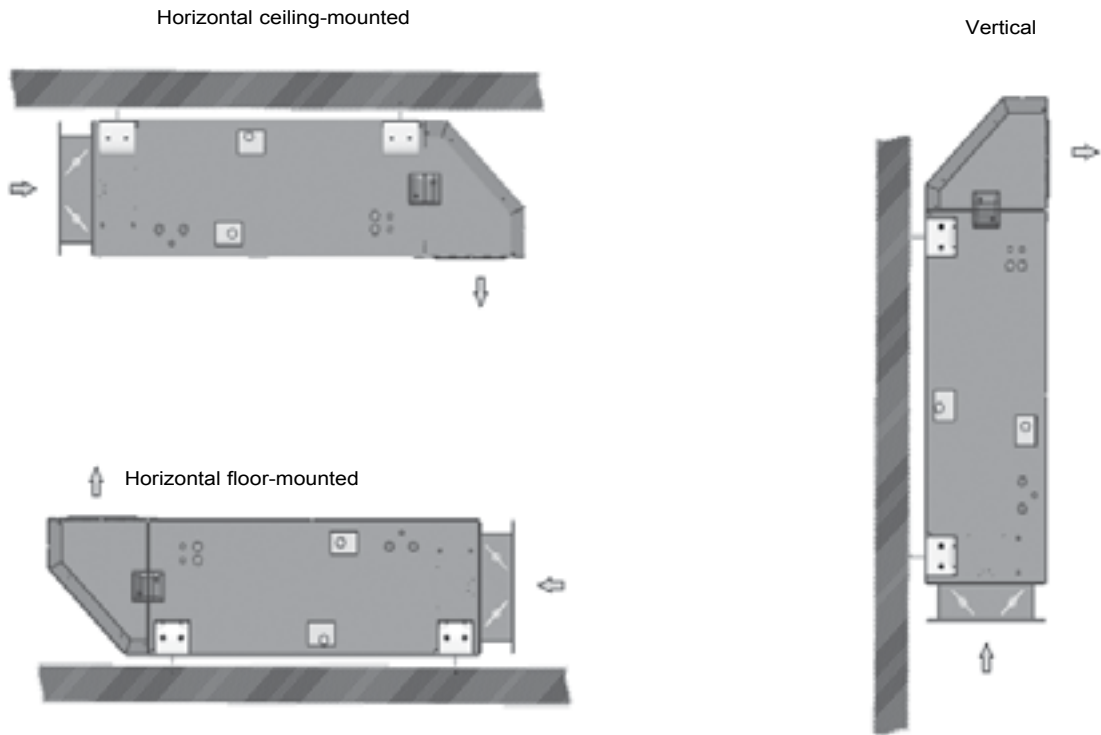
- 1 – Filter safety device
- 2 – Fluid inlet
- 3 – Fluid outlet
- 4 – Condensate outlet pictogram
- 5 – Fluid direction pictogram
- 6 – Electrical safety device
- 7 – Name plate

4 - INSTALLATION AND CONNECTIONS INSTALLATION



The installation of the equipment must comply with the regulations and standards of the recipient country.

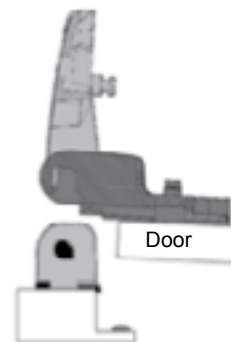
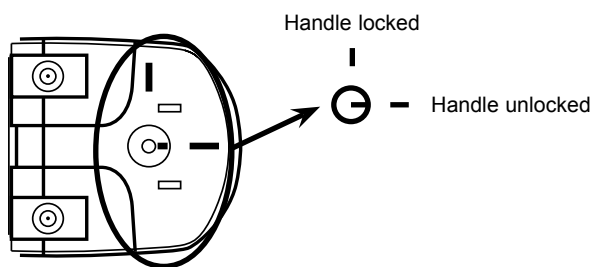
4.1 Selecting a location



Depending on the type of unit being controlled, it can either be ceiling- or floor-mounted or installed vertically. Ensure a minimum space is left to allow the doors to open (540mm, 595mm, 735mm depending on the configuration). However, if this access cannot be provided, all of the doors can be removed from their hinges to gain access.

Details of hinges/handles: Allen key lock, size 4

When they are unlocked, the handles are in "hinge" mode. It is possible to unlock a single row of handles to open like a conventional door. If all of the handles are unlocked, the door can be removed.

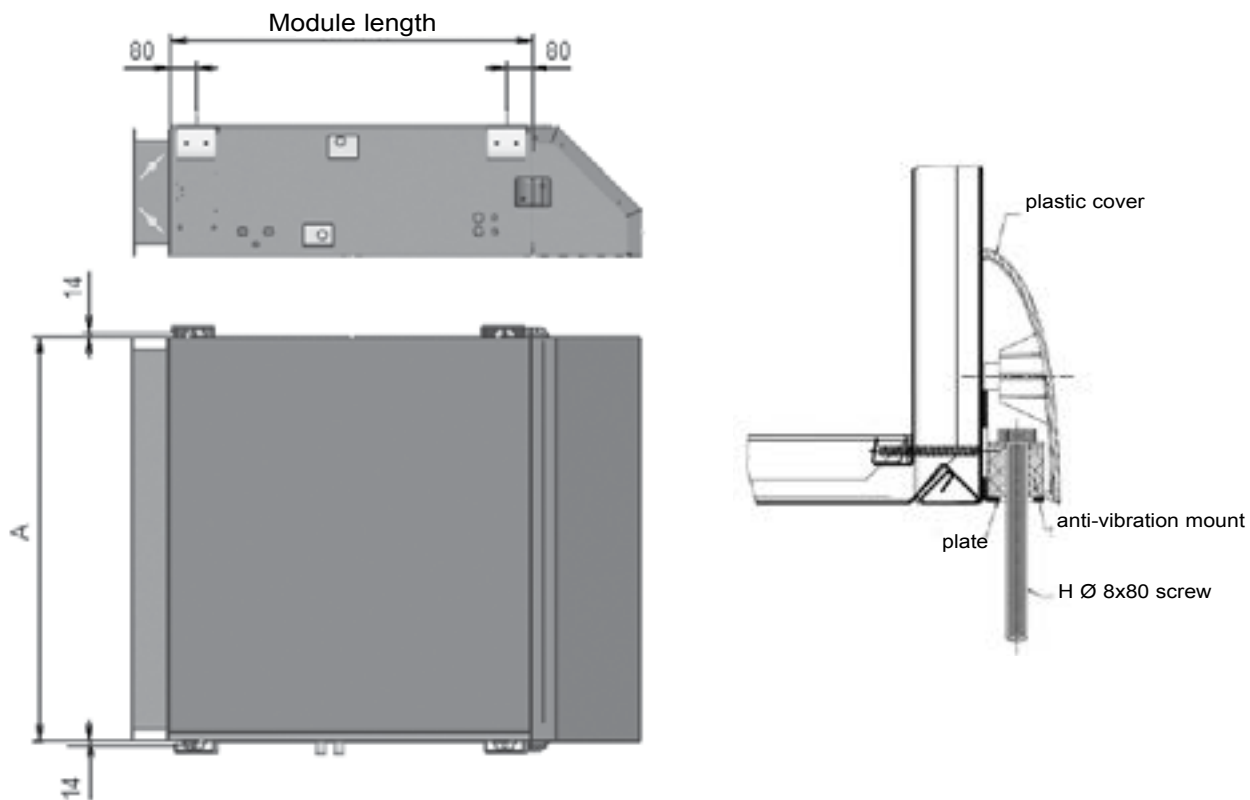


4.2 Mounting

For ceiling-mounted units, two solutions are possible depending on your lifting equipment:

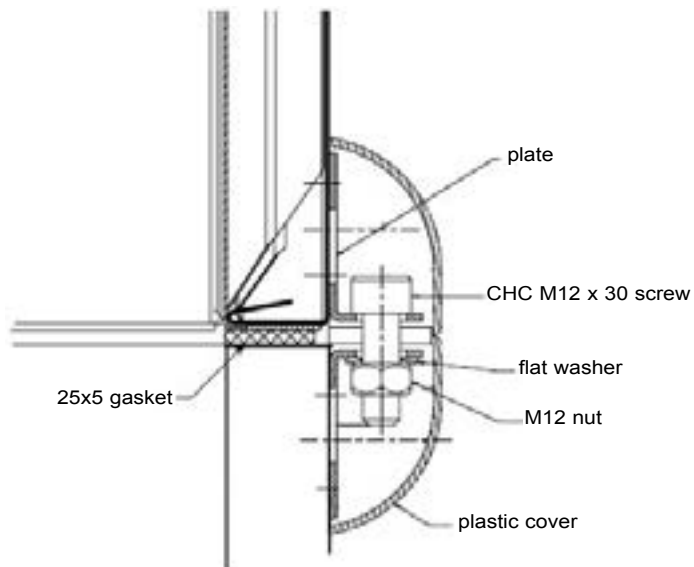
- Secure the main casing to the ceiling, then assemble the additional casings and secure these to the ceiling.
- Assemble the main casing and the additional casings on the floor, then raise the assembly and secure it to the ceiling.

Mounting to their support:



Assembling the casings (for multi-unit AHUs):

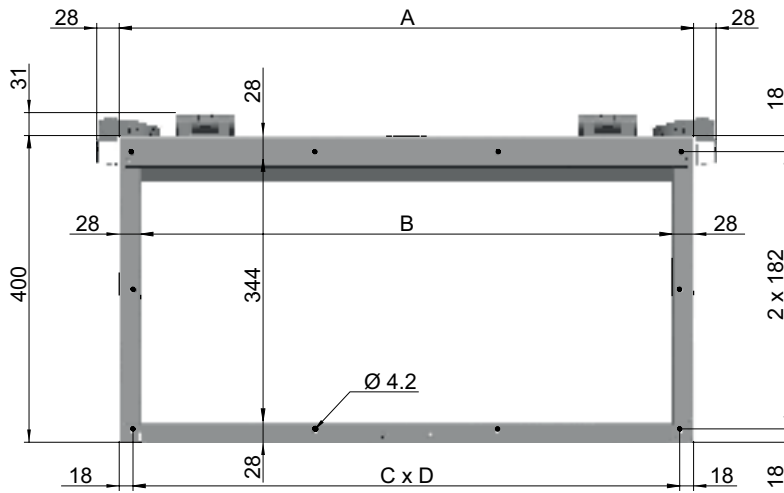
- Bond the PVC 25x5 gasket to the connection face of the additional casing
- Fit the threaded rods in the plates
- Secure the additional casing to the main casing using the nuts provided (the casings must be perfectly aligned to ensure the tightness of the assembly)



4.3 Air connection

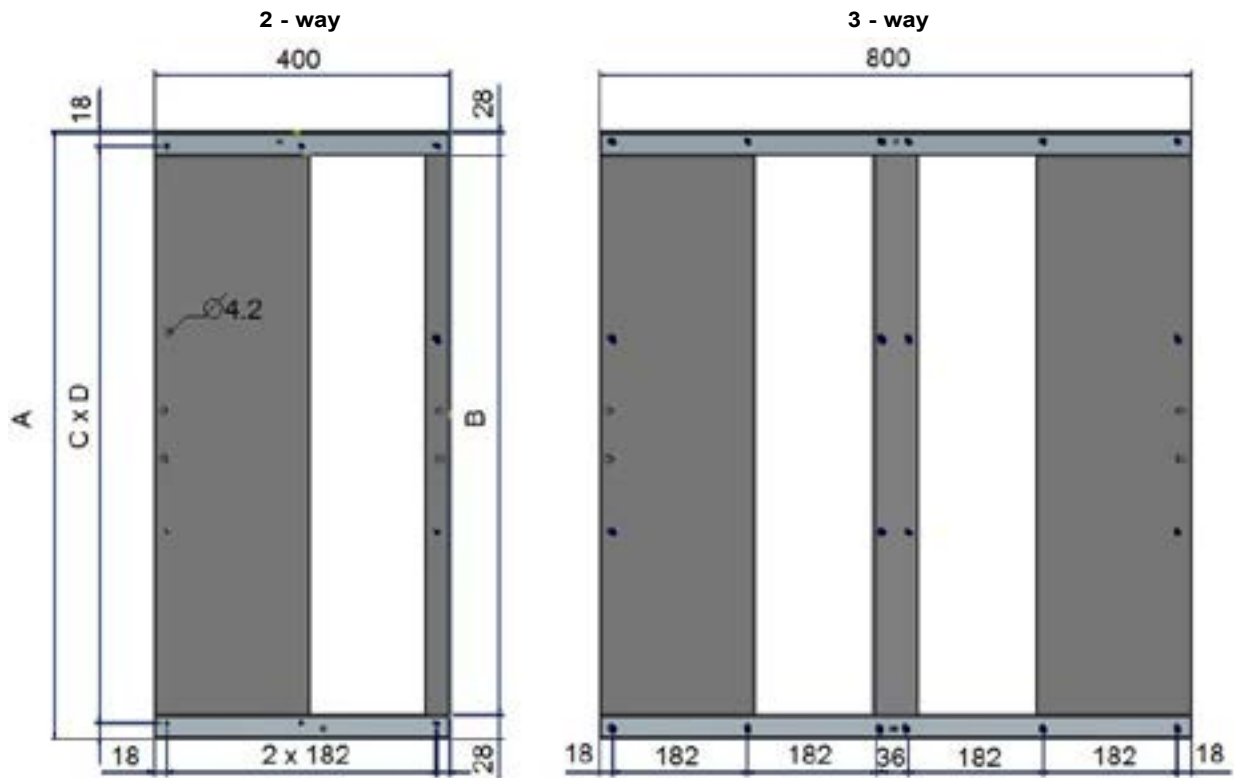
Connections must not place mechanical stresses on the unit
Use the flexible sleeves for the intake and discharge

Intake or discharge:



Size	A	B	C	D
25	750	694	3	238
40	1310	1254	6	212.3
60	1880	1824	8	230.5

Mixing box:



4.4 Hydraulic connections

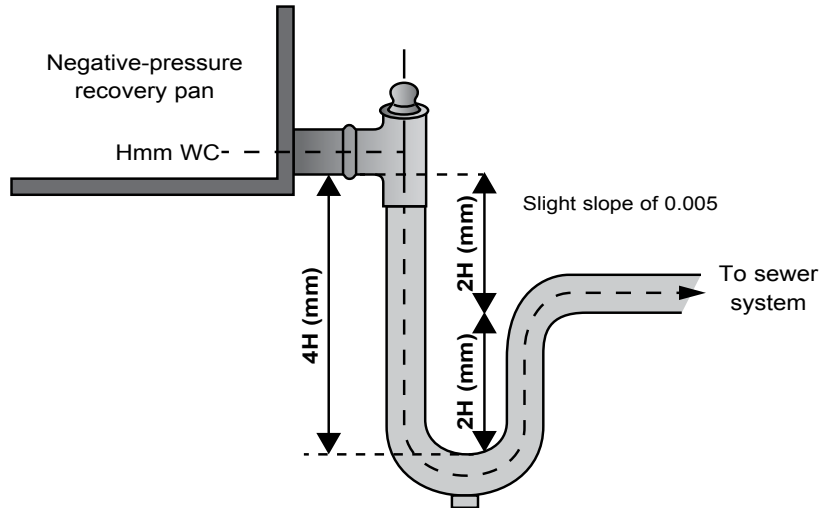
Ensure the hydraulic connections are fitted in the correct direction
Check that the condensate water will drain correctly



The manufacturer cannot be held liable if the coil is damaged by freezing water.

Schematic diagram of the siphon:

For a depression H in the cooling coil, the sizing of the siphon must incorporate dimensions of 2H.



4.5 Servomotors

Closing torque for the dampers:

Air Compact	Size 25	Size 40	Size 60
Intake damper*	4 Nm	4 Nm	10 Nm
2-way mixing box	5 Nm	5 Nm	5 Nm
3-way mixing box	5 Nm	10 Nm	10 Nm
Plate heat exchanger bypass	5 Nm	5 Nm	-

*With spring-return

4.6 Electrical connections

4.6.1 Fan motor assembly

● **Plug fan with asynchronous motor:**

- Motor electrical connection:

Connection to the motor terminal boxes, according to the various current standards

Motor	Nominal current I _N (230V / Δ)	Nominal current I _N (400V / Y)
0.55 kW / 4 pole	2.4 A*	1.4 A*
1.1 kW / 2 pole	4.2 A*	2.4 A*
1.4 kW / 2 pole	5.0 A*	2.9 A*

* Per motor

● **Fan motor assembly and frequency inverter combinations**

Lists of inverter parameters (provided by the manufacturer)

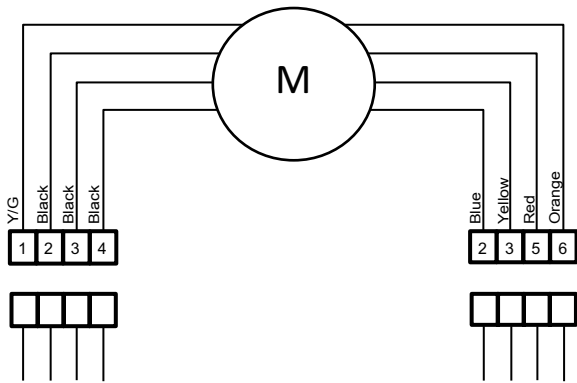
- The values in bold are the values to be modified in relation to the factory configuration
- Parameters 60 to 80: not used in our configurations
- Parameters 81 to 95: diagnostic parameters, read only

Please refer to the manufacturer's instructions for wiring, configuration and system start-up.

Par	Description	Factory setting	Setting 1: Speed from potentiometer	Setting 2: Speed from contact	Setting 3: Speed on the keypad
		Eur			
Paramètres de niveau 1					
1	Minimum speed (Hz)	0	20		
2	Maximum speed (Hz)	50	0.55 kW motor: 97 , 1.1 kW motor: 60 , 1.4 kW motor: 65		
3	Acceleration ramp-up (s / 100 Hz)	5	5		
4	Deceleration ramp-down (s / 100 Hz)	10	10		
5	Inverter configuration	AI.AV	AI.AV	Pr	Pad
6	Nominal motor current (A)	Inverter rating	230 V / Δ : 1 motor : 0.55 kW : 2.4 ; 1.1 kW : 4.2 ; 1.4 kW : 5 2 motors : 0.55 kW : 4.8 ; 1.1 kW : 8.4 ; 1.4 kW : 10 400 V / Y : 1 motor : 0.55 kW : 1.4 ; 1.1kW : 2.4 ; 1.4 kW : 2.9 2 motors : 0.55 kW : 2.8 ; 1.1 kW : 4.8 ; 1.4 kW : 5.8		
7	Nominal speed (rpm)	1500	0.55 kW motor: 1390 ; 1.1 kW motor: 2880 ; 1.4 kW motor: 2839		
8	Nominal motor voltage (V)	230/400	230/400	230/400	230/400
9	Motor output factor (cos φ)	0.85	0.55 kW motor: 0.8 ; 1.1 kW motor: 0.81 ; 1.4 kW motor: 0.88		
10	Access to the parameters	L1	L2		
Level 2 parameters					
11	On/Off logic selection	0	0		
12	Validation of the brake control	diS	diS		
13	Not used				
14	Not used				
15	Pulse mode reference (Hz)	1.5	1.5		
16	Analogue input mode 1 (mA)	4-.20	Volt	4-.20	4-.20
17	Validation of negative preset speeds	OFF	OFF		
18	Preset speed 1 (Hz)	0	-	Speed 1	-
19	Preset speed 2 (Hz)	0	-	Speed 2	-
20	Preset speed 3 (Hz)	0	-	Speed 3	-
21	Preset speed 4 (Hz)	0	-	Speed 4	-
22	Load display unit	Ld	A	A	A
23	Speed display unit	Fr	Fr	Fr	Fr
24	User scale setting	1	1	1	1
25	User security code	0	3-digit code	3-digit code	3-digit code
26	Not used				
27	Keypad reference when powering on	0	0	Last	0
28	Copying parameters	no	No		
29	Loading of default settings	no	No		
30	Selection of soft start mode	1	1		
31	Selection of stop mode	1	0		
32	Dynamic U/f selection	OFF	ON		
33	Flying restart selection	0	2		
34	Mode selection (terminal B7)	dig	Dig		
35	Logic output control (terminal B3)	n=0	n=0		
36	Analogue output control (terminal B1)	Fr	Fr		
37	Maximum switching frequency (kHz)	12-18	12 - 18 (max)		
38	Auto calibration	0	0		
39	Nominal motor frequency (Hz)	50	50		
40	Number of motor poles	Auto	Auto		
41	Voltage mode selection	Ur I	Ur I		
42	Voltage boost at low frequency (%)	3	3		
43	Transmission speed by serial link	19.2	19.2		
44	Serial link address	1	1		
45	Software version				
46	Brake opening current threshold (%)	50	50		
47	Brake opening current threshold (%)	10	10		
48	Brake opening frequency (Hz)	1	1		
49	Brake closing frequency (Hz)	2	2		
50	Time delay before brake opening (s)	1	1		
51	Brake opening time delay (s)	1	1		
52	Fieldbus node address	0	0		
53	Fieldbus transmission speed	0	0		
54	Fieldbus diagnostics	0	0		
55	Last switch to safety mode	0	0		
Level 3 parameters					
56	Switch to safety mode preceding that of Pr 55	0	0		
57	Switch to safety mode preceding that of Pr 56	0	0		
58	Switch to safety mode preceding that of Pr 57	0	0		
59	PLC ladder programme validation	0	0		

● **FMA with EC motor:**

As standard, EC motors are supplied with connectors which allow them to be connected to the terminal box with no intervention. Two cables (power and control) are provided to facilitate connection to the connectors.



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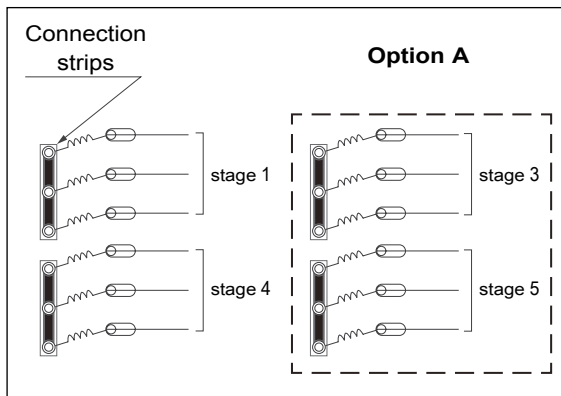
Power cable		Control cable	
4	Live L1	6	Potential free, normally closed state signalling contact
3	Live L2	5	Potential free state signalling contact, changeover switch, shared connection (2A, max 250 VCA, min.10mA, AC1)
2	Live L3	3	0-10 VDC actual value/control input, impedance 100kOhm; only use as an alternative to the 4-20mA input, SELV
1	Earth	2	Reference earth for control interface, SELV

4.6.2 Electric heater

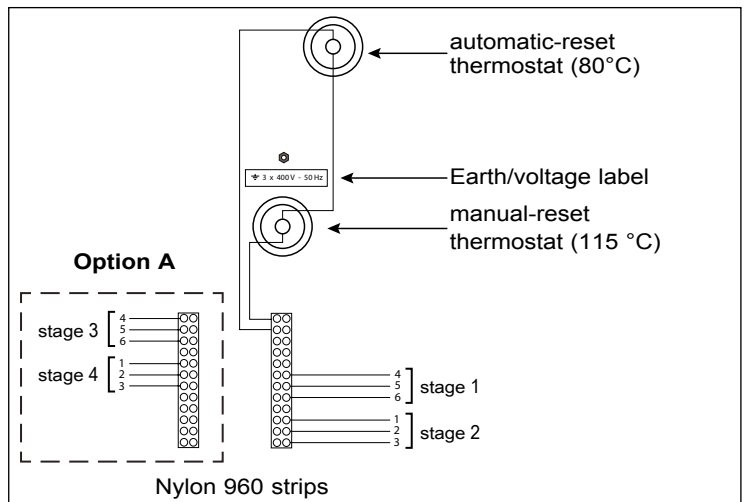
Without box::

- Connection to the coil terminals (accessible from the side).

With regard to the heaters:



With regard to the terminal:



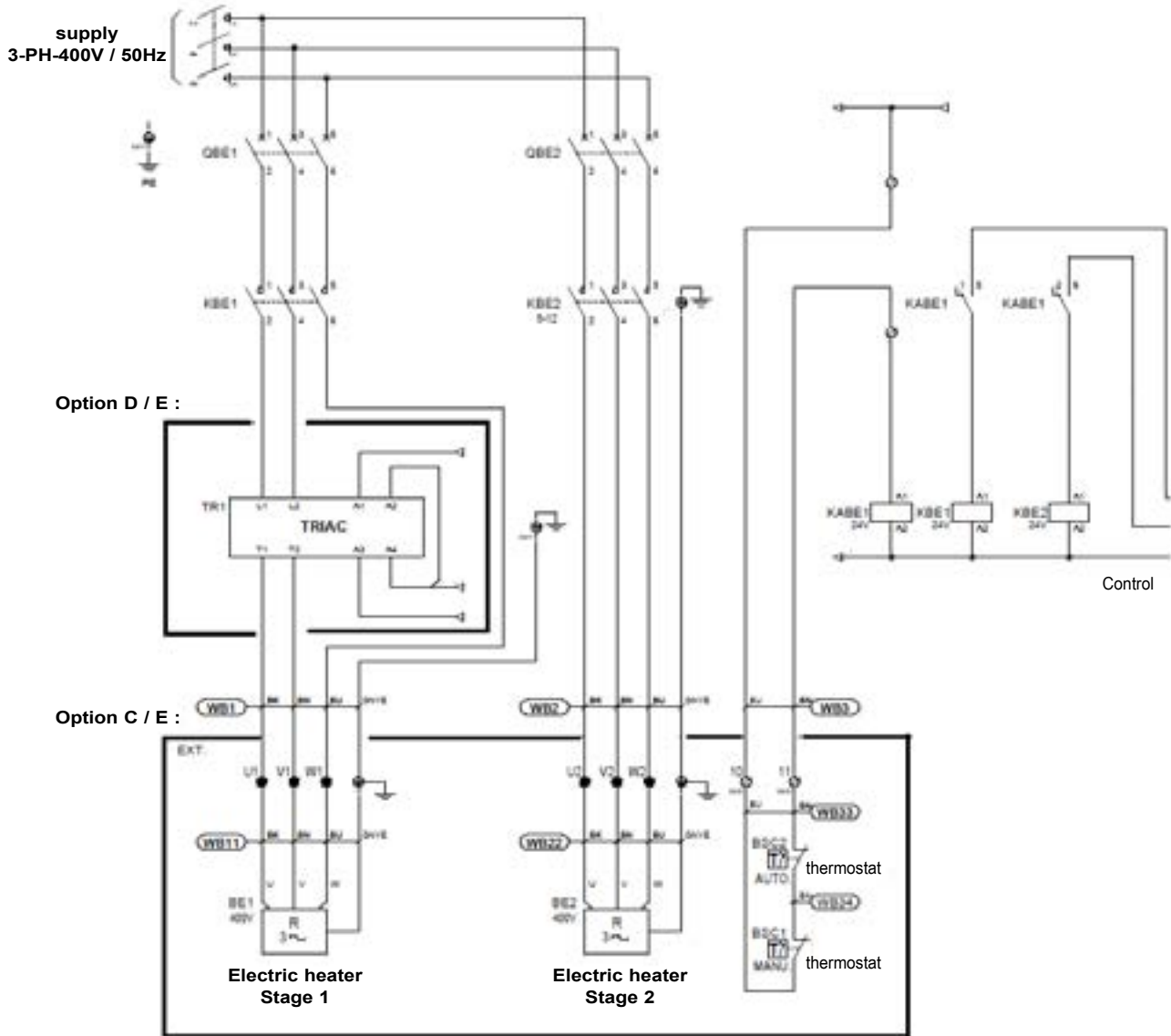
	Power (kW)	Number of speeds	Power (kW)	Number of speeds
			Option A	
Size 25	15	2	30	4
Size 40	24	2	48	4
Size 60	33	2	66	4

With electrics box: On/Off or TRIAC:

- Box not available for option A.

Box options:

- o Option B: On/Off (2-stage) / fitted and wired
- o Option C: On/Off (2-stage) / box not fitted and not wired
- o Option D: modulating with TRIAC (1 On/Off stage + 1 modulating stage)
- o Option E: modulating with TRIAC (1 On/Off stage + 1 modulating stage) / box not fitted and not wired



To be wired:

- 3-PH – 400V supply
- Control/protection
- Option C and E: to be wired between the electrics box and the heater terminal. Cable to be supplied at the customer's expense (See 4.6.2: without box).



The activation of the electric heater stages or the output modulation must be slaved to the AHU's air flow. A fan delay must be provided as part of the control tender.

5 - SYSTEM START-UP



**System start-up must be performed by qualified personnel, trained in air handling technology.
Keep all inspection doors closed while the unit is operating.**

Once the electrical, hydraulic and air connections are complete, system start-up can be performed on the unit, checking the points below:

- The tightening of the connections between the casings.
- The mounting to its support.
- The level of cleanliness inside the unit and the hydraulic network; there must be no foreign bodies inside either. If necessary, clean the panels using a spray and a washing solution and dry with a soft cloth.
- The safety setpoint on the supply air temperature must be $< 60^{\circ}\text{C}$
- The pressure switch rating must be compatible with the theoretical operating pressure.

Mixing boxes/dampers:

- Check the operation and condition of the movable components. For fixed settings, check that they remain in the selected open position.

Filters:

- Check that these are present and clean.
- Connect a pressure gauge or pressure switch (depending on selection) to the pressure connections and check the filter pressure drops. If the filter is fitted in the casing connecting frame (option: CFA, CFR and double filtration in the main casing), one of the pressure connections is fitted on the casing and the second is supplied in kit form (to be fitted on the duct).
- Start the installation with the prefilters only. After a few hours, change them if necessary and install all the filter stages.

Plate heat exchangers:

- Check that the siphon is present on the condensate drain, that it is correctly sized and that there are no foreign bodies liable to obstruct drainage
- Check that the siphon can be primed
- Check that the bypass damper operates correctly

Hydraulic coils:

- Check the condition of the connections (tightness, operating pressure, draining at the high points)
- Check the position of the droplet eliminator (cooling coils)
- Check that the siphon is present on the condensate drain, that it is correctly sized and that there are no foreign bodies liable to obstruct drainage (cooling coils)
- Check that the siphon can be primed

Direct expansion coil

- For coils containing "SPLIT SYSTEM" refrigerant, the unit must not be stored near to a source of heat or in direct sunlight (increase in refrigerant pressure).

Electric heaters:

- Check the presence and mounting of the terminal block protection plate.
- Check the connection of the safety devices:
 - o Manual-reset thermostat (cut-out at 115°C)
 - o Automatic-reset thermostat (cut-out at 80°C)Resets may only be carried out after the installation is checked and the causes of the activation identified.
- Compulsory slaving to the air flow; no start-up without air flow, and stop if excess air flow: risk of fire
- Check that the heater (total or partial) can only operate in the presence of ventilation, by using an air flow detector.
- The ventilation must only stop once the electric heater has been stopped for a few minutes: ensure a time delay of 5 to 10 minutes to allow the heat to dissipate
- Check that the heater's output is proportional to the air flow, if there is a variable flow rate
- Check that the minimum air speed is 2m/s in the operating phase
- Check the connection to earth

Fan motor assemblies:

- Check the power supply voltage and heat protection calibration in accordance with the current ratings of the various elements
- Check that the earth is connected and that the wheel turns freely
- Check the air flow and operating pressure

Calculating the air flow:

<i>Plug fan with asynchronous motor</i>	<i>Plug fan with EC motor</i>
$Q = K \sqrt{\frac{2}{\rho} \cdot (\Delta P)} \times \text{FMA number}$ <p>Q: air flow (m³/h) ρ: air volume mass (kg/m³) P: pressure (Pa) K = 60 (for NPL 280 FMA)</p>	$Q = K \sqrt{(\Delta P)} \times \text{FMA number}$ <p>Q: air flow (m³/h) ρ: air volume mass (kg/m³) P: pressure (Pa) K = 93 (for K3G 280 FMA)</p>

6 - MAINTENANCE/SERVICE INTERVALS



**Switch off the power supply to the air handling unit before carrying out any work
Maintenance must be performed by qualified personnel**

Stop the machine via the human-machine interface then switch off the power supply (fan delay times must be complied with)

It is possible to remove the doors in order to facilitate access to the various components thanks to the detachable hinges.

For all models: open the latches using the wrench provided.

Regular maintenance will keep the unit running at optimum performance levels. The values given in the table below are provided for guidance only. They do not take into account individual factors that can lengthen or shorten the unit's service life.

Components	Required	Recommendation
Tunnel	Check the cleanliness	6 months
	Check for corrosion	6 months
Mixing boxes and dampers	Check that the servomotors operate correctly	12 months
Filters	Check the fouling level (visual and pressure drop)	3 months
	Replace	Depending on operating conditions. Replace every 2 years, even for less intensive use Filter combination: remove the folded F7 or F9 filters firstly then remove the G4 prefilter
Plate heat exchangers	Remove dust/grease and carry out maintenance on the bypass damper	12 months
	Clean and degrease the condensate drain pan using water and non-abrasive detergents	12 months
Hydraulic coils	Check the cleanliness	6 months
	Check the level of antifreeze	Depending on operating conditions
	Drain the coil	Depending on operating conditions
	Check that the droplet eliminator is clean	12 months
Electric heaters	Visually inspect the heaters and connection cables	1500 hours
	Check and retighten the electrical connection	6 months
Fan motor assemblies	Check the impellers (visually)	6 months
	Check the various fixings (visually)	6 months
	Check the various connections	6 months
Sound attenuator	Check the cleanliness and condition (tears)	6 months

7 - CONTROL

Refer to the control manual

8 - CE DECLARATION OF CONFORMITY

CIAT's products carry the CE mark, demonstrating that they may be sold throughout the European Union. This mark is your assurance that CIAT's products are safe to use.



Climatisation - Réfrigération - Traitement d'air - Echanges thermiques

Etudes et Développements Produits

Product Design and Development / Produktforschung und Entwicklung / Estudios y Desarrollo de Productos

DECLARATION "CE" DE CONFORMITE - CERTIFICAT OF "CE" CONFORMITY
EG-KONFORMITÄTSEKTLÄRUNG - DECLARACIÓN "CE" DE CONFORMIDAD



Le Fabricant : Société CIAT
The Manufacturer : 700, Avenue Jean Falconnier
Der Hersteller : Boite Postale N°14
El Fabricante : 01350 CULOZ - France

déclare que les produits désignés ci-dessous : *declares that the units listed below :*
erklärt, das folgende Produkten : *declara que los productos designados a continuación :*

Centrales de Traitement d'Air - **Air Compact 25 à 60**
Air Handling Units - Air Compact 25 to 60
Klimazentralen - Air Compact 25 - 60
Centrales de Tratamiento de Aire - Air Compact 25 a 60

sont conformes aux dispositions des Directives suivantes et aux Législations nationales les transposant :
comply with the requirements of the following European directives and the national legislation transposing them :
sind mit den folgenden Richtlinien und mit den nationalen Gesetzgebungen konform :
son conformes a las disposiciones de las siguientes Directivas y a las legislaciones nacionales que las transponen :

- ✓ 2004/108/CE - Directive C.E.M. Compatibilité Electro Magnétique - *Electro Magnetic Compatibility (EMC) Directive*
- *Richtlinie Elektromagnetische Verträglichkeit, geändert* - *Directiva C.E.M Compatibilidad Electromagnética*
- ✓ 2006/42/CE - Directive Machines - *Machinery Directive*
- *Maschinenrichtlinie* - *Directiva Máquinas*
- ✓ 2011/65/UE - Directive RoHS - *RoHS Directive*
- *RoHS Richtlinie* - *Directiva RoHS*

➤ EN 50581 (2012) **Documentation technique pour l'évaluation des produits électriques et électroniques par rapport à la restriction des substances dangereuses.**

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.
Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe.
Documentación técnica para la evaluación de productos eléctricos y electrónicos con respecto a la restricción de sustancias peligrosas.

Antoine GUIBERT
Directeur Industriel
Industrial director
Industriedirektor
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