USER AND MAINTENANCE MANUAL

precision air-conditioners

ACCURATE

Direct expansion

Direct expansion

AXO air outlet from the top
AXU air outlet from the bottom

Water-cooled

AWO air outlet from the top
AWU air outlet from the bottom

GB

frame 1: 07-10

frame 2: 15-18

frame 3: 20-26-29

frame 4: 39-30-40-50

frame 5: 55-60-70

INDEX

The following symbols are used in this publication and inside the unit:

U **User**

I **Installer**

A **Assistance**

⚠ **Important**

⛔ **Prohibition**

In some parts of this manual, the following symbols are used:

⚠ **WARNING =** for actions that require special care and suitable preparation

⛔ **PROHIBITED =** for actions that absolutely MUST NOT be performed

Specialist personnel (electrician) Person with in-depth knowledge and experience such as to be able to recognise risks and avoid dangers that may derive from electricity (IEV 826-09-01).

DOCUMENTS

U I A

DOCUMENTS ENCLOSED WITH THE UNIT

Each unit is delivered complete with the following documents:

- Air-conditioner installation manual;
- Air-conditioner user and maintenance manual;
- Instruction manual for the microprocessor controller;
- Wiring diagram;
- List of spare parts;
- CE declaration with list of European directives and standards that the unit is compliant with;
- Warranty conditions.

DIRECT EXPANSION UNIT CONFIGURATION

U I A

	type																					
digit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
exe	A	X	O	2	9	M	E															

Digit 1

RANGE	A	ACCURATE air-conditioner Climaveneta Version

Digit 2

VERSION	L	Air-cooled "LT" (low temperature)
	W	Water-cooled
	X	Air-cooled

Digit 3

AIR FLOW	B	Over (intake from the bottom)
	O	Over (intake from the front)
	R	Over (intake from the rear)
	U	Under (intake from the top)

Digit 4-5

FRAME/POTENZA	07	Frame 1 (7 kw)
	10	Frame 1 (10 kw)
	15	Frame 2 (15 kw)
	18	Frame 2 (18 kw)
	20	Frame 3 (20 kw)
	26	Frame 3 (26 kw)
	29	Frame 3 (29 kw)
	30	Frame 4 (30 kw)
	39	Frame 4 (39 kw)
	40	Frame 4 (40 kw)
	50	Frame 4 (50 kw)
	55	Frame 5 (55 kw)
	60	Frame 5 (60 kw)
	70	Frame 5 (70 kw)

Digit 6

COMPRESSORS AND CIRCUITS	B	N° 2 Compressors N° 2 Circuits
	M	N° 1 Compressor N° 1 Circuit

Digit 7

FANS	C	Centrifugal direct traction (standard from 07 to 18 kw)
	E	EC Inverter fans high efficiency
	P	Centrifugal direct traction high ESP, 3 speeds (from 07 to 18 kw)
	T	Centrifugal V-belts ESP 20 Pa (from 21 to 88 kw)
	U	Centrifugal V-belts ESP 50 Pa (from 21 to 88 kw)
	X	Centrifugal V-belts ESP 100 Pa (from 21 to 88 kw)
	Y	Centrifugal V-belts ESP 150 Pa (from 21 to 88 kw)
	Z	Centrifugal V-belts ESP 200 Pa (from 21 to 88 kw)

Digit 8

VOLTAGE	M	230V 1Ph+N 50Hz
	T	400V 3Ph+N 50Hz

Digit 9

FLUID + CONDENSER CONTROL	0	R407 C
	1	R407 C + pressostatic valve x condenser control
	3	R22
	4	R22 + pressostatic valve x condenser control

Digit 10

CONTROL	0	Semi-graphic user terminal on the unit
	1	Without user terminal
	2	Semi-graphic user terminal + wall mounting kit

Digit 11

THERMOSTATIC VALVE	0	Mechanical thermostatic valve
	1	Electronic thermostatic valve

Digit 12

HEATING	0	No post-heating
	1	STD heaters with 3 steps
	3	Hot water post-heating coil
	4	Hot water post-heating coil + STD heaters with 3 steps
	6	Hot gas post-heating coil
	7	Hot gas post-heating coil + STD heaters with 3 steps

Digit 13

HUMIDITY CONTROL	0	No humidity and condensate management
	1	Probe for humidity reading only
	2	Humidifier
	4	Dehumidification with partial coil operation
	6	Humidifier + Dehumidification / part coil
	8	Humidifier + Dehumidification / part coil + condensate drain pump
	9	PPump for draining the condensate and/or the steam cylinder

Digit 14

ELECTRONIC BOARDS	0	No board
	A	Clock board
	B	RS485 board
	C	RS232 board (GSM modem)
	D	Ethernet board
	E	LON board
	F	Trend board
	G	Clock board + RS485 board
	H	Clock board + RS232 board
	L	Clock board + Ethernet board
	M	Clock board + LON board
	N	Clock board + Trend board

Digit 15

SENSORS	0	No sensor
	1	Dirty filter sensor
	2	Fire sensor
	3	Smoke sensor
	4	Fire + smoke sensor
	5	Fire + smoke + flooding sensor
	6	Flood sensor
	7	Dirty filter + fire + smoke sensor
	8	Dirty filter + flood sensor
	9	Dirty filter + fire + smoke + flood sensor

Digit 16

HEAT AND SOUND INSULATION	0	Class 0 panels (A1-DIN 4102)
	1	Class 1 panels STD insulation
	2	Class 1 panels soundproof insulation
	3	Class 0 panels (A1-DIN 4102) + soundproofing hoods on the compressors
	4	Class 1 panels STD insulation + soundproofing hoods for compressors
	5	Class 1 soundproofed panels + soundproofing hoods for compressors

Digit 17

DAMPERS	0	No damper
	1	Pressure-relief damper (Over units only)
	2	Motor-driven damper
	3	Motor-driven damper with spring return, in view
	4	Motor-driven damper + side panel
	5	Motor-driven damper + rwith spring return + side panel

Digit 18

AIR FILTER	2	Air filter with EU2 efficiency
	4	Air filter with EU4 efficiency
	5	Air filter with EU5 efficiency
	6	Air filter with EU2 efficiency + air change filter
	7	Air filter with EU4 efficiency + air change filter
	8	Air filter with EU5 efficiency + air change filter

Digit 19

PACKAGING	0	Thermoplastic perimeter protection + cardboard lid
	1	Wooden crate

Digit 20

EXTRAS	0	No extras requested
	S	No Digit for request

AIR-COOLED DIRECT EXPANSION UNIT - VERSION AX*

Refrigerant circuit

All models have a single refrigerant circuit, and in some cases two circuits.

See the DIGIT on the previous page.

The compressor pumps the hot refrigerant gas into the outdoor condenser.

The liquid refrigerant then flows to a liquid receiver installed in the indoor unit, to ensure a constant flow of refrigerant to the thermostatic valve and subsequently the evaporator.

Here the liquid refrigerant absorbs the heat from the environment and changes state, becoming a gas, then returning to the compressor: the cycle is then repeated.

To ensure the correct discharge pressure of the refrigerant, the outdoor condenser is fitted as standard with fan speed control.

Valves for isolating the refrigerant circuit are supplied as standard to assist the routine maintenance operations.

The Scroll compressor is fitted with a non-return valve to prevent the migration of liquid from the outdoor condenser in the summer, and unwanted flows of refrigerant during start-up.

A second non-return valve, to be fitted by the installer, is recommended during operation in winter, to prevent the migration of the refrigerant charge from the liquid receiver to the outdoor condenser, with consequent low pressure alarms.

Air-cooled condenser, outdoor installation

The indoor unit can be connected to different types of outdoor condensers, standard or low noise versions, with special treatments on the coils.

For the corresponding information refer to the manual on outdoor air-cooled condensers.

Note 1: the outdoor units and condensers are supplied separately

Note 2: the indoor unit is delivered charged with nitrogen at near atmospheric pressure. The outdoor condenser, on the other hand, is supplied pressurised with dry air (around 3 bar.)

Note 3: the customer is considered responsible for making the correct connections between the indoor and outdoor unit, as clearly indicated in the Installation manual, and for ensuring the gas and oil charges, where necessary.

WATER-COOLED DIRECT EXPANSION UNIT - VERSION AW*

Refrigerant circuit

All models have a single refrigerant circuit, and in some cases two circuits.

See the DIGIT on the previous page.

The compressor pumps the hot refrigerant gas into the indoor condenser made from braze welded steel plates.

The liquid refrigerant then flows to a liquid receiver installed in the indoor unit, to ensure a constant flow of refrigerant to the thermostatic valve and subsequently the evaporator.

Here the liquid refrigerant absorbs the heat from the environment and changes state, becoming a gas, then returning to the compressor: the cycle is then repeated.

To ensure the correct discharge pressure of the refrigerant, the outdoor condenser is fitted as standard with fan speed control.

Valves for isolating the refrigerant circuit are supplied as standard to assist the routine maintenance operations.

The Scroll compressor is fitted with a non-return valve to prevent the migration of liquid from the outdoor condenser in the summer, and unwanted flows of refrigerant during start-up.

A second non-return valve, to be fitted by the installer, is recommended during operation in winter, to prevent the migration of the refrigerant charge from the liquid receiver to the outdoor condenser, with consequent low pressure alarms.

Water condenser

The units are fitted with an internal braze welded steel plate heat exchanger.

During installation, a pressure control valve should be fitted (available in the price list) to manage the condensing pressure.
(See the User and Maintenance Manual)

This circuit works with primary water or with a closed circuit connected to an external Dry Cooler or an evaporative tower.

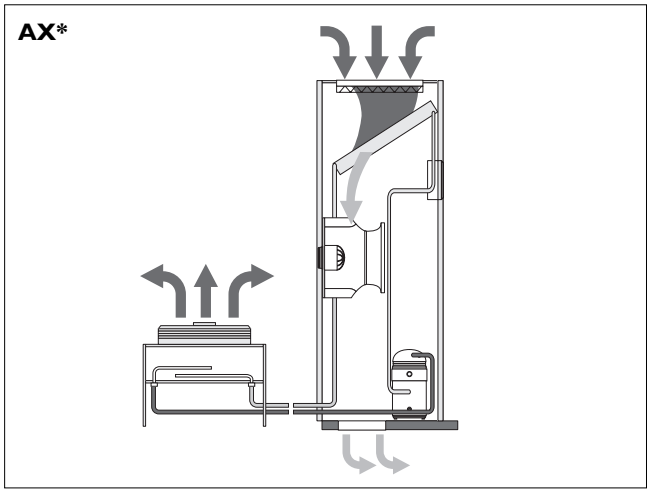
For "closed" circuits, the water should be mixed with antifreeze to prevent frost during the winter, with consequent damage to the systems: see the installation manual to calculate the required percentage of antifreeze fluid.

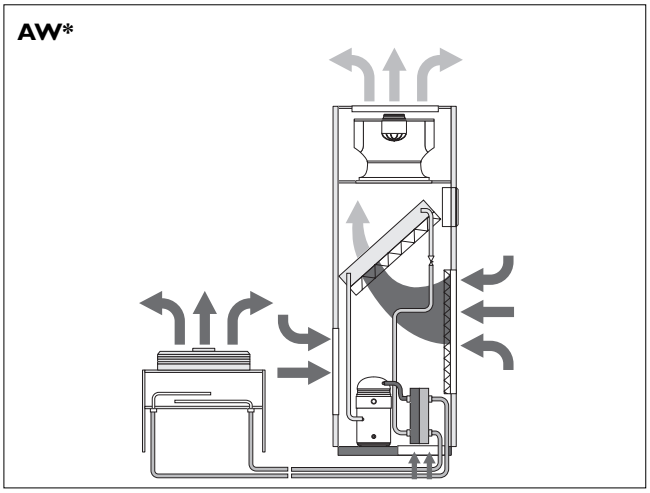
The Dry Coolers are supplied as an accessory (see the price list), while the antifreeze fluid and fluid circulating pump are generally supplied by other companies.

For "open" circuits, mechanical filters are required to protect against impurities and prevent the braze welded plate heat exchanger from blocking.

To reduce energy consumption (pump), a valve should be fitted to close the circuit when the indoor unit is off.

Note 1: the water-cooled indoor units (AW*) come with the refrigerant circuit completely charged and tested in the factory before being delivered.

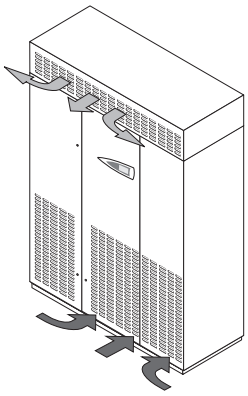




The **ACCURATE** air-conditioners are available in different configurations, based on the air intake and outlet positions; the main distinction is between **OVER** and **UNDER** units.
The versions defined as **OVER** with air outlet from the top generally have the air intake at the front, rear and/or from the bottom, as required by the customer, and the air outlet from the top of the unit, in ducts, false-ceilings, or from outlet plenums at the front.

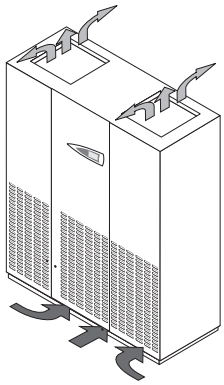
AXO - AWO

fig. 1



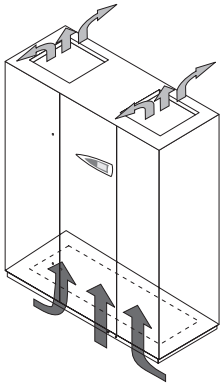
1 OVER units with intake from the front and outlet plenum

fig. 2



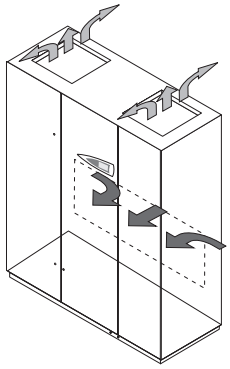
2 OVER units with intake from the front and outlet from the top

fig. 3



3 OVER units with intake from under the floor and outlet from the top

fig. 4

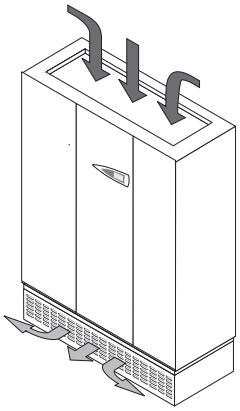


4 OVER units with intake from the rear and outlet from the top

The versions defined as **UNDER** with air outlet from under the floor have the air intake through the top of the unit directly from the environment, or via ducts and/or intake plenums.

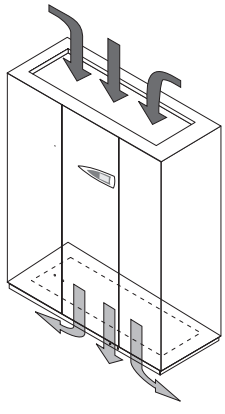
AXU - AWU

fig. 5



5 UNDER units with intake from the top and front outlet plenum.

fig. 6



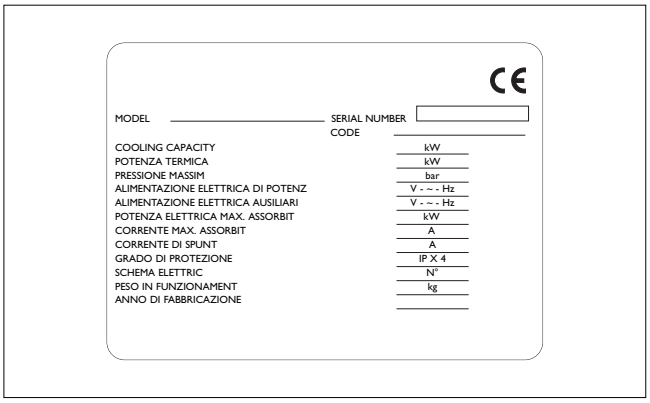
6 UNDER units with intake from the top and outlet under the floor

RATING PLATE

U I A

The air-conditioner rating plate is positioned on a panel inside the unit, and provides the following information:

- Model and serial number of the unit;
- Power supply (voltage, phases and frequency);
- Power input of the unit and the individual components;
- Current input of the unit and the individual components: OA (Operating current), FLA (Full load current) and LRA (Locked rotor current);
- Settings of the pressure switches in the refrigerant circuit (HP and LP);
- Type of refrigerant (R407C/R22);
- Charge or pre-charge in each refrigerant circuit (AW* versions only)



GENERAL TECHNICAL DATA

U I A

ACCURATE AX air cooled		07	10	15	18	20	26	29
Total cooling capacity (1)	kW	7,2	10	15	18	20,8	26,6	29,5
Sensible cooling capacity (1)	kW	7,2	9,1	14,6	17,5	20,8	25,6	27
SHR (1)		1	0,91	0,97	0,97	1	0,96	0,91
Total cooling capacity (2)	kW	6,8	9,1	13,5	16,2	18,9	24,2	26,6
Sensible cooling capacity(2)	kW	6,8	8,7	13,3	16	18,9	23,7	25,2
SHR (2)		1	0,95	0,98	0,99	1	0,98	0,95
No. of compressors	n°	1	1	1	1	1	1	1
Total power input	kW	1,72	2,52	3,83	4,4	5,05	6,75	7,65
N° circuits	n°	1	1	1	1	1	1	1
Air flow-rate	mc/h	2400	2400	4900	4800	6500	8000	8000
No. of fans	n°	1	1	2	2	1	1	1
Total power input	kW	0,49	0,49	0,9	0,9	1,8	2,2	2,2
ESP (3)	Pa	20	20	20	20	20	20	20
Noise level (5)		49	51	55	55	55	56	56
Standard power supply	V/ph/Hz	400/3+N/50						
Width	mm	600		1000				
Depth	mm	500		790				
Height	mm	1980						
ARC outdoor condenser		**014m**	**014m**	**021m**	**025m**	**030m**	**040m**	**040m**

ACCURATE AX air cooled		39	30	40	50	55	60	70
Total cooling capacity (1)	kW	39,4	30,2	40,5	50,4	55,8	61,6	70,6
Sensible cooling capacity (1)	kW	39,4	30,2	40,5	48,4	55,8	61,6	65
SHR (1)		1	1	1	0,97	1	1	0,92
Total cooling capacity (2)	kW	35,8	27,5	36,8	45,4	50,8	56	63,6
Sensible cooling capacity (2)	kW	35,8	27,5	36,8	45	50,8	56	60,4
SHR (2)		1	1	1	0,99	1	1	0,95
No. of compressors	n°	1	2	2	2	2	2	2
Total power input	kW	9,75	7,66	10,1	13,5	13,1	15,6	19,6
N° circuits	n°	1	2	2	2	2	2	2
Air flow-rate	mc/h	13500	10500	13500	13500	19000	19000	19000
No. of fans	n°	2	2	2	2	3	3	3
Total power input	kW	4	3,2	4	4	6	6	6
ESP (3)	Pa	20	20	20	20	20	20	20
Noise level (5)		57	54	56	56	57	57	57
Standard power supply	V/ph/Hz	400/3+N/50						
Width	mm	1550				2100		
Depth	mm	790						
Height	mm	1980						
ARC outdoor condenser		**052m**	**042b**	**051b**	**077b**	**077b**	**088b**	**93b**

1 - 24°C-50%, 35°C ext
2 - 20°C-50%, 35°C ext
3 - Standard centrifugal fans
5 - measured at 1,5 m haight and 2 m front in free field

ACCURATE AW water cooled		07	10	15	18	20	26	29
Total cooling capacity (1)	kW	7,5	10	15	18,9	20,8	27,4	30,8
Sensible cooling capacity (1)	kW	7,5	9,1	14,6	17,2	20,8	26	27,6
SHR (1)		1	0,91	0,97	0,9	1	0,95	0,9
Total cooling capacity (2)	kW	6,8	9,1	13,5	17	18,9	24,7	27,4
Sensible cooling capacity (2)	kW	6,8	8,7	13,5	16,5	18,9	24,2	26,1
SHR (2)		1	0,95	1	0,97	1	0,98	0,95
No. of compressors	n°	1	1	1	1	1	1	1
Compressor power input	kW	1,68	2,52	3,83	4,15	5,05	6,2	7,2
N° circuits	n°	1	1	1	1	1	1	1
Air flow-rate	mc/h	2400	2400	4900	4800	6500	8000	8000
No. of fans	n°	1	1	2	2	1	1	1
Fans power input	kW	0,49	0,49	0,9	0,9	1,8	2,2	2,2
ESP(3)	Pa	20	20	20	20	20	20	20
Noise level (5)		49	51	55	55	55	56	56
Water flow-rate (1)	l/h	1570	2150	3250	3975	4455	5780	6540
Pressure drop Dp (1)	kPa	12	19,5	11	10,8	13	14	17,9
Water content	l	0,66	0,66	1,16	1,53	1,53	1,77	2,2
Standard power supply	V/ph/Hz	400/3+N/50						
Width	mm	600		1000				
Depth	mm	500		790				
Height	mm	1980						
ADC outdoor condenser		**013**	**013**	**025**	**025**	**030**	**038**	**051**

ACCURATE AW water cooled		39	30	40	50	55	60	70
Total cooling capacity (1)	kW	39,4	30,2	42	50,4	58	61,6	70,6
Sensible cooling capacity (1)	kW	39,4	30,2	42	48,4	58	61,6	68,4
SHR (1)		1	1	1	0,97	1	1	0,97
Total cooling capacity (2)	kW	35,8	27,5	38,3	45,4	52,8	56	63,6
Sensible cooling capacity (2)	kW	35,8	27,5	38,3	45	52,8	56	63
SHR (2)		1	1	1	0,99	1	1	0,93
No. of compressors	n°	1	2	2	2	2	2	2
Compressor power input	kW	9,75	7,66	9,4	13,1	12,6	15,6	19,6
N° circuits	n°	1	2	2	2	2	2	2
Air flow-rate	mc/h	13500	10500	13500	13500	19000	19000	19000
No. of fans	n°	2	2	2	2	3	3	3
Fans power input	kW	4	3,2	4	4	6	6	6
ESP (3)	Pa	20	20	20	20	20	20	20
Noise level (5)		57	54	56	56	57	57	57
Water flow-rate (1)	l/h	8465	2x3260	2x4420	2x5460	2x6070	2x6640	2x7760
Pressure drop Dp (1)	kPa	24,1	10,5	13	15,9	15,5	18,3	21,8
Water content	l	02,8	2x1,16	2x1,53	2x1,77	2x2,2	2x2,2	2,5,6
Standard power supply	V/ph/Hz	400/3+N/50						
Width	mm	1550				2100		
Depth	mm	790						
Height	mm	1980						
ADC outdoor condenser		**062**	**078**	**078**	**078**	**078**	**092**	**102**

1 - 24°C-50%, water IN / OUT 30°-35°c
2 - 20°C-50%, water IN / OUT 30°-35°c
3 - standar centrifugal fans
5 - measured at 1,5 m haight and 2 m front in free field

EMPTYING THE REFRIGERANT CIRCUIT AND CHARGING WITH REFRIGERANT

The water-cooled units (AWO, AWU) are already charged with refrigerant, either R407C or R22 (check the rating plate on the unit and the compressors to see which type of refrigerant is used).

The air-cooled units (AXO, AXU) are pre-charged with nitrogen to prevent moisture from entering the circuit; in this case, the refrigerant charge must be completed by the installer, following the instructions shown in this paragraph.

Refrigerant	Type of oil	
R22 (Mineral oil)	Suniso 3 GS	White oil
R407C (POE)	Mobil EAL Arctic 22 CC	ICIEMKARATE RL 32S CF

R22	R407C
Open any valves in the unit or in the system to ensure that all the components are involved in the emptying operation;	
Connect a high efficiency vacuum pump to the Schrader fittings or to the 1/4" SAE fittings on the compressor suction and discharge side;	
Connect a cylinder of refrigerant to the charge fittings.	
Empty the lines, ensuring an absolute pressure of less than 100 Pa (0.7 mm Hg) for an extended period, so as to remove the air and any traces of moisture.	Empty the lines, ensuring an absolute pressure of less than 10 Pa (0.07 mm Hg) for an extended period, so as to remove the air and any traces of moisture.
The circuit should be emptied slowly and maintained for an extended period, rather than performed too quickly.	
Wait 100 seconds and check that the absolute pressure does not rise above 200 Pa.	
Break the vacuum by pre-charging from the cylinder of R22 refrigerant.	Break the vacuum by pre-charging from the cylinder of R407C refrigerant in the liquid phase.
After having started the compressor, complete the charge slowly, until the pressure stabilises in the lines and the gas bubbles disappear from the flow indicator;	
The charge must be checked at the environmental design conditions and with a discharge pressure of around 18 bar (equal to a saturated temperature of 48°C); for units with on-off condenser control, partially close the intake to stop the condenser fan from repeatedly starting-stopping. Make sure that the subcooling of the liquid at the thermostatic valve intake is between 3 and 5°C less than the condensing temperature read on the pressure gauge and that the superheating of the vapour at the evaporator outlet is around 5 °C. The charge must be checked at the environmental design conditions	and with a discharge pressure of around 18 bar (equal to a dew point of 48°C and boiling point of 43°C); for units with on-off condenser control, partially close the intake to stop the condenser fan from repeatedly starting-stopping. Make sure that the subcooling of the liquid at the thermostatic valve intake is between 3 and 5°C less than the condensing temperature read on the pressure gauge and that the superheating of the vapour at the evaporator outlet is around 5 °C.

COMMISSIONING PROCEDURE

Arm the cutout in the auxiliary circuits;

Arm all the cutouts on the electrical panel;

Power up the air-conditioner electrical panel and close the main disconnecting switch on the unit (position 'I');

Check that the control board is powered; **Check** that both the LEDs relating to the phase sequence relay (RSF) are on; the yellow LED indicates power, the green LED indicates that the sequence of phases is correct.

If the green LED is off, disconnect power supply from the units, reverse two phases of the power cable and restart the commissioning procedure.

(In the units with sump heaters)

After having powered up the air-conditioner, wait at least 12 hours before starting so as to suitably heat the oil in the compressors.

During extended shutdown there may be spontaneous migration of refrigerant to the compressor sump, which at the start may cause the oil to foam and consequent damage due to insufficient lubrication.

As a result, do not disconnect power during weekly pauses;

Open the on-off valves in the refrigerant circuits and check that the air-cooled remote condensers are connected (air-cooled models);

Check that the external radiators are connected and make sure there is water flow for cooling (water-cooled models);

Check that the sections of corrugated pipe with the function of drain trap (both inside and outside of the air-conditioner) have been filled with water during installation.

AT LEAST 12 HOURS AFTER POWER UP:

Start the air-conditioner using the buttons on the user terminal;

If an alarm is activated refer to the controller instruction manual.

WATER-COOLED UNITS

Water in an open circuit

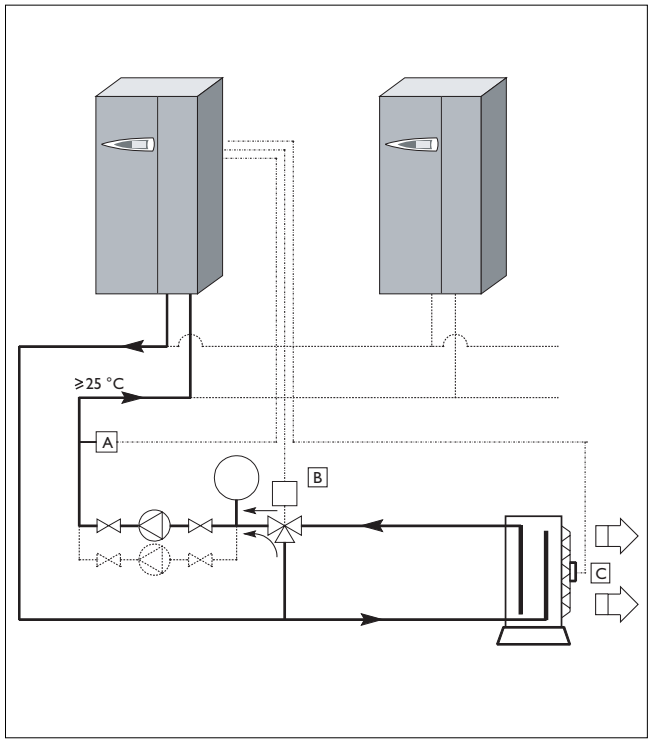
If the temperature of the cooling water is not controlled and may fall below 25°C, a pressure control valve is required (available as an accessory) for each condenser; in this case, the supply pressure must not be less than 200 kPa (2 bar).
IMPORTANT: do not use water cooled using an evaporative tower, as the condensers will rapidly become fouled by lime scale.

Water in a closed circuit

The condensers on the units are supplied with water pumped in a closed circuit and cooled by external radiators; check that the cross-section of the pipes and that the characteristics of the circulating pump are suitable: an insufficient water flow-rate affects the performance of the air-conditioner.
The temperature of the cooling water must be controlled so as to not fall below 25°C, preferably according to the diagram shown in the figure.

⚠ **IMPORTANT:** the cooling water must contain a percentage of ethylene glycol (passivated and consequently non-corrosive) according to the minimum expected outside temperature.
In the Energy Saving models, the use of glycol is always required.

Freezing point (°C)				
-4°C	-10°C	-17°C	-25°C	-37°C
Percentage of ethylene glycol by weight				
10%	20%	30%	40%	50%



CALIBRATING THE THERMOSTATIC VALVE (air-cooled models)

The thermostatic valve is calibrated using the adjustment screw shown in the figure; in the water-cooled models, the correct calibration is already performed in the factory.

- Check that the subcooling of the liquid at the condenser outlet is around 3-5°C;
- Check that the thermostatic valve superheating value is correct (around 5 °C);
- Check that the valve sensor bulb is correctly positioned, secured and insulated.

If the superheating is above the value indicated previously, open the valve further; if it is lower, close the valve further.

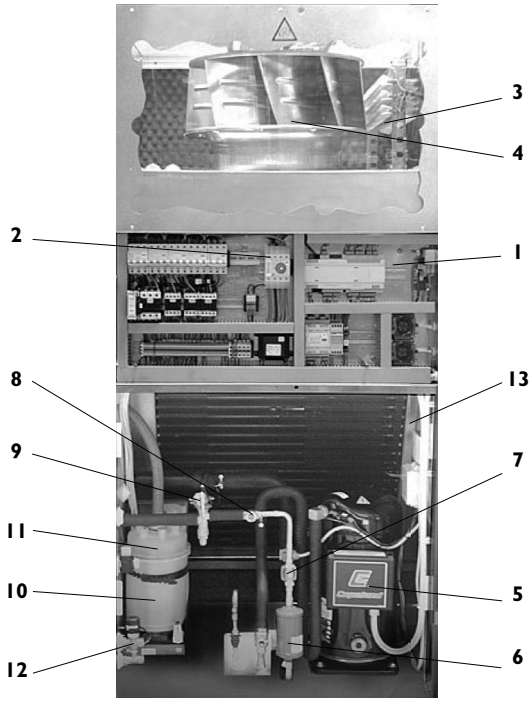
⚠ **NOTE:** the thermostatic valve must only be calibrated by specialist personnel.

The air-conditioner is fitted with the following instruments:
- **High pressure switch/switches F1** with manual reset (one on each refrigerant circuit);
- **Low pressure switch/switches F2** with automatic reset (one on each refrigerant circuit);
- **Air flow sensor F3 and dirty** filter sensor F4 (differential pressure switches);
- Temperature sensor BT2 (versions C and T) or room temperature and humidity sensor BH1 (on the units with humidity control);

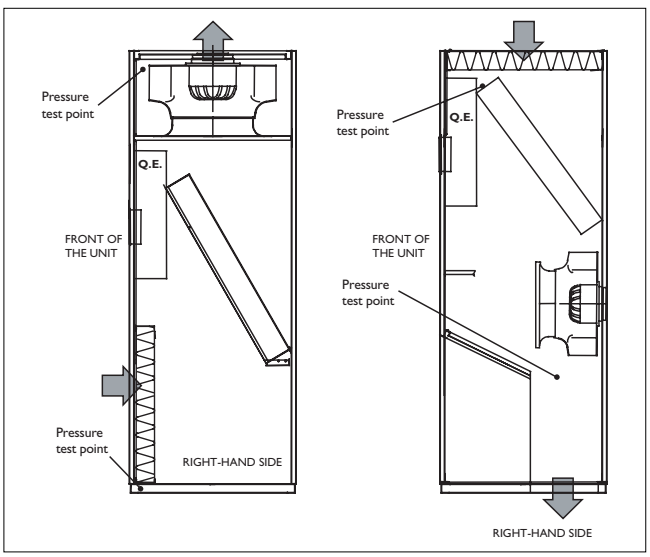
Some versions, in addition, have the following sensors:
- **Safety thermostat TH1** (in the versions with electric heaters), with the reset button accessible on the right-hand side of the electrical panel.

In addition, the following optional devices may be available:
- **Flood sensor made up of:**
  a) FSD device to be inserted in the special socket on the electrical panel;
  b) FLOE sensor (or sensors, connected in parallel) to be positioned at the points monitored;
- **Fire and smoke sensors** SFFS and SFFF;
- **Hot water temperature sensor,** for reading and enabling post-heating with hot water;
- **Outlet air limit temperature sensor (BT1),** installed as described in the "Installation manual".

1 main board
2 disconnecting switch
3 electric heaters
4 radial fan and inverter
5 compressor
6 dewatering filter
7 liquid valve
8 flow indicator
9 thermostatic valve
10 humidifier
11 dehumidification valve
12 hot water coil valve
13 temperature-humidity probe



The pressure test points for the air flow (F3) and dirty filter (F4) differential pressure switches are connected in parallel; (on OVER units)
- the positive pressure test point is located on the right-hand side of the base of the unit;
- the negative pressure test point is located in a position for measuring the pressure upstream of the fan; (on UNDER units)
- the positive pressure test point is located behind the electrical panel, upstream of the air filter;
- the negative pressure test point is located in a position for measuring the pressure upstream of the fan;



CALIBRATING THE CONTROL AND SAFETY DEVICES

U I A

After starting the air-conditioner, make the following adjustments
- Room temperature (cooling and heating set point).
- Relative humidity (set point for humidification and dehumidification);
- Dirty filter differential pressure switch: see the paragraph on "CALIBRATING THE DIRTY FILTER SENSOR".

The calibration values of the control and safety devices must not be altered.

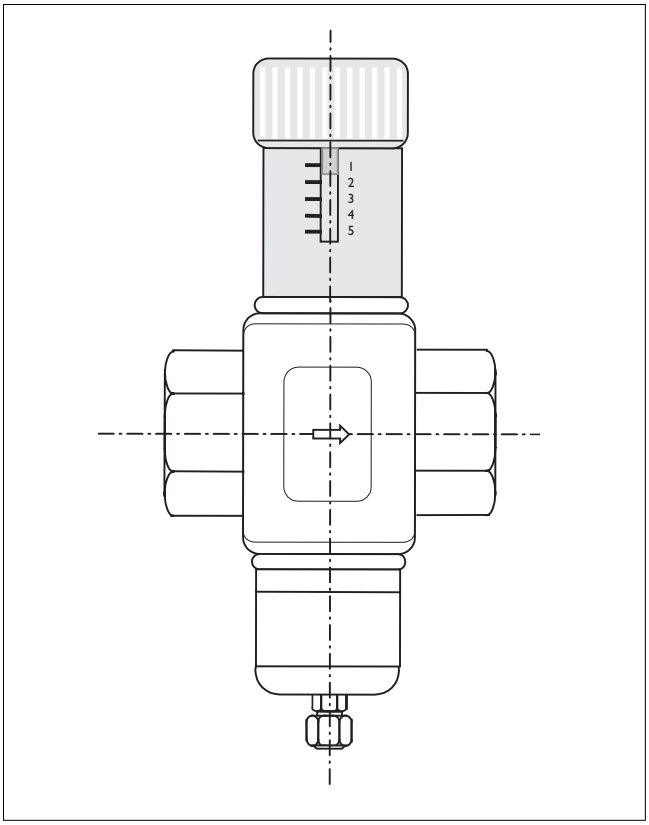
Symbol	Description
F1	High pressure switch
F2	Low pressure switch
TH1	Safety thermostat (versions T and H)

Symbol	Activation	Differential	Reset
F1	28 bar (opening)	-	Manual reset
F2	1,5 bar (opening)	1.5 bar	2.5 bar (automatic)
TH1	320 °C (opening)	-	Manual reset

CALIBRATING THE PRESSURE CONTROL VALVE

U I A

(option available for water-cooled models)
The pressure control valve, by managing the flow of water, prevents the condensing pressure from lowering excessively and, at the same time, saves water consumption.
If necessary, calibrate the pressure control valve using the adjustment knob (the pressure is increased when turning clockwise) until the condensing pressure stabilises at the recommended value of 17 bar (equivalent to a saturated temperature of around 45°C when using R22), measured using a pressure gauge connected to the pressure test point on the outlet valve.

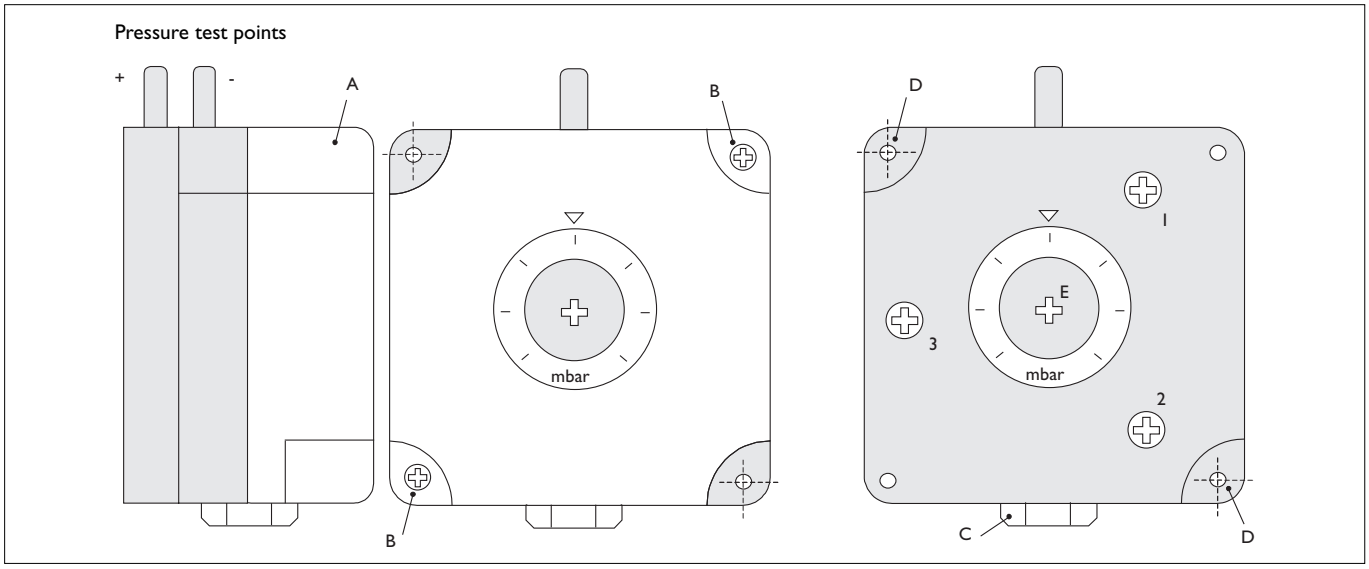


CALIBRATING THE AIR FLOW SENSOR

The differential pressure switch F3 must be activated if the fan is not working (when there is one fan) or one of the fans is not working.
The factory calibration of the differential pressure switch to control the air flow (F3) is 0.5 mbar (=50Pa).
As the difference in pressure between the fan intake and outlet depends on the air flow-rate, the instrument may need to be recalibrated after installation, checking that the contact closes when the fan is operating normally.

To calibrate the pressure switch:
- simulate a fault in the fan system (stop the fan - if there is just one - or one of the fans on the unit) and check that the pressure switch is activated;
- if the device is not activated, progressively increase the calibration value of the pressure switch.

To calibrate the pressure switch, remove the plastic cover (A) by unscrewing the two screws (B).
Use the adjustment screw (E) to calibrate the differential pressure switch on a scale from 0.5 to 4.0 mbar (50 to 400Pa).
If having to replace the pressure switch, unscrew the two fastening screws (D), remove the rubber hoses connected to the pressure test points (+) and (-) and remove the electrical cables connected to terminals 1, 2 and 3.
To install the new pressure switch, perform the same operations in the reverse order, inserting the cables from point (C).



CALIBRATING THE DIRTY FILTER SENSOR

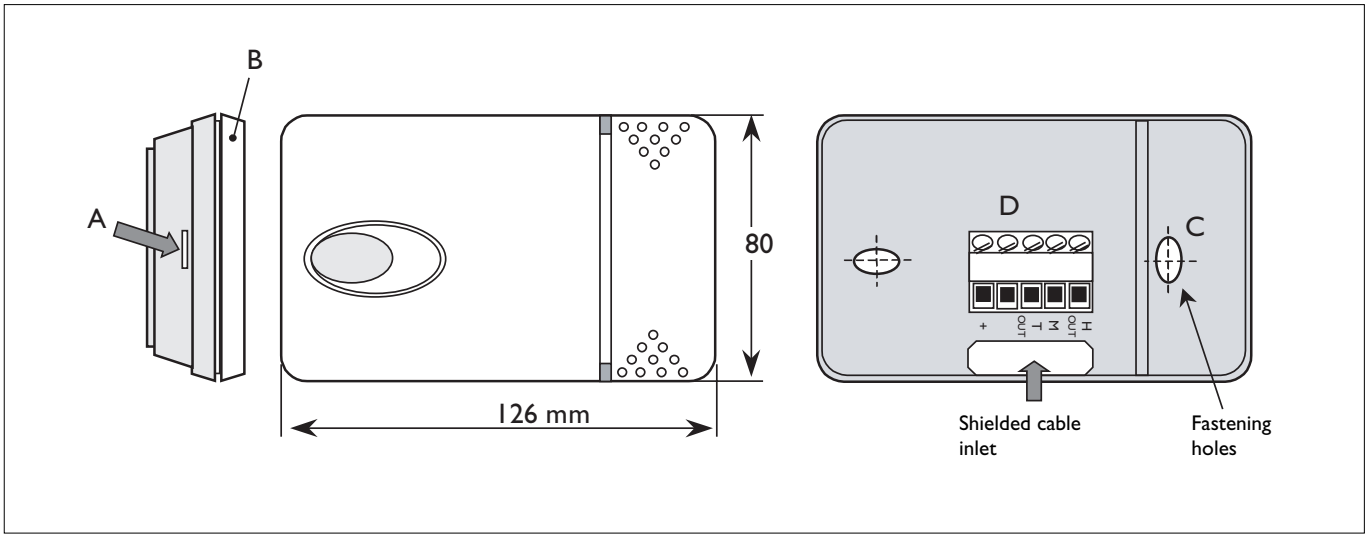
The factory calibration of pressure switch F4 is 3 mbar (=300Pa).
Pressure switch F4 must be calibrated according to the pressure drop, which depends not only on the filter being dirty, but also on the air flow-rate.
The calibration must be performed with a clean filter, as follows:
- switch the unit on
- progressively cover the surface of the air filter and make sure that the pressure switch is activated when around 50-60% covered;
- if the device is not activated, progressively reduce the calibration of the pressure switch;
- if the device is activated too early, increase the calibration.

TEMPERATURE AND HUMIDITY PROBE

U I A

The figure shows the optional temperature and humidity probe.
If having to replace the probe, release the white plastic cover by pressing point (A) with a screwdriver or a pointed object; lift the cover (B) to access the fastening screws (C) and the terminals (D).

For the probe electrical connection use a shielded cable; the connections to the terminals on the board are shown on the wiring diagram.



SERVOMOTOR AND HOT WATER VALVE

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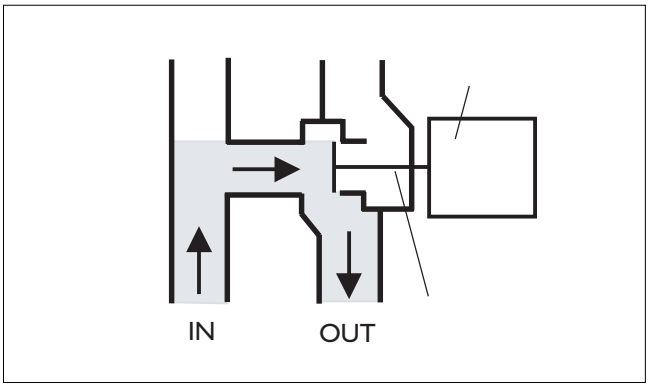
WARNING: Disconnect power before working on the servomotor
On the units with **ACCURATE** controllers the position of the servomotor is proportional to the control voltage, between 0 and 10 Vdc. The servomotor stops:
- automatically at the end of its travel;
- in the position of equilibrium, corresponding to the control voltage;
- in the current position, when cutting off power.

OPERATION OF THE MVX57 - 0-10V SERVOMOTORS
The opening of the valve can be controlled by checking the position using the indicator located on the top of the servomotor

EMERGENCY MANUAL OPERATION
The valve can be operated manually, in the event of faults to the servomotor or the control system, using the manual control knob located near the servomotor.



TOTAL UNIT POWER INPUT

Vers.		B		R		H		T		Main Switch	
mod.	V/ph/Hz	kW	FLA	kW	FLA	kW	FLA	kW	FLA	Amp	Power.
07	400/3N/50	2,47	7,95	6,47	25,45	4,72	17,75	6,47	25,45	80	6
10	400/3N/50	3,22	9,85	7,22	27,35	5,47	19,65	7	27,35	80	6
15	400/3N/50	5,02	18,1	13,02	53,1	8,77	23,6	12,58	53,1	80	10
18	400/3N/50	5,66	17,8	13,66	52,8	9,41	23,3	13,22	52,8	80	10
20	400/3N/50	7,65	22,3	16,65	35,3	11,4	27,8	16,65	35,3	80	6
26	400/3N/50	8,35	24,3	17,35	37,3	12,1	29,8	17,35	37,3	80	6
29	400/3N/50	10,55	29,3	19,55	42,3	14,3	34,8	19,55	42,3	80	10
39	400/3N/50	18,3	50,4	33,3	72,4	22,05	55,9	33,3	72,4	80	16
30	400/3N/50	16,04	48,2	31,04	70,2	19,79	53,7	31,04	70,2	80	16
40	400/3N/50	18,5	53,4	33,5	75,4	22,25	58,9	33,5	75,4	80	16
50	400/3N/50	22,3	63,4	37,3	85,4	26,05	68,9	37,3	85,4	100	25
55	400/3N/50	20,8	60	38,8	86	26,8	68,7	38,8	86	100	25
60	400/3N/50	22,8	64	40,8	90	28,8	72,7	40,8	90	100	25
70	400/3N/50	27,1	74	45,1	100	33,1	82,7	45,1	100	100	25

B = cooling only

R = cooling only + heaters

H = cooling only plus humidifier / dehumidification

T = complete version (cooling only + heaters + humidifier/dehumid.)

POWER INPUT OF THE INDIVIDUAL COMPONENTS

		Centrifugal fans					Radial fans					
Mod	V/ph/Hz	n°	kW	OA	FLA	LRA	n°	Volt	kW	OA	FLA	LRA
07	230/1/50	1	0,5	-	2,85	-	1	230/1/50	0,44	-	2,6	-
10	230/1/50	1	0,5	-	2,85	-	1	230/1/50	0,44	-	2,6	-
15	230/1/50	2	0,5	-	2,85	-	2	230/1/50	0,44	-	2,6	-
18	230/1/50	2	0,5	-	2,85	-	2	230/1/50	0,44	-	2,6	-
20	400/3N/50	1	2,4	-	7,3	-	1	400/3N/50	2,2	-	4,9	-
26	400/3N/50	1	2,4	-	7,3	-	1	400/3N/50	2,2	-	4,9	-
29	400/3N/50	1	2,4	-	7,3	-	1	400/3N/50	2,2	-	4,9	-
39	400/3N/50	1	4	-	11,7	-	2	400/3N/50	1,9	-	4,9	-
30	400/3N/50	1	4	-	11,7	-	2	400/3N/50	1,9	-	4,9	-
40	400/3N/50	1	4	-	11,7	-	2	400/3N/50	1,9	-	4,9	-
50	400/3N/50	1	4	-	11,7	-	2	400/3N/50	1,9	-	4,9	-
55	400/3N/50	1	6,5	-	20	-	3	400/3N/50	1,9	-	4,9	-
60	400/3N/50	1	6,5	-	20	-	3	400/3N/50	1,9	-	4,9	-
70	400/3N/50	1	6,5	-	20	-	3	400/3N/50	1,9	-	4,9	-

values for individual fan

		Electric heaters			
Modelli	V/ph/Hz	n°	kW	OA	FLA
07 - 10	230/1/50	2	4	17,5	-
15 - 18	230/1/50	2	8	35	-
20 - 26 - 29	400/3N/50	3	9	13	-
39 - 30 - 40 - 50	400/3N/50	5	15	22	-
55 - 60 - 70	400/3N/50	6	18	26	-

		Modulating humidifier				
models	**V/ph/Hz**	**n°**	**kg/h**	**kW**	**OA**	**FLA**
07 - 10	230/1/50	1	3	2,25	9,8	-
15 - 18	400/3N/50	1	5	3,75	5,5	-
20 - 26 - 29	400/3N/50	1	5	3,75	5,5	-
39 - 30 - 40 - 50	400/3N/50	1	5	3,75	5,5	-
55 - 60 - 70	400/3N/50	1	8	6	8,7	-

		Compressors				
models	**V/ph/Hz**	**n°**	**kW**	**OA**	**FLA**	**LRA**
07	400/3N/50	1	1,84	3,5	5,1	32
10	400/3N/50	1	2,72	5	7	46
15	400/3N/50	1	4,02	7,8	12,4	65,5
18	400/3N/50	1	4,66	8,3	12,1	74
20	400/3N/50	1	5,25	10	15	101
26	400/3N/50	1	5,95	12,2	17	123
29	400/3N/50	1	8,15	15,3	22	127
39	400/3N/50	1	10,3	17,8	27	167
30	400/3N/50	2	4,02	7,8	12,4	65,5
40	400/3N/50	2	5,25	10	15	101
50	400/3N/50	2	7,15	14,5	20	123
55	400/3N/50	2	7,15	14,5	20	123
60	400/3N/50	2	8,15	15,3	22	127
70	400/3N/50	2	10,3	17,8	27	167

values for individual compressor

MAINTENANCE

U I A

This section, aimed above all for the end user, is extremely important for the correct operation of the appliance.
Just a few operations completed scrupulously and regularly will avoid serious damage to the components and expensive repairs by specialist personnel.
The maintenance instructions are simple and do not require specific technical knowledge of air-conditioning.
The purpose of this chapter is to assist and guide the user and avoid having to unnecessarily call out specialist personnel.

The maintenance operations can be summarised as follows:
- Clean the air filter.
- Check and clean the condenser coils
- Check the water-cooled condensers for fouling.
- Check and clean the drains.
- Check the drive belts.
- Check the humidification system.
- General examination of the overall operation of the appliance.
- Visual check of the condition of the pressurised containers.

Cleaning the air filter
Authorised personnel: maintenance mechanic
Checks:
The gradual fouling of the filters reduces the flow-rate of the conditioned air, with a consequent reduction in cooling capacity.
In the direct expansion units, a reduction in the air flow-rate may cause the activation of the low pressure switch and/or cause serious damage to the compressor.
This can be avoided by the periodical cleaning of the filters.
The frequency at which the filters must be checked exclusively depends on the amount of dust in the environment.
In any case, the following are recommended:
- Every week check that the filters are clean
- Every two weeks clean the filters with a vacuum cleaner
- Every month wash the filters with soapy water
- Every 6 months replace the filters.

It is clear that the recommended times are purely indicative, and in some cases it may be necessary to increase the frequency of the checks and maintenance operations.
These operations must be carried out with the unit off and after having made sure that the appliance is disconnected from the power supply.

Checking and cleaning the condenser coils
Authorised personnel: maintenance mechanic
Checks:
In the hotter period, when the unit operates at maximum capacity, the condensing coils must be able to offer the maximum heat exchange.
Normally installed outside or communicating with the outside, these may pick up dirt such as paper, dry leaves and dust, thus reducing the heat exchange.
Make sure that this situation does not arise.
Failure to perform maintenance will cause the activation of the high pressure switch and the unit to shutdown.
Frequently check the condition of the heat exchanger during the poplar pollination period or the autumn (falling leaves).
Remove any objects accumulated on the coil and wash with a jet of water.
These operations must be carried out with the unit off and after having made sure that the appliance is disconnected from the power supply.

Checking the water-cooled condensers for fouling
Authorised personnel: maintenance mechanic
Checks:
To check the water-cooled condensers for fouling, simply check the water inlet and outlet temperature and compare it against the condensing temperature.
Normally, for good heat exchange, the difference between the water outlet temperature and the condensing temperature must be 5.8°C.
Increases in these values, over time, indicate a reduction in efficiency and consequently the fouling of the condenser.
The condenser is cleaned by chemical washing and must be performed by specialist personnel.
This operation must be carried out with the unit off and after having made sure that the appliance is disconnected from the power supply).

Checking and cleaning the drains
Authorised personnel: maintenance mechanic
Checks:
All the water drains (humidifier and condensate) must ensure perfect drainage, to avoid flooding in the room.
When the humidifiers drain the water, they discharge a quantity of lime scale that depends on the hardness of the supply water.
This lime scale may accumulate in the bottom of the drain hose and block the flow of water.
If cleaning is required, add ordinary descaler to the section of circuit involved.
This operation must be carried out with the unit off and after having made sure that the appliance is disconnected from the power supply.

Checking the drive belt
Authorised personnel: maintenance mechanic
Checks:
On the units with fans coupled to the electric motor by pulleys and drive belts, after a certain number of operating hours the belt may become loose, sliding on the pulleys and causing excessive wear.
This situation, if it persists, causes overheating and consequently the breakage of the belt.
Loosening can be resolved using the special belt tightener fitted on the appliance (this operation must be carried out with the unit off and after having made sure that the appliance is disconnected from the power supply).
Check the tension of the drive belts once a month.
Avoid excessively tightening the belts, as this may cause damage to the bearings.

General examination of operation
Authorised personnel: system supervisor
Checks:
This is a general examination aimed at comparing the operation of the appliance with the last check performed.
Consequently, any differences in the operating characteristics over time can be highlighted.
A detailed and periodical visual check of the appliance and general cleaning are always important to ensure correct operation.
The above-mentioned operations can in general be performed once a month.
Naturally, in special situations and specific installations the frequency may change.
A well maintained system is unlikely to cause disruptions and stoppages to the production cycles.

Visual check of the condition of the pressurised containers
Authorised personnel: system supervisor
Checks:
Check the condition of the pressurised containers at least once a year (if these are fitted).
It is very important to check that rust does not form on the surface, that there is no corrosion and that there are no visible deformations.
If not controlled and stopped, surface oxidation and corrosion will over time cause a decrease in the thickness of the container and a consequent reduction in its mechanical strength.
Protect with paint and/or corrosion proofing products.
In the event of visible deformations, stop the unit and contact the nearest service centre.

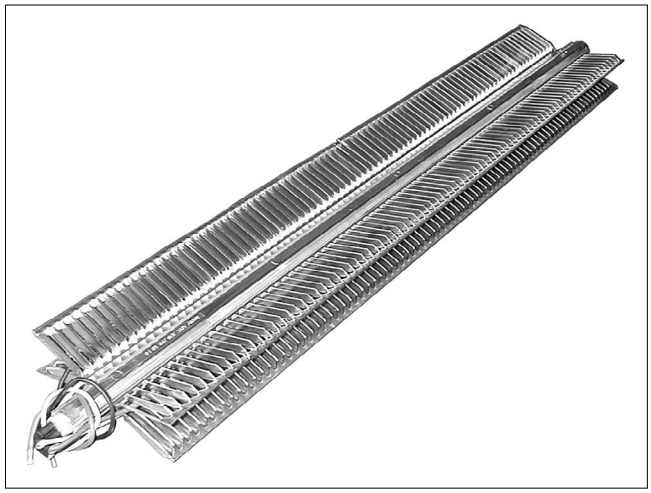
ELECTRIC HEATERS

The overall power of the electric heaters is divided into a number of elements, each with a power of 2/3/4 kW.
The colour of the wires on each element has the following meaning:

- BLACK wire = low power element (0.7/1/1.3 kW);
- WHITE wire = high power element (1.3/2/2.7 kW);
- RED wire = common.

The wires for each element are connected to contactors M5 and KM6 on the electrical panel so as to balance the load between the phases and create three stages of power (see the wiring diagrams on the unit).

If having to replace the electric heaters, disconnect power to the air-conditioner and wait until the heating elements have cooled down.
After having replaced the heaters, make sure the earth is connected.



TIGHTENING THE DRIVE BELTS U I A

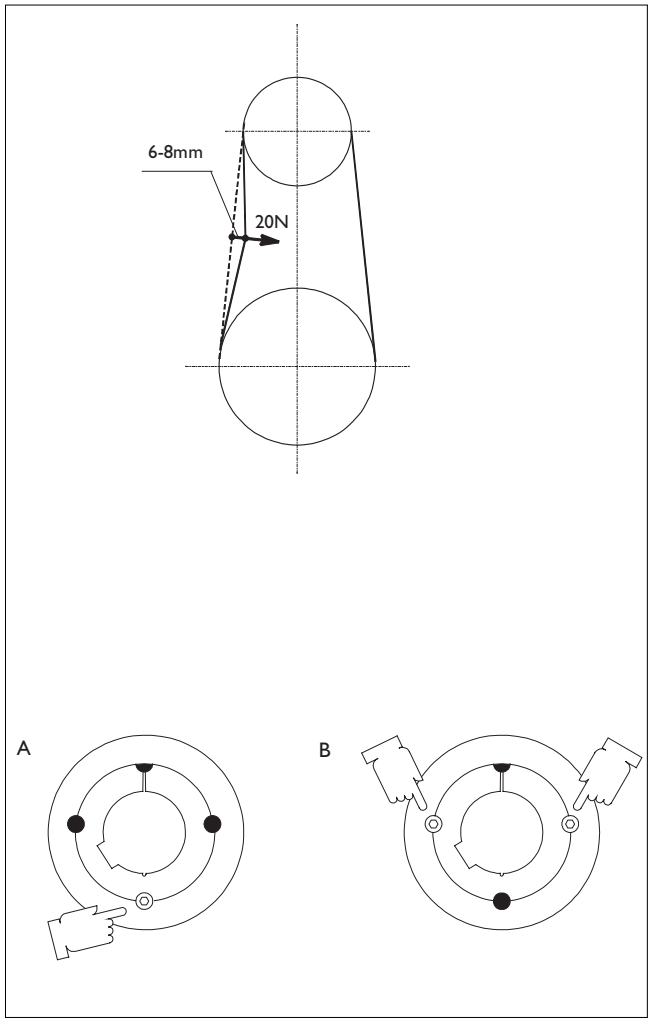
In the versions from frame 3 upwards, the fans in the standard version are centrifugal with forward blades and belt drive.
A required periodical maintenance operation (at least once a year) involves having specialist personnel check the correct tension of the belt.
To check the tension, proceed as follows: apply a perpendicular force of around 20 N (2 kg) to the centre of the belt (between the 2 pulleys).
The belt must have a deformation of around 6-8 mm.
If this is not the case, adjust the tension using the worm screw located on the slide that supports the electric motor.
Overly tight belts will cause unbalanced transmission.
Too loose belts, on the other hand, will cause the motor to overheat and excessive power consumption.

DRIVE PULLEYS

Below is a description of how to assemble and dismantle the pulleys if these require replacement or repair.

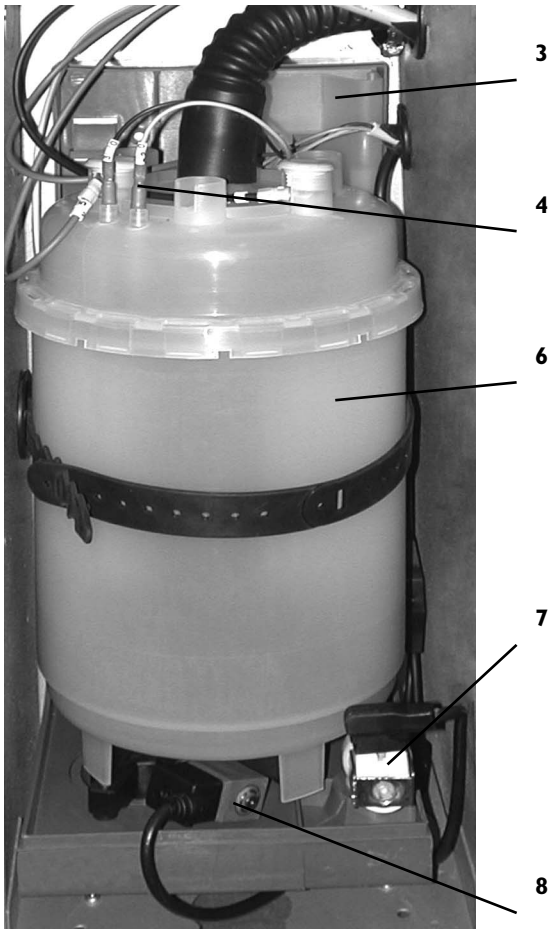
Dismantling
Take out the 2 safety screws and remove the pulley from the elastic ring
See Fig. A

Assembly
Slide the elastic ring onto the motor pin. Insert the pulley on top, then tighten the fastening screws
See Fig. B

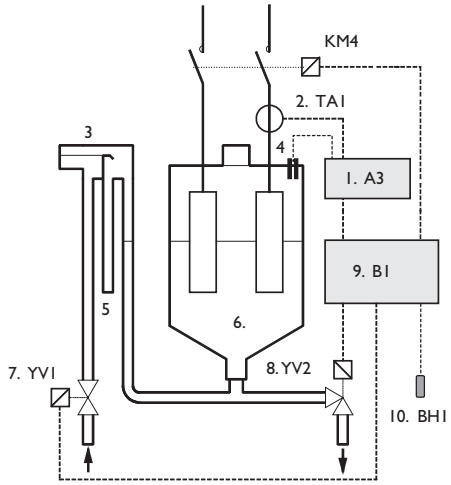


SYSTEM COMPONENTS

Upon request, the air-conditioning unit can be fitted with an immersed electrode humidifier (versions D and H).



1 Humidifier interface board: A3; (inside the electrical panel).
2 Current transformer TA1 (inside the electrical panel) for measuring the current input of the steam cylinder.
3 Water fill tank.
4 High water level electrodes in the steam cylinder.
5 Overflow pipe (BEHIND THE CYLINDER).
6 Boiler cylinder (or steam cylinder).
7 Water fill solenoid valve: YV1.
8 Cylinder drain solenoid valve: YV2.
9 Microprocessor control board: A1.
10 Temperature and humidity probe: BH1.



HUMIDIFIER OPERATING PRINCIPLE

In the immersed electrode humidifier, the current that runs between the electrodes, through the water contained in the boiler cylinder, generates the heat required to boil the water.
By controlling the level of the water and the concentration of salts inside the steam cylinder (6) using the fill (7) and drain (8) solenoid valves, the amount of current delivered can be regulated, and measured using a current transformer (2).
When steam production is required, the humidifier contactor CU closes (see the wiring diagram) so as to supply power to the immersed electrodes.
When the current falls below the set value due to the lowering of the water level, the fill valve (7) is opened.
The drain valve (8) is activated cyclically, depending on the characteristics of the supply water, so as to maintain the optimum salt concentration inside the cylinder (6).
The only periodical maintenance operations required are the inspection and cleaning of the parts in the steam production unit.
The operations indicated below should be performed annually, preferably before shutting down the unit in summer.

STEAM CYLINDER

The steam cylinder requires periodical cleaning to remove the scale deposits that form on the surface of the electrodes and the flakes that deposit on the filter at the base of the cylinder.
To remove the cylinder, proceed as follows:

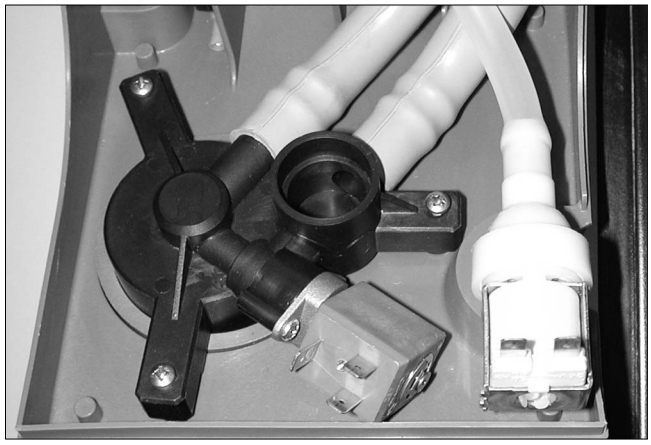
- completely drain the water from the boiler; to do this, see the paragraph "MANUAL CONTROL" in the EVOLUZIONE controller instruction manual;
- disconnect the power supply by opening the main switch on the electrical panel;
- remove, from the top of the cylinder, the hose that carries the steam to the distributor;
- disconnect the power connections by unscrewing the knobs on the cable ends and remove the plugs from the level electrodes;
- release the strap that secures the cylinder to the unit;
- slide the cylinder out upwards.

The steam cylinder can be reused a number of times after cleaning the electrodes: if, however, the wear on the grills of electrodes is such that these cannot be regenerated, they must be replaced.
The only spare part is the complete cylinder body (with filter included).

FILL AND DRAIN ASSEMBLIES

To ensure the correct operation of the humidifier, the supply/fill and drain assemblies need to be inspected periodically.
Proceed as follows:

- completely drain the water from the boiler using the MANUAL CONTROLS on the controller A1;
- disconnect the power supply by opening the main switch on the electrical panel;
- remove the fill pipe from the 3/4 GAS fitting on the fill solenoid valve;
- remove and clean the filter located inside the solenoid valve fitting;
- dismantle the drain assembly (shown in Figure 13), clean the pipes and remove any flakes of scale from the cup-drain trap.



TROUBLESHOOTING U I A

Troubleshooting is simplified by the information provided by the microprocessor controller: if an alarm is signalled, refer to the control panel instruction manual.

If required, contact the nearest service centre, indicating the probable causes of the fault.

FAULT	CAUSE	SOLUTION
THE AIR-CONDITIONER DOESN'T START	The electrical panel is not powered	Check for voltage; close the main switch.
	The auxiliary circuits are not powered	Check that the cutout IM in the auxiliary circuits is armed. Check the fuse on the main board.
	The control panel does not start the air-conditioner.	Check for DC power.
ROOM TEMPERATURE TOO HIGH	The parameter settings on the microprocessor controller are not correct.	See the controller manual.
	The air flow-rate is too low or null.	See "LOW OR NO AIR FLOW".
	The probe isn't working.	Check the electrical connections and the configuration of the controller.
	Thermal load higher than expected.	Check the thermal load in the room being air-conditioned.
	Three-way valve not working.	Check the electrical connections to the valve servomotor. Open the valve using the manual control knob.
	No flow of chilled water.	Check for the flow of chilled water; check that any on-off valves outside of the unit are open.
	High temperature of the chilled water.	Check the operation of the water chiller.
	The compressor/compressors don't start, despite being activated by the controller.	See "THE COMPRESSOR/COMPRESSORS DON'T START".

FAULT	CAUSE	SOLUTION
ROOM TEMPERATURE TOO LOW	The parameter settings on the microprocessor controller are not correct.	See the controller manual.
	The power of the heaters is not sufficient or the heaters aren't working.	Check that the heater thermal cutout is armed. Check the power supply to the electric heaters. If the heater safety thermostat is activated, resolve the causes and reset the alarm.
	The hot water coil isn't working correctly.	Check the flow-rate and the temperature of the water hot. Check the operation of the control valve and the servomotor.
	The hot gas post-heating system isn't working during the dehumidification plus post-heating phase	Check the operation of the hot gas three-way valve; Check the operation of the compressor used for post-heating: in this case, see "THE COMPRESSOR/COMPRESSORS DON'T START".
	The three-way valve in the chilled water circuit is stuck in the open position.	Close the valve using the manual control knob and replace the servomotor.
AMBIENT HUMIDITY TOO HIGH	The parameter settings on the microprocessor controller are not correct.	See the controller manual.
	Latent load higher than expected	Check and calculate the latent load; check the flow-rate and the conditions of the outside air; check the inflow of outside air.
	The compressor isn't working during the dehumidification phase.	See "THE COMPRESSOR/COMPRESSORS DON'T START".
	The dehumidification valve doesn't close.	Check the operation of the solenoid valve that controls the dehumidification circuit.
	The control system isn't working.	See the controller manual; check the operation of the panel and/or the probe.
	The chilled water is not cold enough to dehumidify (energy saving and twin cool units)	Lower the chilled water temperature until there is condensation on the surface of the coil

FAULT	CAUSE	SOLUTION
AMBIENT HUMIDITY TOO LOW	The parameter settings on the microprocessor controller are not correct.	Check the room temperature setting (see the control panel manual).
	Latent load lower than expected.	Verificare la consistenza del carico latente.
	The humidifier isn't working.	Check the pressure of the supply water; Check the operation of the manual control system and the steam production unit (see the control panel manual)
	The control system isn't working.	See the control panel manual; check the operation of the panel and/or the probe.
LOW OR NO AIR FLOW	The fans are not powered.	Check the power supply to the fans.
	The filters are blocked (possible activation of the dirty filter alarm).	Clean the filter using a vacuum cleaner after having shaken off the larger particles of dust. Replace the filter if excessively clogged. Check the correct calibration of the dirty filter differential pressure switch F4.
	Obstructions to the air flow.	See the paragraph on AIR DISTRIBUTION
	The fan thermal cutout has tripped.	Check the resistance of the fan windings; after resetting, measure the voltage and power input.
	EC radial fan speed set too low	
	Excessive pressure drop in the air distribution system.	Check the sizing of the air distribution system (ducting, false-ceiling, underfloor plenum, grills)
HEATER SAFETY THERMOSTAT ACTIVATED	Insufficient air flow-rate	See "LOW OR NO AIR FLOW".
	Thermostat connection wire cut or broken	Check the continuity of the connection from the safety thermostat to the control system.
	Faulty thermostat	Replace the heater safety thermostat.

FAULT	CAUSE	SOLUTION
HIGH COMPRESSOR DISCHARGE PRESSURE	A) Air or incondensable gas in the refrigerant circuit, seen by the presence of bubbles, despite measuring a high subcooling.	Empty and recharge the circuit.
	B) Insufficient air flow-rate to the remote heat exchanger or air too hot	Check the operation and the correct direction of rotation of the fans on the outdoor heat exchanger. Check that the exchanger is not dirty and remove any material that may be blocking it (leaves, paper, seeds, dust, etc.) with a jet of compressed air or with a brush; Check the outdoor unit for any obstacles to the flow of air and any recirculation of the cooling air; Check that the temperature of the cooling air does not exceed the design value.
	Insufficient water flow-rate to the condenser or water too hot.	Check the flow-rate, the pressure and the temperature of the cooling water in the closed circuit; Check the calibration and the operation of the pressure control valve.
	Excessive refrigerant charge; condenser partially flooded. Excessive subcooling of the liquid at the condenser outlet.	Remove refrigerant from the circuit.
	Valves on the high pressure side of the circuit partially closed.	Check the opening of the valves.
HIGH PRESSURE SWITCH ACTIVATED (high compressor discharge pressure)	The condensing pressure control system isn't working.	Check the operation of the condenser fans and the corresponding protection device; repair or replace the faulty fans; Check the calibration and the operation of the remote condenser fan pressure switch or the speed controller. (See CONTROLLING THE CONDENSING PRESSURE)
	The system is affected by an excessive discharge pressure	See "HIGH COMPRESSOR DISCHARGE PRESSURE".
LOW COMPRESSOR DISCHARGE PRESSURE	The condensing pressure control system isn't working (see the control panel manual).	Check the calibration and the operation of the condenser fan pressure switch or the speed controller;
	Excessive water flow-rate to the condenser or water too cold.	Check the temperature of the cooling water; Check the calibration and the operation of the pressure control valve (if fitted); Install a pressure control valve to manage the flow-rate of water according to the condensing pressure.
	Suction pressure too low	See "LOW COMPRESSOR SUCTION PRESSURE".

FAULT	CAUSE	SOLUTION
HIGH COMPRESSOR SUCTION PRESSURE	Thermal load higher than expected	Check the ambient thermal load; check, above all for intense dehumidification, the flow-rate and the conditions of the outside air; check the inflow of outside air.
	The system is affected by an excessive discharge pressure	See "HIGH COMPRESSOR DISCHARGE PRESSURE".
	Too much refrigerant in the circuit.	Remove refrigerant from the circuit
	Return of liquid refrigerant to the compressor intake	Check that the thermostatic valve superheating value is correct; check that the valve sensor bulb is not discharged and that it is correctly positioned, secured and insulated".a
LOW COMPRESSOR SUCTION PRESSURE (and possible defrosting of the coil)	Room temperature too low	See "ROOM TEMPERATURE TOO LOW".
	The air flow-rate is too low or null	See "LOW OR NO AIR FLOW".
	Liquid receiver outlet valve not completely open	Check the opening of the valve.
	Refrigerant filter blocked	Check that the thermostatic valve superheating value is correct; check that the valve sensor bulb is not discharged and that it is correctly positioned, secured and insulated".
	Insufficient refrigerant charge	Check the liquid subcooling at the condenser outlet; if necessary, restore the charge.
LOW PRESSURE SWITCH ACTIVATED (low compressor suction pressure)	Thermostatic valve not correctly calibrated or faulty	Check that the thermostatic valve superheating value is correct (around 5°C).
	Dewatering filter cartridge dirty	Check and if necessary replace the dewatering filter cartridge; the temperature difference measured upstream and downstream of the filter must be less than 2°C.
	The system is affected by an excessively low discharge pressure	See "LOW COMPRESSOR DISCHARGE PRESSURE".

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CLIMAVENETA
Home System

Dé Longhi Group - Via L. Seitz, 47 - 31100 Treviso (Italia)