INSTALLATION, OPERATION & MAINTENANCE MANUAL

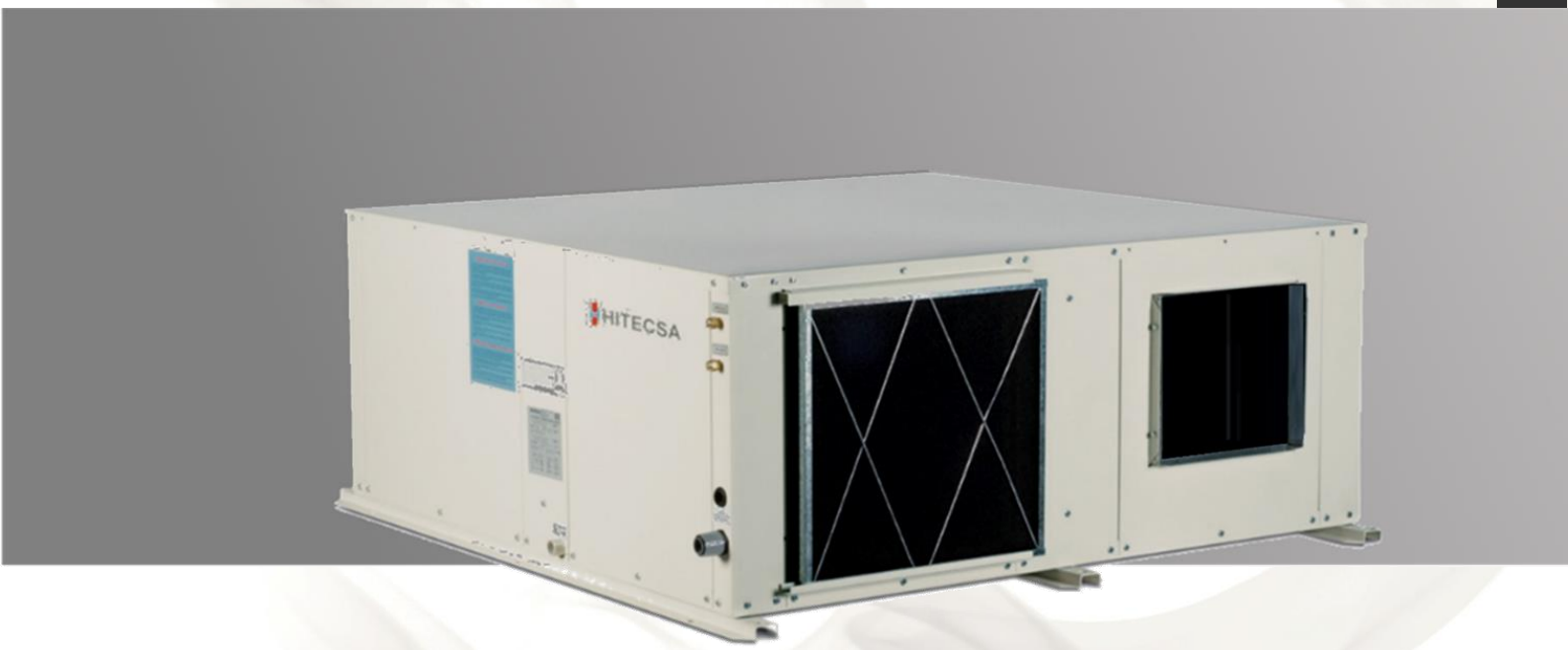
ACHIBA HE

PACKAGED AIR-AIR – COMPACT HORIZONTAL INVERTER UNITS

Models: 17 | 22 | 27

Cooling capacities: from 3.8 kW to 26.5 kW

Heating capacities: from 4.0 kW to 28.9 kW



HITECSA
COOL AIR

Thank you for trusting the Hitecsa Products. Our company has been offering the market an extended range of specialized units for air conditioning and cooling installations for over 35 years. Our approach is based on efficiency, flexibility and on practical solutions. This has been the hallmark of our product catalogue.

The versatility of our factory allows us to deliver solutions that can meet any requirement and we endeavour solving any problem that may arise in designing and implementing air conditioning installations.

From all of us at Hiplus Aire Acondicionado, once again, thank you very much.

ACHIBA HE

INDEX

INTRODUCTION

Purpose of this Manual

This manual and any other instructive document attached as refrigeration lines design, electrical diagrams, etc. have been written to allow a correct installation, commissioning and maintenance of the unit. Therefore it is essential to read the instructions with due attention.
Verify that all the necessary information for the correct installation of the system is included in the manuals supplied with this unit and/or the rest of the indoor units, accessories, etc. Otherwise, the manufacturer declines any responsibility for any damage to persons, animals or things, as a result of improper use of the unit and/or failure to observe these instructions.
Should the stated data differ from one document to the other, the priority order of validity of the given documents will be: 1. Technical data plate of the unit. 2. IOM (the present document), 3. EDM, technical catalogue, 4. UM, user manuals.

Conservation of the Manual

This manual and the electric diagram of the unit must be retained and remain available to the operator for any further consultation.

Updating the Data

The continuous improvement in design and performance to which we are committed gives us the right to modify the specifications of our products without prior notice.

Electrical Supply

Check that the electrical network features are in accordance to data shown in the data nameplate of the unit.

Local Safety Regulations

Observe and analyse all possible causes of accidents that may arise in the place or places of installation of the units, check means and tools to use, etc. It is not possible to anticipate each and every one of the potential circumstances of danger in this manual. Respect the valid local security standards during installation.

Principles of Security on Installation

The unit is designed and built in a way that does not pose a risk to the health and safety of people. Appropriate solutions for the project have been adopted to eliminate the possible causes of risk in the installation.

Packaging and Replacement of Equipment

The material of the package (plastic bags, insulating materials, nails, etc.) is a potential source of danger. Consequently, it should be kept out of the reach of children and properly recycled according to the valid local safety regulations.
This product should not be mixed with household waste at the end of its life. Due to the refrigerant, oil and other components contained in this product, it must be dismantled by professional installers, all waste should be sent, according to its nature to recycling, composting or treatment plants, or to an authorized waste management agency in accordance with the current local legislations.

Utilization

The unit will only be used for the purpose it has been designed. Any other use does not imply any kind of liability or responsibility from the manufacturer.

Incorrect Operation

In case of breakdown or operation faults, turn the unit off.

INTRODUCTION

Periodic Inspections and Maintenance

Carry out periodic inspections to detect possible damaged or broken parts. If these parts are not repaired it could cause damage to people or material. Before executing any maintenance operation, switch the unit power supply off.
Make sure to leave the maintenance areas open. If these areas have to be invaded by the construction of air supply and/or lateral return ducts, verify that the design of the ducts allows the access to the fans and the replacement of the filters.
All operations shall be carried out in accordance with the local safety regulations.

Repairing Operations

The reparations shall always and exclusively be completed by trained personal authorized by the manufacturer using original spares. The safety devices of the unit could be affected due to the failure to comply with these warnings.

Modifications

The manufacturer will not respond to the warranty and to the possible damages of the unit in case of electrical and/or mechanical modifications. The unauthorized manipulation, reparation or modification of the unit will automatically invalidate the warranty.

Refrigerant

This product is hermetically sealed and contains R-410A which is a HFC fluorinated greenhouse gas.

REGULATIONS AND CERTIFICATIONS

ISO 9001 CERTIFICATION: HIPLUS AIRE ACONDICIONADO S.L., by endeavouring to always gain the maximum satisfaction from their customers, obtained the ISO 9001: Quality System for its design and production activities. That result shows our continuous determination to improve quality and the reliability of all our products. Our commercial activities, design, raw materials, production processes and after-sales service represent the means to reach our goal.

CE MARKING: Our products are CE marked according to the essential requirements of the applicable EC directives and their last modifications and comply with the national legislation of each country.

CE

SAFETY PRECAUTIONS

WARNING!

Before starting any installation, service or maintenance operation, turn the main power switch off in order to avoid electrical shock that might cause personal damages.

DANGER

• This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the appliance in a safe way and understand the hazards involved.

• In case of folding electrical panels, before folding them up in order to access to the interior of the machine, it is MANDATORY to disconnect the power supply hose from the electrical voltage, THE LINE MUST ALWAYS BE FREE OF VOLTAGE for this operation.

• Do not touch or adjust the safety devices inside any unit of the system. For repairs use only original spare parts and mount them properly in the same position where old parts were placed.

• The installation and maintenance of air conditioning equipment may be dangerous because the system is under pressure, some of its elements have high temperatures and include electrical components.

• Do not install the unit in an explosive atmosphere.

• Do not pierce or burn.

• Be aware that refrigerants might be odourless.

ATTENTION!

- Only qualified and trained service staff (technical service) is allowed to complete the installation, commissioning and carry out maintenance works. Unqualified personnel is authorised to complete basic tasks only such as cleaning and replacement of filters, etc.
- Prevent access to children so that they cannot play with the appliances.
- For every visit, all precautions must be taken into account: those recommended in the installation, operation and maintenance instructions, as well as the ones indicated in labels of the unit. Do not forget to strictly follow any other safety precautions.
- DO NOT introduce objects into the air inlets or outlets that can be drawn into the fan, people, etc.
- Use safety glasses, work gloves and any other necessary safety accessory.
- For brazing operations use a quenching cloth and make sure a fire extinguisher is available by your side.
- This product contains fluorinated greenhouse gases, its leakage can cause displacement of air and cause insufficient oxygen to breath.
  The decomposition of fluorinated gases when being burned due to e.g. brazing operations, may cause the existence of highly toxic and corrosive gases.

All safety recommendations must be followed carefully.

TECHNICAL SPECIFICATIONS

MOSAIC **ACHIBA HE**		17	22	27
ACHIBA HE	**CAPACITIES**			
COOLING MODE (1)				
Nominal Cooling Capacity (80rps)	kW	12.9	16.6	19.3
Nominal Power input (80rps)	kW	4.9	6.4	7.9
EER coefficient (80rps)	kW	2.60	2.57	2.42
Maximum Cooling Capacity	KW	17.75	20.35	26.26
Seasonal coefficient SEER	kW	3.56	3.54	3.52
Seasonal performance ηs,c	%	146.3	142.8	143.5
HEATING MODE (2)				
Heating capacity (Nom: 80rps)	kW	13.0	15.7	20.4
Power input (80rps)	kW	5.2	5.9	8.7
Maximum Heating capacity	kW	18.6	24.2	28.9
COP coefficient (80rps)	kW	2.52	2.37	2.35
SCOP coefficient	kW	3.23	3.21	3.20
Seasonal performance ηs,h	%	126	125.5	125.1
Refrigeration CIRCUIT				
Refrigerant type		R-410A		
Number of refrigeration circuits		1		
Power stages		Variable		
GWP (3)		2088		
Total refrigerant charge	kg	6.3		9.4
Environmental impact (CO2 eq.)	Tn (CO2)	13		20
Compressor				
Compressor type		SCROLL DC INVERTER		
Number of compressors		1		
Oil type		PVE oil		
Oil volume	Liters	1.4	1.7	2.3

(1). Calculated according to the UNE-EN-14511 standard, for indoor temperature conditions of 27ºC B.S. / 19ºC B.H. and 35ºC outdoor temperature. Frequency (rps) of the compressor as stated above.
Nominal consumption in the cooling mode of the entire equipment (compressors and fans) in nominal conditions, calculated according to the EN-14511 standard.
The seasonal coefficient for the cooling season (SEER) has been calculated according to the EN-14825 standard.
The seasonal area cooling performance ratio (ηs,c) has been calculated according to the (EU) 2281 regulation.

(2). Nominal heating capacity calculated according to the UNE-EN-14511 standard for indoor temperature levels lower than 20ºC and outdoor temperature levels of 7ºC B.S. / 6ºC BH. Frequency of the compressor as stated above.
Nominal consumption in the heating mode of the entire equipment (compressors and fans) in nominal conditions, calculated according to the EN-14511 standard.
The seasonal coefficient for the heating season (SCOP) has been calculated according to the EN-14825 standard.
The seasonal area heating performance ratio (ηs,c) has been calculated according to the (EU) 2281 regulation.

(3). GWP: Global warming potential (climatic) of 1 kg of greenhouse gas relative to 1 kg of CO2, calculated over a period of 100 years.

TECHNICAL SPECIFICATIONS

MOSAIC **ACHIBA HE**		17	22	27
OUTDOOR FAN				
Type		Radial with EC Motor		
Quantity		1		
Nominal air flow	m3/h	5600	6200	7500
Minimum air flow	m3/h	1700	1900	2300
Available static pressure	Pa	50		
Absorbed power input	kW	0.9	1.2	2.2
Maximum available pressure	Pa	715	274	202
Diameter		400		
Maximum power input	kW	2.4		3.3
Maximum operation current	A	3.7		5.2
INDOOR FAN				
Type		Radial with EC Motor		
Quantity		1		
Diameter	mm	400		
Nominal power input	kW	2.4		
Maximum operation current	A	3.7		
Maximum air flow	m3/h	3600	4600	5600
Average air flow	m3/h	2800	3600	4400
Minimum air flow	m3/h	2300	3000	3700
Std available pressure	Pa	100	120	
Absorbed power input	kW	0.40	0.70	0.90
Max. available static pressure	Pa	1176	838	570
DIMENSIONS				
Length	mm	1810		2060
Width	mm	1775		1775
Height	mm	640		675
WEIGHT				
Net Heat pump	kg	360	420	460
SOUND POWER LEVEL				
Unit Lw	dBA	83	85	87
Outdoor discharge Lw	dBA	82	84	86
Indoor discharge Lw	dBA	74	76	81

Optional “low sound level”

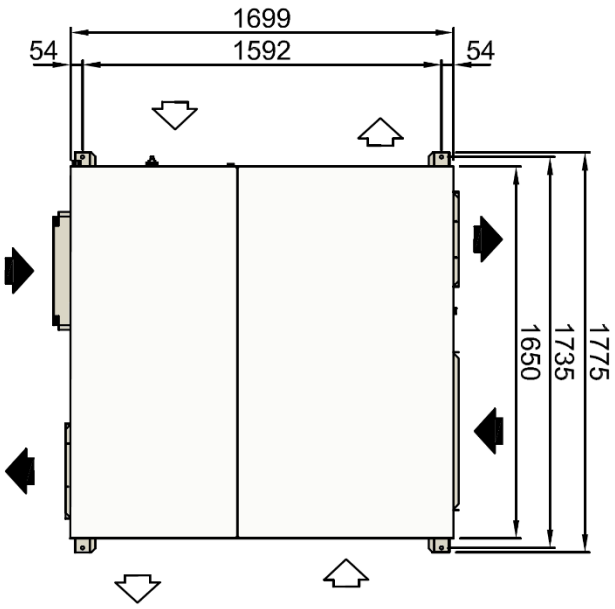
SOUND POWER LEVEL				
Unit Lw	dBA	77	79	83
Outdoor discharge Lw	dBA	74	76	78
Indoor discharge Lw	dBA	74	76	81

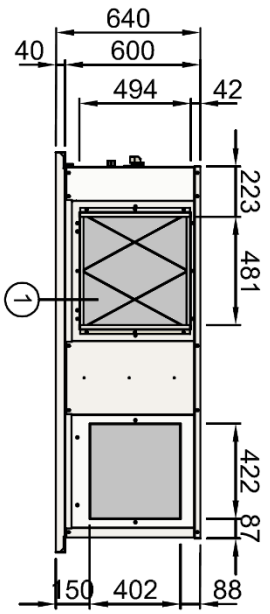
Important note:
The ‘low sound level’ option implies a decrease of the unit's capacity and efficiency by 3% to 6% from the nominal values. See below:

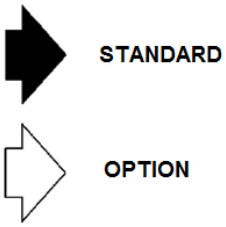
MOSAIC **ACHIBA HE**		17	22	27
Nominal Cooling Capacity (80rps)	kW	12.2	15.6	18.2
Nominal Power input (80rps)	kW	4.8	6.3	7.8
EER coefficient (80rps)	kW	2.52	2.48	2.34

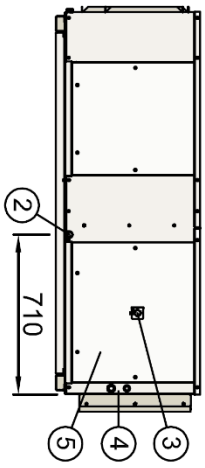
DIMENSIONS

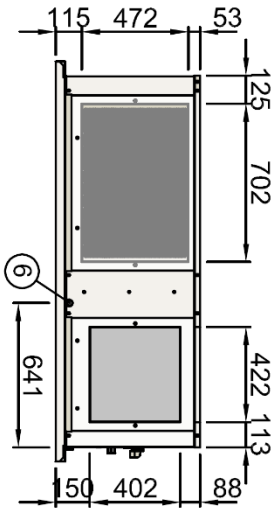
MODELS 17 – 22









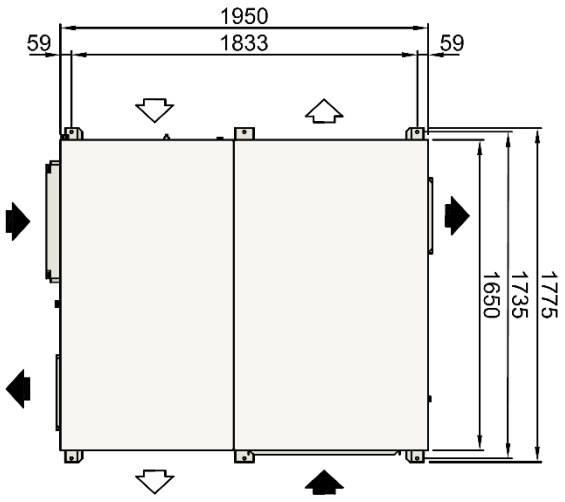


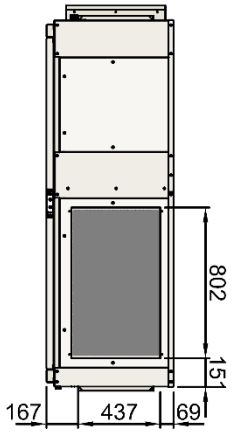
Legend:
1. Electrical control
2. Air filter
3. Male ∅ 3/4'' outdoor drain outlet
4. Male ∅ 3/4'' indoor drain outlet
5. Main switch
6. Power connection inlet

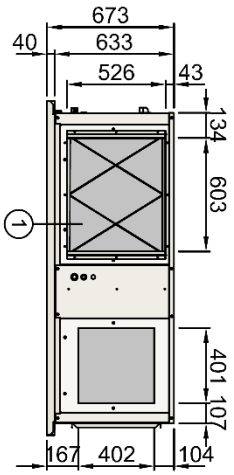
Opening profile 25 mm
Support point ∅15

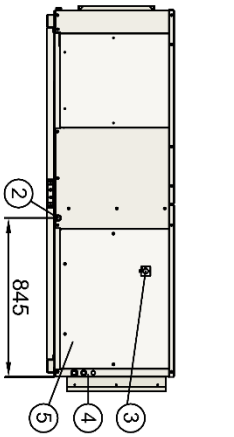
DIMENSIONS

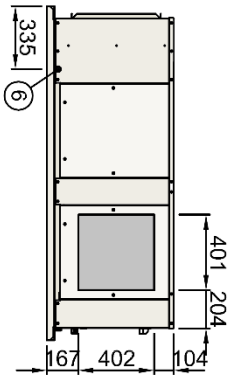
MODEL 27

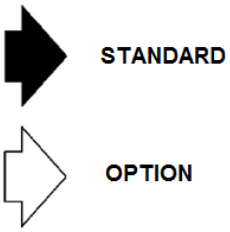










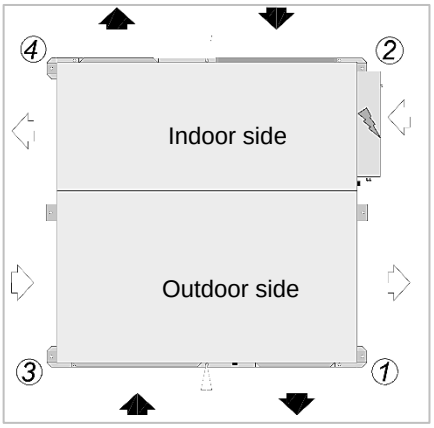


Legend:
1. Electrical control
2. Air filter
3. Male ∅ 3/4'' outdoor drain outlet
4. Male ∅ 3/4'' indoor drain outlet
5. Main switch
6. Power connexion inlet

Opening profile 25 mm
Support point ∅15

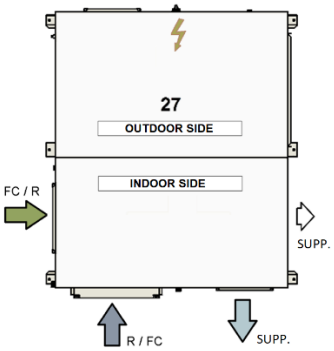
DISTRIBUTION OF WEIGHT (kg)

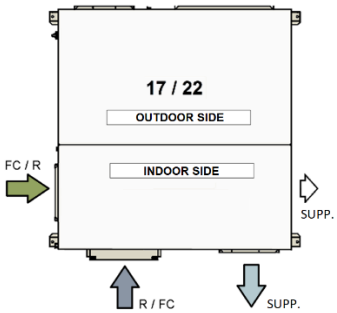
MODEL	1	2	3	4	TOTAL
17	87	73	125	75	360
22	105	75	109	111	400
27	108	95	128	129	460



FREECOOLING (OPTION)

An embeddable Free-cooling is available as an option. Its function is to use the outdoor air for air conditioning when it is favorable.



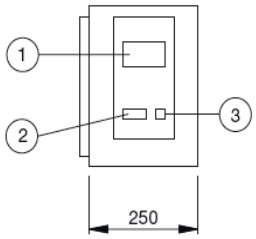


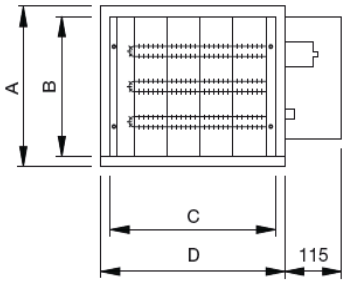
R: Return air.
FC: Free-cooling (Renewed air).
SUPP.: Impulsion/Supply air.

The position of the electric box is different compared with the standard model (please contact Hitecsa).

ELECTRICAL BACK-UP HEATING RESISTANCES FOR THE DEFROST PROCESS (OPTION)

One stage coils that comprise nickel-chrome wire resistances fitted in a frame provided with separators. They are made of galvanized and bichromate steel plates and include a thermal protector. A contactor and a connection terminal box are included.





Legend:
1. Contactor
2. Connection terminal plugs
3. Thermal protector

DIMENSIONS (mm)

MODEL	A	B	C	D
17-22	370	330	353	395
27	370	330	398	440

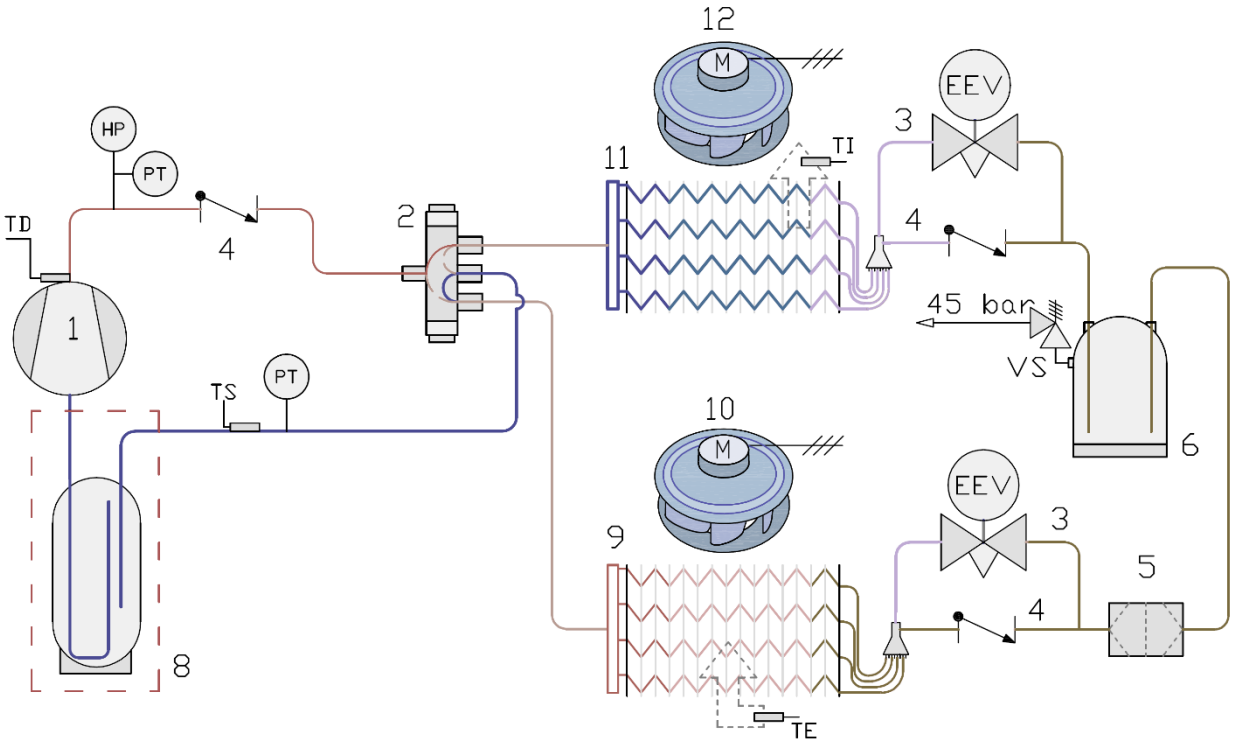
AIR QUALITY PROBE (CO_2) (OPTION)

A pGD or Mini pGD controller is required.

HEATING CABLE IN THE CONDENSATE DRAIN TRAY (OPTION)

This option is compulsory in case of operation at low outdoor temperatures to prevent the condensate water from freezing that might block drainage and cause damages to the coil.

REFRIGERATION DIAGRAM



1 Compressor
2 4-way valve
3 Electronical expansión valve
4 Check valve
5 Filter
6 Liquid tank
8 Suction accumulator
9 Outdoor coil
10 Outdoor fan
11 Indoor coil
12 Indoor fan

HP	High pressure switch
PT	Pressure transducer
TD	Discharge temperature
Ts	Suction temperature
TI.	Indoor air temperature
TE.	Outdoor air temperature

INSTALLATION

INSPECTION AT RECEPTION

- It is advisable to examine the equipment carefully upon reception.
- Check that the equipment has not been damaged during transport and that it is complete with all the parts specified in the order and/or the options stated in the order. If this is not the case please contact the transport company immediately (within 48h).
- Verify the correct voltage stated on the nameplate and make sure it is in accordance with the local power supply.
- In case of any flaw or anomaly detected, please contact HITECSA.

RIGGING

- Before moving the unit, make sure that all panels are fixed properly.
- Raise and put the equipment down carefully.
- Do not tilt the unit more than 15 degrees during transportation (Fig. 2).
- Always transport the unit in its original packaging to the place of installation.
- All units come with a particular rigging diagram of that model similar to the one shown below. Be sure to hoist the machine through the points indicated in the diagram.
- Make sure that the unit is balanced, stable and without any deformations during lifting operations.

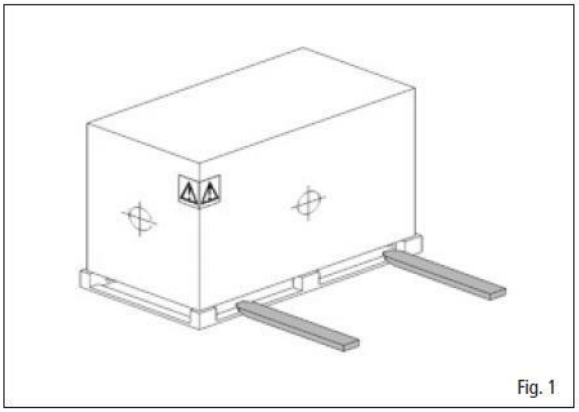


Fig. 1

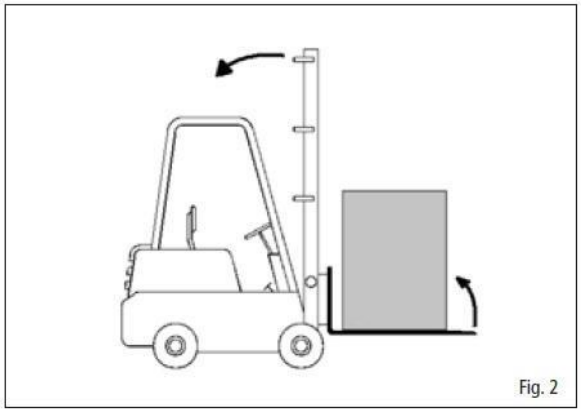


Fig. 2

STORAGE

If the equipment is going to be stored before the installation, please follow the following instructions in order to avoid damages, corrosion or deterioration:

- Move it carefully.
- Do not place the machine in places exposed to ambient temperatures above 50 ºC and preferably keep the unit away from direct sunlight.
- Avoid placing the unit with plastic wrapping protection under the sun as the pressure of the circuits could reach values that could lead to the activation of the safety valves.

  Moreover, with decreasing temperatures water condensation may occur inside the machine and the plastic wrap.
- Avoid placing other objects on top of the unit (unless this is done within the limits of the overlap planes indicated on the packaging, etc. Follow these indications).
- Avoid prolonged storage before installation, water penetration, dust and objects in general due to invasion or biological, meteorological and/or human impacts.
- Minimum storage temperature: -10 ºC
- Maximum relative humidity: 90%.

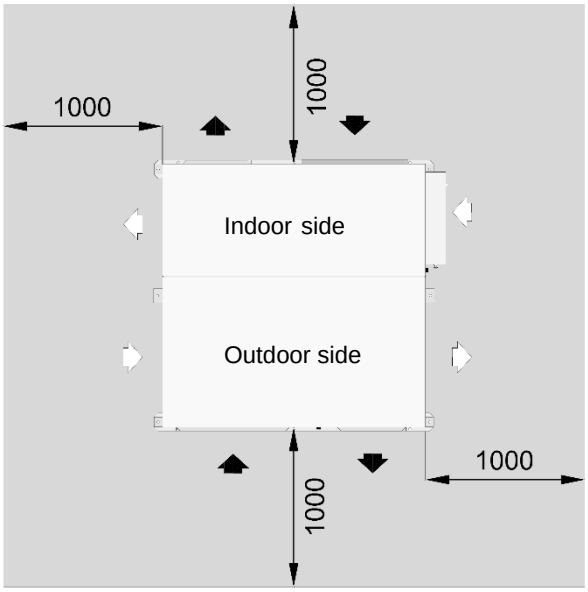
INSTALLATION SITE

- Read and comply with the local rules and regulations applying to the installation of air conditioning systems.
- Choose a clean place without dust nor debris.
- Respect the allocated service area prepared for the equipment.
- The unit can be installed on the ground or hung from the ceiling.
- Verify that the ground or the structure prepared for the equipment is strong enough to support its weight during operation.
- Install shock absorbers throughout the installation to prevent the transmission of noise and vibration.
- Check that the direction of the sound level will not annoy anybody.
- The standard version of this equipment has been designed for installation inside a building (with a roof). Please check with Hitecsa if you plan to expose the machine to weather conditions.

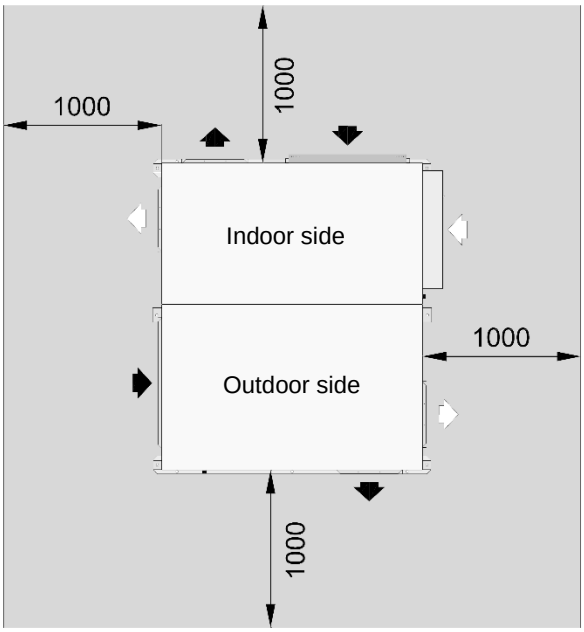
INSTALLATION

SERVICE AREA (mm)

Model 17-22



Model 27

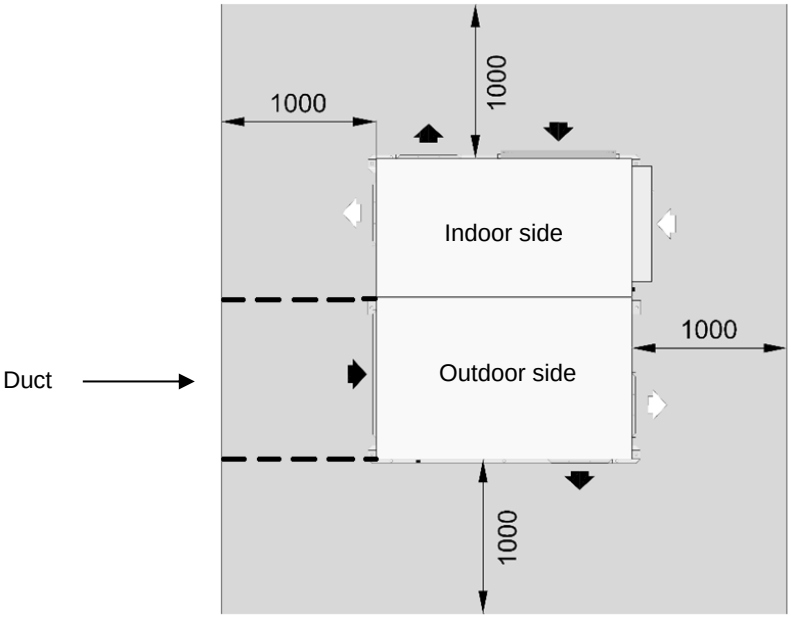


UNIT SETTLEMENT (kg)

- Make sure that the equipment is levelled correctly.
- The bed frame shall be strong enough to support the unit weight.
- Make sure that after settlement the unit drain is working properly.

DUCT AT THE AIR INLET (OUTDOOR SIDE) – 27 model only

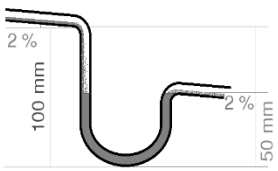
Should a duct be mounted at the air inlet of the outdoor side of the unit, that duct shall be removable on a 100 cm section to enable access to the components of the unit.



INSTALLATION

WATER DRAIN

- All the drain devices are prepared with a male 3/4" gas connection (ISO 228-1, BSPP).
- The unit is equipped as a standard feature with a condensate drain tray to avoid an excessive water accumulation in the indoor side and the outdoor side.
- The condensate drain pipe diameter shall be equal or larger than the unit connection depending on its length and inclination.
- If the drain line is exposed to air temperatures lower than 0 degrees, it is necessary to insulate it with thermal insulation material or to use electrical heating devices to prevent the water from freezing. Blocked water drainage by frozen water may cause damages to the coil.
- The drainage line shall be inclined by 2% minimum for proper water evacuation.
- It is convenient to install a drain trap with proper dimensions (see diagram) or a draining system with a condensate pump to avoid excessive water accumulation in the indoor side and the outdoor side.



AIR DUCTS

- The air duct dimensions will be determined according to the air flow and the available static pressure of the units.
- They shall be designed by qualified technicians. An incorrect design may reduce the unit's performance and may be a hindrance when access to the unit for maintenance operations is needed (in particular where there is only one possible access).
- Use ducts made of non-inflammable material in order to avoid any risk of fire as a consequence of the deflagration of gases. It is advisable to use insulated metal ducts.
- Use flexible conduits to connect air ducts to the unit so as to avoid vibration and noise transmission.

INSTALLATION

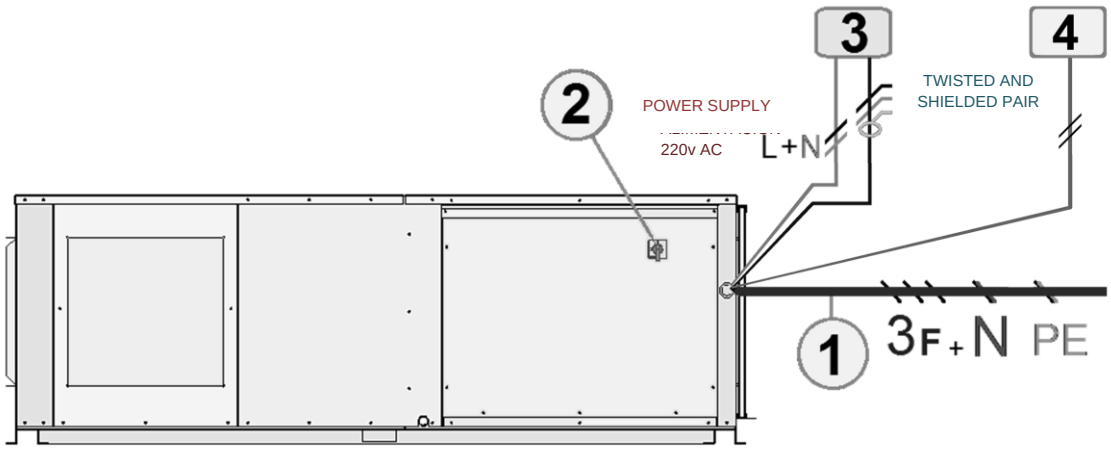
ELECTRICAL INSTALLATION

WARNING!

Turn the main power switch off before proceeding to any operation.

- The unit power supply shall be within 10% of volts indicated on the unit nameplate. Damage caused by the start-up of the unit with an incorrect voltage line will not be covered by the Hitecsa's warranty.
- Always refer to the unit wiring diagram when completing electrical connections.
- The electrical wiring connections and the line protection devices must be installed by the installer according to the current local laws.
- The interconnecting wires shall be protected in a tube or an electrical cable conduit, cable tray, etc.

1. Main power supply 400/3/50 + neutral + ground connection
2. Main switch
3. Remote TH-Tune control (Separate power and communication cables)
4. Room temperature probe



ELECTRICAL DATA

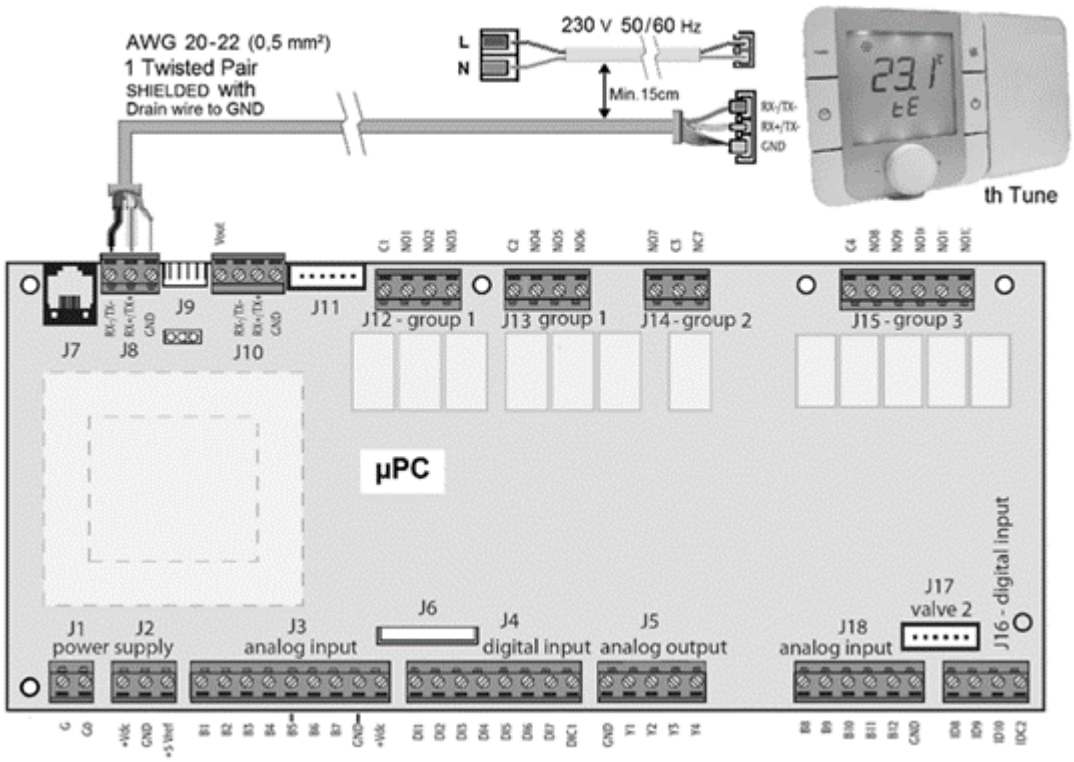
MOSAIC range		17	22	27
ACHIBA HE	ELECTRICAL DATA			
Power supply (50Hz)	V/Phases~	400V / 3Ph.~+N	400V / 3Ph.~+N	400V / 3Ph.~+N
Max. absorbed current	A	23.7	27.2	33.9
Starting current	A	Soft start	Soft start	Soft start

The unit is equipped with frequency inverters. A 300mA differential switch or a superimmunized switch shall be installed to avoid unprogrammed discharges.

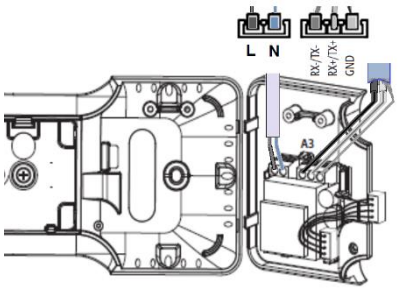
INSTALLATION

THERMOSTAT CONNECTION

Connect the TH-Tune (Mini-pGD or pGD1 as options) to the control board through the medium of a communication cable and a 230V power cable.



- ***Th-TUNE connection:***



- Two 230 VAC (L+N) power cables
- One twisted and shielded pair AWG 20/22 with a drain wire to GND.

- ***Wall probe Connection:***

NTC thermo-resistance within a box. Connected with 2 copper wires between 0.5mm² and 1.5mm² thick (higher thickness if higher resistance).
(Refer to the electrical wiring diagram).
The controller will automatically regulate with that probe if available.

- ***Connecting the duct probe:*** NTC thermor-esistance located in duct. Connected with 2 copper wires between 0.5mm² and 1.5mm² thick (higher thickness if higher resistance).
(Refer to the electrical wiring diagram).
The controller will automatically regulate with that probe if available.

OPERATION

BEFORE START-UP

The installer shall complete various control operations to make sure that the unit operation is correct when commissioning the unit for the first time. Start-up shall be supervised by an air conditioning qualified technician.

GENERAL INSTALLATION CHECKING

- ☐ Control that there is space enough for operation, access to the electrical box and for maintenance.
- ☐ Control that the unit is levelled properly.
- ☐ Control that all the panels are fitted properly with screws.
- ☐ Control the condition and position of the grilles, diffusers, air ducts, tarpaulins, etc…
- ☐ Control that the air filters are clean and correctly fitted.
- ☐ Control that the drainage is not blocked.

Electrical installation checking

- ☐ Check that the electrical wiring diagram is available as it is an essential document to complete the connection operations.
- ☐ Check that all the electrical connections are tight.
- ☐ Check the power supply voltage. The power supply to the unit must be within 10% of the voltage level stated on the serial plate. In case of three-phases lines, make sure that the three phases are well balanced. Damages caused by the start-up of the unit with an incorrect voltage line will not be covered by the Hitecsa's warranty.
- ☐ Check that the necessary line protection devices are installed and comply with the local valid legislation.
- ☐ The unit is equipped with frequency converters. Check that the main switch is of minimum 300 mA or is a superimmunized switch so as to avoid possible power cuts caused when it is activated.
- ☐ Check that the thermostat is connected and power supplied properly.
- ☐ Check the remote on/off connection.
- ☐ Check the rotation direction of the fans.
- ☐ Check that the electrical interconnecting cables are protected with a tube or a conduit.
- ☐ Check that the crankcase heater for each compressor has been working for 24 hours before starting-up the unit.

Refrigeration installation checking

Before opening the electrical box up and accessing inside the unit, it is COMPULSORY to keep the main power supply cable disconnected / WITHOUT VOLTAGE.

- ☐ Check that the unit is completely charged with refrigerant _____kg.
- ☐ Check that there is no oil/refrigerant leakage.
- ☐ **Split units:**

  Control the diameters of the suction lines: _____" and liquids: _____".
  Oil separator? Y/N _____.
  Proper oil trap devices? Y/N_____.
  Insulated refrigeration lines.

OPERATION

START-UP

- Make sure you have access to measuring instruments with their up-to-date calibration certificates.
- Thermometer, anemometer, voltmeter, hook-on meter, high and low manometer.
- The person/people who will complete the measuring operations or the ones who will participate in the start-up process must be qualified professionals with the valid certification according to the local regulation.
- Please read all the security precaution guidelines.
- Before using a hook-on meter make sure that the cable or the cables are connected properly. To disconnect a cable by using force may damage the equipment and entail people injuries.
- It is necessary to register the air inlet and outlet temperatures to the internal coil, the volts and amps of the compressor and motor fan, as well as the suction and discharge pressure of each compressor.
- Remember that it is necessary to clean the air filters after the first 4 hours of operation.
- Complete at least 3 cooling cycle operations.

Indoor fan start-up.

⚠ **Do not approach the fan while it is rotating even at a very slow rotation speed!**
¡Beware automatic restart!
The fan / motor may start and stop automatically for functional reasons.
After a power cut or a technical failure the fan will restart as soon as voltage is present again!

- **ROTATION CAUSED BY AIR FLOW IN THE WRONG DIRECTION.**
If you switch the fan on while it is rotating in the opposite direction the control will reduce the rotations until it reaches the '0' value (fan stoppage). Then, the control will make a restart in the correct rotation direction.
The higher the number of rotations in the wrong direction, the longer time the control will need to make the fan stop.
If the fan is rotating heavily in the wrong direction the control may not be able to start the fan in the correct direction.
Do not switch the fan off and restart it again to slow it down!

OPERATION LIMITS

COOLING CYCLE	OUTDOOR air temperature		INDOOR air temperature	
	Dry	Humid	Dry	Humid
Nominal conditions	35ºC	-	27ºC	19ºC
Minimum	-10ºC	-	20ºC	15ºC
Maximum	50ºC	-	32ºC	23ºC

HEATING CYCLE	OUTDOOR air temperature		INDOOR air temperature	
	Dry	Humid	Dry	Humid
Nominal conditions	7ºC	6ºC	20ºC	-
Minimum	-12ºC	-13ºC	15ºC	-
Maximum	24ºC	18ºC	26ºC	-

These units can operate at a maximum altitude of 1500 m above sea level with a performance loss lower than 3%.
They have been designed to work with 100% of recycled air. An installation with 100% of outdoor air is prohibited.

OPERATION

EC motor fans

Trouble shooting

Type of error	Possible cause	Solution
Fan does not run (anymore)	Failure line voltage. Failure of one phase. Under – or overvoltage.	Check line voltage.
	Earth fault.	Check motor connection and line voltage.
	Short circuit winding.	Replace fan.
	The thermal protection of the motor has triggered (motor is overheated)	Check for free air passages; remove foreign bodies if necessary "Impeller blocked or dirty". Check temperature of supply air. Check voltage.
	Impeller blocked or dirty	• Switch off power to the motor and secure against switching back on. • Check safe isolation from supply. • Remove safety grille. • Remove foreign bodies or soiling. • Remount the safety grille.
Fan will not start	Temperature too low for bearing grease.	Insert bearing with cold greasing.
	Air stream wrong direction (Motor turns in wrong direction at high speed)	Check air stream. ☞Behavior in rotation by air current in reverse direction.
Fan rotates too slowly	Impeller / blade scrapes / brushes.	When indicated clear foreign bodies / dirt from the fan.
	Active temperature management effective (Motor or electronics over-heated).	Check for free air passages; remove foreign bodies if necessary. "Impeller blocked or dirty". Check temperature of supply air. Check installation space (air speed overheat sink).
Air flow too low	Fan turns too slowly	☞ “Fan turns too slowly”.
	Airways blocked	Check for free air passages (supply/exhaust air vents, filters) “Impeller blocked or dirty”
	Pressure loss different to planned.	Check fan selection.
Vibrations	Imbalance.	Check blades for damage, soiling or ice. “Impeller blocked or dirty”
	No or wrong vibration dampers (only in radial)	Install correct vibration dampers
Unusual noises	Bearing damaged / worn.	Change bearings.
	Impeller / blade scrapes / brushes.	When indicated clear foreign bodies / dirt from the fan. “Impeller blocked or dirty”
	Operation beyond stall point (for axial fans)	Check for free air passages (supply / exhaust air vents, filters)
	Wrong overlap on nozzle (for centrifugal fans)	Observe the installation instructions.

OPERATION

EC motor fan

Status Out with flash code

For motor size "D" and "G" status LED integrated in cover.

LED Code	Alarm relay *	Cause (Explanation)
OFF	Open	No line voltage
ON	Closed	Normal operation without fault
1x	Closed	No enable = OFF
2x	Closed	Active temperature management
3x	Open	HALL-IC fault
4x	Open	Line failure (only for 3~ types)
5x	Open	Motor blocked
6x	Open	IGBT fault
7x	Open	DC under voltage
8x	Open	DC overvoltage
9x	Closed	IGBT cooling down period
11x	Open	Fault motor start
12x	Open	Line voltage too low
13x	Open	Line voltage too high
14x	Open	Error peak current
17x	Open	Temperature alarm

*Alarm relay: function programmed by manufacturer: error message not reversed.
With pGD1 or mini pGD the alarm "Safety thermostats serious alarm. Interlock" appears.

MAINTENANCE

WARNING!

Before completing any service or maintenance operation, turn the main power switch off to avoid any personal injuries. Lock it so that anybody else than a qualified technician can switch it on.

- It is advisable to schedule maintenance visits every 1,000 operating hours, as well as at the end of summer. Please keep an updated record of all maintenance operations and readings (maintenance sheet).
- Repairing operations must be carried out by trained specialists only.
- Wear safety shoes and gloves adapted to each operation!
- Please observe the safety regulations and the worker's protection rules for any maintenance and service operation (EN 50 110, IEC 364).
- In the event of leak any manipulation and/or recovery of refrigerant shall be completed by qualified and authorized personnel in accordance with the valid regulation. Add the quantity of oil that has been lost.

REFRIGERANT CHARGE

WARNING!

Never use oxygen to pressurize the system or purge lines for leak test. Oxygen reacts violently with oil which may entail an explosion that could lead to damages, personal injury or event death.

- Should it be necessary to add or recover refrigerant use a digital scale that is suitably reinforced and prepared to withstand the handling of the refrigerant bottle.
- Charge to be in the LIQUID state.
- Introduction of R-410A refrigerant in the liquid state inside empty tubes produces temperatures below 0ºC until the internal pressure reaches 7 bars.

WARNING!

Should it be necessary to complete brazing operation first of all proceed to filling the circuit with dry nitrogen. Burning refrigerant produces toxic gas emissions.

- Leaks should be repaired immediately.
- Never overcharge the system.
- Never use the compressor as a vacuum pump.
- If leakage symptoms appear during operation proceed to a leak test.
- A HCF detector is necessary in case of small leaks.
- If a gas leak is detected proceed to removing and recuperating the entire refrigerant charge. Pressurize the system with dry nitrogen. If no leak is detected proceed to vacuuming the system and refill with refrigerant.

Do not reintroduce the used refrigerant, send it to an authorized recycling plant.

RECOVERY OF THE REFRIGERANT

When recovering refrigerant from the circuit, please make sure that the electronic expansion valves (EEV) are fully open so that the complete emptying of the circuit is guaranteed without any risk that some of the refrigerant circuit may remain isolated.
Thus the installer/maintenance staff shall use a special tool that enables to keep the EEV open while the emptying process is carried on:
- Either by mean of a control module which enables the opening of the EEV electronically (pGD thermostat).
- Or by mean of special magnets that will keep the EEV open mechanically.

An incomplete emptying of the refrigerant circuit before it shall be refilled with refrigerant will entail a possible risk of critical damage of the unit which would invalidate the warranty.

MAINTENANCE

COMPRESSOR LUBRICATION

R-410A refrigerant compressors use synthetic polyolester oil. Each compressor manufacturer has a specific oil for their products.
The compressor or system should not remain open to atmosphere for more than 15 minutes.
Synthetic ester-type lubricants (POE, Polyol Ester) with a high solubility level with R-410A are used. These types of oil are very hygroscopic and shall be handled with more care the conventional ones. Moreover, when these synthetic oils are mixed with minerals (MO) or alkylbenzenes (AB), they deteriorate causing capillary blockage or failure in the compressor.
DO NOT MIX THEM UNDER ANY CIRCUMSTANCES.

CONSERVATION AND CLEANING

Precaution!

- Do not use aggressive cleaning products nor varnish solvents.
- Avoid water penetration inside the motor or to the electronic components (e.g. through the direct contact with joints or holes of the motor), observe the protection class (IP).

Electrical circuit: Make sure that all electrical connections –wires, contactors and terminals- are properly tight. Register the readings of kW and amperes at each compressor and fan motor phase. Verify the starting current. Check the start current. Check that all mechanical components, pressure switches and so on are working properly.

Refrigeration circuit: Check if there is any refrigerant leak, noises or vibration. Proceed to measuring temperatures and/or pressures of components of the most important components of the system and register them on the maintenance sheet (compressor discharge and suction, expansion valve, exchangers' inlet and outlet, etc…)

Compressor: Check regularly the lubricant level, presence of vibrations or noise and motor insulation.

Drainage system: Verify the condition and the correct operation of the drainage tray and drain trap. It is necessary to clean the condensate trays after the first day of operation. Then, clean them at least once a year. Take into account the meteorological conditions, e.g. in areas where falling leaves or the flight of seeds may obstruct the drain trap, it will also be necessary to clean them at mid and late spring and autumn. The dates are approximate and will depend on the blooming, falling leaves, seeds, etc. of the plants of the zone or the human activity or any other cause.

Air filters: Clean the filters after the first operating hours to remove possible light materials such as pieces of paper or polystyrene, etc. that may have been dragged through air circulation. Clean again every 3 months (or more often depending on operation). The filters can be cleaned with soapy water. Then rinse them with clean water and let dry. If necessary replace the filters before they are in poor conditions (refer to the current legislation, EN 779, UNE-EN 13053…).

Coils: At least once a year clean the condenser coils with water and detergent, then dry with air at low pressure. Never clean with a wire brush, water and/or air at high pressure (max. 6 bar).

Fans: Check the direction of rotation of the fans, verify their carriers. Check the transmission elements and the operating status.
Before handling the fan make sure that it is disconnected from the main power supply even though it is already stopped and control that nobody may start it during the intervention.

- A regular inspection of the unit is required to avoid dirt accumulation in propellers, turbines, motors and grids that could entail risks and significantly shorten their life. The frequency will depend on the working conditions.
- Keep the airways of the fan free – danger because of objects dropping out!
- Check the free flow of the condensation water through the evacuation openings is necessary (if there are any).
- During cleaning operations be very careful not to unbalance the propeller or the turbine.
- In case of incorrect cleaning operations no guarantee is assumed regarding corrosion formation / paint adhesion for unpainted / painted fans.
- To avoid humidity accumulation in the motor the fan must be operated during at least 1 hour at 80 to 100% of its maximum speed before cleaning!
- After the cleaning process the fan must be operated for 2 hours at 80 to 100% of maximum speed for drying purposes!
- Check the fan regularly to detect possible mechanical vibrations (recommended every 6 months). Keep in mind the limit values indicated on ISO 14694 and perform correction measures in case of exceeding them (e.g. posterior balance by trained specialists).
- Check the impeller in particular weld-seams to detect possible cracks.
- Motors and fans do not need additional lubrication due to the use of "life-long lubrication" ball bearings. At the end of the grease life period (30-40.000h approx.) the bearing shall be replaced. Please contact our Service Department in that case as well as for any damage (e.g. to the coil or electronical parts).

MAINTENANCE

REPAIRING OPERATIONS

- For all maintenance and repairing operations the current safety rules of each country have to be checked and followed.
- It is forbidden to do brazing repairing operations on mechanic elements such as fans, compressors, valves, etc.
- Due to safety reasons it is forbidden to realise on your own operations or modifications unless it has been previously approved by the manufacturer.
  Use only spare parts/ wear parts / original accessories from the manufacturer of the fans. These parts have been designed especially for the unit. If you use parts from other manufacturers it is not guaranteed that they have been manufactured to resist loads that they will have to support or that they meet the relevant safety requirements.
  The parts and any special equipment that have not been supplied by the manufacturer of the fans are not authorized by these manufacturers and cannot be used for the equipment.

APPENDIX: SAFETY DATA R410A

REFRIGERANT DATA	SAFETY DATA: R410A
Toxicity	Low
Contact with Skin	R410 A vapours can irritate the skin and eyes. In liquid form, it can freeze skin on contact. If contact with skin occurs, flush the exposed area with lukewarm water until all of the chemical is removed. If there is evidence of frostbite, bathe in lukewarm water.
Contact with Eyes	If contact with eyes occurs, immediately flush with large amounts of lukewarm water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation. Seek medical attention as soon as possible.
Ingestion	Very unlikely - should something happen, it will cause frost burns. Do not induce vomiting. Only if the patient is conscious, wash out mouth with water and give some 250 ml of water to drink. Then, obtain medical attention.
Inhalation	Inhalation of the R410A vapour may cause irritation. Vapour inhalation at high concentrations may result in asphyxiation or the heart may become sensitized, causing cardiac arrhythmia. When concentration of R410A reach levels which reduce oxygen to 14-16% by displacement, symptoms of asphyxiation will occur. An individual exposed to high concentrations of R410A must be given medical attention immediately. Adequate ventilation must be provided at all times.
Recommendations	Semiotics or support therapy is recommended. Cardiac sensitisation has been observed that, in the presence of circulating catecholamines such as adrenalin, may cause cardiac arrhythmia and accordingly, in case of exposure to high concentrations, cardiac arrest.
Prolonged Exposure	R410A: a study on the effects of exposure to 50,000 ppm during the whole life of rats has identified the development of benign testicle tumour. This situation should therefore be negligible for personnel exposed to concentrations equal to or lower than professional levels.
Professional Levels	R410A: Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	R410A: without specifying
Conditions to Avoid	Do not use in the presence of high temperatures, flames, burning surfaces and excess humidity.
Hazardous Reactions	Contact with certain red-hot metals may result in exothermic or explosive reactions and yield toxic and/or corrosive decomposition products. Specific materials to avoid include freshly abraded aluminium surfaces and active metals such as sodium, potassium, calcium, powdered aluminium, magnesium and zinc.
Hazardous Decomposition Products	R410A: Halogen acids produced by thermal decomposition and hydrolysis.
General Precautions	Do not inhale concentrated vapours. Their concentration in the atmosphere should not exceed the minimum preset values and should be maintained below the professional threshold. Being weightier than the air, the vapour concentrates on the bottom, in narrow areas. Therefore, the exhaust system must work at low level.
Respiratory System Protection	If you are in doubt about the concentration in the atmosphere, it is recommended to wear a respirator approved by an accident prevention Authority, of the independent or oxygen type.
Storage	Cylinders must be stored in a cool, dry and properly ventilated storage area away from heat, flames, corrosive chemicals, flumes, explosives and be otherwise protected from damage. Keep a temperature below 50°C.
Protective Clothing	Wear overalls, protective gloves and goggles or a mask.
Accidental Release Measures	It is important to wear protective clothing and a respirator. Stop the source of the leak, if you can do this without danger. Negligible leaks can be left evaporating under the sun, providing that the room is well ventilated. Considerable leaks: ventilate the room. Reduce the leak with sand, earth or other absorbing substances. Make sure that the liquid does is not channelled into gutters, sewers or pits where the vapours are likely to create a stuffy atmosphere.
Disposal	The best method is recovery and recycling. If this method is not practicable, dispose according to an approved procedure, which shall ensure the absorption and neutralization of acids and toxic agents.
Fire Fighting Information	R410A: Not flammable in the atmosphere.
Cylinders	The cylinders, if exposed to fire, shall be cooled by water jets; otherwise, if heated, they may explode.
Protective Fire Fighting Equipment	In case of fire, wear an independent respirator and protective clothing.

HITECSA
COOL AIR

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