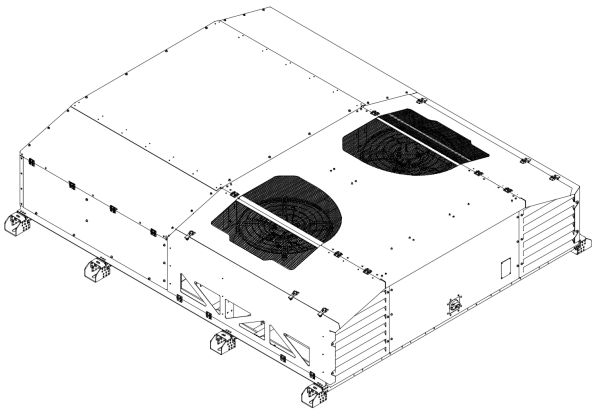
OPERATING AND MAINTENANCE MANUAL

RTX
2 CIRCUITS ROOF TOP



INDUSTRIAL AIR CONDITIONER

PRODUCT CODE :

RTX07-400-STD-A1
RTX08-400-STD-A1
RTX10-400-STD-A1
RTX12-400-STD-A1
RTX16-400-STD-A1

RTX08-400-WCC-A1
RTX10-400-WCC-A1
RTX12-400-WCC-A1
RTX16-400-WCC-A1
RTX20-400-WCC-A1

DOC N° : RTX_OMM01_E_241028_A
FIRST EDITION : SEPTEMBER 2024

Cancel and replace previous draft editions
400VAC/50Hz/3P+N+GND
ENGLISH VERSION

The OMM for Industrial Air Conditioner provides important information on the installation, operation, maintenance and troubleshooting of the air conditioner. This manual is intended for use by qualified technicians and end users. It should be followed to ensure safe and efficient use of the air conditioner.

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither NAYCH nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components. When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use NAYCH software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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SUMMARY

⚠ WARNING

IMPORTANT INFORMATION

Inexperienced persons cannot perceive the dangers and seriousness of the consequences of improper use of the air conditioner.

The user's manual for this industrial air conditioner provides important information on installation, operation, maintenance and troubleshooting. **This manual is intended for qualified technicians and professional end-users.** It must be followed to ensure safe and efficient use of the air conditioner.

Failure to follow these instructions may result in death, serious injury or damage to the equipment.

1 GENERALITY :

To ensure correct and safe operation, please read these instructions before installing and using the unit. This document relates solely to the supply of the industrial air conditioner model RTX. The use and destination of this equipment is at the sole discretion of the customer. The customer must ensure that this equipment is installed exclusively by a qualified and certified professional in the field of refrigeration and air conditioning. The customer, as an informed professional, possibly assisted at his own expense by any consultant of his choice, declares that he has examined or had examined, prior to the Order, the characteristics and performance of the equipment and considers it to be suitable for his needs and use, and consequently waives any dispute on this point.

The products which are the object of the present notice are guaranteed within the strict and exclusive framework of the general conditions of sale of NAYCH and subsidiary companies.

 The information contained in this document includes a general description of the available technical characteristics, which may not apply to all cases. The required technical specifications must be specified by contract.

1.1 SAFETY INFORMATION

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to inform of potential hazards or to call attention to information that clarifies or simplifies a procedure.

1.2 LIABILITY AND RESIDUAL RISK

NAYCH liability is limited to the proper and professional use of this product under the guidelines contained in the present and other supporting documents, and does not extend to damages caused by (but not limited to):

- ñ Unspecified installation/use and, in particular, in contravention of the safety requirements of established legislation or specified in this document;
- ñ Use on equipment which does not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- ñ Use on equipment in which dangerous components can be accessed without the use of specific tools;
- ñ Installation/use on equipment which does not comply with established legislation and standards.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- ñ Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- ñ Always use a properly rated voltage sensing device to confirm the power is removed.
- ñ Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- ñ Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

This equipment has been designed to operate outside of any hazardous location.

Only install this equipment in zones known to be free of hazardous atmosphere.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- ñ Install and use this equipment in non-hazardous locations only.

Failure to follow these instructions will result in death or serious injury.

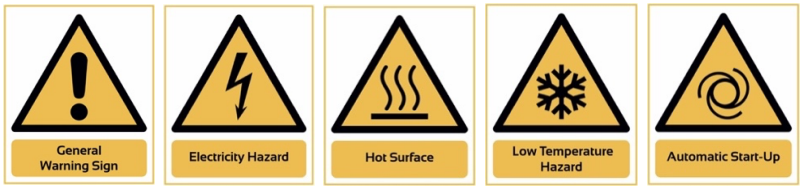
⚠ WARNING
LOSS OF CONTROL ñ The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart. ñ Separate or redundant control paths must be provided for critical control functions. ñ System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link. ñ Observe all accident prevention regulations and local safety guidelines ñ Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

⚠ WARNING
UNINTENDED OPERATION OF EQUIPMENT ñ Make sure your setting are correct and test it before to let it run. ñ Use only software approved by NAYCH for use with this equipment. ñ Update your application program whenever you change the physical configuration of the equipment. **Failure to follow these instructions may result in death, serious injury or damage to the equipment.**

	⚠ WARNING
	**CYBERSECURITY** ñ To enhance authentication security in the PLC, non-secure protocols are disabled (Modbus TCP, BACnet IP, FTP), regardless of BIOS settings, until the user modifies the credentials. With cybersecurity, the password is encrypted and stored internally rather than in EEPROM. ñ Disclosing your equipment's access protocols, addresses and passwords exposes you to attacks or malicious use of your equipment. ñ The decision to make its equipment communicative is the sole responsibility of the customer. **Failure to follow these instructions may result in death, serious injury or damage to the equipment.**

1.3 SAFETY SIGNAL

Safety labels are following the ISO 3864-1 standards, using DIN EN ISO 7010 symbols, please consider these different signal who are representing risks.



1.4 F-GAS REGULATION

The customer shall ensure the compliance of his installations with its corresponding F-GAS national regulation concerning refrigerants.

1.5 GENERAL COMPLIANCE AND DECLARATION

COUNTRY OF ORIGIN :	EEC, FRANCE.
DOUMENTS LANGUAGE :	ENGLISH
HS CODE :	84158200

NAYCH certifies that the equipment detailed in this manual complies with the directives of the following EEC:

Electromagnetic Accounting Directive	(EMC) 89/336 / EEC
Low voltage directive	73/23 / EEC
Machinery Directive (DM)	89/392 / EEC 98/37 / EC
Pressure equipment directive (DEP)	97/23 / EC

In order to comply with these directives appropriate national & harmonized standards have been applied. These can be found in the Declaration of Conformity supplied with each product.

2 INTRODUCTION :

The installation and maintenance manual that accompanies the air conditioner is intended to be consulted by the user or installer at any time. The installation of the unit must be carried out in compliance with the regulations and laws in force in the country of installation.

Installation and maintenance must be carried out by authorized and qualified person; incorrect installation and/or maintenance may cause malfunction, as well as damage to people, animals and things for which the manufacturer is not responsible.

3 UNIT IDENTIFICATION :

When product code is RTX08-400-STD-A1, it means :
- RTX is the type of air conditioner
- 08 is the total compressor capacity index
- 400 is the voltage type
- STD, is the technical design ; can be STD (Basic design), HCC (Hot climate or tropical design) or CCC (Cold climate design).
- A1, A is the design and 1 the nomenclature.

Products concerned by the present document are :
- Indicated on page 1

Each unit is equipped with a ID signal plate. The information written are :

PRODUCT CODE
SERIAL NUMBER
YEAR OF PRODUCTION
VOLTAGE
LRA (COOLING)
FLA (COOLING)
POWER INPUT
COOLING KW T05.4/TC54
REFRIGERANT TYPE
REFRIGERANT WEIGHT
TOTAL GWP
NOISE LEVEL (3M)
HP SWITCH
LP SWITCH
PRODUCT WEIGHT
COUNTRY OF ORIGIN

4 REFERENCE DOCUMENTS :

The RTX air conditioner is delivered with different technical documents ;

ECD	Electrical circuit and Cooling circuit Diagram
EXD	External dimensions drawing
MSDS	Material and Safety
HSC	Handling and Storage Conditions
FAT	Unitary Factory Acceptance Test

5 TECHNICAL DESCRIPTION :

5.1 METAL FRAME AND BODY

- Frame is made in high quality of aluminum 5754-11 sheet having appropriate thickness from 15/10 to 30/10.
- Stainless steel parts are 316 made having appropriate thickness from 15/10 to 40/10.
- Feet are stainless steel 316 made having appropriate thickness of 40/10.

5.2 ALUMINUM ANTICORROSION TREATMENT AND PAINTING

Painted aluminum body and frame metal parts are treated as follows:

1) The aluminum substrate is chemically treated before painting.
2) Application of an 80µ -thick coat of AKZO NOBEL INTERPON REDOX PLUS anti-corrosion primer.
3) Application of a complementary topcoat of AKZO NOBEL D25-25 - RAL 7047 type for mechanical strength, UV resistance and abrasion resistance, with a thickness of between 100µ and 120 µ.

This application process represents a C4M index according to ISO12944-1, considering an aluminum application.

The customer must ensure that the protection rating of this air conditioner is appropriate for the type of exposure to corrosion to which it will be subjected.

5.3 EVAPORATOR COIL

The air condenser general geometry is 22x25,4 – 3/8", 1 stage, 4 rows and 8 circuits. Unitary proof test at 45 bars.

- Copper tubes with a thickness of 0,5mm,
- Aluminum fins with hydrophilic treatment and a thickness of 0,11mm. Space between fins is 1,6mm.
- Optional anticorrosion protection layer is THERMOCHEM COAT 120µ (Thermo-Chemical Coating)

5.4 CONDENSER COIL

The air condenser general geometry is 22x25,4 – 3/8", 1 stage, 4 rows and 11 circuits. . Unitary proof test at 45 bars.

- Copper tubes with a thickness of 0,5mm,
- Aluminum fins with hydrophilic treatment and a thickness of 0,11mm. Space between fins is 2,3mm.
- Optional anticorrosion protection layer is THERMOCHEM COAT 100µ (Thermo-Chemical Coating)

5.5 COPPER CIRCUIT PIPING

The cooling circuit is made of copper pipes in different diameters corresponding to the following quality;

- Temper hard (R290) : Unit break load: R. min. ≥ 290 MPa (N/mm^2) Elongation percentage: A5 min. > 3% .
- Thickness of 1mm for the all diameters.
- Cu DHP (Cu: 99,9% min. P: 0,015 ÷ 0,040%) according to EN 1412
- Dimensions and tolerances, according to EN 12735-1 and EN 13348
- Optional anticorrosion protection layer is THERMOCHEM COAT 120µ (Thermo-Chemical Coating)

5.6 COOLING CIRCUIT ANTICORROSION TREATMENT (OPTIONAL)

Cooling parts are specially treated against corrosion, i.e. the entire refrigeration piping system, condenser and evaporator, as follows:

- Pre-Treatment of metal by degreasing and pickling treatment
- THERMOCHEM COAT 120
    1) Primary anti-corrosion layer 60 µ.
    2) Polyurethane Polymer water based topcoat additivated with thermal conductive, layer 60 µ.

5.7 COMPRESSOR

Vertical ON/OFF, refrigerant brushless motor compressor Scroll (spiro-orbital) type.
Welded metal hull with chemical steel treatment, anti-corrosion primer and protective epoxy paint.

5.8 G4 AIR FILTER (OPTIONAL)

The presence of a filter is strictly mandatory before air enters the air conditioner. The choice of filter position is the customer's responsibility, depending on the type of installation or ducting network. Filters are the responsibility of the customer, and must be installed at the air intake of the ventilation system. Filter presence and cleanliness have a direct impact on system performance.

Efficiency G4 as per EN779, washable manufactured in synthetic fibre, with aluminum steel frame.
Initial pressure drop is 20Pa.

5.9 INDOOR FAN AND AIR FLOW

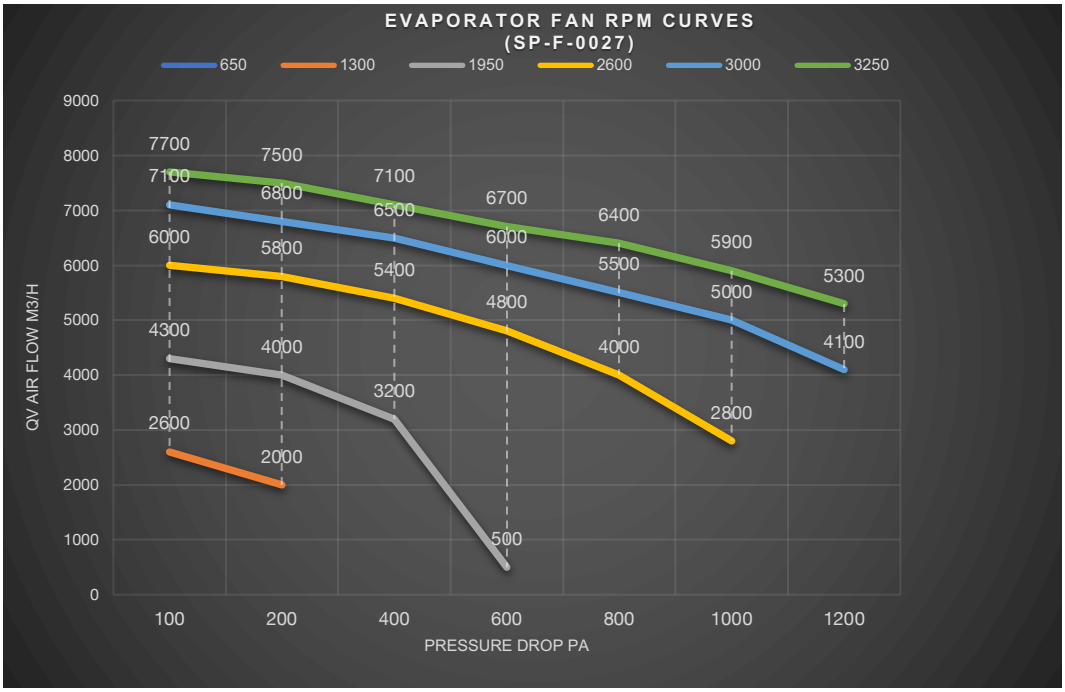
RTX units are equipped with 2 fans. The 2 evaporator fan are a radial EC fan, single inlet, backward blades aluminum impeller, directly coupled to electric motor external rotor type Electronically Commuted for low energy consumption and 50/60 Hz application.

Label of the evaporator fan in different documents is EVF.

5.9.1 AIR PERFORMANCE DIAGRAM

The exact performance of your final installation is depending of different factors.
Before any setting, the customer have to consider the total pressure drop regarding to the ducting and then adapt its minimum speed to get the adapted Qv air flow needed. Customer have to consider that the air flow setting impacts also the current consumption and the pressure noise level.

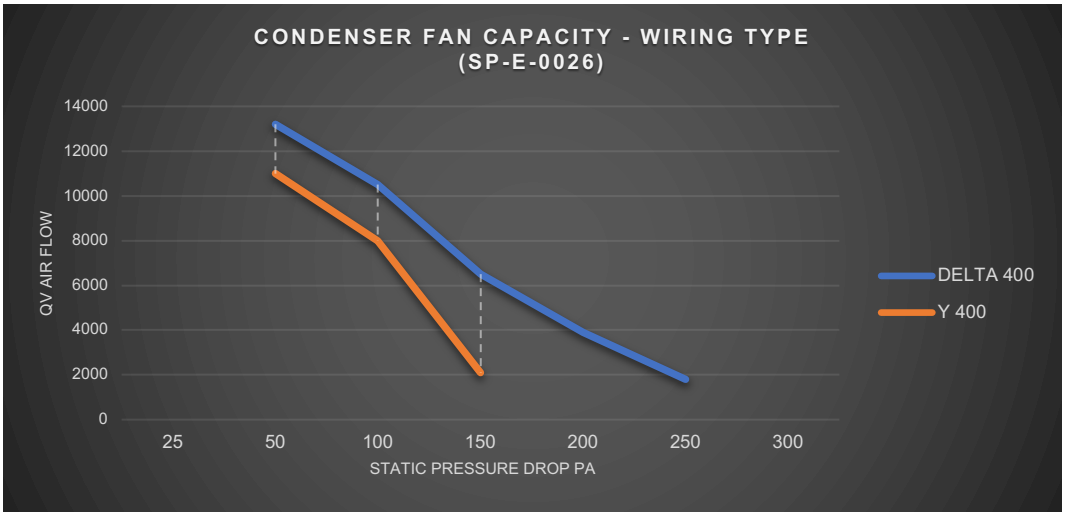
We recommend not to exceed a pressure drop of 800Pa after the air conditioner air outlet.



5.10 CONDENSER FAN AND AIR FLOW

Axial fan with sickle aluminum blades with bionical design shape, motor and terminal class IP54, thermal class THCL 155.
Continuous operation with occasional starts (S1) according to DIN EN 60034-1: 2011-02. Occasional starting between -35 ° C and -25 ° C is permissible.
Permanent operation below -25 ° C only possible with special bearings for refrigeration applications on request.

5.10.1 AIR PERFORMANCE DIAGRAM



Any limitation of condenser heat exchange due to clogging or fouling of any kind will limit the performance of the air conditioner and may activate the HP alarm before the outdoor temperature limit is reached.

5.11 REFRIGERANT LINE COMPONENTS

- Schrader pressure port 1/4
- Schrader pressure port 5/16
- HP switch
- LP switch
- HP transducer
- LP transducer
- Filter dryer
- Liquid sight seeing glass with color change moisture indicator
- Solenoid valve

- Thermostatic expansion valve, with external pressure equalizer
- Stop valve

5.12 ELECTRICAL CONTROL PANEL

The electrical panel is complete with:

- Main interlocking power switch.
- Phase default relay.
- Automatic fuse protections for each single utility.
- Compressor motor contactor.
- Fan motor contactors.
- Transformer for auxiliary services.
- Components and wiring compliance with applicable IEC standards.

5.13 LOGIC CONTROLLER

For the unit management, with the following characteristics:

- Close control of the temperature by a proportional managing of the refrigeration circuit and the heating circuit.
- Close control of the relative humidity by a proportional managing of the refrigeration circuit and the heating circuit.
- LAN connection.

To ensure perfect PLC operability, regardless of outdoor temperature limits, air conditioner operation is conditioned by a temperature range from -20°C to 60°C in the electrical panel, and a humidity range from 10%RH to 95%RH.

5.14 USER DISPLAY

For setting, with the following characteristics :

- On / Off switch from the display
- General temperature and humidity set-point setting ;
- Operating parameters setting ;
- Alarms control and resetting;

5.15 ELECTRIC HEATERS (OPTIONAL)

Heaters are managed by the PLC controller as an ON/OFF device for heating. Each heater of 1.000W is connected to a 230Vac wire.

	⚠ WARNING
	**The fan minimum speed must be setted with higher value than 30.** In addition to the limitation of the supply air flow temperature controlled by the PLC controller, the ELECTRIC HEATERS are secured with a mechanical thermostatic security switch in case of high temperature, up to 100°C. Anyway, due to the presence of electric heaters, customer must install any type of device for detecting smoke or fire in order to cut off the power supply of the air conditioner. **Failure to follow these instructions may result in death, serious injury or damage to the equipment.**

5.16 AIR DIFFERENTIAL PRESSURE SWITCH

Can be used as a clogged filter alarm with a differential pressure settable value between 0 to 500Pa. The APD can not be used without pressure drop due to an air pressure up to 500Pa.

5.17 TEMPERATURE PROBES

Temperature probes are all NTC 10K sensor type.

LABEL	MEASURED FUNCTION	SCALE
TIN	Air intake temperature from the premises	°C
TOUT	Air outlet temperature to the premises	°C
TEXT	Extrenal air temperature	°C
TSC	Subcooling High pressure liquid pipe contact	°C
TSH	Superheat Low pressure gas pipe contact	°C

5.18 RELATIVE HUMIDITY PROBE

At the air intake, the air conditioner is using a analogic sensor with high long-term stability, as the humidity measuring element. The sensor is factory calibrated and can be further adjusted to its environment by a professional if necessary.

LABEL	MEASURED FUNCTION	SCALE
SHR	Air intake humidity from the premises	%

6 GENERAL DATA

MAIN DATA	UNIT	RTX07-400-STD-A1	RTX08-400-STD-A1	RTX10-STD-A1	RTX12-400-STD-A1	RTX16-400-STD-A1
TOTAL COOLING CAPACITY (1)	kW	23	27,8	30,6	38,6	43,3
SENSIBLE COOLING CAPACITY (1)	kW	22,8	27,5	30,3	38,2	42,9
REFRIGERANT	F-GAS	R32	R32	R32	R32	R32
VOLTAGE	U	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N
OUTDOOR CONDITIONS (COOLING)	T°C	-10°C <T°< 45°C	-10°C <T°< 45°C	-10°C <T°< 45°C	-10°C <T°< 45°C	-10°C <T°< 45°C
NOMINAL POWER INPUT (1)	kW	7,7	9,18	10,12	12,86	14
COP (1)	RATE	2,99	3,03	3,02	3,00	3,09
MAIN DATA	**UNIT**	**RTX08-400-HCC-A1**	**RTX10-400-HCC-A1**	**RTX12-400-HCC-A1**	**RTX16-400-HCC-A1**	**RTX20-400-HCC-A1**
TOTAL COOLING CAPACITY (2)	kW	16,4	20	24	36,2	42
SENSIBLE COOLING CAPACITY (2)	kW	16,2	19,8	23,8	35,8	40,4
REFRIGERANT	F-GAS	R513A	R513A	R513A	R513A	R513A
VOLTAGE	U	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N	400Vac/50Hz/3P+N
OUTDOOR CONDITIONS (COOLING)	T°C	0°C <T°< 55°C	0°C <T°< 55°C	0°C <T°< 55°C	0°C <T°< 55°C	0°C <T°< 55°C
NOMINAL POWER INPUT (2)	kW	7	8,5	10,1	13,6	14,5
COP (2)	RATE	2,34	2,35	2,38	2,66	2,90
MAIN DATA	UNIT	**ALL VERSION**	**ALL VERSION**	**ALL VERSION**	**ALL VERSION**	**ALL VERSION**
NUMBER OF COOLING CIRCUIT	Qty	2	2	2	2	2
AIR TEMPERATURE INLET RANGE	T°C DB	18°C <T°< 31°C	18°C <T°< 31°C	18°C <T°< 31°C	18°C <T°< 31°C	18°C <T°< 31°C
AIR RH INLET RANGE	RH%	30% < RH < 80%	30% < RH < 80%	30% < RH < 80%	30% < RH < 80%	30% < RH < 80%
OUTDOOR CONDITIONS (HEATING)	T°C	-30°C <T°< 30°C	-30°C <T°< 30°C	-30°C <T°< 30°C	-30°C <T°< 30°C	-30°C <T°< 30°C
NOMINAL AIR FLOW	m³/h	5 000	6 000	7 000	8 000	9 000
NOMINAL STATIC PRESSURE	Pa	400	400	400	400	400
ELECTRIC HEATERS CAPACITY	kW	3	3	6	6	6
HEATERS STAGE	Qty	1	1	2	2	2
CONTROLLER TYPE	ID	PLC	PLC	PLC	PLC	PLC
MODBUS RS 485 TCP/IP		YES	YES	YES	YES	YES
COMPRESSOR TYPE		SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
EVAPORATOR FAN NUMBER	Qty	2	2	2	2	2
COMPRESSOR NUMBER	Qty	2	2	2	2	2
CONDENSER FAN NUMBER	Qty	2	2	2	2	2
AUXILIARY VOLTAGE	U	24Vac	24Vac	24Vac	24Vac	24Vac
SOUND PRESSURE at 5m – SEMI-REVERBERANT ENVIRONMENT -	dbA	59	60	63	63	64
LENGHT	mm	2 718	2 718	2 718	2 718	2 718
WIDTH	mm	2244 (2440 with FEET)	2244 (2440 with FEET)	2244 (2440 with FEET)	2244 (2440 with FEET)	2244 (2440 with FEET)
HEIGHT	mm	690	675	675	675	675
NET WEIGHT	Kg	750	750	780	830	830

(1) Data conditions are full operating cooling capacity stabilized at constant heat load. Indoor conditions are 21°CDB with a relative humidity of 35%RH, evaporator at 7,2°C. Gas superheat is setted and stabilized at 11,1°K on evaporator coil, gas condensing temperature is 45°C and subcooling is setted and stabilized at 8,3°K on condenser coil. Altitude is + 26m corresponding to 1013HPa. Values are obtained with perfect state of cleanliness of the exchangers.

(2) Data conditions are full operating cooling capacity stabilized at constant heat load. Indoor conditions are 21°CDB with a relative humidity of 35%RH, evaporator at 7,2°C. Gas superheat is setted and stabilized at 11,1°K on evaporator coil, gas condensing temperature is 54,4°C and subcooling is setted and stabilized at 8,3°K on condenser coil. Altitude is + 26m corresponding to 1013HPa. Values are obtained with perfect state of cleanliness of the exchangers.

7 ELECTRICAL DATA

	RTX07-400-STD-A1	RTX08-400-STD-A1	RTX10-400-STD-A1	RTX12-400-STD-A1	RTX16-400-STD-A1
NOMINAL CURRENT COOL (A)	15	16	18	20	22
NOMINAL CURRENT DEHUM USING HEATERS (A)	18	20	22	24	26
NOMINAL CURRENT HEAT (A)	8	8	15	15	15
LRA	40	41	43	45	47
RECOMMENDED PROTECTION	32A 300mA	32A 300mA	32A 300mA	32A 300mA	32A 300mA

	RTX08-400-HCC-A1	RTX10-400-HCC-A1	RTX12-400-HCC-A1	RTX16-400-HCC-A1	RTX20-400-HCC-A1
NOMINAL CURRENT COOL (A)	16	17	19	21	23
NOMINAL CURRENT DEHUM USING HEATERS H(A)	19	21	23	25	27
NOMINAL CURRENT HEAT (A)	8	8	15	15	15
LRA	39	40	42	44	45
RECOMMENDED PROTECTION	32A 300mA	32A 300mA	32A 300mA	32A 300mA	32A 300mA

8 NOISE LEVEL REPORT

Equivalent sound level (LAeq), measures took full load at 5 meters of distance, in semi reverberant field from the front of the unit and 1 meter high from the floor. Unit is operating at 50% of the indoor fan capacity without any pressure drop.

9 ALTITUDE POWER CORRECTION RATE

The rate in the table below is given considering a constant meteorological perimeter and a constant operating mode, exception of the temperature for high altitudes. Mass heat air value is 1.005 (kJ/(kg.K)). It is the exclusive customer's responsibility to integrate this physical factor in his thermal balance and his general study.

ALTITUDE (m)	ATMOSPHERIC PRESSURE (hPa)	TEMPERATURE (°C)	AIR DENSITY (kg/m3)	CAPACITY RATE
0 - sea level	1013	30	1,164	1
500	946	30	1,136	0,96
1000	899	30	1,055	0,87
2000	806	20	0,978	0,86
3000	708	15	0,793	0,66

10 DEHUMIDIFYING CAPACITY

The dehumidification capacity of RTX air conditioners depends on several main factors;

- ñ Air flow
- ñ The absolute value of the weight of water in air.
- ñ Evaporator rintake air temperature

Consider that the amount of latent cooling capacity dedicated to dehumidification, i.e. the quantity of water recovered by the evaporator, must be deducted from the total cooling capacity. Environments with very high humidity levels will have a high dehumidification capacity, i.e. a high latent power share compared to the sensible cooling power share.

11 ELECTRICAL CIRCUIT DIAGRAM

Refer to the electrical circuit diagram corresponding to the exact reference of the air conditioner.
Contact your dealer specifying the series, model and serial number of the air conditioner.

12 COOLING CIRCUIT DIAGRAM

Refer to the electrical circuit diagram corresponding to the exact reference of the air conditioner.
Contact your dealer specifying the series, model and serial number of the air conditioner.

13 DIMENSIONAL DRAWING

For any kind of integration, refer to EXD ISO DIMENSIONAL DRAWING corresponding to the exact reference of the air conditioner.
Contact your dealer specifying the series, model and serial number of the air conditioner.

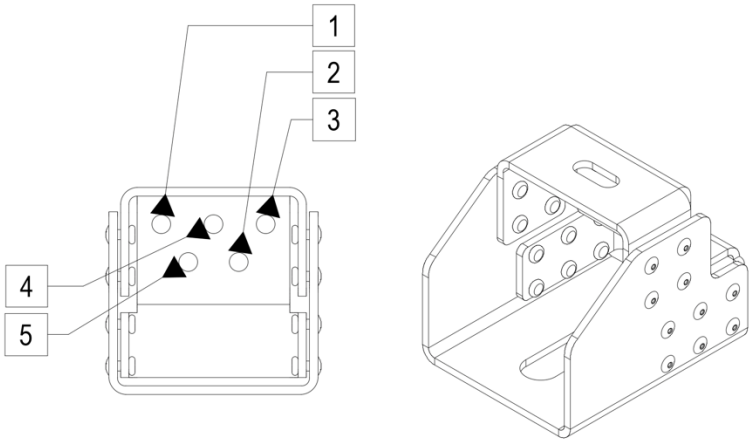
14 INSTALLATION

The customer integration must be compliant with the EN 378 : 2017 standard.

	⚠ WARNING
	UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE ñ Keep equipment in the protective conductive packaging until you are ready to install the equipment. ñ Only install equipment in approved enclosures and / or locations that prevent unauthorized access and provide electrostatic discharge protection as defined by IEC 1000-4-2. ñ Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment. ñ Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

14.1 MOUNTING SUPPORT FEET

The 8 feet are supplied separately with M8 stainless steel knobs and washers. They must be screwed on in the tightening order 1 - 2 - 3 - 4 - 5 as shown in the diagram below. Tightening torque is 22Nm.



14.2 HANDLING

The air conditioner has to be handled with care, kept upright. Never tilt it more than 10°.

Please, consider this air conditioner as an heavy machine.

- ñ **Lifting rings are for lifting purposes only. In particular, to release the machine from its pallet.**
- ñ **Lifting operations must be carried out with care, without couplings.**
- ñ **Machine must be installed with a perfectly level support (support from the feet only). Lifting rings are not provided by NAYCH.**
- ñ **Before handling, regarding to your installation configuration, you should consider the weight and the dimensions of the air conditioner to get the right lifting equipment, tools and protections. Please, consider also the center of gravity at 0,45m high from the bottom of the air conditioner.**
- ñ **The machine may not be lifted without 8 lifting points. Lifting rings are not supplied with the air conditioner.**
- ñ **Do not lift the machine if the straps are not set to the same tension, so that the weight to be lifted is evenly distributed over the 8 points. Lifting must consider the correct (equal) distribution of mass on the 8 inserts.**

- **Carefully check that each lifting ring is correctly screwed into the top feet side.**
- **Do not lift the machine if the straps are not long enough. We recommend a length of 1200mm per attachment point to ensure perfect vertical traction force.**

Remove the packaging and the attached documents before installation.
Take care to remove the fixing part to the air conditioner and to the pallet.
Remove the transportation foam plot around the compressor.

TECHNICAL ADVICE : For lifting, we recommend the use of H-shaped spreader bars with 8 lifting points. See picture below.

14.3 SUPPORT, ENVIRONMENT AND POSITIONING

The air conditioner must be installed perfectly level and plumb.

Make sure the location you choose for this air conditioner is suitable for everyone's safety and comfort.

Make sure that the support for this air conditioner is suitable for the weight of the appliance and the maintenance personnel and equipment.

Ensure that access is limited to technical service personnel only.

Make sure the environment is suitable for this air conditioner, especially in terms of dust pollution, sand wind, volatile waste, projectiles, corrosive materials, excessive vibrations that could damage this equipment. Make sure that the presence of animals does not harm this outdoor equipment (birds' nests, snakes, rodents, insects, etc.). Make sure that the air conditioner is always out of the water and that, as an electrical appliance, it cannot be submerged, even partially.

To ensure perfect PLC operability, regardless of outdoor temperature limits, air conditioner operation is conditioned by a temperature range from -20°C to 60°C in the electrical panel, and a humidity range from 5%RH to 95%RH.

14.4 GROUNDING CONNECTION

The installer of the air conditioner must ensure that the air conditioner is grounded in accordance with applicable standards. The ground connection must be made by a qualified electrician and must comply with electrical safety regulations.

⚠ WARNING
RISK OF IMPROPER GROUNDING **Electric Shock Hazard:** Without proper grounding, electrical currents may flow through unintended paths, posing a significant risk of electric shock to users. **Equipment Damage:** Lack of grounding increases the likelihood of equipment damage due to power surges or other electrical disturbances. **GROUNDING REQUIREMENTS:** **Use Proper Grounding Components:** Utilize appropriate grounding conductors, rods, and connections as recommended by your certified electrical installer. **Regular Inspection:** Periodically inspect the grounding system to verify its integrity and effectiveness. Minimum is 1 inspection per year. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

14.5 AIR FLOW AND DUCTING

Depending on the performance expected by the customer and its application or use, air distribution in the premises must be carried out by a duct network. The design and construction of these ducts is the exclusive responsibility of the customer, and it should be borne in mind that these ducts will have an essential impact on final performance.

The air flow crossing the evaporator, can not be ducted at the entry to the air conditioner. Be sure nothing is closing or limiting the air flow, making no pressure drop. The supply air flow from the air conditioner to the room can be ducted with the limit of 300 Pa of pressure drop. In case of a high pressure drop, please set up the max fan speed to a higher value to compensate this pressure drop.

The air flow crossing the condenser, can not be ducted in any case, as well for the entry or the supply. Be sure nothing is disturbing the air flow.

14.6 CONDENSATE CONNECTION

Connect the condensate pan with a 20mm diameter pipe for condensate drain. The customer is responsible for routing the condensate drain to a suitable outlet.

CAUTION : Condensate water is demineralized and unfit for consumption. Condensate water may be considered polluted depending on the environment.

14.7 POWER WIRING

Power wiring must be carried out by a professional electrician with the required electrical clearance. Before wiring, check that the voltage and frequency of the local mains supply are compatible with the air conditioner.

Before wiring the power, check that all cables and wires comply with international electrical regulations, including color coding.

As reminder, NAYCH products are respecting the IEC 60446 standard, as follow:
Phase (line): Brown
Neutral : Light blue
Earth: Yellow-green

14.8 AUXILIARY CONNECTIONS

Next to the terminal POWER SUPPLY clamps, you can find terminals clamps for RA ALARMS, RS UNIT ON and REMOTE ON-OFF. (check the corresponding electrical circuit diagram).

14.9 START UP

CAUTION : as a reminder, these operations should only be performed by a qualified air conditioning technician. Respect the following sequence of operations. Read the electrical circuit diagram before any intervention.

⚠ WARNING
RISK OF IMPROPER MOUNTING Before starting up the equipment, make sure that all panels, covers and guards are correctly fitted and in their normal operating position. Safety devices must be operational. CAUTION : as a reminder, these operations should only be performed by a qualified air conditioning technician. Respect the following sequence of operations. Read the electrical circuit diagram before any intervention. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The main swtich is OFF. Remove the panel to accede to the electric board. The air conditioner is delivered with the individual protections switched OFF.

1) Turn ON the main IG security switch.
2) We recommend to switch ON the electrical protections one by one.
3) **Check the KPS phase sequence relay, if the yellow light is fix, it means the 3 phases are correctly arranged. If it's not lighting, check your phases arrangement.**
4) Switch ON the QA1 and QA2 protections to turn on the low voltage circuit first.
5) The RHP should be lighting in fix and red.
6) Check if the PLC display is lighting and be sure the UNIT is OFF.
7) Check the correct external communication if applicable (Modbus, TCP/IP, …). Ensure the cyber-security of the communication system to avoid any malicious external intervention.
8) Switch ON the Q1, Q2 and Q5 protections.
9) Check the air conditioner OFF, visual check and noise check.
10) **Before starting the air conditioner, be sure to leave the unit switched on for at least 1 hour to allow the crankcase heater to evaporate any liquid refrigerant and to ensure that the oil is fluid.**

TO START THE UNIT, PLEASE READ THE INSTRUCTIONS IN THE FOLLOWING CHAPTER

14.10 LED SIGNALING ON CONTROLLER

ON – GREEN LIGHT - Power supply LED (P):
- Light is on if the device is powered
- Light is off if the device is not powered

ALARM – RED LIGHT - Operation LED (A):
- Light is on if the application software is running
- Light is off if the application software is not running

ALARM – YELLOW LIGHT - Operation LED (B):
- Light is on if a system alarm resettable via application software is occurring
- Light blinks very slowly if an access in the external flash memory is occurring
- Light blinks slowly if an automatically resettable system alarm is occurring
- Light blinks quickly if a manually resettable system alarm is occurring
- Light is off if no system alarm is occurring

CAN – GREEN LIGHT - Operation LED (C) :
- Light is on if the CANbus communication has not been established
- Light blinks slowly if the CANbus communication is affected by errors
- Light blinks quickly if the CANbus communication is correctly established
- Light is off if no CANbus communication is established

15 CONTROL MANAGEMENT

⚠ WARNING
RISK OF IMPROPER SETTING Setting up the various functions of the air conditioner requires a minimum understanding of the control system and its functions. If you are unfamiliar with the system, you should seek professional assistance. Incorrect settings can have serious consequences in terms of power consumption, equipment deterioration and inapropriate results in terms of temperature and humidity. Incorrect settings can lead to excessive condensation, with serious consequences in terms of water formation when the dew point is reached. To get a good efficiency of your equipment, make it work in a closed environment. The level of airtightness and the level of insulation of the premises will directly impact the performance of your equipment. The adjustment of the set point according to the outside temperature is directly proportional to the energy consumption. The quality of the airtightness of the premises will have a major impact on the level of relative humidity, and the performance of your equipment will be directly affected. A lack of airtightness will have consequences in terms of excessive condensation and a sharp increase in latent cooling capacity to the detriment of total cooling capacity. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The following drawing shows the layout of the remote user interface front.

1 UP key / Scroll up, increase or modify a value, go to next label
2 DOWN key / Scroll dow, decrease or modify a value, go to previous label
3 RIGHT key / Move cursor to right in Edit mode
4 LEFT key / Exit menu page, go back to previous menu, move cursor to left in Edit mode
5 OK key / Scroll down, move to next level or menu, Enter/Exit Edit mode, confirm operation.

Use the UP and DOWN keys to scroll through the menu pages.

REMINDER : Setting up the various functions of the air conditioner requires a minimum understanding of the control system and its functions.

Incorrect settings can have serious consequences in terms of power consumption, equipment deterioration and poor results in terms of temperature and humidity. Incorrect settings can lead to excessive condensation, with serious consequences in terms of water formation when the dew point is reached. If you are unfamiliar with the system, you should seek professional assistance.

15.1 LOCAL DISPLAY

The PLC in the electrical panel has a control screen identical to that of the local remote control. The user terminal is fitted with a graphic LCD single-color display (black with white LED back lighting) of 128 x 64 pixel, to view information on the units' control software.

Information on unit control is organized in the order presented in the following chapters.

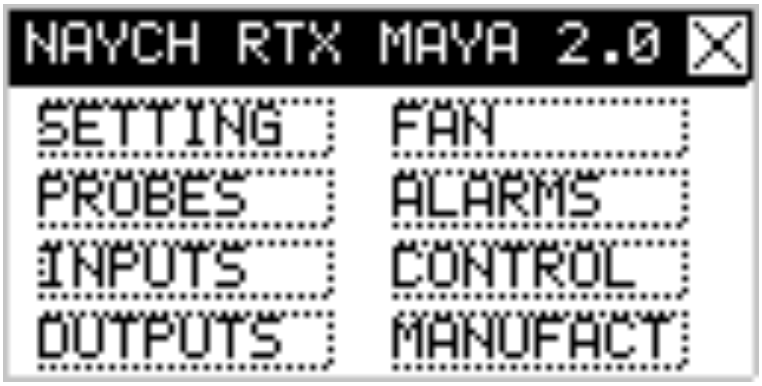
15.2 MAIN PAGE :

The page indicates the all main operating informations of your air conditioner. From this page, you can start or stop your air conditioner, modify heat and cool setpoints, view alarms and go to the MENU page.

15.3 USER MENU :

It enables to access the software management MENU. The MENU organize the parameters into categories for easier user interaction.

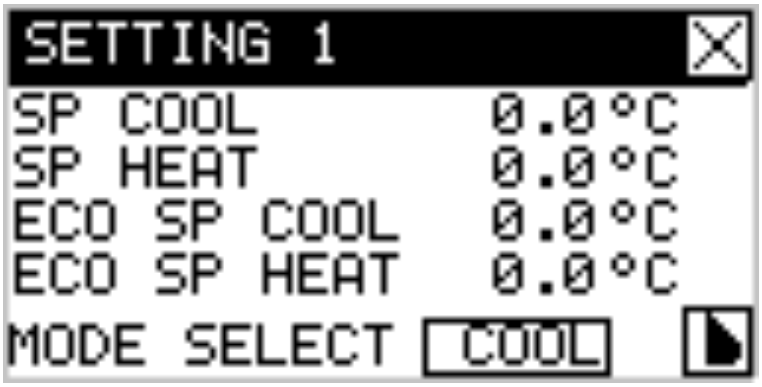
Below, you will find only those parameters that can be set to optimize operation according to the type of use or climatic conditions of the installation site, at the customer's discretion, according to his technical understanding and under his sole responsibility.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
MENU	**PASSWORD**	00010	NUM	9139	R/W	TO ACCEED TO CONTROL MENU

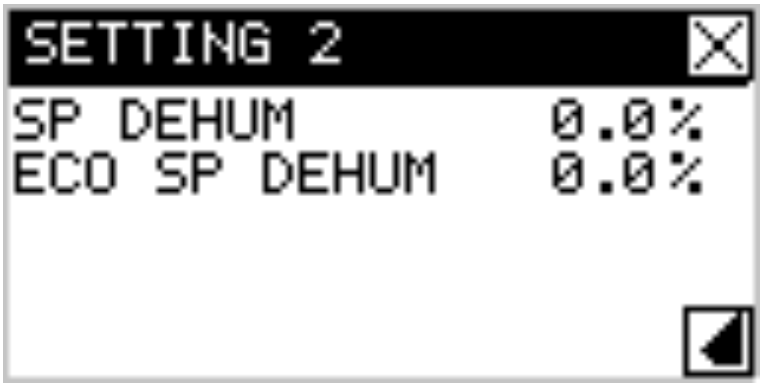
15.4 SETTINGS

The SETTINGS page represents the access to the set points setting. The following information can be displayed within this page.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
SETTING 1	**SP COOL**	20	°C	16412	R/W	SET POINT ON COOLING MODE
SETTING 1	**SP HEAT**	15	°C	16414	R/W	SET POINT ON HEATING MODE
SETTING 1	**ECO SP COOL**	25	°C	16413	R/W	SET POINT ON ECO COOLING MODE
SETTING 1	**ECO SP HEAT**	10	°C	16415	R/W	SET POINT ON ECO HEATING MODE
SETTING 1	**MODE SELECT**	AUTO	BOOL	16387	R/W	SELECTOR MODE – COOL – HEAT - AUTO

TECHNICAL ADVICE : Considering the cooling mode, a low set point will increase the risk of condensation and the energy consumption, this risk will be even greater when the difference between the outside temperature and the inside temperature is high. Considering the heating mode, a high set point will hardly increase the energy consumption. The humidity level also impacts the thermal performance of your equipment, as well as its consumption. It is the customer's responsibility to determine the correct setpoint and settings for his particular application.

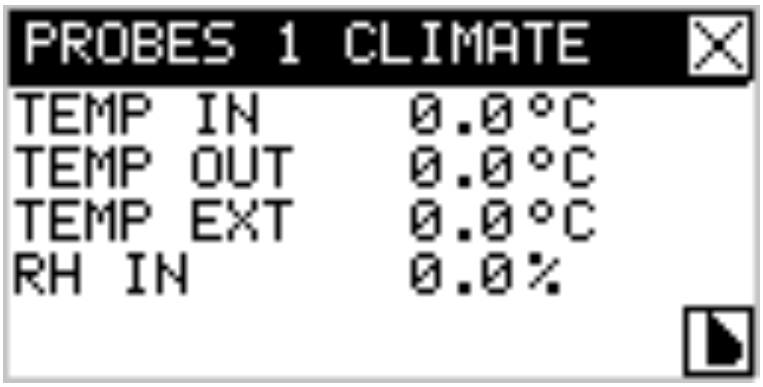


MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
SETTING 2	**SP DEHUM**	55	%RH	16418	R/W	SET POINT ON DEHUMIDIFICATION MODE
SETTING 2	**ECO SP DEHUM**	70	%RH	16419	R/W	SET POINT ON ECO DEHUMIDIFICATION MODE

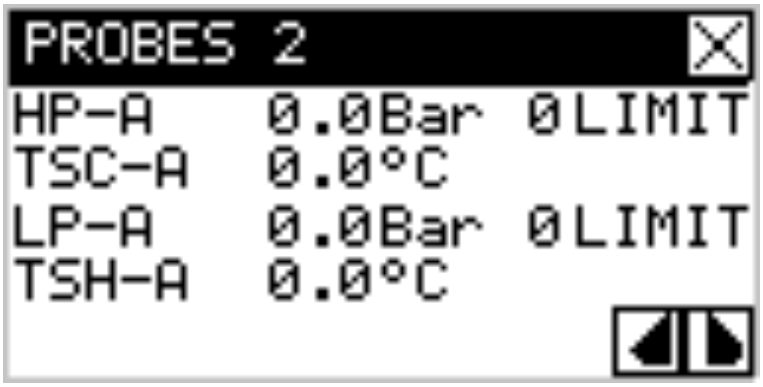
TECHNICAL ADVICE : Considering the dehumidification mode, a low set point will hardly increase the energy consumption. Energy consumption and dehumidification performance are directly linked to the airtightness of the premises and the volume to be treated. It is the customer's responsibility to determine the correct setpoint and settings for his application.

15.5 PROBES

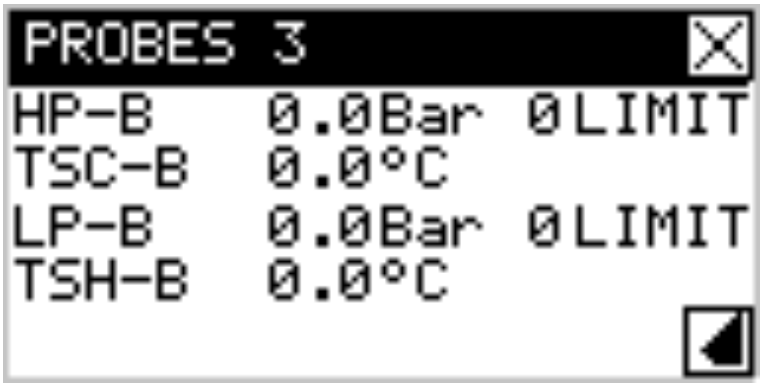
The PROBES pages indicate the probes reading values.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
PROBES 1	**TEMP IN**	ANALOG	°C	8336	R	AIR ENTRY TEMPERATURE FROM ROOM TO AIR CONDITIONER
PROBES 1	**TEMP OUT**	ANALOG	°C	8337	R	AIR SUPPLY TEMPERATURE FROM AIR CONDITIONER TO ROOM
PROBES 1	**TEMP EXT**	ANALOG	°C	8338	R	EXTERNAL AIR TEMPERATURE
PROBES 1	**RH IN**	ANALOG	%RH	8342	R	AIR ENTRY % HUMIDITY FROM ROOM TO AIR CONDITIONER



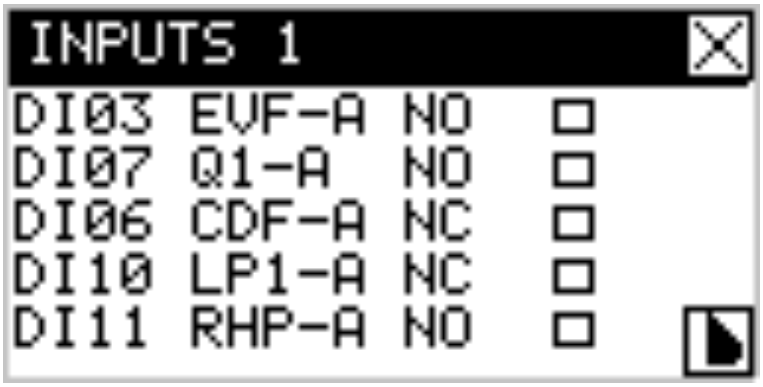
MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
PROBES 2	**HP-A**	ANALOG	Bar	8344	R	HIGH PRESSURE ON COOLING CIRCUIT A
PROBES 2	**TSC_A**	ANALOG	°C	9020	R	SUBCOOLING TEMPERATURE ON COOLING CIRCUIT A
PROBES 2	**HP-A LIMIT**	0	BOOL	8992	R	HIGH PRESSURE TREESHOLD LIMIT ON COOLING CIRCUIT A
PROBES 2	**LP-A**	ANALOG	Bar	8345	R	LOW PRESSURE ON COOLING CIRCUIT A
PROBES 2	**TSH-A**	ANALOG	°C	8340	R	SUPERHEAT TEMPERATURE ON COOLING CIRCUIT A
PROBES 2	**LP-A LIMIT**	0	BOOL	8993	R	LOW PRESSURE TREESHOLD LIMIT ON COOLING CIRCUIT A



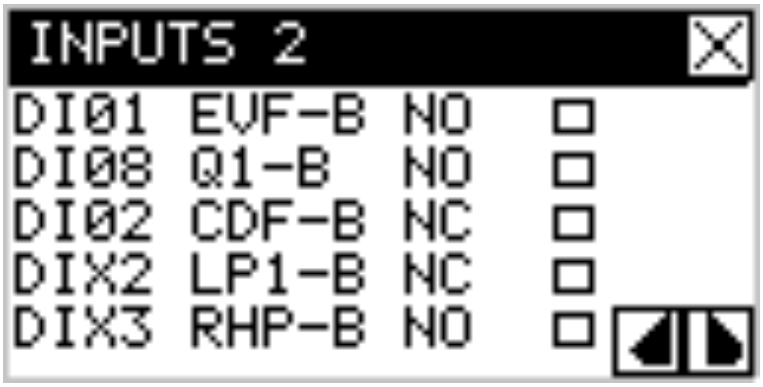
MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
PROBES 3	**HP-B**	ANALOG	Bar	8346	R	HIGH PRESSURE ON COOLING CIRCUIT B
PROBES 3	**TSC_B**	ANALOG	°C	9121	R	SUBCOOLING TEMPERATURE ON COOLING CIRCUIT B
PROBES 3	**HP-B LIMIT**	0	BOOL	9133	R	HIGH PRESSURE TREESHOLD LIMIT ON COOLING CIRCUIT B
PROBES 3	**LP-B**	ANALOG	Bar	8347	R	LOW PRESSURE ON COOLING CIRCUIT B
PROBES 3	**TSH-B**	ANALOG	°C	9122	R	SUPERHEAT TEMPERATURE ON COOLING CIRCUIT B
PROBES 3	**LP-B LIMIT**	0	BOOL	9134	R	LOW PRESSURE TREESHOLD LIMIT ON COOLING CIRCUIT B

15.6 INPUTS

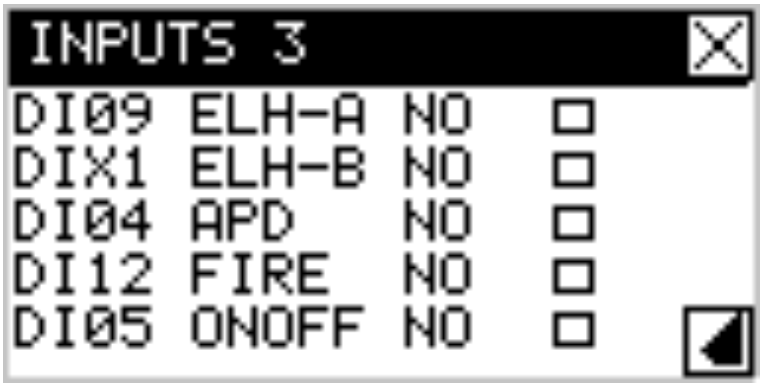
The INPUTS pages indicate the digital input signals of the components.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
INPUTS 1	**DI03 EVF-A NO**	0	BOOL	8194	R	EVAPORATOR FAN A DEFAULT ENTRY
INPUTS 1	**DI07 Q1-A NO**	0	BOOL	8198	R	COMPRESSOR THERMAL Q1-A DEFAULT
INPUTS 1	**DI06 CDF-A NC**	1	BOOL	8197	R	CONDENSER FAN A DEFAULT ENTRY
INPUTS 1	**DI10 LP1-A NC**	1	BOOL	8201	R	LOW PRESSURE SWITCH ALARM LP1-A
INPUTS 1	**DI11 RHP-A NO**	0	BOOL	8202	R	HIGH PRESSURE SWITCH ALARM RHP-A



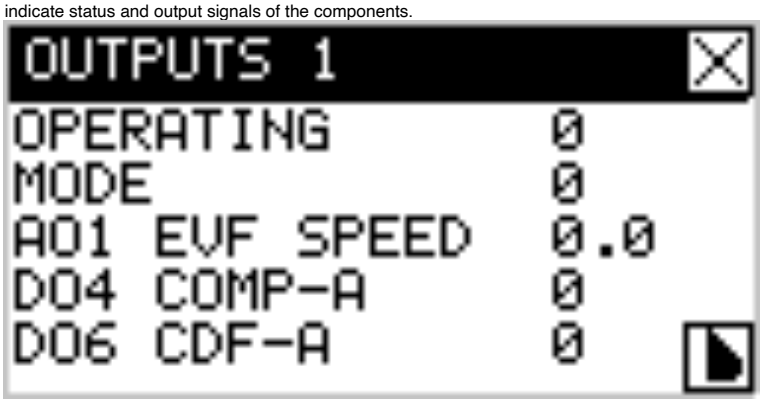
MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
INPUTS 2	**DI01 EVF-B NO**	0	BOOL	8192	R	EVAPORATOR FAN B DEFAULT ENTRY
INPUTS 2	**DI08 Q1-B NO**	0	BOOL	8199	R	COMPRESSOR THERMAL Q1-B DEFAULT
INPUTS 2	**DI02 CDF-B NC**	1	BOOL	8193	R	CONDENSER FAN B DEFAULT ENTRY
INPUTS 2	**DIX2 LP1-B NC**	1	BOOL	9141	R	LOW PRESSURE SWITCH ALARM LP1-B
INPUTS 2	**DIX3 RHP-B NO**	0	BOOL	9142	R	HIGH PRESSURE SWITCH ALARM RHP-B



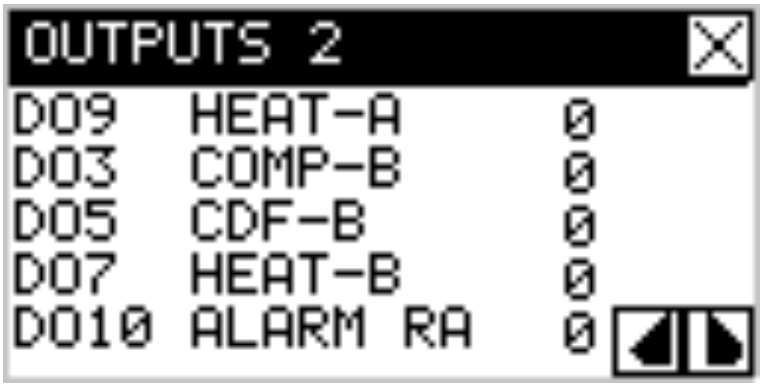
MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
INPUTS 3	**DI09 ELH-A NO**	0	BOOL	8200	R	ELECTRIC HEATERS SECURITY SWITCH ALARM ELH-A
INPUTS 3	**DIX1 ELH-B NO**	0	BOOL	9140	R	ELECTRIC HEATERS SECURITY SWITCH ALARM ELH-B
INPUTS 3	**DI04 APD NO**	0	BOOL	8195	R	AIR PRESSURE DIFFERENTIAL ALARM
INPUTS 3	**DI12 FIRE NO**	0	BOOL	8203	R	FIRE ALARM
INPUTS 3	**DI05 ONOFF NO**	0	BOOL	8196	R	UNIT OFF BY DI5 CONTACT – EMERGENCY OFF -

15.7 OUTPUTS

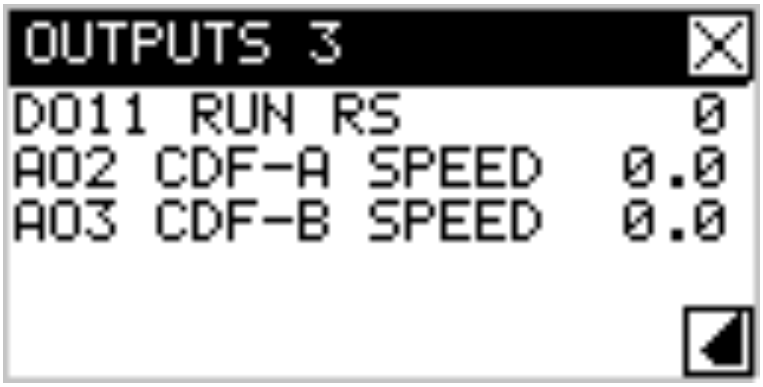
The OUTPUTS pages indicate status and output signals of the components.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
OUTPUTS 1	**OPERATING**	0	BOOL	16386	R	OPERATING MODE INDICATOR
OUTPUTS 1	**MODE**	0	BOOL	16387	R	THERMAL MODE INDICATOR
OUTPUTS 1	**AO1 EVF SPEED**	ANALOG	BOOL	8448	R	EVAPORATOR FAN SPEED
OUTPUTS 1	**DO4 COMP-A**	0	BOOL	8531	R	COMPRESSOR A ON
OUTPUTS 1	**D06 CDF-A**	0	BOOL	8533	R	CONDENSER FAN A ON



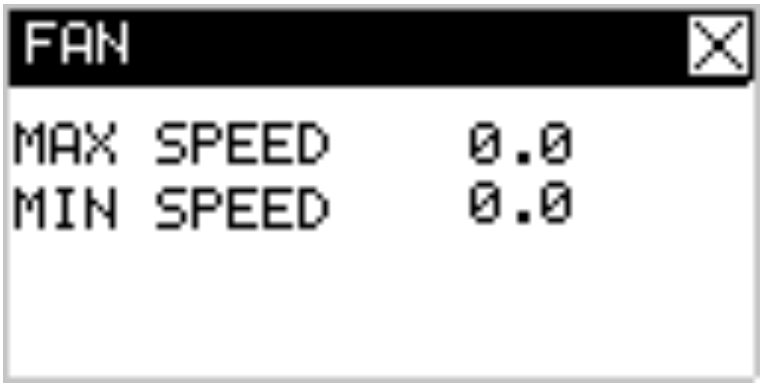
MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
OUTPUTS 2	**DO9 HEAT-A**	0	BOOL	8536	R	ELECTRIC HEATER A ON
OUTPUTS 2	**D03 COMP-B**	0	BOOL	8530	R	COMPRESSOR B ON
OUTPUTS 2	**DO5 CDF-B**	0	BOOL	8532	R	CONDENSER FAN B ON
OUTPUTS 2	**DO7 HEAT-B**	0	BOOL	8534	R	ELECTRIC HEATER B ON
OUTPUTS 2	**DO10 ALARM RA**	0	BOOL	8537	R	ALARM RELAY ON



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
OUTPUTS 3	**DO11 RUN RS**	0	BOOL	8538	R	OPERATING RELAY ON
OUTPUTS 3	**AO2 CDF-A SPEED**	ANALOG	%	8449	R	CONDENSER FAN A SPEED
OUTPUTS 3	**AO3 CDF-B SPEED**	ANALOG	%	8450	R	CONDENSER FAN B SPEED

15.8 FAN SETTING

The FAN SETTING page indicates the radial fans (EVF) possibility limits setted by the user.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
FAN	**MAX SPEED**	30	%	16433	R/W	EVAPORATOR FAN MAX SPEED LIMIT
FAN	**MIN SPEED**	60	%	16402	R/W	EVAPORATOR FAN MIN SPEED LIMIT

TECHNICAL ADVISE : MINIMUM and MAXIMUM speed settings must be carefully considered. An insufficient MINIMUM speed can increase dehumidification capacity and limit cooling capacity, and should be determined in proportion to the aeraulic network. A MAXIMUM speed that is too high can have a major impact on power consumption, noise levels and the risk of condensation droplets being projected. Equipment is factory-limited to between 30% and 80%.

15.9 ALARM PAGE

The Alarms page shows the type of alarm signal and the date and time it was triggered.

- **To exit the alarm page and return to the main menu, press the left arrow for 3 seconds.**
- **To clear an alarm, place the cursor on the RESET button and press the OK button for 5 seconds.**

15.10 CONTROLS

This page is accessible with password 0010.

Any changes made to CONTROL page parameters may affect the equipment's operation. Any new parameter setting must be preceded by a needs analysis. These settings are the exclusive responsibility of the customer.

MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
CONTROL 1	**NEUTRAL ZONE**	1,0	°C	16439	R/W	NEUTRAL ZONE
CONTROL 1	**PROPBAND COOL**	2,0	°C	16443	R/W	COOLING PROPORTIONAL BAND
CONTROL 1	**PROPBAND HEAT**	2,0	°C	16448	R/W	HEATING PROPORTIONAL BAND

TECHNICAL ADVICE: These settings are decisive for the stability of the temperature control.

15.10.1 NEUTRAL ZONE

To avoid untimely cooling or heating demand in the vicinity of the control setpoint, it is possible to configure a control neutral zone which will deviate the control start point from the setpoint.

By setting the "Neutral zone" parameter in terms of temperature, you can configure the temperature control neutral zone.
This function is ideal for the applications with high variable thermal loads, when over-regulation may occur close to the setpoints.

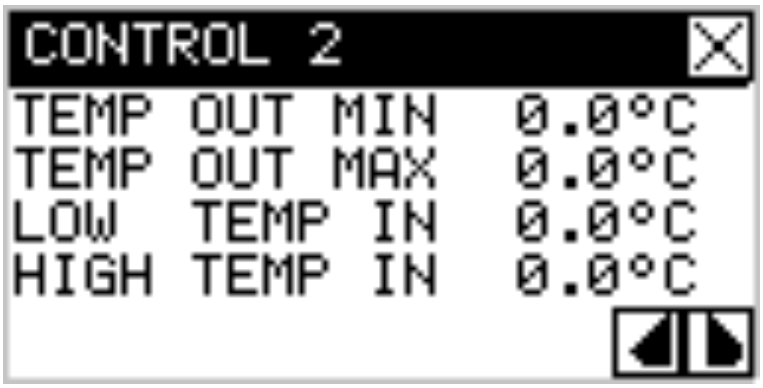
15.10.2 PROPORTIONAL BANDS

It corresponds to a period of time between minimum and maximum speed. The proportional band is expressed in temperature, i.e. the radial fan (EVF) accelerates or decelerates according to the temperature difference obtained between the setpoint + neutral zone and the air inlet temperature TIN.

The proportional band modulates the speed of the radial fan (EVF) linearly from minimum to maximum speed. The further the control temperature is from the setpoint, the higher the fan speed; conversely, the closer the control temperature is to the setpoint, the lower the fan speed.

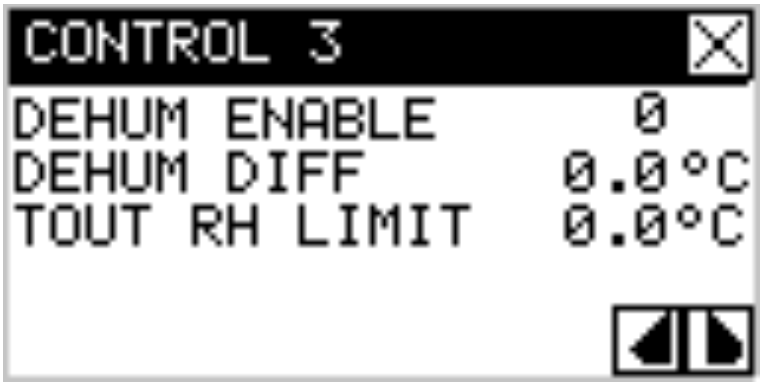
The maximum radial fan speed (EVF) is the value corresponding to the activation of the thermal components. Depending on the cooling or heating demand, this means activation of the compressor or radiators.

The benefits are energy savings when thermal power is not required or static air pressure is not needed, and reduced noise levels.



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
CONTROL 2	**TEMP OUT MIN**	6	°C	16444	R/W	MINIMUM TEMPERATURE FROM AIR CONDITIONER TO ROOM
CONTROL 2	**TEMP OUT MAX**	50	°C	16449	R/W	MAXIMUM TEMPERATURE FROM AIR CONDITIONER TO ROOM

CONTROL 2	**LOW TEMP IN**	10	°C	16460	R/W	MINIMUM TEMPERATURE FROM ROOM TO AIR CONDITIONER
CONTROL 2	**HIGH TEMP IN**	35	°C	16459	R/W	MAXIMUM TEMPERATURE FROM ROOM TO AIR CONDITIONER



MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
CONTROL 3	**DEHUM ENABLE**	0	BOOL	16712	R/W	DEHUMIDIFICATION MODE ENABLE
CONTROL 3	**DEHUM DIFF**	5	%RH	16482	R/W	DEHUMIDIFICATION DIFFERENTIAL
CONTROL 3	**TOUT RH LIMIT**	7	°C	16422	R/W	AIR SUPPLY TEMPERATURE LIMIT ON DEHUMIDIFICATION MODE

MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
CONTROL 4	**FILT RUN TIME**	1000	H	16655	R/W	FILTER RUN TIME
CONTROL 4	**FILT MAX ALARM**	1300	H	16654	R/W	FILTER RUN TIME ALARM
CONTROL 4	**AUTO RESTART**	0	BOOL	16393	R/W	AUTO RESTART AFTER POWER LOSS

15.10.3 AUTO RESTART

⚠ WARNING

ROTATING ELEMENTS UNDER ELECTRICAL VOLTAGE

- **SWITCHING OFF:** Activation of the AUTO RESTART function represents a potentially serious hazard if left unattended by a service technician. As a reminder, all work on the equipment must be carried out with the power off, and power must be restored only when all protective elements have been correctly replaced.
-

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The AUTO RESTART function can be enabled or disabled, YES or NO.

ENABLE AUTO RESTART: The controller resumes its functions in the state it was in before the power failure.

A machine that was switched off before the power failure will remain switched off.

DISABLE AUTO RESTART: The controller will switch the machine OFF when power is restored.

MENU PAGE	FUNCTION	DEFAULT VALUE	VALUE TYPE	MODBUS ADR	ADR TYPE	VARIABLE DESCRIPTION
CONTROL 5	**HOUR**	0	NUM	9065	R/W	HOUR SETTING
CONTROL 5	**MINUTES**	0	NUM	9156	R/W	MINUTES SETTING
CONTROL 5	**DAY**	0	NUM	9068	R/W	DAY SETTING
CONTROL 5	**MONTH**	0	NUM	9067	R/W	MONTH SETTING
CONTROL 5	**YEAR**	0	NUM	9066	R/W	YEAR SETTING

15.11 ALARMS

Alarms can be accessed from the main menu by clicking on the warning logo. There may be a single alarm or several.
These alarms indicate the date and time of their activation. This information is important for subsequent analysis of a fault sequence.

- **To reset the alarms, press the OK button for 5 seconds.**
- **In the alarms page, to return to the MENU page, press the LEFT arrow for 3 seconds.**

LABEL	ACTION
Q1-A THERMAL	Compressor A thermal magneto OFF
Q1-B THERMAL	Compressor B thermal magneto OFF
COMP-A OFF BY ALARM	A fault commands compressor shutdown A
COMP-B OFF BY ALARM	A fault commands compressor shutdown B
HPT-A ALARM	High-pressure threshold reached by HP transducer
LPT-A ALARM	Low-pressure threshold reached by LP transducer
HPT-B ALARM	High-pressure threshold reached by HP transducer
LPT-B ALARM	Low-pressure threshold reached by LP transducer
HP-A SWITCH ALARM	Mechanical high-pressure switch A activated
HP-B SWITCH ALARM	Mechanical high-pressure switch B activated
LP1-A SWITCH ALARM	Mechanical low-pressure switch A activated
LP1-B SWITCH ALARM	Mechanical low-pressure switch B activated
CDF-A THERMAL	Condenser fan A thermal magneto OFF or internal default
CDF-A THERMAL	Condenser fan B thermal magneto OFF or internal default
TEXT SENSOR DEFAULT	External NTC sensor reading error or faulty

TIN SENSOR DEFAULT	Inlet air from room NTC sensor reading error or faulty
TOUT SENSOR DEFAULT	Supply air to room NTC sensor reading error or faulty
SRH DEFAULT	Humidity probe reading error or faulty
TSC-A DEFAULT	Subcooling A NTC sensor reading error or faulty
TSC-B DEFAULT	Subcooling B NTC sensor reading error or faulty
TSH-A DEFAULT	Superheat A NTC sensor reading error or faulty
TSH-B DEFAULT	Superheat B NTC sensor reading error or faulty
HEATERS SECURITY	Heating element thermal safety thermostat activated
RHP-A ALARM	HP A Relay default
RHP-B ALARM	HP A Relay default
APD ALARM	Air Pressure Differential activated
THERMOREGULATION ANOMALY	Control logic fault / parameter setting fault
EVF-A THERMAL	Evaporator fan A thermal magneto OFF or internal default
EVF-B THERMAL	Evaporator fan B thermal magneto OFF or internal default
TEMP OUT LOW LIMIT	Low temperature threshold reached at air outlet
TEMP OUT HIGH LIMIT	high temperature threshold reached at air outlet
TEMP IN LOW LIMIT	Low temperature threshold reached at air inlet
TEMP IN HIGH LIMIT	High temperature threshold reached at air inlet
LOW HUMIDITY LIMIT	Low humidity threshold reached at air inlet
HIGH HUMIDITY LIMIT	High humidity threshold reached at air inlet
STOP COMMAND	External stop command, 24VAC on DI5
FIRE - SMOKE ALARM DI12	Smoke or Fire detection activated, 24VAC on DI12.

15.12 VENTILATION PARAMETERS

Pre-ventilation is the best way to get an accurate indication of air intake conditions and determine the operating mode. Post-ventilation is essential to dissipate thermal loads during shutdown.

FUNCTION	TIMING	OPERATION
PRE-VENTILATION TIME	15 secondes	VENTILATING TIME AT FIRST START BEFORE MODE ACTIVATION
POST VENTILATION	30 secondes	VENTILATING TIME AFTER SWITCH ON THE AIR CONDITIONER

16 TEMPERATURE REGULATION

16.1 TEMPERATURE CONTROL TYPE

The air conditioner regulates temperature using PROPORTIONAL logic, based on the TIN air intake sensor. Temperature control is the primary mode, dehumidification mode is always secondary. Dehumidification mode is always secondary, i.e. it becomes operative as soon as the set temperature is reached.

16.2 TEMPERATURE SET POINT LIMITS

The air-conditioning setpoint is limited in cooling mode to between 14°C and 30°C and in heating mode to between 10°C and 25°C.

16.3 DEHUMIDIFICATION SET POINTS LIMITS

The air-conditioning setpoint is limited in dehumidification mode to between 30% and 90%RH.

16.4 COMPRESSORS LIMITS

The minimum compressor running time is 6 seconds. The minimum compressor stop time between 2 operating ranges is 180 seconds. The number of compressor starts per hour is limited to 8. For each compressor.

The time interval between the engagement of compressor A and compressor B is factory-set to 180 seconds.

16.5 PRESSURE LIMITS

When pressures approach the safety pressure limits, an alarm is transmitted to indicate the following values :

GAS TYPE	CODE	FUNCTION	LIMIT VALUE
R513A	HPT	HIGH PRESSURE LIMIT	24 BARS
R513A	LPT	LOW PRESSURE LIMIT	1 BAR
R32	HPT	HIGH PRESSURE LIMIT	40 BARS
R32	LPT	LOW PRESSURE LIMIT	4 BARS

The number of low pressure LP autoreset alarms per hour is limited to 5 before the air conditioner trips. The delay for LP alarm is 2 seconds.

16.6 PRE VENTILATION

Pre-ventilation corresponds to a minimum operating time before the start of cooling or heating mode. This time is factory-set to 15 seconds.

16.7 FAN CONDENSER REGULATION

Condenser operation is controlled by pressure measurements in the high-pressure circuit.
The factory -set switch ON and switch OFF values are as follows:

GAS TYPE	CODE	FUNCTION	THRESHOLD
R513A	SWITCH-OFF	CONDENSER STOP	7 BARS
R513A	SWITCH-ON	CONDENSER START	15 BARS
R32	SWITCH-OFF	CONDENSER STOP	20 BARS
R32	SWITCH-ON	CONDENSER START	35 BARS

If the air conditioner is equipped with proportional control, the fan speed variation will be linear between the shutdown threshold and the switch ON threshold, which corresponds to the maximum speed.

16.8 AUTO CHANGE OVER

If factory-set AUTO mode is selected, the mode changeover between heating and cooling is governed by the following values:

CODE	FUNCTION	VALUE
CHANGE OVER COOL	FROM HEAT TO COOL	2°C
CHANGE OVER HEAT	FROM COOL TO HEAT	-2°C

16.9 PRESSURE CIRCUIT SAFETY DEVICES

Each refrigeration circuit has a low-pressure circuit pressure switch and a high-pressure safety pressure switch.

SPARE CODE : SP_F_0066	NORMAL POSITION	TRESHOLD	SECURITY POSITION	LP AUTO RESET
LOW PRESSURE SWITCH (R513A)	OPEN (NC)	0,5 bars (+ or - 0,3b)	CLOSED	1,5 bars (+ or - 0,3b)
SPARE CODE : SP_F_0067	**NORMAL POSITION**	**TRESHOLD**	**SECURITY POSITION**	**MANUAL RESET**
HIGH PRESSURE SWITCH (R513A)	CLOSED (NC)	28 bars (+ or - 1b)	OPEN	MANUAL < 20 bars

SPARE CODE : SP_F_0004	NORMAL POSITION	TRESHOLD	SECURITY POSITION	LP AUTO RESET
LOW PRESSURE SWITCH (R32)	OPEN (NC)	2,5 bars (+ or - 0,3b)	CLOSED	3,5 bars (+ or - 0,3b)
SPARE CODE : SP_F_0005	**NORMAL POSITION**	**TRESHOLD**	**SECURITY POSITION**	**MANUAL RESET**

HIGH PRESSURE SWITCH (R32)	CLOSED (NC)	40,5 bars (+ or - 1b)	OPEN	MANUAL < 33 bars

16.10 ETHERNET

We would like to draw your attention once again to the risk of cyber-attack and malicious takeover of your equipment. The customer remains solely responsible for the level of security he implements to make his equipment communicative.

- Disclosing your equipment's access protocols, addresses and passwords exposes you to attacks or malicious use of your equipment.
- The decision to make its equipment communicative is the sole responsibility of the customer.

Initial PLC ethernet setting is :

Default FTP port number :	65535
Default HTTP port number :	0
Default ETHERNET TCP/IP port number :	502
Default ETHERNET IP address :	10.0.0.100
Default ETHERNET gateway :	10.0.0.1
Default ETHERNET net mask :	255.255.255.0
Default ETHERNET primary DNS :	8.8.8.8
Default ETHERNET secondary DNS :	8.8.4.4
ID	administrator
PASSWORD	newpass

17 PREVENTIVE MAINTENANCE

17.1 RISK PREVENTION

At the customer's exclusive expense, a compliant maintenance to the standard EN ISO 378 is mandatory to avoid any risk for persons, the environment and the good unit operability.

17.2 GENERAL SAFETY CONDITIONS

Maintenance operations must be performed by qualified technical personnel who possesses, skills in cooling systems and the legal requirements and operating in compliance with safety regulations.

Before performing any work on the unit or access to internal components, make sure to remove the power supply.

When compressor is running, the flow line can be very hot or very cold with a risk of scalding in the event of contact.

Accidental contact with the fins of the heat exchanger inside the air conditioner can cause cuts. To avoid this danger, is always recommended to use appropriate gloves for the filter maintenance.

The wearing of Personal protective equipment (PPE) is the exclusive responsibility of the project owner. Personal protective equipment (PPE) may not be necessary for routine maintenance of an air conditioner. However, if you are conducting more advanced maintenance procedures or repairs, the following personal protective equipment may be recommended:

Eye Protection: When working with an air conditioner, there is always a risk of debris or chemicals getting into your eyes. Wear safety goggles or glasses to protect your eyes.

Gloves: Wear gloves when handling refrigerants, chemicals, or sharp components to protect your hands.

Respirator Mask: Some maintenance procedures, such as cleaning or replacing air filters, can generate dust or other particles that can be harmful to breathe. A respirator mask can protect you from inhaling these particles.

Protective Clothing: Wearing long sleeves and pants can protect your skin from chemicals or sharp components.

Always follow the manufacturer's instructions and recommended safety procedures when working on an air conditioner. If you are unsure about what PPE is necessary, consult with a professional HVAC technician.

17.3 MAINTENANCE SCHEDULING

Maintenance starts from the first day the equipment is put into service.

It's important to have periodic inspections to maintain unit efficiency and reduce potential failures: some can be made directly by the user and are basically cleaning activities, others require the intervention of specialized technicians and are carried out as inspections.

The definition of the time interval between two maintenance interventions is at the exclusive discretion of the user with regard to the level of soiling and solicitation of the equipment. The frequency of inspections must be at least semiannually. The frequency however depends on the type of use: in the case of continuous use, highly intermittent, close to the operating limits or serving critical applications it is good to include inspections at monthly intervals.

It is advisable to keep a machine book on which track the operations performed on the unit, it's a useful tool for schedule interventions properly and facilitate any troubleshooting analysis.

17.4 REFRIGERATION TOOLS AND SUPPLIES

An effective preventive and corrective maintenance requires refrigeration technicians to have at least the following equipment

Refrigeration Tools

- **High and Low Pressure Manifold with Hoses**: For measuring high and low pressures of refrigerant.
- **Electronic Leak Detector**: For detecting refrigerant leaks.
- **Vacuum Pump (>150 L/h)**: For evacuating air and moisture from the system.
- **Vacuum Gauge**: For measuring the level of vacuum in the system.
- **Gas Recovery Unit**: For recovering refrigerant during maintenance.
- **Charging Scale**: For weighing refrigerant during charging.
- **Oxygen-Acetylene Torch Set S5 1m³**: For welding and brazing.
- **Nitrogen Regulator (35 bars)**: For controlling the pressure of nitrogen used for leak testing.
- **Contact Thermometer**: For measuring surface temperatures.
- **Air Thermostat with Sensor**: For measuring air temperature.
- **AC/DC Multimeter**: For measuring electrical currents in AC and DC.
- **2 Adjustable Wrenches (33 mm and 41 mm)**: For tightening and loosening components.
- **Set of Open-End Wrenches (6 to 32 mm)**: For various bolts and nuts.
- **Set of Hex Keys (3/32 - 3/8)**: For hexagon-headed screws.
- **Set of Screwdrivers (1000 V)**: For screws, with insulation for working under voltage.
- **Schrader Valve Remover**: For removing and replacing Schrader valves.
- **Wire Cutters**: For cutting wires or cables.
- **Combination Pliers**: For gripping and holding various objects.
- **Needle-Nose Pliers**: For working in tight spaces.
- **Electrical Extension Cords**: For powering tools.

Supplies

- **Nitrogen Cylinder (50 L)**: For pressure testing and purging.
- **Corresponding Refrigerant (14 kg or more)**: For recharging the system.
- **Recovery Cylinder**: For storing recovered refrigerant.
- **Refrigerant Oil**: For lubricating system components.
- **Brazing Rod**: For brazing operations.
- **Brazing Flux**: For preparing brazing surfaces.
- **Blue Thread Lock**: For securing screws and preventing leaks.
- **Blue Paste**: For facilitating brazing and preventing leaks.

17.5 ELECTRICAL CHECKING

Inspect the inside of the electrical panel, blow with compressed air the moving and fixed contacts of the contactors, check the status of the contacts of the power contactors, check the electrical connections within and outside the power terminal tightening and electronic cabling.

Verify the supply voltages at no load and under load, check the absorption of individual electrical loads, fans, compressors, electric heaters, humidifiers.

Control the reading of the temperature sensors and if necessary to arrange for their calibration.

17.6 FILTERS CHECKING

The frequency of this operation depends on the dustiness of the air intake, it's still a good practice to never exceed a period of 30 days between cleaning sessions.

The filter G4 can be cleaned with compressed air to blow on the filter in the opposite direction to air crossing. If using an aspirator you must instead clean the filter from the inlet. Then wash the filter body using lukewarm water and normal detergent and dry it in an accurate manner. This operation can be carried out for 10-12 times, then the filters must be replaced.

Excessively dirty filters cause decrease in air flow and cooling performance, excessive drying, probability of battery freezing or frosting, activation of the low pressure and system locking, possibility of failure for the return of refrigerant not completely evaporated to the compressor.

Periodically clean with a damp cloth the air intake.

17.7 FANS CHECKING

Check general condition of the fan blades and any presence of accumulation of dust. Make sure that fans are always well fixed to the frame of the unit and that there are no unusual noise coming from the bearings.

17.8 EVAPORATOR COIL CLEANING

Clean the evaporator coil from dust and lint using a vacuum cleaner and an air compressor. It's also advisable to wash the outer surfaces of the coil with soap solution followed by flushing with tap water. Clean any sediment present into the condensate drain, spray sanitizing product, leave on and flush with water controlling the regular drain flow. Make sure that the cleaning products are compatible with copper, with aluminum and with the protective treatments present on the coil.

- *DO NOT USE HIGH PRESSURE WATER CLEANER.*

17.9 CONDENSER COIL CLEANING

The cleaning of the condenser is needed to prevent that the machine works at a higher pressure with a decrease in efficiency of the air conditioner and with the risk of locking due to the high pressure. **Please, consider that the air flow is important during cooling mode and the risk of clogging can be rapid, depending on the quality of the surrounding atmosphere.**
Clean the condenser exchanger from dust and lint using a vacuum cleaner and an air compressor. It's also advisable to wash the outer surfaces of the coil with soap solution followed by flushing with tap water. Clean any sediment present into the condensate collection tank, spray sanitizing product, leave on and flush with water controlling the regular drain flow. Make sure that the cleaning products are compatible with copper, with aluminum and with the protective treatments present on the exchangers.

- *DO NOT USE HIGH PRESSURE WATER CLEANER.*

17.10 GENERAL CLEANING

Air conditioner cleaning is not limited to the coils. To avoid any risk of corrosion, the outer casing and components must also be cleaned. This is particularly important in areas subject to salty atmospheres, dust or sandy winds.

In such cases, we recommend using clear water for cleaning. The frequency of cleaning should be decided by the customer, with a minimum of one cleaning per year.

Metal surfaces and paintwork should be cleaned at least once a year. The frequency of cleaning depends on the environment and the concentration of dirt on the surface. The more frequent the cleaning, the easier and more economical it is.

17.11 COOLING CIRCUIT

Visually inspect the cooling system for signs of oil, or signs of F-GAS leaks. In this case, check with a suitable detector.
To check that the refrigerant charge is correct, measure the subcooling temperature of the fluid in liquid phase leaving the condenser. 2 minutes after compressor start, the glass placed on the the liquid line, must always appear clear and transparent, even if a slight presence of bubbles is still acceptable. The intense passage of bubbles indicates instead low subcooling and low charge. Measure and record (with machine operating) on the unit book the following operating parameters :

- Air intake temperature and outlet temperature
- Suction pressure
- Suction compressor temperature
- Condensing pressure
- Compressor discharge temperature
- Temperature of the liquid refrigerant before the thermostatic valve
- Temperature difference over the filter drier
- External air temperature at the condenser inlet and outlet for air-cooled machines

The analysis of these parameters will determine if the machine is working properly, and the comparison of the data collected through time allows to detect the presence of anomalies or failures.

17.12 SEALS, GASKETS, LUBRICATION AND POLLUTION

A detailed and regular check of all air and water tightness points is essential to guarantee the performance of your air conditioner. Sealing elements showing signs of deterioration must be replaced or repaired immediately.

Cleaning against particles and lubricating all moving components is essential to guarantee the performance of your air conditioner.

17.13 PREVENTIVE MAINTENANCE PROGRAM

The following information concerning the preventive maintenance schedule is not exhaustive, in all cases, the assessment of the level of clogging of the filters and exchangers is the exclusive responsibility of the customer. As a professional, the customer must take into account the environment and the time of solicitation of the equipment, in any case, the annual maintenance remains mandatory within the framework of the guarantee.

To counter the risks inherent in vibration and expansion, permanent or intensive operation requires regular checks of all tightening and screwing points, such as electrical and refrigeration connections.

Maintenance procedure with machine stopped ⚠ MAINTENANCE TECHNICIANS ONLY ⚠			
CHECK	**CONTROL**	**RECOMMEND FREQUENCY**	**MINIMUM FREQUENCY**
Gaskets	Check sealing and condition of gaskets	6 months	**Annually**
Drains cleaning	Check and eventually clearing drains from condensate and other cause of clogging	6 months	**6 months**
Filters cleaning	Check filters condition and, if needed, wash or change them	3 months	**6 months**
Evaporator coil cleaning	Clean battery and condensate collecting tank from dust and dirt	3 months	**6 months**
Condenser coil cleaning	Check and clean battery with a strong jet of cold water	3 months	**6 months**
Electrical check	Inspect the inside of electrical panel and check the status of components and wiring. Clean from dust.	6 months	**Annually**

Heaters cleaning	Check and eventually clean the heaters from dust or any cause of clogging	6 months	**Annually**
Leakage detection	Using an adapted gas detector, control the possible gas leakage around all the cooling parts. Check some oil presence bellow the cooling parts	6 months	**Annually**
General cleaning	Inspect all your equipment regularly, and clean up any salt deposits that may represent a risk of corrosion on any part or component.	6 months	**Annually**

Maintenance procedure with machine operating ⚠ REFRIGERATION CERTIFIED TECHNICIANS ONLY ⚠			
CHECK	**CONTROL**	**RECOMMEND FREQUENCY**	**MINIMUM FREQUENCY**
Subcooling measure	Pressure and temperature measurement to obtain the sub cooling value.	6 months	**Annually**
Superheat measure	Pressure and temperature measurement to obtain the superheat value.	6 months	**Annually**
Temperature measure	Temperature values measuring and reporting, Tin / Tout / Text / TSC / TSH	6 months	**Annually**
Cooling sequence	Observe the component switching sequence starting from the lowest setpoint temperature.	6 months	**Annually**
Heating sequence	Observe the component switching sequence starting from the highest setpoint temperature.	6 months	**Annually**
Current measure (U/I)	Measure the input voltage to the air conditioner and the amperage drawn by the air conditioner and each of its main components. ZC / EVF / EVC / ELH.	6 months	**Annually**
Leakage detection	Using an adapted gas detector, control the possible gas leakage around all the cooling parts. Check some oil presence bellow the cooling parts	6 months	**Annually**
Noise observation	Observe the sound of the air conditioner during operation to detect any abnormal vibration or friction.	6 months	**Annually**

18 CORRECTIVE MAINTENANCE

Corrective maintenance is an intervention to repair faults and malfunctions that occur in the air conditioner. It should be performed as soon as possible to minimize downtime and prevent further damage to the system. In this chapter, we will explain how to perform corrective maintenance on your air conditioner.

The purpose of corrective maintenance is to ensure that the air conditioner operates at its original performance values.

18.1 PROBLEM IDENTIFICATION

Before performing corrective maintenance, it is important to identify the problem. To do this, you must observe the system's behavior and perform diagnostic tests. Check the information given from the display.

Common faults include decreased cooling performance, refrigerant leaks, unusual noises, unpleasant odors and starting problems.

18.2 TROUBLE SHOOTING

This section is exclusively reserved to skilled technicians with cooling systems experience.

For a good understanding, before any corrective work, please check the F-GAS type and the refrigerant circuit load. Check also the data plate of the air conditioner, the electrical circuit diagram and the cooling circuit diagram.

Once you have identified the problem, you can proceed with the repair. The steps to take depend on the nature of the problem. In this section, we will give you examples of common repairs, such as replacing a faulty compressor, repairing a refrigerant leak, cleaning filters and replacing worn parts.

All units are checked and tested at the factory before shipment to the job site, however, can occur, during any operation, malfunctions or faults that require the intervention of an authorized service center, which is necessary for the approval of warranty if within the coverage period fixed by the conditions of sale.

It is recommended before resetting an alarm to identify and remove the cause that generated it, repetitive reset can in fact result in irreversible damage.

Malfunction or damage may also result from lack of adequate care during shipping and installation. It is a good practice to check before installing or starting up that there are no refrigerant leaks caused by broken capillaries, pressure switches or cooling tubes (breaks caused by tampering, vibration, mistreatment during transportation or on site during the installation). Verify also there are no losses caused by loosening of pipe unions for lack of maintenance.

18.3 UNIT ALARMS MANAGEMENT

The presence of one or more active alarms is signalled by:

- Activation of the Buzzer incorporated in the user terminal.
- Illumination of the RED LED on the front panel of the user terminal ( );
- Alarm presence icon ( ) is displayed in the program's main page.

- If the alarm is CRITICAL, and therefore blocks unit operation, the GREEN LED ( ) starts flashing.

All units are checked and tested at the factory before shipment to the job site, however, can occur, during any operation, malfunctions or faults that require the intervention of an authorized service center, which is necessary for the approval of warranty if within the coverage period fixed by the conditions of sale.

It is recommended before resetting an alarm to identify and remove the cause that generated it, repetitive reset can in fact result in irreversible damage.

Malfunction or damage may also result from lack of adequate care during shipping and installation. It is a good practice to check before installing or starting up that there are no refrigerant leaks caused by broken capillaries, pressure switches or cooling tubes (breaks caused by tampering, vibration, mistreatment during transportation or on site during the installation). Verify also there are no losses caused by loosening of pipe unions for lack of maintenance.

18.3.1 ALARMS, FAILURES AND MALFUNCTIONS TABLE

Here are some guidelines on the most common failures in this type of machine, the possible causes and inspections to be conducted ;

FAILURES / ALARMS / MALFUNCTION	CAUSES	PRECAUTIONS / REMEDIES
HIGH PRESSURE ALARM	The condenser inlet air temperature is too high.	Measure the air temperature and report to your project data, where possible. Make sure there is no obstruction to the passage of air through the condenser. Verify cleaning of the condenser exchanger and check the flow rate of fans.
	Condenser inlet filter obstructed, if there is a filter.	Replace filter if there is one
	Condenser coil's fins obstructed	Clean carefully the coil's fins.
	Recirculating of hot air to the remote condenser	More generally, check any kind of causes and implement remedies
	A too low airflow	Verify the correct rotational speed of the fans and eventually increase, where possible.
		Verify proper operation of the condensation control.
		Verify proper power supply and absorption.
		In case of failure or malfunction, replace the fan.
	Excessive refrigerant charge	Partially drain the circuit. To be carried out by a refrigeration technician only.
	Presence of non-condensable in the condenser	Empty the circuit, operate to a long vacuum (-1bar) and recharge. To be carried out by a refrigeration technician only.
LOW PRESSURE ALARM	Dirty air filters	Clean filters or replace the filters.
	Evaporator inlet temperature lower than the limits allowed	Check causes and bring back air temperature within the proper operating range, where possible.
	Air flow is too low	Make sure there is no obstructions in the air inlet to the evaporator or from the evaporator to the ducting. Check the ducting pressure drop.
		Verify correct operation of the fans inside the machine and possibly increase the speed of rotation, where possible.
	Refrigerant charge is too low	Check for possible leaks, close them and refill the refrigerant circuit. To be carried out by a refrigeration technician only.
	Refrigerant charge accumulated in the air cooled condenser during the winter	Wait 1 hour unit on stand by before starting, the crankcase heater will heat the compressor. The coolant will be distributed properly along the circuit
	Condensing pressure too low	Verify proper operation of the condensation control. Measure the air temperature and report to your project data, where possible.
AIR FLOW ALARM	Dirty air filters	Clean filters
	Fan motor damaged	Change fan if repair is not possible
	Air flow is too low	Make sure no obstructions in the recovery pipe
		Verify correct operation of the fan inside the machine and increase the speed of rotation, where possible.
	Operation with open panels	Close all the panels.
	Differential pressure switch with incorrect calibration value	Pressure air flow: lower calibration value Pressure dirty filter : raising the value of calibration
		Check carefully terminals and wiring

INTERVENTION OF THE CIRCUIT BREAKERS / POWER LOSS ALARM	Excessive absorption of the motor	Without power, check that impeller rotation is correct and not hindered, in which case, replace the fan
		Check motor windings
		Verify correct operation point (avoid excessive air flow caused by a discrepancy between the required pressure and effective load losses)
FAN NOISE	Excessive air flow	Check causes and implement remedies
	Fan unbalanced	Provide or replace
TEMPERATURE SENSOR ERROR RECOVERY / DELIVERY	Loose wiring	Check tightening
	Faulty sensor	Replace sensor
UNSUFFICIENT COOLING CAPACITY	Faulty calibration valve	Provide for its replacement
	Low air flow	Check the cause and provide
	Anomalies of operation of the refrigeration circuit	Check and correct the refrigeration circuit parameters (temperature, pressure)
	Excessive humidity rate at the inlet air to evaporator	Measure the air humidity and report to your project data
ALARM SAFETY THERMOSTAT	Air flow is too low	Check causes and implement remedies
	Thermostat not working properly	Check the thermostat before and replace if necessary.
INTERVENTION OF THE COMPRESSOR PROTECTION	Excessive power consumption of the compressor	Check causes carefully after a detailed and physically checking of all the refrigeration circuit diagram parameters
	Excessive power supply at compressor	Check causes carefully after a detailed and physically checking of all the refrigeration circuit diagram parameters
	Excessive temperature of compressor discharge	Check that the discharge temperature is below 120 °C. The gas charge is possibly insufficient. Check causes carefully after a detailed and physically checking of all the refrigeration circuit diagram parameters
	Low refrigerant charge	Check for any possibility of leakage, repair in accordance with the rules of the art, recharged with refrigerant gas under the precise conditions mentioned on the nameplate of the equipment
	Wrong setting thermostatic valve	Check and reset the initial value
LACK OF COMPRESSION	Mechanical failure of the compressor	Change compressor

18.4 EFFECTIVENESS OF THE REPAIR

This section is exclusively reserved to skilled technicians with cooling systems experience.

After completing the repair, it is important to check the effectiveness of the repair. You should perform tests to ensure that the system is working properly and achieving the desired performance. See the ID signal plate of the unit or the corresponding data sheet.

By following the instructions in this chapter, you can perform effective corrective maintenance on your air conditioner and minimize system downtime.

After completing the repair, the alarm signal can be resseted by pressing 3s the OK button.

19 CONSOMMABLES

This type of equipment has for consumable only the air filter of the evaporator which is cleaned 2 or 3 times before having to be replaced.

Part number SP-F-0001 Description: G4 AIR FILTER

20 LIFE LIMITED PARTS

The value below are an estimation of the life duration given by the corresponding manufacturer of these components in normal operating conditions.

COMPRESSOR	> 100.000 operating hours
AXIAL FAN	> 100.000 operating hours
RADIAL FAN	> 100.000 operating hours
CONTACTOR	> 500.000 operating cycles
TRANSFORMER	> 20 years

HEATERS THERMOSTAT	> 250.000 operating cycles
LOGIC CONTROLER	> 20 years
SENSORS	> 20 years
FPS CONTROLER	> 20 years
HEATERS	> 30 years
VALVES	> 20 years
PRESSURE SWITCH	> 500.000 operating cycles

21 SPARE PARTS LIST

Spare parts must be obtained from the dealer specifying the series, model and serial number of the air conditioner.

Exact part code numbers are given on the last page of the ECD (Electrical and Cooling circuit DIAGRAM) document. Please refer to this document to determine the selected part. Spare parts are also available on the NAYCH.FR website.

22 OUT OF SERVICE

If you expect a long period of inactivity (such as the stop winter per unit of cooling only) it is appropriate to remove tension, we also recommend that you carry out maintenance or a general check before restarting your air conditioner. It's always recommended the unit restart is made by a qualified technician.

23 END OF LIFE

For dismantling and disposal of the air conditioner, please consider the following points ;

Take a special care to correctly remove the refrigerant and the oil, using the good refrigeration practices, as recovery station particularly and dedicatd ecovery bottles.

- Do not dispose of these products in the environment.
- Use appropriate equipment and methods for disassembly.
- Dispose of oil and refrigerant in accordance with local regulations.
- Dispose of compressor in accordance with local regulations.

Under the customer's sole responsibility, disassembly must be compliant to EN 378:2017 Part 4 - 6 / EN ISO 5149 and EN ISO 14040 for environment.

24 WARRANTY

The warranty section provides information on the air conditioner's limited warranty and the terms of the warranty. It is important to understand the terms and conditions of the warranty before proceeding with any repair or replacement.

The manufacturer warrants this product to be free from defects in material and workmanship for a period of one year from the date of purchase by the customer. This warranty covers only defects in material and workmanship that occur during normal and proper use of the product.

If a defect in material or workmanship is discovered during the warranty period, the manufacturer reserves the right, at its sole discretion, to repair or replace the defective product. The warranty does not cover damage caused by misuse, neglect, alteration, abuse or improper installation of the product.

This warranty is limited to the provisions set forth herein and expressly excludes all other warranties, express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The manufacturer's total liability to the end user, regardless of the cause of action, shall not exceed the purchase price of the product.

In any case, the customer is solely responsible for the management of his operating risk with regard to the use of the equipment he has chosen. In order to be able to claim the warranty conditions, the customer must be able to prove up-to-date preventive maintenance.

The warranty is limited to the supply of the defective component or the repair of the product consecutive to a material defect. The provision of parts and any repairs are understood to be exclusively on EXW terms, at NAYCH's premises, with the repatriation of equipment to NAYCH's premises being the exclusive cost and responsibility of the customer. In these terms, NAYCH does not produce services outside its workshops.

As a reminder of the warranty rules.

The manufacturer, in accordance with the international procedures, has tested the unit in its factory. For any verification procedure, the operating checks of the unit, carried out on the final installation, must reproduce the same test conditions to maintain a fair comparison.

The performances of the equipment given in this document are transmitted for a new state.

The customer is solely responsible for the accuracy of his heat balance, in terms of internal and external loads, input, losses, and the consideration of all the climatic and atmospheric factors.

The tolerance and quality of the instrumentation used in the verification phase is a priority condition in the validation of any verification.