systemair

Installation and Operating Instructions

Polarix R290

Air-to-Water Heat pump

50 Polarix0050H Polarix0050-T
60 Polarix0060H Polarix0060-T
70 Polarix0070H Polarix0070-T
80 Polarix0080H Polarix0080-T

Read through the Installation Instructions before you proceed with the installation.
In particular, you will need to read under the **“ IMPORTANT ! ”** section at the top of the page.
As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.

CE Green Ventilation ErP

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IMPORTANT!

Please Read Before Starting

This unit must be installed by the dealer or installer.

This information is provided for use only by authorized persons.

For safe installation and trouble-free operation, you must:

Carefully read this instruction booklet before beginning.

- Follow each installation or repair step exactly as shown.
- This unit must be installed in accordance with national wiring regulations.
- This equipment complies with the requirements of the following EU legislation:
- 2014/30/EU (EMC), 2006/42/EC (Machinery),
- 2014/68/EU (PED), 2011/65/EU (RoHS),
- 2009/125/EC (ErP) and all applicable Standards (see EC Declaration for details).
- Pay close attention to all warning and caution notices given in this manual.

WARNING This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certifi ed dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

Notice

The English text is the "Original language".

The content of this document is intended for use by the manufacturer professional personnel only.

SPECIAL PRECAUTIONS

CAUTION When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully see the wiring diagram and section 2 when wiring. Improper connections and inadequate grounding can cause **accidental injury or death.**
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.
- ELCB must be incorporated in the fixed wiring. Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.
- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation by 3mm in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded.
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fi re in case of equipment breakdown or insulation breakdown.

When Transporting

- It may need two or more people to carry out the installation work.
- Care should be taken when lifting or moving the chiller to reduce the chance of serious injury. Do not attempt to move the equipment without the correct means of lifting.

When Installing…

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

…In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

…In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow protection.

When Servicing

- Turn the power OFF at the main power box (mains), wait at least 10 minutes until it is discharged, then open the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you fi nish, remembering to check that no metal scraps or bits of wiring have been left inside the unit.

WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Users must not clean inside the unit. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this unit, please contact to the sales dealer or service dealer for a repair and disposal.
- Any operation carried out by unauthorized personnel is prohibited and can cause serious damage to people and things.

CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Leaked refrigerant gas, If it comes into contact with flame or a heat source, refrigerant gas leaks can trigger a fire or explosion.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes into contact with a wood-burning stove, gas water heater, electric radiator or any other heat source, this could trigger a fire or explosion.

Others

When disposal of the product, comply with national regulations.

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.

- Do not sit or step on the unit, you may fall down accidentally.

- Do not stick any object into the FAN CASE. You may be injured and the unit may be damaged.

POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING WORK IN THE ELECTRIC CONTROL BOX

1. GENERAL RECOMMENDATIONS

The purpose of this Manual is to provide users with instructions for installing, commissioning, using, and maintaining the units. It also contains instructions on starting up the machine as well as recommendations to avoid bodily injury and risks of damage to the device during its operation.

It does not contain the complete description of all the maintenance operations guaranteeing the unit's long life and reliability. Only the services of a qualified technician can guarantee the unit's safe operation over a long service life.

Please read the following safety precautions very carefully before installing the unit.

1.1. SAFETY DIRECTIONS

Follow the safety rules in force when you are working on your appliance.

The installation, commissioning, use and maintenance of these units should be performed by qualified personnel who have a good knowledge of standards and local regulations, as well as experience of this type of equipment.

This appliance has not been designed for use by persons (including children) with reduced physical, sensorial or mental faculties or by persons without any experience or knowledge of heating systems, unless they act under the safety and supervision of a responsible person or have received prior training concerning the use of the appliance.

The unit should be handled using lifting and handling equipment appropriate to the unit's size and weight.

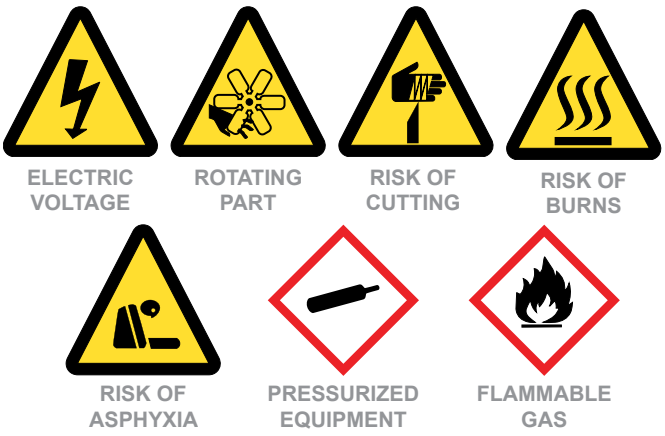
Any wiring produced on site must comply with the corresponding national electrical regulations.

Make sure that the power supply and its frequency are adapted to the required electric current of operation, taking into account specific conditions of the location and the current required for any other appliance connected to the same circuit.

The unit must be EARTHED to avoid any risks caused by insulation defects.

Work must not be carried out on the electrical components if water or high humidity is present at the installation site.

SAFETY SYMBOLS



1.2. WARNING

Isolate and lock-off the the power supply before starting work on the appliance.

When forming the hydraulic connections, ensure that no impurities are introduced into the pipe work.

The manufacturer declines any responsibility and the warranty becomes void if these instructions are not complied with.

If you encounter a problem, please call the Technical Department for your area.

If possible, assemble the compulsory or optional accessories before placing the appliance in its final location (see instructions provided with each accessory).

To familiarize yourself fully with the appliance, we recommend that you also read our Technical Instructions.

The information contained in these Instructions is subject to modification without prior notice.

1.3. PRESSURE EQUIPMENT SAFETY

Gas	Fluid Group	PS (bar)	Category (1)	Evaluation module (2)	Notified body
R290	1	28* 32**	III	H	0062

* models 50/60/70 ** model 80

(1) According the 14 § 6 b) article of the directive 2014/68/EU.

(2) According the 14 § 2 article of the directive 2014/68/EU.

- These units contain pressurised refrigerant. The pressurised elements within these units should only be disturbed during maintenance by fully qualified and trained personnel.
- Do not damage, bend, or impact the pressurised pipe work.
- Failure to follow these recommendations may result in serious or fatal injury.

1.4. EQUIPMENT SAFETY DATA

Safety data	R290	
Toxicity level	Acute toxicity	
In contact with the skin	If the fluid comes into contact with your skin: treat the freeze burns as you would a normal burn. Immediately remove all contaminated clothing and footwear Rinse the affected area immediately with plenty of water If you burn your skin, call a doctor without delay.	
In case of eye contact	Hold the eyelids open and flush immediately with water for at least 15 minutes. Consult an ophthalmologist without delay, even if there are no immediate visible signs of damage.	
Ingestion	Not specifically concerned (gas)	
Inhalation	If inhaled, move to fresh air and give oxygen if necessary. Perform artificial respiration if the patient is no longer breathing or is short of air. In the event of cardiac arrest, perform external CPR. Seek immediate medical attention.	
Acute symptoms	Coma Convulsions Depression of the central nervous system Headaches	Nausea Cardiac disease Vomiting
Occupational exposure limits	1000 ppm - 8 hours 1800 mg/m^3 - 8 hours	4000 ppm - 15 minutes 7200 mg/m^3 - 15 minutes
Stability	Stable at ambient temperature and in normal conditions of use	
Incompatible materials	Strong bases Powerful oxidants Oxidizing materials	
General precautions	Avoid inhaling high concentrations of vapors. Atmospheric concentrations should be minimized and kept as far as possible below the occupational exposure limit. Steam is heavier than air and concentrates at a low level and in small places. Exhaust ventilation at the lowest levels. Distance ignition possible Risk of explosion if heated in a confined environment	

Safety data	R290
Respiratory protection	AX-type rubber mask In the event of inadequate ventilation, insulating self-contained breathing apparatus
Storage and handling	The tanks must be located in a dry and cold room that is fireproof, protected from direct sunlight and away from all sources of heat, e.g. radiators. Storage rooms must be well ventilated. When handling, it is necessary to: perform operations with apparatus and equipment designed for use in an explosive atmosphere. prevent the build-up of electrostatic charges. refrain from smoking. work in a well-ventilated room.
Protective clothing	Anti-static gloves Safety glasses with side shields Anti-static clothing
Procedure in case of spillage or a leak	Evacuate the hazardous area Only qualified personnel wearing the appropriate protective equipment must perform handling operations. Eliminate all sources of ignition if you can safely do so. Prevent the product from penetrating wine cellars, basements, work trenches, etc. Prevent the product from entering the sewers (explosion risk) Mechanically ventilate the spill area Use water spray to disperse vapors Ignited gas leak: Do not switch off if the leak cannot be stopped without risk
Waste disposal	Dispose of waste at a specialist waste center
Fire fighting data	Keep away from heat / sparks / naked flames / hot surfaces. - Refrain from smoking. Suitable extinguishing agents: Small fire: Carbon dioxide (CO_2), powders Large fire: Sprinkler
Fire protection equipment	In case of fire, wear self-contained breathing apparatus and protective clothing.

2. INSPECTION AND STORAGE

At the time of receiving the equipment carefully cross check all the elements against the shipping documents to ensure that all the crates and boxes have been received. Inspect all the units for any visible or hidden damage.

In the event of shipping damage, write precise details of the damage on the shipper's delivery note and send immediately a registered letter to the shipper within 48 hours, clearly stating the damage caused. Forward a copy of this letter to the manufacturer or his representative.

Never store or transport the unit upside down. It must be stored indoors, completely protected from rain, snow etc. The unit must not be damaged by changes in the weather (high and low temperatures). Excessively high temperatures (above 60 °C) can harm certain plastic materials and cause permanent damage. Moreover, the performance of certain electrical or electronic components can be impaired.

Environmental conditions must be within the following limits:

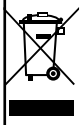
- Minimum ambient temperature : -20 °C
- Maximum ambient temperature : +60 °C
- Maximum R.H. : 95% not condensing

Storage at a temperature below the minimum can cause damage to the components, instead at a temperature above the maximum causes a pressure increasing that could be above the limit (Ps). High humidity atmosphere may damage electrical components.

3. DISPOSAL

Units must be disposed of in accordance with local regulations

Information for Users on Collection and Disposal of Old Equipment and Used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2012/19/EU of 4 July 2012 on waste electrical and electronic equipment (WEEE).

By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

For business users in the European Union

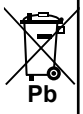
If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

[Information on Disposal in other Countries outside the European Union]

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

Note for the battery symbol

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.



The disposal of refrigerating systems and their component parts must be carried out in accordance with applicable local and national regulations.

Used refrigerant which is not going to be reutilized must be treated as a waste material requiring safe disposal.

The discharge of refrigerants is only permissible when there will be no harm to persons, property or the environment, and provided it is in accordance with legal requirements.

Used oil that cannot be reprocessed must be stored in a suitable separate container and must be treated as a waste material requiring safe disposal.

Other components of the refrigerating system which contain refrigerant and oil must also be disposed of in an appropriate manner.

If necessary, you should seek the advice of a competent person on the disposal of waste refrigerant and oil products.

INFORMATION

For additional information on the recovery, reutilization and disposal of refrigerating systems, please see NF EN 378-4, sect. 6.

4. WARRANTY

The appliances are delivered fully assembled, factory tested and ready to operate.

Any modification to the units without the manufacturer's prior approval, shall automatically render the warranty null and void.

The following conditions must be respected in order to maintain the validity of the warranty:

- ➢ Commissioning shall be performed by specialised technicians from technical services approved by the manufacturer.
- ➢ Maintenance shall be performed by technicians trained for this purpose.
- ➢ Only Original Equipment spare parts shall be used.
- ➢ All the operations listed in the present manual shall be performed within the required time limits.

THE WARRANTY SHALL BE NULL AND VOID IN THE EVENT OF NON-COMPLIANCE WITH ANY OF THE ABOVE CONDITIONS.

5. PRESENTATION

The **POLARIX** units are produced in compliance with state-of-the-art design and manufacturing standards. This guarantees their high performance and reliability as well as their compatibility with all types of air conditioning installations operating with both chilled water and glycol solutions (and with hot water for the Heat pump units). The unit, designed for an outdoor mounted application, is not suitable for any uses other than those specified in this manual.

Improper usage of the unit or a use for purposes other than those originally intended, without the prior approval of the manufacturer or the latter's agents, could result in the unit functioning outside its safe operating limits and could present risks to both personnel and property.

POLARIX are packaged units, optimized for air conditioning applications.

Following assembly of the units in the factory:

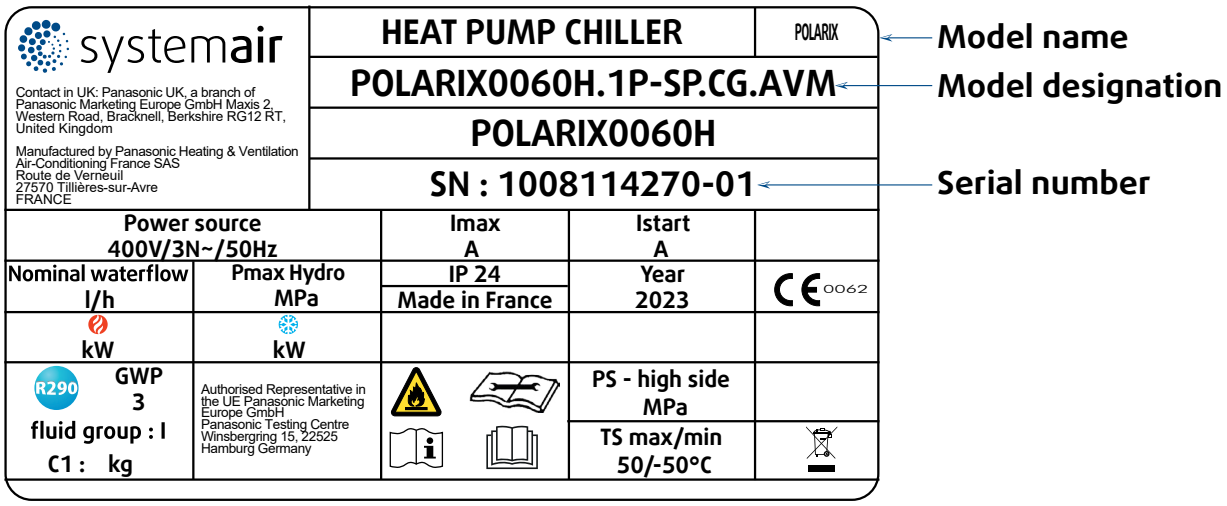
1. the electrical circuits are tested.
2. refrigeration circuits receive their operational refrigerant charge and are subject to pressurized leak detection tests.
3. The **POLARIX** units are tested.

These tests are conducted to guarantee the correct operation and quality of our products.

The Cooling only models can produce chilled water at the unit outlet at temperatures varying from +5°C to +18°C or chilled water/glycol solution at temperatures varying from -15°C to +18°C.

The Heat pump models can produce hot water at the unit outlet at temperatures varying from +20°C to +73°C.

5.1. NAME PLATE



5.2. MODELS DESIGNATION

POLARIX0060H . 1P-SP . S . EC . CG . T . ...

① ② ③ ④ ⑤ ⑤ ⑤

REP.		Description	
①	Size	**POLARIX0050H** : size 50 - Heat pump **POLARIX0060H** : size 60 - Heat pump	**POLARIX0070H** : size 70 - Heat pump **POLARIX0080H** : size 80 - Heat pump
②	Hydraulic circuit	Empty : Without pump **1P-SP** : Single pump standard pressure **1P-HP** : Single pump high pressure	**2P-SP** : Double pump standard pressure **2P-HP** : Double pump high pressure
③	Acoustics	**STD** : Standard	**S** : Super Low Noise
④	Fan type	**EC** : Fan EC motor	
⑤	Option	**CG** : Outdoor coil protection grid **EPO** : Finned coil treatment - epoxy **WPS** : Low water pressure sensor **AVS** : Spring damper **AVM** : rubber pads **VI** : Isolating valve **KM** : Refrigerant gauge **T** : Buffer tank **SS** : Soft Starter **CC** : Container transport	**DHW** : Domestic hot water (Software/ temperature sensor/3-way valve) **VS** : Variable pump 3 speed / constant ΔT **VS+** : Variable pump 3 speed / constant ΔT / constant ΔP **EH12** : Electric heating 12KW **EH24** : Electric heating 24KW **4G** : Modem 4G

The product plate on the device shows the full model reference number and should be used to check that the actual unit matches the model ordered. It also provides the following information:

➢ General information
- ✔ serial number
- ✔ year of manufacture
- ✔ IP index

➢ Electrical information
- ✔ supply voltage
- ✔ maximum operating current
- ✔ starting current

➢ Thermodynamic circuit information
- ✔ type of refrigerant
- ✔ refrigerant charge in each circuit
- ✔ Service pressure of refrigeration circuit
- ✔ refrigeration circuit service temperatures

➢ Hydraulic circuit information
- ✔ nominal water flow
- ✔ maximum water pressure

6. CONTENTS OF PACKAGE

1 **POLARIX**

1 Water filter

1 Bag with the documentation

6.1. OPTIONAL ACCESSORIES

Anti-vibration rubber pads

Spring pads

Isolating valve

Lack of water pressure switch

Hydraulic pressure transducer

On opening the box, check that all of the accessories required for installation are present.

CAUTION **The packaging around the POLARIX unit must be opened in an outdoor area in case any refrigerant has leaked out in transit.**

7. DIMENSIONS

SEE APPENDIX

8. HANDLING

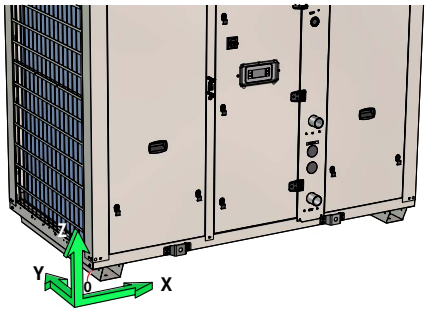
8.1. NET WEIGHT

				50	60	70	80
Without pump			kg	538	603	628	669
1 Single pump		1P-SP standard pressure pump	kg	551	629	657	704
		1P-HP high-pressure pump	kg	555	633	659	707
Double pump		2P-SP standard pressure pump	kg	/	652	681	733
		2P-HP high-pressure pump	kg	/	658	684	739
Buffer tank	1 Single pump	1P-SP standard pressure pump	kg	/	768	786	846
		1P-HP high-pressure pump	kg	/	772	788	848
	Double pump	2P-SP standard pressure pump	kg	/	791	811	875
		2P-HP high-pressure pump	kg	/	798	814	881
Version S			kg	/	30	30	30

INFORMATION The values are for information only. The correct values are shown on the unit nameplate.

8.2. GRAVITY CENTER POSITION

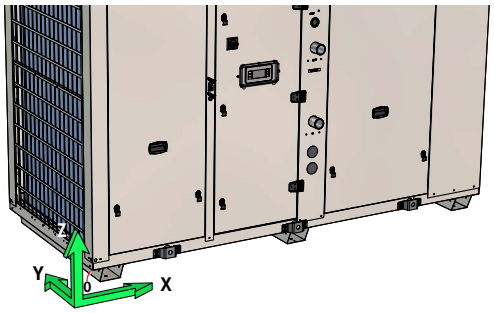
8.2.1. WITHOUT BUFFER TANK



		50		
		X_G mm	Y_G mm	Z_G mm
Without pump		811	644	696
1 Single pump	1P-SP standard pressure pump	806	626	692
	1P-HP high-pressure pump	803	622	691

		60			70			80		
		X_G mm	Y_G mm	Z_G mm	X_G mm	Y_G mm	Z_G mm	X_G mm	Y_G mm	Z_G mm
Without pump		999	572	660	994	526	721	1 009	536	720
1 Single pump	1P-SP standard pressure pump	1 026	569	648	1 021	525	707	1 038	534	705
	1P-HP high-pressure pump	1 030	569	646	1 023	525	706	1 041	534	703
Double pump	2P-SP standard pressure pump	1 030	569	646	1 023	525	706	1 041	534	703
	2P-HP high-pressure pump	1 037	570	642	1 026	525	704	1 047	535	700

8.2.2. WITH BUFFER TANK



		60			70			80		
		X_G mm	Y_G mm	Z_G mm	X_G mm	Y_G mm	Z_G mm	X_G mm	Y_G mm	Z_G mm
1 Single pump	1P-SP standard pressure pump	1 540	477	544	1 356	493	660	1 526	461	595
	1P-HP high-pressure pump	1 541	477	543	1 356	493	658	1 526	461	594
Double pump	2P-SP standard pressure pump	1 318	520	597	1 356	493	658	1 526	463	596
	2P-HP high-pressure pump	1 321	520	596	1 358	493	657	1 527	464	592

8.3. GENERAL HANDLING

The handling method depends on the **POLARIX** model and its final destination.

- ➢ Take care to avoid any rough handling or impacts when unloading and moving the appliance.
- ➢ Before hoisting the appliance into position, perform a test lift to ensure stability and balance. Avoid twisting or uneven lifting of the units.
- ➢ The units shall be carefully inspected before unit installation to make sure this has not happened.
- ➢ All of these sections are inspected before they leave the factory. Prior to commissioning, it is therefore important to make sure that no bolts, screws or other fastening components are loosened or missing.

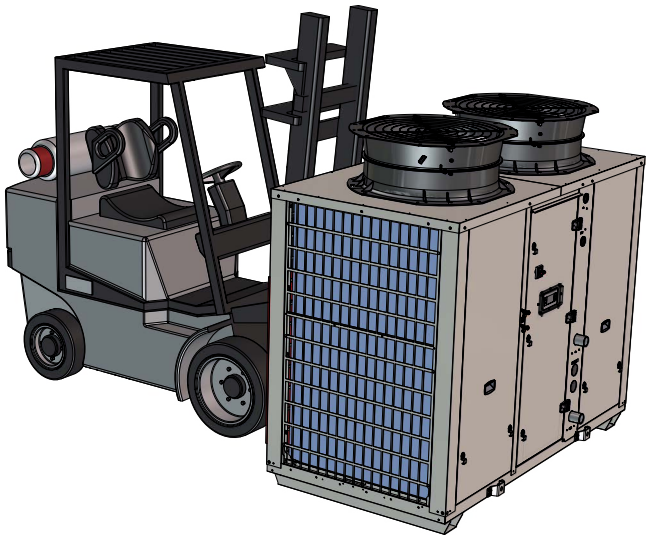
CAUTION Never subject the metal work (panels, posts) of the **POLARIX** to handling constraints, as only its base is designed for that purpose.

CAUTION To avoid irreversible damage, do not tilt the **POLARIX** by more than 45° during handling.

CAUTION Never move the **POLARIX** on rollers.

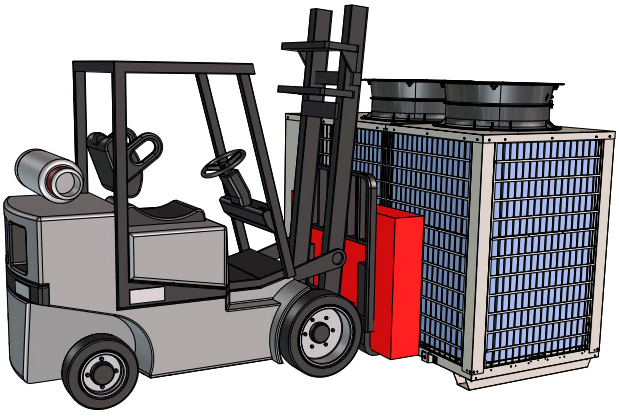
CAUTION When handling the **POLARIX**, beware not to damage the finned battery pack. Protect it with cardboard or particle panels.

8.3.1. HANDLING WITH A FORKLIFT



A forklift can be used to handle the **POLARIX** units when palletized.

Place a safety wedge between the unit base and the fork lift truck to avoid damaging the unit's structure and casing.



8.3.2. HANDLING BY SLINGING

Lifting is also possible by slinging.

Lifting brackets allow you to fit lifting shackles.

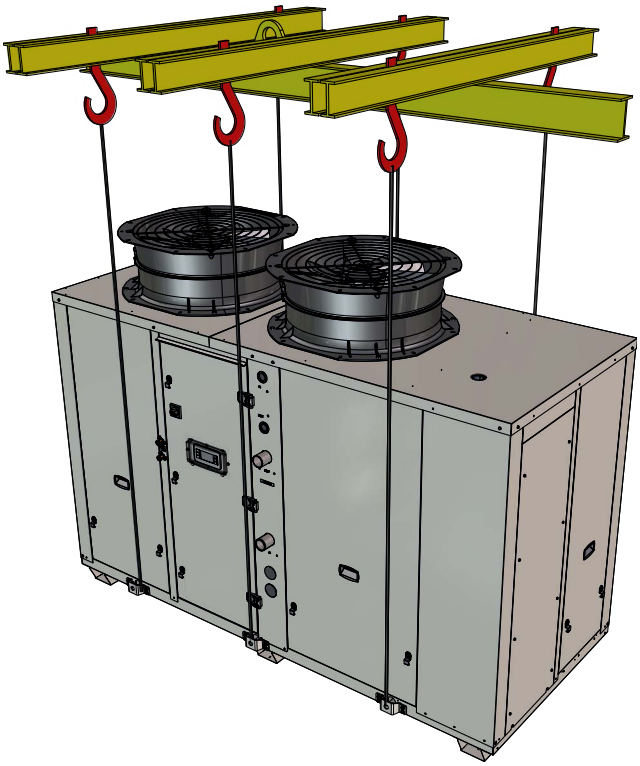
A spreader must be used to prevent damage to the machine edges.

		50	60	70	80
Shackle hole diameter	mm	24	24	24	24

CAUTION Slings must never touch the casing of the **POLARIX** unit.

WITHOUT BUFFER TANK

WITH BUFFER TANK



POLARIX 50 - 60 - 70 - 80

9. TECHNICAL SPECIFICATIONS

9.1. PHYSICAL CHARACTERISTICS

			50	60	70	80
Cooling capacity (1)		kW	48.2	56.1	64.9	74.1
Power input (1)		kW	15.0	19.0	21.6	25.0
Total EER 100% (1)			3.2	3.0	3.0	3.0
SEER (2)			4.4	4.3	4.3	4.2
ηsc (2)		%	171.9	168.9	169.4	165.4
A35°C W23/18°C	Cooling capacity	kW	62.9	77.3	88.8	101.0
	Power input	kW	16.0	21.6	24.4	28.4
	Total EER 100%		3.9	3.6	3.6	3.6
Heating capacity (3)		kW	49.2	61.1	73.5	83.6
Power input (3)		kW	15.6	18.6	21.7	24.9
Total COP 100% (3)			3.2	3.3	3.4	3.4
Low temperature application W30/35°C	SCOP (4)		3.7	3.7	3.9	3.8
	ηsh (4)	%	143.7	146.8	151.8	150.5
	Energy class SCOP (4)		A+	A+	A++	A++
medium temperature application W47/55°C	SCOP (5)		3.1	3.1	3.3	3.2
	ηsh (5)	%	121.4	122.7	127.3	126.0
	Energy class SCOP (5)		A+	A+	A++	A++
ELECTRICAL POWER SUPPLY						
Power supply			400V/3~/50Hz			
Startup type			Direct			
Maximum operating current		A	42.4	51.2	62.5	68.3
Startup current	without Soft Starter		157.8	171.9	220.0	225.8
	with Soft Starter		66.5	88.1	103.6	109.4
REFRIGERANT						
Charge		kg	4.5	4.80	5.30	6.80
Number of refrigerant circuit			1			
CO_2 equivalent charge			13.5	14.4	15.9	20.4
COMPRESSORS						
Number / Type			2 / Scroll			
Part load steps		%	0/50/100	0/50/100	0/50/100	0/50/100
Crankcase heater		W	132	132	132	132
PLATE HEAT EXCHANGER						
Number / Type			1 / Plate			
Cooling mode	Water flow	m^3/h	8.29	9.65	11.16	12.75
	Water pressure drop	kPa	13.39	18.14	13.69	17.85
Heating mode	Water flow	m^3/h	8.46	10.51	12.64	14.38
	Water pressure drop	kPa	13.95	21.52	17.56	22.72
Water volume		l	5.62	5.62	7.84	7.84
Antifreeze heater		W	30	30	30	60
COIL						
Number			1	1	2	2
Frontal surface		m^2	3.4	4.2	2.8	2.8
Number of rows			3	3	2	3
FAN						
Number			1	2	2	2
Air flow		m^3/h	22 400	25 000	41 600	41 600
Rotational speed		rpm	900	900	800	800
Power input each fan		kW	1.02	0.55	0.73	0.73
WATER CONNECTIONS						
Type			Male gas threaded			
Inlet diameter		inch	1"1/4	2"	2"	2"1/2
Outlet diameter		inch	1"1/4	2"	2"	2"1/2
BUFFER TANK (OPTION)						
Volume		L	200	300	300	300
DIMENSIONS						
Length without / with tank		mm	2 215 / -	2 180 / 2 680	2 180 / 2 680	2 180 / 2 680
Width		mm	1 032	1 160	1 160	1 160
Height		mm	1730	2 011	2 030	2 030
ACOUSTIC DATA						
Sound power level		dB(A)	82.67	84.13	85.12	85.83
Sound pressure level (*)		dB(A)	50.96	52.34	53.32	54.03
Sound power level (S)		dB(A)	79.90	80.50	81.50	81.90
Sound pressure level (S) (*)		dB(A)	48.19	48.71	49.70	50.10

(1) According EN14511: chilled water inlet/outlet temperature: 12/7°C, outdoor ambient temperature 35°C DB.

(2) According EN14825 and Following COMMISSION REGULATION (EU) 2016/2281.

(3) According EN14511: warm water inlet/outlet temperature: 40/45°C, outdoor ambient temperature 7°C DB/6°C WB.

(4) According EN14825 and Following COMMISSION REGULATION (EU) No 813/2013: Climate average - low temperature application.

(5) According EN14825 and Following COMMISSION REGULATION (EU) No 813/2013: Climate average - medium temperature application.

(*) Sound pressure levels calculated at 10 meters. Sound pressure levels refer to ISO 3744 standard, parallelepiped shape.

9.2. REFRIGERATION SPECIFICATIONS

9.2.1. REFRIGERANT CIRCUIT DIAGRAM

SEE APPENDIX

9.2.2. REFRIGERANT CHARGE

CAUTION This equipment contains a hydrocarbon (R290) that belongs to fluid category I as per standard EN378-1. Unlike fluorocarbon fluids, this gas presents no risk to the environment (low GWP, fluid not covered by the Kyoto Protocol).

The type and quantity of refrigerant per circuit is indicated on the product plate.

However, this is an A3 category flammable fluid with a consequent risk of fire or explosion (EN1127-1). It must be handled by skilled personnel who are trained in the use of flammable refrigerants. The installer and the end user must know the local regulations governing the installation, operation and disposal of the equipment, in particular with regards to the retrieval of substances presenting a risk of fire or explosion.

CAUTION In compliance with Directive PED 2014/68/EU and harmonized standard EN378 (1 to 4), these **POLARIX** units are classed as category 2.

9.3. ELECTRIC SPECIFICATIONS

			50	60	70	80
Power supply			400V / 3~ / 50Hz +/- 10%			
Without pump	**Maximum current**	**A**	42.4	51.2	62.5	68.3
	Total starting current (without soft starter)	**A**	157.8	171.9	220.0	225.8
	Total starting current (with soft starter)	**A**	66.5	88.1	103.6	109.4
With pump 1P-SP 2P-SP (*)	**Maximum current**	**A**	44.1	53.1	64.9	71.7
	Total starting current (without soft starter)	**A**	159.5	173.7	222.5	229.2
	Total starting current (with soft starter)	**A**	68.2	90.0	106.1	112.8
With pump 1P-HP 2P-HP (*)	**Maximum current**	**A**	45.7	54.4	65.6	74.1
	Total starting current (without soft starter)	**A**	161.1	175.0	223.2	231.7
	Total starting current (with soft starter)	**A**	69.8	91.3	106.8	115.3

* only for models 60, 70 and 80.

POLARIX 50 - 60 - 70 - 80

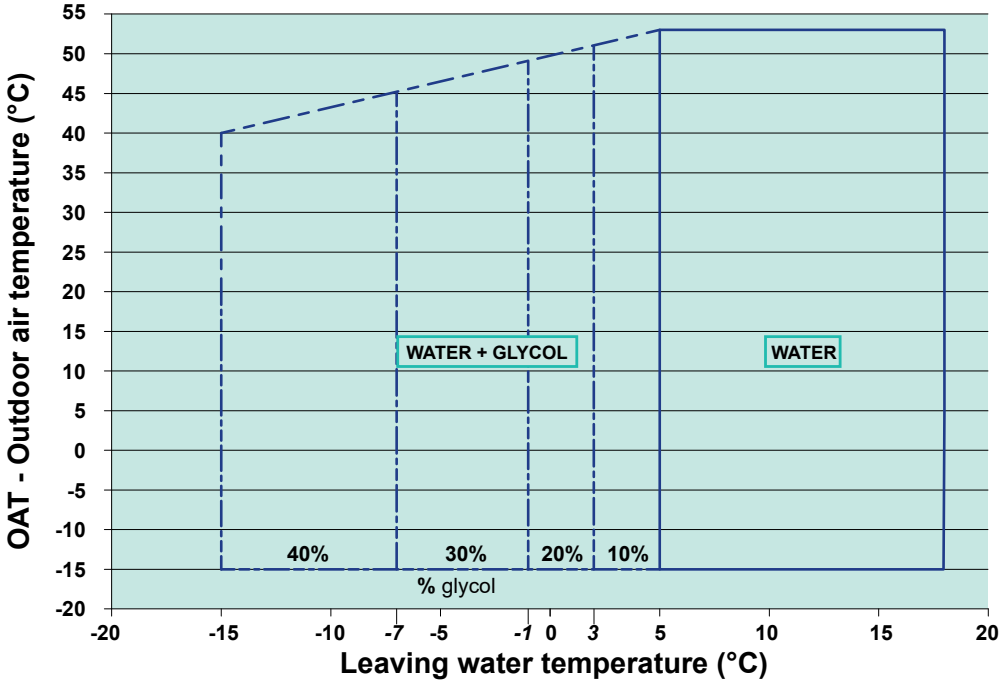
9.4. OPERATING LIMITS

9.4.1. POLARIX.H COOLING MODE

POLARIX.H models			50		60		70		80	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water	Water outlet temperature *	°C	See diagrams							
	Water ΔT **	K	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0
	Flow rate **	m³/h	6.1	14.2	7.1	16.7	8.2	19.1	9.3	21.8
Air temperature		°C	See diagrams							

* Below 5 °C, glycol is required.

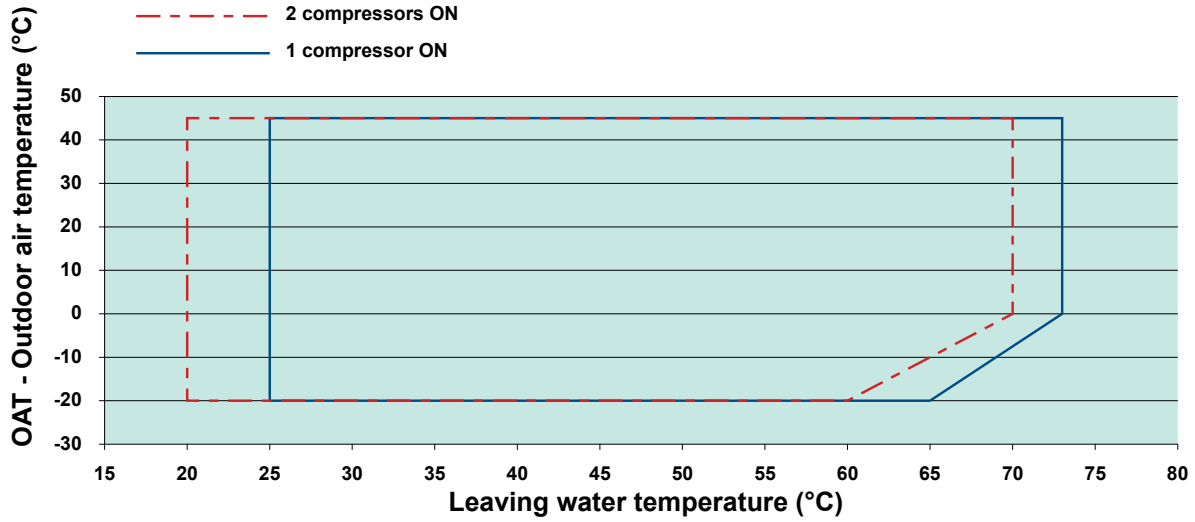
** considered at nominal unit capacity



9.4.2. POLARIX.H HEATING MODE

POLARIX.H models			50		60		70		80	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water	Water outlet temperature	°C	See diagrams							
	Water ΔT **	K	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0
	Flow rate **	m³/h	6.0	14.1	7.5	17.5	9.0	21.1	10.3	24.0
Air temperature		°C	See diagrams							

** considered at nominal unit capacity



10. INSTALLATION

CAUTION The unit is not designed to withstand weights or stresses from adjacent equipment, pipe work or constructions. Any foreign weight or stress on the unit structure could lead to a malfunction or damage, which could prove hazardous to personnel and property. In such an event, the warranty shall be voided.

CAUTION The unit base shall be arranged as indicated in the manual. There could be a risk of personal injury or damage to property in the event of the unit being incorrectly supported.

10.1. SITING THE INSTALLATION

As per standard EN378-1 §5.1, **POLARIX** sizes 50 and 60 are Access category "**a**" and sizes 70 and 80 are Access category "**b**" with for the whole family a class III in terms of location.

The **POLARIX** must be installed outdoors with sufficient surrounding clearance to enable air to circulate freely through the appliance and to allow access for maintenance work.

Refrigeration systems installed in the open air must be positioned in such a way that no leak of refrigerant can enter the building or endanger persons or property. The refrigerant must not be able to spread to a ventilation duct, under a door, hatch or similar opening in the event of a leak. When a shelter is provided for refrigerating equipment installed in the open air, that shelter must be equipped with a natural or forced ventilation device.

A room where a least one of the longer walls is open to the outside air by means of louvers with a free area of 75% and occupying at least 80% of the wall (or equivalent, if more than one wall is open to the outside air) is considered to be in the open air.

INFORMATION The **POLARIX** can also be installed in a machine room in accordance with local and national regulations, and subject to the requirements of EN 378-3:2016. This regulation also applies to machines installed outside where any release of refrigerant may stagnate.

CAUTION Do not expose the **POLARIX** to rejections from chimneys or vents. Fumes charged with soot or grease as well as acid rejections are likely to permanently clog or damage the condenser. This would void the warranty.

10.1.1. PREVAILING WIND

In the case of the unit being sited in areas exposed to high winds, you must avoid the wind hitting the fan blowing surface areas directly to avoid any risk of recycling cooled air at the finned battery. Exchanger fan operation can be disrupted by strong winds, which can cause de-icing problems and fan malfunctions.

CAUTION Unit operation depends on air temperature. Any recycling of air extracted by the fan lowers the air intake temperature across the exchanger fins and alters the standard operating conditions.

10.1.2. CONDENSATE WATER MANAGEMENT IN HEATING MODE

Depending on outdoor temperature and air humidity conditions, water vapor contained in the air can condense on the finned heat exchanger and even form ice at low outdoor temperatures (around < 5°C). This condensate water and defrosted water runs off via outlets provided under the exchanger. To aid water run-off and avoid frozen water remaining in the appliance in winter, we recommend that it is mounted at a height of around 10cm off the ground. This will allow the water to run off freely and be absorbed into the ground or channeled to a basin built under the appliance in order to protect the environment.

In areas where outdoor temperatures drop below 1°C, the system can be equipped with a condensate anti-freeze protection system.

10.1.3. REDUCING NOISE POLLUTION

In order to contain noise levels, we equip our appliances with quiet fans and encase the technical compartment in sound-proofed panels. However, noise levels can be reduced even further by taking a few installation precautions:

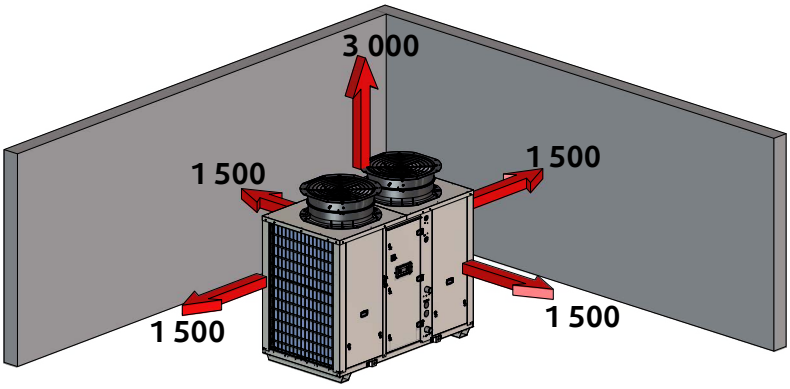
- ➢ Do not install the unit in enclosed or confined yards, narrow locations where noise may bounce off walls.
- ➢ Install the rubber pads supplied or anti-vibration pads (available as an option) under the appliance.
- ➢ Do not join the concrete slab supporting the appliance to the building structure (structure-borne noise transmission).
- ➢ Electrical and hydraulic connections to the unit must be flexible to avoid the transmission of vibrations.

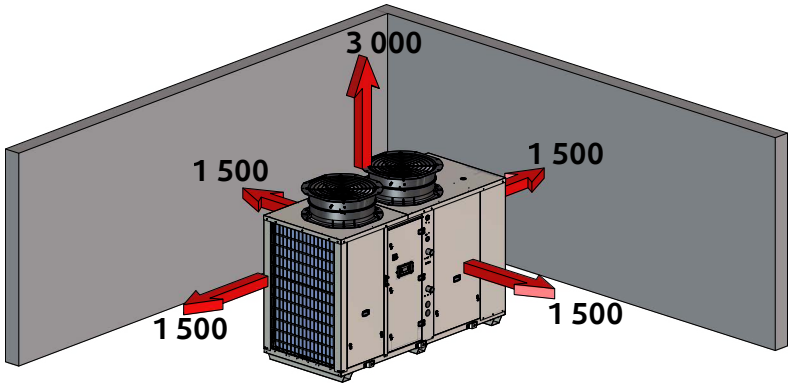
INFORMATION The operator must ensure that hearing protection (PPE and CPE) is properly implemented in the event of prolonged work near the unit.

10.2. CLEARANCE

During installation, it is important to leave sufficient clearance around the **POLARIX**.

The unit is equipped with a R290 refrigerant





leak detection card enabling it to be shut down and for the hydrocarbon to be expelled into the atmosphere (before reaching the fluid flammability limit). To ensure this, two apertures are present on the frame: the first, equipped with an extractor fan, sucks outside air into the frame and the second expels waste air into the atmosphere.

These minimum clearance dimensions must be complied with to ensure correct operation of the unit, to enable the unit to be accessed and maintained, and, above all, to guarantee the safety of personnel.

CAUTION When several **POLARIX** units are installed, ensure proper clearance is implemented around the condensers specific to each machine.

10.3. ANCHORING TO THE GROUND

The surface of the floor or structure located under the **POLARIX** must be flat, and strong enough to withstand the unit's weight with its full liquid load, in addition to the occasional presence of maintenance equipment.

The **POLARIX** only needs to be anchored to the foundations in regions exposed to a high earthquake risk or if the appliance is installed at a high level on a steel frame.
For normal applications, rigidity of the **POLARIX** and the positions of the supports allow for an installation that minimizes vibrations. However, the installers can use anti-vibration rubber pads (supplied as an option).

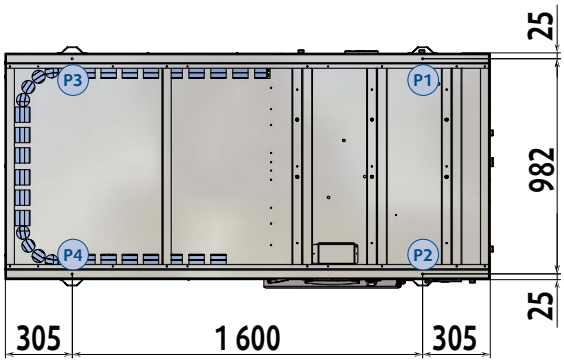
When fitting anti-vibration pads, refer to the manual supplied with the kit.

10.3.1. LOAD DISTRIBUTION

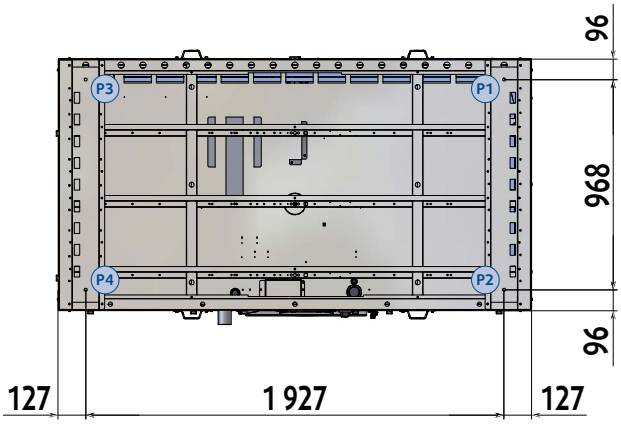
INFORMATION The load distribution is given for the unit in working order.

10.3.1.1. WITHOUT BUFFER TANK

		50		
		Without pump	1P-SP	1P-HP
WEIGHT	Kg	539	552	556
P1	Kg	232	232	233
P2	Kg	136	147	150
P3	Kg	107	106	105
P4	Kg	63	67	68



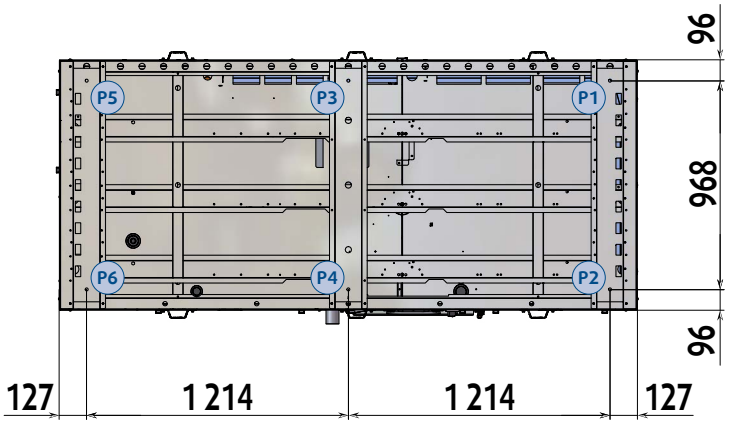
		60					70					80				
		Without pump	1P-SP	1P-HP	2P-SP	2P-HP	Without pump	1P-SP	1P-HP	2P-SP	2P-HP	Without pump	1P-SP	1P-HP	2P-SP	2P-HP
WEIGHT	Kg	606	635	638	661	667	632	663	664	690	693	674	713	716	748	754
P1	Kg	163	166	166	172	172	154	157	158	164	164	166	170	170	178	179
P2	Kg	169	173	173	179	180	193	198	198	206	206	200	206	206	215	215
P3	Kg	135	145	146	151	154	126	136	137	142	143	140	152	154	161	163
P4	Kg	139	151	153	158	161	158	171	172	179	180	168	185	186	194	197



POLARIX 50 - 60 - 70 - 80

10.3.1.2. WITH BUFFER TANK

		60				70				80			
		1P-SP	1P-HP	2P-SP	2P-HP	1P-SP	1P-HP	2P-SP	2P-HP	1P-SP	1P-HP	2P-SP	2P-HP
WEIGHT	Kg	1 077	1 081	1 103	1 110	1 095	1 097	1 123	1 126	1 160	1 163	1 195	1 202
P1	Kg	105	105	166	166	147	147	150	150	113	113	117	118
P2	Kg	161	161	213	214	211	211	216	216	187	187	192	192
P3	Kg	146	146	160	161	150	151	154	155	150	150	155	157
P4	Kg	224	225	205	207	216	217	222	222	248	248	254	255
P5	Kg	174	175	157	158	152	152	156	157	174	175	181	182
P6	Kg	268	269	201	203	219	219	224	226	288	289	296	297



11. HYDRAULIC LINKS

CAUTION When choosing and installing water pipes, you must consult and observe all current local standards, regulations and instructions.

11.1. MAIN HYDRAULIC CIRCUIT

The mains hydraulic circuit will provide a constant water flow on the refrigerating fluid/water plate exchanger and in case of load variation.

You must design the pipe network with the minimum number of bends and keep the number of hydraulic components generating pressure drops to the strict minimum. This will reduce installation costs and ensure optimum system performance. The pipe network must include:

- A vibration elimination system (e.g.: link hoses) on all pipes connected to the appliance in order to reduce vibrations and noise transmitted to the building fabric.
- A balancing valve on the water outlet pipe in order to adjust the water flow.
- Stop cocks to isolate the hydraulic circuit during maintenance.
- Manual or automatic bleed valves at the highest point on the water circuit.
- Draining connectors at all low points to allow complete circuit draining.
- A circulation pump capable of guaranteeing the flow required for **POLARIX** unit operation, in the event that one is not fitted.
- A diaphragm expansion tank fitted with a safety and draining valve must be visible.
- A low water pressure sensor to secure the water pump against cavitation if the water pressure in the circuit decreases.
- The installation of thermometers and pressure gages on the heat exchanger inlet and outlet to facilitate day-to-day controls and system maintenance.
- An element ensuring ground continuity of all piping. An unbalance of grounding connection points can cause electrolytic corrosion.

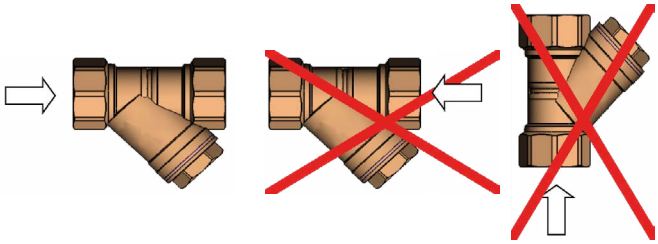
CAUTION The expansion tank must be dimensioned to be able to absorb an expansion corresponding to 2% total volume of water contained in the installation (exchanger, piping, installations and buffer tank, if present).

CAUTION **THE WARRANTY DOES NOT COVER DAMAGE DUE TO CORROSION RESULTING FROM ELECTROLYTIC PHENOMENA.**

11.2. ANTI-CLOGGING PROTECTION

CAUTION **To avoid any risk of foreign bodies entering the appliance and to guarantee operating performance, IT IS IMPERATIVE TO INSTALL A WATER FILTER on the POLARIX inlet pipe.**

Failure to install a water filter would result in clogging of the **POLARIX's** heat plate exchanger soon after commissioning. Proper operation of the **POLARIX** would be disturbed by a reduced water flow or the partial clogging of certain heat plates. The heat plate exchanger could be **IRREVERSIBLY** damaged in the event of inadequate water flow. A mesh size of smaller than or equal to 800µm is recommended



CAUTION **THE MANUFACTURER'S WARRANTY IS VOID IF THE FILTER SUPPLIED WITH THE POLARIX IS NOT INSTALLED TO PROTECT THE APPLIANCE**

11.3. MINIMUM WATER VOLUME REQUIREMENTS

To ensure that the system operates correctly you must use suitably sized and properly routed pipes for the hydraulic links between the **POLARIX** and the mains network. Proper operation of the regulation and safety devices is ensured only when the water volume is sufficient.

For reversible units, a water volume equal to 6.5 L/kW is recommended, so that energy reserves are full enough to ensure the defrosting cycle without any discomfort for the end user.

If the total volume of the primary hydraulic circuit does not allow these recommendations to be adhered to, a buffer tank must be added to the installation to increase the water volume up to the value required.

If the unit runs with a low volume of water (with air treatment plant…) or if it is used for industrial processes, a buffer tank is compulsory to guarantee sufficient thermal inertia and adequate temperature stability.

		50	60	70	80
Buffer tank (optional)	L	200	300	300	300

INFORMATION It is recommended that the hydraulic circuit be sized by a thermal engineer

11.3.1. POLARIX HEAT PUMP VERSION

			50	60	70	80
Minimum water volume in the system	Without buffer tank	L	320	397	478	543
	With buffer tank	L	120	97	178	243

11.4. MAXIMUM WATER VOLUME REQUIREMENTS

The maximum water volume is limited by the size of the unit's expansion tank and/or the expansion tank present in the installation's hydraulic circuit. Expansion tanks must be sized according to the percentage of glycol in the hydraulic circuit.

The expansion tank should be installed at the pump suction, and its pressure will be adjusted by taking into account the whole hydraulic circuit.

The volume of the expansion tanks selected with single pump option is:

		50	60	70	80
volume of the expansion tank supplied with hydraulic options	L	5	12	12	18

11.5. RINSING THE CIRCUIT

CAUTION Before filling the installation, check it and remove any contamination such as sand, stones, welding chips and other materials likely to damage the **POLARIX**.

Fully rinse all water pipes before final connection to the **POLARIX**.

When using an off-the-shelf acid rinsing solution, implement a temporary branching around the **POLARIX** to prevent damaging internal components (particularly the plate exchanger, flow switch, pump...).

11.6. FROST PROTECTION

If the **POLARIX** is exposed to ambient temperatures below 0°C or produces cold water at temperatures between 5°C and -15°C, protect the water circuit against frost.

CAUTION **THE USE OF A GLYCOL-BASED SOLUTION IS THE ONLY EFFECTIVE FROST-PROTECTION MEANS**

The glycol-based water solution must be sufficiently concentrated to ensure appropriate protection and prevent ice from forming at the minimum outdoor temperatures planned for the installation. Take precautions when using non inert MEG antifreeze solutions (Mono Ethylene Glycol or MPG Mono Propylene Glycol). With this type of antifreeze solution, corrosion may occur in the presence of oxygen.

Contact glycol resellers to ensure that its characteristics are compatible with the environmental directive applicable on site (this is not the manufacturer's responsibility).

CAUTION The percentage of glycol in the installation's hydraulic circuit must be entered in the regulation upon start-up. This parameter setting changes the safety and alarm triggering threshold limits. An incorrect value may cause malfunctions and destruction of the unit's heat exchanger.

WARNING It is advisable to clearly record the type of glycol used, as well as the glycol concentration, on the electric cabinet.

The glycol-based solution slightly modifies the installation's performance, particularly in terms of load loss:

% glycol	Freezing point (°C)	Thermodynamic power		Power input	Water flow	Pressure drop
		Cooling mode	Heating mode			
0	0	1.000	1.000	1.000	1.000	1.000
10	-4	0.992	1.000	1.007	1.028	1.110
20	-10	0.986	1.000	1.013	1.056	1.272
30	-17	0.975	1.000	1.020	1.085	1.461
40	-26	0.965	1.000	1.033	1.115	1.679

Example for a solution with 20% Glycol:

- ➢ Increase the pressure drop: with glycol = 1.272 x without glycol
- ➢ Increase the flowrate: with glycol = 1.056 x without glycol
- ➢ Decrease the capacity: with glycol = 0.986 x without glycol

Draining the water circuit is not recommended for frost protection, for the following reasons:

- ➢ The water circuit will rust, which will shorten its service life.
- ➢ Water will remain at the bottom of the plate exchangers and freezing may cause damage.

CAUTION Never fill the hydraulic circuit with pure glycol. Maximum glycol concentration is 40%. The water and glycol mixture must be precisely prepared before filling the hydraulic circuit. If the mixture is too concentrated, the hydraulic circuit could be damaged and the **POLARIX** unit will not perform normally. **In this case, the unit warranty will be automatically voided.**

CAUTION For heatpump models, if the outdoor temperature is likely to fall below +1°C, provide a system to prevent the condensates from freezing (e.g. heating cord).

11.7. WATER QUALITY

The water must be analysed; the hydraulic network system installed must include all elements necessary for water treatment: filters, additives, intermediate exchangers, drain valves, vents, check valves, etc., according to the results of the analysis.

CAUTION **The POLARIX must not run on a network with open loops, likely to cause incidents related to oxygenation, or with untreated ground water.**

Using improperly treated or untreated water in the **POLARIX** may cause scaling, erosion, corrosion, algae, or sludge deposits in the exchangers. Refer to a water treatment expert to determine any treatment required. The manufacturer will not be held liable for damage caused when untreated or improperly treated water, demineralised water, salt water, or seawater are used.

Apply the following guidelines:

- No NH_4^+ ammonium ions in the water, highly detrimental to copper. <10mg/l
- Cl- chloride ions are detrimental to copper with a risk of puncture by pitting. <10mg/l.
- SO_4^{2-} sulphate ions may cause pitting corrosion. < 30mg/l.
- No fluoride ions (<0.1 mg/l)
- No Fe^{2+} and Fe^{3+} ions, particularly in the case of dissolved oxygen. Fe< 5mg/l with dissolved oxygen < 5mg/l. The presence of these ions with dissolved oxygen indicates corrosion of steel parts, likely to generate corrosion of copper parts under Fe deposits, particularly in the case of multitubular exchangers.
- Dissolved silica: silica is an acid element of water and may also cause corrosion. Content < 1mg/l.
- Water hardness: Values between 10°fH and 30°fH are recommended. This limits scaling deposits likely to cause copper corrosion. Excess TH values may lead to clogged pipes.
- TAC<100
- Dissolved oxygen: Prevent any sudden change in the water's oxygenation conditions. Also, avoid deoxygenating water by sparging inert gas as well as overoxygenating it by sparging pure oxygen. Disturbing oxygenation conditions destabilizes copper hydroxides and particle salting-out.
- Electrical Resistivity - Conductivity: The higher the resistivity, the slower the corrosion. Values above 3000 ohm/cm are preferred. A neutral environment favors maximum resistivity. For electrical conductivity, values around 200-600 S/cm are recommended.
- pH: neutral pH at 20°C (7 < pH < 9)

CAUTION **If the water circuit is to be drained for a period of longer than one month, the circuit must be fully charged with nitrogen to prevent any risk of corrosion by differential venting.**

CAUTION

Correct water treatment is critical, and particular care must be taken to ensure that the type of treatment utilised is appropriate.

The recommendations of a company specialising in such matters must be sought and applied.

The manufacturer or their representative cannot be held liable in the event of the use of water that is untreated or of nonconforming quality.

11.8. HEAT INSULATION

To guarantee proper energy efficiency and compliance with current standards, water pipes passing through uninhabited zones should be properly lagged to retain heat.

To achieve correct insulation with conductivity of 0.04 W/mK, lag the pipes with insulating material with a radial thickness between 25mm and 30 mm.

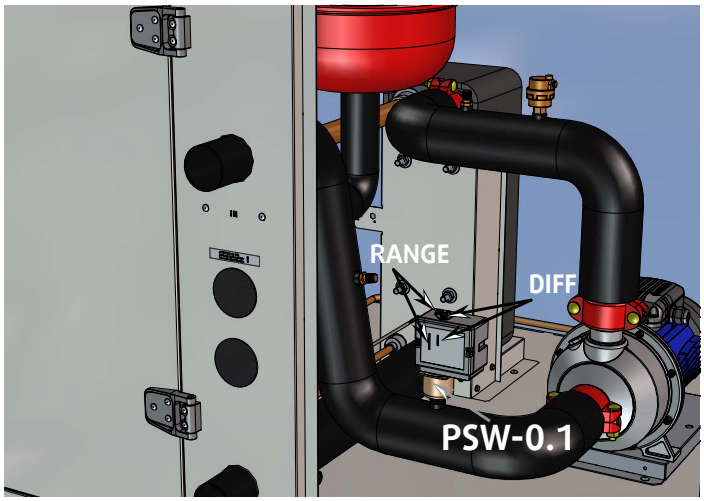
11.9. WATER LOW PRESSURE SWITCH

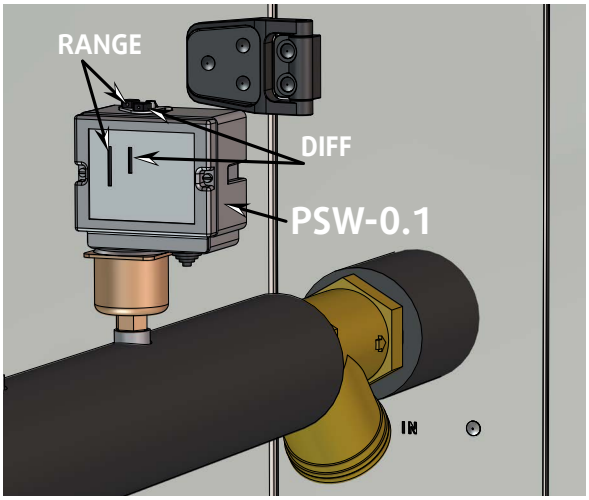
The optional low-water pressure switch (PSW-0.1) can be installed inside or outside the machine. It must be set to the following specifications:

➢ RANGE: 1bar

➢ DIFF: 0.5bar

If the pressure in the circuit drops below 0.5 bar, the machine stops. When the pressure rises above 1.5 bar again, the machine restarts.





For installation inside the unit, a 3/8" pressure test point fitting is provided on the pump supply pipe.

INFORMATION In the case of a **POLARIX** without a pump, the “Water low pressure switch" (PSW-0.1) must be fitted to the external pump supply pipes

INFORMATION The low water pressure switch (PSW-0.1) must be connected to terminals 24 and 25 on terminal block Y.

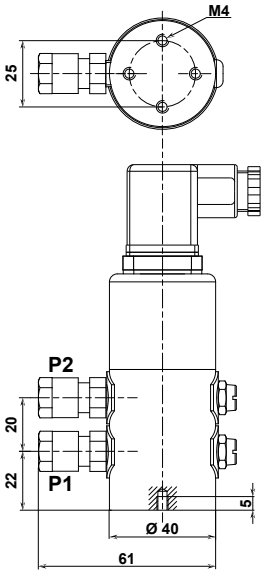
11.10. DIFFERENTIAL PRESSURE TRANSDUCER

The differential pressure transducer (PTWDP-0.1) supplied with the "**VS+**" option must be fitted between the water return and flow pipes.

Rigid plastic tubes with an external diameter of 6 mm are required to connect the hydraulic pipes to the sensor:

P1 connected to the flow water piping

P2 connected to the return water piping



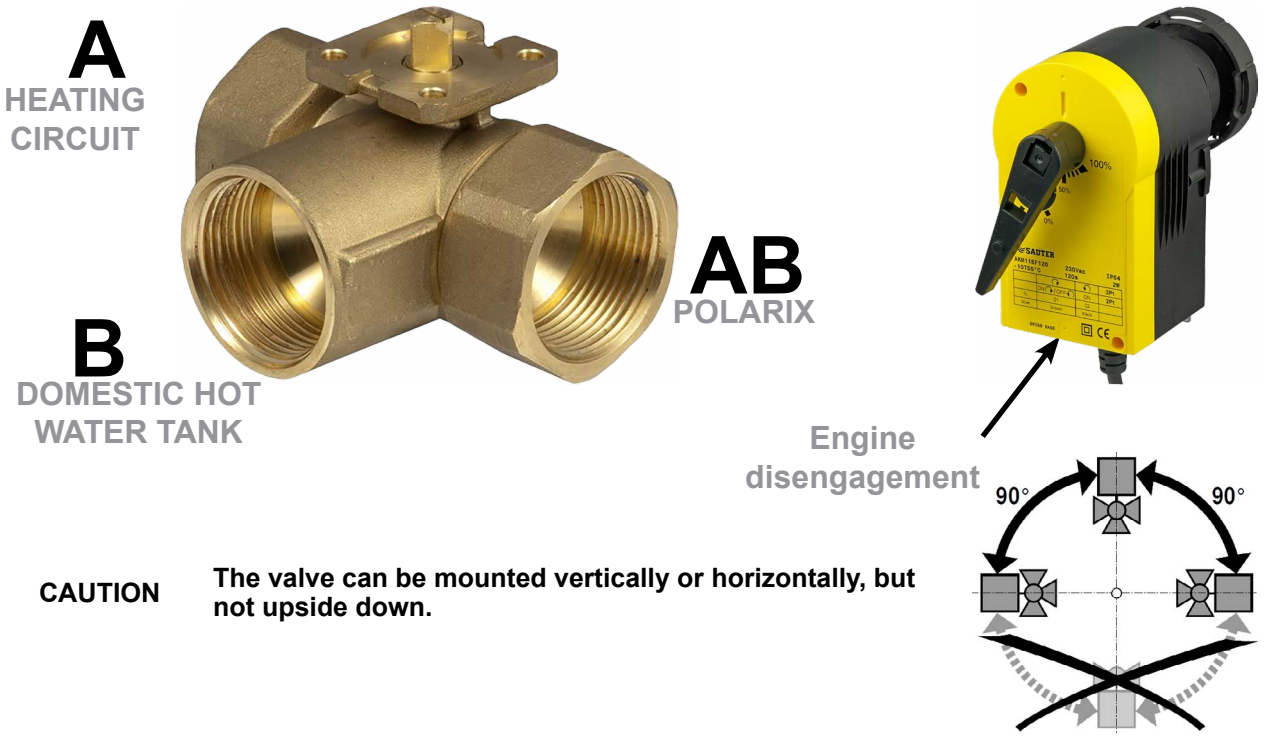
INFORMATION The pressure taps of the differential pressure transducer (PTWDP-0.1) must be positioned in the middle of a straight pipe at least 40 cm long.

INFORMATION The differential pressure transducer (PTWDP-0.1) must be connected to terminals 18 and 19 of terminal block Y.

POLARIX 50 - 60 - 70 - 80

11.11. DOMESTIC HOT WATER

Fit the three-way valve, referring to the channel markings engraved on the valve.



CAUTION **The valve can be mounted vertically or horizontally, but not upside down.**

INFORMATION Replace the slide switch after manual adjustment

INFORMATION For outdoor installation, protection of the valve and servomotor is required.

INFORMATION The 3-way valve (DHW valve) must be connected to terminals 18, 19 and 20 on terminal block Y.

The water temperature sensor (DHWT sensor) must be installed in the hot water cylinder and connected to terminals 9 and 13 on terminal block Y

11.12. FILLING THE SYSTEM WITH WATER

CAUTION **The water circuit must be filled and drained by skilled persons using the appropriate devices provided on the external hydraulic circuit by the installer.**

It is important to ensure that the mains water supply pressure is sufficient to fill the installation.

Once the installation is complete and after cleaning and rinsing the circuit network, you must fill the water circuit in accordance with current professional standards until you obtain the service pressure which will be:

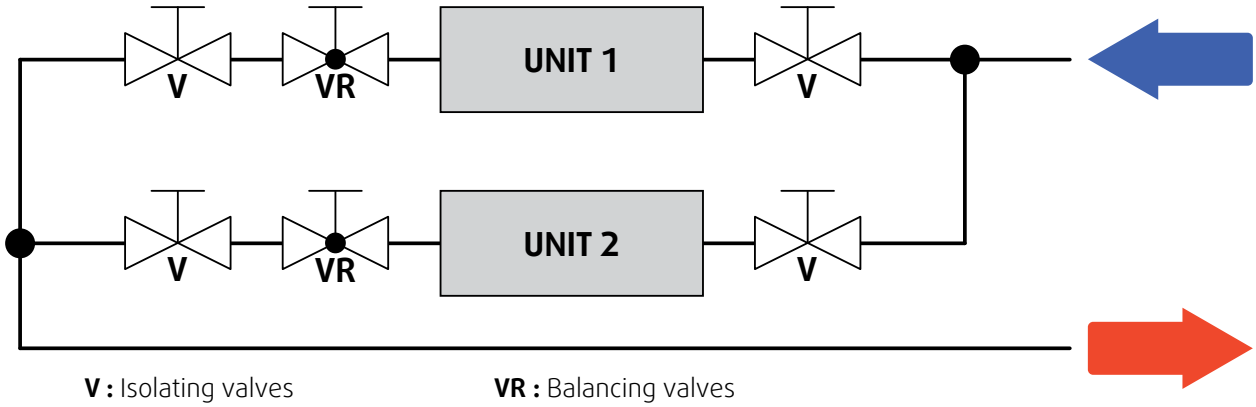
0.5 bar < Service Pressure < 3.0 bar

A valve set at 3.0 bar is supplied with the "single pump" or "double pump" options.

A valve set at 6.0 bar is supplied with the buffer tank option.

Always check that manual or automatic air drains are installed at all the high points of the hydraulic network.

When two or three units are connected in parallel, it is advisable to reverse the return circuit connections (Tichcelmann loop) in order to reduce the pressure loss in each unit's circuit.

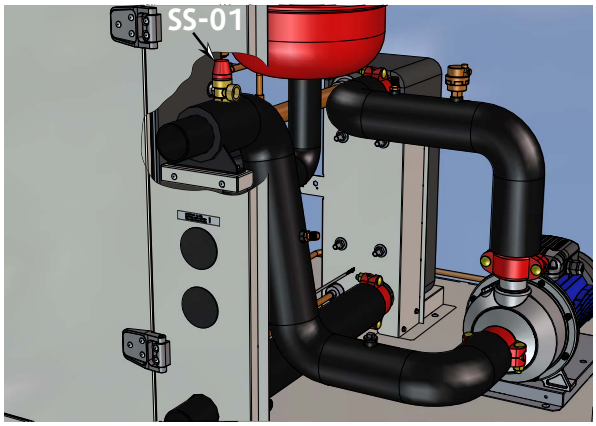


V : Isolating valves **VR :** Balancing valves

Install a balancing valve on the output pipe to adjust the water flow.

CAUTION The water inlets and outlets must be connected as described on the labels affixed near the connections.

When the hydraulic pump option is selected, a safety valve, set to 3.0 bar, (SS-01) is mounted at the water circuit inlet to prevent overpressure in the circuit. The installer must install a pipe at the safety valve outlet for water evacuation.



When the unit is fitted with a buffer storage tank, a safety valve (SS-02), set at 6.0 bar, is installed at the storage tank inlet. The installer must connect a tube to the valve to drain the water away from the machine.

12. WIRING DIAGRAM AND LEGEND

12.1. WIRING DIAGRAM

SEE APPENDIX

SE5028	models 50 / 60 / 70 / 80	Power / Control	400V/3~/50Hz ±10%

12.1.1. POWER SUPPLY

The power cable must be connected to the main power supply switch QG-0.1 (copper cable is recommended).

The power supply must be protected at source by a general fuse holder supplied by the installer. It must be fitted next to the unit. Refer to the § **Electric specifications**, page 13

The electrical installation and wiring of this unit must comply with local electrical installation standards.

➢ Three phase 400 V~ 50Hz + Ground:

On the L1, L2, L3 terminals of the QG-0.1 section switch
On the ground screw of the earth cable.

12.1.2. WIRING DIAGRAM KEY DESCRIPTIONS

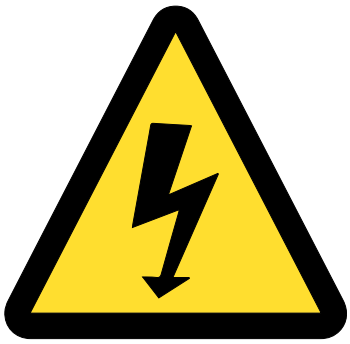
SEE APPENDIX

12.2. RANGE AND SETTINGS OF THERMAL PROTECTION

MODELS				50	60	70	80
FTC-1.1		Range	A	17-23	24-32	30-40	30-40
		Adjustment	A	19	29	32	32
FTC-1.2		Range	A	17-23	17-23	17-23	24-32
		Adjustment	A	19	19	23	29
FTOF-1.1		Adjustment	A	4.00	3	6.3	6.3
FTWP-0.1	1P-SP 2P-SP (*)	Range	A	1.6-2.5	1.6-2.5	2.5-4	2.5-4
		Adjustment	A	2	2	3	4
	1P-HP 2P-HP (*)	Range	A	2.5-4	2.5-4	2.5-4	4-6.3
		Adjustment	A	4	4	4	6.3
FTWP-0.2	2P-SP (*)	Range	A	1.6-2.5	1.6-2.5	2.5-4	2.5-4
		Adjustment	A	2	2	3	4
	2P-HP (*)	Range	A	2.5-4	2.5-4	2.5-4	4-6.3
		Adjustment	A	4	4	4	6.3
FTWP-0.1 Options V2 or VP	1P-SP 2P-SP (*)	Adjustment	A	2.5	2.5	4	6.3
	1P-HP 2P-HP (*)	Adjustment	A	4	4	4	10

* only for models 60, 70 and 80.

13. ELECTRICAL CONNECTIONS



WARNING

BEFORE CARRYING OUT ANY WORK ON THE EQUIPMENT, MAKE SURE THE ELECTRICAL POWER SUPPLY IS DISCONNECTED AND THERE IS NO POSSIBILITY OF THE UNIT BEING STARTED INADVERTENTLY. ALSO MAKE SURE THAT THE ALARM INDICATOR CABLES ARE DISCONNECTED.

NON-COMPLIANCE WITH THE ABOVE INSTRUCTIONS CAN LEAD TO INJURY OR DEATH BY ELECTROCUTION.

The electrical installation must be performed by a fully qualified electrician, and in accordance with local electrical standards and the wiring diagram corresponding to the unit model.

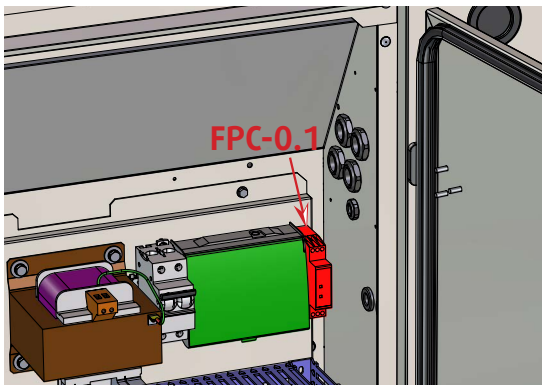
Any modification made without our consent will void the unit's warranty.

The power supply cable section must be sufficient to provide the appropriate voltage to the unit's power supply terminals, both at start-up and under full load operating conditions.

The power supply cable shall be selected in accordance with the following criteria:

1. Power supply cable length.
2. Maximum current draw of unit in operation.
3. Maximum current draw of unit at start-up
4. Installation method of power supply cables.

It is recommended to provide short circuit protection by means of a type aM fuse or a circuit breaker with high breaking capacity on the distribution board. Protection must be selected according to the current values shown in § **Electric specifications**, page 13



VERY IMPORTANT:

3N~400V-50HZ

The outdoor unit is equipped as standard with a phase sequence and cut-out controller located in the electrical box.

THE LEDS INDICATE THE FOLLOWING CONDITIONS:

Green LED = 1

Yellow LED =1

Power ON

The compressor rotation direction is correct.

Green LED = 1

Yellow LED =0

Phase inversion or phase absent (L1)

The compressor and the fans do not start.

Green LED = 0

Yellow LED =0

Phase absent (L2 or L3)

The compressor and the fans do not start.

CAUTION **Before connecting the supply lines, check that the voltage available is within the limits specified (Refer to the § Electric specifications, page 13).**

Voltage differences between each phase do not have to exceed 2%.

If the imbalance is unacceptable, call the distribution company to have this anomaly corrected.

CAUTION **Supplying the unit with a line with an unbalance exceeding the acceptable value will void the warranty.**

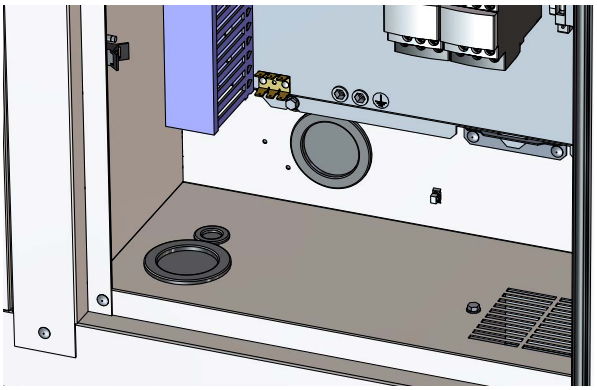
CAUTION **Correction of the excessive centralized power factor (>0.95) may generate transient phenomena dangerous for the unit motors and contactors during the start and stop phases. Check instant voltages during these phases.**

These units are equipped as standard with a proximity switch, with a general terminal board.

13.1. UNIT POWER SUPPLY

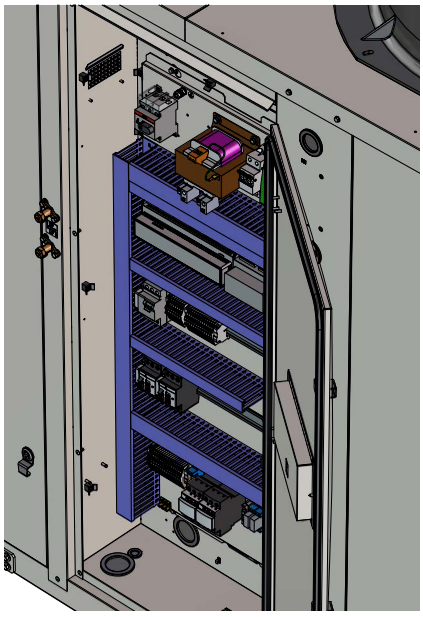
Unit power supply cables must be routed to the switch QG-0.1 through cable glands (not supplied).

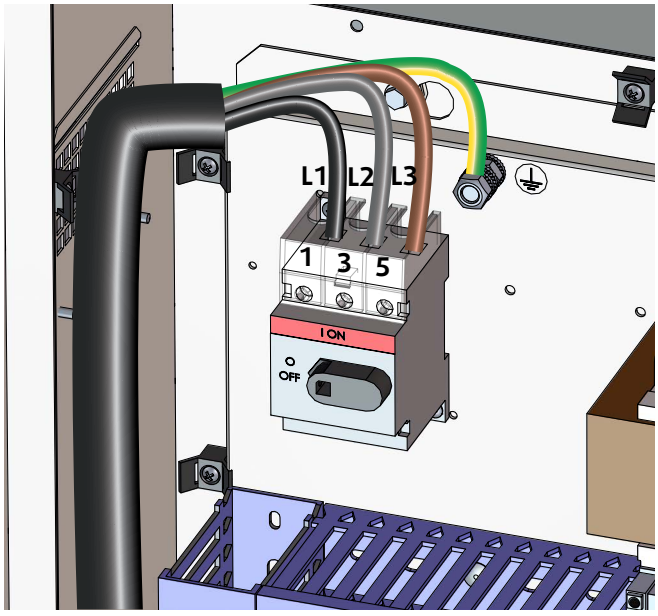
To ensure proper contact, fit the end pieces adapted to the cross-section of the connecting cable.



INFORMATION The wire grommets on the front panels of units must be replaced with cable glands for any cable transits to ensure proper sealing.

Maximum cross-section of the power supply cables: 35mm² for flexible copper cables





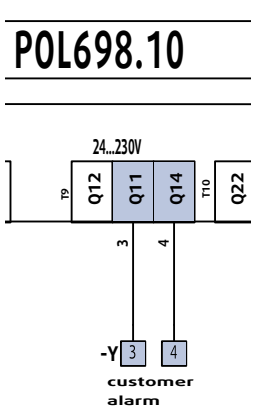
13.2. ALARM INDICATORS

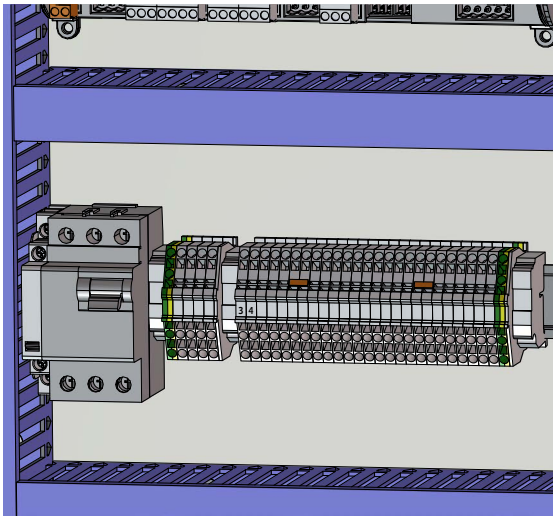
The **POLARIX** unit has two alarm indicators:

- general alarm indicator for the customer
- external pump alarm indicator to the **POLARIX** unit

13.2.1. MAIN CONTROLLER

The **POLARIX** control system has a dedicated alarm indicator. This information is available via a dry contact (Normally Closed) by connecting to the unit's terminals 3 and 4 of the terminal block Y.



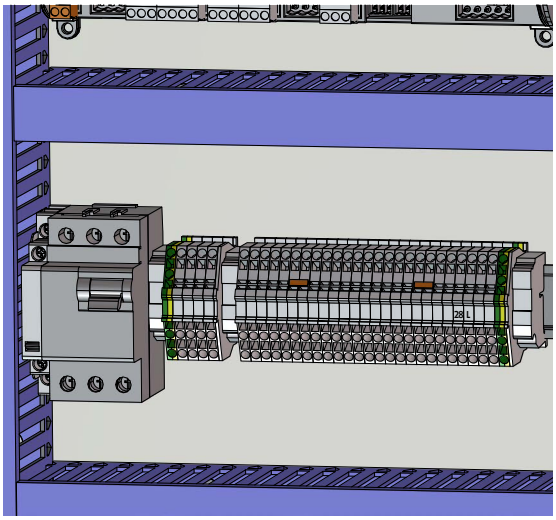


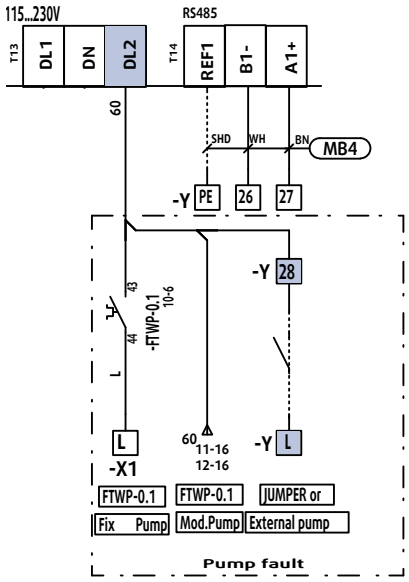
CAUTION **The unit must only be rendered accessible for maintenance if the client cables connected to terminals 3 and 4 of the terminal block Y are locked out/tagged out (disconnected or rendered inoperative upstream of the unit).**

13.2.2. EXTERNAL PUMP

For an **POLARIX** equipped with an external pump, the unit's controller is informed of a pump fault via a dry contact (Normally Open) connected to terminals 28 and L on terminal block Y.

A fault in the external pump activates the "Fault pump 1" alarm.





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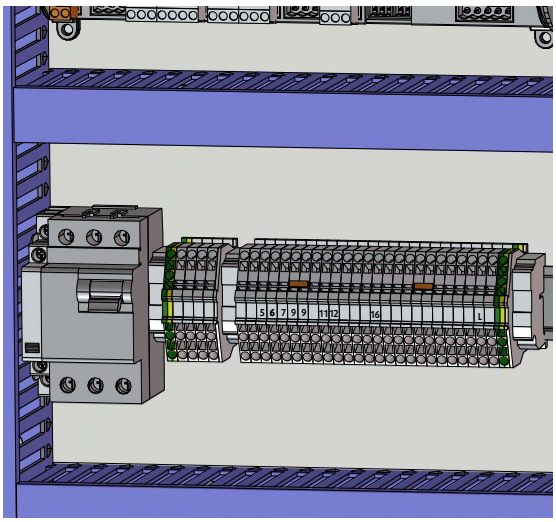
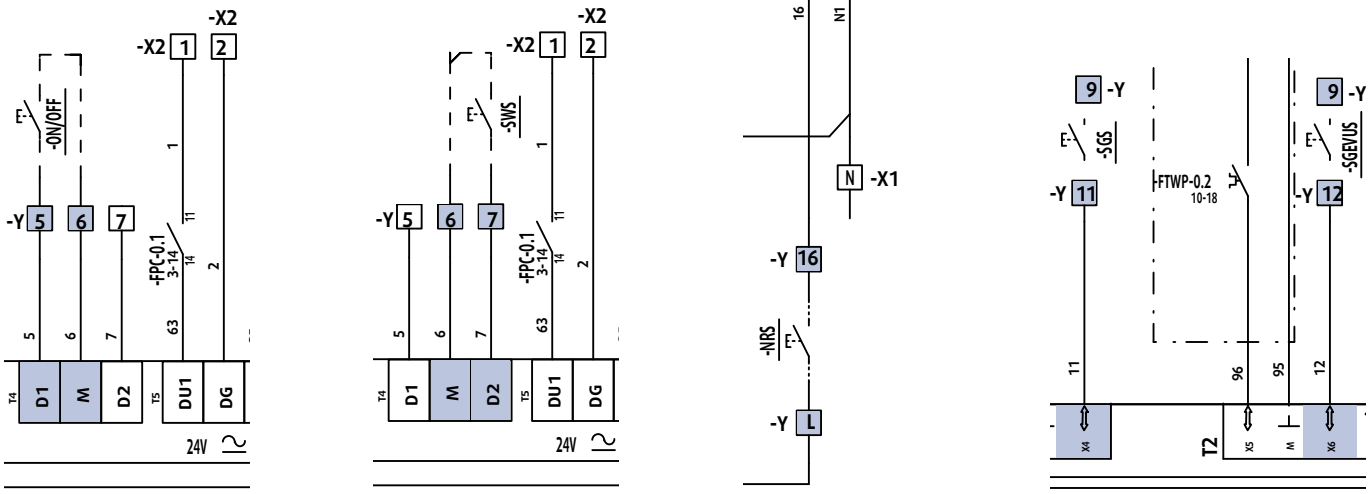
13.3. REMOTE CONTROLS

The **POLARIX** has five remote controls operating via dry contacts (not supplied):

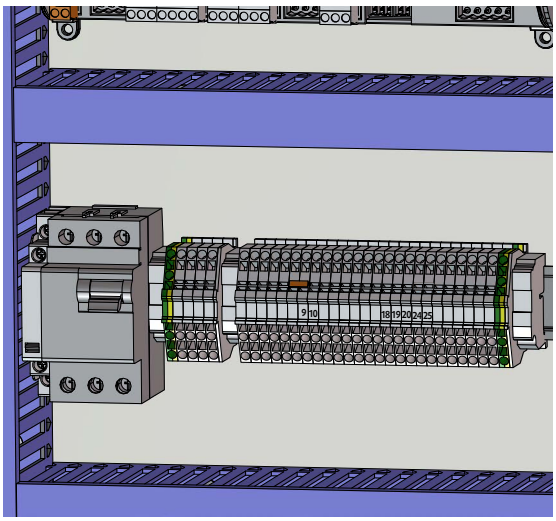
- ON/OFF function (ON/OFF) connected to terminals 5 and 6 of the terminal block Y
- "forced heating" function (SWS) connected to terminals 6 and 7 on terminal block Y
- operating type selection (NRS) connected to terminals 16 and L of the terminal block Y
- SG (Smart Grid) signal from the energy supply company via the SGS contact connected to terminals 9 and 11 on terminal block Y
- EVU (Smart Grid) signal from the energy supply company via the SGEVUS contact connected to terminals 9 and 12 on terminal block Y





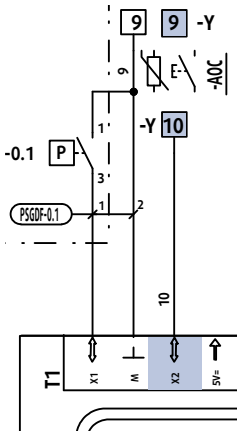
13.4. REMOTE SENSORS

User-defined setpoints can be corrected according to the room temperature. A room temperature sensor (AOC), not supplied, must be connected to terminals 9 and 10 on terminal block Y.

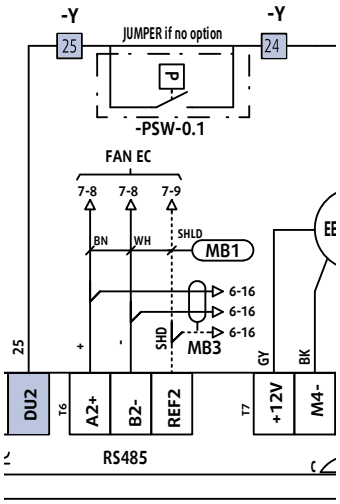


There are two types of room temperature sensor (AOC):

- an NTC sensor dedicated to measuring room temperature
- a 0-10 V potentiometer sensor

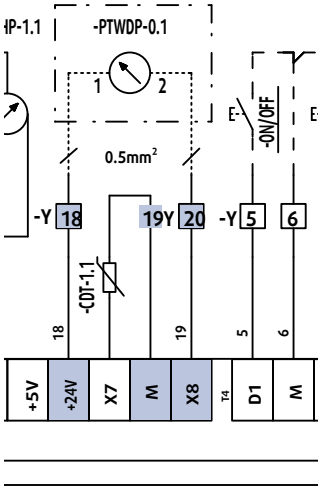


For an **POLARIX** without a pump, the “lack of water” pressure switch (PSW-0.1) must be fitted to the external pump supply pipes and wired to terminals 24 and 25 on the unit.

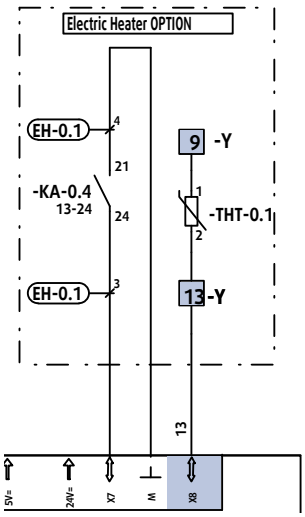


CAUTION **Remove the shunt connected between terminals 24 and 25 on terminal block Y.**

For an **POLARIX** fitted with the "VS+" option, the differential pressure transducer (PTWDP-0.1) must be installed in the flow and return water piping and connected to terminals 18, 19 and 20 of terminal block Y.



For a system including an external buffer tank with electric heating, a water temperature sensor (THT-0.1) is required. This sensor must be connected to terminals 9 and 13 on terminal block Y.



CAUTION **The hot water tank probe (THT-0.1) is not compatible with the "domestic hot water" option.**

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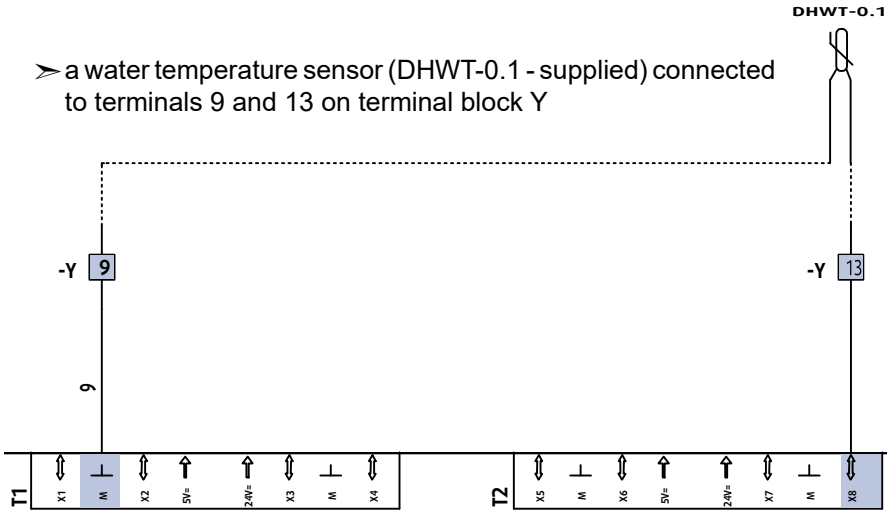
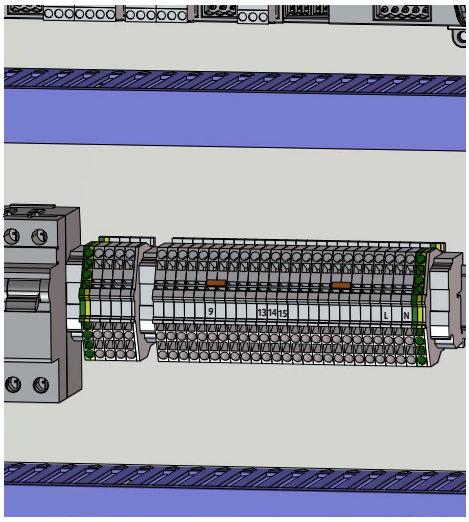
13.5. “DOMESTIC HOT WATER” OPTION

Domestic hot water production requires the installation of:

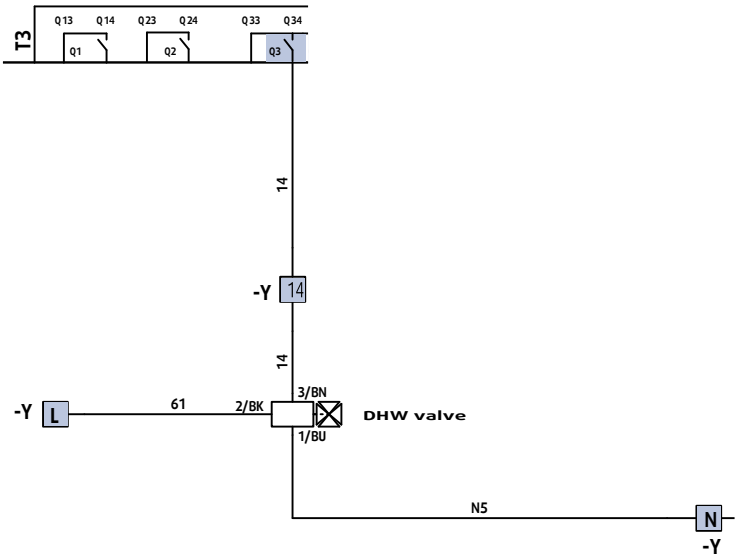
➢ a water temperature sensor (DHWT-0.1 - supplied) connected to terminals 9 and 13 on terminal block Y



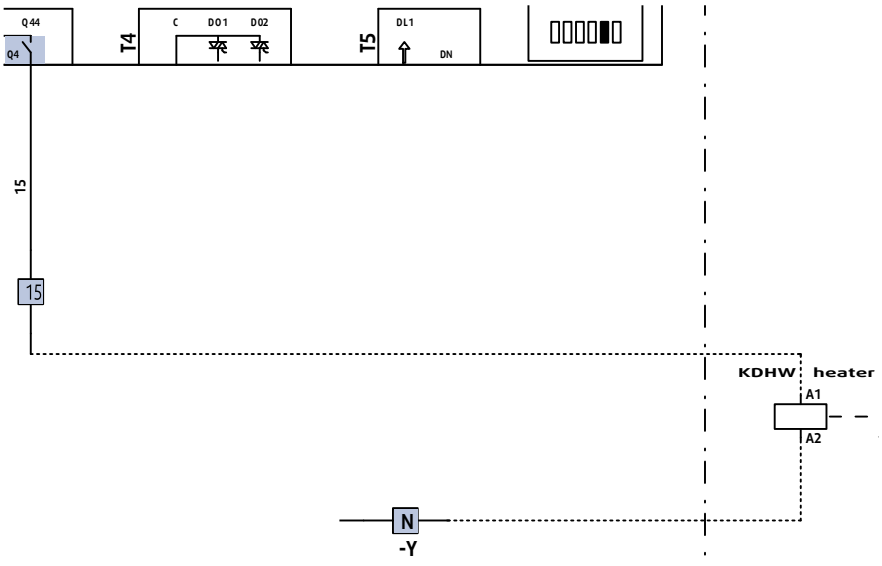


INFORMATION The temperature sensor cable can be extended with a cable of the same or greater cross-section. The connection is made by soldering and with a double protection by braided fibreglass sheath and heat-shrinkable tubing.

➢ a 3-way valve (DHW valve - optional) connected to terminals 14, L and N on terminal block Y



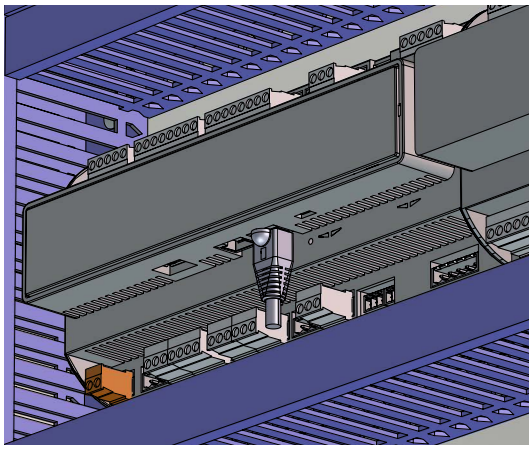
➢ a heating element power contactor (KDHW heater - not supplied) connected to terminals 15 and N on terminal block Y.



13.6. COMMUNICATION

The **POLARIX** has four different communication protocols:

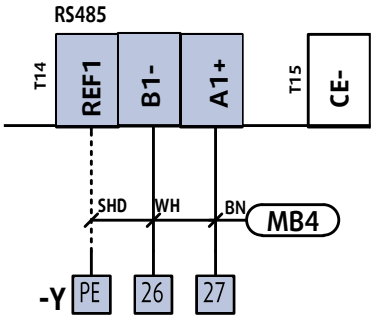
- ➢ Modbus TCP/IP
- ➢ BACNet IP
- ➢ Modbus RTU
- ➢ BACNet MS/TP

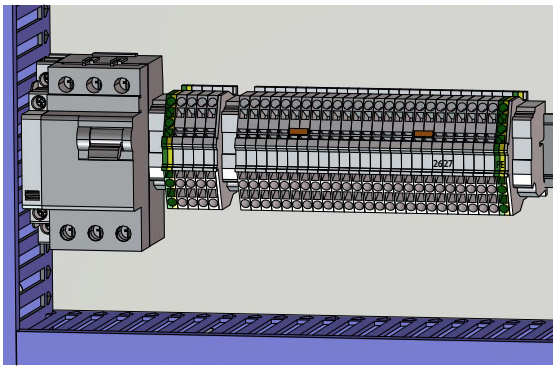


Modbus TCP/IP or BACNet IP communications are via an RJ45 connector and Ethernet type connector.

Modbus RTU or BACNet MS/TP communications are via the RS485 connection on the controller (terminals A1+ and B1- Port T14) and a BUS type cable (1 twisted pair, shielded) with a 0.22 mm² cross-section.

The communication cable must be connected to terminals PE, 26 and 27 on terminal block Y.





CAUTION **The Modbus link should not be routed through the same conduits as the power cables, as the induced voltage may cause a communication fault.**

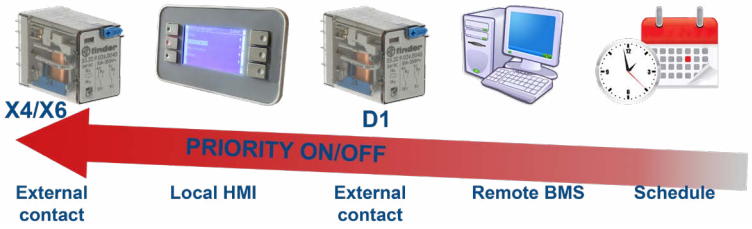
14. CONTROL

POLARIX units are fitted with an electronic control system. It provides the command, control and alarm functions.

14.1. ORDER OF PRIORITY FOR CONTROL SYSTEMS

The integrated regulator in the **POLARIX** can be controlled by various interfaces and systems. The order of priority for each drive system is as follows:

1. The HMI: the commands are given by the user directly on the unit (integrated display) or remotely (remote display)
2. Digital inputs: the client can send commands electromechanically via dry contacts (not supplied) on controller ports
   - ✔ Input D1 (POL698): ON/OFF
   - ✔ Input D2 (POL698): Forced Heating
   - ✔ Input X4 (POL965): Smart Grid - SG signal
     Input X6 (POL965): Smart Grid - EVU signal
   - ✔ Input DL1 (POL965): Reduced mode



3. The BMS : the remote supervision transmits it commands according to the communication protocols
4. Timing programming: this scheduling is integrated in the regulator

14.2. USER INTERFACE

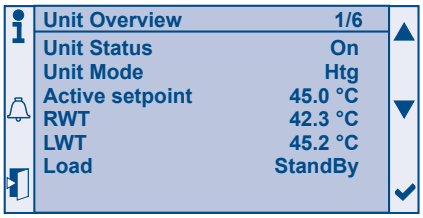
This terminal has a liquid crystal display and 6 buttons.

14.2.1. KEYPAD

INFO	From any screen, this button returns the user to the main menu or home screen and, like the ESCAPE button, invalidates a current modification.
ALARM	When pressing the alarm button (the red LED flashes if an alarm is active), the alarm management menu is displayed. (see § alarms)
ESCAPE	Returns to the previous level in the menu tree. Pressing this button during modification invalidates the change being made and returns the user to the previous menu. This function is very important if a setting is inadvertently modified.
UP/DOWN	These buttons have two functions. **1.** In a menu, they are used to move up and down the list of possible options. **2.** They can change the value of a setting when it has been selected.
ENTER	This button has three functions **1.** It is used to access a submenu **2.** Activate the modification of a setting **3.** Validate the modification of a setting

14.2.2. HOME PAGE

The home page is used to display quickly:

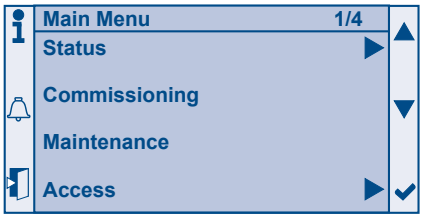


- ➢ the unit status (On/Off/Delegated/Reduced mode)
- ➢ the operating mode (cold/hot)
- ➢ the setpoint temperature
- ➢ the inlet water temperature (RWT)
- ➢ the flow water temperature (LWT)
- ➢ the unit load.

14.2.3. MAIN MENU

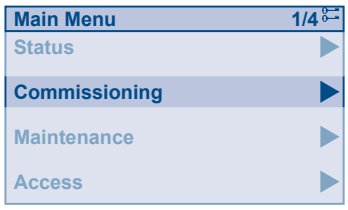
Pressing the "Info" button displays this screen directly.

The authorized menus are displayed according to the access level selected:



Access level	Final user	Installer	Maintenance
“Access” menu	✔	✔	✔
“Status” menu	✔	✔	✔
“Commissioning” menu	✘	✔	✔
“Maintenance” menu	✘	✘	✔
“Alarms” menu	✔	✔	✔

14.2.4. MENUS



The display has several menus. The "Status" menu is freely accessible. The other "Commissioning" and "Maintenance" menus can be displayed and accessed according to the access level.

To change the access level, go to the "Access" menu and enter the password corresponding to the level.

The first line of all the screens integrates the following information:

- ➢ Screen title
- ➢ Number of the active line/number of lines of the menu
- ➢ Access level
  - ✔ Final user
  - ✔ Installer
  - ✔ Maintenance

14.3. INITIAL SETTINGS

Open the electrical box and check that all circuit breakers are open except for **FTCC-0.1**.

Before starting up the **POLARIX** for the first time, the "Commissioning" menu must be configured.

14.3.1. LANGUAGE SETTINGS

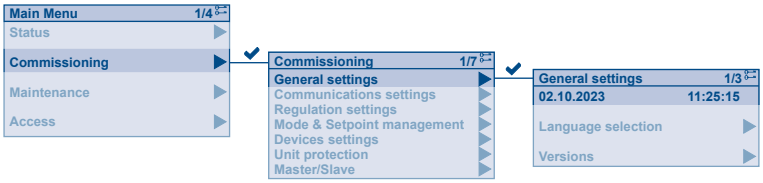
Select the languages required according to the application.

14.3.2. TIME SETTINGS

CAUTION **If the date and time are not set, the unit will function in degraded mode or may not even be able to start.**

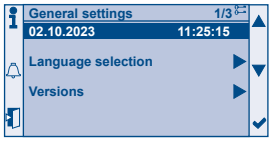
Start by configuring the date and time.

To do so, switch to the "Installer" or "Maintenance" profile in the "General settings" section. The first line of the menu is used to set the date and time.



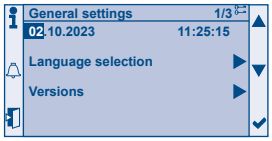
The date and time line will appear as highlighted.

Press the "Enter" button ✔ to activate the change in date.



The ▲ and ▼ buttons are used to change the highlighted setting.

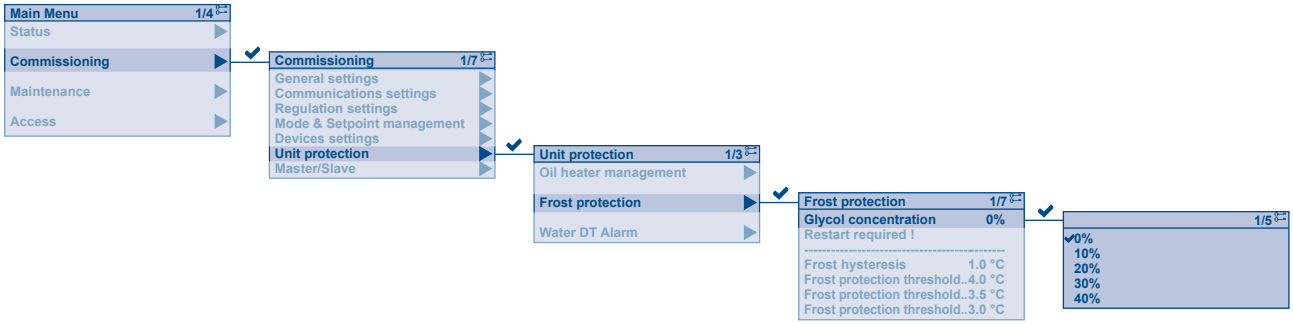
Press once on the ✔ button to approve the defined value and move on to the next setting.



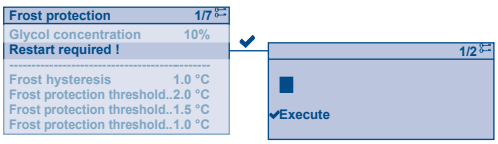
INFORMATION Power outage lasting longer than 8hrs will lead to a loss of the time setting. It is important to set the unit back to the right time after such an event.

14.3.3. DEFINING THE GLYCOL RATE

Define the glycol content present in the installation water circuit.



CAUTION **The settings are not changed until the controller is restarted**



14.3.4. CONFIGURING INPUT ON/OFF (D1)

During installation, a ON/OFF switch can be connected remotely onto the D1 input (POL698). Refer to the § **Remote controls**, page 30.

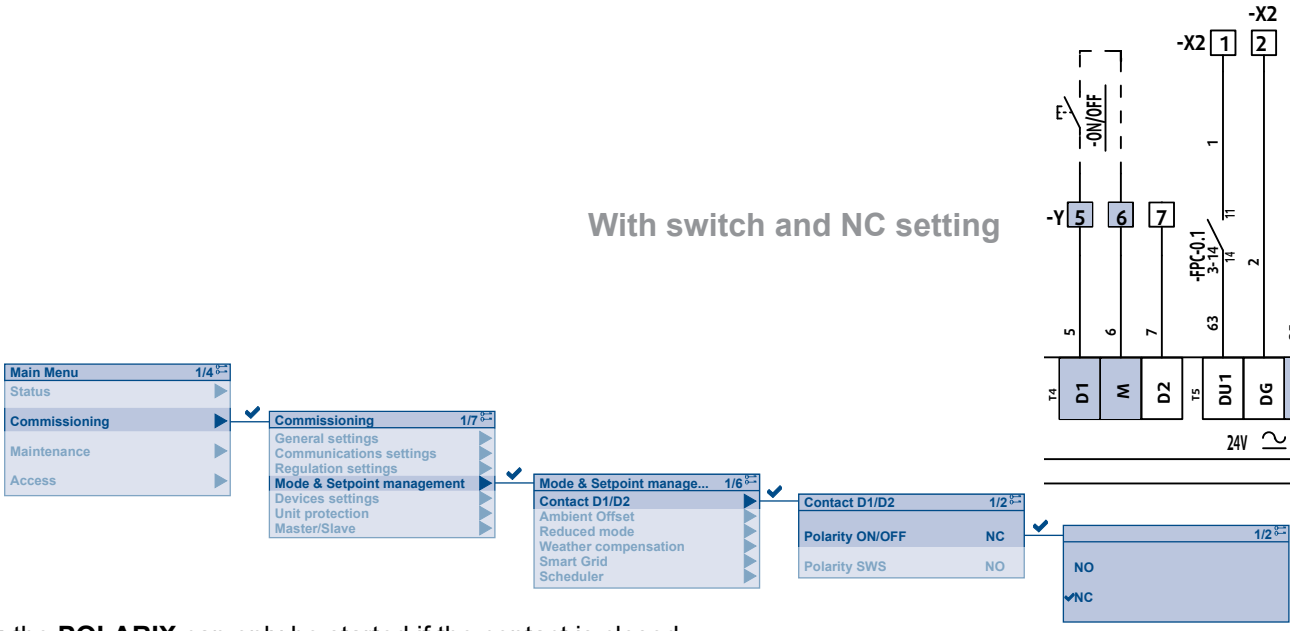
This input's behavior must be defined.

Factory configuration:

No switch and NO setting

NO: the **POLARIX** can only be started if the contact is open.

With switch and NC setting



NC: the **POLARIX** can only be started if the contact is closed.

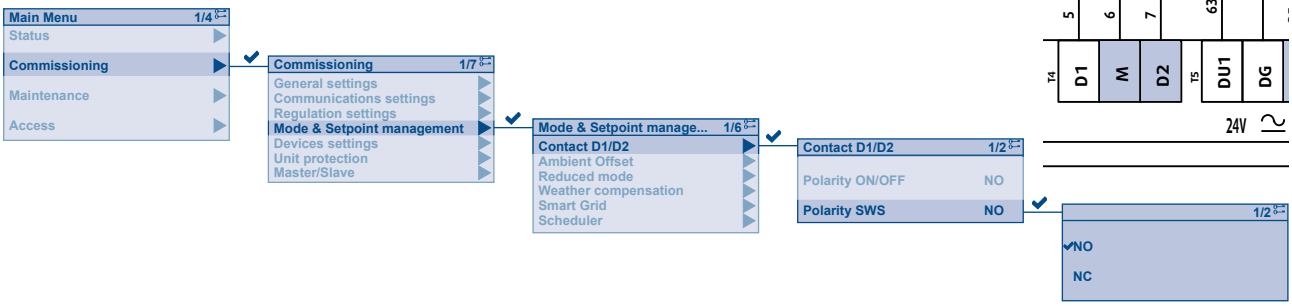
Configuration	Contact open	Contact closed
Normally Open NO	Operation order (ON)	Stop order
Normally Closed NC	Stop order	Operation order (ON)

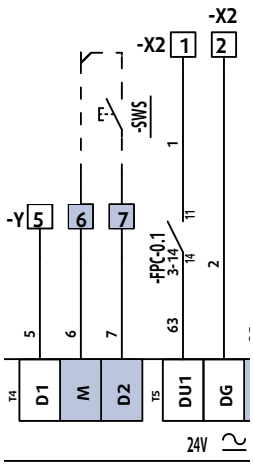
14.3.5. CONFIGURING INPUT SUMMER/WINTER (D2)

During installation, a switch SWS can be connected to the D2 digital input (POL698). Refer to the § **Remote controls**, page 30.

It is essential to set the switch type (NO or NC) to obtain the desired operating mode.

Configuration	Contact open	Contact closed
Normally Open NO	Mode defined by the HMI	Heating mode (forced)
Normally Closed NC	Heating mode (forced)	Mode defined by the HMI

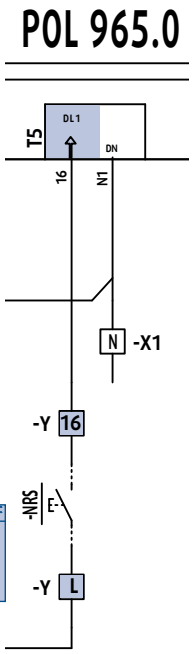


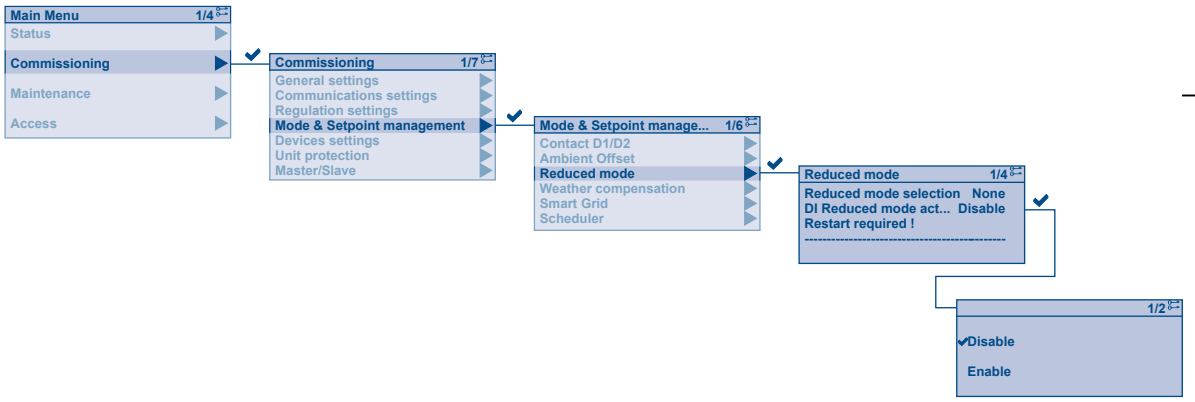


14.3.6. CONFIGURING INPUT REDUCED MODE (DL1)

During installation, a switch NRS can be connected to the DL1 digital input (POL965). Refer to the § **Remote controls**, page 30.

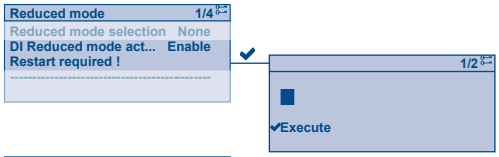
The reduced mode defined for this input takes priority over all control systems such as the HML, BMS or calendar.





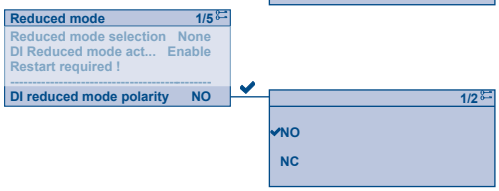
You must start by activating the use of a dry contact as the command for “Reduced mode”.

CAUTION **The settings are not changed until the controller is restarted**



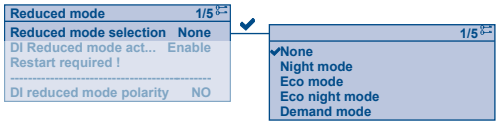
Secondly, you need to set the switch type (NO or NC) to enable or disable reduced mode.

Configuration	Contact open	Contact closed
Normally Open NO	Normal mode	Reduced mode
Normally Closed NC	Reduced mode	Normal mode



Reduced mode can be configured with the function values defined below.

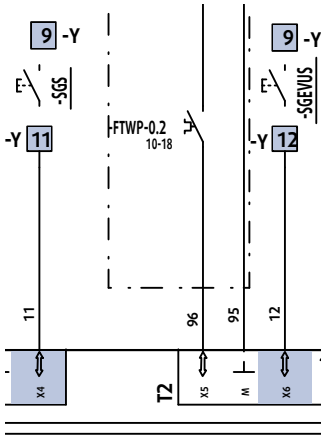
- ➢ None
- ➢ Night mode
- ➢ Eco mode
- ➢ Eco night mode
- ➢ Demand mode

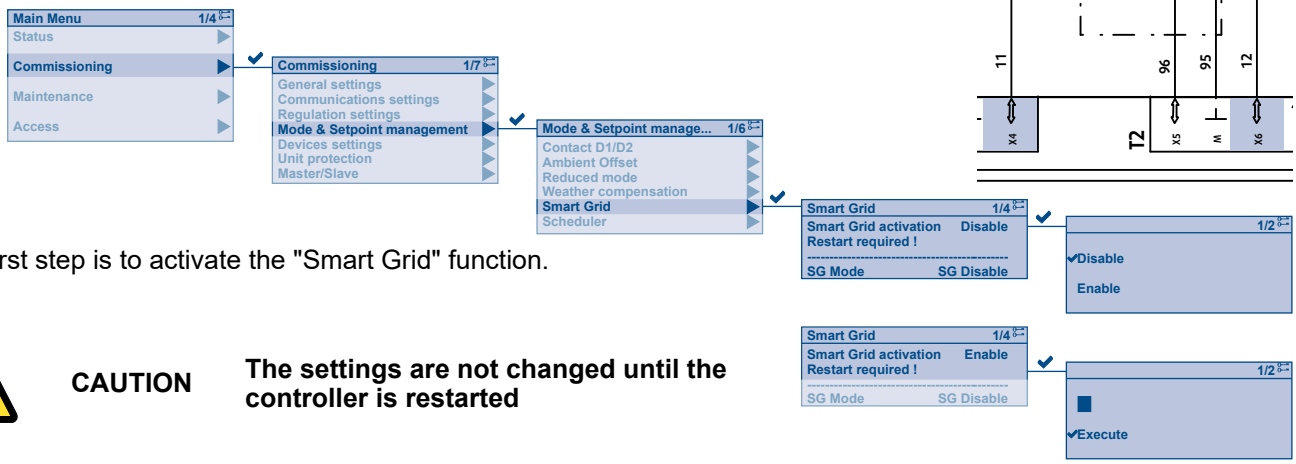


14.3.7. CONFIGURING SMART GRID INPUT (X4 AND X6)

During installation, the switches SGS and SGEVU can be connected onto the X4 and X6 (POL965) digital inputs. Refer to the § **Remote controls**, page 30.

The "Smart grid" mode defined for these inputs takes priority over all control systems such as the HMI, BMS or calendar.





The first step is to activate the "Smart Grid" function.

CAUTION **The settings are not changed until the controller is restarted**

Secondly, you need to set the switch type (NO or NC) in order to integrate the SG and SG EVU signals sent by the electricity provider.

Configuration	Contact open	Contact closed
Normally Open NO	0	1
Normally Closed NC	1	0

Depending on the combination of SG and SG EVU signals, four operating modes are possible:

SG (1)	SG EVU (1)	OPERATING MODE
0	0	Normal operating mode
0	1	Forced OFF
1	0	Boost mode 1
1	1	Boost mode 2

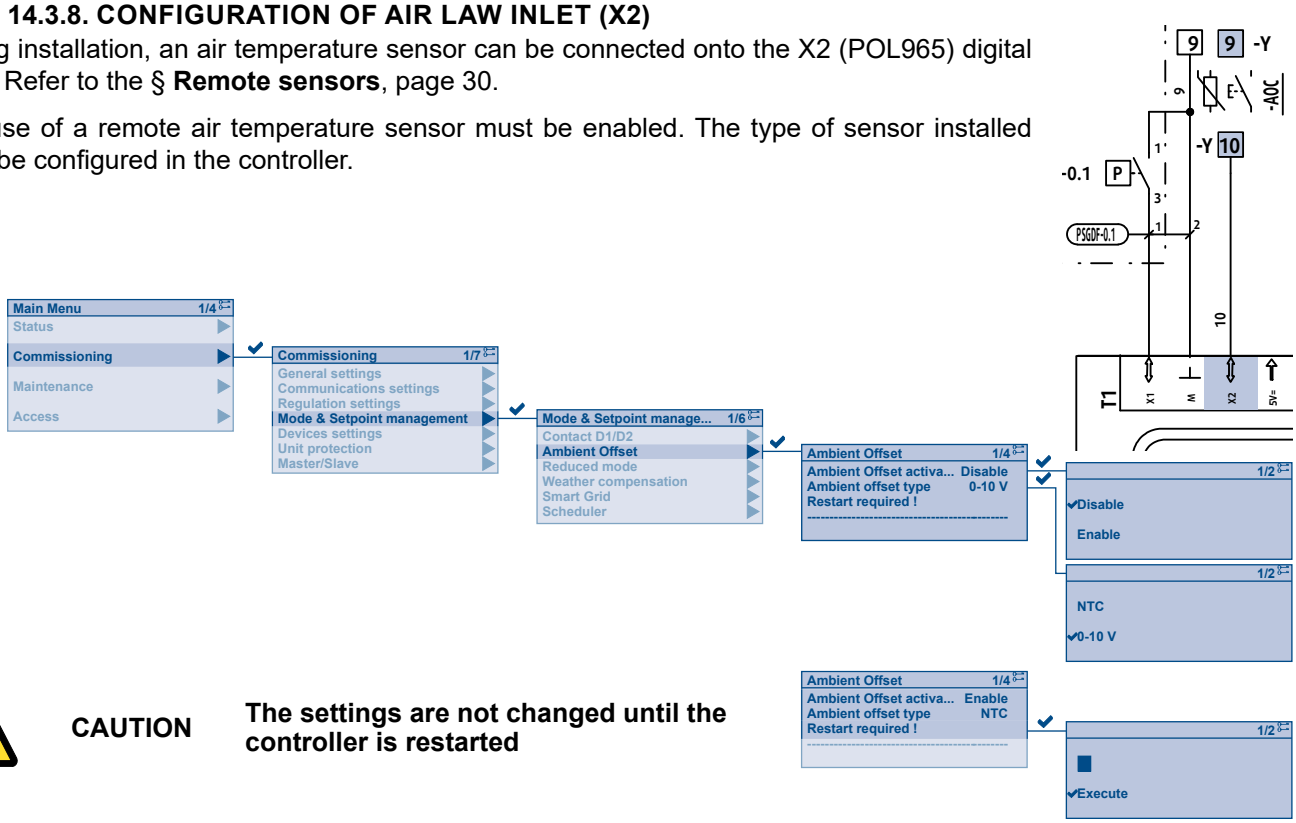
(1) SGS and SGEVU contacts are configured as NO.

Further information regarding this contact's configuration can be found in the in § **Smart Grid input X4 and X6**, page 33 user manual.

14.3.8. CONFIGURATION OF AIR LAW INLET (X2)

During installation, an air temperature sensor can be connected onto the X2 (POL965) digital input. Refer to the § **Remote sensors**, page 30.

The use of a remote air temperature sensor must be enabled. The type of sensor installed must be configured in the controller.



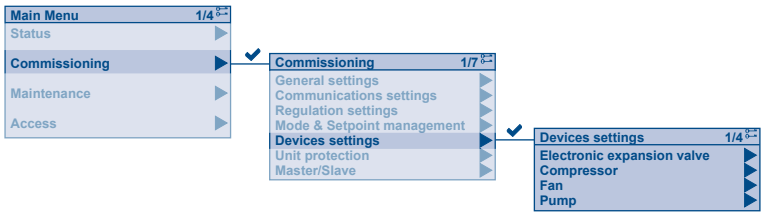
CAUTION **The settings are not changed until the controller is restarted**

Further information regarding this contact's configuration can be found in the in § **Ambient air temperature probe input X2**, page 35 user manual.

14.4. LAUNCHING THE POLARIX SYSTEM

The settings for the various modes and operating instructions are detailed in the machine's user manual.

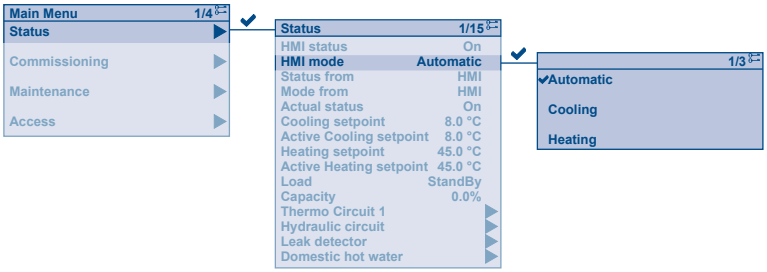
The settings and controls for the various components are described in detail in the machine's user manual.



14.4.1. SELECTING THE OPERATING MODE

The operating mode can be chosen in the "HMI mode":

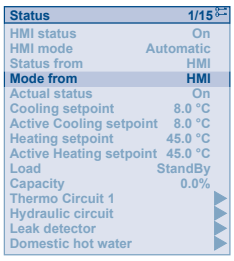
- **Automatic:** delegated to the BMS/Auto-change-over (refer to the UM)
- **Cooling:** request for cool mode
- **Heating:** request for heat mode



INFORMATION Selection of the Automatic/Cooling/Heating mode is only possible in reversible units. This menu does not exist in the "cool only" versions.

The "Mode from" line states what is the trigger for the current operating mode:

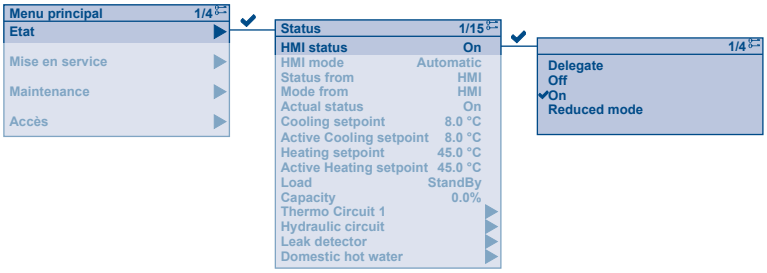
- **DHW**
- **DI S/W**
- **HMI**
- **BMS**
- **CascadeBMS**
- **Cascade**



14.4.2. SELECTING THE OPERATING STATUS

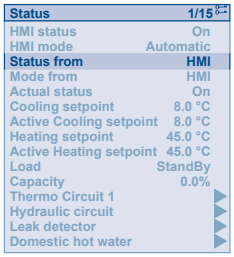
To launch the unit, the user must select the desired mode in the menu:

- **Delegate:** the current mode is determined by the BMS or by default by the calendar (refer to the user manual)
- **Off:** Unit is stopped
- **On:** System is launched
- **Reduced mode**



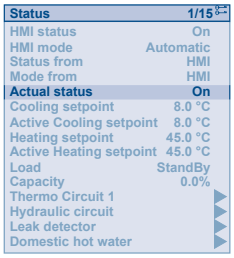
The "Status from" line states what is the trigger for the current status:

- **Scheduler**
- **DI On-Off**: **D1** on/off digital input
- **Reduced DI: DL1** configurable digital input (for “Night mode”, “Eco mode”, “Night eco mode” or “Request mode”)
- **SG:** Smart Grid mode
- **HMI**
- **BMS**
- **Cascade**



The “Actual status” line shows the current status:

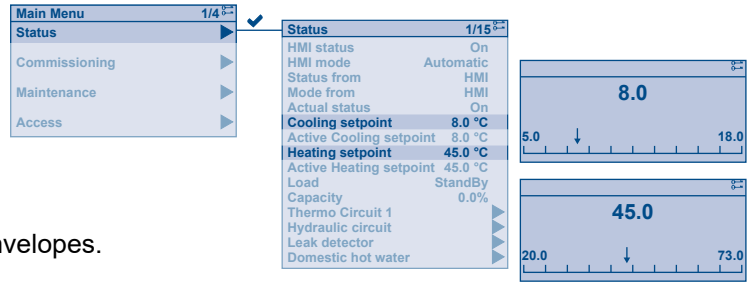
- **On**
- **Off**
- **Reduced mode**



14.4.3. USER TEMPERATURE SETPOINTS AND ACTUAL SETPOINTS

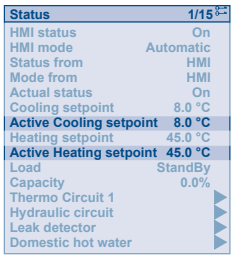
In the Status menu, the user can set start or return temperature setpoints, according to the control mode selected:

- **Cooling setpoint** : temperature setpoint for the cool mode
- **Heating setpoint** : temperature setpoint for the heat mode



These setpoints are limited to the unit’s operating envelopes.

- **Active Cooling setpoint** : current setpoint for cooling mode
- **Active Heating setpoint** : current setpoint for heating mode



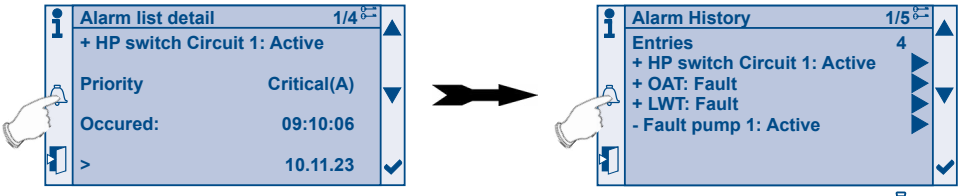
Adjustment by activating the "Smart Grid", "Reduced mode", "Ambient Offset" or “Water law” options will cause the setpoints to vary automatically according to external conditions.

Actual heating and cooling setpoints match the values utilized in real time for optimal operation of units

INFORMATION Regardless of the adjustment, the resulting setpoint is restricted to the operating limits to protect the unit.

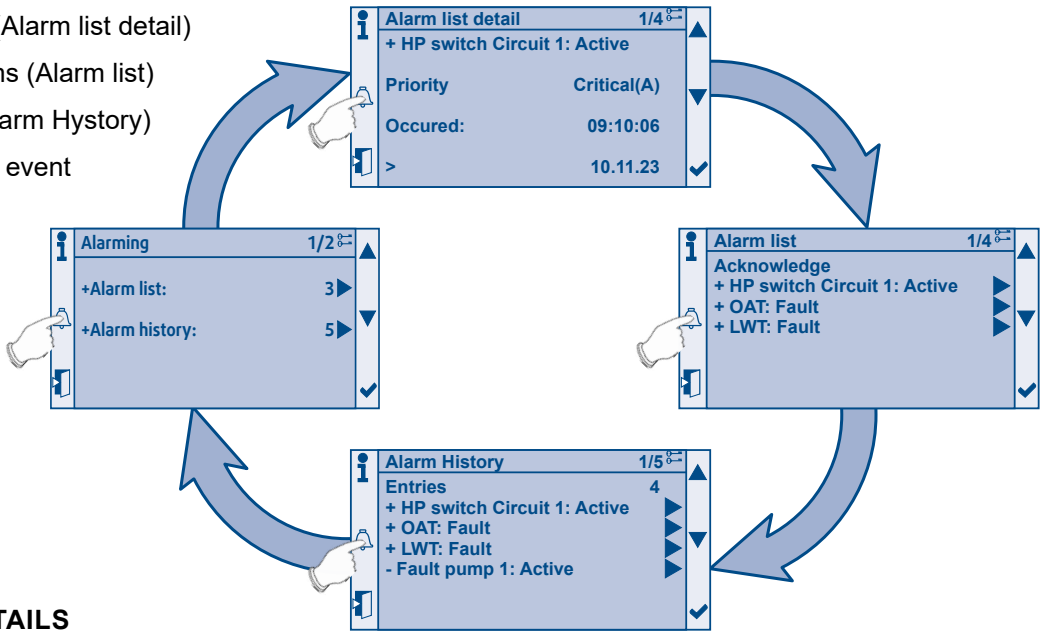
14.5. ALARMS

If no alarm is active, pressing the "Alarm" button takes you to the alarm history



If at least one alarm or event is active, the alarm button flashes. Pressing the "alarm" button, will display successively :

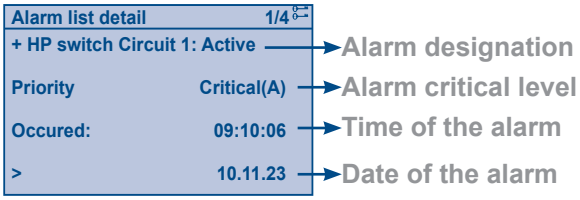
- ➢ The last active alarm (Alarm list detail)
- ➢ The list of active alarms (Alarm list)
- ➢ The alarms history (Alarm Hystory)
- ➢ The alarms menu and event (Alarming)



14.5.1. ALARM DETAILS

This page is displayed :

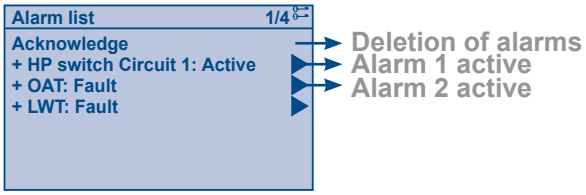
- ➢ Details of the last active alarm
- ➢ If you request the details of an alarm in the list of active alarms
- ➢ If you request the details of an alarm in the alarms history



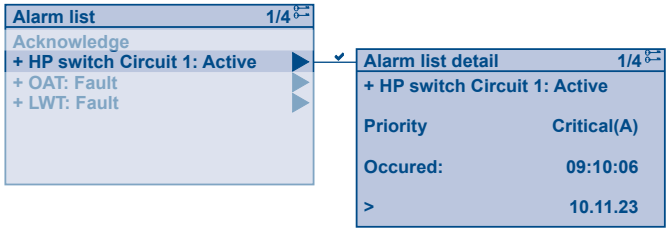
14.5.2. THE LIST OF ACTIVE ALARMS

The list of active alarms allows visualization of current alarms

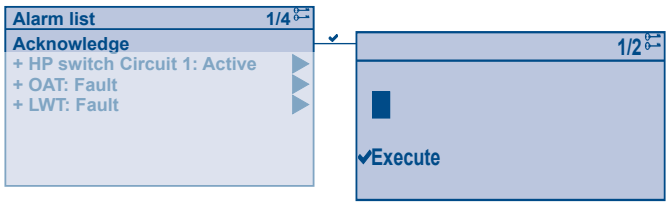
The first line shows the number of active alarms (3 in the example below)



You can access the alarm details by selecting an alarm and pressing the "Enter" button ✔.



With installation or maintenance level access, you can acknowledge active blocking alarms. To do this select delete, confirm and select "Execute". Only the alarms that are no longer active will be deleted from the list.

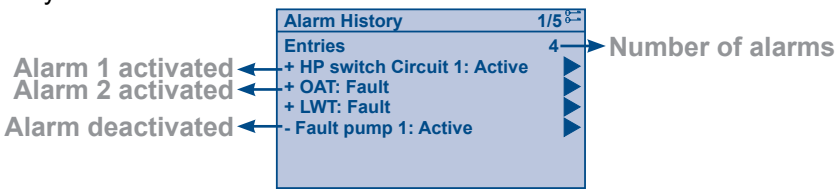


14.5.3. ALARMS HISTORY

This history reports the 150 most recent activation or deactivation of alarms:

➢ Activation of an alarm will be indicated by a "**+**"

➢ Deactivation of an alarm will be indicated by a "**-**"



For the activation and deactivation time of an alarm, select the alarm and press the "enter" button ✔.

15. COMMISSIONING

INFORMATION **THE COMMISSIONING FORM AVAILABLE IN THE ANNEX MUST BE COMPLETED, HANDED TO THE OPERATOR AND SENT TO THE MANUFACTURER AS A PRIOR CONDITION FOR THE WARRANTY TO APPLY.**

CAUTION

When performing startup and service, thorough safety precautions shall always be taken.

Only a skilled person who is trained in the handling of refrigerating systems (as per standard EN13313) and flammable fluids (certified and with proof of relevant training) may carry out this work.

15.1. LIST OF PRELIMINARY CHECKS

Before commissioning the system, you must carry out a certain number of installation checks to ensure that the appliance will operate in the best possible conditions. The following list of checks is not exhaustive and only serves as a minimum reference guide.

1. Make sure that no source of ignition is present in the work area
2. Make sure that the work area is adequately ventilated
3. Make sure that suitable fire extinguishing equipment is available and within reach
4. Make sure that the concentration of R290 in the atmosphere of the work area is continuously controlled in order to be able to warn people of a potentially hazardous situation.
5. Check that the equipment installed, including options, matches the order
6. Check that the oil heating resistors have been energized for at least 12 hours.

15.1.1. VISUAL CHECK

1. Check that there is no debris or cardboard in the unit.
2. Check free clearances around the unit:
   - ✔ exchanger air intake
   - ✔ exchanger air outlet
   - ✔ leak extraction fan air intake
   - ✔ leak extraction fan air outlet
   - ✔ access or maintenance work.
3. Unit mounted as specified.
4. Check that the unit is level and that condensates drain freely away from the unit (for heat pump units).
5. Avoid possible recycling of the air evacuated by the fans, high exposure to prevailing winds.
6. In the case of a harsh climate (temperature well below freezing, snow, high humidity), check the unit is raised 10 cm from the ground.
7. For loose or missing bolts or screws.

15.1.2. HYDRAULIC CHECK

1. Check that the external water circuit components (pumps, user equipment, filters, expansion tank and reservoir if supplied) have been correctly installed in accordance with the manufacturer's recommendations and that the water inlet and outlet connections are correct.
2. Check that the water quality complies with the indicated standards (Refer to the § **Water quality**, page 22).
3. Check the drain plug is properly sealed.
4. Check the air bleed in the unit has actually been opened.
5. **Check the presence, direction and position of the water filter upstream of the appliance (mesh size ≤ 800µm).**

6. Check the presence and position of the stop valves to isolate the unit during maintenance periods.
7. Check the hydraulic circuit is properly filled and that the fluid is circulating freely without any signs of leaks or air bubbles. When glycol antifreeze is used, check it is at the right concentration (in accordance with the intended use).
8. Check that the pump liners are not stuck. The shaft of the motor must turn freely "by hand". If necessary, free up the shaft using a tool.
9. Check the direction of rotation of the pump and leave the fluid to circulate for at least 12 hours for each pump. Then clean the pump inlet water filter.
10. Adjust the water flow in order to comply with the specifications.

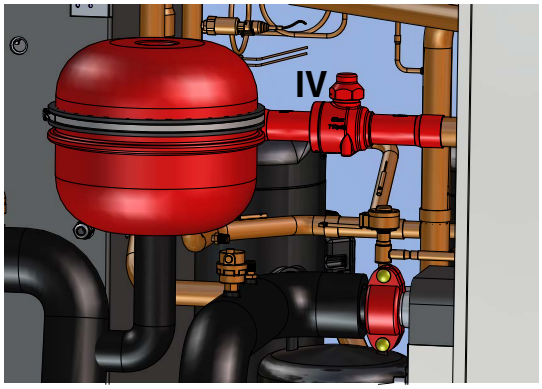
15.1.3. REFRIGERATING CHECKS

1. Leak test of the refrigeration circuit at the unions and on the various parts. The desired result is 5g/year maximum
2. Check that the fluid indicator is green (set by the factory) indicating absence of humidity.

CAUTION

The refrigeration circuit is equipped with a IV isolating valve between the plate exchanger and the compressor.

This valve used during the assembly process is open and MUST NOT BE CLOSED UNDER ANY CIRCUMSTANCES DURING OPERATION.



15.1.4. ELECTRICAL CHECK

1. Electrical installation has been carried out according to the unit wiring diagram and the Supply Authority Regulations in effect.
2. A correctly sized fuse or circuit breaker has been installed at the main switchboard.
3. Supply voltages as specified on the unit wiring diagram.
4. **Check that all of the appliance's electrical connections have been tightened.**
5. Check that no cables are in contact with pipes and/or sharp edges.
6. Check the electrical grounding of the appliance.

15.2. UNIT START-UP

15.2.1. PHASE ROTATION PROTECTION

If the phase of the power supply is not correct, the phase rotation protection device will prevent the machine from starting (Refer to the § **ELECTRICAL CONNECTIONS**, page 27).

If phase rotation is correct, close all circuit breakers.

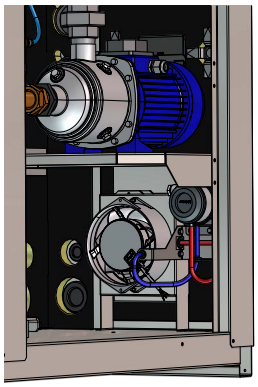
15.2.2. GAS DETECTION SENSOR

The **POLARIX** units are fitted with a gas detection sensor (GD-0.1) to ensure the safety of personnel and the machine in the event of a leak of R290.

Each time it is switched on, the gas detection sensor undergoes a 30-second initialisation cycle. The “Leak detection initialisation” alarm is activated. At the end of the initialisation cycle, if all the parameters are correct, the controller authorises the unit to start up. The “Leak detection initialisation” alarm is automatically acknowledged.

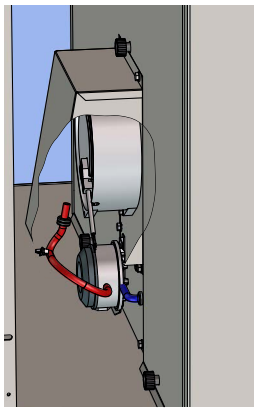
CAUTION

The sensor calibrates itself each time it is switched on during the initialisation cycle. The concentration of R290 detected at this moment is considered to be 0%. It is therefore essential to confirm the complete absence of R290 when the unit is switched on.



The **POLARIX 50** and units with the Extra Low Noise (S) option are equipped with an exhaust fan (GDF-0.1) and a differential pressure switch (PSGDF-0.1). This device is designed to force circulating air into the compressor compartment.

During the initialisation cycle, the correct operation of the exhaust fan is tested. If this fails, the “Leak detection fan initialisation fault” alarm is activated. Starting up the machine is not permitted.



INFORMATION

The panel on the safety fan side must be present to prevent the machine performing a safety shutdown (checking of ΔP of fan GDF-0.1)

The fan pressostat is set by default at the factory to a value just below 0.6 mbar.

Find out more about how the gas detection sensor works in the user manual.

15.2.3. FIRST START-UP

When starting up the unit, it is necessary to first energize the compressor casing resistors to evaporate the fluid and oil. The resistors are activated when the unit is switched on (including in standby mode). The controller will prevent start-up if the system is not ready.

Depending on the time of year and the customer requirement:

1. Configure hot/cold mode (Refer to the § **Selecting the operating mode**, page 41)
2. Start up the unit in manual mode: ON (Refer to the § **Selecting the operating status**, page 42).

15.2.3.1. OPERATING CHECK LIST

1. Cheek for any unusual noises or vibration in the running components.
2. Leak check of the refrigeration circuit in operation. The desired result is 5g/year maximum.
3. Adjust the water flow according to the desired DT for the water (Refer to the § **HYDRAULIC PUMPS CURVES**, page XVIII).
   - ✔ Check pressure at the inlet and outlet of the plate exchanger
   - ✔ Determine the water flow using a flowmeter or the load loss of the plate exchanger
4. Take a reading of the currents at the compressor, fan and pump terminals.
5. Check there is no dampness during operation: green fluid indicator
6. Take a temperature reading of the cooling and hydraulic circuits after 20 minutes of stabilization, using the controller display.
   - ✔ Check the operating pressures are within normal limits.
   - ✔ Check discharge, suction and liquid temperatures
     - Discharge temperature on the cooling cycle should normally not exceed 115°C.
     - Suction superheat should be 6K ±2K.
     - Suction subcooling should be 5K ±2K.

INFORMATION It is very important that the unit should operate with a water flow that conforms to the recommendations shown in § **Physical characteristics**, page 12. It is dangerous to leave the unit running with a low water flow; this could cause irreparable damage to the components and the plate exchanger. If the unit operates with insufficient flow, its performance will not be optimal.

15.2.4. FINAL CHECK

Check that :

1. All panels and fan guards are in place and secured.
2. Unit clean and free of any installation material.

It is the installer’s responsibility to complete the “ON-SITE INFORMATION” form provided in the annex and to hand it to the operator. That document explains what to do in the event of an emergency.

The installer must also provide suitably protected documentation that must remain close to the refrigerating system operating site and be clearly legible.

16. WARRANTY CLAIM - MATERIAL RETURN PROCEDURE

Equipment must not be returned without the permission of our After Sales Department.

To return the equipment, contact your nearest sales office and ask for a "return form". The return form shall be sent with the returned equipment and shall contain all necessary information concerning the problem encountered.

A part return does not constitute a replacement order. Therefore, a purchase order must be submitted through your nearest distributor or regional sales office. The order should include the part name, part number, model number and serial number of the unit involved.

Following our personal inspection of the returned part, if it is determined that the failure is due to faulty equipment or workmanship, and the part is still under warranty, credit will be applied to the customer's purchase order. All parts shall be returned to our factory, transportation charges prepaid.

17. ORDERING SERVICE AND SPARE PARTS ORDER

The part number, the order confirmation and the unit serial number indicated on the name plate must be provided whenever services or spare parts are ordered.

For any spare part order, indicate the date of unit installation and date of failure. Use the part number provided by our spare parts department. If the part number is not available, provide a full description of the part required.

18. MAINTENANCE

Maintenance in accordance with our instructions will prolong the service life of your **POLARIX** :

- ➢ Better refrigeration performance
- ➢ Reduced power consumption
- ➢ Accidental component breakage prevention
- ➢ Prevention of heavy, late, and expensive maintenance work
- ➢ Environment protection

Depending on actual operational constraints and regulatory changes, the installer might recommend increased maintenance operations and more frequent inspections.

Prior to carrying out any work on the unit, the following precautions should be adhered to:

1. Make sure that no source of ignition is present in the work area
2. Make sure that the work area is adequately ventilated
3. Make sure that suitable fire extinguishing equipment is available and within reach
4. Make sure that the concentration of R290 in the atmosphere of the work area is continuously controlled in order to be able to warn people of a potentially hazardous situation.
5. Make sure that all electrical power sources are switched off.

CAUTION

The user is responsible for ensuring that the unit is in perfect working order and that the technical installation and **minimum maintenance** operations have been performed by a qualified technician in accordance with the procedures described in this manual.

18.1. TABLE OF PERIODIC SERVICE AND MAINTENANCE

It is essential to keep an up to date maintenance booklet to record temperature and pressure readings and all checks and maintenance operations performed on the **POLARIX**.

CAUTION

All refrigerating fluid charging, sampling and draining operations must be performed by a skilled technician using equipment adapted to the unit, in agreement with authority regulation in effect on site.

Any inappropriate handling may cause uncontrolled fluid venting into the atmosphere, fires and explosions.

WARNING

Opening the refrigeration circuit then involves vacuum drawing, checking the circuit sealing and recharging the refrigerating fluid. For any intervention on the refrigerating fluid circuit, first drain the unit's charge using a refrigerating fluid collection station.

The list of checks and verifications is provided as a partial guide only. It is the responsibility of the servicing and maintenance technician to adapt it according to local standards and regulations regarding the in-service monitoring of pressurized refrigerating systems.

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TASKS PER COMPONENTS		ACTIONS	6 months	12 months
			Recommended inspection and maintenance interval	
1 - Casing				
1.1	Control possible contaminations, damage and/or corrosion.	Clean and repair if required.		✘
1.2	Check the possible presence of water (condensates, leakages, etc.).	Clean and look for the cause, then repair.	✘	
1.3	Verify the appearance of the thermal insulation	Replace if required.		✘
1.4	Check the state of the anti-vibration pads	Replace if required.		✘
1.5	Check the condition of door gasket.	Replace if required.	At each inspection	
1.6	Check the condition of the markings	Replace if required.		✘
2 - REFRIGERANT CIRCUIT				
2.1	Check there are no gas bubbles in the fluid line		✘	
2.2	Check the lack of humidity in the refrigerating fluid		✘	
2.3	Check the pipes or capillaries do not rub and vibrate.			✘
2.4	Check the compressors do not emit abnormal noise or vibration.		At each inspection	
2.5	Check the backflow temperature.		✘	
2.6	Record the operating pressure	Check it is above or below those recorded when the unit was started up.	✘	
2.7	Check the compressor fastening screws are tight.			✘
2.8	Check the crankcase heater is powered on during the stop cycle.		✘	
2.9	Check the cleanliness of the coil.	Clean if required.	✘	
2.10	Check the filter drier clogging.	Replace if required	✘	
2.11	Check the operation of the high pressure switch.	Replace if required		✘
2.12	Check for the absence of refrigerating fluid leak (image + hydrocarbon detector)	Repair without delay and check after 1 month		✘
2.13	Check the cycle reversal valve			✘
2.14	Check the condition of the anti-vibration studs	Replace if required		✘
2.15	Check and monitor changes in the thickness of tubes and main components (reserve fluid cylinder)	Replace if required		✘

TASKS PER COMPONENTS		ACTIONS	6 months	12 months
			Recommended inspection and maintenance interval	
3 - HYDRAULIC CIRCUIT				
3.1	Check the state of the function, check there is no damage nor corrosion.	Clean and repair.		✘
3.2	Check the condition of the exchanger, in terms of corrosion and functionality.	Clean and repair.		✘
3.3	Check the tightening of the pipe connections and fastening	Readjust and repair if necessary.		✘
3.4	Verify the pressure value of the hydraulic circuit		✘	
3.5	Bleed the air.		✘	
3.6	Run the isolation valves			✘
3.7	Check no ice has formed.			✘
3.8	Check the condition of the piping thermal insulation.	Repair and replace if required.		✘
3.9	Check the frost protection devices (glycol-based water, thermostat, etc.).	Repair and replace if required. When air temperatures are wintery, and after general stoppage of the installation, the water contained in the plate exchanger may freeze. To prevent such problems, fully drain the unused plate exchanger or protect it by pouring an antifreeze solution into the hydraulic circuit or other devices. ⚠ The manufacturer waives any liability for damage to the plate exchanger caused by water freezing inside the unit.		
3.10	Check filter cleanliness.	Clean	✘	
3.11	Check that the hydraulic circuit is filled properly		✘	
3.12	Check the condition of the expansion tank (presence of excess corrosion, or gas pressure loss)	Replace if required.		✘
3.13	Check the water pump	If the unit has not been used for a long time, manually rotate the pump shaft and check that it turns freely. For a unit equipped with a double pump, it is advisable to switch from one pump to the other every month or to check that the pump shaft turns freely to prevent the liners sticking.	✘	
		Replace the pump liner after 15,000 hours running with anti-freeze or 25,000 hours running with water.	✘	
3.14	Verify that the low water pressure sensor works correctly			✘
3.15	Record the water temperatures at the plate exchanger inlet and outlet.		✘	
3.16	water quality - sampling + water analysis			✘

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TASKS PER COMPONENTS		ACTIONS	6 months	12 months
			Recommended inspection and maintenance interval	
4 - ELECTRIC CIRCUIT				
4.1	Check the electrical voltage applied to the unit, which must remain stable within the tolerances specified on the information plates.		✘	
4.2	Check that the main supply cable is void of alterations likely to impact the insulation.	Replace if required.		✘
4.3	Check the grounding of the metallic structure	Repair if required.		✘
4.4	Inspect the contacts.	Replace if required.		✘
4.5	Check that all electrical connections of the device are tight	Tighten if required.		✘
4.6	Check the thermal protection relays of the motors	Replace if required.		✘
4.7	Check the nominal intensity and condition of the fuses.			✘
4.8	Check the condition of the condensers.			✘
4.9	Clean the compressed air electrical unit to remove any dust or other contaminants building up.			✘
4.10	Check the motor windings are insulated.			✘
5 - FAN(S)				
5.1	Check for the absence of contamination, corrosion or damage.	Clean if required		✘
5.2	Check proper fastening of the fan.	Tighten if required.		✘
5.3	Check the vanes to guarantee balancing.	Clean if required.		✘
5.4	Check the bearings for noise.	Repair if required.		✘
5.5	Check the condition of the fan motor.			✘
6 - REGULATION				
6.1	Check the condition of the alarms	Acknowledge them after taking them into consideration	✘	
6.2	Check the setting points		✘	
6.3	Check the operation of all probes		✘	
6.4	Check the gas detection module			✘

18.2. MAINTENANCE PROCEDURES

18.2.1. GENERAL

This equipment must be submitted for sealing checks **at least once per year, by a professional authorized to perform such an operation**. Refer to national requirements for the frequency of these checks.

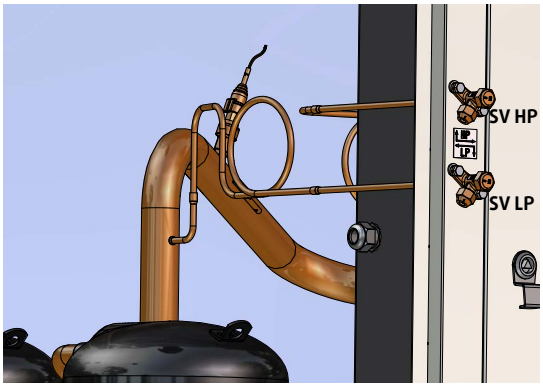
CAUTION **ANY BRAZING OPERATION ON THE COOLING CIRCUIT MUST BE PERFORMED WITH CONSTANT FLOWING NITROGEN.**

18.2.2. REFRIGERANT DRAINAGE

CAUTION **Never use the compressor as a vacuum pump to drain the installation.**

Before opening the refrigeration circuit, use the SV HP/SV LP service valves to:

1. drain the unit's charge using a recovery unit compatible with flammable refrigerants (non-sparking electrical components) until a residual pressure of 0.3 bar absolute is obtained.
2. purge the circuit with nitrogen
3. expel at a pressure of 0.3 bar absolute
4. perform a second nitrogen purge
5. open the circuit
6. use a detector to check there is no fluid.

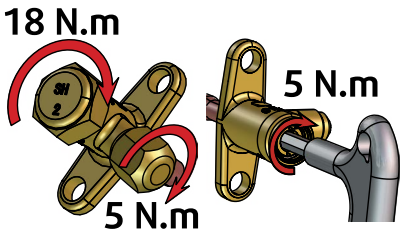


CAUTION **When opening the refrigeration circuit, be particularly alert to the presence of residual oil in the circuit. That oil may contain dissolved refrigerant and be potentially flammable.**

18.2.3. REFRIGERANT CHARGING

The R290 charging procedure must be carried out by a qualified technician using the SV HP/SV LP service valves.

1. Create a vacuum in the refrigeration circuit to obtain at least 0.3 mbar.
   The time it takes to create the vacuum depends on the person performing the task, as well as choosing the right moment to break the vacuum.
2. Fill with R290 up to the amount indicated on the product plate.
3. Close the SV HP and SV LP valves
   - ✔ valve tightening torque: 5N.m
   - ✔ plug tightening torque: 18N.m or 5N.m
4. Perform a leak check of the refrigeration circuit after charging. The desired result is 5g/year maximum.
5. Check for the absence of humidity: green fluid indicator.
6. Run the unit in refrigerating mode to determine whether the group's charge is correct by checking the sub-refrigeration (Refer to the § **Operating check list**, page 48)..



18.2.4. REPAIRS

CAUTION Only the competent person trained in handling flammable refrigerants (demonstrated by proof of suitable training) is authorized to open or shut off the refrigerant circuit.

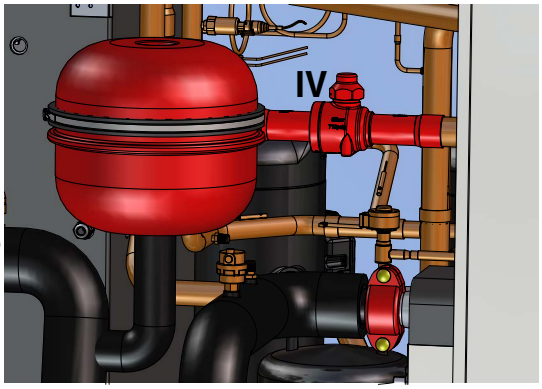
Repairs to components containing refrigerant must be undertaken by a competent person in accordance with the following sequence, if appropriate:

1. carry out a risk assessment and gauge the level of risk for the proposed repair.
2. inform the operator of the unit.
3. obtain authorization to proceed with the repair.
4. drain the fluid (Refer to the § **Refrigerant drainage**, page 53).
5. disconnect and make safe the components which are to be repaired.
6. clean and purge with nitrogen.
7. carry out the repair.
8. subject the repaired component to testing and verification (test with nitrogen at service pressure, leak testing).

CAUTION

The maximum authorized pressure at the compressor intake (BP) is 28 bar. For all service pressure testing, the pressure should be held at 28 bar, the isolating valve (IV) closed, and finally service pressure attained.

The isolating valve and non-return valve at the compressor exhaust isolate it and protect it as a whole unit.



9. open the isolating valve (IV).
10. charge with refrigerant (Refer to the § **Refrigerant charging**, page 53).
11. subject the unit to testing and verification (leak test and operating test).

18.2.5. SPECIFIC COMPONENTS

18.2.5.1. COMPRESSORS

Compressors are not fitted with an oil level sight glass. This is to ensure a perfect seal. Therefore no top-up with oil is required during the service life of a compressor.

For any maintenance operation requiring the oil to be topped up or replaced, you must use an oil such as ZEROL® RFL 68EP, and adhere strictly to the volume indicated on the rating plate. In addition, you must follow the procedures mentioned in § **Refrigerant drainage**, page 53 and in § **Refrigerant charging**, page 53.

18.2.5.2. FILTER DRIER

Refrigeration circuits are fitted with filter driers.

The fluid indicator is used to check the refrigeration flow and humidity rate of the refrigerating fluid. The presence of bubbles indicates that the filter drier is clogged or that the charge is insufficient.

If you notice that air bubbles remain even after the filter has been replaced, this means the device has lost part of its cooling product in one or several places, which will need to be detected and repaired.

The glass window contains a color indicator. By comparing the indicator color with the scale on the glass window, the humidity rate of the refrigerating fluid can be calculated. If the humidity rate is too high, replace the filter, run the system for one day, then check the humidity rate again.

A humidity rate within the preset limits requires no further intervention. If the humidity rate remains too high, replace the filter drier again, start the unit, and run it for another day.

18.2.5.3. EXTERNAL EXCHANGER

CAUTION **Fin edges are sharp and can cause injury. Avoid contact with them.**

External exchanger are composed of copper tubes and aluminum fins. In case of leaks due to damage or shock, the coils must be repaired by one of the authorized Support Centers. To guarantee the best possible operation of the condenser bank, the external exchanger surface must be kept as clean as possible, and it must be free of foreign objects (leaves, wires, insects, slag, etc.). A dirty coil will use more electrical power. In addition, condensation pressure could increase and trigger a high pressure alarm.

Clean the air exchanger using a special product for aluminum-copper coils and rinse with water. Do not use hot water or steam, as these may increase the pressure of the refrigerating fluid's.

CAUTION **Avoid damaging the aluminum fins during cleaning. Never use pressurized water without a wide diffuser. Concentrated and/or rotating water jets are strictly prohibited.**

18.2.5.4. PLATE HEAT EXCHANGER

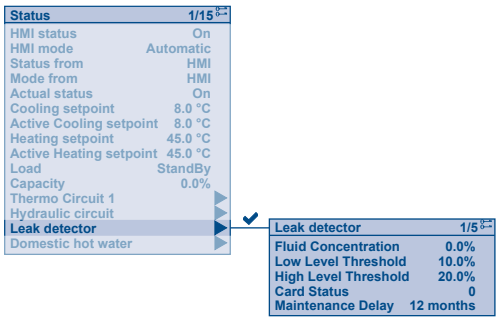
Verify the pressure difference between the inlet and the outlet of the heat plate exchanger. If the water pressure and flow rate values do not correspond to the pressure loss curves available in § **PRESSURE LOSSES OF THE PLATE HEAT EXCHANGER**, page XVII, the heat plate exchanger may become clogged with dirt. To clean it, use a non-corrosive solvent to remove calcareous deposits. The equipment used for the external water flow, the quantity of solvent and safety measures applied must be approved by the company supplying the cleaning products, or the one performing these operations.

18.2.5.5. LEAK DETECTOR

The leak detector must be checked every 12 months from the time it was installed in the machine.

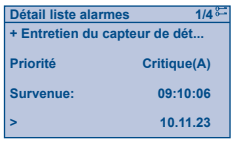
When setting up the **POLARIX**, the system sets the month and year of the next calibration.

The “Status” menu is used to check the various parameters of the gas detector:



- ➢ real-time gas concentration
- ➢ thresholds for triggering alarms in the event of a leak
- ➢ status of the detection card
- ➢ deadline for the next maintenance.

The “Leak detection sensor maintenance” alarm indicates that the gas sensor must be checked.



Acknowledging the alarm resets the time until the next inspection to 12 months (Refer to the § **The list of active alarms**, page 43)

INFORMATION During the annual inspection, carry out a test using a calibrated leakage system set to 10% and 20%. This test provides a precise check that the leak detection system is fully operational.

The gas detector has a robust design and does not require calibration for at least 15 years. After this period, it is advisable to replace it with a new one.

18.2.6. WINTER PROTECTION

In cold weather conditions, following a general shutdown of the installation or a control system malfunction, there is a risk that the water contained in the hydraulic circuit may be frozen.

To prevent any problems if the hydraulic circuit is not glycol-protected or trace heated, it is recommended to fully drain any unused circuits and pressurize them with nitrogen, or protect them by the addition of anti-freeze solution or other measures.

The concentration of anti-freeze solution must be regularly and carefully checked before each winter season.

CAUTION **The manufacturer waives any liability for damage of a plate exchanger caused by water freezing of water contained inside (low winter temperature or water start temperature below 5°C in summer mode).**

19. TROUBLE SHOOTING

Problem	Probable cause	Solution
Unit operates continuously but without generating cooling	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
	Clogged dehumidification filter.	Replace the dehumidification filter.
Excessive noise	Vibrating pipe work	Attach the pipe work correctly.
		Check the pipe work attachments.
	Noisy compressor	Check the condition of the valves.
		Seized bearings. Replace the compressor
		Check the tightness of the compressor attachment nuts.
One or both compressors do not operate.	Electrical circuit cut.	Check the electrical circuit and seek out any grounding and/or short-circuits. Check the circuit breaker.
	High pressure pressostat activated.	Reset the pressostat from the control panel and restart the unit. Identify and eliminate the causes of this activation.
	Control circuit fuse blown.	Check the control circuit and seek out any grounding and/or short-circuits. Replace the fuses.
	Connection problem	Check the tightness of all the electrical connection terminals.
	Electrical circuit thermal protection cuts in.	Check the operation of the control and safety devices. Identify and eliminate the cause of the activation.
	Incorrect wiring.	Check the wiring of the control and safety devices.
	Mains voltage too low.	Check the power line. Eliminate any possible problems associated with the system. If the problem is due to the network, inform the Electricity Company.
	Compressor motor short–circuited.	Check the continuity of the motor winding.
	Compressor seized	Replace the compressor.
Circuit stoppage following activation of the low pressure thermostat.	Presence of a leak.	Locate and repair the leak.
	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
	Pressostat operating fault.	Replace the pressostat.
Circuit stoppage following activation of the high pressure thermostat.	Incorrect operation of the high pressure pressostat.	Check the operation of the pressostat. Replace it if required.
	Non-condensable particles in the circuit.	Bleed the circuit
	Condenser fan(s) not operating.	Check the wiring and the motors. Repair and replace if required.
Liquid line too hot	Insufficient refrigerant fluid charge.	Locate and eliminate the causes of charge losses and top up the refrigerant fluid charge.
Liquid line frozen	Clogged dehumidification filter.	Replace the filter cartridge.

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Problem	Probable cause	Solution
Fans do not operate.	Electrical circuit problems.	Check the connections.
	Internal circuit thermal cut-out activated.	Contact an approved Service Center.
Reduced output in both Heating and Cooling mode	Compressor operating fault	Contact an approved Service Center.
	Dirt in the evaporator water circuit.	Chemical cleaning of the evaporator water circuit.
	Condenser battery blocked.	Clean the condenser battery.
	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
Evaporator heater is not operating.	No power supply.	Check the main fuse and the auxiliary fuses.
	Heater circuit open	Check the heater and replace if required.
No/ little control over water temperature.	Incorrect thermostat setting.	Check the temperature setting on the control panel.
	Incorrect temperature differential between evaporator inlet and outlet.	Check the water flow and the quantity of liquid in the water circuit.
	Electronic control system malfunction.	Contact an approved Service Center.
Insufficient water circulation.	Air in the circuit	Bleed the air via the safety valve.
	Deposits or impurities in the evaporator.	Wash out the evaporator by back-flushing.
Unit not operating, no alarm activation	Water circulation fault	Check the pump.
	Flow controller inoperable.	Check the flow controller.

CAUTION

BEFORE STARTING WORK ON THE EQUIPMENT, YOU SHOULD ENSURE IT IS LOCKED OUT/TAGGED OUT WHENEVER POSSIBLE.

ON-SITE INFORMATION

OPERATOR:

Company name: .....

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Operator's name: .....

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Company address: .....

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INSTALLER:

Company name: .....

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Installer's name: .....

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Company address: .....

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TECHNICAL STATION:

Company name: .....

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Technician's name: .....

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Company address: .....

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EMERGENCY SERVICES:

Fire department: .....

Police: .....

Ambulance: .....

Hospital: .....

REFRIGERANT:

Type: .....

Chemical formula: .....

Designation: .....
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Flammability: .....

Toxicity: .....

UNIT:

Maximum pressures: .....

Emergency shutdown instructions:

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