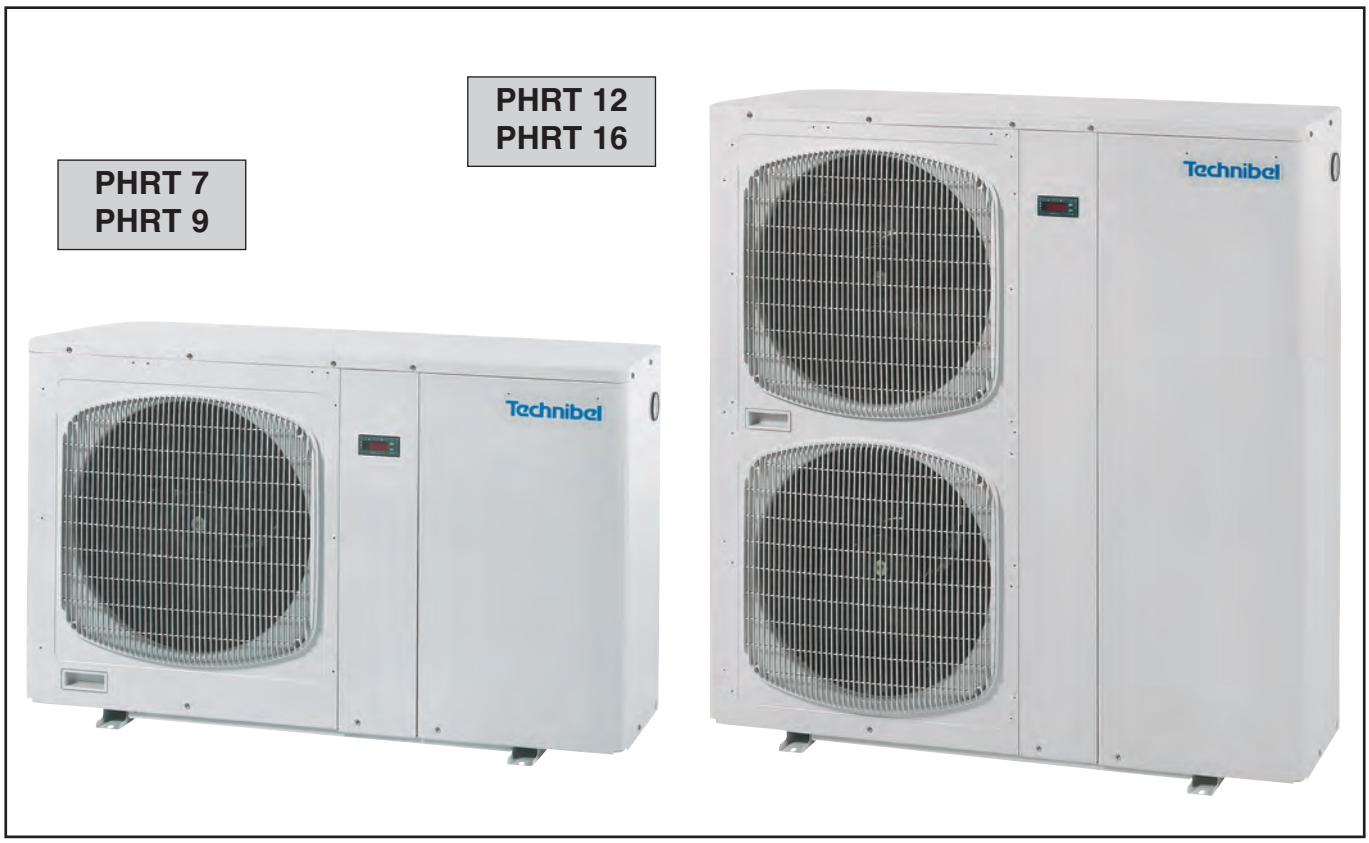
Technibel Climatisation

TECHNICAL INSTRUCTIONS

EUROVENT CERTIFIED PERFORMANCE

PHRT

HEAT PUMP WITH HYDRAULIC EQUIPMENT
AIR / WATER
7 to 16 KW



For terminal units and boiler overhaul applications

	Heating		Cooling
PHRT 7	6.90 kW	-	5.90 kW
PHRT 9	9.00 kW	-	7.10 kW
PHRT 12	10.70 kW / 12.70 kW *	-	8.50 kW / 9.00 kW *
PHRT 16	15.20 kW	-	11.40 kW

* single-phase / three-phase

MARKING CE

This product marked CE conforms to the essential requirements of the Directives:
- Low voltage no. 2006/95/EC.
- Electromagnetic Compatibility no. 89/336 EEC, modified 92/31 and 93/68 EEC.

SUMMARY

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APPLIANCES FILLED WITH R 410 A

R 410 A
- R 410 A is a high-pressure refrigerant (+ 50% in relation to R 22 and R 407 C).
- The compressors approved for operation with this fluid are filled beforehand with polyalcohol oil.
  Contrary to mineral oil, it is very hygroscopic: it absorbs the humidity of the ambient air very quickly. This can modify its lubricant properties and lead in time to the destruction of the compressor.

MAINTENANCE INSTRUCTIONS

1 - Never add oil to the appliance; the compressor is filled with polyalcohol oil, a special oil which cannot tolerate the presence of other oils.

2 - The instruments used for:
- filling,
- pressure measurements,
- emptying under vacuum,
- recovering the fluid,

must be compatible and only used for the R 410 A fluid.
Note: the pressure taps of the refrigerating circuit are 5/16 SAE (1/2 - 20 - UNF)

3 - In the case of a new charge:
- the charge **must** be undertaken in liquid phase,
- use a balance and a dip pipe type R 410 A cylinder,
- charge the weight of R 410 A as per the value indicated on the unit's identification plate (for "split systems", refer to the installation instructions as the charge must consider the length of the connecting lines).

4 - In case of leakage, do not complete the charge: recover the remaining refrigerant for recycling and perform a total charge.
Recovery, recycling or the destruction of the fluid must be done in compliance with the laws in force in the country concerned.

5 - If the refrigerant circuit is opened, you must:
- avoid the entry of air into the circuit as much as possible,
- replace or install a drier,
- perform the "vacuum operation" at a minimum level of **0.3 mbar (static)**.

1 - APPLICATION - USE

- Chilled water or hot water generator for air conditioning or heating of rooms for **terminal unit** and **boiler overhaul** applications.

NOTE : The electronic control parameterization is factory-set for **terminal unit** and **boiler overhaul** applications.

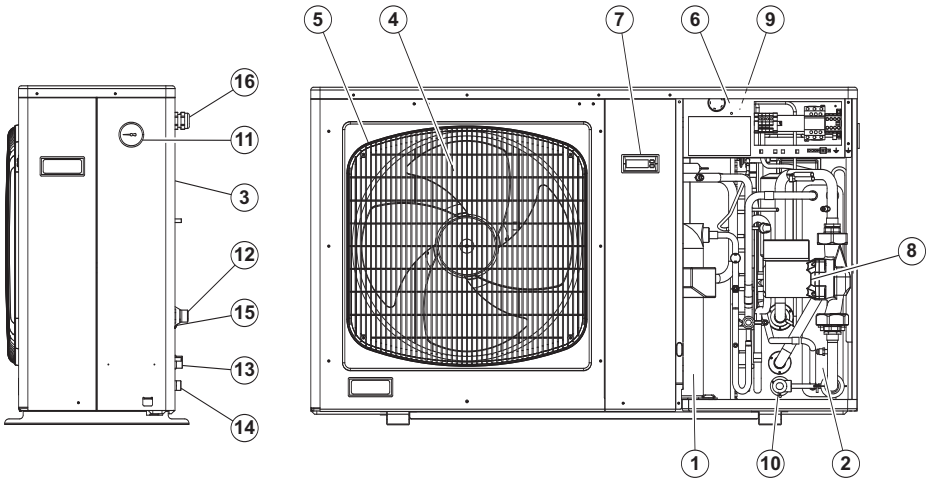
2 - PRESENTATION

2.1 - DESCRIPTION

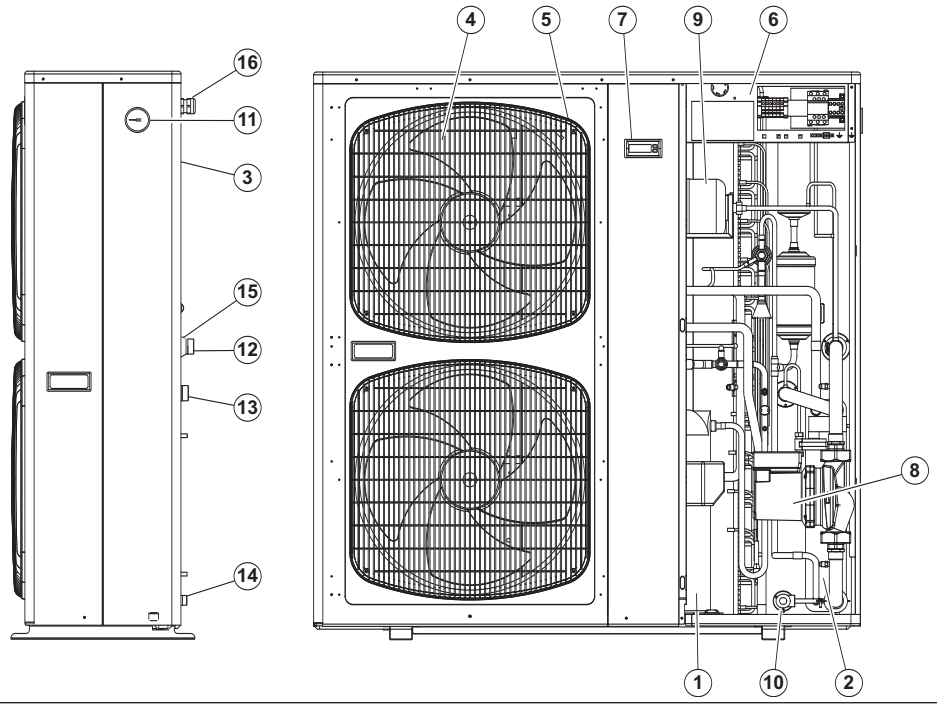
1 - Sound-proofed hermetic compressor.
2 - Plate water heat exchanger.
3 - "Plate-Fin" air heat exchanger.
4 - Fan motor.
5 - Fan protection grille.
6 - Electrical box.
7 - Microprocessor control unit display keyboard.
8 - Circulating pump.
9 - Expansion tank.
10 - Safety valve.
11 - Pressure gauge.
12 - Water inlet connector.
13 - Water outlet connector.
14 - Filling / drainage of the water circuit.
15 - Air vent.
16 - Hole for connecting cables.

Materials:
- Copper piping.
- Painted sheet metal cabinet.
- Copper/aluminium air heat exchanger.
- Stainless steel water heat exchanger.
- Plastic grille.

PHRT 7
PHRT 9



PHRT 12
PHRT 16



NOTE: The units are supplied with a water filter which is to be installed on the water intake.

2.2 - ELECTRICAL EQUIPMENT

- Per EN 60 335-2-40.
- "ECH" electronic control with fan speed control
- Pressure safety cutout.
- Water flow detector.
- Compressor starter with current limitation device (for single-phase units).
- Phase order controller (for three-phase units).

3 - TECHNICAL CHARACTERISTICS

Model			PHRT 7	PHRT 9	PHRT 12	PHRT 16
HEATING						
Heating capacity		**kW**	6.90	9.00 / 9.00	10.70 / 12.70	15.20
Nominal power consumption*		**kW**	2.54	3.16 / 3.10	3.48 / 3.94	4.82
Performance factor (COP)*						
Water regime 40/45°C			2.72	2.85 / 2.90	3.06 / 3.22	3.15
Water regime 30/35°C			3.48	3.63 / 3.68	3.89 / 4.00	4.05
Total Max.	1-phase	**kW**	3.27	4.00	4.70	_
power consumption	3-phase	**kW**	_	4.00	5.10	7.00
Total Max.	1-phase	**A**	14.60	18.20	21.30	_
current consumption	3-phase	**A**	_	7.20	9.00	12.70
Nominal water flow		**m^3/h**	1.24	1.58	1.87 / 2.16	2.70
		10^{-4} m^3/s	4.40	4.40	5.20 / 6.00	7.50
Available pressure		**kPa**	58.00	47.00	66.00 / 53.00	68.00
COOLING						
Cooling capacity		**kW**	5.90	7.10 / 7.10	8.50 / 9.00	11.40
Nominal power consumption*		**kW**	2.54	3.14 / 3.09	3.31 / 3.73	4.98
(EER)*			2.32	2.26 / 2.30	2.57 / 2.41	2.29
Total Max.	1-phase	**kW**	3.27	4.00	4.70	_
power consumption	3-phase	**kW**	_	4.00	5.10	7.00
Total Max.	1-phase	**A**	14.60	18.20	21.30	_
current consumption	3-phase	**A**	_	7.20	9.00	12.70
Nominal water flow		**m^3/h**	1.02	1.22	1.48 / 1.51	1.98
		10^{-4} m^3/s	2.80	3.40	4.10 / 4.20	5.50
Available pressure		**kPa**	64.00	59.00	82.00 / 80.00	84.00

(*) Gross value (without circulator) Single-phase / three-phase

NOMINAL OPERATING CONDITIONS

HEATING	
Outside air temperature (dry)	+ 7° C
Outside air temperature (humid)	+ 6° C
Water outlet temperature	+45° C
COOLING	
Outside air temperature (dry)	+35° C
Water outlet temperature	+7° C

NOTE: Water system pressure: 1,5 to 3 bar.

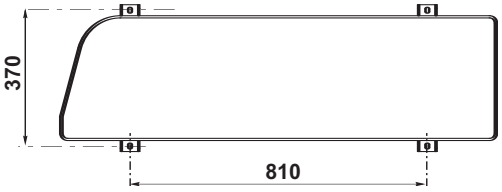
OPERATING LIMITS (pure water) (*)

	PHRT 7	PHRT 9	PHRT 12	PHRT 16
HEATING				
Max. outside air temperature (humid)	+ 19° C	+ 19° C	+ 19° C	+ 19° C
Min. outside air temperature (dry) for water output temperature 55°C (max.)	+ 5° C	+ 5° C	+ 5° C	+ 5° C
Min. outside air temperature (dry) for water output temperature 50°C	- 5° C	- 5° C	- 5° C	- 5° C
Min. outside air temperature (dry) for water output temperature 45°C (nominal)	- 15° C	- 15° C	- 15° C	- 15° C
Max. water intlet temperature	+ 70° C	+ 70° C	+ 70° C	+ 70° C
Min. water outlet temperature	+ 25° C	+ 25° C	+ 25° C	+ 25° C
COOLING				
Max. outside air temperature (dry)	+ 43° C (**)	+ 43° C (**)	+ 43° C (**)	+ 43° C (**)
Min. outside air temperature (dry)	+ 10° C	+ 10° C	+ 10° C	+ 10° C
Max. water outlet temperature	+ 20° C (**)	+ 20° C (**)	+ 20° C (**)	+ 20° C (**)
Min. water outlet temperature	+ 5° C	+ 5° C	+ 5° C	+ 5° C

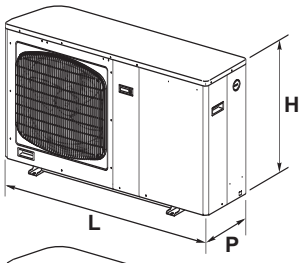
(*) The limits indicated are those of the machine.
(**) At 43° C outside air temperature, the max. temperature of the water outlet is limited to 18° C instead of 20° C.

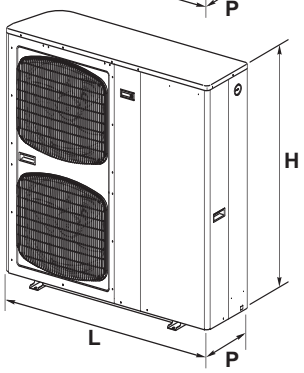
4 - PHYSICAL CHARACTERISTICS

Model			PHRT 7	PHRT 9	PHRT 12	PHRT 16
Dimensions	L	mm	1,190	1,190	1,190	1,190
	H	mm	735	735	1,235	1,235
	P	mm	340	340	340	340
	Weight	kg	98	98	128	133
Dimensions packaged	L	mm	1,270	1,270	1,270	1,270
	H	mm	920	920	1,420	1,420
	P	mm	420	420	420	420
	Weight	kg	110	110	141	146



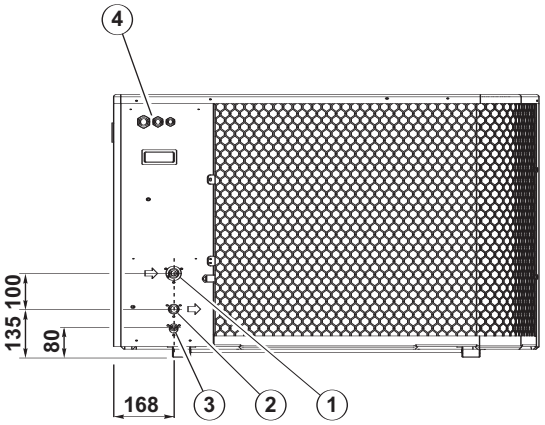
Fastening





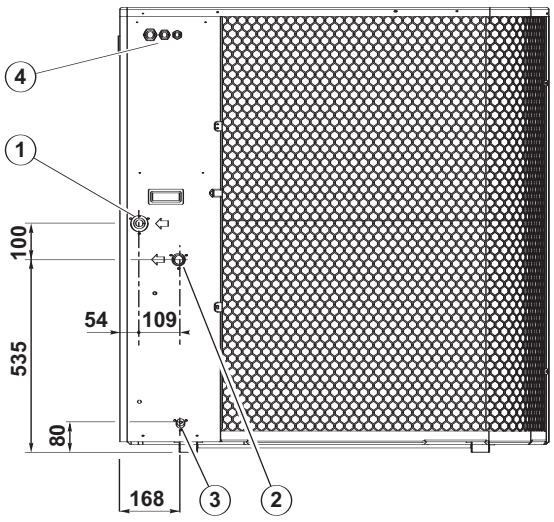
1	Water inlet connection (male) with air vent valve
2	Water outlet connection (male)
3	Water circuit fill/drain
4	Holes for electric cables

PHRT 7
PHRT 9



"Rear view"

PHRT 12
PHRT 16



"Rear view"

5 - DESCRIPTION

Model		PHRT 7	PHRT 9	PHRT 12	PHRT 16
Hermetic compressor with thermal protection		Scroll	Scroll	Scroll	Scroll
Sound insulation cover		●	●	●	●
Power supply	**230V/1/50Hz**	●	●	●	_
	400V/3N/50Hz	_	●	●	●
Start-up current	**1-phase A**	40	33	34	_
	3-phase A	_	39	56	63
Direct drive propeller fan motor with thermal protection, horizontal blowing		1	1	2	2
Total air flow	**m^3/h**	3,000	3,000	6,000	6,000
	m^3/s	0.833	0.833	1.667	1.667
Propellor diameter	**mm**	460	460	460	460
Power supply	**230V/1/50Hz**	●	●	●	●
Rotation speed	**rpm**	770	770	770	770
Current	**A**	0.7	0.7	1.4	1.4
Power input	**kW**	0.140	0.140	0.280	0.280
Air exchanger with louver fins and water-repellant treatment		●	●	●	●
Expansion system (*)	**expansion valve**	●	●	●	●
Water exchanger Plate-type stainless steel water treatment section		●	●	●	●
Water capacity	**liters**	0.84	0.84	1.05	1.4
Expansion system (*)	**expansion valve**	●	●	●	●
Charged internal cooling system with HP and LP switch		1	1	1	1
R 410 A refrigerant Total charge 1-phase / 3-phase	**kg**	2.05	2.1	3.5 / 3.7	3.8
Circulating pump		●	●	●	●
Current	**A**	0.8	0.8	1	1.3
Power input	**kW**	0.16	0.16	0.24	0.28
Power supply	**230V/1/50Hz**	●	●	●	●
Expansion tank (charge pressure 1.5 bar)		●	●	●	●
Capacity	**liters**	2	2	2	2
Safety valve (pressure 3 bar)		●	●	●	●
Pressure gauge (0 to 6 bar)		●	●	●	●
Air vent valve		●	●	●	●
Hydraulic system					
Male connections	**inlet**	3/4"	3/4"	1"	1"
	outlet	3/4"	3/4"	1"	1"
Water capacity of the unit	**liters**	2.3	2.3	2.8	3.2
Water flow rate detection pressure differential cut-out		●	●	●	●
Water filter supplied, uninstalled		●	●	●	●
Water volume in system					
Minimum water volume (**)	**liters**	30	40	50	60
Maximum water volume (***)					
Terminal unit or overhaul application	**liters**	90	90	90	90
Mains power supply					
Power supply	**230V/1/50Hz**	●	●	●	_
	400V/3N/50Hz	_	●	●	●
Equipment protection index		IP 24	IP 24	IP 24	IP 24

(*) The PHRT units are equipped with a single bi-flow regulator used for both heating and cooling operation.

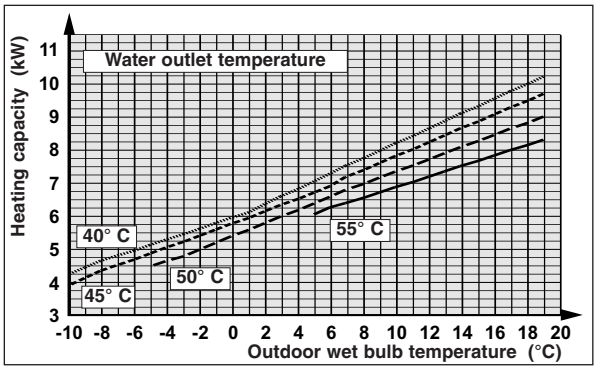
(**) If the water volume of the system is below the minimum, a buffer tank must be installed.

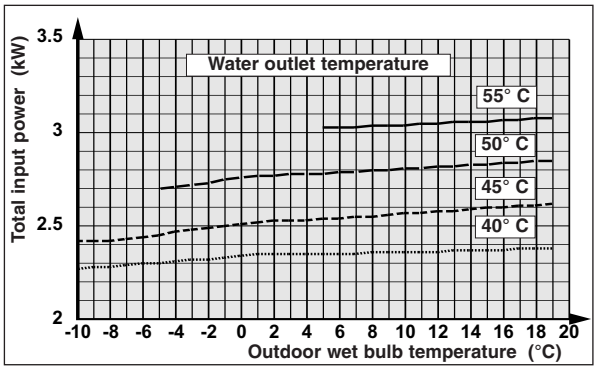
(***) If the water volume of the system is above the maximum, an additional expansion tank is required.

6 - HEATING PERFORMANCES

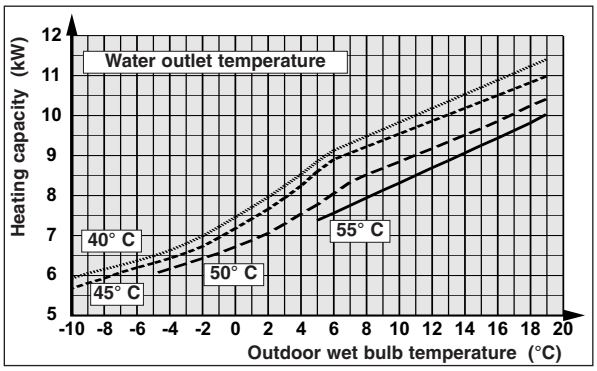
HEATING CAPACITY | **INPUT POWER**

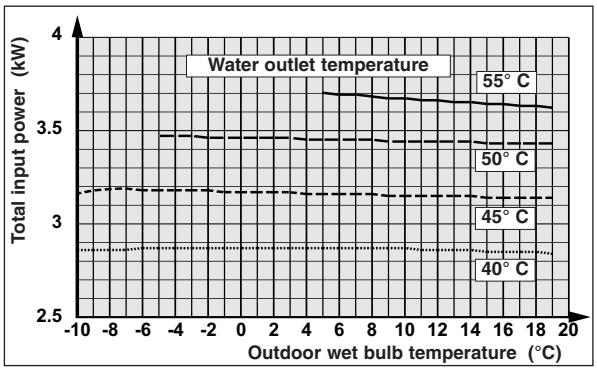
PHRT 7





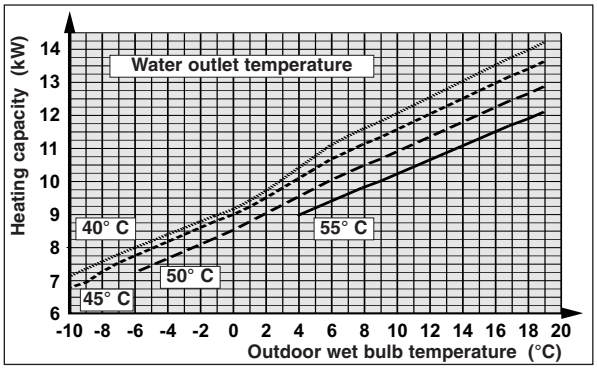
PHRT 9

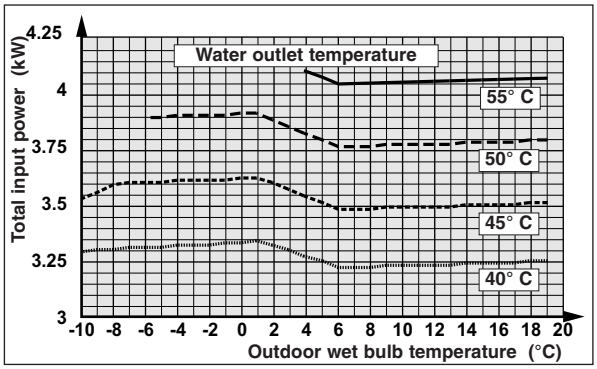




PHRT 12 mono

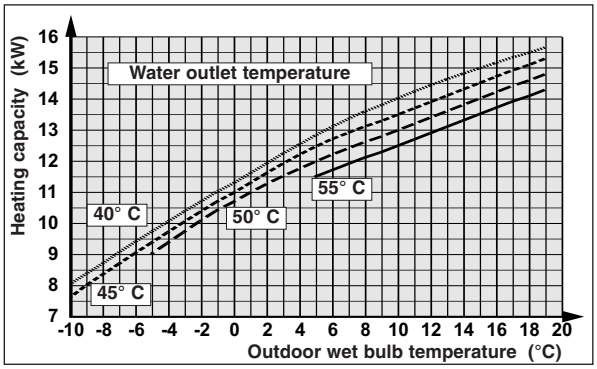
(single-phase)

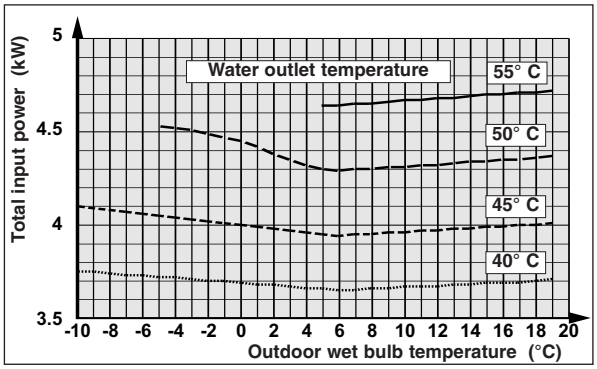




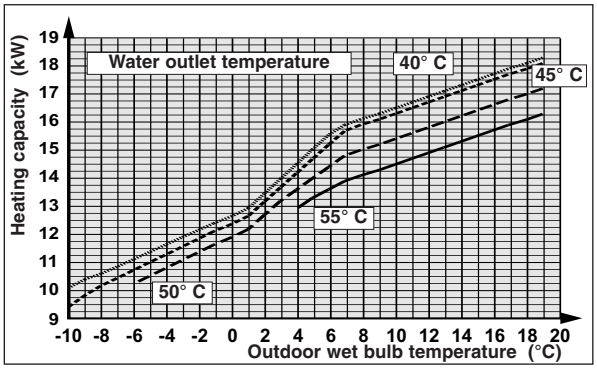
PHRT 12 tri

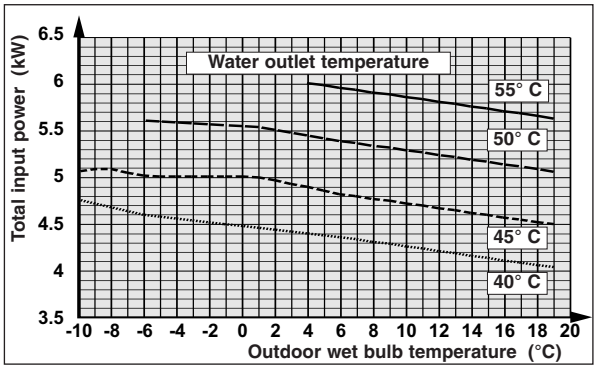
(three-phase)





PHRT 16

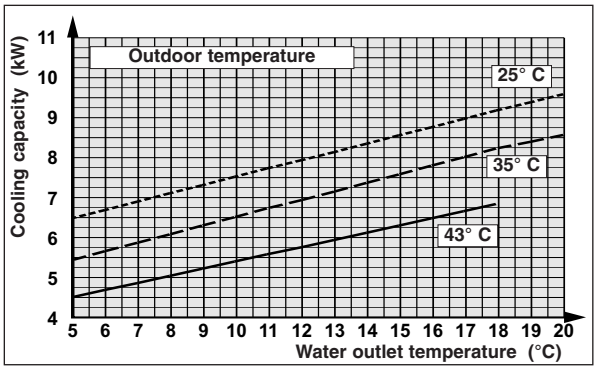


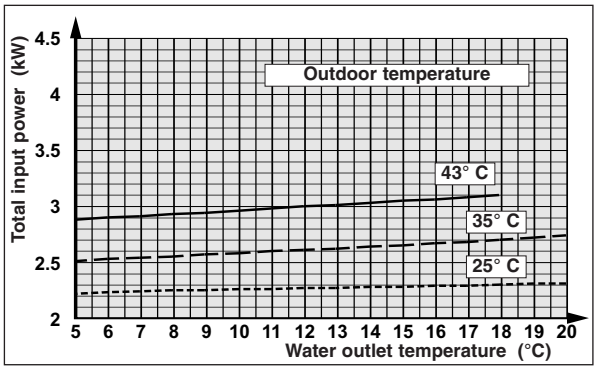


7 - COOLING PERFORMANCES

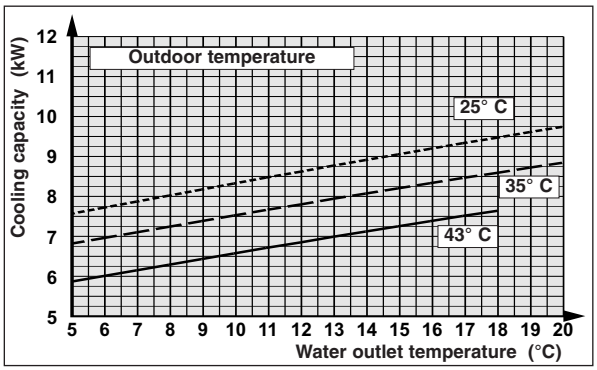
COOLING CAPACITY | **INPUT POWER**

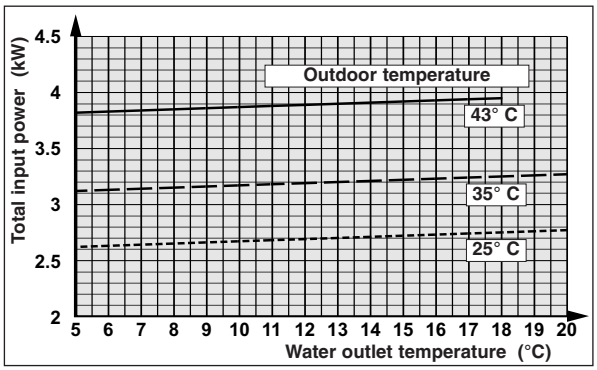
PHRT 7





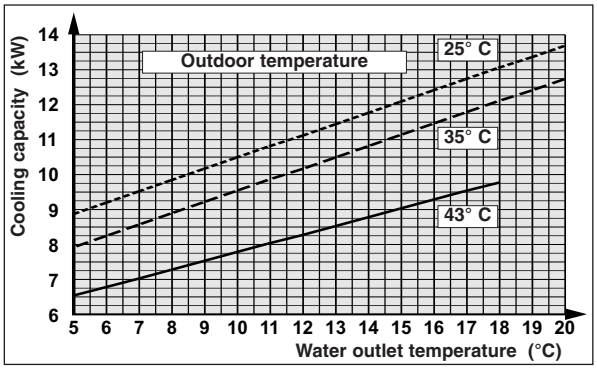
PHRT 9

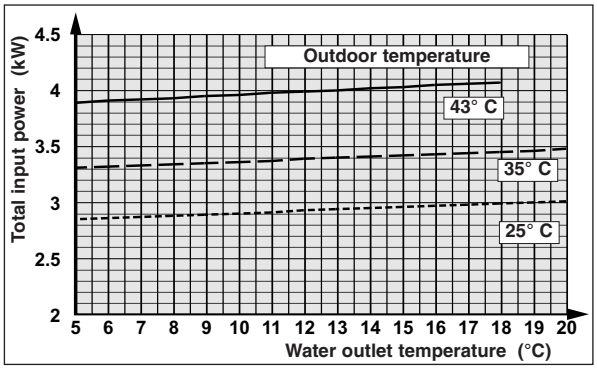




PHRT 12 mono

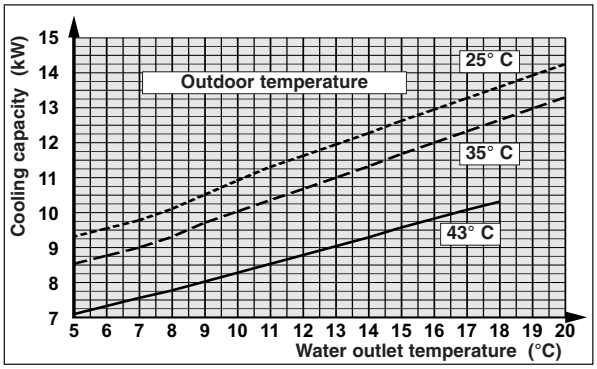
(single-phase)

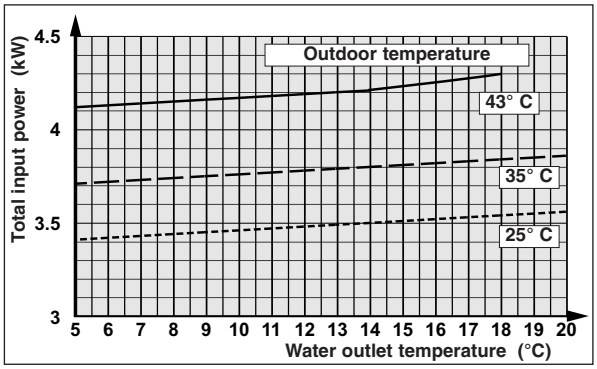




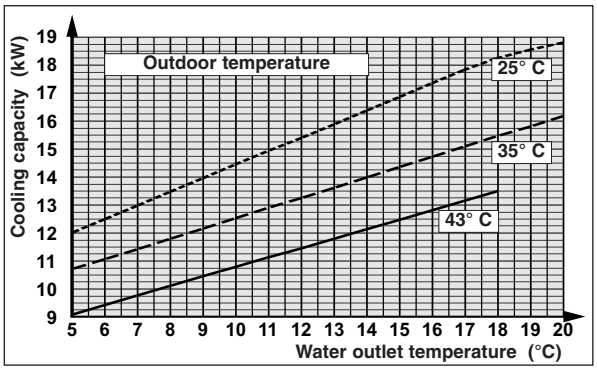
PHRT 12 tri

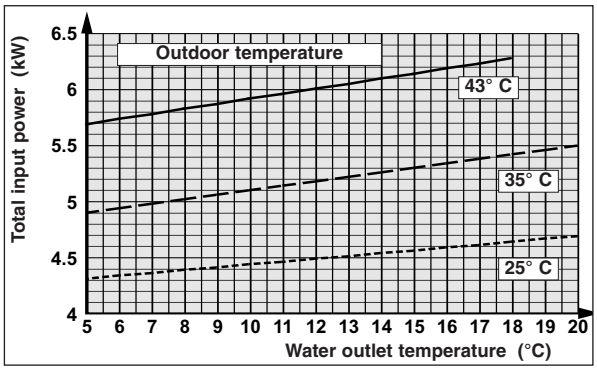
(three-phase)





PHRT 16





8 - CORRECTIONS TO BE MADE WHEN USING ANTI-FREEZE

(Cooling mode)

IMPORTANT:

Use monopropylene glycol.

A minium rate of 15% to 20% is needed to avoid any risk of corrosion.

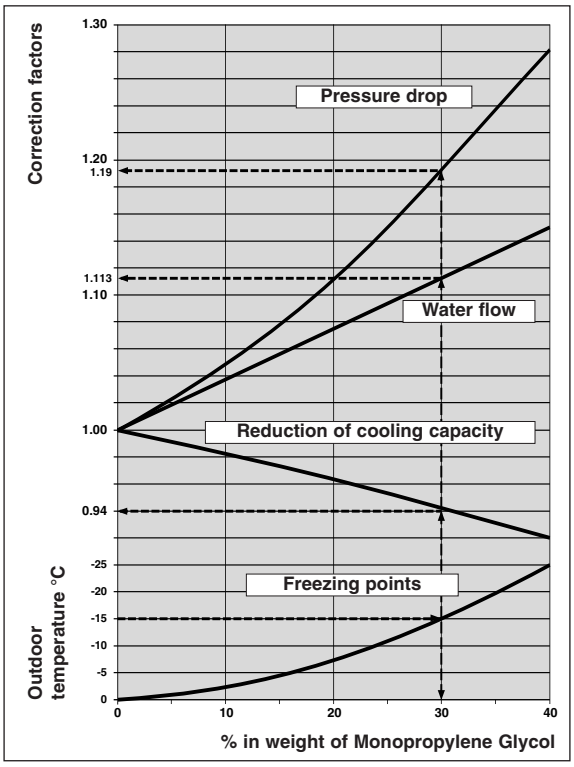
8.1 - PRINCIPLE OF USING THE CURVES

- Choose the percentage of glycol according to the minimum temperature to protect the hydraulic circuit against frost and determine the coefficients to be applied to the power, the water flow rate and the pressure drop.

8.2 - EXAMPLE

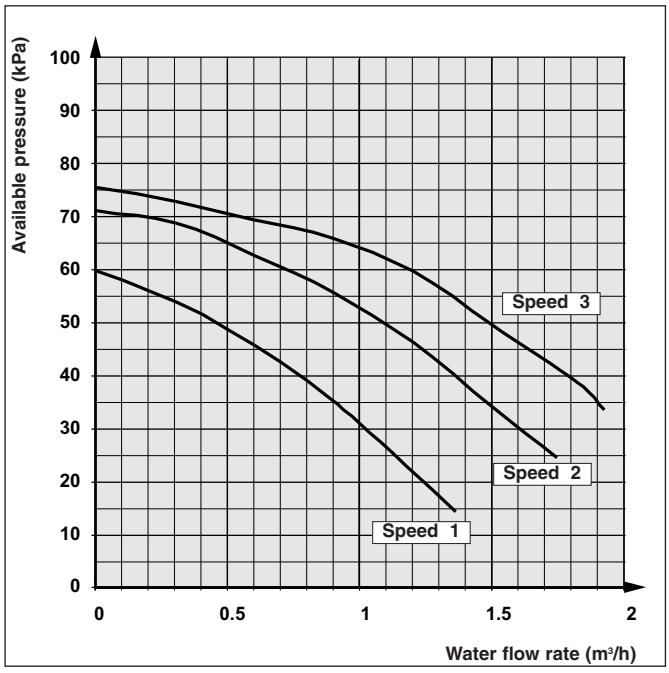
- Protection at an external temperature of -15°C, which gives 30% glycol ("Freezing points" curve).
- The "Reduction of cooling capacity" curve gives the coefficient to be applied to the refrigerating capacity (0.94).
- The "Water flow" curve gives the coefficient to be applied to the water flow rate (1.113).
- The "Pressure drop" curve gives the coefficient to be applied to the pressure drop (1.19).

Curves valid for temperature control on the water intake.

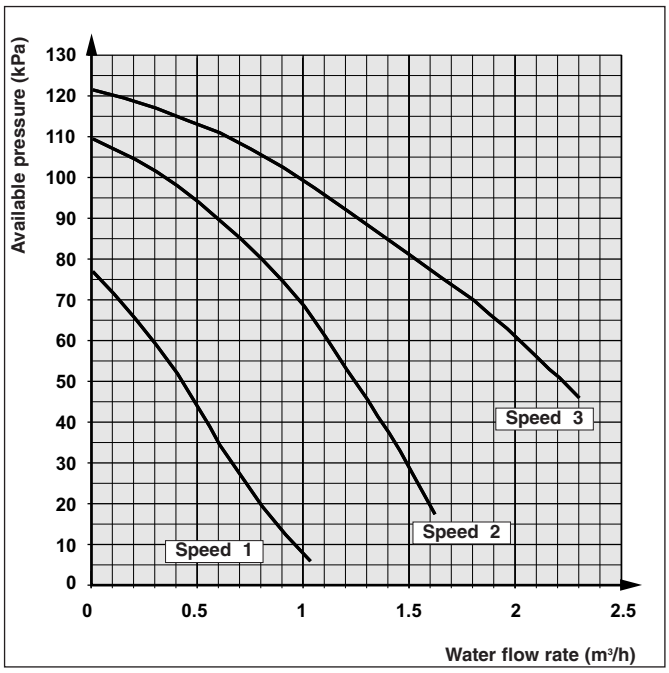


9 - CURVES OF AVAILABLE PRESSURES (on unit's outlet)

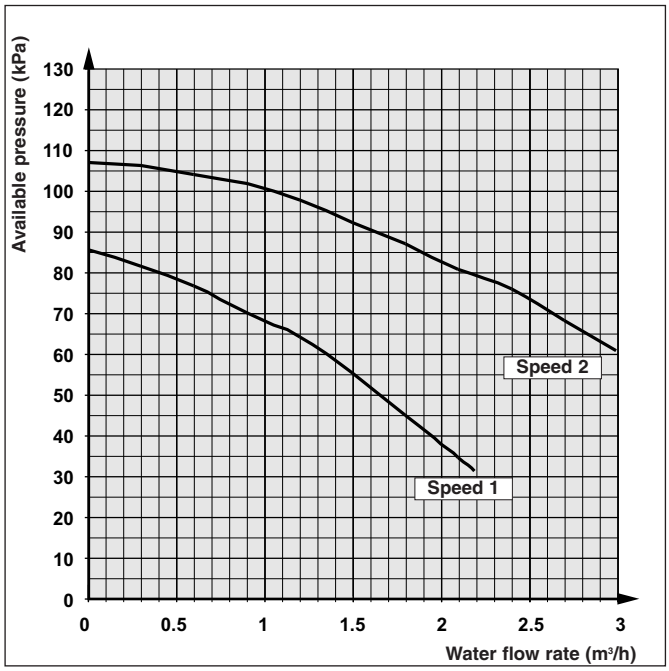
PHRT 7
PHRT 9



PHRT 12



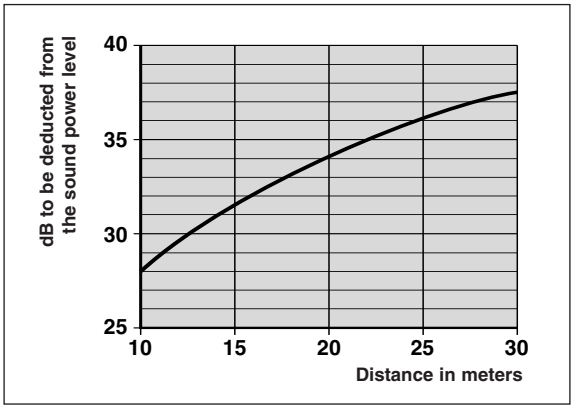
PHRT 16



10 - SOUND LEVELS

Model	Power level Lw (dBA)	Sound-pressure level Lp (dBA)
PHRT 7	65	37
PHRT 9	65	37
PHRT 12	67	39
PHRT 16	67	39

Sound-pressure level:
Unit installed outdoors (free field) on a reflective surface.
Measurement carried out at a distance of 10 m.



11 - ACCESSORIES

		PHRT 7	PHRT 9	PHRT 12	PHRT 16
Set of 2 flexible hoses	length 1 m Ø 3/4"	●	●	_	_
	length 1 m Ø 1"	_	_	●	●
Condensate tank heating cord kit		●	●	●	●
Remote control		●	●	●	●
RS 485 communication interface (MODBUS protocol)		●	●	●	●
Insulated tank 35 liters 6 branch connection		●	●	●	●

12 - "ECH" ELECTRONIC CONTROL

- Microprocessor control module, including:
  - chilled water temperature control (water return),
  - control of operating parameters,
  - self-adapting algorithm for water volume reduction,
  - circulating pump control (frost protection and anti-sticking function),
  - anti-short cycle system,
  - hour counter compressor and circulating pump,
  - alarm management,
  - anti-freeze security (water exchanger),
  - digital display of:
    - . water temperature,
    - . set-point,
    - . alarm code (HP, LP, water output, probes, anti-freeze...).
  - remote alarm reporting is possible via a potential-free contact,
  - integrated condensation pressure control,
  - heating cord control (accessory),
  - remote control with display unit (accessory),
  - serial communications port (RS 485 interface, accessory) - MODBUS Protocol.

Due to our policy of continuous development, our products are liable to modification without notice.

Technibel

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