



AUDAX

Air-water heat pumps
reversible with inverter single
and three-phase



AUDAX 16/18 kW



Three-phase reversible air/water Heat Pumps with inverter technology are the Immergas products for air conditioning, named "AUDAX 16 kW" and "AUDAX 18 kW". Designed especially for the production and distribution of heat and cold. They can function independently or coupled with other generators/systems. These machines can also be coupled to a remote storage tank unit for the production of DHW.

Using the relevant system manager kit, it is always possible to make use of the most convenient energy source, alternating heat pump functioning of the boiler and also the solar heat system.

The inverter technology and the features of these machines allow to attain high performance thus consenting to benefits from tax relief in compliance of the provisions of the M.D. 19/02/2007 and s.m.s.¹

AUDAX 16 and 18 kW are ideal for air conditioning large homes, offices, shops and pre-existing or new buildings. They have system side plate heat exchanger + circulation pump as per standard.

A range of hydraulic, electrical and electronic kits are available, which allow flexible use in all circumstances.

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AUDAX 16 - 18 kW FEATURES

16 kW and 18 kW three-phase inverter air/water heat pumps for winter and summer air conditioning. The galvanised steel structure makes the machines particularly suitable for outdoor installation.

Components:

- Inverter "scroll" rotational compressor;
- R410A refrigerant gas;
- External unit air/gas heat exchanger treated with "Blue fin" system: it makes it easier for the dew drops to slide off and reduces corrosion (for example when there is salt water);
- Fan with variable speed managed by the electronic control board;
- Steel plate water/gas heat exchanger with anti-freeze electric resistance (70 W) supplied as per standard;
- Bi-flow electronic throttle valve;
- 4-way inversion valve (reversible functioning with Heat Pump cycle or Cooling cycle);
- IPX4 electrical insulation rating;
- Possibility of outdoor installation in open places;
- System 3 speed pump;
- 5 litre expansion vessel;
- 3 bar safety valve;
- System manometer;
- 7 probes: 4 sensors on the cooling circuit + external probe + inlet and outlet water temperature detection via 2 probes;
- Regulation of the functioning parameters using keys with display of functioning status by means of a 3-digit display;
- Self diagnostics with error codes shown on display;
- Proportional control logic (linked to instant Δt) and integral logic control (linked to temperature variation time).

System solutions:

- "Stand alone" system with AUDAX and integrative resistance;
- Can be coupled to separate storage tank for DHW;
- Can be coupled to the solar heat system;
- Can be coupled to boiler via the System Manager;
- Can be coupled to boiler and the solar heat system via the System Manager.

is available in the model:

- AUDAX 16 kW
- AUDAX 18 kW

code 3.022095
code 3.022096



EC Declaration Of Conformity.

NOTA BENE:

¹ the M.D. 6 August 2009 establishes - for 55% tax relief - what the energy performance of an ≤ 35 kW air/water heat must be: **COP ≥ 4.1 – EER ≥ 3.8** ; if supplied with speed changer (inverter) these values decrease by 5%.

For correct functioning of the AUDAX, free spaces must be left on top of and on all four sides of the machine itself, as indicated in the installation book accompanying the product. The instructions for correct installation must also be followed.

AUDAX

4 INTELLIGENT INTEGRATED SYSTEMS; NEW CONCEPT, HYBRID SYSTEMS FOR AIR CONDITIONING AND DHW PRODUCTION



4.1 INTEGRATED SYSTEMS AND HEAT REGULATION

Comprised of a boiler – solar heating – heat pump and possibly photovoltaic – etc, they are the natural evolution of air-conditioning systems: with very high seasonal yields, low energy consumption and reduced pollutant emissions. They are engineering solutions that can be perfectly integrated with each other, which allow to attain maximum benefit from the various energy production systems on the basis of the respective efficiency parameters.

For correct functioning of the entire system, Immergas proposes an "intelligent" System Manager, able to:

- always make use of the most convenient heat source;
- keep the system performance high in every circumstance;
- control and command the entire system with a unique "brain" (i.e. the System Manager).

Basically, the System Manager is a supervisor that can control the entire system.

Amongst other things, the following main operations are necessary:

- to acquire the external temperature (from the external probe, inserted as per standard on the heat pump);
- to set the functioning climatic curve to determine the system flow temperature;
- configure the fuel cost (e.g. methane);
- configure the electric energy cost.

The point of economic balance between the condensing boiler and the heat pump is a COP value between 2.3 and 2.5 approximately (approximate value referred to methane); this value changes based on the cost of electrical power and gas, in the location where the system is installed.



With an external T. that fulfils the min COP for economical convenience, the heat pump starts up, and the operating conditions/performance will constantly be monitored. On the contrary, if the environmental conditions are such that the AUDAX coefficient of performance tends towards values that are lower than the min COP for economical convenience, the System Manager turns the boiler on (or the integrative resistance), and not the heat pump.

Every time AUDAX is operating, the Manager enables an additional control, which checks the time it takes for the system to reaching full operation: when a maximum time has been exceeded (settable), the boiler or the integrative electric resistance is activated in order to reach the T.flow with heat pump.

In all cases where radiant panels are also included for summer cooling, alongside dehumidifiers (see previous picture), the System Manager will also monitor the dew point through the installation of temperature/humidity probe kits set up in the room. Thanks to this intelligent function the System Manager can increase the flow temperature to the radiant panels by about 1-2°C (up to a max T. of 20°C - maximum limit of the heat pump), avoiding the phenomenon of condensation on the surface of the structure. This function can only be

activated when there is a "Zone control" or "Temperature/humidity sensor". In some cases, for example, the System Manager can turn the heat pump off if the flow temperature to the radiant panels is not sufficiently corrected.

If on the other hand, there is a high temperature zone in the system, in addition to the low temperature one, it will be served exclusively by the boiler through an accordingly configured dedicated expansion connected to the System Manager.

In general, the boiler and heat pump do not operate at the same time (except when a high temperature zone is active).

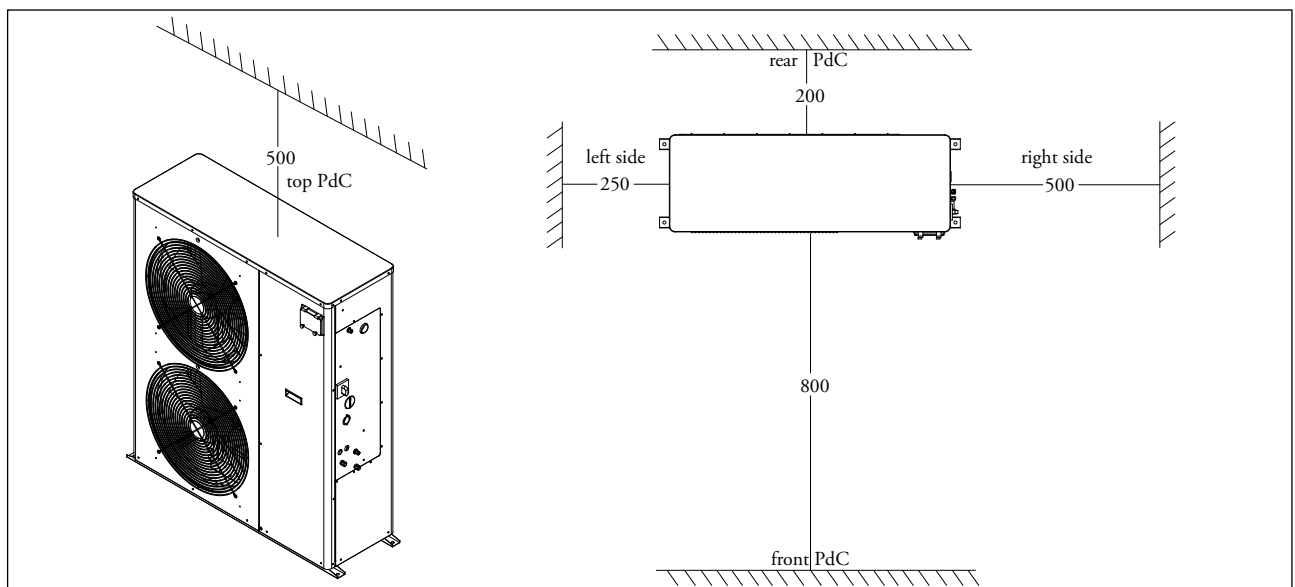
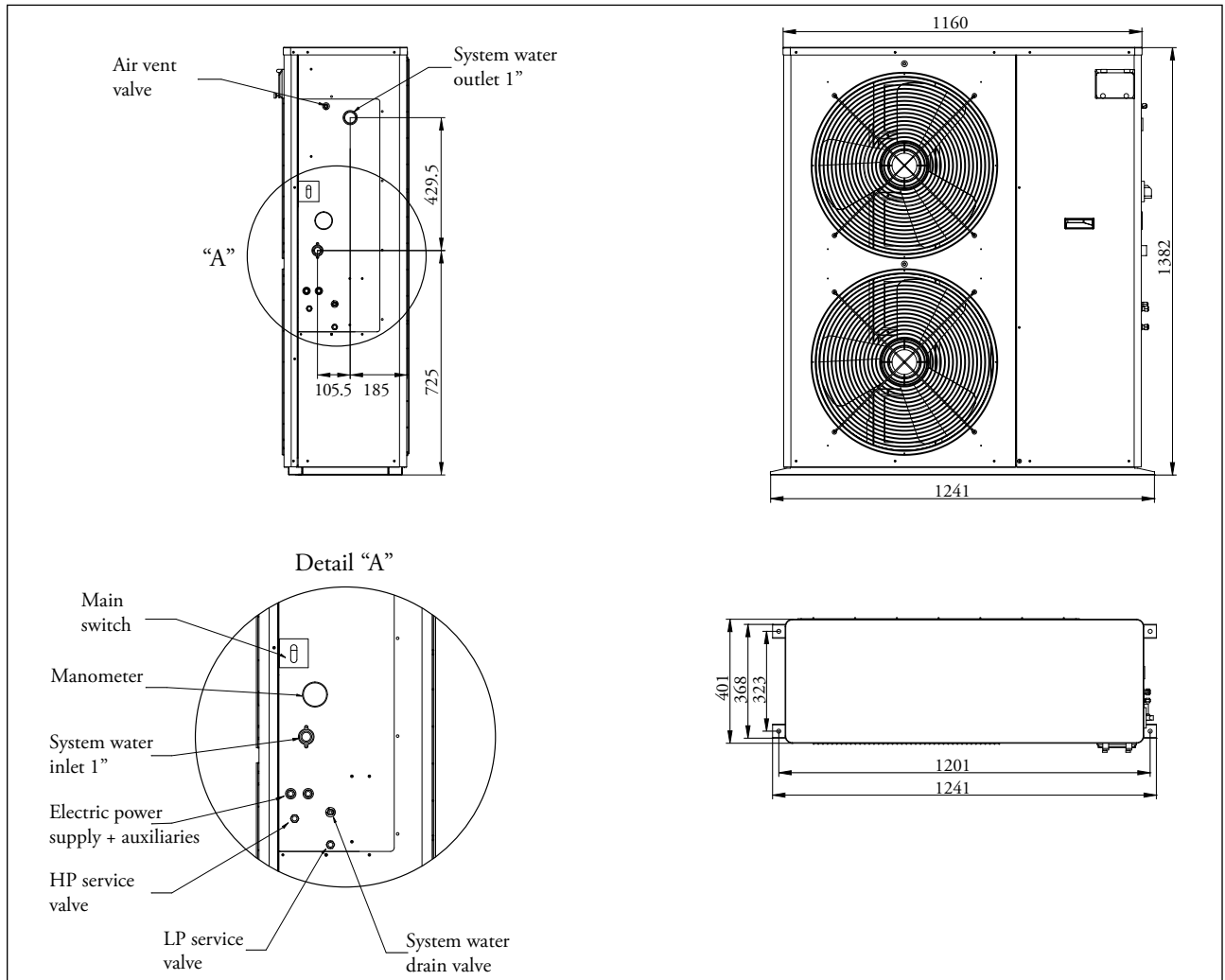
Functioning in domestic hot water mode: if the temperature set for the dhw is < 50°C the heat pump will come on (always carrying out the afore-mentioned convenience check); if it is > 50°C, on the other hand, the boiler will come on;- if there is no boiler but there is an integrative electrical resistance on the storage tank, the water is brought to 50°C using the heat pump, after which time AUDAX is disabled leaving the resistance to integrate up to the pre-set value.

In systems where there is a boiler or an integrative electrical resistance on the storage tank, in addition to the heat pump, it is also possible to enable the anti-legionella function.



AUDAX

7 AUDAX 16/18 kW DIMENSIONS, CONNECTIONS AND MINIMUM INSTALLATION DISTANCES

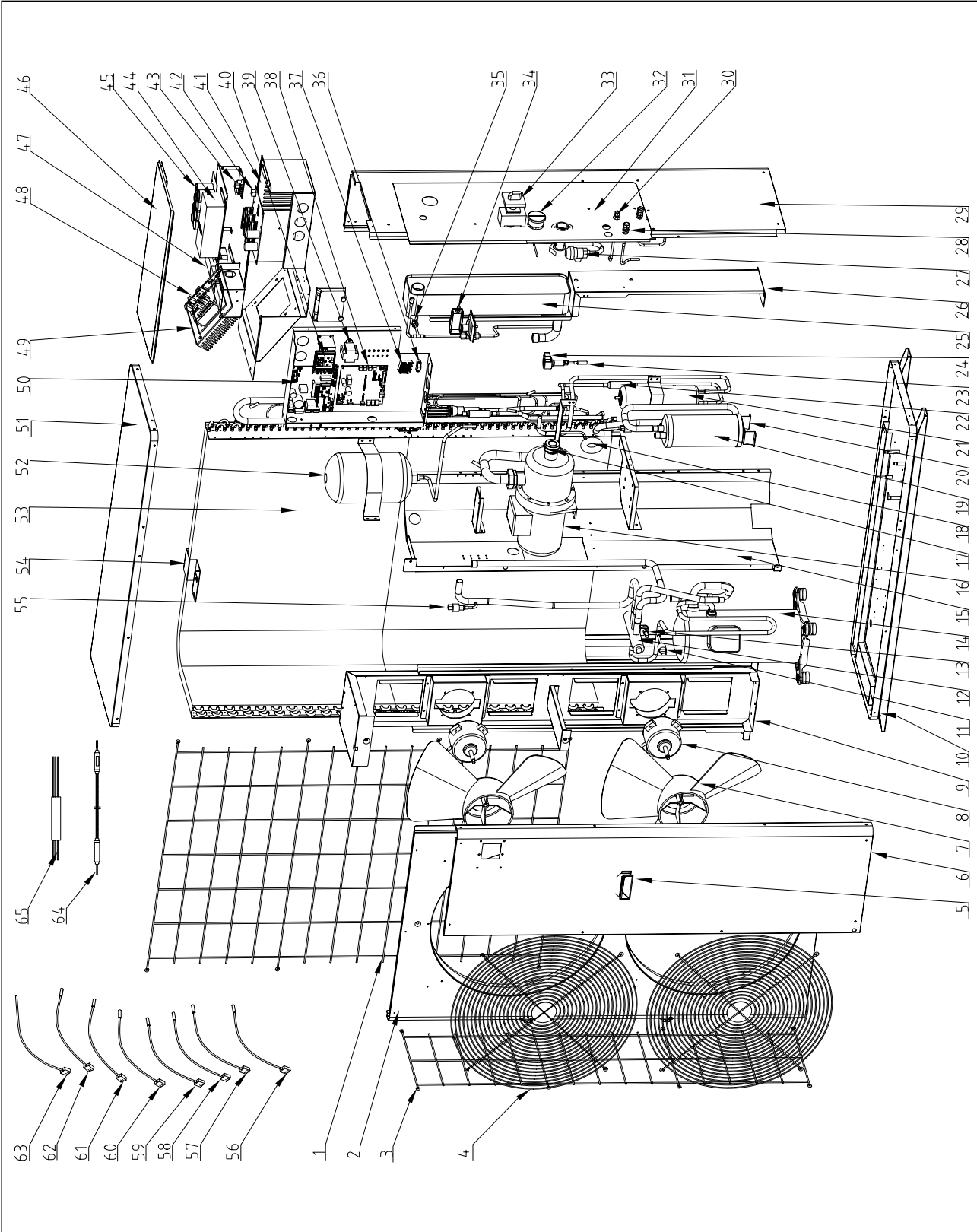


AUDAX

KEY:		
1 - AUDAX 6-8 fan grid		54 - AUDAX 6-8 DG29 SES fairlead
2 - AUDAX 6-8 left front casing	plate	55 - AUDAX 6 external coil
3 - AUDAX 6-8 D=493 fan	28 - AUDAX 6-8 Right sides connections plate	56 - AUDAX 6-8 rear protection grid
4 - AUDAX 6-8 front casing handle	29 - AUDAX 6-8 plate heat exchanger	57 - AUDAX 6-8-10 (hydraulic) HYDI board
5 - AUDAX 6-8 fan motor	30 - AUDAX 6-8 right casing	58 - AUDAX 6-8 ODU board
6 - AUDAX 6-8 Fan motor support plate	31 - AUDAX 6-8-10 Waterproof display lid	59 - AUDAX 6-8 DCI 80 CR inductance
7 - AUDAX 6-8 right front casing	32 - AUDAX 6-8 Electric connections plastic lid	60 - AUDAX 6-8 boards cover plate
8 - AUDAX 6-8 2 l expansion vessel	33 - AUDAX 6-8-10 display board	61 - AUDAX 6-8 upper lid
9 - AUDAX 6-8 0.8 l liquid receiver	34 - AUDAX 6-8 HMI display support plate	62 - CTT temperature probe (compressor drain) AUDAX 6-8
10 - AUDAX 6 separation plate	35 - AUDAX 6-8 water outlet pipe unit	63 - AUDAX 6-8 OCT temperature probe
11 - AUDAX 6 compressor unit	36 - AUDAX 6-8 2 - Ø 9.53x0.7 drain pipe	64 - AUDAX 6-8 OAT and OT temperature probe
12 - AUDAX 6 collector unit	37 - AUDAX 6-8 intake pipe	65 - AUDAX 6-8 ET temperature probe (water inlet)
13 - AUDAX 6 distribution unit	38 - 4-way valve/plate heat exchanger connection pipe using AUDAX 6-8 plates	66 - AUDAX 6-8 LT temperature probe (water outlet)
14 - AUDAX 6 base plate	39 - AUDAX R410A 6-8 gas service valve	67 - AUDAX 6-8 IRT temperature probe
15 - AUDAX 6-8 Electronic expansion valve	40 - AUDAX 6-8 4-way valve/external coil connecting pipe	68 - AUDAX 6-8 circulator wiring
16 - AUDAX 6-8 expansion valve coil	41 - AUDAX 6-8-10 high pressure sensor	69 - AUDAX 6-8-10 plate heat exchanger anti-freeze resistance wiring
17 - AUDAX 6-8 Expansion valve drain pipe	42 - AUDAX 6-8 4-way valve	70 - AUDAX 6-8 assembled drain pipe
18 - AUDAX 6-8-10 3 bar safety valve	43 - AUDAX 6-8 4-way valve coil	
19 - AUDAX 6-8 Safety valve fitting pipe	44 - AUDAX 6-8 Circuit boards support plate	
20 - AUDAX 6-8 differential water pressure switch	45 - AUDAX 6-8 Nylon cable tie	
21 - AUDAX 6-8 Service valve connecting pipe	46 - AUDAX 6-8 4 pole terminal board	
22 - AUDAX 6-8 service valve 2 connecting pipe	47 - AUDAX 6-8-10 4 pole/VRF WNG22 terminal board	
23 - AUDAX 6-8 water inlet pipe unit	48 - AUDAX 6-8 pump gaskets	
24 - AUDAX 6-8-10 manometer	49 - AUDAX 6 circulator pump	
25 - AUDAX 6-8 service valve 1 connecting pipe	50 - AUDAX 6-8 16x28-22.5 fairlead	
26 - AUDAX 6-8 pressure switch support plate	51 - AUDAX 6-8 HYDI board support plate	
27 - AUDAX 6-8 plate heat exchanger support	52 - AUDAX 6-8 DCI 80 CR filter board	
	53 - AUDAX 6-8-10 EI/T10EI16A-85 transformer	



10 AUDAX 16/18 kW MAIN COMPONENTS



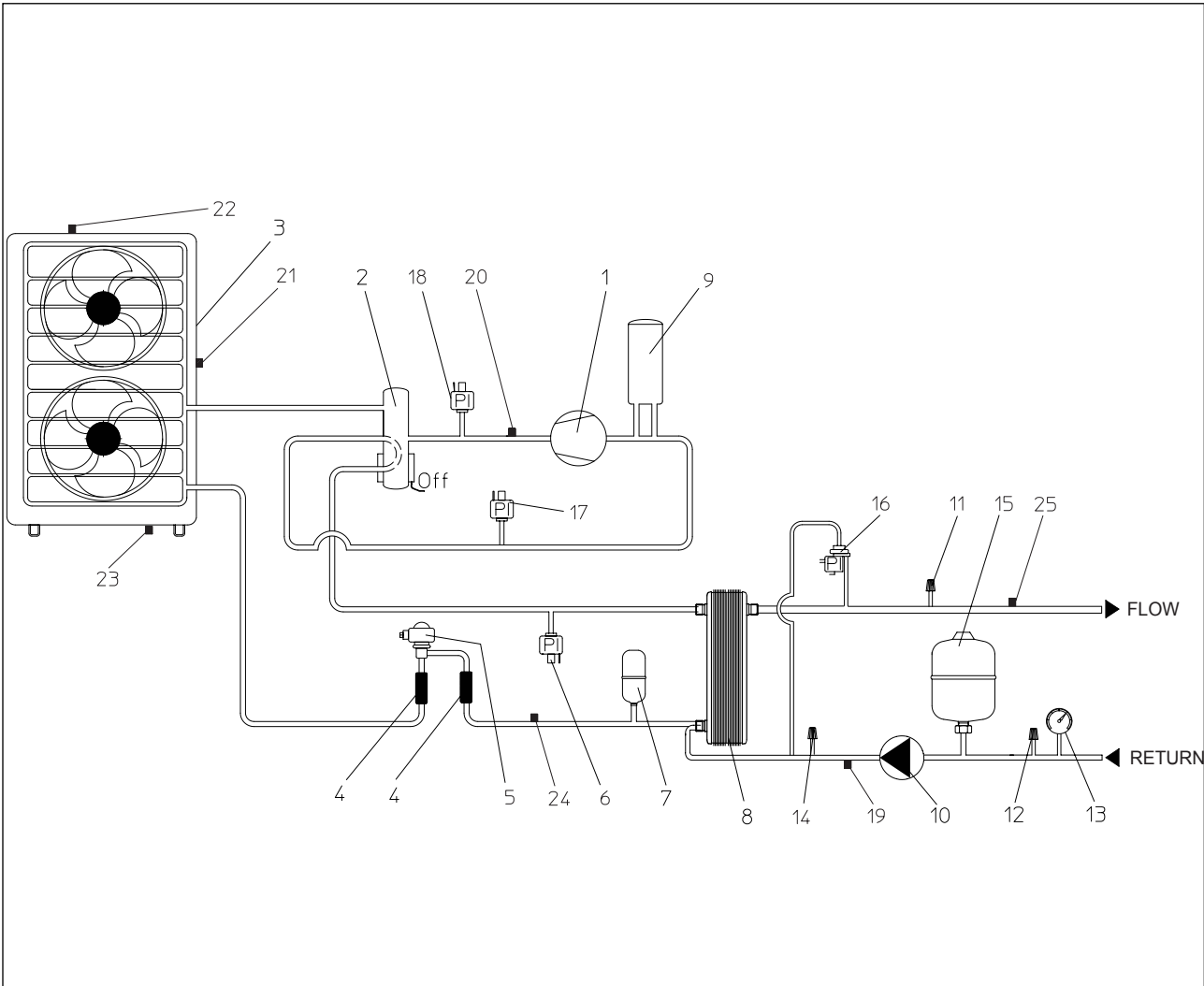
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KEY:		
1 - Rear protective grid		
2 - Front left casing		
3 - Left side with protective grid		
4 - Fan grid		
5 - Front casing handle		
6 - Front right casing		
7 - Ø552 fan		
8 - DC 77W 750rpm fan motor		
9 - Fan motor support plate		
10 - Base plate		
11 - High pressure switch		
12 - 4-way valve SHF-20A-46-00		
13 - 4-way valve coil		
14 - Compressor unit		
15 - Separation plate		
16 - Pump/MHI202EM		
17 - Pump connector		
18 - 1½" G sealing pad		
19 - Liquid separator		
20 - Liquid separator support plate		
21 - Liquid receiver		
22 - Filter		
23 - Electronic expansion valve/D24FKS		
24 - Electronic expansion valve coil		
25 - WATER/GAS plate exchanger		
26 - Right support plate/PHE		
27 - 3 bar safety valve		
28 - System pressure point		
29 - Right casing side		
	30 - Gas pressure point/R410A	
	31 - Right sides connections plate	
	32 - Manometer	
	33 - Main switch	
	34 - Differential water pressure switch WFS1000 8AAF	
	35 - ¼" SAE probe connector	
	36 - Cable tie	
	37 - 4-pole terminal board	
	38 - HYDI board	
	39 - EI/T10EI16A-85 transformer	
	40 - Display board	
	41 - Circuit boards support plate	
	42 - PFC board with communication port /IL-PFCA	
	43 - Phase protector	
	44 - Filter board	
	45 - Condenser board	
	46 - Board cover plate	
	47 - Inductance	
	48 - Compressor inverter board	
	49 - Heat dissipator	
	50 - ODU board	
	51 - Top cover	
	52 - Brio 5F expansion vessel	
	53 - Finned coil	
	54 - Coil fastening plate	
	55 - NSK-BC high pressure sensor	
	56 - NSK-S489 high pressure sensor cabling	
	57 - OAT temperature probe/Red	
	58 - OMT temperature probe/White	
	59 - OCT temperature probe/Blue	
	60 - IRT temperature probe/Black	
	61 - System return temperature probe (EWT)/white	
	62 - System flow temperature probe (LWT)/red	
	63 - CTT temperature probe	
	64 - Plate exchanger anti-freeze resistance cabling (E8ECRS018 L=3m)	
	65 - Cabling	



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12 AUDAX 10/16/18 kW COOLING-HYDRAULIC CIRCUITS DIAGRAM



KEY:

- | | |
|-------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1 - Compressor | 14 - Drain valve |
| 2 - 4-way valve | 15 - Expansion vessel |
| 3 - Finned coil + fan | 16 - Differential pressure switch |
| 4 - Filter | 17 - Low pressure sensor |
| 5 - Electronic expansion vessel | 18 - High pressure sensor |
| 6 - Electronic pressure sensor | 19 - System return water temperature |
| 7 - Water receiver | 20 - Compressor outlet temperature |
| 8 - Plate heat exchanger with resistance electric anti-freeze as per standard | 21 - Cooling fluid temperature at half way on finned coil |
| 9 - Water tank | 22 - Installation room temperature |
| 10 - Pump | 23 - Condens./evap. temperature |
| 11 - Air vent valve | 24 - Liquid/vapour phase temperature |
| 12 - 3 bar safety valve | 25 - System flow water temperature |
| 13 - Manometer | |



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AUDAX 18 kW TECHNICAL DATA

Central heating circuit		
Power in CH mode with water set at 35°C ⁽¹⁾	kW	17.5
Power in CH mode with water set at 45°C ⁽²⁾	kW	16.1
CH mode COP with water set at 35°C ⁽¹⁾		3.90
CH mode COP with water set at 45°C ⁽²⁾		3.05
Min/max heat power with water set at 35°C ⁽¹⁾	kW	5.46 / 20.38
Min/max heat power with water set at 45°C ⁽²⁾	kW	5.62 / 18.91
Electric power absorbed at 35°C/45°C	W	4470 / 5240
Flow temperature range	°C	24 / 55
Cooling circuit		
Power in cooling mode with water set at 18°C ⁽¹⁾	kW	18
Power in cooling mode with water set at 7°C ⁽²⁾	kW	15.5
Cooling mode EER with water set at 18°C ⁽¹⁾		3.78
Cooling mode EER with water set at 7°C ⁽²⁾		2.59
Min/max cooling capacity with water set at 18°C ⁽¹⁾	kW	10.90 / 19.00
Min/max cooling capacity with water set at 7°C ⁽²⁾	kW	7.70 / 14.80
Electric power absorbed at 18°C/7°C	W	4770 / 5980
Flow temperature range	°C	5 / 20
General data		
System max. working pressure	bar	3
Total head available at system (with 3.000 l/h flow rate)	kPa (m H ₂ O)	123.0 (12.9)
Expansion vessel capacity	l	5
Sound power level	dB(A)	73
Appliance electric protection rating	IP	X4
Electric power supply	V - Hz	380 - 50
Maximum power absorbed	W	6500
Nominal current absorbed (CH/cooling)	A	6.8 / 6.3
Maximum absorbed current from the P.C.B.	A	15
Fuse inserted	A	20
Refrigerant fluid load (R410A)	g	4100
Heat pump weight	kg	219

THE REPORTED DATA REFERS TO THE FOLLOWING CONDITIONS:

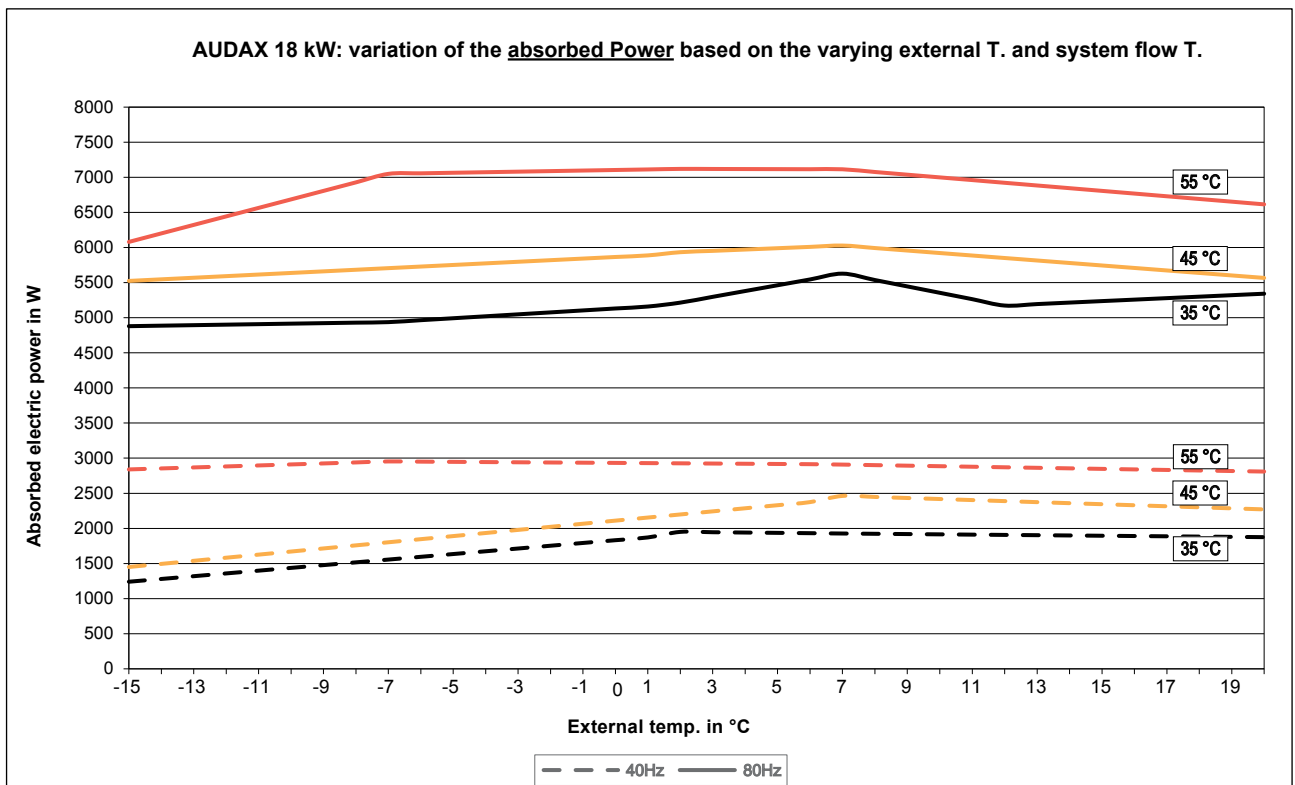
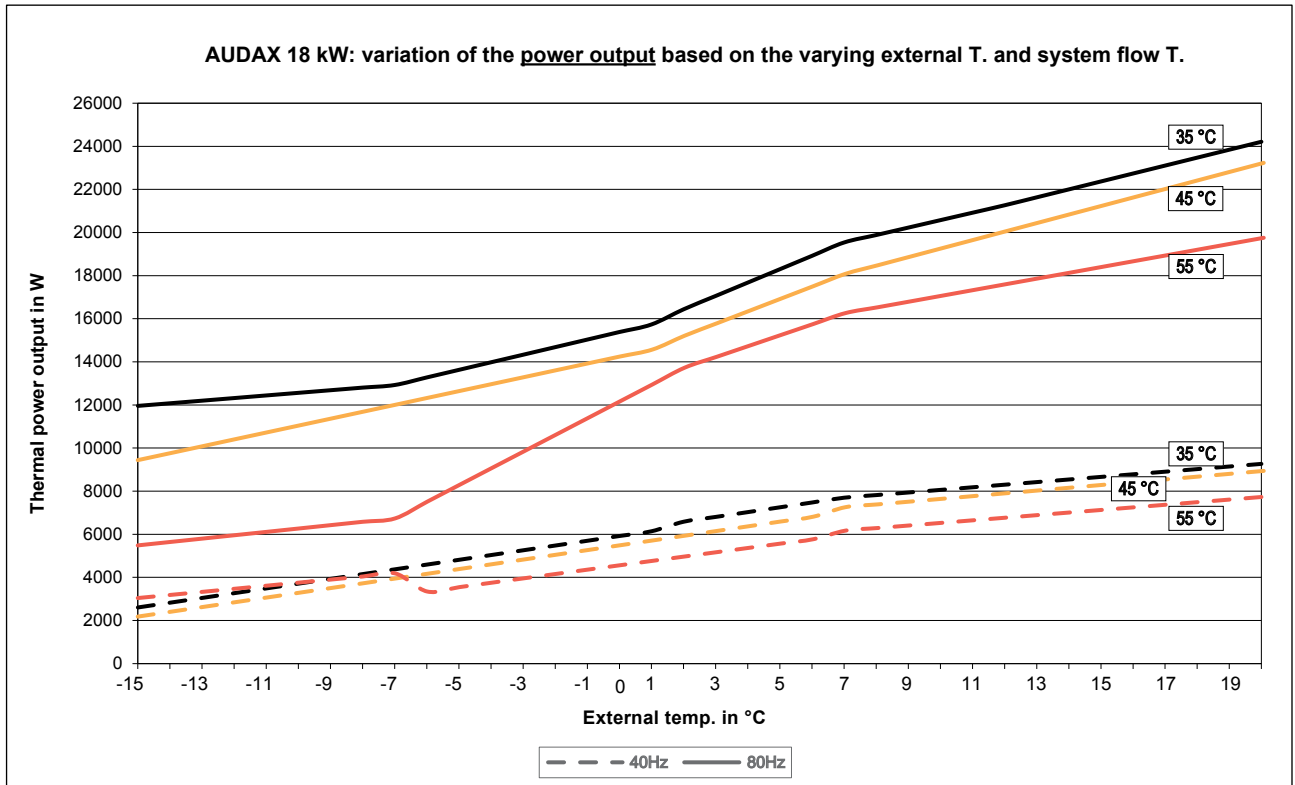
Sound pressure level measured in free field at 1 m from the machine, in compliance with UNI EN ISO 3746/97

ROOM	HEATING PHASE (°C)	COOLING PHASE (°C)
Water TEMP. (F/R) ⁽¹⁾ – AIR (db/wb)	35/30 – 7/6	18/23 – 35/24
Water TEMP. (F/R) ⁽²⁾ – AIR (db/wb)	45/40 – 7/6	7/12 – 35/24

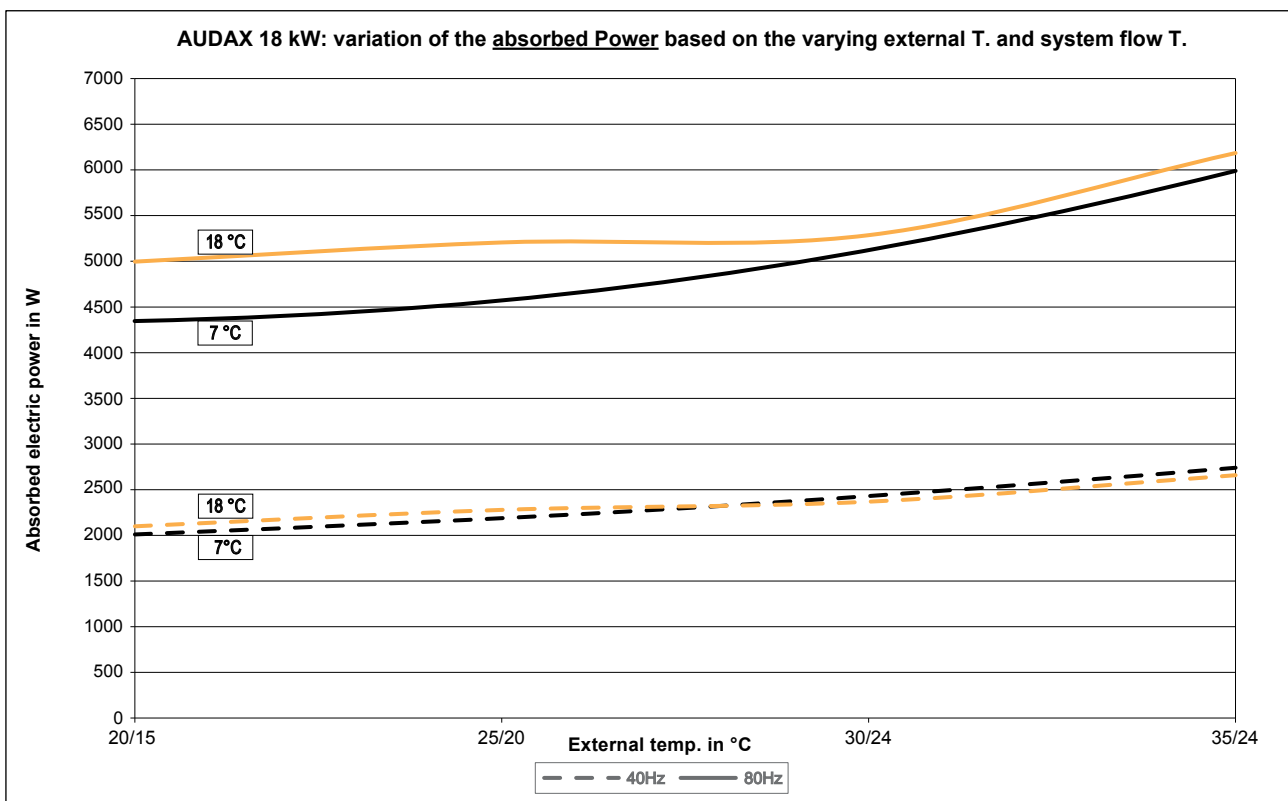
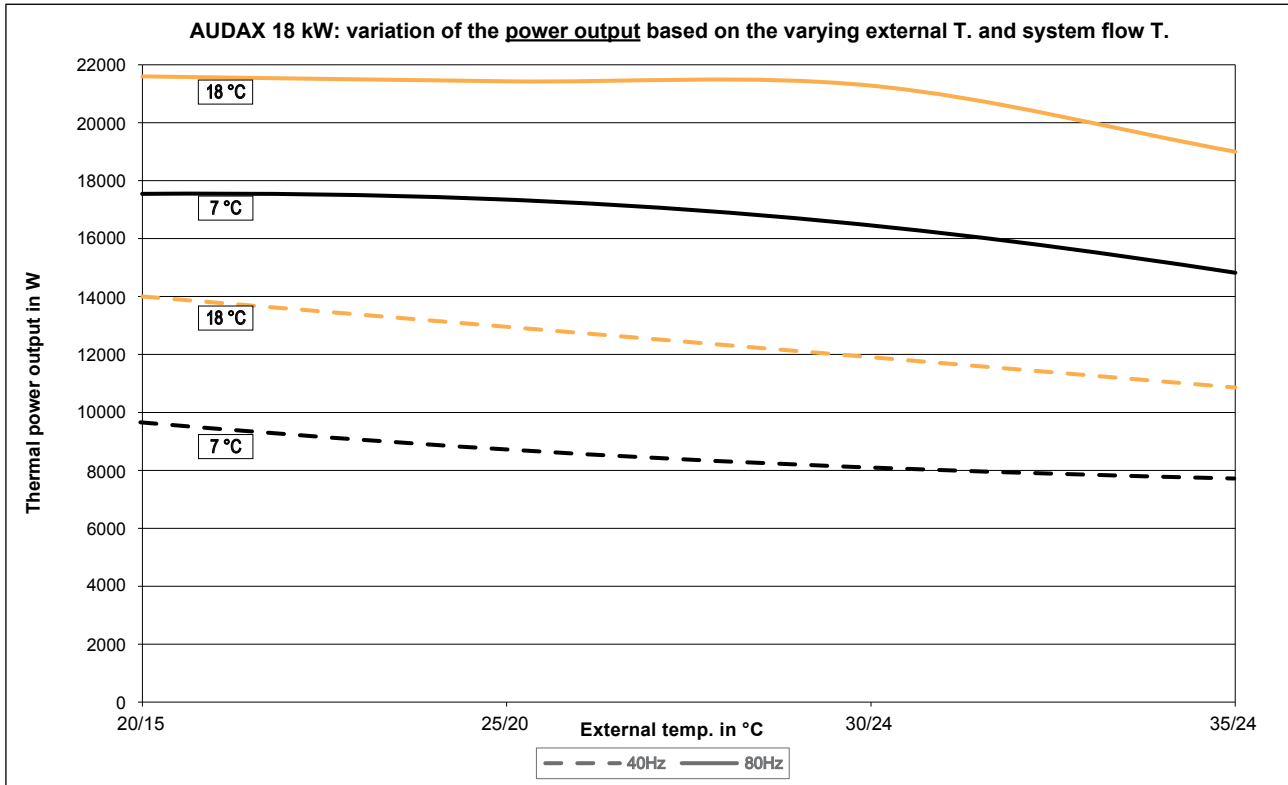


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17.1 VARIATION OF THE AUDAX 18 POWER IN HEATING kW



17.2 VARIATION OF THE AUDAX 18 POWER IN COOLING kW



AUDAX

17.3

AUDAX 18 kW CIRCULATION PUMP

AUDAX 18 kW is equipped with an incorporated circulation pump.

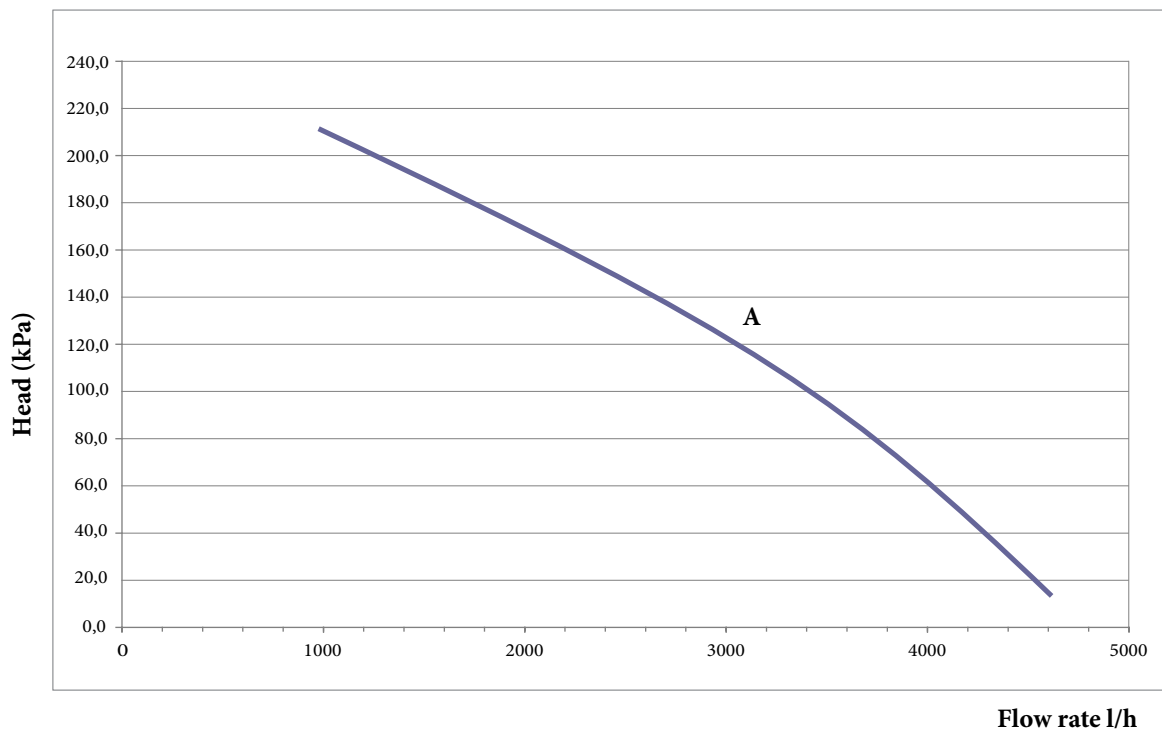
The pump, which is already equipped with a condenser, is connected to the AUDAX supplies in single phase (230 V - 50 Hz).

TECHNICAL NOTE:

In the presence of systems with fan coils (without water side control probe), it is recommended to check the water content in the system, making sure it is not lower than 250 litres.

17.4

PUMP HEAD/FLOW RATE GRAPHICS



A = Flow rate/Head curve available to the system with zone pump at 3rd speed



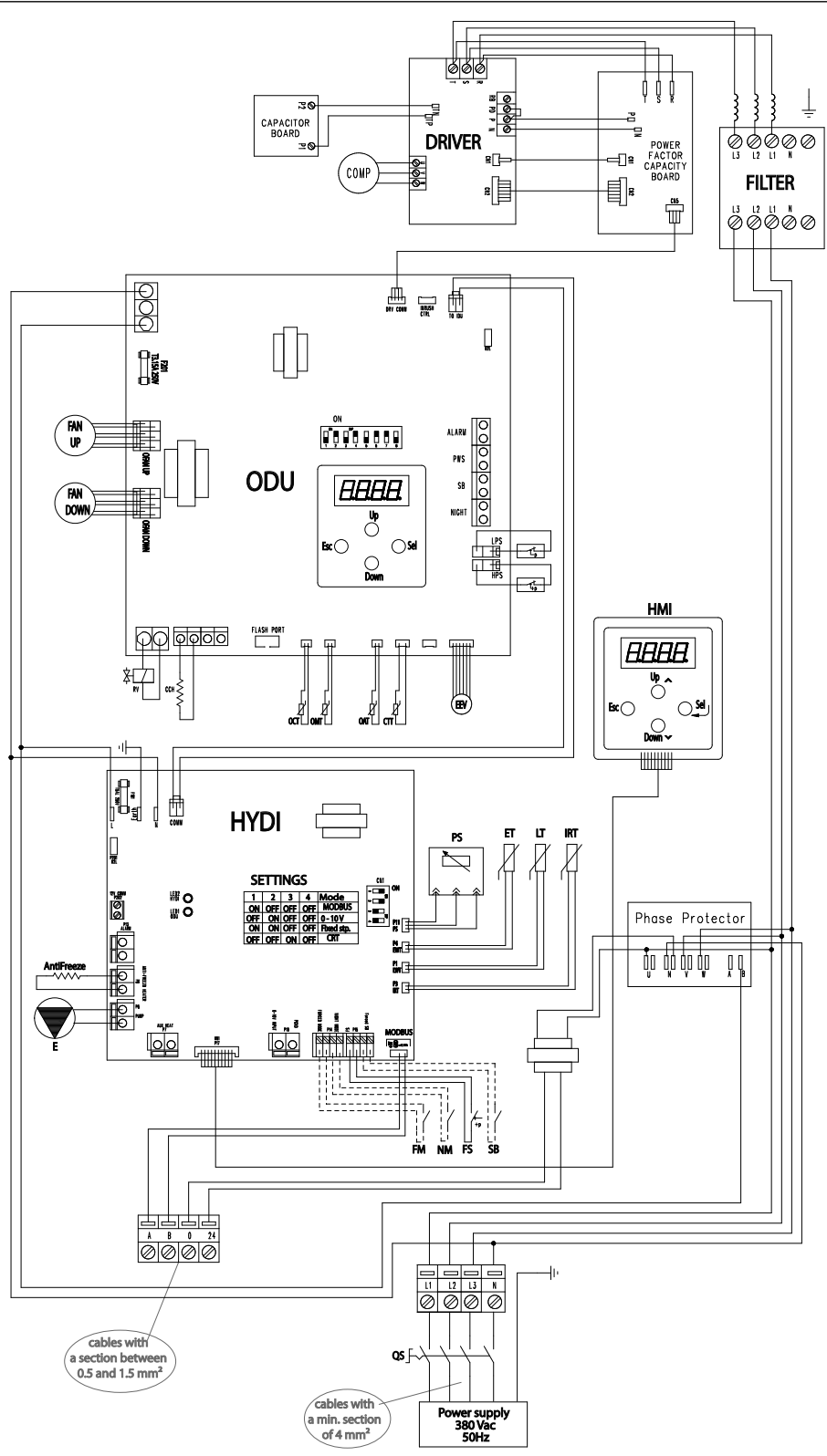
AUDAX 16/18 kW CIRCUIT BOARD

The AUDAX 16 kW and 18 kW heat pumps are designed to function correctly also without external manager. They must

only be set, using the "HMI" panel, to work appropriately in the specific system.

KEY:

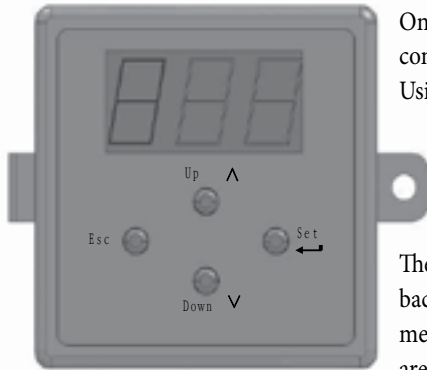
- PS - Pressure sensor
- ET - Return temperature
- LT - Flow temperature
- IRT - Liquid phase temperature
- FM - Heating/Cooling selection (optional)
- NM - DHW or low consumption mode selection (optional)
- FS - Differential pressure switch
- SB - On/Off selector (optional)
- E - Pump
- HMI - Operator panel
- HST - P.C.B. temperature
- CTT - Compressor discharge temperature
- OCT - Evaporation temperature
- OAT - External temperature
- OMT - Coil temperature
- EEV - Electronic valve
- OFAN - Upper fan
- OFAN - Lower fan
- QS - Main switch
- COMP - Compressor
- RV - Reversing valve
- HPS - High pressure switch
- LPS - Low pressure switch



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PRELIMINARY CONTROL PANEL SETTINGS



User Interface (HMI)

Once the machine has been electrically powered, the screen displays the software version 3 consecutive times, and then goes into stand-by mode (SB).

Using the UP/DOWN buttons it is possible to scroll through the 3 main menus:

- **DIAGNOSTICS (dia)**: this displays the current alarms/alarm log of the board hydraulics (HYDI) and inverter board (ODU)
- **SETUP (StP)**: this allows you to set the parameters of the machine
- **STATUS (Stt)**: this displays the status of the (HYDI) and (ODU) boards

The "STATO (STATUS)" menu and its submenus, once they have been selected, automatically go back to the main menu after no keys have been pressed for 60 consecutive minutes. The other menus go back to the main menu after 10 min. When numerical and alphanumerical characters are shown at the same time, they are separated by a period.

Example of the AUDAX menu:

1 st level	2 nd level	3 rd level	Description	Default
SETTINGS (STP)	CAP	0 - 4	<u>Set machine capacities</u> 3 → AUDAX 6 4 → AUDAX 8/10/16/18	0
	dl	A, B, C, D	<u>Set machine model</u> A → AUDAX 6/8/10/16/18	A
	<u>LoT</u>	0, 1	<u>If the machine is configured to be managed by an external 0-10 V signal (switch setting) the LoT parameter specifies the meaning of the external signal.</u> 0 → Power management 1 → Flow temperature management	0
	SPC	5 - 20	<u>Set cooling water flow set-point</u>	7
	SPH	24 - 55	<u>Set heating water flow set-point</u>	45
SETTINGS (STP)	odE	Sb, H, C	<u>Set operating mode</u> Sb → Stand-by H → Heating Mode C → Cooling Mode	Sb
	<u>FCD</u>	0, 1	<u>Set machine control mode</u> 0 → Control through User Interface HMI 1 → Control through contacts on HYDI board	0
	br	1.2 , 9.6	<u>Set data transfer speed 1.</u> 1.2 → Connection with chrono-thermostat (1200 bit/s) 9.6 → Connection with chrono-thermostat (9600 bit/s)	9.6
	Add	0 – 247	<u>Set Modbus address</u> Set at 1 by default (do not change)	1
	<u>nod</u>	0, 1	<u>Enable Night Mode or Domestic Water</u> 0 → Enable Night Mode 1 → Enable boiler operation (Domestic Water)	0

