

DAIKIN



INSTALLATION AND OPERATION MANUAL

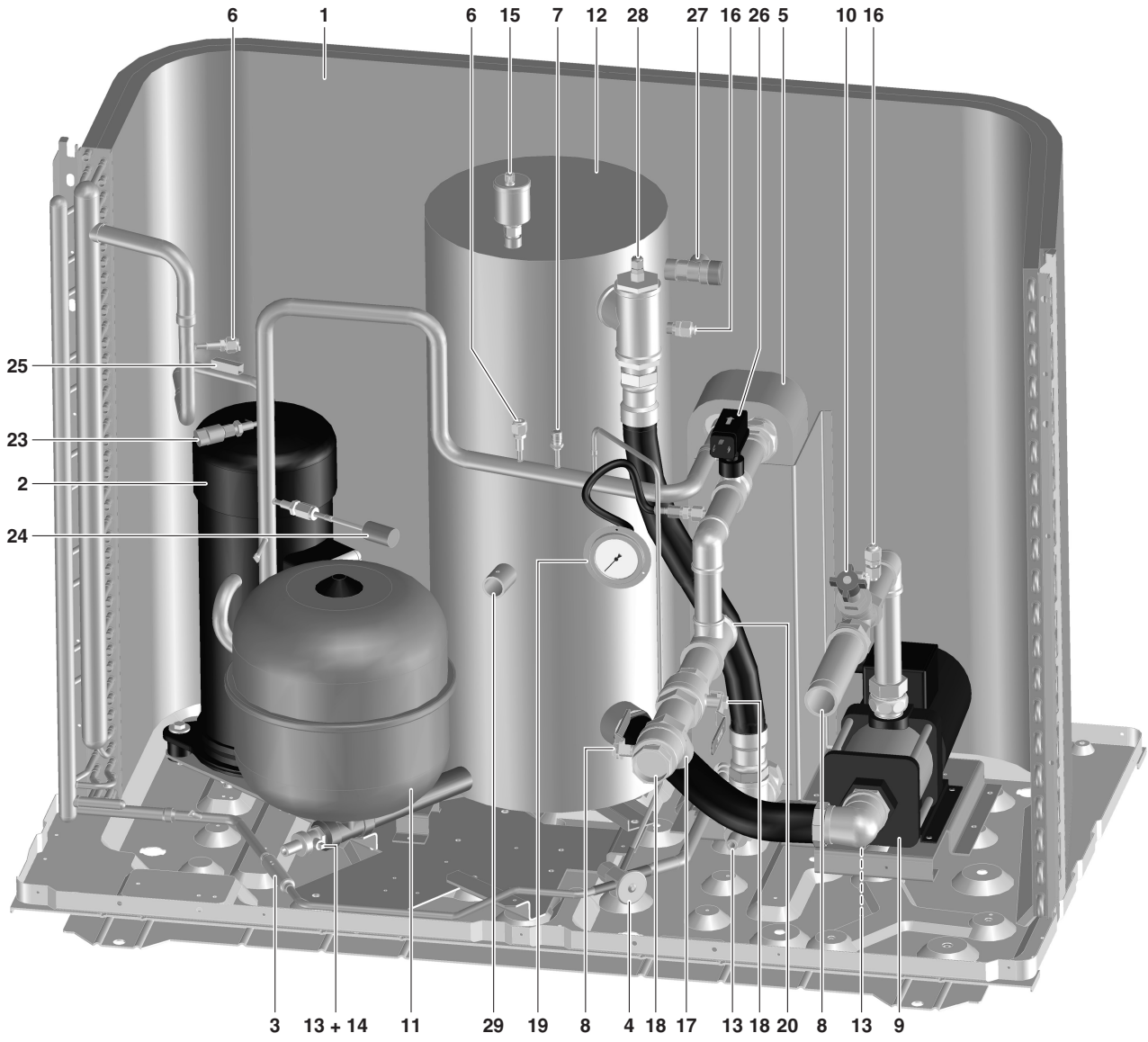
Packaged air-cooled water chillers



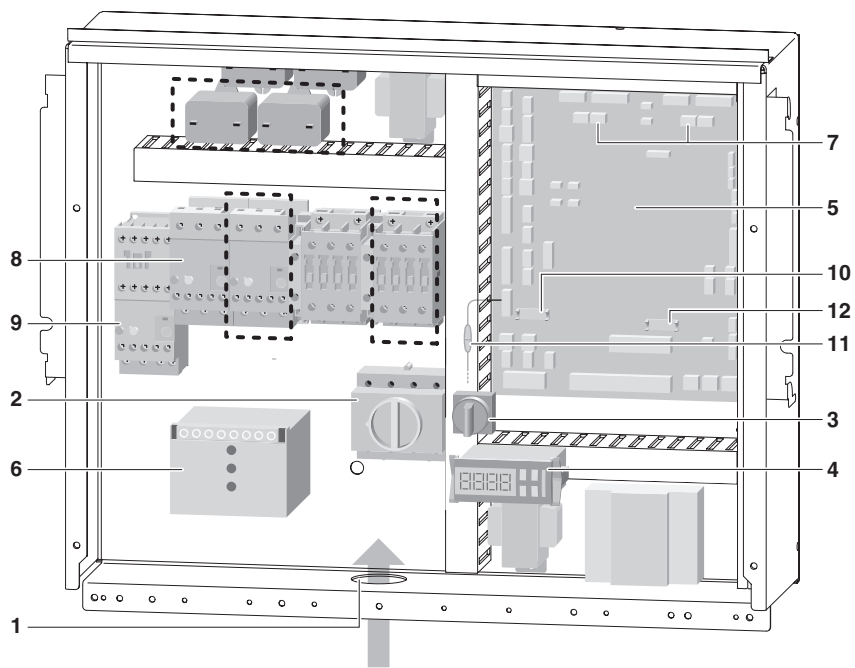
**EUWAN5KBZW1
EUWAN8KBZW1
EUWAN10KBZW1
EUWAN12KBZW1
EUWAN16KBZW1
EUWAN20KBZW1
EUWAN24KBZW1**

**EUWAP5KBZW1
EUWAP8KBZW1
EUWAP10KBZW1
EUWAP12KBZW1
EUWAP16KBZW1
EUWAP20KBZW1
EUWAP24KBZW1**

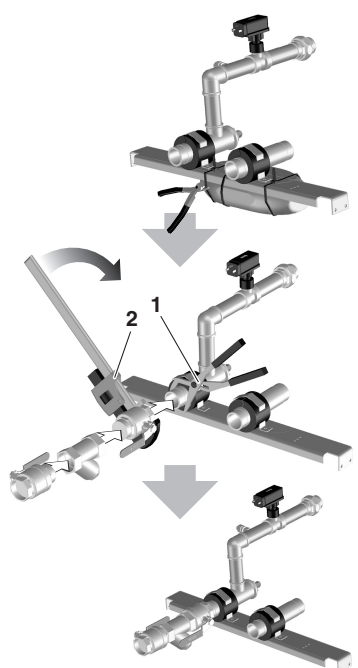
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EUWAB20KBZW1
EUWAB24KBZW1**



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Thank you for purchasing this Daikin air conditioner.



READ THIS MANUAL ATTENTIVELY BEFORE STARTING UP THE UNIT. DO NOT THROW IT AWAY. KEEP IT IN YOUR FILES FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

Read the chapter "Operation" on page 10 before changing the parameters.

The English text is the original instruction. Other languages are translations of the original instructions.

This appliance is not intended for use by persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

INTRODUCTION

This operation manual concerns packaged air-cooled water chillers of the Daikin EUWA(*)-KBZ series. These units are designed for outdoor installation and used for cooling applications. The units are available in 7 standard sizes ranging from 5 to 24 Hp. All sizes are available in 3 versions, varying in level of equipment.

The EUWA(*) units can be combined with Daikin fan coil units or air handling units for air conditioning purposes. They can also be used for supplying water for process cooling.

The manual describes the procedures for unpacking, installing and connecting the EUWA(*) units as well as instructions for adequate operation and maintenance of the unit and will provide help if problems occur.

(*) = N, P, B

OPTIONS AND FEATURES

Refer to the engineering data book for the complete list of specifications, options and features.

Options

- Glycol application for chilled water temperature down to -10°C or -5°C .
- BMS-connection MODBUS (optional kit address card EKAC10C)⁽¹⁾
- Remote user interface (optional kit EKRUMCA). (Necessary to additionally install kit address card EKAC10C.)⁽¹⁾

Features

- Voltage free contacts
 - general operation
 - alarm
 - operation compressor 1
 - operation compressor 2
- Changeable remote inputs
 - Following functions can be assigned to a total of 2 digital inputs.
 - remote start/stop
 - dual setpoint

(1) When EKAC10C is used in combination with remote user controller EKRUMCA then it is not possible to use the BMS-connection MODBUS.

TECHNICAL SPECIFICATIONS

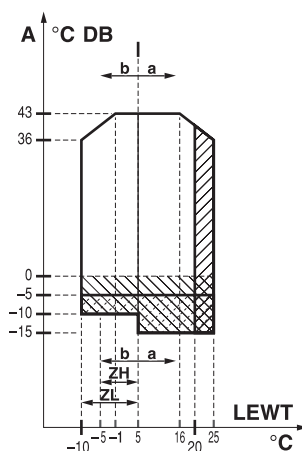
Single circuit units




Unit (Hp)	5			8			10			12		
Version	N	P	B	N	P	B	N	P	B	N	P	B
Dimensions HxWxD (mm)	1230x1290x734			1230x1290x734			1450x1290x734			1450x1290x734		
Weight												
• machine weight (kg)	150	168	180	215	229	241	245	259	271	248	262	274
• operation weight (kg)	152	171	239	218	232	300	248	262	330	251	265	335
Connections												
• water inlet MBSP	1-1/4"			1-1/4"			1-1/4"			1-1/4"		
• water outlet MBSP	1-1/4"			1-1/4"			1-1/4"			1-1/4"		
Internal water volume (l)	2	3	59	3	3	59	3	3	59	3	4	60
Expansion vessel												
• Volume (l)	—	12	12	—	12	12	—	12	12	—	12	12
• Pre-pressure (bar)	—	1.5	1.5	—	1.5	1.5	—	1.5	1.5	—	1.5	1.5
Safety valve water circuit (bar)	—	1x3.0	1x3.0	—	1x3.0	1x3.0	—	1x3.0	1x3.0	—	1x3.0	1x3.0

Double circuit units

Unit (Hp)	16			20			24		
Version	N	P	B	N	P	B	N	P	B
Dimensions HxWxD (mm)	1321x2580x734			1541x2580x734			1541x2580x734		
Weight									
• machine weight (kg)	430	448	440	490	508	520	496	514	526
• operation weight (kg)	436	457	525	496	518	586	503	524	592
Connections									
• water inlet MBSP	2"			2"			2"		
• water outlet MBSP	2"			2"			2"		
Internal water volume (l)	6	9	65	6	10	66	7	10	66
Expansion vessel									
• Volume (l)	—	12	12	—	12	12	—	12	12
• Pre-pressure (bar)	—	1.5	1.5	—	1.5	1.5	—	1.5	1.5
Safety valve water circuit (bar)	—	1x3.0	1x3.0	—	1x3.0	1x3.0	—	1x3.0	1x3.0

Operation range



- A** Outdoor temperature
- a** Standard (water)
- b** Option (glycol)
- °C DB** °C dry bulb
- LEWT** Leaving evaporator water temperature
-  Pull down operation area
-  Protect the water circuit against freezing.
-  When the units operate below -5°C and are installed in a rather windy region, a windscreen is required.

Main components (See figure 1)

Displayed unit = EUWAB12KBZW1.

- 1 Condenser**
The function of the condenser is to change the state of the refrigerant from gaseous to liquid. The heat gained by the gas in the evaporator is discharged through the condenser to the ambient air, and the vapour condenses to liquid.
- 2 Compressor**
The compressor acts as a pump and circulates the refrigerant in the refrigeration circuit. It compresses the refrigerant vapour coming from the evaporator at the pressure at which it can easily be liquefied in the condenser.
- 3 Refrigerant filter**
The filter installed behind the condenser removes small particles from the refrigerant to prevent blockage of the tubes.
- 4 Expansion valve**
The liquid refrigerant coming from the condenser enters the evaporator via an expansion valve. The expansion valve brings the liquid refrigerant to a pressure at which it can easily be evaporated in the evaporator.
- 5 Evaporator**
The main function of the evaporator is to take heat from the water that flows through it. This is done by turning the liquid refrigerant, coming from the condenser, into gaseous refrigerant.
- 6 Pressure port refrigerant circuit**
These ports make it possible to measure refrigerant pressure in the pipes.
- 7 Charge valve**
Allows refrigerant charge in the circuit.
- 8 Water in/outlet connection**
The water inlet and outlet connection allows an easy connection of the unit to the water circuit of the air handling unit or industrial equipment.

- 9 Pump (only EUWAP, EUWAB)**
The pump circulates the water in the circuit.
- 10 Pressure regulating valve**
The pressure regulating valve is used to regulate the water flow in the system.
- 11 Expansion vessel (only EUWAP, EUWAB)**
The water in the water circuit expands with rising temperatures. The expansion vessel stabilizes the pressure changes with changing water temperatures by giving free space to the changing water volume.
- 12 Buffer tank (only EUWAB)**
The buffer tank reduces the variation in water temperature in the water circuit. This prevents frequent compressor starts and stops.
- 13 Drain valve**
The drain valve permits complete drainage of the chiller water system during maintenance or in case of shut down.
- 14 Fill valve (only EUWAP, EUWAB)**
The water circuit can be filled with water via this fill valve.
- 15 Air purge valve**
Remaining air in the chiller water system will be automatically removed via the air purge valve.
- 16 Pressure ports water circuit**
It is possible to detect any blockage in the water circuit or a malfunction of the pump by means of the 3 pressure ports.
U 7/16 flare pressure ports are provided to connect a device for measuring the pump pressure and the evaporator pressure drop. The waterflow can be deducted from these pressures (Refer to "Figures pressure characteristics" on page 10).
- 17 Water filter**
The filter installed in front of the pump removes dirt from the water to prevent damage to the pump or blockage of the evaporator. The water filter should be cleaned on a regular base.
- 18 Ball valve**
A ball valve is installed in front of and behind the water filter to allow filter cleaning without having to drain the water circuit.
- 19 Manometer**
The manometer allows readout of available water pressure to load.
- 20 Sensor for inlet water temperature**
The measured inlet water temperature is used by the controller for regulating the outlet water temperature.
- 21 Low pressure gauge (optional)**
Measurement on low pressure side compressor.
- 22 High pressure gauge (optional)**
Measurement on high pressure side compressor.

Safety devices (See figure 1)

- 23 High-pressure switch**
The high-pressure switch is installed on the discharge pipe of the unit and measures the condenser pressure (pressure at the outlet of the compressor). When the pressure is too high, the pressure switch is activated. The unit stops.
When activated, it resets automatically, but the controller needs to be reset manually.
- 24 Low pressure switch**
The low pressure switch is installed on the suction pipe of the unit and measures the evaporator pressure (pressure at the inlet of the compressor). When the pressure is too low, the pressure switch is activated. The unit stops.

- 25 Discharge thermal protector (general safety device)**
The discharge thermal protector is activated when the temperature of the refrigerant leaving the compressor becomes too high. The unit stops.
- 26 Flow switch**
The flow switch measures the flow in the water circuit. In case the flow does not reach the minimum allowed water flow, the unit will be shut down.
- 27 Safety valve (only EUWAP, EUWAB)**
The safety valve prevents water pressure from exceeding 3 bar. It protects the tank against burst. Activation of this safety has no influence on the operation of the unit.
- 28 Sensor for outlet water temperature**
The outlet water temperature sensor measures the temperature of the water at the evaporator outlet. The protection device shuts down the unit when the temperature of the chilled water becomes too low in order to prevent freezing of the water during operation.
When water temperature becomes back to normal, the protector resets automatically, but the controller needs to be reset manually.
- 29 Freeze protection (optional)**
Heaters protect the chiller water system against freezing.

ELECTRICAL SPECIFICATIONS

Unit (Hp)	5	8	10	12	16	20	24	
Power circuit								
• Phase				3N~				
• Frequency (Hz)				50				
• Voltage (V)				400				
• Voltage tolerance (%)				±10				
• Recommended fuses	EUWAN (A)	20	25	25	32	40	50	63
	EUWAP+B (A)	20	25	32	40	50	50	63

Main components (See figure 2) (⋮) only for 16~24 Hp units

Refer to the wiring diagram supplied with the unit.

- 1 Power supply intake (L1, L2, L3, N, PE)**
The power cables from the local supply panel can be inserted in the unit through this foreseen entrance.
- 2 Main switch (S12M)**
Power to unit can be disconnected by means of this switch.
- 3 Switch for pump (S21P)**
Pump can be switched between automatically (steered by controller) or manually on (for servicing purpose) by means of this switch.
- 4 Digital controller (A1P)**
Controls the functioning of the unit.
- 5 I/O PCB (A2P) (input/output)**
The I/O PCB (A2P) is used to connect all internal wiring and field wiring. It includes some control and safety functions as well.
- 6 Softstarter (A5P) (possible optional for 5-12 Hp only)**
The softstarter reduces the starting current of the compressor.

Safety devices (See figure 2) (⋮) only for 16~24 Hp units

- 5 I/O PCB (A2P) (input/output)**
The I/O PCB (A2P) contains a reverse phase protector.
The reverse phase protector detects if the 3 phases of the power supply are connected correctly. If a phase is not connected or if 2 phases are inverted, the unit can not start up.

- 7** Fan motor thermal protector (Q11F, Q12F, Q21F, Q22F)
The fan motors are equipped with a thermal protector. The protectors are activated when the temperature becomes too high. When temperature returns to normal, the protector resets automatically.
- 8** Overcurrent relay for compressor (K4S, K5S)
The overcurrent relay protects the compressor motor in case of overload, phase failure or too low voltage. The relay is factory set and may not be adjusted. When activated, the overcurrent relay has to be reset in the switch box and the controller needs to be reset manually.
- 9** Overcurrent relay for pump (K6S)
The overcurrent relay protects the pump motor in case of overload, phase failure or too low voltage. The relay is factory set and may not be adjusted. When activated, the overcurrent relay has to be reset in the switch box and the controller needs to be reset manually.
- 10** Fuse for control circuit (F1U)
The fuse for control circuit protects cables of control circuit and controller components in case of short circuit.
- 11** Fuse for control circuit (F4)
The fuse for control circuit protects cables of control circuit and heater(s) for freeze protection in case of short circuit.
- 12** Fuse for digital controller (F3U)
The fuse protects cables of digital controller and digital controller in case of short circuit.

Internal wiring - Parts table

Refer to the internal wiring diagram supplied with the unit. The abbreviations used are listed below.

A1P	PCB: controller PCB
A2P	PCB: I/O PCB (input/output)
A3P	** PCB: Address card for BMS
A5P	** Softstarter for circuit 1
A7P	** PCB: remote user interface
A71P	PCB: power supply card
A72P	PCB: remote user interface
C1,C2,C3,C4	Capacitors for fanmotors
E1H,E2H	Crankcase heater circuit 1, circuit 2
E3H,E4H	** Evaporator heatertape
E5H	* Field heater
E6H	** Buffertank heater
F1,F2,F3	# Main fuses for the unit
F4	Fuse for I/O PCB and evaporator heatertape
F5	## Surge proof fuse (optional for BMS)
F6	(#) Fuse for pumpmotor
F7,F8	Fuse for fan motor circuit 1, circuit 2
F1U	Fuse for I/O PCB
F3U	Fuse controller PCB
H3P	* Indication lamp alarm
H4P	* Indication lamp operation compressor 1
H5P	* Indication lamp operation compressor 2
H6P	* Indication lamp general operation
K1M,K2M	Compressor contactor circuit 1, circuit 2
K4S,K5S	Overcurrent relay circuit 1, circuit 2
K6S	(*) Overcurrent relay pump
K1P	(*) Pumpcontactor
M1C,M2C	Compressor motor circuit 1, circuit 2
M11F,M12F	Fanmotors circuit 1
M21F,M22F	Fanmotors circuit 2
M1P	Pumpmotor (only P and B models)
PE	Main earth terminal
Q1D,Q2D	Discharge thermal protector circuit 1, circuit 2

Q11F,Q12F	Thermal protector fan circuit 1
Q21F,Q22F	Thermal protector fan circuit 2
R3T	Evaporator inlet water temperature sensor
R4T	Evaporator outlet water temperature sensor
R6T	Ambient temperature sensor
R7T,R8T	Coil temperature sensor for circuit 1, circuit 2
S1HP,S2HP	High pressure switch circuit 1, circuit 2
S4LP,S5LP	Low pressure switch circuit 1, circuit 2
S7S	* Switch for remote cooling/heating selection or dual setpoint
S9S	* Switch for remote start/stop or dual setpoint
S10L	Flowswitch
S12M	Main isolator switch
S21P	Switch for pump: manual/auto
TR1	Transfo 230 V → 24 V for supply of controller PCB
TR2	Transfo 230 V → 24 V for supply of I/O PCB (A2P)
X1~82A/B/M	Connectors
Y1R,Y2R	Reverse valve circuit 1, circuit 2

	Not included with standard unit	
	Not possible as option	Possible as option
Obligatory	#	##
Not obligatory	*	**

() Applicable for unit without integrated pump

INSTALLING THE UNIT

SELECTION OF LOCATION




The unit should be installed in a location that meets the following requirements:

- The foundation is to be in such way that it causes no vibrations or noise when the unit is in operation.
- The space around the unit is adequate for servicing and the minimum space for air inlet and air outlet is available.
If several units are being installed side by side, the minimum service space between them must be taken into account.
- There is no danger of fire due to leakage of inflammable gas.
- Ensure that water cannot cause any damage to the location by adding water drains to the foundation and prevent water traps in the construction.
- Select the location of the unit in such a way that neither the discharged air nor the sound generated by the unit disturb anyone.
- Make sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a windscreen to block the wind.
- In heavy snowfall areas, select an installation site where snow will not affect operation of the unit.

The equipment is not intended for use in a potentially explosive atmosphere.

DESCRIPTION DIMENSIONS

For dimensions of the unit, refer to the outlook diagram delivered with the unit.



-  Space for air inlet B1/B2
-  Space for air outlet ≥3 m
-  Service space

INSPECTING AND HANDLING THE UNIT

The units are packed in a wooden crate and attached on a wooden pallet.

At delivery, the unit should be checked and any damage should be reported immediately to the carrier claims agent.

When handling the unit, take into account the following:

- 1  Fragile, handle the unit with care.
 Keep the unit upright in order to avoid compressor damage.
- 2 Lift the unit preferably with a crane and 2 belts in accordance with the instruction sticker on the unit.
- 3 When lifting the unit with a crane, always use protectors to prevent belt damage and pay attention to the position of the unit's centre of gravity.
- 4 Bring the unit as close to its final installation position in its original package to prevent damage during transport.

UNPACKING AND PLACING THE UNIT

- 1 Remove the wooden crate from the unit.
- 2 Remove the screws fixing the unit to the pallet.
- 3 The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete).
- 4 Fasten the unit in place using four anchor bolts M12.
- 5 Make sure that the unit is levelled in both directions.



- 1 Prepare a water drainage channel around the foundation to drain waste water from around the unit.
- 2 If the unit is to be installed on a roof, check the strength of the roof and its drainage facilities first.
- 3 If the unit is to be installed on a frame, install a waterproofing board with a distance of 150 mm under the unit in order to prevent infiltration of water coming from under the unit.
- 4 In case of indoor installation, make sure to connect a drainhose to the drain connection (Ø16).

- 6 If the unit is operating below -5°C ambient, the unit must be installed out of the wind. If this is not possible, a windscreen must be installed.

IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type: R407C
GWP⁽¹⁾ value: 1652.5

⁽¹⁾ GWP = global warming potential

The refrigerant quantity is indicated on the unit name plate.

CHECKING THE WATER CIRCUIT

The units are equipped with a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with all relevant European and national regulations.

Before continuing the installation of the unit, check the following points:

Only for EUWAN version

- A circulation pump must be provided in such a way that it discharges the water directly into the water heat exchanger.
- Provide adequate safeguards in the water circuit to make sure that the water pressure will never exceed the maximum allowable working pressure (10 bar).

For all versions

- A kit containing 2 ball valves and 1 filter is delivered with the unit. For location of the kit within the unit, refer to the outlook diagram and to the sticker on the frontplate of the unit. Install this kit at the water inlet of the unit. Refer to figure 3.



Not installing the filter kit can lead to severe damage of the unit.

- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance or in case of shut down. A drain plug is provided to drain the water from the chiller water system.
- Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge is provided on the chiller water system.
- Take care that the components installed in the field piping can withstand at least the sum of opening pressure of the safety valve + the static height of the pump.
 - For EUWAP and EUWAB: 6 bar.
 - For EUWAN: depending on the selected pump and safety valve.

CONNECTING THE WATER CIRCUIT

Water connections must be made in accordance with the outlook diagram delivered with the unit, respecting the water in- and outlet.



Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- 1 Use clean pipes only.
- 2 Hold the pipe end downwards when removing burrs.
- 3 Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- 4 Use a good thread sealant for the sealing of the connections. The sealing must be able to withstand the pressures and temperatures of the system, it must also be resistant to the used glycol in the water.
- 5 Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes. Refer to figure 3.
 - 1 To secure the piping of the chiller
 - 2 To connect the ball valve

WATER CHARGE, FLOW AND QUALITY

For all versions

To assure proper operation of the unit a minimum water volume is required in the system and the water flow through the evaporator must be within the operation range as specified in the table.

Unit (Hp)	Minimum water volume (l) ^(*)	Minimum water flow (l/min)	Maximum water flow (l/min)
5	162/a	25	65
8	255/a	35	102
10	324/a	40	129
12	378/a	51	152
16	264/a	65	212
20	333/a	75	267
24	396/a	83	317

(*) a = cooling temperature difference (refer to "Defining the cooling temperature differential" on page 15).

Only for EUWAP, EUWAB versions

Connecting pressure gauges to the water circuit (field supply)

It is desirable to know the static height over the pump, for regulating the water flow (refer to "Pump start up" on page 10). For this reason you need to install pressure gauges or a differential pressure gauge on the pressure ports.

Maximum allowed installation height in function of the water volume

Make sure to respect following limitations:

If the EUWA is installed at the highest point of the system, then there is no height difference to be considered.

If the EUWA is placed on a height level other than the highest point, refer to figure 7 to read the maximum allowed height difference in function of the water volume.

e.g.: If water volume=180 l, the maximum allowed installation height difference is 9 m.

Setting the pre-pressure of the expansion vessel

The pre-pressure (Pg) on the expansion vessel has to be set before filling the system with water or water/glycol solution in function of the maximum installation height difference (H).

Use dry compressed air or nitrogen for this operation.

The pre-pressure (Pg) to be set is calculated as below:

$$P_g = (H/10 + 0.3) \text{ bar}$$

H=Maximum installation height of the circuit above the EUWA unit (m)

Water quality specifications

		circulating water	supply water	tendency if out of criteria
Items to be controlled				
pH	at 25°C	6.8-8.0	6.8-8.0	corrosion + scale
Electrical conductivity	[mS/m] at 25°C	<40	<30	corrosion + scale
Chloride ion	[mg Cl ⁻ /l]	<50	<50	corrosion
Sulfate ion	[mg SO ₄ ²⁻ /l]	<50	<50	corrosion
M-alkalinity (pH 4.8)	[mg CaCO ₃ /l]	<50	<50	scale
Total hardness	[mg CaCO ₃ /l]	<70	<70	scale
Calcium hardness	[mg CaCO ₃ /l]	<50	<50	scale
Silica ion	[mg SiO ₂ /l]	<30	<30	scale
Items to be referred to				
Iron	[mg Fe/l]	<1.0	<0.3	corrosion + scale
Copper	[mg Cu/l]	<1.0	<0.1	corrosion
Sulfide ion	[mg S ²⁻ /l]	not detectable	not detectable	corrosion
Ammonium ion	[mg NH ₄ ⁺ /l]	<1.0	<0.1	corrosion
Remaining chloride	[mg Cl/l]	<0.3	<0.3	corrosion
Free carbide	[mg CO ₂ /l]	<4.0	<4.0	corrosion
Stability index		—	—	corrosion + scale

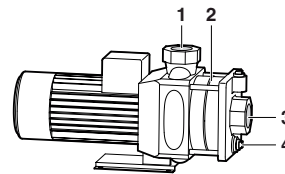


The chillers are only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.



If the water system is drained during some period, rinse out the pump chamber with demineralised water. This to prevent the impeller to be blocked by dried impurities.

To do this, use the drain tap of the pump. Fill and empty the pump a few times until the removed water is completely clear. Keep the connections closed to prevent corrosion and dirt entering the water system.



- 1 Water out
- 2 Impeller
- 3 Water in
- 4 Drain tap



Use of glycol is allowed, but the amount should not exceed 40% of the volume. A higher amount of glycol may cause damage to some hydraulic components.

Charging water

For all versions

- 1 Connect the water supply to the drain and fill valve
- 2 Open the pressure regulating valve (only for EUWAP and EUWAB) and shut-off valves
- 3 Use the air purge valves on the unit and purge valves installed in the highest places in the circuit to remove all air when filling the system

Only for EUWAP, EUWAB versions

Water must be filled until the system reaches the required pressure (Pr). The pressure can be read on the manometer.

The value of the required water pressure (Pr) is depending on the total water volume in the system and the pressure in the expansion vessel (see previous chapter).

Refer to figure 7 – Required water pressure in function of water volume and pre-pressure:

- A Water volume (l)
- B Installation height difference (m)
- C Pre-pressure
- D Factory setting (1.5 bar)

1. Calculate the total water volume in the entire system.
2. Check in figure 7 where the horizontal line of the set prepressure (Pg) cuts the vertical line of the system water volume.
3. At the cutting point, read the required water pressure (Pr) from the lines in the figure.


Example 1

Total system water volume=130 l

Highest point of circuit above the EUWA=5 m

$P_g=(5/10+0.3)=0.8$ bar

$P_r=\pm 2.0$ bar

NOTE  In this example it is allowed to keep the pre-pressure factory setting from 1.5 bar. In this case the initial water-pressure must be ± 2.2 bar


Example 2

Total system water volume=190 l

Highest point of circuit above the EUWA unit=5 m


$P_g=(5/10+0.3)=0.8$ bar

$P_r=\pm 1.7$ bar

NOTE  In this example it is not allowed to keep the pre-pressure factory setting from 1.5 bar.

PIPING INSULATION

The complete water circuit, inclusive all piping, must be insulated to prevent condensation and reduction of the cooling capacity.

NOTE  A terminal is foreseen in the switchbox on which a heater (tape) can be connected for preventing the water piping from freezing during the cold weather months. Refer to the wiring diagram supplied with the unit.

FIELD WIRING



All field wiring and components must be installed by a licensed electrician and must comply with relevant European and national regulations.

The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.

Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.

Parts table

Refer to the wiring diagram supplied with the unit.


Following parts are to be connected during installation:

N	Neutral
P.....	Main earth terminal
F1,F2,F3	Main fuses (field supply, obligatory)
H3P	Indication lamp alarm (field supply, not obligatory)
H5P,H6P.....	Indication lamp compr circuit 1, circuit 2 (field supply, not obligatory)
S7S	Switch for cool/heat selection or dual setpoint selection (field supply, not obligatory)
S9S	Switch for remote start/stop selection or dual setpoint selection (field supply, not obligatory)
E5H.....	Field heater (field supply, optional)
X2M (E5H)	Terminal for field heater connection (optional)
---	Field wiring

Power circuit and cable requirements

A power circuit must be provided for connection of the unit. This circuit must be protected with the required safety devices, i.e. a slow blow fuse on each phase and an earth leak detector. For maximum cable section (mm²) refer to the table.

Description	Legend	5-24 Hp
Powerlines	L1, L2, L3, N	10
Main earth cable	PE	10

NOTE  Select the power cable in accordance with relevant local and national regulations.



Switch off the main isolator switch before making any connections.



For units equipped with freeze protection:

Keep in mind that the heaters are automatically switched off when the main isolator switch is switched off. For this reason the main switch should be switched on during the cold weather months.

Connection of the power supply

- 1 Using the appropriate cable, connect the power circuit to the N, L1, L2 and L3 terminals of the main switch as shown on the wiring diagram.
- 2 Connect the earth conductor (yellow/green) to the earthing terminal PE.

Point for attention regarding quality of the public electric power supply

- This equipment complies with EN/IEC 61000-3-11⁽¹⁾ provided that the system impedance Z_{sys} is less than or equal to Z_{max} at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a system impedance Z_{sys} less than or equal to Z_{max} .

	Z_{max} (Ω)
EUWAN+P+B5	0.26
EUWAN+P+B8	0.22
EUWAN+P+B10	0.22
EUWAN+P+B12	0.21
EUWAN+P+B16	0.21
EUWAN+P+B20	0.21
EUWAN+P+B24	0.20

- Only for EUWAN+P+B8~24: Equipment complying with EN/IEC 61000-3-12⁽²⁾

OPERATING THE UNIT

BEFORE OPERATION

Checks before initial start-up



Make sure that the main switch of the unit is switched off.

After the installation of the unit, check the following before switching on the circuit breaker:

- 1 Field wiring
Make sure that the field wiring between the local supply panel and the unit has been carried out according to the instructions described in the the chapter "Field wiring" on page 8, according to the wiring diagrams and according to European and national regulations.
- 2 Fuses or protection devices
Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "Electrical specifications" on page 4. Make sure that neither a fuse nor a protection device has been bypassed.
- 3 Earth wiring
Make sure that the earth wires have been connected properly and that the earth terminals are tightened.
- 4 Internal wiring
Visually check the switch box on loose connections or damaged electrical components.
- 5 Fixation
Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.
- 6 Damaged equipment
Check the inside of the unit on damaged components or squeezed pipes.
- 7 Refrigerant leak
Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local Daikin dealer.

(1) European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 75 A.

(2) European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase.

- 8 Oil leak
Check the compressor on oil leakage. If there is an oil leak, call your local Daikin dealer.
- 9 Air inlet/outlet
Check that the air inlet and outlet of the unit is not obstructed by paper sheets, cardboard, or any other material.
- 10 Power supply voltage
Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- 11 Ball valve and filter kit
Make sure that the ball valve and filter kit are correctly installed.
- 12 Pressure regulating valve and shut-off valve
Check that the pressure regulating valve (only for EUWAP and EUWAB) and the shut-off valves are fully open.



Operating the system with closed valves will damage the pump.

Water supply

Fill the water piping, taking into account the minimum water volume required by the unit. Refer to the chapter "Water charge, flow and quality" on page 7.

Make sure that the water is of the quality as mentioned in the chapter "Water quality specifications" on page 7.

Purge the air at the high points of the system (automatic air purge inside the chiller) and check the operation of the circulation pump and the flow switch.

Power supply connection and crankcase heating



In order to avoid compressor damage, it is necessary to switch on the crankcase heater for **at least six hours** before starting the compressor after a long period of stand-still.

To switch on the crankcase heater proceed as follows:

- 1 Switch on the main switch of the unit. Make sure that the unit is "OFF".
- 2 The crankcase heater is switched on automatically.
- 3 Check the supply voltage on the supply terminals L1, L2, L3, (N) by means of a voltmeter. The voltage must correspond to the voltage indicated on the identification label of the unit.
If the voltmeter reads values which are not within the ranges specified in the technical data, check the field wiring and replace the supply cables if necessary.
- 4 Check the service leds H1P and H2P on the I/O PCB (A2P).
If the H1P led is off and the H2P is on, then the phase order is not correct. Switch off the main switch and call a licensed electrician to connect the wires of the power supply cable in the correct phase order.

After six hours, the unit is ready for operation.

Pump start up (only for EUWAP and EUWAB)

- 1 Turn the pump switch to manual. The pump must run now.
- 2 Set the desired flow by turning the pressure regulating valve.

NOTE



- The desired flow is depending on the capacity of the chiller and the desired temperature difference between water inlet and outlet (Δt).
- If manometers are installed, the flow can be deduced from the pressure difference over the pump.
For pump and resistance characteristics, refer to paragraph "Figures pressure characteristics" on page 10.

- 3 Put the switch to auto. The pump will stop.
- 4 Switch the chiller on. The pump will be started by the chiller.
Detailed instructions for switching the unit on and operating the unit, can be found in the chapter "Working with the units" on page 11.
- 5 Check if the Δt of the chiller is within expectations. If necessary, regulate the flow by using the pressure regulating valve.

Figures pressure characteristics

- Pump characteristics (See figure 4)

- | | |
|----------------------|-------------------------------------|
| 1 pump 5, 8 Hp | 4 pump 5, 8, 10 Hp (optional) |
| 2 pump 10, 12 Hp | 5 pump 12, 16, 20, 24 Hp (optional) |
| 3 pump 16, 20, 24 Hp | |

- External static pressure (See figure 5)

- | | |
|--------------------|--------------------|
| 1 EUWAP5, EUWAB5 | 5 EUWAP16, EUWAB16 |
| 2 EUWAP8, EUWAB8 | 6 EUWAP20, EUWAB20 |
| 3 EUWAP10, EUWAB10 | 7 EUWAP24, EUWAB24 |
| 4 EUWAP12, EUWAB12 | |

- Pressure drop curves evaporators (See figure 6)

- | | |
|-------------|-------------|
| 1 EUWA(*)5 | 5 EUWA(*)16 |
| 2 EUWA(*)8 | 6 EUWA(*)20 |
| 3 EUWA(*)10 | 7 EUWA(*)24 |
| 4 EUWA(*)12 | |

OPERATION

The units are equipped with a digital controller offering a user-friendly way to set up, use and maintain the unit.

This part of the manual has a task-oriented, modular structure. Apart from the first section, which gives a brief description of the controller itself, each section or subsection deals with a specific task you can perform with the unit.

Digital controller

User interface

The digital controller consists of a numeric display, four labelled keys which you can press and LEDs providing extra user information.



Figure - Digital controller

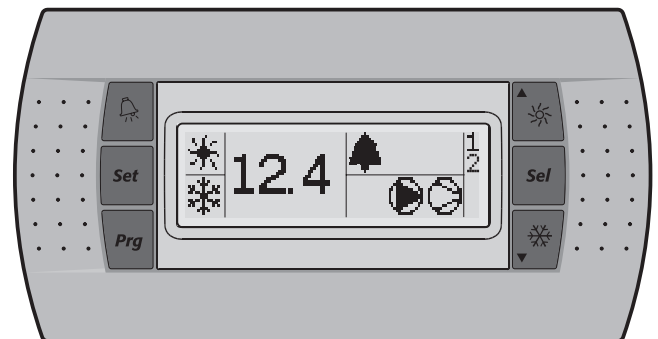


Figure - Remote user interface (optional kit)

Keys provided on the controller:

The function carried out when the user presses one or a combination of these keys depends on the status of the controller and the unit at that specific moment.

Keys digital controller	Keys remote interface	Main display	Sensor readout menu	Parameter selection menu	Parameter setting menu
	■	—	Press once: Return	Press once: Return	Press once: Cancel and return
	■	Press for 5 seconds: To be able to access DIRECT parameters	—	Press once: Select parameter group or parameter	Press once: Confirm and return
+	■	Press for 5 seconds: + OR Press once: ■ To be able to access USER parameters (after entering USER password)	—	—	—
		Press for 5 seconds: Has no effect on these units. Press once: Direct access to readout menu sensor (b0 1/b02/b03)	Press once: Select previous sensor parameter	Press once: Select previous parameter group or parameter	Press once: Increase value
		Press for 5 seconds: Switch unit on/off in cooling mode Press once: Direct access to readout menu sensor (b0 1/b02/b03)	Press once: Select next sensor parameter	Press once: Select next parameter group or parameter	Press once: Decrease value
+	■	Press for 5 seconds: Manually alarm reset in the event of alarm	—	—	—

LEDs provided on the controller and remote interface:

Function during main display (not inside menu)

Leds digital controller	Remote interface	Main display
■	Led (green)	
*	Led (amber)	
❄	Led (amber)	
🚨	Led (red)	
🌀	Led (amber)	
⊖	Led (amber)	
1	Led (amber)	
2	Led (amber)	

When selecting a parameter group or parameter, different LEDs related to the parameter group or parameter are displayed.

Example: The LEDs * and ❄ are displayed when accessing a parameter group or when accessing parameters directly.

NOTE Temperature readout tolerance: ±1°C.
 Legibility of the numeric display may decrease in direct sunlight.

Direct and user parameters

The digital controller provides direct and user parameters. The direct parameters are important for the everyday usage of the unit, e.g. to adjust the temperature setpoint or to consult actual operational information. The user parameters on the contrary provide advanced features such as adjusting time delays.

Each parameter is defined by a code and a value. For example: the parameter used to select local or remote on/off control has code H07 and value 1 or 0.

For an overview of the parameters, refer to "Overview of the direct and user parameters" on page 14.

Working with the units

This chapter deals with the everyday usage of the units. Here, you will learn how to perform routine tasks, such as:

- "Switching the unit on" on page 12 and "Switching the unit off" on page 12,
- "Adjusting the cooling temperature setpoint" on page 12,
- "Consulting actual operational information" on page 13,
- "Resetting alarms" on page 13,
- "Resetting warnings" on page 13.

Switching the unit on

To switch the unit on in cooling mode, proceed as follows:

- 1 Press the key for approximately 5 seconds, the LED will be displayed.

Then an initialization cycle is started, the LED, the LED, the 1 LED and the 2 LED will light up depending on the programmed thermostat function.

In case the 1 LED or the 2 LED is flashing, it indicates that there is a compressor 1 or 2 startup request. The compressor will start after the timer has reached zero.

NOTE If remote on/off control is enabled, refer to "Selecting local or remote on/off control" on page 16.

- 2 When the unit is started up for the first time, or when the unit has been out of operation for a longer period, it is recommended to go through the following checklist.

Abnormal noise and vibrations

Make sure the unit does not produce any abnormal noises or vibrations: check the fixations and piping. If the compressor makes any abnormal noises, this may also be caused by an overcharge of refrigerant.

Working pressure

It is important to check the high and low pressure of the refrigerant circuit to ensure the proper operation of the unit and to guarantee that the rated output will be obtained.



The pressures measured will vary between a maximum and minimum value, depending on the water and outdoor temperatures (at the moment of measurement).

Cooling mode	Minimum	Nominal	Maximum
	-5°C (LW 4°C)	35°C (LW 7°C)	38°C (LW 20°C)
Low pressure	3 bar	4 bar	6.5 bar
High pressure	7 bar	21 bar	24 bar



outdoor temperature
leaving water temperature

- 3 If the unit does not start after a few minutes, consult the actual operational information available in the list of direct parameters. Also refer to the chapter "Troubleshooting" on page 18.

NOTE In case of remote on/off control ($HO 7=1$), it is recommended to install an on/off switch near the unit in series with the remote switch. The unit can then be switched off from either place.

Switching the unit off

To switch the unit off and cooling mode is active, proceed as follows:

- 1 Press the key for approximately 5 seconds, the LED will be extinguished.

NOTE If remote on/off control is enabled, refer to "Selecting local or remote on/off control" on page 16.

How to consult and modify the direct parameters

For an overview of the menu structure, refer to "Menu overview" on page 21.

- 1 Press for 5 seconds in the main display. The r parameter group is displayed.
- 2 Press the or key to select the required parameter group.
- 3 Press the key to enter the selected parameter group.
- 4 Press the or key to select the required parameter.
- 5 Press the key to consult the selected parameter.
- 6 Press the or key to raise, respectively lower the setting of the selected parameter. (Only valid for read/write parameters.)
- 7 Press the key to confirm the modified setting.
OR
Press the key to cancel the modified setting.
- 8 Press the key to return to the parameter group.
- 9 Press 2 times the key to return to the main display.

If during the procedure no buttons are pressed for 30 seconds, the displayed parameter code or value will start flashing. After another 30 seconds without pressing any buttons, the controller automatically returns to the main display without saving any modified parameter.

How to consult the "sensor readout menu" parameters

For an overview of the menu structure, refer to "Menu overview" on page 21.

The $b0$ / $b02$ / $b03$ parameters are part of the "sensor readout menu".

- 1 Press the or key in the main display. The $b0$ parameter is displayed. In case no buttons are pressed, the value of the $b0$ sensor will be displayed until or is pressed again to select another parameter ($b02$ or $b03$).
- 2 Press the key to return to the main display.

If during the procedure no buttons are pressed for 30 seconds, the displayed parameter code or value will start flashing. After another 30 seconds without pressing any buttons, the controller automatically returns to the main display.

Adjusting the cooling temperature setpoint

- 1 Modify the r cooling setpoint parameter.

This is a direct parameter, refer to "How to consult and modify the direct parameters" on page 12.

NOTE When dual setpoint is enabled (refer to "Selecting dual setpoint control" on page 16).

Consulting actual operational information

The actual operational information that can be consulted in the list of direct parameters consists of:

- *b01*: Evaporator inlet water temperature,
- *b02*: Evaporator outlet water temperature,
- *b03*: Not used,
- *c10*: Total running hours of the compressor 1,
- *c11*: Total running hours of the compressor 2,
- *c15*: Total running hours of the pump.

NOTE




- The parameters *b01*, *b02* and *b03* can also be consulted by the "sensor readout menu". Refer to "How to consult the "sensor readout menu" parameters" on page 12.
- To reset the timers of parameters *c10*, *c11* and *c15* refer to "Resetting warnings" on page 13.

These are direct parameters, refer to "How to consult and modify the direct parameters" on page 12.

Resetting alarms

When an alarm is detected, the following happens:

- the alarm relay is energized,
- the  LED is displayed
- the display starts flashing, alternately showing the alarm code and the inlet water temperature.

The following alarm codes may appear on the screen:

- *R1*: indicates an anti-freeze alarm.
- *E1*: indicates that the NTC probe used to measure the evaporator inlet water temperature is defective.
- *E2*: indicates that the NTC probe used to measure the evaporator outlet water temperature is defective.
- *E3*: indicates that the fuse for the evaporator heatertape (F4) is blown or that there is a reverse phase error or that there is a problem with the I/O PCB (A2P).



In case the unit is equipped with freeze protection, it is highly recommended to install the remote indicator lamp alarm (H3P) (see wiring diagram supplied with the unit). By doing so, breakdown of the fuse for the evaporator heatertape (F4) will be detected sooner and freezing of the circuit will be avoided during cold weather.

- *EHS*: indicates that the supply voltage is exceedingly high. In this case contact a licensed electrician.
- *EL1*: indicates that there is a power supply error (example: noise). In this case contact a licensed electrician.
- *EL2*: indicates that there is a power supply error (example: noise). In this case contact a licensed electrician.
- *ELS*: indicates that the supply voltage is exceedingly low. In this case contact a licensed electrician.
- *EPb*: indicates that the EEPROM on the controller PCB inside the unit is defective.
- *EPc*: indicates that the EEPROM on the controller PCB inside the unit is defective.
- *FL*: indicates that there was no sufficient water flow either during the period of 15 seconds after the pump was started or for 5 seconds while the compressor is active or that the overcurrent protection of the pump is activated.
- *HP1*: indicates that a high pressure switch, the discharge thermal protection or the overcurrent protection of the compressor motor is activated or that the NTC probe used to measure the ambient temperature is defective.
- *FL + HP1*: indicates that there is most likely an RPP error or that the F4 fuse is blown.





- *LP1*: indicates that the low pressure switch is activated.
- *LER*: indicates that there is a remote user interface communication error.
- **Offline**: communication failure between the digital controller of the unit and the remote user interface. Confirm the correct selection of parameter code *H23*. This should be default setting 0 and confirm the correction installation according to the installation manual of the remote user interface EKRUMCA.

NOTE



If the alarm codes *FL* and *H1* are flashing alternately, the alarm is most probably caused by the reverse phase protector or by the fuse for evaporator heatertape (F4) that was blown.

To reset an alarm, proceed as follows:




- 1 Find the cause of shutdown and correct.
Refer to the chapter "Troubleshooting" on page 18.
- 2 If the alarm codes *R1*, *FL*, *HP1* or *LP1* appear on the display, reset the alarm manually by pressing the *clear* combination keys   and  simultaneously for approximately 5 seconds.
In all other cases the alarm is reset automatically.
Once the alarm is reset, the error code and the  LED no longer appears on the display. The controller continues its normal operation, displaying the inlet water temperature.

Resetting warnings

During normal operation, the display of the controller may start flashing, alternately showing the inlet water temperature and the following warning code:

- *Hc1*: indicates that the compressor 1 requires maintenance: the total running hours of the compressor 1 (direct parameter *c10*) has exceeded the setting of the timer threshold for maintenance warning (user parameter *c14*).
- *Hc2*: indicates that the compressor 2 requires maintenance: the total running hours of the compressor 2 (direct parameter *c11*) has exceeded the setting of the timer threshold for maintenance warning (user parameter *c14*).

To reset the maintenance warning *Hc1* or *Hc2*, proceed as follows:

- 1 Consult *c10* running hours of compressor 1 or *c11* running hours of compressor 2.
These are direct parameters, refer to "How to consult and modify the direct parameters" on page 12.
- 2 When *c10* or *c11* parameter value is displayed, press the   and  key simultaneously for 5 seconds. The value of the timer becomes 0 and the warning is reset.

NOTE




Do not forget to carry out the required maintenance activities after resetting the timers.

Besides resetting timer *c10* and *c11*, it is also possible to reset timer *c15* (running hours of pump) in the same way.

Advanced features of the digital controller

This chapter gives an overview of the direct parameters and user parameters provided by the controller. In the following chapter, you will learn how you can set up and configure the unit using these parameters.

Overview of the direct and user parameters

The list of direct parameters is accessible by pressing the  key for approximately 5 seconds. Refer also to "How to consult and modify the direct parameters" on page 12.

Parameter group	Parameter code	Description	Default value	Min	Max	Units	Read/Write	User/Direct	Modbus Address	Parameter type ^(*)
-r-	r23	Measurement unit $\bar{0}$ =°C $\bar{1}$ =°F	0	0	1		R/W	U	5	D
-R-	No user or direct parameters accessible									
-b-	b01	Evaporator inlet water temperature				0.1°C	R	D	102	A
	b02	Evaporator outlet water temperature				0.1°C	R	D	103	A
	b03	Not used				0.1°C	R	D	104	A
-c-	c07	Time delay between pump startup and compressor startup	15	0	999	1 sec	R/W	U	238	I
	c08	Time threshold between the unit shutdown and the pump shutdown	0	0	150	1 min	R/W	U	239	I
	c10	Total running hours of compressor 1				x100 hours	R	D	122	A
	c11	Total running hours of compressor 2				x100 hours	R	D	123	A
	c14	Maintenance threshold for maintenance warning (c10 and c11)	0	0	100	x100 hours	R/W	U	241	I
	c15	Total running hours of pump				x100 hours	R	D	126	A
-d-	No user or direct parameters accessible									
-F-	No user or direct parameters accessible									
-H-	H07	To activate remote on/off control $\bar{0}$ =not active $\bar{1}$ =active (only in case P34=23)	0	0	1		R/W	U	15	D
	H09	To lock the controller keyboard $\bar{0}$ =lock $\bar{1}$ =unlock	1	0	1		R/W	U	16	D
	H10	Serial address for BMS connection	1	1	200		R/W	U	256	I
	H23	To select address card connection $\bar{0}$ =remote user interface connection $\bar{1}$ =MODBUS connection	0	0	1		R/W	U	11	D
-P-	P09	Changeable digital input selection S7S $\bar{0}$ =no function $\bar{1}$ =remote dual setpoint DO NOT SELECT OTHER VALUES	9	0	27		R/W	U	277	I
	P34	Changeable digital input selection S9S $\bar{0}$ =no function $\bar{1}$ =remote dual setpoint $\bar{2}$ =remote on/off (only active in combination with H07) DO NOT SELECT OTHER VALUES	23	0	27		R/W	U	329	I
-r-	r01	Cooling setpoint	12.0	7.0 ^(†)	25.0	0.1°C	R/W	D	41	A
	r02	Cooling difference	3.0	0.3	19.9	0.1°C	R/W	D	42	A
	r21	Cooling setpoint 2 ^(‡)	12.0	7.0 ^(†)	25.0	0.1°C	R/W	D	55	A
-t-	No user or direct parameters accessible									
F-r	H99	Software release version					R	D	208	I

(*) D=digital, A=analog, I=integer.

(†) -2.0 and -7.0 only applicable for units with glycol applications.

(‡) Used in case dual setpoint is enabled in P09 or P34 and dual setpoint digital input is closed.

How to consult and modify the user parameters

NOTE When user parameters are consulted, the direct parameters are displayed as well.

For an overview of the menu structure, refer "[Menu overview](#)" on page 21.

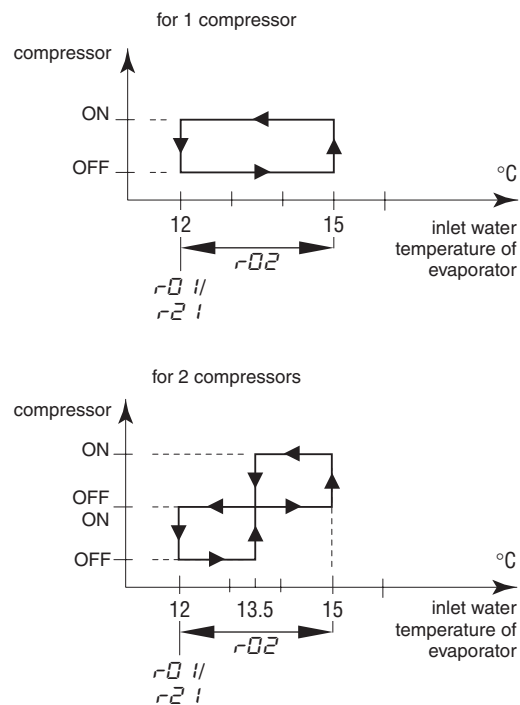
- 1 In case of digital controller, press the **Prg/men** and **Sel/** keys for approximately 5 seconds until 0.0.0 is displayed. In case of remote user interface, push **■** once.
- 2 Enter the correct password by using the **▲** and **▼** keys. The password's value is 22.
- 3 Press the **Sel/** key to confirm the password and to enter the menu, S-P is displayed.
- 4 Press the **Sel/** key to consult the parameter settings (=S-P). (L-P means consulting the parameter level, but this function is not used). The -r- parameter group is displayed.
- 5 Press the **▲** or **▼** key to select the required parameter group.
- 6 Press the **Sel/** key to enter the selected parameter group.
- 7 Press the **▲** or **▼** key to select the required parameter.
- 8 Press the **Sel/** key to consult the selected parameter.
- 9 Press the **▲** or **▼** key to increase, respectively decrease the setting. (Only valid for read/write parameters.)
- 10 Press the **Sel/** key to confirm the modified setting.
OR
Press the **Prg/men** key to cancel the modified setting.
- 11 Press the **Prg/men** key to return to the parameter group.
- 12 Press 2 times the **Prg/men** key to return to the main display.

If during the procedure no buttons are pressed for 30 seconds, the displayed parameter code or value will start flashing. After another 30 seconds without pressing any buttons, the controller automatically returns to the main display without saving any modified parameter.

Defining the cooling temperature differential

Modify the r02 cooling differential parameter.

This is a direct parameter, refer to "[How to consult and modify the direct parameters](#)" on page 12.



Tasks carried out using user parameters

Defining the measurement unit

Depending on the setting of user parameter r23 (measurement unit), all temperature values are displayed in °C (=0) or in °F (=1).

This is a user parameter, refer to "[How to consult and modify the user parameters](#)" on page 15.

Defining the time delay between pump and compressor startup

User parameter c07 allows you to define the time delay between the pump startup and the compressor startup.

This is a user parameter, refer to "[How to consult and modify the user parameters](#)" on page 15.

Defining the time delay between unit and pump shutdown

User parameter c08 allows you to define the time delay between the unit shutdown and the pump shutdown, more specifically the period during which the pump will still be active after the unit has been shut down.

This is a user parameter, refer to "[How to consult and modify the user parameters](#)" on page 15.

Defining the timer threshold for maintenance warning

User parameter c14 allows you to define a timer threshold (running hours of the compressor) after which the controller will generate a maintenance warning or request.

This is a user parameter, refer to "[How to consult and modify the user parameters](#)" on page 15.

Selecting local or remote on/off control

User parameter $H07$ in combination with the remote on/off switch (installed by the customer) allows the user to switch the unit on without using the ⏏ or ⏏ key on the controller.

- When user parameter $H07$ is set to 0 (=not active), the unit can only be switched on by means of the ⏏ and ⏏ key on the controller.
- When user parameter $H07$ is set to 1 (=active), the unit can be switched on or off as follows:
 - When remote on/off switch is opened, then the unit is switched off and it is not possible to switch the unit on/off while pressing the ⏏ or ⏏ key on the controller (5 sec).
 - When remote on/off switch is closed, then the unit is switched on and it is possible to switch the unit on/off while pressing the ⏏ or ⏏ key on the controller (5 sec).

This is a user parameter, refer to "How to consult and modify the user parameters" on page 15.

NOTE



- This is only in case $P34$ (changeable digital input selection S9S) has value 23 (default value).
- In case dual setpoint function is selected for this function ($P34=13$) then the remote on/off control is not activated.

Selecting dual setpoint control

User parameters $P09$ (changeable digital selection S7S) and $P34$ (changeable digital selection S9S) can be used to assign the dual setpoint control to S7S or S9S.

There are 2 different controls available for 2 different change digital inputs (S7S and S9S):

- $P09$: changeable digital input selection S7S
 - 0=no function
 - 13=remote dual setpoint
- $P34$: changeable digital input selection S9S
 - 0=no function
 - 13=remote dual setpoint
 - 23=remote on/off

When dual setpoint switch is open, the first setpoint is activated ($r0$ / cooling setpoint).

When dual setpoint switch is closed, the second setpoint is activated ($r2$ / cooling setpoint 2).

This is a user parameter, refer to "How to consult and modify the user parameters" on page 15.

Locking the controller keyboard

Once user parameter $H09$ is set to 0 , the following advanced features can no longer be carried out by means of the controller:

- modifying direct and user parameters (parameters can be displayed but not modified),
- resetting the timers.
- switching the unit on/off in cooling or heating

When user parameter $H09$ is set to 1 , the above-described advanced features can be carried out using the controller.

To modify user parameter $H09$ value from 1 to 0 , the standard user parameter modification procedure can be used with the standard password "22". Refer to "How to consult and modify the user parameters" on page 15.

To modify user parameter $H09$ value from 0 to 1 , the user parameter modification procedure can be used with dedicated password "11". Refer to "How to consult and modify the user parameters" on page 15.

BMS CONNECTION MODBUS

By installing the optional kit address card EKAC10C, you will be able to communicate with your chiller through a Building Management System or supervisory system via the Modbus protocol.

General description of Modbus

The address card communicates using the Modbus protocol.

Different parts of the communication network

- The communication network consists of two major players:
 - The Building Management System (BMS) or supervisory system.
 - The chiller or multiple chillers.
- The BMS or other supervisory system is able to communicate with the chillers through the address card. The management of the communication occurs in accordance with a master-slave structure in polling, where the supervising BMS is the master and the address cards are the slaves.
- The chiller unit can be identified by the supervisor through the assignment of an address within the Modbus network. The address of the chiller unit can be programmed during the configuration of the BMS settings.
- The variables database of every chiller with installed address card is the point of reference for the supplier of the supervisory system in Modbus to assign a suitable meaning to the variables. The variables can be read and/or written by the supervisory system. Whether the variables are read-only or read/write depends on the connected chiller and/or the application program being used.
 - If the supervisory system assigns a value to a variable with read-only status, the command will not be executed at all.
 - Variables requested by the supervisory system that are not available in a chiller with an address card are sent from the address card to the supervisory system with zero value. The supervisory system will have to manage these properly.
 - In case the supervisory system tries to write a value of a parameter that is out of range, the writing will be ignored.

General information about the Modbus protocol

The Modicon Modbus protocol implemented in the address card complies with the content of the following document:

Modicon Modbus Protocol
Reference Guide
June 1996, PI-MBUS-300 Rev. J

The Modbus protocol implemented is of the RTU (Remote Terminal Unit) type based on character transmission times. The configuration uses the multi-drop feature of RS485. The address sent within the Modbus packet addresses the chiller unit.

Implemented RS485 communication settings for the Modbus protocol

The RS485 communication settings are implemented as follows:

- Baud-rate: 9600
- Stop bit: 2
- Parity: none

Implemented commands for the Modbus protocol

The implemented commands in the program are as listed:

Modbus command	Meaning	Notes
01 read coil status	Read digital variable(s)	obtains current status (ON/OFF) of a group of logic coils or discrete input
02 read input status	Read digital variable(s)	obtains current status (ON/OFF) of a group of logic coils or discrete input
03 read holding registers	Read analogue variable(s)	obtains current binary value in one or more holding registers
04 read input registers	Read analogue variable(s)	obtains current binary value in one or more holding registers
05 force single coil	Write individual digital variable(s)	forces single coil to ON or OFF status
06 preset single register	Write individual analogue variable(s)	places a specific binary value into a holding register
15 force multiple coils	Write series of digital variables	forces a series of consecutive logic coils to be defined to ON or OFF status
16 preset multiple registers	Write series of analogue variables	places specific binary values into a series of consecutive holding registers

Note that:

- Due to the variety of chillers with installed address cards, no distinction is made between input variables (with read-only status) and output variables (with read/write status) so that the knowledge of the database and its management depends on the part present on the supervisory system.
- Due to the general nature of the system, the address card answers in the same way to various Modbus commands.

Data representation of the Modbus protocol

- Digital
All digital data is coded by a single bit:
 - "0" for OFF
 - "1" for ON.All digital variables are assigned to bits of consecutive registers, each one having:
 - the lower-address variable assigned to the less significant bit
 - the higher-address variable assigned to the most significant bit.
- Analogue and integer data
An analogue and integer value is represented by a 16-bit WORD register in binary notation. For each register, the first byte contains the high order bits and the second byte contains the low order bits.
 - The analogue variables are represented in tenths:
for example, the value 10.0 is transmitted as 0064h=100d
for example, the value -10.0 is transmitted as FF9Ch=-100d
 - The integer variables are transferred using the effective value:
for example, the value 100 is transmitted as 0064h=100d

The address card operates on registers where one register must be considered at 16-bit.

In case the BMS or supervisory system tries to write a value of a parameter that is out of range, the writing will be ignored.

Implemented error code

Code	Modbus interpretation	Condition
1	Illegal function	Message is not supported or the number of variables required is greater than the allowed limit (length ≤20)

Defining the BMS setting

Activating the Modbus protocol

The Modbus protocol is activated by setting the *H23* parameter to *1*.

This is a user parameter, refer to "How to consult and modify the user parameters" on page 15.

Defining the unit's serial address

To define each unit's unique serial address required for communication with the supervisory system, set parameter *H10*.

This is a user parameter, refer to "How to consult and modify the user parameters" on page 15.

Variables database

The BMS or supervisory system and the chiller unit communicate through a fixed set of variables, also called address numbers. Hereafter, you will find the information you need about the digital, integer and analogue variables that the BMS or supervisory system can read from or write to the address card of the chiller.

For addresses of all the direct and user parameters refer to "[Overview of the direct and user parameters](#)" on page 14.

Overview of all variables which are not direct or user parameters

Description		Modbus address	Parameter type(*)
Circuit alarm	1=A1, HP1, or LP1 alarm codes active 0=no alarm code active	Read only 41	D
General alarm	1=FL alarm code 0=no alarm code active	Read only 45	D
NTC Probe alarm	1=E1, E2, or E3 alarm codes 0=no alarm code active	Read only 46	D
Input of flowswitch alarm	1=closed 0=open	Read only 53	D
Input of changeable digital S7S input	1=closed 0=open	Read only 54	D
Input of high pressure or discharge protector or overcurrent alarm	1=closed 0=open	Read only 55	D
Input of low pressure switch alarm	1=closed 0=open	Read only 56	D
Input of changeable digital S9S input	1=closed 0=open	Read only 57	D
Output of compressor 1	1=on 0=off	Read only 59	D
Output of compressor 2	1=on 0=off	Read only 60	D
Output of pump	1=on 0=off	Read only 61	D
Output of reversing valve	1=on 0=off	Read only 62	D
Output of alarm	1=on 0=off	Read only 63	D
On or off	1=on 0=off	Read/write 64	D

(*) D=digital.

TROUBLESHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.

Before starting the trouble shooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

Before contacting your local Daikin dealer, read this chapter carefully, it will save you time and money.



When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances safety devices may be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local Daikin dealer.

Symptom 1: The unit does not start, but the LED lights up

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the controller setpoint.
Power supply failure.	Check the voltage on the supply panel.
Blown fuse or interrupted protection device.	Inspect fuses and protection devices. Replace by fuses of the same size and type (refer to chapter " Electrical specifications " on page 4).
Loose connections.	Inspect connections of the field wiring and the internal wiring of the unit. Tighten all loose connections.
Shorted or broken wires.	Test circuits using a tester and repair if necessary.

Symptom 2: The unit does not start, but the LED is flashing

POSSIBLE CAUSES	CORRECTIVE ACTION
The remote ON/OFF input is enabled and the remote switch is off.	Put the remote switch on or disable the remote ON/OFF input.
The anti-recycling timer is still active.	The circuit can only start up after approximately 4 minutes.
The guard timer is still active.	The circuit can only start up after approximately 1 minute.

Symptom 3: The unit does not start and the LED does not light up

POSSIBLE CAUSES	CORRECTIVE ACTION
One of the following safety devices is activated: <ul style="list-style-type: none"> Reverse phase protector Overcurrent relay (K*S) Discharge thermal protector (Q*D) Evaporating temperature Thermostat (S*T) Flow switch (S10L) High pressure switch (S*HP) 	Check on the controller and refer to symptom 4 " One of the following safety devices is activated " on page 19. Refer to the explanation of the digital controller in the chapter " Resetting alarms " on page 13.
The unit is in anti-freeze alarm.	Check on the controller and refer to symptom 4 " One of the following safety devices is activated " on page 19. Refer to the explanation of the digital controller in the chapter " Resetting alarms " on page 13.
The remote ON/OFF input is enabled and the remote switch is off.	Put the remote switch on or disable the remote ON/OFF input.
The keyboard is locked. The user parameter $H\bar{Q}Q$ is set to \bar{Q} .	Unlock the controller keyboard.

Symptom 4: One of the following safety devices is activated

Symptom 4.1: Overcurrent relay of compressor	
POSSIBLE CAUSES	CORRECTIVE ACTION
Failure of one of the phases.	Check fuses on the supply panel or measure the supply voltage.
Voltage too low.	Measure the supply voltage.
Overload of motor.	Reset. If the failure persists, call your local Daikin dealer.
RESET	<i>Push the red button on the over-current relay inside the switch box. The controller still needs to be reset.</i>
Symptom 4.2: Low pressure switch	
POSSIBLE CAUSES	CORRECTIVE ACTION
Water flow to water heat exchanger too low.	Increase the water flow.
Shortage of refrigerant.	Check for leaks and refill refrigerant, if necessary.
Unit is working out of its operation range.	Check the operation conditions of the unit.
Inlet temperature to the water heat exchanger is too low.	Increase the inlet water temperature.
Flow switch is not working or no water flow.	Check the flow switch and the water pump.
RESET	<i>After pressure rise, the low pressure switch resets automatically, but the controller still needs to be reset.</i>
Symptom 4.3: High-pressure switch	
POSSIBLE CAUSES	CORRECTIVE ACTION
Condenser fan does not operate properly.	Check that the fans turn freely. Clean if necessary.
Dirty or partially blocked condenser.	Remove any obstacle and clean condenser coil using brush and blower.
Inlet air temperature of the condenser is too high.	The air temperature measured at the inlet of the condenser may not exceed 43°C.
RESET	<i>After pressure decrease, the high pressure switch resets automatically, but the controller still needs to be reset.</i>
Symptom 4.4: Fan thermal protector is activated	
POSSIBLE CAUSES	CORRECTIVE ACTION
Mechanical failure (fan is blocked).	Check that the fan rotates freely.
Air flow in the unit too low or outdoor temperature too high.	Clean the air heat exchanger properly.
RESET	<i>After temperature decrease, the thermal protector is reset automatically.</i> <i>If the protector is activated frequently, replace the motor or call your local Daikin dealer.</i>
Symptom 4.5: Reverse phase protector is activated	
POSSIBLE CAUSES	CORRECTIVE ACTION
Two phases of the power supply are connected in the wrong phase position.	Invert two phases of the power supply (by licensed electrician).
One phase is not connected properly.	Check the connection of all phases.
RESET	<i>After inverting two phases or fixing the power supply cables properly, the protector is reset automatically, but the controller still needs to be reset.</i>
Symptom 4.6: Discharge thermal protector is activated	
POSSIBLE CAUSES	CORRECTIVE ACTION
Unit is working outside the operation range.	Check the operation condition of the unit.
RESET	<i>After temperature decrease, the thermal protector resets automatically but the controller still needs to be reset.</i>

Symptom 4.7: Flow switch is activated	
POSSIBLE CAUSES	CORRECTIVE ACTION
Water flow too low.	Check the water pump.
RESET	<i>After finding the cause, the flow switch is reset automatically, but the controller still needs to be reset.</i>

Symptom 5: Unit stops soon after operation

POSSIBLE CAUSES	CORRECTIVE ACTION
One of the safety devices is activated.	Check safety devices (refer to "One of the following safety devices is activated" on page 19).
Voltage is too low.	Test the voltage in the supply panel and, if necessary, in the electrical compartment of the unit (voltage drop due to supply cables is too high).

Symptom 6: Unit runs continuously and the water temperature remains higher, respectively lower than the temperature set on the controller

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting on the controller is too low.	Check and adjust the temperature setting.
The heat production in the water circuit is too high.	The cooling capacity of the unit is too low. Call your local Daikin dealer.
Water flow is too high.	Recalculate the water flow.

Symptom 7: Excessive noises and vibrations of the unit

POSSIBLE CAUSES	CORRECTIVE ACTION
Unit has not been fixed properly.	Fix the unit as described in the installation manual.

Symptom 8: Water flow is too low

POSSIBLE CAUSES	CORRECTIVE ACTION
Shut-off valve is not completely open.	Open the shut-off valve completely.
There is air in the system.	Purge the air.
The filter is not clean.	Clean the filter.
There is an obstruction in the circuit.	Remove the obstruction.
Pressure regulating valve is not enough open.	Open more.
The chosen pump has not enough capacity.	Check Δp over pump. Install heavier pump.

Symptom 9: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
Shut-off valve is not completely open.	Open completely.
There is air in the system.	Purge air.
The filter is not clean.	Clean filter.
Pre-pressure and required water pressure are not according to installation instructions or expansion vessel is broken.	Recalculate the values as described in chapter "Setting the pre-pressure of the expansion vessel" on page 7 and "Charging water" on page 8.

MAINTENANCE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

If the unit is used for air conditioning application, the described checks must be executed at least once a year. In case the unit is used for other applications, the checks must be executed every 4 months.



Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses or open the protection devices of the unit.

Do never clean the unit with water under pressure.

Important information regarding the refrigerant used

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol.

Refrigerant type: R407C

GWP⁽¹⁾ value: 1652.5

⁽¹⁾ GWP = global warming potential

Periodical inspections for refrigerant leaks may be required depending on European or local legislation. Please contact your local dealer for more information.

Maintenance activities



The wiring and power supply must be checked by a licensed electrician.

1 Air heat exchanger

Remove dust and any other contaminant from the coil fins using a brush and a blower. Blow from the inside of the unit. Take care not to bend or damage the fins.

2 Field wiring and power supply

- Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage marked on the identification label of the unit.
- Check the connections and make sure they are properly fixed.
- Check the proper operation of the circuit breaker and the earth leak detector provided on the local supply panel.

3 Internal wiring of the unit

Visually check the switch box on loose connections (terminals and components). Make sure that the electrical components are not damaged or loose.

4 Earth connection

Make sure that the earth wires are still connected properly and that the earth terminals are tightened.

5 Refrigerant circuit

- Check for leaks inside the unit. In case a leak is detected, call your local Daikin dealer.
- Check the working pressure of the unit. Refer to paragraph "Switching the unit on" on page 12.

6 Compressor

- Check on oil leaks. If there is an oil leak, call your local Daikin dealer.
- Check for abnormal noises and vibrations. If the compressor is damaged, call your local Daikin dealer.

7 Fan motor

- Clean the cooling ribs of the motor.
- Check on abnormal noises. If the fan or motor are damaged, call your local Daikin dealer.

8 Water supply

- Check if the water connection is still well fixed.
- Check the water quality (refer to the installation manual of the unit for specifications of the water quality).

9 Flowswitch

Make sure that there is no dirt accumulated on the paddle of the flowswitch

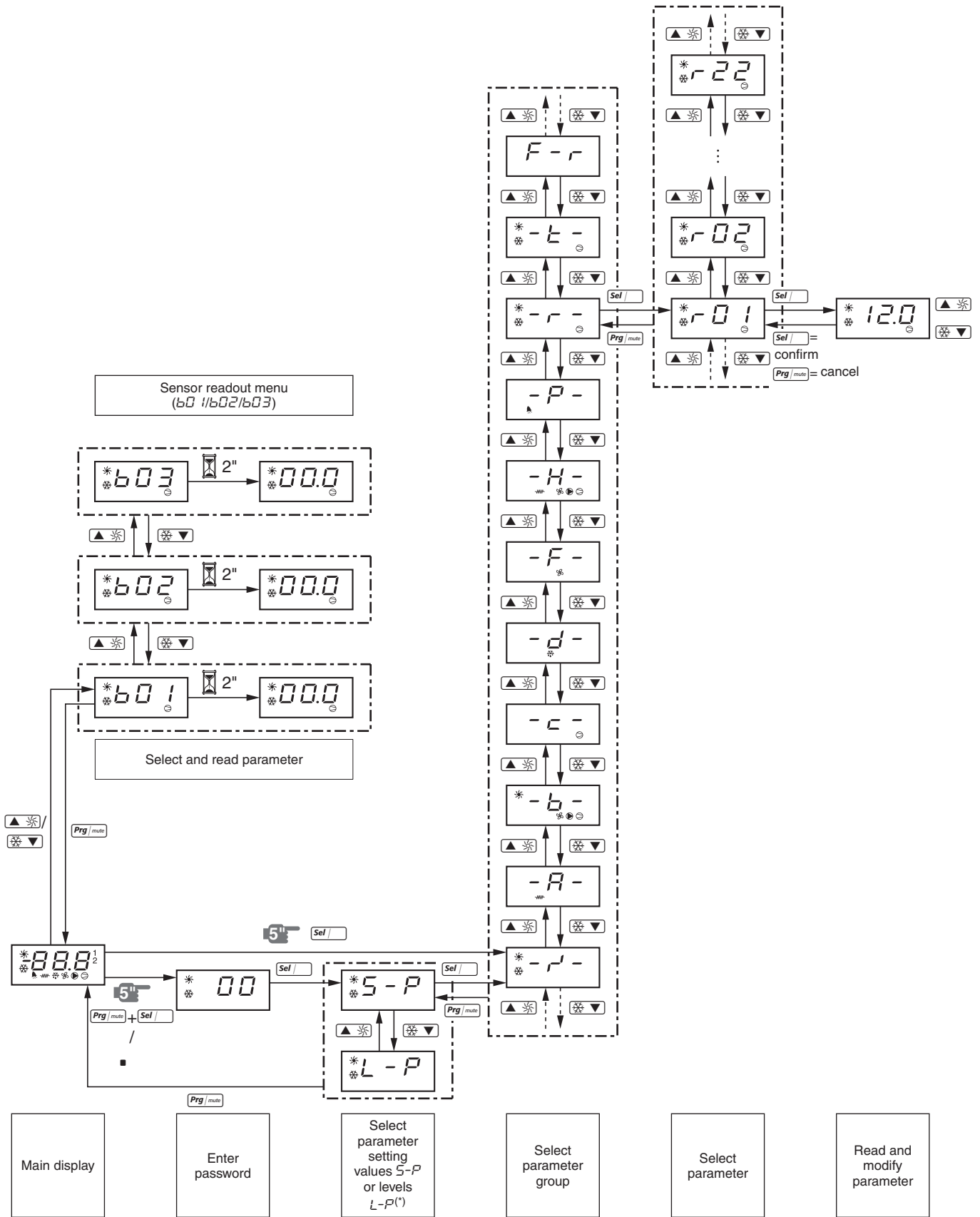
10 Water filter

Clean the water filter.

Disposal requirements

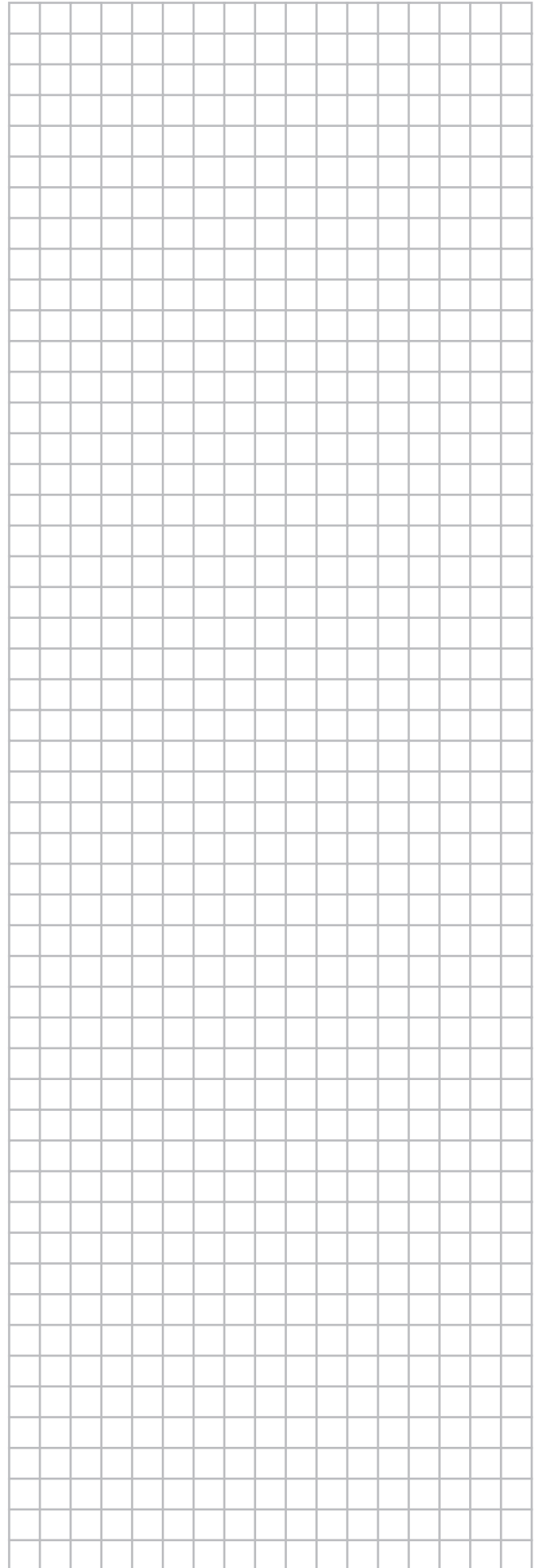
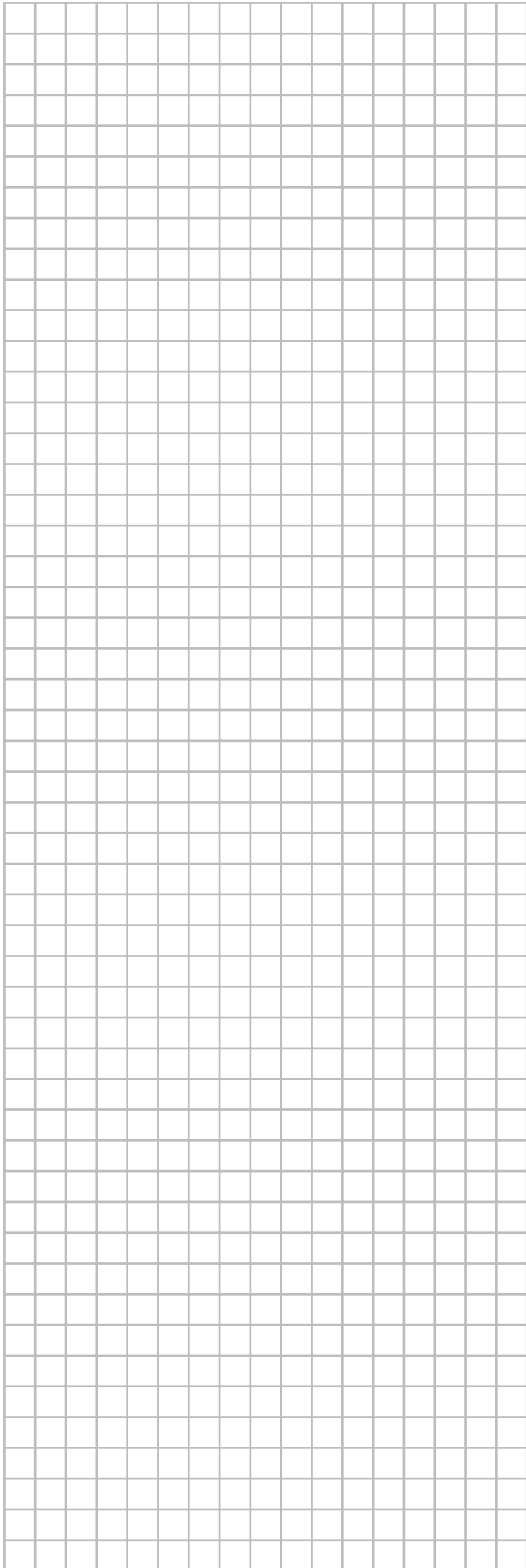
Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with relevant local and national legislation.

MENU OVERVIEW

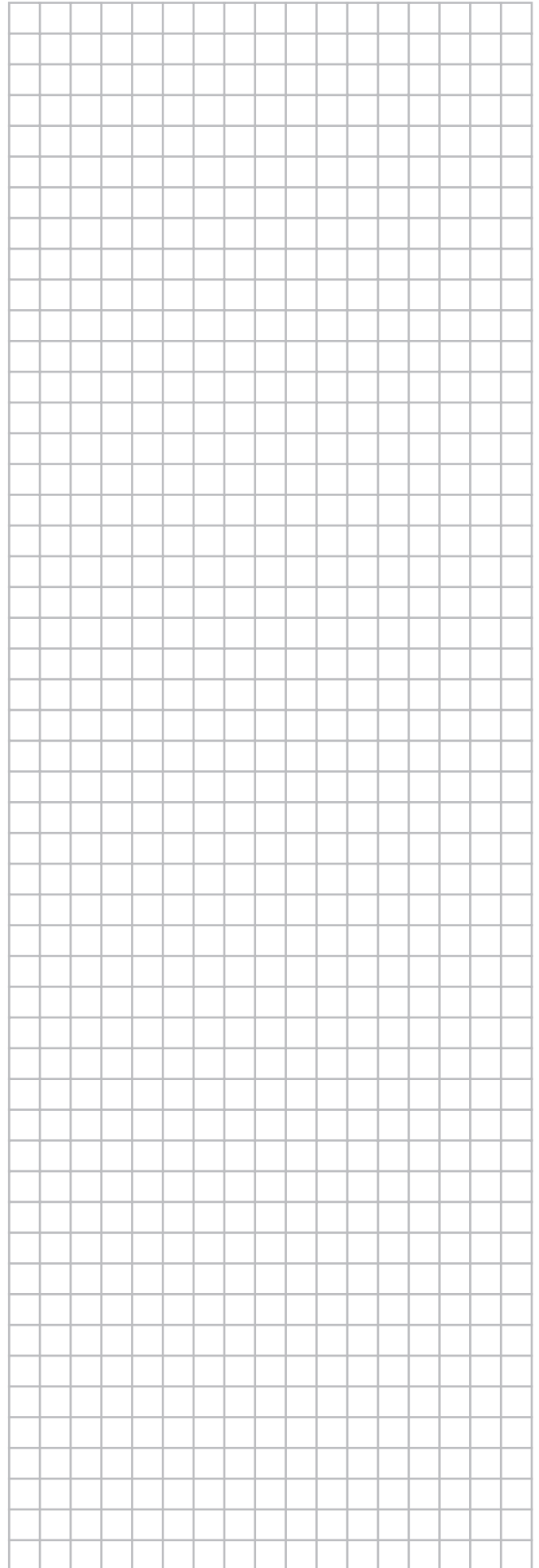
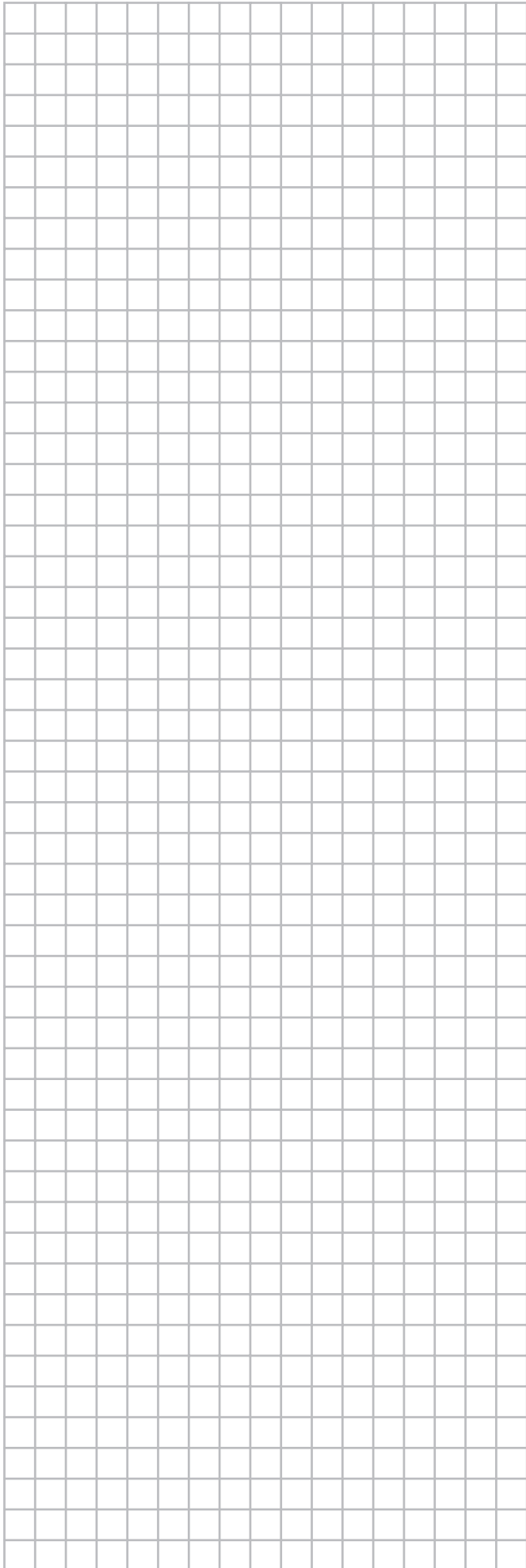


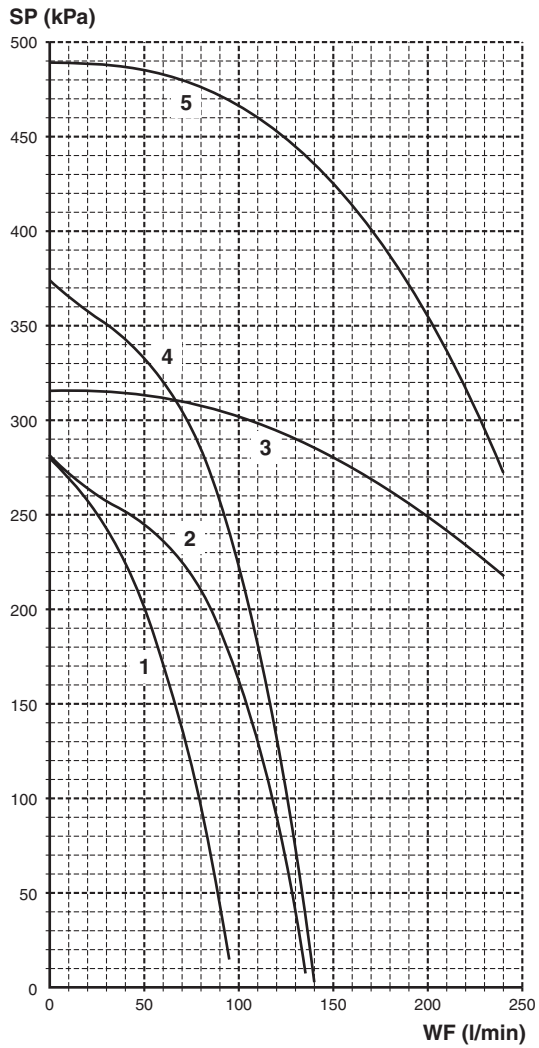
(*) L-P function is not used.

NOTES

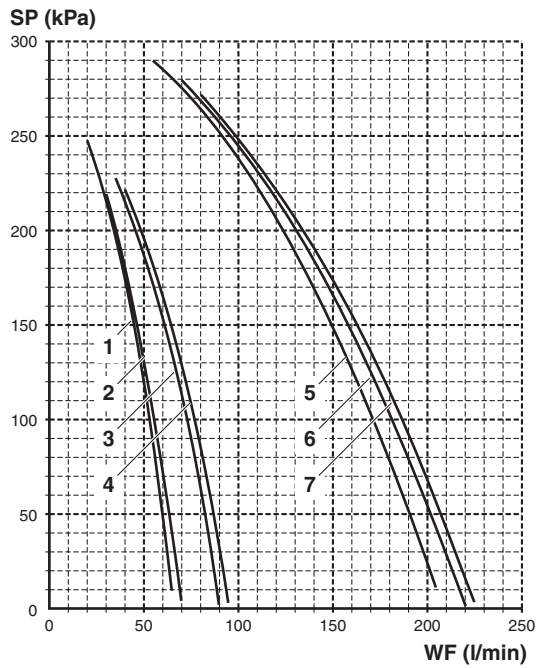


NOTES

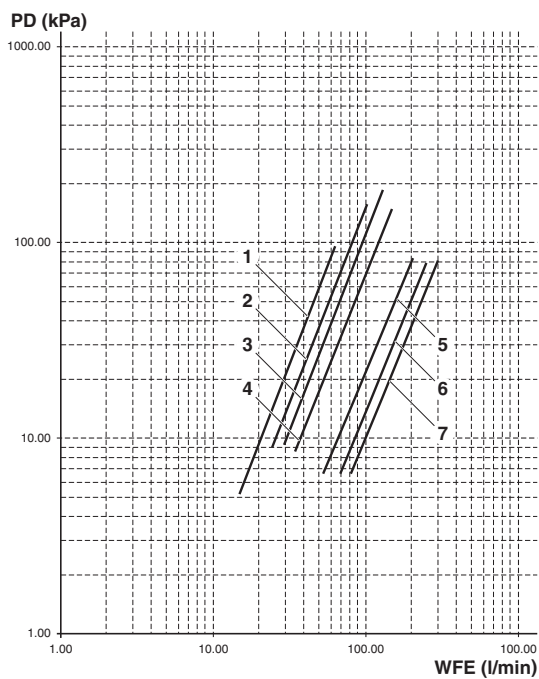




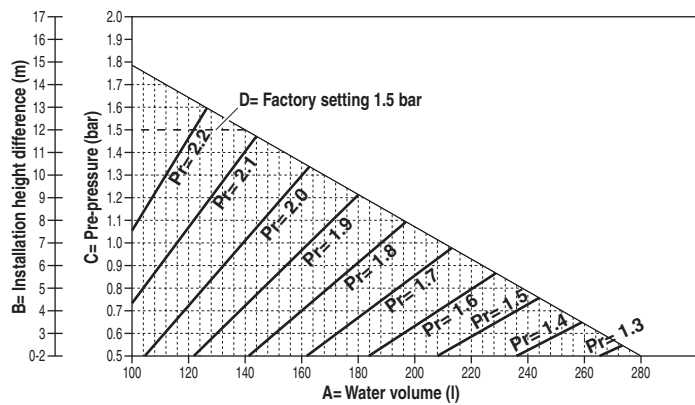
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