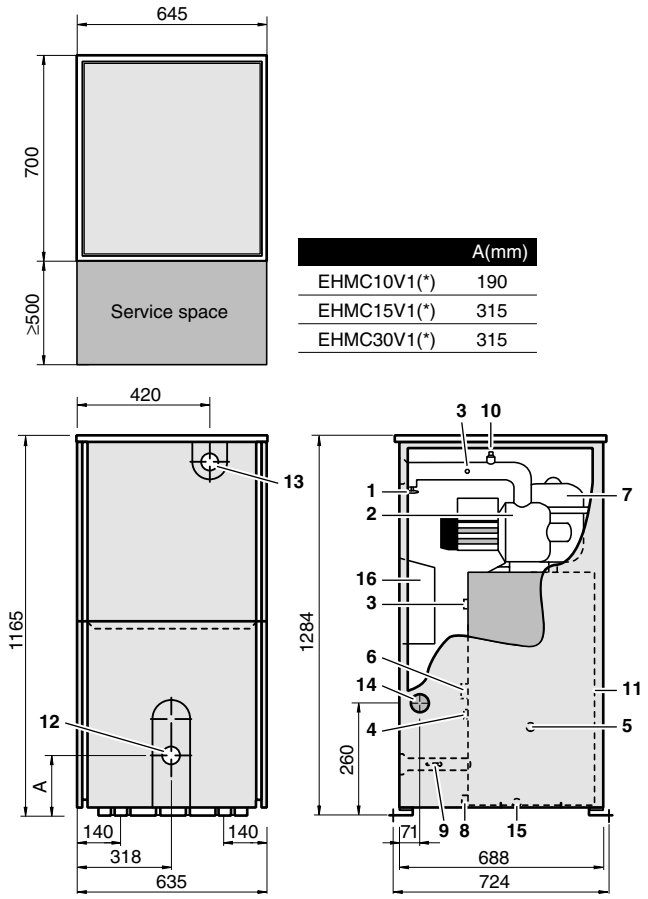
DAIKIN

INSTALLATION AND OPERATION MANUAL

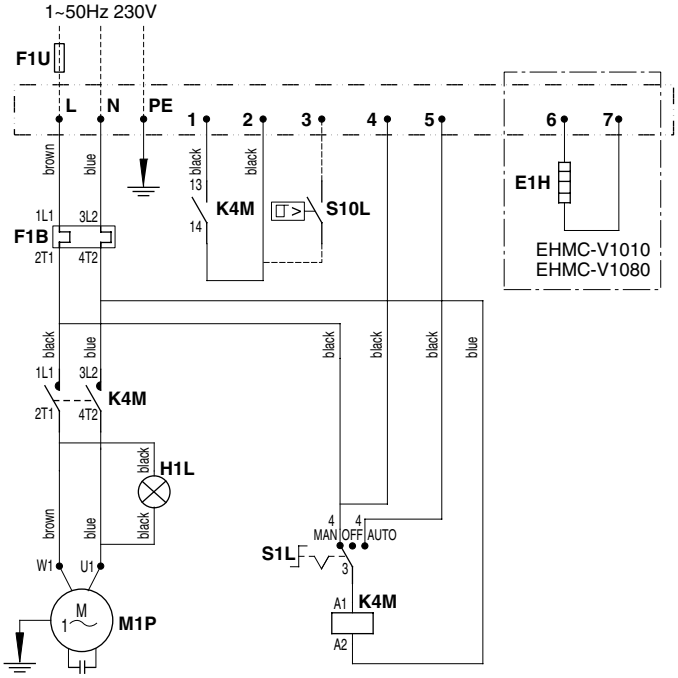
Hydraulic module

EHMC10AV1(*)
EHMC15AV1(*)
EHMC30AV1(*)



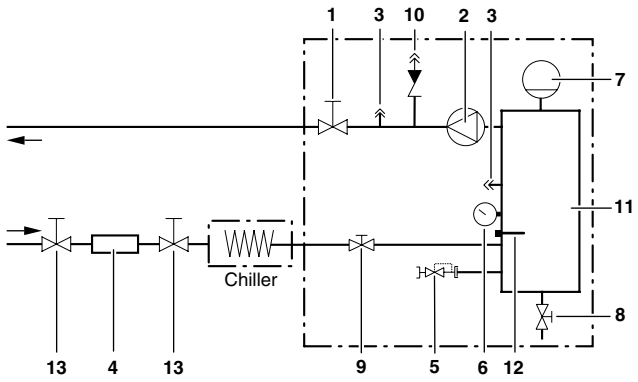
	A(mm)
EHMC10V1(*)	190
EHMC15V1(*)	315
EHMC30V1(*)	315

1



	EHMC10V1	EHMC15V1	EHMC30V1	EHMC10V1070 EHMC10V1080	EHMC15V1070 EHMC15V1080	EHMC30V1070 EHMC30V1080
F1U	20aM	20aM	20aM	20aM	20aM	20aM
F1B	4.4A	4.4A	5A	5A	5A	10A

3



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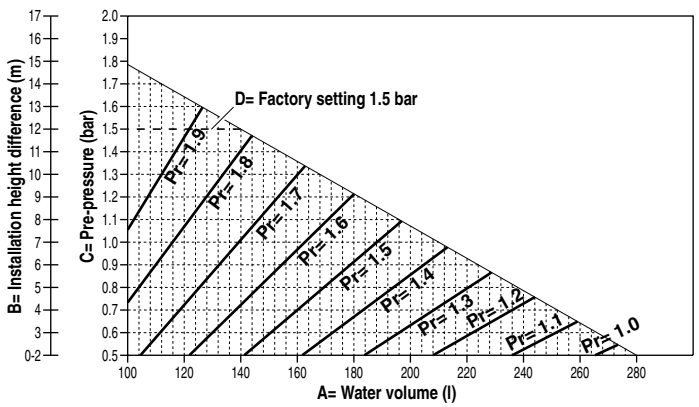

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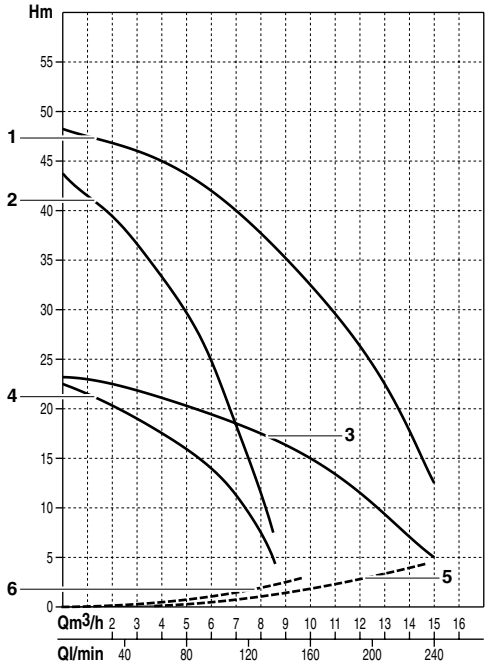

1 EHMC30V1070, EHMC30V1080
2 EHMC10V1070, EHMC10V1080, EHMC15V1070, EHMC15V1080
3 EHMC30V1, EHMC30V1010
4 EHMC10V1, EHMC10V1010, EHMC15V1, EHMC15V1010
5 EHMC15V1(*), EHMC30V1(*)
6 EHMC10V1(*)

(*) = -, 010, 070, 080

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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 THE 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.

INTRODUCTION

The Daikin EHMC series are hydraulic modules for in or outdoor installation. They are designed to be installed with EUWA5~30 and EUWY5~30 series, in closed systems, and can be used for water and glycol applications.

This manual describes correct installation and operation of the EHMC. If difficulties appear during installation or operation, please contact your Daikin dealer.

Technical specifications

Model		EHMC10V1	EHMC15V1	EHMC30V1
Nominal flow	(l/min)	62	88	187
Nominal static height	(mH_20)	17(34*)	15(27*)	10(27*)
Power supply	(V)	1~230	1~230	1~230
Nominal input	(W)	630(1050*)	650(1070*)	1070(2090*)
Nominal running current	(A)	4.4(5)	4.4(5)	5(10)

* for options 070 and 080

Main components				
Pump				
Brand and type		Salmson Multi-H 402	Salmson Multi-H 402	Salmson Multi-H 802
Tank				
Volume	(l)	100	100	100
Expansion vessel			Vessel with rubber membrane	
Volume	(l)	12	12	12
Maximum working pressure	(bar)	5	5	5
Pre pressure	(bar)	1.5	1.5	1.5
Water Circuit				
Piping connections (galvanised steel)		1“ BSPF	2“ BSPF	2-1/2“ BSPF
Piping (carbon steel)		1-1/4”	1-1/4”	1-1/2”
Safety valve		1x3.0 bar	1x3.0 bar	1x3.0 bar
Dimensions HxDxW	**(mm)**		1284 x 635 x 688	
Weight				
Machine weight		99	102	105
Operation weight		199	202	205

Options			
Pump with high ΔP (*)	Salmson Multi-H 404	Salmson Multi-H 404	Salmson Multi-H 804
Anti freeze protection			
Electrical heater element		200 W	

Options

- EHMC-V1010 is unit with freeze-up protection
- EHMC-V1070 is unit with high static pump
- EHMC-V1080 is unit with high static pump and freeze-up protection

Operation range

Water side -10 ~ 55°C
Air side -10 ~ 43°C

Main components

Refer to figure 1

1. Pressure regulating / shut-off valve
2. Pump
3. Pressure ports
4. Electric heater element (optional)
5. Safety valve
6. Manometer
7. Expansion vessel
8. Drain/fill valve
9. Shut off valve
10. Automatic air purge valve
11. Buffer tank
12. Water inlet
13. Water outlet
14. Intake power supply, chiller connection cables
15. Drain connection ø16
16. Switch box

Piping diagram

Refer to figure 2

1. Pressure regulating / shut-off valve
   This valve is used to regulate the required flow in the system. It is also used in combination with shut-off valve (9) to isolate the hydraulic module from the rest of the system.
2. Pump
   The pump circulates the water or water/glycol solution.
3. Pressure ports
   1/4” BSPF pressure ports are provided to connect a differential manometer as to measure the pump pressure. The water flow can be deduced from this pressure (refer to “Start up operation”).

4. Filter
   The filter protects the chiller heat exchanger and the pump from impurities. The filter should be cleaned on a regular base.
5. Safety valve
   The safety valve protects the system against excessive pressure. It opens at 3 bar.
6. Manometer
   The manometer measures the system pressure.
7. Expansion vessel
   The expansion vessel keeps the system pressure constant when the water expands or contracts due to temperature fluctuations.
8. Drain / Fill valve
   This valve is used to drain or fill the system with water or water/glycol solution.
9. Shut-off valve
   This valve is used to isolate the hydraulic module from the rest of the system.
10. Air purge valve
    The air purge valve removes the air from the system.
11. Tank
    The tank accumulates the water or water/glycol solution.
12. Freeze-up protection
    This device protects the circuit against freezing (optional as on EHMC-V1010 and EHMC-V1080).
13. Shut off valves
    These valves are used for servicing the filter (field supply).

Safety devices

The EHMC unit has following safety devices:

Thermal protector

The pump has an internal protector which activates when the motor temperature becomes to high. After temperature decrease , the thermal protector is reset automatically.

Safety valve

This valve opens when the system pressure rises above 3 bar and closes automatically when the system pressure returns to normal.

Selection of location

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

1. The foundation is strong enough to support the weight of the unit and the floor is flat to prevent vibration and noise generation.
2. The space around the unit is adequate for servicing.
   Refer to figure 1.
3. There is no danger of fire due to leakage of inflammable gas.
4. Ensure that water cannot cause any damage to the location in case it drips out the unit.
5. Select the location of the unit in such a way that the sound generated by the unit will not disturb anyone.
6. Make sure that the unit can be fixed directly in concrete.

Inspecting and handling the unit

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.
2. Lift the unit preferably with a crane and 2 belts(1) of at least 6 m long.
3. When lifting the unit with a crane, always use protectors(2) 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 cardboard cover from the unit.
2. Remove the screws fixing the unit to the pallet.
3. Fix the unit directly in concrete, using anchor bolts with M8 thread.
4. Make sure that the unit is levelled in both directions.

⚠ Caution

1. If the unit is to be installed on a roof, check the strength of the roof and its drainage facilities first.
2. In case of indoor installation, make sure to connect a drainhose to the drain connection (ø16).

Maximum allowed installation height in function of the water volume

The EHMC unit is installed after the chiller in the system. Make sure to respect following limitations:

If the EHMC is installed at the highest point of the system than there is no height difference to be considered.

If the EHMC is placed on a height level other than the highest point, refer to figure 4 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.

Installing the filter

Included in the EHMC package is a filter to keep the water or the water/glycol solution circuit free of impurities. Install the filter in the circuit before the chiller (refer to figure 2). Make sure that it is easy accessible for maintenance.

Connecting pressure gauges to the water circuit (field supply)

If it is desirable to know the static height over the pump, e.g. as to help regulate the water flow (refer to 'Start up operation'), install pressure gauges or a differential pressure gauge on the pressure ports.

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:

Pg = (H/10+0.3) bar

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

⚠ Caution

The pre-pressure (Pg) on the expansion vessel always must be ≥ 0.5 bar. If for example the EHMC unit is installed at the highest point of the system the pre-pressure on the expansion vessel must be 0.5 bar.

Note Factory pre-pressure setting

The factory pre-pressure setting of the expansion vessel is 1.5 bar. This pre-pressure setting can be maintained if following installation conditions are not exceeded:

1. Installation height difference < 12 m
2. Total water volume < 140 l
3. Water pressure setting is respected (refer to next chapter)

Charging water

1. Connect the water supply to the drain/fill valve.
2. Open the pressure regulating valve and shut-off valve.
3. Use the air purge valves on the EHMC unit, fancoils, and purge valves installed at the highest places in the circuit, to remove all air when filling the system.

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 4 - 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 4 where the horizontal line of the set pre-pressure (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 EHMC = 5 m
Pg = (5/10+0.3) = 0.8 bar
Pr = ±1.7 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 ±1.9 bar

Example 2

Total system water volume = 200 l
Highest point of circuit above the EHMC unit = 5 m
Pg = (5/10+0.3) = 0.8 bar
Pr = ± 1.4 bar

Note

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

FIELD WIRING

ALL FIELD WIRING AND COMPONENTS MUST BE INSTALLED BY A LICENSED ELECTRICIAN AND MUST COMPLY WITH RELEVANT LOCAL AND NATIONAL REGULATIONS.
THE FIELD WIRING MUST BE CARRIED OUT IN ACCORDANCE WITH THE WIRING DIAGRAMS AND THE INSTRUCTIONS GIVEN BELOW.
BE SURE TO USE A DEDICATED POWER CIRCUIT. NEVER USE A POWER SUPPLY SHARED BY ANOTHER APPLIANCE.

Internal wiring - parts table

Refer to figure 3 with the wiring diagram. The abbreviations used are listed below:

L	Live
N	Neutral
PE	Protective earth (screw)

E1H ..... Electric heater (optional)
F1B ..... Overcurrent protector
F1U ..... Fuse
H1L ..... Pilot lamp
K4M ..... Pump contactor
M1P ..... Pump motor
S1L ..... Selector switch
S10L ..... Flow switch (field supply)

Power circuit and cable requirements

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

	phase and frequency	voltage	recommended fuses main	transmission line section
EHMC-V1	1N~50Hz	220~240V	20aM	0.75~1.25mm^2
EHMC-V1010	1N~50Hz	220~240V	20aM	0.75~1.25mm^2
EHMC-V1070	1N~50Hz	220~240V	20aM	0.75~1.25mm^2
EHMC-V1080	1N~50Hz	220~240V	20aM	0.75~1.25mm^2

Note

1. Select the power supply cable in accordance with relevant local and national regulations.
2. The EHMC unit can be branched from the power supply terminal in switch box nr.1 of the chiller. In this case make sure to install the recommended fuse in that switch box.

Connections

1. Connect the power supply cable to the L1 and N terminal, as shown on the wiring diagram.
2. Connect the earth conductor (yellow/green) to the earth terminal PE.
3. Connect the terminals 1 and 3 to the pump operation control contact on the chiller (refer to the connection diagram inside the switch box of the hydraulic module).
4. For remote operation, connect the terminals 4 and 5 to the pump control contact of the chiller (refer to the connection diagram inside the switch box of the hydraulic module).
5. For EHMC with freeze-up protection (010 or 080), connect the optional electric heater (terminal 6 and 7) parallel to the evaporator heater tape in the chiller (refer to the connection diagram inside the switch box of the hydraulic module).
6. Connect a flow switch (S10L-field supply) between terminal 2 and 3.

BEFORE OPERATION

Checks before initial start-up

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

1. The EHMC unit and the whole system is properly filled with water.
2. Electric connections to the power supply and connections to the chiller are properly done.
3. The shut-off valve and the pressure regulating valve are fully open.

OPERATING THE SYSTEM WITH CLOSED VALVES WILL DAMAGE THE PUMP.

Start up operation

1. Turn the operation switch to manual. The pump must run now.
2. Check if all air is removed from the system. If not, stop the pump and reopen the air purge valve(s). Add water to the system, until the required water pressure is reached. Restart the pump.

   Repeat this step until all air is removed.
3. Set the desired flow by turning the pressure regulating valve.
4. Put the switch to remote. The pump will stop.
5. Start the chiller. The pump will be started by the chiller.
6. Check if the Δt of the chiller is within expectations. If necessary, regulate the flow by using the pressure regulating valve.

Note Flow

- The desired flow is depending on the capacity of the attached chiller and the desired Δt (refer to the installation and operation manual of your chiller).
- If manometers are installed, the flow can be deduced from the pressure difference over the pump.
  For pump and hydraulic module resistance characteristics, refer to figure 5:

—— Pump characteristics
---- Resistance of hydraulic module + water filter

Disposal requirements

Dismantling of the unit should be done in accordance with the relevant local and national regulations.

Trouble shooting

This section provides useful information for diagnosing and correcting certain problems which may occur in the hydraulic module. Before starting the trouble shooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects.

Symptom	Possible causes	Corrective action
1. Water flow is too low	a. Shut-off valve is not completely open. b. There is air in the system. c. The filter is not clean. d. There is an obstruction in the circuit. e. Pressure regulating valve is not enough open. f. The chosen pump has not enough capacity.	a. Open the shut-off valve completely. b. Purge the air. c. Clean the filter. d. Remove the obstruction. e. Open more. f. Check Δp over pump. Install heavier pump.
2. Pump is making noise (cavitation)	a. Shut-off valve is not completely open. b. There is air in the system. c. The filter is not clean. d. Pre-pressure and required water pressure are not according to installation instructions.	a. Open completely. b. Purge air. c. Clean filter. d. Recalculate the values as described in chapter “Setting the pre-pressure of the expansion vessel” and “Charging water”.
3. Safety valve is opening	a. Pre-pressure and required water pressure are not according to installation instructions.	a. Recalculate the values as described in chapter “Setting the pre-pressure of the expansion vessel” and “Charging water”.
4. The motor trips out	a. Setting of overcurrent protector F1B in the switch box is too low.	a. Adapt the overcurrent protector to the nominal running current (refer to “Technical specifications”).

DAIKIN EUROPE NV
Zandvoordestraat 300, B-8400 Oostende, Belgium