EV3 HP & EVD HP

Controllers for reversible single-circuit residential heat pumps

Installer Manual | ENGLISH

Code 1443DHPI124

Important

Read this manual carefully before installation and before using the devices and take all the prescribed precautions. Keep this manual with the devices for future consultation.

Only use the devices in the ways described in this manual. Do not use these devices as safety devices.

Disposal

The devices must be disposed of according to local regulations governing the collection of electrical and electronic waste.

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1 INTRODUCTION

1.1 Introduction

EV3 HP and EVD HP are controllers for reversible air-water and water-water single-circuit residential heat pumps.

EV3 HP is available in the standard 74x32mm format with built-in user interface consisting of a double custom display, with decimal point and function icons, and four touch keys. It guarantees IP65 protection for easy cleaning.

EVD HP is available in standard 4-module DIN format, in a blind version that can be connected to a remote user interface (EV3K01) if required.

These controllers are capable of running compressors and fans of both the on-off and modulating types.

EV3 HP is available with a 12VAC power supply, while EVD HP can be supplied with a 115... 230VAC power supply.

EV3 HP is designed to be installed on a panel with snap-in brackets, while EVD HP is fitted to a DIN rail in a control panel.

1.2 Models available, purchasing codes and technical features

The table below shows the models available, the purchasing codes and the technical features of the devices.

	COMPACT VERSION		SPLIT VERSION	
Models available >	EV3 HP		EVD HP	EV3K01
Purchasing codes >	EV3914LM2	EV3916LM2GF	EVD914BM9	EV3K01XOCT
Version				
Blind			•	
Built-in LED (4+4 digit custom display)	•	•		•
Connections				
Micro-Fit connectors	•	•	•	
Edge connectors	•	•		
Plug-in screw terminal blocks	•	•	•	•
Power supply				
12VAC not insulated	•	•		
12VAC/DC not insulated				•
115 - 230VAC insulated			•	
Analogue inputs				
NTC	4	4	4	
NTC/4-20 mA	1	1	1	
Digital inputs				
Dry contact	5	5	5	
Analogue outputs				
0-10V/phase cutting/PWM	2	2	2	

	COMPACT VERSION		SPLIT VERSION	
Models available >	EV3 HP		EVD HP	EV3K01
Purchasing codes >	EV3914LM2	EV3916LM2GF	EVD914BM9	EV3K01XOCT
Digital outputs (electro-mechanical relays; A res. @ 250 VAC)				
2A SPST	4	4		
3A SPST			2	
8A SPDT			1	
12A SPST			1	
Digital outputs (triac; A res. @ 250 VAC)				
200mA		1		
2A		1		
Digital outputs (open collector)				
12VDC, max. 40mA			1	
Communications ports				
Powered INTRABUS	•	•	•	•
Other features				
Alarm buzzer	•	•		•

Notes

None

Optional extras

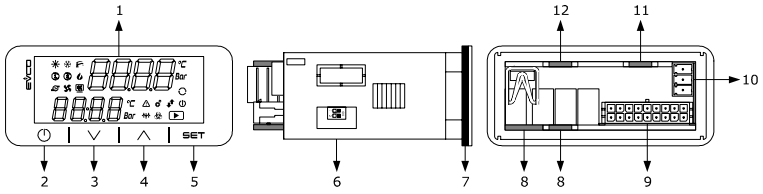
- Clock (not available for model EV3K01)
- RS-485 MODBUS slave port (not available for model EV3K01).

The purchasing codes for EV3 HP and EVD HP do not include the cabling connectors, see the ACCESSORIES section.
For more models contact the EVCO sales network.

2 DESCRIPTION

2.1 Description of EV3 HP

The picture below shows the layout of the EV3 HP.



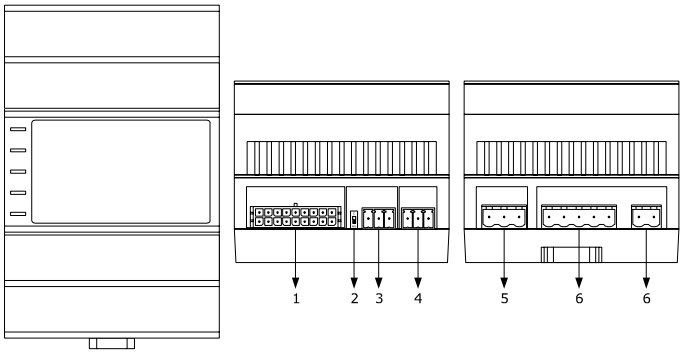
The table below describes each part of the EV3 HP.

PART	DESCRIPTION
1	Double row LED display, with decimal point and function icons
2	On/Off key, subsequently also called the On/Stand-by key
3	Decrease key, subsequently also called the Down key
4	Increase key, subsequently also called the Up key
5	Setting key, subsequently also called the Set key
6	Micro-switch for the termination of the RS-485 MODBUS line
7	Seal
8	Edge connector joint for the digital output cabling with electro-mechanical relay (for future reference, the digital outputs DO1... DO4)
9	Male Micro-Fit connector for cabling for the power supply, analogue inputs, digital inputs, analogue outputs and the INTRABUS powered port.
10	If fitted, plug-in screw terminal block for cabling for the RS-485 MODBUS port
11	If fitted, the joint of the Edge connector for the triac digital output cabling (for future reference, the digital output TK1).
12	If fitted, the joint of the Edge connector for the triac digital output cabling (for future reference, the digital output TK2)

For more information see subsequent sections.

2.2 Description of EVD HP

The picture below shows the layout of the EVD HP.



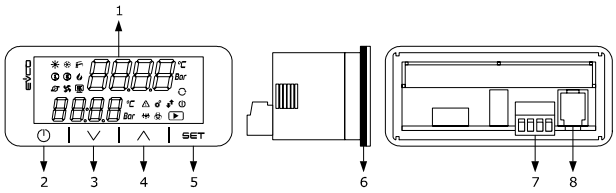
The table below describes each part of the EVD HP.

PART	DESCRIPTION
1	Male Micro-Fit connector for cabling for analogue inputs, digital inputs, analogue outputs and the open collector digital output (for future reference, the digital output OC1)
2	Micro-switch for the termination of the RS-485 MODBUS port
3	If fitted, plug-in screw terminal block for cabling for the RS-485 MODBUS port
4	Plug-in screw terminal block for cabling for the powered INTRABUS port
5	Plug-in screw terminal block for cabling for the digital outputs with electro-mechanical relay (for future reference, the digital outputs DO1 and DO2)
6	Plug-in screw terminal block for cabling for the power supply, electrical-mechanical relay digital outputs (for future reference, the digital outputs DO3 and DO4)

For more information see subsequent sections.

2.3 Description of EV3K01

The picture below shows the layout of the EV3K01.



The table below describes each part of the EV3K01.

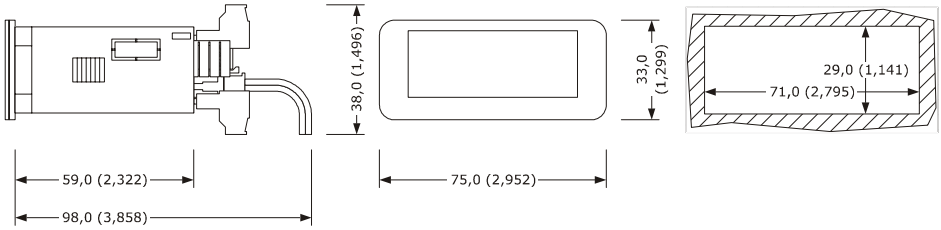
PART	DESCRIPTION
1	Double row LED display, with decimal point and function icons
2	On/Off key, subsequently also called the On/Stand-by key
3	Decrease key, subsequently also called the Down key
4	Increase key, subsequently also called the Up key
5	Setting key, subsequently also called the Set key
6	Seal
7	Male + female plug-in screw terminal block for cabling for the power supply and the powered INTRABUS port
8	Not used

For more information see subsequent sections.

3 MEASUREMENTS AND INSTALLATION

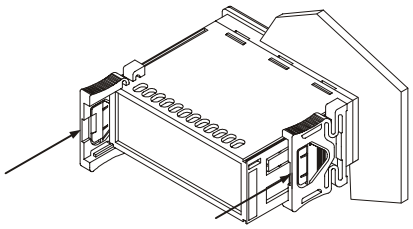
3.1 Measurements and installation of EV3 HP

The pictures below show the measurements of EV3 HP; measurements are expressed in mm (inches).



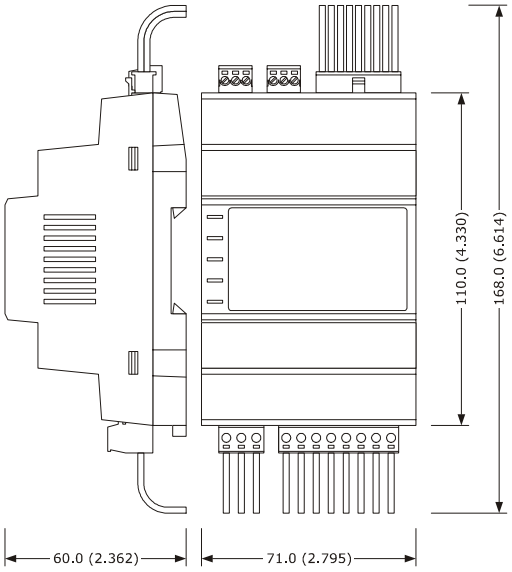
To be installed on a panel with snap-in brackets provided.

The thickness of the panel on which EV3 HP is to be installed must be between 0.8 and 2.0mm (0.031 and 0.078 in).



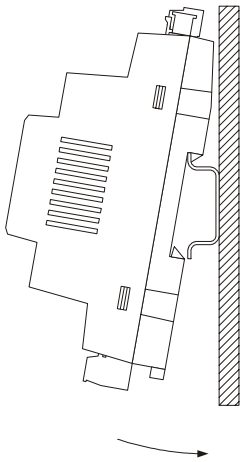
3.2 Measurements and installation of EVD HP

The picture below shows the measurements of EVD HP (4 DIN modules); measurements are expressed in mm (inches).

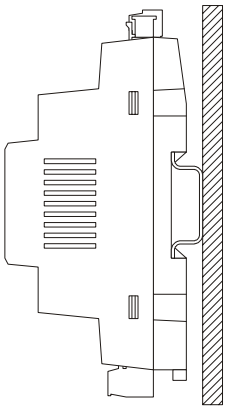


Installation is on a DIN rail 35.0 x 7.5mm (1.377 x 0.295 in) or 35.0 x 15.0mm (1.377 x 0.590 in), in a control panel.
The pictures below show how to install the EVD HP.

1

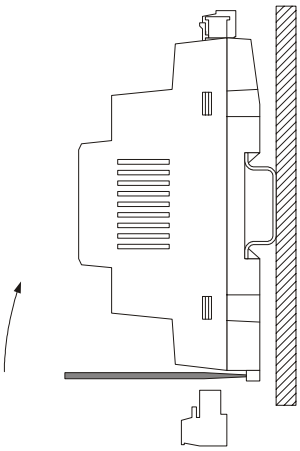


2

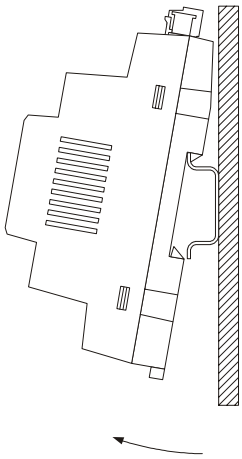


To remove the EVD HP, first remove any plug-in screw terminal blocks fitted in the lower part, then, using a screwdriver, loosen the DIN rail clip, as shown in the pictures below.

3



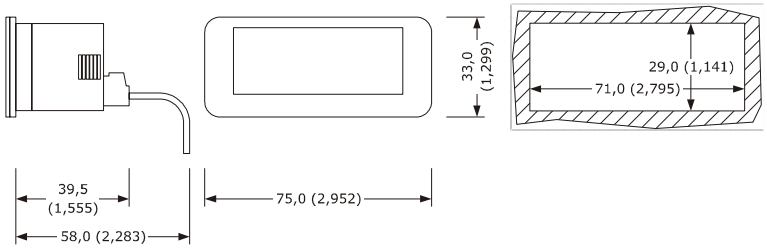
4



To re-install the EVD HP first press the DIN rail clip fully in.

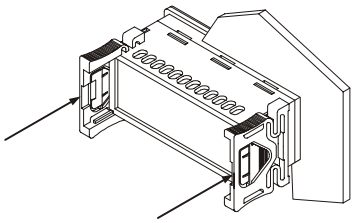
3.3 Measurements and installation of EV3K01

The pictures below show the measurements of EV3K01; measurements are expressed in mm (inches).



To be installed on a panel with snap-in brackets provided.

The thickness of the panel on which the EV3K01 is to be installed must be between 0.8 and 2.0mm (0.031 and 0.078 in).



3.4 Installation precautions

- Ensure that the working conditions for the devices (operating temperatures, humidity, etc.) are within the set limits. See the section TECHNICAL SPECIFICATIONS.
- Do not install the devices close to heat sources (heating elements, hot air ducts, etc.), equipment with a strong magnetic field (large diffusers, etc.), in places subject to direct sunlight, rain, damp, excessive dust, mechanical vibrations or shocks.
- In compliance with safety regulations, the devices must be installed properly to ensure adequate protection from contact with electrical parts. All protective parts must be fixed in such a way as to need the aid of a tool to remove them.

4 ELECTRICAL CONNECTION

4.1 I/O configuration

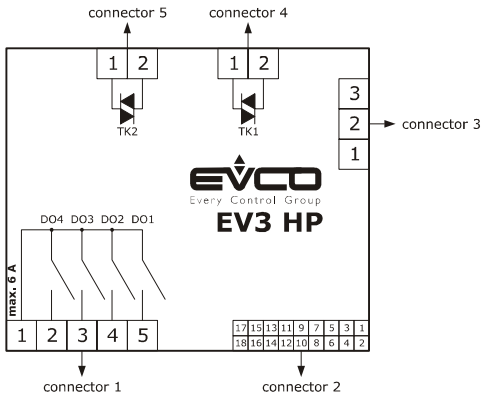
The table below shows the I/O configuration.

ANALOGUE INPUTS		EV3914LM2	EV3916LM2GF	EVD914BM9
IN1	Condensation temperature/pressure (NTC/4-20 mA)	•	•	•
IN2	Input water temperature (NTC)	•	•	•
IN3	Output water temperature (NTC)	•	•	•
IN4	Compressor discharge temperature (NTC)	•	•	•
IN5	Battery temperature (NTC)	•	•	•
DIGITAL INPUTS		EV3914LM2	EV3916LM2GF	EVD914BM9
IN10 (EVD) IN6 (EV3)	System flow switch (NC)	•	•	•
IN9 (EVD) IN7 (EV3)	Fan thermal protection	•	•	•
IN8	Compressor thermal protection (NC)	•	•	•
IN7 (EVD) IN9 (EV3)	Maximum pressure switch (NC)	•	•	•
IN6 (EVD) IN10 (EV3)	Minimum pressure switch (NC)	•	•	•
ANALOGUE OUTPUTS		EV3914LM2	EV3916LM2GF	EVD914BM9
AO1	Compressor (0-10V/phase cutting/PWM)	•	•	•
AO2	Fan (0-10V/phase cutting/PWM)	•	•	•
DIGITAL OUTPUTS		EV3914LM2	EV3916LM2GF	EVD914BM9
DO1	Reversing valve	•	•	•
DO2	Enable fan	•	•	•
DO3	Circulation pump	•	•	•
DO4	Enable compressor	•	•	•
TK1	Boiler/system heating element enable		•	
TK2	Fan		•	
OC1	Boiler/system heating element enable			•

4.2 Description of connectors

4.2.1 Description of connectors for EV3 HP

The picture below shows the layout of the EV3 HP connectors.



The tables below describe the EV3 HP connectors.

Connector 1

PART	DESCRIPTION
1	Electro-mechanical relay digital outputs DO1... DO4 (max. 6A): common
2	Electro-mechanical relay digital output DO4 (2 A SPST): normally open
3	Electro-mechanical relay digital output DO3 (2 A SPST): normally open
4	Electro-mechanical relay digital output DO2 (2 A SPST): normally open
5	Electro-mechanical relay digital output DO1 (2 A SPST): normally open

Connector 2

PART	DESCRIPTION
1	Dry contact digital input IN10
2	Analogue input IN1 (NTC/4-20 mA)
3	Dry contact digital input IN9
4	Analogue input IN2 (NTC)
5	Dry contact digital input IN8
6	Analogue input IN3 (NTC)
7	Dry contact digital input IN7

8	Analogue input IN4 (NTC)
9	Dry contact digital input IN6
10	Analogue input IN5 (NTC)
11	Analogue output AO1 (0-10V/phase cutting/PWM)
12	Reference (GND) for analogue inputs, digital inputs, analogue outputs and powered INTRABUS port
13	Analogue output AO2 (0-10V/phase cutting/PWM)
14	INTRABUS port powered up signal
15	Power supply to analogue inputs 4-20 mA (12 VDC, max. 40 mA)
16	Reference (GND) for analogue inputs, digital inputs, analogue outputs and powered INTRABUS port
17	EV3 HP power supply (12VAC not insulated)
18	EV3 HP power supply (12VAC not insulated)

Connector 3 (if installed)

PART	DESCRIPTION
1	RS-485 MODBUS port: +
2	RS-485 MODBUS port: -
3	RS-485 MODBUS port: reference (GND). NB: do not connect the cable shield.

Connector 4 (if installed)

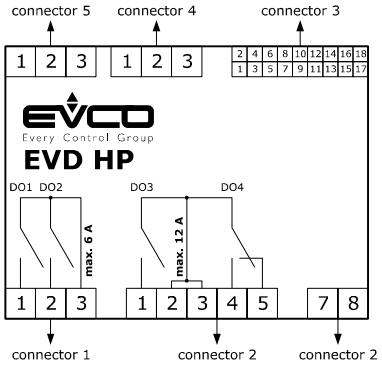
PART	DESCRIPTION
1	Triac TK1 output: GND
2	Triac TK1 output (200 mA): OUT

Connector 5 (if installed)

PART	DESCRIPTION
1	Triac TK2 output: GND
2	Triac TK2 output (2 A): OUT

4.2.2 Description of connectors for EVD HP

The picture below shows the layout of the EVD HP connectors.



The tables below describe the EVD HP connectors.

Connector 1

PART	DESCRIPTION
1	Electro-mechanical relay digital output DO1 (3A SPST): normally open
2	Electro-mechanical relay digital output DO2 (3A SPST): normally open
3	Electro-mechanical relay digital outputs DO1 and DO2 (max. 6A): common

Connector 2

PART	DESCRIPTION
1	Electro-mechanical relay digital output DO3 (12A SPST): normally open
2	Electro-mechanical relay digital output DO3 and D04: common
3	Electro-mechanical relay digital output DO3 and D04: common
4	Electro-mechanical relay digital output DO4 (8A SPDT): normally open
5	Electro-mechanical relay digital output DO4 (8A SPST): normally closed
7	EVD HP power supply (115... 230 VAC insulated)
8	EVD HP power supply (115... 230 VAC insulated)

Connector 3

PART	DESCRIPTION
1	Analogue output AO2 (0-10V/phase cutting/PWM)
2	Analogue outlet AO1 (0-10V/phase cutting/PWM)
3	Reference (GND) for analogue inputs, digital inputs and analogue outputs
4	Analogue input IN1 (NTC/4-20 mA)
5	Dry contact digital input IN10
6	Analogue input IN2 (NTC)
7	Dry contact digital input IN9
8	Analogue input IN3 (NTC)
9	Dry contact digital input IN8
10	Analogue input IN4 (NTC)
11	Dry contact digital input IN7
12	Analogue input IN5 (NTC)
13	Reference (GND) for analogue inputs, digital inputs and analogue outputs
14	Dry contact digital input IN6
15	Reference (GND) for analogue inputs, digital inputs and analogue outputs
16	power supply for analogue inputs 4-20mA (12 VDC, max. 120mA)
17	Open collector digital output OC1 (12V, max. 40mA)
18	Reference (GND) for analogue inputs, digital inputs and analogue outputs

Connector 4 (if installed)

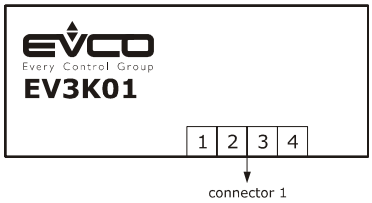
PART	DESCRIPTION
1	RS-485 MODBUS port: reference (GND)
2	RS-485 MODBUS port: -
3	RS-485 MODBUS port: +

Connector 5

PART	DESCRIPTION
1	Reference (GND) for EV3K01 power supply powered INTRABUS port
2	INTRABUS port powered up signal
3	EV3K01 power supply

4.2.3 Description of EV3K01 connectors

The picture below shows the layout of the EV3K01 connectors.



The table below describes the EV3K01 connectors.

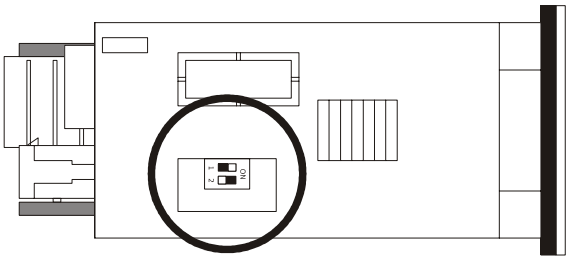
Connector 1

PART	DESCRIPTION
1	EV3K01 (12 VAC/DC) power supply; if EV3K01 is fed by DC power, connect the positive pole
2	Not used
3	INTRABUS port powered up signal
4	Reference (GND) for EV3K01 power supply powered INTRABUS port

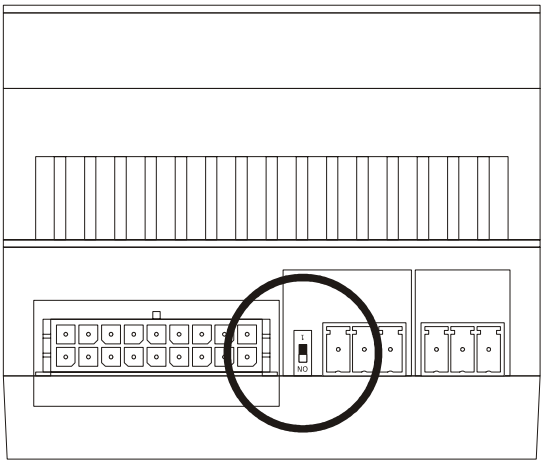
4.3 Termination of the RS-485 MODBUS line

To reduce reflections on the signal transmitted along the cables connecting the devices to a RS-485 network it is necessary to terminate the line ONLY at the first and last element in the network.

To terminate the line, it will be sufficient to place EV3 HP micro-switch 1 in position ON. Do not touch micro-switch 2.



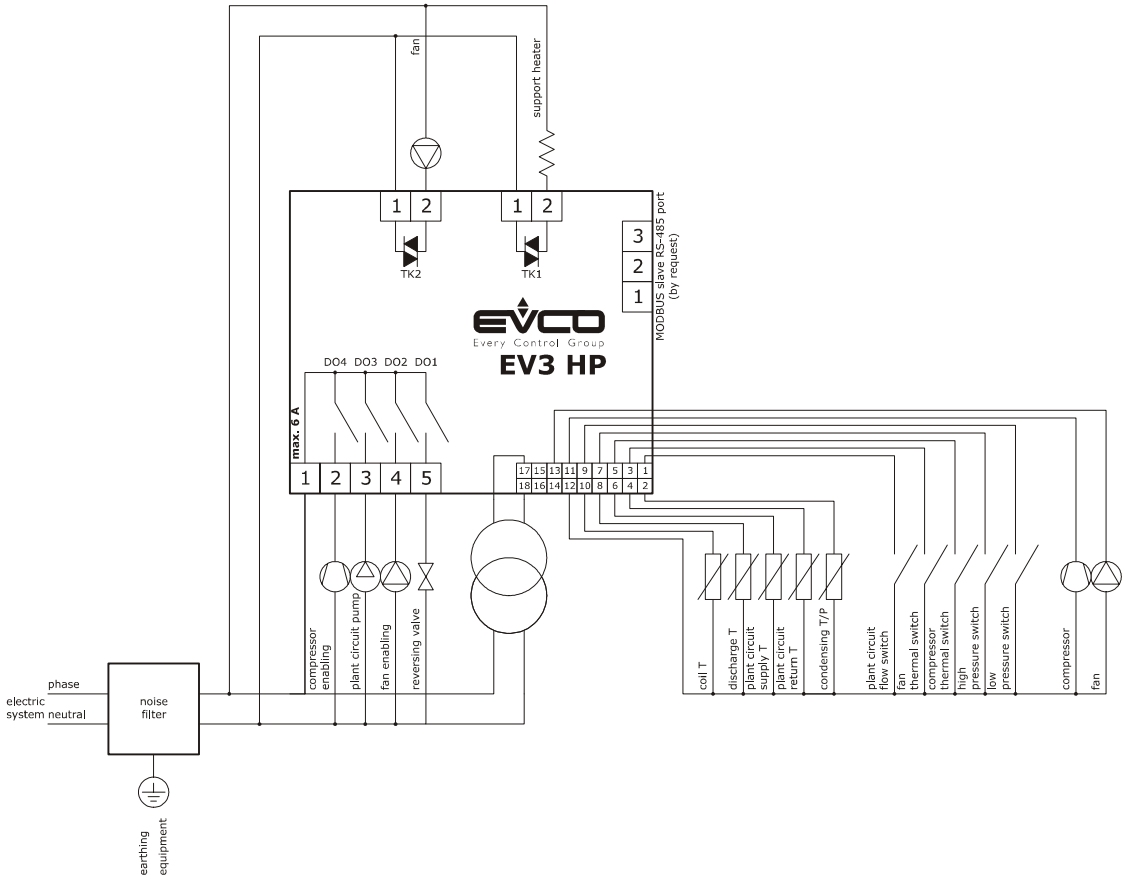
When using EVD HP, place micro-switch 1 in position ON.



4.4 Example of electrical connection

4.4.1 Example of EV3 HP electrical connection

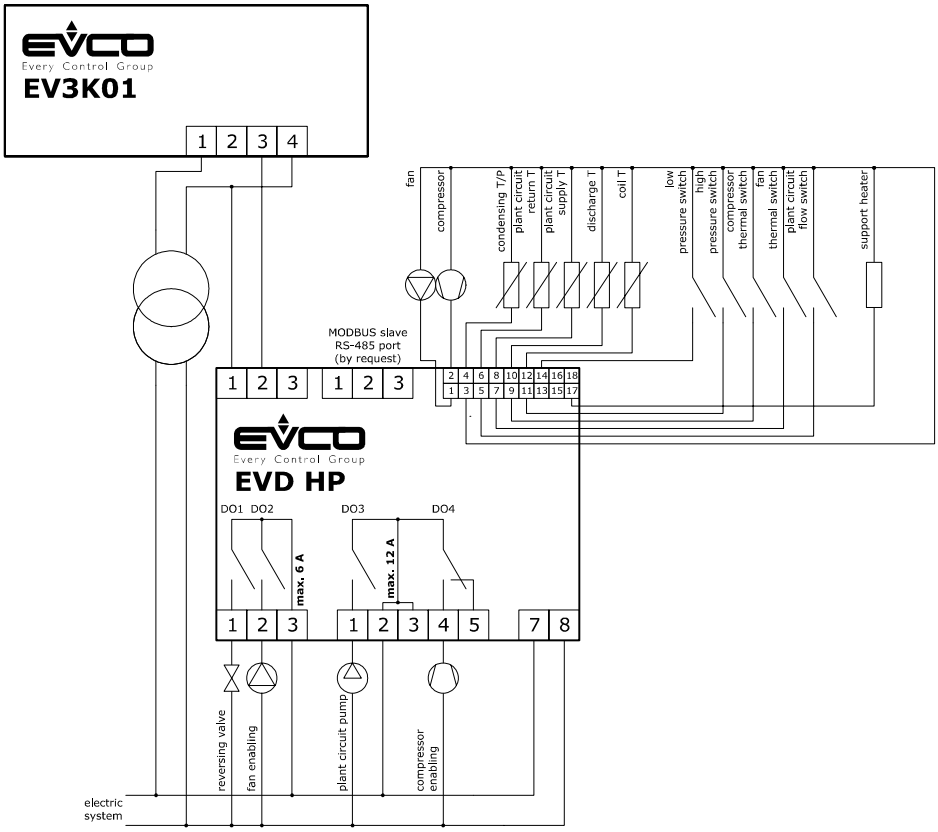
The picture below shows an example of the EV3 HP electrical connection.



If using triac digital outputs, we recommend connecting a noise filter. The heat sink might reach very high temperatures, do not touch it.

4.4.2 Example of EVD HP electrical connection

The picture below shows an example of the EVD HP electrical connection.



4.5 Precautions for electrical connection

- Do not use electric or pneumatic screwdrivers on the terminal blocks of the devices.
- If the devices have been moved from a cold to a warm place, the humidity may cause condensation to form inside. Wait about an hour before switching on the power.
- Make sure that the supply voltage, electrical frequency and power of the devices correspond to the local power supply. See the section TECHNICAL SPECIFICATIONS.
- Disconnect the devices from the power supply before doing any type of maintenance.
- The devices must be fed by power of the same phase as that feeding any module with a phase-cutting command signal.
- If using triac digital outputs, we recommend connecting a noise filter. The heat sink might reach very high temperatures, do not touch it.
- Connect the devices to an RS-485 network using a screened cable with twisted pair for the signal and a third separate conductor for the reference (for example the BELDEN 3106A cable). NB: do not connect the cable shield to the reference (GND)
- Connect the power cables as far away as possible from those for the signal.
- Do not use the devices as safety devices.
- For repairs and for further information on the devices, contact the EVCO sales network.

5 DESCRIPTION OF USER INTERFACE

5.1 Key functions

The table below shows the functions of the keys.

ICON	NAME	FUNCTION
⏻	On/stand-by	- Prolonged pressure will switch the device on or off. - While setting the parameters, it functions as a "Back" key. - The system function mode is modified every time this key is pressed according to the sequence cold → hot
SET	Set	- Prolonged pressure makes it possible to enter or exit the set-up menu (SEtP menu) - Press once to modify the set-point and confirm it. - It functions as the "Enter" key in menu navigation.
∧	Up	In set-parameters mode: - It enables you to move to a higher menu - It enables you to increase the value of a parameter
∨	Down	In set-parameters mode: - It enables you to move to a lower menu - It enables you to decrease the value of a parameter - Prolonged pressure enables you to view the measurements found by the probes.

5.2 Display

A pressure on the On/ stand-by will switch on / switch off the device. When the device is switched on with the key, it is possible to switch it remotely to Stand-By mode by operating on the dedicated digital input through a switch.

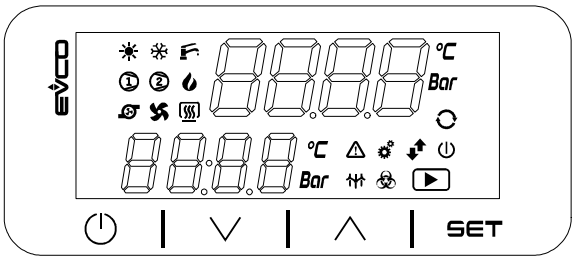
The user interface has two display modes.

Initial display mode

- The upper row shows the input water temperature, while the lower row shows the output water temperature or any alarms activated.
- When the device is switched on with the key but remotely put to Stand-By mode, the label "oFFd" will be displayed on the lower row.
- When the device is switched off with the key, the label "OFF" will be displayed on the upper row, while the time will be displayed on the lower row (if RTC is present and enabled, otherwise 4 lines ---- will be displayed.

Menu display mode

- What is displayed depends upon the menu level you are in, using a directory tree system in which the lower row shows a subcategory of the one shown on the upper row. To help users to identify what is being displayed, labels and codes are used, see paragraph 5.4.2.



5.3 Signals

The table below shows the meaning of the LED signals of EV3 HP.

LED	COLOUR	DESCRIPTION
	GREEN	Controller LED Dependant on parameter CF06 (default 0) 0 ☀ = heating ON / ❄ = chilling ON 1 ❄ = heating ON / ☀ = chilling ON
	GREEN	Compressor LED - ON if the compressor is switched on - OFF if the compressor is switched off - BLINK if some timings are underway
	GREEN	Hydraulic pump LED - ON if the pump is switched on - OFF if the pump is switched off
	GREEN	Condenser fan LED - ON if the fan is switched on - OFF if the fan is switched off
	GREEN	System heating element LED - ON if the heating element is switched on - OFF if the heating element is switched off
°C	AMBER	LED for the unit of measurement of the value shown on the lower display when the probe is configured for temperature
Bar	AMBER	LED for the unit of measurement of the value shown on the lower display when the probe is configured for pressure
	AMBER	Defrost LED - OFF if defrosting is underway - OFF if defrosting is not in progress or is completed - BLINK (1 sec) if some timings are underway for the defrost start or if the dripping is underway
	AMBER	Run LED
	RED	Alarm LED - ON if an alarm is underway - OFF if no alarm is underway
	RED	Set-up LED - ON if the device is not showing the initial display - OFF during normal functioning

LED	COLOUR	DESCRIPTION
	RED	On/stand-by LED - OFF if the controller is switched off (at the same time the "OFF" label will be displayed) - OFF if the controller is switched on
	RED	LED for the unit of measurement of the value shown on the upper display when the probe is configured for temperature
	RED	LED for the unit of measurement of the value shown on the upper display when the probe is configured for pressure
	RED	IB/RS485 LED - BLINK if an INTRABUS/RS485 communication is underway - OFF if no communication is underway

The table below shows the meaning of the LED signals of EVD HP.

LED	COLORE	SIGNIFICATO
ON	GREEN	Power supply LED - ON if the controller is powered - OFF if the controller is not powered
RUN	GREEN	"RUN" LED - ON if the controller is switched on - OFF if the controller is switched off
Δ	RED	Alarm LED - ON if an alarm is underway - OFF if no alarm is underway
IB	AMBER	INTRABUS LED - BLINK if an INTRABUS communication is underway - OFF if no communication is underway
RS485	AMBER	RS-485 LED - BLINK if an RS-485 communication is underway - OFF if no communication is underway

5.4 Menu

5.4.1 Access levels

There are three access levels for navigating within the menus, two of which require a password:

U User: always visible

S Servicer: visible if the servicer password (parameter CF09, default -12) or the manufacturer password (parameter CF10, default -123) have been entered

M Manufacturer: visible if the manufacturer password (parameter CF10, default -123) has been entered.

5.4.2 Menu list

The following menus are available:

SEtP For rapid access to the adjustment set-points

Prob Shows the temperature or pressure values for the inputs configured as probes

ALAr Shows the list of alarms underway

di Shows the status of the inputs configured as digital inputs

Ao Shows the status of the outputs configured as analogue outputs or as triac/open collector

do Shows the status of the outputs configured as digital outputs

PAr Shows and allows the device parameters to be altered. The parameters are grouped according to their function, identified on the display by a label. Each parameter has an alphabetic code followed by two numbers, as shown in the table below.

GROUP	IDENTIFICATION LABEL	PARAMETER CODE
Configuration	ConF	CF
Compressor	CoMP	CP
Fan	FAn	Fn
Alarms	ALAr	AL
Adjustment	rEGL	rL
Pump	PUMP	PM
Electric heating elements	Fro	Fr
Defrost	dFr	dF
Offset	OFF	oF

OHr Shows the time the compressors (OH1 and OH2) and the pump (OHP) have been functioning.

HiSt In devices fitted with a clock, up to 20 alarm events can be stored in the memory. The history and details of these are shown on the lower display in the following sequence.

y xx year
M xx month
d xx day
hh:mm hours:minutes

rtC The time can be set on devices fitted with a clock.

inFo Shows the FW version (project, variation and revision)

PASS The password is entered for access to the desired level: parameter Cf09 for servicer level, Cf10 for manufacturer level.

6 LIST OF PARAMETERS

6.1 Initial information

The three levels of access to the parameters are shown in the first column of the following table with letters:

U User

S Servicer

M Manufacturer

For more information see the previous paragraph 5.4.

MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	SET-POINT
U	CooL	8,5	CF04	CF03	°C	Temperature set-point in cold mode
U	HEAt	40,0	CF02	CF01	°C	Temperature set-point in hot mode
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	CONFIGURATION
S	CF01	60,0	HEAt	90.0	°C	Maximum set-point value in hot mode
S	CF02	20,0	0.0	HEAt	°C	Minimum set-point value in hot mode
S	CF03	30,0	CooL	90.0	°C	Maximum set-point value in cold mode
S	CF04	4,0	-50.0	Cool	°C	Minimum set-point value in cold mode
M	CF06	0	0	1	- - - -	Controller LED meaning 0= ☀ = heating / ❄ = cooling 1= ❄ = heating ☀ = cooling
S	CF07	1	0	1	- - - -	Enable clock 0=Off 1= On
S	CF08	1	1	200	- - - -	MODBUS serial address
S	CF09	-12	-127	127	- - - -	Servicer password
M	CF10	-123	-127	127	- - - -	Manufacturer password
M	CF13	1	0	1	- - - -	Enable hot mode 0= Off 1= On
M	CF14	1	0	1	- - - -	Enable cold mode 0= Off 1= On

M	CF17	0	0	2	- - - -	IN1 output configuration type 0= Temperature [°C] 1= 4-20mA [Bar] 2= Not used The choice of CF17 value determines the unit of measurement for the condensation (°C or Bar)
M	CF31	0,0	-50,0	80,0	Bar	Start of condensation pressure scale
M	CF32	50,0	-50,0	80,0	Bar	Bottom of condensation pressure scale
M	CF35	2	0	4	- - - -	AO1 output configuration type 0= Disabled 1= Phase cutting [%] 2= 0-10V [%] 3= PWM [%] 4= Frequency [Hz] The choice of CF35 value determines the unit of measurement for adjusting the compressor (Hz or %)
M	CF36	1	0	4	- - - -	AO2 output configuration type 0 = Disabled 1= Phase cutting [%] 2= 0-10V [%] 3= PWM [%] 4= Frequency [Hz] The choice of CF36 value determines the unit of measurement for adjusting the fan (Hz or %)
M	CF47	0	0	4	- - - -	AO1 analogue output function configuration 0= Disabled 1= Not used 2= Not used 3= Not used 4= Modulating compressor
S	CF51	0	0	1	- - - -	RUN Logo 0= Off 1= On
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	ALARMS
M	AL01	3	0	255	- - - -	Number of alarms in an hour for low pressure after which the alarm switches from automatic to manual re-arm
M	AL02	120	0	255	s	Low pressure alarm bypass time
M	AL03	-20,0	-50.0	80.0	°C-Bar	Low pressure alarm set-point

M	AL04	10,0	-12.7	12.7	°C-Bar	Low pressure alarm hysteresis
M	AL05	65,0	-50.0	80.0	°C-Bar	High pressure alarm set-point
M	AL06	25,0	-12.7	12.7	°C-Bar	High pressure alarm hysteresis
M	AL07	5	0	255	- - - -	Number of flow alarm events in an hour after which the alarm switches from automatic to manual re-arm
M	AL08	30	0	255	s	Bypass time for flow alarm from pump activation
M	AL09	3	0	255	s	Flow alarm delay from activating flow switch input
M	AL10	5	0	255	s	Flow alarm re-arm delay from deactivating flow switch input
S	AL12	3,0	-127	127	°C	Antifreeze alarm set-point
S	AL13	2,0	0.0	25.5	°C	Antifreeze alarm hysteresis
M	Al14	0	0	1	- - - -	Stop fan with antifreeze alarm 0= Disabled 1= Enabled
M	AL15	99	0,0	255,0	°C	High adjustment temperature alarm set-point
M	AL16	5	0	255	s*10	High adjustment temperature alarm delay
M	Al17	105,0	0,0	255,0	°C	High discharge temperature alarm set-point
M	AL18	15,0	0.0	25.5	°C	High discharge temperature alarm hysteresis
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	COMPRESSOR
M	CP01	6	0	255	s*10	Compressor OFF minimum time
M	CP02	36	0	255	s*10	Compressor successive switch-ons minimum time
M	CP05	20	10	CP06	Hz - %	Minimum modulating compressor value
M	CP06	100	CP05	255	Hz - %	Maximum modulating compressor value
M	CP08	0,0	0.0	25.5	°C	Cut-off hysteresis for modulating compressor adjustment ("CooL" and "HEAt") For ON-OFF adjustment set to 0
M	CP09	40	0	255	Hz - %	Set-point for refreshing the modulating compressor oil

M	CP10	5	0	255	min	Delay for refreshing the modulating compressor oil
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	COMPRESSOR ADJUSTMENT
S	rL01	5,0	0.0	25.5	°C	Compressor proportional adjustment band in cold mode
S	rL02	5,0	0.0	25.5	°C	Compressor proportional adjustment band in hot mode
S	rL04	0	0	255	s*10	Compressor adjustment integral time
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	VENTILATION
M	Fn01	20	0	255	s/10	Fan start-up time, if CF36 is set to 1 (AO2 output configuration type = phase cutting)
M	Fn02	1	0	10	ms/2	Fan phase shift
M	Fn03	1	0	1	- - - -	Fan mode 0= On-call (at the request of the compressor) 1= Independent
M	Fn04	3,0	0.0	25.5	°C-Bar	Fan adjustment delta cut-off
M	Fn05	2,0	0	25.5	°C-Bar	Fan cut-off hysteresis
M	Fn06	20	0	255	s	Fan cut-off bypass time
M	Fn07	30	0	100	Hz - %	Minimum fan speed in cold mode
M	Fn08	100	0	100	Hz - %	Maximum silent-running fan speed in cold mode
M	Fn09	30,0	-50.0	80.0	°C-Bar	Set-point temp/press minimum fan speed in cold mode
M	Fn10	20,0	0.0	25.5	°C-Bar	Fan proportional adjustment band in cold mode
M	Fn11	100	0	100	Hz - %	Maximum fan speed in cold mode
M	Fn12	57,0	-50.0	80.0	°C-Bar	Maximum fan speed set-point in cold mode
M	Fn13	30	0	255	s	Pre-ventilation time in cold mode
M	Fn14	30	0	100	Hz - %	Minimum fan speed in hot mode
M	Fn15	100	0	100	Hz - %	Maximum silent-running fan speed in hot mode
M	Fn16	9,0	-50,0	80,0	°C-Bar	Minimum fan speed set-point in hot mode
M	Fn17	6,0	0,0	25,5	°C-Bar	Fan proportional adjustment band in hot mode

M	Fn18	100	0	100	Hz - %	Maximum fan speed in hot mode
M	Fn19	0,0	-50,0	80,0	°C-Bar	Maximum fan speed set-point in hot mode
M	Fn20	50,0	-50,0	80,0	°C-Bar	Fan activation set-point in defrost mode
M	Fn21	10,0	0,0	25,5	°C-Bar	Fan activation hysteresis in defrost mode
M	Fn23	30	0	255	Hz - %	Fan speed in defrost mode
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	PUMP
M	PM01	20	0	255	s	Compressor switch-on delay from pump switch-on
M	PM02	10	0	255	s	Pump switch-off delay from compressor switch-off
M	PM03	1	0	1	- - - -	Pump ON mode at request 0= disabled (pump on constantly) 1= enabled
S	PM04	4	-127	127	°C	Antifreeze set-point for activating pump
S	PM05	2,0	0.0	25.5	°C	Antifreeze hysteresis for activating pump
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	HEATING ELEMENTS
S	Fr02	6	Fr04	Fr03	°C	Heating element set-point (for antifreeze)
M	Fr03	10	Fr04	127	°C	Maximum heating element set-point (for antifreeze)
M	Fr04	-10	-127	Fr03	°C	Minimum heating element set-point (for antifreeze)
S	Fr05	2,0	0,0	25,5	°C	Heating element hysteresis in integration mode
M	Fr11	180	0	255	s*10	Heating element activation delay in integration mode
M	Fr12	6,0	0,0	25,5	°C	Heating element delta temperature in integration mode
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	DEFROST
M	dF01	1	0	3	- - - -	Enable defrost 0 = disabled 1 = with activated compressor 2 = for compressor stop (similar to dF01 = 1 but without activating the compressor) 3 = Time interval defrost (similar to dF01 = 1 but ending up for exceeded time
M	dF02	-5,0	-50.0	80.0	°C-Bar	Defrost start set-point

M	dF03	20	0	255	min	Defrost activation delay
M	dF04	15,0	-50.0	80.0	°C	Defrost end set-point
M	dF05	5	0	255	min	Maximum defrost time
M	dF06	60	0	255	s	Waiting time between compressor switching and reversing valve switching
M	dF07	6	0	255	s*10	Dripping time
M	dF09	3	0	255	s*10	Compressor switch-on delay in defrost mode
MENU	PARAM.	DEFAULT	MIN.	MAX.	U.M.	PROBE OFFSET
S	oF01	0,0	-12.7	12.7	°C-Bar	Offset analogue input 1 (IN1)
S	oF02	0,0	-12.7	12.7	°C	Offset analogue input 2 (IN2)
S	oF03	0,0	-12.7	12.7	°C	Offset analogue input 3 (IN3)
S	oF04	0,0	-12.7	12.7	°C	Offset analogue input 4 (IN4)
S	oF05	0,0	-12.7	12.7	°C	Offset analogue input 5 (IN5)

7 REGULATORS

7.1 Initial information

The CF06 parameter makes it possible to configure the meaning of the sun and snowflake LEDs according to the following coding.

- CF06 = 0 ☀ = heating / ❄ = cooling
- CF06 = 1 ❄ = heating / ☀ = cooling

7.2 Function mode

The following function modes are available

- Parameter CF13 enables the Heating function
- Parameter CF14 enables the Cooling function

If neither mode is enabled, the unit will in Cooling mode.

The function mode can be selected on the keypad: to move from one mode to another, simply press the On/Standby key.

7.3 Compressor

The adjustment is based on the value provided by the input water probe. The compressor is run on the basis of this temperature and of the set-point.

If a modulating compressor is to be used, connect it to analogue output AN1, in which case it will be adjusted by a proportional-integral controller (PI). Output DO4 provides the enable signal to the modulating compressor DO4. In order for the enable signal to be synchronised with the compressor control signal, parameter CP08 must be other than 0.

Parameter CP01 determines the minimum time between the compressor switch-off and its successive switch-on, while parameter CP02 determines the minimum time between two successive switch-ons (that is to say the maximum number of switch-ons per hour).

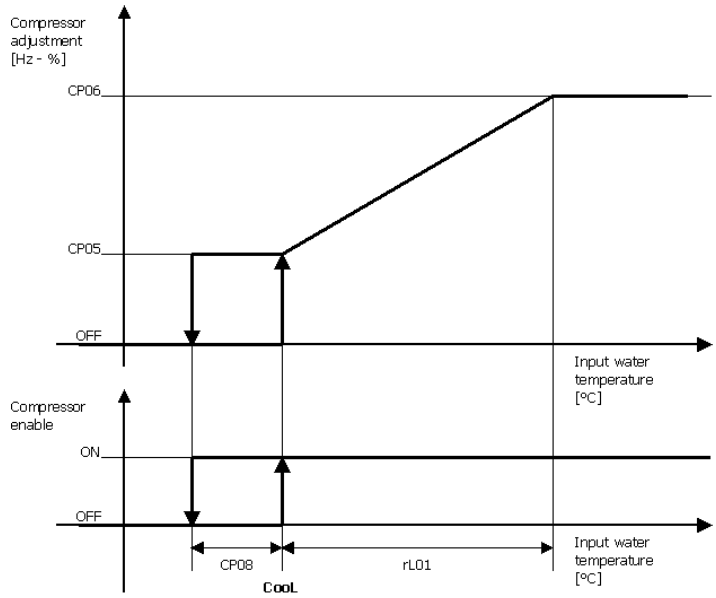
Parameters CP05 and CP06 have a different meaning depending on the type of analogue output, selected by parameter CF35: if the output is a frequency, they represent the maximum and minimum working frequencies, otherwise they represent the maximum and minimum working percentages.

If ON-OFF type compressors are to be used, parameter CP08 must be set at 0. Compressor is connected to output DO4.

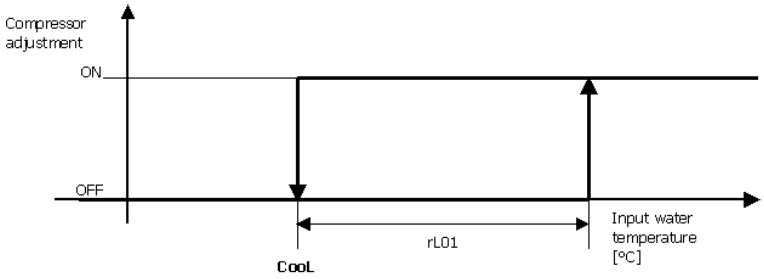
7.3.1 Adjustment in cold mode

The regulators can work in cold (chiller) mode if parameter CF14 is configured correctly.

The diagram below represents the proportional adjustment in cold mode. To keep it simple, the integral component is not represented (RI04 = 0). The compressor enable outlet is also shown.



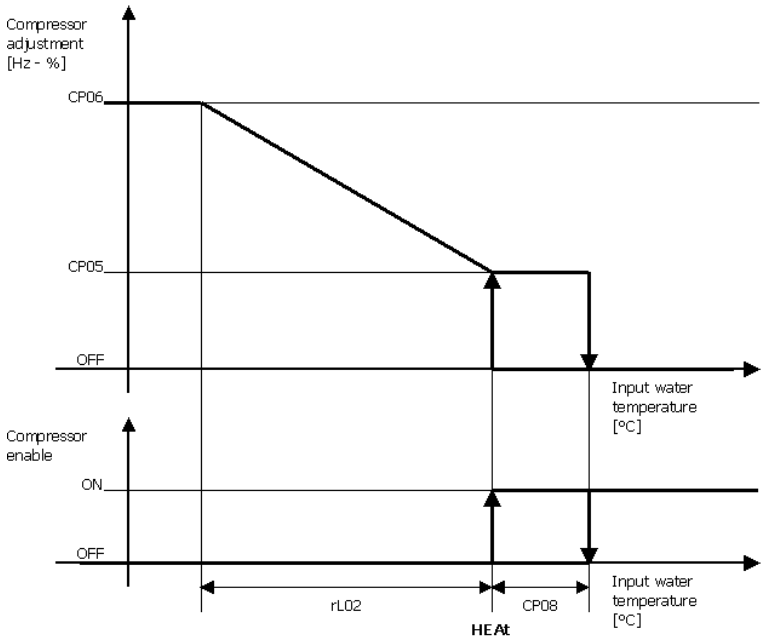
For ON-OFF adjustment, the cut-off delta must be set to 0 and there will be only one adjustment step, as shown on the diagram below.



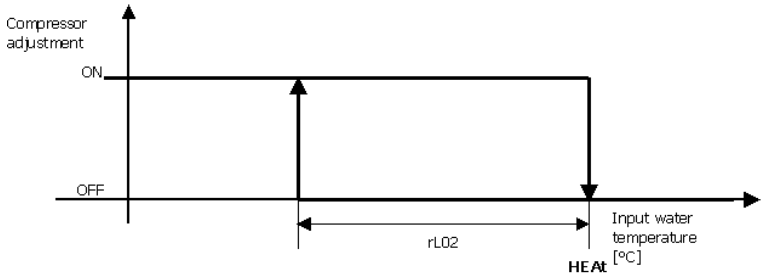
7.3.2 Adjustment in hot mode

The regulators can work in hot (heat pump) mode if parameter CF13 is configured correctly.

The diagram below represents the proportional adjustment in hot mode. The integral component is not represented (RI04 = 0).



For ON-OFF adjustment, the cut-off delta must be set to 0 and there will be only one adjustment step, as shown on the diagram below.



7.3.3 Oil refresh

If the compressor is running at a frequency lower that the CP09 parameter for a period longer than the CP10 parameter, it is activated at the maximum frequency. The compressor will remain at the maximum power until it reaches the set-point.

7.4 Hydraulic pump

7.4.1 Initial information

The functional mode of the hydraulic pump can be set using parameter Pm03: the pump may be always kept switched on or be switched on for thermoregulation in relation to the functioning of the compressor.

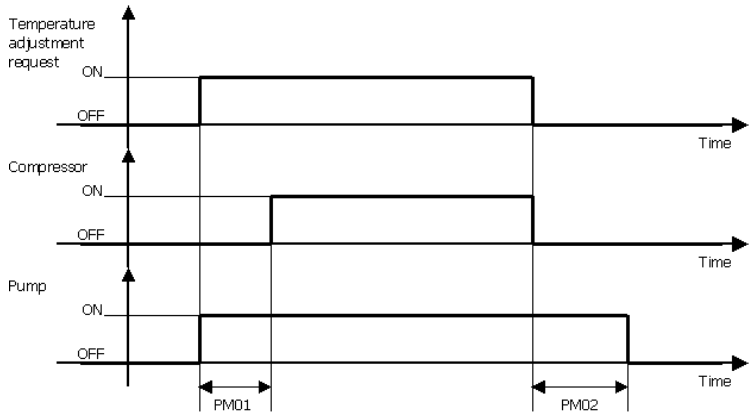
In the second case, the pump switches off after a delay of PM02 from when the compressor is switched off every time it is deactivated by the regulator. It will switch off immediately if an alarm sounds requiring the pump to be stopped, as for the flow alarm in manual re-arm (with the flow alarm active in automatic re-arm, the pump stays switched on).

7.4.2 Function modes

The hydraulic pump can be set to function in two modes.

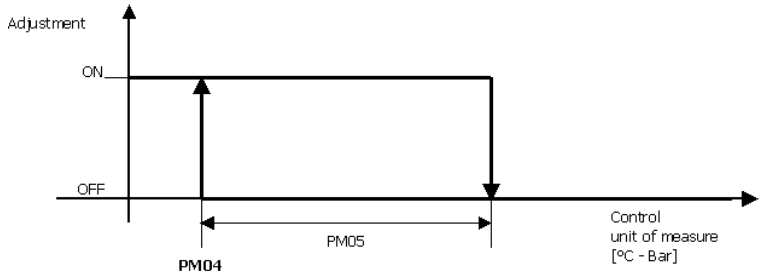
Continuous The pump is always in ON mode if PM03 = 0

On-call The pump is switched on at the request of the heat regulator if PM03 = 1. The compressor is activated with a delay (PM01) from pump switch-on and the pump is switched off with a delay (PM02) from when the compressor is switched off, as shown below:



7.4.3 Antifreeze function

When the temperature of the input or output water is below PM04, the pump is activated automatically if it was switched off. The pump switches off when the temperature rises above the value of the antifreeze threshold, to which must be added the hysteresis (PM05).



7.5 Electric heating elements

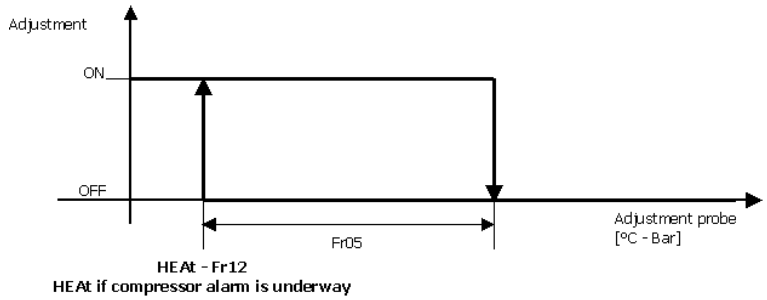
7.5.1 Initial information

The digital output that controls the electric heating elements may also be used for enabling a boiler.

7.5.2 Heating elements in integration mode

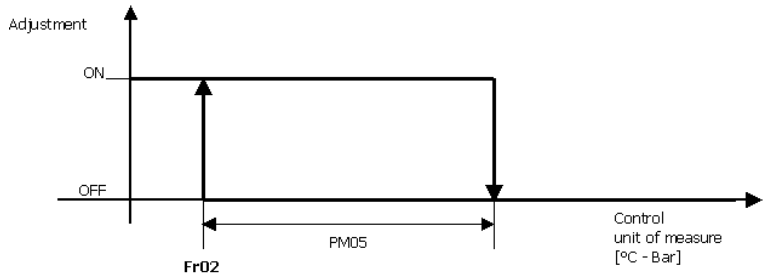
The heating element output in integration mode is only activated if the system is in Heating mode.

The heating elements come on when the temperature of the adjustment probe falls below threshold set by parameter HEAt - Fr12 for a time period of Fr11. They switch off when the temperature rises above the threshold set by (HEAt - Fr12) + Fr05. If the compressor is in alarm mode, the adjustment is made without delay from when the heat set-point is reached.



7.5.3 Heating elements in antifreeze mode

The heating element comes on when the pump is switched on and the minimum temperature between the input and output water is lower than the parameter Fr02.



7.6 Condensation control

7.6.1 Initial information

The condensation is controlled by adjustments to the fan that can either be a proportional or ON-OFF type.

If an ON-OFF fan is to be used, connect it to digital output "Enable fan".

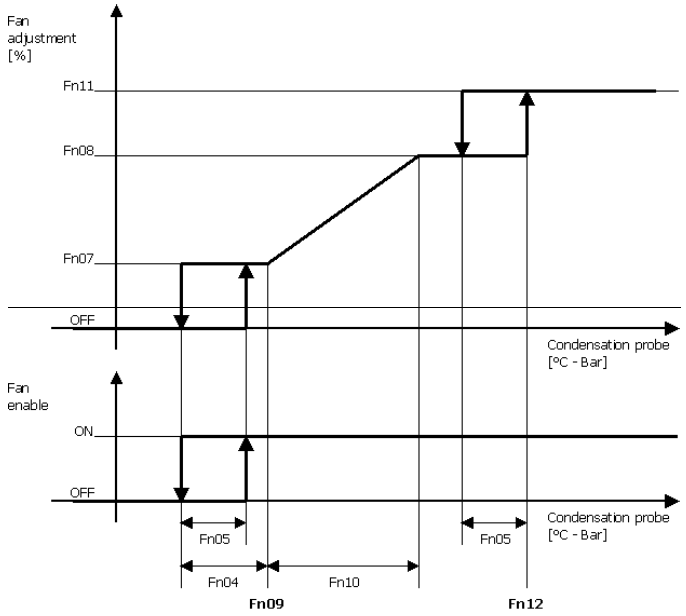
If a proportional adjustment fan is to be used, it should be connected to analogue outlet "Fan". If an enable outlet is to be used to work the modulating fan it only has to be connected to digital output "Enable fan".

For modulating fans, parameter Fn01 enables the start-up time only if the output is configured as cutting phase (CF36 = 1.

The fan can be adjusted independently of the compressor (Fn03=1) or at the request of the compressor (Fn03=0). When the fan is switched off this will be by-passed by a time equal to Fn06 from switch-on of a compressor. During this period, the fan is set to minimum speed if the regulator requests cut-off.

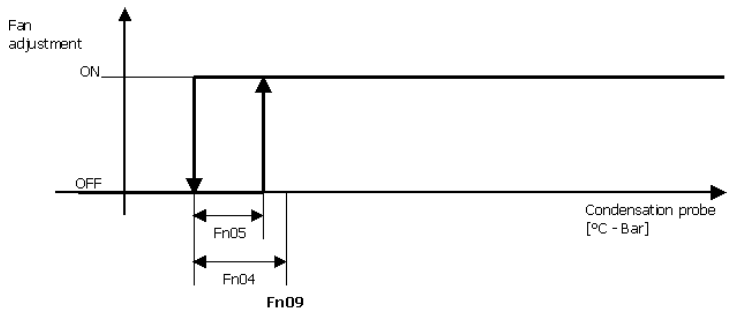
7.6.2 Adjustment in cold mode

The diagram below represents the proportional adjustment in cold mode.



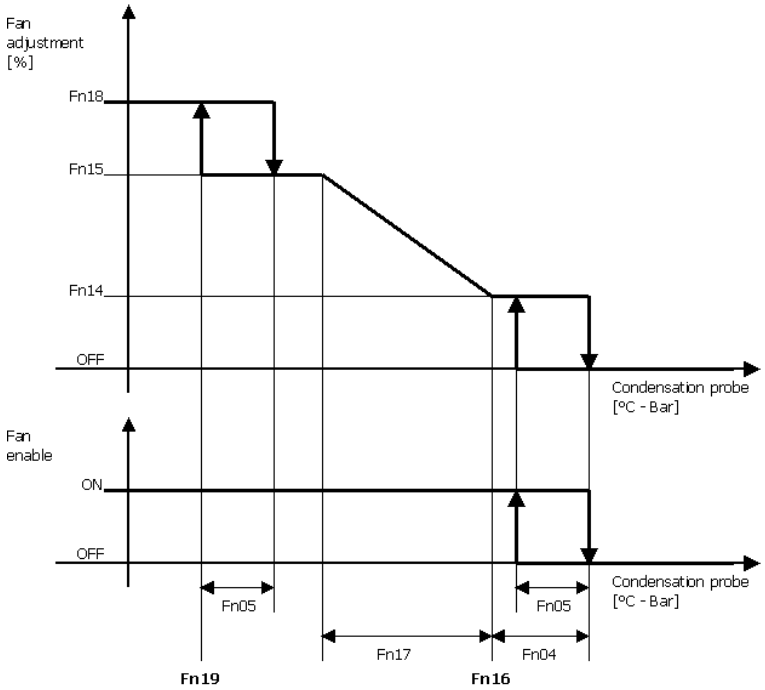
In this mode, parameter Fn13 (external fan pre-ventilation time) is also activated to avoid the compressor starting up at a condensation temperature that is too high. Depending on this parameter, the fan is activated for a time equal to Fn13 before the compressor is switched on and the fan speed is proportional to the condensation temperature. During this period, the fan is set to minimum speed if the regulator requests cut-off.

The diagram below represents the ON-OFF adjustment in cold mode.

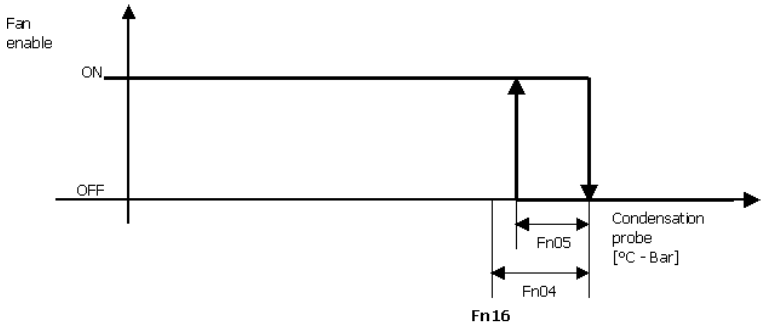


7.6.3 Adjustment in hot mode

The diagram below represents the proportional adjustment in hot mode.



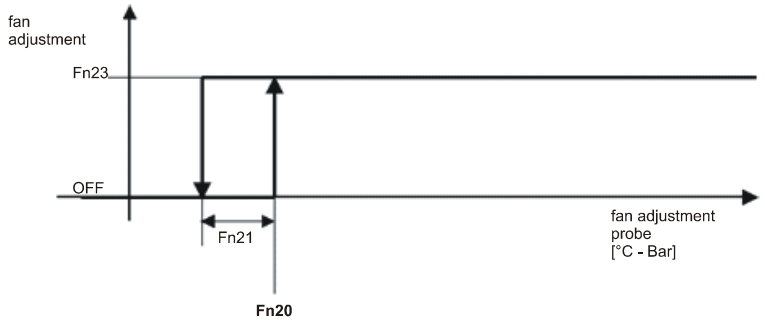
The diagram below represents the ON-OFF adjustment in hot mode.



7.6.4 Regolazione in sbrinamento

During the start-defrost period, the fan remains off.

The diagram below represents the fan adjustment when a defrost cycle is underway (with compressor in On mode).



During the dripping period, the fan is first switched off and once the 4-ways valve is inverted, it is switched back on at the maximum speed for a time equal to dF07.

7.7 Defrost

7.7.1 Initial information

The defrost function is only active if the system is in Heating mode and enabled by parameter dF01.

dF01 = 0 Defrost disabled

dF01 = 1 Defrost with activated compressor

dF01 = 2 Defrost for compressor stop (similar to dF01 = 1 but without activating the compressor)

dF01 = 3 Time interval defrost (similar to dF01 = 1 but ending up for exceeded time)

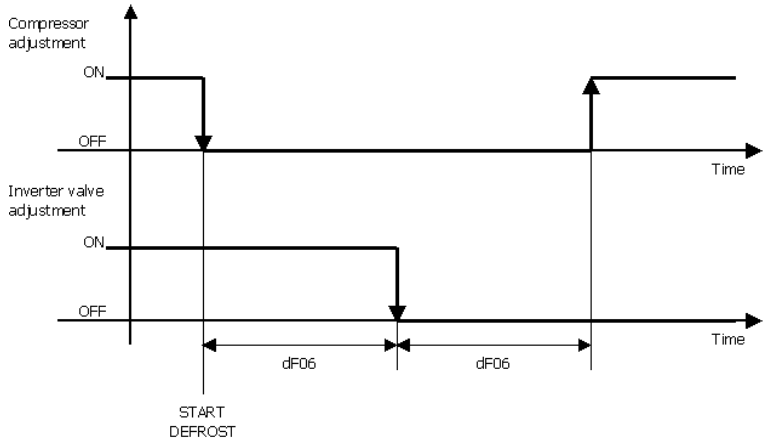
The battery probe regulates the start and end defrost cycles.

7.7.2 Start defrost control

When the reading indicated by the probe is below the dF02 threshold and the compressor is activated, a counter starts up. When the counter reaches the dF03 value and the dF08 time period has elapsed since the last defrost, a defrost cycle is activated. The counter stops if the probe reading rises above the dF02 threshold or the compressor is switched off.

The reversing valve is regulated after a delay equal to the time expressed by parameter dF06 and the compressor is switched back on at full power (df01 = 1 o 3) after a further wait equal to the time expressed by the parameter dF06, also with a switch-on waiting time of dF09. If the reading rises above Fn20, the fans are activated on full power; if it falls below Fn20-Fn21, the fans stop.

The diagram below shows the start defrost cycle.

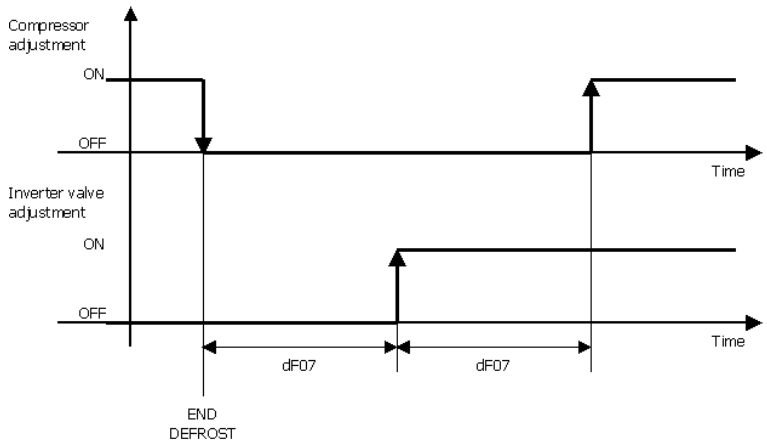


7.7.3 End defrost control

Defrost is interrupted when the reading detected by the probe rises above the dF04 threshold (df01 = 1 o 2) or if the duration of the defrost is equal to Df05 (always valid if df01 = 3)..

Just as for the start defrost control, the reversing valve is regulated after a delay equal to the time expressed by parameter dF07 and the compressor is switched back on at full power after a further wait equal to the time expressed by parameter dF07.

The diagram below shows the end defrost cycle.



8 ALARMS

8.1 Initial information

All the alarms re-arm automatically except for:

- **Antifreeze alarm**: manual re-arm
- **Low pressure alarm:** manual re-arm if, in an hour, the number of events is higher than parameter AL01
- **Flow alarm:** manual re-arm if, in an hour, the number of events is higher than parameter AL07

Prolonged pressure of the On/stand-by key resets all manual re-arm alarms.

8.2 List of alarms

The table below shows the meaning of the device's various alarm codes.

CODE	DESCRIPTION
AHP1	**High pressure alarm** The alarm is activated both by the maximum pressure switch and when the value of the condensation probe exceeds the threshold set by AL05. The alarm is deactivated when both conditions return to normal. Main results - The compressor is switched off.
ALP1	**Low pressure alarm** The alarm is activated both by the minimum pressure switch and when the value of the condensation probe falls below the threshold set by AL03. The alarm is deactivated when both conditions return to normal. The alarm is activated after a delay of AL02 from compressor switch-on. Main results - The compressor and fan are switched off.
AtC1	**Compressor thermal protection alarm** The alarm is activated if the input configured as a compressor thermal protection input is active. It deactivates if the input is inactive. Main results - The compressor is switched off.
AdS1	**Compressor discharge alarm** The alarm is activated if the value detected by the probe configured as a compressor discharge temperature exceeds AL17. The alarm is deactivated when the temperature falls below AL17-AL18. Main results: - The compressor is switched off.
AtF1	**Fan thermal protection alarm** The alarm is activated if the input configured as fan thermal protection is active. It deactivates if the input is inactive. Main results - The compressor and fan are switched off.
AFr1	**Antifreeze alarm** The alarm is calculated on the minimum temperature reading of the input and output water probes: the alarm is activated when the minimum value is below AL12; it is deactivated when the value is above AL12+AL13. The alarm is delayed for a period equalling AL11 from when it is switched on in hot mode. Main results - The compressor and fan are switched off.

AFLo	**Flow alarm** This alarm is activated when the input configured as a flow switch is active for a period of AL09, with a delay of AL08 from pump switch-on; it is deactivated when the input is inactive for a time amounting to AL10. It reverts to manual re-arm if the number of alarm events in an hour exceeds AL07. Main results - All functions switched off.
AHtr	**High temperature alarm** This alarm is activated when the input water temperature exceeds AL15 for a period longer than AL16. It is deactivated when the temperature is lower than AL15-AL13. Main results - The compressor is switched off.
EA01 **EA02** **EA03** **EA04** **EA05**	**Probe alarms** The alarm is activated in the following situations: - when a probe short circuits or is interrupted - if the upper or lower limits set for a probe are exceeded Main results - All functions switched off.

9 ACCESSORIES

9.1 EVIF20SUXI RS-485/USB serial interface

9.1.1 Initial information

This interface makes it possible to connect EV3 HP and EVD HP to the set-up software Parameters Manager.

9.2 0025100010 drip protector

9.2.1 Initial information

This drip protector shields EV3 HP and EV3K01 from damp.

9.3 CJAV connection kit

9.3.1 Initial information

These kits make it possible to cable EV3 HP and EVD HP.

CONTROLLER	PURCHASING CODE
EV3 HP	CJAV37
EVD HP	CJAV38

10 TECHNICAL SPECIFICATIONS

10.1 Technical specifications

Purpose of the control device	EV3 HP	Function controller.
	EVD HP	
	EV3K01	
Construction of the control device	EV3 HP	Built-in electronic device.
	EVD HP	
	EV3K01	
Container	EV3 HP	Black, self-extinguishing.
	EVD HP	Grey, self-extinguishing.
	EV3K01	Black, self-extinguishing.
Category of heat and fire resistance	EV3 HP	D.
	EVD HP	
	EV3K01	
Measurements	EV3 HP	75.0 x 33.0 x 59.0mm (2.952 x 1.299 x 2.322 in; L x H x D).
	EVD HP	71.0 x 110.0 x 60.0mm (2.795 x 4.330 x 2.362 in; L x H x D); 4 DIN modules.
	EV3K01	75.0 x 33.0 x 39.5mm (2.952 x 1.299 x 1.555 in; L x H x D).
Mounting methods for the control device	EV3 HP	To be fitted to a panel, snap-in brackets provided.
	EVD HP	On a DIN rail 35.0 x 7.5 mm (1.377 x 0.295 in) or 35.0 x 15.0mm (1.377 x 0.590 in), in a control panel.
	EV3K01	To be fitted to a panel, snap-in brackets provided.
Degree of front protection	EV3 HP	IP65.
	EVD HP	IP40.
	EV3K01	IP65.

<table>
<tr><td rowspan="4">Connections:</td><td>EV3 HP</td><td>- Micro-Fit connector (power supply, analogue inputs, digital inputs, analogue outputs and powered INTRABUS communications port)
- Edge connectors (digital outputs)
- Plug-in screw terminal block (RS-485 MODBUS slave communications port).</td></tr>
<tr><td>EVD HP</td><td>- Micro-Fit connector (analogue inputs, digital inputs, analogue outputs and open collector digital output)
- Plug-in screw terminal blocks (power supply, electro-mechanical relay digital outputs and communications ports).</td></tr>
<tr><td>EV3K01</td><td>Plug-in screw terminal block (power supply and communications port).</td></tr>
<tr><td colspan="2">The maximum length of the connection cables are as follows:
- power supply:
- for EV3 HP 10m (32.8ft)
- for EVD HP 10m (32.8ft)
- for EV3K01:
- 10m (32.8ft) if the power supply is supplied by EVD HP
- 3m (9.8ft) for independent power supply
- Analogue inputs: 10m (32.8ft)
- Power supply for transducer analogue inputs 4-20mA: 10m (32.8ft)
- Digital inputs: 10m (32.8ft)
- Analogue outputs 0-10V: 10m (32.8ft)
- Phase cutting analogue outputs: 10m (32.8 ft)
- PWM analogue outputs: 1m (3.28ft)
- Electro-mechanical relay digital outputs: 10m (32.8ft)
- Triac digital outputs: 10m (32.8ft)
- Open collector digital outputs: 10m (32.8ft)
- INTRABUS powered ports: 10m (32.8 ft)
- RS-485 MODBUS slave ports: 1,000m (3,280ft); see also the MODBUS manual, specifications and implementation guides available on http://www.modbus.org/specs.php.
Use cables of an adequate section for the current running through them.
For EV3 HP cabling we recommend using the CJAV37 connection kit (to be ordered separately). For EVD HP cabling we recommend using the CJAV38 connection kit (to be ordered separately).</td></tr>
<tr><td rowspan="3">Operating temperature</td><td>EV3 HP</td><td rowspan="3">From -10 to 55°C (from 14 to 131°F).</td></tr>
<tr><td>EVD HP</td></tr>
<tr><td>EV3K01</td></tr>
<tr><td rowspan="3">Storage temperature</td><td>EV3 HP</td><td rowspan="3">From -25 to 70°C (from -13 to 158°F).</td></tr>
<tr><td>EVD HP</td></tr>
<tr><td>EV3K01</td></tr>
</table>

Operating humidity	EV3 HP	Relative humidity without condensate from 10 to 90%.
	EVD HP	
	EV3K01	
Pollution status of the control device	EV3 HP	2.
	EVD HP	
	EV3K01	
Operating altitude	EV3 HP	from 0 to 2,000m (from 0 to 6,591ft).
	EVD HP	
	EV3K01	
Transport altitude	EV3 HP	From 0 to 3,048m (from 0 to 10,000ft).
	EVD HP	
	EV3K01	
Environmental compliance	EV3 HP	- RoHS 2011/65/EC - WEEE 2012/19/EU - REACH (EC) Regulation 1907/2006.
	EVD HP	
	EV3K01	
EMC compliance	EV3 HP	- EN 60730-1 - IEC 60730-1.
	EVD HP	
	EV3K01	
Power supply	EV3 HP	12VAC (±15%), 50/60 Hz (±3 Hz), max. 6VA not insulated, supplied by a class 2 circuit. Protect the power supply with a 1 A-T 250V fuse.
	EVD HP	115... 230VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 6VA insulated. Protect the power supply with a 2 A-T 250V fuse.
	EV3K01	- 12VAC (+10 % -15 %), 50/60 Hz (±3 Hz), max. 7VA not insulated. - 12VDC (±15%), max. 5W not insulated, supplied by a class 2 circuit. Protect the power supply with a 1 A-T 250V fuse.

Rated impulse-withstand voltage	EV3 HP	4 KV.
	EVD HP	
	EV3K01	
Over-voltage category	EV3 HP	III.
	EVD HP	II.
	EV3K01	Not applicable.
Software class and structure	EV3 HP	A.
	EVD HP	
	EV3K01	
Clock	EV3 HP	On request (with secondary lithium battery). Battery autonomy in the absence of a power supply: > 6 months at 25°C (77°F). Battery charging time: 24h (the battery is charged by the power supply of the device). Drift: ≤ 60s/month at 25°C (77°F).
	EVD HP	
	EV3K01	Not available.
Analogue inputs	EV3 HP	5 inputs: - 4 for NTC probes - 1 can be set up using the configuration parameter for NTC 4-20mA probes or transducers
	EVD HP	
	EV3K01	None.
	<u>NTC analogue inputs (10 KΩ @ 25 °C, 77 °F)</u> Sensor type: ß3435. Measurement field: from -50 to 150°C (from -58 to 248°F). Resolution: 0.1°C. Accuracy: 0.5°C from -20 to 40°C, 1°C from -40 to 120°C, 2°C from -50 to 150°C. Protection: none.	
	<u>Analogue inputs 4-20 mA</u> Input resistance: ≤ 200 Ω. Resolution: 0.02mA. Protection: none; the maximum current permitted on each input is 25mA.	
Digital inputs	EV3 HP	5 volt-free contact inputs.
	EVD HP	

	EV3K01	None.
	Volt-free contact digital inputs (5 VDC, 1,5mA) Power supply: none. Protection: none.	
Analogue outputs	EV3 HP	2 outputs that can be set up using the configuration parameter for 0-10V, phase cutting or PWM.
	EVD HP	
	EV3K01	none.
	Analogue outputs 0-10V (max. 10mA) Input resistance: 1 KΩ. Resolution: 0.01 V. Protection: none.	
	Phase cutting analogue outputs Output: 10VDC, max. 10mA Protection: none.	
	PWM analogue outputs Output: 10VDC, max. 10mA Frequency: 10... 2KHz. Duty cycle: 5... 95%. Protection: none.	
Digital outputs	EV3 HP	Up to 6 outputs: - 4 with SPST electro-mechanical relay, 2A res. @ 250 VAC - 1 with triac 200mA res. @ 250VAC at 25°C (77°F) - 1 with triac, 2A res. @ 250VAC at 25°C (77°F).
	EVD HP	Up to 5 outputs: - 2 with SPST electro-mechanical relay, 3A res. @ 250VAC - 1 with SPST electro-mechanical relay, 8A res. @ 250VAC - 1 with SPST electro-mechanical relay, 12A res. @ 250VAC - 1 with open collector, 12VDC, max. 40mA.
	EV3K01	None.
Type 1 or Type 2 Actions	EV3 HP	Type 1.
	EVD HP	
	EV3K01	Not applicable.

Additional features of Type 1 or Type 2 actions	EV3 HP	C.
	EVD HP	
	EV3K01	not applicable.
Displays	EV3 HP	Custom 4+4 digit display.
	EVD HP	Signalling LED.
	EV3K01	Custom 4+4 digit display.
Communications ports	EV3 HP	Up to 2 ports: - 1 powered INTRABUS port - 1 RS-485 MODBUS slave port
	EVD HP	
	EV3K01	1 powered INTRABUS port.
Alarm buzzer	EV3 HP	Built-in.
	EVD HP	Not available.
	EV3K01	Built-in.

Notes

EV3 HP & EVD HP

Controllers for reversible single-circuit residential heat pumps

Installer manual ver. 1.2

GA - 03/16

Code 1443DHPI124

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