EV3 HP Controller for reversible single-circuit residential heat pumps

EN ENGLISH

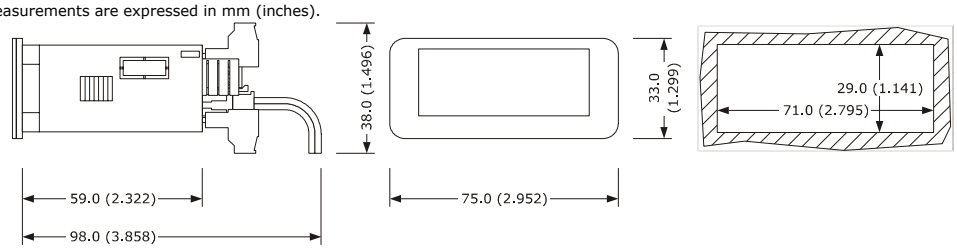
IMPORTANT
Read this document carefully before installation and before using the device and take all the prescribed precautions. Keep this document with the device for future consultation.
Only use the device in the ways described in this document. Do not use the device as safety device.
For more information see the installer manual.

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

1 MEASUREMENTS AND INSTALLATION

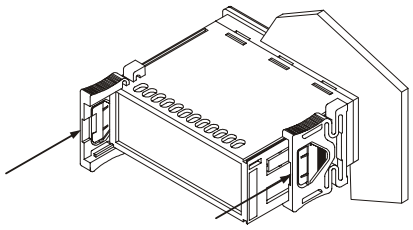
1.1 Measurements

Measurements are expressed in mm (inches).



1.2 Installation

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



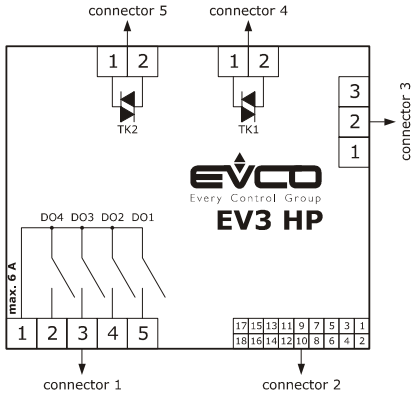
INSTALLATION PRECAUTIONS
- The thickness of the panel on which the device is to be installed must be between 0.8 and 2.0mm (0.031 and 0.078 in).
- Ensure that the working conditions for the device (operating temperatures, humidity, etc.) are within the set limits. See the section TECHNICAL SPECIFICATIONS.
- Do not install the device 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 device 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.

2 ELECTRICAL CONNECTION

2.1 I/O configuration

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

2.2 Description of connectors



Connector 1

PART	DESCRIPTION
1	Electro-mechanical relay digital outputs DO1... DO4 (max. 6A): common
2	Electro-mechanical relay digital output DO4 (2A SPST): normally open
3	Electro-mechanical relay digital output DO3 (2A SPST): normally open
4	Electro-mechanical relay digital output DO2 (2A SPST): normally open
5	Electro-mechanical relay digital output DO1 (2A 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	Analogue input GND, digital input GND, analogue output GND and GND for powered INTRABUS port
13	Analogue output AO2 (0-10V/phase cutting/PWM)
14	INTRABUS port powered up signal
15	Power supply to transducer analogue inputs 4-20 mA (12 VDC, max. 40 mA)
16	Analogue input GND, digital input GND, analogue output GND and GND for 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 slave port: +
2	RS-485 MODBUS slave port: --
3	RS-485 MODBUS slave port: 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

2.3 Example of electrical connection

See next page.

PRECAUTIONS FOR ELECTRICAL CONNECTION
- Do not use electric or pneumatic screwdrivers on the terminal blocks of the device.
- If the device has 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 are within the set limits. See the section TECHNICAL SPECIFICATIONS.
- Disconnect the device 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; do not touch the heat dissipator because it could be very hot
- Connect the device to an RS-485 network using a screened twisted pair. We recommend using a BELDEN 3106A cable.
- Connect the power cables as far away as possible from those for the signal.
- For repairs and for further information on the device, contact the EVCO sales network.

3 SIGNALS AND ALARMS

3.1 Signals

LED	DESCRIPTION
	Heat pump function mode LED
	Chiller function mode LED
	Compressor LED
	Circulation pump LED
	Fan LED
	Boiler/system heating element enable LED
°C	Temperature LED
Bar	Pressure LED
	Defrost LED
	Alarm LED
	Set-up LED
	On/stand-by LED

3.2 Alarms

CODE	DESCRIPTION
EA01	Condensation temperature probe alarm/ condensation pressure probe alarm
EA02	System return temperature probe alarm
EA03	System delivery temperature probe alarm
EA04	Compressor discharge temperature probe alarm
EA05	Battery temperature probe alarm
AFLo	Flow switch alarm
AHtr	Maximum temperature alarm
AFr1	Antifreeze alarm

AHP1	Maximum pressure switch alarm
ALP1	Minimum pressure switch alarm
AtC1	Compressor thermal protection alarm
AtF1	Fan thermal protection alarm

4 TECHNICAL SPECIFICATIONS

Purpose of the control device	Function controller.
Construction of the control device	Built-in electronic device.
Container	Black, self-extinguishing.
Category of heat and fire resistance	D.
Measurements	75.0 x 33.0 x 59.0 mm (2.952 x 1.299 x 2.322 in; L x H x D).
Mounting methods for the control device	To be fitted to a panel, snap-in brackets provided.
Degree of front protection	IP65.
Connections	- 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).

The maximum length of the connection cables are as follows:
- Power supply: 10m (32.8 ft)
- Analogue inputs: 10m (32.8 ft)
- Power supply for transducer analogue inputs 4-20mA: 10m (32.8 ft)
- Digital inputs: 10m (32.8 ft)
- Analogue outputs 0-10V: 10m (32.8 ft)
- Phase cutting analogue outputs: 10m (32.8 ft)
- PWM analogue outputs: 1m (3.28 ft)
- Electro-mechanical relay digital outputs: 10m (32.8 ft)
- Triac digital outputs: 10m (32.8 ft)
- INTRABUS powered ports: 10m (32.8 ft)
- RS-485 MODBUS master/slave ports: 1,000m (3,280 ft); see also the *MODBUS manual, specifications and implementation guides* available on *www.modbus.org/specs.php*.

Use cables of an adequate section for the current running through them.
We recommend using the CJAV37 connection kit (to be ordered separately).

Operating temperature	From -10 to 55°C (from 14 to 131°F).
Storage temperature	From -25 to 70°C (from -13 to 158 °F).
Operating humidity	Relative humidity without condensate from 10 to 90%.
Pollution status of the control device	2.
Operating altitude	From 0 to 2,000m (from 0 to 6,591
Transport altitude	From 0 to 3,048 m (from 0 to
Environmental compliance	- RoHS 2011/65/EC - WEEE 2012/19/EU - REACH (EC) Regulation 1907/2006.
EMC compliance	- EN 60730-1 - IEC 60730-1.
Power supply:	12VAC (+10 -15%), 50/60 Hz (±3 Hz), max. 7VA not insulated.

Protect the power supply with a 1 A-T 250V fuse.

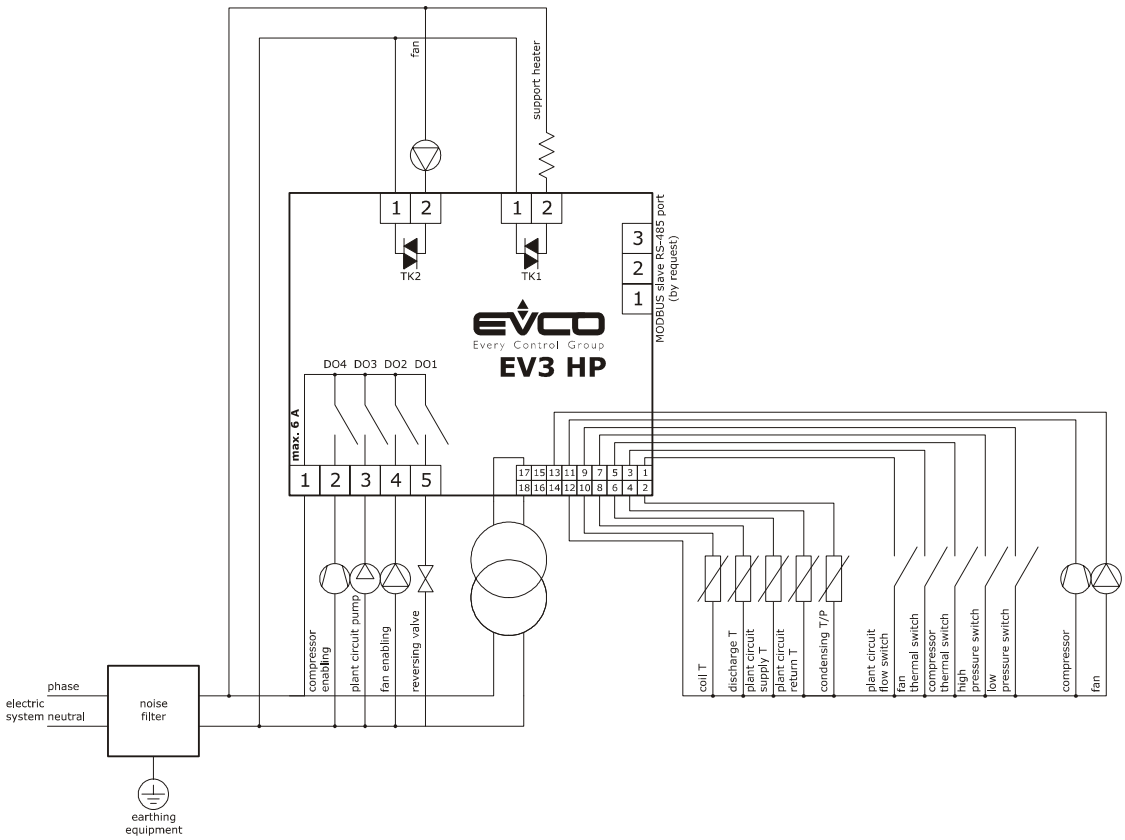
Rated impulse-withstand voltage	4 KV.
Over-voltage category	III.
Software class and structure	A.
Clock	On request (with secondary lithium battery).

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).

Analogue inputs	5 inputs: - 4 for NTC probes - 1 can be set up using the configuration parameter for NTC probes or 4-20mA
Digital inputs	5 dry contact inputs.
Analogue outputs	2 outputs that can be set up using the configuration parameter for 0-10V, phase cutting or PWM.
Digital outputs	Up to 6 outputs: - 4 with SPST electro-mechanical relay, 2A res. @ 250VAC - 1 with triac, 200 mA res. @ 250 VAC at 25 °C (77 °F) - 1 with triac, 2A res. @ 250 VAC at 25 °C (77 °F).
Type 1 or Type 2 Actions	Type 1.
Additional features of Type 1 or Type 2 actions	C.
Displays	Custom 4+4 digit display.
Communications ports	Up to 2 ports: - 1 powered INTRABUS port - 1 RS-485 MODBUS slave port
Alarm buzzer	Built-in.

2 ELECTRICAL CONNECTION

2.3 Example of electrical connection



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