

ENGLISH
IMPORTANT

Read this document carefully before installing and using the device and follow all the additional information; keep this document close to the device for future consultations. For further information consult the "Application manual".

The device must be disposed according to the local legislation about the collection for electrical and electronic equipment.

1 INTRODUCTION

1.1 Introduction

The drivers of the EVDRIVE03 series are devices studied for the management of bipolar stepper electronic expansion valves.

They are available in built-in and blind version (according to the model).

The user interface of the built-in versions consists of a LCD graphic display, of six buttons and guarantees an index of protection IP40.

The blind versions must be used with a remote user interface.

They can be powered both in alternating and in direct current (24 VAC/24... 37 VDC).

The drivers can work with the most common temperature probes (NTC and Pt 1000) and with the most common pressure transducers (0-20 mA, 4-20 mA, 0-5 V ratiometric and 0-10 V).

They have configurable digital inputs (enable the operation, change parameters set, backup module status, etc.) and a 5 res. A @ 250 VAC digital output (electromechanical relay) configurable as alarm output, solenoid valve or resynchronization valve.

Through the programming port it is possible to make the upload and the download of the configuration parameters (using the programming key EVKEY10); through this port (or the RS-485 one, with MODBUS communication protocol), it is also possible to connect the devices to the set-up software system Parameters Manager or to the plants monitoring and supervision one RICS (through a serial interface).

Through the CAN communication port (or the RS-485 one) it is finally possible to connect the devices to a controller or to a remote user interface.

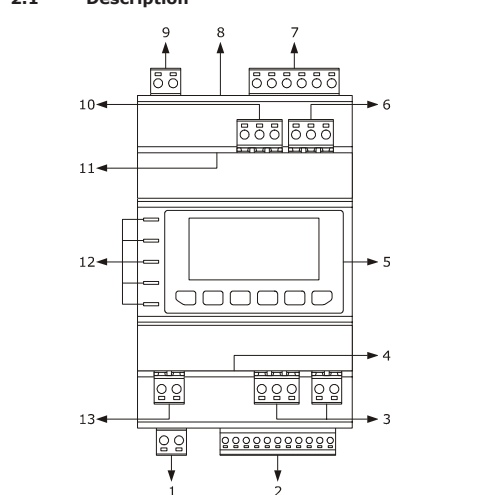
Through the backup module EPS4B it is finally possible to close the valve in case of lack of power supply of the drivers.

Installation is on DIN rail.

Among the several functions one highlights the possibility to work both in stand alone mode and under the supervision of a controller, the management both of generic electronic expansion valves and of the most common valves Sporan and Alco and the management of the backup probes.

2 DESCRIPTION

2.1 Description



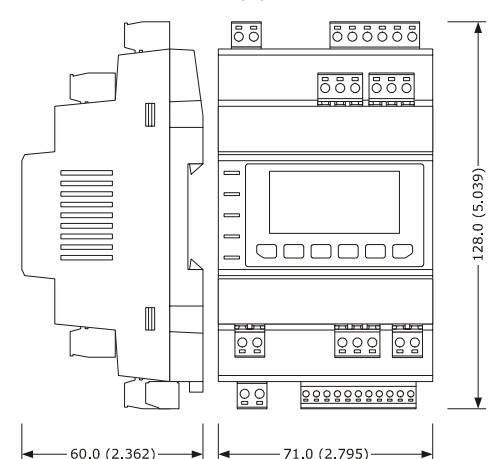
Term.	Meaning
1	digital output
2	analog inputs and free of voltage digital inputs
3	CAN port (not available in model EPD4BX3)
4	CAN port line termination (not available in model EPD4BX3)
5	display and keyboard (not available in models EPD4BX3, EPD4BC3 and EPD4BF3)
6	reserved
7	bipolar stepper motor output
8	programming port
9	power supply
10	RS-485 port (not available in models EPD4BX3 and EPD4BC3)

11	RS-485 port line termination (not available in models EPD4BX3 and EPD4BC3)
12	signalling LEDs
13	high voltage digital input (not available in model EPD4BX3)

3 SIZE AND INSTALLATION

3.1 Size

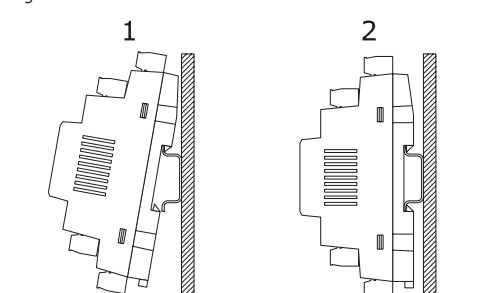
4 DIN modules; size in mm (in).



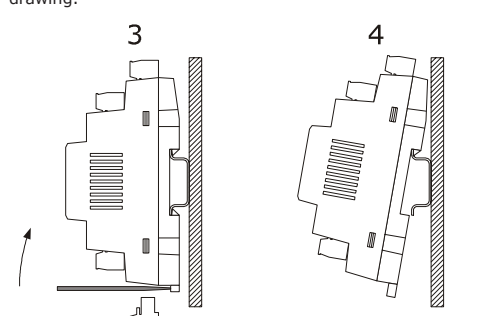
3.2 Installation

On DIN rail 35.0 x 7.5 mm (1.377 x 0.295 in) or 35.0 x 15.0 mm (1.377 x 0.590 in).

To install EVDRIVE03 operate as shown in the following drawing.



To remove EVDRIVE03 remove possible extractable screw terminal blocks plugged at the bottom first, then operate on the DIN rail clips with a screwdriver as shown in the following drawing.



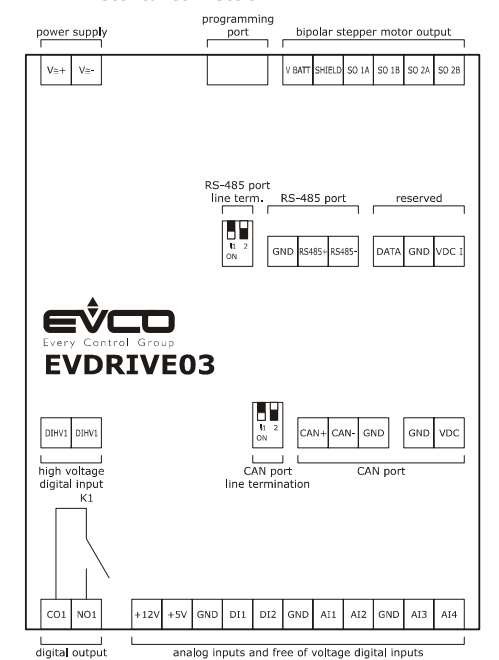
To install EVDRIVE03 again press the DIN rail clips to the end first.

3.3 Additional information for the installation

- make sure the working conditions of the device (operating temperature, operating humidity, etc.) are in the limits indicated; look at chapter "TECHNICAL DATA"
- do not install the device close to heating sources (heaters, hot air ducts, etc.), devices having big magnets (big speakers, etc.), locations subject to direct sunlight, rain, humidity, dust, mechanical vibrations or bumps
- according to the safety legislation, the protection against possible contacts with the electrical parts must be ensured by a correct installation of the device; all the parts which ensure the protection must be fixed so that you can not remove them if not by using a tool.

4 ELECTRICAL CONNECTION

4.1 Electrical connection



Digital output

Electromechanical relay.

Term.	Meaning
CO1	common digital output
NO1	normally open contact digital output

Analog inputs and free of voltage digital inputs

Term.	Meaning
+12V	power supply 0-20 mA/4-20 mA/0-10 V transducers (12 VDC ±10%, 60 mA max.)
+5V	power supply 0-5 V ratiometric transducers (5 VDC ±5%, 40 mA max.)
GND	ground analog inputs and free of voltage digital inputs
DII1	digital input 1 (non optoisolated free of voltage contact; 5 V when not loaded, 3.3 mA when loaded)
DII2	digital input 2 (non optoisolated free of voltage contact; 5 V when not loaded, 3.3 mA when loaded)
GND	common analog inputs and free of voltage digital inputs
AI1	analog input 1 (which can be set via configuration parameter for NTC/Pt 1000 probes and for 0-20 mA/4-20 mA/0-5 V ratiometric transducers)
AI2	analog input 2 (which can be set via configuration parameter for NTC/Pt 1000 probes and for 0-20 mA/4-20 mA/0-5 V ratiometric transducers)
GND	common analog inputs and free of voltage digital inputs
AI3	analog input 3 (which can be set via configuration parameter for NTC/Pt 1000 probes)
AI4	analog input 4 (which can be set via configuration parameter for 0-20 mA/4-20 mA/0-5 V ratiometric/0-10 V transducers)

CAN port (not available in model EPD4BX3)

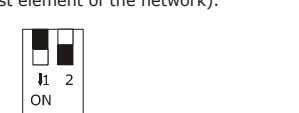
Non optoisolated CAN port, with CANBUS communication protocol.

Term.	Meaning
CAN+	signal +
CAN-	signal -
GND	ground

Term.	Meaning
GND	ground
VDC	power supply remote user interface (22... 35 VDC, 100 mA max.)

CAN port line termination (not available in model EPD4BX3)

Position microswitch 2 on position on (120 Ω, 0.25 W) to plug in the CAN port line termination (plug in the termination of the first and of the last element of the network).



Reserved

Reserved.

Bipolar stepper motor output

Term.	Meaning
V BATT	backup power supply input
SHIELD	common bipolar stepper motor shielded cable
SO 1A	bipolar stepper motor coil 1
SO 1B	bipolar stepper motor coil 1
SO 2A	bipolar stepper motor coil 2
SO 2B	bipolar stepper motor coil 2

Programming port

Non optoisolated programming port, with MODBUS communication protocol.

Power supply

Term.	Meaning
V _± +	power supply device (not isolated; 24 VAC +10% -15%, 50/60 Hz ±3 Hz, 40 VA max. or 24... 37 VDC, 22 W max.)
V _± -	power supply device (not isolated; 24 VAC +10% -15%, 50/60 Hz ±3 Hz, 40 VA max. or 24... 37 VDC, 22 W max.)

If the device is powered in direct current, it is necessary to respect the polarity of the power supply voltage.

RS-485 port (not available in models EPD4BX3 and EPD4BC3)

Non optoisolated RS-485 port, with MODBUS communication protocol.

Term.	Meaning
GND	ground
RS485+	D1 = A = + (terminal 1 of the transceiver)
RS485-	D0 = B = - (terminal 0 of the transceiver)

RS-485 port line termination (not available in models EPD4BX3 and EPD4BC3)

Position microswitch 1 on position on (120 Ω, 0.25 W) to plug in the RS-485 port line termination (plug in the termination of the first and of the last element of the network).



High voltage digital input

Term.	Meaning
DIHV1	high voltage digital input (optoisolated contact; 115 VAC -10%... 230 VAC +10%)
DIHV1	high voltage digital input (optoisolated contact; 115 VAC -10%... 230 VAC +10%)

4.2 Additional information for electrical connection

- do not operate on the terminal blocks of the device using electrical or pneumatic screwdrivers
- if the device has been moved from a cold location to a warm one, the humidity could condense on the inside; wait about an hour before supplying it
- make sure the power supply voltage, the electrical frequency and the electrical power of the device correspond to those of the local power supply; look at chapter "TECHNICAL DATA"
- disconnect the power supply of the device before servicing it
- do not use the device as safety device
- for the repairs and for information about the device please contact the EVCO sales network.

5 SIGNALINGS

5.1	Signalings
LED	Meaning
ON	LED power supply if it is lit, the device will be powered if it is out, the device will not be powered
STEP 1	LED stepper output 1 if it is lit, the valve will be stopped and completely closed if it flashes slowly, the valve will be stopped and completely open if it flashes quickly, the valve will be moving if it is out, the valve will be stopped and open in an intermediary position
STEP 2	LED auxiliary if parameter Ph80 = 0, LED status if it is lit, the device will be working in superheating algorithm modality if it flashes slowly, the device will be working in analog positioner modality

if it flashes quickly, the device will be working in manual or in debugger modality
if it is out, the device will be in a status different from the ones related for parameter Ph80 = 0
if parameter Ph80 = 1, LED MOP/LOP alarm
if it flashes slowly, the LOP alarm will be running
if it flashes quickly, the MOP alarm will be running
if it is out, no MOP/LOP alarm will be running
if parameter Ph80 = 2, LED high superheating/low superheating alarm
if it flashes slowly, the low superheating alarm will be running
if it flashes quickly, the high superheating alarm will be running
if it is out, no high superheating/low superheating alarm will be running

▲	LED alarm if it is on, an alarm will be running if it flashes slowly, it is necessary to disable/enable the device to the operation in order that the modification of the configuration parameters has effect if it flashes quickly, it is necessary to switch off/on the power supply of the device in order that the modification of the configuration parameters has effect if it is out, no alarm will be running
COM	LED communication if it is lit, a communication alarm device-controller will be running if it flashes slowly, the communication device-controller will not be completely correct if it flashes quickly, a communication alarm device-controller will be happened and the device (if foreseen) will be working in stand alone modality if it is out, the device will be working in stand alone modality or no communication alarm device-controller will be running

6 TECHNICAL DATA

6.1 Technical data

Purpose of the device: electronic expansion valves driver.

Box: self-extinguishing grey.

Size: 71.0 x 128.0 x 60.0 mm (2.795 x 5.039 x 2.362 in; W x H x D); 4 DIN modules.

Size refers to the device with the extractable screw terminal blocks properly plugged.

Installation: on DIN rail 35.0 x 7.5 mm (1.377 x 0.295 in) or 35.0 x 15.0 mm (1.377 x 0.590 in).

Index of protection: IP20 (IP40 the front).

Connections: male extractable screw terminal blocks pitch 3.5 mm (0.137 in; analog inputs and free of voltage digital inputs), male extractable screw terminal blocks pitch 5.0 mm (0.196 in; power supply, high voltage digital inputs, outputs, CAN port and RS-485 port) for conductors up to 2.5 mm² (0.0038 in²) and 6 poles female RJ11 telephone connector (programming port).

The maximum lengths allowed for the connecting cables are the following:

- power supply device: 30 m (98 ft)
- analog inputs: 100 m (328 ft)
- power supply 0-20 mA/4-20 mA/0-5 V ratiometric/0-10 V transducers: 100 m (328 ft)
- free of voltage digital inputs: 100 m (328 ft)
- high voltage digital input: 100 m (328 ft)
- digital output: 100 m (328 ft)
- bipolar stepper motor output: 5 m (16 ft; 10 m (32 ft) with shielded cable)
- CAN port:
 - 1,000 m (3,280 ft) with baud rate 20,000 baud
 - 500 m (1,640 ft) with baud rate 50,000 baud
 - 250 m (820 ft) with baud rate 125,000 baud
 - 50 m (164 ft) with baud rate 500,000 baud
- power supply remote user interface: 30 m (98 ft)
- RS-485 port: 1,000 m (3,280 ft); also look at the MODBUS specifications and implementation guides manual.

One suggests using the connecting kit CJAV17 (female extractable screw terminal blocks pitch 5.0 mm (0.196 in), to order separately).

Operating temperature: from -10 to 60 °C (from 14 to 140 °F).

Storage temperature: from -20 to 70 °C (from -4 to 158 °F).

Operating humidity: from 10 to 90% of relative humidity not condensing.

Pollution situation: 2.

Power supply:
- 24 VAC +10% -15%, 50/60 Hz ±3 Hz, 40 VA max. not isolated
- 24... 37 VDC, 22 W max. not isolated
supplied by a class 2 circuit.

If the device is powered in direct current, it is necessary to respect the polarity of the power supply voltage.

Protect the power supply with a fuse rated 2 A-T 250 V.

Overvoltage category: III.

Analogue inputs:
4 inputs

- 2 inputs (which can be set via configuration parameter for NTC/Pt 1000 probes and for 0-20 mA/4-20 mA/0-5 V ratiometric transducers) which can be set via configuration parameter for suction temperature backup probe/suction pressure backup probe
- 1 input (which can be set via configuration parameter for NTC/Pt 1000) as suction temperature probe
- 1 input (which can be set via configuration parameter for 0-20 mA/4-20 mA/0-5 V ratiometric/0-10 V transducers) as suction pressure probe.

NTC analog inputs (10K Ω @ 25 °C, 77 °F)

Kind of sensor: B3435.
Working range: from -40 to 110 °C (from -40 to 230 °F) for standard NTC probes
from -50 to 150 °C (from -58 to 302 °F) for high temperature NTC probes
from -50 to 110 °C (from -58 to 230 °F) for fast NTC probes.

Accuracy: ±0.6% of the full scale for standard and fast NTC probes
±0.5% of the full scale for high temperature NTC probes.

Resolution: 0.1 °C (1 °F).
Conversion time: 100 ms.
Protection: none.

Pt 1000 analog inputs (1K Ω @ 0 °C, 32 °F)

Working range: from -100 to 400 °C (from -148 to 752 °F).

Accuracy: ±0.5% of the full scale.
Resolution: 0.5 °C (1 °F).
Conversion time: 100 ms.
Protection: none.

0-20 mA/4-20 mA analog inputs

Input resistance: ≤ 200 Ω.
Accuracy: ±1% of the full scale.
Resolution: 0.01 mA.
Conversion time: 100 ms.
Protection: none; the maximum current allowed on each input is 25 mA.

0-5 V ratiometric analog inputs

Input resistance: ≥ 10 KΩ.
Accuracy: ±1% of the full scale.
Resolution: 0.01 V.
Conversion time: 100 ms.
Protection: against the reversal of polarity.

0-10 V analog inputs

Input resistance: ≥ 10 KΩ.
Accuracy: ±1% of the full scale.
Resolution: 0.01 V.
Conversion time: 100 ms.
Protection: against the reversal of polarity.

Power supply 0-20 mA/4-20 mA/0-10 V transducers: 12 VDC ±10%, 60 mA max.

Power supply 0-5 V ratiometric transducers: 5 VDC ±5%, 40 mA max.
The device incorporate a restorable thermal protection of the power supplies against the short circuit and the overload.

Digital inputs:
3 inputs

- 2 inputs (non optoisolated free of voltage contacts, which can be set via configuration parameter as normally open/normally closed contact) which can be set via configuration parameter as enable the operation/change parameters set/resynchronization command/backup module status
- 1 input (optoisolated high voltage contact, which can be set via configuration parameter as normally open/normally closed contact) which can be set via configuration parameter as enable the operation/change parameters set/resynchronization command/backup module status (not available in model EPD4BX3).

Non optoisolated free of voltage contacts

Power supply: none (5 V when not loaded, 3.3 mA when loaded).

Protection: none.
Optoisolated high voltage contact

Power supply: 115 VAC -10%... 230 VAC +10%.
Protection: none.

The device ensure a reinforced isolation among each terminal of the high voltage contact and the remaining parts of the device.

Displays:

- 128 x 64 pixel single colour (black with rearlighting through white LEDs) LCD graphic display (not available in models EPD4BX3, EPD4BC3 and EPD4BF3)
- signalling LEDs.

Digital outputs: 1 SPST 5 res. A @ 250 VAC (5 res. A @ 30 VDC) output (electromechanical relay) which can be set via configuration parameter as alarm output/solenoid valve/resynchronization valve.

Electromechanical relay

Maximum switching power: 1,250 VA (150 W).

Mechanical life: > to 5,000,000 operations.

Electrical life: > to 100,000 operations.

Protection: none.

The device ensure a reinforced isolation among each terminal of the digital output and the remaining parts of the device.

Bipolar stepper motor output: 4 wires bipolar stepper motor output.

Bipolar stepper motor output

Input voltage: 21 VDC \pm 10%.

Output voltage: 27... 36 VDC (18... 24 VDC if supplied by the backup module).

Maximum output current: 1 A.

Driver type: chopper (or constant current).

Protection: none.

Type of actions and additional features: 1C.

Communication ports:

3 ports

- 1 non optoisolated CAN port, with CANBUS communication protocol (not available in model EPD4BX3)
- 1 non optoisolated RS-485 port, with MODBUS communication protocol (not available in models EPD4BX3 and EPD4BC3)
- 1 non optoisolated programming port, with MODBUS communication protocol.

Power supply remote user interface: 22... 35 VDC, 100 mA max.