

ABB motion control

User's Manual

Option Card of MicroFlex e190 Servo Drive

OPT-SIO-1



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List of related manuals

<u>Drive hardware manuals and guides</u>	<u>Code (English)</u>
<i>MicroFlex e190 User Manual</i>	3AXD50000037326
<i>MicroFlex e190 Quick Installation Guide</i>	3AXD50000037325
<i>MicroFlex e190 Wall chart</i>	3AXD50000037323
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<u>Certificates</u>	
<i>MicroFlex e190 EU Single Declaration of Conformity</i>	3AXD10000540159
<i>MicroFlex e190 STO (TÜV) Certificate</i>	3AXD10000540318
<i>MicroFlex e190 UL Certificate</i>	3AXD10000540319
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<u>Option manuals and guides</u>	
<i>OPT-SIO-1 Option Card Quick Installation Guide</i>	3AXD50000296361

You can find manuals and other product documents in PDF format on the [Internet Document library](#). For manuals not available in the Online Document library, contact your local ABB representative.

User's Manual

OPT-SIO-1

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Safety

This chapter states the general safety instructions that must be followed when installing and operating the OPT-SIO-1 option card.

In addition to the safety instructions given below, read the complete safety instructions of the specific servo drive you are working on.

These warnings are intended for all who work on the servo drive. Ignoring the instructions can cause physical injury or death or damage the equipment.



Warning! All electrical installation and maintenance work on the servo drive should be carried out by qualified electricians only.

The servo drive and adjoining equipment must be properly earthed.

Do not attempt any work on a powered servo drive. After switching off the mains, always allow the intermediate circuit capacitors 5 minutes to discharge before working on the servo drive, the motor or the motor cable. It is good practice to check (with a voltage indicating instrument) that the servo drive is in fact discharged before beginning work.



6 Safety

The motor cable terminals of the servo drive are at a dangerously high voltage when mains power is applied, regardless of motor operation.

There can be dangerous voltages inside the servo drive from external control circuits even when the servo drive mains power is shut off. Exercise appropriate care when working on the unit.





About the manual

2.1 Intended audience

The manual is intended for the people who are responsible for installing, commissioning and using an OPT-SIO-1 option card with servo drive MicroFlex e190. The reader is expected to have a basic knowledge of electrical fundamentals, electrical wiring practices and how to safely operate the servo drive.

2.2 Before you start

It is recommended to install the option card before installing MicroFlex e190 into a cabinet, if the drive is already mounted into an electrical cabinet, then installer needs to make sure all power supply is removed before starting the installation of the option card. Ensure that all dangerous voltages connected from external control circuits to the inputs and outputs of the servo drive are switched off.

In addition to conventional installation tools, have the MicroFlex e190 servo drive manuals available during the installation as they contain important information

not included in this manual. The servo drive manuals are referred to at various points of this document.

2.3 What this manual contains

This manual contains information on the wiring, configuration and use of the OPT-SIO-1 option card.

Safety are featured in the first few pages of this manual.

Overview contains a short description of the OPT-SIO-1.

Installation contains instructions for hardware settings, mounting and cabling.

Software utility contains the software configuration of the OPT-SIO-1.

Technical data contains detailed technical information.

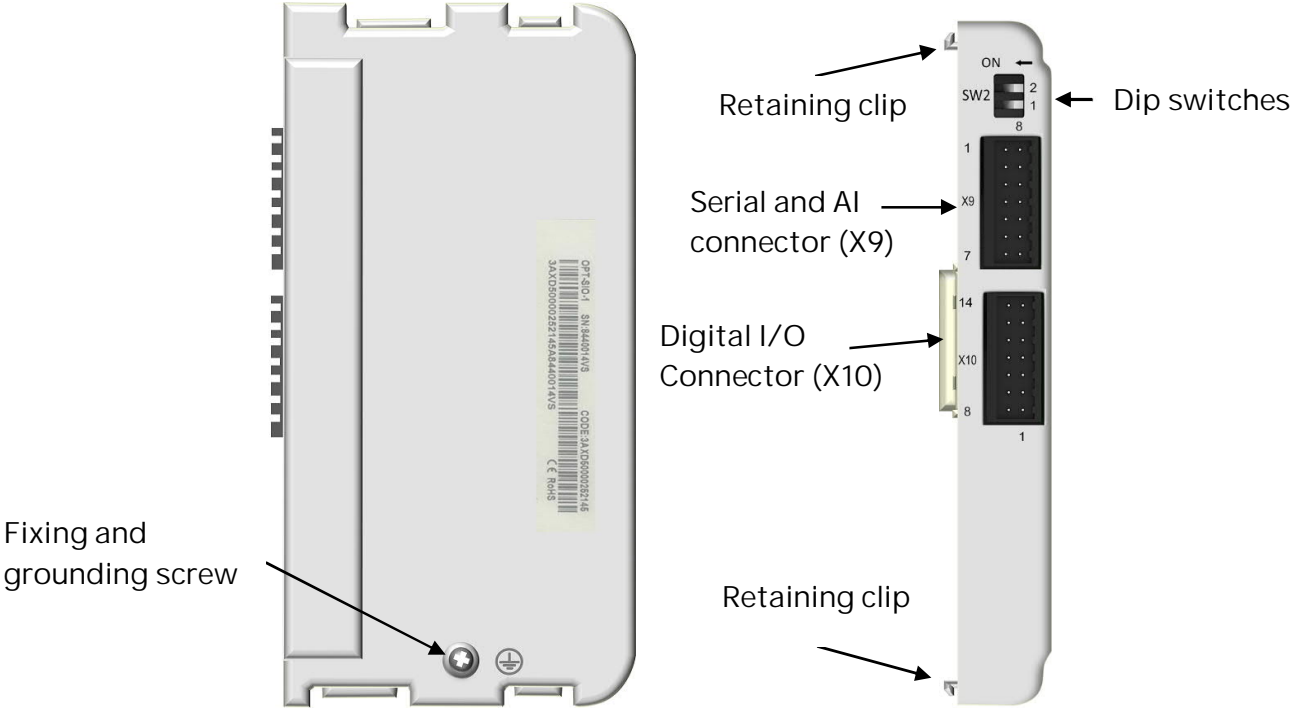


Overview

This chapter contains a short description of the OPT-SIO-1 option card.

3.1 Layout

The OPT-SIO-1 option card provides additional digital input/output and analog input and serial port to MicroFlex e190.



3.2 Compatibility

OPT-SIO-1 is compatible with the MicroFlex e190 which serial number is *W180000000 or later*, and firmware version is build *5869.12.0 or later*.

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Installation



Warning! Follow the safety instructions given in this guide and in the servo drive hardware manual.



Warning! Selecting the wrong supply voltage may damage or break the option card.

4.1 Mounting



Warning! Before installation, switch off the servo drive power supply. Wait for five minutes to ensure that the capacitor bank of the drive is discharged. Switch off all dangerous voltages connected from external control circuits to the inputs and outputs of the drive.

The OPT-SIO-1 is to be inserted into the option slot of the MicroFlex e190 servo drive.

The fixing screw is essential to connect the ground of the drive and the OPT-SIO-1 together.

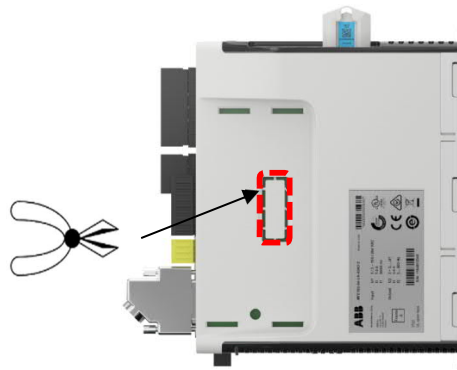
Mounting procedure:



12 Installation

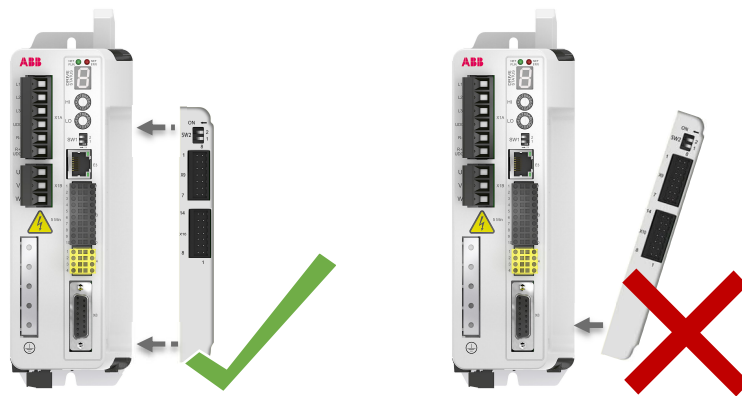
1. Cut out the plastic part from MicroFlex e190 as shown marked in red, with diagonal cutters.

IMPORTANT Ensure that all plastic parts do not fall inside the drive as this may block the cooling fan and cause damage.



2. Insert the option card carefully into the option slot until the retaining clips lock the card into position on both sides at the same time.

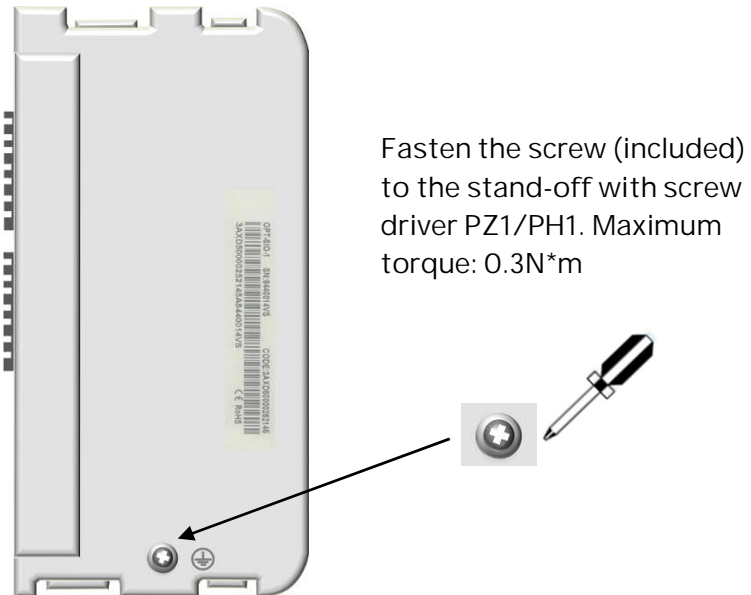
IMPORTANT Do not insert the option card at an angle as this may damage the connections.



3. Fasten the screw located on the side of the card.



IMPORTANT Ensure the option card is properly installed and electrically bonded to the drive. Do not over-tighten the screw, the maximum torque is 0.3N*m.



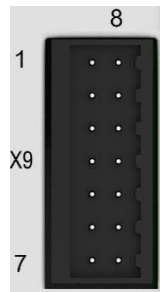
Note: Correct installation of the screw is essential for fulfilling the EMC requirements and for proper operation of the card.

4.2 I/O connection

- Abbreviations

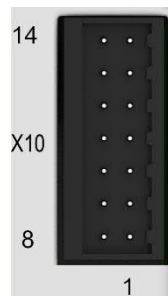
AIN	Analog input
DIN	Digital input
DOUT	Digital output
RX	Receive
TX	Transmit
CREF	Common Reference
USRV	External supply reference voltage

- X9



Pin	Description	Pin	Description
1	TX+ / A+	8	TX+ / A+
2	TX- / B-	9	TX- / B-
3	Shield	10	Shield
4	RX+	11	RX+
5	RX-	12	RX-
6	Shield	13	Shield
7	AIN1-	14	AIN1+

- X10



Pin	Description	Pin	Description
14	Shield	7	DIN4
13	CREF1	6	DIN5
12	DIN8	5	DIN6
11	DIN9	4	DIN7
10	USRV+	3	CREFO
9	DOUT5	2	DOUT3
8	DOUT6	1	DOUT4

- Dip Switches



Switch	Purpose	OFF	ON
2	RS422 RX terminator	No	120Ω
1	RS422 TX terminator or RS485 terminator	No	120Ω

X9 - RS485 interface

.....	1/8	A+	RS485
.....	2/9	B-	
	3/10	Shield	Signal cable shield (screen)
	4/11	RXA	Not used
	5/12	RXB	Not used

X9 - RS422 interface

.....	1/8	TX+	RS422 Transmit
.....	2/9	TX-	
	3/10	Shield	Signal cable shield (screen)
.....	4/11	RX+	RS422 Receive
.....	5/12	RX-	

X9 - Analog input

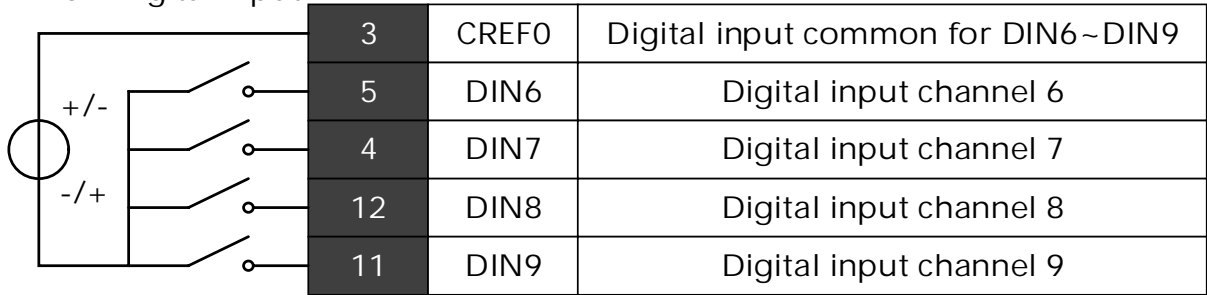
	6/13	Shield	Signal cable shield (screen)
	7	AIN1-	Analog input channel 1
	14	AIN1+	

Differential voltage signal, -10v...+10V range, 40kOhm impedance



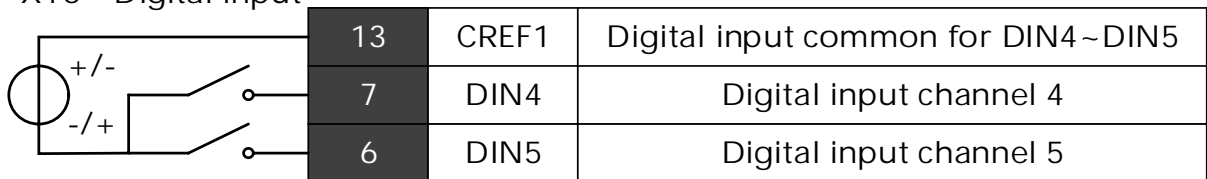
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X10 - Digital input



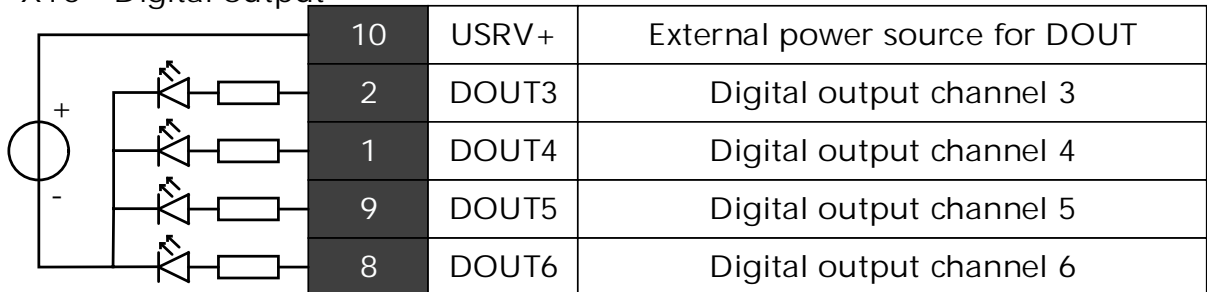
12V...24V bi-directional, 3kOhms input impedance

X10 - Digital input



12V...24V bi-directional, 3kOhms input impedance

X10 - Digital output



0V...30V DC source, 100mA nominal load, 300mA PTC Resettable Fuse




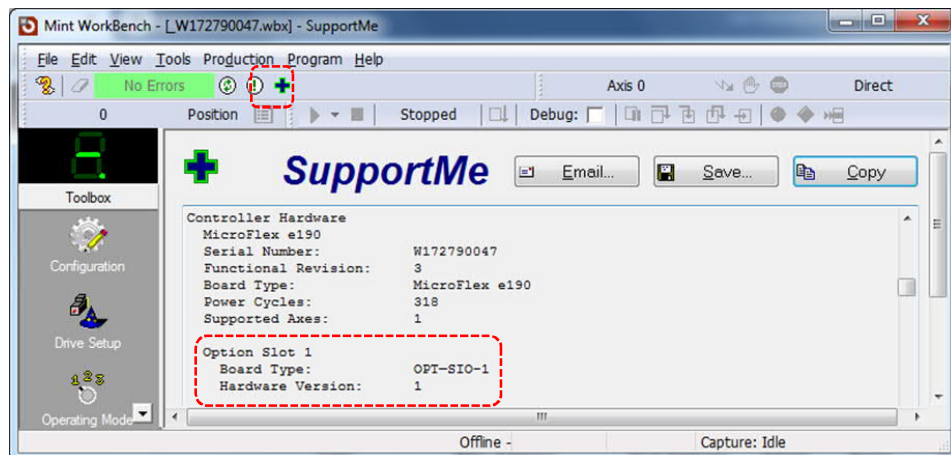
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Software utility

5.1 Identify OPT-SIO-1

In Mint WorkBench

Option card "OPT-SIO-1" could be found by clicking SupportMe icon .



"Option Slot 1" section will be hidden when option card is removed.

With Mint Command

"Print OPTIONCARDTYPE(0)"

"23" (String) will be printed on terminal which stands for OPT-SIO-1 is connected.

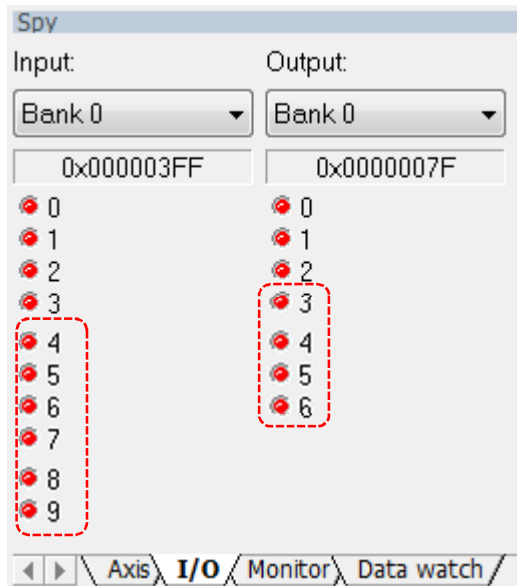
Via ActiveX, VB, C#, C++

Function "value = OPTIONCARDTYPE(0)" returns value (short)23.

5.2 Digital input and output

In Mint WorkBench

Digital Input and Output channels could be access via I/O panel in Spy window.



4 to 9 of *Input Bank 0* are OPT-SIO-1 extended DIN4~DIN9, and 3 to 6 of *Output Bank 0* are OPT-SIO-1 extended DOUT3~DOUT6.

With Mint Command

Digital Input

"Print INX(4)"

"1" indicates that DIN4 is value "1".

Digital Output

"OUTX(3) = 1" Sets DOUT3 to value "1".

ActiveX, VB, C#, C++

Digital Input

Function "value = IN(0)" returns current status of digital inputs as an Integer type. Logical or Bit operation helps to check the status of a specific channel.

Digital Output

OUT(0) = value

value = OUT(0)

Integer type "value" should be less than 125.

OUTX(output) = value

value = OUTX(output)

Integer type "output" stands for digital output channel 0~6 and 3~6 is the digital outputs (DOUT3~DOUT6) of the OPT-SIO-1.

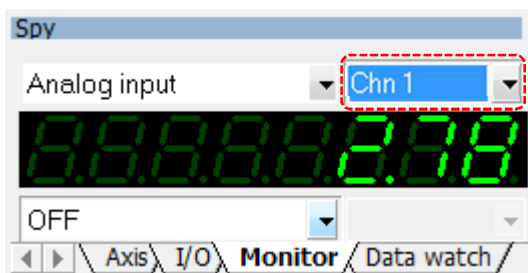
Integer type "value" should be 0 or 1.



5.3 Analog input

In Mint WorkBench

Monitor panel in Spy window can be used to display analog input value.



Analog input Chn1 (as shown above) is the analog input (AIN1) of the OPT-SIO-1.

With Mint Command

"Print ADC(1)"

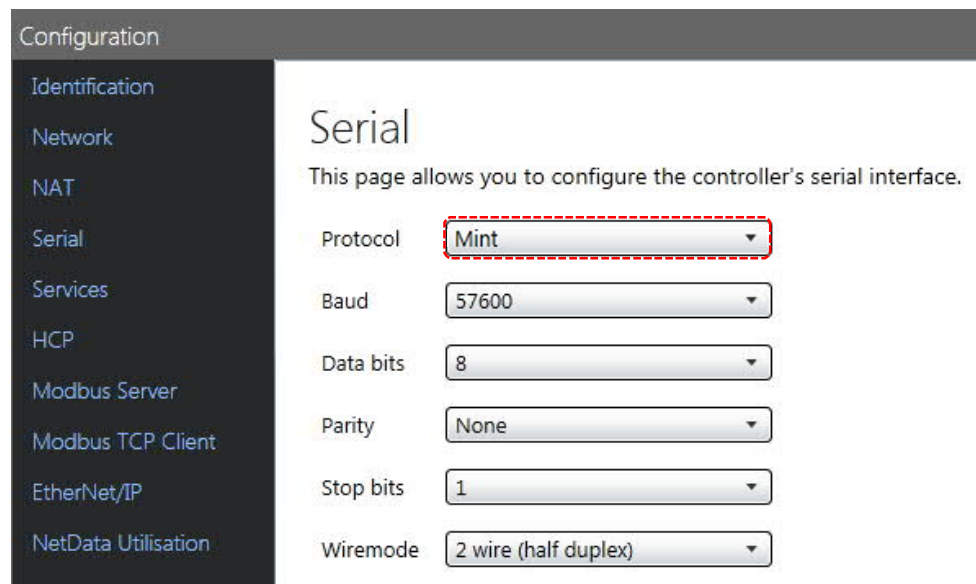
Analog input value from OPT-SIO-1 extended channel will be displayed on terminal. The default is percentage value within range -100%~100%

Via ActiveX, VB, C#, C++

Function "value = ADC(1)" returns a float value from analog input channel 1.

5.4 Serial communication

Serial communication could be configured via Mint WorkBench.



Echo Protocol transmit the received character, it's designed to quick check the connection with external terminal.

Mint Protocol map serial communication to #_TERM1, use Print #_TERM1 Message, to send a string via serial

communication in Mint program, and InKey / LastKey keywords could be used to receive character(s).

HCP Protocol will automatically synchronize COMM Array among nodes in network

Modbus protocol allows connectivity between a wide range of ABB products and third-party Modbus client devices.

More details are available in Online Help file.





Technical data

6.1 Digital input

Input voltage	+12VDC/+24VDC
Logic levels	"0" < 2VDC, "1" > 10VDC
Input type	Sinking/sourcing
Input impedance	3.3 kOhm
Pulse width	60us (min)
Max input rate	1 kHz
Isolation	Digital inputs are electrical isolated from the inner circuit, isolated voltage 3750V _{RMS} .

6.2 Digital output

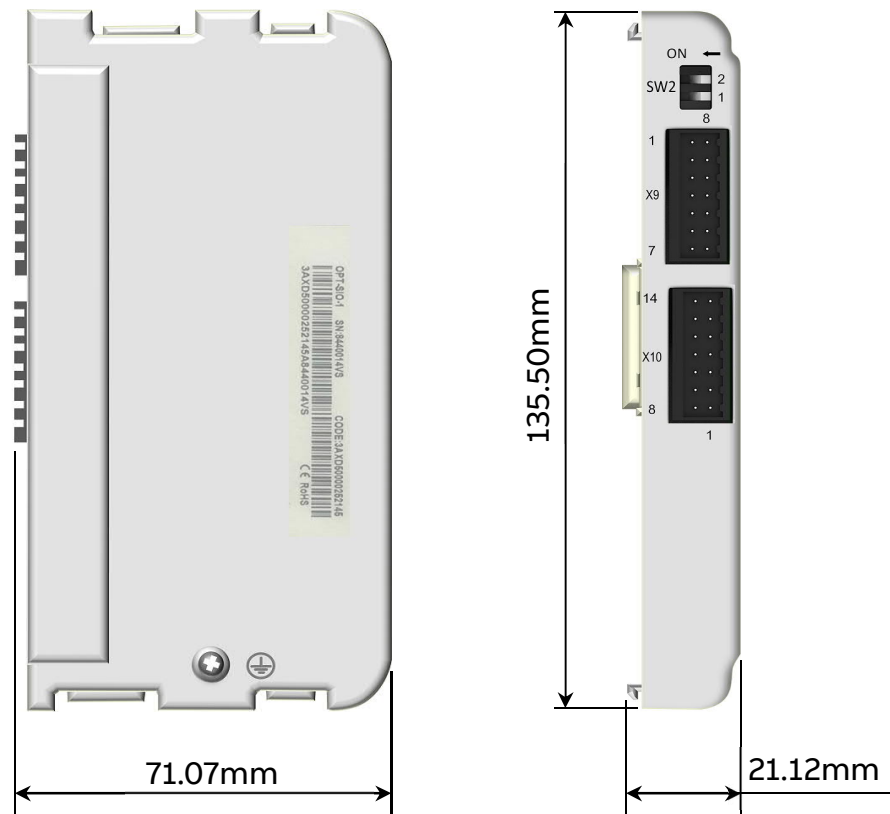
Supply voltage	+24VDC (externally supplied, input range 20VDC~28VDC)
Output current	100 mA continuous max
Fuse open	300mA
Isolation	Digital outputs are electrical isolated from the inner circuit, isolated voltage 2500V _{RMS}

6.3 Analog input

Common mode voltage range	+/-10VDC
Input type	Differential
Input impedance	40 kOhm
Resolution	12 bits (can be enhanced by firmware)
Sampling interval	0.25ms

6.4 Physical data

- Dimensions



- Degree of protection: IP20 when mounted on MicroFlex e190
 - Ambient conditions: The applicable ambient conditions are same as the MicroFlex e190 see MicroFlex e190 User Manual 3AXD50000037326 for detail.
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