

Options for ABB drives, converters and inverters

User's manual

FDIO-01 digital I/O extension module



Power and productivity
for a better world™



List of related manuals

Drive manuals and guides	Code (EN/Multilingual)
<i>ACS880-01 manuals</i>	9AKK105408A7004
<i>ACS880-04 manuals</i>	9AKK105713A4819
<i>ACS880-07 manuals</i>	9AKK105408A8149
<i>ACS880-04 single drive module packages hardware manual</i>	3AUA0000138495
<i>ACS880-14 and -34 single drive module packages hardware manual</i>	3AXD50000022021
<i>ACS880-17 drives hardware manual</i>	3AXD50000020436
<i>ACS880-37 drives hardware manual</i>	3AXD50000020437
<i>ACS880-107 inverter units hardware manual</i>	3AUA0000102519
<i>ACS880-207 IGBT supply units hardware manual</i>	3AUA0000130644
<i>ACS880-307 (+A003) diode supply units hardware manual</i>	3AUA0000102453
<i>ACS880-307 (+A018) diode supply units hardware manual</i>	3AXD50000011408
<i>ACS880-607 1-phase brake units hardware manual</i>	3AUA0000102559
<i>ACS880-607 3-phase brake units hardware manual</i>	3AXD50000022034
<i>ACS880-907 regenerative rectifier units hardware manual</i>	3AXD50000020546
<i>ACS880-1607 DC/DC converter units hardware manual</i>	3AXD50000023644

Option manuals and guides

<i>FDIO-01 digital I/O extension module user's manual</i>	3AUA0000124966
---	--------------------------------

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

User's manual

FDIO-01 digital I/O extension module

Table of contents



1. Safety instructions



4. Mechanical installation



5. Electrical installation



6. Start-up



Table of contents

1. Safety instructions

Contents of this chapter	7
Use of warnings	8
Safety in installation	9

2. Introduction to the manual

Contents of this chapter	11
Target audience	11
Contents of the manual	12
Terms and abbreviations	12

3. Hardware description

Contents of this chapter	13
Product overview	13
Layout	14
Hardware filtering for DC input signals	15



4. Mechanical installation

Contents of this chapter	17
Necessary tools and instructions	17
Unpacking and examining the delivery	17
Installing the module	18
...onto the drive control unit	18
...onto an extension adapter module	19

5. Electrical installation

Contents of this chapter	21
Warnings	21
Necessary tools and instructions	21
Adjusting hardware filtering for DC input signals	22
Terminal designations	23
Digital inputs	23
Relay outputs	23

6 Table of contents

General cabling instructions	23
Wiring	24
Digital input wiring example	24

6. Start-up

Contents of this chapter	25
Before you start	25
Setting the parameters	25

7. Diagnostics

Contents of this chapter	27
Faults and warning messages	27
LEDs	27

8. Technical data



Contents of this chapter	29
Dimension drawing	30
Data	31
Installation	31
Degree of protection	31
Ambient conditions	31
Package	31
Hardware settings	31
Isolation areas	32
Digital inputs (XDI1:1...2, XDI2:3...4, XDI3:5...6)	32
Relay outputs (XRO1:11...13, XRO2:21...23)	33
Power supply	33
General	33

Further information

Product and service inquiries	35
Product training	35
Providing feedback on ABB Drives manuals	35
Document library on the Internet	35

1

Safety instructions

Contents of this chapter

The chapter contains the warning symbols used in this manual and the safety instructions which you must obey when you install or connect an optional module to a drive, converter or inverter. If you ignore the safety instructions, injury, death or damage can occur. Read this chapter before you start the installation.



Use of warnings

Warnings tell you about conditions which can cause injury or death, or damage to the equipment. They also tell you how to prevent the danger. The manual uses these warning symbols:



Electricity warning tells you about hazards from electricity which can cause injury or death, or damage to the equipment.



General warning tells you about conditions, other than those caused by electricity, which can cause injury or death, or damage to the equipment.



Safety in installation

These instructions are for all who install or connect an optional module to a drive, converter or inverter and need to open its front cover or door to do the work.




WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur.

- If you are not a qualified electrician, do not do installation or maintenance work.
- Disconnect the drive, converter or inverter from all possible power sources. After you have disconnected the drive, converter or inverter, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you continue.
- Disconnect all dangerous voltages connected to other control signal connectors in reach. For example, it is possible that 230 V AC is connected from outside to a relay output or digital input of the drive, converter or inverter.
- Always use a multimeter to make sure that there are no parts under voltage in reach. The impedance of the multimeter must be at least 1 Mohm.



10 Safety instructions





Introduction to the manual

Contents of this chapter

This chapter introduces this manual.

Target audience

This manual is intended for people who plan the installation, install, start up, use and service the extension module. Before you do work on the module, read this manual and the applicable drive/converter/inverter manual that contains the hardware and safety instructions for the product in question.

You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide. Both SI and imperial units are shown.

Contents of the manual

The manual consists of these chapters:

- *Safety instructions* gives the safety instructions which you must obey when you install an extension module.
- *Hardware description* gives a short description of the extension module.
- *Mechanical installation* contains a delivery checklist and instructions on installing the extension module.
- *Electrical installation* contains instructions on adjusting hardware filtering for DC input signals and wiring the extension module.
- *Start-up* contains instructions on starting up the extension module.
- *Diagnostics* shows how to trace faults with the status LED on the extension module.
- *Technical data* contains the technical data of the extension module.

Terms and abbreviations

Term/abbreviation	Explanation
ELV	Extra low voltage
EMC	Electromagnetic compatibility
PELV	Protective ELV
SELV	Safety ELV

Later in this manual, term *drive* substitutes for string drive/converter/inverter.

A green square with rounded corners containing the number 3 in a large, bold, black font.

Hardware description

Contents of this chapter

This chapter gives a short description of the extension module.

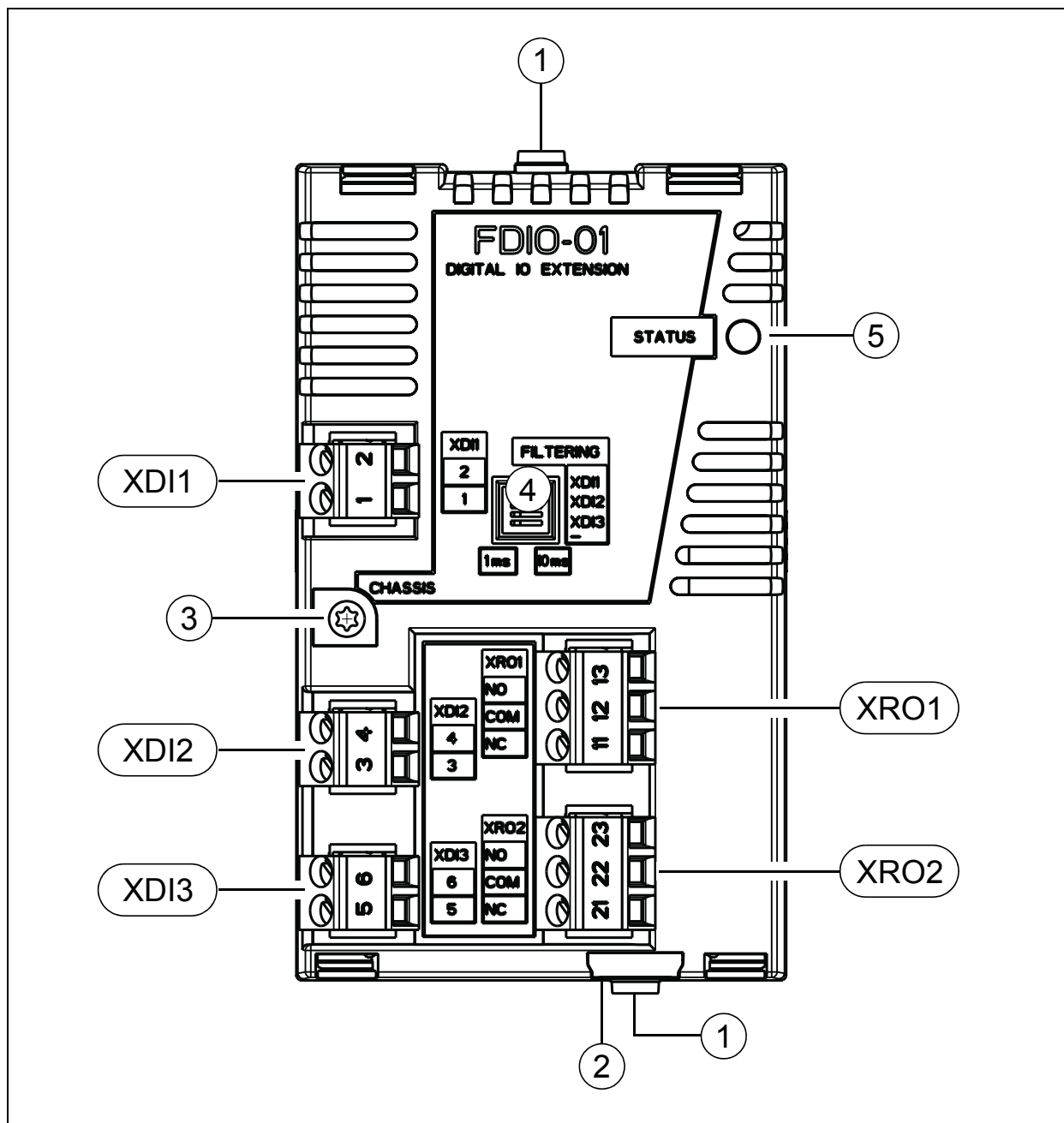
Product overview

The FDIO-01 digital I/O extension module expands the digital inputs and outputs of the drive control unit. It has three digital inputs and two relay outputs.

Compared to the FIO-01 digital I/O extension module, FDIO-01 has a wider input voltage range and basic insulation between all inputs, outputs, and the drive control unit interface. If you connect one or more inputs/outputs to the AC power line, you can still safely connect the other inputs/outputs and the drive control unit inputs/outputs to SELV or PELV circuits.

The extension module makes the signal and power connection to the drive through a 20-pin connector.

Layout



Item	Description	Additional information
1	Retaining clips	Page 18
2	Lock	
3	Mounting screw	
4	DIP switches for hardware filtering	Page 15 , 22
XDI1	2-pin detachable terminal blocks for digital inputs	Page 23
XDI2		
XDI3		
XRO1	3-pin detachable terminal blocks for relay outputs	Page 23
XRO2		
5	Diagnostic LED	Page 27

Hardware filtering for DC input signals

The extension module has DIP switches for adjusting the hardware filtering time for DC input signals. By default, hardware filtering is enabled for all digital inputs with a 10-millisecond filtering time. To detect the input signal faster with a DC signal, you can shorten the filtering time of the digital input in question to 1 ms. Shortening the filtering time to 1 ms will, however, reduce the noise immunity of the input.

Note: You must always use a 10-millisecond filtering time with an AC input signal.

4

Mechanical installation

Contents of this chapter

This chapter contains a delivery checklist and instructions on installing the extension module.

Necessary tools and instructions

See the applicable drive hardware manual.

Unpacking and examining the delivery

1. Open the option package.
2. Make sure that the package contains:
 - FDIO-01 digital I/O extension module
 - this manual.
3. Make sure that there are no signs of damage.



Installing the module



WARNING! Obey the safety instructions. See chapter *Safety instructions* on page 7. If you ignore the safety instructions, injury or death can occur.

■ ...onto the drive control unit

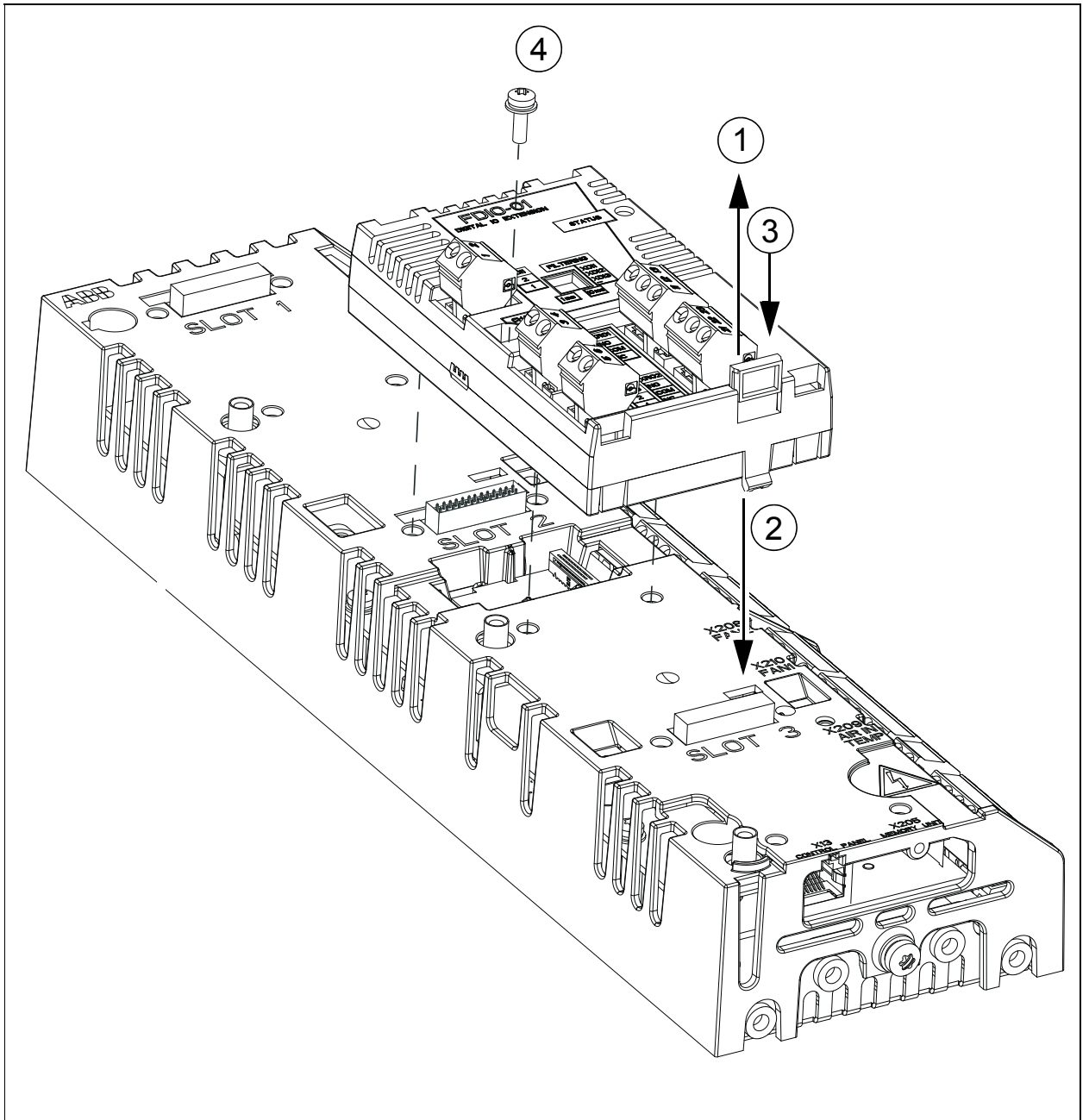
1. Pull out the lock.
2. Put the module carefully into its position on the drive until the retaining clips lock it into position.
3. Push in the lock.
4. Tighten the screw to 0.8 N·m.

Note: The screw tightens the connections and grounds the module. It is necessary for fulfilling the EMC requirements and for proper operation of the module.



WARNING! Do not tighten the screw tighter than 0.8 N·m. Too big torque value breaks the thread.

See the applicable drive manual for further instructions on how to install the module to the drive.



■ ...onto an extension adapter module

For instructions on how to install the module onto an extension adapter module, see *FEA-03 F-series extension adapter user's manual* (3AUA0000115811 [English]).



5

Electrical installation

Contents of this chapter

This chapter contains instructions on adjusting hardware filtering for DC input signals and wiring the extension module.

Warnings



WARNING! Obey the safety instructions. See chapter [Safety instructions](#) on page 7. If you ignore the safety instructions, injury or death can occur. If you are not a qualified electrician, do not do electrical work.



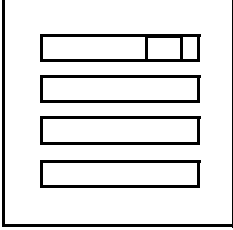
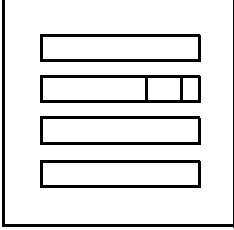
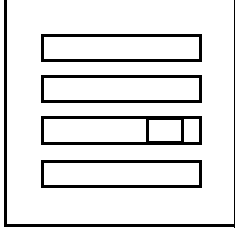
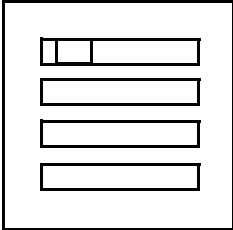
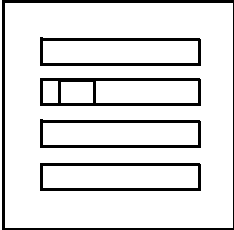
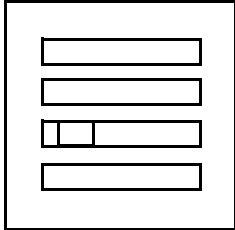
Necessary tools and instructions

See the applicable drive hardware manual.

Adjusting hardware filtering for DC input signals

Set the DIP switches (see page [14](#)) to the applicable positions for the necessary inputs.

This table shows the possible positions for each input.

Filtering time	DIP switch setting					
	XDI1		XDI2		XDI3	
10 ms (default)						
	1ms	10ms	1ms	10ms	1ms	10ms
1 ms						
	1ms	10ms	1ms	10ms	1ms	10ms



Terminal designations

■ Digital inputs

Marking		Description
XDI1		
1	1	Digital input 1 terminal 1
2	2	Digital input 1 terminal 2
XDI2		
3	3	Digital input 2 terminal 3
4	4	Digital input 2 terminal 4
XDI3		
5	5	Digital input 3 terminal 5
6	6	Digital input 3 terminal 6

■ Relay outputs

Marking		Description
XRO1		
11	NC	Relay output 1, normally closed
12	COM	Relay output 1, common
13	NO	Relay output 1, normally open
XRO2		
21	NC	Relay output 2, normally closed
22	COM	Relay output 2, common
23	NO	Relay output 2, normally open

General cabling instructions

Use 0.5...2.5 mm² twisted pair unshielded cable with an applicable voltage rating.

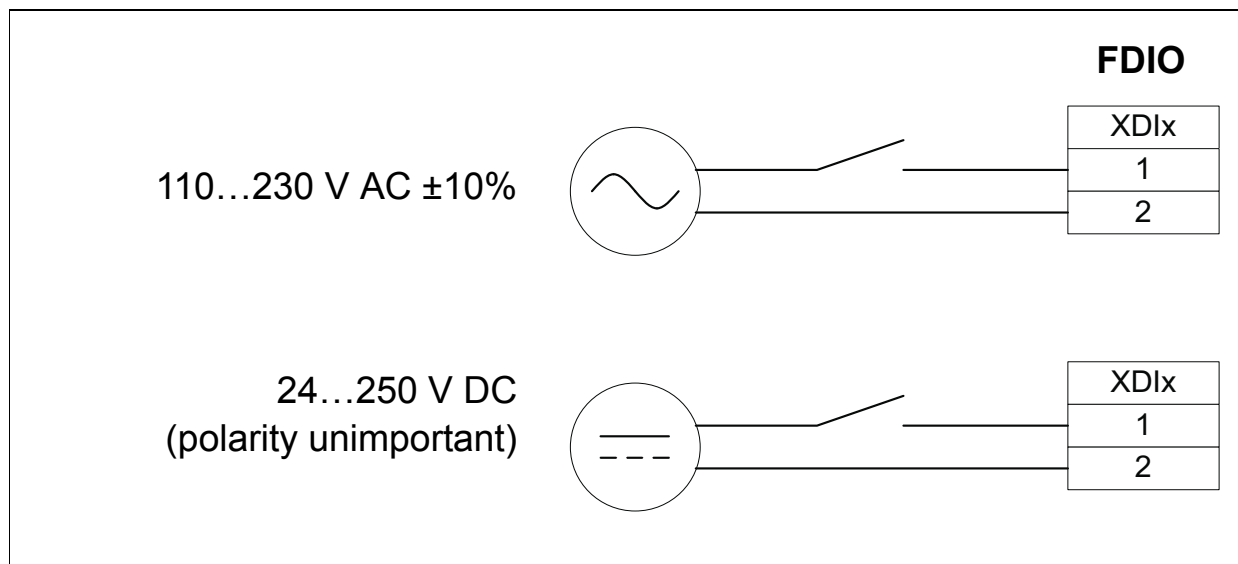
Do not route signal cables parallel to power cables.



Wiring

Connect the external control cables to the applicable module terminals.

■ Digital input wiring example



A large green square with rounded corners containing the number 6 in a bold, black, sans-serif font.

Start-up

Contents of this chapter

This chapter contains instructions on starting up the extension module.

Before you start

Make sure that you have completed these start-up tasks for the drive:

- Checks and settings with no voltage connected
- Powering up the drive
- Setting up the drive control program.

See the applicable drive hardware manual.

Setting the parameters

The extension module is started up through drive parameters. See the applicable firmware manual.





A large green square with rounded corners containing the number 7 in a bold, black, sans-serif font.

Diagnostics

Contents of this chapter

This chapter shows how to trace faults with the status LED on the extension module.

Faults and warning messages

For the fault and warning messages concerning the extension module, see the drive firmware manual.

LEDs

The extension module has one diagnostic LED.

Color	Description
Green	The extension module is powered up.
Red	There is no communication with the drive control unit or the extension module has detected some other error.

A green square with rounded corners containing a large black number 8.

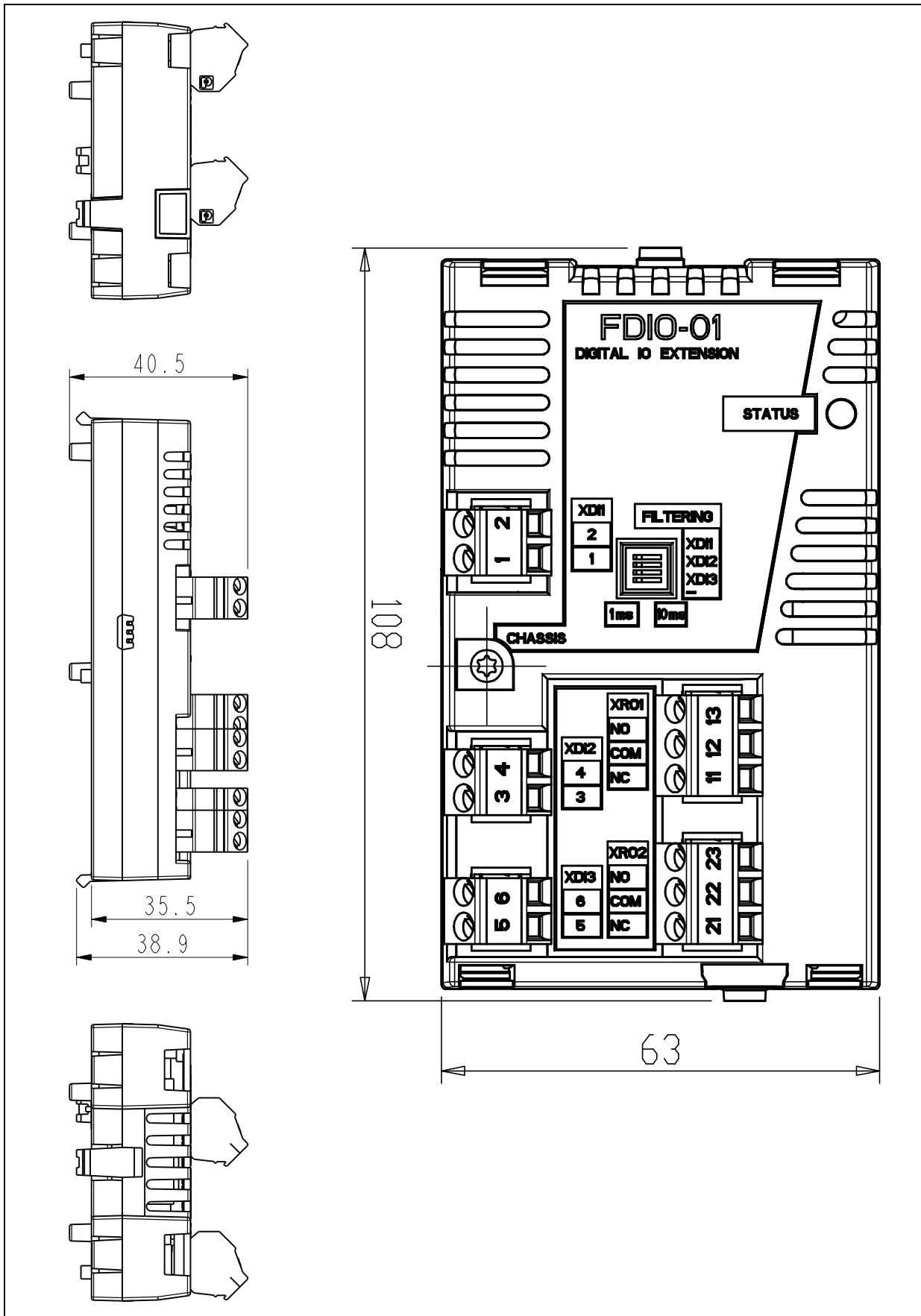
Technical data

Contents of this chapter

This chapter contains the technical data of the extension module.

Dimension drawing

The dimensions are in millimeters.



Data

■ Installation

Into an option slot on the drive control unit or onto an extension adapter module (FEA-03)

■ Degree of protection

IP20

■ Ambient conditions

The applicable ambient conditions specified for the drive in its manuals are in effect.

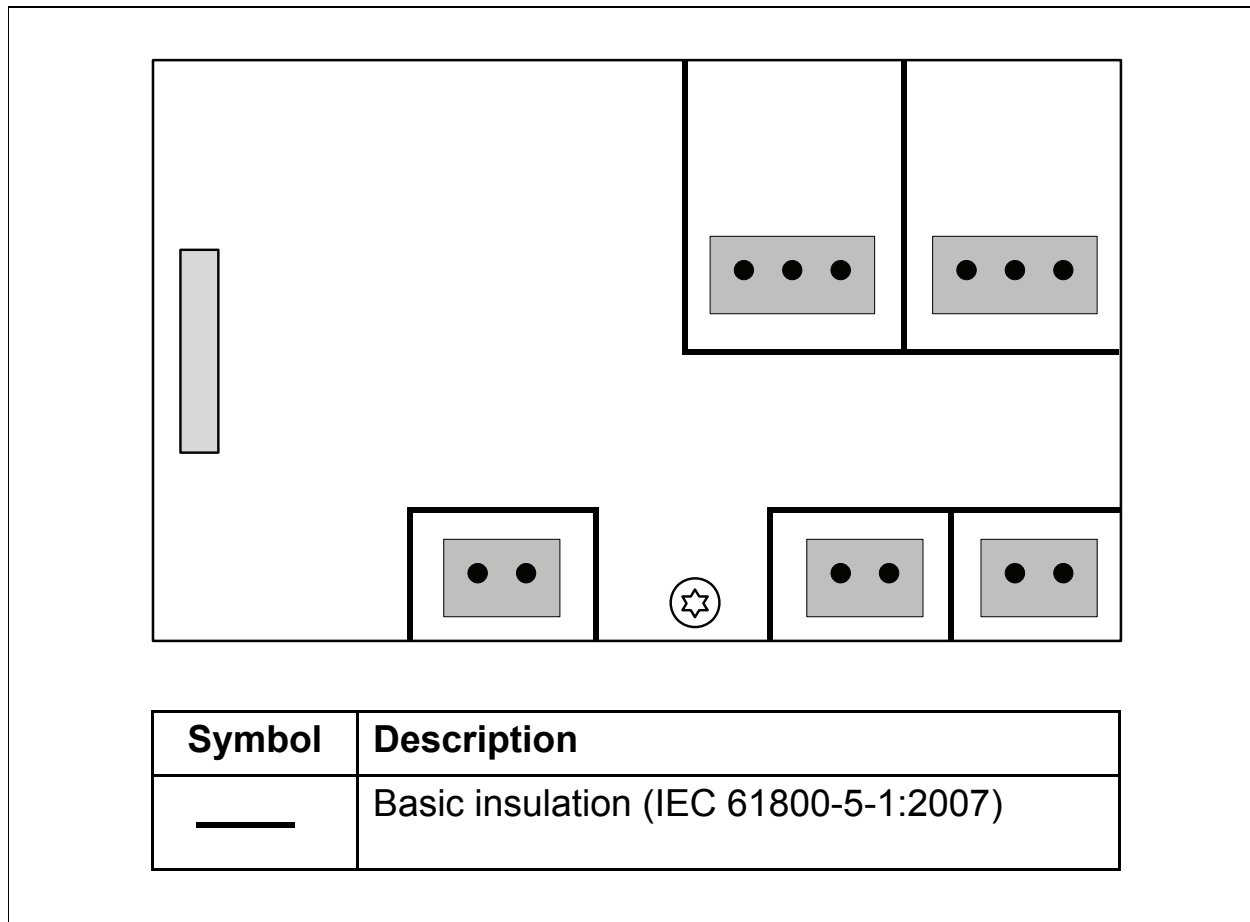
■ Package

Cardboard. Plastic wrapping: Antistatic air bubble sheet (PE).

■ Hardware settings

One DIP switch per digital input for hardware filtering

■ Isolation areas



■ Digital inputs (XDI1:1...2, XDI2:3...4, XDI3:5...6)

- Connector pitch 5 mm, wire size max. 2.5 mm²
- Torque: 0.5 N·m
- Input voltages: 24...250 V DC or 110...230 V AC
- Logic levels (DC): “0” < 5 V, “1” > 15 V
- Logic levels (AC) 110...230 V ±10%: “0” < 5 V_{rms}, “1” > 20 V_{rms}
- Input currents: 10 mA at 24 V DC, 3 mA at 230 V AC
- Filtering times, selectable for all channels:
10 ms (default), 1 ms
- Inputs isolated from each other, the relay outputs, power supply and ground (earth)
- Varistor protected (250 V)
- Insulation strength: ≥ 4 kV

■ Relay outputs (XRO1:11...13, XRO2:21...23)

- Connector pitch 5 mm, wire size max. 2.5 mm²
- Torque: 0.5 N·m
- Max. contact voltage: 120 V DC, 250 V AC
- Max. contact current/power:
5 A, 24 V DC; 0.4 A, 120 V DC; 1250 VA, 250 V AC
- Max. continuous current: 2 A rms
- Minimum current: 10 mA, 24 V DC
- Contact material: AgNi
- Outputs isolated from each other, the digital inputs, power supply and ground (earth)
- Contact protection: Varistor (250 V)
- Insulation strength: ≥ 4 kV

■ Power supply

- +3.3 V and 24 V (supplied by the drive control unit or the FEA-03 extension adapter module)
- Max. power consumption: 100 mA at 3.3 V, 25 mA at 24 V

■ General

- Complies with standards EN 61800-3, EN 61800-5-1, UL508C
 - cULus listed
 - Printed circuit board conformal coated
-

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/searchchannels.

Product training

For information on ABB product training, navigate to new.abb.com/service/training.

Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Navigate to new.abb.com/drives/manuals-feedback-form.

Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at www.abb.com/drives/documents.

Contact us

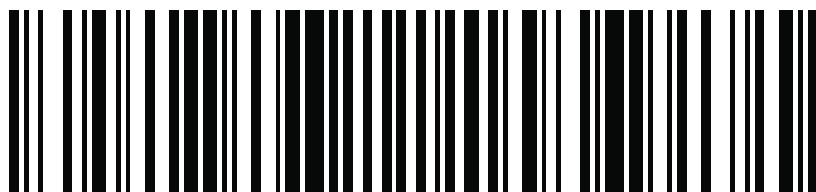
www.abb.com/drives

www.abb.com/solar

www.abb.com/windconverters

www.abb.com/drivespartners

3AUA0000124966 Rev B (EN) 2015-11-30



3AUA0000124966B

Power and productivity
for a better world™

