List of related manuals

<table>
<thead>
<tr>
<th>Drive manuals and guides</th>
<th>Code (EN/Multilingual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS880-01 manuals</td>
<td>9AKK105408A7004</td>
</tr>
<tr>
<td>ACS880-04 manuals</td>
<td>9AKK105713A4819</td>
</tr>
<tr>
<td>ACS880-07 manuals</td>
<td>9AKK105408A8149</td>
</tr>
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<td>ACS880-04 single drive module packages hardware manual</td>
<td>3AUA0000138495</td>
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<tr>
<td>ACS880-14 and -34 single drive module packages hardware manual</td>
<td>3AXD50000022021</td>
</tr>
<tr>
<td>ACS880-17 drives hardware manual</td>
<td>3AXD50000020436</td>
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<td>ACS880-37 drives hardware manual</td>
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<td>ACS880-107 inverter units hardware manual</td>
<td>3AUA0000102519</td>
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<tr>
<td>ACS880-207 IGBT supply units hardware manual</td>
<td>3AUA0000130644</td>
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<tr>
<td>ACS880-307 (+A003) diode supply units hardware manual</td>
<td>3AUA0000102453</td>
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<tr>
<td>ACS880-307 (+A018) diode supply units hardware manual</td>
<td>3AXD50000011408</td>
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<tr>
<td>ACS880-607 1-phase brake units hardware manual</td>
<td>3AUA0000102559</td>
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<td>ACS880-607 3-phase brake units hardware manual</td>
<td>3AXD50000022034</td>
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<tr>
<td>ACS880-907 regenerative rectifier units hardware manual</td>
<td>3AXD50000020546</td>
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<tr>
<td>ACS880-1607 DC/DC converter units hardware manual</td>
<td>3AXD50000023644</td>
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<table>
<thead>
<tr>
<th>Option manuals and guides</th>
<th>Code (EN/Multilingual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDIO-01 digital I/O extension module user’s manual</td>
<td>3AUA0000124966</td>
</tr>
</tbody>
</table>

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.
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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

<table>
<thead>
<tr>
<th>Term/abbreviation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELV</td>
<td>Extra low voltage</td>
</tr>
<tr>
<td>EMC</td>
<td>Electromagnetic compatibility</td>
</tr>
<tr>
<td>PELV</td>
<td>Protective ELV</td>
</tr>
<tr>
<td>SELV</td>
<td>Safety ELV</td>
</tr>
</tbody>
</table>

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

- **Layout**

![Diagram of hardware layout](image-url)

- **FDIO-01**
- **Digital ID Extension**
- **XDI1**
- **XDI2**
- **XDI3**
- **XRO1**
- **XRO2**
- **Status**
It is important to choose the appropriate filtering time for different types of input signals. By default, hardware filtering is enabled for all digital inputs with a 10-millisecond filtering time. For DC signals, which are slower to change, you can decrease the filtering time to 1 ms. However, doing so will reduce the noise immunity of the input.

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

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

**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.
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]).
20 Mechanical installation
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.

<table>
<thead>
<tr>
<th>Filtering time</th>
<th>DIP switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>XDI1</td>
</tr>
<tr>
<td>10 ms (default)</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>1ms 10ms</td>
</tr>
<tr>
<td>1 ms</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>1ms 10ms</td>
</tr>
</tbody>
</table>
Terminal designations

- **Digital inputs**

<table>
<thead>
<tr>
<th>Marking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XDI1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Digital input 1 terminal 1</td>
</tr>
<tr>
<td>2</td>
<td>Digital input 1 terminal 2</td>
</tr>
<tr>
<td>XDI2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Digital input 2 terminal 3</td>
</tr>
<tr>
<td>4</td>
<td>Digital input 2 terminal 4</td>
</tr>
<tr>
<td>XDI3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Digital input 3 terminal 5</td>
</tr>
<tr>
<td>6</td>
<td>Digital input 3 terminal 6</td>
</tr>
</tbody>
</table>

- **Relay outputs**

<table>
<thead>
<tr>
<th>Marking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XRO1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Relay output 1, normally closed</td>
</tr>
<tr>
<td>12</td>
<td>Relay output 1, common</td>
</tr>
<tr>
<td>13</td>
<td>Relay output 1, normally open</td>
</tr>
<tr>
<td>XRO2</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Relay output 2, normally closed</td>
</tr>
<tr>
<td>22</td>
<td>Relay output 2, common</td>
</tr>
<tr>
<td>23</td>
<td>Relay output 2, normally open</td>
</tr>
</tbody>
</table>

**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

- 110…230 V AC ±10%
- 24…250 V DC (polarity unimportant)

FDIO

<table>
<thead>
<tr>
<th>XDIx</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
26 Start-up
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.

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>The extension module is powered up.</td>
</tr>
<tr>
<td>Red</td>
<td>There is no communication with the drive control unit or the extension module has detected some other error.</td>
</tr>
</tbody>
</table>
28 Diagnostics
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**

- **Hardware settings**
  One DIP switch per digital input for hardware filtering
Technical data

Isolation areas

- 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<sub>rms</sub>, “1” > 20 V<sub>rms</sub>
- 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

Symbol | Description
---|---
| Basic insulation (IEC 61800-5-1:2007)
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
Technical data
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.

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