AXIS A9910 I/O Relay Expansion Module

User manual

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Installation

To watch this video, go to the web version of this document.

Configure your device

> Note
>
> The expansion module can only be used together with AXIS A9210 Network I/O Relay Module. To configure the expansion module, go to the web interface of your AXIS A9210. For more information, see the *user manual.*

Add an encryption key

You need to set up an encryption key before you add any AXIS A9910. The encryption key ensures the encrypted communication between AXIS A9210 and AXIS A9910.

> Note
>
> - The encryption key is not visible in the system. If you generate the key, you need to export and save it in a safe place before you continue.
>
> - To reset the encryption key, you need to reset the device to factory default. See .

1. Go to the device web interface of your AXIS A9210.

2. Go to **Device > I/Os and relays > AXIS A9910** and click ╄ **Add encryption key**.

3. Set up the encryption key in one of the following ways:
   - Under **Encryption key**, enter the key.

   - Click **Generate key** to generate the key and then click **Export key** to save the key.

4. Click **OK**.

Add an expansion module

> Note
>
> Each expansion module has a unique address, which can be configured through the DIP switch connector. See .

1. Connect an expansion module to your AXIS A9210.

2. Go to the device web interface of your AXIS A9210.

3. Set up an encryption key. See .

4. Go to **Device > I/Os and relays > AXIS A9910**, and click ╄ **AXIS A9910**.

5. Enter the name and select the address for the expansion module.

6. Click **Save**.

Configure an I/O port

1. In the web interface of your AXIS A9210, go to **Device > I/Os and relays > AXIS A9910**.

2. Click the expansion module you want to configure.

3. Under **I/Os**, click ⌄ to expand the I/O port settings.

4. Rename the port.

5. Configure the normal state. Click ⌀ᵒ for open circuit, or ⌀ᵒ for closed circuit.

6. To configure the I/O port as input:

   6.1. Under **Direction**, click ⟲ .

   6.2. To monitor the input state, turn on **Supervised**. See .

Note

In APIs, the supervised I/O ports work differently from the supervised input ports. For more information, go to the *VAPIX® Library*.

7. To configure the I/O port as output:

   7.1. Under **Direction**, click ⬈ .

   7.2. To view the URLs to activate and deactivate connected devices, go to **Toggle port URL**.

Configure a relay

1. In the web interface of your AXIS A9210, go to **Device > I/Os and relays > AXIS A9910**.

2. Click the expansion module you want to configure.

3. Under **Relays**, click ⌄ to expand the relay settings.

4. Turn on **Relay**.

5. Rename the relay.

6. To view the URLs to activate and deactivate the relay, go to **Toggle port URL**.

The web interface

The expansion module can only be used together with AXIS A9210 Network I/O Relay Module. To reach the device's web interface, go to the web interface of your AXIS A9210.

Add encryption key: Click to set up an encryption key to ensure encrypted communication.

Add AXIS A9910: Click to add an expansion module.

- **Name**: Edit the text to rename the expansion module.
- **Address**: Shows the address that the expansion module is connected to.
- **Device software version**: Shows the software version of the expansion module.
- **Upgrade device software**: Click to upgrade the device software of the expansion module.

I/Os

I/O: Turn on to activate connected devices when the port is configured as output.

- **Name**: Edit the text to rename the port.
- **Direction**: Click ⤢ or ⤢ to configure it as input or output.
- **Normal state**: Click ⚬ for open circuit, and ⚬ for closed circuit.
- **Supervised**: Turn on to make it possible to detect and trigger actions if someone tampers with the connection to digital I/O devices. In addition to detecting if an input is open or closed, you can also detect if someone has tampered with it (that is, cut or shorted). To supervise the connection requires additional hardware (end-of-line resistors) in the external I/O loop. It appears only when the port is configured as input.
    - To use parallel first connection, select **Parallel first connection with a 22 KΩ parallel resistor and a 4.7 KΩ serial resistor**.
    - To use serial first connection, select **Serial first connection** and select a resistor value from the **Resistor values** drop-down list.
- **Toggle port URL**: Shows the URLs to activate and deactivate connected devices through the VAPIX® Application Programming Interface. It appears only when the port is configured as output.

Relays

- **Relay**: Turn on or off the relay.
- **Name**: Edit the text to rename the relay.
- **Direction**: Indicates that it is an output relay.
- **Toggle port URL**: Shows the URLs to activate and deactivate the relay through the VAPIX® Application Programming Interface.

Specifications

Product overview
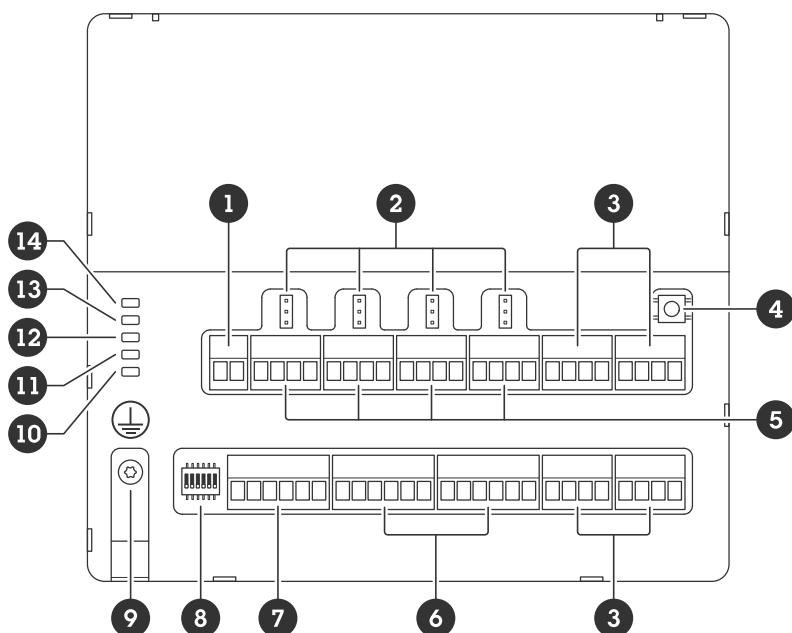
1 Power connector
2 Relay jumper
3 RS485 connector
4 Control button
5 Relay connector
6 Auxiliary connector
7 Expansion connector
8 DIP switch
9 Grounding position
10 Relay status LED
11 RS485 status LED
12 Power status LED
13 Expansion status LED
14 Status LED

LED indicators

LED	Color	Indication
Status	Green	Blinks (on for 1 second, off for 1 second) when offline.
(STAT)	Green	Blinks (blink for 2 times, off for 2 seconds) when online with encrypted communication.
	Red	Blinks green/red during device software upgrade.
Expansion network	Green	Blinks when transmitting data.
(EXP NET)		
Power	Green	Normal operation.
(PWR)		

RS485 over current (RS485 OC)	Red	Over current or under voltage fault on any RS485 port.
Relay over current (Relay OC)	Red	Over current or under voltage fault on any relay port.

For more status LED indicators, see .

Buttons

Control button

The control button is used for:
- Resetting the product to factory default settings. See .

Connectors

Power connector

2-pin terminal block for DC power input. Use a Safety Extra Low Voltage (SELV) compliant limited power source (LPS) with either a rated output power limited to ≤100 W or a rated output current limited to ≤5 A.

1 2
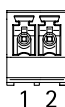
Function	Pin	Notes	Specifications
DC ground (GND)	1		0 V DC
DC input (12–24 V)	2	This pin can only be used as power in.	12–24 V DC, max 90 W

UL: DC power to be supplied by a UL 603 listed power supply, depending on application, with appropriate ratings.

Relay connector

Four 4-pin terminal blocks for form C relays that can be used, for example, to control a lock or an interface to a gate. If used with an inductive load, for example a lock, connect a diode in parallel with the load to protect against voltage transients.

1 2 3 4
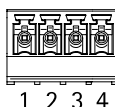
Function	Pin	Notes	Specifications
DC ground (GND)	1		0 V DC
NO	2	Normally open. For connecting relay devices. Connect a fail-	Max current = 4 A Max voltage = 30 V DC

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		secure lock between NO and DC ground. The three relay pins are galvanically separated from the rest of the circuitry if the jumpers are not used.	
COM	3	Common The three relay pins are galvanically separated from the rest of the circuitry if the jumpers are not used.	
NC	4	Normally closed. For connecting relay devices. Connect a fail-safe lock between NC and DC ground. The three relay pins are galvanically separated from the rest of the circuitry if the jumpers are not used.	

Relay power jumper

When the relay power jumper is fitted, it connects 12 V DC or 24 V DC to the relay COM pin.

It can be used to connect a lock between the GND and NO, or GND and NC pins.

Power source	Max power at 12 V DC	Max power at 24 V DC
DC IN	4 A (combined max for all relays)	2 A (combined max for all relays)

RS485 connector

Four 4-pin terminal blocks that can be used to connect Modbus sensors, for example, a temperature or light sensor to provide readings for event triggers.

1 2 3 4
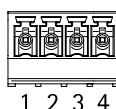
RS485

Function	Pin	Note	Specifications
DC ground (GND)	1	Supplies power to auxiliary devices, for example, Modbus sensors.	0 V DC

DC output (+12 V)	2	Supplies power to auxiliary devices, for example, Modbus sensors.	12 V DC, max 2 A (combined max for all RS485 ports)
A	3		
B	4		

Important

- When the connector is powered by the device, the qualified cable length is up to 200 m (656 ft) if the following cable requirements are met: 1 twisted pair with shield connected to the protected ground, 120 ohm impedance.

- When the connector is not powered by the device, the qualified cable length for RS485 is up to 1000 m (3281 ft) if the following cable requirements are met: 1 twisted pair with shield connected to the protected ground, 120 ohm impedance.

- The RS485 connector allows connection of up to 16x Modbus sensors per AXIS A9910, with 64 sensors supported across all units.

Expansion connector

6-pin terminal block used for communication between additional expansion units or main unit.

- EXP IN: communication from main or already connected expansion unit.
- EXP OUT: provides communication to the next expansion unit.
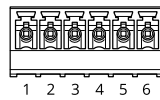
Function		Pin	Specifications
EXP IN	DC ground (GND)	1	0 V DC
	A	2	
	B	3	
EXP OUT	DC ground (GND)	4	0 V DC
	A	5	
	B	6	

DIP switch connector

6-pin terminal block
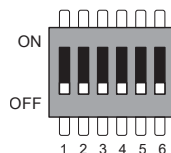
1	2	3	4	5	6	Description
OFF	OFF	OFF	OFF			Address 0
ON	OFF	OFF	OFF			Address 1
OFF	ON	OFF	OFF			Address 2

|						
ON	ON	OFF	OFF			Address 3
OFF	OFF	ON	OFF			Address 4
ON	OFF	ON	OFF			Address 5
OFF	ON	ON	OFF			Address 6
ON	ON	ON	OFF			Address 7
OFF	OFF	OFF	ON			Address 8
ON	OFF	OFF	ON			Address 9
OFF	ON	OFF	ON			Address 10
ON	ON	OFF	ON			Address 11
OFF	OFF	ON	ON			Address 12
ON	OFF	ON	ON			Address 13
OFF	ON	ON	ON			Address 14
ON	ON	ON	ON			Address 15
				OFF		120 Ohm RS485 termination disabled
				ON		120 Ohm RS485 termination enabled
					ON/OFF	Not used

Auxiliary connector

Use the auxiliary connector with external devices in combination with, for example, motion detection, event triggering, and alarm notifications. In addition to the 0 V DC reference point and power (DC output), the auxiliary connector provides the interface to:

Digital input – For connecting devices that can toggle between an open and closed circuit, for example PIR sensors, door/window contacts, and glass break detectors.

Supervised input – Enables possibility to detect tampering on a digital input.

Digital output – For connecting external devices such as relays and LEDs. Connected devices can be activated by the VAPIX® Application Programming Interface or from the device's web interface.

Two 6-pin terminal blocks
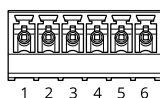
Function	Pin	Notes	Specifications
DC ground (GND)	1		0 V DC
DC output (+12 V)	2	Can be used to power auxiliary equipment. Note: This pin can only be used as power out.	12 V DC Max load = 100 mA in total for all I/Os

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Configurable inputs or outputs (I/O 1–4)	3–6	Digital input or supervised input – Connect to pin 1 to activate, or leave floating (unconnected) to deactivate. To use supervised input, install end-of-line resistors. See connection diagram for information about how to connect the resistors.	0 to max 30 V DC
		Digital output – Internally connected to pin 1 (DC ground) when active, and floating (unconnected) when inactive. If used with an inductive load, e.g., a relay, connect a diode in parallel with the load, to protect against voltage transients. I/Os are capable of driving 12 V DC, 100 mA (combined max) external load, if internal 12 V DC output (pin 2) is used. In the case of using open drain connections in combination with an external power supply, then the I/Os can manage DC supply of 0–30 V DC, 100 mA each.	0 to max 30 V DC, open drain, 100 mA

1 DC ground
2 DC output 12 V, max 100 mA
3 I/O configured as input
4 I/O configured as output
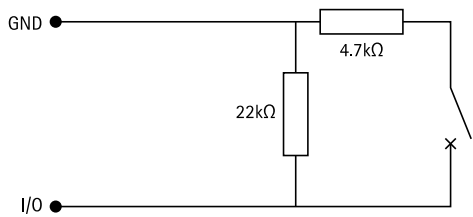5 Configurable I/O
6 Configurable I/O
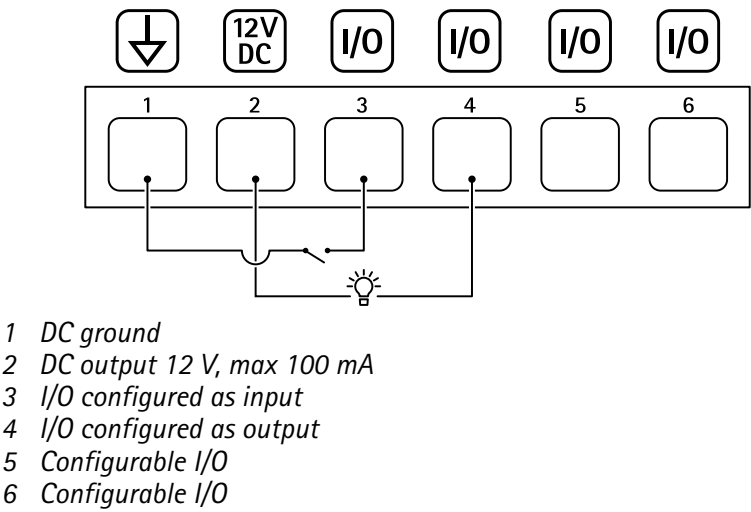
Supervised inputs

To use supervised inputs, install end of line resistors according to the diagram below.
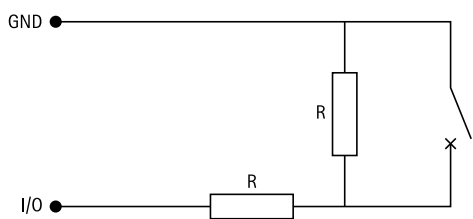
Parallel first connection

The resistor values must be 4.7 kΩ and 22 kΩ.

Serial first connection

The resistor values must be the same and possible values are 1 kΩ, 2.2 kΩ, 4.7 kΩ and 10 kΩ, 1%, ¼ watt standard.

Note

It is recommended to use twisted and shielded cables. Connect shielding to 0 V DC.

Status	Description
Open	The supervised switch is in open mode.
Closed	The supervised switch is in closed mode.
Short	The I/O 1–8 cable is short circuit to GND.
Cut	The I/O 1–8 cable is cut and left open with no current path to GND.

Troubleshooting

Reset to factory default settings

1. Disconnect power from the product.

2. Press and hold the control button while reconnecting power. See .

3. Keep the control button pressed for 5 seconds.

4. Release the control button. The process is complete when the status LED indicator turns green. The product has been reset to the factory default settings.

Check the current device software version

Device software determines the functionality of network devices. When you troubleshoot a problem, we recommend you to start by checking the current device software version. The latest version might contain a correction that fixes your particular problem.

To check the current version:

1. Go to the web interface of AXIS A9210.

2. Go to **Device > I/Os and relays > AXIS A9910**.

3. Click the expansion module and see the current version.

Upgrade the device software

Important
- Preconfigured and customized settings are saved when you upgrade the device software (provided that the features are available in the new version) although this is not guaranteed by Axis Communications AB.

- Make sure the device remains connected to the power source throughout the upgrade process.

Note
When you upgrade the device with the latest version, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release before you upgrade the version. To find the latest device software and the release notes, go to *axis.com/support/device-software*.

1. Download the device software file to your computer, available free of charge at *axis.com/support/device-software*.

2. Log in to your AXIS A9210 as an administrator.

3. Go to **Device > I/Os and relays > AXIS A9910**.

4. Click the expansion module and click **Upgrade device software**.

When the upgrade has finished, the product restarts automatically.

Technical issues, clues, and solutions

If you can't find what you're looking for here, try the troubleshooting section at *axis.com/support*.

Problems upgrading the device software	
Upgrade failure	If the upgrade fails, the device reloads the previous version. The most common reason is that the wrong device software file has been uploaded. Check that the name of the file corresponds to your device and try again.

Troubleshoot status LEDs

Color	Indication
Blinks green (1 green 200 ms blink, off until 2 seconds)	The device is online with unencrypted communication.
Blinks green (2 green 200 ms blinks, off until 2 seconds)	The device is online with encrypted communication.
Blinks green (on for 250 ms, off for 250 ms)	Bootloader is running.
Blinks green and red (blinks green for 250 ms, then red for 250 ms)	New application.
Blinks red (2 red 200 ms blinks, off until 3 seconds)	Hardware initialization error.
Blinks red (3 red 200 ms blinks, off until 3 seconds)	Storage initialization error.
Blinks red (4 red 200 ms blinks, off until 3 seconds)	Secure element initialization error.
Blinks green (on for 100 ms, off for 100 ms)	The control button is pressed.
Blinks red (on for 100 ms, off for 100 ms)	The control button is pressed over 60 seconds.

Contact support

If you need more help, go to *axis.com/support*.