

JAB0451 Analog Output Module

Manual and Installation Instructions

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Description

The **JAB0451** is an analog output expansion module compatible with the Johnson Controls family of Field Controllers and Network Controllers. It is designed to provide additional outputs for all compatible controllers that are programmed with the controller configuration tool (CCT). The **JAB0451** is designed to provide additional analog outputs (0-10 VDC). The device **JAB0451** provides integral manual overrides for the analog outputs, selected by 3 position switches and the output VDC signal adjusted by rotary potentiometers. The status of the outputs is indicated by the variable brightness LEDs.

The **JAB0451** module is a DIN rail mountable device and includes the terminals for wiring the physical output points, the manual overrides and the status and troubleshooting LEDs. The **JAB0451** module communicates with the host controller via the controllers SA (sensor/actuator) bus.

Configuring and commissioning of the **JAB0451** module is done using the Controller Configuration Tool (CCT).



Part Numbers and Designations

Part-No.	Designation	Description
00002892	JAB0451	Rail mounted Analog Output module

Parts Included

- One JAB0451 Output Module with removable Terminal Plugs.
- One Installation Instructions sheet.

Installation

Observe these guidelines when installing the JAB0451 module(s):

- Transport the modules in the original container to minimize vibration and shock damage to the devices.
- Do not drop the JAB device or subject it to physical shock.
- Verify that all parts are shipped with the JAB modules.

Mounting

Follow these guidelines when mounting JAB0451 modules:

- Mount the JAB module in areas free of corrosive vapours and observe the environmental limitations listed in the *Technical Specifications* section.
- Do not mount the JAB module on surfaces that are prone to vibration.
- Do not mount the modules in areas where electromagnetic emissions from other devices or wiring can interfere with JAB modules communication.
- Mount the JAB module so that no other parts or devices obstruct ventilation of or radiate heat into the modules housing.

Materials and Special Tools Needed

- One 45 mm (1.8 in.) or longer piece of DIN rail and appropriate hardware for mounting the DIN rail.
- Small straight blade screwdriver for securing the wires in the terminal blocks.
- Medium straight blade screwdriver for loosening the device from the DIN rail.

DIN Rail Mount Applications

To mount modules on a DIN rail:

1. Securely mount a 45 mm (1.8 in.) or longer section of DIN rail horizontally and centred in the required space. Allow sufficient space for cable and wire connections (minimum of 50 mm [2 inches] above and below the module, i.e. a total height of approximately 200 mm [8 inches]).
2. Hang the rail mounted devices by the DIN rail hook on the top track of the DIN rail, and position the module's DIN rail channel snugly against the tracks of the DIN rail.
3. The bottom mounting clip must click into place to fix the JAB module securely on the DIN rail.
4. To remove a module from the DIN rail, pull the bottom DIN clip carefully down to the extended position and lift the module off the DIN rail.

Wiring

Please pay attention to all specifications and guidelines documented by Johnson Controls concerning devices running on the MS/TP-Bus. Refer to the *MS/TP Communications Bus Overview Technical Bulletin (LIT-12011034)* for further information.

To wire the JAB0451 module:

1. Terminate wiring as per engineering drawing (see Figure 1) and connect other devices to the SA Bus as required. Wire the SA Bus in a daisy chain.
Note: If multiple Input/Output Modules are used, and the JAB0451 module is located at one end of the SA Bus daisy chain, set the End-of-Line (EOL) switch to Terminated on the last Module (see Figure 3).
2. Ensure the device address DIP switches are set to the appropriate hardware address (in the range of 128-254). See *Setup and Adjustments*.
3. Connect a 24Vac power supply to the JAB0451 module.
4. Download and commission the JAB0451 module. See *Configuring and Commissioning*. The point definitions are automatically downloaded into the JAB0451 module after the host controller has been put into operation by means of the CCT tool and the Input/output modules have been detected by the host controller.

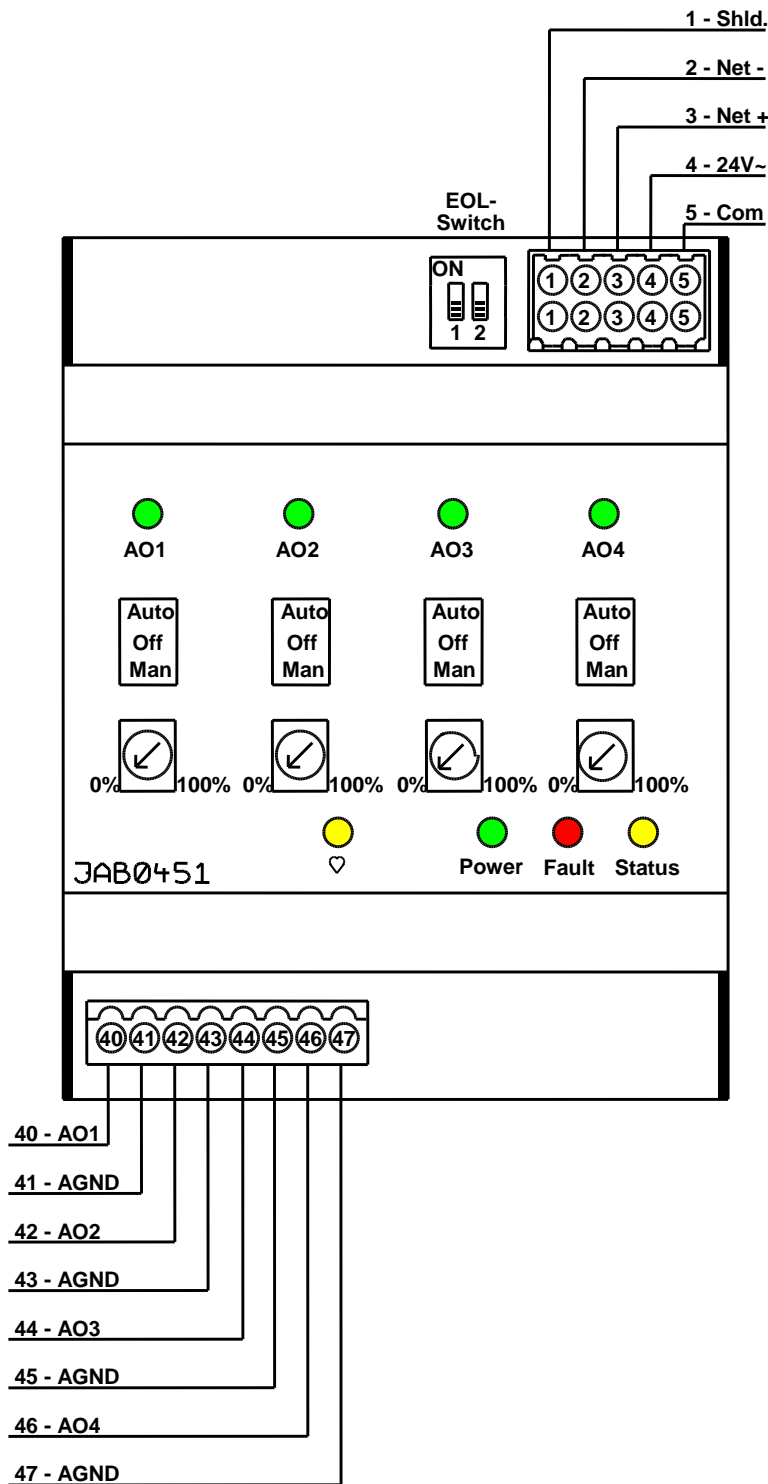


Figure 1: JAB0451 Module Wiring Interface



Note: The SHLD terminal on the SA Bus neither provides an electrically grounded connection or power source for other devices on the SA Bus. It only provides a convenient terminal for connecting the screens of the daisy-chained network cable.

Table 1: Romutec I/O-Modules Family Wiring List (Part 1 of 2):

Terminal Block	Label in Wiring Interface	Function and Electrical Ratings/Requirements	Wiring Requirements
Analog OUT (Terminals 40 - 47)	AOn	Analog Output, Voltage mode, sources 0-10 VDC output voltage External 1kΩ minimum load required 10 VDC maximum output voltage 10 mA maximum output current	A
	AGND	The signal common for all Analog OUT terminals; combined with power supply terminal commons	

Table 2: Romutec I/O-Modules Family Wiring List (Part 2 of 2):

Terminal Block / Function Group	Label in Wiring Interface	Function and Electrical Ratings/Requirements	Wiring Requirements
SA Bus ¹⁾ (Terminals 1 - 3)	Net + Net -	Provides SA Bus communication network	Daisy-chained 366 m maximum length
	Shld	Terminal for the shield of the SA Bus cable	0.5 mm ² to 1.5 mm ² [0.75 mm ² recommended]
24~ Power (Terminals 4 & 5)	24~	AC Supply Input, Supply 24 VAC ± 10%	0.75 mm ² to 1.5 mm ² [1.0 mm ² recommended]
	COM	The 24~ Power common; combined with AO-terminal commons	

¹⁾ The SA Bus specifications in this table are for MS/TP bus communications at 38.4k. For more information, refer to the Johnson Controls *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

Table 3: Wire Gauge and Length Guidelines

Guideline	Cable Size	Maximum Length	Assumptions
A	1.5 mm ² (16 AWG)	457.2 m (1,500 ft)	100 mV maximum voltage drop
	1.0 mm ² (17 AWG)	304.8 m (1000 ft)	
	0.75 mm ² (18 AWG)	228.6 m (750 ft)	
	0.5 mm ² (20 AWG)	152.4 m (500 ft)	
	0.35 mm ² (22 AWG)	106.7 m (350 ft)	

Setup and Adjustments

Determining the SA Bus Address

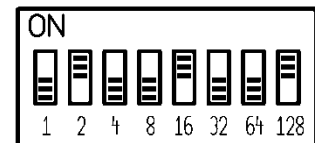
The SA bus address switch sets a unique address for this module on the SA bus. The default address setting is 255 (all ON). You must change this address.

Set consecutive addresses, 128 through 254, for JDB and JAB modules and other subordinate devices on the SA bus.

Set the address of the JAB0451 module using the Dual Inline Package (DIP) switches on the side of the JAB0451 module. The address equals the sum of the numbers set to ON. For example, if the second (2), the fifth (16), and the eighth (128) DIP switches are set to ON, the device address is 146 (2 + 16 + 128 = 146). See Figure 2.

Table 4: FC Bus/SA Bus Address Descriptions

Address	Description
0	Reserved for FC Bus supervisory controller
1-3	Reserved for peripheral devices. (e.g. for FEC local display, address fixed = 3)
4-127	Illegal addresses for Romutec I/O modules – Reserved for field equipment controllers (FEC) and Metasys® IOM devices. Also NCE address fixed = 4
128-254	Valid range of addresses for Romutec I/O-Modules (Subordinate devices)
255	Default address – must be changed



**Figure 2:
Setting the Address DIP
switches**

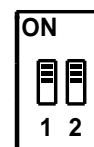
SA Bus termination

The SA Bus End-of-Line termination switch allows you to designate the JAB0451 module as the end of the SA Bus. The default position is OFF, i.e. not terminated, as shown in figure 3 (factory setting). If the JAB0451 module is at the end of a daisy chain of devices on the SA Bus, set **both** EOL switches to the ON position.

Note: The EOL switched should be either set to the default position as shown in Figure 3 or with both switches 1 and 2 set to ON when used as a SA Bus network terminator.

**Table 5: Valid values for EOL switches
Adjustment**

Value	Description
0	not terminated
1	adjustment not valid
2	adjustment not valid
3	terminated



**Figure 3:
Setting EOL switches**

Configuring and Commissioning

The parameters for configuring the JAB0451 are defined using the CCT Tool and will be stored together with the other controller application data in the *.caf file (Controller Application File). During commissioning this data is downloaded to the controller. Once the host controller has detected the JAB0451 with the appropriate address, it will automatically send the configuration data to this module.

When adding the JxBxx51 devices to the SA Bus in the CCT it is necessary to select the equivalent JxBxx10 model from the SA Bus Device list, see table 6.

Table 6: CCT Reference

Model Number	Description	CCT Reference	CCT Description
JDB8451	8BI, 4BO Integral Overrides	JDB8410	I/O MODULE 8BI w LEDs, 4 Relay w HOA
JDB6451	6BI, 4BO Integral Overrides (2 x 2-state drives)	JDB6410	I/O MODULE 6BI w LEDs, 2 Relay Pairs w HOA
JDB8051	8BI Integral Status Indication red/green	JDB8010	I/O MODULE 8BI w LEDs
JAB0451	4AO Integral Overrides	JAB0410	I/O MODULE 4AO w Manual Override
JAB6651	2BI, 2BO, 4AI, 4AO	JAB6610	I/O MODULE 4AI,2BI,4AO,2RO

The manual control functions are available independently from the SA-Bus connection of the JAB0451 module to a host controller, i.e. the analog outputs signal voltage may be adjusted at any time using the switches and potentiometers on the front of the module.

The status of the analog outputs will be indicated by the variable brightness LEDs independent of the SA-Bus connection of the JAB0451 module to the host controller. LED off =0%, Full brightness = 100%

For more information concerning the Controller Configuration Tool software (CCT), please refer to the *CCT Help*.

Troubleshooting

Use Table 7 as a guide to troubleshoot the JAB0451 module.

Table 7: Status LEDs of the JAB0451 module

Name	Colour	Normal	Descriptions
Power	Green	On Steady	Off Steady = No Power, 24VAC missing On Steady = Power is Supplied by Primary Voltage 24VAC
Fault	Red	Off Steady	Blink - 2 Hz = Download or start up in progress, not ready for normal operation Off Steady = No Faults On Steady = Device Fault or Bootloader Mode
Status	Orange	Blink	Blink = Data Transmission (send, normal communication) Off Steady = No Data Transmission or auto baud in progress
♥ LED	Orange	Flicker	Flicker = Internal System Check ok Off Steady/On Steady = Restart or replace device

Technical Specifications

General Specifications

Ambient Operating Conditions	0 to 50°C (32 to 122°F); 10 to 90% RH non-condensing
Ambient Storage Conditions	0 to 70°C (32 to 158°F); 10 to 90% RH non-condensing
Standards Compliance	CE Directive 2014/30/EU CE Directive 2014/35/EU

JAB0451 Analog Output Module

Product Code Numbers	JAB0451 Analog Output Module
Supply Voltage	24 VAC ± 10% at 50 or 60 Hz
Power Consumption	12 VA maximum
Terminations	Spring-type terminals for I/Os, power supply and MS/TP Bus
Device Addressing	DIP switch set (128-254). Addresses 0-127, 255 are reserved
Communications Bus	BACnet® MS/TP; 4-wire SA Bus ¹⁾ (only 3 wires used)
Mounting	35 mm DIN rail
Dimensions (H x W x D)	92 x 72 x 70 mm (3.6 x 2.8 x 2.8 in.) Minimum space for mounting: 120 x 72 x 70 mm (4.7 x 2.8 x 2.8 in.)
Housing	Plastic housing, Plastic material: PC-GF10 Protection: IP20 (IEC529)
Weight	JAB0451: 0.16 kg (0.35 lb)

¹⁾ For more information, refer to the Johnson Controls *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Romutec office. Romutec GmbH shall not be liable for damages resulting from misapplication or misuse of its products.

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