

JAB0410 Analog Output Module

Manual and Installation Instructions

JAB0410 & JAB0420 & JAB0440

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Applications

The **JAB0410** is an analog output expansion module compatible with the Johnson Controls family of Field Controllers and Network Controllers. It is designed to provide additional inputs and outputs for all compatible controllers that are programmed with the controller configuration tool (CCT). The devices **JAB0420** and **JAB0440** provide the feature of manual override for the analog outputs.

Note: The module contains a connector that can be used to lock the option of manual override, i.e. if a signal is applied here, the positions of the switches have no influence, but the outputs will behave as if all switches would be in the "Automatic" position. However, the 'overridden' flag will be updated, regardless if manual override is locked or released.

The **JAB0410** module is a DIN rail mountable device and includes the terminals for wiring the physical output points and the status and troubleshooting LEDs. The **JAB0410** module communicates with the host controller via the controller's SA (sensor/actuator) bus. Configuring and commissioning of the **JAB0410** module is done using the Controller Configuration Tool (CCT).

The **JAB0420** is a front panel device which can be mounted into the door of a cabinet. On the front panel the manual override of the outputs can be done with rotary switches. Each front panel device will be connected to its corresponding rail mounted module with a USB-cable. Instead of a **JAB0420** front panel, the rail mounted device **JAB0440** can be used.

If manual override and signaling are not required, the **JAB0410** can be used without front panel just as additional outputs for compatible Johnson Controls controllers.



JAB0420

JAB0410

JAB0440

Article Numbers and Designations

Part-No.	Designation	Description
00002743	JAB0410	Rail mounted Analog Output module
00002744	JAB0420	Front Panel Device appropriate for JAB0410
00002745	JAB0430	Combination of JAB0410 and JAB0420 (incl. USB-cable 3,0 m)
00002816	JAB0440	Rail mounted Device appropriate for JAB0410
00002817	JAB0450	Combination of JAB0410 and JAB0440 (incl. USB-cable 0,1 m)
00002747	USB-A-B-3m	USB-cable A-B type, 3,0 m
00002748	USB-A-B-5m	USB-cable A-B type, 5,0 m
00002809	USB-A-B-10cm	USB-cable A-B type, 0,1 m

Parts Included

- One JAB0410 Input/Output Module with removable Terminal Plugs.
- Optional: one JAB0420 Front Panel Module if ordered.
- Optional: one rail mounted JAB0440 Module if ordered.
- Optional: one USB cable type A-B (only delivered with JAB0420 or JAB0440).
- One Installation Instructions sheet.

Installation

Observe these guidelines when installing the JAB0410 / JAB0420 / JAB0440 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 shipped with the JAB modules.

Mounting

Follow these guidelines when mounting JAB0410 and JAB0420 / JAB0440 modules:

- Mount the JAB0410 / JAB0420 / JAB0440 module in areas free of corrosive vapours and observe the environmental limitations listed in the *Technical Specifications* section.
- Do not mount the JAB0410 / JAB0420 / JAB0440 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 JAB0410 / JAB0420 / JAB0440 module communication.
- Mount the JAB0410 / JAB0420 / JAB0440 module so that no other parts or devices obstruct ventilation of or radiate heat into the module's 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.
- Straight blade screwdriver for loosening the device from the DIN rail.

DIN Rail Mount Applications (JAB0410 and JAB0440)

To mount the JAB0410 module 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 JAB0410 and JAB0440 module by the DIN rail hook on the top track of the DIN rail, and position the module 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 the module from the DIN rail, pull the bottom DIN clip carefully down to the extended position and lift the module off the DIN rail.

Front Panel Mounting (JAB0420)

To mount the JAB0420 module into the front of a switch cabinet:

1. Securely install a 19"-mounting frame (e.g. RTR4084S) in the door of the cabinet. Allow sufficient space for cable and wire connections, especially the USB plugs (minimum of 50 mm [2 inches] at the rear of the module).
2. Put the JAB0420 module in place and fix the screws into the holes of the 19"-rack. Carefully tighten all of the screws.

IMPORTANT: Do not overtighten the mounting screws. Overtightening the screws may damage the threads.

Wiring

Please pay attention to all specifications and guidelines documented by Johnson Controls concerning devices running with the MS/TP-Bus, e.g. refer to the *MS/TP Communications Bus Overview Technical Bulletin (LIT-12011034)*.

To wire the JAB0410 module:

1. Terminate wiring per engineering drawings (see Figure 1).
2. Wire other devices to the SA Bus, as the case may be.
3. Wire the SA Bus in a daisy chain.

Note: If multiple Input/Output Modules are used, and the JAB0410 module is located at one end of the SA Bus daisy chain, set the End-of-Line (EOL) switch on the last Module (also see Fig. 3).

4. Ensure the device address DIP switches are set to the appropriate hardware address (in the range of 128-254). See *Setup and Adjustments*.
5. Connect power to the JAB0410 module.
6. Download and commission the JAB0410 module. See *Commissioning*. Once the host controller has detected the JAB0410 module, the configuration will be downloaded to the JAB0410 if the host controller has been put into operation by means of the CCT tool.

To connect the JAB0420 front panel or a rail mounted JAB0440 to the JAB0410 module:

1. Use the available 3m or 5m USB cable of type A-B.
2. If there are more I/O modules and front panels mounted, be sure to connect the correct ones.
3. After connecting the modules, fix the cable plugged to the front panel, ensuring strain relief. While doing so, do not pull down the cable. This avoids that the plug might become loose.

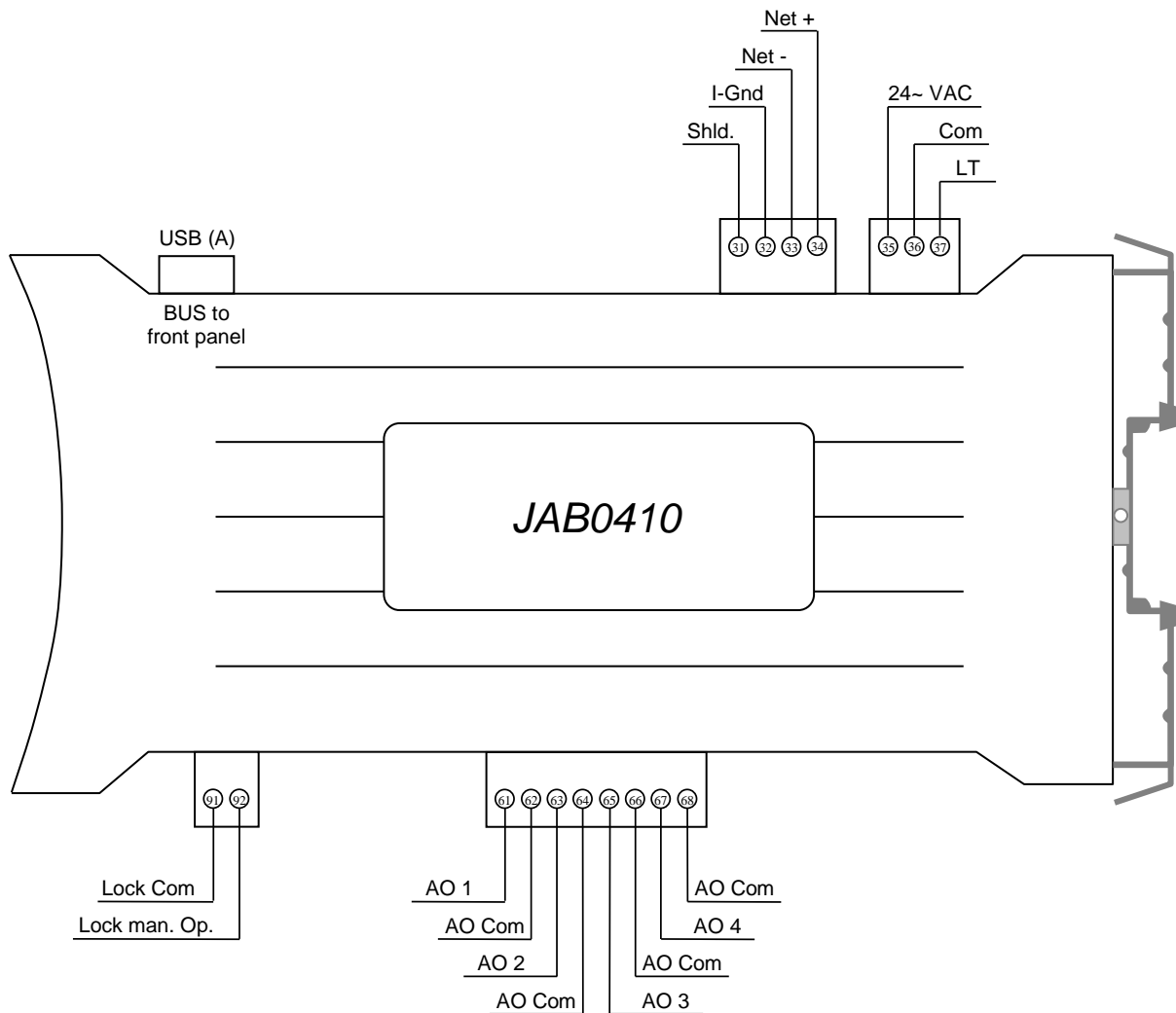


Figure 1: JAB0410 Module Wiring Interface



Note: The SHLD terminal on the SA Bus neither provides an electrically grounded connection nor sources power for other devices on the SA Bus. It is for daisy-chaining purposes only.

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
Lock man. Op.	Lock man. Op.	Binary Input, Dry Contact Maintained Mode 0.01 s minimum pulse width (50 Hz at 50% duty cycle) Internal 35 V, 2.7kΩ pull-up	A
	Lock COM	The signal common for all Binary IN terminals; combined with power supply terminal commons	
Analog OUT	AO <i>n</i>	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
	AO Com	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⁾	Net + Net – I-Gnd	Provides SA Bus communication network	Daisy-chained 366 m maximum length
	Shield	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	24~ Hot	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	
LED Test Input	LT	Input to activate a check of all LEDs Input LT will be activated by Com	0.5 mm ² to 1.5 mm ² [0.75 mm ² recommended]

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

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 JAB0410 module using the Dual Inline Package (DIP) switches on the face of the JAB0410 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-/SA Bus Address Summary

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

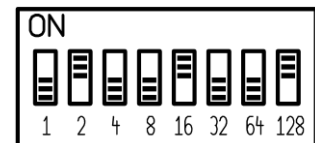


Fig. 2:
Setting the Address DIP switches

SA Bus termination and selecting use of front panel

Using the quad dip switch (fig. 3), it is possible to decide about the use of a front panel with the JAB0410 module and to designate the JAB0410 module as the end of the SA Bus. Valid values of the adjustments are marked in table 5 below.

Dip switches 1...3: SA-Bus Termination

The SA Bus End-of-Line termination switch allows you to designate the JAB0410 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 JAB0410 module is at the end of a daisy chain of devices on the SA Bus, set **all** the three EOL switches to the ON position. Doing so, this will avoid the occurrence of reflections at the end of the line.

Note: Either all the switches 1 ... 3 are set to the ON position or none. See figure 3.

Dip switch 4: Application with or without Front Panel

For the application of the JAB0410 module with an attached front panel device JAB0420 (or rail mounted JAB0440 instead), the fourth DIP switch must be set to the ON position, otherwise the JAB0410 module will ignore the front panel and just work as if there was no front panel device connected. In case of a missing front panel although the fourth DIP switch is set to the ON-position, the JAB0410 will signalize an error by a blinking red LED.

Table 5: Valid values for EOL switches and Front Panel Mode Adjustment

Value	Description
0	not terminated, without Front Panel
1-6	adjustment not valid
7	terminated, without Front Panel
8	not terminated, with Front Panel
9-14	adjustment not valid
15	terminated, with Front Panel

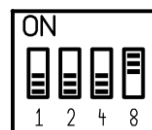


Fig. 3:
Setting EOL switches and selecting Front Panel Mode

Configuring and Commissioning

The parameters for configuring the JAB0410 will be defined within the CCT Tool and are stored together with the other project data in the *.caf project file (Controller Application File). All this data will be downloaded to the controller. Once the controller has detected the JAB0410 with the appropriate address, it will send the configuration data to this module.

In conjunction with the use of the front panel JAB0420 (or JAB0440), manual control functions are available independent from the SA-Bus connection of the JAB0410 module to a controller, i.e. the analog outputs' voltage may be adjusted at any time using the rotary switches and pots on the front panel. Furthermore the states of the analog outputs will be signalized by the dimmed LEDs independent from the SA-Bus connection of the JAB0410 module to the controller.

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

The function of optional locking the manual operation via a connection terminal does not require any parameterization with the help of the CCT. In order to display the status "manual control enabled or locked" and to report it to the controller, the corresponding contact can be connected in parallel to a digital input of a JDB8010 or JDB1610, for example.

Troubleshooting

Use Tables 6 and 7 to troubleshoot the JAB0410 module and the JAB0420 / JAB0440 devices.

Table 6: Status LEDs of the JAB0410 module

Name	Colour	Normal	Descriptions
Power	Green	On Steady	Off Steady = No Power, 24V AC missing On Steady = Power is Supplied by Primary Voltage 24V AC
Fault	Red	Off Steady	Blink - 2 Hz = Download or start up in progress, not ready for normal operation Blink - 4 Hz = Fault or missing Front Panel Off Steady = No Faults On Steady = Device Fault
SA/FC Bus	Orange	Flicker	Flicker = Data Transmission (send, normal communication) Off Steady = No Data Transmission or auto baud in progress

Table 7: Status LED of the JAB0420 front panel and JAB0440 rail mounted device

Name	Colour	Normal	Descriptions
Status	Green	Blink - 2 Hz	Blink - 2 Hz = Data Transmission (normal communication, no fault) Off Steady = No Power On Steady = No Data Transmission / Device Fault / Communication Fault

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

JAB0410 Analog Output Module

Product Code Numbers	JAB0410 Analog Output Module
Supply Voltage	24 VAC ± 10% at 50 or 60 Hz
Power Consumption	12 VA maximum incl. Front Panel Load
Terminations	Spring-type terminals for I/Os, power supply and MS/TP Bus USB type A for the connection of an optional Front Panel JAB0420
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)	116 x 32 x 166 mm (4.6 x 1.3 x 6.5 in.) Minimum space for mounting: 210 x 40 x 180 mm (8.3 x 1.6 x 7.1 in.)
Housing	Plastic housing, Plastic material: PA6.6 25%GF Protection: IP20 (IEC529)
Weight	JAB0410: 0.180 kg (0.40 lb)

JAB0420 Front Panel

Product Code Numbers	JAB0420 Front Panel for JAB0410
Supply Voltage	5 VDC ± 5%, provided by the JAB0410 Analog Output Module via USB
Power Consumption	1 VA maximum, provided by JAB0410 Analog Output Module
Terminations	USB type B for the connection to the JAB0410 Analog Output Module
Mounting	considered for 19"-Rack (e.g. RTR4084S)
Dimensions (H x W x D)	129 x 40.5 x 43 mm (5.1 x 1.6 x 1.7 in.) Minimum space for mounting: 135 x 42 x 90 mm (5.3 x 1.7 x 3.6 in.)
Housing	Plastic housing, material: ABS + Polycarbonate UL94 5VB Protection: IP20 (IEC529) (in conjunction with 19"-rack RTR4084S: IP54)
Weight	JAB0420: 0.102 kg (0.23 lb)

JAB0440 Rail Mounted Control Panel

Product Code Numbers	JAB0440 rail mounted Control Panel for JAB0410
Supply Voltage	5 VDC ± 5%, provided by the JAB0410 I/O-Module via USB
Power Consumption	1 VA maximum, provided by JAB0410 I/O-Module
Terminations	USB type B for the connection to the JAB0410 I/O Module
Mounting	35 mm DIN rail
Dimensions (H x W x D)	116 x 32 x 166 mm (4.6 x 1.3 x 6.5 in.) Minimum space for mounting: 210 x 40 x 180 mm (8.3 x 1.6 x 7.1 in.)
Housing	Plastic housing, Plastic material: PA6.6 25%GF Protection: IP20 (IEC529)
Weight	JAB0440: 0.143 kg (0.32 lb)

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

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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