

JDB8410 Input/Output Module

Manual and Installation Instructions

JDB8410 & JDB8420 & JDB8440

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Applications

The **JDB8410** is an input/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 **JDB8420** and **JDB8440** provide the feature of manual override for four 1-state drives.

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

The **JDB8410** module is a DIN rail mountable device and includes the terminals for wiring the physical input and output points and the status and troubleshooting LEDs. The **JDB8410** module communicates with the host controller via the controller's SA (sensor/actuator) bus. Configuring and commissioning of the **JDB8410** module is done using the Controller Configuration Tool (CCT).

The **JDB8420** is a front panel device which can be mounted into the door of a cabinet. On the front panel the state of the inputs is signaled through LEDs and 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 **JDB8420** front panel, the rail mounted device **JDB8440** can be used.

If manual override and signaling are not required, the **JDB8410** can be used without front panel just as additional inputs and outputs for compatible Johnson Controls controllers.



JDB8420

JDB8410

JDB8440

Article Numbers and Designations

Part-No.	Designation	Description
00002737	JDB8410	Rail mounted Input/Output module
00002738	JDB8420	Front Panel Device appropriate for JDB8410
00002739	JDB8430	Combination of JDB8410 and JDB8420 (incl. USB-cable 3,0 m)
00002814	JDB8440	Rail mounted Device appropriate for JDB8410
00002815	JDB8450	Combination of JDB8410 and JDB8440 (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
10002620	Jumper, 3-pole	Three-pole jumper, needed for coding the colour of a LED to orange

Parts Included

- One JDB8410 Input/Output Module with removable Terminal Plugs.
- Optional: one JDB8420 Front Panel Module if ordered.
- Optional: one rail mounted JDB8440 Module if ordered.
- Optional: one USB cable type A-B (only delivered with JDB8420 or JDB8440).
- One Installation Instructions sheet.

Installation

Observe these guidelines when installing the JDB8410 / JDB8420 / JDB8440 module(s):

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

Mounting

Follow these guidelines when mounting JDB8410, JDB8420 and JDB8440 modules:

- Mount the JDB8410 / JDB8420 / JDB8440 module in areas free of corrosive vapours and observe the environmental limitations listed in the *Technical Specifications* section.
- Do not mount the JDB8410 / JDB8420 / JDB8440 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 JDB8410 / JDB8420 / JDB8440 module communication.
- Mount the JDB8410 / JDB8420 / JDB8440 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 (JDB8410 and JDB8440)

To mount the JDB8410 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 JDB8410 and JDB8440 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 JDB 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.

Front Panel Mounting (JDB8420)

To mount the JDB8420 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 JDB8420 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 JDB8410 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 JDB8410 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 JDB8410 module.
6. Download and commission the JDB8410 module. See *Commissioning*. Once the host controller has detected the JDB8410 module, the configuration will be downloaded to the JDB8410 if the host controller has been put into operation by means of the CCT tool.

To connect the JDB8420 front panel or a rail mounted JDB8440 to the JDB8410 module:

1. Use the available USB cable of type A-B (3m or 5m for JDB8420, respectively 0.1m for JDB8440).
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.

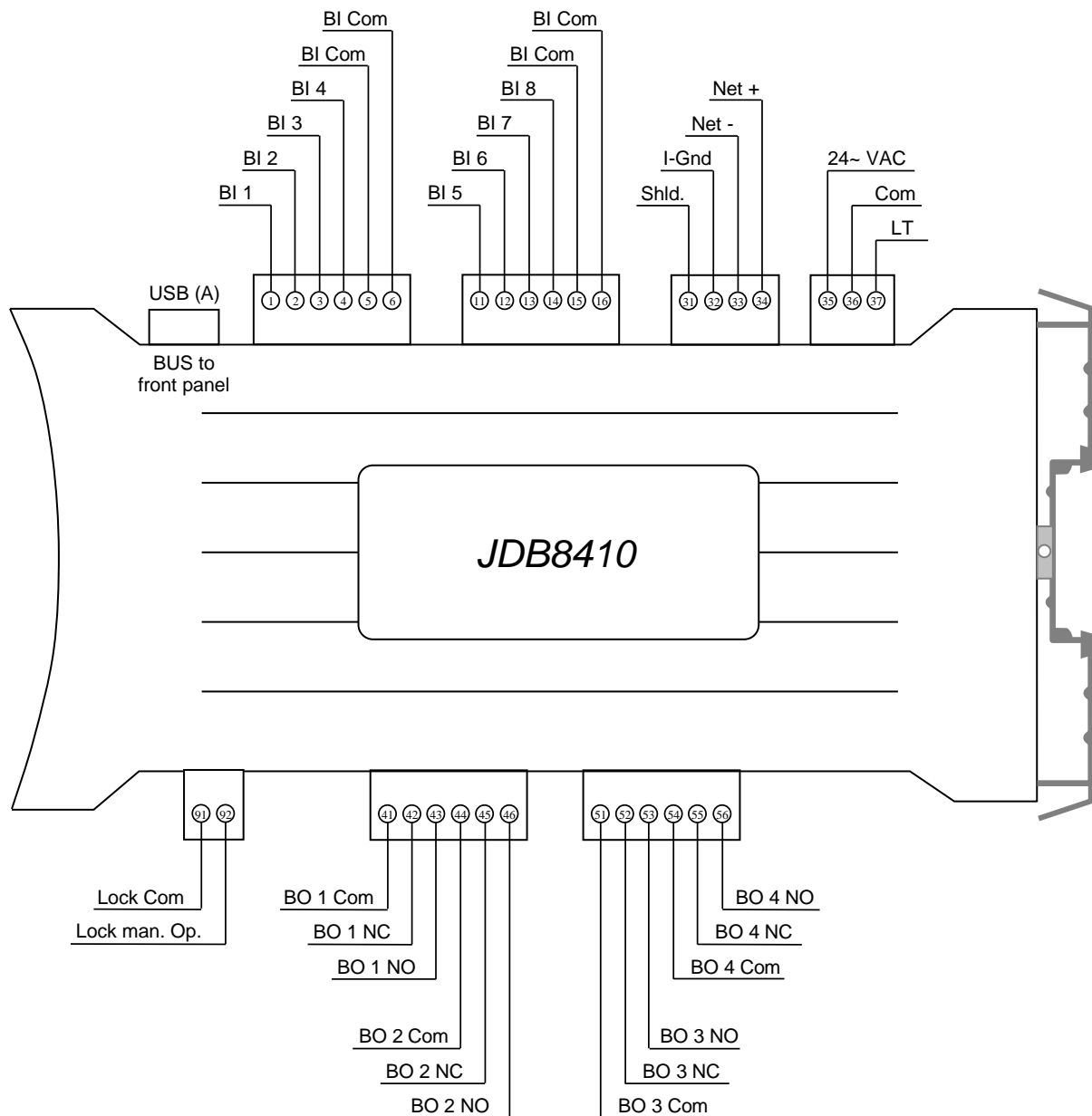


Figure 1: JDB8410 Module Wiring Interface



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
Binary IN	BI <i>n</i>	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
	BI Com	The signal common for all Binary IN terminals; combined with power supply terminal commons	
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	
Binary OUT	BO <i>n</i> NO	Binary Output, up to 250 VAC Relay Contact Connects BO <i>n</i> NO to BO Com when activated <u>Characteristics (Resistive Load):</u> Initial contact resistance 100mΩ (at 1A / 24 VDC) Rated load 5 A at 250 VAC, 5 A at 30 VDC, 10 A at 125 VAC Max. switching voltage 277 VAC, 30 VDC Max. switching capacity 1250 VA (AC), 150 W (DC) Endurance 1x10 ⁵ ops (Rated Load), 1x10 ⁷ ops (no Load)	0.5-1.5 mm ² (20-16 AWG) stranded cable
	BO <i>n</i> NC	Binary Output, up to 250 VAC Relay Contact Disconnects BO <i>n</i> NC from BO Com when activated <u>Characteristics (Resistive Load):</u> Initial contact resistance 100mΩ (at 1A / 24 VDC) Rated load 3 A at 250 VAC, 3 A at 30 VDC, 5 A at 125 VAC Max. switching voltage 277 VAC, 30 VDC Max. switching capacity 750 VA (AC), 90 W (DC) Endurance 1x10 ⁵ ops (Rated Load), 1x10 ⁷ ops (no Load)	
	BO <i>n</i> Com	The output signal common for Binary OUT terminals; isolated from all other terminal commons, incl. BO terminal commons	

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

Terminal Block / Function Group	Label in Wiring	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 BI-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 [0.75mm 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 JDB8410 module using the Dual Inline Package (DIP) switches on the face of the JDB8410 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 Johnson Controls 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

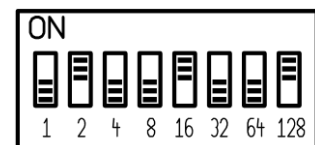


Fig. 2:
Setting the Address DIP switches

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 JDB8410 module and to designate the JDB8410 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 JDB8410 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 JDB8410 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 JDB8410 module with an attached front panel device JDB8420 (or rail mounted JDB8440 instead), the fourth DIP switch must be set to the ON position, otherwise the JDB8410 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 JDB8410 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

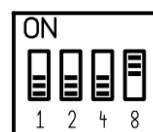


Fig. 3:
Setting EOL switches and selecting Front Panel Mode

Encoding the LED Colour

The colour of LED 1, 3, 5 and 7 can be selected by means of the jumpers that are located at the rear of the module (JDB8420) respectively on top of the device (JDB8440). Depending on the position of the jumper, the LED will be lit red or green. (See fig. 4 beneath). All other LEDs (2, 4, 6 and 8) are set to green colour.

Jumpers which are plugged onto the left position will cause the LED to be lit in green colour, whereas jumpers located on the right side will determine the LED to be illuminated in red colour. For choosing the colour orange, special jumpers are needed to connect all the three pins instead of just two. These jumpers can be ordered as special accessories (for Part-No. see *Article numbers and designations*).

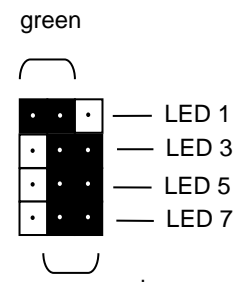


Fig. 4: Jumper positions for LED-colours of JDB8420 and JDB8440

Configuring and Commissioning

The parameters for configuring the JDB8410 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 host controller has detected the JDB8410 with the appropriate address, it will send the configuration data to this module.

In conjunction with the use of a front panel JDB8420 (or JDB8440), manual control functions are available independent from the SA-Bus connection of the JDB8410 module to a controller, i.e. the binary outputs can be switched to ON or OFF at any time using the rotary switches of the front panel. Furthermore the states of the binary inputs will be signaled independent from the SA-Bus connection of the JDB8410 module to the controller, but until the controller has sent configuration data to the JDB8410, factory settings are used for all polarity parameters (polarity = NORMAL). This means that basically a LED on the front panel will be lit when the contact of the corresponding binary input is closed. This can be changed by appointing the property „Polarity“ in the CCT to REVERSE, downloading the *.caf-file to the controller and connecting the SA-Bus so that the controller will send configuration data to the JDB8410.

For more information concerning the Controller Configuration Tool software (CCT), please refer to the CCT *Help*, (LIT-12011147).

The optional function of disabling and locking the manual operation via a remote contact connected to the 'lock' terminals does not require any parameters set 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 JDB8410 module and the JDB8420 / JDB8440 devices.

Table 6: Status LEDs of the JDB8410 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 JDB8420 front panel and JDB8440 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

JDB8410 I/O-Module

Product Code Numbers	JDB8410 Input/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 JDB8420 or JDB8440
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	JDB8410: 0.240 kg (0.53 lb)

JDB8420 Front Panel

Product Code Numbers	JDB8420 Front Panel for JDB8410
Supply Voltage	5 VDC ± 5%, provided by the JDB8410 I/O-Module via USB
Power Consumption	1 VA maximum, provided by JDB8410 I/O-Module
Terminations	USB type B for the connection to the JDB8410 I/O 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	JDB8420: 0.105 kg (0.23 lb)

JDB8440 Rail Mounted Control Panel

Product Code Numbers	JDB8440 rail mounted Control Panel for JDB8410
Supply Voltage	5 VDC ± 5%, provided by the JDB8410 I/O-Module via USB
Power Consumption	1 VA maximum, provided by JDB8410 I/O-Module
Terminations	USB type B for the connection to the JDB8410 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	JDB8440: 0.135 kg (0.30 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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