

# JDB8010 Binary Input Module

## Manual and Installation Instructions

### JDB8010 & JDB8020 & JDB8040

Release 4.01  
Issued Oct 21, 2019

### Applications

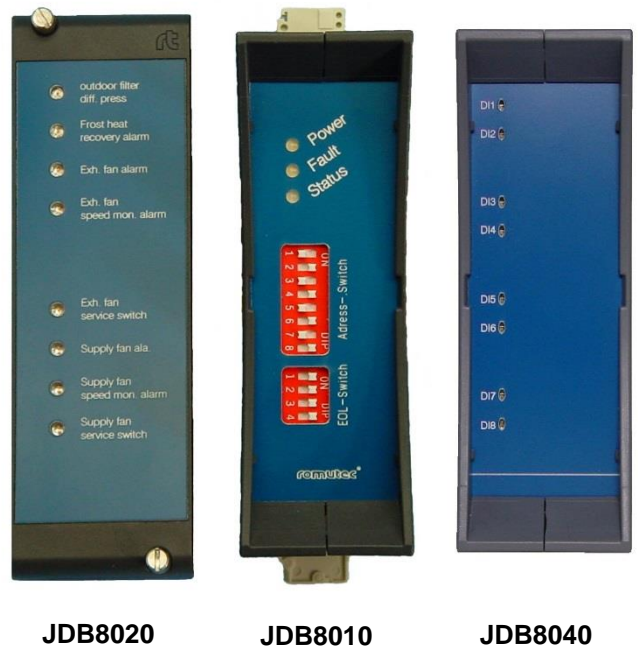
The **JDB8010** is an input expansion module compatible with the Johnson Controls family of Field Controllers and Network Controllers. It is designed to provide additional inputs and outputs for all compatible controllers that are programmed with the controller configuration tool (CCT). The devices **JDB8020** and **JDB8040** provide the opportunity of signaling the eight binary inputs by the means of LEDs.

The rail mounted module **JDB8010** provides the physical I/O points. The module communicates with the host controllers via the controllers SA (sensor/actuator) bus. Configuring the module is done through the Johnson Controls controller. For configuring and commissioning of the controller, the CCT tool is required.

The **JDB8020** is a front panel device which can be mounted into the door of a cabinet. On the front panel the state of each input is signaled through LEDs. The colour of each LED is selectable to red, green or orange by jumpers. Each front panel device will be connected to its corresponding rail mounted module with a USB-cable.

Instead of a **JDB8020** front panel, also the rail mounted device **JDB8040** can be used.

If signaling input status is not required, the **JDB8010** can be used without front panel just as additional inputs for the controller.



### Article Numbers and Designations

Romutec Part-No.	Designation	Description
00002734	JDB8010	Rail mounted Input/Output module
00002735	JDB8020	Front Panel Device appropriate for JDB8010
00002736	JDB8030	Combination of JDB8010 and JDB8020 (incl. USB-cable 3,0 m)
00002810	JDB8040	Rail mounted Device appropriate for JDB8010
00002811	JDB8050	Combination of JDB8010 and JDB8040 (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 JDB8010 Input/Output Module with removable terminal Plugs.
- Optional: one JDB8020 Front Panel Module if ordered.
- Optional: one rail mounted JDB8040 Module if ordered.
- Optional: one USB cable type A-B (only delivered with JDB8020 or JDB8040).
- One Installation Instructions sheet.

## Installation

Observe these guidelines when installing the JDB8010 / JDB8020 / JDB8040 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 JDB8010, JDB8020 and JDB8040 modules:

- Mount the JDB8010 / JDB8020 / JDB8040 module in areas free of corrosive vapours and observe the environmental limitations listed in the *Technical Specifications* section.
- Do not mount the JDB8010 / JDB8020 / JDB8040 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 JDB8010 / JDB8020 / JDB8040 module communication.
- Mount the JDB8010 / JDB8020 / JDB8040 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 (JDB8010 and JDB8040)

To mount the JDB8010 and JDB8040 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 above and below the module, i.e. a total height of approximately 200 mm).
2. Hang the JDB8010 and JDB8040 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 (JDB8020)

To mount the JDB8020 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 at the rear of the module).
2. Put the JDB8020 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 JDB8010 module:**

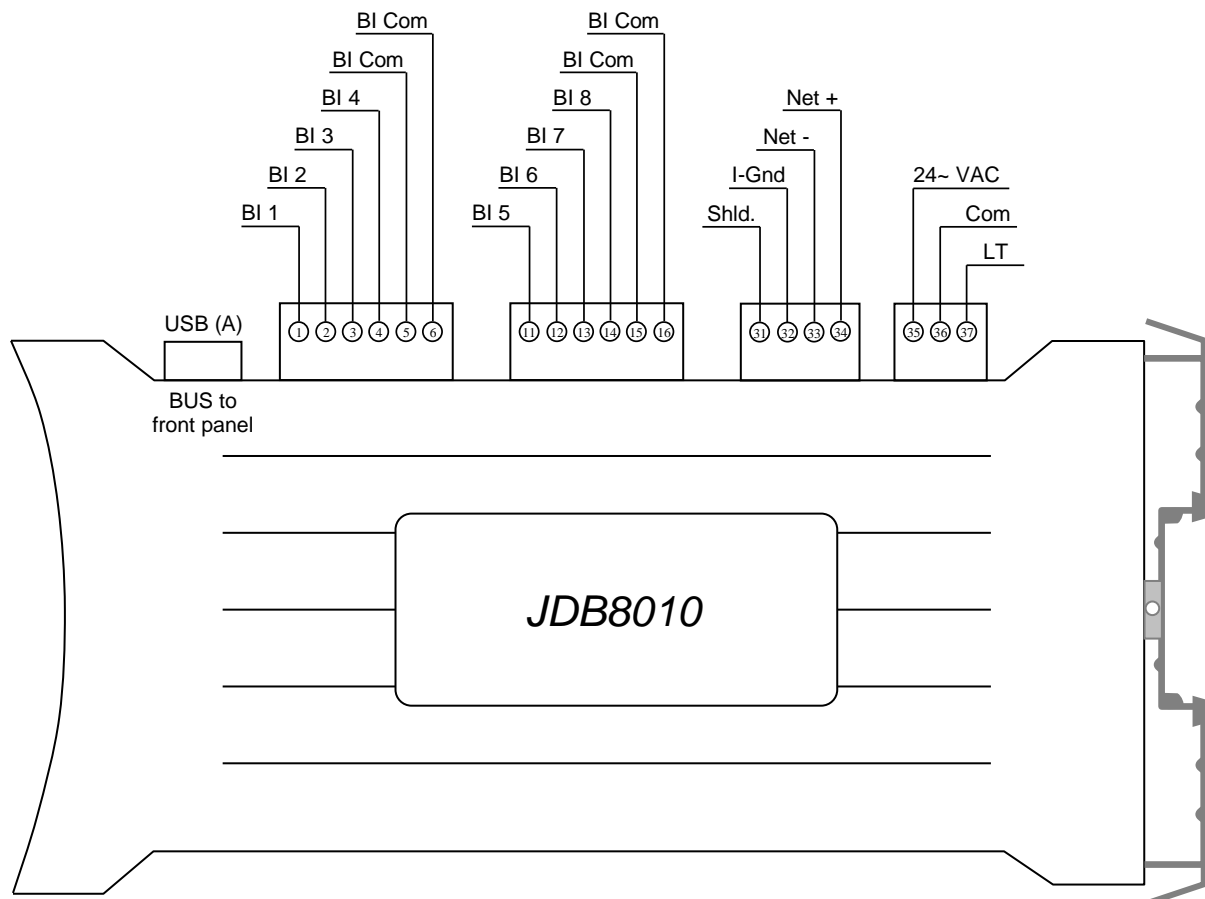
1. Terminate wiring per engineering drawings (see Figure 1).
2. Wire other devices to the SA Bus, as the case may be.
3. Wire the SA Bus in a daisy chain.

**Note:** If multiple Input/Output Modules are used, and the JDB8010 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 JDB8010 module.
6. Download and commission the JDB8010 module. See *Commissioning*. Once the host controller has detected the JDB8010 module, the configuration will be downloaded to the JDB8010 if the controller has already been put into operation by means of the CCT tool.

### **To connect a JDB8020 front panel or a rail mounted JDB8040 to the JDB8010 module:**

1. Use the available USB cable of type A-B (3m or 5m for JDB8020, respectively 0.1m for JDB8040).
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: JDB8010 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
Digital 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, 2.7Ω pull-up	A
	BI Com	The signal common for all Binary IN 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 <sup>1)</sup>	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 <sup>2</sup> to 1.5 mm <sup>2</sup> [0.75 mm <sup>2</sup> recommended]
24~ Power	24~ Hot	AC Supply Input, Supply 24 VAC ± 10%	0.75 mm <sup>2</sup> to 1.5 mm <sup>2</sup> [1.0 mm <sup>2</sup> 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 <sup>2</sup> to 1.5 mm <sup>2</sup> [0.75 mm <sup>2</sup> recommended]

<sup>1)</sup> 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 <sup>2</sup> (16 AWG)	457.2 m (1,500 ft)	100 mV maximum voltage drop
	1.0 mm <sup>2</sup> (17 AWG)	304.8 m (1000 ft)	
	0.75 mm <sup>2</sup> (18 AWG)	228.6 m (750 ft)	
	0.5 mm <sup>2</sup> (20 AWG)	152.4 m (500 ft)	
	0.35 mm <sup>2</sup> (22 AWG)	106.7 m (350 ft)	

## Setup and Adjustments

### Determining the SA Bus Address

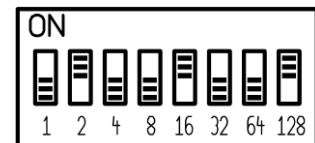
The SA bus address switch sets a unique address for this module on the SA bus. The default address setting is 255 (all ON). You must change this address.

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

Set the address of the JDB8010 module using the Dual Inline Package (DIP) switches on the face of the JDB8010 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 field equipment controllers (FEC) and Metasys® IOM master devices. NCE's address fixed = 4
128-254	<b>Valid range of addresses-for Romutec I/O-Modules (Subordinate devices)</b>
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 JDB8010 module and to designate the JDB8010 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 JDB8010 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 JDB8010 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.

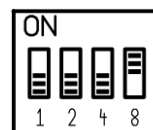
**Note:** Either all the switches 1 ... 3 are set to the ON position or none. See figure 3.

#### Dip switch 4: Application with or without Front Panel

For the application of the JDB8010 module with an attached front panel device JDB8020 (or rail mounted JDB8040 instead), the fourth DIP switch must be set to the ON position, otherwise the JDB8010 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 JDB8010 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



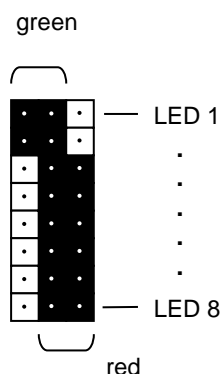
**Fig. 3:  
Setting EOL switches and selecting Front Panel Mode**

### Encoding the LED Colour

The colour of each LED can be selected by means of the jumpers that are located at the rear of the module (JDB8020) respectively on top of the device (JDB8040). Depending on the position of the jumper, the LED will be lit red or green. See fig. 4.

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 JDB8020  
and JDB8040

### Configuring and Commissioning

The parameters for configuring the JDB8010 will be appointed 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 JDB8010 with the appropriate address, it will send the configuration data to this module.

In conjunction with the use of the front panel JDB8020, the states of the binary inputs will be signaled independent from the SA-Bus connection of the JDB8010 module to the controller, however until the controller has sent configuration data to the JDB8010, 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 JDB8010 module.

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

### Troubleshooting

Use Tables 6 and 7 to troubleshoot the JDB8010 module and the JDB8020 / JDB8040 devices.

**Table 6: Status LEDs of the JDB8010 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 JDB8020 front panel and JDB8040 rail mounted device**

Name	Colour	Normal	Descriptions
Status	Orange	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

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

### JDB8010 Binary Input Module

<b>Product Code Numbers</b>	JDB8010 Binary Input Module
<b>Supply Voltage</b>	24 VAC ± 10% at 50 or 60 Hz
<b>Power Consumption</b>	12 VA maximum incl. Front Panel Load
<b>Terminations</b>	Spring-type terminals for I/Os, power supply and MS/TP Bus USB type A for the connection of an optional Front Panel JDB8020 or JDB8040
<b>Device Addressing</b>	DIP switch set (128-254). Addresses 0-127, 255 are reserved
<b>Communications Bus</b>	BACnet® MS/TP; 4-wire SA Bus <sup>1)</sup> (only 3 wires used)
<b>Mounting</b>	35 mm DIN rail
<b>Dimensions (H x W x D)</b>	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.)
<b>Housing</b>	Plastic housing, Plastic material: PA6.6 25%GF Protection: IP20 (IEC529)
<b>Weight</b>	JDB8010: 0.180 kg (0.40 lb)

### JDB8020 Front Panel

<b>Product Code Numbers</b>	JDB8020 Front Panel for JDB8010
<b>Supply Voltage</b>	5 VDC ± 5%, provided by the JDB8010 Binary Input-Module via USB
<b>Power Consumption</b>	1 VA maximum, provided by JDB8010 Binary Input-Module
<b>Terminations</b>	USB type B for the connection to the JDB8010 Binary Input Module
<b>Mounting</b>	considered for 19"-Rack (e.g. RTR4084S)
<b>Dimensions (H x W x D)</b>	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.)
<b>Housing</b>	Plastic housing, material: ABS + Polycarbonate UL94 5VB Protection: IP20 (IEC529) (in conjunction with 19"-rack RTR4084S: IP54)
<b>Weight</b>	JDB8020: 0.075 kg (0.17 lb)

### JDB8040 Rail Mounted Control Panel

<b>Product Code Numbers</b>	JDB8040 rail mounted Control Panel for JDB8010
<b>Supply Voltage</b>	5 VDC ± 5%, provided by the JDB8010 Binary Input-Module via USB
<b>Power Consumption</b>	1 VA maximum, provided by JDB8010 Binary Input-Module
<b>Terminations</b>	USB type B for the connection to the JDB8010 Binary Input Module
<b>Mounting</b>	35 mm DIN rail
<b>Dimensions (H x W x D)</b>	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.)
<b>Housing</b>	Plastic housing, Plastic material: PA6.6 25%GF Protection: IP20 (IEC529)
<b>Weight</b>	JDB8040: 0.132 kg (0.29 lb)

<sup>1)</sup> 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.*

Latest Information and Firmware Updates will be available on the website [www.romutec.de](http://www.romutec.de)