S300

Series

hardware

installation

S300-DIN-RDR8S
and S300-DIN-I32O16

Johnson
Controls

Other Manufacturers' Documentation

Johnson Controls does not duplicate documentation of other equipment manufacturers. When necessary, Johnson Controls provides documentation that supplements that of other manufacturers. When unpacking equipment, keep all original manufacturer documentation for future reference.

Technical Support

For factory technical support, Johnson Controls authorized field technicians or authorized dealer representatives can contact Global Security Solutions Technical Support by phone at (866) 893-0423 or (414) 524-1214, or by email at support.globalsecuritysolutions@jci.com. They can also call the Field Support Center at (800) 524-1330 or (414) 524-5000 and use options 6, 1, 7.

End users and customers should contact their local Johnson Controls branch or authorized dealer for any of their support needs (technical support, maintenance contracts, on-site field support, P2000 Software Service Agreements, Service Partnerships, and so on). Visit http://www.johnsoncontrols.com/location-finder to find your local Johnson Controls office.

For material returns contact the branch if the material was purchased through a Johnson Controls branch or through the Product Sales Operations Team, if ordered through the Advanced Order Management System (AOMS) and follow the RMA process; or contact the authorized dealer representative where the material was purchased directly.

Acknowledgments

Declaration of Conformity

United States: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

Canada: CAN ICES-3 (B)/NMB-3(B)

European Union: This product complies with the requirements of the EMC Directive.

This equipment must not be modified for any reason and it must be installed as stated in the Manufacturer's instructions. If this shipment (or any part thereof) is supplied as second-hand equipment, equipment for sale outside the European Economic Area or as spare parts for either a single unit or system, it is not covered by the Directives.

$C\epsilon$

UNDERWRITERS LABORATORIES COMPLIANCE VERIFICATION SHEET

The following model numbers are listed under Underwriters Laboratories Inc. ® (UL) 1076 for Proprietary Burglar Alarm Units and Systems, UL 294 for Access Control Systems Units and Underwriters Laboratories of Canada ULC/ORD-C1076-86.

      S300-DIN-RDR8S
      S300-DIN-I32O16

When installed at the site the following requirements must be met to comply with these standards.

1. The S300-DIN-RDR8S and/or S300-DIN-I32O16 shall be mounted in subassembly S300-DIN-L.

2. The S300-DIN-RDR8S and/or S300-DIN-I32O16 in combination with the S300-DIN-L must be connected to a UL Listed Uninterruptible Power Supply that provides a minimum of 24 hours of AC emergency power.

3. The tamper switch must be enabled at all times.

4. Transient protection devices that are installed must not be removed or defeated.

5. Do not connect equipment to an AC power source that is controlled by a switch.

6. For a UL 294 Listed system the following Listed readers may be used.

Manufacturer	Model
HID Corp.	30387, 31503, 31815, 31880, 32005, 32788, 32985, 5355, 5365, 5395, 5405, 5455, 6005. All models may be followed by additional suffixes.
	13.56 MHZ Models - iCLASS Models R10, R15, R40, RP10, RP15, RP40, RK40, RPK40. All models may be followed by additional suffixes.
	OSDP Models - iCLASS SE Models R10E, R15E, R30E, R40E, RP10E, RP15E, RP30E, RP40E, RK40E, RPK40E. May be followed by "XXX", may be further followed by "NN". Suffix explanation X1=Reader Colors: K = Black, G = Gray, X2= Wiring, N = Pigtail, T =Terminal, X3 = "R" or "N". The suffix "R" = Reader Employed with RS485 Module, "N" = No RS485 Module present.
	pivCLASS Models – pivCLASS reader models R10E, R15E, R30E, R40E, RP10E, RP15E, RP30E, RP40E, RPK40E and RK40E, RPKCL40E, RKCL40E may be followed by "XXX". Suffix explanation X1 = Reader Colors: K = Black, G = Gray, X2 = Wiring, N = Pigtail, T = Terminal, X3 = "R" or "N". For use with the model pivCLASS authentication module (PAM) M2000. May be connected directly to S300-DIN-RDR8S Data 0/Data1 Wiegand interface.
Mercury Security Corp.	MR-5

7. UL 294 Performance Levels

Destructive Attack	Level I
Endurance	Level IV
Line Security	Level I
Standby Power	Level I

HARDWARE INSTALLATION

This document provides hardware installation instructions for the S300-DIN-RDR8S and the S300-DIN-I32O16.

INTRODUCTION

The S300-DIN-RDR8S and S300-DIN-I32O16 modules provide interface control for access and security devices associated with up to eight doors.

NOTE: Throughout this manual the S300-DIN-RDR8S module is also referred to as the RDR8S, while the S300-DIN-I32O16 module is referred to as the I32O16.
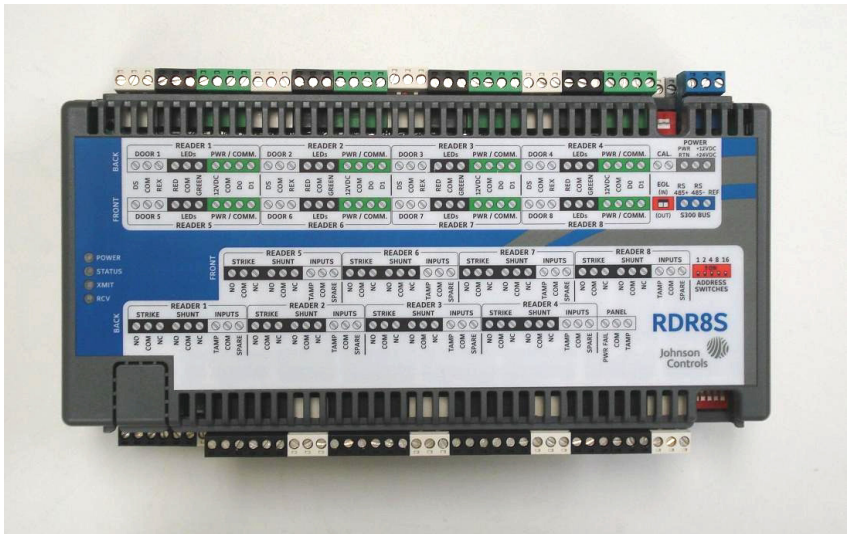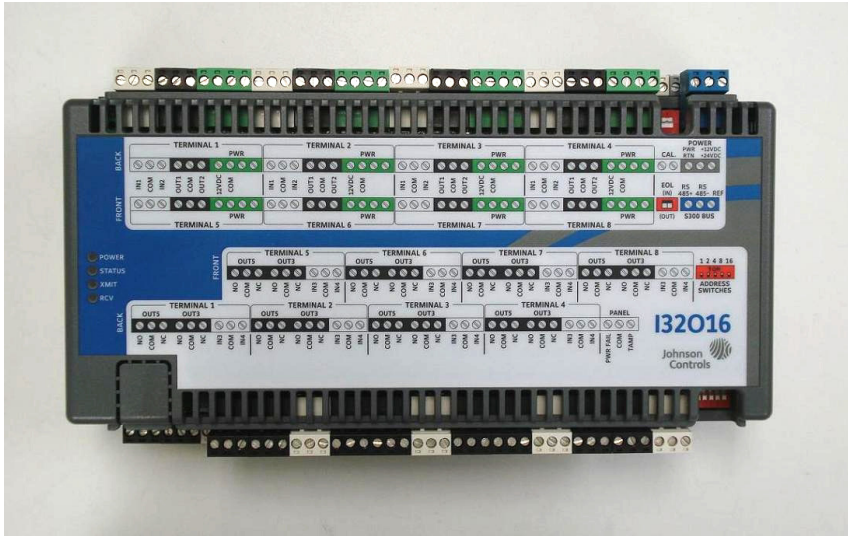

Figure 1: S300-DIN-RDR8S

Figure 2: S300-DIN-I32O16

KEY FEATURES

The key features of the RDR8S include:

- Wide range nominal voltage for power source (+12 to 24VDC)
- Support for S300 bus communications at 9600 or 19200 (Auto baud rate detection 9600/19200 baud)
- Eight-door access control input/output interface, each door's interface consisting of:
  - Supervised door sensor input, normally open or normally closed, based on wired configuration
  - Supervised "request to exit" switch input, normally open
  - Supervised tamper and spare inputs
  - Device interface (Wiegand Data0/Data1 or RS485)
  - Door strike relay, SPDT (Single Pole Double Throw)
  - Alarm shunt relay, SPDT
  - Red lamp driver and green lamp driver (open collectors)
  - +12VDC 250mA per reader power supply

- The OSDP Reader feature supports the use of HID OSDP Keypad Readers type and HID OSDP Reader type (no keypad). The OSDP Reader feature:
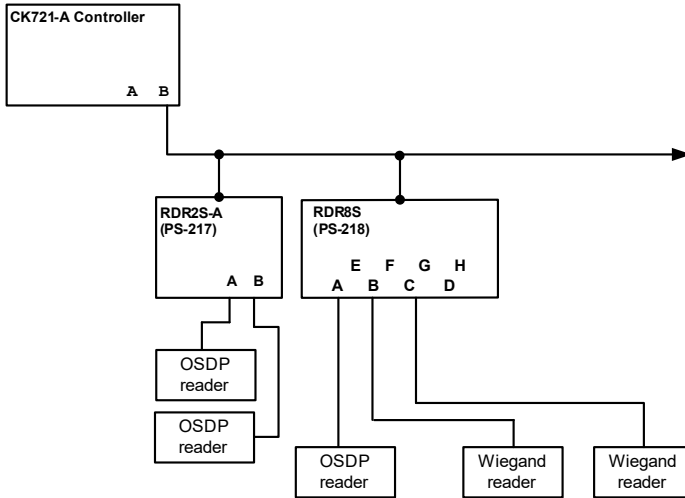   - Adds Open Supervised Device Protocol (OSDP) v1.1 reader device support.

Figure 1-1: OSDP System Diagram

- The OSDP reader implementation supports unencrypted communications between the RDR8S and OSDP device. (OSDP Standard version 2 SCF Encrypted Communications is not supported.)

The following inputs are shared by all interfaces (one per unit):

- Calibration resistor input
- Supervised panel tamper and power fail inputs

The key features of the I32O16 include:

- Wide range nominal voltage for power source (+12 to 24VDC)
- Support for S300 bus communications at 9600 or 19200 (Auto baud rate detection 9600/19200 baud)
- 32 input/output interface consisting of 8 terminals, each terminal including:
    - 4 supervised inputs
    - 2 relay outputs
    - 2 open collector outputs (OUT1 and OUT2)

The following inputs are shared by all interfaces (one per unit):

- Calibration resistor input
- Supervised panel tamper and power fail inputs

APPLICATION

The RDR8S module supports up to eight doors per unit. The I32O16 module supports 32 inputs, 16 relay outputs, and 16 open collector outputs per unit. Both RDR8S and I32O16 use standard S300 bus (RS-485) communications and can interface with the following controllers:

- CK722
- CK721-A version 3.0 and higher

The RDR8S provides the ability to configure supervised 4-state inputs and unsupervised 2-state inputs. Any points not used for the door can be configured as general purpose input/output (I/O) points, possibly eliminating the need to purchase additional I/O modules for certain installations. The RDR8S provides power for the card reader hardware. It does not provide power for door locking hardware.

The I32O16 provides the ability to configure supervised 4-state inputs, unsupervised 2-state inputs, and relay outputs. Additionally, 2 open collector outputs per terminal are available.

INSTALLATION

Unpacking the Equipment

Carefully inspect the shipping containers as soon as you receive them (with the delivery agent present). Some shipping companies want to have an agent present when a damaged container is opened. If a container is damaged, open it immediately, inspect the contents, and have the agent make note on the shipping document. Check the purchase order against the packing slips to ensure the order is complete. If the contents of a container are damaged in any way, notify the carrier and your Johnson Controls representative immediately. Report any discrepancies to your Johnson Controls representative. Save the packing materials for possible return shipments.

Package Contents

- S300-DIN-RDR8S or S300-DIN-I32O16 module
- Connectors set
- This manual

Tools Needed

Small, straight-blade screwdriver for securing wires in the terminal blocks.

MOUNTING

The module (RDR8S or I32O16) can be mounted on a flat surface, DIN rail, or in a Johnson Controls' approved enclosure, such as the S300-DIN-L.

For information on mounting the module in an enclosure, refer to the manual provided with the enclosure.

DIN Rail Mounting

To mount an RDR8S or I32O16 module on a DIN rail:

1. Fully extend the white clips located on the bottom of the module.

2. Hook the module on top of the rail.

3. Push in the clips.

To remove a module from the DIN rail:

1. Pull down the clips at the bottom of the module.

2. Pull the bottom of the module out and lift it up.

Flat Surface Mounting

To mount an RDR8S or I32O16 module on a flat surface:

1. Make sure no connectors obstruct access to the clips on the bottom of the module. If necessary, remove the connectors.

2. Fully extend the bottom clips.

3. Mount the module to the surface with mounting screws.

4. Replace the connectors, if previously removed.

Power Source

See the following table for power requirements.

Parameter	Value
Input voltage	+12 to 24VDC
Input current	2A at 24V, 4A at 12V
Power	48W

Line Voltage Information

If the facility is located in an area where power lines are subject to frequent lightning strikes, verify with the electric company that the building transformer is equipped with surge protectors. These, as well as a "crowbar" type of protection, can be installed at the main service entrance if the building transformer is not equipped with lightning protection.

While lightning is one cause of power line transients, others can be internal or external to the building environment. The general application of transient surge suppression is low-cost insurance to ensure long life of the equipment being installed.

DESCRIPTION OF SIGNALS

All interface signals are connected via plug-in connectors. For a description of the I/O interface signals, see:

- "Input Point Signals" on page 24
- "Output Point Signals" on page 26

The following figures show the details of the terminal blocks.

RDR8S DOOR INTERFACE: **I32O16 TERMINAL INTERFACE:**
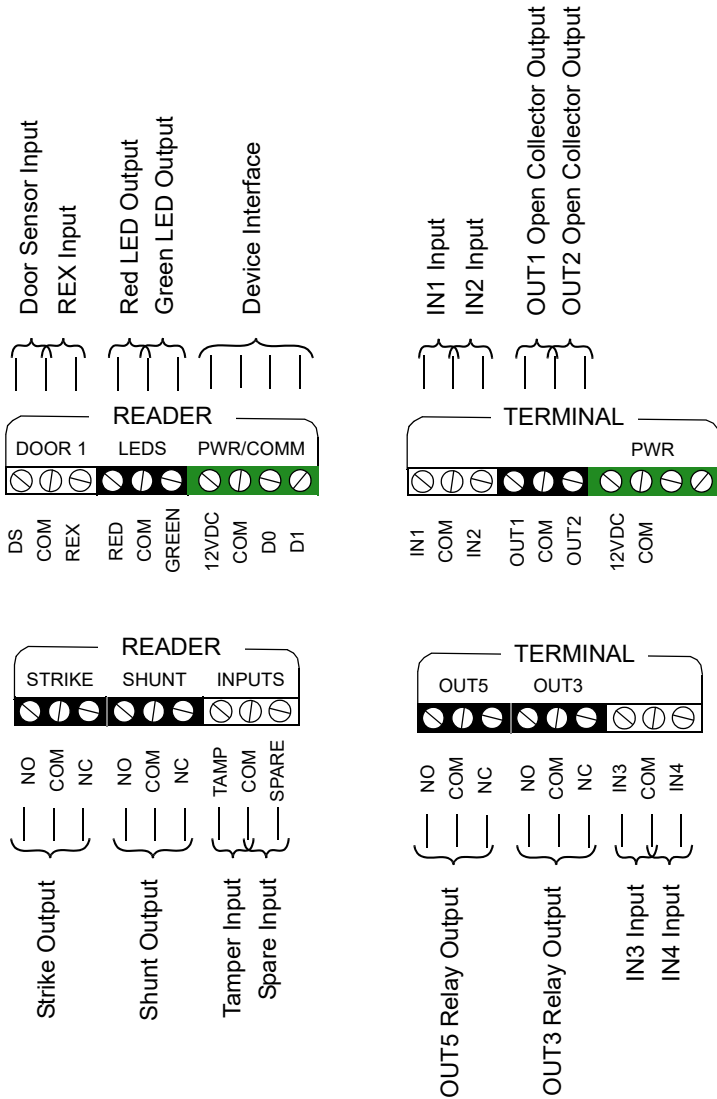**ONE OF 8 READERS** **ONE OF 8 TERMINALS**

Figure 2: RDR8S Door Interface and I32O16 Terminal Interface

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Calibration Resistor

CAL.

Figure 3: RDR8S and I32O16 Interface: Calibration Resistor

To the power supply

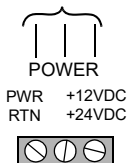POWER

PWR   +12VDC
RTN   +24VDC

Figure 4: RDR8S and I32O16 Interface: Power Supply

RDR8S Input/Output Points

Device Interface Lines DATA0/RS485- and DATA1/RS485-

Description of Signals – With Wiegand readers, DATA0 and DATA1 are inputs from each reader, complying with the Wiegand interface specification. In Wiegand configuration, these signals are pulled up to 5VDC by internal 3.92 K Ohm resistors.

In RS485 configuration, RS485- and RS485+ are bidirectional communication lines. The signal lines are terminated to form one end of a RS485 bus. The lines are NOT pulled up to 5VDC by internal resistors.

Reference – These signals are referenced to logic ground (COM).

Protection – Each signal has a 6 V transient voltage suppressor between it and COM.

CAUTION: These open collector outputs can be damaged with the use of alternating current (AC) potentials as low as 1VAC. The LED outputs can only be connected to direct current (DC) loads up to 12VDC.

Input Points

Description of Signals – The following are internally pulled up inputs:

– Reader 1: Door Sensor, REX, Tamper, Spare
– Reader 2: Door Sensor, REX, Tamper, Spare
– Reader 3: Door Sensor, REX, Tamper, Spare
– Reader 4: Door Sensor, REX, Tamper, Spare
– Reader 5: Door Sensor, REX, Tamper, Spare
– Reader 6: Door Sensor, REX, Tamper, Spare
– Reader 7: Door Sensor, REX, Tamper, Spare
– Reader 8: Door Sensor, REX, Tamper, Spare
– Panel Power Fail
– Panel Tamper

Reference – These signals are referenced to their associated COM input.

Protection – Each signal is protected with series resistors and dual clamping diodes.

External Circuits – Two external resistors and switch circuit connected between an input point and COM is required for 4-state operation. An external switch connected between an input point and COM is required for 2-state operation. For wiring details see "Wiring Input Devices" on page 19.

Open Collector Output Points

Description of Signals – The following are open collector outputs:

– Reader 1: Red LED, Green LED
– Reader 2: Red LED, Green LED
– Reader 3: Red LED, Green LED
– Reader 4: Red LED, Green LED
– Reader 5: Red LED, Green LED
– Reader 6: Red LED, Green LED
– Reader 7: Red LED, Green LED
– Reader 8: Red LED, Green LED

The allowable voltage range for these signals is 0-12VDC, limited to 100mA. The connectors are shown in Figure 2.

Reference – These signals are referenced to logic ground (COM).

Protection – Each signal has a 30V transient voltage suppressor between it and system ground.

Relay Output Points

Description of Signals – NC, NO, and COM are the three connections to a single pole, double throw relay.

The following are the relay outputs:

- Reader 1: Strike, Shunt
- Reader 2: Strike, Shunt
- Reader 3: Strike, Shunt
- Reader 4: Strike, Shunt
- Reader 5: Strike, Shunt
- Reader 6: Strike, Shunt
- Reader 7: Strike, Shunt
- Reader 8: Strike, Shunt

Reference – The relay is a dry contact relay rated at 1A at 24VDC, 25VA maximum.

RDR8S Reader Power

Description of Signals – 250mA at 12VDC is provided for each reader.

Protection – There is a 750mA PTC (Positive Temperature Coefficient) re-settable fuse.

I32O16 Input/Output Points

Input Points

Description of Signals – The following are internally pulled up inputs:

- Terminal 1: IN1, IN2, IN3, IN4
- Terminal 2: IN1, IN2, IN3, IN4
- Terminal 3: IN1, IN2, IN3, IN4
- Terminal 4: IN1, IN2, IN3, IN4
- Terminal 5: IN1, IN2, IN3, IN4
- Terminal 6: IN1, IN2, IN3, IN4

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– Terminal 7: IN1, IN2, IN3, IN4

– Terminal 8: IN1, IN2, IN3, IN4

– Panel Power Fail

– Panel Tamper

The allowable voltage range for these signals is 0-12VDC.

Reference – These signals are referenced to their associated COM input.

Protection – Each signal is protected with series resistors and dual clamping diodes.

External Circuits – Two external resistors and switch circuit connected between an input point and COM is required for 4-state operation. An external switch connected between an input point and COM is required for 2-state operation. For wiring details see "Wiring Input Devices" on page 19.

Open Collector Output Points

Description of Signals – The following are open collector outputs:

– Terminal 1: OUT1, OUT2

– Terminal 2: OUT1, OUT2

– Terminal 3: OUT1, OUT2

– Terminal 4: OUT1, OUT2

– Terminal 5: OUT1, OUT2

– Terminal 6: OUT1, OUT2

– Terminal 7: OUT1, OUT2

– Terminal 8: OUT1, OUT2

The allowable voltage range for these signals is 0-12VDC, limited to 100mA. The connectors are shown in Figure 2.

CAUTION: These open collector outputs can be damaged with the use of alternating current (AC) potentials as low as 1VAC. The LED outputs can only be connected to direct current (DC) loads up to 12VDC.

Reference – These signals are referenced to logic ground (COM).

Protection – Each signal has a 30V transient voltage suppressor between it and system ground.

Relay Output Points

Description of Signals – NC, NO, and COM are the three connections to a single pole, double throw relay.

The following are the relay outputs:

- Terminal 1: OUT5, OUT3
- Terminal 2: OUT5, OUT3
- Terminal 3: OUT5, OUT3
- Terminal 4: OUT5, OUT3
- Terminal 5: OUT5, OUT3
- Terminal 6: OUT5, OUT3
- Terminal 7: OUT5, OUT3
- Terminal 8: OUT5, OUT3

Reference – The relay is a dry contact relay rated at 1A at 24VDC, 25VA maximum.

Cable Requirements

Description	Recommended Cable Type	Maximum Segment Length
RDR8S or I32O16 to Power Supply[1]	Listed, 18 AWG, hook-up wire	Wire should fit within the enclosure.
RDR8S or I32O16 to Controller	Listed, 18 AWG, 1 twisted pair	4000 feet (1219 m) maximum. All RDR8S and I32O16 modules connected to a single controller must be within 4000 feet of the controller.
RDR8S or I32O16 to RDR2S-A	Listed, 18 AWG, 1 twisted pair	4000 feet (1219 m) maximum
Door Sensor	Belden 8442, 1 twisted, unshielded pair, 22 AWG	500 ft. (152 m)
Door Strike and Shunt	Belden 9740, 1 twisted, unshielded pair, 18 AWG	Depends on power requirements of the door strike. Voltage to the strike must not be reduced more than 10% over the 18 AWG wire, measured when energized.
Request to Exit	Belden 8442, 1 twisted, unshielded pair, 22 AWG	500 feet (152 m)
Reader Power[2] (I32O16 has +12 supplied)	Belden 9740, 1 twisted, unshielded pair, 18 AWG	Refer to reader manufacturer's specification for power requirements.
Reader Data0/Data1[2] (RDR8S only)	Belden 9744, 2 twisted, unshielded pair, 22 AWG	500 ft. (152 m). Refer to reader manufacturer's specification for data requirements.
Reader RS485 -/+[2] (RDR8S only)	Listed, 18 AWG, 1 twisted pair	4000 feet (1219 m) maximum. Refer to manufacturer's specification for requirements.

Description	Recommended Cable Type	Maximum Segment Length
General Purpose Input	Belden 8442, 1 twisted, unshielded pair, 22 AWG to each detector	500 feet (152 m)
General Purpose Output	Belden 9740, 1 twisted, unshielded pair, 18 AWG to each relay	Depends on load.

[1] When wiring more than one RDR8S or I32O16, use the same type of hook-up wire and communications wire to connect subsequent modules.
[2] Refer to reader manufacturer's recommendations when using UL-listed readers. In the absence of other recommendations, consider these cable specifications taking into account the number of conductors that will actually be needed for installation.

Cable Routing

The cables should run in grounded conduit or at least two feet from AC power, fluorescent lights, or other high energy sources.

CAUTION: All data cables should be physically separated from power lines. If conduit is used, do not run data cables in the same conduit as power cables or certain door strike cables, e.g. strike voltage greater that 42V or Magnetic door locks without EMI suppression.

All cables must conform with the following regulations:

– National Electrical Code
– NFPA 70
– Local electrical codes
– Canadian Electric Code C22.1 (installations in Canada)
– BSI Standard BS7671, latest edition (installations in Great Britain)

Cabling should be made using good wiring practices and should be long enough to allow service loops at their terminations in the enclosure.

Power Supply

For power wiring with the enclosure, use the cable assembly shown in the following figure. For more information refer to the manual provided with the enclosure.
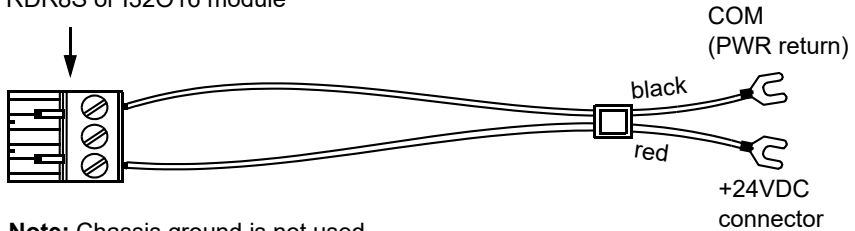
Connector (3-pole, gray) for
RDR8S or I32O16 module

COM
(PWR return)

black

red

+24VDC
connector

Note: Chassis ground is not used.

Figure 5: Cable Assembly for Power Wiring

CAUTION: Do not connect the power cable to the RDR8S or I32O16 until all wiring is complete.

When connecting multiple RDR8S or I32O16 modules, wire the modules in parallel following the "daisy chain" pattern as shown in the following figures.

RS-485 cable
connecting to
S300 bus

To the next
RDR8S or
I32O16
module

1st RDR8S
or I32O16

2nd RDR8S
or I32O16

3rd RDR8S
or I32O16
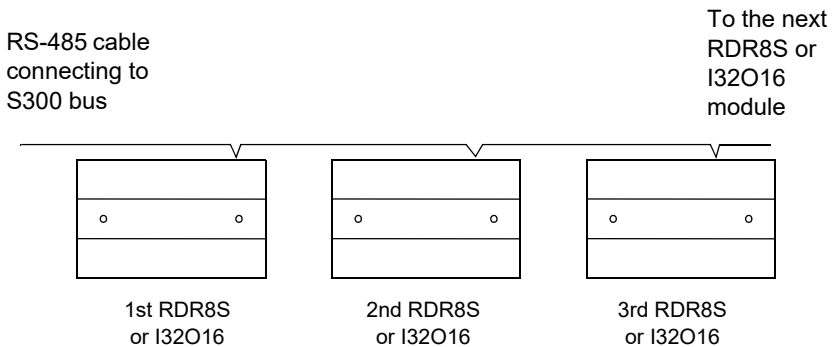
Figure 6: "Daisy Chain" Wiring Pattern
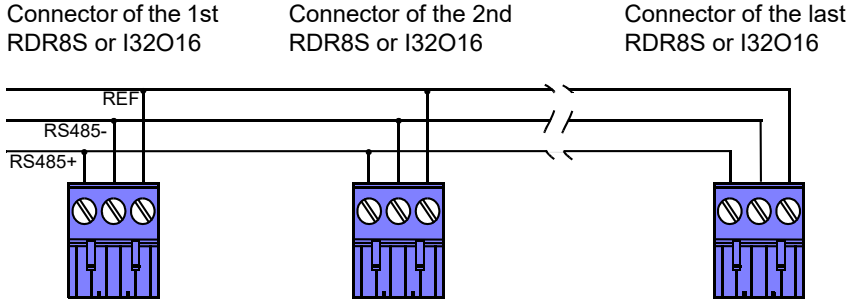
Figure 7: "Daisy Chain" Connector Details

Connecting the COM (Ground) Wire

When daisy-chain connecting an RDR8S or I32O16, wire the devices according to the following illustration:
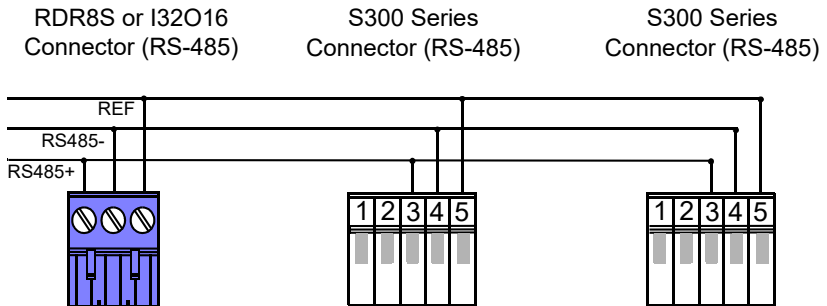

Figure 8: Connecting an RDR8S or I32O16 in the "Daisy-Chain" Wiring Pattern

RDR8S Input Point and Output Point Disassociation

This feature allows RDR8S reader terminal input/output (I/O) points to be re-assigned from reader-specific functions to general purpose I/O points.

The following RDR8S reader terminal output points can be re-assigned:

– Red LED
– Green LED
– Reader Strike
– Reader Shunt

The following RDR8S reader terminal input points can be re-assigned:

– Reader Door Contact
– Reader REX

Reassignment of the special RDR8S reader terminal output points to general purpose output points is done by configuring the general purpose output points listed below:

Reader Output Point	Terminal Output Point Number
Red LED	Output 1 [Open Collector Output]
Green LED	Output 2 [Open Collector Output]
Reader Shunt	Output 3 [Relay Output]
Reader Strike	Output 5 [Relay Output]

Reassignment of the special RDR8S reader input points to general purpose input points is done by configuring the general purpose input points listed below:

Reader Input Point	Terminal Input Point Number
Reader Door Sensor	Input 1
Reader REX	Input 2

NOTE: On CK721-A controllers, a write to flash must be performed after completion of input point/output point disassociation configuration.

Wiring Input Devices

Tamper Switch Wiring

The tamper switch connects to a general purpose input point. To be operational, the tamper switch must be wired to one of the unused input points on any RDR8S in the enclosure, and programmed in the controller. Use the PANEL/TAMP connector for this function.

Power Fail Wiring

In order to indicate panel power (AC) failure, the PWR FAIL input should be connected to an AC power fail monitoring circuit which detects loss of AC power supplying the panel. Use the PANEL/PWR FAIL connector for this function.

General Input Wiring

The inputs can be used as either 2-state or 4-state inputs. You should calibrate the inputs depending on the needs of your site.

2-State Inputs Wiring
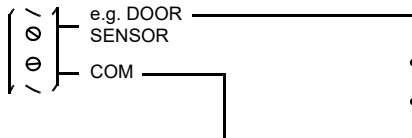
4-State Inputs Wiring: N/C Switch
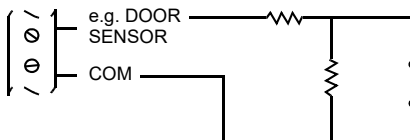
Note: The 4-state wiring requires two resistors of the same value. The resistors can be 150-2000 Ohms, 1%, 1/4W. The recommended resistor is **1200 Ohms**.

4-State Inputs Wiring: N/O Switch
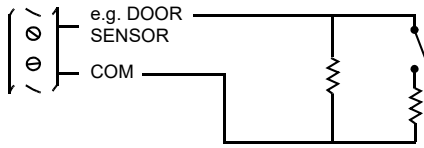
Note: The 4-state wiring requires two resistors of the same value. The resistors can be 150-2000 Ohms, 1%, 1/4W. The recommended resistor is **1200 Ohms**.

General Input Configuration

An input must be configured before it can be used.

2-State Inputs

2-state inputs wired as shown on must be uncalibrated. An "Uncalibrate" command must be executed for each 2-state input.

4-State Inputs

4-state inputs wired as shown on must be calibrated. There are two methods available to calibrate a 4-state input: "Calibrate" and "Calibrate with Resistor."

– Calibrate

Once the input resistors are wired as shown on and the input is placed in the secure state, a "Calibrate" command may be executed.

This method should be used when the input resistance tolerance is greater than 1% or unknown, when the cable requirements on are not guaranteed, when the resistor value is less than 500 ohms, or when all the inputs on an RDR8S or I32O16 are not wired with the same resistor values.

– Calibrate with Resistor

If a resistor matching the resistors wired to a 4-state input is installed across the CAL RESISTOR contacts, a "Calibrate with Resistor" command may be executed.

This method may be used when the input resistor tolerance is 1%, the cable requirements on are guaranteed, and the resistor value is greater than 500 ohms.

This method allows an input to be calibrated before the input wiring is completed.This method allows an input in any state (alarm, secure, open, or short) to be calibrated.

Ground

Every metal DIN enclosure in a Johnson Controls installation must have its chassis bonded to a verified electrical ground (earth).

CAUTION: Conduit ground, cold water pipes, unbrazed joints or dissimilar metals are unacceptable in the path of either building or supplemental ground. Where grounding is required, connect only to the proven building electrical system ground (earth).

SETUP AND ADJUSTMENTS

You do not need to open the module's plastic enclosure to access the RDR8S and I32O16 setup switches.

Wiegand Reader Interface (RDR8S Only)

Data0 and Data1 inputs are enabled for the Wiegand reader interface.

RS485 Device Interface (RDR8S Only)

RS485- and RS485+ are bidirectional communication lines for reader communications.

NOTE: Unlike the S300/RS485 interface, RS485 device interface connections are not optically isolated. Each RDR8S reader interface can be attached to either a Wiegand reader or an RS485 device. The interface will only be terminated correctly and operate correctly after it has been configured correctly.

S300/RS485 Connection

Baud Rates

The RDR8S and I32O16 modules support autobaud operation between 9600 and 19200 bps and does not require any switch settings.

S300/RS-485 Isolation and Protection

Isolation and protection is provided by the following components:

– Three optical isolators (optocouplers)
– Two self-resetting switch thermistors
– Two transient voltage suppressors (TVSs)

Address Switches

The following figure shows the location of the adjustable 5-position address switch. The address switch is used to set the S300 bus address.

Address switch (5-position)
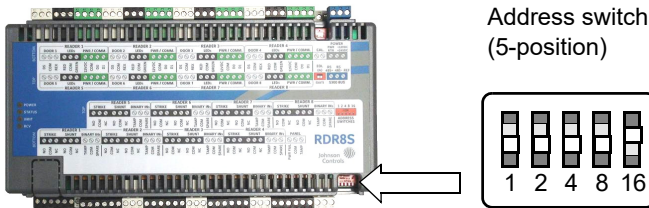
The address switches are OFF (down) by factory default, denoting bus address "0" (zero).

Table 1: S300 Bus Address

	DIP Switch Number				
	1	**2**	**3**	**4**	**5**
Hardware Module Number (S300 Bus Address)	**Label on the Module**				
	1	**2**	**4**	**8**	**16**
0	off	off	off	off	off
1	**ON**	off	off	off	off
2	off	**ON**	off	off	off
3	**ON**	**ON**	off	off	off
4	off	off	**ON**	off	off
5	**ON**	off	**ON**	off	off
6	off	**ON**	**ON**	off	off
7	**ON**	**ON**	**ON**	off	off
8	off	off	off	**ON**	off

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Table 1: S300 Bus Address

	DIP Switch Number				
	1	**2**	**3**	**4**	**5**
Hardware Module Number (S300 Bus Address)	**Label on the Module**				
	1	**2**	**4**	**8**	**16**
9	**ON**	off	off	**ON**	off
10	off	**ON**	off	**ON**	off
11	**ON**	**ON**	off	**ON**	off
12	off	off	**ON**	**ON**	off
13	**ON**	off	**ON**	**ON**	off
14	off	**ON**	**ON**	**ON**	off
15	**ON**	**ON**	**ON**	**ON**	off
16	off	off	off	off	**ON**
17	**ON**	off	off	off	**ON**
18	off	**ON**	off	off	**ON**
19	**ON**	**ON**	off	off	**ON**
20	off	off	**ON**	off	**ON**
21	**ON**	off	**ON**	off	**ON**
22	off	**ON**	**ON**	off	**ON**
23	**ON**	**ON**	**ON**	off	**ON**
24	off	off	off	**ON**	**ON**
25	**ON**	off	off	**ON**	**ON**
26	off	**ON**	off	**ON**	**ON**
27	**ON**	**ON**	off	**ON**	**ON**
28	off	off	**ON**	**ON**	**ON**
29	**ON**	off	**ON**	**ON**	**ON**
30	off	**ON**	**ON**	**ON**	**ON**
31	**ON**	**ON**	**ON**	**ON**	**ON**

End-of-Line (EOL) Switch

The EOL switch is used to provide EOL termination for the S300 bus. On the RDR8S and I32O16 modules the EOL switch is a single throw 3-pole DIP switch. If used, it should be in ON (up) position.

The following figure shows the location of the EOL switch.
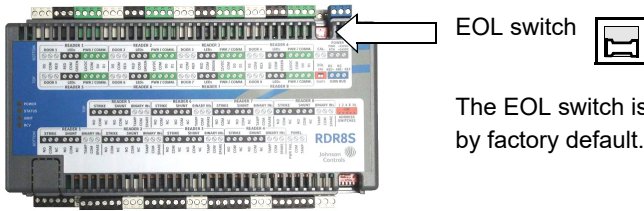
EOL switch

The EOL switch is OFF (down) by factory default.

Network devices at either end of the S300 network must be set as network terminated devices. This is done with the use of the EOL switch. The RDR8S and I32O16 modules have one EOL switch per module.

This switch is set to ON/OFF position to enable or disable End-of-Line termination on the S300 bus.

The RDR8S and I32O16 modules follow the same rules as other terminated devices. See the following figure to determine the appropriate EOL setting for each RDR8S or I32O16 module in your network.
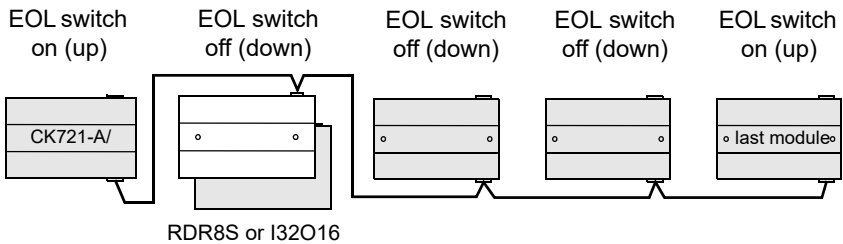
Note: Position of the EOL switch on the device depends on the kind of device used.

Input Point Signals

In the following table, *n* denotes a reader/door number (RDR8S) or a terminal number (I32O16).

n = 1, 2, 3, 4, 5, 6, 7, or 8

Table 2: RDR8S and I32O16 Input Points

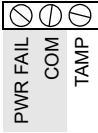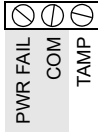| RDR8S		I32O16	
DOOR *n* DS COM REX	"Reader *n* Door Sensor" Input Can be calibrated to 2-state or 4-state. Wire this input normally closed.	IN1 COM IN2	"Terminal *n* IN1" Input Can be calibrated to 2-state or 4-state. Wire this input normally closed.
DOOR *n* DS COM REX	"Reader *n* REX" Application Specific Input Can be calibrated to 2-state or 4-state. 2-state auxiliary input is closed for the "request to exit" state. When calibrating the 4-state auxiliary input, ensure that the switch is in the inactive state (not in the "request to exit" state). Wire this input normally open.	IN1 COM IN2	"Terminal *n* IN2" Input Can be calibrated to 2-state or 4-state.
INPUTS TAMP COM SPARE	"Reader *n* Tamper" General Purpose Input Can be calibrated to 2-state or 4-state.	IN3 COM IN4	"Terminal *n* IN3" General Purpose Input Can be calibrated to 2-state or 4-state.
INPUTS TAMP COM SPARE	"Reader *n* Spare" General Purpose Input Can be calibrated to 2-state or 4-state.	IN3 COM IN4	"Terminal *n* IN4" General Purpose Input Can be calibrated to 2-state or 4-state.
PANEL PWR FAIL COM TAMP	"Panel Tamper" General Purpose Input Can be calibrated to 2-state or 4-state.	PANEL PWR FAIL COM TAMP	"Panel Tamper" General Purpose Input Can be calibrated to 2-state or 4-state. IN5 (Terminal 1)

Table 2: RDR8S and I32O16 Input Points

RDR8S		I32O16	
PANEL PWR FAIL — COM — TAMP	"Power Fail" General Purpose Input Can be calibrated to 2-state or 4-state.	PANEL PWR FAIL — COM — TAMP	"Power Fail" General Purpose Input Can be calibrated to 2-state or 4-state. IN6 (Terminal 1)
Internal	"Panel Battery Low" Internally derived, 2-state only input. In alarm only if the "Power Fail" point is also in alarm and power voltage has decreased more than 10% from either 12V or 24V (the system detects 12 versus 24 nominal voltage automatically). IN7 (Terminal 1) **Note:** For use only with 12VDC or 24VDC power supply. If used, "Power Fail" must be wired to a power fail monitoring circuit.		

Output Point Signals

In the following table, n denotes a reader/door number (RDR8S) or a terminal number (I32O16).

n = 1, 2, 3,4, 5, 6, 7, or 8

Table 3: RDR8S and I32O16 Output Points

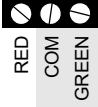| RDR8S		I32O16	
LEDs RED — COM — GREEN	"Reader n Red LED" Output is an open collector that switches to ground.	OUT1 — COM — OUT2	"Terminal n OUT1" It can be timed, set, reset, fast flash, or slow flash. Output is an open collector that switches to ground.
LEDs RED — COM — GREEN	"Reader n Green LED" Output is an open collector that switches to ground.	OUT1 — COM — OUT2	"Terminal n OUT2" It can be timed, set, reset, fast flash, or slow flash. Output is an open collector that switches to ground.

Table 3: RDR8S and I32O16 Output Points

RDR8S		I32O16	
SHUNT NO COM NC	"Reader *n* Shunt" Output is a relay.	OUT3 NO COM NC	"Terminal *n* OUT3" It can be timed, set, reset, fast flash, or slow flash. Output is a relay.
STRIKE NO COM NC	"Reader *n* Strike" Output is a relay.	OUT5 NO COM NC	"Terminal *n* OUT5" It can be timed, set, reset, fast flash, or slow flash. Output is a relay.

TECHNICAL SPECIFICATIONS

The terminal is expected to operate at moderate temperature variation, non-condensing humidity variation, moderate vibration, and possible dust contamination.

Item	Specification
Input Power	Nominal voltage +12 to +24VDC 48W
Wiegand Reader Interface	2-wire Wiegand* (up to 256 bits) 12VDC, 250mA (typical) Red indicator Green indicator
RS485 Device Interface	OSDP V1.0 compliant interface to select devices** 12VDC, 250mA (typical)
General Purpose Inputs	Resistive load
Relay Outputs	1A max. 0-24 VDC / VAC, 25VA max
Red LED/ Green LED/ OUT1/OUT2 Outputs	100mA max. 0-24VDC. These open collector outputs can be damaged with the use of alternating current (AC) potentials as low as 1VAC. The LED outputs can only be connected to direct current (DC) loads up to 24VDC.
Communications	2 or 3-wire RS-485

Item	Specification
Certifications	FCC, Class B CE Mark C-Tick ICES-003, Class B
Mounting Specifications	DIN rail Flat surface
Dimensions	5.15 H x 10.58 W x 2.5 D inches (13.07 cm x 26.88 cm x 6.36 cm)
Weight	2.75 lb (1.2 kg)
Ambient Temperature	32º to 122ºF (0º to 50ºC)
Humidity	10 to 85% non-condensing
Ventilation	Cabinets require free movement of air over all exposed surfaces

* The RDR8S does not support 1-wire Wiegand readers.

** Support limited to devices with Red/Green LEDs. Optional elements can include a card reader, a keypad (12 or 16 key), and/or a two-line 16 character display.

MAINTENANCE

This section provides maintenance instructions, operational testing procedures, and information on replacement parts.

LEDs

The RDR8S and I32O16 modules have 4 LEDs:

- Power (POWER): On during normal operation.
- Status (STATUS): Blinks every second when unit is operational.
- Transmit (XMIT): Blinks when a character is transmitted on theS300 bus.
- Receive (RCV): Blinks when a character is received from the S300 bus.

Routine Maintenance

For the RDR8S or I32O16 maintenance, perform the operational testing monthly (see "Testing Procedure" on page 29).

Impaired Performance Conditions

Condition	Information Location
Unit environment not as specified	See "Technical Specifications" on page 27.
Unit power and grounding not as specified	See "Power Supply" on page 16 and "Ground" on page 21.
Cable length or type not as specified	See "Cable Requirements" on page 14.

Testing Procedure

To check for proper operation of the RDR8S:

1. Verify that the "POWER" LED is ON.

2. Verify that the "STATUS" LED flashes once per second.

3. Verify that the "XMIT" and "RCV" LEDs blink.

4. Present a valid card to each reader connected to the RDR8S reader interface and then verify that access is granted (green lamp lights).

5. Present an invalid card to each reader connected to the RDR8S reader interface and then verify that access is denied (red lamp lights).

To check for proper operation of the I32O16:

1. Verify that the "POWER" LED is ON.

2. Verify that the "STATUS" LED flashes once per second.

3. Verify that the "XMIT" and "RCV" LEDs blink.

4. Change the state of any input and verify change of state.

5. Change the state of any output and verify change of state.

Replacement Parts

There are no serviceable components inside the RDR8S or I32O16 plastic enclosure. Generic replacement terminal blocks can be ordered if lost. For more information on the parts listed, refer to the applicable catalog page.

Fuses

The RDR8S and I32O16 have no replaceable fuses.

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