

Mercury™

MR50-S3 Reader Interface

Installation and Specifications

PLT-05247, A.6
September 2024

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Contacts

For technical support, please visit: <https://support.hidglobal.com>.

What's new

Date	Description	Revision
September 2024	Minor edit to 2.2 Door strike relay wiring	A.6

A complete list of revisions is available in [Revision history](#).

Section 01

Overview

1.1 MR50-S3 reader interface

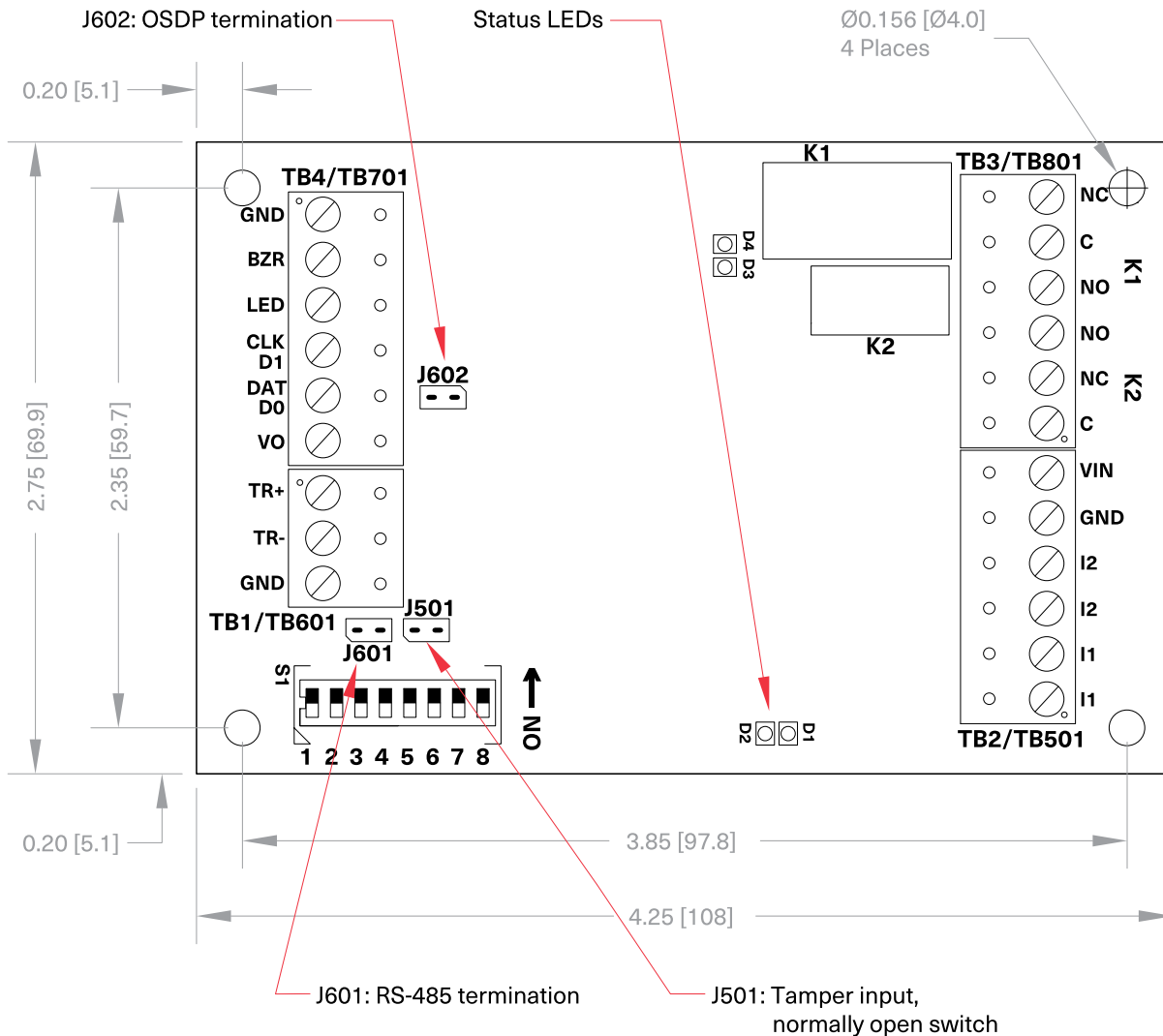
The Mercury MR50-S3 reader interface provides a solution to the OEM system integrator for interfacing to a TTL (D1/D0, Clock/Data), F/2F or RS-485 device, and door hardware. It also provides a tri-stated LED control and buzzer control.

Two Form-C contact relay outputs are provided for strike control or alarm signaling.

Two inputs are provided for monitoring the door contact and request to exit push button. Input circuits can be configured as unsupervised or supervised.

The MR50-S3 communicates with the controller via a 2-wire RS-485 interface.

The MR50-S3 requires 12 to 24 V DC for power.



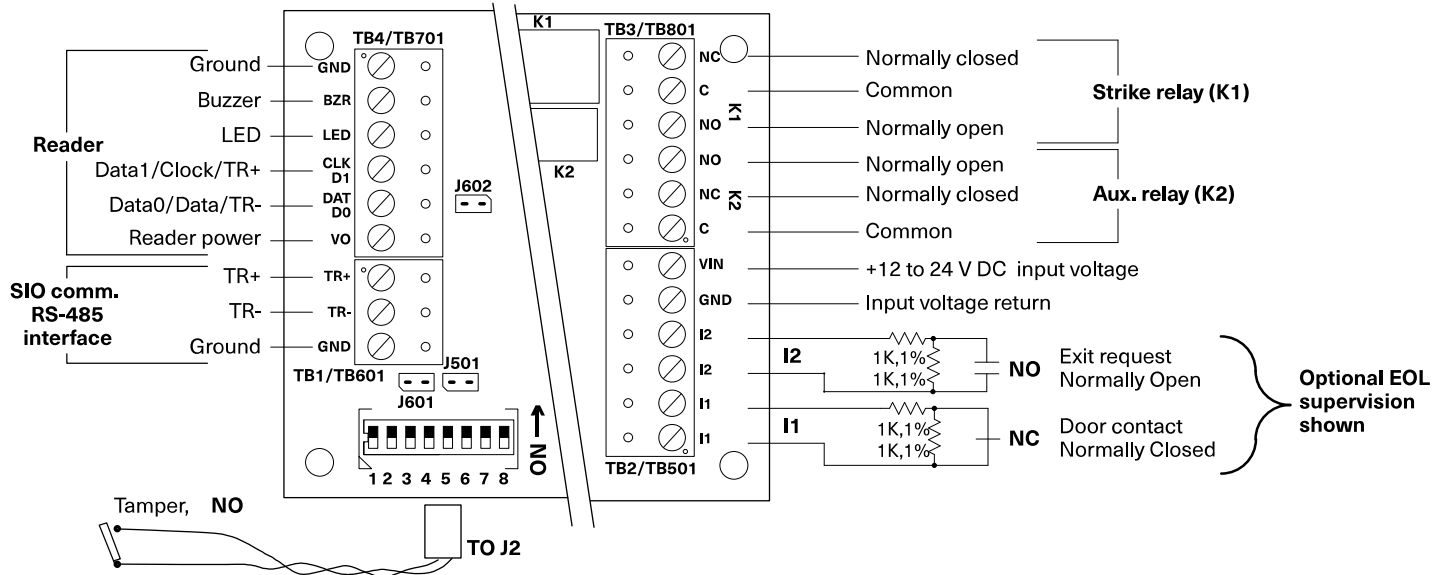
Note: Older versions of the MR50-S3 do not include the OSDP termination jumper J602.

1.2 MR50-S3 hardware

The MR50-S3 requires filtered 12 to 24 V DC \pm 10% for power. Two inputs are typically used for door contact and exit push button monitoring. End of line resistors are required for input supervision, shown below.



Caution: The input power is passed through to the reader terminal strip and is available for powering a reader. Readers that have different voltage requirements must be powered separately. Care must be taken to ensure that the input voltage is within the voltage range of the reader. The reader power output terminal, TB4-6/TB701-6 (VO), is not current limited.



1.2.1 J602 OSDP termination jumper

The J602 jumper is located next to the reader port and controls OSDP termination. This jumper should be closed when an OSDP reader is used. When using a non-OSDP reader the jumper should be open.

Important: Failure to properly set the OSDP termination jumper could cause reader communication issues.

Note: Older versions of the MR50-S3 do not include the OSDP termination jumper J602.

Section 02

MR50-S3 wiring and setup

2.1 Reader wiring

The reader port supports a reader with TTL (D1/D0, Clock/Data), F/2F, or 2-wire RS-485 signaling.

Refer to the reader manufacture specifications for cabling requirements.

In the 2-wire LED mode the buzzer output is used to drive the second LED.

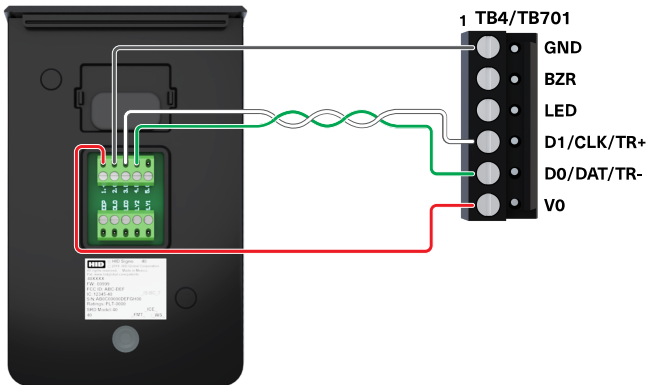
Reader port configuration is set via the host software.

Note:

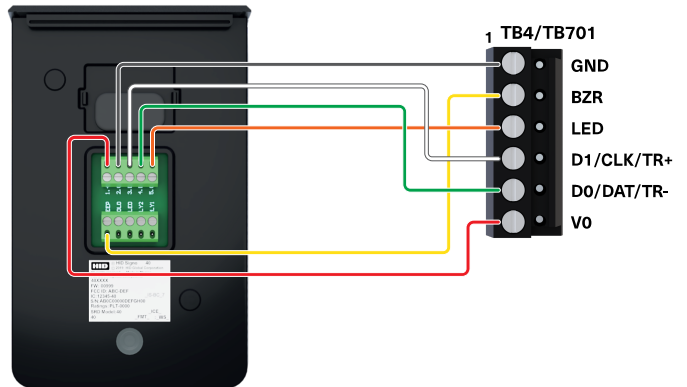
- For OSDP cable lengths greater than 200 ft (61 m) or EMF interference close jumper J602.
- For older versions of the MR50-S3 that do not include jumper J602, install a 120Ω +/- 2Ω resistor across RS-485 termination ends.
- Data 0 and Data 1 wires for Wiegand may be reused for OSDP. However, standard Wiegand cable may not meet RS-485 twisted pair recommendations. The reuse of cable works best on shorter cable lengths at lower data rates.

2.1.1 Reader wiring diagrams

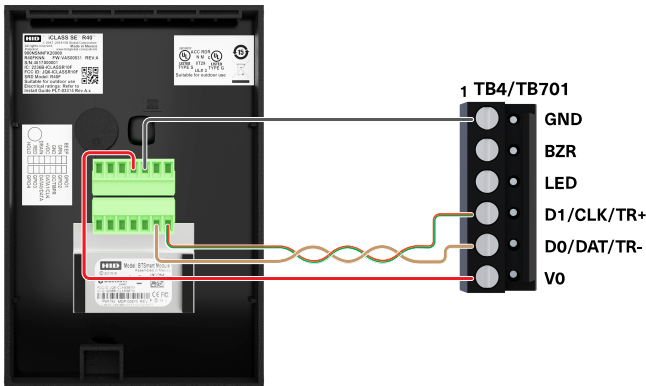
**Typical reader 1
(OSDP installation)**



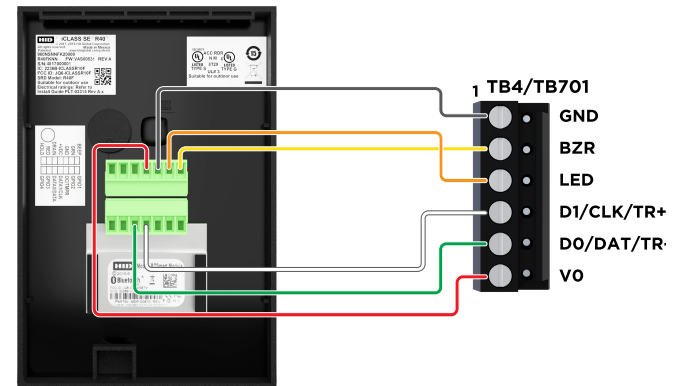
**Typical reader 1
(Wiegand or Clock/Data installation)**



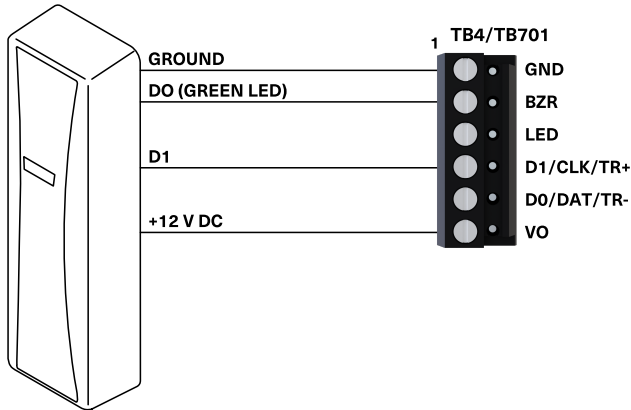
**Typical reader 2
(OSDP installation)**



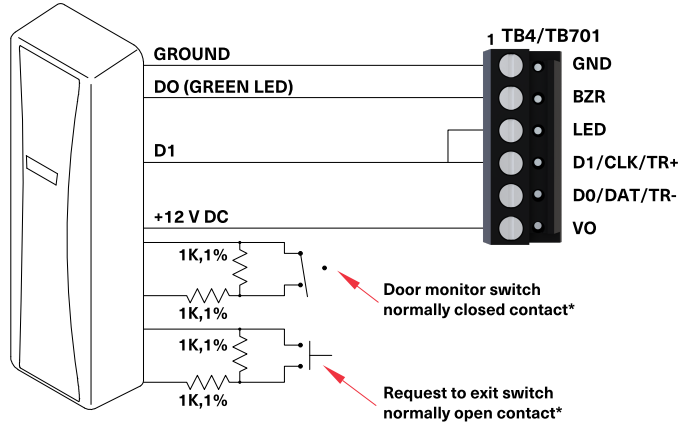
**Typical reader 2
(Wiegand or Clock/Data installation)**



Typical Unsupervised F/2F Reader



Typical Supervised F/2F Reader

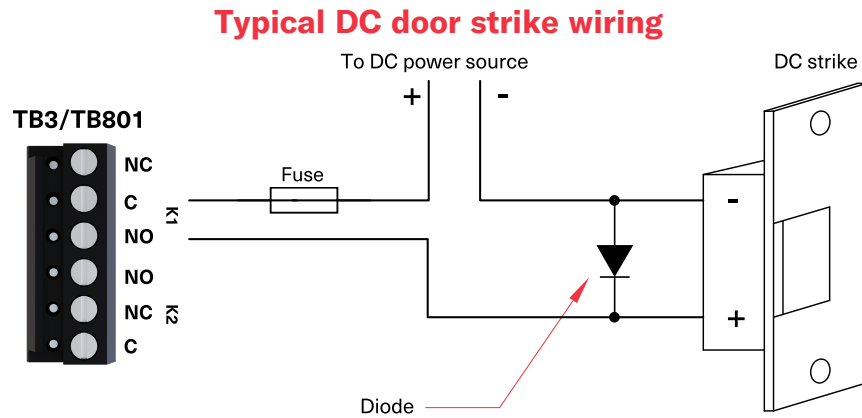


Jumper D1 to LED on supervised F/2F readers

*Inputs on supervised F/2F readers may be unsupervised or supervised (supervised shown).

2.2 Door strike relay wiring

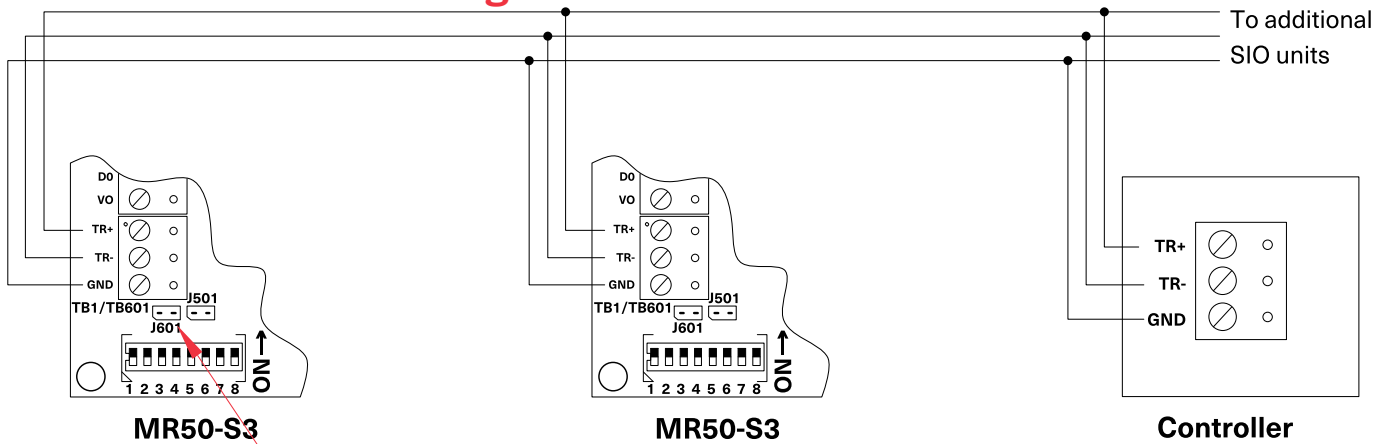
Two Form-C contact relays are provided for controlling door strike or other devices. See **Specifications** for the relay contact ratings. Load switching can cause abnormal contact wear and premature contact failure. Switching of inductive loads (strike) also causes EMI (electromagnetic interference) which may interfere with normal operation of other equipment. To minimize premature contact failure and to increase system reliability a contact protection circuit must be used. Locate the protection circuit as close to the load as possible (within 12 inches [30 cm]), as the effectiveness of the circuit will decrease if it is located far away.



Diode selection

- Diode current rating: 1x strike current.
- Diode breakdown voltage: 4x strike voltage.
- For 12 V DC or 24 V DC strike, diode 1N4002 (100V/1A) typical.

2.3 Communication wiring



J601 - RS-485 communication terminator jumper. Install on the last unit on the communication line.

The MR50-S3 communicates with a Mercury Security intelligent controller (EP2500 for example) via a half-duplex multi-drop 2-wire RS-485 interface. The total cable length is limited to 4,000 feet (1,219 meters). Shielded cable of 24 AWG with characteristic impedance of 120Ω is specified for the 2-wire RS-485 interface. The last device on each end of the communication line should have the terminator installed (install jumper J601).

2.4 Address, baud rate and encryption configuration switch

Switches 1 to 5 select the device address. Switches 6 and 7 select the communication baud rate. Switch 8 enables encrypted communication. All other configuration settings are set via host software.

S8	S7	S6	S5	S4	S3	S2	S1	Selection
			OFF	OFF	OFF	OFF	OFF	Address 0
			OFF	OFF	OFF	OFF	ON	Address 1
			OFF	OFF	OFF	ON	OFF	Address 2
			OFF	OFF	OFF	ON	ON	Address 3
			OFF	OFF	ON	OFF	OFF	Address 4
			OFF	OFF	ON	OFF	ON	Address 5
			OFF	OFF	ON	ON	OFF	Address 6
			OFF	OFF	ON	ON	ON	Address 7
			OFF	ON	OFF	OFF	OFF	Address 8
			OFF	ON	OFF	OFF	ON	Address 9
			OFF	ON	OFF	ON	OFF	Address 10
			OFF	ON	OFF	ON	ON	Address 11
			OFF	ON	ON	OFF	OFF	Address 12
			OFF	ON	ON	OFF	ON	Address 13
			OFF	ON	ON	ON	OFF	Address 14
			OFF	ON	ON	ON	ON	Address 15
			ON	OFF	OFF	OFF	OFF	Address 16
			ON	OFF	OFF	OFF	ON	Address 17
			ON	OFF	OFF	ON	OFF	Address 18
			ON	OFF	OFF	ON	ON	Address 19
			ON	OFF	ON	OFF	OFF	Address 20
			ON	OFF	ON	OFF	ON	Address 21
			ON	OFF	ON	ON	OFF	Address 22
			ON	OFF	ON	ON	ON	Address 23
			ON	ON	OFF	OFF	OFF	Address 24
			ON	ON	OFF	OFF	ON	Address 25
			ON	ON	OFF	ON	OFF	Address 26
			ON	ON	OFF	ON	ON	Address 27
			ON	ON	ON	OFF	OFF	Address 28
			ON	ON	ON	OFF	ON	Address 29
			ON	ON	ON	ON	OFF	Address 30

S8	S7	S6	S5	S4	S3	S2	S1	Selection
			ON	ON	ON	ON	ON	Address 31
	OFF	OFF						115,200 BPS
	OFF	ON						9,600 BPS
	ON	OFF						19,200 BPS
	ON	ON						38,400 BPS
OFF								Encrypted communication not required
ON								Encrypted communication required

2.5 Status LEDs

2.5.1 Power-up

All LEDs are OFF.

2.5.2 Initialization

Once power is applied, initialization of the module begins. The D1 LED is turned ON at the beginning of initialization.

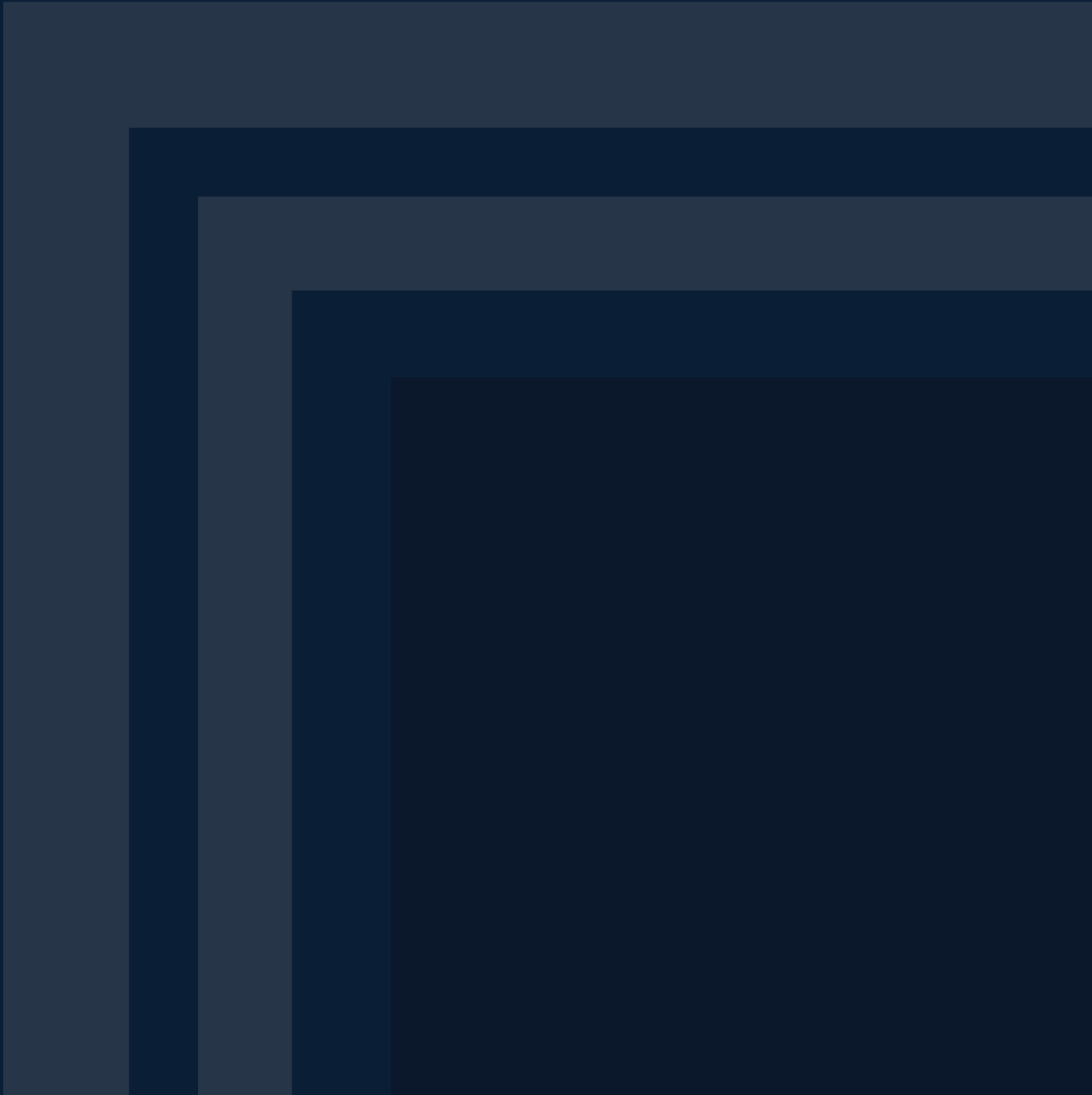
2.5.3 Run time

After a successful initialization, the LEDs have the following meanings:

LED	Description
D1 LED heartbeat and on-line status	Off-line: 1 second rate, 20% ON, 80% OFF
	On-line: Non-encrypted communication: 1 second rate, 80% ON, 20% OFF Encrypted communication: .1 S ON, .1 S OFF, .1 S ON, .1 S OFF, .1 S ON, .1 S OFF, .1 sec ON, .3 S OFF
D1 LED	Error Indication: Waiting for application firmware to be downloaded: .1 S ON, .1 S OFF
D2 LED	SIO Communication Port Status: Indicates communication activity on the SIO communication port.

Section 03

Specifications



3.1 MR50-S3 reader interface specifications

Revision E assembly:

The Interface is for use in low voltage, class 2 circuits only.

Primary power	12 to 24 V DC \pm 10%, 150 mA maximum (plus reader current)
Outputs	Two Form-C contact relays
	K1: Normally open contact (NO) contact: 5 A @ 30 V DC resistive Normally closed contact (NC) contact: 3 A @ 30 V DC resistive
	K2: 1 A @ 30 V DC resistive
Inputs	Two unsupervised/supervised, standard EOL, 1k/1k Ω , 1%, ¼ watt One unsupervised, dedicated for cabinet tamper
READER INTERFACE	
Reader power	12 to 24 V DC \pm 10% (input voltage passed through)
Reader LED output	TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer output	Open collector, 12 V DC open circuit maximum, 40 mA sink maximum
Data Inputs	TTL compatible, F/2F or 2-wire RS-485
Communication	2-wire RS-485: 9600, 19200, 38400 or 115200 bps
CABLE REQUIREMENTS	
Power	1 twisted pair, 18 AWG
RS-485 I/O devices	1 twisted pair with drain wire and shield, 24 AWG, 120 Ω impedance, 4,000 feet (1,219 m) maximum
Alarm Inputs	1 twisted pair per input, 30 Ω maximum
Outputs	As required for the load
Reader data (TTL)	6-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (F/2F)	4-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (RS-485)	1 twisted pair with drain wire and shield, 24 AWG, 120 Ω impedance, 2,000 feet (610 m) maximum
MECHANICAL	
Dimension	4.25 inches (108 mm) W x 2.75 inches (70 mm) L x 1 inches (25.4 mm) H
Weight	4 oz. (120 g) nominal
ENVIRONMENT	
Storage temperature	-55 to +85°C
Operating temperature	-40 to +75°C (UL Verified for 0 to 49°C)
Humidity	5 to 95% RHNC

UL 294, 7th edition Performance Levels

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

These specifications are subject to change without notice.

- For ULC 60839-11-1 compliance, product was evaluated as Access Control Grade Assignment: Grade 2 Suitable for "Indoor dry conditions".
- If readers are used in system setup, readers (Wiegand or OSDP type) and power supplies connected to this system, are to be ULC 60839-11-1 listed for ULC 60839-11-1 compliance.
- For ULC 60839-11-1, the unit shall be installed in an enclosure secured with a tamper switch.
- For ULC 60839-11-1, the PCB mentioned may be utilized to form a Grade 2 system when there is a compatible grade 2 controller with monitoring and the above items are provided.
- For UL 294 compliance, units are to be powered via a UL 294 power supply with a class 2 power limited output.
- For ULC 60839-11-1, the unit was not evaluated for duress functionality, permitted door release time if programmable shall not be less than 3 seconds.
- Units shall be wired in accordance to NFPA70.

3.2 Warranty

Mercury Security warrants the product is free from defects in material and workmanship under normal use and service with proper maintenance for one year from the date of factory shipment. Mercury Security assumes no responsibility for products damaged by improper handling or installation. This warranty is limited to the repair or replacement of the defective unit.

There are no expressed warranties other than set forth herein. Mercury Security does not make, nor intends, nor does it authorize any agent or representative to make any other warranties, or implied warranties, and expressly excludes and disclaims all implied warranties of merchantability or fitness for a particular purpose.

Returns must be accompanied by a Return Material Authorization (RMA) number obtained from customer service, and prepaid postage and insurance.

3.3 Liability

The Interface should only be used to control exits from areas where an alternative method for exit is available. This product is not intended for, nor is rated for operation in life-critical control applications. Mercury Security is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. Mercury Security's liability does not extend beyond the purchase price of the product.

3.4 Regulatory

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Revision history

Date	Description	Revision
September 2024	Minor edit to 2.2 Door strike relay wiring	A.6
June 2024	Updated to new Mercury branding.	A.5
December 2023	Updated the terminal block connector numbers.	A.4
November 2023	Added jumper J602 and updated the labeling for jumpers J501 and J601. Removed footnotes from the Address, baud rate and encryption configuration switch table. UL compliance updates to Section 03.	A.3
August 2022	New branding.	A.2
June 2021	Minor updates.	A.1
October 2020	Initial release.	A.0



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