HID® Mercury™
MR50-S3 Reader Interface
Installation and Specifications

PLT-05247, A.2
August 2022

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Contacts

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

What's new

Date	Description	Revision
August 2022	New branding.	A.2

A complete list of revisions is available in **Revision history**.

Section 01
Overview

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![HID logo] **Powering** Trusted Identities

1.1 MR50 reader interface

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

The MR50 requires 12 to 24 V DC for power.

J2: Tamper input, normally open switch
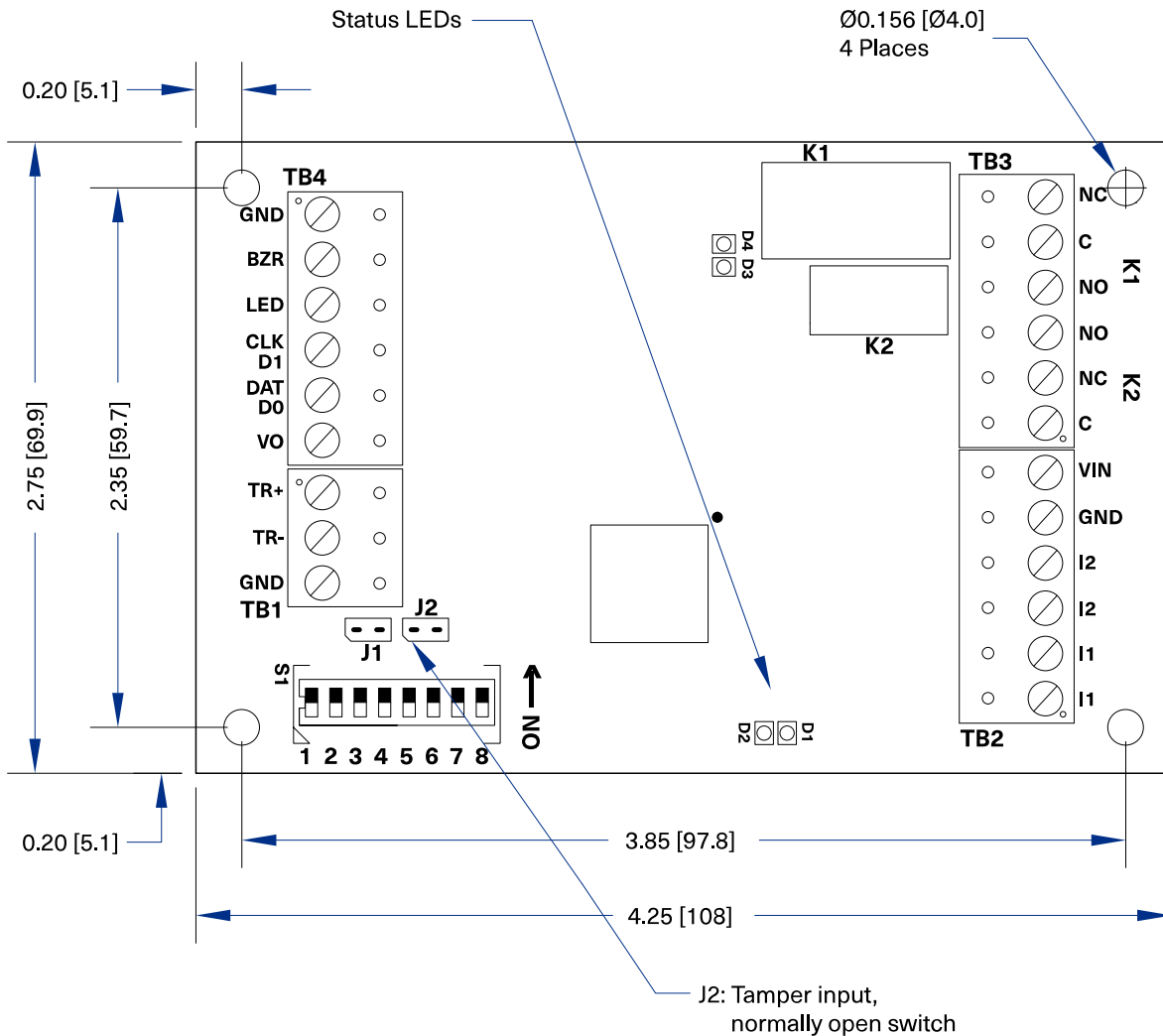
1.2 MR50 hardware

The MR50 requires filtered 12 to 24 V DC ± 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 require different voltage requirements must be powered separately. Care must be taken to insure that the input voltage is within the voltage range of the reader. The reader power output terminal, TB4-6 (VO), is not current limited.
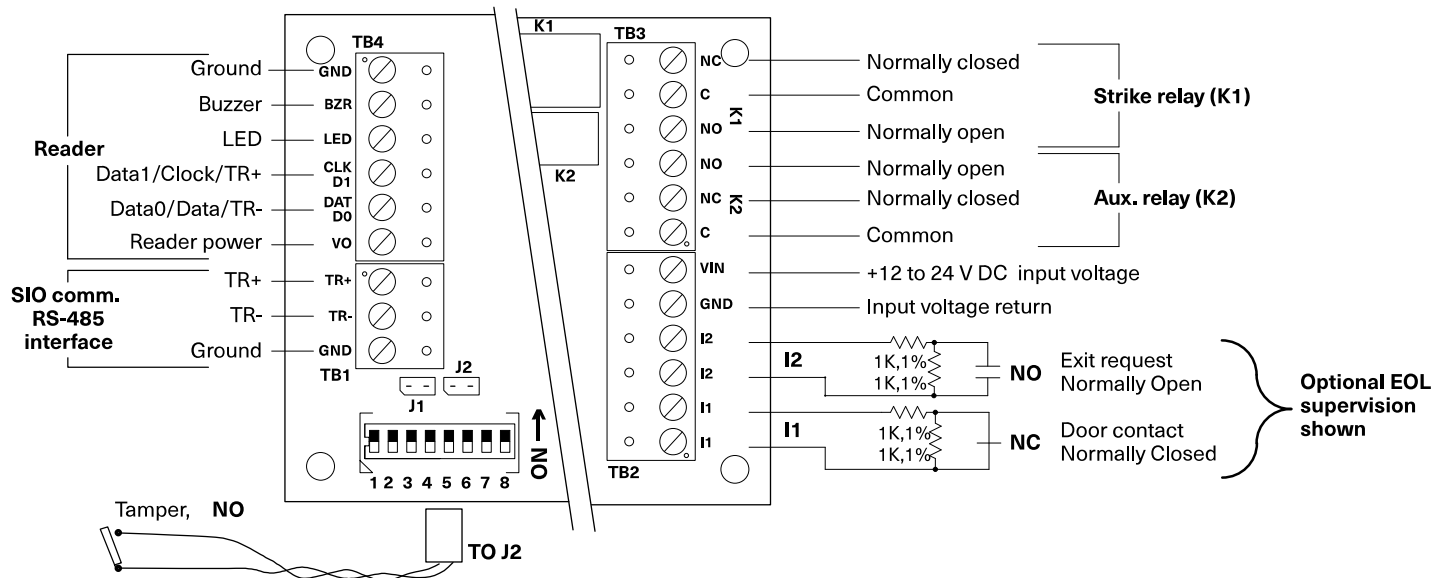
Section 02

MR50 wiring and setup

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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.

> **Notes:**
> - For OSDP cable lengths greater than 200 ft (61 m) or EMF interference, install 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)**
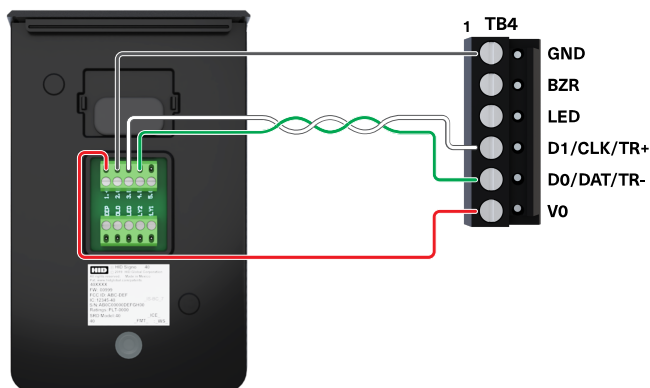
**Typical reader 1
(Wiegand or Clock/Data installation)**
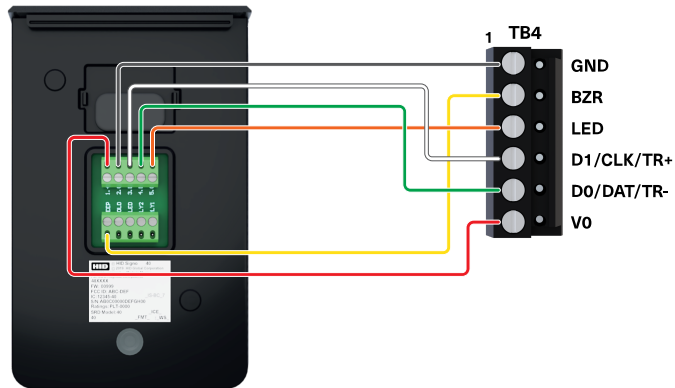
**Typical reader 2
(OSDP installation)**
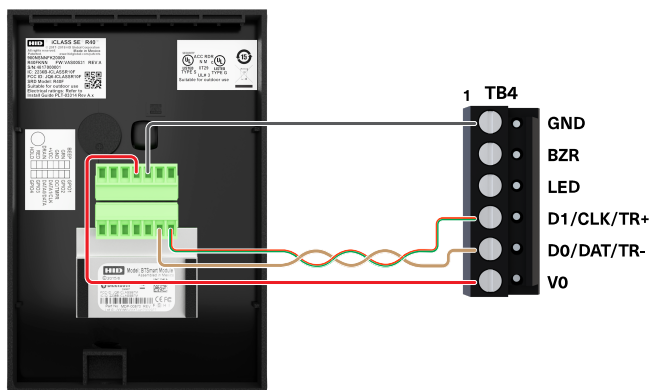
**Typical reader 2
(Wiegand or Clock/Data installation)**
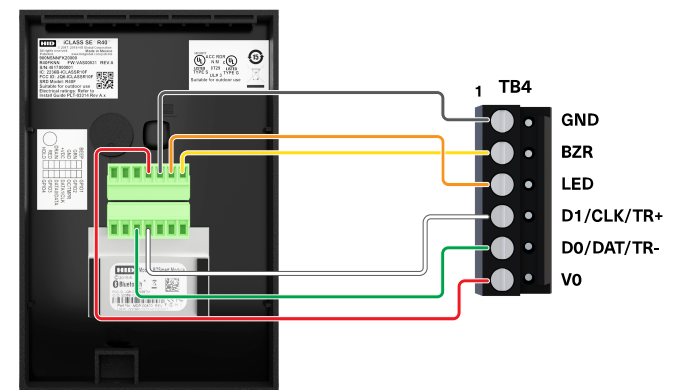
Typical Unsupervised F/2F Reader

GROUND — GND
DO (GREEN LED) — BZR
— LED
D1 — D1/CLK/TR+
— D0/DAT/TR-
+12 V DC — VO

1 TB4
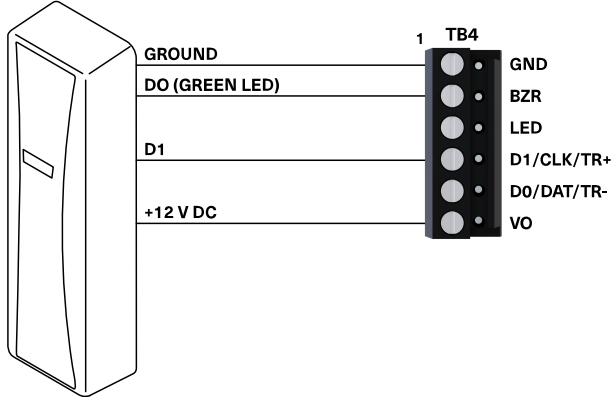
Typical Supervised F/2F Reader

GROUND — GND
DO (GREEN LED) — BZR
— LED
D1 — D1/CLK/TR+
— D0/DAT/TR-
+12 V DC — VO

1 TB4

1K,1%
1K,1%
Door monitor switch
normally closed contact*

1K,1%
1K,1%
Request to exit switch
normally open contact*
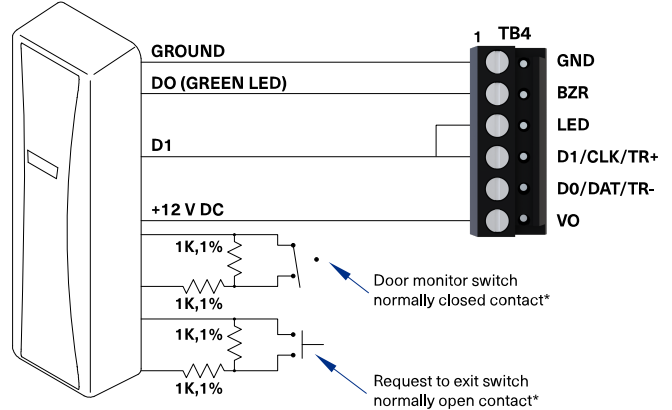
Jumer D1 to LED on supervised F/2F readers

*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, contact protection circuit must be used. The following two circuits are recommended. 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.

Typical DC door strike wiring
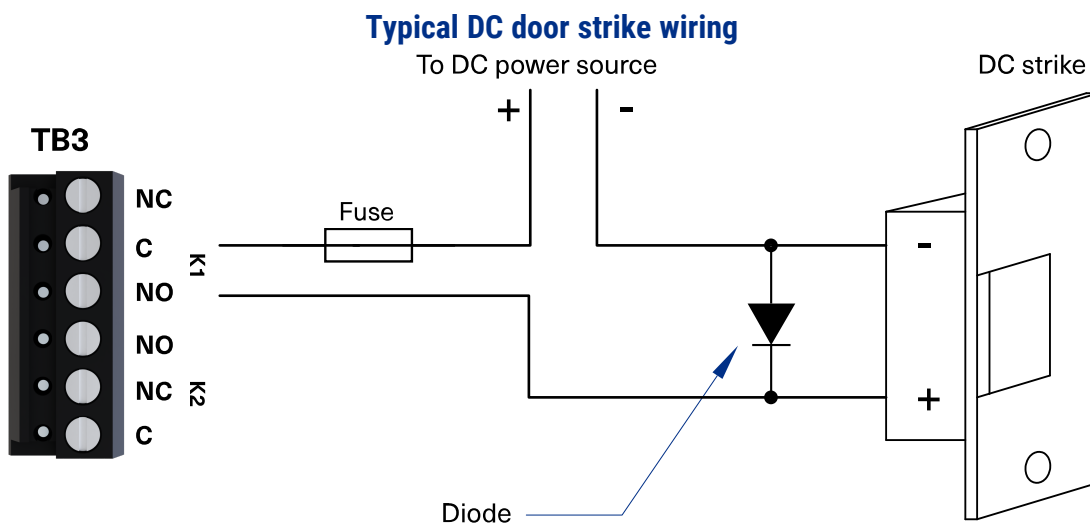
Diode selection

- 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
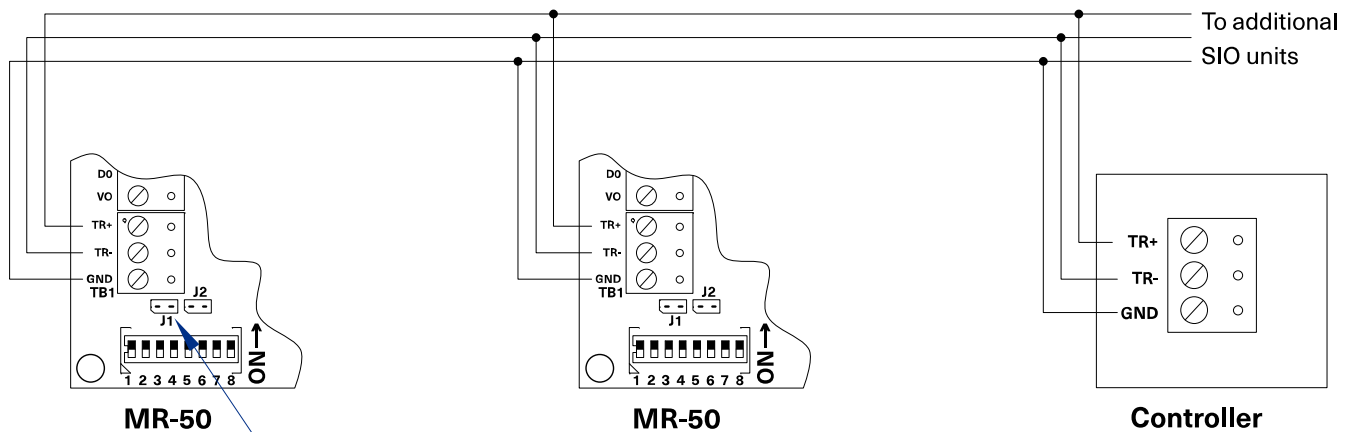
J1 - RS-485 communication terminator jumper install on last unit on the communication line.

The MR50 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 J1).

2.4 Address, baud rate and encryption configuration switch

Switches 1 to 5 select the device address. Switch 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[1]
	OFF	ON						9,600 BPS
	ON	OFF						19,200 BPS
	ON	ON						38,400 BPS
OFF								Encrypted communication not required[2]
ON								Encrypted communication required[2]

1. Firmware revisions prior to 1.39.1, this setting is 2,400 BPS
2. Firmware revisions prior to 1.39.1, SW8 is not defined. Set to the OFF position

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

Revision E assembly:

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

Primary power	12 to 24 V DC ± 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/1kΩ, 1%, ¼ watt
	One unsupervised, dedicated for cabinet tamper
	READER INTERFACE
Reader power	12 to 24 V DC ± 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, 120Ω impedance, 4,000 feet (1,219 m) maximum
Alarm Inputs	1 twisted pair per input, 30Ω 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, 120Ω 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
Humidity	5 to 95% RHNC

UL294, 6th edition Performance Levels

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

These specifications are subject to change without notice.

3.1 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.

3.2 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.

3.3 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
August 2022	New branding.	A.2
June 2021	Minor updates.	A.1
October 2020	Initial release.	A.0

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