P2000

Security Management System

hardware

installation

CKM-MR50-S3

authentic Mercury™ terminal module

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 your equipment, keep all original manufacturer documentation for 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.

Single Point of Contact by Region

European Single Point of Contact	NA/SA Single Point of Contact	APAC Single Point of Contact
JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA	JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 22 BLOCK D NEW DISTRICT WUXI JIANGSU PROVINCE 214142 CHINA

Acknowledgments

Declarations of Conformity

United States: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

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 instruction. 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.

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UNDERWRITERS LABORATORIES COMPLIANCE VERIFICATION SHEET

The following model number is listed under Underwriters Laboratories® (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.

CKM-MR50-S3

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

1. The CKM-MR50-S3 shall be mounted in Listed Enclosures CKM-CE75-E1M, CKM-CE75-E2M, CKM-CE7150-E4M, and Listed Burglar Alarm and Access Control System SPF10000-1I00, SPF1I1100-1I00 or SPF1I300-1J00.

2. A CKM-MR50-S3 mounted in Listed Enclosures CKM-CE75-E1M, CKM-CE75-E2M, CKM-CE150-E4M, and Listed Burglar Alarm and Access Control System SPF10000-1I00, SPF1I1100-1I00 or SPF1I300-1J00E4M shall be powered through the CKM-F8P power distribution module.

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

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

5. A 1.5Kohm/750ohm custom end-of-line resistance supervised circuit was investigated by Underwriter Laboratories.

6. Power for devices connected through relay/control output wiring must be provided by a UL Listed power limited power source.

7. RS485-type readers have not been investigated by Underwriters Laboratories.

8. Encrypted communication has not investigated by Underwriters Laboratories.

9. Relay K2 wiring should not leave the room of installation.

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

Manufacturer	Models
HID Global Corp.	5355, 5365, 5395, 5405, 5455, 6005, 6100, 3110-6445, R10T, R10N, R15N, R15T, RP15N, RP15T, R40N, R40T, RK40N, RK40T, RP40N, RP40T, RPK40N, RPK40T
	All models may be followed by additional suffixes
	OSDP Readers: R10Exxx, RP10Exxx, R15Exxx, RP15Exxx, R30Exxx, RP30Exxx, R40Exxx, RP40Exxx, RK40Exxx, RPK40Exxx.
	All models may be followed by additional suffixes. The last "X" in the model number maybe an "R" or "N"
Mercury Security Corp.	MR-5, MR-20

11. The maximum Wiegand line impedance is 8 ohms, representing 22 AWG @ 500 feet.

12. The HID 3110-6445 shall be powered by a separate power source that is UL 294 or UL 603 power limited power source.

13. Suitable for use with the model P2K-nnn-UL-x Security Management System, where **n** can be any number 0 through 9 and where **x** can be any three letters A through Z.

14. UL 294 Performance Levels

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

CKM-MR50-S3 READER TERMINAL MODULE

This document provides hardware installation and setup instructions for CKM-MR50-S3, the authentic Mercury™ single reader terminal module Series 3. This document is divided into the following sections:

NOTE: Throughout this manual the CKM-MR50-S3 module is also referred to as the CKM-MR50.

GENERAL INFORMATION

The CKM-MR50 reader interface provides a solution to the OEM system integrator for interfacing to a TTL, Wiegand, or RS-485 type reader and door hardware.

The CKM-MR50 can accept data from a reader with clock/data, Wiegand signaling, or 2-wire RS-485, and also provides a tri-stated LED control and buzzer control. Two Form-C contact relay outputs may be used for strike control or alarm signaling. Two inputs are provided for monitoring the door contact and exit push button. Communication to the interface is accomplished via a 2-wire RS-485 interface. The CKM-MR50 requires 12 to 24 VDC for power.
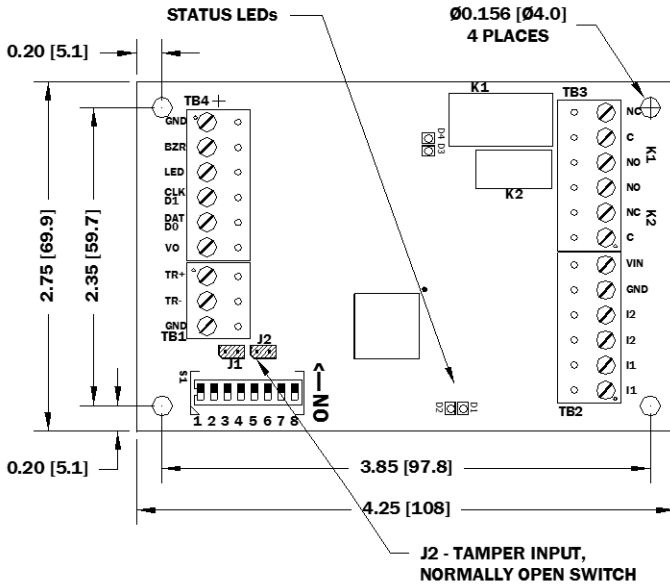
MOUNTING INFORMATION

Figure 1: CKM-MR50 Hardware

WIRING INFORMATION

This sections covers the following:

- Cable Routing
- Power Wiring
- Reader Wiring
- Door Strike Relay Wiring
- Communications to a Controller

Cable Routing

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

IMPORTANT: 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 Wiring

All interconnections to the interface are via quick-disconnect terminal blocks. The CKM-MR50 requires filtered 12 to 24 VDC±10% for power. The CKM-MR50 supports clock/data, Wiegand, or 2-wire RS-485 reader interface signaling. Two inputs are typically used for door contact and exit push button monitoring. Line supervision requires end of line resistors.

NOTE: 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. You must ensure that the input voltage is within the voltage range of the reader. The reader power output terminal, TB4-6 (VO), is not current limited.
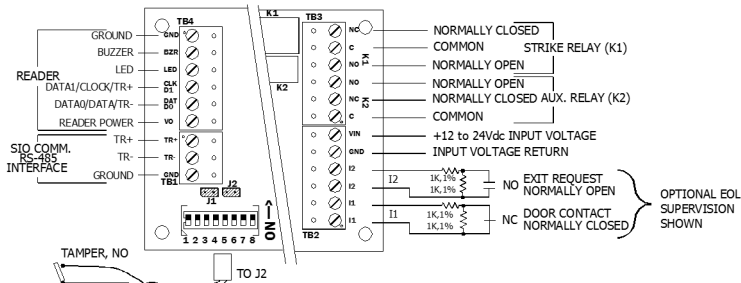
Figure 2: Power Wiring

When request to exit (REX) input is supervised, the strike remains locked when a transition to open state or short state occurs. Such transitions do not generate notifications. The strike relay unlocks only when the REX input changes to the active state, that is, when the REX switch contact opens or closes depending on the configuration.

Reader Wiring
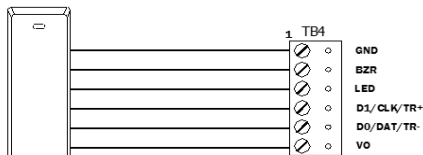
Typical D1/D0 or Clock/Data Reader

Figure 3: CKM-MR50 Reader Wiring

Door Strike Relay Wiring

Two Form-C contact relays are provided for controlling door strike or other devices. See specifications section 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 in., or 30 cm), as the effectiveness of the circuit decreases if it is located far away.
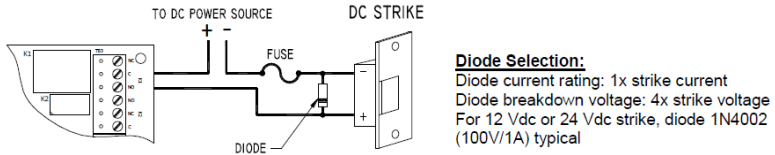
Figure 4: CKM-MR50 Door Strike Relay Wiring

Communications to a Controller

The CKM-MR50 communicates to a Mercury Security intelligent controller (EP2500 for example) via a half duplex multidrop 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 120 ohm is specified for the 2-wire RS-485 interface. The last device on each end of the communication line should have the terminator jumper J1 installed.

Figure 5: CKM-MR50 Communications Wiring

SETUP INFORMATION

Each interface (for example, CKM-MR50, CKM-MR52) must be configured to have a unique address and correct baud rate. The address and baud rate are selected by installing the specified jumpers.

Table 1: CKM-MR50 Address and Baud Rate Settings

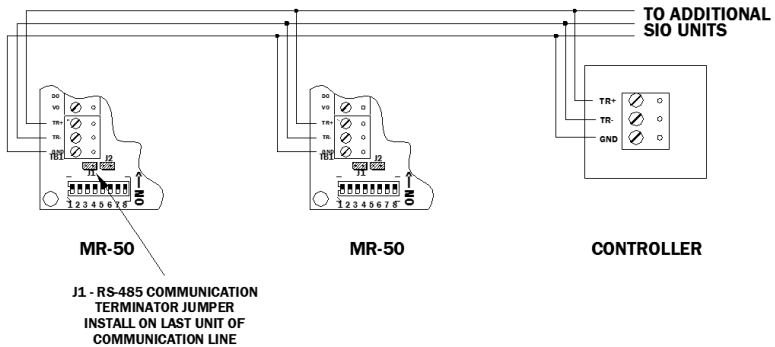| S8	S7	S6	S5	S4	S3	S2	S1	Selection
			OFF	OFF	OFF	OFF	OFF	Address 0
			OFF	OFF	OFF	OFF	ON	Address 1
			OFF	OFF	OFF	ON	OFF	Address 2
			OFF	OFF	OFF	ON	ON	Address 3
			OFF	OFF	ON	OFF	OFF	Address 4
			OFF	OFF	ON	OFF	ON	Address 5
			OFF	OFF	ON	ON	OFF	Address 6
			OFF	OFF	ON	ON	ON	Address 7
			OFF	ON	OFF	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

Table 1: CKM-MR50 Address and Baud Rate Settings

S8	S7	S6	S5	S4	S3	S2	S1	Selection
			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
			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**

* In firmware revisions prior to 1.39.1, the 115,200 baud rate setting is 2,400 baud.
** In firmware revisions prior to 1.39.1, jumper 8 is not defined; set jumper to the OFF position.

STATUS LEDS

Table 2: LED Information

Process	LED Information
Power-up	All LEDs OFF
Initialization	Once you apply power, initialization of the module begins. The D1 LED is turned ON at the beginning of initialization.

Run Time	D1 LED Heartbeat and On-Line Status:
	Offline
	   1-second rate, 20% ON, 80% OFF
	Online
	   Non-encrypted communication: 1-second rate, 80% ON,20% OFF
	   Encrypted communication:
	     0.1 second ON
	     0.1 second OFF
	     0.1 second ON
	     0.1 second OFF
	     0.1 second ON
	     0.1 second OFF
	     0.1 second ON
	     0.3 second OFF
	
	D1 LED Error Indication:
	Waiting for application firmware to be downloaded:
	     1 second ON
	     1 second OFF
	
	D2 LED SIO Communication Port Status:
	Indicates communication activity on the SIO communication port.

SPECIFICATIONS

Use this interface in low voltage, Class 2 circuits only.

Table 3: CKM-MR50 Specifications

Category	Description
Primary Power	12 to 24 VDC ±10%, 150 mA maximum (plus reader current)
Outputs	2, Form-C contact relays: K1: Normally open contact (NO) contact: 5 A at 30 VDC resistive Normally closed contact (NC) contact: 3 A at 30 VDC resistive K2: 1 A at 30 VDC resistive
Inputs	2 unsupervised/supervised, standard EOL, 1k ohm, 1% 1/4 watt 1 unsupervised, dedicated for cabinet tamper
Reader Interface	
Reader Power	12 to 24 VDC±10% (input voltage passed through), 300 mA maximum
Reader LED Output	TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer Output	Open collector, 5 12 VDC open circuit maximum, 40 mA sink maximum
Data Inputs	TTL compatible, 2-wire RS-485.
Communication	
Communication	2-wire RS-485: 9600, 19200, 38400, or 115200 bps
Cable Requirements	
Power	1 twisted pair, 18 AWG.
RS-485 I/O devices	24 AWG, 120 ohm impedance, twisted pair with drain wire and shield, 4,000 ft (1,219 m) maximum
Alarm Inputs	1 twisted pair per input, 30 ohms maximum, typically 22 AWG at 1,000 ft (304.8 m)
Outputs	As required for the load
Reader data (TTL)	18 AWG, 6 conductor, 500 ft (150 m) maximum
Reader data (RS-485)	24 AWG, 120 ohm impedance, twisted pair with drain wire and shield, 2,000 ft (609.6 m) maximum
Reader data (F/2F)	4-conductor, 18 AWG, 500 ft. (150 m) maximum

Table 3: CKM-MR50 Specifications

Category	Description
Environmental	
Temperature	32 to 120°F (0 to 49°C) operating -67 to 185°F (-55 to 85°C) storage
Humidity	10 to 93% RHNC
Mechanical	
Dimensions (W x L x H)	4.25 in. x 2.75 in. x 1 in. (10.8 cm x 7 cm x 2.5 cm)
Weight	4 oz. (120 g) nominal

MAINTENANCE

Impaired Performance

The following is a list of the impaired performance conditions:

- Unit environment not as specified
- Unit power not as specified
- Cable type and length not as specified

Test Procedure

To check for proper operation of the device:

1. Verify LED status indicates device is online

2. Present a valid card to a reader connected to the device and the verify that access is granted.

3. Present an invalid card to a reader connected to the device and the verify that access is denied.

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

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

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