



Item No. 00-4072-xxxx

## 1. Field of Application

The IF-4072 controller family convinces with its multi-functional, powerful and user-friendly features for recording data via Interflex hardware.

The IF-4072 controller is technically state-of-the-art and can be integrated into a 10/100 MB Ethernet network. Power can be supplied via PoE HUB (PoE = Power over Ethernet) without any problems. Thus, you can save the costs for a separate power supply. All of the bookings are transferred to the Interflex host systems in real time. The control and monitoring of doors, for example, takes place via two relays and 4 input contacts. The controller is available in four different versions which support two, four, eight or sixteen terminals.

The terminal controller:

- is operated in conjunction with an IF-6020 or IF-6040 host system.
- transfers the booking data from slave terminals to the IF-6020/IF-6040 time recording/access control program.
- controls - depending on the version - up to 16 slave terminals, e.g. terminals for time data recording or access control. allows for the connection of slave terminals to three RS485 interfaces.
- sends booking decisions from the IF-6020/IF-6040 program back to the slave terminals.
- stores:
  - a) data required for offline operation, e.g. person records, day and week programs, and local permissions.
  - b) booking conditions and display texts from slave terminals.
  - c) data recorded by slave terminals when a booking is performed or contacts are changed, such as e.g. the credential number including booking type and time stamp or input contact data.
- works in offline mode. The terminal controller takes over the functions of the T&A/access control system in offline mode. It checks and acknowledges booking permissions during identification procedures at slave terminals.
- switches external devices. Two relays switch devices up to 3V/2A, e.g. electric door openers.
- records sensor statuses. Four contact inputs are used for the connection of sensors. The sensors can be configured as indicator, event, or counting contacts (up to max. 20 Hz).
- verifies and stores employee bookings, messages and events.

Interflex controller hardware is used for accurate and smooth recording of required data and signals. It can easily be integrated into your network via PoE and into Interflex software platforms.



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## 2. Technical Specifications

<b>Power supply</b>	
- Operating voltage	18 - 24 VAC, 18 - 30 VDC or PoE, class 3 (13 W)
- Power consumption	approx. 13W
<b>Interfaces</b>	
Host interface	TCP/IP Ethernet as per IEEE 802.3, optionally RS232
Service interface	TELNET, SSH or RS232 connection
Interfaces for terminals (slaves)	3x RS485 for up to 16 terminals (slaves)
<b>Processor</b>	
Number of person records	Up to 150,000
Contact inputs for sensors	4 inputs for the connection of floating sensors
<b>Relays</b>	
Relay contacts	2 relays
Relay contacts	Normally open (NO), normally closed (NC), change-over contact
Switching power	30V 2A
Switching rate	Max. 20 Hz
Electrical service life	5,000,000 switching operations
<b>General Data</b>	
Ambient temperature	+5 °C to +40 °C
Humidity	Max. 95%, non-condensing
Degree of protection	III
Protection category	IP20
Electromagnetic compatibility	EN 60950, EN 300330, EN 301-489, CE 0682
Dimensions (HxWxL)	90x160x 58 mm
Weight	Approx. 0.3 kg
Housing material	PC UL 94V-0
Installation	Mounting rail EN 60715 TH 35 (size for 9 modules)
Connection	Screw connectors, RJ45 connection to Ethernet



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## 3. Special Features

- Energy-saving ARM i.MX processor.
- The device can be operated in 10/100 Mbps Ethernet networks.
- Access to the service interface is possible via SSH connection. TELNET can be switched off.
- Quick and easy installation due to DIN rail technology (TH35).
- Light-emitting diodes for the indication of operating statuses
- 4 inputs for the connection of sensors. The inputs are used for the connection of floating sensors. In the T&A/access control program, the inputs can be defined as indicator or counting contacts.
- The connection of 2/4/8/16 access terminals and the storage of up to 150,000 person records is controlled via a license model.
- Data transmission from the terminal to the host system can either be performed through AES or proprietary encryption.
- The following options are available for power supply:
  - a) PoE (Power over Ethernet). In this case, a PoE hub, performance class 3 (13 watt), is required.
  - b) Low-voltage, 18 VAC to 24 VAC or 18 VDC to 30 VDC.
- IF-4072 can take over the power supply of 2 slave terminals that are connected via a BUS cable of maximum 100 meters length.

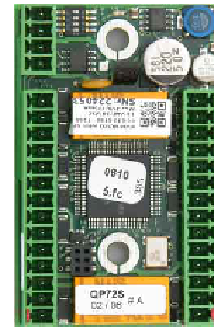
## IF 0 610 Door Manager




We are pleased that you have decided in favor of an IF 0 610 Door Manager from Interflex to safeguard a sensitive area.

Included in delivery are:

- ⇒ IF 0610 door manager w/b, ready for the connection of the ordered reader.
- ⇒ Connecting terminals for cables.

**Relevant information and instructions concerning your safety are marked with the **Danger** sign and must be observed. Noncompliance may lead to most severe injuries or death.**



 <b>Danger:</b>	<p><b>Usage in Accordance with the Intended Purpose:</b> Door managers of the series IF 0 610 are used for access control and for the control of locking devices that are safeguarded with electric access point actuators and monitored by sensors. Any other use is not in accordance with the intended purpose and, therefore not permitted.</p>
	<p>For wiring, only use cables that are allowed to be used at this specific installation site.</p>
	<p>The connection to 110 V/ 230 V-line voltage requires specialized knowledge and may, therefore, only be performed by skilled personnel trained in electrical engineering.</p>
	<p>Interflex appliances may only be operated and supplied from electrical power systems that comply with the requirements of DIN VDE 0100. To guarantee malfunction-free operation, it is advisable to carry out the electrical installation according to the rules of the TN-S-Systems. This means, to use separated neutral and protective conductors.</p>
	<p>In order to ensure compliance with EN standards on EMI Emission and Immunity, it is necessary to connect the <b>PE conductor</b> to the terminal.</p>
	<p>Please observe the "Requirements Concerning Electrical Interlocks on Doors in Escape Routes" when installing electric access point actuators used to operate doors in rescue routes.</p>
	<p>Interflex devices comply with both CE directives and regulations by the Association of German Electrical Engineers that are effective at the time of printing. Constructional changes are not permitted.</p>
	<p><b>IF-0-610 - Driver Software and Solder Bridges:</b> Solder bridge settings and software configuration comply with the reader type ordered. Other reader types can only be operated after changing the software configuration.</p>

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If there should be any further questions, please contact your Interflex office.  
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# IF 0 610 Door Manager

**i** Door managers (1) of the series IF 0 610 are part of a T & A recording/ access control system. They are to be installed in a protected area in close vicinity to the locking devices (2), and connected via an RS 485 BUS data cable to higher ranking systems such as master terminals, access managers or terminal controllers (4).

Door managers are designed to be used:

- for access control of persons identifying themselves with radio frequency<sup>1</sup> identification media at the connected reader (2).
- for the control and monitoring of locking devices (2).
- as door manager for access control terminals relocating their door management.

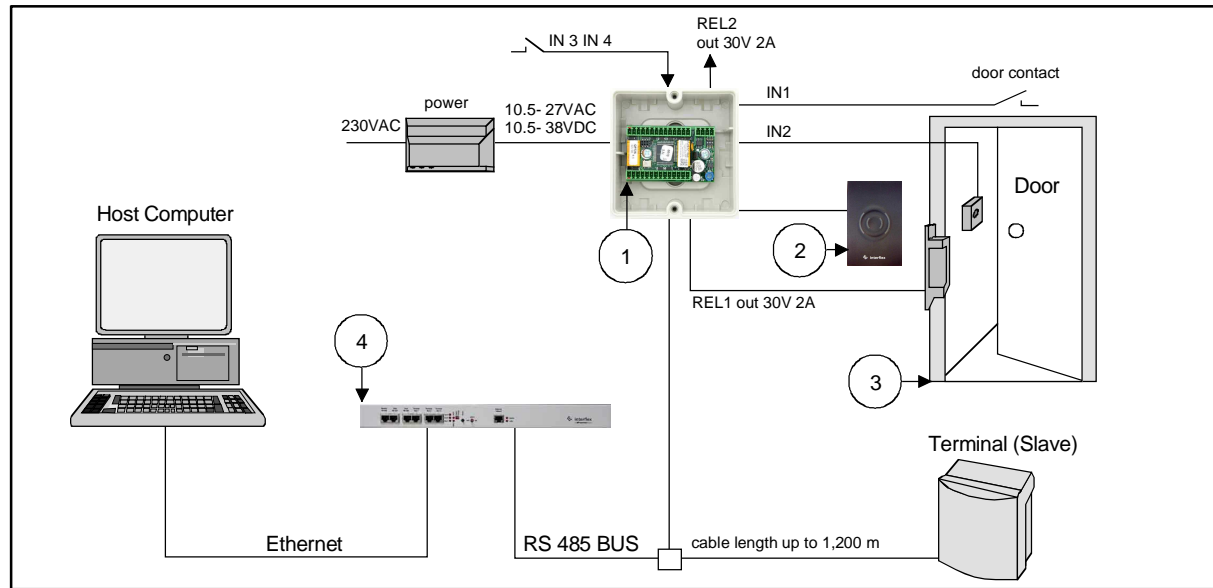


Figure 1: Interflex T&A/ access control system with IF 0 610 door manager

1	IF 0 610 door manager installed in housing	3	Locking device with actuators and sensors
2	Remote-controlled RFID reader <sup>2</sup>	4	Higher-ranking system <sup>2</sup> , terminal controller

## Installation

**i** We recommend installing the door manager board (1) into housings made of plastic material, such as the surface-mounted installation box 75-610-0003 (2).

In order to eliminate the danger of short-circuits, use spacers (3) or a suitable insulation (4) if the board (1) is mounted on a conductive surface (5).

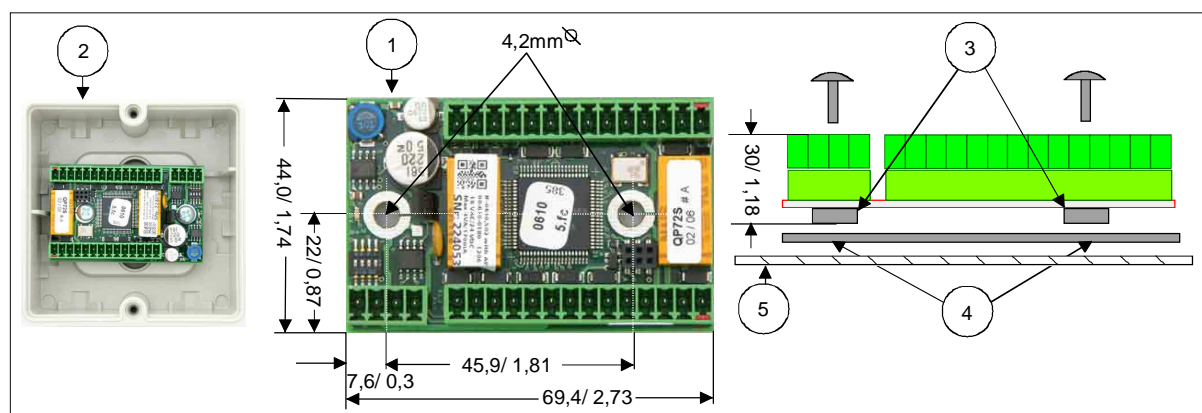


Figure 2: Installation

<sup>1</sup> RFID = Radio Frequency IDentification

<sup>2</sup> Remote-controlled credential readers, such as readers of the series P 60 are accessories.

## Possible Connections

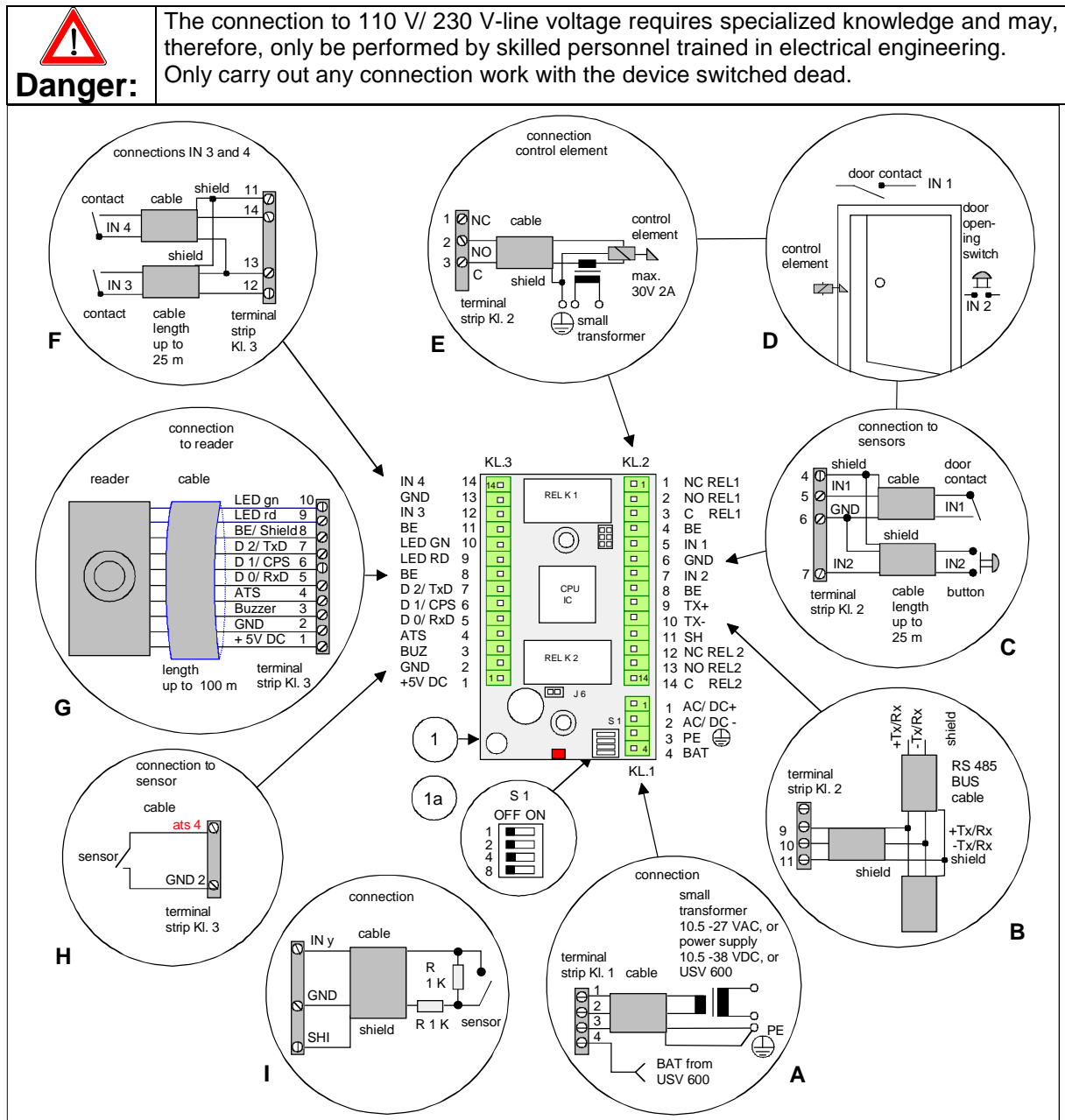


Figure 3: Possible connections at the door manager board (1)

A	Connection of the power source	G	Connection of the credential reader
B	RS 485 BUS data line connection	H	Connection of an anti-tamper switch
C	Connection of door monitoring system to IN 1 <sup>1</sup> and 2 <sup>2</sup>	I	Connection of monitored cables <sup>3</sup>
D	Door management with sensors and access point actuator	1	IF-0-610 board with terminal strips
E	Connection of the access point actuator	1a	Dip switch for address setting
F	Connection of additional sensors to IN 3 and 4		



Further information on the connection and initial operation can be found in the IF 0610 manual on the enclosed CD-ROM.

<sup>1</sup> The door status can only be monitored if a floating sensor is connected to IN 1. This sensor is activated each time the door is opened or closed.

<sup>2</sup> Handle contact and also door opening push-button of monitored access points have to be connected to IN 2.

<sup>3</sup> Special terminal software (TSS) is needed if the IF 0610 can be used to monitor the cables.

## Hardware Address Setting

<b>i</b>	A hardware address between 1 and 8 is required for an operation at higher-ranking systems <sup>1</sup> . Use the four dip switches (figure 3, 1a) to set an address which is not assigned to one of the connected terminals (same RS 485 data line), and which lies in the BUS address section of the higher-ranking system.					
<b>→</b>	Use a small screw driver and move the switches into ON or OFF position.					
	<b>Switch</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>8</b>	
	Address 1	OFF	OFF	OFF	OFF	not applicable if connected to terminals (master)
	Address 2	ON	OFF	OFF	OFF	
	Address 3	OFF	ON	OFF	OFF	
	Address 4	ON	ON	OFF	OFF	
	Address 5	OFF	OFF	ON	OFF	
	Address 6	ON	OFF	ON	OFF	
	Address 7	OFF	ON	ON	OFF	
	Address 8	ON	ON	ON	OFF	

## Technical Specifications

CPU, memory	68 HC 12, 60 K Flash PROM, 2 K RAM, 1 K EE-PROM
Software	In Flash, downloadable.
Power supply	10.5 VAC to 27 VAC or 10.5 VDC to 38 VDC
- Fuse protection	Via PTC resistor
- Power consumption:	Max. 4 VA
<b>Interfaces</b>	
- Data interface to IF-1xxx	RS 485, 9,600 or 19,200 baud, automatic setting
- Output	2 relays with floating "normally open" (NO) and "normally closed" (NC) contacts
Switching power of the relays:	Up to max. 30 V 2 A
- Input	4 inputs with A/D converters for recognizing 4 statuses
Input frequency	Up to max. 20 Hz
- Reader:	Uni-/ bi-directional TTL interface
<b>User information</b>	
	1 VCC LED
<b>General Data</b>	
Electromagnetic compatibility:	EN 60950, ETS 300330, EN 301489- -1
Temperature range	- 25 °C to + 55 °C
Connection	Terminal strips for cable cores of up to 1mm <sup>0</sup>
Weight:	0.2 kg
Mounting	Screw mounting
Protection category:	Not applicable
Dimensions (in mm):	44x70x28 incl. screw-type connectors

<sup>1</sup> Master terminal, access manager or terminal controller

# MR-10/MR-20 Magnetic Card Reader

## Installation and Maintenance

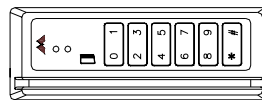
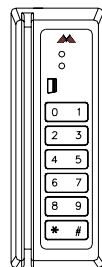
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### 1. General:

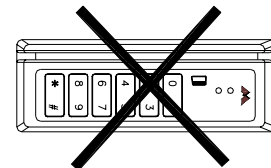
The MR-10/20 family of magnetic stripe card readers are designed for reading standard or high-coercivity magnetic stripe cards. The MR-20 also provides a 12-key keypad for PIN entry. The MR-10/20 provides a TTL interface. The following paragraphs describe instructions for installing and maintaining the card reader.

### 2. Mounting the reader:

Find a suitable location to anchor the reader mounting bracket. The reader may be mounted vertically or horizontally. See recommended orientation. The mounting of the reader does not require a junction box. However, rigid conduit is required for outdoor application. A single gang junction box may be used to provide a transition to rigid conduit. If a single gang junction box is used, a wall plate (optional) may be used to cover the junction box. The reader is then secured to the mounting bracket using a screw. Refer to figures for reader dimensions and typical junction box usage.



Recommended



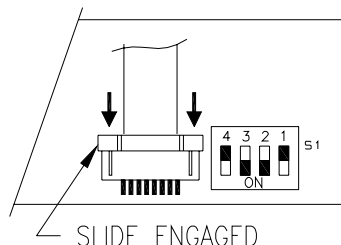
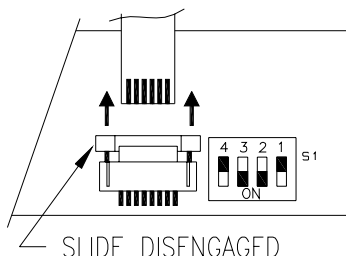
Not Recommended

### 3. Reader Wiring:

The reader has a RJ-11 modular jack for easy field connection. A small piece of pre-terminated cable is supplied with each standard reader for field wiring. The pre-terminated cable has nonstandard color. Refer to pin number if the pre-terminated cable is not used. Cable with wires of 24AWG or larger are recommended for field wiring.

### 4. Connecting the Keypad:

The MR-20 reader provides a 12-key keypad for PIN entry. The flex tail of the keypad is connected to the electronic board via a ZIF (zero insertion force) connector. The contacts are engaged/disengaged by a moving slide. Care must be exercised when connecting and disconnecting the keypad. When connecting the keypad to the board, open the slide as shown. Insert the electronics into the housing and insert flex tail in the ZIF connector. Then, close the slide to engage the contacts. To disconnect the keypad, follow the previously described steps in reverse.



**CAUTION: DO NOT DISCONNECT KEYPAD WITHOUT DISENGAGING THE CONNECTOR!**

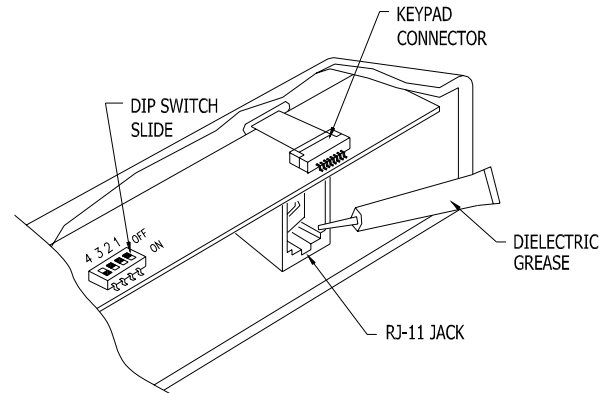
Information subject to change without notice.

**CONFIDENTIAL: For installation and maintenance use only. DO NOT distribute.**



## 5. Weather Proofing the Reader:

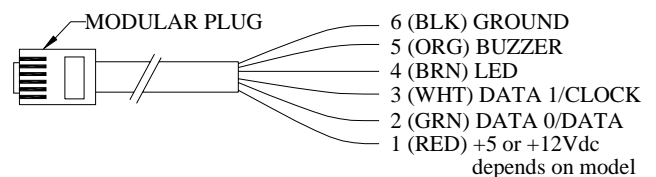
The reader is rated to operate over an extended temperature range. However, if the reader is expected to be exposed to weather, the weatherized option (-OW) must be ordered. The option is implemented in two parts. With the (-OW) option, the electronics is conformal coated against moisture. A tube of dielectric grease is supplied for the installer to coat field connections to complete the procedure. After field connection/configuration is made, the grease is to be applied on the DIP switch slides, keypad connection, and the RJ-11 jack to seal out moisture.



**Do not use sealant to seal reader case to the wall.** Doing so will trap water in the reader and may cause damage to the reader.

## 6. TTL Interface:

The TTL interface has the standard 5-wire interface widely used in the access control application. In addition, an input to control the buzzer is provided. Cable with minimum of 24AWG wires should be used.



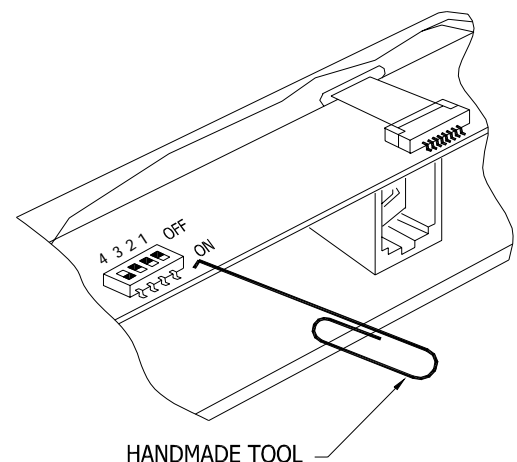
Pin #	Wire	Signal	Description
1	Red	Vin	Power supply input, 5Vdc or 12Vdc, Model dependent
2	Green	/Data (Mag) or /Data 0 (Wieg)	Reader data output
3	White	/Clock (Mag) or /Data 1 (Wieg)	Reader data output
4	Brown	LED	LED input 1-wire control: 0V turns on the green LED 5V turns on the red LED
5	Orange	Buzzer/LED	Buzzer/LED input: 1-wire control: 0V turns on the buzzer 2-wire control: 0V turns on the green LED
6	Black	Signal Ground	Power supply return, DC ground

## 7. Grounding the Reader:

To avoid having ESD (electrostatic discharge) interfering with the operation of the reader, the reader casing shall be grounded. This can be accomplished by tying the mounting bracket to earth ground locally (e.g. grounded conduit).

## 8. DIP switch/Jumper setting:

The DIP switch/jumper on the MR-10/20 readers are used to select a preset format. This preset format determines how the card is interpreted, the functions for the LED and buzzer, and the output signal format, etc. Refer to the format specification for detail. The settings are for STANDARD models ONLY.



FORMAT	SW-4	SW-3	SW-2	SW-1	OUTPUT	LED	BUZZER	TAMPER
0	ON	ON	ON	ON	DATA 1/DATA 0	1-WIRE LED	YES	NO
1	ON	ON	ON	OFF	CLOCK/DATA	1-WIRE LED	YES	NO
2	ON	ON	OFF	ON	CLOCK/DATA	1-WIRE LED	YES	YES
3	ON	ON	OFF	OFF	CLOCK/DATA	1-WIRE LED	YES	NO
4	ON	OFF	ON	ON	DATA 1/DATA 0	1-WIRE LED	YES	NO
5	ON	OFF	ON	OFF	DATA 1/DATA 0	1-WIRE LED	YES	NO
6	ON	OFF	OFF	ON	DATA 1/DATA 0	1-WIRE LED	YES	NO
7	ON	OFF	OFF	OFF	DATA 1/DATA 0	1-WIRE LED	YES	NO
12	OFF	OFF	ON	ON	CLOCK/DATA	2-WIRE LED	NO	NO
13	OFF	OFF	ON	OFF	DATA 1/DATA 0	2-WIRE LED	NO	NO
15	OFF	OFF	OFF	OFF	CLOCK/DATA	1-WIRE LED	YES	YES

## 9. MR-10/20 Standard Format Code Summary:

### The following formats are supported in standard models (300x2-0000/310x2-0000).

Unless otherwise indicated, the LED input line controls both LEDs (low=green, high=red); the BUZZER input controls the buzzer (low = activate); a good read is signaled by a flash of the green LED; a bad read is signaled by a flash of the red LED and a double beep of the buzzer.

- Format 0 - 32-bit Wiegand compatible output from standard Northern Computer mag card. 16-bit facility code and 16-bit user ID. Reverse read and error filter is enabled. No tamper monitor.
- Format 1 - Basic mag-stripe data output: send track 2 data without any verification or formatting using **CLOCK/DATA** signaling. (All reads are "good", card data is sent as is.) Tamper monitor disabled.
- Format 2 - Mag-stripe data output with zero trim using **CLOCK/DATA** signaling. (All reads are "good", trims excess zero bits, otherwise sends data as is.) Tamper monitor enabled.
- Format 3 - Mag-stripe data output with zero trim, reverse read correction, and error filter enabled using **CLOCK/DATA** signaling. Tamper monitor disabled.
- Format 4 - 26-bit Wiegand (8-bit fac. and 16-bit ID) compatible output from cards with 8 or more digits or AMC encoding. See Format 5 for digit usage.
- Format 5 - 34-bit Wiegand (12-bit fac. and 20-bit ID) compatible output from cards with 8 or more digits or AMC encoding.

Digits in mag card	Facility Code			User ID		
	Digits	26-bit Range	34-bit Range	Digits	26-bit Range	34-bit Range
8	1-3	000-255	000-999	4-8	00000-065535	00000-99999
9	1-3	000-255	000-999	4-9	000000-065535	000000-999999
10	1-4	0000-0255	0000-4097	5-10	000000-065535	000000-999999
11 or more	1-5	00000-00255	00000-04097	6-11	000000-065535	000000-999999
AMC card	1-6	000000-000255	000000-004097	7-12	000000-065535	000000-999999

- Format 6 - 26-bit Wiegand compatible output from standard Northern Computer 32-bit mag-stripe card. The lower 8 bits of the 16-bit facility code is used as facility code. The 16-bit user ID is unaltered. Reverse read and error filter is enabled. No tamper monitor.
- Format 7 - Mag-stripe data output with zero trim and reverse read correction using **DATA 1/DATA 0** signaling. The tamper monitor is disabled.
- Format 12 - Mag-stripe data output using **CLOCK/DATA** signaling. 2-wire LED control. No buzzer control. Tamper monitor disabled.
- Format 13 - Mag-stripe data output using **DATA 1/DATA 0** signaling. 2-wire LED control. No buzzer control. Tamper monitor disabled.
- Format 15 - (factory test) mag-stripe data output: verify track 2 data and send track 2 data without formatting using **CLOCK/DATA** signaling. Zero trim, reverse read, bad card filter, and tamper monitor option are enabled.

## 10. Keypad Data and Tamper Monitor Signalling:

Keypad data and tamper monitor status are transmitted on the data lines as 8-bit blocks. They are encoded and sent using the same signaling method as selected for the card data output (clock/data or data 1/data 0). Card data, tamper status data, and keypad data blocks are separated by a minimum of 100 milliseconds. See following for codes:

10110000 - 0 (ASCII '0', odd parity, MSB first)	00110001 - 1 (ASCII '1', ...)
00110010 - 2 (ASCII '2', ...)	10110011 - 3 (ASCII '3', ...)
00110100 - 4 (ASCII '4', ...)	10110101 - 5 (ASCII '5', ...)
10110110 - 6 (ASCII '6', ...)	00110111 - 7 (ASCII '7', ...)
00111000 - 8 (ASCII '8', ...)	10111001 - 9 (ASCII '9', ...)
00101010 - * (ASCII '*', ...)	00100011 - # (ASCII '#', ...)
11010011 - SAFE (ASCII 'S', ...)	01010100 - ALARM (ASCII 'T', ...)

## 11. Reader Verification:

The reader performs a self-test when power is first applied to the unit. If power-on test is successfully completed, The reader will turn on both LEDs for approximately 1 second and sound the buzzer for 1 short beep. Then the reader is ready for normal operation.

If further verification of the reader hardware is needed, the reader may be temporarily set to format T. With this format selected, the reader will read and verify standard ANSI track 2 encoded card. If no read error is detected, the green LED will flash. Otherwise, the red LED will flash and the buzzer will sound two short beeps to indicate an error. The LED input can be used to verify the LED function; and the buzzer input for the buzzer function. For the MR-20, the reader will echo a key press with a brief flash of both LEDs and a short beep of the buzzer. Reset to the required format for normal operation after test.

## 12. Maintenance:

The readers are designed to provide continuous service with minimal routine maintenance. However, contaminants (such as magnetic oxides from badges and dirt) tend to accumulate on the read head. Without regular cleaning, these contaminants will shorten the read head life and increase the probability of card read error. A maintenance schedule should be developed base on the card reader environment (dirty or clean) and the usage frequency (light traffic or heavy traffic). Extreme case may require daily cleaning.

Head cleaning may be done by using a disposable, pre-saturated magnetic head cleaning card. These cards are readily obtainable from a number of sources (e.g. Clean Team Co., [www.cleanteam.com](http://www.cleanteam.com), 800-888-8830; KIC Products, [www.kicproducts.com](http://www.kicproducts.com), 207-514-7030; System ID, [www.systemid.com](http://www.systemid.com) 888-648-4452).

The reader exterior surface is covered with high strength polymer and polyester membrane. It may be cleaned with a soft cloth and mild detergent if required.

## 13. Specification:

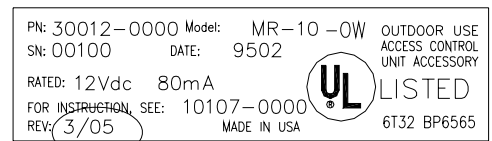
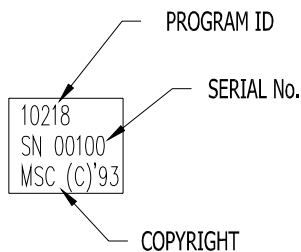
The reader is for use in low voltage, class 2 circuits only.

Power:	Voltage -	5Volt Model: 5.8 Vdc (4.9 to 6.4 Vdc) 12Volt Model: 12 Vdc (10.2 to 13.8 Vdc)
	Current -	50mA (25mA typical.)
Data output:	Data 1/0 pair or clock/data	
	Timing-	clock/data - period 1mS setup/hold time 400uS, clock pulse width 200uS typical
		data 1/0 - period, 1mS for Wiegand data, 1mS for mag stripe data pulse width 50uS typical
LED input:	1-wire mode:	input not driven: LEDs off input > 3.5Vdc: Red LED on

Buzzer/LED:	2-wire mode: input < 0.8Vdc: Green LED on 1-wire mode: input < 0.8Vdc: Red LED on input not driven or > 3.5Vdc: buzzer off input < 0.8Vdc: buzzer on
Mechanical:	2-wire mode: input < 0.8Vdc: Green LED on Dimension - 1.95" (50mm)W x 1.30" (33mm)H x 5.50" (140mm)L Weight - 10 oz. (284 g) nominal Material - Case, Die cast aluminum, gray powder coat standard. Mounting, stainless steel Wall plate, 18 CRS, gray powder coat standard
Card:	75 bpi, ANSI X4.16, Track 2 standard, Speed 3 to 50 ips
Read Head:	1,000,000 passes typical, standard.
Distance:	500' (152m) with 18 AWG wires.
Environmental:	Temperature: -55 to +85 degrees C, storage -40 to +75 degrees C, operating Humidity: 0-95% RHNC, standard 100% (-OW option)

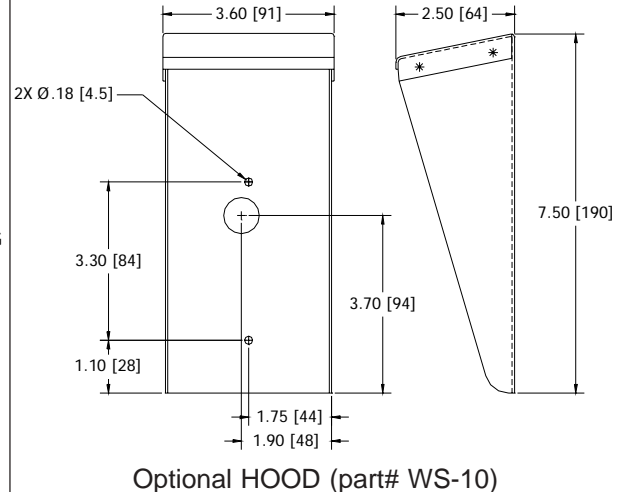
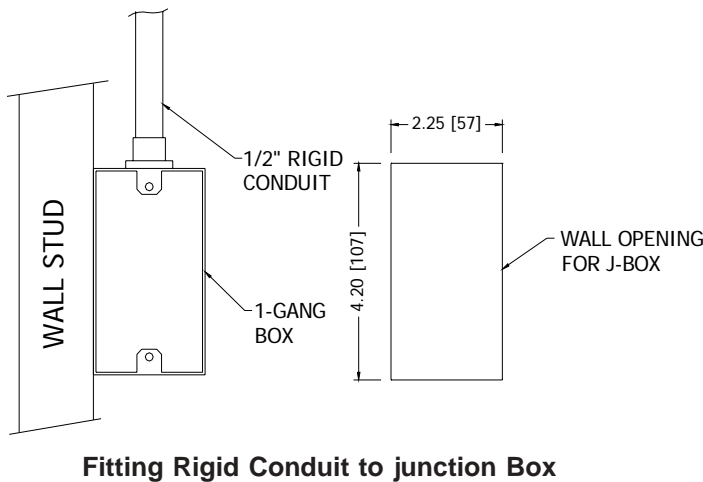
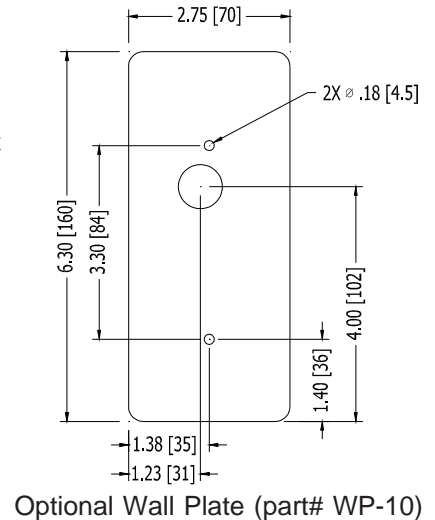
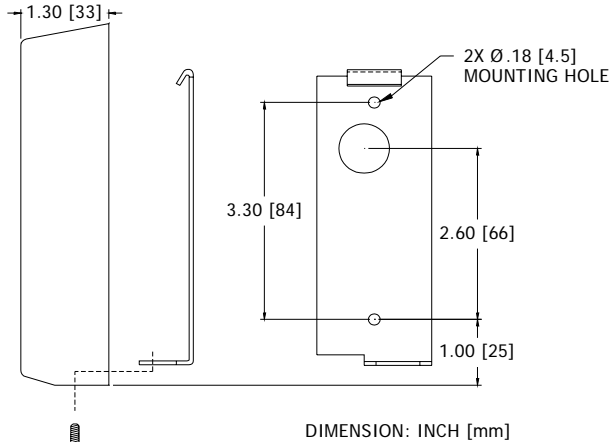
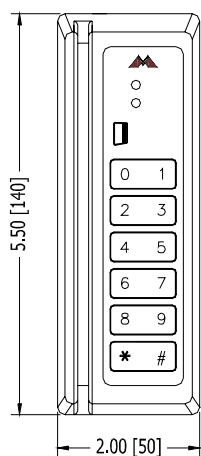
#### 14. Product Identification:

Reader product identification is provided on labels. These labels have information on program ID, revision, product ID, supply voltage, and copyright notice. These labels are located on the circuit board and the back of the reader.



Manual revision, See appropriate manual for FORMAT information

## 15. Reader Mounting Dimensions:



## Warranty

Mercury Security Corporation warrants the product is free from defects in material and workmanship under normal use and service with proper maintenance for two years from the date of factory shipment. Mercury Security Corporation 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 Corporation 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.

Returned units are repaired or replaced from a stock of reconditioned units. Returns must be accompanied by a return authorization number (RMA) obtained from customer service, and prepaid postage and insurance.

## Liability

The card readers 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 Corporation 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 Corporation's liability does not extend beyond the purchase price of the product.

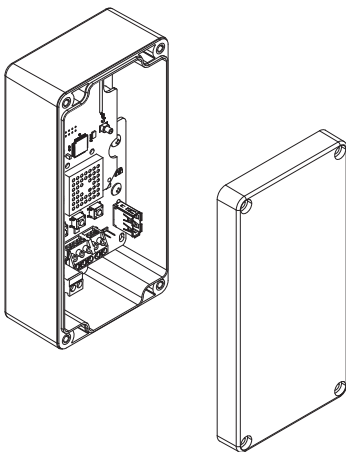


24303034

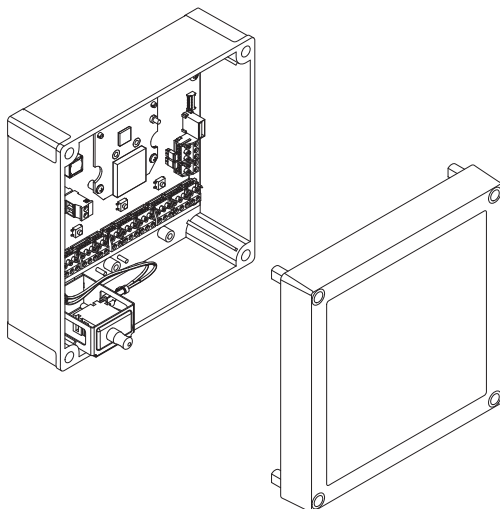


# PIM400-485 USER GUIDE

User guide for the panel interface module PIM400-485



Version 2



Version 1  
(Manufacturing discontinued)

Para el idioma español, navegue hacia [www.allegion.com/us](http://www.allegion.com/us)  
Pour la portion française, veuillez consulter le site [www.allegion.com/us](http://www.allegion.com/us)

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To comply with FCC and Industry Canada RF radiation exposure limits for general population, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

This product is compliant of UL 294 and ULC S319 standard. This product's compliance would be invalidated through the use of any add-on, expansion, memory or other module that has not yet been evaluated for compatibility for use with this UL Listed product, in accordance with the requirements of the Standards UL 294 and ULC S319. This product has been evaluated for ULC-S319 Class I.

## Overview

This manual describes the installation, operation and interaction of all Schlage PIM400-485 models with Access Control Panels (ACPs) and Wireless Access Point Modules (WAPMs). The PIM400-485 is a product in the AD-400 Wireless Panel Interface Module (WPIM) category.

There are two versions of the PIM400-485. Both versions have the same features and connections, and both have interchangeable configurations and settings.

- The PIM400-485 is wired to a UL or cUL Listed compatible Access Control Panel (ACP).
- The PIM400-485 has been evaluated for UL and cUL compliance in indoor applications only, within the protected premises.
- Connect the PIM400-485 to external power using a UL294 Listed power limited power supply for UL installations, and a ULC S318/ULC S319 Listed Power Supply for cUL installations.
- Installation location is determined by the location of the WAPM. The PIM400-485 is ideally installed very close to the ACP.
- The PIM400-485 communicates to the WAPM(s) using Radio Frequency (RF).
- The WAPM is installed at the access point where access will be controlled and/or monitored.
- The PIM400-485 enclosure is NEMA Type 4.

## Getting started

The following is an overview of the steps required to set up the PIM400-485:

1. Install the WAPM (AD-400, WPR400, etc). See the installation guide that came with the WAPM or visit [www.allegion.com/us](http://www.allegion.com/us) (see Support>Schlage Electronics>Electronic Locks Technical Library) for more information.
2. Make sure the PIM400-485 is located to allow for optimum RF signal transmission. See *Determine the location* on page 5 for more information.
3. Before installing the PIM400-485, check for proper communication function and linking with WAPM(s). See *Pre-installation test* on page 6 for more information.
4. Make sure to follow unique installation procedures if installing on an indoor metallic wall. Refer to *Mount the PIM400-485* on page 7 for more information. Consult the Schlage Utility Software User Manual for information about configuring the PIM400-485 and the WAPM.
5. Familiarize yourself with the information contained in this user guide.

**This user guide is for the PIM400-485 only.**

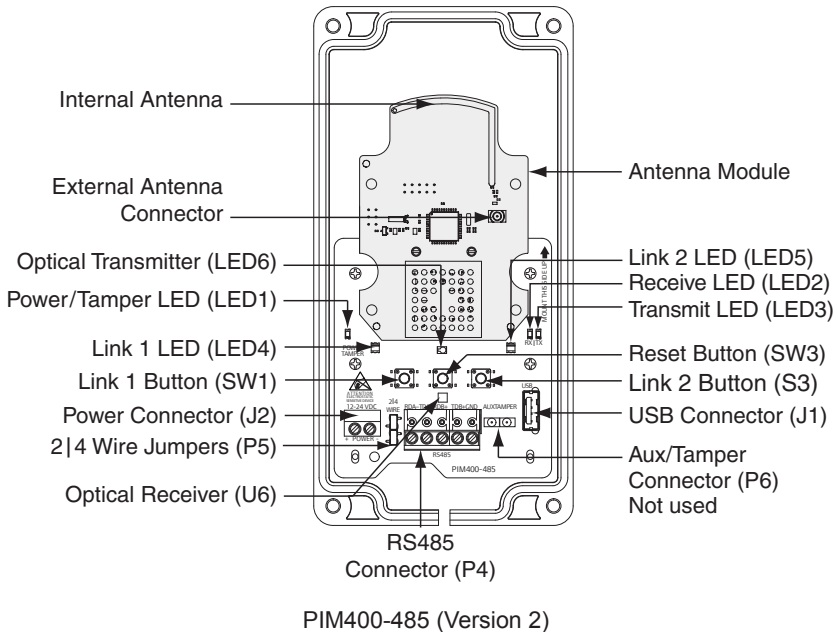
**Save this user guide for future reference.**

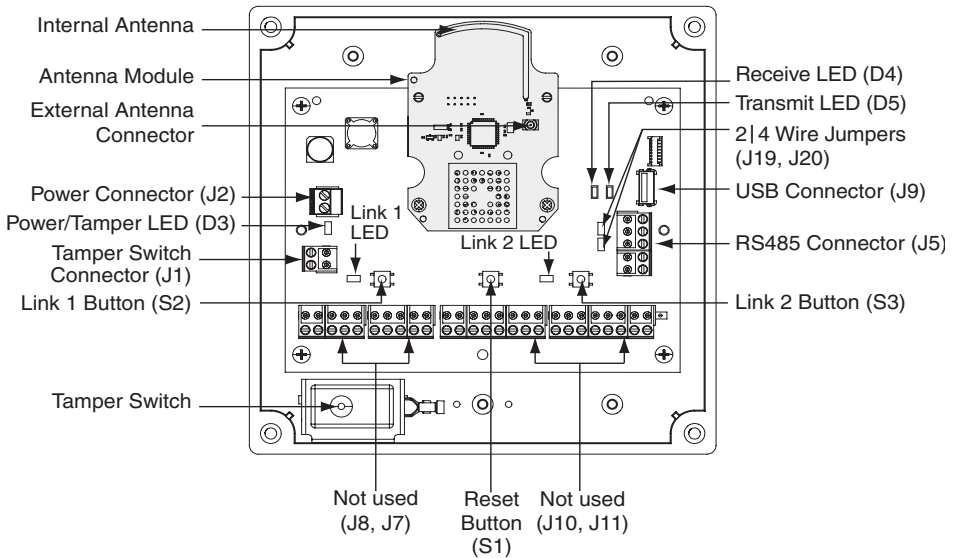


## Features

Feature	Description
Power status	Power status is indicated by the <b>Power/Tamper LED</b> . When the PIM400-485 is powered and tamper is not detected (cover is on), the <b>Power/Tamper LED</b> will illuminate steady green.
ACP communication status	ACP communication status is indicated by the <b>receive (RX) LED</b> and the <b>transmit (TX) LED</b> . When the PIM400-485 communicates with an ACP, the <b>receive (RX) LED</b> and the <b>transmit (TX) LED</b> will continuously flash randomly.
WAPM communication status	WAPM Communication Status is indicated by the <b>link 1 LED</b> and the <b>link 2 LED</b> . When the PIM400-485 communicates with a WAPM, the <b>link 1 LED</b> will blink if the WAPM is assigned an odd number, and the <b>link 2 LED</b> will blink if the WAPM is assigned an even number.
Tamper status	Tamper Status is indicated by the <b>power/tamper LED</b> . When the cover is off, tamper is detected and the <b>power/tamper LED</b> will flash green. When the cover is on, tamper is not detected and the <b>power/tamper LED</b> will illuminate steady green.
Reset	Reset is performed by the <b>reset button</b> . Press the <b>reset button</b> if the PIM400-485 does not seem to work properly.

## Components





PIM400-485 (Version 1)

Component	Description
RS485 connector	The PIM400-485 connects up to 16 WAPMs to an Access Control Panel using the RS485 connection.
Power connector	The PIM400-485 power input is non-polarized. If power is lost or cycled, upon restoring power, the PIM400-485 will continue operation with the same configuration and linking information. <b>There is no need to re-configure or re-link.</b>

## Installation

### Determine the location

The PIM400-485 communicates with WAPMs using radio frequency (RF) signals. RF signals are diminished by walls, distance, metal objects or barriers. Consider the following when placing the PIM400-485:

- Mount the PIM400-485 within 200 horizontal feet (61 meters) of each WAPM with typical building construction. When clear line-of-sight is available, communication may be possible up to 1000 feet (305 meters).
- Do not mount the WAPM(s) and the PIM400-485 on different floors. The signal may be degraded and functionality could be severely limited.
- Do not mount the PIM400-485 on a metal surface. A separation of at least one inch must be maintained in all directions from any metal.
- Signal will not pass through metal walls or metal mesh in the walls (stucco). Use a remote antenna module located outside the room when necessary.
- Moving vehicles will interrupt the signal. Placement distance should be reduced by half when vehicles may temporarily block the signal.
- Mount the PIM400-485 or the remote antenna so that the antenna is vertical for optimal communication.

Locations and wiring methods shall be in accordance with the National Electrical Code, ANSI/NFPA 70 for U.S. and Canadian Electrical Code for Canada.

## Pre-installation test

Once the location for a PIM400-485 is estimated to support the WAPM(s), check performance prior to installation.

If using a remote antenna module, install the antenna as indicated in the ANT400 user guide.

1. As close as possible to its exact mounting location, temporarily mount the WAPM to the access control point (i.e. door, gate, elevator). Do not connect power yet.  
*The WPR400 may be used as a portable range tester to facilitate properly locating the PIM400-485.*
2. Temporarily mount the PIM400-485 in the exact location and orientation it will be mounted.
3. Power the PIM400-485 with a 12 or 24 VDC supply capable of delivering 250 mA.
4. Put the PIM400-485 into link mode. Refer to *Link mode* on page 12.
5. Go to the most distant WAPM being tested and apply power.
6. Put the WAPM into link mode. Refer to the WAPM's User Guide for Link instructions.
7. Verify that linking has occurred, indicated at the WAPM by the green LED flashing and optionally by an internal sounder beeping. The number of green flashes and audible beeps will be the same as the channel number to which the PIM400-485 is set.

If linking occurred successfully on the first WAPM, repeat the pre-installation test on any additional WAPMs. If all linking is successful, follow steps to wire and mount the PIM400-485 and any additional WAPMs (see *Drill holes for wiring* on page 6).

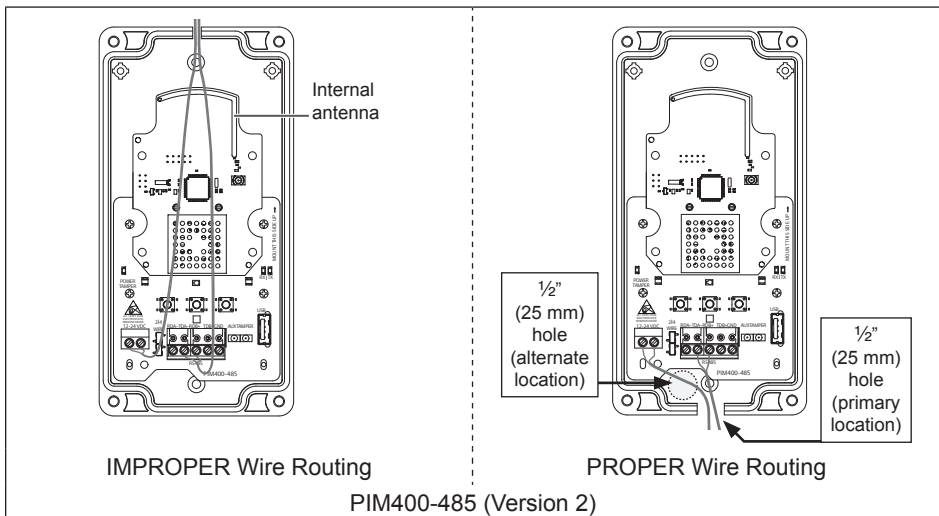
- **If linking is unsuccessful**, move the PIM400-485 six to ten inches (15.2 to 25.4 cm) in any convenient direction until all WAPMs link successfully. If still not successful, move the PIM400-485 closer to the WAPMs and repeat the pre-installation test, or add more PIM400-485s.
- If still not successful, RF interference may be the cause. Refer to the Schlage Utility Software user guide for information on changing the RF channel.

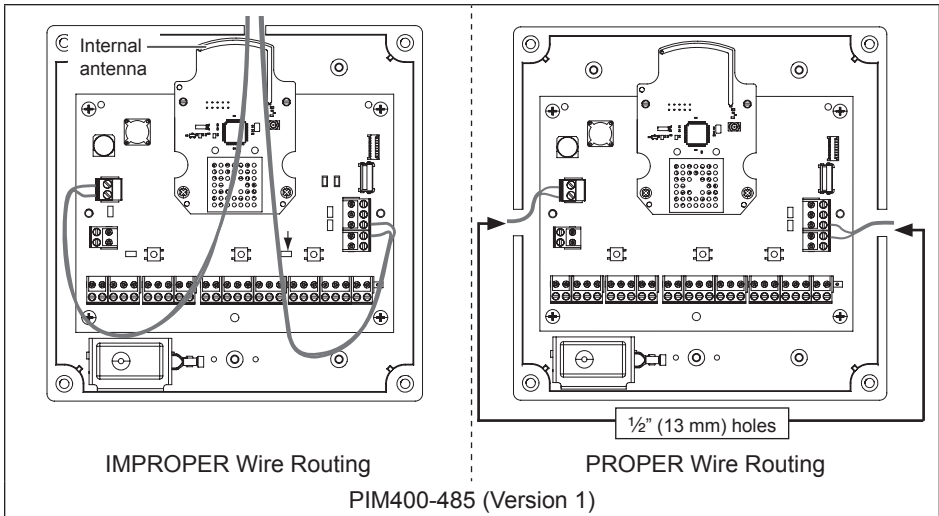
## Drill holes for wiring

Drill hole(s) in the PIM400-485 enclosure to accommodate the size and number of entry/exit connectors to be used.

Drill a hole in the top of the PIM400-485 for remote antenna installation only.

***DO NOT*** run signal or power wiring through the top of the PIM400-485 enclosure.  
*Be sure to follow all local electrical code requirements.*

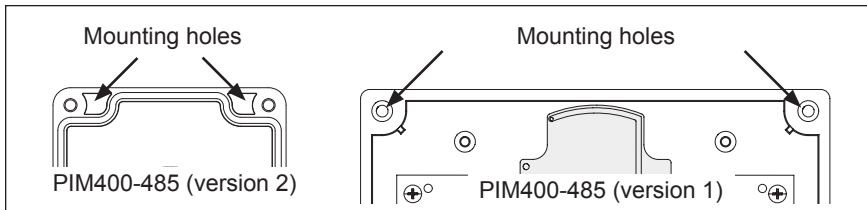




- ① A single drill hole may be used for wire routing, however be sure to avoid routing wires near the internal antenna and the mechanical tamper switch.
- ① If using a remote antenna module, an additional hole is required. Refer to the ANT400 user guide for drilling instructions.

### Mount the PIM400-485

1. Remove the cover and place the PIM400-485 against the wall in the location where it successfully passed the pre-installation test.
  2. Mark the four (4) mounting hole locations on the wall with a pencil using the PIM400-485 enclosure as a template.
- ① Be sure to mount the PIM400-485 vertically (refer to diagrams on page 6).



3. Remove the PIM400-485 from the wall and drill the four holes ( $\frac{1}{16}$ " diameter drill bit recommended).
- ① If the wall does not adequately support the PIM400-485, wall anchors should be used.
4. Place the PIM400-485 against the wall where the four holes are drilled and screw four screws into the mounting holes (#6 screws recommended).
- ① If mounted on a metallic surface or where metal is within 1 inch (25 mm) of the back of the PIM400-485, mount the PIM400-485 at least 1 inch (25 mm) from the wall.
  - ① If a remote antenna is to be used, refer to the ANT400 user guide.

## Wire routing

Avoid routing the wires near the internal antenna and the tamper detection mechanism. Improper wire routing may reduce RF performance and/or prevent tamper detection. Wire routing inside the enclosure should be as short as possible. Do not coil any excess wire inside the enclosure.

Refer to wire routing diagrams on page 6 and page 7.

## Cable/wire specifications

Application	Part number	AWG	Description	Max distance
DC Power Input	Belden 8760 or equivalent	18	2 Conductor	1000 Feet (305 meters)
RS485	Belden 9841 or 9842 or equivalent, or as specified by local electrical codes or the ACP provider	24	2 or 4 Conductor shielded	4000 Feet (1219 meters)

## Retrofit

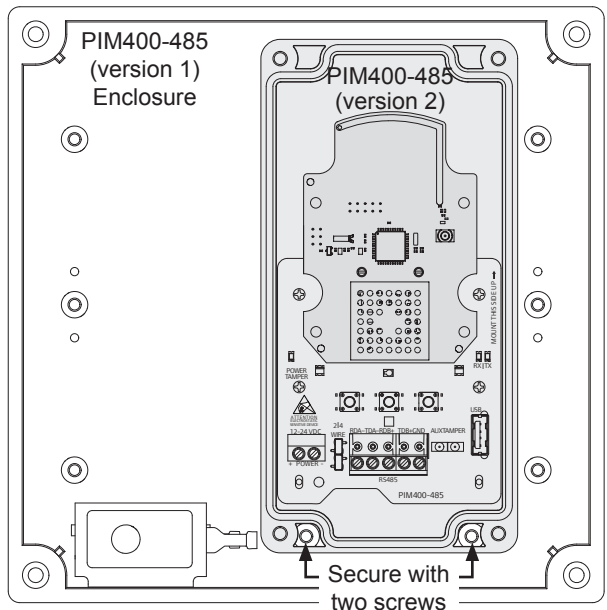
If desired, to retrofit an existing PIM400-485 (version 1) installation with a PIM400-485 (version 2), complete the following steps:

1. Disconnect all electrical connections to the PIM400-485 (version 1) PCBA.
2. Remove the four screws from the PIM400-485 (version 1) PCBA. Set aside two (2) of the screws for later use.
3. Remove the PIM400-485 (version 1) PCBA from the enclosure.
4. Drill a 1/2" (25 mm) wire routing hole in the bottom of the PIM400-485 (version 2) as shown below.
5. Place the PIM400-485 (version 2) into the PIM400-485 (version 1) enclosure as shown below.
6. Secure the PIM400-485 (version 2) enclosure to the PIM400 (version 1) enclosure using the two screws removed at step 2.

Enclosure covers for both the PIM400-485 (version 2) and PIM400-485 (version 1) are used when installing the retrofit configuration.

If a remote antenna is to be used, refer to the ANT400 user guide.

The retrofit installation procedure is not evaluated by UL/cUL.



## PIM400-485 to ACP connection

Review *Components* on page 4 and page 5 before connecting the PIM400-485 to an Access Control Panel.

**CAUTION:** Disconnect the Access Control Panel power and batteries before wiring the PIM400-485 to the panel.

**WARNING:** Because every Access Control Panel is different, always check the panel's instruction manual for appropriate interface wiring.

The EIA RS485 specification labels the data wires as "A" and "B", however, many RS485 products label their wires "+" and "-". Some products associate the "+" signal with "A", some with "B". Reversing polarity will not damage either RS485 device, it will just not communicate; if it does not work, switch the connections.

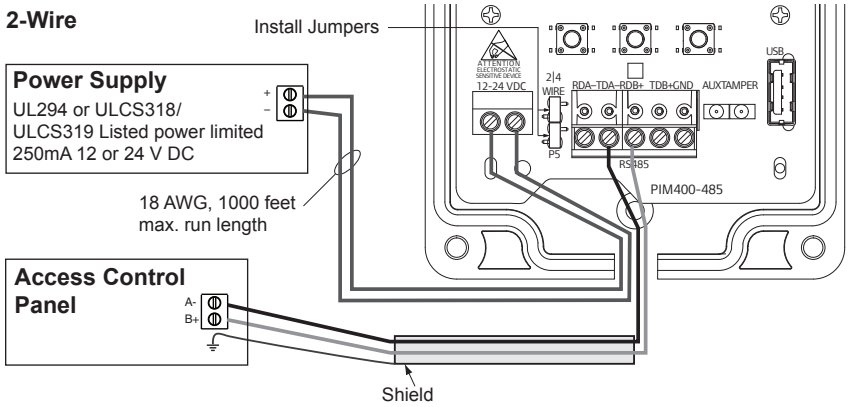
- The wires from the Access Control Panel must be a shielded twisted pair. For maximum wire lengths and cable specifications, refer to *Cable/wire specifications* on page 8.
- For compliance with UL 294 or ULC S319, product must be used with a UL 294 or ULC S319 Listed Access Control Panel or unit, respectively.
- Must be used with a UL 294 or ULC S318/ULC S319 Listed power-limited Power Supply capable of sourcing at least 250mA @ 12 or 24 VDC.

### ACCESS CONTROL PANEL CONNECTIONS

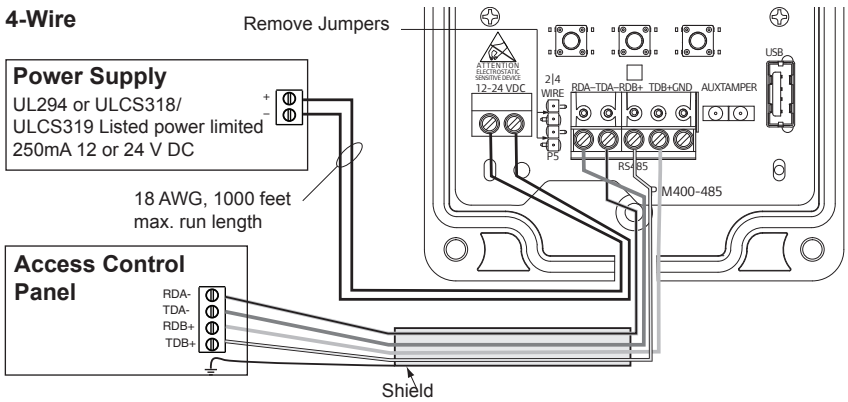
PIM400-485 connector	PIM400-485 signal	Access control panel signal	Description
Power (J2)	+	12 or 24 VDC	PIM400-485 inputs for 12 or 24 VDC power. Draws 250mA max.
	-	DC Ground	If the Access Control Panel (ACP) reader power outputs do not source enough current for the PIM400-485, use the ACP main regulated 12 VDC power supply or a separate UL294 or ULCS318/ULCS319 Listed 12 or 24 VDC power-limited power supply. Power input is non polarized.
RS485 (P5)	RDA -	- Receive Data	4-Wire or 2-Wire bi-directional RS485 communication port for interface to Access Control Panels. 2-Wire installation: Both 2 4 wire jumpers should be added.
	TDA -	- Transmit Data	
	RDB +	+ Receive Data	4 -Wire installation: Both 2 4 wire jumpers should be removed.
	TDB +	+ Transmit Data	
	GND	Signal Ground	Refer to <i>Typical PIM400-485 to ACP wiring diagrams</i> on page 10 and page 11.

# Typical PIM400-485 to ACP wiring diagrams

## 2-Wire

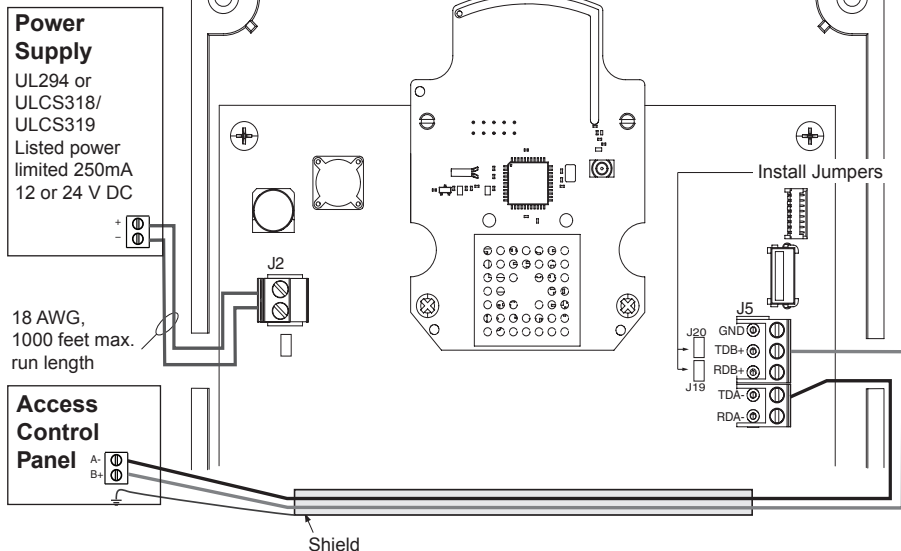


## 4-Wire

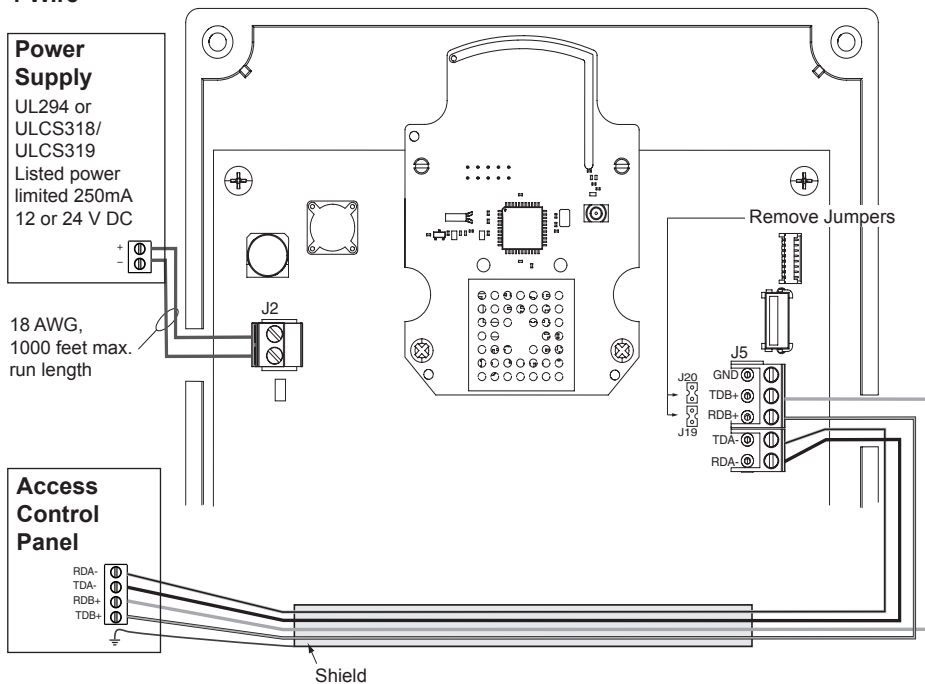


PIM400-485 Version 2

## 2-Wire



## 4-Wire



PIM400-485 Version 1



## Optional remote antenna

The PIM400-485 may be used with a remote antenna when:

- the PIM400-485 needs to be located in a remote, more serviceable or secure area,
- the RF range needs to be increased, or
- the PIM400-485 needs to communicate with a WAPM located outdoors.

① **When the optional remote antenna is used, the PIM400-485 internal antenna will be disabled.**

Optional remote antenna models are shown below. For more information on remote antenna use and installation, refer to the ANT400 optional remote antenna user guide.

The optional remote antenna is not evaluated by UL.

OPTIONAL REMOTE ANTENNA MODELS			
Model	Enclosure	Location	Description
ANT400-REM-CEILING		Indoor	Optional remote omni-directional antenna (0 dB gain)
ANT400-REM-I/O	NEMA 4	Indoor/ Outdoor	Optional remote omni-directional antenna (0 dB gain)
ANT400-REM-HALL		Indoor	Optional remote bi-directional antenna (3.5 dB gain)
ANT400-REM-I/O+6dB	NEMA 4	Indoor/ Outdoor	Optional remote directional antenna (6 dB gain)

## Link mode

The PIM400-485 can be placed into link mode using the Schlage utility software (SUS) on the handheld device (HHD). Refer to the Schlage utility software user guide for information.

The PIM400-485 can also be placed into Link Mode directly through select Access Control Panels.

## Schlage Utility Software (SUS)

**The Schlage utility software is used for programming and setup only.**

The SUS is used to configure this device's links and outputs. For information about the SUS, refer to the Schlage utility software user guide.

## Reset to factory defaults

All configuration information will be deleted and the PIM400-485 will be reset to factory defaults!

1. Remove the PIM400-485 cover.
2. Press and hold the **Link 1 button** and **Link 2 button** for about three (3) seconds. The **Link 1 LED** and the **Link 2 LED** will flash red when factory default reset configuration begins.
3. Release both the **Link 1 button** and **Link 2 button**. The **Link 1 LED** and the **Link 2 LED** will flash green when factory default reset configuration is complete.
4. Replace the PIM400-485 cover.

## DC power

This connection is always required regardless of the system application or configuration. Refer to page 9 for instructions to connect DC power to the PIM400-485.

## Complete the installation

After all required connections have been made, connect the power and Access Control Panel standby batteries (optional) to the panel. Standby batteries are required for ULC-S319 applications for Access Control Panels and must be able to provide 30 minutes of standby for Class I. The system must be tested for operation at least once per year. Refer to Access Control Panel installation instructions for additional details.

## Troubleshooting

Problem	Possible cause	Solution
The PIM400-485 does not communicate with the Access Control Panel.	The RS485 cable between the PIM400-485 and the Access Control Panel may be damaged.	Replace the RS485 cable between the PIM400-485 and the Access Control Panel.
	The RS485 signals between the PIM400-485 and the Access Control Panel may be wired incorrectly.	Refer to <i>PIM400-485 to ACP connection</i> on page 9 or ACP system documentation for proper wiring instructions.
	The RS485 address of the PIM400-485 may not match the RS485 address assigned in the Access Control Panel.	Change the RS485 address of the PIM400-485 to match the RS485 address assigned within the Access Control Panel. Refer to the Schlage utility software guide for more information.
	The 2 4 wire jumpers (P5) may be improperly installed for communication with RS485 4-Wire or improperly removed for communication with RS485 2-Wire.	Install the 2 4 wire jumpers (P5) when communicating with RS485 2-Wire. Remove the 2 4 wire jumpers when communicating with RS485 4-Wire. Refer to <i>Typical PIM400-485 to ACP wiring diagrams</i> on page 10 and page 11.

Problem	Possible cause	Solution
The PIM400-485 reports false tamper detections to the Access Control Panel.	An intense light source may cause interference with the optical receiver (version 2 model only) when the enclosure cover is removed.	Move the PIM400-485 (version 2 model only) away from the intense light source and ensure that the enclosure cover is installed.
	Improper wiring may cause interference with the optical transmitter and optical receiver (version 2 model only).  Improper wiring may cause false tamper detection at the ACP (version 1 model).	Refer to <i>Wire routing</i> on page 8 for proper wire routing instructions.
The PIM400-485 does not communicate with Wireless Access Point Modules (WAPMs)	The Antenna Module may not be properly installed.	Ensure that the Antenna Module is installed and properly seated.
	Wiring may cause interference with the internal antenna on the Antenna Module.	Check to ensure that wiring is properly routed in the PIM400-485 enclosure and the area around the internal antenna is clear of any wire. See <i>Wire routing</i> on page 8 for more information.
	The PIM400-485 may not be linked to the Wireless Access Point Module (WAPM).	Link the PIM400-485 to the Wireless Access Point Module. See <i>Link mode</i> on page 12 for more information. Also refer to the Wireless Access Point Module's User Guide for Link instructions.

## FCC/IC statements

The communication module is a 900 MHz transceiver for electronic locks and non-lock devices. The communication module links the access device to the Access Control Management System, with feedback control to the Access Device via a wireless means. The module contains the embedded firmware implementing the radio physical and data layers. There are 5 antennas approved for use with this module:

### Approved antenna list:

The required antenna impedance is 50 ohms.

1. PCB trace antenna with a 5.7dBi maximum gain
2. p/n: 23520587, dual beam antenna with a 3.5dBi gain (ANT400-REM-HALL)
3. p/n: 23530579, multi band directional panel antenna with 8.5dBi gain (ANT400-REM-I/O+dB)
4. p/n: 23530553, dual band quasi-omni panel antenna with 4.5dBi gain (ANT400-REM-I/O)
5. p/n: 23520561, multi band omni antenna with 2dBi gain (ANT400-REM-CEILING)

Antennas having a gain greater than the antenna type approved in the list are strictly prohibited for use with this device. However, antennas of the same type with a gain equal to or less may be used. Examples of this may include:

- a directional panel antenna with a gain equal to or less than 8.5 dBi may be used with this module
- an omni-directional antenna with a gain equal to or less than 2.0 dBi may be used with this module

### Specifications of the radio module:

Power output: 18.6 dBm

Modulation: BPSK-40

Operating frequency: 906 -924 MHz

**Note:** The intended use of this module is not for the general public. It is generally for industry/commercial use only. This transceiver is to be professionally installed in the end product by Allegion, and not by a third party. The Schlage XPB-COMAD400V2 900 MHz Communication Board Module will not be sold to third parties via retail, general public or mail order. In the case of a repair, the transceiver will be replaced by a professional installer.

### Federal Communication Commission interference statement

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 communication. 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 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.

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.

### FCC/IC caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

To comply with FCC/IC RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

### Industry Canada statements

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This radio transmitter, 8053B-COMAD400V2, has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated.

**Approved antenna list:**

The required antenna impedance is 50 ohms.

1. PCB trace antenna with a 5.7dBi maximum gain
2. p/n: 23520587, Dual Beam Antenna with a 3.5dBi gain (ANT400-REM-HALL)
3. p/n: 23530579, Multi band Directional Panel antenna with 8.5dBi gain (ANT400-REM-I/O+dB)
4. p/n: 23530553, Dual Band Quasi-Omni Panel Antenna with 4.5dBi gain (ANT400-REM-I/O)
5. p/n: 23520561, Multi band Omni Antenna with 2dBi gain (ANT400-REM-CEILING)

Antennas having a gain greater than the antenna type approved in the list are strictly prohibited for use with this device. However, antennas of the same type with a gain equal to or less may be used. Examples of this may include:

- a directional panel antenna with a gain equal to or less than 8.5 dBi may be used with this module
- an omni-directional antenna with a gain equal to or less than 2.0 dBi may be used with this module.

To comply with IC RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

**Customer Service**

1-877-671-7011 [www.allegion.com/us](http://www.allegion.com/us)



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