HID CORPORATION

Installation Manual - 6000-900 Rev F
MultiProx Controller - 6000A

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MultiProx System Overview

The MultiProx system is designed to retrofit existing Schlage/Westinghouse Security Electronics (SE) systems that use 2814/2815 type sensors, 708/808 type Controllers and SE774 Multiple Switch Monitors MSM(s). The MultiProx system reads Schlage/Westinghouse (SE) Command Keys (1030, 1040, or 1050) along with HID ProxCard II Cards. It interfaces to all host systems that have standard Wiegand electrical interfaces. The MultiProx system uses the existing coax cable and provides monitoring input points and associated outputs that are the functional equivalent of the SE MSM (Multiple Switch Monitor) module. The MultiProx system directly replaces the existing SE components without major modifications to the existing mounting hardware. This includes the mounting holes and cable locations. The MultiProx Controller replaces the SE 708(S) or 808(S), the MultiProx Reader replaces the SE Sensors, and the MultiProx HSM (HID Switch Monitor) replaces the SE MSM.

MultiProx System Layout Diagram - Figure 1

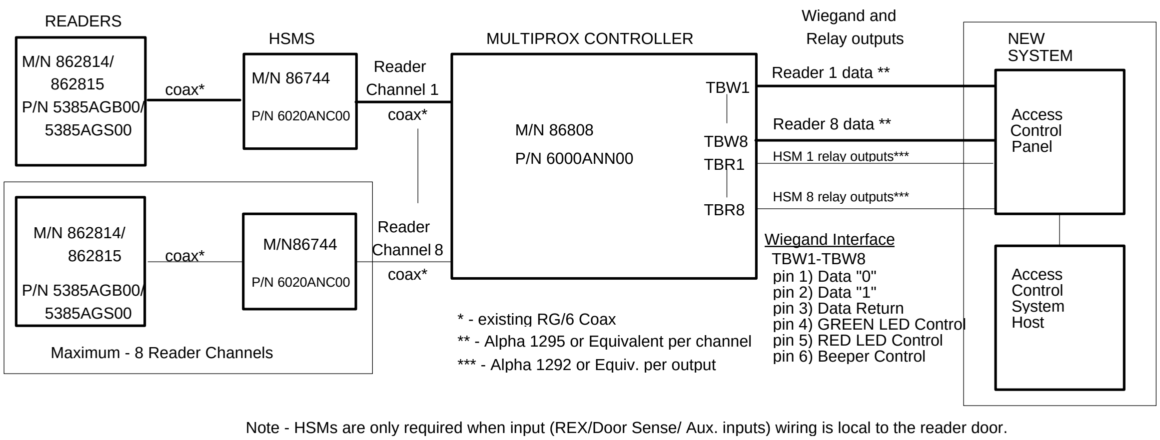


Figure 1

Description/Operation

The **MultiProx Controller** is the center of the MultiProx system. The Controller scans the Readers for HID or Schlage/Westinghouse (SE) access control cards, communicates with the HSMs for switch status changes and communicates with the Reader for LED and Beeper control. When a card is read, the Controller outputs the card data over the Wiegand interface. When a monitored contact has a status change, the Controller switches the relay output that provides status of the HSM monitored switch that changed. See Figure 1. The Controller has a default mode for controlling the Reader beeper and LEDs, as well as an external (Host) controlled beeper and LED option.

Parts List

1) MultiProx Controller	p/n 6000ANN00 qty 1 (included)
2) This Installation Sheet	p/n 6000-900 qty 1 (included)
3) RS3222 Screwdriver	p/n 68-0002-01 qty 1 (included)
3) Cable, coax - RG/6 or SE 9284	As required/installed (1000 feet maximum per Reader channel) 65% shield, copper center, 18AWG
4) Cable, multi-conductor Wiegand	As required (500 ft maximum per Reader channel)
5) Power Supply Requirements	Linear type recommended, 20.0 - 28.5 VDC @ 2.0 Amps

Installation Procedure For Retrofitting an existing 708 or 808 Controller

1.Replace old 708/808 with new MultiProx Controller

1a. Locate the existing Schlage/Westinghouse (SE) Controller.
1b. Remove coax cables from Sensors, cables from door lock outputs, power supply and terminal connections. Mark coax cables with Reader channel locations, and all other wires with their functions for future reference.
1c. Remove SE components and put aside. Replace the 708/808 Controller with the **MultiProx Controller.** The mounting holes are located in the same positions as the SE Controller.

2. Install MultiProx Readers

2a. Locate existing Schlage/Westinghouse Sensor(s). Determine their type (back or side mounted). Verify that the existing location is suitable for the MultiProx Reader. See Installation notes for mounting Readers and MultiProx Reader dimensions - Figure 6.
2b. the coax cable from the SE Sensor. Remove the SE Sensors.
2c. Connect the MultiProx Reader to the coax cable (hand tight) and insulate the connector using electrical tape or shrink tubing. Do not use wrenches or pliers to tighten the coax connectors.
2d. Mount the MultiProx Reader. Use the hardware that comes with the MultiProx Reader or use existing SE hardware. For more information see the MultiProx Reader installation guide (5385-900).

3. MultiProx Reader and Wiegand connections - at the Controller

3a. Connect the coax cables to the **MultiProx Controller**. Note which channels are connected to each Reader location. The Reader coax channel numbers are labeled on the top cover of the Controller. The Coax connectors are the same type as a typical TV or cable TV connection that uses 75 ohm RG/6 coax cable. The cable connectors are called “F” type and are commonly available in electrical supply stores as “F-56 crimp-on connectors for RG/6 cable”. A crimping tool is required. Follow the directions that come with the connectors and crimp tools. Twist-on types are also available, but are less reliable.
3b. Connect the **Wiegand interface** cables using the supplied removable 6 pin terminal strips. Connect the Wiegand interface cables to the Access Control Panel. The terminal strips are labeled **TBW1 to TBW8**. Reader channel one corresponds to TBW1, Reader channel two corresponds to TBW2, and so on.
3d. Wiegand terminal strips accept up to 18AWG wire. Use the small screwdriver provided to secure each wire into its terminal strip location. The terminal strips are removable to facilitate attaching the signal wires. Their signal names are marked on the Controller board, near each connector. See **MultiProx Controller - Connectors, Relay and Jumper Positions** Figure 4. The terminal strip connections are also shown in the following table:

TBW(1-8) PIN NUMBER	SIGNAL	TYPICAL WIRE COLOR
1	DATA “0”	GREEN
2	DATA “1”	WHITE
3	DATA RETURN	DRAIN WIRE
4	GREEN LED	ORANGE
5	RED LED	BROWN
6	BEEPER	YELLOW

4. Configure the DIP switches SW1 SW2, SW3 and SW4

Note: Following each change of dip switch settings for SW1, SW2, SW3 or SW4, the unit must be reset by powering down then up again before the new switch setting will take affect.

4a. See the **Schlage/Westinghouse Card description diagram** - Figure 2. To identify the card type, count the number of digits printed on the SE card. 5 digit card numbers are 1030’s, 6 digit cards are 1040’s, and 8 digit are 1050’s. Select **Card Type** on SW4, switch 6 and 7 for either 1030, 1040 or 1050. 1050 is the default setting. See the **MultiProx Switch settings** - Figure 3.
4b. If the card type is 1050, ignore the Main facility, Alternate facility and Card letter switch settings and go to paragraph (4d). If the type of card is a 1030 or 1040, set the **Main Facility Code Letter** on SW4 switch 2 and 3 and **Main Facility Code Number** on SW4 switch 1 and SW3 switch 1-8. The switches are to be set for the binary representation of the facility code number printed on the cards. See the **MultiProx Switch settings** Figure 3 and the **Decimal to Binary Conversion Chart** - Figure 9.

4c. If two facility codes are used, set the **Alternate Facility Code Letter** on SW2 switches 2 and 3. Also set the **Alternate Facility Code Number** on SW2 switch 1 and SW1, switch 1-8. The switches are to be set for the binary representation of the Facility Code Number printed on the cards. See the **MultiProx Switch settings** Figure 3 and the **Decimal to Binary Conversion Chart** - Figure 9.

4d. Select the **Number of Reader Channels** used on SW2 switch 6 and 7. The options are 1, 2, 4 or 8, meaning, Channel 1 active, Channels 1 and 2 active, Channels 1 through 4 active or Channels 1 through 8 active. The default is channels 1 through 8 active, with switch 6 and 7 are in the "on" position. See the **MultiProx Switch settings** - Figure 3.

5. Install MultiProx HSM(s) if required.

5a. The SE **MSMs (Multiple Switch Monitor)** can be located anywhere between the Controller and the Reader. Locate each SE MSM. Remove the Coax cable and dismount the unit. Remove the screws that secure the back plate.

5b. Remove the MSM printed circuit board by loosening the nuts on the coax connectors, end screws on the terminal block and mounting screws internal to the MSM housing.

5c. Pull the MSM printed circuit board from the housing. Pigtails on the terminal block are inserted into sockets on the printed circuit card. Use caution not to break the pigtails on the terminal block.

5d. Set the jumper at J1 to **NRD** (pins 1 and 2) when the **HSM** is not connected to a Reader or **RD** (pins 2 and 3) when connected to a Reader.

5e. Place the HSM into the housing by fitting the pigtails of the terminal block into the respective socket of the HSM printed circuit board. The coax connectors will fit directly into the existing holes.

5f. Replace the internal mounting screws, the end screws on the terminal block and the coax connector nuts.

5g. Attach the coax cables (hand tight) to both connectors. It does not matter which connector is used to connect the Reader and Controller.

5h. Each monitored contact requires a **36K ohm resistor** across the HSM input. The SE MSM requires the same termination resistance. The connections to the monitored switches and their termination resistors are not affected and do not require rewiring or reconfiguration. See the **HSM Wiring Description** - Figure 8.

6. HSM configuration - at the Controller

6a. If there are no HSM's in the system, be sure the **HSM** switch (SW2 switch 8) is off. If there are HSM's, Be sure **HSM** SW2 switch 8 is on. Determine which channel the Reader and the HSM are to be connected. Four relays will be packaged with each HSM's accessory kit. Install the relays on the Controller in the associated sockets for the channel. The 6 pin relay sockets and 8 pin terminal connections are marked for the respective channel. For example, the channel 1 relays are marked **RLY1A, RLY1B, RLY1C and RLY1D** and the terminal is marked **TBR1**. For channel 2 the relays are marked RLY2A, RLY2B, RLY2C and RLY2D and the terminal is marked TBR2. A maximum of 32 relays (4 for each channel) can be installed. See **the MultiProx Controller - Connectors, Relays and Jumper Positions** - Figure 4.

6b. To connect the inputs of the Access Control Panel to the terminal connector for the relay outputs, each relay will require 2 wires. For example, if channel 1, relay "A" is used, connect one wire to the **TBR1-RLYA** pin and connect one to the **TBR1-COM-A** pin. The COM-A pin is the common contact of the relay. **Relays A, B, C and D** correspond to **MSM inputs 4, 3, 2 and 1** respectively. See the **HSM Wiring Description** - Figure 8. Consult the Access Control Panel installation guidelines for the correct contact configuration alarm state - normally open or normally closed.

6c. Set the relay contact configuration for either normally open or normally closed contacts using the shunt/jumper provided in the HSM accessory kit. The jumper positions are marked **J1A through J8D** on the Controller for the respective channel and relay. **Note: The relay contact configuration refers to the "alarm" state of the monitored switch**. Place the shunts/jumpers across the jumper pins **"NC"** for contacts that are normally closed in the alarm condition and place the jumpers across the **"NO"** for contacts that are normally open in the alarm condition. The jumper setting will then be set so the relay contacts follow the switch contacts. When power is on, the relays on the Controller are energized in the normal/non alarm state, so a power shutdown causes them to go to the alarm state.

6d. On the Controller, place the **HSM** switch 8 of SW2 to the "on" position. Also see **MultiProx HSM Installation Guide (6020-900)**

7. Connect power, test system

7a. Connect the **24VDC** power cables to **TB1**. See **Controller - Connectors, Relays and Jumper Positions** - Figure 4. Pin 1 is the **Ground** terminal (-) and Pin 2 is the **+24 VDC** terminal (+). See cautions:
Cautions: Never connect the wires while the power is on. The +24VDC terminal is very close to the Controllers' metal housing, making it very easy to short out the power supply with an non-insulated screwdriver. Care should be taken not to reverse the polarity on the power supply to the Controller as damage can occur. Also, always connect all system grounds together at one point - preferably at the power supply. Make sure all system components are grounded properly before applying power to any of them. This applies to the MultiProx Controller, Host panel, Wiegand interface modules or converters (if any), and any other peripheral components.

7b. Once the MultiProx Reader(s), HSM(s) and Controller are wired together, configured and powered, the system can be tested. If the LED and beeper switch settings are still in the default positions, the LED on each Reader will be red and the LED should flash and the beeper should beep when you present a card.

7c. Test the HSMs by opening (if normally closed), or shorting (if normally open) the input contacts and verifying the respective output is activated.

Troubleshooting Guide

1. Slow read speed

1a. The system will always read/report a card read within 2 seconds, even under the worst case condition. The response time may depend on how the LEDs and Beeper are configured. If they are controlled by the host, the response time is the reading/reporting time plus the host system response time.

1b. Make sure the **HSM** switch is off (SW2, position 8). This will speed up the system by 1/3.

1c. The MultiProx system must share the time between reading Schlage cards and reading HID cards. If you are accustomed to the Schlage system and are now using the MultiProx system, the response may be slower especially if the Schlage system was using 4 channel Controllers.

1d. The method of presenting the card is very important. Present the Schlage card in the center of the Reader and hold it there momentarily while the reading is taking place. **Swiping the card across the face of the Reader is not recommended.**

1e. The Schlage card will read up to 3 inches. See the **Optimized performance for Schlage card reads** - below. For quick and accurate reads, it is best to hold the card away from the face of the Reader about ½ inch for the best performance. If you press the card directly onto the face of the Reader, the tuned circuits can get de-tuned, distorting the hit information transmitted by the card. Also, any of the situations listed in the next section, **Low read range**, can cause the read speed to appear slow.

2. Low read range

2a. Mounting the Reader on or near any metal objects will result in a reduction of read range. If metal is unavoidable, then a minimum of two inch spacing should be maintained between the Reader and the metal surface. Contact HID customer service to inquire about the availability of 2 inch spacers that fit the MultiProx Reader.

2b. Placing the reader in a noisy RF environment will also result in a reduced read range. Sources of this noise include, but are not limited to, computer monitors, AC wiring, radios, televisions, cellular phones, printers, fax machines, motors and generators.

2c. A switching power supply can create noise affecting both the Readers ability to read cards and its read range. Linear supplies are recommended because they filter RF noise out of the 24 VDC connection.

2d. A power supply that is less than the recommended 24 volt, 2 Amp capacity, may not be able to drive enough current. This can result in a reduced read range.

2e. Care should be taken to only hand tighten coax connections. The Reader antenna wires can become twisted or broken if too much torque is applied to the coax connector. See **Troubleshooting Guide - optimized performance for Schlage card reads** below.

2f. Mounting readers to tinted glass may result in reduced read range for Schlage cards.

2g. Readers mounted behind non-metallic surfaces such as a wall may have low read range. In extreme cases contact technical support for the possibility of acquiring a customized reader.

3. No Card Read

If there is a constant amber LED:

3a. Check that the coax connectors on the Controller, Reader and HSM connections are properly and tightly secured thus making good electrical contact.

3b. Check the integrity of the coax cable. Check for continuity or broken center leads.

3c. Check that the appropriate channels are enabled on the Controller. This is done through dip switch SW2 switches 6 and 7. See **MultiProx Switch Settings** - Figure 3.

If there is a constant red LED no beep or green LED flash:

3d. Make sure Controller is properly configured for the particular **Card Type** is set correctly to match the type of SE card that is being presented to the Reader - 1030, 1040 or 1050. This is done through the DIP switch settings **SW4** switches 6 and 7. See **MultiProx Switch Settings** - Figure 3.

3e. Check that the Controller is configured for the correct **Card Letter and Facility Code(s).** This is controlled through the DIP switches **SW4** switches 1 through 3 and **SW3** switches 1 through 8.

3f. Check DIP switches **SWB, SWG and SWR** to ensure that the beeper and LED are properly enabled or disabled on each channel for the particular application.

3g. Make sure that when the card is presented to the Reader the front of the card is parallel to the Reader face. Care should be taken not to move the card into or out of the field too quickly. SE cards tend to read well in one spot on the Reader; if one spot will not read, try another.

4. Improper HSM response

4a. Check to see if the **HSM** is properly connected and making good electrical contact.

4b. Check that the HSM enable switch - **SW2** switch 1 is on.

4c. If the Controller relays begin cycling on and off, check that the shunt jumper on the HSM is in the proper place - **"NRD"** when no Reader is attached to the HSM or **"RD"** when a Reader is attached to the HSM.

Note: Following each change of dip switch settings for **SW1, SW2, SW3 or SW4**, the unit must be reset by re-powering it before the new switch setting will take affect.

5. Optimize performance for Schlage card reads

5a. If you have a terminal with a serial port, the read performance can be monitored and adjusted for optimal performance. You will need:

- A terminal (Dumb terminal, PC, laptop, etc.)
- A communications program for RS232 serial port applications
- A 9 pin male to 9 or 25 pin female cable (depending on your terminal)
- An extension coax cable with "F-type barrel connector (optional)
- The small insulated screwdriver (provided with the Controller)
- A small Philips head screwdriver
- A DC Voltmeter

Connect the 9 pin serial cable (male end) to the MultiProx Controller serial port and the other (female) end to the terminals' Com1 or Com2 port. Set the terminal programs' serial Communication mode settings to Com1 or Com2, 9600, N, 8, 2. To test the connection, the MultiProx Controller will transmit a message when power is applied. The message will appear as follows:

```
MultiProx 501-05 Copyright (c) 1994-1996 HID Corporation
```

5b. Once this message is observed, the terminal and terminal program you are using is set-up correctly. To start the Controller messages, press "1" on the terminal key board, and card numbers will be displayed each time a card is read. The format is **"Card type, Channel #, Card #".** HID Prox and Schlage cards will appear as follows:

```
PROX CH 1 20 4CA064F
1050 CH 1 15712643
```

5c. Pressing **"2"** will output card numbers along with additional information for SE cards. The data will represent the data for the 4 or 5 tuned circuit responses (hits) referred to in **Theory of Operation**. A typical output will look as follows:

```
1050 CH 1 15712643 10 5 1 1638 20 953 28 760 31 694 48 429
```

```
PROX CH 1 20 4CA064F
```

5d. Pressing **"3"** will output all data, whether or not there is a card present. This mode can be used to monitor electrical noise in the environment. To optimize the read performance, this output should show no data when no cards are present (all zero's). The output for a system configured with 8 channels will look as follows:

```
CH 1          0 0
CH 2          0 0
CH 3          0 0
CH 4          0 0
CH 5          0 0
CH 6          0 0
CH 7          0 0
CH 8          0 0
CH 1          0 0
CH 2          0 0
CH 3          0 0
```

5e. **If any other hit information is being displayed (numbers above 0), the system is detecting noise** that will interfere with the card read performance. If there is additional data being displayed, press **"0"** to stop the serial output. If the output looks just as the sample output above, skip down to 12h below. If there is noise reported on **all channels**, the power supply and associated system cables may be generating noise. Disconnect the Power supply and run the system on a battery if possible, to determine if the supply is the problem. If there is still noise on all channels, the noise may be injected by other cables or wiring in the vicinity. Try to separate other cables and/or power down non-associated equipment to find the cause by a process of elimination.

5f. If the noise is reported on **specific channel(s**), observe which channel is being effected, and check to make sure all coax connections are tight for that channel. Check for any "electrical noise generators" in the vicinity of the Reader as described in the **Troubleshooting Guide - low read range**. If there are no noise generators in the vicinity, dismount the Reader and move it away from the wall with an extension cable. Rotate the Reader slowly as if it was a radar antenna, and monitor the hit information on the terminal to see if it disappears when the Reader is rotated. This checks for radiated noise in the vicinity. If there is noise in all positions, the noise is conducted into the controller somewhere along the cables of the system. Try to separate other cables and/or power down non-associated equipment to find the cause by a process of elimination.

5g. If the noise is consistent and cannot be avoided after carrying out the steps above, an adjustment is provided on the Controller board, under the large cover panel. Remove the large cover panel, press **"3"** on the terminal, and observe the noise as it scrolls on the screen. Monitor the DC voltage on the test point labeled **TP2**. Connect the ground of the meter to the test point labeled **A.GND**. TP2 is set for 7.0 volts at the factory. Adjust **R1746** (located directly below the A.GND test point) slowly counter clock-wise (CCW) until the noise has stopped showing up on the terminal display. Do not turn above 8.5 volts. The higher voltage will result in a slightly lower read range for Schlage cards, but it will eliminate the effects of electrical noise on read performance.

5h. If the output appears as in 12d above, some read range improvement may be possible; the following adjustment will optimize the read range for Schlage cards. Remove the large cover panel, press **"3"** on the terminal, and observe the scrolling data. Monitor the DC voltage on the test point labeled **TP2**. Connect the ground of the meter to the test point labeled **A.GND**. TP2 is set for 7.0 volts at the factory. Adjust **R1746** (located directly below the A.GND test point) clock-wise (CW) until noise begins to add hit information to the scrolling data. Back-off about .2 volts to leave room for error. It can be adjusted below 7.0 volts as long as there is no extra noise observed on the terminal screen. This adjustment can be as low as 6.5 volts. The lower it can be adjusted without introducing extra hit information, the longer the Schlage card read range will be.

6. Optional Led and Beeper configurations

6a. Configure the DIP Switches **SWB, SWG and SWR**. These switch blocks have numbers on each position (1 through 8), that refer to the Reader channel number. The **SWB** DIP switch controls the function of the **Beeper** when a card is read. "On" indicates the beeper will beep when any card is read. The beeper is Disabled in the "Off" position. The **SWG** DIP switch controls the function of the **Green LED** when a card is read. **"On"** indicates the LED on the Reader will **flash green** when any card is read. The Green LED is disabled in the "off" position. The **SWR** DIP switch controls the function of the **Red LED**. **"On"** indicates that the **Red LED** will be **normally on** and will toggle off momentarily when ever the Green LED is turned on.

6b. The **LED's and Beeper** of each Reader have eight different modes of operation. The LEDs and beeper of each Reader can be controlled using control commands issued by the Controller, or by external control via the Wiegand interface. The various combinations possible are as follows:

Number	SWB(1-8)	SWG(1-8)	SWR(1-8)
1.	**On**	**On**	**On**
2.	**Off**	**On**	**On**
3.	**On**	**Off**	**On**
4.	**Off**	**Off**	**On**
5.	**On**	**On**	**Off**
6.	**Off**	**On**	**Off**
7.	**On**	**Off**	**Off**
8.	**Off**	**Off**	**Off**

1. **The standard (default) mode** - The **LED is normally red** and **flashes green and beeps when a card is read**. The green LED and beeper may be controlled through the control inputs on the respective channel connector, TBW1 to TBW8. When the green LED control line is activated, the LED changes from red to green as long as the line is asserted. The beeper sounds when the beeper control line is activated. The LED and beeper may be controlled independent of each other.
2. The **LED is normally red** and only the **green LED is flashed** when a card is read. The **beeper does not sound** unless Controller by the external control line. The green LED and beeper may be controlled through the control inputs on TBW1 to TBW8.
3. The **LED is normally red and only the beeper beeps** when a card is read. The green Led and beeper may be controlled through the control inputs on TBW1 to TBW8.
4. The **LED is normally red** and when a card is read the **LED and beeper do not flash or beep**. The green Led and beeper may be controlled through the control inputs on TBW1 to TBW8.
5. The **LED is off** and **flashes green and the beeper sounds** when a card is read. The red LED, Green LED and beeper may be controlled through TBW1 to TBW8.
6. The **LED is off** and **flashes green** when card is read. The red LED, Green LED and beeper may be controlled through TBW1 to TBW8.
7. The **LED is off** and the **beeper sounds** when a card is read. The red LED, Green LED and beeper may be controlled through TBW1 to TBW8.
8. The **LED is off** and when a card is read the **LED and beeper do not flash or beep**. The red LED, Green LED and beeper may be controlled through TBW1 to TBW8.

Theory of Operation

MultiProx Controller Operation

The MultiProx Controller is the main processing unit of the MultiProx system. The Controller consists of a microprocessor, RF filters, and communications and interface electronics . It is the task master that schedules the reading of HID proximity card, SE command cards, communications for control of the LEDs and Beeper on the Reader, communication with the HSMs, converting/calculating card numbers and facility code, Wiegand message building and Wiegand message output. The Controller uses a polling scheme to divide its time between each of the eight Reader channels. At each channel, the Controller will enable the HID read sequence, the SE sequence and communicate with the HSMs. The Controller polls channel one through eight until a card or HSM status change occurs.

The MultiProx Controller reads HID proximity cards and SE command keys by sending commands that tell the Reader to alternate between the two reading modes. Once the HID proximity cards or Schlage cards are energized, a signal that corresponds to the encoding of the card is sent to the Controller. The Controller interprets the signal and outputs the data over the Wiegand interface to an access control panel. The HID proximity card data is sent in the exact format that was programmed on the card. For example, a card encoded with the standard 26 bit format will be read and outputs as the standard 26 bit format. This would be the same for another ProxCard II programmed card, no matter what the format type is or number of bits 32, 34, 27, etc. The SE command key data is decoded, converted to the card number that is printed on the card and output to the access control panel as Wiegand data.

The Wiegand output format chosen to represent the SE 1030, 1040 and 1050 card numbers is a 32 bit format. The 32 bits allows for parity, fields for facility code, card number and a card type identifier. The 1030 cards have an 11 bit facility code, 0-2047, and 15 bit card number, 0-32767. The 1040 cards have an 11 bit facility code and 18 bit card number, 0-262143. The 1050 cards have a 25 bit card number, 0-33554431. For access control systems that only accommodate one type of Wiegand bit format, an identical format may be programmed into ProxCard II cards. The card type identifier is used to distinguish the difference between HID 32 bit programmed cards and the SE cards. The card type identifier maybe used as another bit in the card field, adding a card number differentiation between the HID cards and SE command keys.

MultiProx Reader Operation

The MultiProx Reader accepts commands from the controller to change the read mode and to signal changes to the LED and beeper. While in the HID “Prox mode”, the reader detects HID proximity cards by generating a 125kHz low power field that energizes the card and allows it to transmit its manchester-encoded data. While in the “sweep mode”, the Reader detects Schlage/Westinghouse (SE) command keys by outputting an RF field in the frequency range of 2 to 27 megahertz. This signal is swept from high to low frequencies. The SE command keys are a set of tuned L/C (tank) circuits that resonate at their tuned frequency. As the L/C circuits resonate, they generate an interference in the swept frequency range. This interference pulse is detected by the reader and transmitted to the Controller via the coax cable. The Controller determines the frequencies of a command key and matches the set of frequencies to a card number.

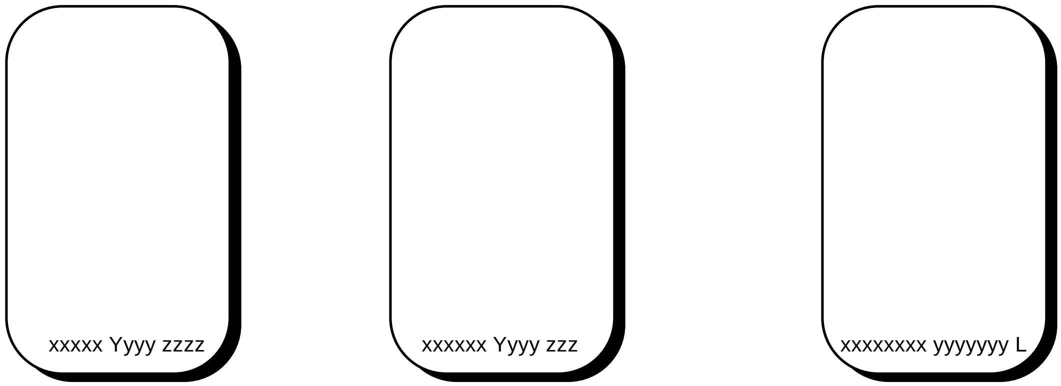
Schlage/Westinghouse (SE) “Command key” Operation

The 1050 cards are a series of five L/C circuits. Each set of circuits (frequencies) in the card represent a card number. Facility codes are not used with the 1050 cards. The range of card numbers is 1 to 24040016. The 1030 and 1040 command keys are a set of four L/C circuits. The set of frequencies are matched to a card number, which is dependent on the facility code. Each facility code for the 1030 or 1040 select the specific frequencies that match a certain card number. So, the facility code must be set up on the Controller to determine which frequencies are valid and how to interpret the set of frequencies detected from a key . If a 1030 or 1040 command card is presented to a Reader that is not in the facility code set up, the Controller will not interpret the card correctly and will not output a card message. The facility code range of 1030 or 1040 cards is 0 to 2047. The card range for 1030 cards is 0 to 32767 and for 1040 is 0 to 262143.

MultiProx HSM operation

The HSM monitors four inputs for voltage changes in the monitored circuits. The Controller communicates with the HSM using a polling scheme and digital communication. When the HSM receives a poll message, the HSM communicates the status of the inputs with a response message. If there is a status change, the Controller changes the respective relay output. The relays on the Controller are energized in the normal state. If the Controller loses power, the relays will de-energize and change to the “alarm” state. The relay outputs are grouped by channel and have specific connector assignments.

Schlage/Westinghouse Card Types - Figure 2



1030

xxxxx = 5 digit **octal** card number
Yyyy = 4 digit facility code
Y = facility code letter
yyy = facility code number (decimal)
zzz = 3 digit run code

1040

xxxxxx = 6 digit **octal** card number
Yyyy = 4 digit facility code
Y = facility code letter
yyy = facility code number (decimal)
zzz = 3 digit run code

1050

xxxxxxxx = 8 digit **decimal** card number
yyyyyyy = 7 digit data code
L = 1 digit library code (optional)

Figure 2

Wiegand Data Formats - 32 bit output description

The data format consists of 32 bits of data when switch 2 position 4 is off. Two parity bits cover half of the message respectively much like the standard 26 bit format. The 1030 and 1040 cards have facility codes and card numbers, whereas, the 1050 cards only have a card number.

Wiegand Data Formats - 26 bit output description

The data format consists of 26 bits of data when switch 2 position 4 is on. The two parity bits cover half of the message. The 1030 and 1040 cards have facility codes and card numbers, whereas, the 1050 cards only have a card number. When sw2.4 is on, the 32 bit card code is transformed into 26 bits. For 1030 and 1040 cards, the 11 bit facility code is reduced to 8 bits where the 3 most significant bits are dropped. The 1030 15 bit card code is preserved but becomes a 16 bit card code with 0 as the most significant bit. The 1040 card code is reduced from 18 bits to 16 bits, where the 2 most significant bits are dropped. For 1050 cards, there is no facility code, so the 25 bit card code is reduced to 24 bits with the most significant bit being dropped.

Schlage 1030 Card 32 bit Output Format

```
Bits      0                   1                    2                    3
1 to 32 1  2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1  2
          E XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX O
          P f  f FFFFFFFFF I 0 0 0 CCCCCCCCCCCCCCC P
```

Where:
P = Parity code, see Parity bits, below
ff are the bits for the A-D facility code groupings - A = 00, B = 01, C = 10, D = 11
f/F = Facility Code, 11 bits), 0-2047, (includes the bits for the letters A-D)
I = ID bit, 0 = Schlage 1030 card, 1 = Hughes ID Card (used to eliminate Schlage/HID duplicates)
C = Card number, 15 bits, 0-32,767

Schlage 1030 card 26 bit Output Format

1030 card - 32 bit to 26 bit mapping - when sw2.4 is on

```
                E f  f  F F F F F F F F F I  0 0 0 C C C C C C C C C C C C C C C O    15 bit card code
                      < - - - - - - - >       < - - - - - - - - - - - - - - - >
                      |              |        |                               |
                      |                - >    | |                               |
                        - >               | |                               |
                           < - - - - - - - > < - - - - - - - - - - - - - - - >
26 bit map                E F F F F F F F F C C C C C C C C C C C C C C C C O
                          E e e e e e e e e e e e e o o o o o o o o o o o o O
```

Where:
E = even parity code
e = individual even parity bits
O = odd parity code
o = individual odd parity bits
F = Facility Code, 8 bits), 0-255
C = Card number, 16 bits, 0-32,767 with 0 as Most Significant Bit

Schlage 1040 Card 32 bit Output Format

```
Bits       0                    1                     2                    3

1 to 32    1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1  2
           E XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX 0
           P f  f  F FFFFFFFF I CCCCCCCCCCCCCCCCCC P
```

Where:
P = Parity code, see Parity bits, below
f/F = Facility Code, 11 bits, 0-2047, (includes the bits for the letters A-D
ff are the bits for the A-D facility code groupings - A = 00, B = 01, C = 10, D = 11
I = ID bit, 0 = Schlage 1040 card, 1 = Hughes ID Card (used to eliminate Schlage/HID duplicates)
C = Card number, 18 bits, 0-262,143

Schlage 1040 Card 26 bit Output Format

1040 card - 32 bit to 26 bit mapping - when sw2.4 is on

```
               E f  f  F F F F F F F F F I  C C C C C C C C C C C C C C C C C C O   18 bit card code
                   < - - - - - - - >       < - - - - - - - - - - - - - - - - >
                   |               |       |                                 |
                   |               |       |                                 |
                   |                 - >   |                                 |
                     - >                 | |                                 |
                         < - - - - - - - > < - - - - - - - - - - - - - - - - >
26 bit map               E F F F F F F F F C C C C C C C C C C C C C C C C C O
                         E e e e e e e e e e e e e o o o o o o o o o o o o O
```

Where:
E = even parity code
e = individual even parity bits
O = odd parity code
o = individual odd parity bits
F = Facility Code, 8 bits), 0-255
C = Card number, 16 bits, Schlage card number conversions

0 to 65,535	will report as	0 to 65,535
65,536 to 131,072	will report as	0 to 65,535
131,073 to 155,000	will report as	0 to 23,928

Schlage 1050 Card 32 bit Output Format

```
Bits       0                   1                   2                   3

1 to 32    1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1  2
           E X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X 0
           P  0 0 0 0 I C C C C C C C C C C C C C C C C C C C C C C C C C P
```

Where:
P = Parity code, see Parity bits, below
I = ID bit, 0=Schlage 1050 card, 1=Hughes ID card (used to eliminate Schlage/HID duplicates)
C = Card number, 25 bits, 0-33,554,431

Wiegand format note: Bit one is the first bit transmitted and bit 32 is the last. Bit 2 is the most significant digit of the facility code for the 1030 and 1040 cards and the most significant bit of the cards number for the 1050 card number.

Schlage 1050 Card 26 bit Output Format

1050 card - 32 bit to 26 bit mapping - when sw2.4 is on

```
             E 0 0 0 0 I  C C C C C C C C C C C C C C C C C C C C C C C C C O   25 bit card code
                            < - - - - - - - - - - - - - - - - - - - - - - - - >
                            |                                                 |
                            |                                                 |
                            |                                                 |
                            < - - - - - - - - - - - - - - - - - - - - - - - - >
26 bit map                E C C C C C C C C C C C C C C C C C C C C C C C C C O
                          E e e e e e e e e e e e e o o o o o o o o o o o o O
```

Where:
E = even parity code
e = individual even parity bits
O = odd parity code
o = individual odd parity bits
C = Card number, 24 bits, Schlage card number conversions

0 to 16,777,215	will report as	0 to 16,777,215
16,777,216 to 24,040,016	will report as	0 to 7,262,800

Wiegand Format Components

Facility Codes for 32 bit output - when sw2.4 is off

The Schlage facility codes for the 1030 and 1040 cards are partitioned into groups of A to D. Each group consists of the subset 0-511. The groups are as follows:

A0 to A511 report as decimal numbers 0 to 511	(00000000000 to 00111111111)
B0 to B511 report as decimal numbers 512 to 1023	(01000000000 to 01111111111)
C0 to C511 report as decimal numbers 1024 to 1535	(10000000000 to 10111111111)
D0 to D511 report as decimal numbers 1536 to 2047	(11000000000 to 11111111111)

Facility Codes for 26 bit output - when sw2.4 is on

When sw2.4 is on, the 11 bit facility code is reduced to 8 bits. The 3 most significant bits of the facility code are dropped.

A000 to A255 report as decimal numbers 0 to 255	(00000000 to 11111111)
A256 to A511 report as decimal numbers 0 to 255	(00000000 to 11111111)
B000 to B255 report as decimal numbers 0 to 255	(00000000 to 11111111)
B256 to B511 report as decimal numbers 0 to 255	(00000000 to 11111111)
C000 to C255 report as decimal numbers 0 to 255	(00000000 to 11111111)
C256 to C511 report as decimal numbers 0 to 255	(00000000 to 11111111)
D000 to D255 report as decimal numbers 0 to 255	(00000000 to 11111111)
D256 to D511 report as decimal numbers 0 to 255	(00000000 to 11111111)

Parity BITS - 32 bit output when sw2.4 is off

```
Bits      0                1                  2                  3

1 to 32  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6  7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
         E XXXXXXXXXXXXXXX XXXXXXXXXXXXXXX0
```

E = Even parity calculated over bits 2 through 16
O = Odd parity calculated over bits 17 through 31

Parity BITS - 26 bit output - when sw2.4 is on

```
Bits      0                1                  2

1 to 26   1 2 3 4 5 6 7 8 9 0 1 2 3  4 5 6 7 8 9 0 1 2 3 4 5 6
          E XXXXXXXXXXXX XXXXXXXXXXXX0
```

E = Even parity calculated over bits 2 through 13

O = Odd parity calculated over bits 14 through 25

Pulse Timing

The pulse width is 50 micro-seconds and the time between pulses is 2 milliseconds.

Access Control panel - converting external octal number to “system reporting number”

The SE 1050 cards are identified with an external number. The number is the matching number in decimal that the card will report when read.

The external number on the Schlage 1030 and 1040 cards are printed in the Octal numbering system. Contact customer service for a Cross Reference Table that can be provided to correlate the printed numbers and the decimal number that is typically used in Access Control systems (system reporting number). This conversion can also be made by a calculating the Decimal number as shown:

1030 Command Card - Octal to Decimal Card Number Conversion

Card number = 5 digits - ABCDE (octal) to convert, add the product of the following:

A x 4096 example: card #54321	5 x 4096
+ B x 512	+ 4 x 512
+ C x 64	+ 3 x 64
+ D x 8	+ 2 x 8
+ E x 1	+ 1 x 1
= decimal number	= 22737

1040 Command Card - Octal to Decimal Card Number Conversion

Card Number = ABCDEF (octal) to convert: add the product of the following:

A x 32768 example: card# 123456	1 x 32768
+ B x 4096	+ 2 x 4096
+ C x 512	+ 3 x 512
+ D x 64	+ 4 x 64
+ E x 8	+ 5 x 8
+ F x 1	+ 6 x 1
= decimal number	= 42798

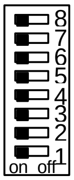
Contact HID customer service for information regarding a cross reference list and number conversions.

Installation Aid Diagrams

MultiProx Controller Switch Settings - Figure 3

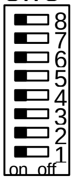
Switches are shown in the factory default position.

SWB - BEEPER



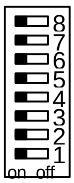
Channel 8 - Beeper operation - "on" = reader beeps when a card is read, "off" = reader does not beep
Channel 7 - Beeper operation “
Channel 6 - Beeper operation “
Channel 5 - Beeper operation “
Channel 4 - Beeper operation “
Channel 3 - Beeper operation “
Channel 2 - Beeper operation “
Channel 1 - Beeper operation “

SWG - GREEN LED



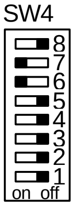
Channel 8 - Green LED operation - "on" = reader flashes Green LED when a card is read, "off" = does not flash Green LED
Channel 7 - Green LED operation “
Channel 6 - Green LED operation “
Channel 5 - Green LED operation “
Channel 4 - Green LED operation “
Channel 3 - Green LED operation “
Channel 2 - Green LED operation “
Channel 1 - Green LED operation “

SWR - RED LED



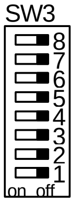
Channel 8 - Red LED operation - "on" = reader LED is normally Red, "off" = reader LED is normally off
Channel 7 - Red LED operation “
Channel 6 - Red LED operation “
Channel 5 - Red LED operation “
Channel 4 - Red LED operation “
Channel 3 - Red LED operation “
Channel 2 - Red LED operation “
Channel 1 - Red LED operation “

SW4



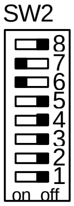
Alternate Facility code, on = enabled, off = disabled
Card type 1030 = off, 1040 = on, 1050 = on
Card type 1030 = on, 1040 = off, 1050 = on
Not Used
Not Used
Main Facility Code Letter A = off, B = off, C = on, D = on
Main Facility Code Letter A = off, B = on, C = off, D = on
Main Facility Code Bit 8 - 2^8 (256) on = 1, off = 0 See Decimal to Binary conversion table Figure 9

SW3



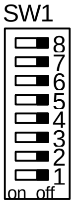
Main Facility Code Bit 7 - 2^7 (128) See Decimal to Binary conversion table Figure 9
Main Facility Code Bit 6 - 2^6 (64) “
Main Facility Code Bit 5 - 2^5 (32) “
Main Facility Code Bit 4 - 2^4 (16) “
Main Facility Code Bit 3 - 2^3 (8) “
Main Facility Code Bit 2 - 2^2 (4) “
Main Facility Code Bit 1 - 2^1 (2) “
Main Facility Code Bit 0 - 2^0 (1) “

SW2



HSM Monitor Enable on = enabled, off = disabled
Channel Number selection 1 = off, 2 = off, 4 = on, 8 = on
Channel Number selection 1 = off, 2 = on, 4 = off, 8 = on
Not Used
Schlage 26 Bit Wiegand Output Option = on, 32 Bit Wiegand Output = off
Alternate Facility Code Letter A = off, B = off, C = on, D = on
Alternate Facility Code Letter A = off, B = on, C = off, D = on
Alternate Facility Code Bit 8 - 2^8 (256) on = 1, off = 0 See Decimal to Binary conversion table Figure 9

SW1



Alternate Facility Code Bit 8 - 2^7 (126) See Decimal to Binary conversion table Figure 9
Alternate Facility Code Bit 6 - 2^6 (64) “
Alternate Facility Code Bit 5 - 2^5 (32) “
Alternate Facility Code Bit 4 - 2^4 (16) “
Alternate Facility Code Bit 3 - 2^3 (8) “
Alternate Facility Code Bit 2 - 2^2 (4) “
Alternate Facility Code Bit 1 - 2^1 (2) “
Alternate Facility Code Bit 0 - 2^0 (1) “

Note: Power down and power up again to program changes made to SW1 through SW4

Figure 3

MultiProx Controller - Connectors, Relay and Jumper Positions - Figure 4

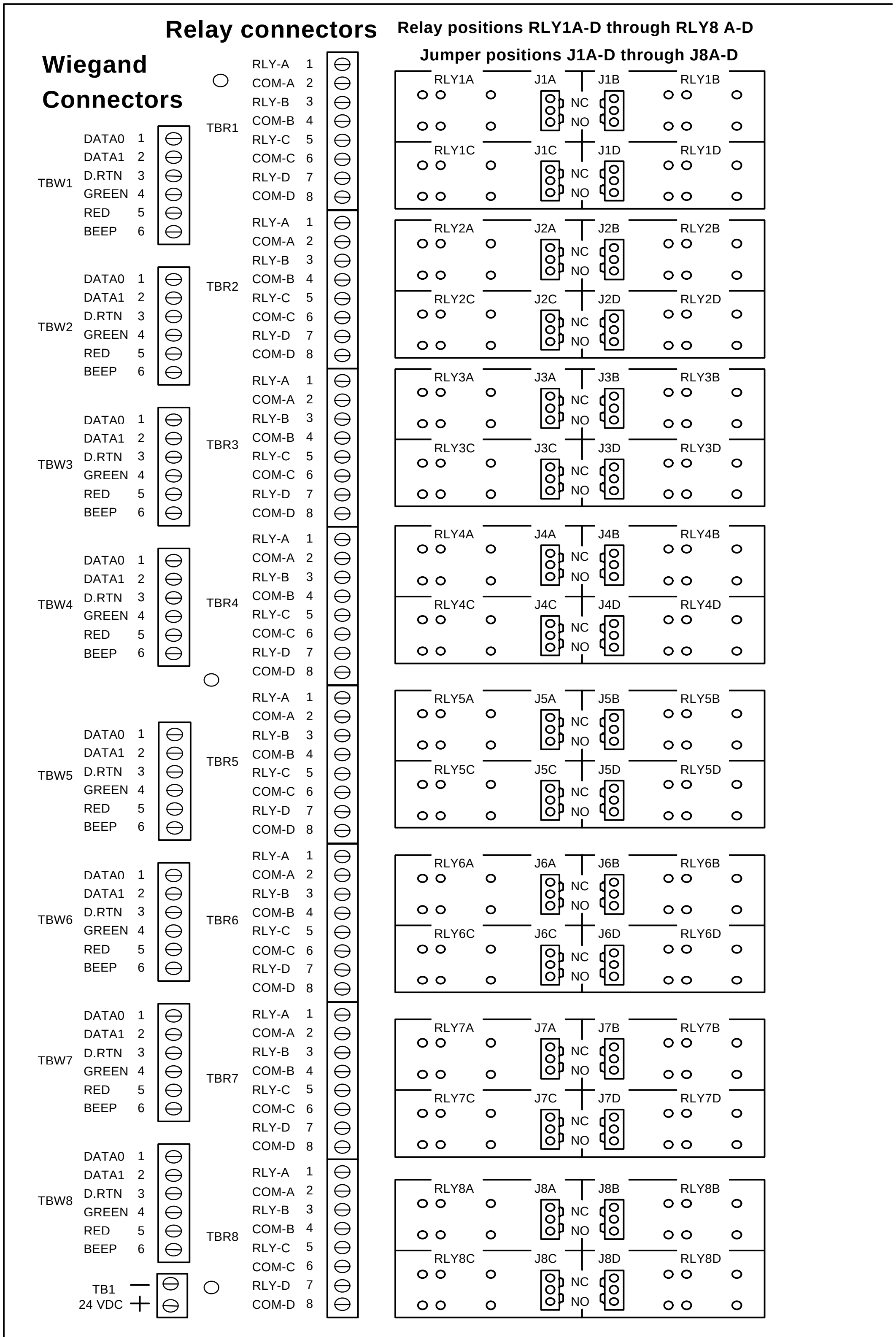


Figure 4

MultiProx Controller Dimensions - Figure 5

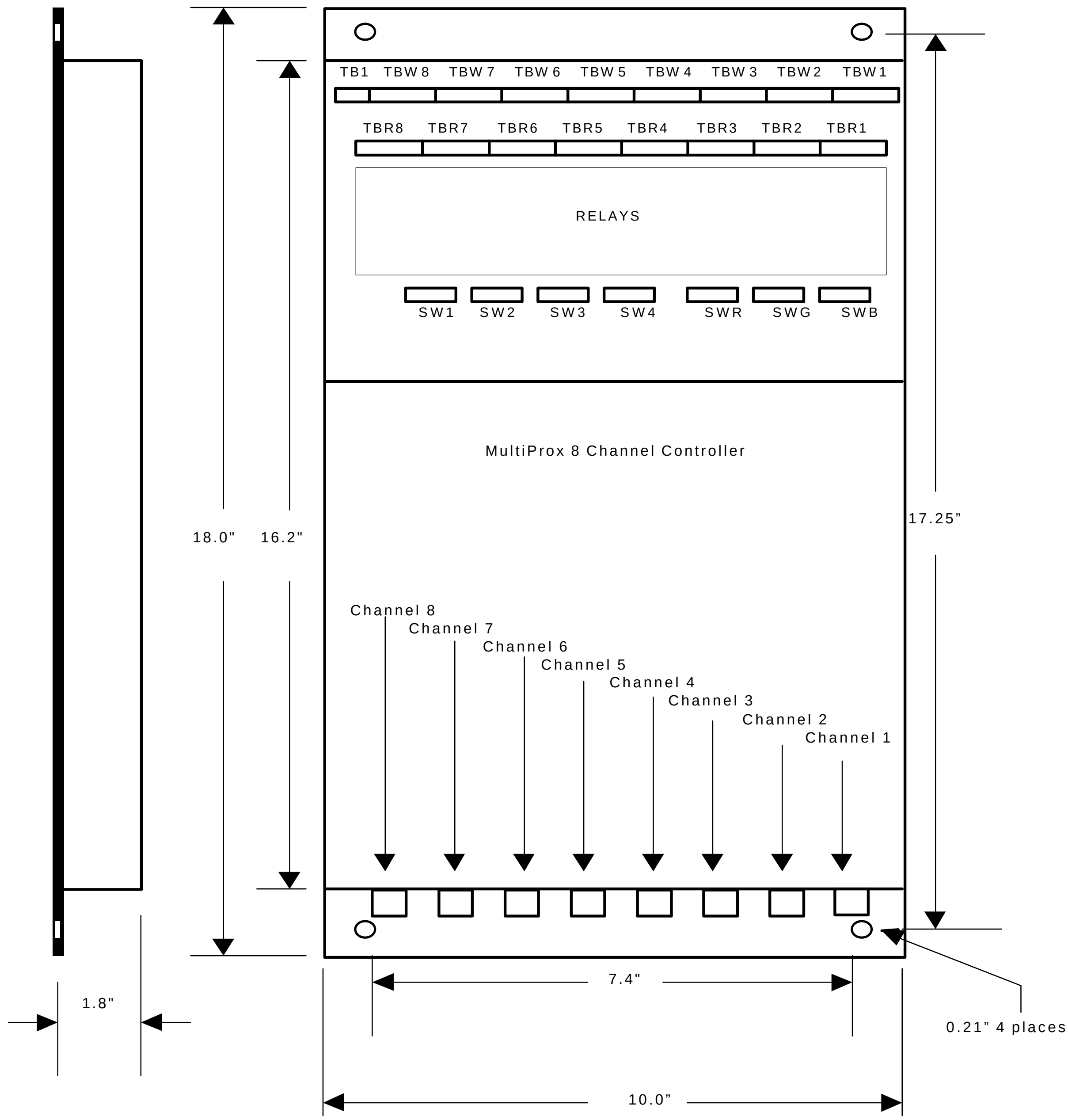


Figure 5

Installation notes for mounting the 5385AGS (side) or B (back) Reader

1. The MultiProx Reader must be located a minimum of 6 inches (15.3cm) away from electrical wiring, conduit, metal wall studs or metal pipes.
2. The MultiProx Reader must be located a minimum of 2 inches (5.08cm), on all sides, away from any metal objects. This includes rebar, metal mesh, sheet metal, or metal beams.
3. Mounting the MultiProx Reader in an enclosure is acceptable, provided a minimum of 3 inches (7.62cm) clearance is maintained on all sides.
4. Insulate all cable connectors with electrical tape or shrink tubing so contact is not made with any metal or conductive material.
5. The MultiProx Reader should not be mounted within six feet of any monitors (VDTs or CRTs) . The scan frequencies of most monitors may interfere with the signal received from the access control cards. Motors and electronic devices generate RF noise that may interfere with the reception of the signal from an access control card. The effect of RF noise is typically a reduction of read range. The MultiProx is susceptible to RF interference as are all devices that receive RF signals, such as, radios, television or cellular phones. **See also MultiProx Reader Installation Guide 5385-900-01.**

MultiProx Reader Dimensions - Figure 6

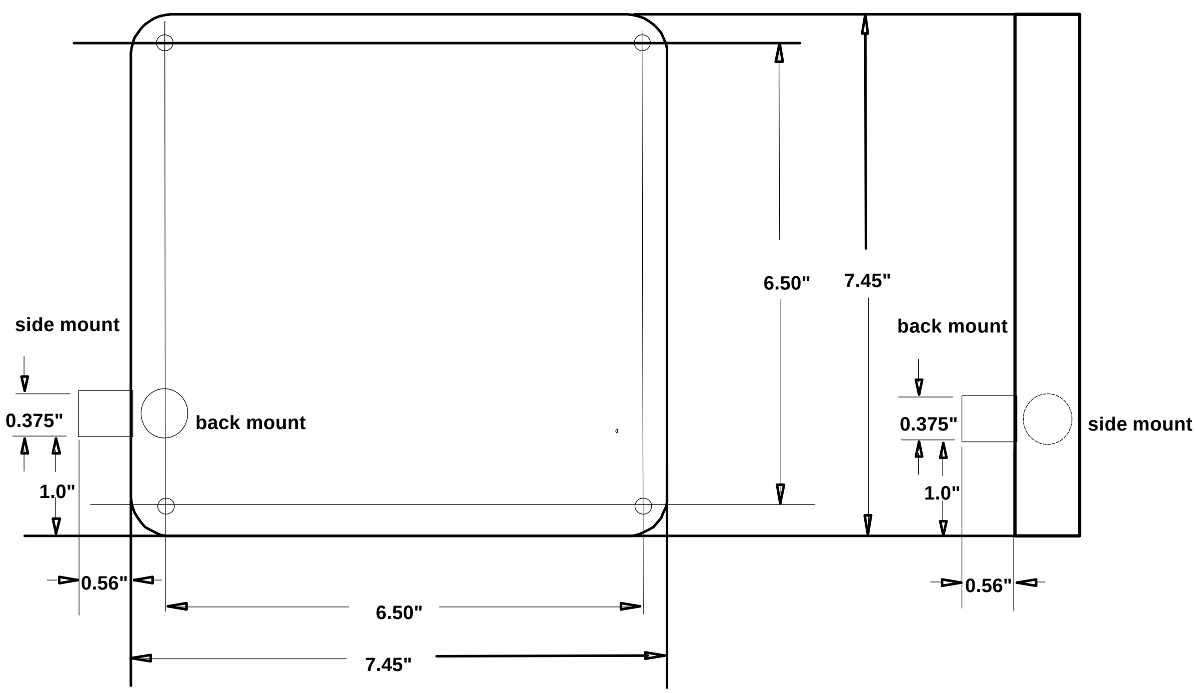


Figure 6

MultiProx HSM Dimension Diagram - Figure 7

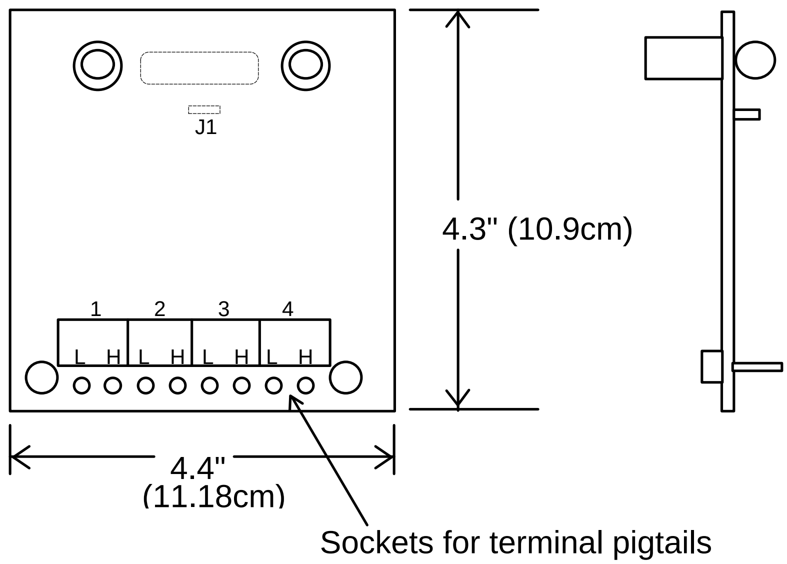
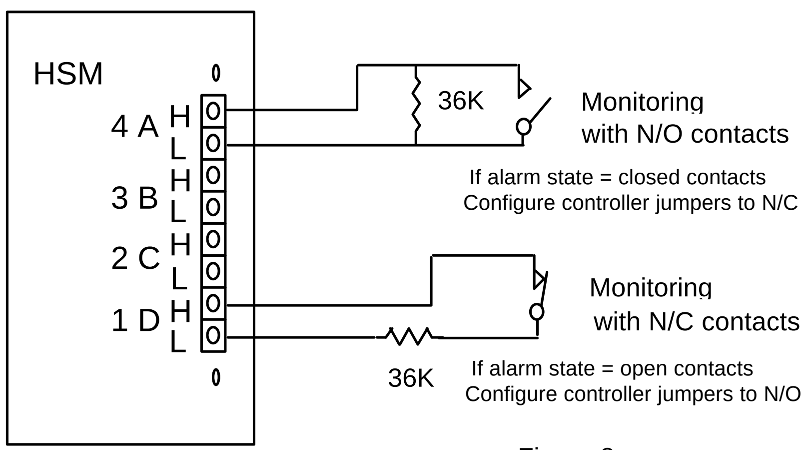


Figure 7

MultiProx HSM Wiring Description - Figure 8



Controller Relay Connectors are TBR1-TBR8
pin 1 - relay output (rly A) for input 4
pin 2 - common output (A) for input 4
pin 3 - relay output (rly B) for input 3
pin 4 - common output (B) for input 3
pin 5 - relay output (rly C) for input 2
pin 6 - common output (C) for input 2
pin 7 - relay output (rly D) for input 1
pin 8 - common output (D) for input 1

Figure 8

Decimal to Binary Conversion Table for facility codes 0 to 511 - Figure 9

Decimal to Binary conversion table for facility code switch settings - Facility codes 0 - 187							
Decimal	2^8 -Binary- 2^0	Decimal	2^8 -Binary- 2^0	Decimal	2^8 -Binary- 2^0	Decimal	2^8 -Binary- 2^0
0	000000000	47	000101111	94	001011110	141	010001101
1	000000001	48	000110000	95	001011111	142	010001110
2	000000010	49	000110001	96	001100000	143	010001111
3	000000011	50	000110010	97	001100001	144	010010000
4	000000100	51	000110011	98	001100010	145	010010001
5	000000101	52	000110100	99	001100011	146	010010010
6	000000110	53	000110101	100	001100100	147	010010011
7	000000111	54	000110110	101	001100101	148	010010100
8	000001000	55	000110111	102	001100110	149	010010101
9	000001001	56	000111000	103	001100111	150	010010110
10	000001010	57	000111001	104	001101000	151	010010111
11	000001011	58	000111010	105	001101001	152	010011000
12	000001100	59	000111011	106	001101010	153	010011001
13	000001101	60	000111100	107	001101011	154	010011010
14	000001110	61	000111101	108	001101100	155	010011011
15	000001111	62	000111110	109	001101101	156	010011100
16	000010000	63	000111111	110	001101110	157	010011101
17	000010001	64	001000000	111	001101111	158	010011110
18	000010010	65	001000001	112	001110000	159	010011111
19	000010011	66	001000010	113	001110001	160	010100000
20	000010100	67	001000011	114	001110010	161	010100001
21	000010101	68	001000100	115	001110011	162	010100010
22	000010110	69	001000101	116	001110100	163	010100011
23	000010111	70	001000110	117	001110101	164	010100100
24	000011000	71	001000111	118	001110110	165	010100101
25	000011001	72	001001000	119	001110111	166	010100110
26	000011010	73	001001001	120	001111000	167	010100111
27	000011011	74	001001010	121	001111001	168	010101000
28	000011100	75	001001011	122	001111010	169	010101001
29	000011101	76	001001100	123	001111011	170	010101010
30	000011110	77	001001101	124	001111100	171	010101011
31	000011111	78	001001110	125	001111101	172	010101100
32	000100000	79	001001111	126	001111110	173	010101101
33	000100001	80	001010000	127	001111111	174	010101110
34	000100010	81	001010001	128	010000000	175	010101111
35	000100011	82	001010010	129	010000001	176	010110000
36	000100100	83	001010011	130	010000010	177	010110001
37	000100101	84	001010100	131	010000011	178	010110010
38	000100110	85	001010101	132	010000100	179	010110011
39	000100111	86	001010110	133	010000101	180	010110100
40	000101000	87	001010111	134	010000110	181	010110101
41	000101001	88	001011000	135	010000111	182	010110110
42	000101010	89	001011001	136	010001000	183	010110111
43	000101011	90	001011010	137	010001001	184	010111000
44	000101100	91	001011011	138	010001010	185	010111001
45	000101101	92	001011100	139	010001011	186	010111010
46	000101110	93	001011101	140	010001100	187	010111011

Decimal to Binary conversion table for facility code switch settings - Facility codes 188 - 375

DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0
188	010111100	235	011101011	282	100011010	329	101001001
189	010111101	236	011101100	283	100011011	330	101001010
190	010111110	237	011101101	284	100011100	331	101001011
191	010111111	238	011101110	285	100011101	332	101001100
192	011000000	239	011101111	286	100011110	333	101001101
193	011000001	240	011110000	287	100011111	334	101001110
194	011000010	241	011110001	288	100100000	335	101001111
195	011000011	242	011110010	289	100100001	336	101010000
196	011000100	243	011110011	290	100100010	337	101010001
197	011000101	244	011110100	291	100100011	338	101010010
198	011000110	245	011110101	292	100100100	339	101010011
199	011000111	246	011110110	293	100100101	340	101010100
200	011001000	247	011110111	294	100100110	341	101010101
201	011001001	248	011111000	295	100100111	342	101010110
202	011001010	249	011111001	296	100101000	343	101010111
203	011001011	250	011111010	297	100101001	344	101011000
204	011001100	251	011111011	298	100101010	345	101011001
205	011001101	252	011111100	299	100101011	346	101011010
206	011001110	253	011111101	300	100101100	347	101011011
207	011001111	254	011111110	301	100101101	348	101011100
208	011010000	255	011111111	302	100101110	349	101011101
209	011010001	256	100000000	303	100101111	350	101011110
210	011010010	257	100000001	304	100110000	351	101011111
211	011010011	258	100000010	305	100110001	352	101100000
212	011010100	259	100000011	306	100110010	353	101100001
213	011010101	260	100000100	307	100110011	354	101100010
214	011010110	261	100000101	308	100110100	355	101100011
215	011010111	262	100000110	309	100110101	356	101100100
216	011011000	263	100000111	310	100110110	357	101100101
217	011011001	264	100001000	311	100110111	358	101100110
218	011011010	265	100001001	312	100111000	359	101100111
219	011011011	266	100001010	313	100111001	360	101101000
220	011011100	267	100001011	314	100111010	361	101101001
221	011011101	268	100001100	315	100111011	362	101101010
222	011011110	269	100001101	316	100111100	363	101101011
223	011011111	270	100001110	317	100111101	364	101101100
224	011100000	271	100001111	318	100111110	365	101101101
225	011100001	272	100010000	319	100111111	366	101101110
226	011100010	273	100010001	320	101000000	367	101101111
227	011100011	274	100010010	321	101000001	368	101110000
228	011100100	275	100010011	322	101000010	369	101110001
229	011100101	276	100010100	323	101000011	370	101110010
230	011100110	277	100010101	324	101000100	371	101110011
231	011100111	278	100010110	325	101000101	372	101110100
232	011101000	279	100010111	326	101000110	373	101110101
233	011101001	280	100011000	327	101000111	374	101110110
234	011101010	281	100011001	328	101001000	375	101110111

Decimal to Binary conversion table for facility code switch settings - Facility codes 376 - 511							
DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0	DECIMAL	2^8 -Binary- 2^0
376	101111000	420	110100100	464	111010000	508	111111100

377	101111001	421	110100101	465	111010001	509	111111101
378	101111010	422	110100110	466	111010010	510	111111110
379	101111011	423	110100111	467	111010011	511	111111111
380	101111100	424	110101000	468	111010100		
381	101111101	425	110101001	469	111010101		
382	101111110	426	110101010	470	111010110		
383	101111111	427	110101011	471	111010111		
384	110000000	428	110101100	472	111011000		
385	110000001	429	110101101	473	111011001		
386	110000010	430	110101110	474	111011010		
387	110000011	431	110101111	475	111011011		
388	110000100	432	110110000	476	111011100		
389	110000101	433	110110001	477	111011101		
390	110000110	434	110110010	478	111011110		
391	110000111	435	110110011	479	111011111		
392	110001000	436	110110100	480	111100000		
393	110001001	437	110110101	481	111100001		
394	110001010	438	110110110	482	111100010		
395	110001011	439	110110111	483	111100011		
396	110001100	440	110111000	484	111100100		
397	110001101	441	110111001	485	111100101		
398	110001110	442	110111010	486	111100110		
399	110001111	443	110111011	487	111100111		
400	110010000	444	110111100	488	111101000		
401	110010001	445	110111101	489	111101001		
402	110010010	446	110111110	490	111101010		
403	110010011	447	110111111	491	111101011		
404	110010100	448	111000000	492	111101100		
405	110010101	449	111000001	493	111101101		
406	110010110	450	111000010	494	111101110		
407	110010111	451	111000011	495	111101111		
408	110011000	452	111000100	496	111110000		
409	110011001	453	111000101	497	111110001		
410	110011010	454	111000110	498	111110010		
411	110011011	455	111000111	499	111110011		
412	110011100	456	111001000	500	111110100		
413	110011101	457	111001001	501	111110101		
414	110011110	458	111001010	502	111110110		
415	110011111	459	111001011	503	111110111		
416	110100000	460	111001100	504	111111000		
417	110100001	461	111001101	505	111111001		
418	110100010	462	111001110	506	111111010		
419	110100011	463	111001111	507	111111011		

Figure 9

Specifications for MultiProx system

Controller - Model No. 6000ANN00

Operating Limits

Operating voltage range — 20.0 - 28.5VDC Linear supply recommended
Absolute maximum voltage — 28.5VDC

Maximum conductor size on DC input	14 AWG
Current consumption	Controller - Recommend 2.0 Amp @ 24VDC Linear Supply Current breakdown: Controller - 550mA Equipped with 32 relays - 1A Equipped with 8 Readers - 1.4A Equipped with 8 Readers and 8 HSM's - 1.6A
Transient protection	Designed to conform to UL 294 "Standard for Access Control Units"
Reverse voltage protection	On DC input connector
Reader connection	F type - female 8 each
Reader cable limits	1000' (300m) RG/6, 75ohm 18AWG low loss, 7.5ohms DC max
Short circuit protection on F connectors	Dead short to ground for 30 seconds

Environmental

Enclosure rating	Indoor only
Enclosure material	Aluminum
Enclosure finish	Iridite
Enclosure color	Gold, with silk screened logo and connector details
Weight	3.5 lbs.
Operating temperature range	-20 to 50°C (0 to 122°F)
Storage temperature	-40 to 85°C (-40 to 185°F)
Operating humidity range	5 to 95% Non-condensing
Operating vibration limit	.04 G^2/Hz 20 - 2000Hz
Operating shock limit	30g, 11mS half sine

Operating parameters

Excitation frequency - Prox mode	125kHz
Excitation frequency - Sweep mode	2-30MHz
Duty cycle per channel	12.5%
Duty cycle within channel	Prox/Schlage50%
Read and report speed	225mS - 2.24 seconds, 1 to 8 channels
LED/Beeper external control speed	38mS - 280mS
HSM Communication speed1	5 -150mS
Configurations	See switch settings
Debug	RS232 debug port available

Wiegand interface

Maximum interface voltage	5.5VDC Data 0 and Data 1 lines
Output voltage - High	3.5V minimum @ 2mA source
Output voltage - Low	.5V maximum @ 35mA sink
Maximum cable distance - 18 AWG	500 feet
Wiegand data pulse widths	40uS
Wiegand data pulse intervals	2mS
Anti-pass-book delay	1 Second
Connector	Screw terminal strip, pluggable, 6 contacts 3/32" screw head, 3.5mm spacing
Maximum conductor size	18 AWG
Pin-out - TBW1 thru TBW8	1 - Data 0 2 - Data1 3 - Data Rtn 4 - Green LED 5 - Red LED 6 - Beeper

Relay interface

Operating Limits	30V 1A
Contacts	Form C - Normally open and normally closed - selectable
Connector	Screw terminal strip, pluggable, 8 contacts

	3/32” screw head, 3.5mm spacing Maximum conductor size18 AWG
Pin-out - TBR1 thru TBR8	1 - RLY-A Contact selected by J1-A thru J8-A 2 - COM-A Common for relay 1A thru 8A 3 - RLY-B Contact selected by J1-B thru J8-B 4 - COM-B Common for relay 1B thru 8B 5 - RLY-C Contact selected by J1-C thru J8-C 6 - COM-C Common for relay 1C thru 8C 7 - RLY-D Contact selected by J1-D thru J8-D 8 - COM-D Common for relay 1D thru 8D

Default Board jumper settings

JMP1	IN (Ramp)
JMP2	IN (Count)
JMP3	IN (Prox input)
JMP4	OUT (Hit disable)
JMP5	IN (Hit filter input)
J9	1 to 3 (Processor setting)
J10	1 to 2 (Processor setting)

MultiProx Reader - model no. 5385AGB00 (back) or 5385AGS00 (side)

Operating Limits

Operating voltage range	14 - 28.5VDC Supplied by the Controller
Absolute maximum voltage	28.5VDC
Current consumption	Prox mode - 85mA, Sweep mode - 25mA Average - 45mA
Reverse voltage protection	On coax F type input connector

Environmental

Enclosure rating	Outdoor rated to NEMA 4X
Enclosure material	Polycarbonate
Enclosure finish	.002” Matte - pebble
Enclosure color	Gray
Weight	15 oz.
Operating temperature range	-40 to 65°C (-40 to 150°F)
Storage temperature	-40 to 85°C (-40 to 185°F)
Operating humidity range	5 to 95% Non-condensing
Operating vibration limit	.04 G^2/Hz 20 - 2000Hz
Operating shock limit	30g, 11mS half sine

Operating parameters

Read distance/ProxCard II	2.5 - 4 inches over operating limits, 3.0 inches typical
Read distance/Schlage/WSE 1050	.75 - 3 inches over operating limits, 1.75 inches typical
Read distance/Schlage/WSE 1030/1040	1.0 - 3.5 inches over operating limits, 2.0 inches typical
Excitation frequency - Prox mode	125kHz generated internally
Excitation frequency - Sweep mode	2-30MHz generated on the controller
Minimum clearance from metal	4 inches behind, 2 inches on the side
Minimum clearance from wiring	6 inches
Minimum metal enclosure size	14” square by 5” deep no cover
Connector	F type rear mount

HSM model no. 6020ANC00

Operating Limits

Operating voltage range	14 - 28.5VDC Supplied by the controller
Absolute maximum voltage	28.5VDC
Current consumption	20mA
Reverse voltage protection	On coax F -type input connectors

Environmental

Enclosure rating	Indoor only
Enclosure	None - PCB only
Weight	3 oz.
Operating temperature range	-40 to 65°C (-40 to 150°F)
Storage temperature	-40 to 85°C (-40 to 185°F)
Operating humidity range	5 to 95% Non-condensing
Operating vibration limit	.04 G^2/Hz 20 - 2000Hz
Operating shock limit	30g, 11mS half sine

Operating parameters

Connector	F type PCB mount
HSM Communication speed	15 -150mS
Inputs	Up to 4 - Monitors normally open or normally closed contacts
Termination resistor - 36Kohm	Normally open - Resistor in parallel, normally closed - series

Note: The above are recommended installation procedures. All local, state and national electrical codes have precedence.