

System Components

iSTAR Edge is a smaller, cost effective, 2 or 4 reader iSTAR that can be powered over its Ethernet connection using PoE, and is suitable for placement above or near the door. iSTAR Edge can be clustered with other iSTAR Edges and iSTAR eXs.

NOTE

iSTAR Edge requires the following minimum versions:

- C•CURE 9000 version 1.93 (for 2 or 4 reader models)
- C•CURE 800/8000 version 10.0, 10.1 (for 2 reader model only)

UL has evaluated and approved firmware version 5.1.x.xxxxx where 'x' may indicate any numeral representing minor revisions or debugging.

iSTAR Edge has:

- 8 onboard inputs plus 32 or 64* optional I8 inputs
- 4 onboard relay outputs plus 32 or 64* optional R8 outputs
- 2 onboard direct connect Wiegand reader connectors
- 3 serial ports for RMs, I8s, I8-CSIs, and R8s.
- 2 AUX power outputs for PIRs, etc.

* 4 Reader model supports 8 I/8s and 8 R/8s.

Overview and Introduction

Figure 1 shows a photograph of the iSTAR Edge with an optional PoE board and with an I8 and R8 mounted on the door.

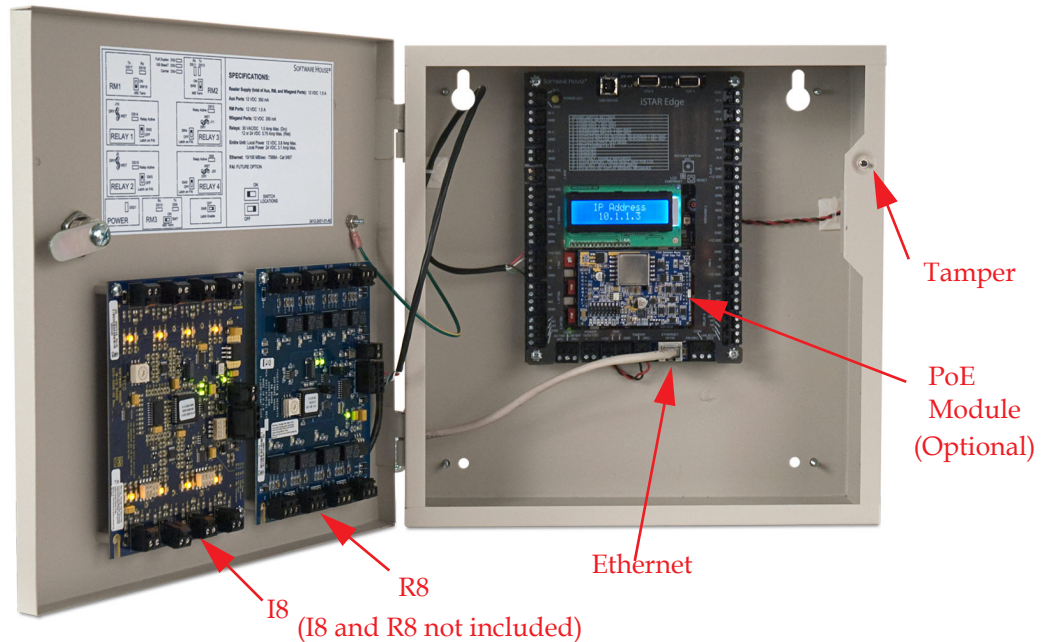


Figure 1: iSTAR Edge Photo

The 4 reader model can be ordered with 2 RM-4s mounted on the door.

Figure 2 on [page 3](#) shows an iSTAR Edge layout.

iSTAR Edge Layout

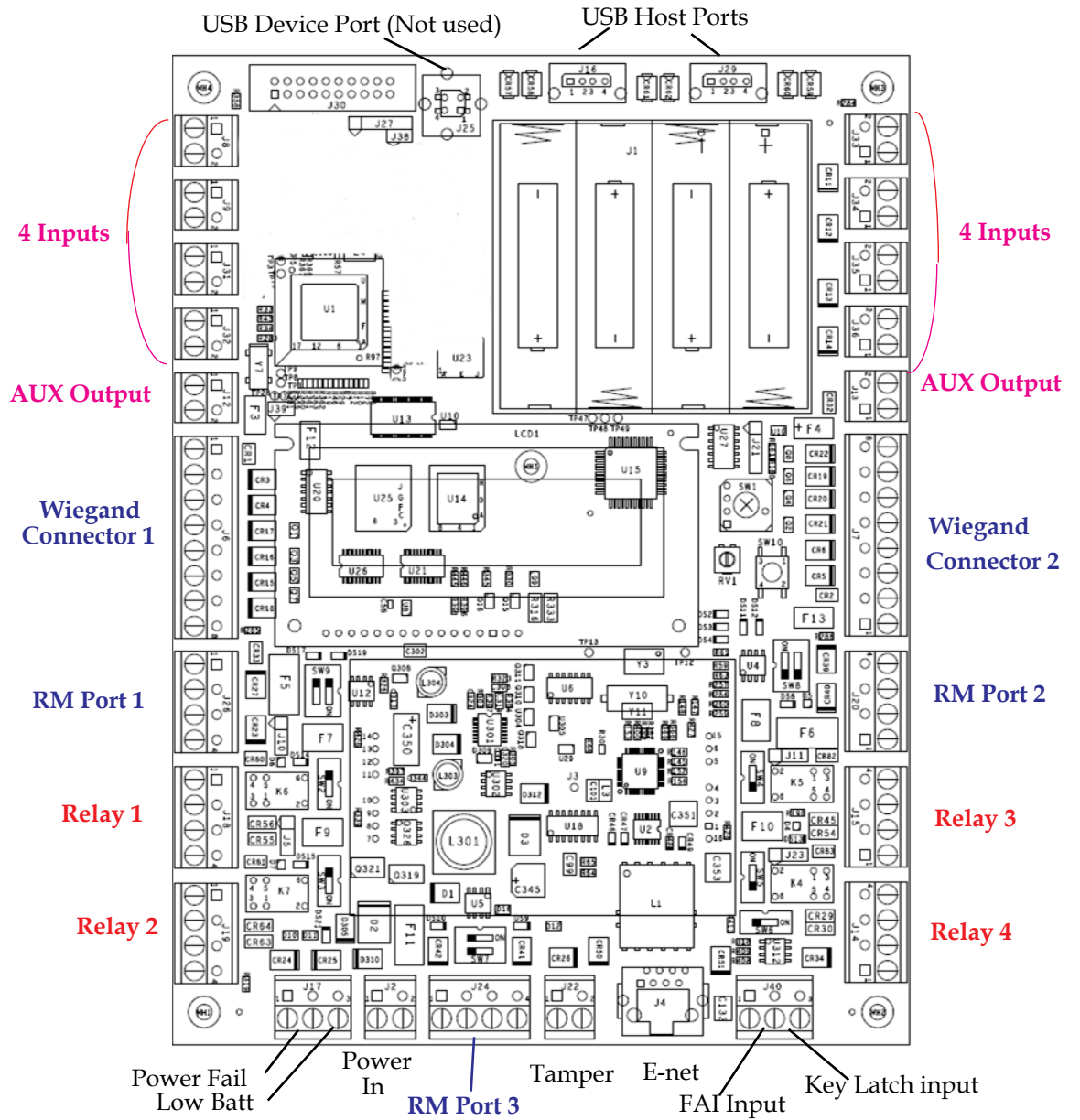


Figure 2: iSTAR Edge Layout

Main Features Main features of iSTAR Edge include:

Storage

- > 250k cards.
- 64 MB of RAM.
- 128 MB of onboard flash.

Power

- Powered by
 - ◆ Ethernet connection: UL 294 Listed PoE or PoE Plus using optional add-on board (edgePower). A UL Listed surge protector must be used with the PoE module. The PoE board can supply either 12VDC or 24VDC to the relay outputs (selectable via a jumper on the PoE board).
- or -
- ◆ 12/24V DC, from UL Listed apS power source or other UL 603 Listed, power-limited power supply with appropriate ratings and a minimum 4 hours of standby power.
- Provides up to 1.5A @ 12V unswitched to external devices:
 - ◆ Wiegand readers
 - ◆ RS-485 ports
 - ◆ Two 2-pin AUX power connectors for PIRs and motion sensors.
- Provides power to relays:
 - ◆ Relays configurable to be wet or dry by jumper.
 - ◆ Wet Relays provide current at main input voltage (12 or 24V on PoE, 12 or 24V with external DC supply).
 - ◆ Each wet relay is limited to 0.75A (at 12 or 24V).
 - ◆ Each dry relay is limited to 3.0A (at 12 or 24V).

Readers

- 2 or 4 readers total.
 - ◆ 2 Wiegand connectors are available.
 - ◆ 2 RMs are available to be configured for the 4 reader model to provide 4 Wiegand connectors.
 - ◆ 3 RS-485 serial ports are available.
 - ◆ Readers can be any combination of 2 from Wiegand ports and/or RMs on any of 3 serial ports.

I/O

- 8 general purpose inputs.
- 4 general purpose relays:
 - ◆ Dry or wet contact settable per relay by jumpers.
 - ◆ 4-pin connectors to support NO/NC and dry/wet configurations.
- 2 reader model, 4- I8 and 4- R8 allowed to be configured on any of the three RS-485 ports.

- 4 reader model, 8- I8 and 8- R8 allowed to be configured on any of the three RS-485 ports or the optional 2 RM-4s.
- Special purpose inputs:
 - ◆ Tamper (from enclosure door)
 - ◆ Main AC fail (from apS)
 - ◆ Low external battery (from apS)

NOTE The following 4 inputs to the host are determined by the firmware. There is no actual wiring to the iSTAR Edge board.

- ◆ FAI Supervision State (J40 F input)
- ◆ FAI Relay Control
- ◆ FAI Key Supervision State (J40 K input)
- ◆ Onboard battery low
- 3 RS 485 serial ports.
- USB Ports
 - ◆ 2 USB host ports. (These are the *wide and flat* USB connectors used by memory sticks, used when the iSTAR Edge is the *host* of the attached devices.)
 - ◆ 1 USB device port. (This is the *square* connector used when the iSTAR Edge itself is the *client* device.) (not currently used)
 - ◆ The only use of USB in the first version is to import encryption keys, in the same way as iSTAR eX.

Communications

- One 10/100 Ethernet port.
- No secondary communication path.
- Full 256 bit AES encryption, as with iSTAR eX
- Can cluster with other iSTAR Edges
- Can cluster with iSTAR eXs

FAI

- Fire Alarm Interlock - When the F input is true, FAI activates relays that are enabled for FAI by individual enable switches.
- Latch option is available by switch control. If the selected relays are latched, they will be cleared to normal by the key (K) input.

Onboard controls

- LCD with backlight for diagnostics.
- Rotary switch for diagnostics, as with iSTAR eX.
- LEDs for serial, Ethernet, power and relay state.
 - ◆ Two power LEDs: one *super bright* LED that is on when the enclosure door is closed, and one green LED that is always on when main power is present.
 - ◆ Relay activation LEDs are not affected by enclosure door.

- ◆ All other LEDs only turn on when enclosure door is open.
- Reset button.
- Switches for serial termination of RM ports.
- Switches for selection of relays for control by FAI.
- Switch for FAI Latch.
- Jumpers for relay wet/dry control.

Housing

- Enclosure is similar to RM 4e enclosure.
- Mountable in existing apC/L enclosure.

Compliance

- FCC, CE, EN50133, UL60950 by CB Scheme (International Safety) & RoHS.

NOTE

For all compatible devices, see the *iSTAR Edge Installation and Configuration Guide* (Doc. No. UM-236).

Pre-Installation Planning

Pre-installation involves the following:

1. Checking equipment (hardware, software, power supply, and wiring).
2. Checking power, wiring, equipment clearances, and code compliance at the site.
3. Ensuring the proper tools are available.

Equipment Check

Verify that the contents of the shipped boxes match the packing lists. Contact Software House if any items are missing or damaged.

The iSTAR Edge hardware does not include mounting hardware for an installation. Mounting hardware depends upon the site and must be approved by a structural engineer or other certified professional.

Software House recommends anchoring systems capable of sustaining a 20 lb. load.

Site Check

Ensure that the mounting site is ready:

- Mounting dimensions
 - The can is 12" by 12" (30.48 x 30.48 cm)
 - Upper mounting holes are 9" (22.86 cm) center to center.
 - Bottom mounting holes are 10.5" (26.67 cm) below the upper mount holes.
- The site has been approved and all wiring complies with UL requirements and other codes, as appropriate.
- All preliminary site work is complete.
- An appropriate power supply is accessible.
- The site is clean and free of dust or other contaminants.

iSTAR Edge Mounting Requirements

The mounting dimensions and board overlay are shown in Figure 3.

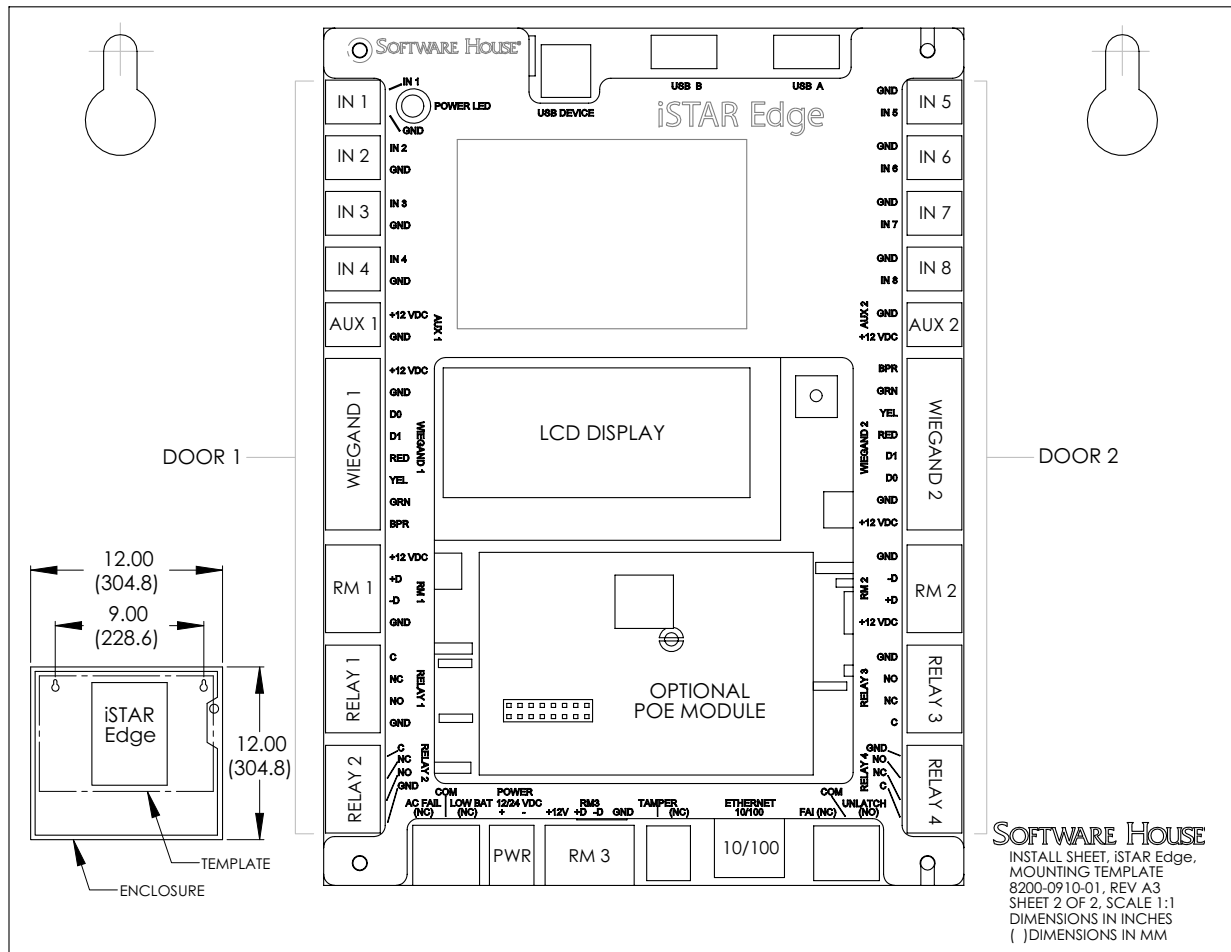


Figure 3: Mounting Requirements

Installation Tools

- Antistatic floor mat, tabletop mat, and wrist strap.
- Standard tool kit
- 3/32" (2.4 mm) screwdriver (supplied with iSTAR Edge)
- Security screwdriver (contact Software House)
- Small needlenose pliers; small Phillips screwdriver; wire strippers
- 5/16" (#10) nut driver (for securing shield wires to a ground stud)

Installation Requirements

iSTAR Edge Cabinet Requirements

The iSTAR Edge cabinet must conform to the specifications shown in Table 1.

Table 1: Cabinet Assembly Specifications

Item	Specification
Weight	<10 lbs (<4.6 kg)
Height	12" (30.48 cm)
Width	12" (30.48 cm)
Depth	4.5" (11.4 cm)

Environmental Requirements

Table 2 shows the iSTAR Edge environmental requirements.

Table 2: Environmental Requirements

Status	Range
Operation	32° F (0° C) to 120° F (48.9° C)
Storage	4° F (-20° C) to 158° F (70° C)

Power Requirements

The standard iSTAR Edge uses a UL Listed 603 External Power Supply, such as the Software House apS or uses a Power Over Ethernet (PoE) injector with UL listed surge protector.

To ensure adequate power, calculate the total power requirements of iSTAR Edge and its related hardware, as follows.

- Add the total current power for components in the system (modules, relays, optional modules, readers, and wire resistance).

iSTAR Edge Components and Boards

Table 3 shows the power requirements of iSTAR Edge components and attached boards.

Table 3: Component and Board Power Requirements

Component/Board	Current Draw at 12VDC
iSTAR Edge	400 mA with LCD - no load
RM-4 board ^a	80 mA without LCD - no load 180 mA with LCD - no load
RM-4E board ^b	125 mA - no load
I/8 board	125 mA - no load
R/8 board	150 mA - no active relays. Add 20 mA for each active relay

^a RM-4 board has only been evaluated by UL with RM Series readers (RM 1,2,3)

^b RM-4E boards have only been evaluated by UL for use with RM-DCM-2 enclosure.

iSTAR Edge Input Power Rating

The iSTAR Edge has the following input ratings when using an external power supply:

- 12 VDC, 3.8 A
- 24 VDC, 3.1 A

Individual/Total Loads

- RS-485 Reader Power Outputs: 10.6-12.5 VDC, 1.5 A max each.
- Wiegand Reader Power Outputs: 10.6-12.5 VDC, 350 mA max each.
- Total of all Reader and AUX outputs combined (RS-485 & Wiegand) not to exceed 1.5 A
- Four (4) activated relay coils = 100 mA, 25 mA/relay
- One I/8 module - 12 VDC, total= 125 mA
- One R/8 module - 12 VDC, total= 325 mA (125 ma + 25 mA for each active relay (max 4))
- R/8 relay contact ratings - 30 VDC at 3A (resistive)

iSTAR Edge Wiegand Reader Ports

Table 4 shows the maximum ratings for iSTAR Edge Wiegand direct reader ports.

Table 4: Wiegand Port Rating

Port	Rating
Reader output control (red, green, yellow, beeper)	Low = 0 v to 0.8 v High = 4.0 v to 5.25 v 20 mA maximum
Reader input data lines (D0, D1)	Low = 0 v to 0.8 v High = 4.0 v to 5.25 v
Reader output voltage	+12 VDC
Reader current	350 mA max per reader, not to exceed 1.5 A for Readers and AUXs

Table 5 shows maximum rating for RM Reader ports.

Table 5: RM Port Rating

Port	Rating
Reader output voltage	+12 VDC
Reader current	1.5 A max per port, not to exceed 1.5 A for Readers and AUXs

Ethernet Requirements

The iSTAR Edge Ethernet connection is:

- **Onboard 1 Ethernet port** – supports 10/100Base-T Ethernet connections.

Wiring Requirements

Table 6 shows general wiring requirements for an iSTAR Edge and its components.

Table 6: Equipment Wiring Specifications

Signal	From	To	Belden # or equiv.	AWG	# Prs	Shield	Max Length	Max. Wire Resistance
RS-485 Comm, two wire	iSTAR Edge	RM & I/O Modules	9841	24	1	Yes	4000 ft. (1212 m)	103Ω
Power	iSTAR Edge	RM & I/O Modules	8442/8461	22/18	1	No	Range of 600 ft. to 1500 ft. depends on AWG	See Note ^b
RJ45-Ethernet	iSTAR Edge	Hub, Host	N/A	Cat 5 or more 24	2	N/A	328 ft. (100 m)	8.4 Ω
Supervised Input	iSTAR Edge or I8	Input	8442/8461	22/18	1	No	2000 ft. (606 m)	32Ω
Request-to-exit (REX or RTE)	iSTAR Edge or RM-4/4E module	Switch	8442/8461	22/18	1	No	2000 ft. (606 m)	32 Ω
Door contact (DSM)	iSTAR Edge or RM-4/4E module	Contact	8442/8461	22/18	1	No	2000 ft. (606 m)	32Ω
Supervised Input (UL) Note ^a	iSTAR Edge or I8	Input	9462	22	1	Yes	2000 ft. (606 m)	32Ω
Relay Control	RM-4 module	ARM-1	9462	22	1	Yes	25 ft. (7.6 m)	.04Ω
Reader Data	iSTAR Edge or RM-4/4E module	Proximity/Wiegand signaling read head	9942	22	3	Yes	200 ft. (60.96 m)	3.2 Ω (22)
			9260	20			300 ft. (91.4 m)	3.2 Ω (20)
			Alpha wire 5386C	18			500 ft. (152.4 m)	3.2 Ω (18)

a. To comply with UL requirements, use shielded, minimum 22 AWG stranded, twisted pair cable for monitor points, DSMs, and REXs. Use Belden 9462 or equivalent.

b. Calculations are based on a single RM-4 reader with keypad and LCD (250 mA):

Using 22 AWG, distance = 600 ft. (.0165 Ω /ft.)


Using 18 AWG, distance = 1500 ft. (.0065 Ω /ft.)

NOTE

UL Listed Panic hardware shall be used to allow emergency exit from a protected area.

Grounding Requirements

Grounding requirements are as follows:

- Ensure that the iSTAR Edge controller is properly connected to an earth ground at the ground stud in the cabinet. Identified by  symbol.)
Use 16 AWG or larger wire.
- Ensure that the shield wires for the readers, inputs, outputs, and AUX cables are grounded to the nearest earth/ground connection at one end only of the cable.
- Disconnect the ground wire last to provide maximum protection to the equipment and personnel.

NOTE

All cabling must be shielded.

Power - Batteries - Backup

As indicated on the door map shown below, the following are power specifications for the iSTAR Edge:

- Entire Unit
 - Local Power 12 VDC, 3.8 Amp Max.
 - Local Power 24 VDC, 3.1 Amp Max.
- Reader and I/O Module Supply (Total of AUX, RM, and Wiegand Ports)
 - 12 VDC, 1.5 Amp
 - AUX Ports 12 VDC 350 mA each
 - RM Ports 12 VDC, 1.5 Amp each (but the max. is also 1.5 Amp for all)
 - Wiegand Ports, 12 VDC, 350 mA each
- Relays
 - 30 VAC/DC 3.0 Amp Max. (Dry) each
 - 12 or 24 VDC 0.75 Amp Max. (Wet) each

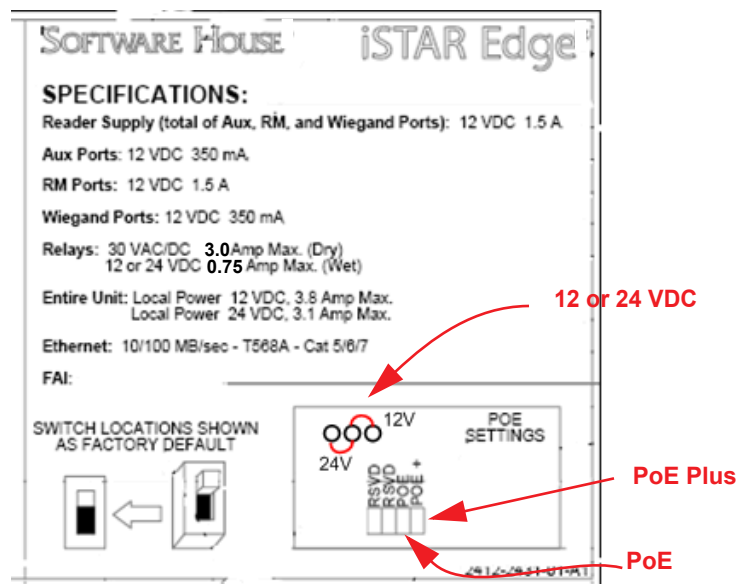


Figure 4: Specifications

NOTE

If using Power Over Ethernet (PoE), be sure that the jumpers on the PoE board are set correctly. As shown in Figure 4, there is a jumper position for PoE and another for PoE Plus (+).

There is also a 2 position jumper to select 12 or 24VDC to power the Edge. The voltage that is configured will be used to power the Edge and also to supply the wet relays for door locks.

NOTE Do not connect to a receptacle controlled by a switch.

NOTE For UL Listed products, a UL 603 Listed, power-limited power supply must be used.

Other interactions with the power system include:

AC / Main Fail input:

- Indicates whether the external power source has reported loss of its main power.
- Shares connector and Ground pin with Low Battery.
- Normally closed dry relay contacts are required. This signal is normally wired to the energized NO output on the apS.
- Configurable on host as an unsupervised input, as with iSTAR eX, iSTAR Pro.

Low Battery input

- Indicates whether external power source, has reported its battery is low.
- Wired in from external power source.
- Shares connector and Ground pin with AC / Main Fail.
- Normally closed dry relay contacts are required.
- Configured on host as unsupervised input, as with iSTAR eX, iSTAR Pro.

Onboard Battery Low input

- Internal measurement (no connections necessary) of onboard AA alkaline batteries.
- Active if their voltage is below 4.6 volts or they are not present or one or more of them is not making full connection.
- This informs user that they should replace the onboard backup batteries for this controller as soon as possible.
- No need to power down the controller to remove/replace the batteries
- Onboard batteries are alkaline and non-rechargeable, so this is a reasonably accurate measure of when the batteries need to be changed.
- Configured on host as an unsupervised input. This is a new input not present in iSTAR eX or iSTAR Pro.

NOTE The Tamper, Low Battery, and AC power fail inputs must be enabled and connected to report for compliance with UL requirements.

NOTE Shielded cable must be used for AC Fail & Low Battery Input connections

Onboard backup batteries

iSTAR Edge uses four onboard AA batteries to power *backup to flash* on loss of main input power. These batteries must be non-rechargeable Alkaline batteries, specifically:

- AA
- Alkaline
- 2.5 Amp hour
- Button top

Backup

When power (input voltage) drops too low to support full operation, power usage is reduced as much as possible, processes are stopped and data is written into flash. Processes remain stopped until the input voltage returns to a normal operating range. At that point, iSTAR Edge reboots and reloads data from flash to RAM and starts processing again.

The only input that controls the initiation of iSTAR Edge's power-fail backup process is iSTAR Edge's own onboard measurement of incoming power voltage. iSTAR Edge measures external power voltage every 1/10 of a second. When external power voltage moves outside of normal operating voltage (10.2 V to 14.4 V for nominal 12 V operation, or below 20.4 V for nominal 24 V operation), iSTAR Edge will initiate the backup process.

When the backup process starts iSTAR Edge will:

- Cut power to as many *non-critical* devices as possible, including:
 - LEDs
 - LCD backlight
 - Wiegand readers
 - AUX power ports
 - WET relays
 - Relay coils are de-energized, i.e. relays revert to *normal* state - NO contacts open and NC contacts close.
- Set the following devices to *low power* or *shutdown* mode
 - Ethernet circuit
 - Serial transceivers
- Stop all processes
- Write data in RAM to flash.
- iSTAR Edge issues an activity report indicating a backup is beginning.
- As with iSTAR Classic and iSTAR eX, the backup process will finish even if power returns during the backup process.

When the backup completes, iSTAR Edge will check whether power voltage has returned to normal operating range. If the voltage is within the normal range, iSTAR Edge will reboot.

As with iSTAR Classic, iSTAR Pro and iSTAR eX, data can only be restored if the clock is valid when the iSTAR boots. Otherwise, the firmware would not be able to make valid access control decisions. As with iSTAR Pro, iSTAR Classic and iSTAR eX, if the clock is not valid on reboot the iSTAR will not restore any data, and will in fact invalidate all data, including activity history.

Inputs

There are eight onboard inputs available on the iSTAR Edge. Pin 2 is Ground.

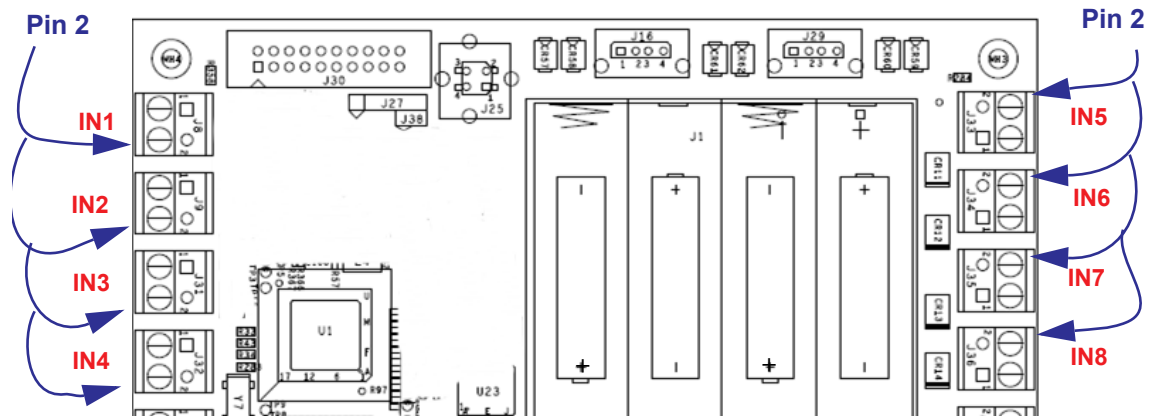


Figure 5: iSTAR Edge Inputs

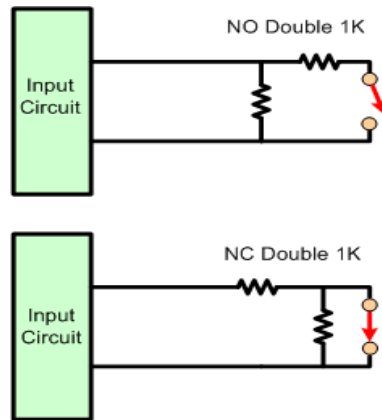
The type of supervision is configured in the host. The inputs are the same as the iSTAR eX. Supervision Modes are shown in Table 7. The first three methods allow you to wire both NO and NC inputs. The wiring determines which it is. The remaining choices require you to pick either NO or NC.

Table 7: Supervision Modes

Mode	Comment
NO/NC Double Resistor 1K Wire with Parallel/Serial for NO and Serial/Parallel for NC.	Traditional Software House Method. 1K = Normal. NO Alert = 500 ohms, NC Alert = 2K
NO/NC Double Resistor 5K Wire with Parallel/Serial for NO and Serial/Parallel for NC.	5K = Normal. NO Alert = 2500 ohms, NC Alert = 10K
NO/NC Double Resistor 10K Wire with Parallel/Serial for NO and Serial/Parallel for NC.	10K = Normal. NO Alert = 5K, NC Alert = 20K
NO Double 1K	Parallel and Serial Resistors
NC Double 1K	Serial and Parallel Resistors
NO Double 5K	Parallel and Serial Resistors
NC Double 5K	Serial and Parallel Resistors
NO Double 10K	Parallel and Serial Resistors
NC Double 10K	Serial and Parallel Resistors
NO Single 5K	Parallel Resistor
NC Single 5K	Series Resistor
NO Single 10K	Parallel Resistor
NC Single 10 K	Series Resistor
NO Non Supervised	No Resistors
NC Non Supervised	No Resistors

NO/NC Double Resistor 1K

This is the traditional Software House method of supervision where 1K Ω is considered Secure and 500 Ω or 2K Ω are considered Alert. Notice that the wiring is different for NO and NC.



For UL Listed products,
burglar alarms must be supervised.

Figure 6: NO / NC Double Resistor 1K

This method will report:

- Short
- Alert (500 ohms)
- Normal (1K)
- Alert (2K)
- Open (>30K)
- Line Fault (Any unexpected value) Usually due to wrong value resistors or faulty resistors.

AUX Outputs

The AUX outputs can supply 350 mA for motion sensor or PIR type devices.

The voltage is 12 VDC.

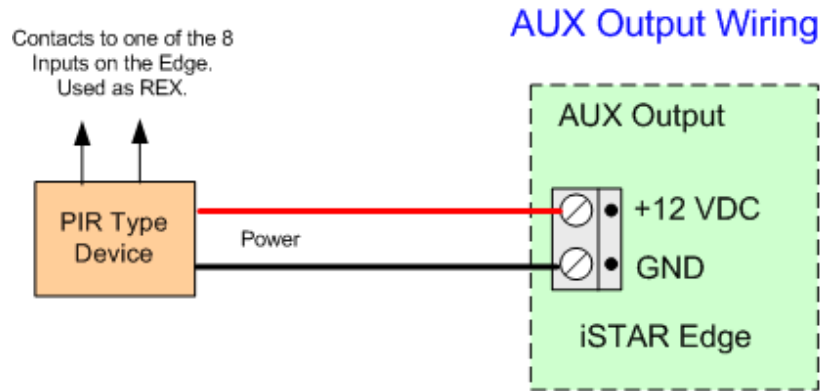


Figure 7: AUX Wiring

Wire the switch contacts of the PIR to one of the iSTAR Edge inputs, using the proper resistor supervision.

Relay Outputs

The relays can be used as DRY or WET. Figure 8 shows a jumper for each relay to set the mode.

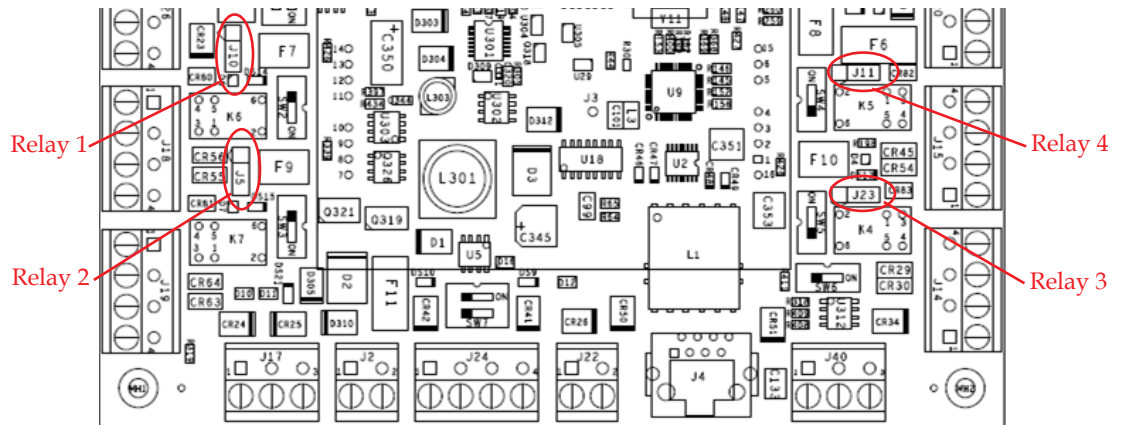


Figure 8: Relay Outputs Dry/Wet Jumpers

Dry Relay Wiring

Figure 9 shows DRY mode. Max current is 3A at 30 VAC/VDC. Use NO or NC as appropriate. Notice that jumper is in the Dry position.

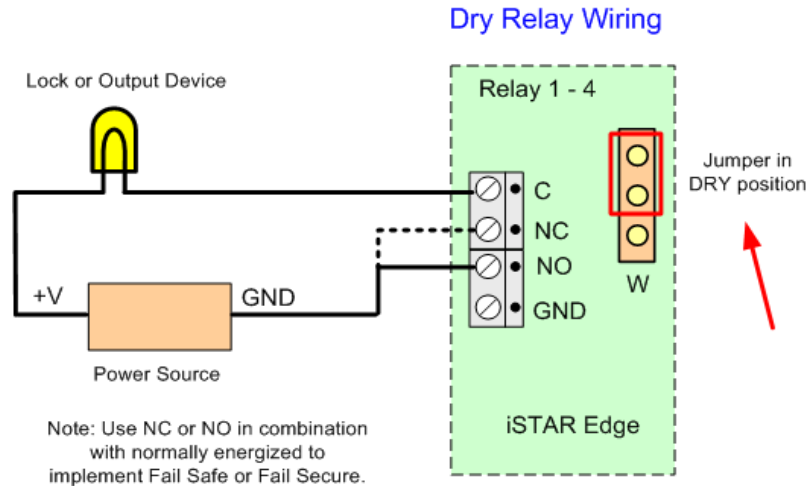


Figure 9: DRY Relay Wiring

Wet Relay Wiring

Figure 10 shows WET wiring for a normal NO Latch. The iSTAR Edge will supply either 12 VDC or 24 VDC depending on the input supply. Current is limited to 0.75 A. Notice that the GND is used for common, not the C pin. Notice that the jumper is in the Wet position.

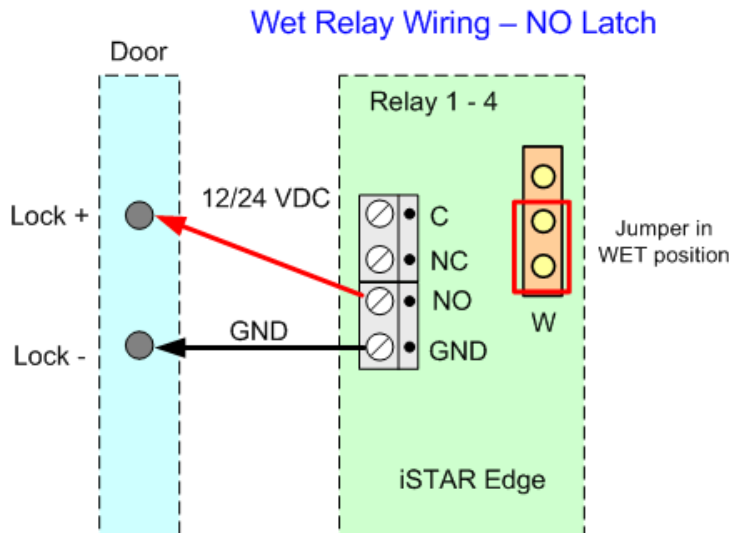


Figure 10: WET Latch

WET Wiring for a MagLock

Mag Locks are normally energized so the GND and NC pins are used in this case. Notice that jumper is in the Wet position, as shown in Figure 11.

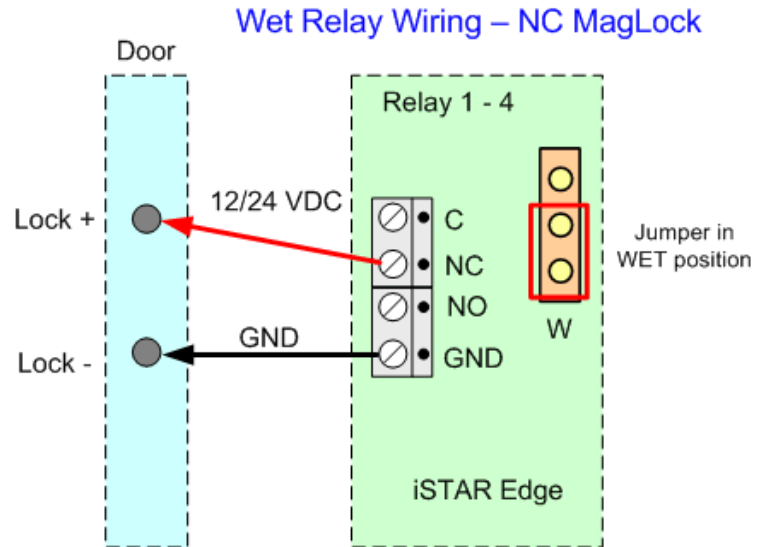
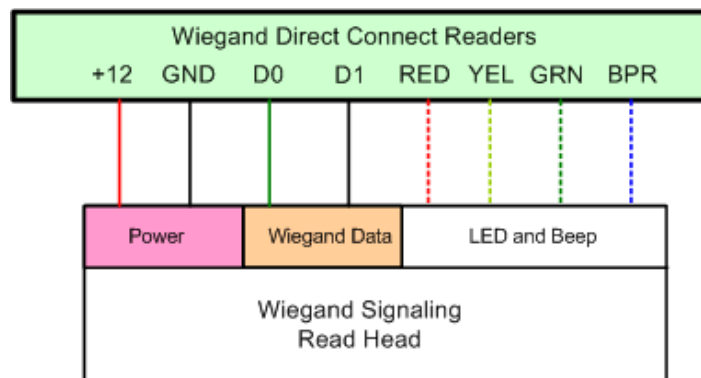


Figure 11: WET Mag

Wiegand Readers

Direct Wiegand signaling read head connections are shown in Figure 12.



LED connections vary.

The following cases are typical:

- Green, Yellow, Red connected (Three Wire)
- Green and Red only (Two Wire)
- Green or Yellow or Red individually (One Wire (A,B,C))

Figure 12: Wiegand Readers

RM Readers - I/8s - R/8s

Normal RM bus wiring is used for RM readers, I/8 boards, and R/8 boards. Notice that the connectors are oriented so that a connector taken off of RM1 can be used on RM2 or RM3 without moving the wires, as shown in Figure 13.

RM Port Wiring

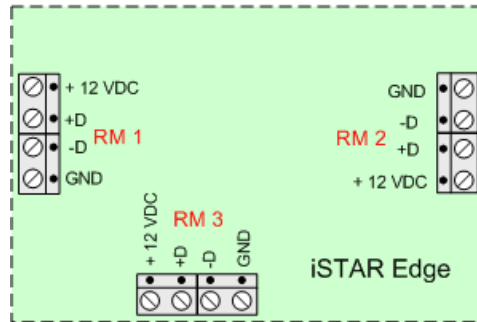


Figure 13: RM Wiring

AC Fail / Low Battery

AC Fail and Low Battery wiring is shown in Figure 14. They are NC connections, and they share a common ground pin.

AC Fail and Low Batt Wiring

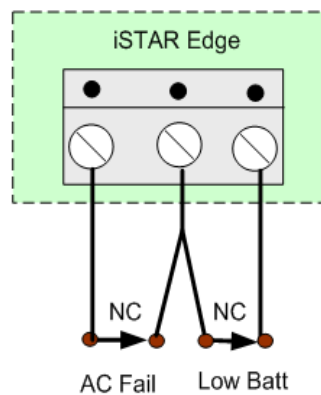


Figure 14: AC Fail - Low Battery

NOTE The Low Battery and AC power fail inputs must be enabled and connected to report for compliance with UL requirements.

NOTE Shielded cable must be used for AC Fail & Low Battery Input connections

Tamper

Tamper is NC. It is usually connected to the Tamper switch on the enclosure. If there is no standard enclosure, be sure that there is a jumper across the two pins, as shown in Figure 15.

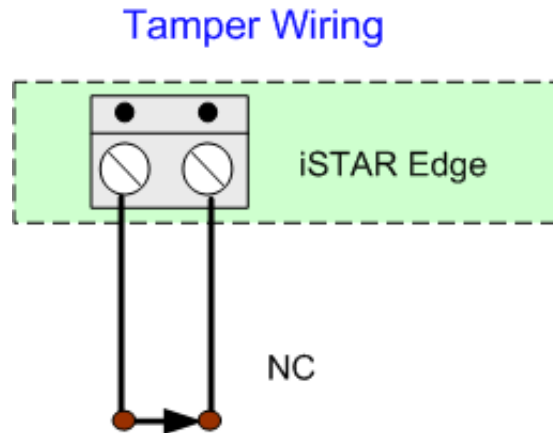


Figure 15: Tamper

The tamper switch controls many LEDs, to preserve power and also not blind users with the *super bright* LED when the door is open. When the door is closed the two power LEDs are the only ones on. The LCD is also off when the door is closed.

NOTE The tamper input must be enabled and connected to report for compliance with UL requirements.

Important Safety Information

Operating problems are often caused by failure to ground system components properly. Be sure to follow all instructions for grounding described in this Quick Start.

CAUTION: Changes to the iSTAR Edge not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

The following precautions apply to all procedures described in this manual.

1. To meet life safety requirements, a fail-safe mechanism override must be installed at each card reader exit to allow people to leave the secure area in case of electromechanical device failure.
2. The iSTAR Edge device described in this manual could cause electrical shock. Installation and maintenance should be performed only by qualified personnel. Make sure power is removed before the system is installed.
3. The iSTAR Edge and printed circuit boards in the reader devices are susceptible to damage by static electricity. When handling these devices:
 - Make sure your work area is safeguarded
 - Transport all components in static-shielded containers

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