

**Protege Intelligent 2 Reader Expander
Installation Manual**

ICTProtege[®].

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1 Introduction

Thank you for purchasing the PRT-RDI2-PCB Protege Intelligent Reader Expander by Integrated Control Technology. The Protege System is an advanced technology security system designed to provide integration with building automation, apartment complex control and HVAC in one flexible package. Communication is over a proprietary high speed protocol across an encrypted local area network and AES Encrypted Proprietary RS-485 module network. Using modular-based hardware design, system installers have the flexibility to accommodate any installation whether it's small, large, residential or commercial.

The PRT-RDI2-PCB Protege Intelligent Reader Expander extends the number of card reader inputs on the system by 2, the number of zone inputs by 8 (4 zones used for door monitoring and control and up to 8 can be used for extended functionality), and the number of PGM outputs by 8 (includes 2 monitored lock control outputs).

Flexible module network architecture allows large numbers of modules to be connected to the RS-485 Module Network. Up to 250 modules can be connected to the Protege System in any combination to the network up to a distance of 900M (3000ft). Communication beyond this distance requires the use of a RS-485 Network Extender or the Slave Communications Port on a PRT-RDI2-PCB Protege Intelligent Reader Expander.

The current features of the PRT-RDI2-PCB Protege Intelligent Reader Expander include:

- 4 Wiegand Reader Mode for 2 Entry/Exit Doors Per Reader Expander
- Secure Encrypted RS-485 Module Communications
- 8 Zone Inputs
- 2 Monitored Lock Control PGM Outputs
- 6 Open Collector PGM Outputs (Reader Control Outputs)
- 2.5A Switching Power Supply
- Intelligent Battery Charge and Monitoring
- Smart Reader Missing/Tamper Monitoring
- Online and Remote upgradeable firmware

When receiving this product, you should find the kit contains the items listed below. If you do not have the correct contents, please contact your distributor immediately.

- Reader Expander Printed Circuit Board
- 6 X Plastic Mounting Standoffs
- 20 X 1K Ohm Resistors
- 2 X 1N4007 Lock Reverse EMF Protection Diodes
- Red/Black Backup Battery Wires

For more information on the PRT-RDI2-PCB Protege Intelligent Reader Expander and other Integrated Control Technology products please visit the ICT website (<http://www.ict.co>).

1.1 Document Conventions

This document uses the following conventions:



Important warnings or cautionary messages to prevent equipment damage, data loss, or other similar conditions



Notes with additional information such as an explanation, a comment, or a clarification about the subject



Tips containing practical information that may help you solve a problem or describing actions that may save you time



Information relating to UL and ULC compliance



Bold text enclosed in brackets is used to show a section number or address of a programmable option or information on programming shortcut sequences

2 Installation Requirements

This equipment is to be installed in accordance with:

- The Product installation instructions
- UL 681 - Installation and Classification of Burglar and Holdup Systems
- UL 827 - Central-Station Alarm Services
- CAN/ULC-S301, Central and Monitoring Station Burglar Alarm Systems
- CAN/ULC-S302, Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults
- CAN/ULC-S561, Installation and Services for Fire Signal Receiving Centres and Systems
- The National Electrical Code, ANSI/NFPA 70
- The Canadian Electrical Code, Part I, CSA C22.1
- The Local Authority Having Jurisdiction (AHJ)

3 Installation

3.1 Location and Mounting

The Reader Expander is available as a PCB Only (Printed Circuit Board) or complete unit supplied with a metal cabinet. We recommend that the cabinet is used wherever possible as this provides the best mounting and installation solution as well as the required cable entry and termination space.

When installing the Reader Expander ensure that there is adequate clearance around all sides of the enclosure and air flow to the vents of the enclosure are not restricted.

We recommend the Reader Expander is installed in a location that will facilitate easy access for wiring. We also recommend that the Reader Expander is installed in electrical rooms, communication equipment rooms, closets or in an accessible area of the ceiling.

1. Insert the plastic stand-offs in to the locations to mount the PCB board.
2. Calculate the location and position of the enclosure and mark the holes for the keyhole points in the top left and right locations. This will allow you to screw in the screws and then hang the box on them adjusting the location to suit.
3. Ensure a solid fixing point and screw in the two screws. Before tightening the top screws insert the tamper bracket in the slot provided on the right side of the enclosure.
4. Fix the enclosure securely using the remaining mounting holes on the bottom left, right and centre of the enclosure.
5. Insert the PCB in to the enclosure and mount using the plastic standoffs inserted during step one.



Install the enclosure when the circuit board is NOT installed on the plastic stand-offs. This will reduce the risk of damage caused by debris during the installation process.

3.2 UL/ULC Installation Cabinet Options

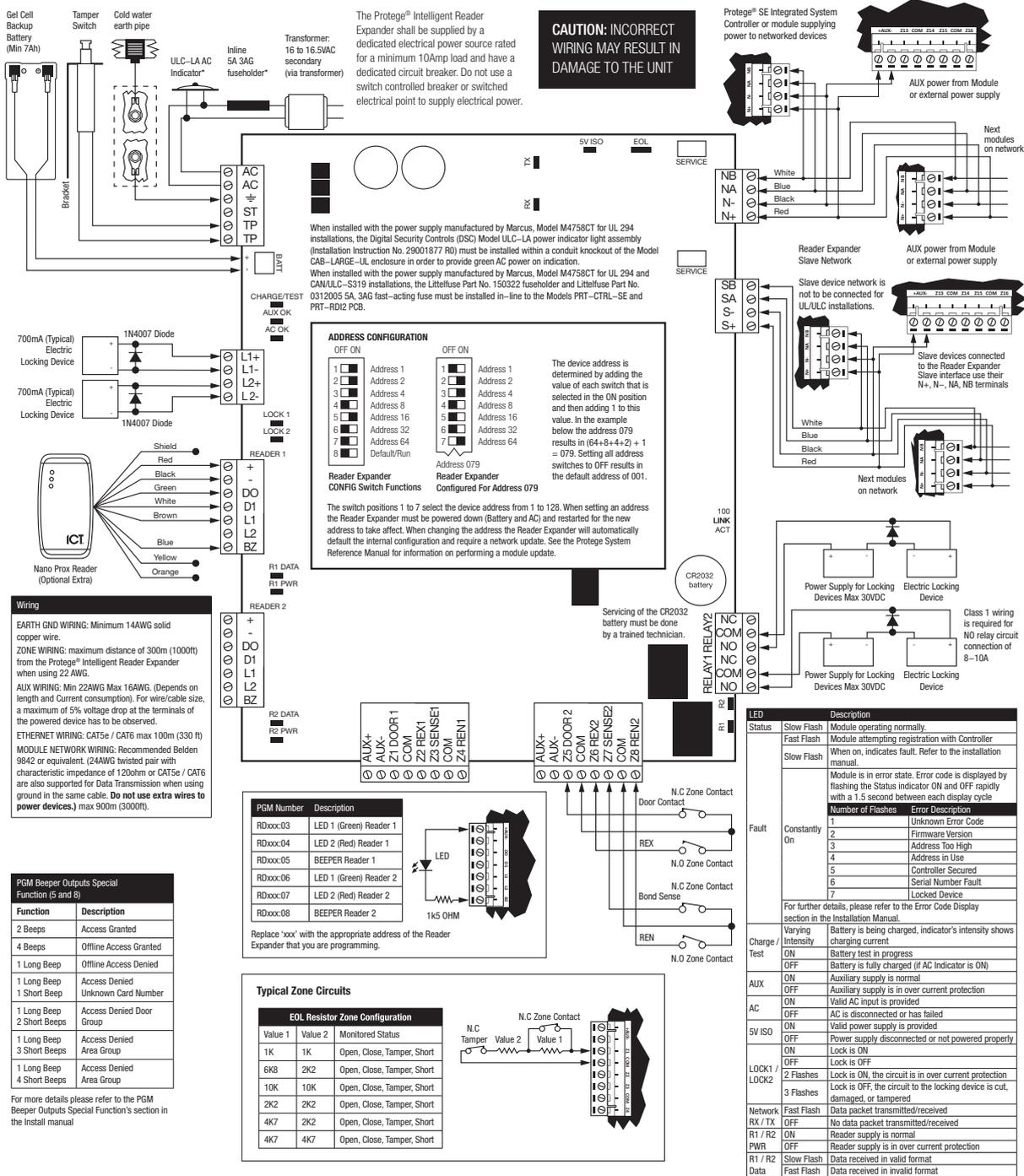
Electronic Access Control System Installations



All cabinet installations of this type must be located **inside the Protected Area**.

Cabinet Model	Manufacturer	UL/ULC Installation Listings
CAB-LARGE-UL	ICT	UL294, CAN/ULC-S319
D8108A	Bosch	UL294, CAN/ULC-S319

3.3 Wiring Diagram



3.4 Wiring

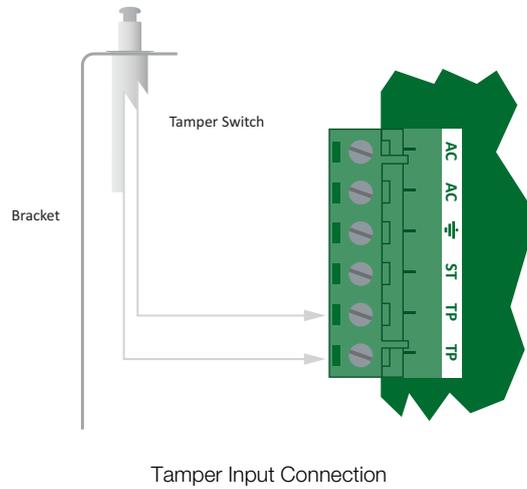


CAUTION: Incorrect wiring may result in damage to the unit.

- All output circuits comply with the requirements for inherent power limitation and are Class 2 except the battery wires and AC wires which are not power limited.
- A minimum of 1/4" (6.35mm) physical separation must be respected between power limited and non power limited wiring (Battery Wires and AC Wires).
- Do not route any wiring over circuit board. Maintain at least 25.4mm (1") separation.
- The connection to the mains supply must be made as per local authorities rules and regulations.

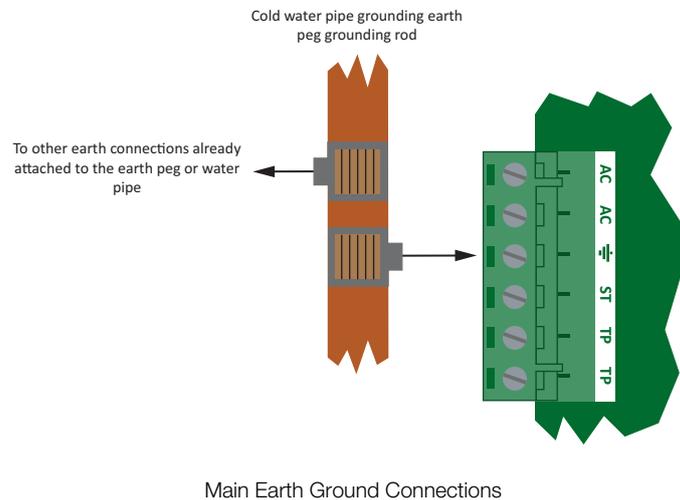
3.5 Cabinet Tamper Switch

The enclosure tamper input signals to the monitoring station or remote computer that the Reader Expander enclosure has been opened. The tamper input switch shall be mounted into the steel bracket provided and connected to the tamper connection terminals as shown in the diagram below. The tamper input opens and closes trouble zone RDxxx:01 on the Reader Expander.



3.6 Earth Ground Connection

The Reader Expander has a connection for earth ground. For best results a cold water pipe should be used with a pipe wiring clamp. If a cold water pipe is not available, connect to a suitable ground connection in the installation. A minimum 14AWG solid copper wire shall be used from the Reader Expander's earth connection point to the clamp on the cold water pipe. If other earth clamps are present at the same connection point connect the clamp below the existing units.



3.7 AC Power

The Protege Controller shall be supplied by a dedicated electrical power source rated for a minimum 10Amp load and have a dedicated circuit breaker. Do not use a switch controlled breaker or a switched electrical point to supply electrical power. Connect the primary (120VAC) of a 16 to 16.5 VAC, 60Hz, 40VA or 100VA transformer (refer to the table below) to the electrical circuit and run the secondary (16 to 16.5VAC) to the AC Input on the Controller terminals.

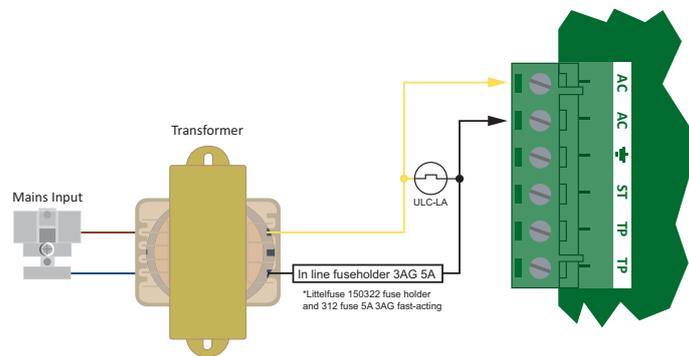
The following table outlines the transformers that shall be used in order to comply with UL and ULC installation standards.



When installed with the power supply manufactured by Marcus, Model M4758CT for UL 294 installations, the Digital Security Controls (DSC) Model ULC-LA power indicator light assembly (Installation Instruction No. 29001877 R0) must be installed within a conduit knockout of the Model CAB-LARGE-UL enclosure in order to provide green AC power on indication.

When installed with the power supply manufactured by Marcus, Model M4758CT for UL 294 and CAN/ULC-S319 installations, the Littelfuse Part No. 150322 fuseholder and Littelfuse Part No. 0312005 5A, 3AG fast-acting fuse must be installed in-line to the Models PRT-CTRL-SE and PRT-RDI2-PCB.

Transformer	Manufacturer	Transformer Type	Specification
TRI-PIT 1640C	Solex	PLUG IN Transformer	16.5VAC 40VA
NE-TP4016L	National Electronics	PLUG IN Transformer	16.5VAC 40VA
GF-4016L	GFX	PLUG IN Transformer	16.5VAC 40VA
M4758CT	MARCUS	HARDWIRE Transformer (requires Class 1 120VAC input)	16VAC 100VA



AC Power Connection

Specific regional regulations may allow the transformer to be mounted inside the cabinet enclosure. In this case wire the electrical circuit to the electrical termination point inside the cabinet enclosure and the secondary wires of the transformer to the AC Input on the Reader Expander. The earth wire shall be routed to the V- terminal on the Reader Expander when using an internal transformer.



Warning:

- This installation should be made by qualified service personnel and should conform to all local codes and in accordance with the National Electrical Codes (NEC US) or the Canadian Electrical Codes (CEC Canada).
- Termination of wiring to the Reader Expander while power is applied or the battery is connected may cause serious damage to the Reader Expander and will VOID ALL WARRANTIES OR GUARANTEES. Power the unit only after all wiring, configuration and jumper settings are completed.
- Extra care must be taken when wiring the AC inputs. Improper connection will cause permanent damage to the Reader Expander.

3.8 Battery Backup

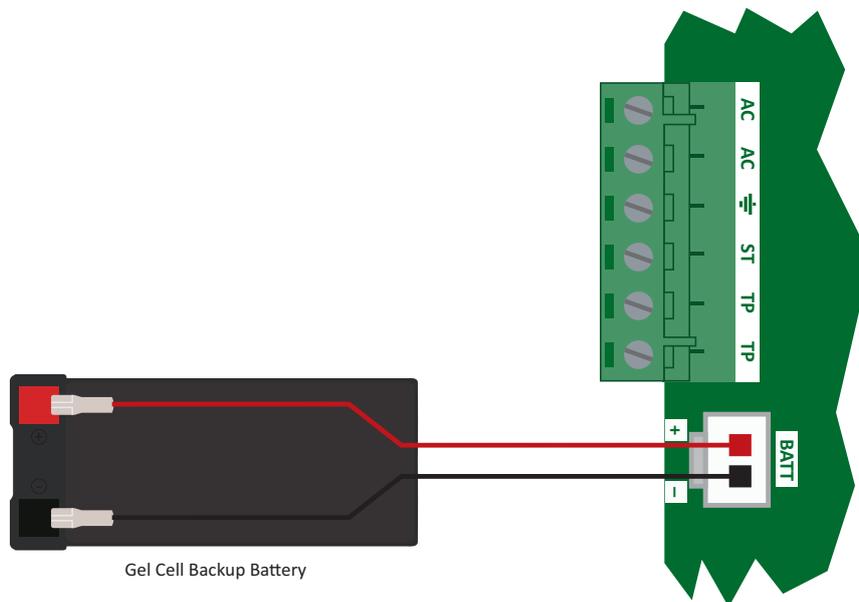
It is recommended that a minimum of a 7Ah battery is used as the main battery backup. From the accessory bag provided, connect the battery housing connector to the battery connector on the Controller. Connect the spade terminals to the battery as shown in the diagram below. Connection of the battery in reverse will not damage the Controller but will cause the electronic battery fuse (5A fast blow) to open. Prolonged reverse connection can cause damage to the Controller.



Please refer to the section Maximum Total Output Current : UL and ULC Installations for specific requirements on complying with UL and ULC installation standards.

Servicing of the battery circuit and replacement of lithium battery must be done by a trained technician.

Follow battery manufacturer instructions for installation, testing and maintenance.



Battery Connection

The battery test procedure uses a special algorithm to prevent deep discharge and increase battery endurance. A dynamic battery test is performed every ten minutes (default) when AC power is present. A battery trouble zone alarm will be generated if the battery is either disconnected or shows poor capacity. Battery fault conditions will activate the battery trouble zone.

If AC is not present, the Controller will monitor the battery for a low voltage level and will activate the battery trouble zone. The next dynamic battery test will occur 30 minutes after AC power has been restored. This delay allows the battery to achieve optimal charging during the first 30 minutes that power has been restored to the unit. Once the first test is completed the dynamic testing will return to the programmed value (default 10 minutes).

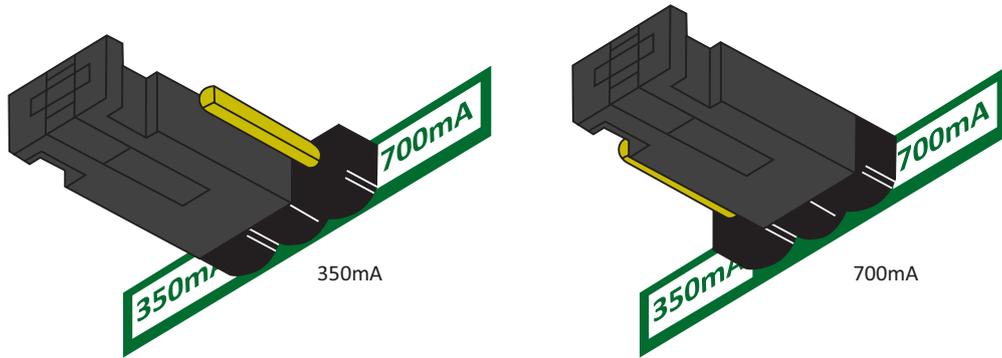
When power is first applied to the Controller, a dynamic battery test will be performed after 30 seconds. This allows the status and condition of the battery to be detected. On completion of this first test, the default testing period of 10 minutes will be resumed. This is a programmable setting in the Controller panel options. The test period can be changed as required by setting the battery test time in the Controller Configuration Menu.



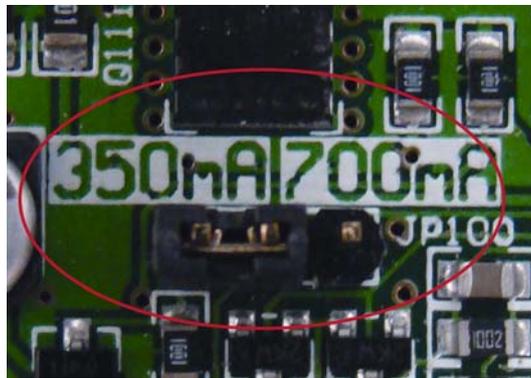
Warning: Only attach standard lead acid batteries. Do not connect the battery wires or battery housing connector of the Controller to any other ancillary device (siren, lock or mag clamp etc). Connection may cause erroneous faults or serious damage to the Controller and will VOID ALL WARRANTIES OR GUARANTEES.

3.9 Battery Charge Current Setting

To configure the Reader Expander manually for the charge current, select the appropriate battery current limit setting using the jumpers as shown below.



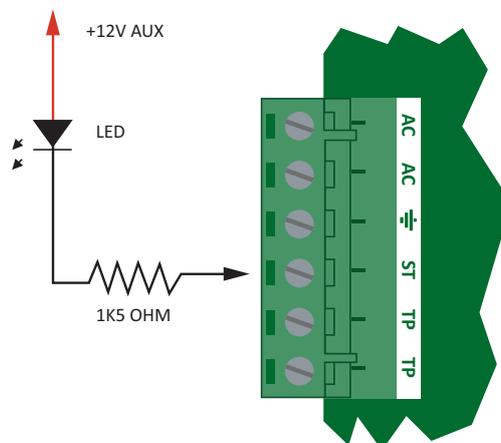
Battery Charge Jumper



Jumper Location

3.10 Status Indicator

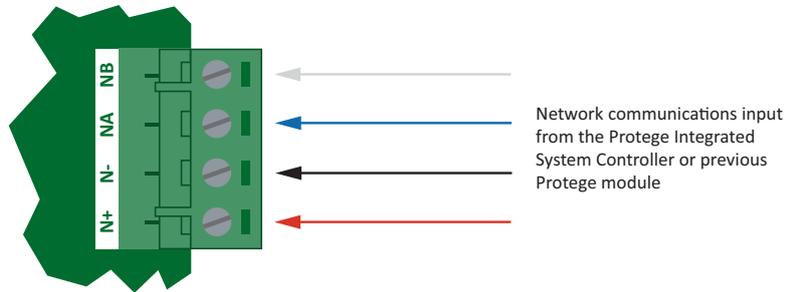
The status output will activate according to the status indicator on the Protege Reader Expander and can be used to provide signalling or indication of the Reader Expander status outside the enclosure. The following diagram shows the connection of an LED indicator to the status output.



External Status LED Connection

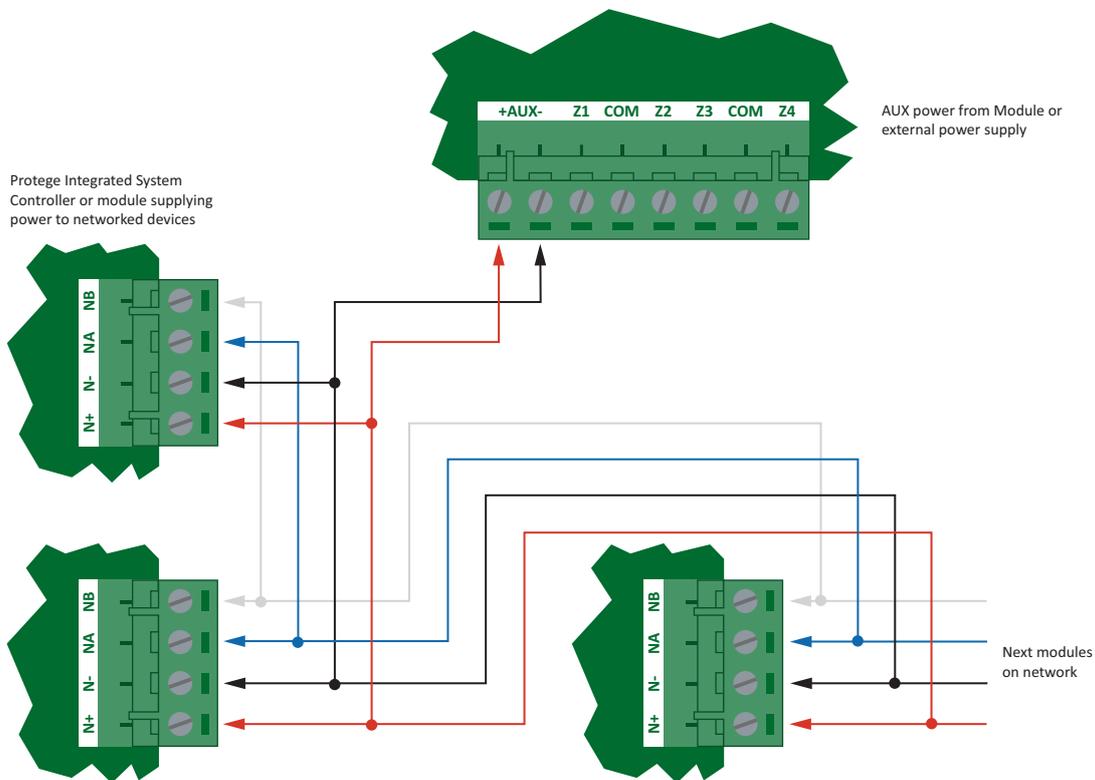
3.11 Encrypted Module Network

The Protege Reader Expander incorporates technically advanced encrypted RS-485 communications technology. The isolated communications interface offers full galvanic isolation to prevent ground loop noise and cross phase ground differential. The communication offers superior interference immunity. Connection of the communications shall be performed according to the following diagram.



Standard Communication Connection

Always connect the Protege Reader Expander's NA and NB terminals to the NA and NB terminals of the expansion devices and keypads. The N+ and N- must go to a 12V power supply source as shown below.



Network Power Connection

The above diagram shows a power connection taken from the auxiliary power outputs on the Reader Expander's zone terminals.

This connection is suitable for smaller systems provided that the:

- Maximum total output current,
- AUX DC output current,
- B1/B2 DC output current, and
- Total combined current

are ALL lower or equal to the values outlined in the Technical Specifications section. If these currents are exceeded, a separate power supply shall be used.



- High Rise Elevator Control is not evaluated for UL/ULC installations
- Slave Device Network is not to be connected for UL/ULC installations



Warning: The 12V N+ and N- communication input must be supplied from only one point. Connections from more than one 12V supply may cause failure or damage to the units supplying power.

The recommended module network wiring specifications are:

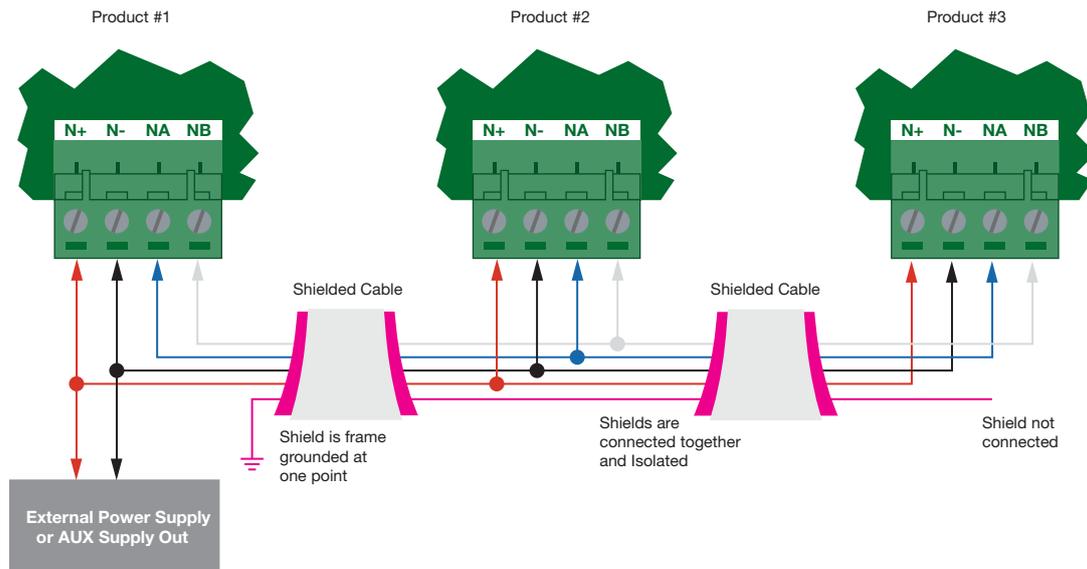
- CAT5e / CAT6 are also supported for data transmission when using ground in the same cable.
- 24AWG twisted pair with characteristic impedance of 120ohm
- Belden 9842 or equivalent.
- Maximum total length of cable is max 900m (3000ft)



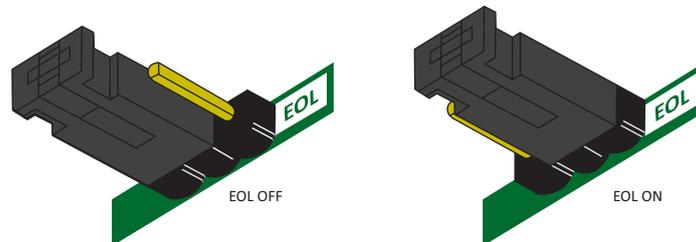
Warning: Unused wires in the cable must not be used to carry power to other devices.

Shielded Cables

- Shielded cables can be used in noisy environments (with RF and electromagnetic interference).
- If a shielded cable is used, the shield must be connected at only one end of the cable. DO NOT connect a shield at both ends. Refer to the following diagram for the recommended shield connection.



Recommended Shield Connection



EOL Jumper

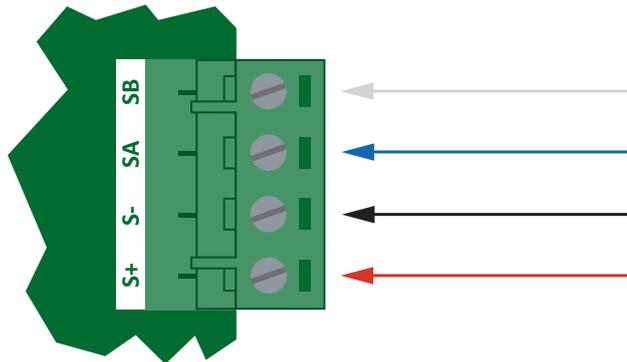


The EOL (End Of Line) jumper setting must be set in the on position for the first and last expansion device only.

3.12 Slave Device Network

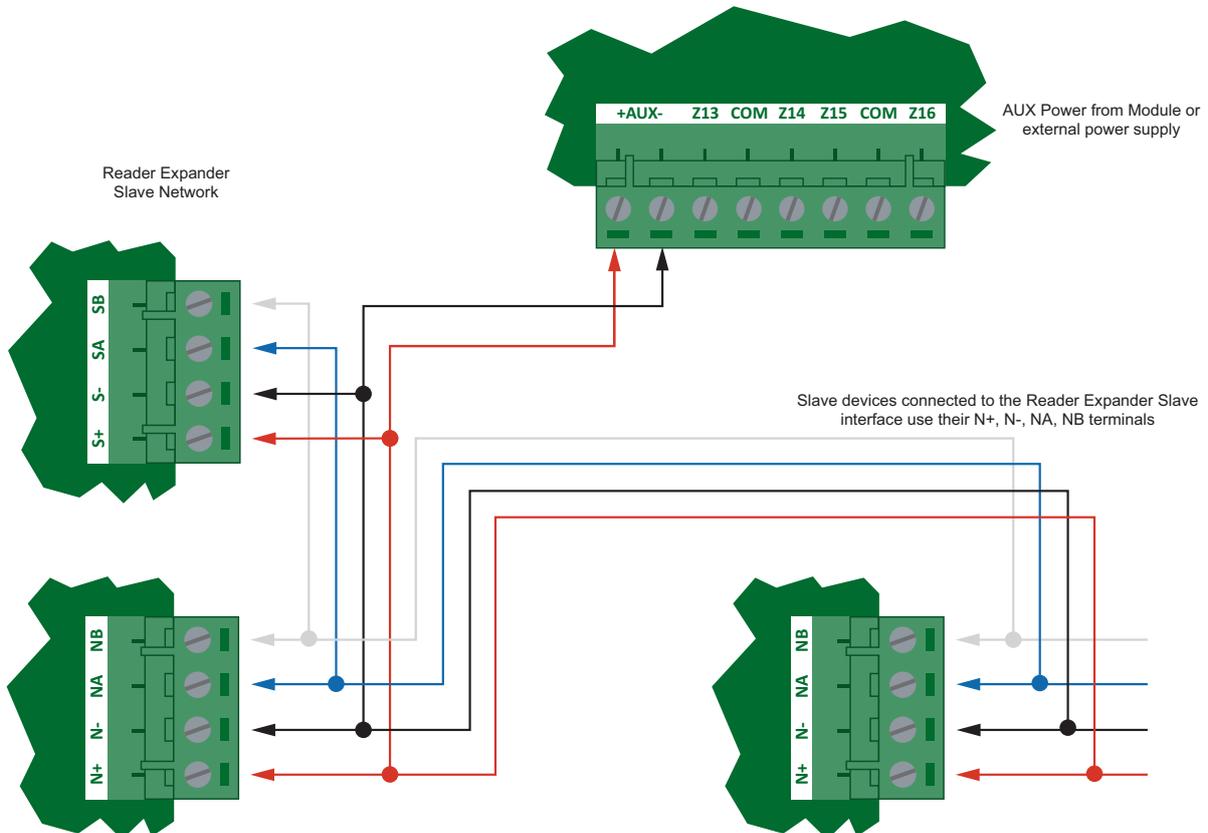
The Protege Reader Expander incorporates a secondary encrypted RS-485 communication interface that can be used to expand the functionality of the Reader Expander for the purpose of High Rise Elevator Control. A floor control module PRT-PX16 Protege 16 PGM Expander, set as a floor control device, is attached to the slave communication interface.

Connection of the communications shall be performed according to the following diagram. It is important that the S+ Slave Communications Power be supplied from an independent battery backed power supply unit or a module connected to the slave communication interface capable of supplying the required voltage to all devices on the slave RS485 network.



Slave Communications Connection

Always connect the Reader Expanders SA and SB terminals to the SA and SB terminals of the slave devices. The S+ and S- must go to a 12V power supply source as shown in the following diagram.



Slave Power Supplied by Module

The above diagram shows a power connection taken from the auxiliary power outputs on the Reader Expander's zone terminals.

This connection is suitable for smaller systems provided that the:

- Maximum total output current,
- AUX DC output current,
- B1/B2 DC output current, and
- Total combined current

are ALL lower or equal to the values outlined in the Technical Specifications section. If these currents are exceeded, a separate power supply shall be used.



If an external power supply is required, a UL 603 or UL 294 listed power-limited power supply must be used to comply with UL installation standards, and a CAN/ULC-S318 or CAN/ULC-S319 listed power-limited power supply must be used to comply with ULC installation standards.



Warning: The 12V S+ and S- Communication input must be supplied from only ONE point. Connections from more than one 12V supply may cause failure or damage to the Reader Expander or device supplying slave communication power.

The recommended module network wiring specifications are:

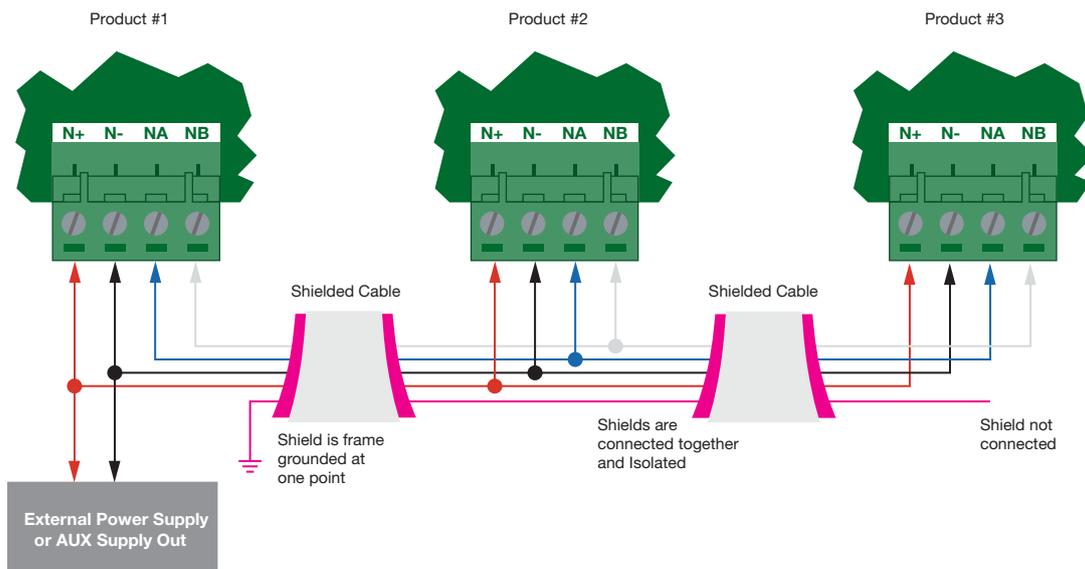
- CAT5e / CAT6 are also supported for data transmission when using ground in the same cable.
- 24AWG twisted pair with characteristic impedance of 120ohm
- Belden 9842 or equivalent.
- Maximum total length of cable is max 900m (3000ft)



Warning: Unused wires in the cable must not be used to carry power to other devices.

Shielded Cables

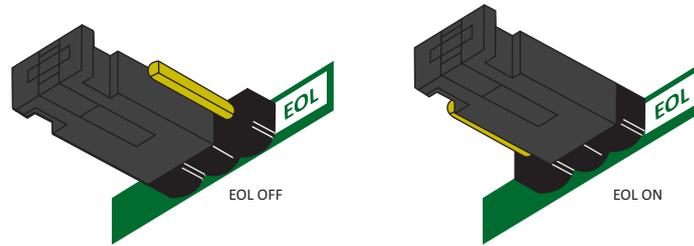
- Shielded cables can be used in noisy environments (with RF and electromagnetic interference).
- If a shielded cable is used, the shield must be connected at only one end of the cable. DO NOT connect a shield at both ends. Refer to the following diagram for the recommended shield connection.



Recommended Shield Connection



The EOL (End Of Line) jumper setting **MUST** be set in the ON position for the LAST slave module on the RS485 network. EOL is ON when the jumper is closest to the EOL text.



EOL Jumper

3.13 RS-485 Biasing Settings

The Protege Reader Expander has biasing settings for the module network. Biasing can be configured for either high or low (L indicates a low bias and H indicates high bias configuration). Both jumpers **MUST** be set to the same bias type.



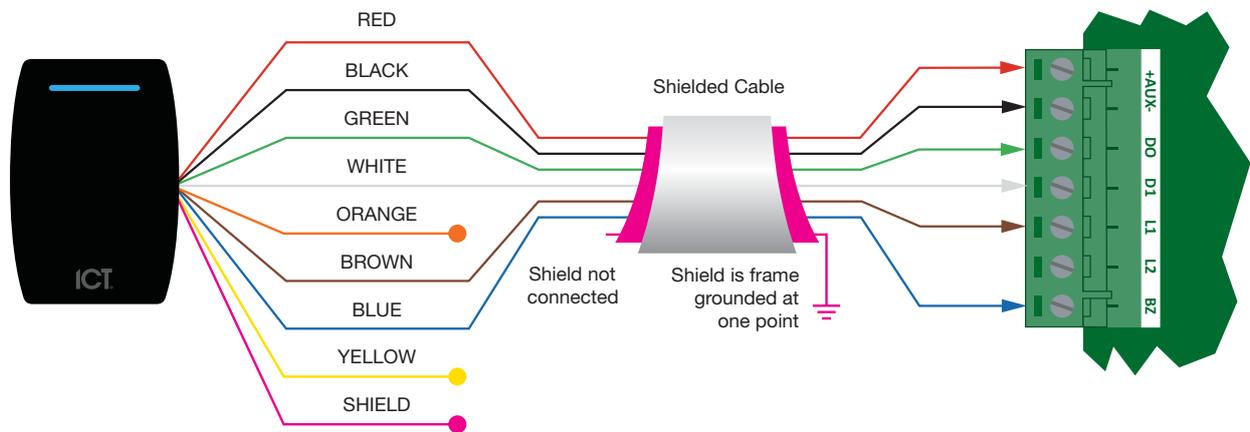
- Biasing shall only be set to LOW on ONE point on any single segment of the RS-485 network. All other devices on the same segment shall be set to the middle position which is no biasing.
- By default, the PRT-CTRL System Controller has the jumpers for the biasing set to low and the EOL jumper on. This is also the same default configuration for the slave communication port on the PRT-RDI2 Protege Intelligent Reader Expander.

4 Door Access Control

The Reader Expander allows the control of two separate access controlled doors used for entry or exit only, and a single access controlled door using entry/exit.

4.1 Reader Connection

The Protege Reader Expander allows the connection of 2 reading devices or 4 Wiegand reading devices and the ability to control 2 doors (Entry or Exit Only) or 1 door (Entry and Exit). The following diagram shows the connection of standard Wiegand Reader with the Protege Reader Expander controlling an Access Door and Entry/Exit Door.



Standard Card Reader Connection

The card reader must be connected to the Controller port using a shielded cable. Always refer to the card reader manufacturer for detailed installation guidelines. The shield connection must only be connected at one end of the cable in the metallic enclosure (frame grounded). The beeper output on the Controller provides diagnostic information to the end user and installer when access is denied or the unit is operating offline.

Warning:



- Do not connect the shield to a AUX- or 0V connection.
- Do not join the shield and black wires at the reading device.
- Do not connect the shield to any shield used for isolated communication.

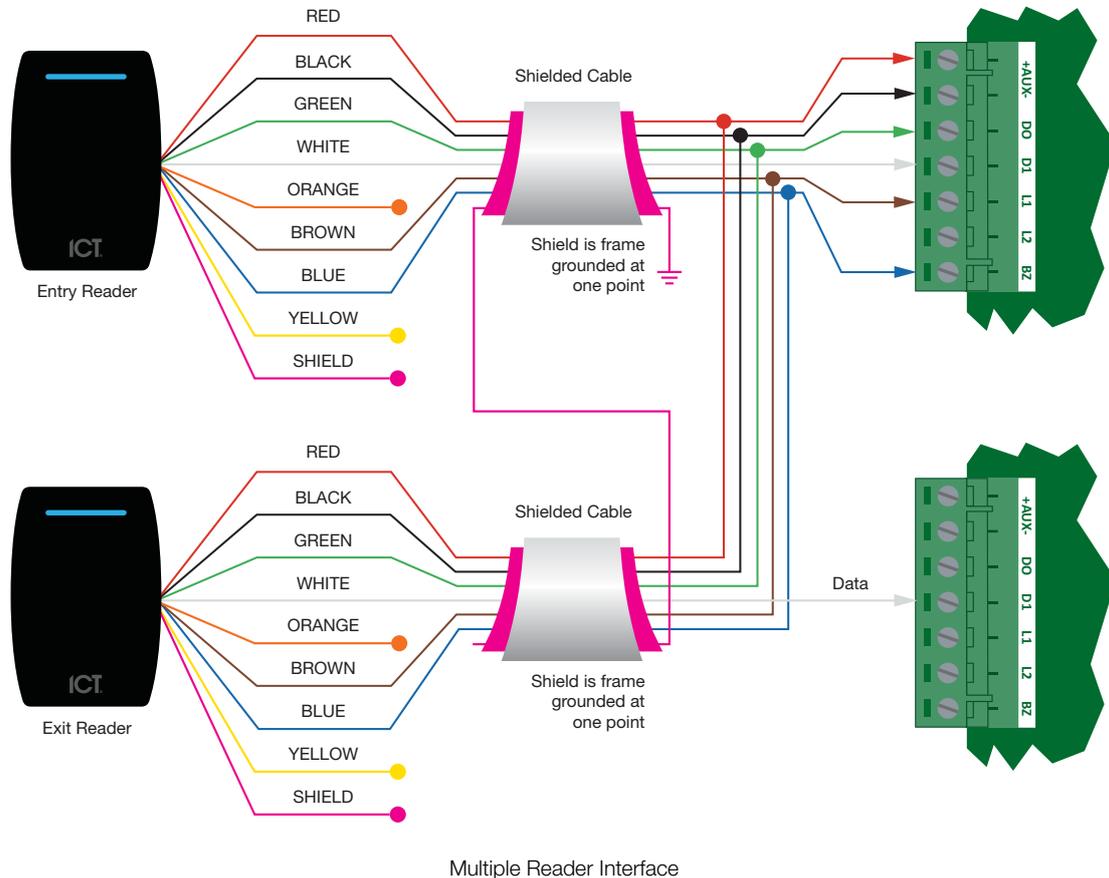


Compatible access control card reader communication formats are: 26-, 34-, 37-Bit Wiegand, RS-232, RS-485, and Smart RS-485.

4.2 Multiple Wiegand Reader Connection

When operating the reader expander in multiple reader mode the Protege Reader Expander allows the connection of 4 wiegand reading devices controlling two doors each with Entry/Exit readers.

When connecting Wiegand readers in multiple reader mode the secondary reader that is connected will have all connections wired to the same port as the primary card reader with the DATA 1 connection wired to the opposite reader connection DATA 1 input.



The card reader must be connected to the reader port using a shielded cable. Always refer to the card reader manufacturer for detailed installation guidelines. The shield connection must only be connected at one end of the cable in the metallic enclosure (frame grounded). The reader that is multiplexed in to the alternate reader port will operate as the exit reader and the normal reader connection shall be programmed to operate as the Entry Reader.

Warning:



- Do not connect the shield to a AUX- or 0V connection.
- Do not join the shield and black wires at the reading device.
- Do not connect the shield to any shield used for isolated communication.

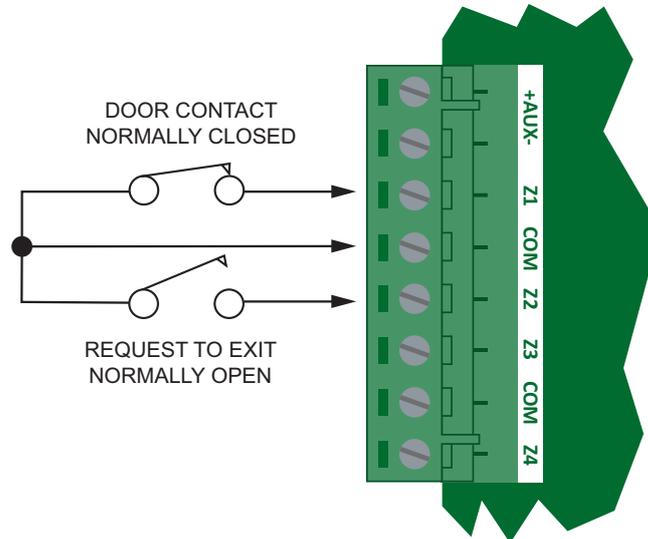
4.3 Magnetic Reader Connection

The Protege Reader Expander allows the connection of standard magnetic track 2 format cards and provision is made in the software for a large number of formats. Formats include BIN (Bank Identification Number) for ATM access control, Full 16 Character decoding, and a range of first 4, 5 and 6 card number encoding.

For information on the use of magnetic readers please refer to Application Note AN 009 Connecting Magnetic Card Readers available at www.incontrol.co.nz.

4.4 Door Contact Connection

The Reader Expander allows the connection of up to 4 contacts for monitoring and controlling access control doors. Each zone on the Reader Expander can be used for the door function that is automatically assigned and as a normal zone input on the system. The following example shows the connection of a normally closed door position monitoring contact to monitor the open, closed, forced and alarm conditions of the door.



Standard Door Contact Inputs



When connected the REX input can be programmed to operate regardless of the door contact state. The REX input can also be programmed to recycle the door alarm time to prevent nuisance alarms when the door is held open to permit longer entry.

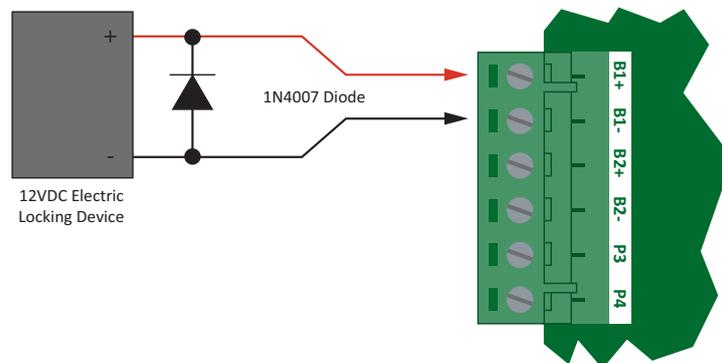


REX and REN devices must be listed to UL 294 for UL installations and CAN/ULC-S319 for ULC installations, and be compatible with the system.

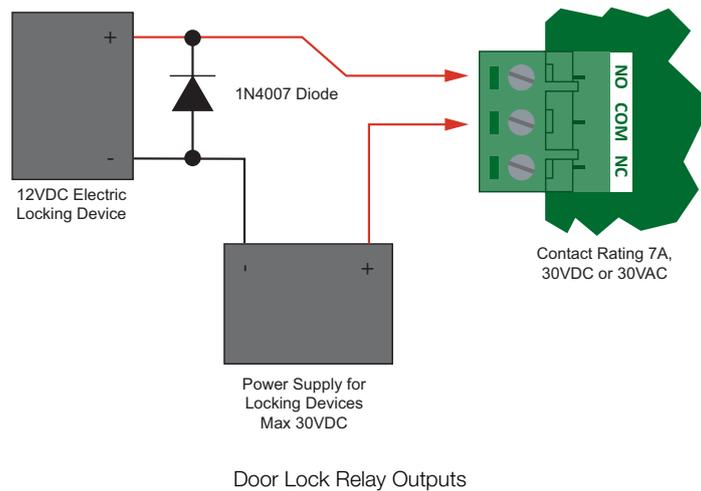
4.5 Door Lock Connection

The Protege Reader Expander provides a connection for 2 electric strike locks with full monitoring of the lock circuit for tamper and over current/fuse blown conditions. The door lock monitoring can be disabled if it is not required. For information on the LOCK control status, refer to the Indication section on page.

For locking devices that have different voltage or current requirements than is available at the L1+/- or L2+/- terminals, a FORM C relay contact is also provided, with the RELAY 1 contacts operating in parallel with L1 output and the RELAY 2 contacts operating in parallel with the L2 output.



Door Lock Powered Outputs



- When using a door with an entry and exit reader, the LOCK output shall be connected to LOCK 1, and enable the swap lock option for the second reader input to allow the reader LED's to display the correct status.
- The 1N4007 diode (as shown in the above diagrams) is supplied with the Protege Reader Expander and **MUST** be installed at the electric strike terminals.



Class 1 wiring is required for NO relay circuit connection of 8-10A

5 Zone Inputs

The Protege Reader Expander has 8 Zone Inputs. The reader expander also monitors 16 trouble zones used to report trouble conditions. A trouble zone is in most cases not physically connected with a device, rather it is related within the system. For example, a module communication fault causes a trouble zone to open as a result of the communication failure.

5.1 Zone Inputs

The Protege Reader Expander can monitor the state of up to 8 zone inputs such as magnetic contacts, motion detectors and temperature sensors. Devices connected to these zones can be installed to a maximum distance of 300m (1000ft) from the Controller when using 22 AWG. The Controller supports normally opened and normally closed configurations with or without EOL resistors on a per zone configuration setting.

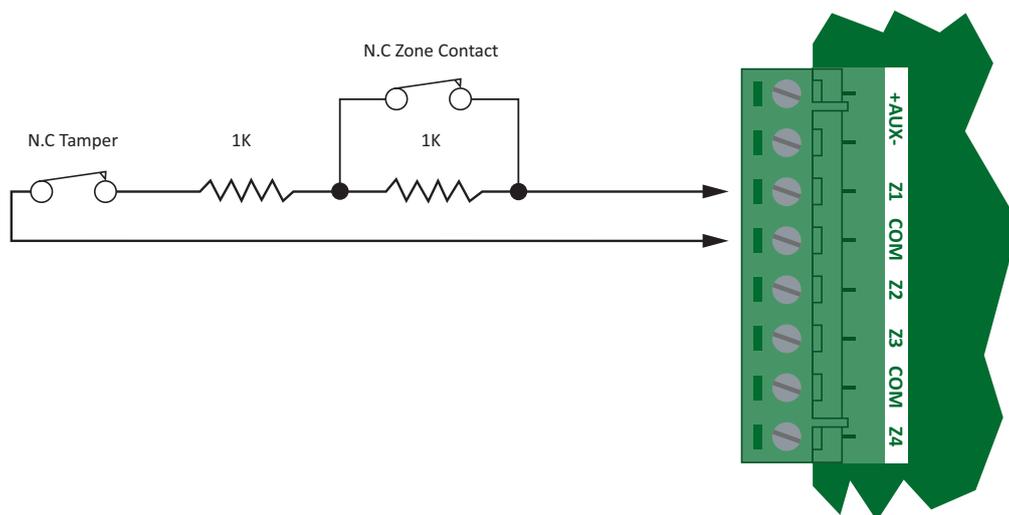


- Magnetic contacts shall be listed to UL 634 to comply with UL installation standards and ULC/ORD-C634 to comply with ULC installation standards.
- Motion detectors and temperature sensors shall be listed to UL 639 to comply with UL installation standards and ULC-S306 to comply with ULC installation standards.
- The PRT-RDI2-PCB has been evaluated for UL 294 and CAN/ULC-S319 standalone access control.

Zones can be programmed from the Protege LCD Keypad (PRT-KLCD) or using the Protege System Management Suite (PRT-SMGT). RD001:01 to RD001:08 represent Zone 1 to Zone 8 on the Protege Reader Expander (Substitute the module address for the appropriate address being programmed).

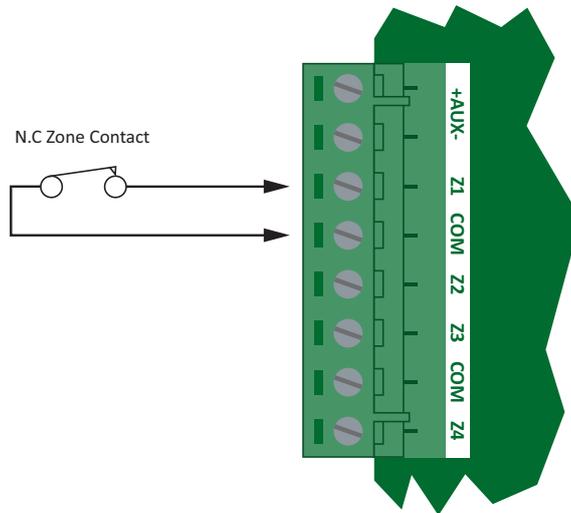
When using a zone with the EOL resistor configuration, the controller generates an alarm condition when the state of a zone changes and generates a tamper alarm condition when a wire fault (short circuit) or a cut wire (tampered) in the line occurs.

When using the EOL resistor configuration, the EOL resistor option must be turned on for the zone(s) so that the tamper and short states can be monitored (refer to Zones Section in the Protege Reference Manual).



EOL Resistor Zone Configuration

Each zone input can use a different input configuration. To program a large number of zones, with a single configuration type, use the Multiple Selection feature in the Protege System Management Suite application. When using the No Resistor configuration, the Controller only monitors the opened and closed state of the connected input device generating the (OPEN) Alarm and (CLOSED) Sealed conditions.



Normally Closed Zone Configuration No Resistors

5.2 Resistor Value Options

When using the EOL resistor configuration, the EOL resistor option must be configured based on the site requirements. Note that not all resistor options are supported on all Protege field modules. (Refer to Zones Section in the Protege Reference Manual).

Value 1	Value 2	Monitored Status
1K	-	Open, Closed
<5K7	-	Open, Closed
No Resistors	-	Open, Closed
1K	1K	Open, Closed, Tamper, Short
6K8	2K2	Open, Closed, Tamper, Short
10K	10K	Open, Closed, Tamper, Short
2K2	2K2	Open, Closed, Tamper, Short
4K7	2K2	Open, Closed, Tamper, Short
4K7	4K7	Open, Closed, Tamper, Short

5.3 Trouble Zone Inputs

Each reader expander can monitor up to 16 trouble zones. Trouble zones are used to monitor the status of the reader expander and in most cases are not physically connected to an external zone. For example, trouble zone RD001:06 is used to monitor door 1 for a forced open condition and will generate an alarm state if the door is forced.

The following table details the trouble zones that are configured in the system and the trouble type and group that they activate.

Zone Number	Description	Type	Group
RDxxx:01	Module Tamper	System Tamper	System
RDxxx:02	AC failure	Power Fault	General
RDxxx:03	Low Battery	Power Fault	General
RDxxx:04	Aux Failure	Power Fault	General
RDxxx:05	Lock Failure	Power Fault	General
RDxxx:06	Door 1 Forced	Forced Door	Access
RDxxx:07	Door 2 Forced	Forced Door	Access
RDxxx:08	Door 1 Left Open	Left Open	Access
RDxxx:09	Door 2 Left Open	Left Open	Access
RDxxx:10	Reader 1 Voltage	Power Fault	General
RDxxx:11	Reader 2 Voltage	Power Fault	General
RDxxx:12	Reader 1 Tamper	System Tamper	System
RDxxx:13	Reader 2 Tamper	System Tamper	System
RDxxx:14	Door 1 Lockout	Attempts	Access
RDxxx:15	Door 2 Lockout	Attempts	Access
RDxxx:16	Module Offline	Module Offline	System

Replace 'xxx' with the appropriate address of the Reader Expander that you are programming.

6 Programmable Outputs

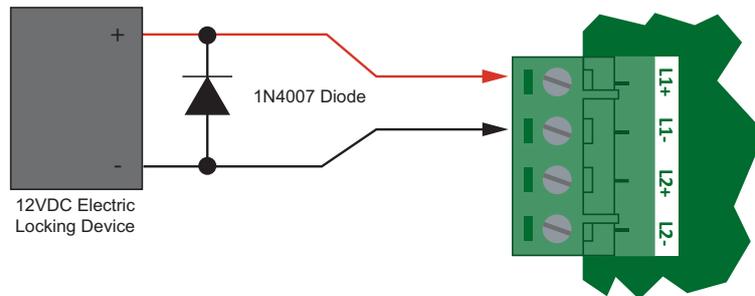
The Protege Reader Expander has 4 Programmable Outputs (PGMs). The PGMs are used to activate the Electric Door Locks, Sirens, Lighting Control and Relay Accessory Products.

6.1 Lock PGM Outputs (1 and 2)

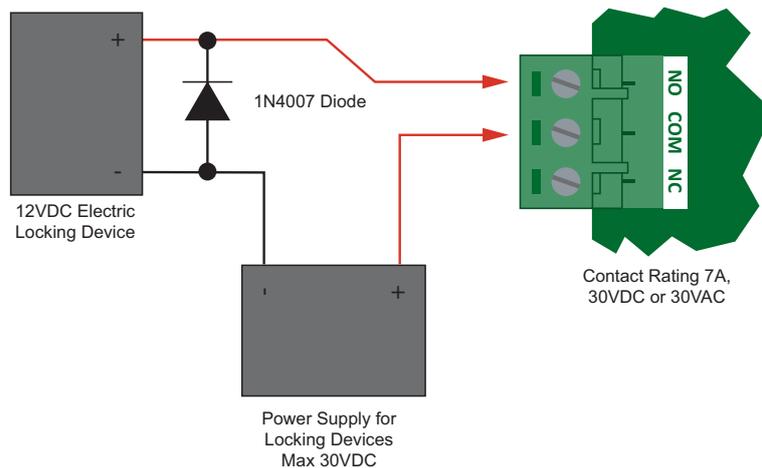
The + and - terminals of Lock 1 (PGM1 RD001:01) and Lock 2 (PGM2 RD001:02) are used to power electric door strikes and other lock control devices that require a steady voltage output. The lock outputs supply 12Vdc upon an unlock or activation and support up to 1000mA (1A) inrush and 700mA continuous operation. The lock output uses an electronically fused circuit and automatically shuts down if the current exceeds 1.1A.

If the load on the lock terminals returns to normal ($\leq 1A$), the reader expander will reinstate power to the lock terminals if they are activated.

For locking devices that have different voltage or current requirements than is available at the L1+/- or L2+/- terminals, a FORM C relay contact is also provided, with the RELAY 1 contacts operating in parallel with Lock 1 (PGM1 RD001:01) output and the RELAY 2 contacts operating in parallel with the Lock 2 (PGM2 RD001:02) output.



Lock Output PGM1/2 Connection (PGM 1 Shown)



Lock Output PGM1/2 Relay Outputs

When the lock output is not used, the appropriate trouble zone will be activated (refer to the Trouble Zone Input section (see page 25)). To avoid this, connect a 1k Ω resistor across the lock output. If the Lock is not being used for another function, and the trouble zone is not programmed in the system, no resistor is required.

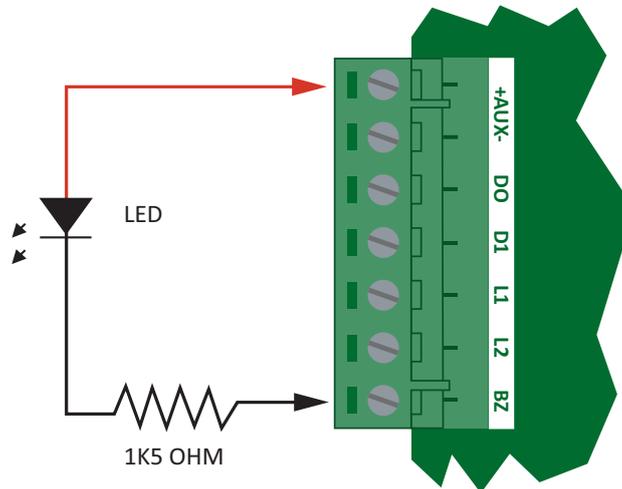
6.2 Standard PGM Outputs (3 To 8)

The PGM outputs 3, 4, 5, 6, 7 and 8 on the Protege Reader Expander are open collector outputs and switch to a ground connection.

The PGMs have a default pre-programmed function as detailed in the following table and are used to control the indicator and audible outputs on the attached reading device. These functions may be disabled by programming the appropriate setting in the reader expander configuration.

PGM Number	Description
RDxxx:03	LED 1 (Green) Reader 1
RDxxx:04	LED 2 (Red) Reader 1
RDxxx:05	BEEPER Reader 1
RDxxx:06	LED 1 (Green) Reader 2
RDxxx:07	LED 2 (Red) Reader 2
RDxxx:08	BEEPER Reader 2

Replace 'xxx' with the appropriate address of the Reader Expander that you are programming.



Example Open Collector Output Connection (LED)



The PGM outputs 3 to 8 can switch to a maximum capacity of 50mA each, exceeding this amount will damage the PGM output.

6.3 PGM Beeper Outputs Special Functions (5 and 8)

The PGM beeper outputs 5 and 8 on the Reader Expander provide special diagnostic information when a card is presented. The following table shows the beeper modes of operation.

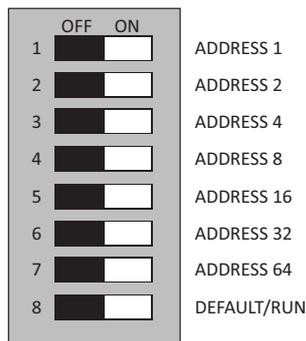
Function	Description
2 Beeps	Access Granted. The lock will activate and allow access to the door the card has been presented.
4 Beeps	Offline Access Granted. This is generated ONLY if the Reader Expander is operating offline and the mode of offline operation allows access.
1 Long Beep	Offline Access Denied. This is generated ONLY if the Reader Expander is operating offline and the mode of offline operation prevents this card from being allowed access.
1 Long Beep 1 Short Beep	Access Denied Card Number Not Known. The card number is not known in the system. The card that has been presented to the reader could not be matched to a valid user in the system.
1 Long Beep 2 Short Beeps	Access Denied Door Group. The user is denied access because they do not have access to the door. This error will also be generated if the door group is not set or the door group schedule is not valid.
1 Long Beep 3 Short Beeps	Access Denied Area Group. The user is denied access because they do not have access to the area that is being controlled by the door. If the area that the door is associated with is armed, and the user does not have this area in their area disarm group, they will be denied access. This also depends on the area group settings for the door.
1 Long Beep 4 Short Beeps	Access Denied Access Level. The user is denied access because they do not have a valid access level or the access level they are assigned is currently outside the programmed schedule.

7 Configuration Switch

The addressing of the Reader Expander allows up to 128 devices to be connected to the system controller. The 'CONFIG' configuration DIP switch allows each Reader Expander to have a unique address.

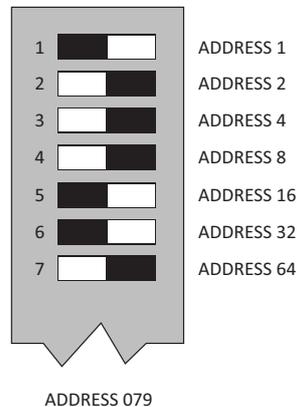
7.1 Address Configuration

The switch positions 1 to 7 select the device address from 1 to 128. When setting an address, the Reader Expander must be powered down (Battery and AC) and restarted for the new address to take effect. When changing the address, the Reader Expander will automatically default the internal configuration and require a network update. See the Protege System Reference Manual for information on performing a module update.



Reader Expander CONFIG Switch Functions

The device address is determined by adding the value of each switch that is selected in the ON position and then adding 1 to this value. In the example below the address 079 results in $(64+8+4+2) + 1 = 079$. Setting all address switches to OFF results in the default address of 001.



Reader Expander Configured For Address 079

8 Status Indication

The Reader Expander includes comprehensive diagnostic indicators that can aid the installer in diagnosing faults and conditions. In some cases, an indicator may have multiple meanings depending on the status indicator display at the time.

8.1 Status Indicator

The Status Indicator is located in the centre of the PCB and indicates the status of the Protege Reader Expander. If the Protege Reader Expander is operating normally the LED will indicate this by **FLASHING** at 1 second intervals. **FLASHING** rapidly at 250ms intervals indicates that the Reader Expander is attempting to register with the system controller, or that communication has failed and the Reader Expander is retrying the request.



When the fault indicator is ON the status indicator will show an error code. Refer to the section on Error Code Display (see page 32) for more information.

8.2 Fault Indicator

The fault indicator LED is identified by the text 'FAULT' and is located in the centre of the PCB. When the fault indicator is **FLASHING** the Reader Expander is operating in firmware update mode, or there is no firmware loaded. The fault indicator when **ON** indicates that an error has occurred while trying to register with the system controller. The status indicator will flash a number of times indicating an error code. Refer to the section on Error Code Display (see page 32) for more information.

8.3 Charge/Test Indicator

The charge and test indicator serves two functions; it will indicate that a Battery Test is in progress, and that Battery Charging is being performed. When AC is present the battery charging current will be indicated by a varying intensity level on this indicator. This indicator will be **ON** when a battery test is in progress by illuminating brightly for 30 seconds every 10 minutes.

This indicator is identified by the text **CHARGE/TEST**. This indicator does not function when AC is not present. For more information, refer to the section on Battery Backup.

8.4 Auxiliary OK Indicator

Auxiliary voltage is supplied to the AUX+ outputs through the auxiliary fuse. If auxiliary supply is normal the the **AUX OK** indicator will be illuminated. If the auxiliary fuse is damaged, the indicator will be off.

8.5 AC OK Indicator

When a valid AC input is provided, the **AC OK** indicator will illuminate. When the AC is disconnected or has failed, the indicator will be off.

8.6 5V Isolated Power Indicator

The Reader Expander communicates using an isolated RS-485 interface for optimal performance and this requires an isolated supply on the N+ and N- terminals. When a valid power supply is available the '5V ISO' indicator will be **ON** for the interface. The '5V ISO' indication is located at the top of the network isolated interface.

8.7 Lock 1/Lock 2 Indicators

The Lock 1 and Lock 2 indicators will show the status of the Lock Output and the over current or circuit fault conditions.

ON Lock is **ON**.

TWO FLASHES Lock is **ON**, the circuit is in Over Current Protection or the fuse has blown.

THREE FLASHES Lock is **OFF**, the circuit to the locking device is cut, damaged or tampered.

8.8 Network RX/TX Indicator

The Network Receive and Transmit Data indicators are located on the top right side of the PCB beside the network communication interface. The indicator shows when the Protege Reader Expander is transmitting and receiving information from the module communications interface and is identified by the text 'RX' and 'TX'. When the indicator is **ON** data is being transmitted or received.

8.9 R1 and R2 Power Indicator

The R1 and R2 power indicators are located beside the reader 1 and reader 2 connection terminals. Reader voltage is supplied to the R+ outputs through the reader fuse. If the reader supply is normal the indicator will be **ON**. If the indicator is **OFF** the reader fuse is damaged.

8.10 R1 and R2 Data Indicator

The R1 and R2 data indicators are located beside the reader 1 and reader 2 connection terminals. A short **FLASH** (<250 Milliseconds) on the Data Indicator will show that data was received but was not in the correct format. A long **FLASH** (>1 Second) indicates that the unit has read the data and the format was correct.

9 Error Code Indication

When the Reader Expander attempts to register or communicate with the system controller a registration error can be generated indicating that it was not successful.

9.1 Error Code Display

The following table is only valid if the FAULT indicator is **ON** and the STATUS indicator is **FLASHING GREEN**.

If the fault indicator is **FLASHING** the Reader Expander requires a firmware update or is currently in firmware update mode.

The status indicator will **FLASH GREEN** with the error code number. The error code number is shown with a 250ms **ON** and **OFF** period (duty cycle) with a delay of 1.5 seconds between each display cycle.

Flash	Error Description
1	Unknown Error Code The error code returned by the system controller could not be understood by the Reader Expander. Contact Integrated Control Technology.
2	Firmware Version The firmware version on the Reader Expander is not compatible with the system controller. To clear this error, update the module using the module update application.
3	Address Too High The Reader Expander address is above the maximum number of Reader Expanders available on the system controller. To clear this error change the address to one within the range set on the system controller, restart the Reader Expander by disconnecting the power.
4	Address In Use The Address is already in use by another Reader Expander. To clear this error set the address to one that is currently not occupied by a Reader Expander. Use the view network status command to list the attached devices, or the network update command to refresh the registered device list.
5	Controller Secured Registration Not Allowed Controller is not accepting any module registrations. To allow module registrations use the network secure command to change the secure setting to not secured.
6	Serial Number Fault The serial number in the device is not valid. Return the unit to the distributor for replacement.
7	Locked Device The Reader Expander or system controller is a locked device and cannot communicate on the network. Return the unit to the distributor for replacement.

10 Technical Specifications

The following specifications are important and vital to the correct operation of the PRT-RDI2-PCB Protege Intelligent Reader Expander. Failure to adhere to the specifications will result in any warranty or guarantee that was provided becoming null and void.

Integrated Control Technology continually strives to increase the performance of its products. As a result these specifications may change without notice. We recommend consulting the ICT website (<http://www.ict.co>) for the latest documentation and product information.

Operating Voltage	16 to 16.5VAC secondary (via transformer)
Operating AC Input Current	3.15A @ 16.5VAC, 3.3A @ 16VAC when Total Combined Current = 2.5A 2.2A @ 16.5VAC, 2.25A @ 16VAC when Total Combined Current = 1.7A
Operating Current	120mA (Typical)
Total Combined Current	1.7A (Max) using a 37/40VA transformer 2.5A (Max) using a 60VA or greater transformer Electronically limited at 2.5A
AUX DC Outputs	11.0V-12.3V, 700mA (Typical) Electronic Shutdown at 1.1A
L1/L2 DC Outputs (Continuous)	11.0V-12.3V, 700mA (Typical) Electronic Shutdown at 1.1A
L1/L2 DC Outputs (Inrush)	1000mA (1A)
R1/R2 DC Outputs (Continuous)	11.0V-12.3V, 700mA (Typical) Electronic Shutdown at 1.1A
Battery Charging	350mA/700mA
Battery Low	11.2VDC
Battery Restore	12.5VDC
Electronic Disconnection	9.4VDC
Communication (Serial, COM1 Master and COM2 Slave)	2 Isolated RS-485 Communication Interface Port 12VDC @ 28mA. (Input)
Readers (Standard Mode)	2 Wiegand or clock data readers providing one Entry/Exit Door or two Entry/Exit only Doors
Readers (Multiplex-reader Mode)	4 Wiegand Readers (connected in Multiplex Reader mode) providing any combination of Entry or Exit for two Doors
Tamper Input	Dedicated Hardware Tamper Input
PGM Outputs	6 50mA (Max) Open Collector Output for reader LED and beeper or general functions
Relay 1 / Relay 2 Outputs	Contact Rating 7A, 30VDC or 30VAC (power factor of 0.6)
Status Output	1 50mA (Max) Open Collector Output
Operating Temperature	0° - 50° Celsius (32° - 122° Fahrenheit)
Storage Temperature	-10° - 85° Celsius (14° - 185° Fahrenheit)
Humidity	0%-93% non-condensing, indoor use only (Relative Humidity)
PCB Dimensions	234mm X 183mm X 35mm (9.21" X 7.2" X 1.37")
Weight	339g (11.95oz)



Warning: The total combined current must not exceed a maximum of 1.7A if a 37/40VA transformer is used, or a maximum of 2.5A if a 60VA or greater transformer is used. The transformer can be damaged if the total combined current exceeds its capability. The total combined current is the sum of the operating current, charging current, and DC Outputs (AUX, L1 and L2, R1 and R2). Please refer to the following Current and Validations Examples for more details.



It is important that the unit is installed in a dry cool location that is not affected by humidity. Do not locate the unit in air conditioning or a boiler room that can exceed the temperature or humidity specifications.

The isolated communications interface on the Protege Reader Expander uses full galvanic isolation to prevent ground loop noise and cross phase ground differential. This is a very important feature of the product family and the correct connection of power to this isolated section will ensure the correct operation of the communications network. Failure to apply power to the communication interface will prevent the operation of the communication interface.

10.1 Current and Validation Example 1

The example shown below refers to the specifications needed to help ensure the correct installation of the Protege Reader Expander. Specifications have to be validated to ensure that individual maximum currents and total combined current are not exceeded.

Using a 40VA Transformer

External Devices Connected to Panel

2 x PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC) connected on Reader 1 and Reader 2 ports

2 x REX (Request to Exit) PIR Motion Detectors connected on AUX Output

Current Consumption

Total Combined Current Available	1.7A (1700mA)
Operating Current	120mA (Typical)
Battery Charging	350mA (Standard Current Charging)
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
Total Consumption	810mA

Validation

Is the total DC Output (AUX1) current less or equal to 700mA?	Yes, it is 100mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R1) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R2) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is the total combined current less or equal to 1.7A (1700mA)?	Yes, it is 810mA	<input checked="" type="checkbox"/>

10.2 Current and Validation Example 2

The example shown below refers to the specifications needed to help ensure the correct installation of the Protege Reader Expander. Specifications have to be validated to ensure that individual maximum currents and total combined current are not exceeded.

Using a 80VA Transformer

External Devices Connected to Panel		
2 x PRX-NPROX Nano Prox Card Readers (120mA @ 13.8VDC) connected on Reader 1 and Reader 2 Outputs		
2 x REX (Request to Exit) PIR Motion Detectors connected on AUX Output		
2 x Electric Locking Devices (520mA @ 13.8VDC) connected on Lock Outputs		
Current Consumption		
Total Combined Current Available	2.5A (2500mA)	
Operating Current	120mA (Typical)	
Battery Charging	700mA (High Current Charging)	
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)	
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)	
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)	
L1 Output	Electric Locking Device (520mA @ 13.8VDC)	
L2 Output	Electric Locking Device (520mA @ 13.8VDC)	
Total Consumption	2.2A (2200mA)	
Validation		
Is the DC Output (AUX) current less or equal to 700mA?	Yes, it is 100mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R1) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R2) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is L1 current output less or equal to 700mA?	Yes, it is 520mA	<input checked="" type="checkbox"/>
Is B2 current output less or equal to 700mA?	Yes, it is 520mA	<input checked="" type="checkbox"/>
Is the total combined current less or equal to 2.5A (2500mA)?	Yes, it is 2.2A (2200mA)	<input checked="" type="checkbox"/>

10.3 Maximum Total Output Current : UL and ULC Installations

The following table describes the maximum total output current available for standby operation using an external VRLA battery in order to comply with UL and ULC standby requirements.

Application	Maximum Total Output Current Available	Charging Jumper Setting	Transformer	Battery Rating
UL 294 and CAN/ULC-S319, 4hr backup	1200mA	350mA or 700mA	40VA/100VA	1 x 12VDC, 7Ah
	1400mA	350mA or 700mA	100VA	
	2000mA	350mA or 700mA	100VA	2 x 12VDC, 7Ah = 14Ah



The Maximum Total Output Current Available is the **maximum** current that can be supplied to the AUX1/AUX2 DC Outputs and B1/B2 DC Outputs. These are the maximum current values to ensure compliancy with the standby requirements.

10.4 Current and Validation (UL Installation) Example 1

Using a 40VA Transformer and 14Ah Battery

UL294 (4 hr standby capacity)

External Devices Connected to Panel	
2 x PRX-NPROX Nano Prox Card Readers (120mA @ 13.8VDC) connected on Reader 1 and Reader 2 ports	
2 x REX (Request to Exit) PIR Motion Detectors connected on AUX Output	
Standby Current Consumption	
Total Output Current Available	1.2A (1200mA)
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
Total Output Current Consumption	0.34A (340mA)
Current Consumption	
Operating Current	120mA (Typical)
Battery Charging	350mA (Standard Current Charging)
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
Total Consumption	810mA

Validation		
In order to comply with UL294 4 hr standby requirements, is the Total Output Current less or equal to 1200mA (1.2A)?	Yes, it is 340mA	✓
Is the DC Output (AUX) current less or equal to 700mA?	Yes, it is 100mA	✓
Is the DC Output Current (R1) less or equal to 700mA?	Yes, it is 120mA	✓
Is the DC Output Current (R2) less or equal to 700mA?	Yes, it is 120mA	✓
Is the total combined current less or equal to 1.7A (1700mA)?	Yes, it is 810mA	✓

10.5 Current and Validation (UL Installation) Example 2

Using a 100VA Transformer and 14Ah Battery

ULC-S319 (4hr standby capacity)

External Devices Connected to Panel	
2 x PRX-NPROX Nano Prox Card Readers (120mA @ 13.8VDC) connected on AUX2 Outputs	
2 x REX (Request to Exit) PIR Motion Detectors connected on AUX Output	
2 x Electric Locking Devices (520mA @ 13.8VDC)	
Standby Current Consumption	
Total Output Current Available	2A (2000mA)
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
L1 Output	Electric Locking Device (520mA @ 13.8VDC)
L2 Output	Electric Locking Device (520mA @ 13.8VDC)
Total Output Current Consumption	1.38A (1380mA)
Current Consumption	
Total Combined Current Available	2.5A (2500mA)
Operating Current	120mA (Typical)
Battery Charging	700mA (High Current Charging)
DC Output (AUX)	2 x REX (Request to Exit) PIR Motion Detectors (50ma @ 13.8VDC)
DC Output (Reader 1)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
DC Output (Reader 2)	PRX-NPROX Nano Prox Card Reader (120mA @ 13.8VDC)
L1 Output	Electric Locking Device (520mA @ 13.8VDC)
L2 Output	Electric Locking Device (520mA @ 13.8VDC)
Total Consumption	2.2A (2200mA)

Validation		
In order to comply with ULC-S319 30-min standby requirements, is the Total Output Current less or equal to 2A?	Yes, it is 1.38A (1380mA)	<input checked="" type="checkbox"/>
Is the DC Output current (AUX) less or equal to 700mA?	Yes, it is 100mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R1) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is the DC Output Current (R1) less or equal to 700mA?	Yes, it is 120mA	<input checked="" type="checkbox"/>
Is L1 current output less or equal to 700mA?	Yes, it is 520mA	<input checked="" type="checkbox"/>
Is L2 current output less or equal to 700mA?	Yes, it is 520mA	<input checked="" type="checkbox"/>
Is the total combined current less or equal to 2.5A (2500mA)?	Yes, it is 2.2A (2200mA)	<input checked="" type="checkbox"/>

11 New Zealand and Australia

General Product Statement

The RCM compliance label indicates that the supplier of the device asserts that it complies with all applicable standards.



12 European Standards

CE Statement

Conforms to European Union (EU) Low Voltage Directive (LVD) 2014/35/EC, Electro-Magnetic Compatibility (EMC) Directive 2014/30/EU and RoHS Recast (RoHS2) Directive: 2011/65/EU.

The CE mark indicates that this product complies with the European requirements for safety, health, environmental and customer protection.



Information on Disposal for Users of Waste Electrical & Electronic Equipment

This symbol on the product(s) and / or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points where it will be accepted free of charge.

Alternatively, in some countries you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

Information on Disposal in other Countries outside the European Union

This symbol is only valid in the European Union. If you wish to discard this product please contact your local authorities or dealer and ask for the correct method of disposal.

EN50131 Standards

This component was tested by the accredited testing laboratory No. 1172 of the company TESTALARM Praha s.r.o. and met the requirements and conditions for full compliance with EN50131 series of standards for equipment classification;

Security Grade 3

Environmental Class II

Equipment Class: Fixed

EN 50131-1:2006, EN 50131-3:2009, EN 50131-6:2008

Recognition class 2 (for readers without a keypad)

Recognition class 3 (for readers with a keypad)

Access class B

EN 50133-1:1998

ICT enclosure all products, CAB-JMB-NOT, has been tested and certified to EN50131. By design, the ICT enclosure for all products, CAB-FBY-NOT, complies with the EN50131 standards. Tamper protection against removal of the cover as well as removal from mounting is provided by tamper switch.

Warning:

Enclosures supplied by 3rd parties may not be EN50131-compliant, and should not be claimed as such.

EN 50131

In order to comply with EN 50131-1 the following points should be noted:

Ensure for Grade 3 compliant systems, the minimum PIN length is set for 6 digits.

To comply with EN 50131-1 Engineer access must first be authorized by a user, therefore Installer codes will only be accepted when the system is unset. If additional restriction is required then Engineer access may be time limited to the first 30 seconds after the system is unset.

Reporting delay –Violation off the entry path during the entry delay countdown will trigger a warning alarm. The warning alarm should not cause a main alarm signal and is not reported at this time. It can be signaled locally, visually and or by internal siren type. If the zone is not disarmed within 30 seconds, the entry delay has expired or another instant is violated, the main alarm will be triggered and reported.

To comply with EN 50131-1 neither Internals Only on Part Set Zone Alarm nor Internals Only on Part Set Tamper Alarm should be selected.

To comply with EN 50131-1 Single Button Setting should not be selected.

To comply with EN 50131-1 only one battery can be connected and monitored per system. If more capacity is required a single larger battery **must** be used.

Anti Masking

To comply with EN 50131-1 Grade 3 for Anti Masking, detectors with a separate or independent mask signal should be used and the mask output should be connected to another input zone.

I.e. Use 2 input zones per detector. One zone input for alarm/tamper and one zone input for masking.

To comply with EN 50131-1:

- do not fit more than 10 unpowered detectors per zone,
- do not fit more than one non-latching powered detector per zone,
- do not mix unpowered detectors and non-latching powered detectors on a zone.

To comply with EN 50131-1 the Entry Timer should not be programmed to more than 45 seconds.

To comply with EN 50131-1 the Bell Cut-Off Time should be programmed between 02 and 15 minutes.

EN 50131-1 requires that detector activation LEDs shall only be enabled during Walk Test. This is most conveniently achieved by using detectors with a Remote LED Disable input.

To comply with EN 50131: Only one battery can be connected and monitored per system. If more capacity is required, a single, larger battery must be used.

13 UL and ULC Installation Requirements



Only UL / ULC listed compatible products are intended to be connected to a UL / ULC listed access control system.

13.1 CAN/ULC-S319-05

- The Models PRT-CTRL-SE and PRT-RDI2-PCB are intended to be mounted within the Model CAB-LARGE-UL enclosure, installed inside the protected premise, and are CAN/ULC-S319 Listed for Class I applications only
- Exit devices and wiring must be installed within the protected area.
- System must be installed with at least one PRX-NPROX proximity card reader. For CAN/ULC-S319 Listed installations, the PRX-NPROX is the only reader that may be used.
- For the Models PRT-CTRL-SE and PRT-RDI2-PCB, all RS485 and reader terminal connections must be made using shielded, grounded cable.
- The Model PRX-NPROX must be connected with shielded, grounded cable.
- Fail secure locking mechanism shall only be installed where allowed by the local authority having jurisdiction (AHJ) and shall not impair the operation of panic hardware and emergency egress.
- If fire resistance is required for door assembly, portal locking device(s) must be evaluated to ULC-S533 and CAN/ULC-S104.
- Must be installed with CAN/ULC-S319 Listed portal locking device(s) for ULC installations.
- When installed with the power supply manufactured by Marcus, Model M4758CT for UL 294 and CAN/ULC-S319 installations, the Littelfuse Part No. 150322 fuseholder and Littelfuse Part No. 0312005 5A, 3AG fast-acting fuse must be installed in-line to the Models PRT-CTRL-SE and PRT-RDI2 PCB.

13.2 UL294

- The Models PRT-CTRL-SE and PRT-RDI2-PCB are intended to be mounted within the Model CAB-LARGE-UL enclosure, installed inside the protected premise, and are UL 294 Listed for Attack Class I applications only
- Exit devices and wiring must be installed within the protected area.
- System must be installed with at least one PRX-NPROX reader. For UL 294 Listed installations, the PRX-NPROX, HID Model ProxPoint (6005BGB00) and iClass R40 (6120CKN0000) readers may be used.
- For the Models PRT-CTRL-SE and PRT-RDI2-PCB, all RS485 and reader terminal connections must be made using shielded, grounded cable.
- The Model PRX-NPROX must be connected with shielded, grounded cable.
- Fail secure locking mechanism shall only be installed where allowed by the local authority having jurisdiction (AHJ) and shall not impair the operation of panic hardware and emergency egress.
- If fire resistance is required for door assembly, portal locking device(s) must be evaluated to ULC-S533 and CAN/ULC-S104.
- Must be installed with UL 1034 Listed electronic locks for UL installations.
- When installed with the power supply manufactured by Marcus, Model M4758CT for UL 294 installations, the Digital Security Controls (DSC) Model ULC-LA power indicator light assembly (Installation Instruction No. 29001877 R0) must be installed within a conduit knockout of the Model CAB-LARGE-UL enclosure in order to provide green AC power on indication.
- When installed with the power supply manufactured by Marcus, Model M4758CT for UL 294 and CAN/ULC-S319 installations, the Littelfuse Part No. 150322 fuseholder and Littelfuse Part No. 0312005 5A, 3AG fast-acting fuse must be installed in-line to the Models PRT-CTRL-SE and PRT-RDI2 PCB.

14 FCC Compliance Statements

FCC PART 15, WARNINGS: INFORMATION TO USER

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 communications. 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 or more of the following measures:

- Re-orient 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.
- Changes or modifications not authorized by the party responsible for compliance could void the user's authority to operate this product.

This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

15 Industry Canada Statement

This class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

16 Ordering Information

Please use the following product codes when placing an order for the Protege Reader Expander.

- PRT-RDI2-PCB - Protege Reader Expander (PCB Only)

Includes Accessory Bag

To order the Protege Intelligent Reader Expander in a cabinet order the CAB-LRG large steel cabinet complete with transformer and tamper connections.

Manuals and additional literature are available on the ICT Website (<http://www.ict.co>).

17 Warranty

Integrated Control Technology (ICT) warrants its products to be free from defects in materials and workmanship under normal use for a period of two years. Except as specifically stated herein, all express or implied warranties whatsoever, statutory or otherwise, including without limitation, any implied warranty of merchantability and fitness for a particular purpose, are expressly excluded. ICT does not install or connect the products and because the products may be used in conjunction with products not manufactured by ICT, ICT cannot guarantee the performance of the security system. ICT's obligation and liability under this warranty is expressly limited to repairing or replacing, at ICT's option, any product not meeting the specifications. In no event shall ICT be liable to the buyer or any other person for any loss or damages whether direct or indirect or consequential or incidental, including without limitation, any damages for lost profits, stolen goods, or claims by any other party caused by defective goods or otherwise arising from the improper, incorrect or otherwise faulty installation or use of the merchandise sold.

18 Contact

Integrated Control Technology welcomes all feedback.

Please visit our website (<http://www.ict.co>) or use the contact information below.

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Designers & manufacturers of integrated electronic access control, security and automation products.

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