Hardware Installation and Setup Instructions

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Attention

This section serves as a notice of the immediate or potential dangers involved when working with the equipment described throughout this manual. Any person involved in installation, maintenance, or service of the equipment should first carefully examine the equipment and read the instructions contained in this manual to ensure that personal and/or equipment injury is avoided.

The following safety messages appear throughout this manual to alert of immediate or potential danger to life as well as property.

Note : Indicates an important note.

Tip : Indicates a helpful tip or trick.

Safety Reminder : Applicable safety instructions will be included with this symbol.

DANGER : Indicates an immediately hazardous situation which ,if not avoided, will result in serious injury or death.

WARNING : Indicates a potentially hazardous situation which ,if not avoided, may result in serious injury or death.

CAUTION : Indicates a potentially hazardous situation which ,if not avoided, may result in minor or moderate injury.

Disclaimer

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

Instructions contained in this user's guide should be performed only by qualified persons in accordance with local and national codes. Blue Ridge Technologies International, LLC and its affiliates assume no responsibility for any consequences related to the improper use of this manual.

Overview : Document

This document provides mounting and connection instructions for the following Blue Ridge Technologies Retrofit Interior (RI) products :

RI16, 32, and 48 with Top, Bottom, or Center Low Voltage Compartments

Sections of this Install Guide apply to optional equipment and may not be applicable. Siemens' P1 and Automated Logic Corporation's BACnet ARCnet protocols are only available to authorized integrators.

For RI integration with a Building Automation System (BAS) as well as software configuration refer to the Application Guide.

Overview : Component

The RI includes the following items :

1 - RI

1 - BT485 BAS Network Terminator (BT485 Terminator)

Overview : Assembly

Top/Bottom Low Voltage Compartment

1. Back Plate
2. Exclusion Frame
3. Wing Barrier
4. Controller
5. Lighting Tough Relays (LTR)
6. Mounting Fastener Point
7. Earth Ground Lug
8. Transformer

The transformer is factory installed in the Exclusion Frame. However, a knockout bushing is included to facilitate remote mounting applications.

Center Low Voltage Compartment

1. Back Plate
2. Controller
3. Low Voltage Compartment
4. Earth Ground Lug
5. Transformer
6. Lighting Tough Relays (LTR)
7. Mounting Fastener Point
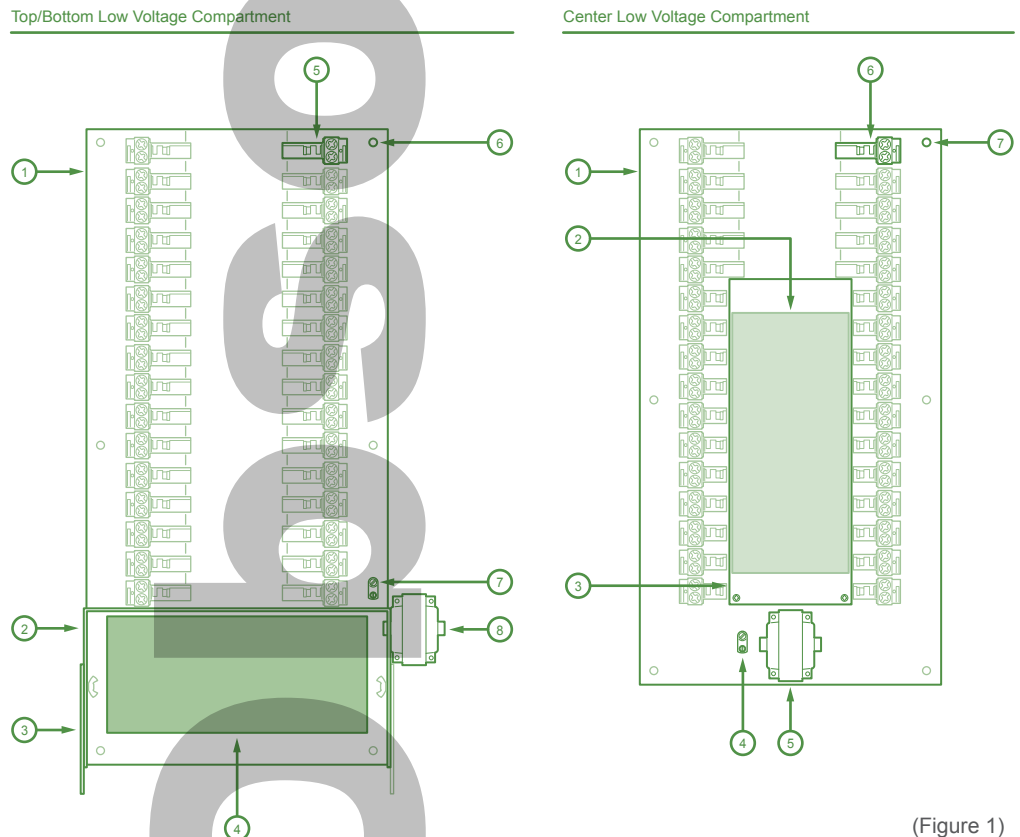
(Figure 1)

⚠ Disconnect line voltage power before performing RI installation.

WARNING : Live Parts
Disconnect before servicing. Disconnect provided by installer, located remotely.
Panel protected by circuit breaker or equivalent current limiting device.
Transformer Input Voltage Rating : 120 or 277 VAC +/- 10%, 30 VA, 50 / 60 Hz
Transformer Output Voltage Rating : 24 VAC +/- 10%
Relay Short Circuit Current Rating (SCCR) 20,000 Amps @ 277 VAC
Use only copper conductors rated only @ 60 degree celsius minimum.
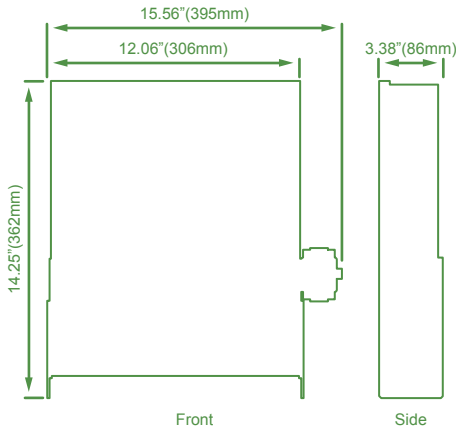
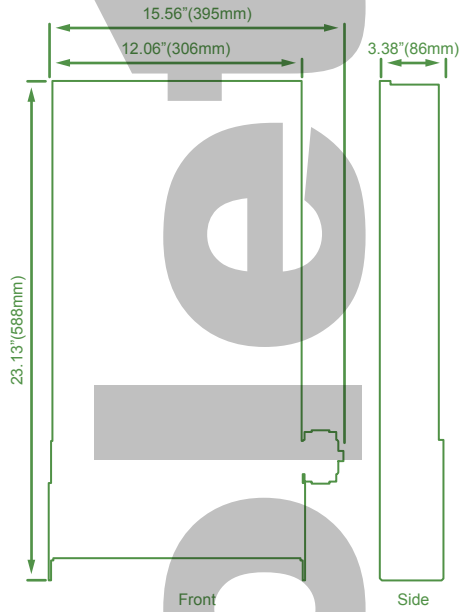⚡ All circuits must be tested for wiring errors and shorts prior to RI installation.

Before handling any RI components, the technician should be grounded to prevent circuit board damage.

Overview : Dimensions

RI16 : Top/Bottom Low Voltage Compartment

15.56"(395mm)
12.06"(306mm)
3.38"(86mm)
14.25"(362mm)

Front

Side

RI32 : Top/Bottom Low Voltage Compartment

15.56"(395mm)
12.06"(306mm)
3.38"(86mm)
23.13"(588mm)

Front

Side

RI48 : Top/Bottom Low Voltage Compartment

15.56"(395mm)
12.06"(306mm)
3.38"(86mm)
31.88"(810mm)

Front

Side

RI32 : Center Low Voltage Compartment

12.06"(306mm)
5.25"(133mm)
20.25"(514mm)

Front

Side

RI48 : Center Low Voltage Compartment

12.06"(306mm)
5.25"(133mm)
29.00"(737mm)

Front

Side
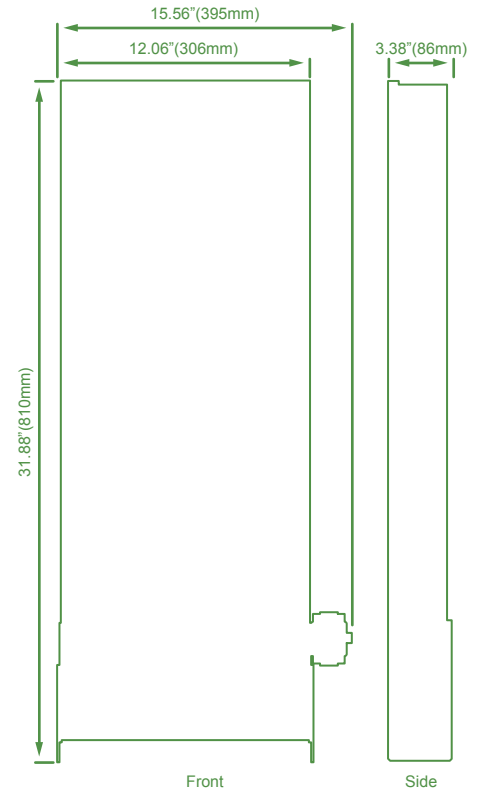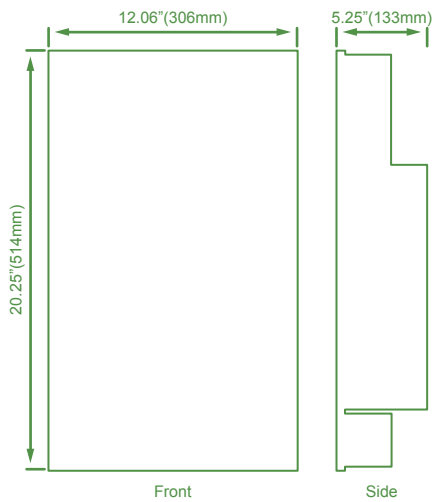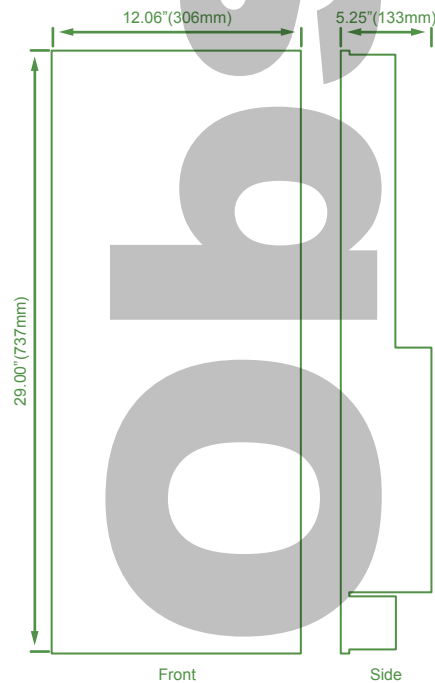
(Figure 2)

Enclosure Preparation

The existing control system must be removed to allow installation of the RI.
1. Disconnect power from the panel.
2. Mark all existing leads.
3. Unfasten or cut existing leads. Do Not cut existing leads too short.
4. Unbolt and remove existing controller electronics, relays, and unnecessary hardware.
5. Remove any dust or construction debris from the panel.

Mounting

Determine position of all components prior to RI mounting. Consider these dimensions when positioning the RI.
• Length of the existing leads.
• Distance between the RI Low Voltage Compartment and Transformer. (If the Transformer is mounted remotely)
• Wing Barrier extension 3.5" (89mm) if applicable.

Mount RI to enclosure back plate. It is beneficial to remove the applicable low voltage knockouts from RI with a Center Low Voltage Compartment prior to mounting.
1. Confirm power is disconnected from the panel.
2. Fasten the RI in position. Utilize 1.00" (25mm) washer head self-tapping screws. For panels mounted to concrete substrate employ 2.25" (51mm) masonry screws with a flat washer. Drive a screw through each of the Mounting Fastener Points in the Back Plate. Keep the circuit boards clear of any metal shavings. (Figure 3)
3. Mount the Transformer in position. (If the Transformer is mounted remotely)
4. Remove any metal shavings from the panel.

Mounting

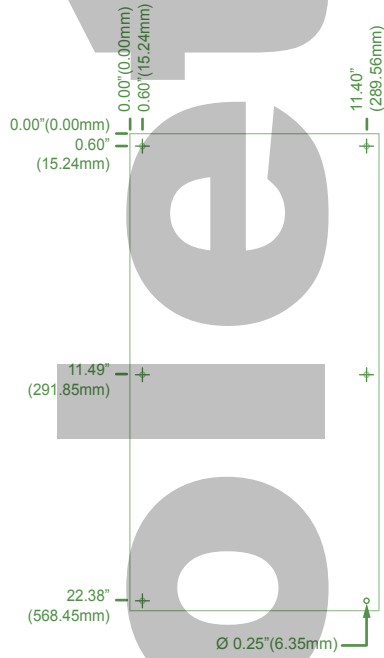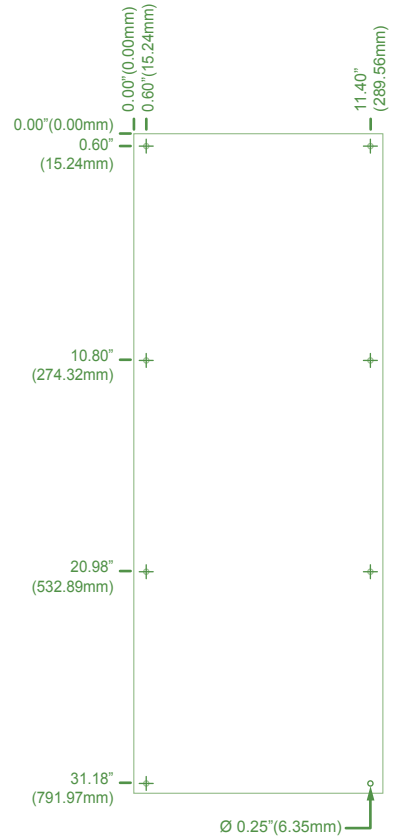Mounting Fastener Point positions and dimensions.

RI16 : Top/Bottom Low Voltage Compartment
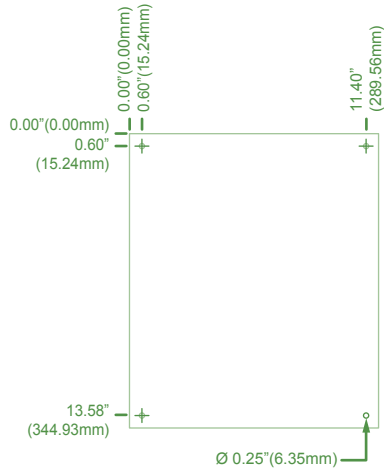
0.00"(0.00mm)
0.60"(15.24mm)
11.40" (289.56mm)

0.00"(0.00mm)
0.60" (15.24mm)

13.58" (344.93mm)

Ø 0.25"(6.35mm)

RI32 : Top/Bottom Low Voltage Compartment

0.00"(0.00mm)
0.60"(15.24mm)
11.40" (289.56mm)

0.00"(0.00mm)
0.60" (15.24mm)

11.49" (291.85mm)

22.38" (568.45mm)

Ø 0.25"(6.35mm)

RI48 : Top/Bottom Low Voltage Compartment

0.00"(0.00mm)
0.60"(15.24mm)
11.40" (289.56mm)

0.00"(0.00mm)
0.60" (15.24mm)

10.80" (274.32mm)

20.98" (532.89mm)

31.18" (791.97mm)

Ø 0.25"(6.35mm)

RI32 : Center Low Voltage Compartment

0.00"(0.00mm)
0.60"(15.24mm)
11.40" (289.56mm)

0.00"(0.00mm)
0.60" (15.24mm)

10.12" (257.05mm)

19.63" (498.60mm)

Ø 0.25"(6.35mm)

RI48 : Center Low Voltage Compartment

0.00"(0.00mm)
0.60"(15.24mm)
11.40" (289.56mm)

0.00"(0.00mm)
0.60" (15.24mm)

9.88" (250.96mm)

19.15" (486.41mm)

28.43" (722.12mm)

Ø 0.25"(6.35mm)
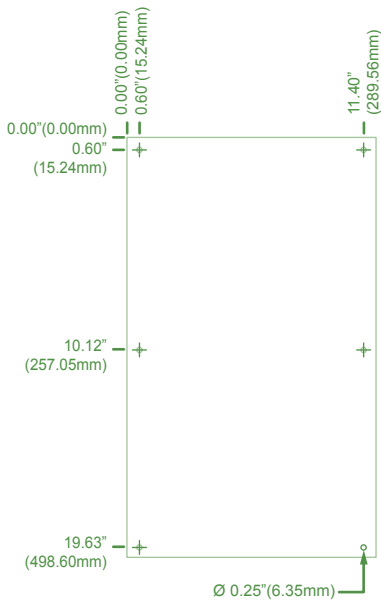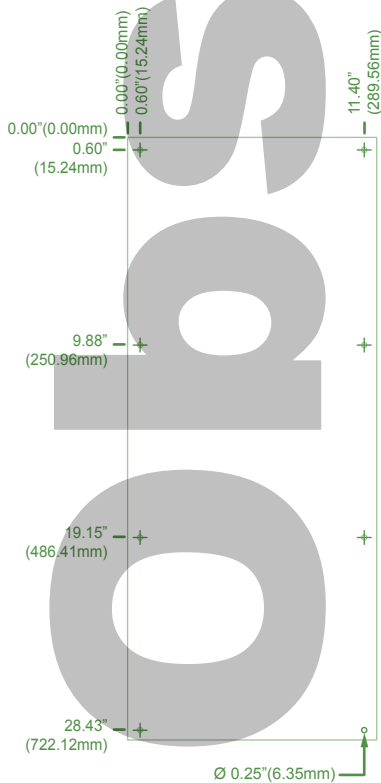
(Figure 3)

Terminations : Line Voltage

Complete line voltage terminations. (Figure 4 and 5)
1. Confirm power is disconnected from the panel.
2. Route leads as appropriate.
3. Cut to length and strip as appropriate.
4. Complete Transformer and LTR terminations.
5. Cap unused primary leads from Transformer.
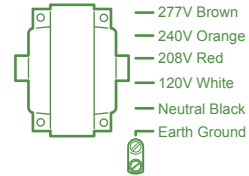6. Torque each LTR screw terminal to 36 in-lbs.

Transformer Specifications
Type: 40VA Inherently Limited UL Listed
Primary: Multi Tap 120, 208, 240, or 277VAC +/-10%, 40VA, 50-60 Hz
Secondary: 24VAC +/-10% Inherently Limited
Wire Requirement: 18AWG Minimum (Solid or Stranded)
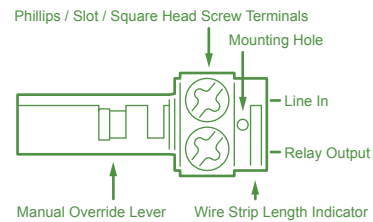
LTR Specifications
Type:
  UL Listed
  SPST latching with manual override lever
  Electrically operated mechanically held, pulse driven
  Short Circuit Current Rating (SCCR) 30,000A @ 277 VAC
Ratings: Tungsten 20A @ 120VAC / Ballast 20A @ 277VAC / Ballast 20A @ 347VAC / Resistive 20A @ 277VAC / Resistive 20A @ 347VAC
Load Terminal: Universal screw terminal, box type clamp
Terminal Capacity (per side): (2) 14-10AWG or (1) 8AWG (Solid or Stranded copper wire)

Transformer Terminations

277V Brown
240V Orange
208V Red
120V White
Neutral Black
Earth Ground

(Figure 4)

LTR Terminations

Phillips / Slot / Square Head Screw Terminals
Mounting Hole
Line In
Relay Output
Manual Override Lever
Wire Strip Length Indicator

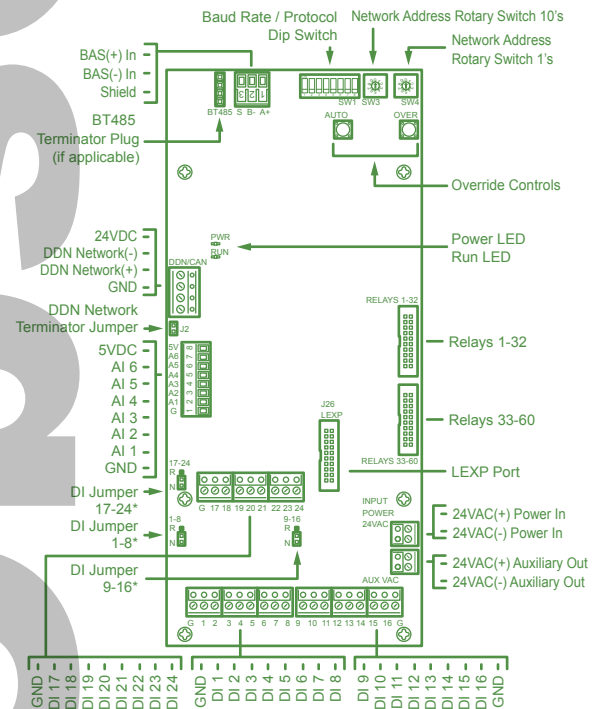(Figure 5)

Terminations : Low Voltage

All low voltage leads are terminated on the Controller. These screw terminals accept a 0.4 x 2.5mm slot head screw driver. For reference, some terminal blocks may be removed to reveal terminal labels. (Figure 6)
1. Confirm power is disconnected from the panel.
2. Route leads.
3. Cut to length and strip as appropriate.
4. Insert stripped lead into screw terminal and tighten screw.
5. Repeat for each lead.

Controller Specifications
Power In: 24VAC +/-10%, 30VA, 50-60 Hz
Auxiliary Out: 24VAC Full Wave Rectified

Controller Terminations

Baud Rate / Protocol Dip Switch
Network Address Rotary Switch 10's
Network Address Rotary Switch 1's
BAS(+) In
BAS(-) In
Shield
BT485 Terminator Plug (if applicable)
Override Controls
24VDC
DDN Network(-)
DDN Network(+)
GND
DDN Network Terminator Jumper
Power LED
Run LED
Relays 1-32
5VDC
AI 6
AI 5
AI 4
AI 3
AI 2
AI 1
GND
Relays 33-60
LEXP Port
DI Jumper 17-24*
DI Jumper 1-8*
24VAC(+) Power In
24VAC(-) Power In
24VAC(+) Auxiliary Out
24VAC(-) Auxiliary Out
DI Jumper 9-16*

GND DI 17 DI 18 DI 19 DI 20 DI 21 DI 22 DI 23 DI 24 GND DI 1 DI 2 DI 3 DI 4 DI 5 DI 6 DI 7 DI 8 DI 9 DI 10 DI 11 DI 12 DI 13 DI 14 DI 15 DI 16 GND

AI (Analog Input) / DI (Digital Input) / GND (Ground)
*DI Jumper Position N(Dry Contact) / R(Externally Powered)
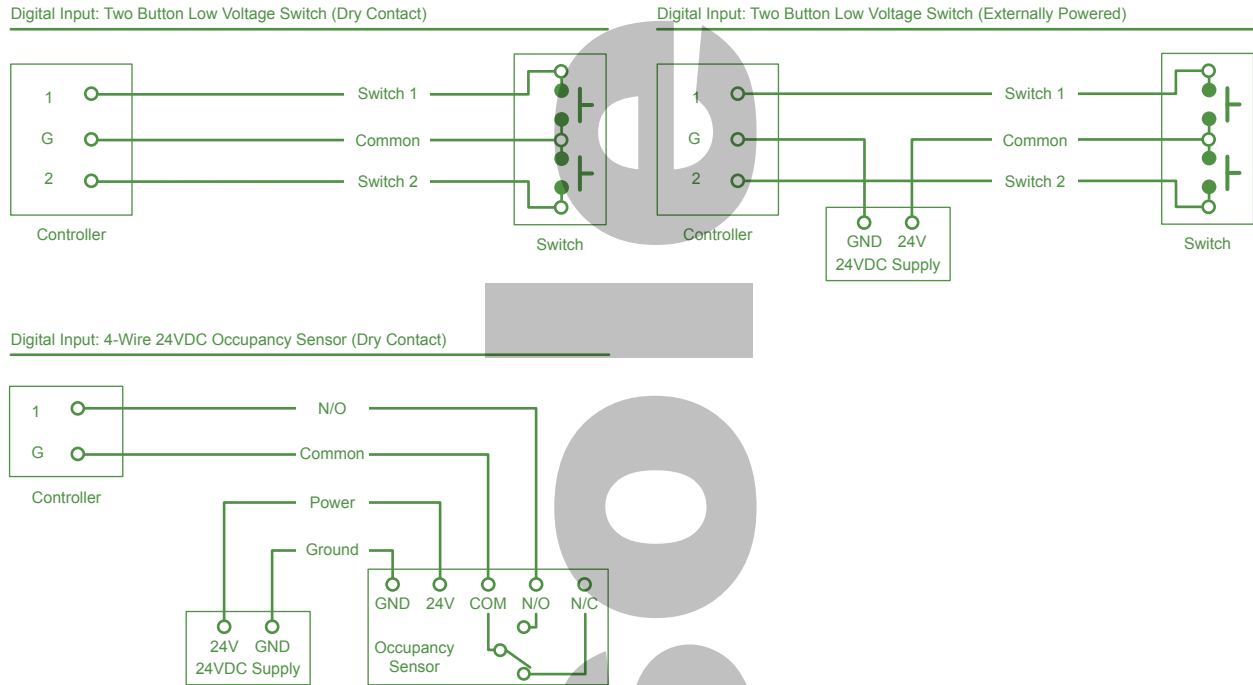
(Figure 6)

Terminations : Low Voltage

Digital Input Specifications
    Controller: 24 two-wire inputs
    Software Configuration: Maintained, state change, momentary on/off, momentary on, or momentary off
    Jumper Configuration: 8 input segments, dry contact (N) or 24VDC externally powered (R)
    Wire Requirement / Maximum Length: 18AWG (Solid or Stranded) / Dry Contact 500'(152m) or externally powered 1,000'(304m)
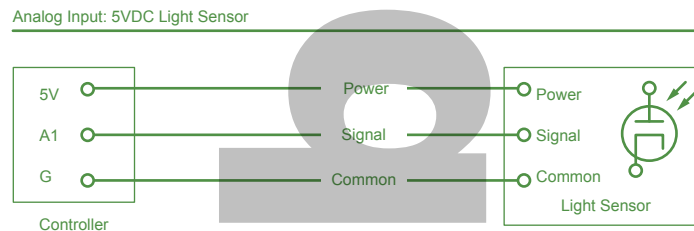
Digital Input: Two Button Low Voltage Switch (Dry Contact)

Digital Input: Two Button Low Voltage Switch (Externally Powered)

Digital Input: 4-Wire 24VDC Occupancy Sensor (Dry Contact)

(Figure 7)

Analog Input Specifications
    Analog Input: 6 three-wire 0-5VDC inputs
    Wire Requirement / Maximum Length: 18AWG (Solid or Stranded) / 250'(76m)

Analog Input: 5VDC Light Sensor

(Figure 8)

Terminations : Low Voltage

BAS Network Specifications
   Topology: RS-485, 3 conductor (+, -, and shield), daisy chain wiring (no stars or t-taps)
   Wire Requirement / Maximum Length: Belden 8760 / 4000'(1216m)
BACnet MS/TP
   Baud Rate: DIP switch selectable 9.6K, 19.2K, 38.4K, or 76.8K
   Device Profile: BACnet Advance Application Controller (AAC)
   Address Range: 1 – 99 selectable with rotary dials
   Unit Load: Full unit load, 32 devices per MS/TP segment
   Points: See Application Guide and PIC Statement
N2
   Baud Rate: DIP switch selectable 9.6K
   Address Range: 1 – 255 selectable with rotary dials and DIP switch
P1
   Baud Rate: DIP switch selectable 4.8K, 9.6K, 19.2K, or 38.4K
   Address Range: 1 – 99 selectable with rotary dials

See Automated Logic Corporation's *ARC156 Wiring Technical Instructions* for the latest BACnet ARCnet specifications.
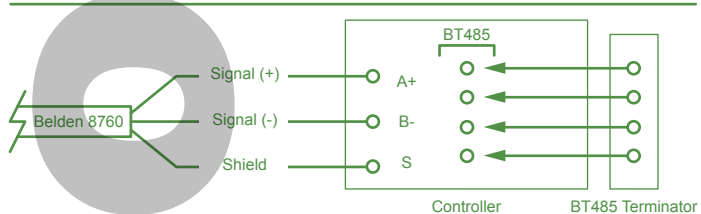
Install BT485 Terminator if RP is operated as end of line device(first or last device on network). BT485 Terminator requires no specific orientation in relation to the terminal.
See Controller Setup for Address and Protocol settings.
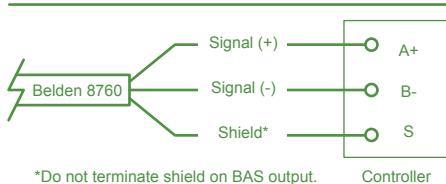
(Figure 9)

DDN Network Specifications
   Protocol: Digital Device Network (DDN)
   Address Range: 1-60, DIP switch selectable
   Topology: Daisy Chain Wiring (no stars or t-taps)
   Wire Requirement: CL3P, 22AWG, 4 conductor, Unsheilded
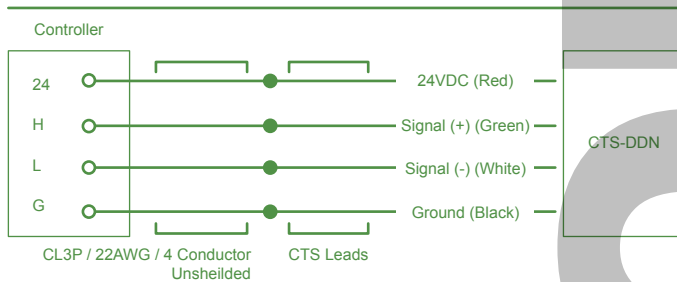   Maximum Stations (w/o external power): 10 CTS-DDN
   Maximum Length (w/o external power): 500'(152m)
   Maximum Stations (w/ external power): 60 one-button, 30 two-button, or a combination for 60 buttons total
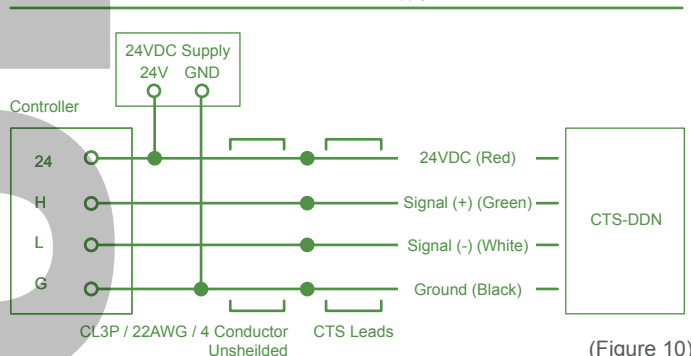   Maximum Length (w/ external power): 2,000'(610m)
   Power / Draw: 24VDC / 15mA per CTS-DDN

(Figure 10)

Controller Setup

Controller configuration and RI testing are the final steps of installation. (Figure 11)

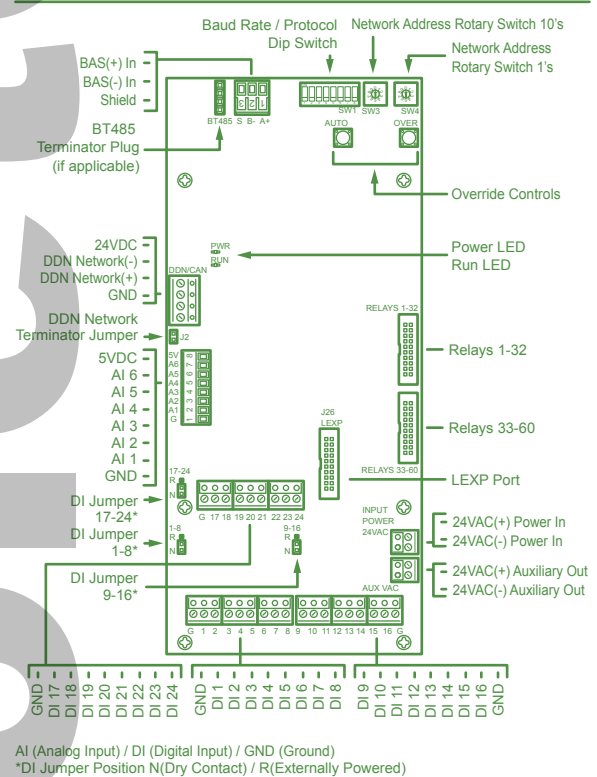### Setup

1. Confirm power is disconnected from the Controller and the Power / Run LED's are not illuminated.
2. Set the DDN Network Terminator Jumper if utilizing DDN Network. Two devices on the DDN Network should be set for network termination. If the Controller is the end-of-line, terminate the Controller and the device at the opposite end of the network. If the Controller is positioned at a mid-point on the network, terminate devices at the opposite ends of the network either side of the Controller.
3. Set the Digital Input (DI) Jumpers.
4. Set the Baud Rate / Protocol Dip Switch for protocol and baud rate.
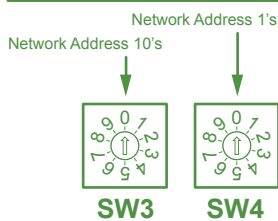5. Set the Network Address.

Testing

1. Connect power to the Controller. Wait 10 seconds for power up.
2. Confirm normal LED operation.
   Power LED: Solid illumination
   Run LED: Continuous blinking
3. Press and release the Over Button. Confirm the Relays turn off.
4. Press and release the Over Button again. Confirm the Relays turn on.
5. Press and release the Auto Button to exit override mode.
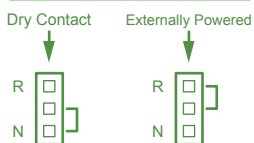6. Test procedure complete.

Controller Terminations

AI (Analog Input) / DI (Digital Input) / GND (Ground)
*DI Jumper Position N(Dry Contact) / R(Externally Powered)

Network Address

SW3   **SW4**
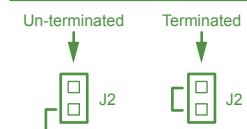
See right for N2 addresses 100-255
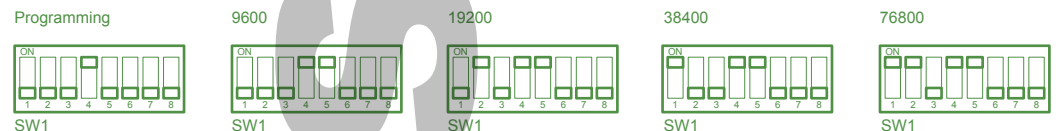
Digital Input (DI) Jumper
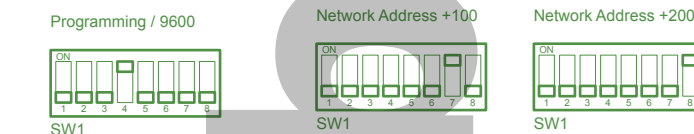

DDN Network Terminator Jumper
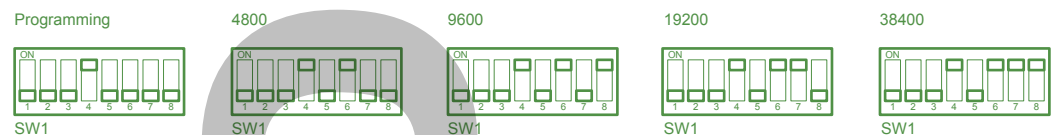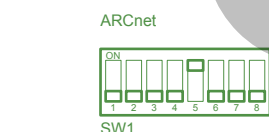

Baud Rate / Protocol Dip Switch: BACnet MS/TP

Baud Rate / Protocol Dip Switch: N2

N2 Network Addresses 100-255

Baud Rate / Protocol Dip Switch: P1

Baud Rate / Protocol Dip Switch: BACnet ARCnet

(Figure 11)

Optional Equipment

RI may be equipped with the following optional equipment.

LEXP Specifications
   Description: Digital Input Expansion Card
   Digital Input: 32 two-wire inputs
   Software Configuration: Maintained, state change, momentary on/off, momentary on, or momentary off
   Jumper Configuration: 8 input segments, dry contact (N) or 24VDC externally powered (R)
   Wire Requirement / Maximum Length: 18AWG (Solid or Stranded) / Dry Contact 500'(152m) or externally powered 1,000'(304m)
   Mounting:
      Top / Bottom Low Voltage Compartment: LEXP mounts atop Controller with hinged stand-offs. LEXP increases overall depth to 3.88"(99mm).
      Center Low Voltage Compartment: LEXP mounts above Controller in the Low Voltage Compartment. Not applicable on RI16.

347 Transformer Specifications
   Type: 50VA Inherently Limited UL Listed
   Primary: Single Tap 347VAC, 50VA, 60 Hz
   Secondary: 24VAC +/-10% Inherently Limited
   Wire Requirement: 18AWG Minimum (Solid or Stranded)

LEXP Terminations

*DI Jumper Position N(Dry Contact) / R(Externally Powered)

(Figure 12)

347 Transformer Terminations

- 347VAC Brown
- Neutral Black
- Earth Ground

(Figure 13)