

RealStream

Lift Station Hardware Installation Manual

Version: 1.02.0

Date: July 2018



Table of Contents

| | | |
|-----------|--|-----------|
| 1 | Legal Information | 5 |
| 2 | Technical Support | 6 |
| 3 | Safety Information | 7 |
| 4 | Cybersecurity | 10 |
| 5 | About the Book | 12 |
| 6 | Introducing RealStream Lift Station | 14 |
| 6.1 | Temperature and Humidity Ranges | 16 |
| 6.2 | Environmental Condition Ratings | 16 |
| 6.3 | Understanding RealStream LiftStation Measurement Units | 17 |
| 7 | RealStream Lift Station System Components | 18 |
| 7.1 | Required Tools and Materials | 18 |
| 8 | Installing the RealStream Lift Station Controller | 19 |
| 8.1 | System Grounding | 19 |
| 8.2 | Mounting the RealStream Lift Station RTU | 20 |
| 8.3 | Power Supply Requirements | 24 |
| 8.3.1 | Power Calculations | 24 |
| 8.3.2 | Power Supply Wiring..... | 25 |
| 8.3.2.1 | Basic Wiring..... | 26 |
| 8.3.2.2 | Recommended 24 Vdc Power Supply Configuration..... | 27 |
| 9 | Installing the Graphic Display Terminal | 28 |
| 9.1 | Connecting the Graphic Display Terminal | 33 |
| 10 | Connecting an Altivar 630 Drive | 34 |
| 10.1 | Configuring an Altivar 630 Drive | 37 |
| 11 | Connecting the Sensors | 41 |
| 11.1 | Analog Input Wiring | 42 |
| 11.2 | Analog Output Wiring | 42 |
| 11.3 | Digital Input Wiring | 43 |

| | | |
|-----------|---|-----------|
| 11.4 | Digital Output Wiring | 43 |
| 11.5 | Counter Input Wiring | 44 |
| 11.6 | Confirming Sensor Readings | 45 |
| 11.7 | Grounding the Sensor | 45 |
| 12 | Completing the RealStream Lift Station Installation..... | 46 |
| 13 | Appendix A- Maintenance..... | 47 |
| 13.1 | Calibration | 47 |
| 13.2 | Preventative Maintenance | 48 |
| 13.3 | Routine Maintenance | 49 |
| 13.4 | Replacing the Battery | 51 |
| 13.5 | Fuses | 51 |
| 14 | Appendix B- Specifications..... | 53 |
| 14.1 | General | 53 |
| 14.2 | Power Supply | 53 |
| 14.3 | Controller Board | 54 |
| 14.4 | Data Capacity | 54 |
| 14.5 | Serial Ports | 55 |
| 14.6 | Ethernet Port | 56 |
| 14.7 | USB Port | 56 |
| 14.8 | Visual Indicators | 57 |
| 14.9 | Counter Inputs | 58 |
| 14.10 | Digital Inputs | 59 |
| 14.11 | Digital Outputs | 60 |
| 14.12 | Analog Inputs | 61 |
| 14.13 | Analog Outputs | 61 |
| 15 | Appendix C- Standards and Certifications..... | 63 |

1 Legal Information

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without express written permission of Schneider Electric.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

Trademarks

Schneider Electric, SCADAPack, Altivar, Modbus, and RealStream are trademarks and the property of Schneider Electric SE, its subsidiaries and affiliated companies. All other trademarks are the property of their respective owners.

Address

Schneider Electric

415 Legget Drive, Suite 101, Kanata, Ontario K2K 3R1 Canada

Direct Worldwide: +1 (613) 591-1943

Fax: +1 (613) 591-1022

Toll Free within North America: 1 (888) 267-2232

www.schneider-electric.com

© 2016 - 2018 Schneider Electric Canada Inc.

All rights reserved.

2 Technical Support

Questions and requests related to any part of this documentation can be directed to one of the following support centers.

Technical support: Americas, Europe, Middle East, Asia

Available Monday to Friday 8:00am – 6:30pm Eastern Time

| | |
|--------------------------------|--|
| Toll free within North America | 1-888-226-6876 |
| Direct Worldwide | +1-613-591-1943 |
| Email | supportTRSS@schneider-electric.com |

Technical support: Australia

| | |
|------------------|--|
| Inside Australia | 1300 369 233 |
| Email | au.help@schneider-electric.com |

3 Safety Information

Important information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

| |
|--|
| ⚠ DANGER |
| DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
| ⚠ WARNING |
| WARNING indicates a hazardous situation which, if not avoided, can result in death or serious injury. |
| ⚠ CAUTION |
| CAUTION indicates a hazardous situation which, if not avoided, can result in minor or moderate injury. |
| NOTICE |
| NOTICE is used to address practices not related to physical injury. |

Please note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Before you begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

WARNING

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in death or serious injury.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future reference.

Test all software in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to help prevent accidental equipment damage.

Operation and adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

Acceptable use

WARNING

UNACCEPTABLE USE

Do not use this solution as an integral part of a safety system. The components in this solution are not safety products.

Failure to follow these instructions can result in death or serious injury.

CAUTION

EQUIPMENT OPERATION HAZARD

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Use only Schneider Electric software or approved software with Schneider Electric hardware products.

Failure to follow these instructions can result in minor or moderate injury.

Important notices

DANGER

HAZARD OF ELECTRIC SHOCK

Installation, adjustment, repair, and maintenance must be performed by qualified personnel.

Ensure power has been removed before servicing.

Failure to follow these instructions will result in death or serious injury.

4 Cybersecurity

Cybersecurity is a branch of network administration that addresses attacks on or by computer systems and through computer networks that can result in accidental or intentional disruptions. The objective of cybersecurity is to help provide increased levels of protection for information and physical assets from theft, corruption, misuse, or accidents while maintaining access for intended users.

No single cybersecurity approach is adequate. Schneider Electric recommends a defense-in-depth approach. This approach layers the network with security features, appliances, and processes. The basic components of this approach are:

- Risk assessment: A systematic security analysis of the environment and related systems.
- A security plan built on the results of the risk assessment
- A multi-phase training campaign
- Network separation and segmentation: Physical separation of the control network from other networks, and the division of the control network itself into segments and security zones.
- System Access Control: Controlling access to the system with firewalls, authentication, authorization, and other software means, and traditional physical security measures such as video surveillance, fences, locked doors and gates, and locked equipment cabinets.
- Device hardening: The process of configuring a device against communication-based threats. Device hardening measures include disabling unused network ports, password management, access control, and the disabling of all unnecessary protocols and services.
- Network monitoring and maintenance: An effective defense-in-depth campaign requires continual monitoring and system maintenance to meet the challenge of new threats as they develop.

Contact us

For more information, refer to the Schneider Electric Cybersecurity Support Portal at <http://www.schneider-electric.com/b2b/en/support/cybersecurity/overview.jsp>.

Additional Resources

Industrial Control Systems Cyber Emergency Response Team (ICS-CERT)
<https://ics-cert.us-cert.gov>

ICS-CERT Recommended Practices
<https://ics-cert.us-cert.gov/Recommended-Practices>

Center for Internet Security (CIS) Top 20 Critical Security Controls
<https://www.cisecurity.org/cybersecurity-best-practices>

FBI Cyber Crime
<https://www.fbi.gov/investigate/cyber>

Guide to Industrial Control Systems (ICS) Security
<https://www.nist.gov/publications/guide-industrial-control-systems-ics-security>

WaterISAC Water Security Network
<https://www.waterisac.org>

5 About the Book

Audience

This manual describes how to install RealStream Lift Station. It is written for people who already understand:

- The physical set up of the lift station, including the well, pump(s), digital I/O devices and variable frequency drive operation
- The skills and knowledge related to the construction, installation, and operation of electrical equipment and have received safety training to recognize and avoid the hazards involved

Document scope

This manual assumes that the RealStream Lift Station hardware is being installed for the first time. It describes:

- The acceptable temperature and humidity ranges for installing RealStream Lift Station
- RealStream Lift Station equipment and environmental condition ratings
- The tools required to install RealStream Lift Station
- The steps required to install the RealStream Lift Station
- The steps required to connect a variable frequency drive
- Connecting sensors

Validity note

This document is valid for RealStream Lift Station version 1.01.0

Related documents

The RealStream Lift Station Configuration Manual describes how to use a Schneider Electric Graphic Display Terminal to configure RealStream Lift Station operation. It describes:

- How to start RealStream Lift Station and use the Graphic Display Terminal (GDT)
- The factors you need to consider before configuring RealStream Lift Station
- The parameters available for drives, sensors, alarms, pump alternation selection and configuration
- How to view and manage alarms and events
- The different types of screens that are available
- How to manage PINs

Product related information

 **WARNING****UNINTENDED EQUIPMENT OPERATION**

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise are allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death or serious injury.

6 Introducing RealStream Lift Station

RealStream Lift Station is an advanced pump-down controller for automating the process of maintaining a level in a wet well, while extending the life of the pumps. It is comprised of the following components:

- A RealStream Remote Terminal Unit (RTU) that manages operation of wet well devices including pumps and variable frequency drives (VFD), if applicable.
- A Schneider Electric Graphic Display Terminal (GDT) that provides the interface to configure lift station parameters.

The RealStream Lift Station Hardware Installation Manual contains instructions for installing and wiring the RealStream Lift Station control equipment. For RealStream Lift Station configuration instructions, refer to the RealStream Lift Station Configuration Manual.

DANGER

ELECTRICAL HAZARD

- Read and understand this manual, the RealStream Lift Station Configuration Manual, and the manuals for your variable frequency drive (VFD), and motor before installing or operating RealStream Lift Station. Installation adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding and wiring of all equipment. Many parts of VFDs, including the printed circuit boards, operate at the line voltage. Do not touch. Use only electrically-insulated tools.

Failure to follow these instructions will result in death or serious injury.

DANGER

ELECTRICAL HAZARD

- Do not touch unshielded components or terminal strip screw connections with voltage present.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, and OSHA 1910.
- Before servicing any RealStream Lift Station components, read and understand the documentation for that component.
- Install and close all covers before applying power or starting and stopping any RealStream Lift Station components.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER**ELECTRICAL HAZARD**

- Before servicing any electrical component of the RealStream Lift Station system:
 - Follow the applicable lock out/tag out (LOTO) procedure.
 - Disconnect all power sources, including external control power.
 - Place a Do Not Turn On label on all power disconnects.
 - Lock all power disconnects in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge and then verify that DC voltage is less than 42 V. The drive LED is not an indicator of the absence of DC bus voltage.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not install or operate any equipment that appears damaged.

Installation, adjustment, repair, and maintenance must be performed by qualified personnel.

Ensure power has been removed before servicing.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING**UNACCEPTABLE USER**

Do not use this solution as an integral part of a safety system. The components in this solution are not safety products.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING**LOSS OF CONFIGURATION CONTROL**

Storing and operating the Graphic Display Terminal at temperatures below -15 °C (5 °F) can render the Graphic Display Terminal unusable.

To help ensure proper operation of the GDT and local access to RealStream Lift Station, store and operate the GDT at temperatures above -15 °C (5 °F) and below 50 °C (122 °F)

Failure to follow these instructions can result in death or serious injury.

NOTICE**UNAUTHORIZED SYSTEM ACCESS**

Change the default PIN immediately after logging in for the first time.

In addition to a PIN, use physical locks and a security system to help prevent unauthorized access to the RealStream Lift Station and to help protect the security of the RealStream Lift Station components.

Failure to follow these instructions can result in equipment damage.

6.1 Temperature and Humidity Ranges

RealStream Lift Station supports the temperature and humidity ranges described in the table below.

| Equipment | Ambient Operating Temperature Range | Storage Temperature Range | Relative Humidity |
|------------------------------------|-------------------------------------|----------------------------|-------------------|
| RealStream Lift Station Controller | -40...70 °C (-40...158 °F) | -40...70 °C (-40...158 °F) | 0...95% |
| GDT | -15...50 °C (5...122 °F) | -40...70 °C (-40...158 °F) | 0...90% |

When the Station is configured, RealStream Lift Station can control the pump(s) outside the operating temperature range of the GDT.

6.2 Environmental Condition Ratings

The equipment is designed to be safe for the extended environmental conditions listed in the table below, as well as the conditions in the temperature and humidity ranges table and the indoor use table.

| Condition | Rating |
|----------------------|---|
| Altitude | Up to 2000 meters (6562 ft) |
| Ambient temperatures | <ul style="list-style-type: none"> For RealStream Lift Station Controller: -40...70 °C (-40...158 °F) For GDT: -15...50 °C (5...122 °F) |
| Humidity | Relative humidity levels specified in the temperature and humidity ranges table |
| Supply Voltage | 11...30 Vdc |

6.3 Understanding RealStream LiftStation Measurement Units

RealStream Lift Station measurement values can be configured in imperial or metric units. See the RealStream Lift Station Configuration manual for details on switching between imperial and metric.

NOTICE

UNINTENDED EQUIPMENT OPERATION

Verify that all values are entered in the appropriate measurement unit in RealStream Lift Station.

Failure to follow these instructions can result in equipment damage.

The following table summarizes the measurement units used in RealStream Lift Station.

| Measurement Type | Imperial | Metric |
|------------------|--------------------------------|--------------------------------|
| Level | percent (%) of wet well volume | percent (%) of wet well volume |
| Efficiency | percent (%) | percent (%) |
| Flow Rate | gallons per minute (GPM) | liters per minute (LPM) |
| Pressure | pounds per square inch (PSI) | pounds per square inch (PSI) |
| Flow | mega gallons (MGAL) | cubic meters (m ³) |
| Speed | hertz (Hz) | hertz (Hz) |
| Voltage | volts (V) | volts (V) |
| Current | amperes (A) | amperes (A) |

7 RealStream Lift Station System Components

The RealStream Lift Station system consists of a RealStream Lift Station controller and a GDT.

| Quantity | Description |
|----------|------------------------------------|
| 1 | RealStream Lift Station Controller |
| 1 | Graphic Display Terminal (GDT) |
| 1 | GDT Mounting Kit |
| 1 | GDT Serial Adapter |
| 1 | 1 m (3 ft) Ethernet Cable |

The RealStream Lift Station solution can be ordered with an optional serial modem and corresponding modem cable. The optional modem is connected to COM3 of the RealStream Lift Station Controller using the accompanying modem cable. To configure the modem for operation, follow the configuration instructions accompanying the modem. To configure the RealStream Lift Station Controller to work with the modem settings, follow the instructions for configuring the COM Port settings as described in the RealStream Lift Station Configuration Manual.

7.1 Required Tools and Materials

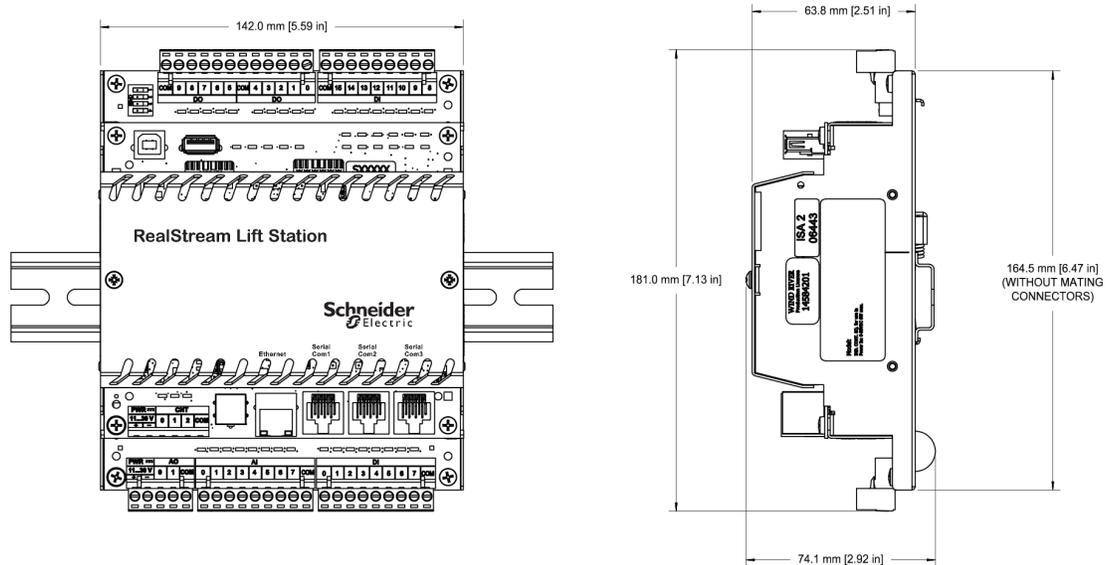
The tools, wires, and other components required for a RealStream Lift Station installation, but not included with RealStream Lift Station, are listed below:

- Slotted screwdriver
- Wire of appropriate gauge to power the RealStream Lift station and connect the I/O
 - The RealStream Lift Station controller supports solid or stranded wires from 3.3...0.08 mm² (12...28 AWG)
 - Apply 0.5 Nm (4.5 lb-in) torque to tighten the screw so that the wire is held firmly in place
- Drill with suitable bits (if it becomes necessary to drill wiring access holes in the enclosure)
- Wire cutter and wire stripper
- Ethernet cable
- Spare din rail (may be needed if no more rail space is available) and mounting hardware

8 Installing the RealStream Lift Station Controller

The installation of the RealStream Lift Station RTU requires mounting the RTU on the 7.5 x 35 mm (0.3 x 1.4 in) DIN rail.

The following diagram shows the dimensions of the RTU.



For more information, see the following sections:

[System Grounding](#) ¹⁹

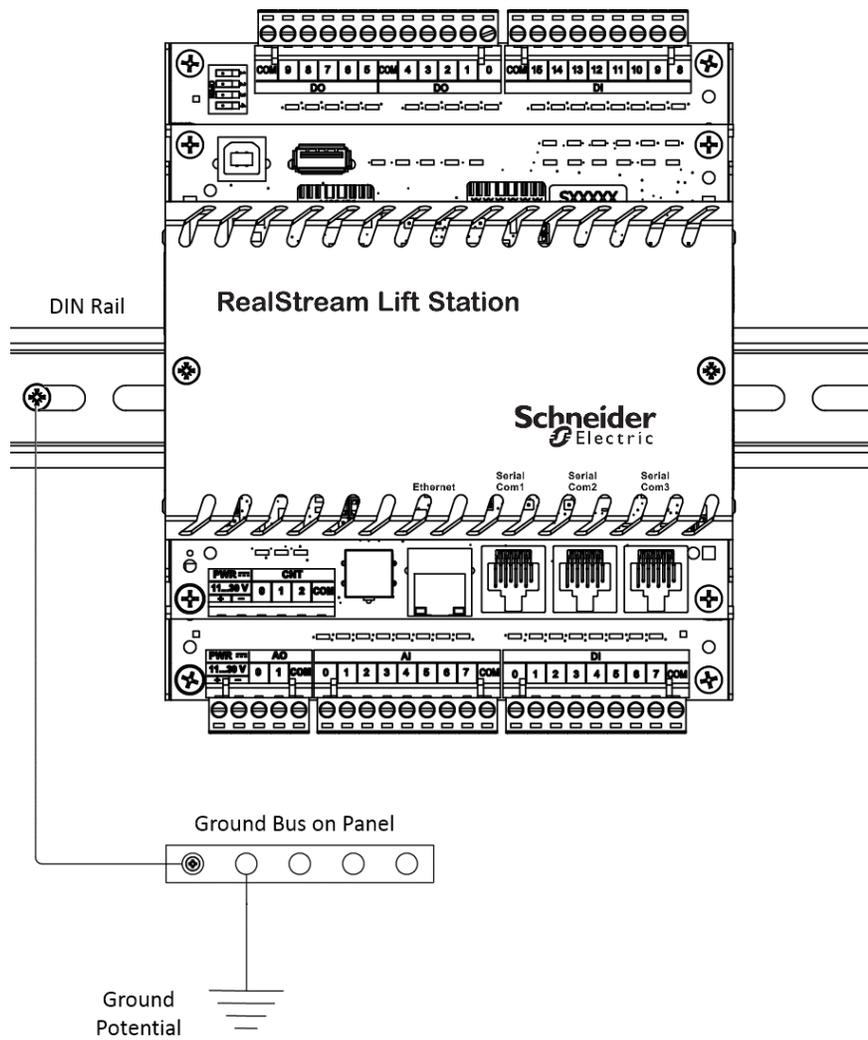
[Mounting the RealStream Lift Station RTU](#) ²⁰

[Power Supply Requirements](#) ²⁴

8.1 System Grounding

Ground the system by connecting the system power supply common to the chassis or panel ground. The negative (–) side of the DC power input terminal as well as I/O point terminals labeled COM are connected to chassis ground.

RTUs and I/O expansion modules are mounted on a DIN rail which is connected to the panel as shown in the illustration below. Connect the panel to ground according to the local electrical code.



8.2 Mounting the RealStream Lift Station RTU

The RTU mounts on a 7.5 x 35 mm (0.3 x 1.4 in) DIN rail.

⚠ WARNING**UNINTENDED EQUIPMENT OPERATION**

Evaluate the operational state of the equipment being monitored or controlled by the RTU before removing power.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING**ELECTRICAL HAZARD**

Remove power from the RTU before mounting it on a DIN rail.

Do not remove the RTU cover when mounting the RTU. The RTU is designed so that it can be mounted on a DIN rail with the cover in place.

Failure to follow these instructions can result in death or serious injury.

NOTICE**UNINTENDED EQUIPMENT OPERATION**

Installing the RTU in an environment where the electromagnetic compatibility (EMC) rating exceeds the certified EMC rating for the RTU can lead to unpredictable operation and unexpected results.

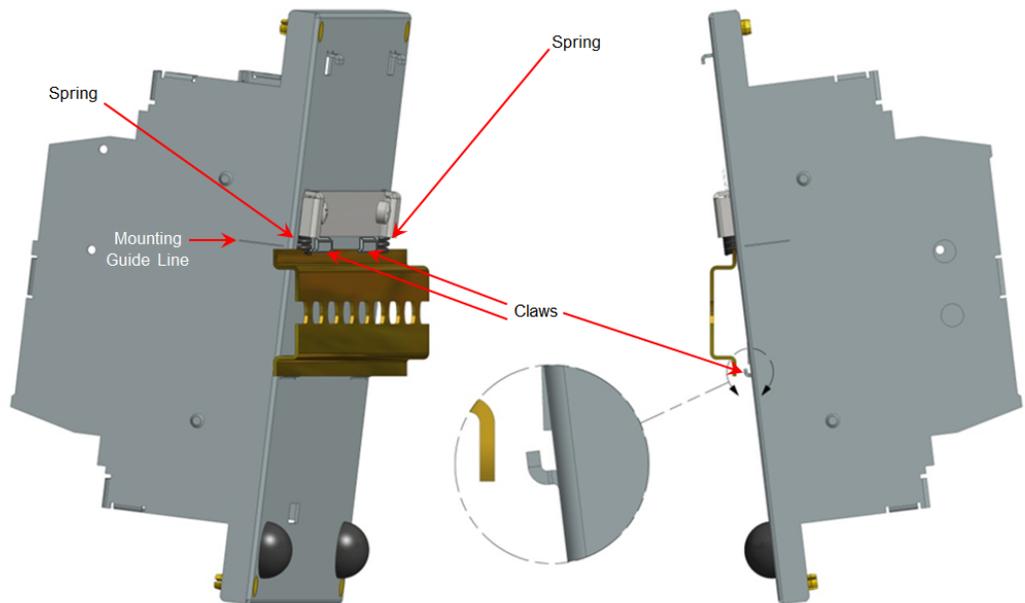
Failure to follow these instructions can result in equipment damage.

To Mount the Realift Lift Station RTU on a DIN Rail

The illustrations below show the correct way to mount the device on a horizontally-oriented DIN rail. The steps to mount the device on a vertically oriented DIN rail are the same. Your device may look different from the device shown in the illustrations.

1. With the lower part of the device tilted away from the DIN rail, position the mounting guide line on the side of the device so that it is just above the edge of the DIN rail.

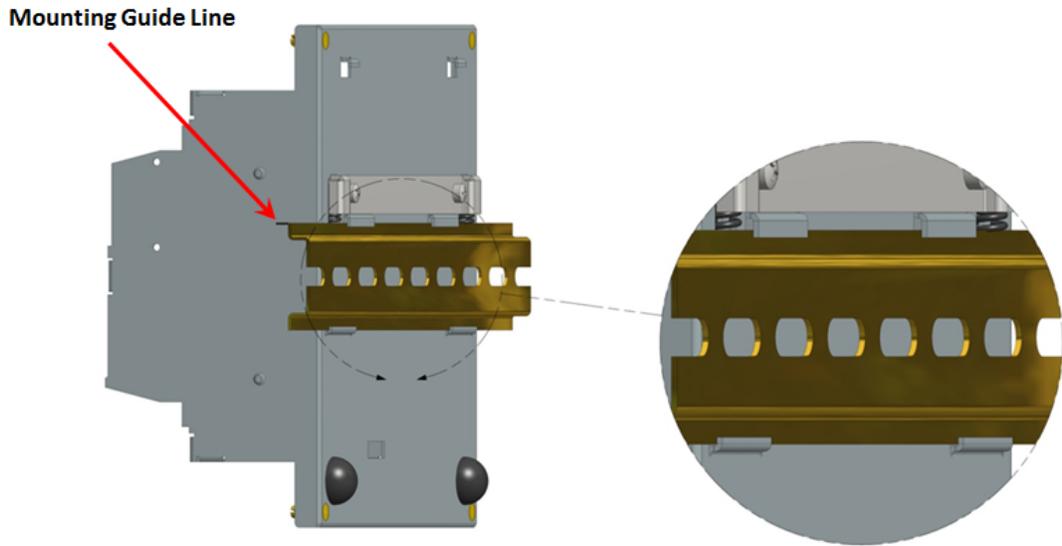
Rest the springs on the back of the device on the DIN rail and insert the edge of the DIN rail under the upper support claws that are adjacent to the springs, as shown below.



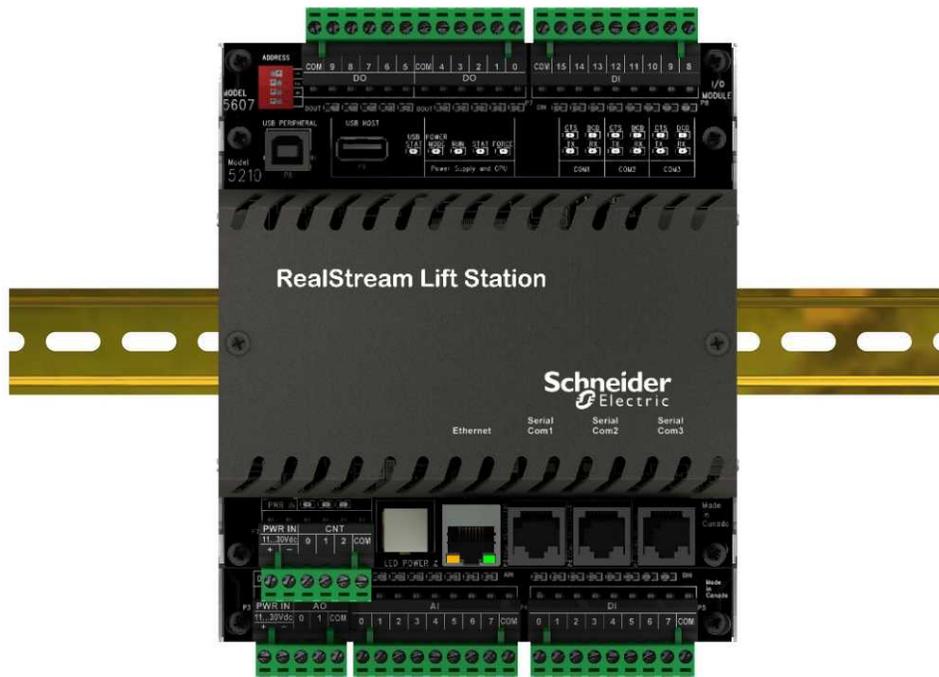
2. Push firmly on the device while tilting it toward the DIN rail until the DIN rail is positioned under both the upper and lower claws on the back of the device.
3. Release the pressure on the springs so that the DIN rail is held firmly in place between the upper and lower claws.

The mounting guide line will be aligned with the edge of the DIN rail.

The figure below shows a device with the DIN rail correctly positioned between the upper and lower claws on the back of the device.



The figure below shows the front view of the RTU mounted on a horizontally-oriented DIN rail.



8.3 Power Supply Requirements

This topic describes the power requirements for the RealStream Lift Station RTU.

The RTU is powered by an 11...30 Vdc input power source. Input power is applied to the positive (+) and negative (-) terminals on connector P3.

NOTICE

UNINTENDED EQUIPMENT OPERATION

The RTU operates only on a DC power source. Connections to power sources such as 16 Vac transformers will blow the input power fuse.

Do not exceed the maximum input voltage or apply a reverse voltage.

Failure to follow these instructions can result in equipment damage.

When the input voltage is below the minimum recommended voltage the RTU turns off.

The power-input voltage is used to generate 6 W (5 Vdc at 1.2 A), some of which is used for the onboard circuitry. The output capacity of the 6 W is sufficient to power the controller board, a Schneider Electric Graphic Display Terminal and a limited number of I/O modules, such as the integrated I/O board.

For more information, see the following topics:

[Power Calculations](#)²⁴

[Power Supply Wiring](#)²⁵

8.3.1 Power Calculations

This topic describes the power requirements for a RealStream Lift Station RTU with no I/O expansion modules.

Power requirements are determined by a combination of factors, including the number of relays energized, whether or not there is an Ethernet connection, the number of LEDs activated and the number of analog outputs being used.

The power requirements specified are for operation at 25 °C (77 °F). Add 0.3 W to cover operation at the extremes of the -40...70 °C (-40...158 °F) temperature range.

Analog outputs are not included in this calculation. Add 20 mA for each analog output used.

The calculations assume that the digital inputs are active.

The table below summarizes the base power requirements of the RTU in Normal Clock Mode.

| Digital Output Relays | Ethernet and USB Host | LEDs | 12 Vdc | 24 Vdc |
|-----------------------|-----------------------|------|--------|--------|
| Off | Off | Off | 0.9 W | 1.2 W |

| | | | | |
|-----|-----|-----|-------|-------|
| Off | On | Off | 2.0 W | 2.3 W |
| Off | Off | On | 1.3 W | 1.7 W |
| On | Off | On | 2.9 W | 3.4 W |
| Off | On | On | 2.4 W | 2.8 W |
| On | On | On | 4.0 W | 4.5 W |

8.3.2 Power Supply Wiring

The topics in this section describe the power supply wiring of the RealStream Lift Station RTU.

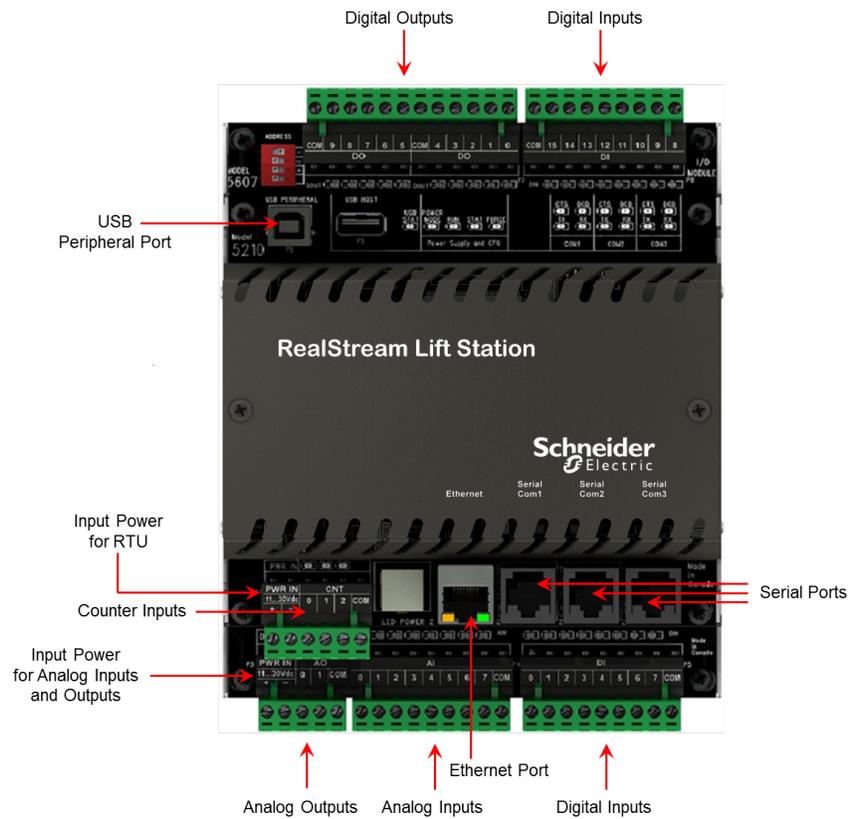
For basic power supply wiring for the RTU, see [Basic Wiring](#)²⁶.

Power for the I/O board can be provided in several ways:

- With a 24 Vdc source connected to the PWR IN terminals on the controller board and on the I/O board, in a parallel configuration. See [Recommended 24 Vdc Power Supply Configuration](#)²⁷ for an example of this wiring configuration.
- With a 12 Vdc source connected to the PWR IN terminals on the controller board and on the I/O board, in a parallel configuration.

For information about grounding the system, see [System Grounding](#)¹⁹.

The figure below shows the location of the input connections on the RealStream Lift Station RTU and the I/O board.



8.3.2.1 Basic Wiring

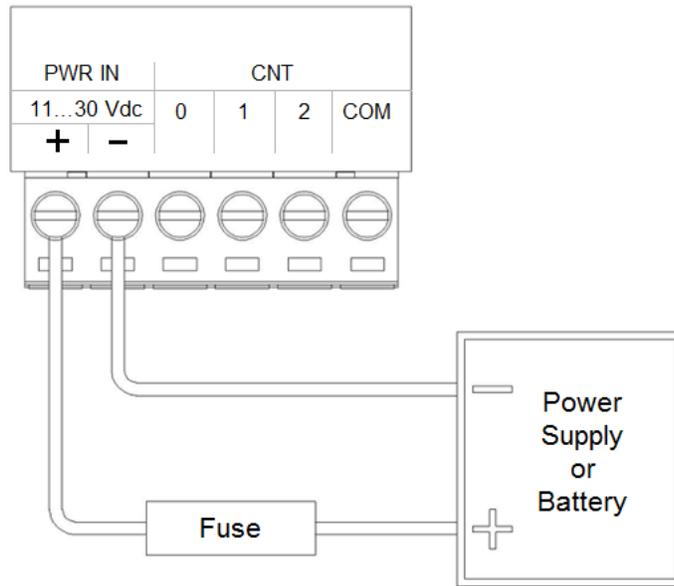
NOTICE

UNINTENDED EQUIPMENT OPERATION

Install an external 1.6 A fast-acting fuse on the input voltage side of the power supply connection.

Failure to follow these instructions can result in equipment damage.

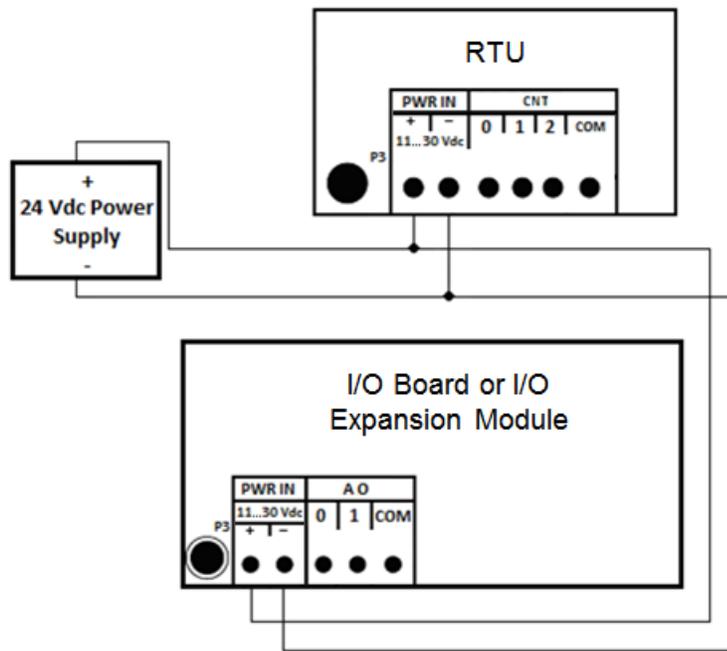
The following figure illustrates power supply wiring.



8.3.2.2 Recommended 24 Vdc Power Supply Configuration

This configuration uses a 24 Vdc power supply to power the controller board and the I/O board or I/O expansion module. This 24 Vdc is also used to power the analog circuitry on the I/O board or I/O expansion module.

- Connect the controller board PWR IN terminal to the same power supply as the I/O board or I/O expansion module PWR IN terminal.



9 Installing the Graphic Display Terminal

The following danger messages apply when you open the panel.

 **DANGER**

ELECTRICAL HAZARD

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.

Failure to follow these instructions will result in death or serious injury.

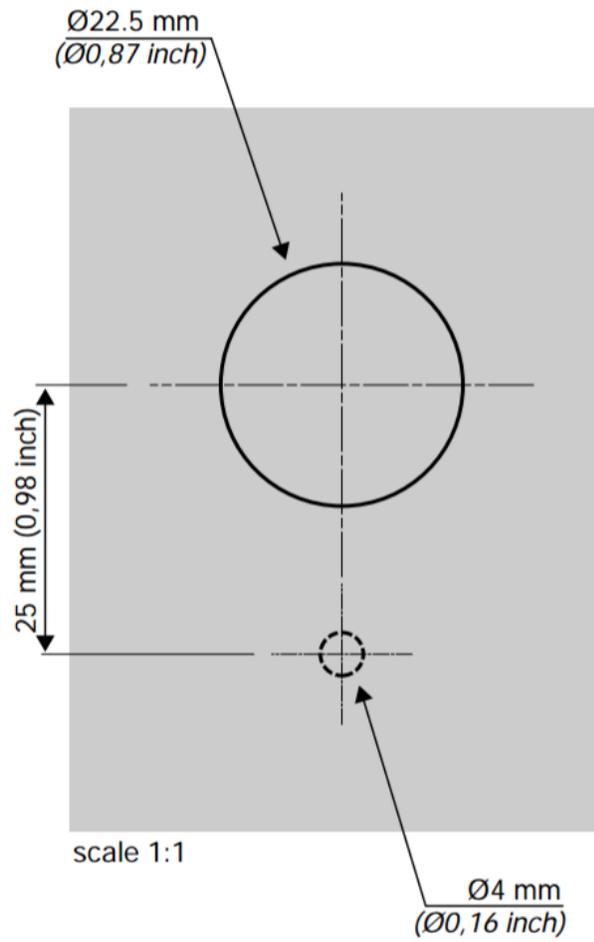
⚠ DANGER**ELECTRICAL HAZARD**

- Before performing work on the drive system:
 - Disconnect all power, including external control power that may be present.
 - Place a "Do Not Turn On" label on all power switches.
 - Lock all power switches in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 Vdc.
 - Measure the voltage on the DC bus between the DC bus terminals (PA/+ and PC/-) using a properly rated voltmeter to verify that the voltage is <42 Vdc.
 - If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative. Do not repair or operate the product.
- Install and close all covers before applying voltage

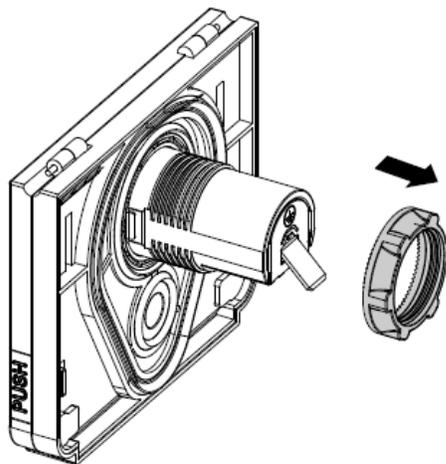
Failure to follow these instructions will result in death or serious injury.

To install the Graphic Display Terminal

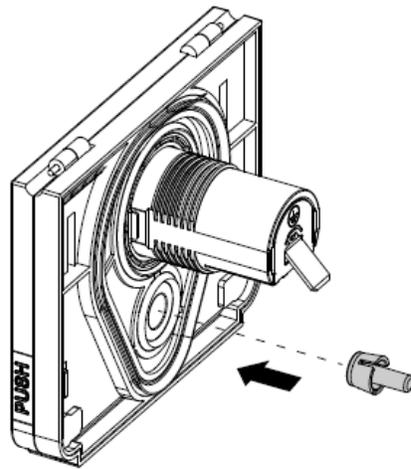
1. Open the packaging for the door mounting kit and remove all parts.
2. Using the measurement template, shown below, mark the panel where you want to install the GDT.



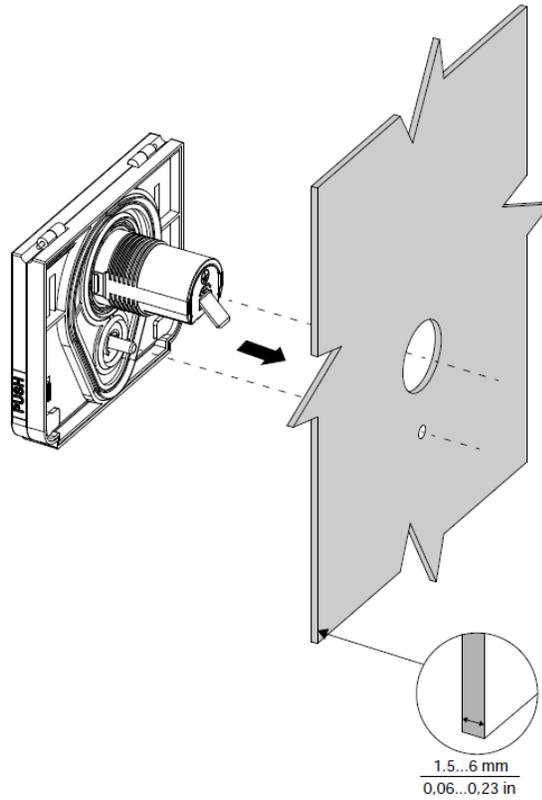
- Using an appropriate tool, make holes in the panel where you marked it in step 2.
- Remove the fixing nut from the back of the mounting plate.



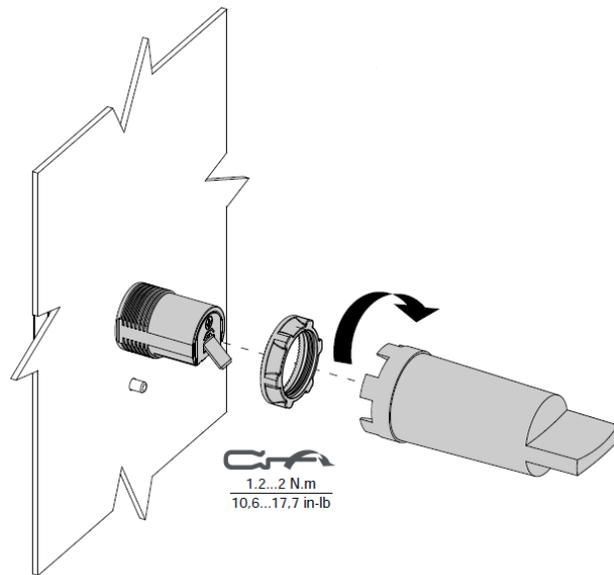
- Insert the anti-rotation pin.



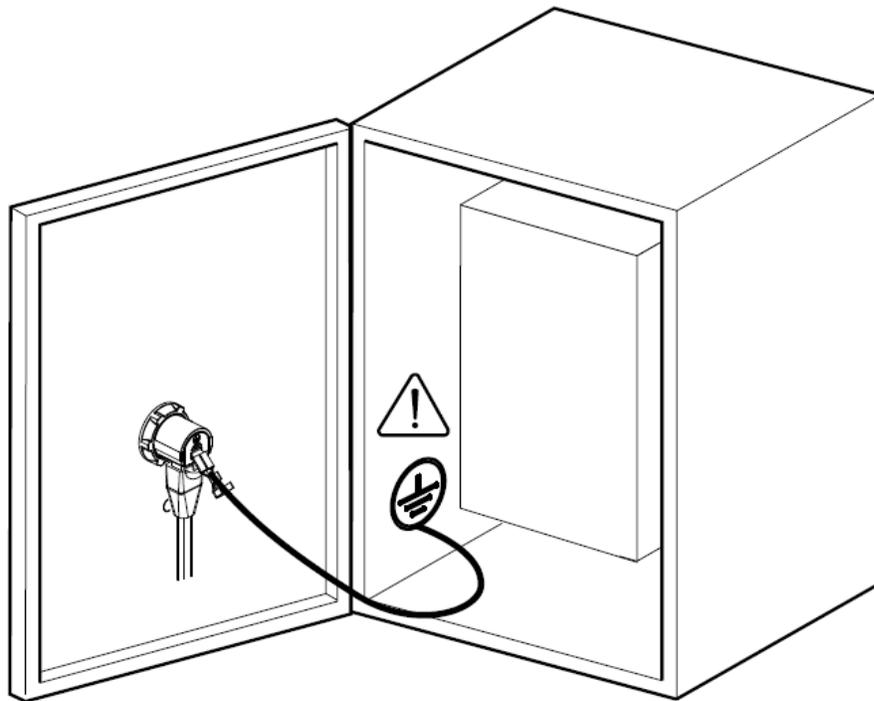
6. Insert the mounting plate, as shown below.



- 7. Insert the mounting kit plate through the larger hole.
- 8. Tighten the fixing nut using the tightening tool provided.



9. Ground the mounting plate to the panel.



10. Attach the cable to the back of the mounting plate. See [Connecting the Graphic Display Terminal](#)³³.

11. Close the panel door and attach the GDT to the mounting plate.

You can close the cover plate to maintain IP 65 protection when the GDT is not connected to the mounting plate.

9.1 Connecting the Graphic Display Terminal

To connect the GDT

1. Plug the provided GDT Serial Adapter into COM2 on the RTU.



2. Plug one end of a standard Ethernet cable into the adapter.
3. Plug the other end of the Ethernet cable into the GDT or the mounting plate, if used.

10 Connecting an Altivar 630 Drive

RealStream Lift Station can be used with an Altivar 630 variable frequency drive (VFD).

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual, the RealStream Lift Station Configuration Manual and the drive or motor manual before installing or operating the RealStream Lift Station system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to wiring and grounding of all equipment.
- Do not touch unshielded components or terminal strip connections with voltage present.
- Do not short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, and OSHA 1910.

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before servicing any electrical component of the RealStream Lift Station system:
 - Follow the applicable lock out/tag out (LOTO) procedure.
 - Disconnect all power sources, including external control power.
 - Place a Do Not Turn On label on all power disconnects.
 - Lock all power disconnects in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge and then verify that DC voltage is less than 42 V. The drive LED is not an indicator of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

NOTICE

UNINTENDED EQUIPMENT OPERATION

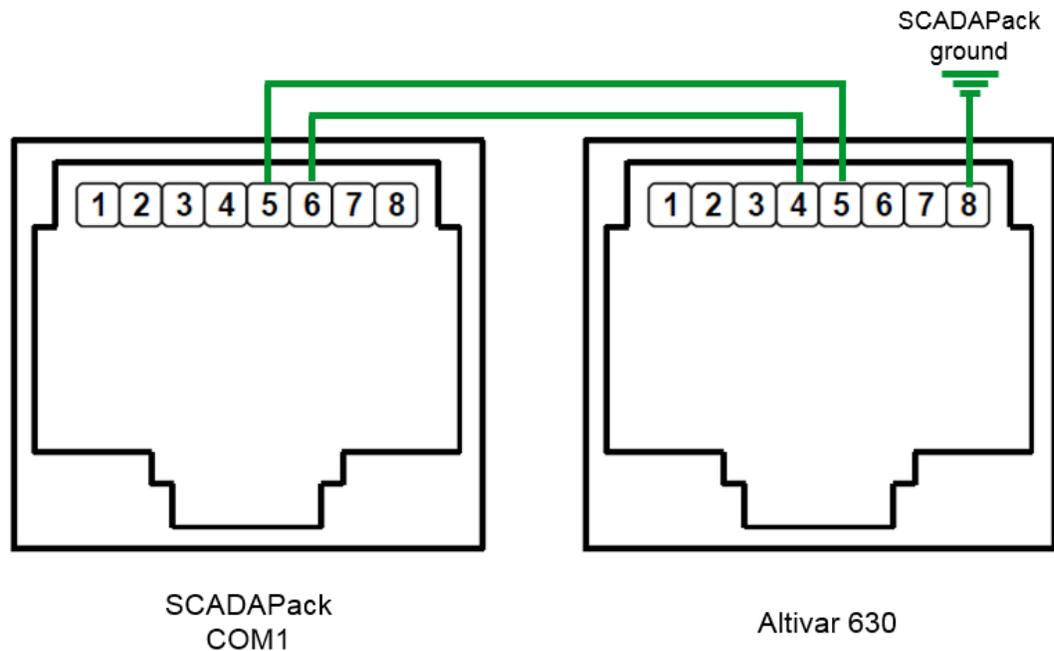
Connect a COM terminal from the variable frequency drive to enclosure ground at only one point in the system. Connecting a COM terminal to the RealStream RTU ground is recommended.

Failure to follow these instructions can result in equipment damage.

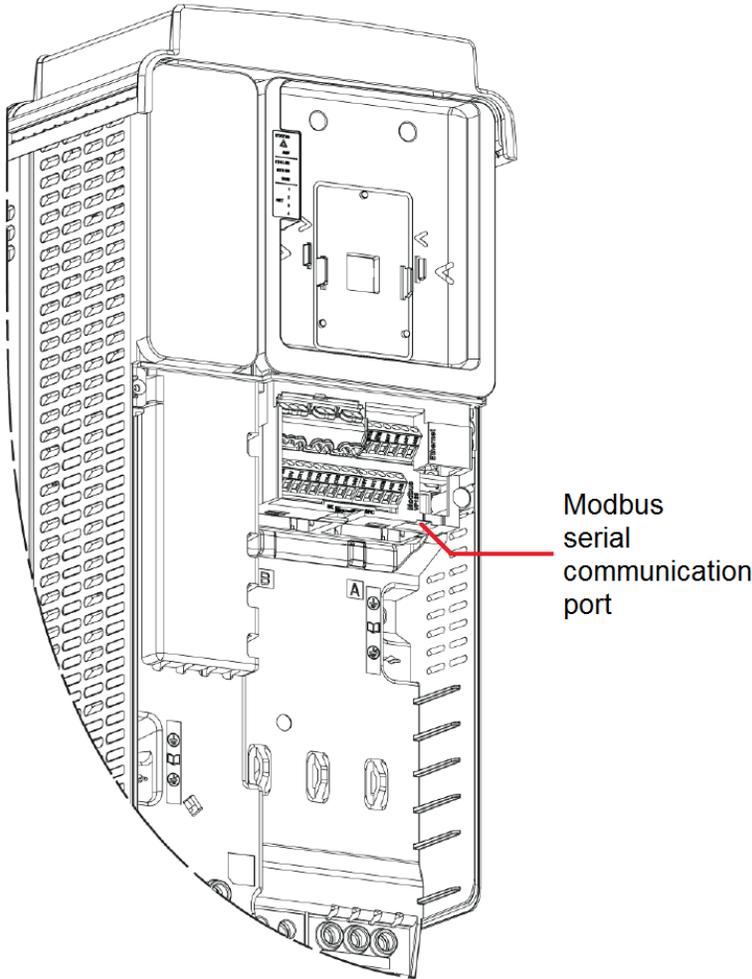
Before beginning the procedure below, see the drive manual provided by the manufacturer for information about how to open and close the drive cover.

To connect an Altivar 630 drive to RealStream Lift Station

1. Ensure the power to the drive is turned off for 15 minutes.
2. Open the drive cover. See the drive manual for detailed instructions.
3. Make an RJ45 cable connecting Altivar 630 pin 4 to RealStream RTU pin 6 and Altivar 630 pin 5 to RealStream RTU pin 5, as shown in the figure below. Ensure that only the indicated wires are terminated.



4. Connect the custom RJ45 cable connector to the Altivar 630, as shown in the figure below.



5. Connect the other end of the cable to COM1 on the RealStream RTU.



6. Close the drive cover.
7. Configure Modbus communication with the drive, as described in [Configuring an Altivar 630 Drive](#)³⁷.

10.1 Configuring an Altivar 630 Drive

To configure an Altivar 630 drive

1. Using the GDT on the Altivar 630 drive, set the following parameters:
 - a. DRIVE MENU > SIMPLY START (1.1):

| Option | Value | Additional Information |
|---|------------|--|
| 2/3 wire control | 2 wire | |
| Macro config. (Macro configuration) | Start/Stop | |
| Customized Macro | Yes | |
| Std. mot. freq (Standard motor frequency) | 60 Hz NEMA | |
| Input Phase loss (1ph) | Ignore | |
| Auto tuning | No | |
| Auto tuning state | Not done | |
| Output Ph rotation (Output Phase Rotation) | | Either ABC or ACB, depending on how you connect to the motor |
| Mot. therm. Current | | Use drive default |
| Max. Frequency | 90.0 Hz | |
| Low Speed | 0 Hz | |
| High Speed | 90.0 Hz | |

b. DRIVE MENU > COMMAND (1.6):

| Option | Value | Additional Information |
|----------------------|--------------|---|
| Ref.1 channel | Modbus | VFD command to set the reference speed via Modbus |
| RV Inhibition | Yes | |
| Stop Key priority | Yes | |
| Profile | Not separate | Allows Std. Command Word to control the VFD |
| Cmd switching | ch1 active | Used for commands like FWD or Stop |
| Cmd channel 1 | Modbus | |
| Cmd channel 2 | Terminal | |
| Ref.2 switching | LI3 | |
| Ref.2 channel | Modbus | |
| Copy channel 1<>2 | no | |
| F1 key assignment | No | Allows you to toggle between Remote and Local Control to control the motor. |
| F2 key assignment | No | |
| F3 key assignment | No | |
| F4 key assignment | No | |

c. DRIVE MENU > FAULT MANAGEMENT (1.8):

| Option | Value |
|-----------------------|-----------------------------|
| Com. Fault Management | Modbus fault mgt: Freewheel |
| Catch On The Fly | Yes |

d. DRIVE MENU > COMMUNICATION (6) > Comm parameters > Modbus SL > Modbus Fieldbus:

WARNING**UNINTENDED EQUIPMENT OPERATION**

Assign a unique Modbus address to each VFD.

Failure to follow these instructions can result in death or serious injury.

| Option | Value | Notes |
|------------------|---------|---|
| Modbus Address | 1...247 | The address for the Altivar 630 Each VFD must have a different address |
| Modbus baud rate | 19.2 | The default is 19.2 Kbps |
| Modbus format | 8-N-1 | The default is 8-E-1 |
| Modbus time out | 10.0s | 10 seconds is recommended |

2. Leave COM. SCANNER INPUT and COM. SCANNER OUTPUT set as default.

To test that you have local control with your configuration

1. Press ESC on the local display of the drive that you want to test until you see the Frequency ref. screen.
2. Toggle local control by pressing LOCAL/REMOTE.
3. Adjust the frequency reference by turning the wheel.
4. Press RUN to start.
5. Press STOP to stop.
6. Toggle Modbus control by pressing LOCAL/REMOTE.

To verify that you have a Modbus connection between the RealStream RTU and the drive, refer to the RealStream Lift Station Configuration Manual.

NOTICE**UNINTENDED EQUIPMENT OPERATION**

Connect a COM terminal from the variable frequency drive to enclosure ground at only one point in the system. Connecting a COM terminal to the RealStream Lift Station Controller ground is recommended.

Failure to follow these instructions can result in equipment damage.

11 Connecting the Sensors

You can configure RealStream Lift Station to use sensors. See the RealStream Lift Station Configuration Manual for a list of support sensor types.

The sensors are connected to a 24 Vdc power supply that is provided by the system. The system is designed for 4...20 mA sensor signals.

Different connection types are available for different sensors. The analog signals are 4...20 mA inputs.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual and the relevant sensor installation manual before installing or operating the RealStream Lift Station system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to wiring and grounding of all equipment.
- Do not touch unshielded components or terminal strip connections with voltage present.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, and OSHA 1910.

Failure to follow these instructions will result in death or serious injury.

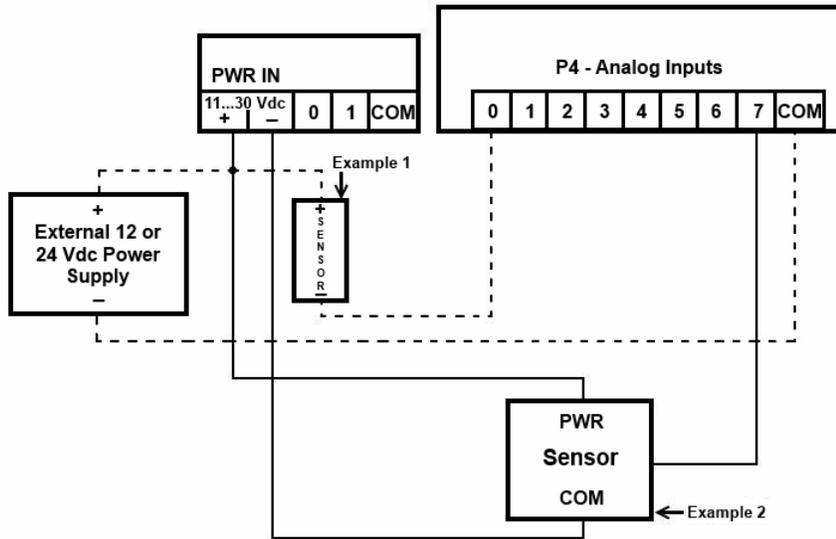
DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before servicing any electrical component of the RealStream Lift Station system:
 - Follow the applicable lock out/tag out (LOTO) procedure.
 - Disconnect all power sources, including external control power
 - Place a Do Not Turn On label on all power disconnects.
 - Lock all power disconnects in the open position.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

11.1 Analog Input Wiring



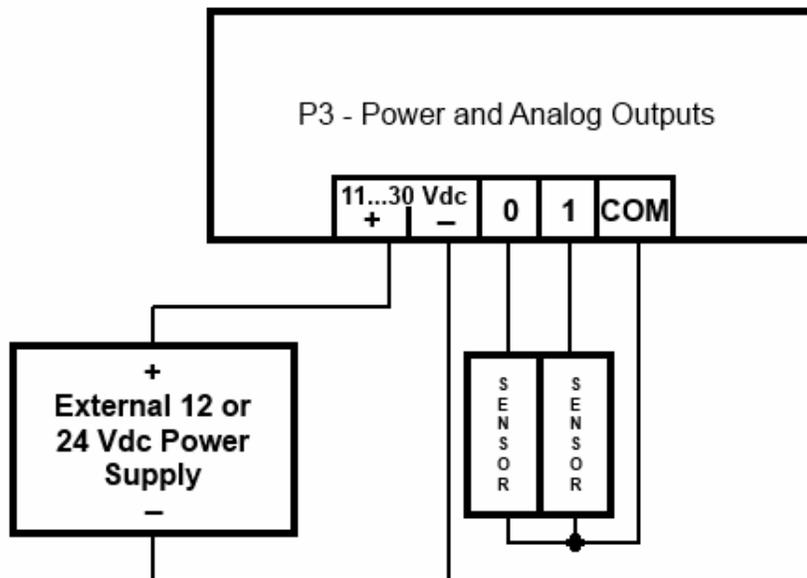
Example 1 (shown with a dotted line):

- Channel 0 has a loop powered current transmitter connected to the external power supply.

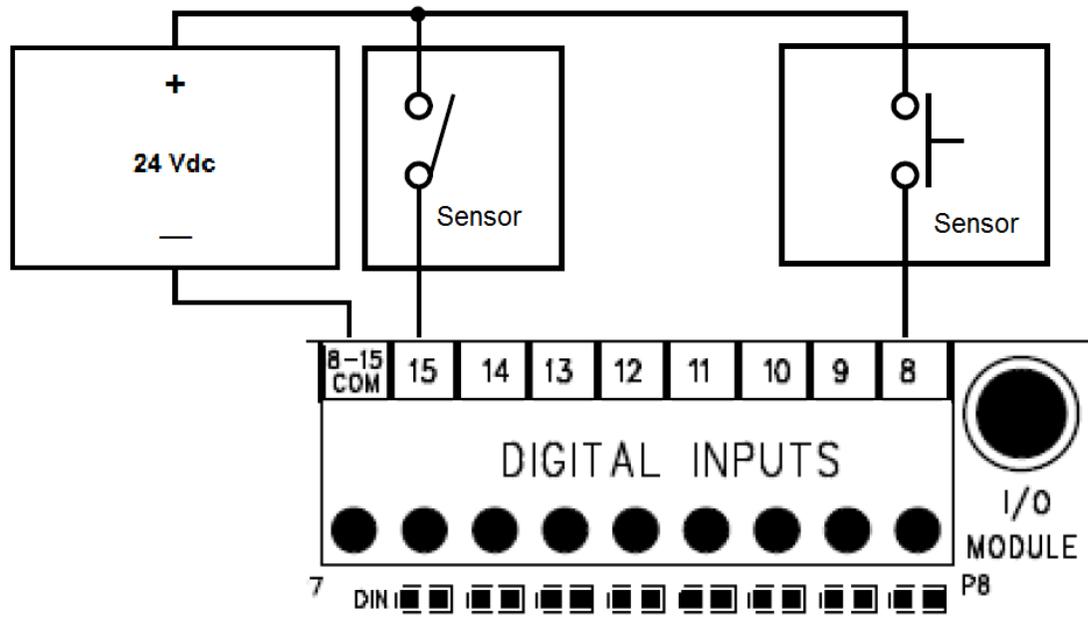
Example 2 (shown with a solid line):

- Channel 7 has a self-powered current transmitter connected to the external power supply.

11.2 Analog Output Wiring



11.3 Digital Input Wiring



11.4 Digital Output Wiring

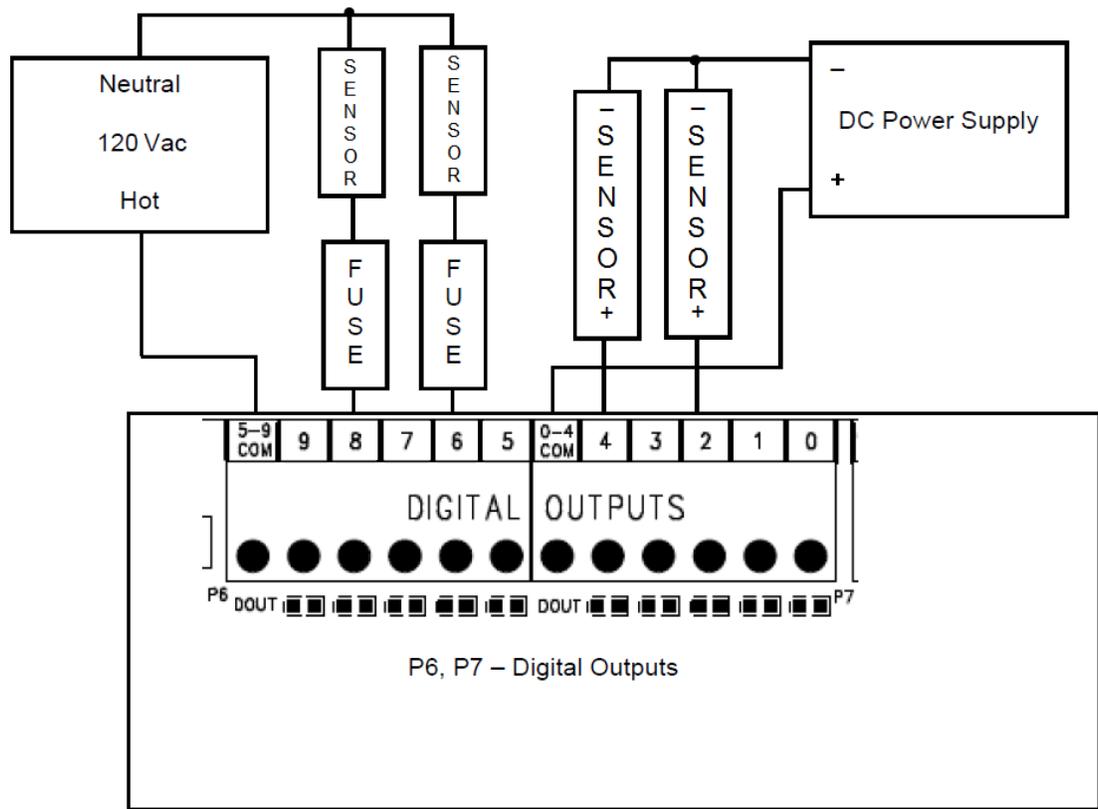
⚠ WARNING

ELECTRICAL HAZARD

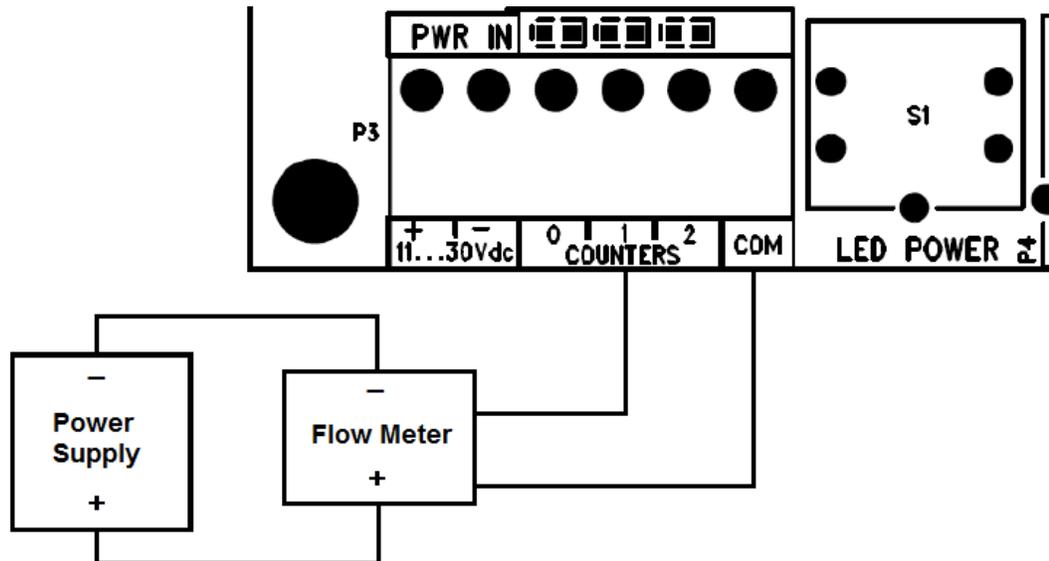
Remove power from all devices before connecting or disconnecting inputs or outputs to any terminal or installing or removing any hardware.

Failure to follow these instructions can result in death or serious injury.

The RealStream controller is optionally available with solid state relays (SSR). The polarity of the load voltages needs to be considered when using the SSR version of the RealStream controller. The loads need to be connected to the -ve (negative) side of the power supply and the +ve (positive) side of the power needs to be switched through the COM terminal as shown in example below.



11.5 Counter Input Wiring



11.6 Confirming Sensor Readings

To confirm that you are getting readings from the sensor, induce a reading from the sensor that you are verifying. On the GDT, verify that the reading is what you expect.

11.7 Grounding the Sensor

The sensors need to be grounded.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The user is responsible for compliance with all international and national electrical code requirements with respect to wiring and grounding of all equipment.

Failure to follow these instructions will result in death or serious injury.

12 Completing the RealStream Lift Station Installation

The system is now ready for a qualified person to reapply power to the system. To configure you system, see the RealStream Lift Station Configuration Manual.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual and the relevant drive installation manual before installing or operating the RealStream Lift Station system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to wiring and grounding of all equipment.
- Many parts of the RealStream Lift Station system, including the printed circuit boards, operate at the line voltage. Do not touch. Use only electrically-insulated tools.
- Do not touch unshielded components or terminal strip connections with voltage present.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, and OSHA 1910.

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before servicing any electrical component of the RealStream Lift Station system:
 - Follow the applicable lock out/tag out (LOTO) procedure.
 - Disconnect all power sources, including external control power.
 - Place a Do Not Turn On label on all power disconnects.
 - Lock all power disconnects in the open position.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

13 Appendix A- Maintenance

The Power Mode LED indicates the status of the 5 Vdc supply.

If the LED is off, the on-board fuse F1 may require replacing. The fuse is a Littelfuse Nano-SMF, part number 045301.5 or R45101.5. This fuse is available in a package of 10 from Schneider Electric as part number TBUM297327.

If the program is lost during power outages, the lithium battery may require replacement. See [Replacing the Battery](#)⁵¹ for details.

The analog input and output circuitry (where available) is calibrated at the factory and does not require periodic calibration. Calibration may be necessary if the module has been repaired as a result of damage.

If the RTU is not functioning correctly, contact Schneider Electric Technical Support for information regarding returning the RealStream RTU for repair.

WARNING

UNINTENDED EQUIPMENT OPERATION

Evaluate the operational state of the equipment being monitored or controlled by the device before removing power.

Failure to follow these instructions can result in death or serious injury.

WARNING

HAZARD OF ELECTRIC SHOCK

Remove power from all devices before connecting or disconnecting inputs or outputs to any terminal or insalling or removing any hardware

Failure to follow these instructions can result in death or serious injury.

For more information, see the following sections:

- [Calibration](#)⁴⁷
- [Preventative Maintenance](#)⁴⁸
- [Routine Maintenance](#)⁴⁹
- [Replacing the Battery](#)⁵¹
- [Fuses](#)⁵¹

13.1 Calibration

The RTU is electronically calibrated at the factory during the manufacturing process and after any repair procedures.

There are no user calibration procedures.

13.2 Preventative Maintenance

Keep circuit boards free from contaminants such as dust and moisture.

WARNING

UNINTENDED EQUIPMENT OPERATION

Evaluate the operational state of the equipment being monitored or controlled by the RTU or the I/O expansion module before removing power.

Failure to follow these instructions can result in death or serious injury.

WARNING

HAZARD OF ELECTRIC SHOCK

- Remove power from the RTU before removing the RTU cover
- Remove power from the RTU before servicing

Failure to follow these instructions can result in death or serious injury.

Battery Handling Procedures

NOTICE

UNINTENDED EQUIPMENT OPERATION

- Treat batteries with care.
- Follow the manufacturers' instructions concerning battery storage, use and disposal.
- Keep batteries clean and free from contaminants or other materials that could short the terminals.
- Connect new batteries using the correct polarity.
- Replace batteries with new units of the same chemistry, capacity and make.
- Observe the manufacturers' instructions regarding disposal of batteries. Considerable energy remains in the battery.

Failure to follow these instructions can result in equipment damage.

Electrostatic Discharge (ESD) Procedures

NOTICE

UNINTENDED EQUIPMENT OPERATION

The electronics inside the RTU can be damaged by static electricity. If you need to remove the RTU cover, wear an anti-static wrist strap that is connected to ground. Failing to follow this simple step can cause intermittent or total loss of RTU operation and will void the warranty.

Failure to follow these instructions can result in equipment damage.

13.3 Routine Maintenance

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Evaluate the operational state of the equipment being monitored or controlled by the RTU or the I/O expansion module before removing power.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK

- Remove power from the RTU before removing the RTU cover
- Remove power from the RTU before servicing

Failure to follow these instructions can result in death or serious injury.

NOTICE

UNINTENDED EQUIPMENT OPERATION

The electronics inside the RTU can be damaged by static electricity. If you need to remove the RTU cover, wear an anti-static wrist strap that is connected to ground. Failing to follow this simple step can cause intermittent or total loss of RTU operation and will void the warranty.

Failure to follow these instructions can result in equipment damage.

Primary Power Supply

The primary power for the RTU is a DC power supply. If this is a mains-operated power supply charger with battery backup, replace the batteries every 36 months or earlier if necessary.

Real-Time Clock and Onboard RAM Back-up Battery

The RTU includes a lithium-powered back-up battery on the controller board. The main task of the battery is to back-up the microprocessor RAM chips and the real-time clock. However, the back-up battery also maintains the RTU configuration during a power-supply interruption.

NOTICE

DATA LOSS

RTU memory contents are lost when:

- The onboard RAM back-up battery goes flat
- The onboard RAM backup battery is replaced while power to the RTU is disconnected.

When memory contents are lost, RTU configuration information and user-created applications must be reloaded for correct RTU operation.

Failure to follow these instructions can result in equipment damage.

NOTICE

UNINTENDED EQUIPMENT OPERATION

Before replacing the onboard RAM back-up battery, save a copy of the RTU configuration information, user-created applications, logs and other data to an external drive so it can be reloaded when the procedure is complete.

Failure to follow these instructions can result in equipment damage.

The onboard RAM back-up battery will retain the RTU configuration for at least two years if the unit is not powered. Replace the battery after every five years of continuous use, or earlier if necessary.

RAM back-up batteries are not rechargeable.

Cleaning

There are no special cleaning instructions for this product.

Routine Maintenance Schedule

The frequency of routine maintenance depends on the specific piece of equipment and the environment in which it is installed. Routine maintenance is recommended at two time-intervals:

- Every three years
- Every five years

The following table summarizes the recommended frequency for maintenance procedures. In some cases, the period stated is the maximum interval between maintenance activities.

Experience, or the high usage of a particular piece of equipment, may determine that maintenance procedures need to be performed more frequently than indicated in the table

Items requiring re-calibration may not be suitable for user servicing. Contact [Schneider Electric Technical Support](#)⁶ for advice.

| Component | Every Three Years | Every Five Years |
|-------------------------------|--------------------------------|--|
| Connections and ground points | Check and replace if necessary | |
| Power supply units | | Check and replace if necessary |
| Modems | Check and replace if necessary | |
| RAM back-up battery | Check and replace if necessary | Replace the battery when it has been installed for five years. See Replacing the Battery ⁵¹ for more information. |

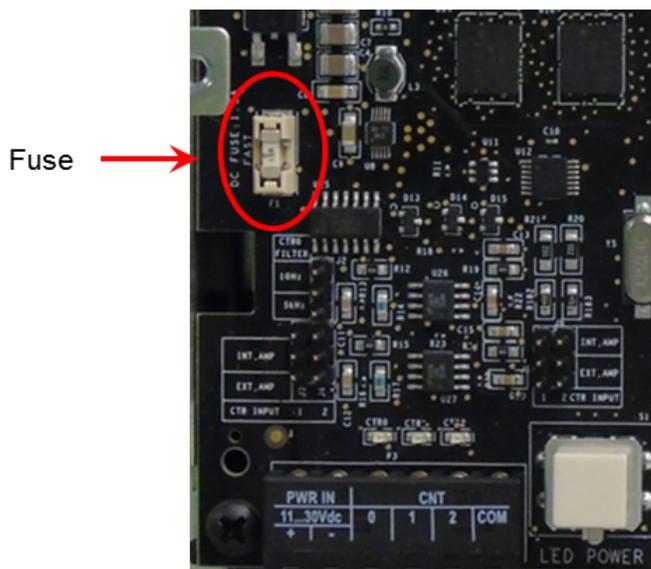
13.4 Replacing the Battery

A flat-package lithium battery located on the controller board provides backup power to the RTU's real-time clock and RAM memory.

Contact Schneider Electric as soon as possible when the intervals recommended in [Routine Maintenance](#)⁴⁹ suggest that the battery should be changed.

13.5 Fuses

A single 1.5 Amp fast-blow fuse provides protection for the power supply. The fuse is mounted under the cover. See the following image for the location.



⚠ WARNING**RISK OF EXPLOSION**

Before replacing the fuse:

- Verify the area is non-hazardous
- Assess the impact that

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING**UNINTENDED EQUIPMENT OPERATION**

Evaluate the operational state of the equipment being monitored or controlled by the RTU or the I/O expansion module before removing power.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING**UNINTENDED EQUIPMENT OPERATION**

Replace the fuse with a fuse of the same rating. Under no circumstances would a fuse be bypassed or replaced with a fuse of a higher rating.

Failure to follow these instructions can result in death or serious injury.

The fuse is a Littelfuse Nano-SMF, part number 045301.5 or R45101.5. This fuse is available in a package of 10 from Schneider Electric as part number TBUM297327.

In every case, investigate and correct the cause of the blown fuse before replacement. Common causes of a blown fuse are short circuits and excessive input voltages.

14 Appendix B- Specifications

The following sections list the specifications of the RealStream RTU.

Disclaimer: Schneider Electric reserves the right to change product specifications without notice. For more information visit <http://www.schneider-electric.com>.

14.1 General

| Feature/Function | Detail |
|------------------|---|
| Terminations | <ul style="list-style-type: none"> • 5, 6 and 9-pin, removable terminal blocks • 3.3...0.08 mm² (12...28 AWG) • 15 A contacts • Screw termination - 0.5 N•m (4.5 lb-in) torque |
| Dimensions | <ul style="list-style-type: none"> • 142 mm (5.59 in) wide • 181 mm (7.13 in) high • 74.1 mm (2.92 in) deep |
| Packaging | Corrosion-resistant zinc-plated steel with black enamel paint |
| Environment | <ul style="list-style-type: none"> • 5% RH to 95% RH, non-condensing • -40...70 °C (-40...158 °F) operation • -40...85 °C (-40...185 °F) storage |

14.2 Power Supply

| Feature/Function | Detail |
|--|--------|
| Power required at 12 Vdc (Relays, Ethernet, digital inputs and LEDs active) | 4.0 W |
| Power required at 24 Vdc (Relays, Ethernet, digital inputs and LEDs active) | 4.5 W |
| 5 Vdc current available for I/O expansion | 500 mA |
| Maximum power consumption with maximum I/O expansion | 7.7 W |

14.3 Controller Board

| Feature/Function | Detail |
|-----------------------------|--|
| Processors | <ul style="list-style-type: none"> • 32-bit ARM7-TDMI microcontroller (32 MHz clock) • Integrated watchdog timer • Microcontroller I/O co-processors (20 MHz clock) |
| Memory | <ul style="list-style-type: none"> • 16 MB FLASH ROM • 4 MB CMOS RAM • 4 kB EEPROM |
| Non-volatile RAM | CMOS RAM with lithium battery retains contents for 2 years with no power |
| Clock calendar | <p>±1 minute/month at 25 °C (77 °F)</p> <p>+1/-3 minutes/month 0...50 °C (32...122 °F)</p> |
| Internal temperature | <ul style="list-style-type: none"> • Measurement range -40...75 °C Accuracy ± 5 °C • Measurement range -40...167 °F Accuracy ± 9 °F |
| Lithium Battery Monitor | Accuracy ± 0.2 Vdc |
| Power Input Voltage Monitor | Accuracy ±0.4 Vdc |

14.4 Data Capacity

| Feature/Function | Detail |
|--|--------|
| Maximum DNP3 Events | 500 |
| Maximum Locally Stored Events on File System | 40,000 |

14.5 Serial Ports

| Feature/Function | Detail |
|-----------------------|--|
| Serial Port COM 1 | <ul style="list-style-type: none"> • Reserved for VFD and Modbus RTU sensors • RS485 compatible serial port • 8-pin modular jack • Two-wire half duplex • Bias resistors installed • Baud Rate: 19200 • Data Mode: 8-bit, no parity, 1 stop bit |
| Serial Port COM2 | Reserved for local Graphic Display Terminal (GDT) |
| Serial Port COM3 | <ul style="list-style-type: none"> • Dedicated RS232 compatible serial port • 8-pin modular jack • Full duplex with RTS/ CTS control • Implemented TxD, RxD, CTS, RTS, DCD, and DTR |
| Baud Rates (COM3) | 9600, 19200, 38400, 57600, 115200 |
| Data Modes (COM3) | <ul style="list-style-type: none"> • 8-bit, no parity, 1 stop bit • 8-bit, even parity, 1 stop bit • 8-bit, odd parity, 1 stop bit • 7-bit, even parity, 1 stop bit • 7-bit, odd parity, 1 stop bit • 8-bit, no parity, 2 stop bits |
| Protocol (COM3) | DNP3 Slave, Modbus RTU Slave |
| Protocol Modes (COM3) | Slave |
| Isolation | Common ground return connected to chassis ground |
| Cable Length | RS232: maximum 3 m (10 ft) |

14.6 Ethernet Port

| Feature/Function | Detail |
|---------------------|--|
| Terminations | <ul style="list-style-type: none"> • RJ-45 modular connector • 10Base-T/100Base-T (twisted pair) • 10/100 Mbps per second |
| Protocols Supported | <ul style="list-style-type: none"> • DNP3 in TCP Master/Slave (default) • DNP3 in UDP Master/Slave (default) • Modbus/TCP Client • Modbus/TCP Server |

14.7 USB Port

| Feature/Function | Detail |
|---------------------|--|
| Compliance | USB 2.0 |
| USB Port | <ul style="list-style-type: none"> • One USB Peripheral Port "B" connector (for local configuration) • USB Host Port "A" connector - Not currently supported |
| Speed | <ul style="list-style-type: none"> • 1.5 Mb/s • 12 Mb/s |
| Protocols Supported | DNP3 |

14.8 Visual Indicators

| Feature/Function | Detail |
|------------------|---|
| COM1 | Received data: (RX) LED Transmitted data: (TX) LED Clear to send: (CTS) LED Data carrier detect: (DCD) LED |
| COM2 | Received data: (RX) LED Transmitted data: (TX) LED Clear to send: (CTS) LED Data carrier detect: (DCD) LED |
| COM3 | Received data: (RX) LED Transmitted data: (TX) LED Clear to send: (CTS) LED Data carrier detect: (DCD) LED |
| Status | <ul style="list-style-type: none"> • POWER MODE LED • RUN LED • STAT LED (blinking when operational non-zero status code present) • FORCE LED (some I/O has been locked by ISaGRAF) |
| Counters | 3 LEDs |
| Ethernet | Link indicator: (LINK) LED Activity indicator: (ACT.) LED |
| LED POWER button | LED power toggle and operating mode selector |

14.9 Counter Inputs

| Feature/Function | Detail |
|-------------------------|---|
| Counter Inputs | <ul style="list-style-type: none"> • Counter 0 Not used • Counter 1 turbine meter inputs • Counter 2 Not used |
| Digital Input Counter 0 | Not used |
| Counter 1 | Configured for use with dry contact closure |
| Counter 2 | Not used |
| Counter 1 Dry Contact | <ul style="list-style-type: none"> • Maximum input 10 Vp-p without internal amplifier • Maximum frequency 10 KHz |
| Dry Contact Thresholds | <ul style="list-style-type: none"> • 0.9 Vdc typical turn on voltage • Less than 0.4 Vdc turn on input voltage • 1.5 Vdc typical turn off input voltage • Greater than 2.2 Vdc turn off input voltage |
| Isolation | Common ground return connected to chassis ground |

14.10 Digital Inputs

| Feature/Function | Detail | |
|------------------------|--|---|
| Quantity | 16 | |
| Connectors | 2 removable, 8-pin | |
| Indicators | Logic-powered LEDs | |
| Voltage | Typical: 12 Vdc or 24 Vdc | |
| Over-voltage Tolerance | 36 Vdc | |
| Input Current | 0.67 mA typical at 24 Vdc | |
| Input Logic-HI Level | OFF to ON transition threshold is typically 6.5 Vdc | |
| Input Voltage | <ul style="list-style-type: none"> • Off – To – On • 6.5 Vdc +/- 0.5 Vdc | <ul style="list-style-type: none"> • On – To – Off • 6.5 Vdc +/- 0.5 Vdc |
| Response Time | <ul style="list-style-type: none"> • Off – To – On • 15...19 ms • 13.5...18 ms | <ul style="list-style-type: none"> • On – To – Off • 25...29 ms • 23...28 ms |
| @ 50 Hz | | |
| @ 60 Hz | | |
| Isolation | <ul style="list-style-type: none"> • Isolation is in 2 groups of 8 • Isolation from logic supply and chassis: 250 Vac/1000 Vdc | |

14.11 Digital Outputs

| Feature/Function | Detail |
|------------------|---|
| Quantity | 10 |
| Connector | Removable, 12-pin |
| Type | <ul style="list-style-type: none"> • Form A Contacts (normally open) • 5 contacts share one common |
| Indicators | Logic-powered LEDs |
| Inductive Loads | Place a diode across the coil to suppress the noise in DC circuits and extend the life of the relay contacts |
| Isolation | <ul style="list-style-type: none"> • Isolation is in 2 groups of 5 • Chassis to contact: 1500 Vac (1 min) • Logic to contact: 1500 Vac (1 min) • Output group to output group: 1500 Vac (1 min) |
| Operate Time | 25 ms maximum, 20 ms typical |
| Release Time | 30 ms maximum, 25 ms typical |

14.12 Analog Inputs

| Feature/Function | Detail |
|------------------|--|
| Quantity | 8 |
| Connector | Removable, 9-pin |
| Indicators | <ul style="list-style-type: none"> • Logic-powered LEDs • Indicate voltage or current mode and out-of-range input signal |
| Ranges | <ul style="list-style-type: none"> • Software-configurable from the GDT Sensors page • 0...20 mA • 4...20 mA |
| Resolution | 14 bits over the 0...20 mA measurement range |
| Accuracy | <ul style="list-style-type: none"> • $\pm 0.1\%$ of full scale at 25 °C (77 °F) • $\pm 0.2\%$ over temperature range |
| Input Resistance | 250 ohms in 20 mA |
| Isolation | Isolation from logic supply and chassis: 500 Vac |

14.13 Analog Outputs

| Feature/Function | Detail |
|-------------------------|---|
| Quantity | 2 |
| Connector | Removable, 5-pin |
| Range | <ul style="list-style-type: none"> • 0...20 mA sourcing • 4...20 mA sourcing |
| Resolution | 12 bits |
| Maximum Load Resistance | <ul style="list-style-type: none"> • 925 W with 24 Vdc input voltage or when internal 24 Vdc power supply is on • 375 W with 12 Vdc input voltage • 250 W with input voltage at power supply turnoff |
| Accuracy | <ul style="list-style-type: none"> • Accuracy specified from 0.5...20 mA • $\pm 0.15\%$ of full scale at 25 °C (77 °F) • $\pm 0.25\%$ of full scale over temperature range |

| Feature/Function | Detail |
|--|---|
| Noise and Ripple | 0.04% maximum |
| Logic End-Of-Scan to Signal Update Latency | Typical: 18...27 ms |
| Response time (D/A to signal) | Less than 10 μ s for 10% to 90% signal change |
| Isolation | Isolation from logic supply and chassis |

15 Appendix C- Standards and Certifications

| | |
|--|--|
| <p>Hazardous Locations - North America</p> |  <p>Non-Incendive Electrical Equipment for Use in Class I, Division 2 Groups A, B, C and D Hazardous Locations.</p> <ul style="list-style-type: none"> • CSA Std. C22.2 No. 213-M1987 - Hazardous Locations. • ANSI/ISA 12.12.01 - Hazardous (Classified) Locations. |
| <p>Safety</p> | <ul style="list-style-type: none"> • CSA (cCSAus) certified to the requirements of: CSA C22.2 No. 142-M1987 and UL508. (Process Control Equipment, Industrial Control Equipment) • UL (cULus) certified to the requirements of UL508 and CSA C22.2 No. 142-M1987 (Industrial Control Equipment, Process Control Equipment) |
| <p>Digital Emissions</p> | <ul style="list-style-type: none"> • FCC Part 15, Subpart B, Class A Verification • EN 61000-6-4 Electromagnetic Compatibility (EMC) - Generic Emission Standard for Industrial Environments • RCM Compliance |
| <p>Immunity</p> | <ul style="list-style-type: none"> • EN 61000-6-2 Electromagnetic Compatibility (EMC) - Generic Standards - Immunity for Industrial Environments |
| <p>CE Mark Declaration</p> | <ul style="list-style-type: none"> • This product conforms to the above Emissions and Immunity Standards and therefore conforms with the requirements of Council Directive 2014/30/EU (as amended) relating to electromagnetic compatibility and is eligible to bear the CE mark. • The Low Voltage Directive 2014/35/EU is not applicable to this product when installed according to our specifications. |

Schneider Electric

415 Legget Drive, Suite 101, Kanata, Ontario K2K 3R1 Canada

Direct Worldwide: +1 (613) 591-1943

Fax: +1 (613) 591-1022

Toll Free within North America: 1 (888) 267-2232

www.schneider-electric.com

Copyright © 2016 - 2018 Schneider Electric Canada Inc. All Rights Reserved.