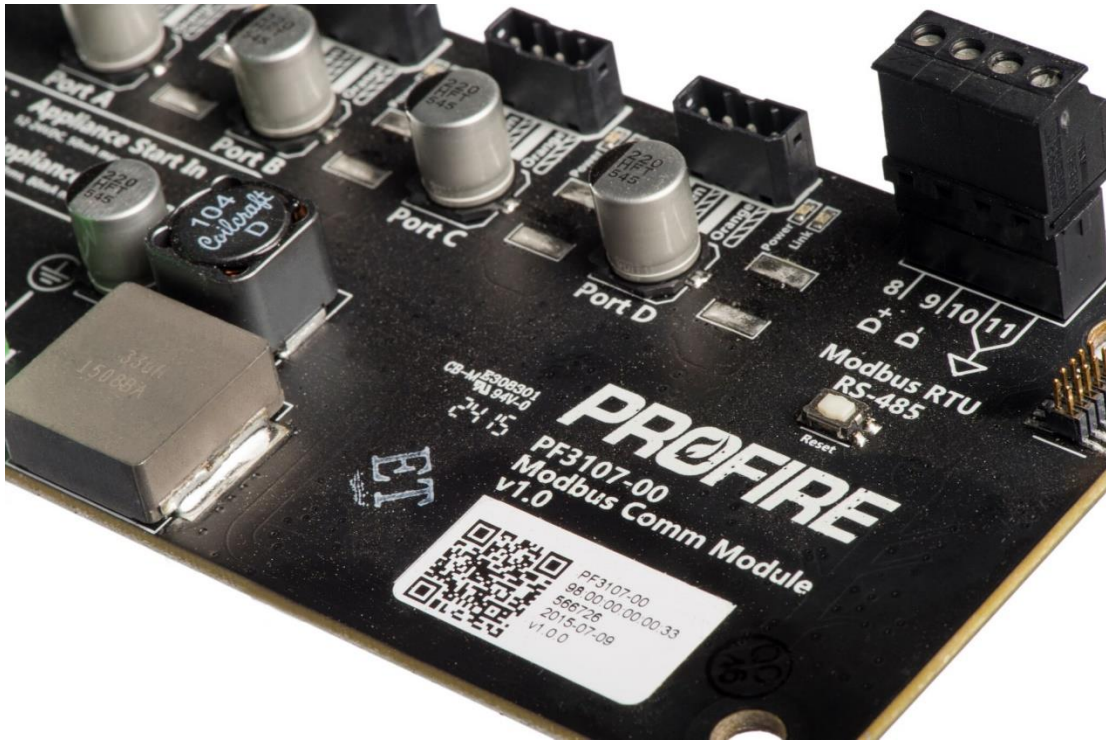# PROFIRE PF3100 Modbus Card

PF3107-00

The PROFIRE PF3100 IO Modbus RS-485 card allows a PF3100 system to interact with other devices.

1. Introduction

Functional Description

The PROFIRE PF3100 Modbus RS-485 card allows the PF3100 system to interact with other devices, such as PLCs and SCADA networks that support RS-485 two wire (half-duplex) communication via Modbus RTU Protocol. This card is always a Modbus slave device. Separate Modbus master devices can start/stop the system, read system status and process values, and modify settings.

Model Types

Model Number	Name	Description
PF3107-00A	Modbus TCP and Modbus RTU	Standalone - polyester painted steel enclosure.

2. Certifications

PROFIRE strives to ensure that certifications are updated as quickly as they become available for all of our products.

Modbus Card - Hazardous Location Rating

Certification: Class I, Div 2, Grp ABCD; T4; Type 4
CSA 22.2 No. 60730-2-5, UL 60730-2-5.

The board includes the following symbols:

Caution: possibility of electric shock.
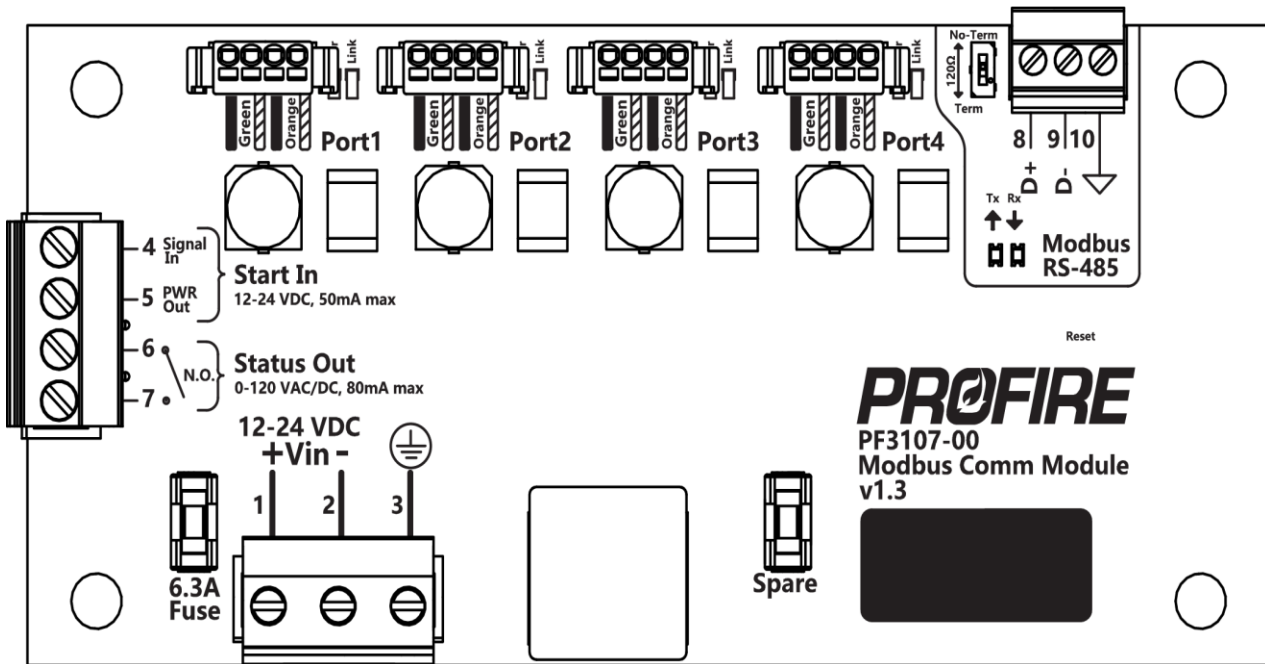
Caution: documentation must be consulted in all cases where this symbol is marked.

3. Card Information

Card Specifications

The ambient temperature rating for the Modbus Card is -40°C (-40°F) to +60°C (+140°F).

Card Diagram

Terminal Specifications

Terminal Number	Terminal Name	Expected Connections	Input/Output	Safety Rated	Electrical Ratings	
					Voltage	Current
1	Power 12-24 VDC Vin -	Input power from a DC source	12/24 VDC Power Input	N/A	Nominal: 12 VDC or 24 VDC Max: 30V	Max: 6A
2	Common 12-24 VDC Vin +	Ground back to DC source	Ground	N/A	N/A	N/A
3	EGND	Earth Ground	Ground	N/A	N/A	N/A
6 + 7	Status Out	Not implemented.	Not implemented.	No	120VAC 50/60Hz or 12/24 VDC	80mA
4	Start Signal In	Not implemented.	Not implemented.	No	30 VDC	5mA
5	Start PWR Out	Not implemented.	Not implemented.	No	12 VDC or 24VDC (same as voltage supply	150mA
8	RS-485 D+	Connect to a RS-485 Bus connected to a PLC or similar device.	RS-485 Input/Ouput	No	+/-6V	250mA
9	RS-485 D-	Connect to a RS-485 Bus connected to a PLC or similar device.	RS-485 Input/Ouput	No	+/-6V	250mA
10	RS-485 Reference (Terminal 10)	Connect to a RS-485 Bus connected to a PLC or similar device.	Ground	N/A	N/A	N/A

Port Number	Port Name	Expected Connections	Input/Output	Safety Rated	Electrical Ratings	
					Voltage	Current
1	PFRN Port 1	The PFRN IO connect ports are used for IO modules to communicate with the BMS card.	I/O	N/A	36 VDC	500mA
2	PFRN Port 2	The PFRN IO connect ports are used for IO modules to communicate with the BMS card.	I/O	N/A		
3	PFRN Port 3	The PFRN IO connect ports are used for IO modules to communicate with the BMS card.	I/O	N/A		
4	PFRN Port 4	The PFRN IO connect ports are used for IO modules to communicate with the BMS card.	I/O	N/A		

Terminal Descriptions

Power, Common

Input power 12/24 VDC, 6.3A max.

EGND

Internally connected to Common; must be wired to a nearby Earth Ground.

RS-485 D+/D-

-7V to 12V absolute.
+/- 3VDC differential recommended.

The baud rates supported are from 9600 baud to 19200.

RS-485 Reference (Terminal 10)

Shared common ground with customer PLC. Must be wired in.

Terminator Selector Switch

The termination selector switch is used to apply a 120ohm resistance to the signal. By applying this resistance, it in turn "terminates" the signal. It should only be used when you want to terminate the signal.

4. Wiring Diagram
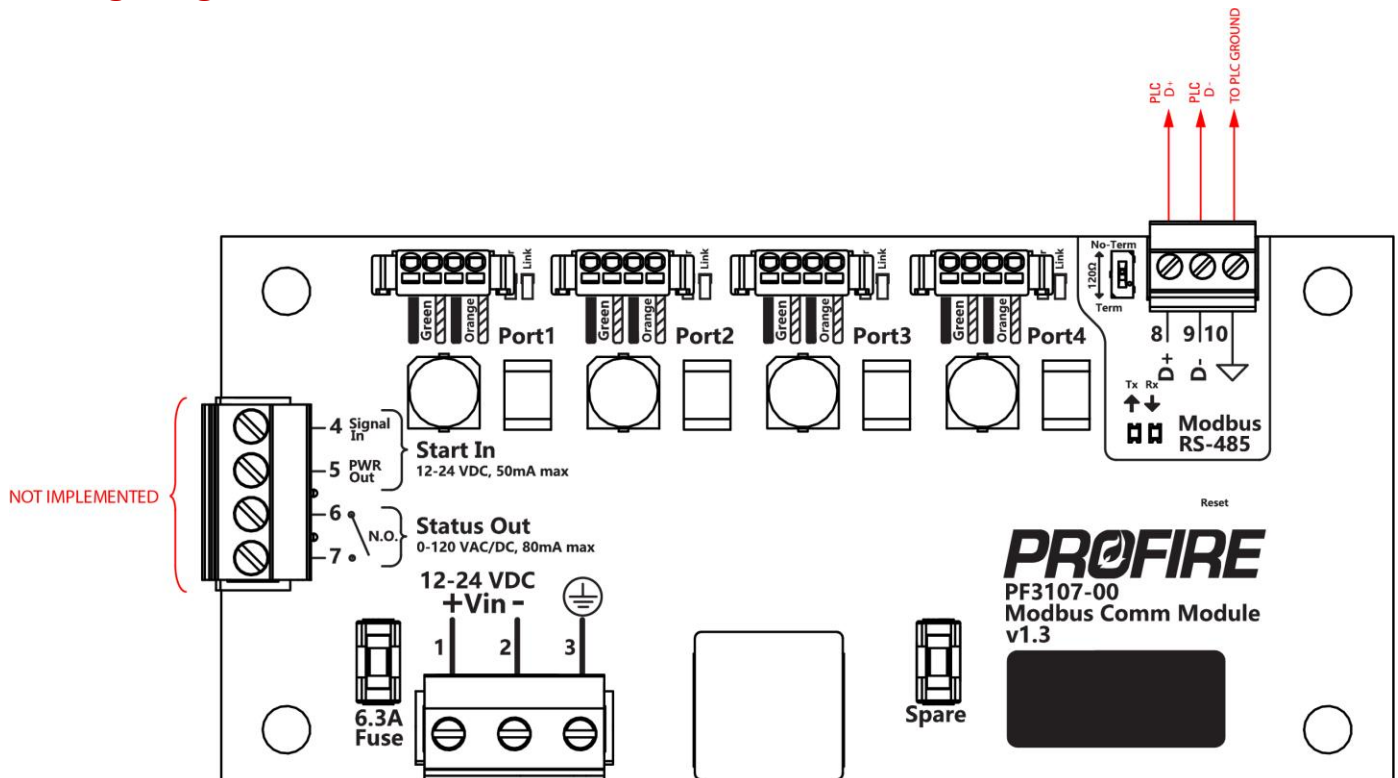
Wiring Specifications

12-30 AWG can be used for all connections. External fuses must be installed according to the local electrical code. Wire gauge size must also be selected in accordance with local electrical codes.

5. Mounting Instructions

Mounting the Card in the Enclosure

1. Install four (4) #10-32 screws through the Modbus card (as indicated in the image below) and attach them to the upper set of enclosure stand-offs. Please note the board orientation.
2. Torque to 26 in*lb.
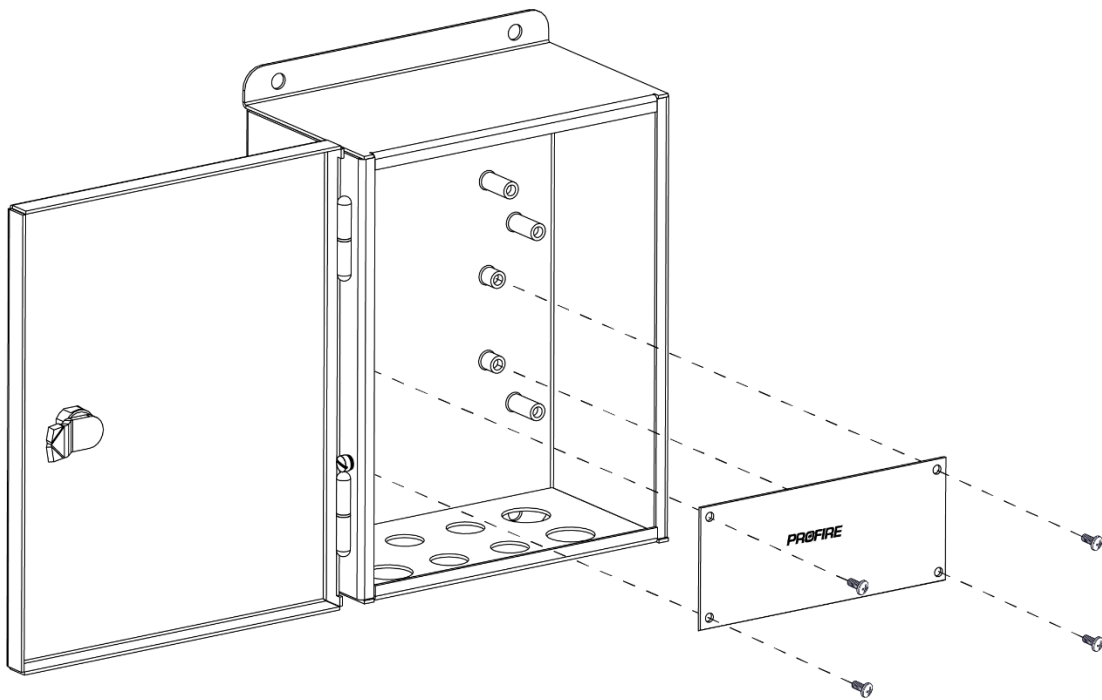
6. Enclosure Specifications

The Modbus card can be mounted in a fire-proof enclosure that is safe for the area of operation (e.g. – hazardous/non-hazardous.) The UIX, CTX, and AUX enclosures described below are examples:

	Enclosure Type		
Specifications	**UIX**	**CTX**	**AUX**
Dimensions	Height 30.9cm (12.15 inches) Width 23.4cm (9.23 inches) Depth 13.4cm (5.28 inches)	Height 30.9cm (12.15 inches) Width 23.4cm (9.23 inches) Depth 13.4cm (5.28 inches)	Height 30.9cm (12.15 inches) Width 23.4cm (9.23 inches) Depth 13.4cm (5.28 inches)
Hazloc Rating	Class I Div 2, IP66	Class I Div 2, IP66	Class I Div 2, IP66
Mounting	Channel Bar or Direct Mount	Channel Bar or Direct Mount	Channel Bar or Direct Mount
Enclosure Construction	Poly Painted Steel	Poly Painted Steel	Poly Painted Steel
Operating Temperature	-40°C (-40°F) to 60°C (140°F)	-40°C (-40°F) to 60°C (140°F)	-40°C (-40°F) to 60°C (140°F)
Storage Temperature	-40°C (-40°F) to 60°C (140°F)	-40°C (-40°F) to 60°C (140°F)	-40°C (-40°F) to 60°C (140°F)

7. Instructions for Use

The Modbus card is designed to be used with a certified BMS controller as part of the PF3100 platform.

Operation

Operating controls and their uses are described under "Terminal Descriptions" above. For an outline of all registers supported through Modbus, please see the link below for the document "Modbus Register Map":

http://3100.profireenergy.com/pf3100-documentation/

8. Preventative Maintenance & Inspection

In order to ensure that the Modbus card works correctly and efficiently, the following maintenance and inspection procedures should be followed:

➢ Ensure that all wires are connected correctly.
➢ Minimize copper wire exposure.
➢ Check for corrosion and ensure that no wires are frayed or worn out, and all insulation is intact.
➢ Confirm no moisture or condensation is apparent on the board or in the enclosure.
➢ Ensure that the board does not show any sign of mechanical damage (e.g. – damage from an impact such as dropping an item).
➢ Ensure that the board does not show any sign of electrical damage (components should not be burnt or damaged in any way).
➢ Check that the device is not subject to excessive vibration.
➢ Confirm that the temperature of the board is within ambient temperature operating limits.
➢ Check that the enclosure is secured and that the device is not subject to excessive vibration.
➢ Routine inspections of all equipment should be performed. If any abnormality is found, corrective actions should be taken. If the abnormality cannot be corrected, contact PROFIRE.

> ➤ A qualified technician should perform any tests necessary to confirm that the equipment is still in a safe condition.

Cleaning

If the card becomes dirty it can be cleaned with compressed air. Do NOT use solvents, cleaners, or liquids to clean the board. Caution must be exercised when cleaning the board in order to prevent damage from ESD (electrostatic discharge).

Replacement Parts

Please contact PROFIRE should any replacement parts be required.

9. Important Safety Information

Before installing the PF3100 Modbus card, please review the list of warnings below. Product use in a manner not specified by PROFIRE is not recommended. Failure to observe the following warnings may result in death, electrocution, property damage, product damage, product damage, government fines, or malfunction of the product itself.

WARNING: Explosion Hazard

➤ Do not disconnect while circuit is live unless area is known to be non-hazardous or equivalent.
➤ Substitution of components may impair suitability for specified zones.
➤ Do not service unless the area is known to be non-hazardous.
➤ Do not open when energized.
➤ Installation and use must conform to the directions in this guide.
➤ System must be properly connected to earth-ground for effective operation of flame detection circuitry.

Installation Warnings

➤ Ensure that the PF3100 enclosures are securely closed each time after opening the enclosure. This protects the internal circuitry from moisture damage and other environmental concerns. Moisture damage is not covered by the product warranty.
➤ Do not connect wires or handle the device when powered.
➤ Properly fuse the board according to local codes.
➤ Do not disassemble or modify the board in any way. The board is not field repairable and must be sent back to PROFIRE for replacement if damaged.

10.   PROFIRE Contact Information

If you have any concerns or questions about this product, please contact PROFIRE as follows:

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