



USER MANUAL

Modbus Pressure or Temperature Transmitter – V1.0.0

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History of Changes

Rev. No.	Date	Pages	Description of Changes
1.0.0	April 29, 2020	14	Initial Draft
1.1	August 20, 2021	15	Added pinout of connector

1 About This Guide

This document is intended as a supplement to formal training. DataCan is constantly working to improve its products. We must therefore reserve the right to change designs, materials, specifications and prices without notice. DataCan declines any liability that may arise out of the potential inaccuracies in this guide.

This guide assumes that you have some computing and tool knowledge. For more information, contact your local service representative.

www.datacan.ca

info@datacan.ca

We thank you for any feedback or comments that will help us to continue to improve our products and service.

2 Introduction

DataCan Services Corp. provides technology driven downhole measurement solutions that deliver productivity, quality and safety. We design, manufacture and service 200°C plus hybrid platform instruments, patent pending multi-cycle instant close shut-in tools, reservoir management systems and a suite of quartz and piezo-resistive pressure measurement instruments. We offer specialized solutions that will help you improve productivity in your applications.

We are the leader in ultra high temperature circuit design, manufacturing and packaging.

- Our part selection process ensures the best long term reliability is provided.
- Our fully automated surface mount assembly procedures ensure the highest quality circuit is constructed every time with minimal heat impact.
- Our Hybrid design and construction techniques will enable DataCan and its customers to reliably enter the 177°C to 225°C market.
- Our metal to metal seal and fully welded designs prevent potential leaks.

3 Product Description

3.1 Pressure and Temperature Transmitters

There are two types of transmitters available; pressure and temperature. Each is available with some variations. Cables for connecting the tools to USB are available in 25, 50, or 100ft lengths. The pressure transmitters are available in either piezo-resistive or quartz. The latest offerings from DataCan are available here:

<https://www.datacan.ca/products/Wellhead%20Pressure%20Loggers/Wired%20Transmitters>

On all current products, both Modbus and proprietary DataCan standard (Jamesbus) versions are available. This document focuses on the Modbus versions.

Pressure transmitters are available for a range of maximum pressure ratings as shown in the table below:

1.25" OD Pressure Transmitter		
Pressure	Temperature	Part No.
750 psi	85°C	101631
1,500 psi		101630
3,000 psi		101629
5,000 psi		101628
10,000 psi		101627
15,000 psi		101626
20,000 psi		101625

Removable connection adapters are available with HF4, 1/2" NPT, or 3/4" NPT connections. Custom connections are available upon request.

Temperature transmitters have a 1/2" NPT connection and are available with a 3" or 6" temperature probe. Custom connections are available upon request.



Pressure Transmitter



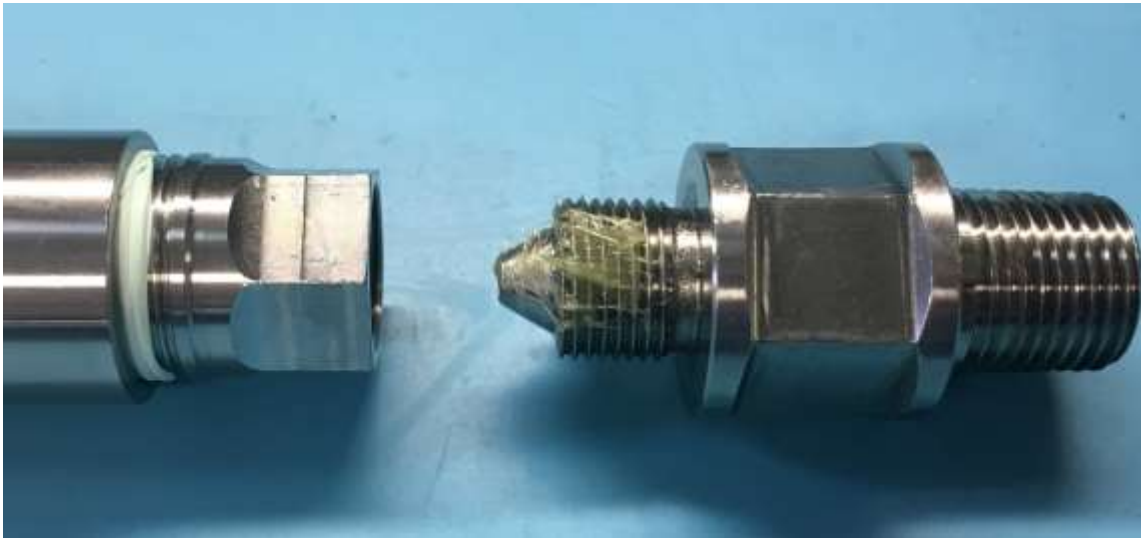
Temperature Transmitter

4 Mechanical Connections

4.1 Pressure Connections

There are two types of pressure connections used on DataCan pressure transmitters depending on the maximum service pressure. Low and medium pressure transducers (up to 5,000 psi) have a ¼" NPTM fitting. The strength on an NPT seal connection is dependent on the material used on both sides of the connection so care must be taken to only use adapters and fittings. The transmitter thread is made of stainless steel so the application of a thread sealant is required to ensure a good seal as well as guard against thread galling when using other stainless fittings.

The high pressure sensors (10,000 psi and above) use a ¼" high pressure tubing connection. This connection is compatible with the Autoclave F250C or the HF4 style for ¼" connections, or the F375C or HF6 connections for the 3/8" style. These use a large thread and a small cone to create a metal-metal seal. The metal-to-metal seal does not require any additional materials to initiate the seal, however DataCan does recommend using a small amount of lubrication to ease the process of making and breaking the connection.



4.2 Temperature Connections

The temperature is NOT intended to be exposed directly to high pressure or corrosive materials. The ½" NPTM connection is meant to connect to standard thermowell pre-installed into the system.

5 Modbus / RS-485

5.1 Connections

The two main ways to electrically connect to the transmitters: 4-wire ended cable or RS-485 to USB converter. In both cases the keyed connector from the cable must be inserted correctly and then finger-tightened (clock-wise) to lock the cable onto the gauge.



When using a 4-wire ended cable, the colouring scheme of most DataCan cables is as follows:



SIGNAL	CONNECTOR PIN	CABLE WIRE COLOUR
VCC (5 - 22VDC)	B	Red
RS-485A (D+)	D	White
RS-485B (D-)	C	Yellow or Green
GND	A	Black

Figure 1 Wire-ended RS-485 cable.

WARNING: Make sure the input voltage is within the range specified for the transmitter being connected.

When using a USB to RS-485 converter (like Part numbers 102121, 101796, 101797 or 101798), connect the USB end to your computer as follows:



Figure 2 USB connection of the data cable to a computer.

5.2 Modbus Communications

Modbus RTU is setup by default as follows:

Table 2-1 Modbus RTU Message Formats

Coding System	8 bit binary
Number of data bits per character	10 bits start bits - 1 data bits - 8 parity bits - 0 stop bits - 1
Parity	Not used
Bit transfer rate	9600
Duplex	Half duplex Transceiver or TX/RX
Error Checking	CRC (cyclic redundancy check)

Polynomial	(CRC-16 10100000000001)
Bit transfer order	LSB first
End of message	Idle line 3.5 or more characters (>3.65 msec for 9600)

The basic map is as follows:

Modbus Register (Address) - Decimal	Contents
30129 (128)	Pressure 1 – High register
30130 (129)	Pressure 1 – Low register
30131 (130)	Temperature 1 – High register
30132 (131)	Temperature 1 – Low register

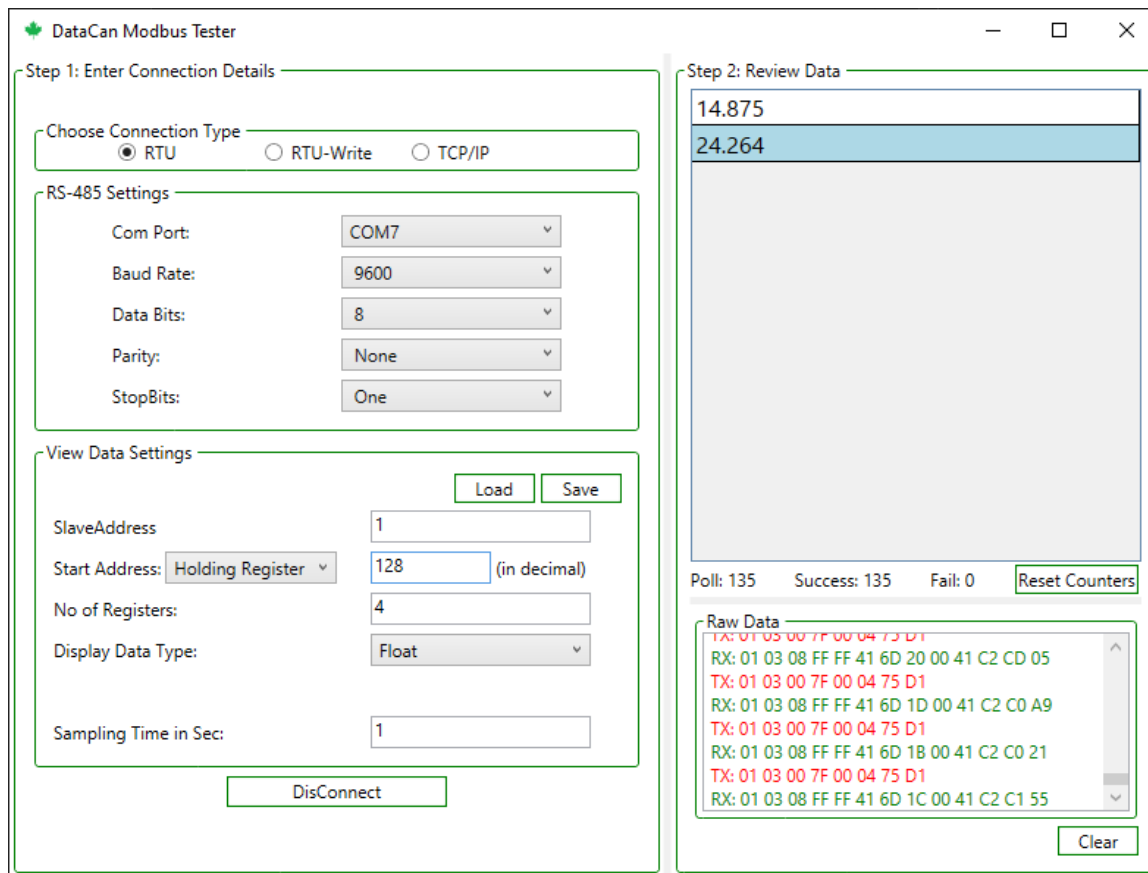


Figure 3 Basic pressure and temperature registers from Modbus.

NOTE: The default Modbus slave address is 1. In order to communicate with a transmitter, the correct slave address must be used. If you cannot

*communicate with the transmitter try to connect only the transmitter to the
Modbus network and try the broadcast address 250.*

6 DataCan Telemetry Modbus Tester Software

6.1 Software Installation

Each tool shipment comes with a DataCan USB Flash Drive that contains all of the files you need to install the software program and USB drivers. The most current versions of DataCan software are available at: <https://www.datacan.ca/downloads>

Before installing DataCan Digital Chart Recorder Software, you should have your computer ready with one of the following operating systems: Windows 7/8/8.1/10.

For help installing software please consult the **Download Software Installation Manual**.

Please reference the **Quick Driver Install RevX_X.pdf** user guide on how to install USB drivers.

6.2 Changing Transmitter Settings

Various settings can be configured and modified on each transmitter. This is done using a USB to RS-485 cable attached to a computer and the transmitter and running the **DataCan Telemetry Modbus Tester VX.X.X.X** software.

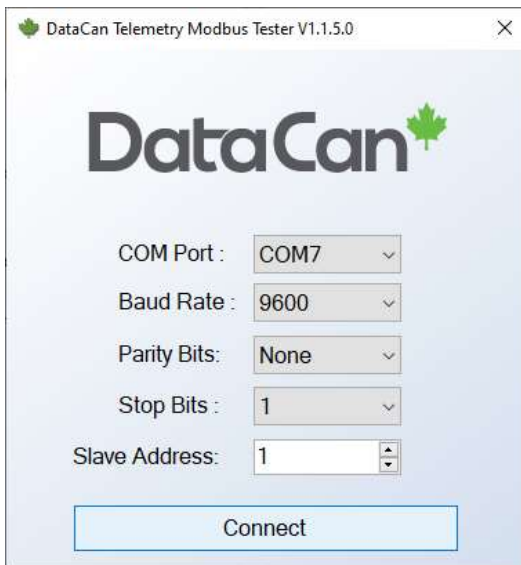
The following settings can be changed:

- Modbus slave address
- Baud rate
- Pressure, temperature, voltage, current, acceleration and flow units (if supported)
- Company and location information strings.

To view / modify settings or check the current readings from a transmitter:

- 1) Run the **DataCan Telemetry Modbus Tester VX.X.X.X** software.
- 2) Select the **COM Port** for the USB to RS-485 converter cable being used.

- 3) Confirm the **Baud Rate** being used by the transmitter.
- 4) Set the Modbus **Slave Address** for the attached transmitter.
- 5) Press the **Connect** button.



- 6) The next screen that appears shows the current settings and any readings that the transmitter can display.



- 7) Press the “gear” icon in the top-right corner to enter the **Settings** menu.



- 8) Change any settings and press the **Update** button or hit **Cancel** to exit without making any changes.