

How to Hook Up a Flow Meter to a Ranger Telemetry Unit with Modbus Connectivity Introduction

This document provides a step-by-step guide on how to hook up a flow meter to a Ranger telemetry unit with Modbus connectivity. The specific flow meter that will be used in this procedure is the Seametrics AG90. A Ranger telemetry unit is a device that collects data from sensors and transmits it wirelessly to a remote server or display. Modbus is a communication protocol that allows devices to exchange data over serial or Ethernet connections.

Requirements

To follow this guide successfully, it is assumed that you already have the following:

- A flow meter that supports Modbus RTU protocol. These instructions will be done using an AG90-0800-BX-S-XX-0000 (Battery powered, 8 inch AG90 with Modbus).

This guide assumes you have configured the meter with the appropriate set-up values, including giving it an ID (Inner Diameter) value, HOLE (Small for new installations, Large for retrofit installations), and PIPE (Straight, 10/2 elbow, or 5/2 elbow).

- A Ranger telemetry unit that supports Modbus with the expansion card.
- A Modbus cable.
- Signal-Fire cloud access.

Step-By-Step Guide

1. Begin by ensuring you satisfy all the requirements above.
2. Open 8-Pin Power/Output port on the AG90 (or other Modbus capable meter), as seen in *Figure 1*.
3. Connect the 8-pin Modbus cable to the port on the flow meter, as seen in *Figure 2*.
4. Now, take the Ranger and remove the cover, exposing the interior as seen in *Figure 4*.

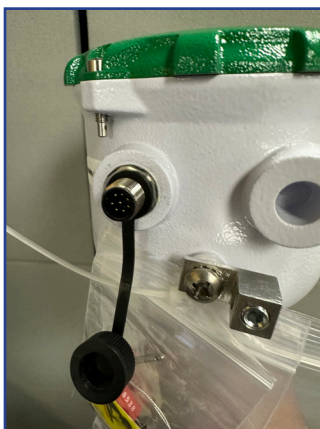


Figure 1:
8 Pin Power/Output Port on AG90



Figure 2:
8 Pin Cable Connected to Port on
AG90



Figure 3:
Ranger Node with Cover



Figure 4:
Ranger Node with Cover Removed

Step-By-Step Guide (Continued from page 1)

5. Remove the battery power cable from the circuit board module as shown in *Figure 5*.
6. Unscrew and remove the circuit board module on top of the battery. Be careful not to unscrew the LTE antenna, and instead unscrew the three circled screws, as seen in *Figure 6*. When done properly, it should look like *Figure 7*.
7. Carefully pull out the battery pack from the body of the Ranger and set it aside for now.



Figure 5:
Ranger with Battery Power Cable
Removed

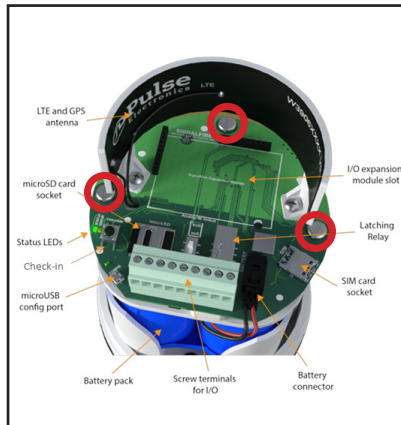


Figure 6:
Ranger Internal Components
Labeled



Figure 7:
Ranger with Battery Power Cable
Removed

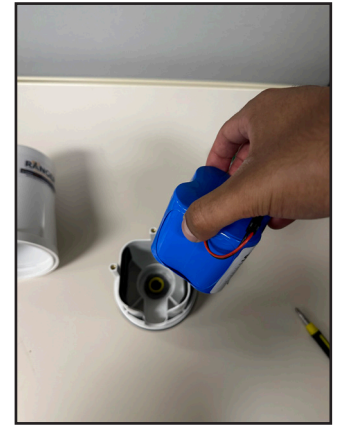


Figure 8:
Ranger with Battery Power Cable
Removed

8. Feed the stripped end of the Modbus cable through the hole in the Ranger body, as seen in *Figure 9*.
9. Place the battery pack snugly on top of the cable and feed the cable out the gap on the side of the body, *Figure 10*.
10. Screw the circuit board module back into place over the battery. The assembled interior should look like *Figure 11*.



Figure 9:
Cable Fed Through Central Hole
in Ranger



Figure 10:
Battery Installed with Cable
Underneath



Figure 11:
Circuit Board Module Installed
without Power and with Cable
Underneath

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11. Using the wiring diagram in *Figure 12*, connect the Blue (P6) and Orange (P7) wires to the appropriate screw terminal I/O as seen in *Figure 13*. See *Figure 14* to see what the wiring inside the Ranger looks like for this wiring configuration.

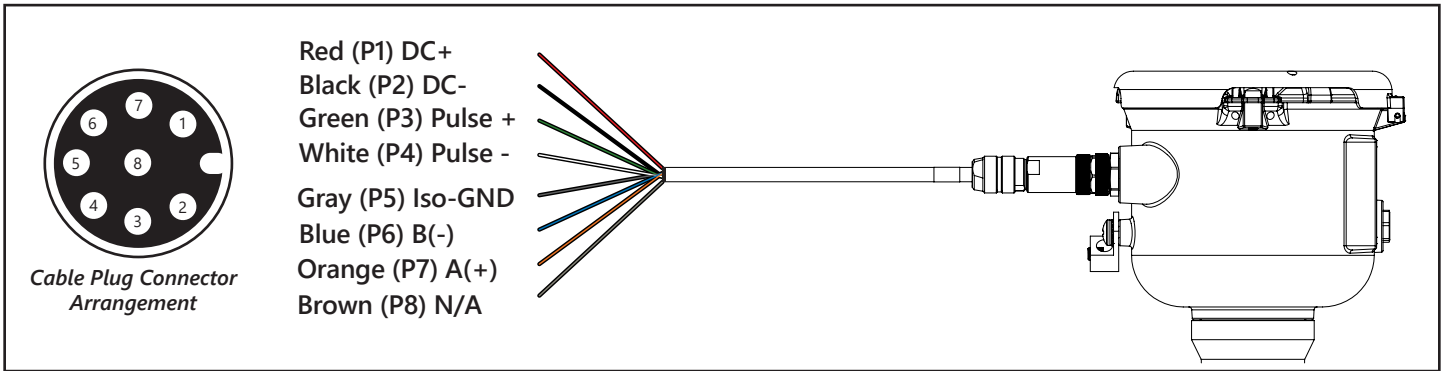


Figure 12:
Wiring Diagram for the Modbus Output Cable

12. Plug the battery power cable back into the Ranger after all wiring has been completed.

13. On the Signal-Fire Cloud interface, your interface should now include a Modbus section as seen in *Figure 15* and *Figure 16*. These figures show what the section would look like with the “total fwd” and “rate” registers enabled. If no Modbus section appears, ensure that your wiring is correct, and that the Ranger has the power cable connected.

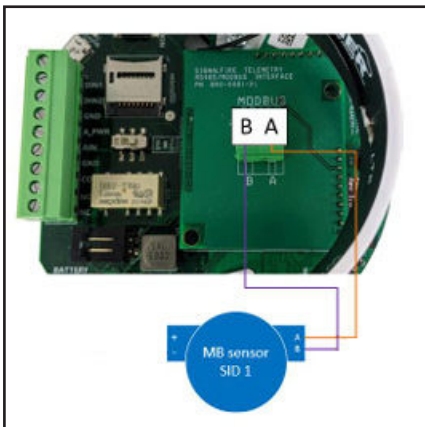


Figure 13:
Modbus Wiring Diagram – The diagram shows P6 (B) and P7 (A) from Figure 12 going into the Screw Terminal on the Ranger.



Figure 14:
Blue (B-) Wire into B slot, Orange (A+) Wire into A Slot

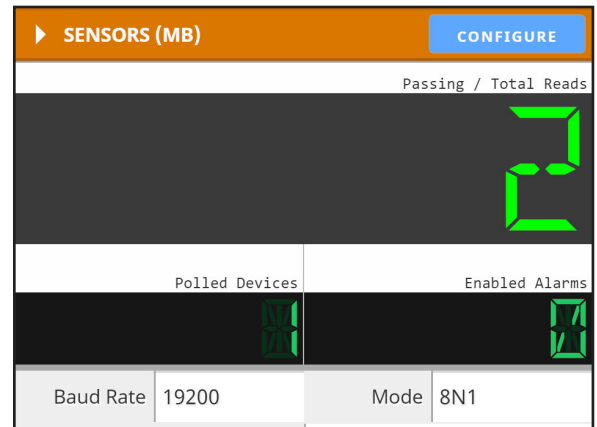


Figure 15:
Modbus Sensor Display on Signal-Fire Cloud Interface

MODBUS REGISTERS							CONFIGURE	
Tag Name	Value	Units	Status	Alarm Low	Alarm High	Configure	Enable View History	Enable Custom Tile
rate	0 gpm	gpm	<input checked="" type="checkbox"/> Passing	0.0 (DISABLED)	0.0 (DISABLED)	MODIFY	<input type="checkbox"/>	<input type="checkbox"/>
total fwd	3,741,087.5 Gx1000	Gx1000	<input checked="" type="checkbox"/> Passing	0.0 (DISABLED)	0.0 (DISABLED)	MODIFY	<input type="checkbox"/>	<input type="checkbox"/>

Figure 16:
Modbus Register Display on Signal-Fire Cloud Interface with rate and total fwd displayed.

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14. Make sure that the Baud Rate displayed matches what is configured on the meter, as seen in *Figure 17*. The Serial Mode of the Ranger is 8N1 (8 data bits, no parity bit, and 1 stop bit) by default. Ensure that if you make any changes to this mode, the Ranger and the meter are configured the same.

15. To add further registers or modify existing registers in the interface, press the blue "Configure" button in *Figure 16* to be taken to a Modbus configuration menu. Using the Modbus guide provided by Seametrics for IMAG4700/AG3000 and EX90/AG90 meters (<https://www.seametrics.com/wp-content/uploads/LT-103393r1.8-20230308-Modbus-Interface-1.pdf>), you can add registers and modify their values as you desire.

16. To add registers, press the "+" icon above the trash can icon as seen in *Figure 18*. From there, configure the registers fields as appropriate/necessary.

17. Carefully install the cover of the Ranger unit back on. It should be able to twist back on, just as you were able to twist it off.

18. **Congratulations, you have a functioning Modbus connection between the Ranger telemetry node and an AG90!**



Figure 17:
COMM Menu on Seametrics AG90, with Baud Rate Set to 19200 and No Parity Bit

Modbus Configuration: Test Unit PC (RA000512)

MODBUS SETTINGS APPLY EXIT

Current Settings on Node

Baud: 19200 Serial Mode: 8N1 (8 Data Bits, No P... Byte Order: ABCD (High word, Hig...
 Request Delay: 0 Response Timeout: 1,000 Force Write Multiple:

ERROR ALARMS APPLY

Current Settings on Cloud

Enable Alarm for Modbus Device ID: 1

REGISTERS: 4 + - DELETE ROWS APPLY

	Tag Name	ID	Address	Type		Unit	Access	
1.	totalizer unit	1	1000	HOLDING	INT16		Read/Write	+
2.	status	1	5000	HOLDING	INT16		Read Only	+
3.	rate	1	7006	HOLDING	FLOAT	gpm	Read Only	+
4.	total fwd	1	7008	HOLDING	FLOAT	Gx1000	Read Only	+

Figure 18:
Modbus Configuration Menu. Two Additional Registers (Status and Totalizer Unit) have been Added from Figure 17)