Maretron®
Vessel Monitoring & Control Systems

# Installation Instructions
M4AR Fuel Flow Sensor

⚠️ **WARNING**
NEVER disassemble the fuel flow sensor. The sensor is factory sealed, and disassembly will void the product warranty. If you feel that the sensor is not functioning correctly, please contact Maretron Technical Support.

Operating Principle
When fluid passes through the sensor, the rotors turn, as shown in the figure on the right. Magnets which are located in the rotors will pass across sensors in the sensor circuit board. Pulses from these sensors are transmitted to the FFM100 which performs flow rate calculations based on the received pulses.
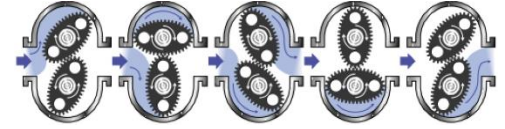
Instructions
Please follow these instructions to connect the M4AR fuel flow sensor to the NMEA 2000® network via a Maretron FFM100 Fuel Flow Monitor.

1. The fuel flow sensors are compatible with fuel, lubricating oil, hydraulic fluid, or other clean petroleum based products and should not be used with any other fluid types.

2. The fuel flow sensor contains shafts on which the oval rotors spin. The fuel flow sensor must be mounted so that these rotor shafts are always in a horizontal plane (parallel with the ground or water surface). The rotor shafts are parallel to the screws attaching the sensor cap to the sensor base, so ensure that these screws are in a horizontal plane. Please refer to Figure 1 below for examples of correct and incorrect orientations.
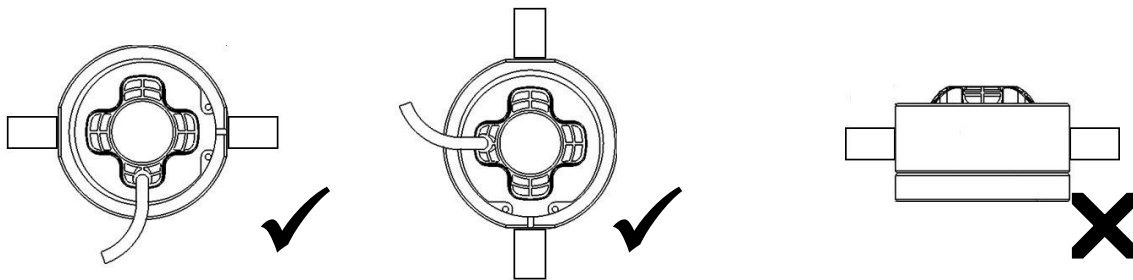

Figure 1 - Correct and Incorrect Mounting Orientations

3. To prevent damage from dirt or foreign matter, it is required that either 1) a diesel fuel filter capable of filtering out 75 micron particles or 2) a Y or basket type 60 mesh strainer be installed as close as possible to the inlet side of the sensor.

4. Install so that the direction of the "FLOW" arrows on the sensor label matches the direction of fuel flow.

5. The M4AR fuel flow sensor accessory for the FFM100 is fitted with 1/2" NPT female threads.

6. Use a liquid thread sealant on all pipe threads. Do **NOT** use Teflon tape. The fittings should be tightened hand tight, then a further 1/2 to 1 turn. Do not over tighten.

7. Extreme care must be taken when installing the sensor. Pipe strain or over tightening sensor connections can cause sensor damage.

8. To prevent damage to the sensor from entrapped air during initial commissioning or after maintenance, slowly fill the system with fuel (this will prevent damage caused by air purge). Failure to do this could damage the sensor. NEVER blow or send compressed air through the sensor as this may over rev and damage the sensor.

9. Connect the six wires of the pressure transducer to a free pressure monitoring channel. Please refer to Figure 2 below for details.

10. Use a Maretron DSM150 or DSM250 display (firmware 1.4.12 or higher), Maretron N2KAnalyzer software, or other Maretron display product capable of configuring the FFM100 to configure the connected channel. Please refer to the FFM100 User's Manual for configuration details. Be sure to program the FFM100 with the K factor printed on the fuel flow sensor.

11. Supply Power to the NMEA 2000 network and verify that the flow channel indicates a valid flow rate and temperature reading.
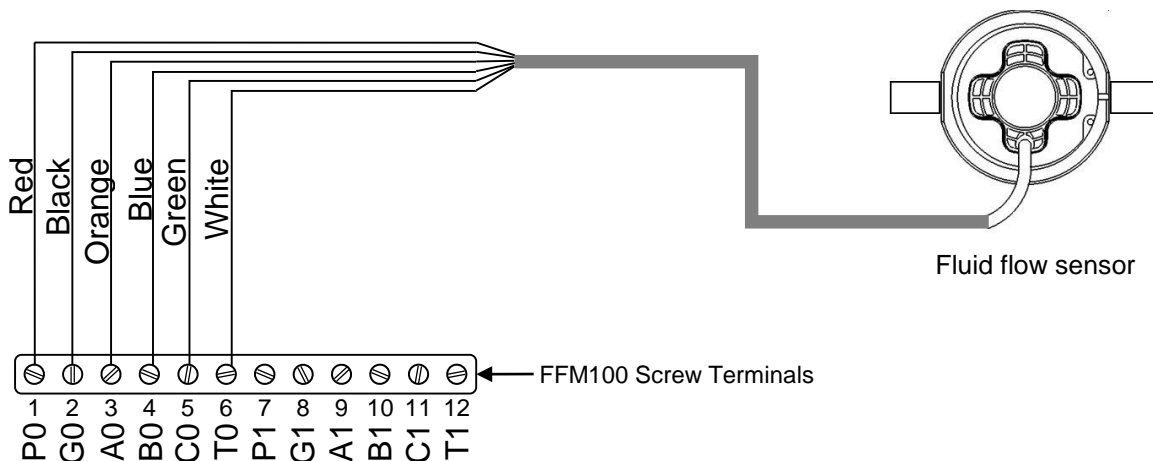

Red Black Orange Blue Green White — FFM100 Screw Terminals

1	2	3	4	5	6	7	8	9	10	11	12
P0	G0	A0	B0	C0	T0	P1	G1	A1	B1	C1	T1

Fluid flow sensor

Figure 2 – Fuel Flow Sensor Connection Diagram
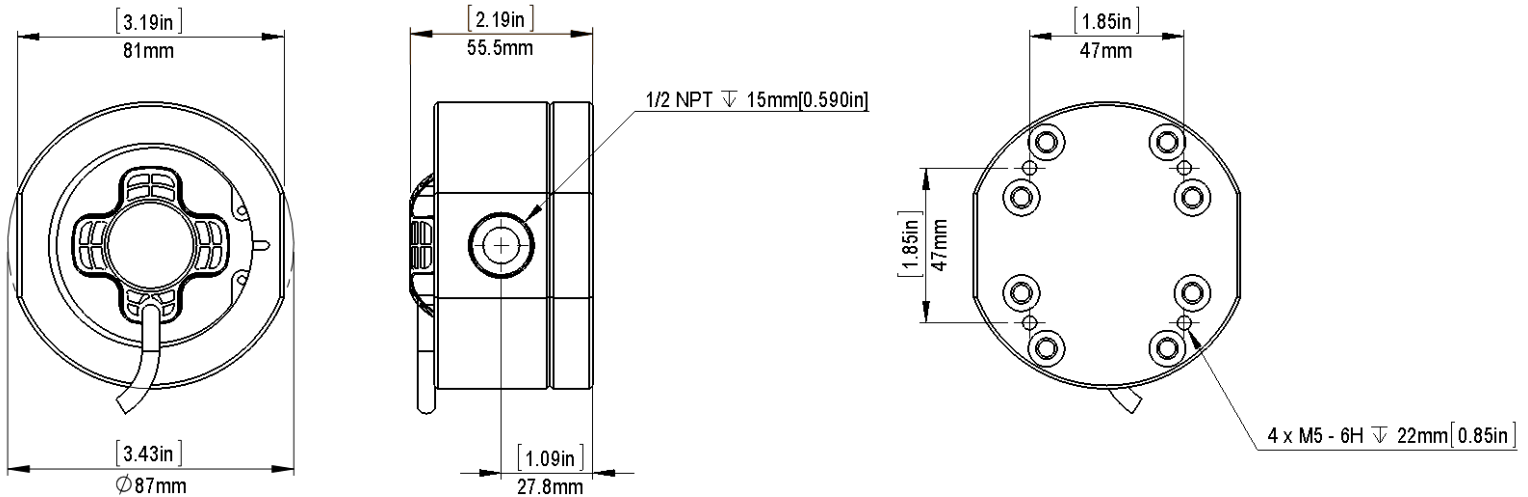
Figure 3 - Fuel Flow Sensor Mechanical Drawing

Fuel Flow Sensor Specifications

Flow Range	Nominal K Factor
180 LPH to 1500 LPH (48 GPH to 396 GPH)	112 pulses/L (424 pulses/Gal)

Specification	Value
Operating Temperature	-10°C to 80°C (14°F to 186°F)
Storage Temperature	-65°C to 170°C (-85°F to 338°F)
Construction	Housing Material: Aluminum Rotors: PPS (Ryton) Shafts: 316/304 Stainless Steel Magnets: Neodymium O-Ring: FKM (Viton™)
Port Size	1/2" NPT Female
Accuracy % Reading	±0.25% (With K factor on sensor entered into FFM100)
Maximum Viscosity	1000 cPs
Maximum Operating Pressure	137.8 Bar (2000 PSI)
Strainer Size	60 Mesh (If not already installed after fuel filter)
Weight	907g (2.0 lb)
Dimensions	100 x 96 x 105 mm (3.94 x 3.78 x 4.13 in.)

For installation support, please contact:

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