CAPM-2o Carrier Frequency Pickup Module

Installation & Technical Guide

Installation:

- Ensure that the flow meter sensor cavity is free of debris prior to installation.
- Screw the CAPM-2o into the flow meter by hand until the sensor nose contacts the bottom of the cavity.
- Do not screw in harder than hand tight, as a thin metal section is under the sensor nose.

Please heed the following warning:

CAUTION: DO NOT EXCEED 7 NEWTON-METERS FORCE TO SEAT THE SENSOR, THIS IS EQUIVALENT TO HAND TIGHT. EXCESS FORCE MAY CRUSH THE SENSOR NOSE OR DAMAGE THE FLOW METER BY FORCING THE METAL SECTION UNDER THE SENSOR INTO THE MEASURING CHAMBER.

Wiring should be installed by a qualified instrumentation technician.
Some basic installation guidelines are reviewed overleaf.

Description:

The **CAPM-2o** is a UL & CUL approved, intrinsically safe pickup sensor for use in Class 1, Div. 1 locations. The output signal is a frequency proportional to flow in a square wave voltage form of approximate amplitude: Supply – 1.5V. The sensor must be installed with an intrinsic safety barrier in accordance with the guidelines detailed in document # CAP2902 – *CAPM INSTALLATION IN HAZARDOUS AREA*. Recommended barriers such as Pepperl & Fuchs Z787 (12-28V) are available from AW Flow Meters.

The output is a sourcing open collector transistor (NPN Type).

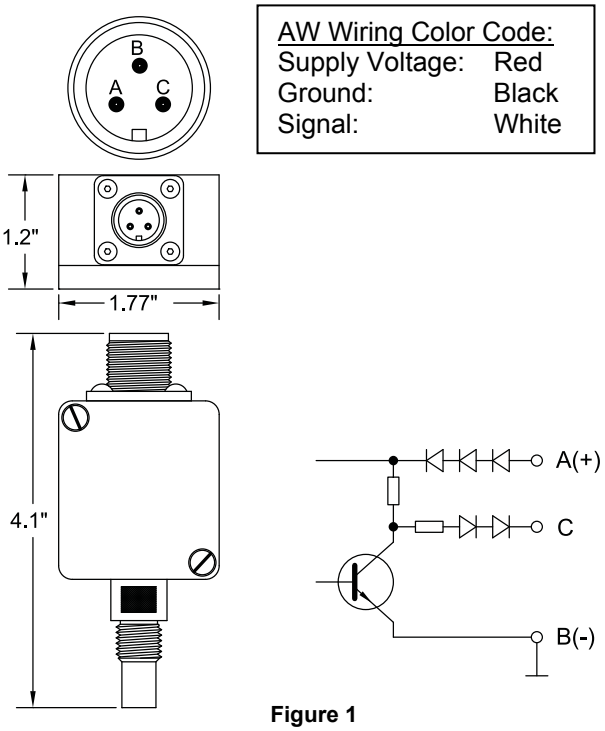
An NPN sinking type is available and is designated as CAPM-2i.

Technical Data

Supply Voltage:	10 to 30 Volt DC
Supply Current:	20 mA @ 15 Volt, Max 35 mA
Minimum Signal:	0.5 Hz
Signal Output:	Square wave, $V_{High} \approx V_{CC}$ - 1.5V $V_{Low} \approx 0V$
Duty Cycle:	50%
Frequency Output:	Flow dependent, up to 2000 Hz
Load:	>500Ω
Driving Capacity:	10 mA Max
Temperature Range:	-60°F to 185°F (-50°C to 85°C)

Connections:
A – +10 to 30 Volt DC supply voltage
B – Ground for supply and signals
C – Frequency signal output

Note: If signal does not go to ground, connect external resistor, 5 K-10 Kohm, between input and ground of monitoring equipment.



AW Wiring Color Code:	
Supply Voltage:	Red
Ground:	Black
Signal:	White

Figure 1

Electrical Installation Tips for Sensors and Flow Meters

Wiring should be installed by a qualified electrician or instrumentation technician. When dealing with low voltage/power signals from pickups and transmitters, it is important to use a shielded cable between the transmitter and the signal processing unit. A shielded cable will keep most of the electromagnetic interference (EMI) from entering the signal cable and disrupting the signal before it can be processed. A 20-22 gauge 3 or 4 conductor cable with shield is acceptable. Recommended cable: Belden #88723 2 pair stranded, 22 awg Teflon coated cable. This cable is available from AW Flow Meters.

When hooking up to instrumentation, connect the shield together with the wire for the signal ground, to the **Instrument Ground** terminal.

NEVER CONNECT THE SHIELD TO GROUND AT BOTH ENDS.

When hooking up to AW Flow Meters instrumentation, refer to the following drawing:

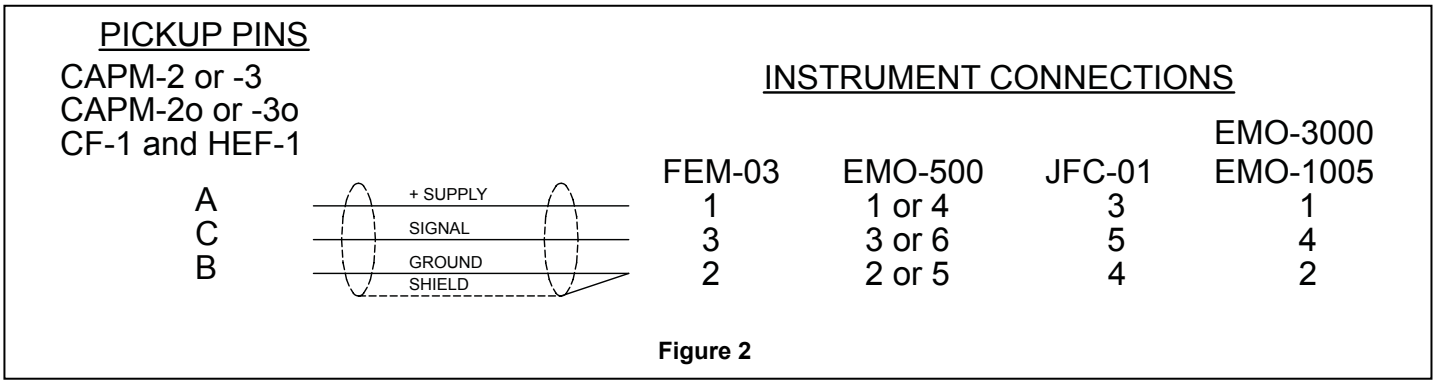


Figure 2

1. To prevent extraneous signal noise, ensure that a clean, central ground is established for both the flow meter and sensor.
2. Where possible, keep the signal cable at least 1 foot from any cable handling 110 Volt AC. If several signal cables are used, consider using metal conduit tubing for the signal cables for extra protection and shield from external noise and EMI. If possible, ground the conduit at one end. Ground to a water pipe or another good ground connection.
3. Place the pickup well away from motors, starters and relays. If used in a location where there are starters and other controls using relays, be sure there are diodes mounted across the coils for DC relays, and an R-C network for AC relays. This will dampen EMI from the relays when they operate.
4. Supply clean, regulated DC power with a ripple under 3% of supply

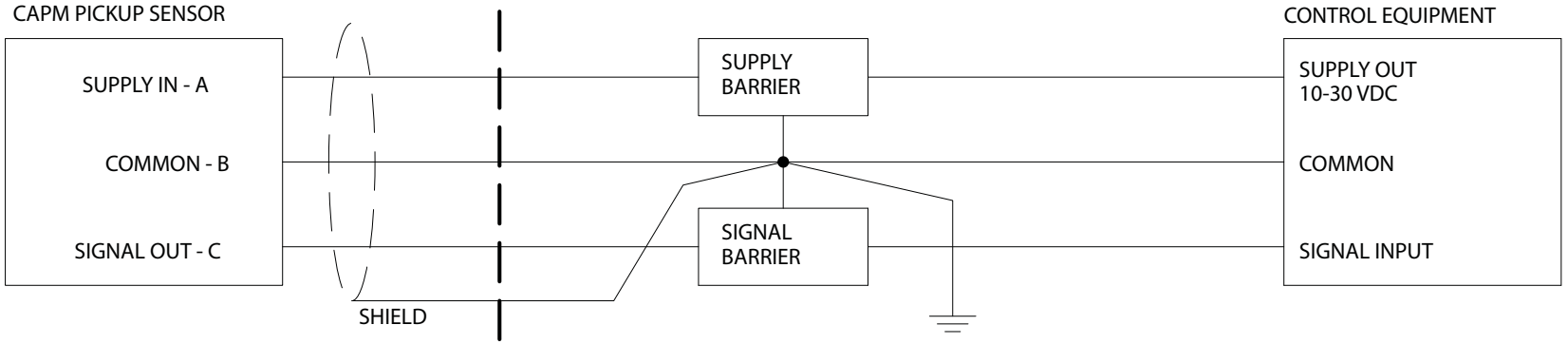
If the sensor appears faulty, review the following steps:

1. Detach the wiring connector from the sensor. Using a short wire, repeatedly touch pin A to C inside the wiring connector. These simulated pulses should register at the instrument. If this does not occur, verify that the wiring connections are set up as shown in Figure 2 above and check the instrument. If using a non-AW instrument, check the specifications for signal compatibility.
2. If the pulses do register, re-attach the wiring connector to the sensor and rapidly move a screwdriver back and forth 1/16” in front of the sensor nose. If pulses register, the sensor is okay. If not, contact the factory for a return tracking number.

   Note: If the sensor transmits a frequency irrespective of flow or by touch, the cable shielding and/or grounding is faulty and the equipment is behaving as an antenna.

CAPM INSTALLATION IN HAZARDOUS AREA
MODELS 2o, 2i, 3o, 3i

REV	DESCRIPTION	DATE	APPR.BY
A	CONCEPT DRAWING	03-26-96	J.S.
B	ADDED o & i VERSIONS	02-20-97	J.S.
C	ADDED 2nd SET OF ENTITY PARAMETERS	07-10-98	J.S.
D	TITLE BLOCK CHANGE ONLY TO AW-LAKE	12-01-08	F.J.



NOTES ON CAPM SENSORS

1. COMMON (B) IS CONNECTED TO SENSOR CASE, BUT CAN BE DISCONNECTED.
2. SUPPLY: 10-30 VDC
   20 mA @ 15 VOLT, MAX 35 mA
3. ENTITY PARAMETERS

   FOR CAPM'S BEARING THE Ex MARK
   Ci = 0, Li = 1.5 mH
   Vmax = 30 VDC, Imax = 90 mA

   FOR CAPM'S WITHOUT THE Ex MARK
   Ci = 0, Li = 1.5 mH
   Vmax = 30 VDC, Imax = 110 mA

NOTES ON BARRIERS

1. MUST BE INSTALLED IN ACCORDANCE WITH GUIDELINES PROVIDED BY THE MANUFACTURER, AND SUITABLE FOR FOR CLASS 1, GROUPS A, B, C AND D HAZARDOUS LOCATIONS.
2. CABLE CAPACITANCE PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE MUST BE LESS THAN THE MARKED CAPACITANCE (Ca) SHOWN ON ANY BARRIER USED. THE SAME APPLIES FOR INDUCTANCE. TYPICAL CABLE CAPACITANCE IS 60pF/ft, AND TYPICAL CABLE INDUCTANCE IS 0.20µH/ft. (FROM UL913)
3. SELECTED BARRIERS MUST MEET THE FOLLOWING CRITERIA:
   Voc < Vmax
   Isc < Imax
   Ca > Ci + Ccable
   La > Li + Lcable
   THE SUM OF BOTH CHANNELS ON DUAL CHANNEL BARRIER AND THE SUM OF EACH CHANNEL ON SINGLE CHANNEL BARRERS MUST NOT EXCEED Imax.
   ALL BARRIERS MUST HAVE SAME POLARITY.
4. CAPM MUST BE CONNECTED TO AN EARTH GROUND TERMINAL OF LESS THAN 1Ω.

NOTES ON CONTROL EQUIPMENT

1. MAINS POWER MUST NOT EXCEED 250 VOLTS RESPECT TO EARTH.

AW-LAKE COMPANY
2440 W. Corporate Preserve Dr. #600
Oak Creek, WI 53154
Phone: 414.574.4300
Fax: 414.574.4301

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