

Instructions



Coriolis Fluid Flow Meter

309234 rev.G

5000 psi (34 MPa, 345 bar) Maximum Working Pressure

Part No. 116158 Bare Meter

.01 to 0.5 gpm (40 to 2,000 cc/min.) Flow Range.



Part No. 244039 Meter Kit

Includes Part No. 116158 Bare Meter, mounting hardware, and fittings.

2300 psi (16 MPa, 160 bar) Maximum Working Pressure

Part No. 15D135 Bare Meter

.01 to 0.5 gpm (40 to 2,000 cc/min.) Flow Range.

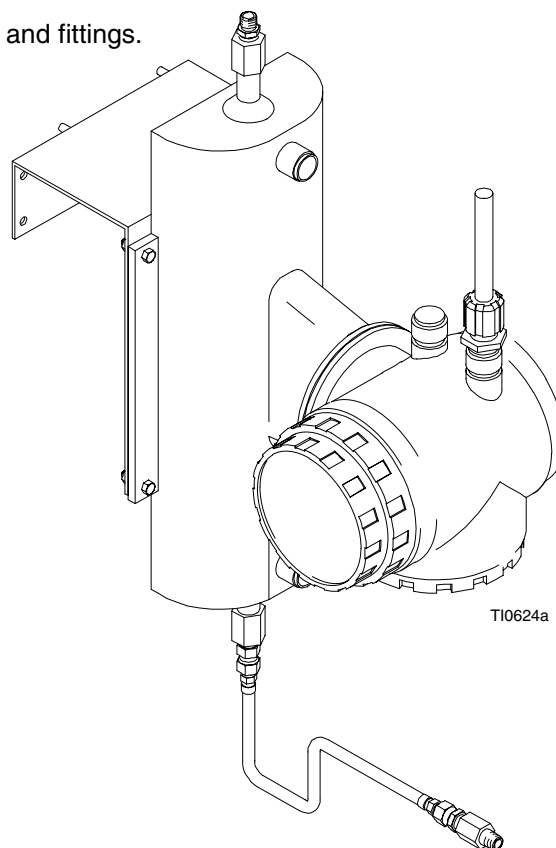


Part No. 15D599 Meter Kit

Includes Part No. 15D135 Bare Meter, mounting hardware, and fittings.

The meter and meter kit are intended for installation and use on a PrecisionMix II fluid panel in non-hazardous environments only.

U.S. Patent No. 6,293,157
China Patent No. ZL98126956.7
EU Patent No. 0927876



Important Safety Instructions

Read all warnings and instructions in this manual.
Save these instructions.

PROVEN QUALITY. LEADING TECHNOLOGY.

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Symbols

Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

⚠ WARNING



SKIN INJECTION HAZARD

Spray from leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Splashing fluid in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** on page 6 whenever you: are instructed to relieve pressure; stop operation; or clean, check, or service the equipment.
- Tighten all the fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately.



FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

Improper grounding, poor air ventilation, open flames, or sparks can cause a hazardous condition and result in fire or explosion and serious injury.

- Ground the equipment as instructed in **Grounding**, page 5.
- Never use the flow meter with an electrostatic gun isolation stand.
- Keep liquids away from the electronic sensor device.
- Follow the material supplier recommendations when flushing or servicing the meter.
- Do not service the electronic sensor. Return it to your Graco distributor for service.
- If there is any static sparking while using the equipment, **stop spraying immediately**. Identify and correct the problem.



INSTRUCTIONS



EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check the equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. See manual cover for pressure rating.
- Use fluids or solvents that are compatible with the equipment wetted parts. See the **Technical Data** section of all the equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Comply with all applicable local, state and national fire, electrical and other safety regulations.

Installation

WARNING



FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

To reduce the risk of fire, explosion, or electric shock:

- All electrical equipment must only be installed by a qualified electrician.
- Understand and follow your local code and safety regulations for hazardous location wiring of explosion proof circuits.

Dust and Foreign Matter

Avoid having dust or foreign matter enter the flow meter by taking the following precautions:

- Thoroughly flush the fluid supply lines before installing the flow meter.
- When installing fittings, make sure that no sealing tape overlaps into the inside of the pipe.

Installing the Flow Meter

- Flow volume can only be measured at the location where the flow meter is installed.
- The meter is safe for Class I; Division 1; Group D hazardous indoor (NEMA 1) locations when installed in accordance to NEC power requirements.

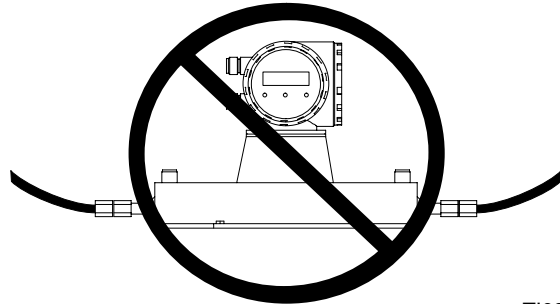
Refer to ANSI standards ISA-RP12.6, NEC Article 504 and the Canadian Electrical Code Appendix F.

- Do not use more than 200 ft (61 m) of cable.

Mounting the Flow Meter

CAUTION

The bare meter weighs 33 lb (15 kg). Do not mount the meter in the fluid line without proper support, to prevent stress on the fluid inlet and outlet connections. See Fig. 1.



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Fig. 1

No special fittings or brackets are required for mounting. External vibration will not affect the accuracy of the meter.

To prevent turbulence and cavitation in the fluid line, be sure the line is adequately sized and contains a minimal number of restrictions (such as valves or bends).

For mounting dimensions, refer to page 10.

Continued on page 5.

Installation

Vertical Mounting

When mounting on a vertical surface, the preferred fluid flow is upward through the meter. See Fig. 2. This allows solids to settle out and air to rise away from the metering tube. This also allows thorough draining of the meter during shutdown, to prevent fluid from drying in the meter.

Downward flow is permitted if a check valve is installed at the meter outlet to prevent fluid from falling through the meter.

Do not mount the meter so the fluid line runs horizontally across the vertical mounting surface.

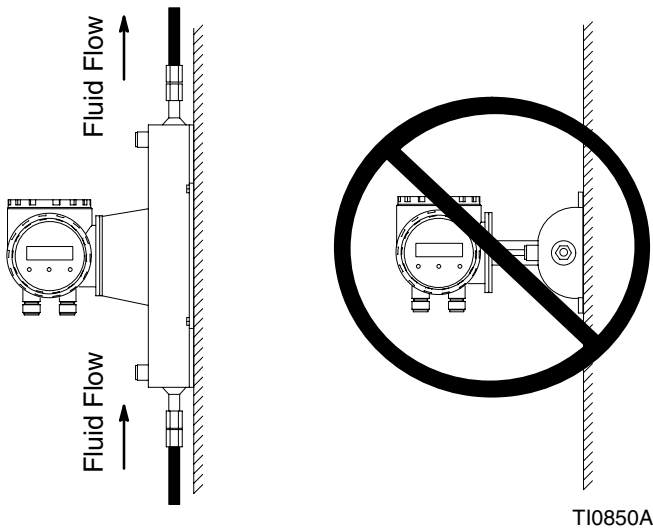


Fig. 2

Horizontal Mounting

When mounting on a horizontal surface, the meter transmitter must be either above or below the fluid line. This ensures that solids do not collect and air does not become trapped in the metering tube. See Fig. 3.

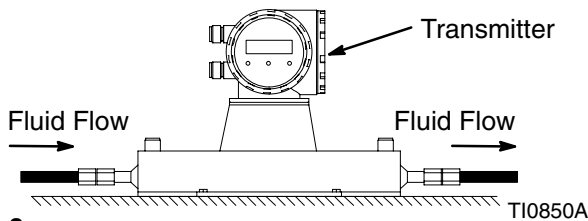


Fig. 3

Grounding

⚠ WARNING



FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

Proper electrical grounding of your system is essential. For your safety, read the warning section, **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD**, on page 3.

1. Ground the flow meter by connecting a grounded cable to the sensor. Part No. 116005 Cable is available (must be ordered separately).

Have a qualified electrician check the electrical grounding continuity between the flow meter sensor and a true earth ground; remove the cable connector from the sensor and measure the resistance from the cable connector Pin A to true earth ground. Refer to the Wiring Diagram on page 12.

If the resistance is greater than 25 ohms, check the cable ground connection. Reconnect the ground sheath or replace the cable. Do not operate the system until the problem is corrected.

2. Always ground the fluid supply unit, using one of the following options:
 - a. Mount the meter to a grounded conductive surface, or
 - b. Connect the conductive fluid hose to the meter inlet and outlet, or
 - c. Connect a ground wire to the meter's 1/4–20 unc mounting holes.
3. Never use the flow meter with an electrostatic gun isolation stand.

Operation

Pressure Relief Procedure

WARNING

INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment.

1. Turn off the fluid supply to the meter.
2. Shut off all electrical power to the fluid system.
3. Follow the Pressure Relief Procedure for your fluid system dispensing device.

Recommended Usage

WARNING

COMPONENT RUPTURE HAZARD

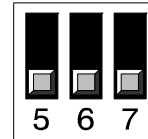
Do not exceed the maximum working pressure of your meter or any component or accessory in your system.

- See the **Technical Data** for fluid and ambient temperature limits.
- Only use the flow meter with fluids that are compatible with the “Wetted Parts” listed in the **Technical Data**.
- Purge the meter housing as local codes require.

Flow Volume Range (60 Series)

The meter flow volume range is 0.01–0.5 gpm (40–2,000 cc/min.).

Unscrew the meter cover to access the DIP switches. The DIP switches must be set as shown in Fig. 4 to ensure that the volume is 0.1 ml per pulse.



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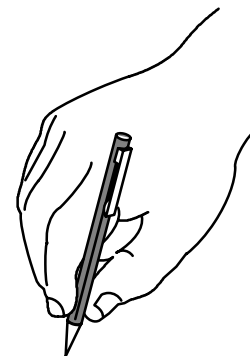
Fig. 4

Checking the Meter Accuracy (All)

1. To check the accuracy of the meter, turn your gun fan and atomizing air off, then trigger the fluid into a graduated cylinder; dispense at least 500 cc of fluid.
2. Measure the volume of fluid in the beaker in cubic-centimeters (cc) and read the volume on the flow meter/PrecisionMix II monitor.

Operating Mode (60 Series)

Unscrew the meter cover to access the DIP switches. Set the ON switch to the DIP position for operation and configuration. See Fig. 5.



DIP

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Fig. 5

Operation

Using the ProMass 80A with a Graco PrecisionMix II System

Generic Settings for Basic Installation with a PrecisionMix II System

The function matrix is a two level construct: groups and functions.

The groups, being the highest level, are compromised by multiple functions. In order to select the individual functions that will control or parameterize the measuring device, you must first select a group.

NOTE: For an overview of the functions available see page 8.

1. Using the function matrix press **E** to access group options.
2. To scroll through the group options, press **-** or **+**.
3. To select a group option, press **E**.
Once you select a group, the functions related to that group will follow.
4. To scroll through functions, press **-** or **+**.
5. To select a function, press **E**.
6. To return back to the previous option, press **-** and **+**.

NOTE: Once you press **E**, your selection is saved.

Measuring values

The following will list values per the E&H function matrix. If a value isn't mentioned, the the default E&H settings will suffice.

The table below shows the minimum required settings for use with a Graco PrecisionMix II system.

NOTE: To enable programming of the meter you will need to enter the personal code. The factory setting is 80.

| Group | Parameter | Value |
|----------------------------|--------------------|------------------|
| System Units | Volume Flow | cc/m |
| | Unit Volume | cc |
| Totalizer | Reset Total | Yes |
| Current Output (Mass Flow) | Assign Current | Off |
| Pulse/Freq. Output | Operation Mode | Pulse |
| | Assign Pulse | Volume |
| | Pulse Value | .119 cc/pulse |
| | Pulse Width | 1.000 ms |
| | Output Signal | Passive/Positive |
| Process Parameter | On-Val. Lf-Cut off | 30.000 cc/min |

Maintenance

CAUTION

The fluid meter has no field-serviceable parts. Contact your Graco distributor for service.

Graphical Illustration of the Function Matrix

The table below shows a display of the total set values available. The values in bold are the minimum required setting for use with a Graco PrecisionMix II System.

| | | | | | | | | |
|------------------|--------------------|-------------------|---------------------|-------------------|--------------------|-------------------|---------------------|-------------------|
| MEASURING VALUES | MASS FLOW | VOLUME FLOW | DENSITY | TEMPERATURE | | | | |
| SYSTEM UNITS | UNIT MASS FLOW | UNIT MASS | UNIT VOLUME FLOW | UNIT VOLUME | UNIT DENSITY | UNIT TEMPERATURE | UNIT LENGTH | UNIT PRESSURE |
| QUICK SETUP | SETUP COMMISSION | | | | | | | |
| OPERATION | LANGUAGE | ACCESS CODE | DEF. PRIVATE CODE | STATUS ACCESS | | | | |
| USER INTERFACE | ASSIGN LINE 1 | ASSIGN LINE 2 | 100% VALUE | 100% VALUE | FORMAT | DISPLAY DAMPING | CONTRAST LCD | TEST DISPLAY |
| TOTALIZER | ASSIGN TOTALIZER | SUM | OVERFLOW | UNIT TOTALIZER | RESET TOTAL | | | |
| CURRENT OUTPUT | ASSIGN CURRENT | CURRENT SPAN | VALUE 0.4 mA | VALUE 20 mA | TIME CONSTANT | FAILSAFE MODE | ACTUAL CURRENT | SIMULATION CURR. |
| PULSE/FREQ. OUT. | OPERATION MODE | ASSIGN FREQUENCY | END VALUE FREQ. | VALUE F LOW | VALUE F HIGH | OUTPUT SIGNAL | TIME CONSTANT | FAILSAFE MODE |
| | SIMULATION FREQ. | VALUE SIM. FREQ. | ASSIGN PULSE | PULSE VALUE | PULSE WIDTH | OUTPUT SIGNAL | FAILSAFE MODE | ACTUAL FREQ. |
| STATUS OUTPUT | ASSIGN STATUS | ON-VALUE | OFF-VALUE | TIME CONSTANT | ACTUAL STATUS | SIM. SWITCH POINT | VAL. SIM. SWIT. PNT | |
| STATUS INPUT | ASSIGN STATUS IN | ACTIVE LEVEL | MIN. PULSE WIDTH | SIM. STATUS IN | VAL. SIM. STAT. IN | | | |
| COMMUNICATION | TAG NAME | TAG DESCRIPTION | BUS ADDRESS | HART PROTOCOL | WRITE PROTECTION | MANUFACTURER ID | DEVICE ID | |
| PROCESS PARAM. | ASSIGN LF-OUT OFF | ON-VAL LF-OUT OFF | OFF-VAL. LF-OUT OFF | EMPTY PIPE DET. | EPD VALUE LOW | EPD VALUE HIGH | EPD RESPONSETIME | ZERO POINT ADJUST |
| | DENSITY ADJUST | RESTORE ORIGINAL | PRESSURE MODE | PRESSURE | | | | |
| SYSTEM PARAMETER | INSTL. DIR. SENSOR | MEASURING MODE | POS. ZERO RETURN | DENSITY DAMPING | FLOW DAMPING | | | |
| SENSOR DATA | K-FACTOR | ZERO POINT | NOMINAL DIAMETER | TEMP. COEF. KM | TEMP. COEF. KM 2 | TEMP. COEF. KT | CAL. COEF. KD 1 | CAL. COEF. KD 2 |
| | DENSITY COEF. C 2 | DENSITY COEF. C 3 | DENSITY COEF. C 4 | DENSITY COEF. C 5 | MIN. TEMP. MEAS. | MAX. TEMP. MEAS. | MIN. TEMP. CARR. | MAX. TEMP. CARR. |
| SUPERVISION | ACTUAL SYS. COND. | PREV. SYS. COND | ASSIGN SYS. ERROR | ERROR CATEGORY | ASSIGN PROC. EHR. | ERROR CATEGORY | ALARM DELAY | SYSTEM RESET |
| SIMULAT. SYSTEM | SIM. FAILSAFE MODE | SIM. MEASURAND | VALUE SIM. MEAS. | | | | | |
| SENSOR VERSION | SERIAL NUMBER | SENSOR TYPE | SW-REV. S-DAT | | | | | |
| AMP. HW VERSION | SW-REV. AMP. | I/O MODULE TYPE | SW-REV. I/O | | | | | |

Parts

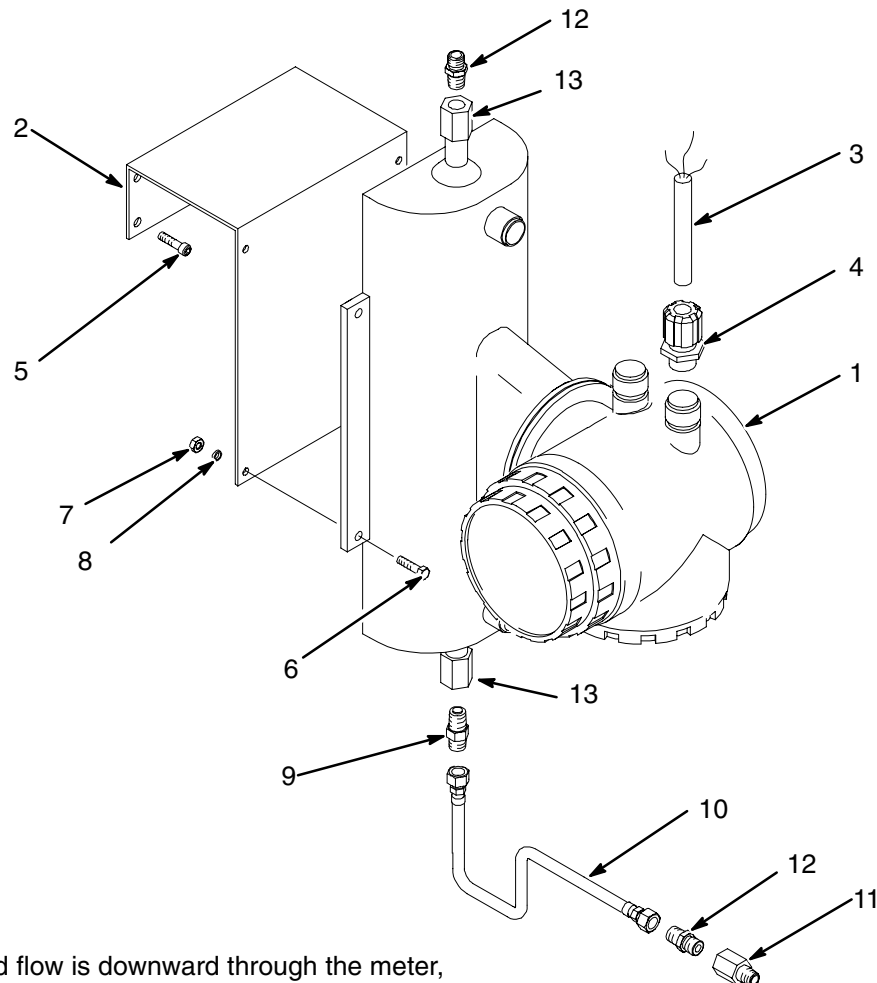
Use Only Genuine Graco Parts and Accessories

Part No. 244039 and 15D599

Coriolis Meter Kit, for solvent-borne materials (0.8–2000 cps)

| Ref. No. | Part No. | Description | Qty. | Ref. No. | Part No. | Description | Qty. |
|----------|----------|--|------|----------|----------|---|------|
| 1✓ | 116158 | METER, Coriolis; for solvent and water-borne materials that cannot be handled through a gear meter (244039 only) | 1 | 7 | 100015 | NUT, hex; 1/4–20 | 4 |
| | 15D135 | METER, Coriolis; same as above (15D599 only) | | 8 | 105510 | WASHER, lock, spring; 1/4 in. | 4 |
| 2 | 196805 | BRACKET, mounting | 1 | 9✓ | 501687 | VALVE, check | 1 |
| 3✓ | 111647 | CABLE, 4 conductor; 10 ft (3.05 m) | 1 | 10 | 206966 | HOSE, fluid; PTFE; 1/4 npsm(f) | 1 |
| 4 | 514030 | CONNECTOR, cable | 1 | 11 | 115571 | FITTING, adapter, 1/4 bsp(m) x 1/4 npt(f) | 1 |
| 5 | 100643 | SCREW, cap, socket head; 1/4–20 x 1 in. (25 mm) | 4 | 12 | 166846 | FITTING, connector; 1/4 npt x 1/4 npsm | 2 |
| 6 | 100021 | SCREW, cap, hex head; 1/4–20 x 1 in. (25 mm) | 4 | 13 | 552269 | FITTING, adapter; 1/4 npt x 1/4 #4 FAC | 2 |

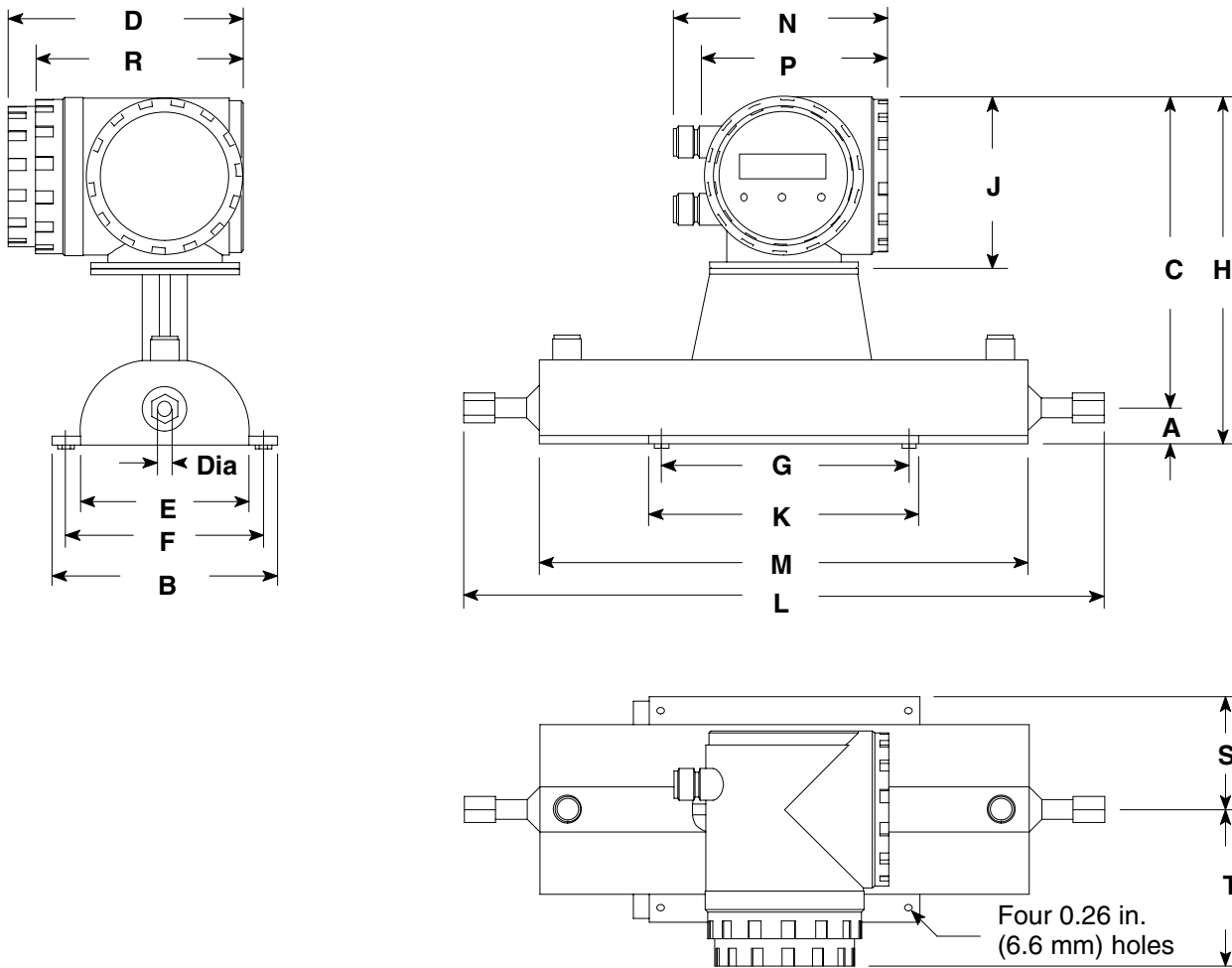
✓ *Keep these spare parts on hand to reduce down time.*



NOTE: When fluid flow is downward through the meter, a check valve (9) must be installed at the fluid outlet.

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Dimensions



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| Diameter (ANSI) | Dia. | A | B | C | D | E | F | G | H |
|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1/8 in. | 0.138 in. (3.5 mm) | 1.26 in. (32 mm) | 7.88 in. (200 mm) | 11.0 in. (279 mm) | 8.23 in. (209 mm) | 5.90 in. (150 mm) | 6.89 in. (175 mm) | 8.66 in. (220 mm) | 12.3 in. (312 mm) |
| J | K | L | M | N | P | R | S | T | Weight |
| 6.16 in. (156 mm) | 9.45 in. (240 mm) | 22.4 in. (569 mm) | 17.1 in. (434 mm) | 7.50 in. (191 mm) | 6.73 in. (171 mm) | 7.26 in. (184 mm) | 3.86 in. (98 mm) | 4.34 in. (110 mm) | 33 lb (15 kg) |

Technical Data for Bare Meter

| Category | Data |
|--------------------------------|--|
| Maximum Working Fluid Pressure | <i>Model 116158:</i> 5000 psi (34 MPa, 345 bar) <i>Model 15D135:</i> 2300 psi (16 MPa, 160 bar) |
| Flow Range | 0.01–0.5 gpm (40–2,000 cc/min) |
| Fluid Temperature Range | 40–180° F (4–80° C) |
| Maximum Ambient Temperature | 180° F (80° C) |
| Fluid Viscosity Range | 0.8–2000 cps |
| Maximum Cable Length | 200 ft (61 m) |

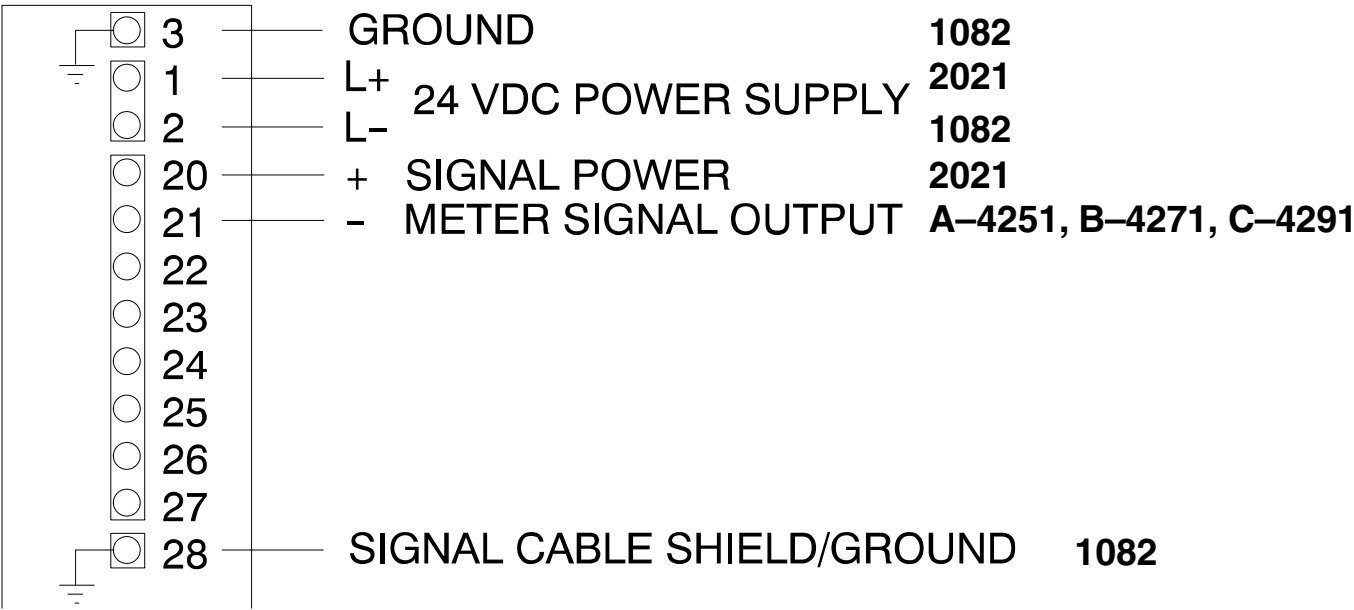
| Flow Meter Inlet/Outlet | 1/4 npt(f) |
|-------------------------|------------------------------------|
| Category | Data |
| Resolution | ≈ 0.119 cc/pulse |
| Accuracy | ± 0.5 %* |
| Supply Voltage | 24 Vdc |
| Wetted Parts | 303 and 440C Stainless Steel, PTFE |

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* For most commonly used coatings, the flow meter reading will be accurate to within ± 0.5%. Accuracy will diminish at low viscosities and low flow rates.

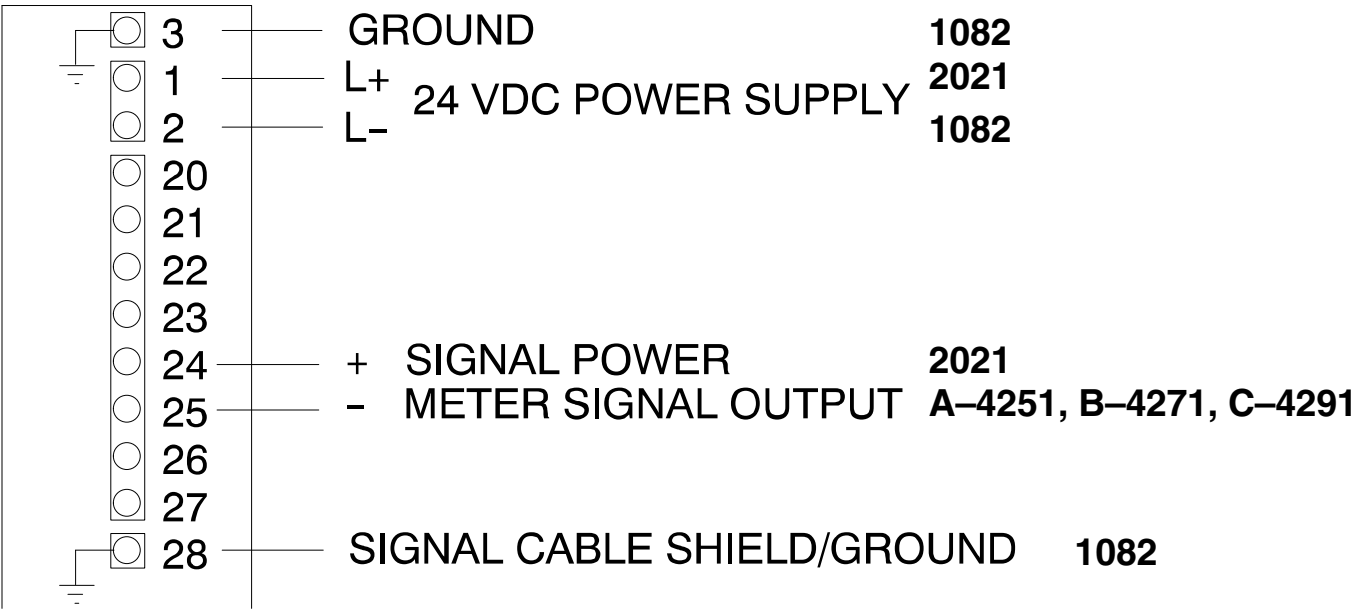
Wiring Diagram for PrecisionMix II and PrecisionMix II 3K

60 Series Meter Wiring Detail



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80 Series Meter Wiring Detail



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Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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Graco Information

TO PLACE AN ORDER, contact your Graco distributor, or call one of the following numbers to identify the distributor closest to you:

1-800-328-0211 Toll Free

612-623-6921

612-378-3505 Fax

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