

Coriolis Meter Kits

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EN

For use with Graco ProMix® 2KS/2KE/3KS ProMix-V® Proportioners, Informer® Fluid Monitoring Kits, and ProControl™ 1KS/1KE Management Kits for Fluid and Air, in non-IS systems. Uses vibration to measure fluid flow in low flow applications or with light viscosity, shear sensitive, or acid catalyzed materials. For professional use only.

Bare meters are approved for use in explosive atmospheres [Class I, Div I, Group C and D, or Class I, Zone I, EExd (ia) IIC T1-T6] if all installation requirements are met. See page 10.

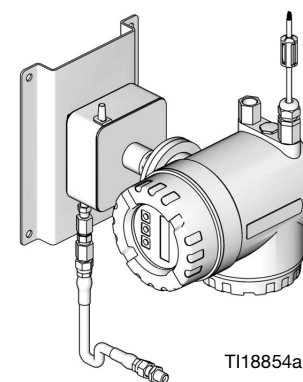
Meter Kits on page 2 are approved for intrinsic safe installation/use with ProControl 1KS and ProMix 2KS/3KS and as part of ProControl 1KS and ProMix 2KS/3KS system certification, if all installation requirements from this manual and the appropriate ProControl and ProMix manuals are met. Meter kits are not approved for use with ProMix - V®.



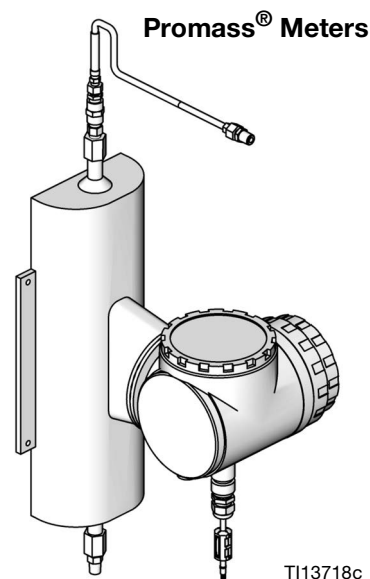
Important Safety Instructions

Read all warnings and instructions in this manual and in your system manuals.
Save these instructions.

See page 2 for model information, including maximum working pressure.



Cubemass® Meters



TI13718c



FM08ATEX0073
FM08ATEX0074



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Models

Part No.	For Use With	Maximum Working Pressure psi (MPa, bar)	Description
15V806	ProControl 1KS and ProMix 2KS/2KE/3KS	2300 (16, 160)	Promass [®] 80A with 1/8 in. (3 mm) metering tube
258151		2300 (16, 160)	Promass [®] 80I with 3/8 in. (10 mm) metering tube
24M260		2300 (16, 160)	Cubemass [®] DCI with 1/8 in. (3 mm) metering tube
24M261		2300 (16, 160)	Cubemass [®] DCI with 1/4 in. (6 mm) metering tube
24N525	Informer and Pro- Control 1KE	2300 (16, 160)	Cubemass [®] DCI with 1/4 in. (6 mm) metering tube
2013593	ProMix -V	2300 (16, 160)	Cubemass [®] DCI with 1/4 in. (6 mm) metering tube

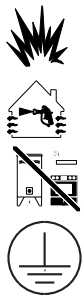
Related Manuals

See the following manuals for additional information on the ProMix 2KS/2KE/3KS, Informer, and ProControl 1KS/1KE.

Manual	Description
312775	ProMix 2KS Manual System Installation
312776	ProMix 2KS Manual System Operation
312777	ProMix 2KS Manual System Repair-Parts
312778	ProMix 2KS Automatic System Installation
312779	ProMix 2KS Automatic System Operation
312780	ProMix 2KS Automatic System Repair-Parts
3A0868	ProMix 2KE Pump-Based Operation
3A0869	ProMix 2KE Meter-Based Operation
3A0870	ProMix 2KE Repair-Parts
313881	ProMix 3KS Installation
313882	ProMix 3KS Manual System Operation
313883	ProMix 3KS Repair-Parts
313885	ProMix 3KS Automatic System Operation
3A1163	ProControl 1KS Installation
3A1080	ProControl 1KS Automatic System Operation
3A1164	ProControl 1KS Automatic System Repair-Parts
3A2040	Informer Fluid Monitoring Kits, Instructions/Parts
3A2614	ProControl 1KE Management Kits for Fluid and Air, Instructions/Parts
3B0203	ProMix V Package Meter Proportioner, Installation/Operation
3B0361	ProMix V Package Meter Proportioner, Repair/Parts

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
	FIRE AND EXPLOSION HAZARD Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion: • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.
	ELECTRIC SHOCK HAZARD This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock. • Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
	INTRINSIC SAFETY This intrinsically safe Coriolis meter is approved for installation in a Hazardous Location - Class I, Div I, Group D, T3 or Zone I Group IIA T3. Intrinsically safe equipment that is installed improperly or connected to non-intrinsically safe equipment will create a hazardous condition and can cause fire, explosion, or electric shock. Follow local regulations and the following safety requirements. • Be sure your installation complies with national, state, and local codes for the installation of electrical apparatus in a Class I, Div I, Group D, T3 or Zone I Group IIA T3 Hazardous Location, including all of the local safety fire codes, NFPA 33, NEC 500 and 516, and OSHA 1910.107. • Do not install equipment approved only for a non-hazardous location in a hazardous area. See the ID label for the intrinsic safety rating of your model. • Do not substitute system components as this may impair intrinsic safety.

 WARNING	
	SKIN INJECTION HAZARD High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment. • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.
	EQUIPMENT MISUSE HAZARD Misuse can cause death or serious injury. • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the Pressure Relief Procedure in this manual when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	TOXIC FLUID OR FUMES HAZARD Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed. • Read MSDS's to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear impervious gloves when spraying or cleaning equipment.
	PERSONAL PROTECTIVE EQUIPMENT You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to: • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves • Hearing protection

Installation

						
• To avoid electric shock, turn off equipment power and shut off power at main circuit breaker before installing. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations. • Do not substitute system components as this may impair intrinsic safety. • Protect the meter from friction and impact.						

Overview

The Endress+Hauser Promass® and Cubemass® flow meters provide a configurable and highly accurate means of measuring fluid flow. The meters use the Coriolis principle to measure mass flow and fluid density and also measure fluid temperature, using an integrated temperature sensor.

This manual provides information for using the Endress+Hauser flow meters with the Graco ProMix 2KS/2KE/3KS proportioners, Informer Kits, and Pro-Control 1KS/1KE Kits in non-IS systems. See the manual provided by Endress+Hauser for further meter instructions.

Hazardous Location Intrinsically Safe Installation Requirements

See FIG. 6 on page 10.

NOTE: For ProMix 2KE systems, the Coriolis meter can only be used on non-IS systems 24F080 through 24F083. When installed on these systems, the meter's hazardous location intrinsically safe status is voided.

1. Install Coriolis flow meters as explosion proof (USA, Canada)/flameproof Ex d (ATEX) with passive intrinsically safe connections for the signal output circuit only. Installation must be per the manufacturer's installation instructions and applicable codes.

2. Terminals 24 and 25 of optional Endress+Hauser Coriolis flow meters are installed using intrinsically safe wiring methods. Observe manufacturer's instructions for installation and use.

- For the United States and Canada, install all other wiring for Coriolis flow meters using explosion proof wiring methods for Division I.
- For ATEX installations, install all other wiring for Coriolis flow meters using Flameproof, Ex d, wiring methods for Zone 1.

Fluid Supply

NOTICE

To avoid damaging electrical components, keep liquids away from the meter sensor.

- Avoid having solids enter the flow meter. Thoroughly flush fluid supply lines before installing the meter.
- Do not allow sealing tape to overlap inside pipe connections.
- Use an adequately-sized fluid line with a minimal number of restrictions (valves or bends) to avoid turbulence and cavitation.

Location

ProMix 2KS/2KE/3KS, ProMix-V, and ProControl 1KS

- The meter measures the flow at the location it is installed, so install the flow meter as close as possible to the proportioner component A or B dispense valve.
- The meter must be located within 20 ft. (6.1 m) of the proportioner fluid panel. The Graco-provided meter signal cable assembly (4) must be used. No substitution is allowed. See FIG. 6 on page 10.

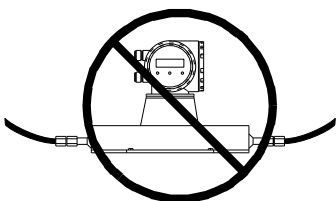
Informer and ProControl 1KE

The meter must be located within 50 ft. (6.1 m) of the proportioner fluid panel. The Graco-provided meter signal cable assembly (4) must be used. No substitution is allowed. See FIG. 10 on page 14

Mounting

NOTICE

See **Technical Data** on page 33 for the weight of your meter. The meter is heavy and must be properly supported to avoid stress on the fluid connections.



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NOTE: Model 258151 Meter includes two 2-piece mounting brackets and screws. See **Mounting Hole Dimensions** on page 31 to install.

No other special fittings or brackets are required. External vibration will not affect meter accuracy.

NOTE: The transmitter housing, with the display, can be rotated for better viewing. See the Endress+Hauser Instruction Manual for details.

Vertical Mounting

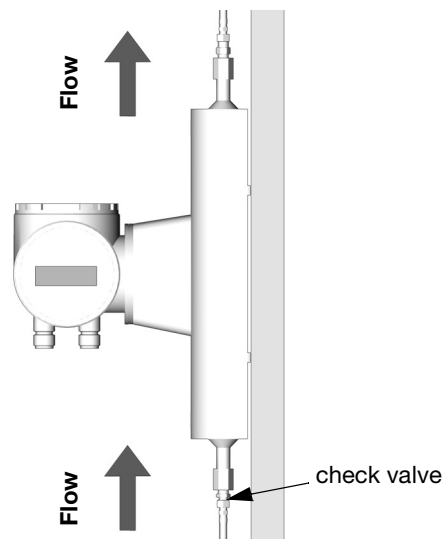
NOTE: Do not mount the meter so the fluid line runs horizontally across the vertical mounting surface.



Fluid Flow Upward - preferred method

Mounting so fluid flow is upward through the meter is preferred as this allows solids to settle out and air to rise away from metering tube. See FIG. 1.

Install the check valve provided at the meter inlet to minimize pulsation and backflow from the fluid supply.



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FIG. 1. Fluid Flow Upward

Fluid Flow Downward

If this method is used, install the check valve at the meter outlet. This provides back pressure in the meter, ensuring that the fluid flow remains smooth and even. See FIG. 2.

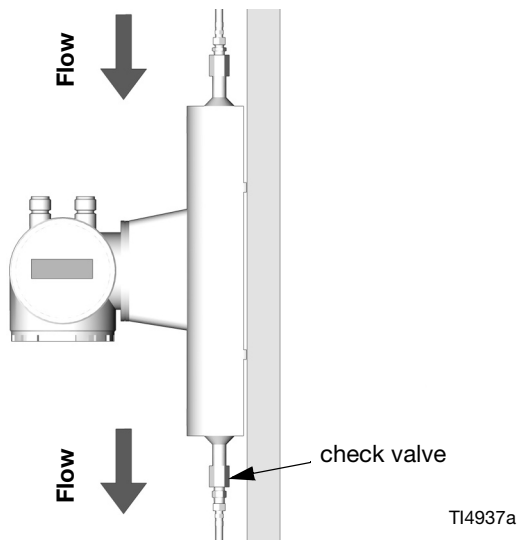


FIG. 2. Fluid Flow Downward

Horizontal Mounting

The meter transmitter must be either above or below the fluid line to ensure that solids do not collect and air does not become trapped in metering tube. See FIG. 3.

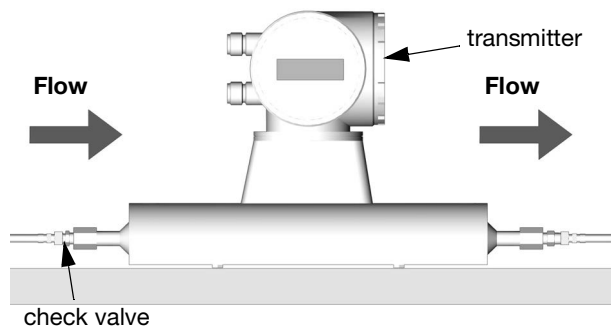


FIG. 3. Horizontal Mounting

Fluid Line Connection

Check hoses, tubes, and couplings daily. Tighten connections before operating. Replace worn or damaged parts immediately.						

Connect the fluid supply line to the meter inlet.

Connect the 5 ft (1.52 m) fluid hose (10) from the meter outlet to the appropriate component A or B dispense valve. See FIG. 6 on page 10.

Grounding

Your system must be grounded. Never use the flow meter with an electrostatic gun isolation system.						

Flow Meter Sensor

Ground the flow meter sensor by connecting the signal cable ground wire as shown in FIG. 6 and FIG. 7 on pages 10 and 11, respectively.

Have a qualified electrician check resistance between the flow meter sensor and a true earth ground. If resistance is greater than 1 ohm, a different ground site may be required. Do not operate until the problem is corrected.

Meter Fluid Manifold

Ground the meter fluid housing by connecting the power cable ground wire as shown in FIG. 5 on page 9.

Connect conductive fluid hoses to the meter inlet and outlet.

ProMix 2KS/2KE/3KS and ProControl 1KS Cable Connections

Meter Power Cable (ProMix 2KS/3KS and ProControl 1KS only)

See Hazardous Location Intrinsically Safe Installation Requirements on page 6 and FIG. 6 on page 10. Install the power cable according to all local electrical codes. Use conduit where required. Do not operate proportioner with equipment enclosure doors/covers open. Disconnect power source before servicing or doing electrical wiring.						

NOTE: When used with the ProMix 2KE, meter power is supplied through the meter signal cable. See **Meter Signal Cable** on page 11.

1. Turn proportioner power off and disconnect power source.
2. Bring the user-provided power cable (PC) from the hazardous area into the non-hazardous area. Follow all local and national codes for flameproof, explosion proof, or increased safety protection.
3. Open the EasyKey enclosure with its key.

4. There are two knockouts on the top of the EasyKey enclosure. Knock out one, depending on whether the Coriolis meter will be on the A or B side.
5. Apply the A and B labels (11) as shown in FIG. 4. Install the strain relief (12) as shown in FIG. 5.

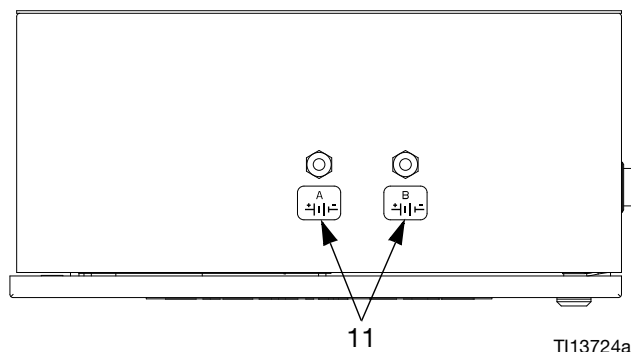


FIG. 4. Apply Labels at Top of EasyKey

NOTE: FIG. 5 shows wiring for a meter on the B side. If you are using two Coriolis meters, wire the second meter in the same way, but on the A side.

6. Feed the power cable (PC) through the strain relief (12). Connect the ground wire (GND) to the ground terminal (G).
7. Connect the white wire to the +24 Vdc terminal on the power supply, and the black wire to the Common terminal.
8. Close and lock the EasyKey door.

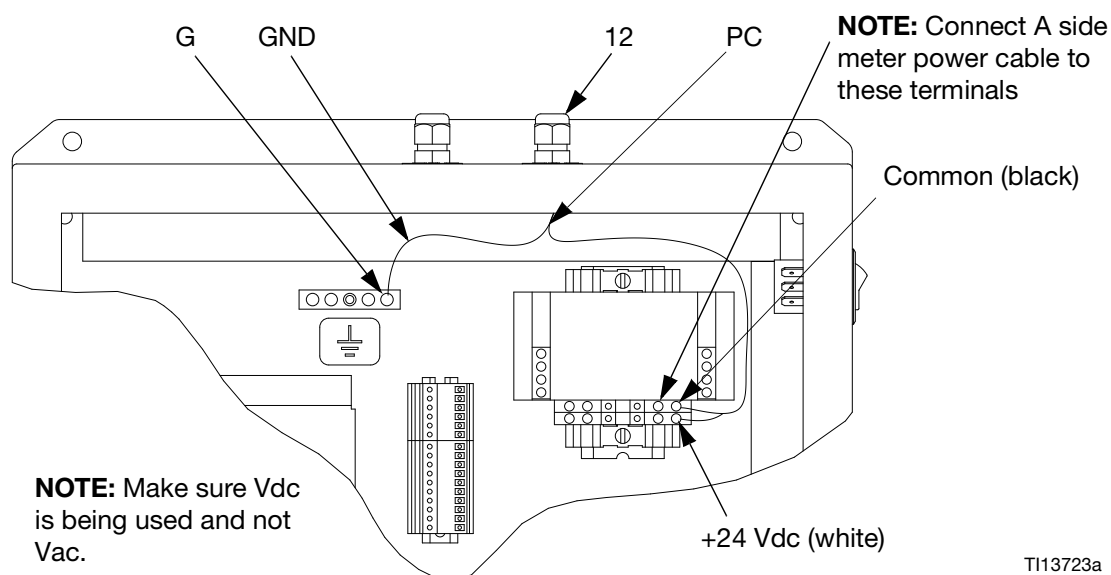
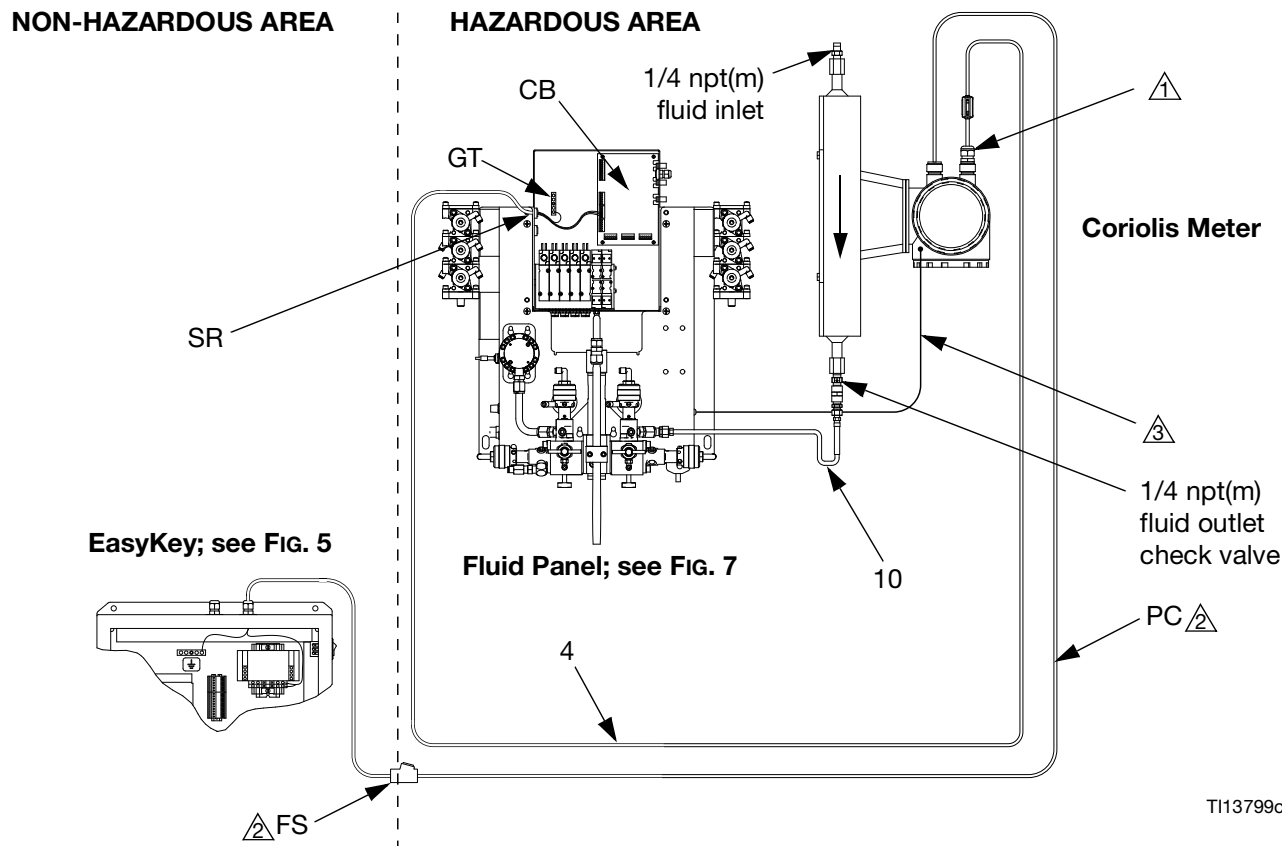


FIG. 5. Cable Connections Inside EasyKey (B Side Meter Installation Shown)


Coriolis Meter Options, DMT 00 ATEX E 074 X (No exceptions):

Size	Graco P/N	Endress+Hauser P/N
1/8"	15T633*	80A-04-A-SVW-9-A-N-A-B-B-A-S
3/8"	15T634*	80I-08-A-999-9-A-N-A-B-B-A-S
1/8"	16M510*	8CN04-84S89AABA9AC
1/4"	16M519*	8CN06-84S89AABA9AC

Power			
EasyKey +24 Vdc Common		Meter Terminal Block # 1 2	
Signal			
Fluid Plate Board	J3 Terminal		Meter Terminal Block #
Meter Position	A	B	
Signal	3	6	24
Common	2	5	25

* For P/N 15T633 order Coriolis Meter Kit 15V806.
 For P/N 15T634 order Coriolis Meter Kit 258151.
 For P/N 16M510 order Coriolis Meter Kit 24M260.
 For P/N 16M519 order Coriolis Meter Kit 24M261.

Wiring Requirements for Installing the Coriolis Meter in a Hazardous Location

⚠ Signal Cable Requirements
 The 258743 Signal Cable Kit (4) supplied by Graco **must** be used in hazardous locations. No cable substitution is allowed.

- The signal cable **must** be sealed to the meter housing per local and national electrical code requirements, to maintain the meter's flameproof or explosion proof enclosure protection. The cable strain relief supplied is **not** rated for hazardous location installation.
- Required electrical components to complete a compliant hazardous location installation of the signal cable circuit to the meter are **not** provided with the meter kit.

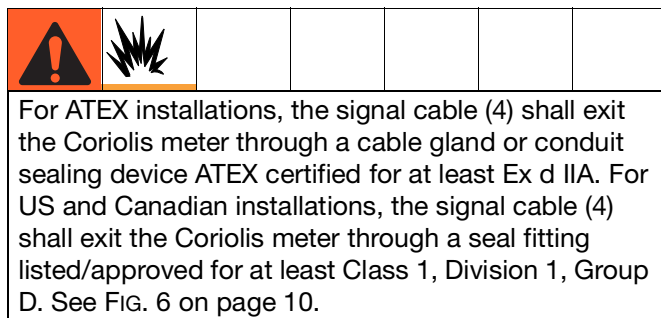
⚠ Power Supply Circuit Requirements
 24 Vdc at 1 Amp is required to power the meter, which is more power than an intrinsically safe circuit can provide. The 24 Vdc can be supplied from the EasyKey.

- Installation of the power input circuit (PC) in the hazardous location **must** comply with all local and national electrical code requirements relating to flameproof or explosion proof methods of protection.
- Required electrical components to complete a compliant hazardous location installation of the power input circuit to the meter are **not** provided with the meter kit.

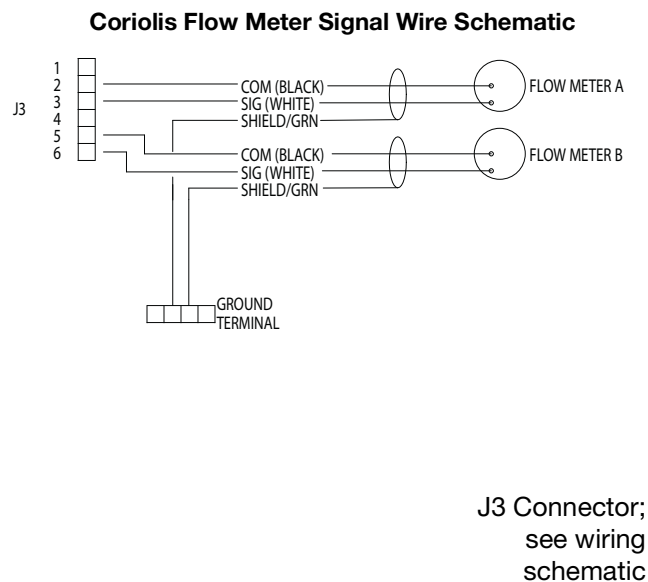
⚠ Earthing
 The Coriolis meter must be grounded to the ProMix 2KS fluid panel using a minimum 12 AWG ground wire.

FIG. 6. System Layout for Coriolis Meter (B Side Meter Installation in ProMix 2KS/3KS and ProControl 1KS Systems)

Meter Signal Cable



1. See FIG. 6 on page 10. Route the 20 ft (6.1 m) signal cable (4) into the fluid panel and through a strain relief (SR) on the left side of the fluid panel enclosure or control box.
2. See FIG. 7 for ProMix 2KS/3KS and ProControl 1KS, and FIG. 8 on page 12 for ProMix 2KE.



- ProMix 2KS/3KS and ProControl 1KS:* Connect the signal cable's green ground wire to the ground terminal bar (GT). Connect the white and black wires to J3 on the fluid panel control board (CB). Use pins 2-3 for Flow Meter A and pins 5-6 for Flow Meter B. See TABLE 1 on page 13 for signal cable connections for additional meters.
- ProMix 2KE:* See FIG. 8 on page 12. Connect the signal cable's green ground wire to the ground terminal bar (GT). For Flow Meter A, connect the black wire to pin 13 and the white wire to pin 14 on the left terminal strip, as shown. Connect Flow Meter B to the right terminal strip, pins 13 and 14. Coriolis meters do not have a red wire and do not use pin 12.

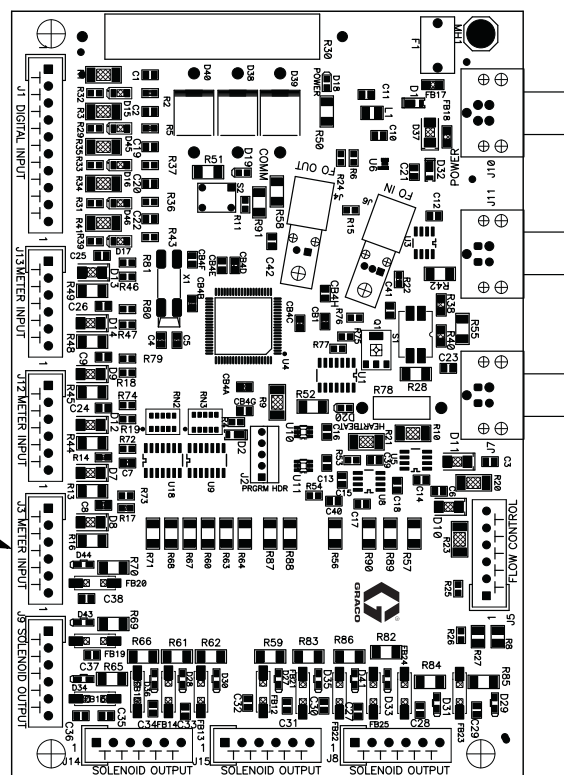


FIG. 7. Signal Cable Connections (ProMix 2KS/3KS and ProControl 1KS)

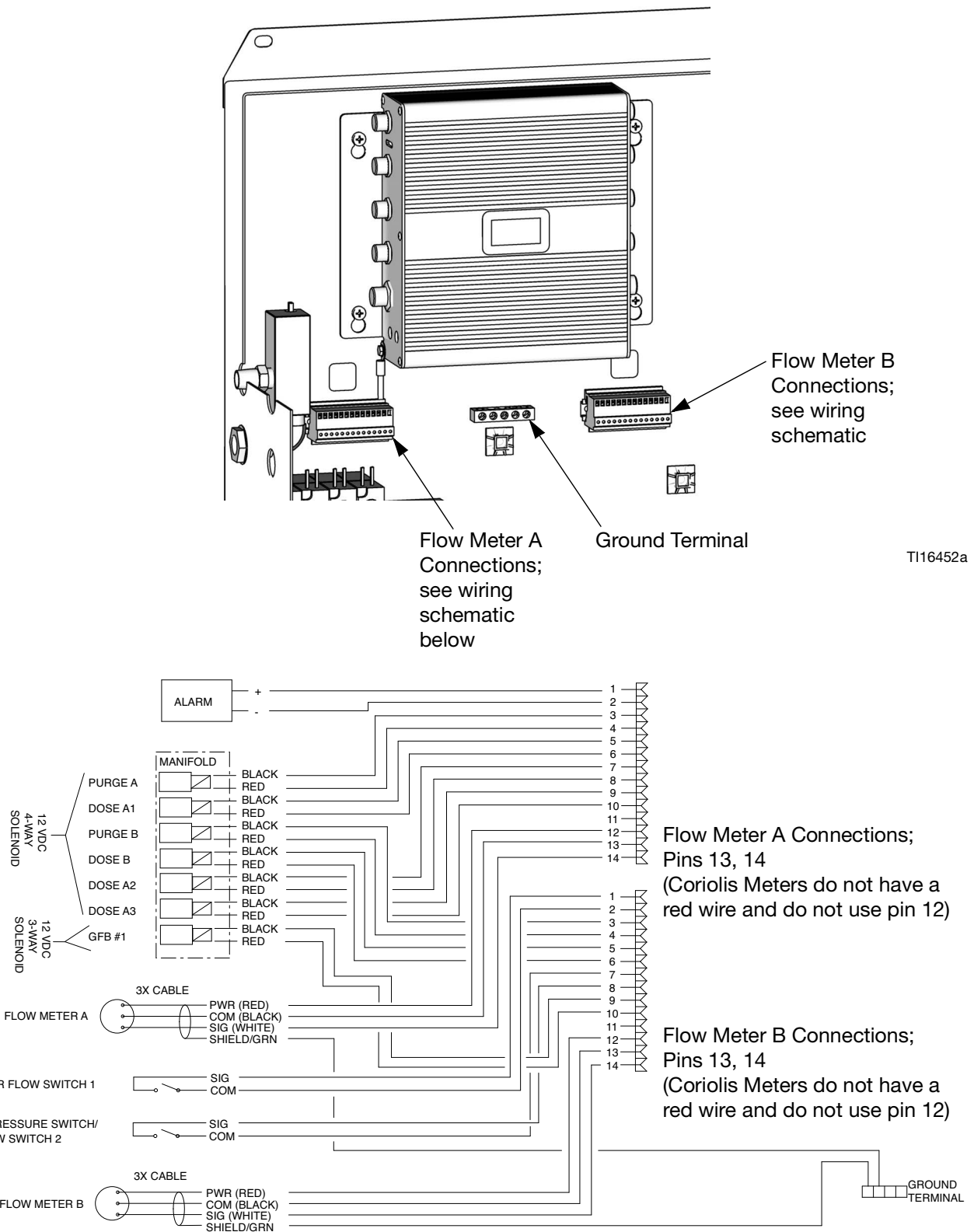


Fig. 8. Power and Signal Cable Connections (ProMix 2KE)

Power and Signal Cable Connections at Meter

The signal cable (4) is factory assembled to the meter. The power cable (PC) is user-provided. If cables need servicing or replacement, see FIG. 9 and Table 1 to connect to meter.

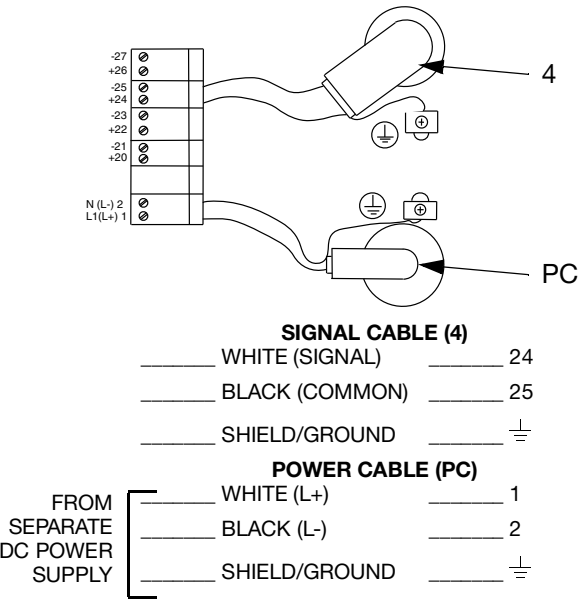


FIG. 9. Power and Signal Connections at Meter, ProMix 2KS/2KE/3KS and ProControl 1KS

Table 1: Signal Cable Connections

Meter	Proportioner				Wire Color (Function)	Coriolis Meter Terminals
	ProMix 2KE	ProControl 1KS	ProMix 2KS	ProMix 3KS		
Resin A	Left-14	J3-3	J3-3	J3-3	White (Signal)	24
	Left-13	J3-2	J3-2	J3-2	Black (Common)	25
Catalyst B	Right-14	NA	J3-6	J3-6	White (Signal)	24
	Right-13		J3-5	J3-5	Black (Common)	25
Reducer C	NA	NA	NA	J12-6	White (Signal)	24
				J12-5	Black (Common)	25
Solvent	NA	J12-3	J12-3	J12-3	White (Signal)	24
		J12-2	J12-2	J12-2	Black (Common)	25
All	Ground Terminal Block	Ground Terminal Block	Ground Terminal Block	Ground Terminal Block	Shield (Ground)	Ground Terminal Block

Informer and ProControl 1KE Cable Connections.

Meter Power Cable



To avoid electric shock, disconnect power source before doing electrical wiring. All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

The meter is powered by a user-supplied 24V, 1 A, 24W. power supply. Order Graco power supply 120369, if desired.

Meter Signal Cable

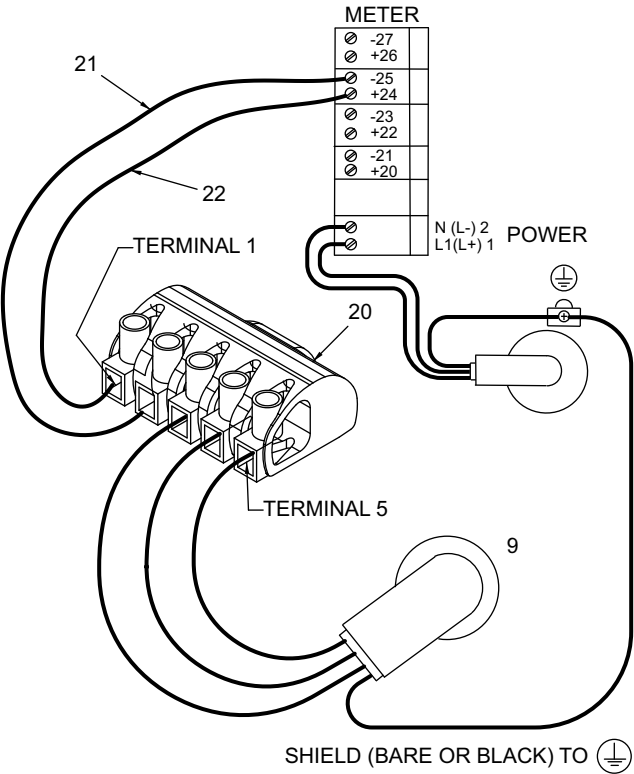
Connect the meter signal cable to port 4 on your Informer DCM or ProControl ADCM.

Cable Connections at Meter

The signal cable (9) is factory assembled to the meter. The power cable is user provided.

See FIG. 10. To service or replace components:

1. Remove meter cover and feed cable through housing. Connect signal cable (9) and wires (21, 22) per wire schematic.
2. Install terminal (20) in the storage area of the meter.
3. Gently pull back extra signal cable and tighten cable gland to secure cable.



TERMINAL (20)	METER
1	24
2	25

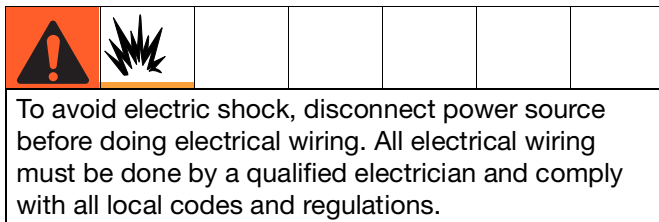
SIGNAL CABLE (9)	TERMINAL (20)
BROWN (POWER)	5
WHITE (SIGNAL)	4
GRAY (COMMON)	3

FROM SEPARATE DC POWER SUPPLY	POWER CABLE	METER
	WHITE (L+)	1
	BLACK (L-)	2
	SHIELD/GROUND	⊥

FIG. 10. Power and Signal Connections at Meter, Informer and ProControl 1KE

ProMix-V Cable Connections

Meter Power Cable



Meter Signal Cable

Route the cables into the ProMix-V cabinet from the bottom. Refer to FIG. 11.

1. Connect the cable ends with the white signal wire for the A or B side.
2. Connect cable ends in section C according to their color, red wire to red block, black wire to black block.
3. Connect the ground cable to the green ground screw as shown in FIG. 11.

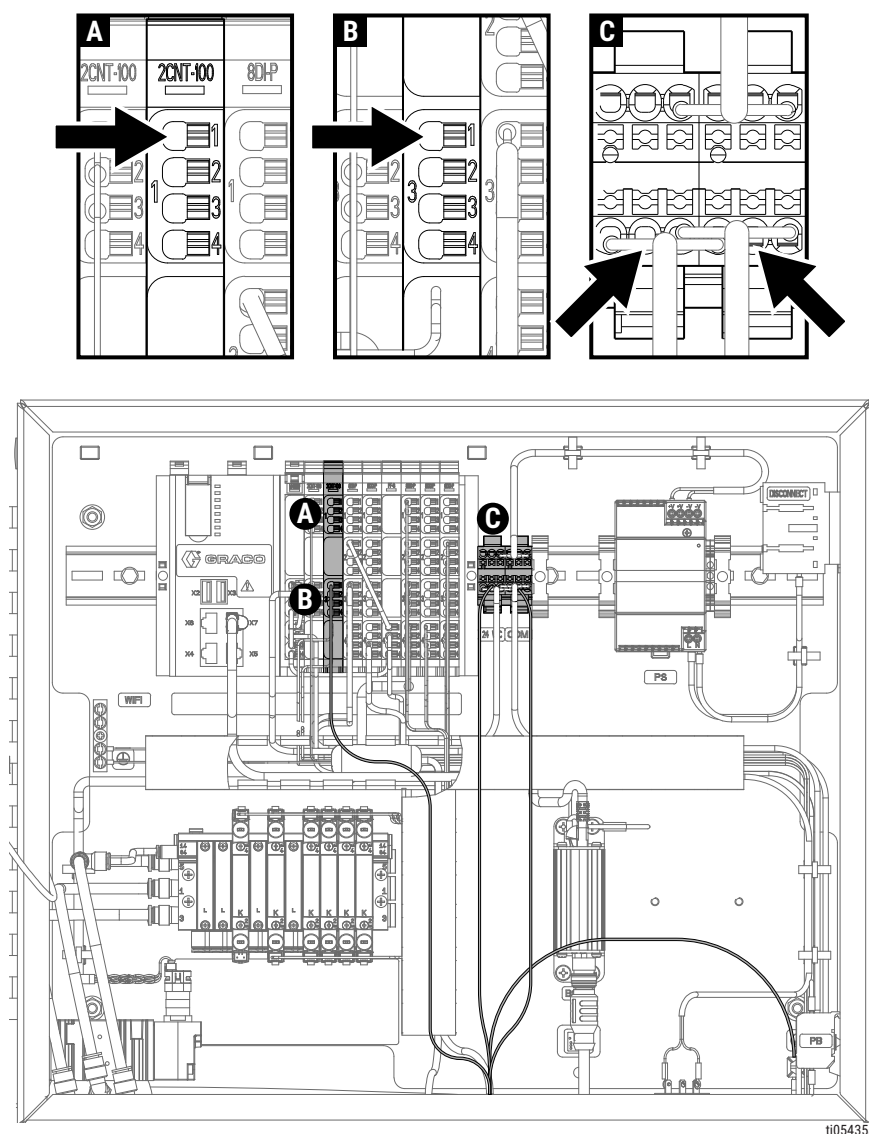


FIG. 11.

I/Operation

Start Up

When all electrical and fluid connections are complete, reconnect the power source and turn it on.

NOTE: See your Operation manual for system operating instructions.

Pressure Relief Procedure



Follow **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, servicing, or transporting equipment.

1. Turn off the fluid supply to the meter.
2. Follow the **Pressure Relief Procedure** in your operation manual.

NOTE: Do not service the electronic sensor. Return it to your Graco distributor for service.

Check I/O Board Jumper (only if necessary)

NOTICE

If the meter does not operate after following all procedures in the **Installation** section, starting on page 6, check the position of the I/O circuit board jumper as follows. To avoid damaging the circuit board, wear a grounding strap on your wrist and ground appropriately.

1. Unscrew the outer cover (A). Press the latches (B) to release the display module (C). Disconnect the ribbon cable (D) from the middle board (E). Remove the display module.
2. Remove two screws (F) and the inner cover (G). Insert a thin pin into the hole (H) and pull out the I/O board.
3. V4 on the I/O board must be jumpered and V5 must not be jumpered. If that is the case, no action is necessary and you may reinstall the board. If the opposite is the case, remove the jumper from V5 and place it on V4, then reinstall the board.
4. Reassemble in reverse order.

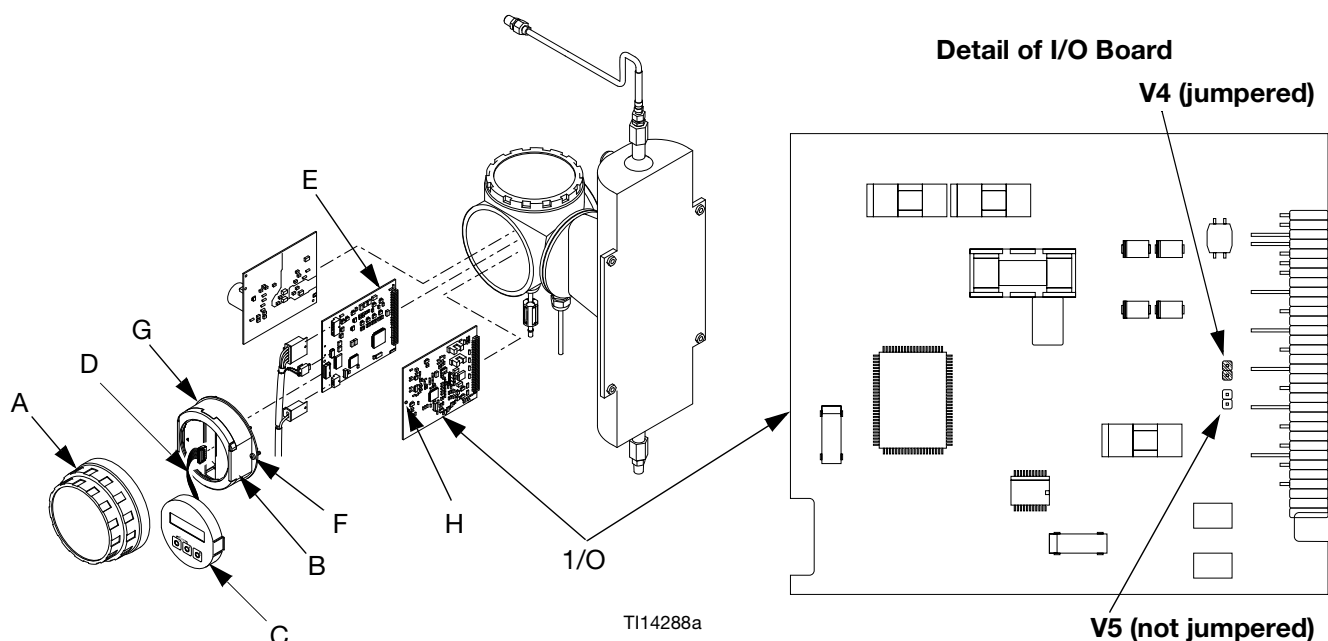


FIG. 12. Check I/O Board Jumper

Using Promass Meter with ProMix 2KS/2KE/3KS, ProMix-V, or ProControl 1KS System

Basic Installation Settings

The function matrix consists of groups which have a set of related functions. See **Promass Meter Function Matrix** on page 19.

To access groups and functions:

(Refer to FIG. 13.)

1. From HOME, press **E** to enter function matrix and access Group options.
2. To scroll from one Group to the next or previous Group, press **+** or **-**.
3. To select the Group and access its Functions, press **E**.
4. To scroll through Functions, press **E**.

5. To select a Function, press **+** or **-**.

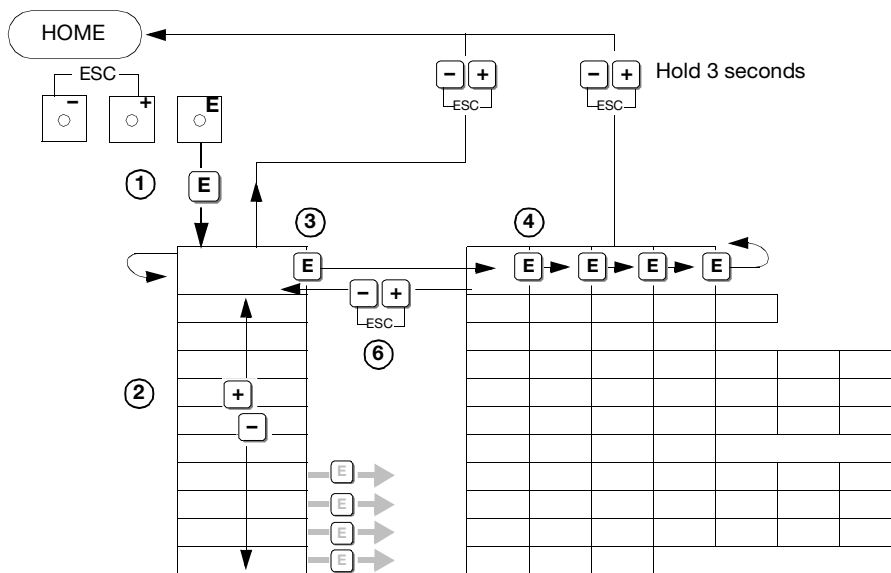
NOTE: To enable meter programming, you need to enter the access code. The factory setting is 80. See the Endress+Hauser manual to change the access code.

6. To exit the function matrix one level at a time, press **+** and **-** together.

NOTE: Pressing and holding **+** and **-** together for more than 3 seconds will return you to HOME.

For additional Promass instructions, see the Endress+Hauser manuals shipped with the meter, or access the manuals online at www.endress.com.

IMPORTANT: Enter the correct K-factor (pulse value function in TABLE 2 on page 18) and calibrate the meter before operating the proportioner.



NOTE:

① numbers represent steps of **Basic Installation Settings** procedure, page 17.

FIG. 13: Promass Meter Group and Function Navigation

Promass Meter Measuring Values

The following are the recommended settings for using the Promass meter with the proportioner. If a value is not mentioned, use the default Endress+Hauser setting.

Table 2: Promass Meter Values to use with Proportioner

Group	Function	Value*
System Units	Volume Flow	cc/m
	Unit Volume	cc
User Interface	Assign Line 1	Volume Flow
	Assign Line 2	Totalizer 1 or Operation/System Condition (user's choice)
Totalizer 1	Assign Totalizer	Volume Flow
	Reset Total	No - default setting Yes - resets totals, then returns to default
Current Output 1	Assign Current	Off
Pulse/Freq. Output	Operation Mode	Pulse
	Assign Pulse	Volume Flow
	Pulse Value (K-Factor)	0.020 cc/pulse for Low Flow applications (20-500 cc/min.)
		0.061 cc/pulse for Medium Flow applications (500-1500 cc/min.)
		0.150 cc/pulse for High Flow applications (1500-3800 cc/min.)
	Pulse Width	0.50 ms
	Pulse Value	1.00 ms
	Output Signal	Passive/Positive
Process Parameter	Assign LF-Cut Off	Volume Flow
	On-Val. FL-Cut Off	5.00 cc/min. for Low Flow applications (20-500 cc/min.)
		30 cc/min. for Medium & High Flow applications (500-3800 cc/min.)

* When changing a value, use **+** or **-** keys to toggle through available selections. Use Enter **E** key to select and save each value. Only the value flashing can be selected; you may have to select and press **E** for each digit or unit to move to the next digit/unit.

Promass Meter Function Matrix

The Promass Meter Function Matrix, page 19, shows all the Promass setting values available. The bold values are the minimum settings required to use the Promass Coriolis Meter with the Graco proportioning system.

Promass Meter Function Matrix

Functions

MEASURING VALUES										
SYSTEM UNITS	MASS FLOW	VOLUME FLOW	DENSITY	TEMPERATURE						
QUICK SETUP	UNIT MASS FLOW	UNIT MASS	UNIT VOLUME FLOW	UNIT VOLUME	UNIT DENSITY	UNIT TEMPERATURE	UNIT LENGTH	UNIT PRESSURE		
OPERATION	SETUP COMMISSION									
	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 1 & 2	ASSIGN TOTALIZER	SUM	OVERFLOW	UNIT TOTALIZER	RESET TOTAL	FAILSAFE MODE				
HANDLING TOTALIZER	RESET ALL TOTALIZERS									
CURRENT OUTPUT 1 & 2	ASSIGN CURRENT	CURRENT SPAN	VALUE 0.4 mA	VALUE 20 mA	TIME CONSTANT	FAILSAFE MODE	ACTUAL CURRENT	SIMULATION CURR.	VALUE SIM. CURR.	
PULSE/FREQ. OUT	OPERATION MODE	ASSIGN FREQ.	END VALUE FREQ.	VALUE FLOW	VALUE F HIGH	OUTPUT SIGNAL	TIME CONSTANT	FAILSAFE MODE	FAILSAFE VALUE	ACTUAL FREQ.
STATUS OUTPUT	SIMULATION FREQ.									
	ASSIGN STATUS	ON-VALUE	OFF-VALUE	TIME CONSTANT	ACTUAL STATUS	SIM. SWITCH POINT	VAL. SIM. SWIT. PNT			
STATUS INPUT	ASSIGN STATUS IN									
COMMUNICATION	TAG NAME	TAG DESCRIPTION	BUS ADDRESS	HART PROTOCOL	WRITE PROTECTION	MANUFACTURER ID	DEVICE ID			
PROCESS PARAM.	ASSIGN LF-CUT OFF	ON-VAL LF-OUT OFF	OFF-VAL LF-CUT OFF	EMPTY PIPE DET.	EPD VALUE LOW	EPD VALUE HIGH	EPD RESPONSE TIME	ZERO POINT ADJUST	DENSITY SET VALUE	MEASURE FLUID
	DENSITY 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 0	DENSITY COEF. C 1
	DENSITY COEF. C 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. ERR.	ERROR CATEGORY	ALARM DELAY	SYSTEM RESET	TROUBLESHOOTING	
SIMULAT. SYSTEM	SIM. FAILSAFE MODE	SIM MEAS.	VALUE SIM. MEAS.							
SENSOR VERSION	SERIAL NUMBER	SENSOR TYPE	SW-REV. S-DAT							
AMP. HW VERSION	SW-REV. AMP.	I/O MODUL TYPE	SW-REV. I/O							

Using Cubemass Meter with ProMix 2KS/2KE/3KS, ProMix-V, Informer, or ProControl 1KS/1KE System

Basic Installation Settings

The function matrix consists of groups which have a set of related functions. See **Cubemass Meter Function Matrix** on page 22.

To access groups and functions:

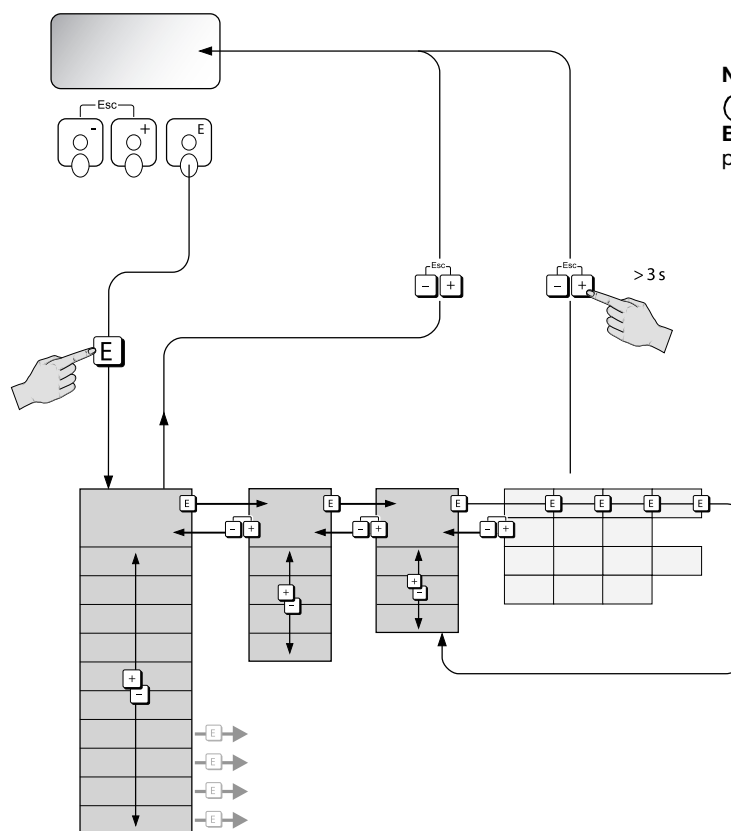
1. From HOME, press **E** to enter the function matrix and access the Block menu. See FIG. 14.
2. Scroll through the Block menu. Press **E** to save the selection and advance to the Group menu.
3. Scroll through the Group menu. Press **E** to save the selection and advance to the Function Group menu.
4. Scroll through the Function Group menu. Press **E** to save the selection and advance to the Function menu.

NOTE: To enable meter programming, you need to enter the access code. The factory setting is 84. See the Endress+Hauser manual to change the access code.

5. Select a function. Press the **+** or **-** key to change or enter parameters or numerical values.
See TABLE 3 on page 23. Press **E** to save the entries.
6. Press the **+** and **-** keys together to exit the function matrix one level at a time. Press and hold the **+** and **-** keys together for more than 3 sec to return to the HOME position.

For additional Promass instructions, see the Endress+Hauser manuals shipped with the meter, or access the manuals online at www.endress.com.

IMPORTANT: Enter the correct K-factor (pulse value function in TABLE 3 on page 23) and calibrate the meter before operating.



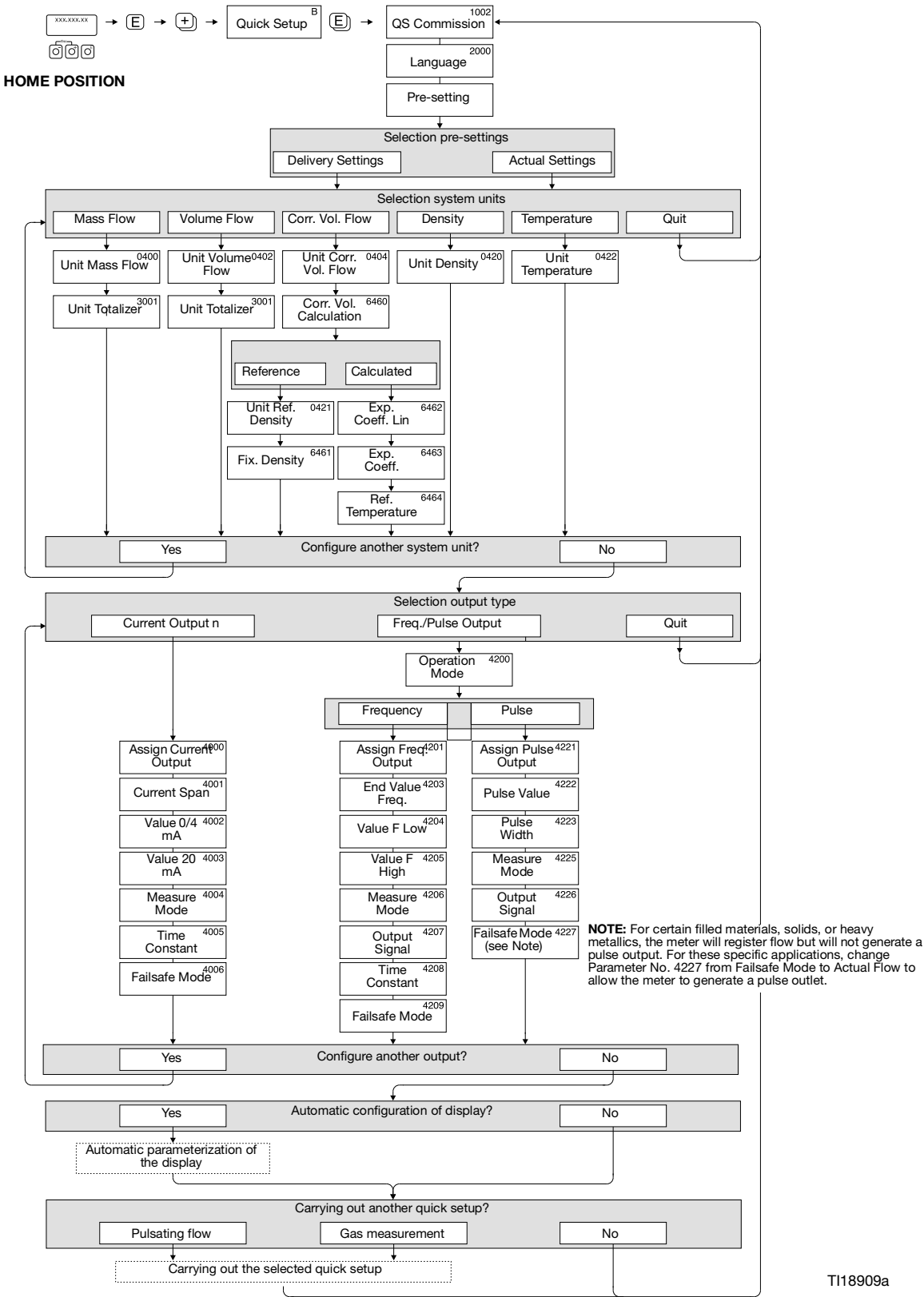
NOTE:

① numbers represent steps of **Basic Installation Settings** procedure, page 20.

FIG. 14: Cubemass Meter Group and Function Navigation

TI18908a

Cubemass Meter Function Matrix



Cubemass Meter Minimum Required Setup Table

The following are the recommended settings for using the Cubemass meter with the proportioner. If a value is not mentioned, use the default Endress+Hauser setting.

Table 3: Cubemass Meter Values to use with Proportioner

Block	Group	Function Group	Function	Value*	Parameter No.
Measured Variables	System Units	Configuration	Unit Volume Flow	cc/min	402
			Unit Volume	cc	403
User Interface	Main Line	Configuration	Assign	Volume Flow	2220
	Additional Line		Assign	Totalizer 1	2400
Totalizer	Totalizer 1	Configuration	Assign	Volume Flow	3000
			Unit Totalizer	No - default setting	3001
Outputs	Current Output	Configuration	Assign Current Output	Volume Flow	4000
	Pulse/Frequency Output	Configuration	Mode of Operation	Pulse	4200
			Pulse	Volume Flow	4221
			Pulse Value (K-Factor)	0.020 cc/pulse for Low Flow applications (50-750 cc/min.)	4222
				0.061 cc/pulse for Medium Flow applications (500-1500 cc/min.)	
				0.150 cc/pulse for High Flow applications (1500-3800 cc/min.)	
			Pulse Width	0.50 ms	4223
			Output Signal	Passive - Positive	4226
Basic Function	Process Parameter	Configuration	Assign Low Flow Cut Off	Volume Flow	6400
			On-Value Low Flow Cut Off	30 cc/min for Medium and High Flow applications (500-3800 cc/min.)	6402
				5 cc/min for Low Flow applications (50-1000 cc/min.)	

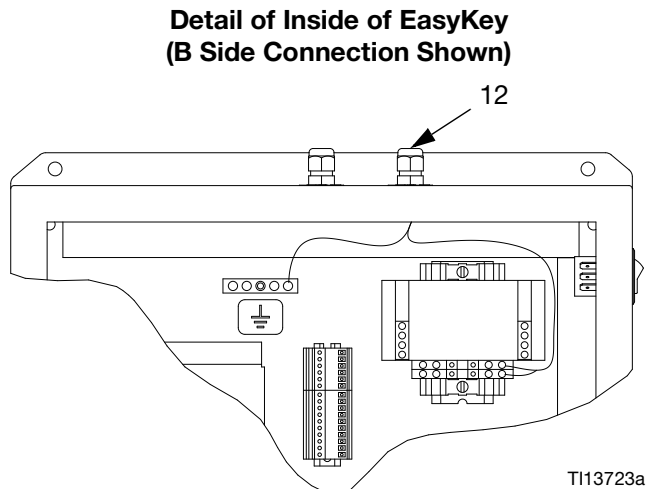
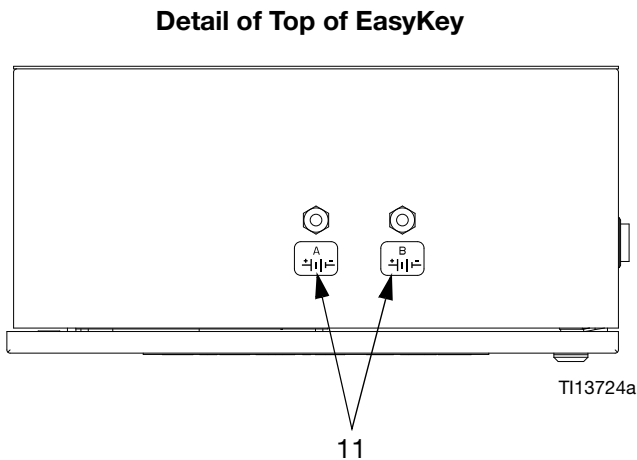
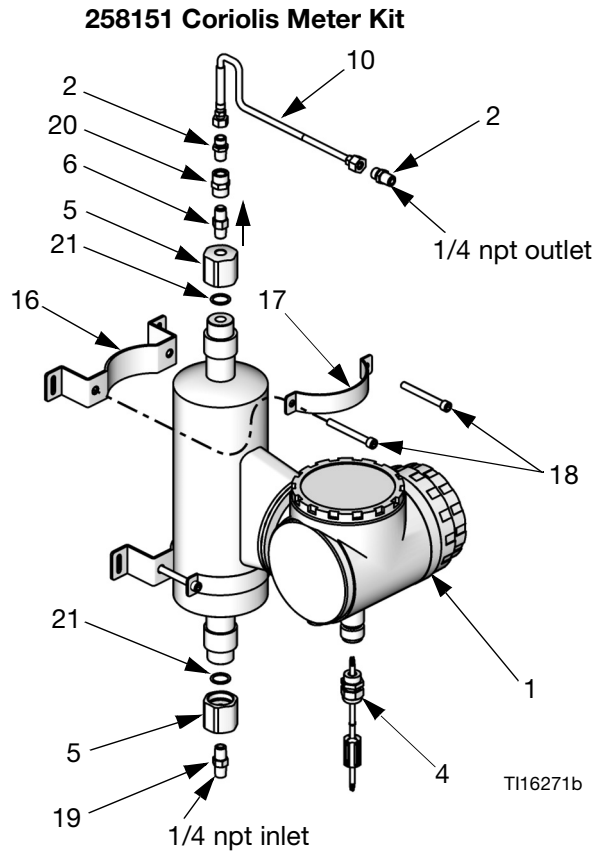
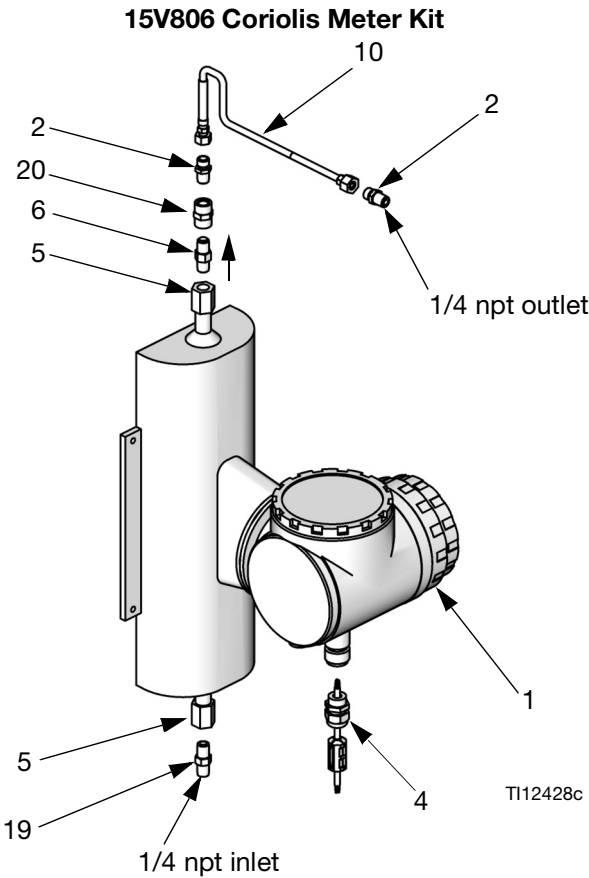
* When changing a value, use **+** or **-** keys to toggle through available selections. Use Enter **E** key to select and save each value. Only the value flashing can be selected; you may have to select and press **E** for each digit or unit to move to the next digit/unit.

Parts

ProMix 2KS/2KE/3KS and ProControl 1KS Kits

15V806 Coriolis Meter Kit
Promass 80A Meter with 1/8 in. (3 mm) metering tube. Includes items 1-12, 19, 20.

258151 Coriolis Meter Kit
Promass 80I Meter with 3/8 in. (10 mm) metering tube. Includes items 1-20.



15V806 Coriolis Meter Kit

Promass 80A Meter with 1/8 in. (3 mm) metering tube. Includes items 1-12, 19, 20.

258151 Coriolis Meter Kit

Promass 80I Meter with 3/8 in. (10 mm) metering tube. Includes items 1-21.

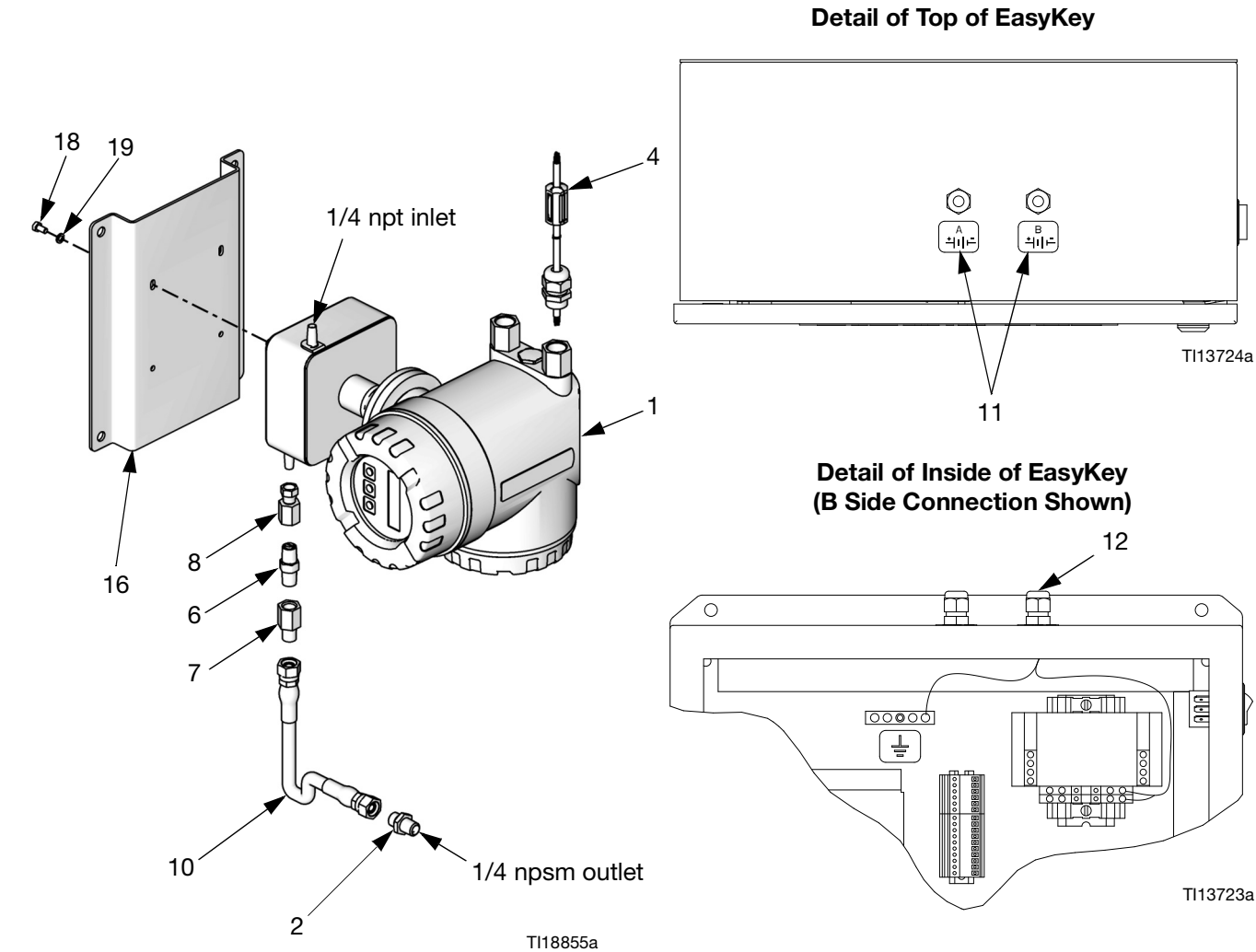
Ref. No.	Part No.	Description	Qty
1	15T633	CORIOLOG FLOW METER, intrinsically safe; 1/8 in. (3 mm) metering tube; used on 15V806	1
	15T634	CORIOLOG FLOW METER, intrinsically safe; 3/8 in. (10 mm) metering tube; used on 258151	1
2	166846	ADAPTER; 1/4 npt x 1/4 npsm (mbe)	2
4	258743	CABLE, signal; 20 ft. (6.1 m)	1
5	552269	ADAPTER; 1/4 npt(f) x #4 face seal; used on 15V806	2
	16G031	COUPLER; 1/4 npt(f) x 1-1/4 unef; used on 258151	2
6	501867	CHECK VALVE; 1/4-18 npt (mbe)	1
10	24N347	HOSE, fluid; 5 ft (1.52 m); 1/4-18 npsm (fbe); ptfe	1
11	15D580	LABELS, A and B	1
12	111987	STRAIN RELIEF	1
16	16G029	BRACKET, wall; used on 258151 only	2
17	16G030	BRACKET, meter; used on 258151 only	2
18	104161	SCREW, cap, socket-hd; 5/16-24 x 2.75 in. (70 mm); used on 258151 only	4
19	121907	NIPPLE; 1/4 npt	1
20	110336	CONNECTOR, pipe; 1/4 npt (fbe)	1
21	15Y627	O-RING; used on 258151 only	2

24M260 Coriolis Meter Kit

Cubemass DCI Meter with 1/8 in. (3 mm) metering tube. Includes items 1-19.

24M261 Coriolis Meter Kit

Cubemass DCI Meter with 1/4 in. (6 mm) metering tube. Includes items 1-19.

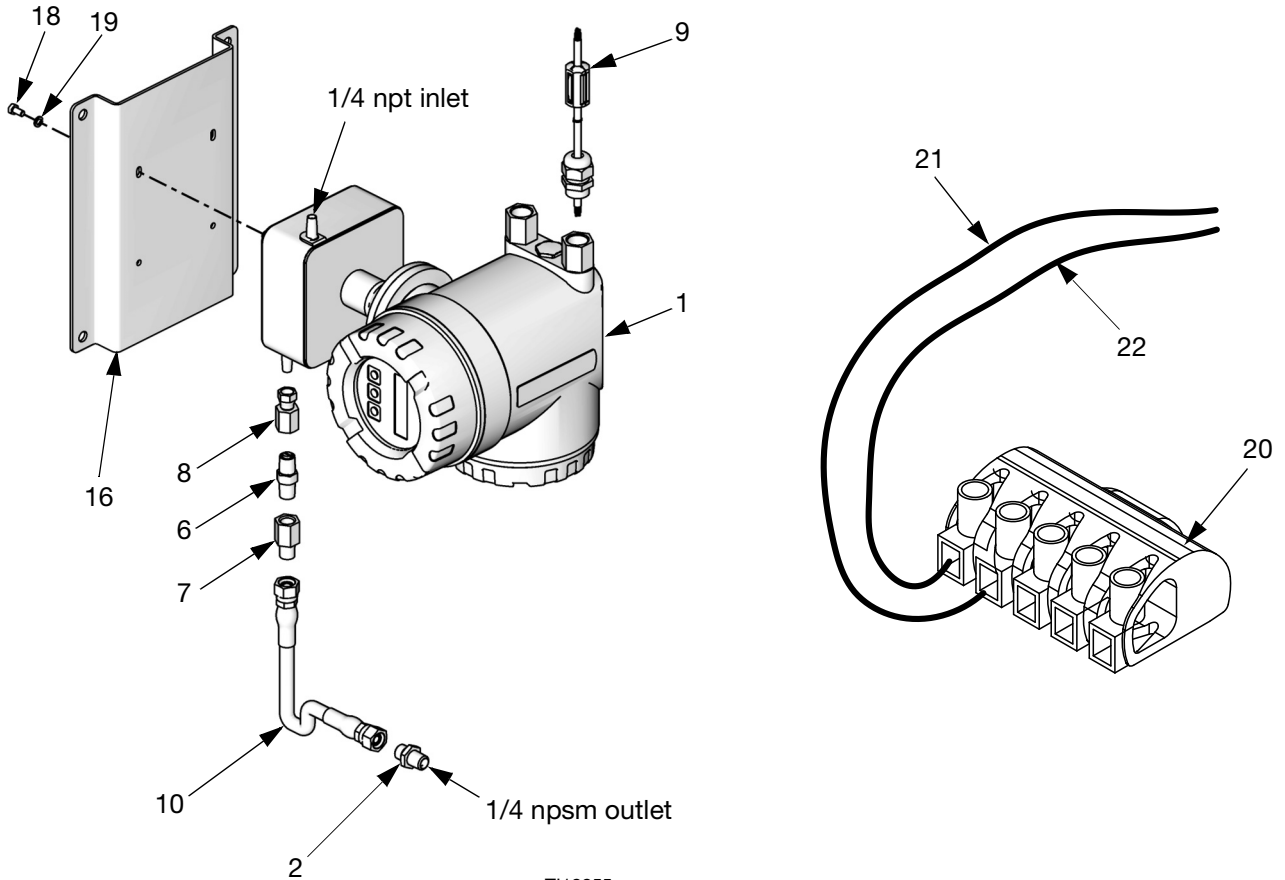


Ref. No.	Part No.	Description	Qty	Ref. No.	Part No.	Description	Qty
1	16M510	CORIOLIS FLOW METER, intrinsically safe; 1/8 in. (3 mm) metering tube; used on 24M260	1	8	16P309	FITTING, swivel; 1/4 npt(f) x 1/4 npsm(f)	
	16M519	CORIOLIS FLOW METER, intrinsically safe; 1/4 in. (6 mm) metering tube; used on 24M261	1	10	24N347	HOSE, fluid; 5 ft (1.52 m); 1/4-18 npsm (fbe); ptfe	1
2	166846	ADAPTER; 1/4 npt x 1/4 npsm (mbe)	1	11	15D580	LABELS, A and B	1
4	258743	CABLE, signal; 20 ft. (6.1 m)	1	12	111987	STRAIN RELIEF	1
6	501867	CHECK VALVE; 1/4-18 npt (mbe)	1	16	16M520	BRACKET, wall	1
7	17A106	FITTING, adapter; 1/4 npt(f) x 1/4 npt(m)	1	18	106137	SCREW, cap, hex-hd; M5 x 0.8 x 10 mm	4
				19	112903	WASHER, lock; M5	4

Informer and ProControl 1KE Kits

24N525 Coriolis Meter Kit

Cubemass DCI Meter with 1/4 in. (6 mm) metering tube. Includes items 1-19.



TI18855a

Ref. No.	Part No.	Description	Qty.
1	16M519	CORIOLIS FLOW METER, intrinsically safe; 1/4 in. (6 mm) metering tube; used on 24N525	1
2	166846	ADAPTER; 1/4 npt x 1/4 npsm (mbe)	1
6	501867	CHECK VALVE; 1/4-18 npt (mbe)	1
7	17A106	FITTING, adapter; 1/4 npt(f) x 1/4 npt(m)	1
8	16P309	FITTING, swivel; 1/4 npt(f) x 1/4 npsm(f)	1
9	262852	CABLE, signal; 20 ft. (6.1 m)	1
10	24N347	HOSE, fluid; 5 ft (1.52 m); 1/4-18 npsm (fbe); ptf	1

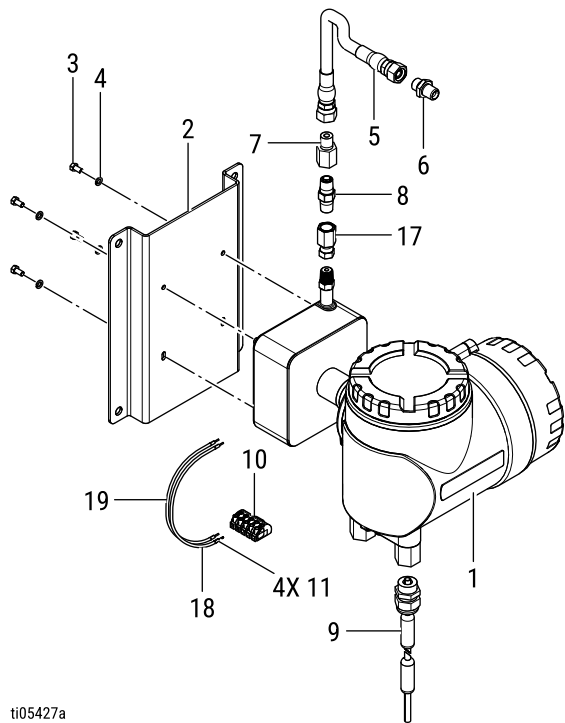
Ref. No.	Part No.	Description	Qty.
16	16M520	BRACKET, wall	1
18	106137	SCREW, cap, hex-hd; M5 x 0.8 x 10 mm	4
19	112903	WASHER, lock; M5	4
20*	17A450	TERMINAL, pull down register	1
21	-----	WIRE, copper, 16 ga; 6 in (154mm)	1
22	-----	WIRE, copper, 16 ga; 6 in (154mm)	1

* See **Cable Connections at Meter**, page 14 for Installation instructions

ProMix-V Kit

2013593 Coriolis Meter Kit

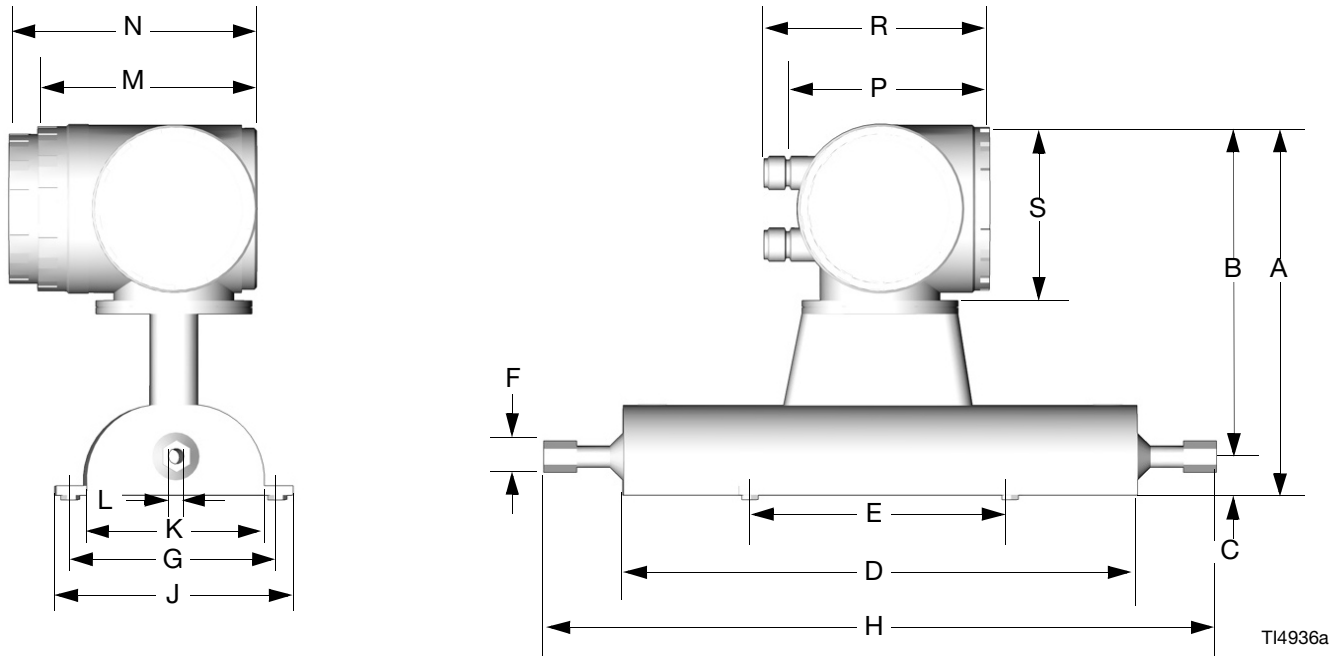
Kit, Meter, Coriolis 1/4"



ti05427a

Ref.			
No.	Part No.	Description	Qty.
1	16M519	METER, coriolis, 1/4 in.	1
2	-----	BRACKET, meter, coriolis	1
3	-----	SCREW, cap, hex hd	4
4	-----	WASHER, lock, spring	4
5	-----	HOSE, coupled, 5.0 ft.	1
6	-----	FITTING, adapter	1
7	17A106	FITTING, adapter, 30 deg chamfer	1
8	501867	VALVE, check	1
9	2013596	CABLE, signal informer, coriolis	1
10	17A450	TERMINAL, pull down resisitor	1
11	-----	FERRULE, wire, red	4
12	-----	SEALANT, pipe, SST	1
17	16P309	SWIVEL, union	1
18	-----	WIRE, copper, 16ga, PVC blue	0.5
19	-----	WIRE, copper, elect	0.5

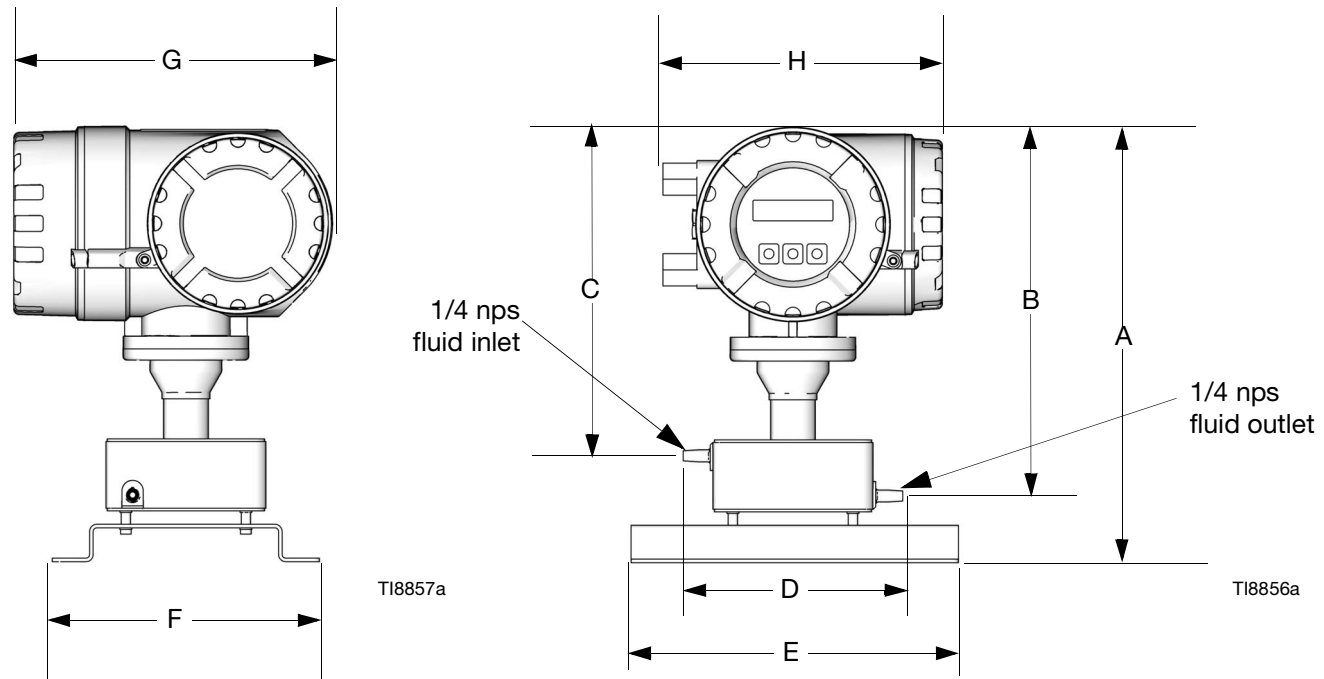
Promass Dimensions



Dimensions - inches (mm)

A	B	C	D	E	F	G	H
12.4 (315)	11.14 (283)	1.26 (32)	17.13 (435)	8.66 (220)	11/16	6.89 (175)	19.57 (497)
J	K	L	M	N	P	R	S
7.68 (195)	5.91 (150)	.14 (3.5)	8.19 (207)	8.94 (227)	6.61 (168)	7.36 (187)	6.3 (160)

Cubemass Dimensions

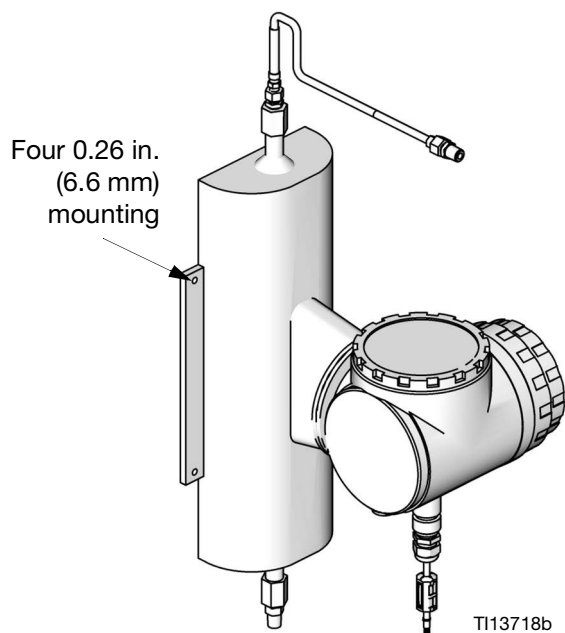


Dimensions - inches (mm)

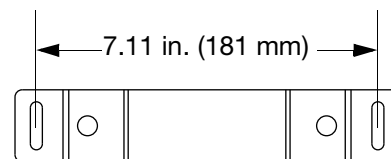
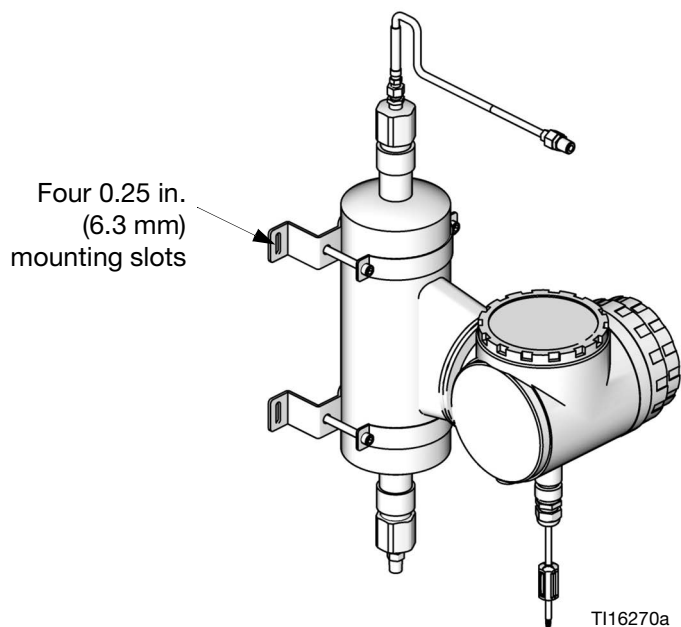
A	B	C	D	E	F	G	H
12.52 (318)	10.65 (271)	9.47 (241)	6.89 (175)	9.66 (245)	7.89 (200)	8.92 (227)	7.61 (193)

Mounting Hole Dimensions

15V806 Coriolis Meter Kit

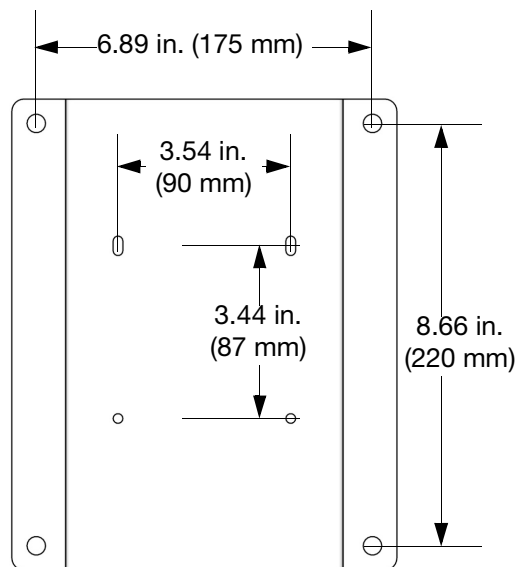
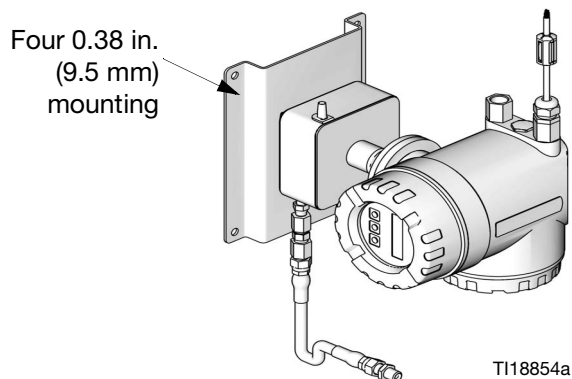


258151 Coriolis Meter Kit



TI16272a

24M260, 24M261, and 24N525 Coriolis Meter Kits



TI18858a

[illegible]

Technical Data

Part No. 15V806 and 258151 Coriolis Meter Kits		
	U.S.	Metric
Maximum Fluid Working Pressure	2300 psi	16 MPa, 160 bar
Fluid wetted parts (meter)	1.4539/904L stainless steel alloy C-22 2.4602/N 06022	
Fluid wetted parts (hose and fittings)	303, 304 stainless steel, PTFE	
Fluid Temperature Range*	41-122° F	5-50° C
Maximum Ambient Temperature*	122° F	50° C
Fluid Inlet/Outlet	4-VCO-4 Face Seal	
Power and Signal Cable Entry	1/2 npt strain relief	
Resolution	settable 0.020-0.150 cc/pulse	
Accuracy	see Endress+Hauser manual	
Supply Voltage	24 Vdc	
Weight (meter only)		
Part No. 15V806	33 lb	15 kg
Part No. 258151	29 lb	13 kg

Part No. 24M260, 24M261, and 24N525 Coriolis Meter Kits		
	U.S.	Metric
Maximum Fluid Working Pressure	2300 psi	16 MPa, 160 bar
Fluid wetted parts (meter)	1.4539/904L stainless steel alloy C-22 2.4602/N 06022	
Fluid wetted parts (hose and fittings)	303, 304 stainless steel, PTFE	
Fluid Temperature Range*	41-122° F	5-50° C
Maximum Ambient Temperature*	122° F	50° C
Fluid Inlet Fitting	1/4 nps	
Fluid Outlet Fitting	1/4 npt	
Power and Signal Cable Entry	1/2 npt strain relief	
Resolution	settable 0.020-0.150 cc/pulse	
Accuracy	see Endress+Hauser manual	
Supply Voltage	24 Vdc	
Weight (meter only)	12.1 lb	5.5 kg

* When used with ProMix 2KS/2KE/3KS and ProControl 1KS systems. When used with Informer or ProControl 1KE, the maximum temperature is 200° F (93° C). See Endress+Hauser meter manual for additional information.

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Graco warrants all equipment referenced in this document which is 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.

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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.

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For the latest information about Graco products, visit www.graco.com.

For patent information, see www.graco.com/patents.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM 313599

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