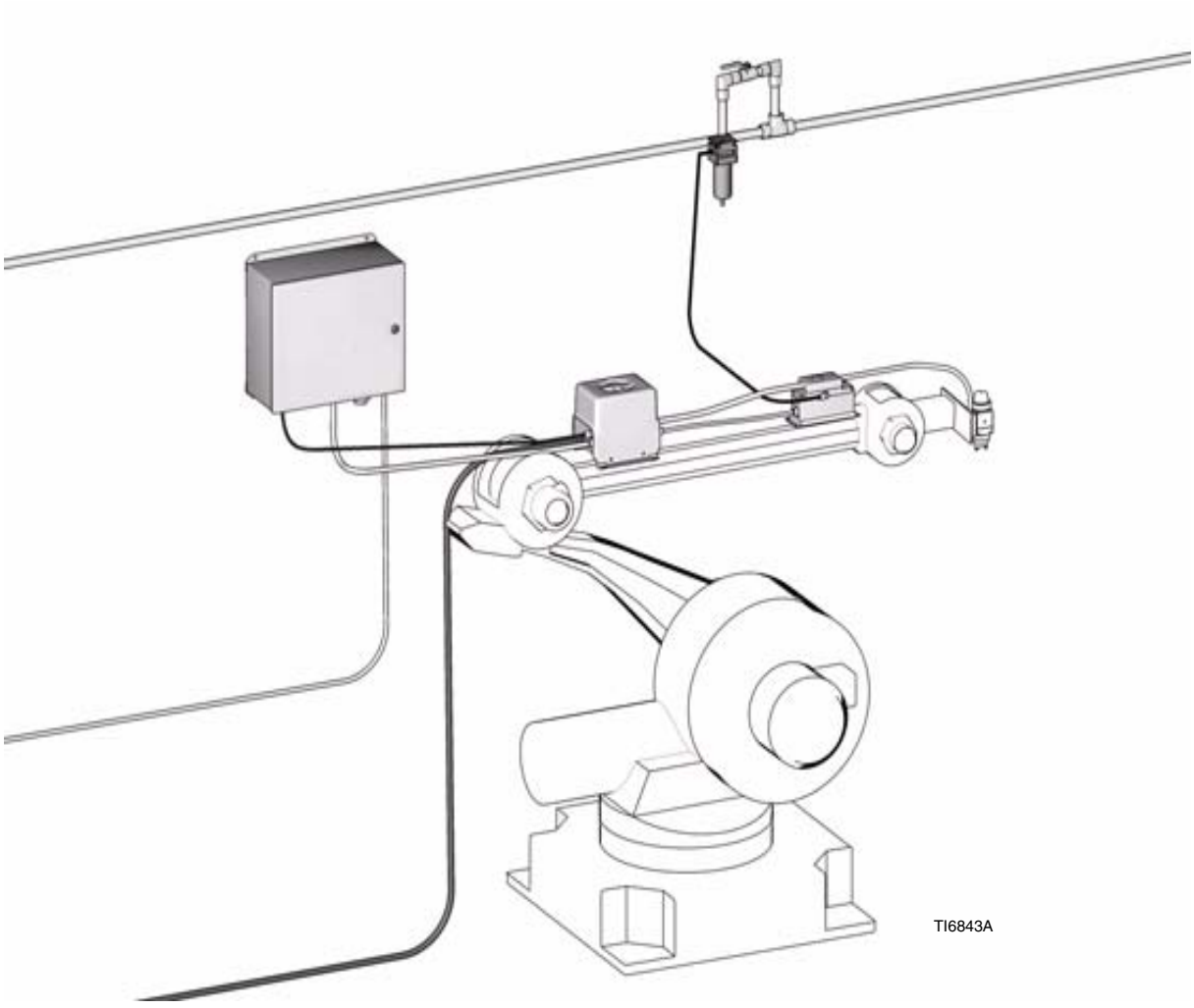
Setup, Operation, Service, and Repair

ProControl™

311190C

For flow control of mixed, catalyst, and resin coatings.

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.



TI6843A

PROVEN QUALITY. LEADING TECHNOLOGY.

Graco Inc. P.O. Box 1441 Minneapolis, MN 55440-1441

HO03

Contents

Related Manuals

Component Manuals in English

Manual	Description
311090	ProControl™ Setup, Operation, Service, and Repair
310655	Dispense Valve
308778	Volumetric Fluid Flow Meter
310696	Coriolis Flow Meter
311191	ProMix Auto™ & ProControl™ Network Communications

This manual (311190) is available in the following languages:

Manual	Language	Manual	Language
311190	English	311271	Chinese
311267	French	311272	Korean
311268	Spanish	311295	Italian
311269	German	311294	Dutch
311270	Japanese		

ProControl™ Models

Do not install equipment approved only for a non-hazardous location in a hazardous area. Substitution of components may impair intrinsic safety. See page 5.

Model number

ProControl Unit

FC Part Number:	Meter Option:
249871	G250HR
249958	G250
249959	No Meter
249968	Coriolis Meter

Hazardous Location Approval

Only models with a G250 meter, G250HR meter, or no meters are approved for installation in a Hazardous Location - Class I, Div I, Group D, T3.

FM APPROVED
Conforms to FM std 3600 & 3610 for use in Class I Div 1 Group D T3 Hazardous locations

Non-hazardous Location Approval

249968 - ProControl System with Coriolis Meter

FM APPROVED

Maximum Working Pressure

Maximum working pressure rating is dependent on the A meter. The pressure rating is based on the rating of the lowest rated fluid manifold component. Refer to the component pressure ratings below. *Example:* Model FC1140 has a maximum working pressure of 200 psi (1.4 MPa, 13.8 bar).

Check the ID plate on your EasyKey Display for its maximum working pressure. See FIG. 5, page 14.

ProControl Fluid Manifold Components Maximum Working Pressure

Coriolis Meter, No Meters or, G250 or G250HR [200 psi (1.4 MPa, 13.8 bar) All Options]

Flow Meter Fluid Flow Rate Range

G250 Meter 75-3000 cc/min. (0.02-0.79 gal./min.) 1500 cc/min Max all meter options
G250HR Meter 38-1500 cc/min. (0.01-0.40 gal./min.)
Coriolis Meter 20-3800 cc/min. (0.005-1.00 gal./min.)

Warnings

The following general warnings are for the setup, use, grounding, maintenance, and repair of this equipment. Additional, more specific warnings may be found throughout the body of this manual where applicable. *Symbols appearing in the body of the manual refer to these general warnings. When these symbols appear throughout the manual, refer back to these pages for a description of the specific hazard.*

⚠ 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 fire extinguisher in the work area.

INTRINSIC SAFETY

Only models with a G250 or G250HR meters are approved for installation in a Hazardous Location - Class I, Div I, Group D, T3. To help prevent fire and explosion:

- Do not install equipment approved only for non-hazardous location in a hazardous area. See the ID label for the intrinsic safety rating for your model.
- Do not substitute system components as this may impair intrinsic safety.

ELECTRIC SHOCK HAZARD

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.

PRESSURIZED EQUIPMENT HAZARD

Fluid from the gun/dispense valve, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow **Pressure Relief Procedure** in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.

⚠ WARNING

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.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine Graco (ASM) replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your Graco 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.

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

Glossary of Terms

Analog - relating to, or being a device in which data are represented by continuously variable, measurable, physical quantities, such as length, width, voltage, or pressure.

Closed Loop Flow Control - refers to the process when the flow rate is adjusted automatically to maintain a constant flow.

Coriolis Meter - a non-intrusive flow meter often used in low flow and light viscosity materials. This meter uses vibration to measure flow. It is used for non-intrinsically safe applications.

Digital Input and Output - a description of data which is transmitted as a sequence of discrete symbols, most commonly this means binary data represented using electronic or electromagnetic signals.

Discrete I/O - refers to data that constitutes a separate entity and has direct communication to another control.

Ethernet - a method for directly connecting a computer to a network or equipment in the same physical location.

Fiber Optic Communication - the use of light to transfer communication signals.

Flow Rate Analog Signal - the type of communication signal that can be used on the ProControl module.

Flow Rate Tolerance - the settable percent of acceptable variance that the system will allow before a flow rate warning occurs.

Flow Set Point - a predefined flow rate target.

Grand Total - a non-resettable value that shows the total amount of material dispensed through the system.

Intrinsically Safe (IS) - refers to the ability to locate certain components in a hazardous location.

Job Total - a resettable value that shows the amount of material dispensed through the system for one job. A job is complete when a color change, purge or complete system flush occurs.

K Factor - a value that refers to the amount of material that passes through a meter. The assigned value refers to an amount of material per pulse.

Ki - refers to the degree fluid flow over shoots its set point.

Kp - refers to the speed in which the fluid flow reaches its set point.

Manual Mode - when the proportioning or flow control system is controlling the inputs without any input from an outside control.

Modbus/TCP - a type of communication protocol used to communicate Digital I/O signals over an ethernet.

Network Station - a means to identify a particular individual proportioning or flow control system.

Flow Control Resolution - a settable value that allows the flow control system to maximize its performance. The value is based on maximum desired flow rates.

V/P - refers to the voltage to pressure device in the flow control module.

Overview

Usage

The Graco ProControl is an electronic paint flow control. It is not for use with “quick-setting” paints (those with a potlife of less than 15 minutes).

Models are available to operate air spray, Flow Control outbound fluid pressure range from 7 psi (0.48 bar) to 50 psi (3.45 bar), with a capacity of up to 1500 cc/min.

Component Identification and Definition

See FIG. 1 for the ProControl™ system components.

Component	Description
EasyKey™ Display	Used to setup, display, operate, and monitor the ProControl system. The EasyKey Display accepts 85-250 VAC, 50/60 Hz line power and converts that power to acceptable low voltage and optical signals used by other system components.
Smart Meter Assembly	Includes the control board for flow control functions and the meter for monitoring flow rate. The circuit board is powered by I/S circuit and communicates via fiber optic with the Easy Key Display module, and provides analog output for pressure sensor input flow control regulator assembly. Three optional flow meters are available from Graco: • **G250** is a general purpose gear meter typically used in flow ranges of 75-3000 cc/min. (0.02–0.79 gal/min.), and viscosities of 20–3000 centipoise. The K-factor is approximately 0.119 cc/pulse. • **G250HR** is a high resolution version of the G250 meter. It is typically used in flow ranges of 38–1500 cc/min. (0.01–0.4 gal/min.), and viscosities of 20–3000 centipoise. The K-factor is approximately 0.061 cc/pulse. • **Coriolis** is a specialty meter capable of a wide range of flow rates and viscosities.
Flow Control Regulator Assembly	Includes an air operated fluid pressure regulator, fluid pressure sensor, voltage to air pressure transducer and circuit board. The function of this unit is to receive the flow analog signal and drive (manage) the desired flow rate.
Dual Fiber Optic Cable	Used to communicate between the EasyKey Display and Smart Meter Panel.
Fluid Panel Power Supply Cable	Used to provide intrinsic safe power circuit to the Smart Meter Panel.

See **Operation and System Setup** page 21, for detailed information on the EasyKey Display and Flow Control Grounding.

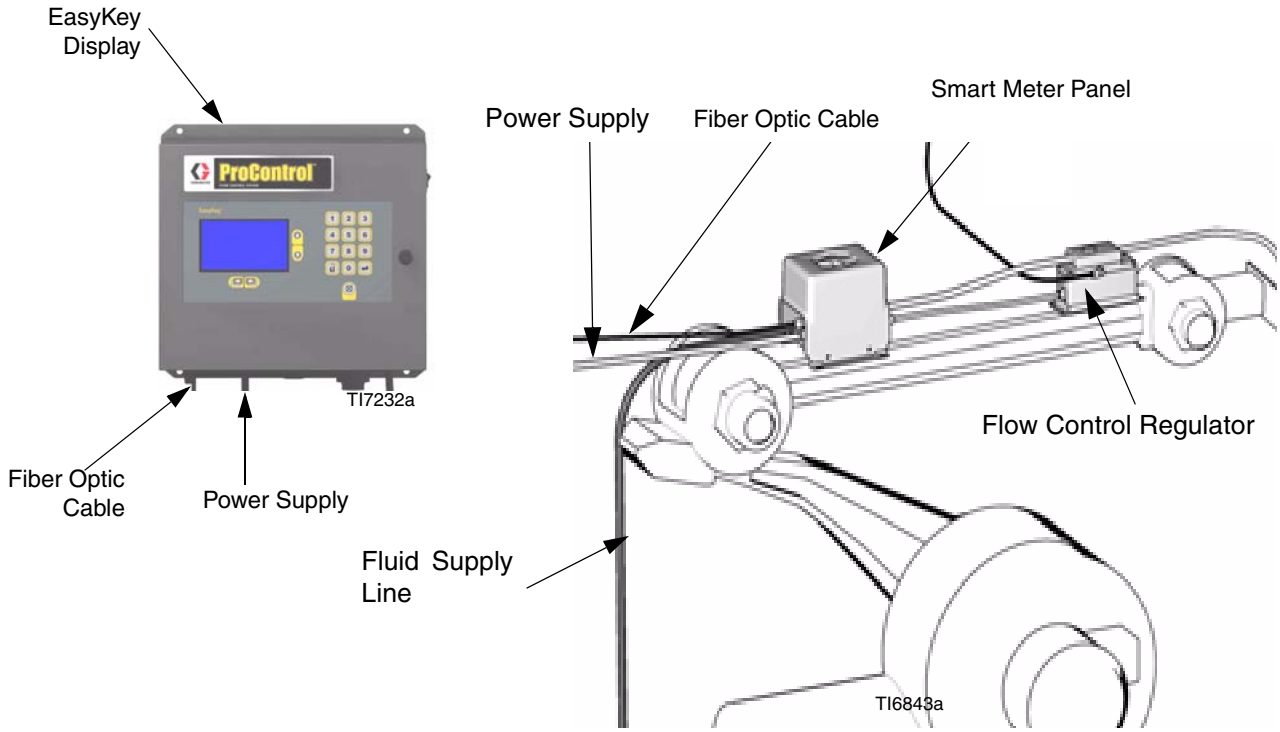


FIG. 1

Input Signals

Gun Trigger Signal

The gun triggered input signals the ProControl controller when the gun is being triggered.

If the ProControl controller detects through the gun trigger input signal that the gun is not triggered the flow control stops functioning and holds the last pressure setting.

Idle Time Warning

This warning occurs if the ProControl is set to Spray, and 2 minutes have elapsed since the system received a flow meter pulse.

Flow Rate Analog Signal

The flow rate analog signal from the user's process controller is a 0 - 10VDC flow rate signal.

The user's process controller must send an input signal to establish a desired flow rate output for ProControl to operate in the auto mode.

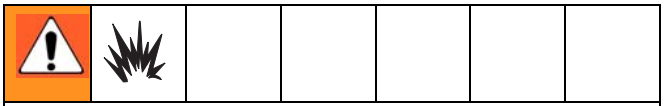
0V = 0 cc/min and based on flow rate range selection:

Flow rate range - cc/min.		**10V signal**
0 - 300	=	300 cc/min/
0 - 600	=	600 cc/min.
0 - 1200	=	1200 cc/min.

Pressure Relief Procedure

Follow **Pressure Relief Procedure** on when you stop spraying, before changing spray tips, and before cleaning, checking, or servicing equipment. Read warnings, page 5.

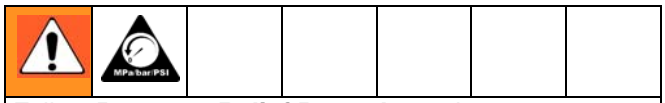
1. Release the gun trigger.
2. Shut off air at the spray gun.



If using an electrostatic gun, shut off electrostatics before flushing.

3. Relieve fluid pressure at supply feed pumps as instructed in their separate manuals. Close all fluid supply shutoff valves.
4. Trigger spray gun until fluid pressure is fully relieved.
5. *If you suspect that the spray nozzle or hose is clogged or that pressure has not been fully relieved after following the steps above,* very slowly loosen the hose end coupling to relieve pressure gradually, then loosen completely. Clear hose nozzle obstruction.

Shutdown



Follow **Pressure Relief Procedure** when you stop spraying, before changing spray tips, and before cleaning, checking, or servicing equipment. Read warnings, page 5.

Service Shutdown:

1. Follow **Pressure Relief Procedure** on page 10.
2. To stop production at any time remove the gun trigger input signal on the EasyKey Display.
3. Shut off fluid supply system to remove fluid supply pressure.
4. Trigger spray gun to relieve pressure.
5. Shut off power switch on EasyKey.

Overnight Shutdown:

If there is remaining fluid, release gun trigger. System is ready for next production cycle.

If there is no remaining fluid, follow Service (regular) Shutdown procedure.

Installation

- Reference numbers and letters in parentheses in the text refer to numbers and letters in the illustrations.
- Icons in the text refer to icons on the equipment or keypad.
- FIG. 2 shows a typical installation. Contact your Graco distributor for actual system designs.
- Ensure all accessories are adequately sized and pressure-rated to meet system requirements.
- For maintenance and safety, you must have a shutoff valve between the fluid supply line and the Pro-Control system.
- A 100 mesh minimum fluid filter must be installed on component fluid supply lines.
- See page 15 for dimensions.
- To protect the EasyKey display screens from paints and solvents, clear-plastic protective shields are available in packs of 10. Clean the screens with a dry cloth if necessary.

Typical Installation

Key - See FIG. 2

A EasyKey Display
B I/S Power Cable
C Fiber Optic Cable
D Smart Meter Panel
E Automatic Spray Gun
F Gun Fluid Line
G Flow Control Regulator Assembly
H EasyKey Panel Power Supply
I Air Supply Control
J Air Shutoff Valve
K Flow Control Power and Communication

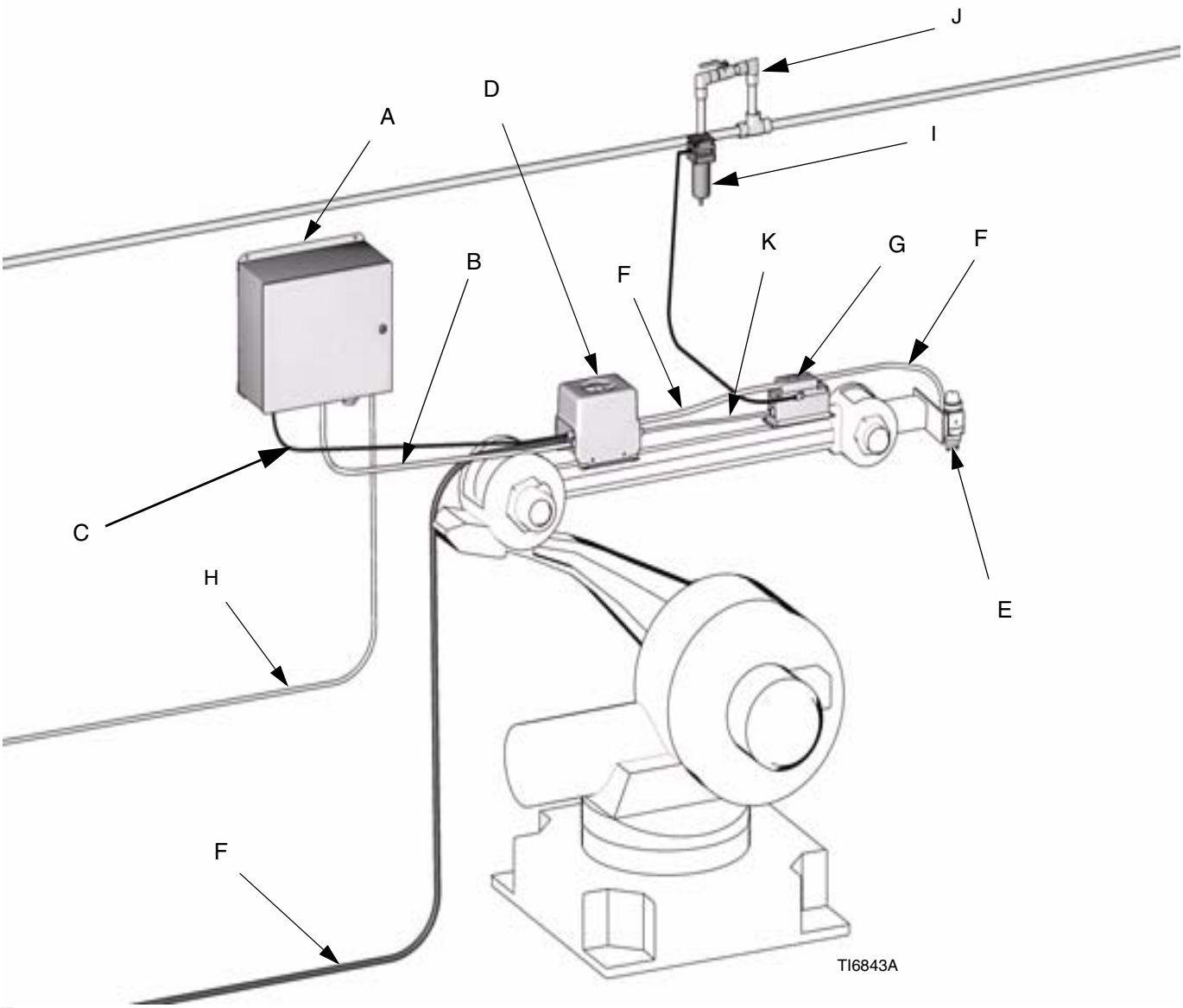


FIG. 2

Installation Requirements

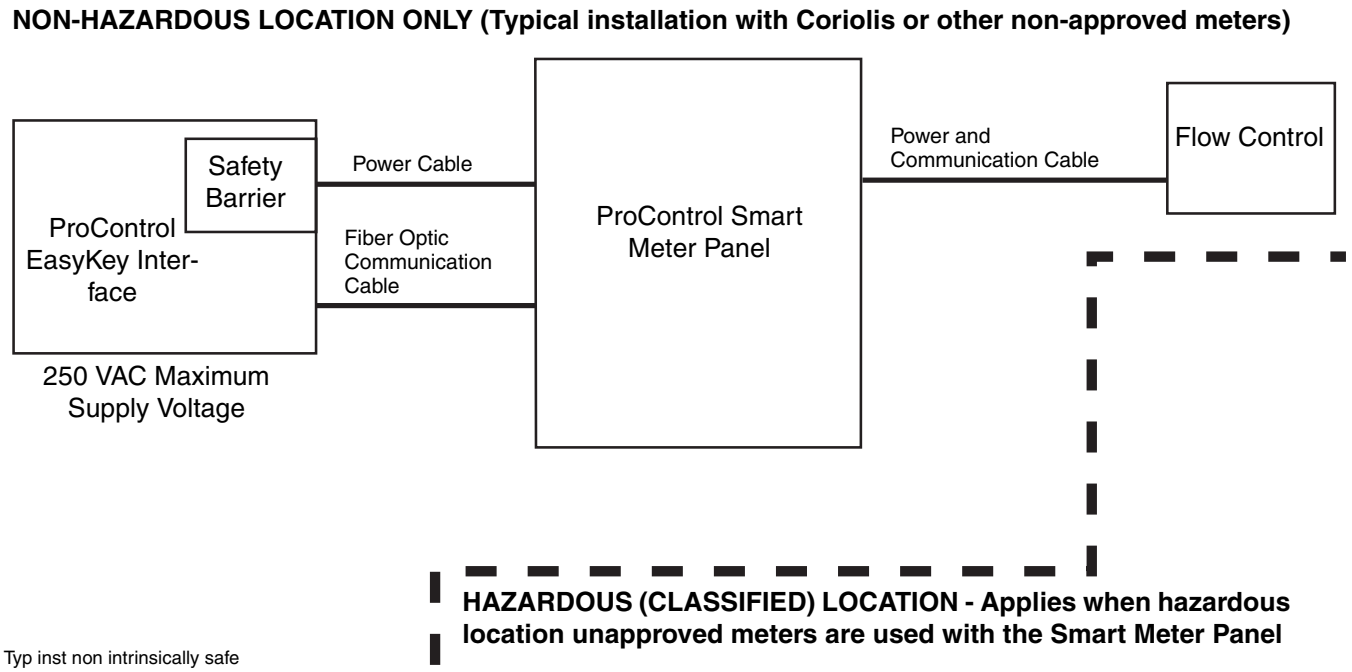
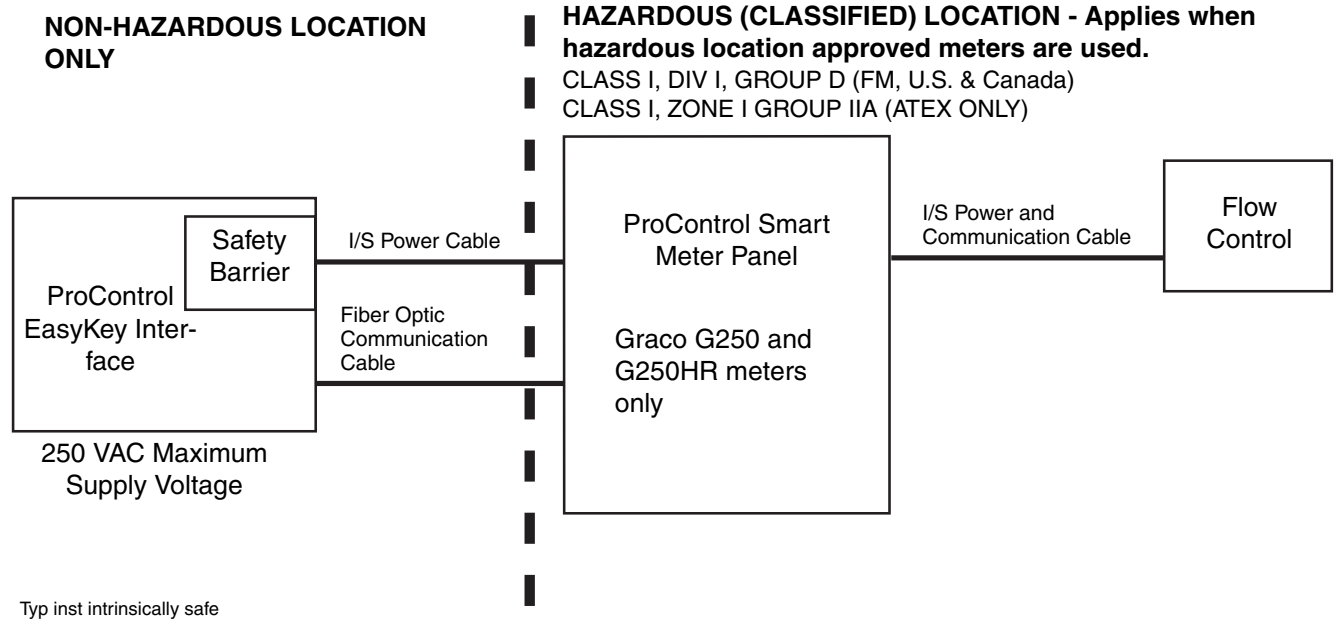


FIG. 3: Non-intrinsically Safe Installation



1. Nonintrinsically safe terminals (power rail) must not be connected to any device which uses or generates more than 250 VRMS or DC unless it has been determined that the voltage has been adequately isolated.
2. The installation must meet the requirements of the National Electric Code, Canadian Electrical Code Part I, NFPA 70, Article 504 Resp., Article 505 and ANSI/ISA 12.06.01.
3. Multiple earthing of components is allowed only if high integrity equipotential system is realized between the points of bonding
4. Do not operate system with safety barrier cover removed.

WARNING: Substitution of components may impair intrinsic safety. For installation, maintenance or operation instructions, read instruction manuals.

FIG. 4 Intrinsically Safe Installation

Location Requirements

Do not install equipment approved only for non-hazardous location in a hazardous area. See the identification (ID) label (FIG. 5) on the EasyKey Display and Smart Meter Panel for the intrinsic safety rating for your model. Cover must be removed from Smart Meter Panel to see label. Refer to **ProControl Models**, page 4. Read warnings, page 5.

- Refer to FIG. 3 or FIG. 4, page 13, for non-hazardous or hazardous location equipment requirements.
- Mount EasyKey Display and Smart Meter Panel within 50 ft. (15.2 m) of each other. There is an optional 100 ft. cable available. See Accessories.

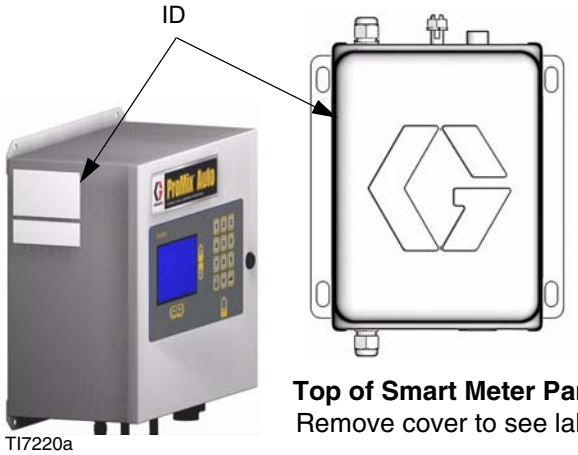


FIG. 5: EasyKey Display and Smart Meter Panel

EasyKey Display: Install in the non-hazardous area at a convenient location for the operator to view and operate.

Smart Meter Panel

Install according to requirements for Non-intrinsically Safe Installation (FIG. 3) or Intrinsically Safe Installation (FIG. 4) and at a convenient location to connect to paint and solvent supplies.

For an Intrinsically Safe Installation, the Smart Meter Panel may be located inside or outside the hazardous location. Install according to appropriate electrical codes.

IMPORTANT: Do not substitute or modify system components as this may impair intrinsic safety.

Flow Meters: If you have Coriolis Flow Meters, refer to the Coriolis manual for installation instructions. The correct orientation of the flow meter is critical to its operation.

Mounting

1. Follow **Location Requirements**, page 14.
2. Ensure that the wall and mounting hardware are strong enough to support the weight of the equipment (see **EasyKey™ Display**, page 40), fluid, hoses, and stress caused during operation.
3. Using the equipment as a template, mark the mounting holes on the wall at a convenient height for the operator and so equipment is easily accessible for maintenance. See FIG. 6.
4. Drill mounting holes in the wall. Install anchors as needed.
5. Bolt equipment securely.

Dimensions

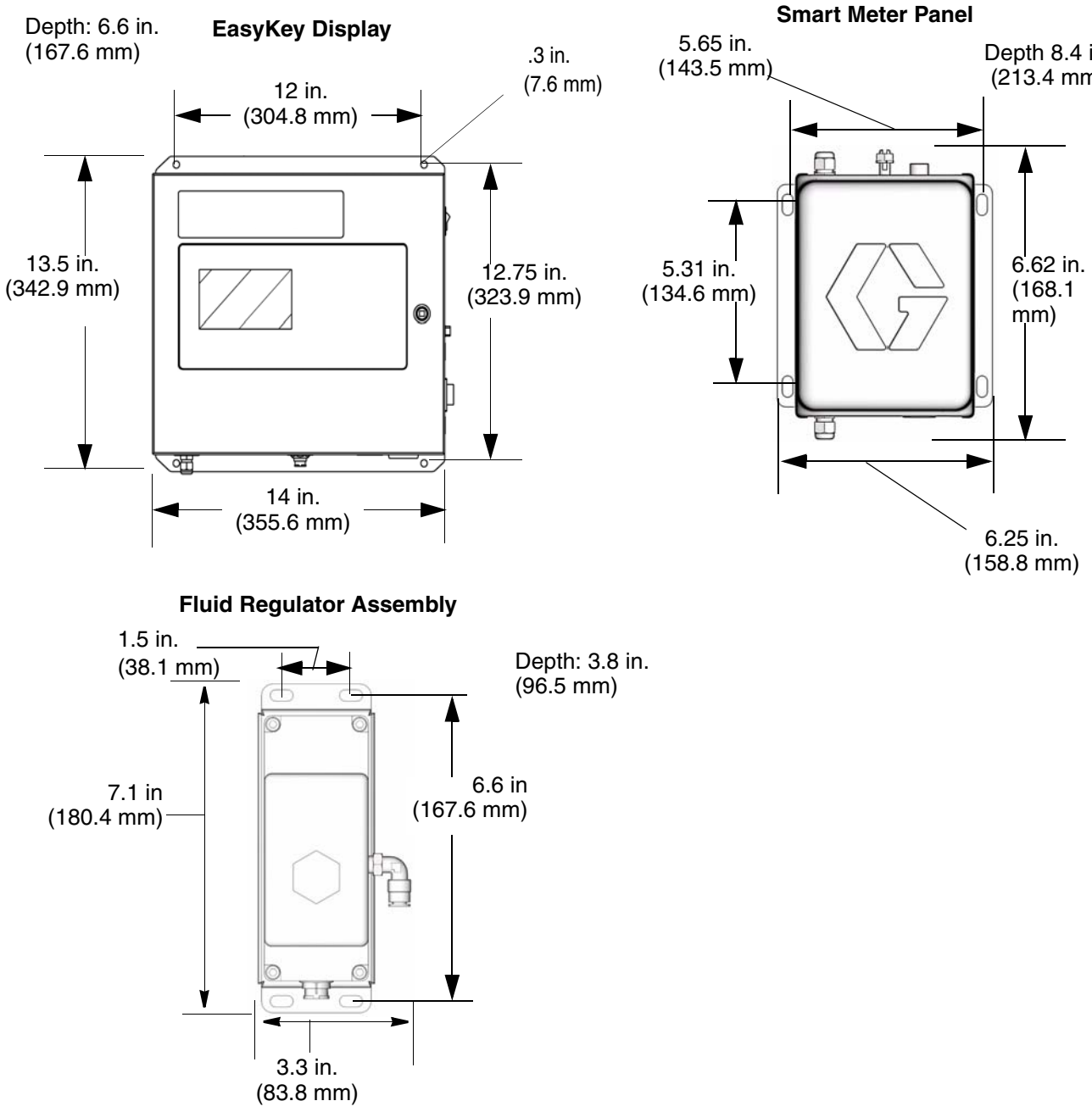


FIG. 6

Fluid Supply Connections

Do not exceed the pressure rating of the lowest rated component. Refer to the product ID Label. Read **Pro-Control Models** information, page 4.

To reduce the risk of injury, including fluid injection, you must install a shutoff valve between each fluid supply line and the fluid manifold assembly. Use the valves to shut off fluid during maintenance and service.

1. Connect the component supply line to flow control meter.
2. Connect the supply line between the flow control meter outlet and the flow control inlet.
3. Connect the flow control outlet to gun inlet.

Cable Connections

- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
- Enclose all cables routed in the spray booth and high traffic areas in conduit to prevent damage from paint, solvent, and traffic.
- All options ordered on the ProControl system are electrically tested at the factory.

I/O Connections List

Digital Input (24V DC)	Description	Wire Color
Gun Trigger	Signal from the automation to alert the proportioner that the gun has been triggered.	Blue / Black
Job Complete	Signal from the automation that a job has completed. The job will be logged to the job log and the job totals will be cleared.	Black / White
	Digital Input Supply	Red / White, Green / White, Blue / White
Note: I/O is opto-isolated. Must supply power.		

Analog I/O (0-10V)	Description	
Set point Input	The analog signal from the automation that is proportional to the flow control set point	Natural / Black
Common	Analog input common	Black

Digital Output (24V DC)	Description	
General Alarm	Signal from the proportioner that there is an active alarm	Green / White
	Digital Output Supply	

Use colors indicated to verify correct wiring.

Power Requirements

The ProControl operates with 85-250 VAC, 50/60 Hz input power, with a maximum of 2 amp current draw. The power supply circuit must be protected with a 15 amp maximum circuit breaker.

Not included with system:

- Power supply cord compatible to your local power configuration. Wire gauge size must be 8-14 AWG.
- Bulkhead strain relief sized for 22.4 mm (0.88 in.) hole that will hold the power supply cord in the EasyKey Display port (V). See FIG. 7.

1. Provide power to the EasyKey Display. Use conduit to protect wiring.
2. Install the strain relief and power cord or conduit bulkhead through the EasyKey Display port (V). See FIG. 10.

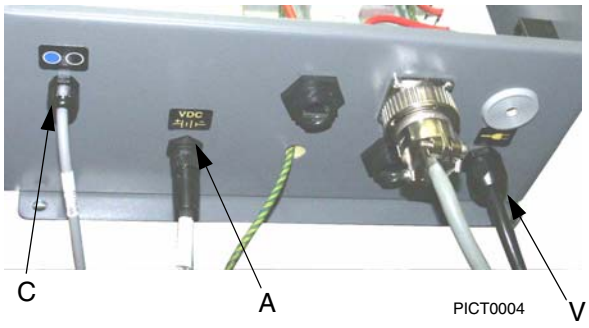


FIG. 7

3. See FIG. 11 for the L1, L2, and ground wiring connections inside the EasyKey Display.
4. Ground the Display to a true earth ground. See **Grounding,** page 19.

Connect EasyKey Display to Smart Meter Panel

There are two 50 ft. (15.2 m) cables to route between the EasyKey Display and Smart Meter Panel: the Fluid Panel Power Cable (A) and the Fiber Optic Cable (C).

1. Connect the appropriate Fluid Panel Power Cable (A) end to the EasyKey Display connector VDC. FIG. 7.
2. Connect the other cable end to the Smart Fluid Meter connector VDC (B). See FIG. 2.
3. The Fiber Optic Cable (C) is shipped from the factory attached to the EasyKey Display connector. See FIG. 7.

If you need to detach the Fiber Optic Cable (C) from the EasyKey Display, note how the cable is routed inside the enclosure. Ensure that the door can swing open and close without catching, pulling, or pinching wires or cables.

4. Route the opposite Fiber Optic Cable end through the Smart Meter Panel strain relief connector. See FIG. 8. Do not route the cable with tight bends or kinks.

The fiber optic cable has a minimum bend radius of 1.6 in. (40 mm).

5. Connect the blue and black cable connectors (E) to the matching connectors on the electrical circuit board. FIG. 8. Insert the cable connectors until they bottom out (approximately ¼” [6 mm]), then tighten the threaded connector.

CAUTION
Do not over-tighten or cause excessive stress on the circuit board connector.

6. Tighten the strain relief connector.

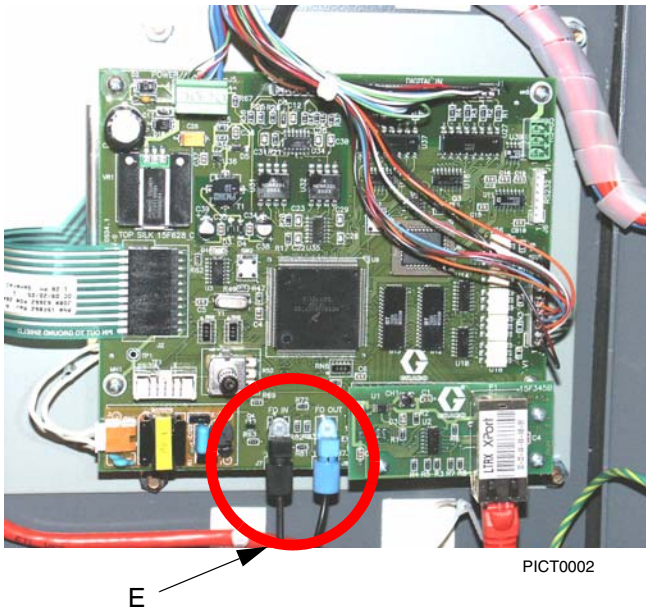


FIG. 8

Adding Flow Meters

If using flow meters other than those supplied with the system:

- You must provide a separate power source to the flow meter (unless it is a Graco G250, G250HR, or Coriolis meter).
- Route the signal cables through the Smart Meter Panel grommet and into the enclosure through the strain reliefs. Leave enough slack in the cable so the enclosure can be raised for service.
- See FIG. 9 for electrical connections.

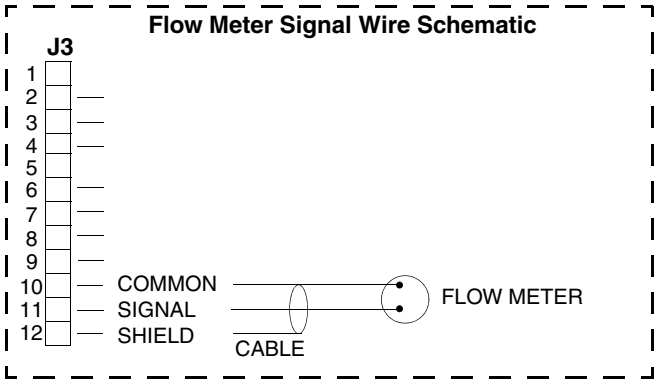


FIG. 9

Grounding

Your system must be grounded. Read warnings, page 5.

For Intrinsic Safety:

Ground wires for the EasyKey Display, Smart Meter Panel must all be connected to the same true earth ground. See FIG. 12, page 20.

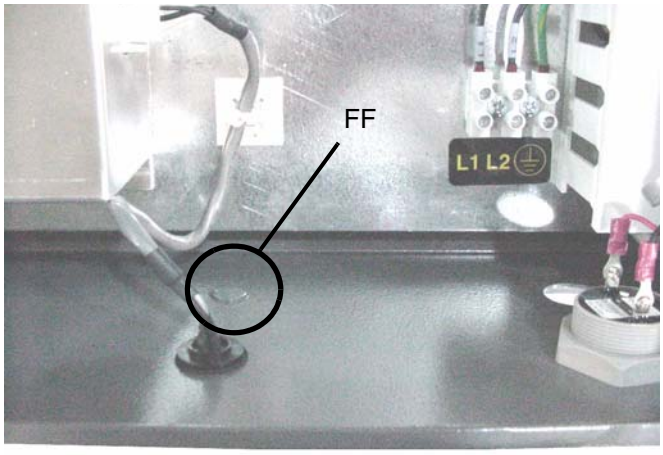
Different ground points may cause current to flow through component cables, causing incorrect signals.

Ground the ProControl system as instructed here and in the individual component manuals. A ground wire and clamp, part no. 222011, is available from Graco.

EasyKey Display

For Intrinsic Safety

Remove knock-out (FF) from bottom of EasyKey Display enclosure. See FIG. 10. Install a bulkhead strain relief. Connect a ground wire to the ground block terminal (W), see FIG. 11. Route the wire through the strain relief and connect it to a true earth ground.



Display-knockout

FIG. 10

Display-powersupply copy

FIG. 11

Smart Meter Panel - connect a ground wire from the Smart Meter Panel ground lug to a true earth ground. See FIG. 12.

Flow Meters - connect the meter cables as instructed on page 18. Failure to properly connect the shield may cause incorrect signals.

Feed Pumps or Pressure Pots - connect a ground wire and clamp from a true earth ground to the pumps or pots. See pump or pressure pot manual.

Air and Fluid Hoses - use grounded hoses only.

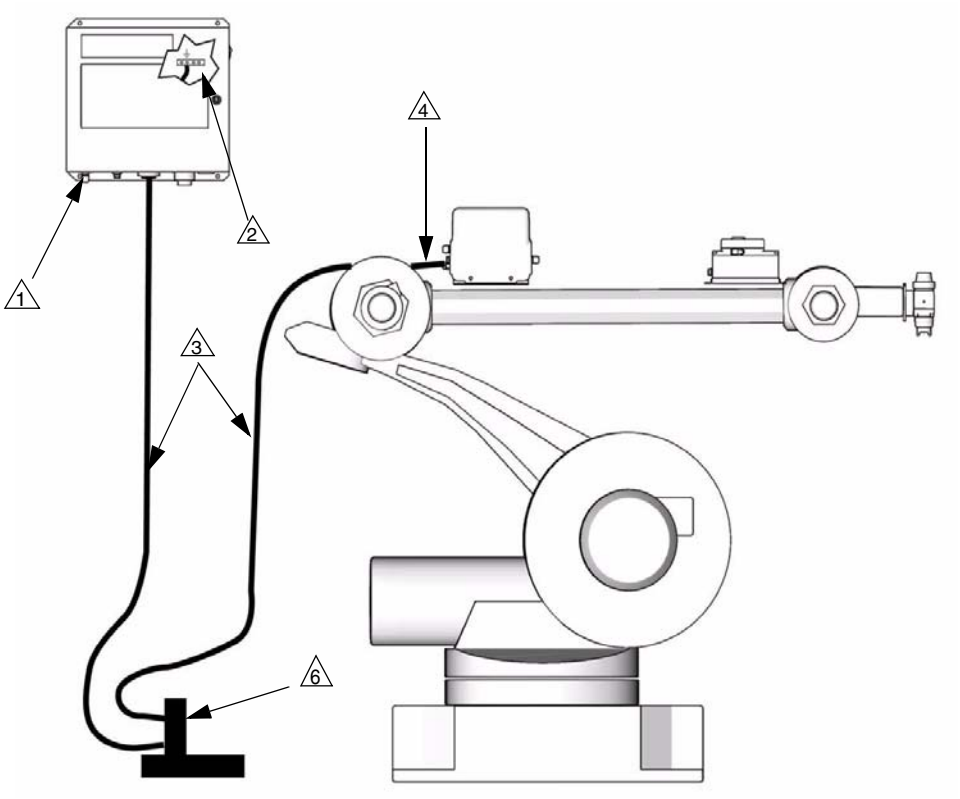
Spray Gun - follow the grounding instructions in your gun manual.

Fluid Supply Container - follow local code.

Object Being Sprayed - follow local code.

All Solvent Pails Used When Purging - follow local code. Use only conductive metal pails placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

Grounding



Key:

Ground wires for the EasyKey Display and Smart Meter Panel must all be connected to the same true earth ground 6.

1 EasyKey Display

2 EasyKey Display ground terminal

3 Ground wire

4 Fluid Panel ground wire connection point

6 True Earth Ground - check your local code for requirements

FIG. 12: Grounding

Check Resistance

To ensure proper grounding, resistance between ProControl components and true earth ground **must** be less than 1 ohm. Read warnings, page 5.

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

Operation and System Setup

The ProControl installation must be designed with specific fluid dynamics.

The flow rate typical adjustable range is a 5 to 1 turn down ratio. For example:

- 20 - 100 cc/min
- 50 - 250 cc/min
- 100 - 500 cc/min
- 200 - 1000 cc/min
- 250 - 1200 cc/min

The minimum fluid pressure of the lowest flow rate is 7 psi at the outlet of the flow control regulator. The fluid regulator V to P resolution becomes to coarse below 7 psi at the outlet of the flow control regulator.

- To set back pressure, size each of the down line components as required.

  ➜ Spray gun needle/nozzle size and travel.
  ➜ Fluid line regulator to gun 1/4” (6.35 mm) and below.

At very low flow rates such as 20 - 50 cc/min 1/8” tubing or smaller and 0.33 or smaller gun setup will be required depending on viscosity.

- To determine the correct setup use an air pressure gauge and fluid pressure gauge to confirm proper back pressure.

Test the system at the lowest flow rate set point to ensure minimum pressures are met. Unnecessary warnings and alarms may occur if pressure are lower than the 7 psi (0.48 bar) allowed. The flow rate warning may occur if flow goes lower than 15 cc/min.

The flow rate warning on the status bar indicates the flow rate through the meter has fallen below or gone above the flow tolerance.

The most important component of the system is the meter. The meter must be capable of measuring the target flow rate with a consistent pulse stream. Inconsistent meter pulses will result in inconsistent flow control.

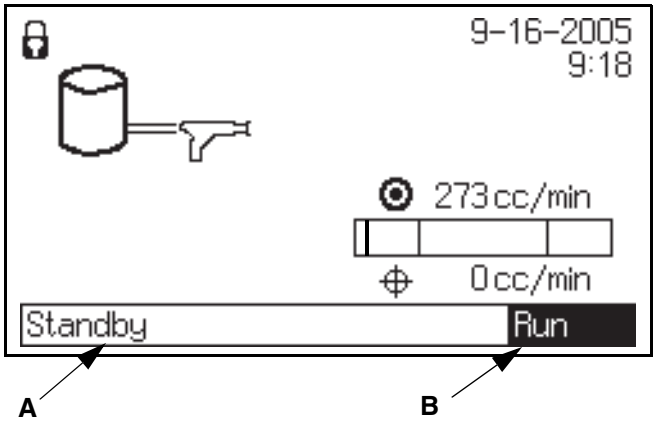


FIG. 13 Automatic Run Display Screen

Status Bar (A) - displays Active, Standby or Alarm/Warning.

Operating Status (B) - displays mode (manual, auto).

EasyKey Display

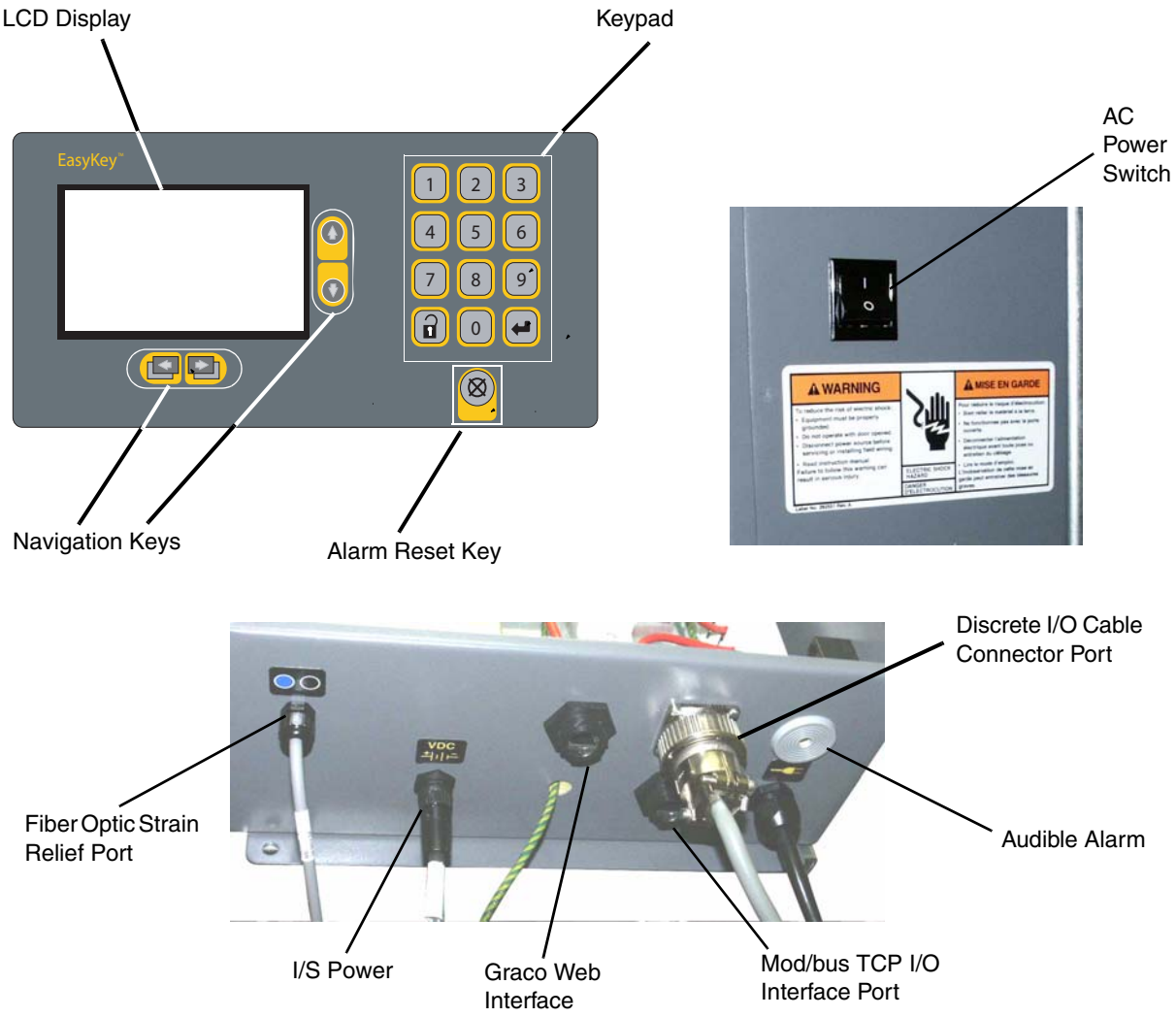


FIG. 14

AC Power Switch - Turns system AC power on or off.

Keypad - Used to input numerical data, enter setup screens, scroll through screens manual operation, and select setup values. See page 23 for additional keypad/screen navigation information.

I/S Power - Power circuit to Smart Meter Panel.

Backlit LCD Display - Shows graphical and text information related to setup and flow operation. The back light on the screen will turn off after 10 minutes. Pressing any key brings the display out of screen saver mode.

Audible Alarm - Provided to alert the user when an alarm condition occurs. It will sound continuously for all alarms. The alarm is cleared by pressing the EasyKey Display Error Clear ⊗ key. There are some non-clearable alarms. See **Alarm Troubleshooting** on page 35 for more information.

Key Commands

In addition to the numbered keys on the EasyKey keypad, which are used to enter values in setup, there are the following keys to navigate within a screen and between screens, and to save entered values.

Key	Function
	*Setup:* press to enter or exit Setup mode.
	*Enter:* if cursor is in drop-down list box, press Enter key to view drop-down list. Press Enter to save a value either keyed in from the numerical keypad or selected from a drop-down list.
	*Up Arrow:* move to previous field or drop-down list item.
	*Down Arrow:* move to next field, or drop-down list item.
	*Left Arrow:* move to previous screen.
	*Right Arrow:* move to next screen.
	*Alarm Reset*

Graco PC Cable Port

The Graco PC Cable Port is for use with the ProControl Web Interface which enables you to communicate with the ProControl from a PC to:

- ➜ Upgrade software
- ➜ View software version
- ➜ Download
  - job and alarm logs
  - material usage report
  - setup values (can also upload)
- ➜ Clear job, alarm, and material usage reports
- ➜ Upload a custom language to view on screen
- ➜ Restore factory defaults
- ➜ Restore setup password

See WEB Interface Software manual 311191 for more information.

Ethernet Connection

You can access data from the ProControl on an office or industrial network or through the internet with the proper network configuration.

EasyKey Display Screens

Power Up Screens

When the EasyKey power switch is turned on, the Graco logo screen and current software version screen display for several seconds before the run screen appears in the standby mode.

The Run screen displays either the manual run screen or the automatic run screen according to the setup being used at the time the power was shut down. See **Automatic Run Screen** FIG. 15 and **Manual Run Screen** FIG. 16.

Automatic Run Mode

Is used when a varying gun flow is needed such as a robot application where an analog 0 - 10 VDC signal is provided to vary the flow being applied. Automatic Run Mode is selected in the Setup process. See **Manual Mode (Automatic or Manual)** on page 27.

Automatic Run Screen

This screen displays the operating status of the system and is the default screen after powering up. See FIG. 15.

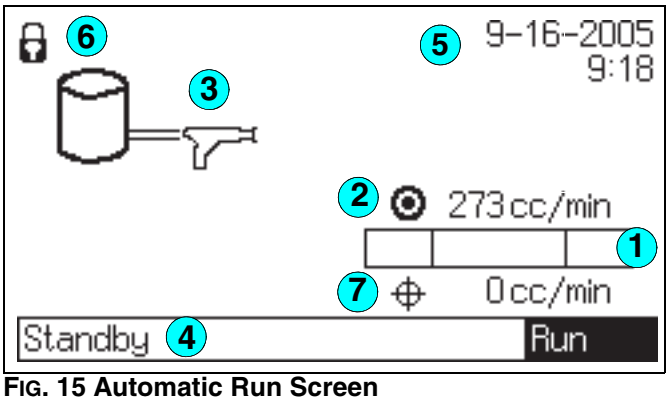


FIG. 15 Automatic Run Screen

Key

1. **Flow Control Tolerance** - when flow control is operating. See **Flow Control Tolerance**, page 25.
2. **Target Flow:** in cc/min. or oz/min. Designates target material flow designated by robot controller.
3. **Animation:** When there is flow, the gun appears to spray.
4. **Status Bar:** shows current alarm or operation mode (Run, Standby).
5. **Current Date and Time**
6. **Security Level:** a padlock appears on the screen if a password is required to enter Setup mode. If the password was set to “0”, no padlock appears and setup can be entered without a password.
7. **Actual Flow:** in cc/min. or oz/min. Designates current material flow designated by robot controller.

The only key that functions with the Automatic Run Screen is the Setup key (used to enter Setup mode) and the Alarm Reset Key .

Manual Run Mode

Is used when a constant gun flow is needed such as a reciprocating (back and forth) application and when no analog signal is available for a flow control command. The Manual Run Mode is also used for testing purposes and setup.

Manual Run Mode is selected in the Setup process. See **Manual Mode (Automatic or Manual)** on page 27.

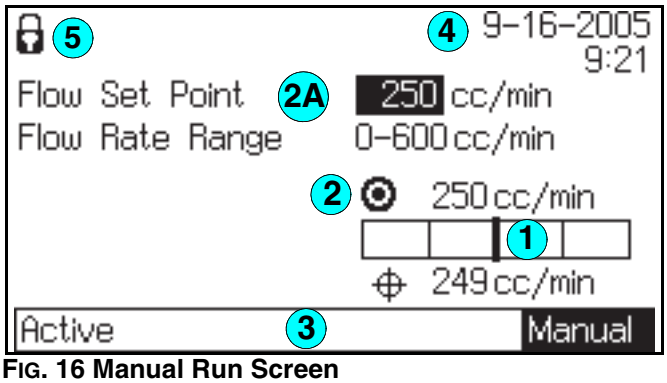


FIG. 16 Manual Run Screen

Key

1. **Target Tolerance** - when flow control is operating. See **Flow Control Tolerance**, page 25.

2. **Target Flow** - in cc/min. or oz./min. Designates current material flow designated.

2A. **Flow Set Point Manual Selection Field** - enter desired set point and press  to select and become the target flow rate.

3. **Status Bar:** shows operation mode or current alarm (Run, Standby).

4. **Current Date and Time**

5. **Security Level:** a padlock appears on the screen if a password is required to enter Setup mode. If the password was set to “0”, no padlock appears and setup can be entered without a password.

Flow Control Tolerance

Appears in both the Automatic Run Mode Screen and the Manual Run Mode Screen. See FIG. 15 and FIG. 16.

This indicator band visually shows how well a +/- flow rate tolerance is being held during product application, see FIG. 17. Set the flow rate tolerance of the color from 1–50% in increments of 1%. To minimize nuisance alarms, select the largest tolerance value that meets the paint manufacturer’s recommendations and your production requirements. Graco recommends a tolerance setting of +/- 5% or higher.

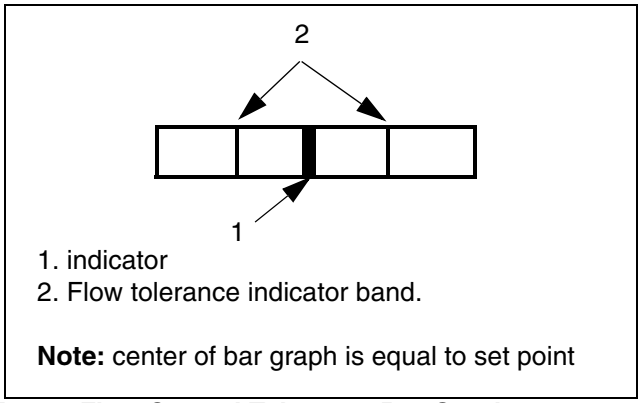


FIG. 17 Flow Control Tolerance Bar Graph

Setup Mode

This mode is used to initially setup the ProControl or to periodically recalibrate or select new settings.

Enter Setup

1. Press the Setup key to enter or exit Setup.

Password Screen

If a password was activated you must enter the password before entering the Setup mode. See FIG. 18. Entering the wrong password returns you to the Run Screen.

If you forget the password, you can reset the password to 0, using the Web Interface.

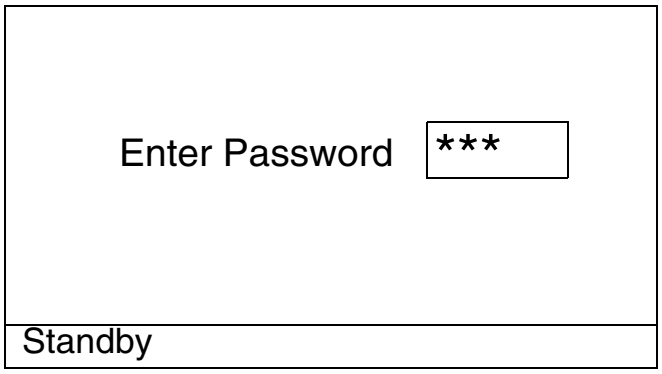


FIG. 18: Password Screen

If a password is activated, “Setup Locked” displays momentarily after exiting Setup mode and returning to the Run Screen. See FIG. 19.

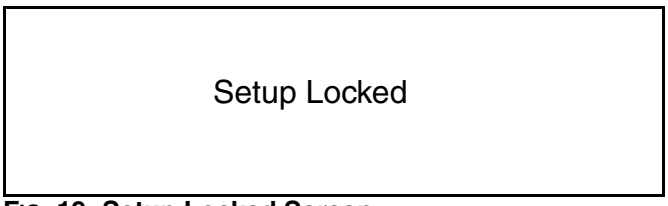


FIG. 19: Setup Locked Screen

Setup Screen Menu

1. While in the Power up Standby mode press on the Easy Screen keyboard.
2. Use the right navigation scroll key to select the Advanced screen 1.

Advanced Screens

Advanced setup has 5 screens. The screen number appears on the right side of the screen. See FIG. 20.

Press to show drop-down lists and to enter your selection.

Advanced Screen 1

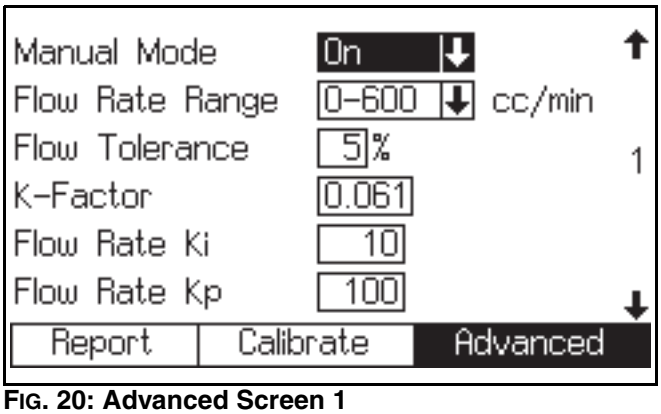


FIG. 20: Advanced Screen 1

Manual Mode (Automatic or Manual)

1. Use the up or down navigation keys to highlight the box next to the Manual Mode.
2. Press  to select the Manual Mode.
3. Use the up or down navigation keys to highlight on or off and press  .

Turning the manual mode off selects the automatic run mode.

4. Press the up or down arrow to select the next item or press  to exit to run.

Flow Rate Range

1. Use the up or down navigation keys to highlight the box next to the Flow Rate Range.
2. Press  to select the flow rate range.
3. Use the up or down navigation keys to highlight one of the three following flow rate range selections:

Select from these 3 settings:

- **0 - 300 cc/min.**
- **0 - 600 cc/min.**
- **0 - 1200 cc/min.**

4. Press the  .
5. Press up or down arrow to select the next item or press  to exit to run.

Flow Tolerance

1. Use the up or down navigation keys to highlight the Flow Tolerance box.
2. Use the EasyKey numeric pad to enter the percentage of flow tolerance desired. To avoid unnecessary alarms Graco recommends a setting of 5% or higher.
   - 1 - 50 may be selected
3. Press the up or down arrow to select the next item or press  to exit to run.

K-Factor

1. Use the up or down navigation keys to highlight the K-factor box.
2. Use the EasyKey to enter a value from 0.001-0.999. The default is 0.061. Refer to your flow meter manual for the recommended K-Factor.
   - 0.061 is the K-Factor for the G-250 HR meter
   - 0.119 is K-Factor for the G250 meter

The maximum meter pulse frequency input to the ProControl is 425 Hz (pulse/second). Use a flow meter with a K-factor that does not exceed 425 Hz output while operating at your maximum flow rate.

425 Hz = 1555 cc/min @ 0.061 K-Factor

Minimum K-factor =
Maximum Flow Rate (cc/min.) / 25,000

3. Press up or down arrow to select the next item or press the lock key  to exit to run.

Flow Rate Ki

1. Use the up or down navigation keys to highlight the Flow Rate Ki box.
2. For most systems enter a Ki factor of 10 for an average setting.
3. Press the up or down arrow to select the next item or press  to exit to run.

Flow Rate Kp

1. Use the up or down navigation keys to highlight the Flow Rate Kp box.
2. For most systems select a Kp factor of 100 for an average setting.
3. Press up or down arrow to select the next item or press to exit to run.

Advanced Screen 2

Use the EasyKey down arrow to navigate from the Advanced screen 1 to Advanced screen 2.

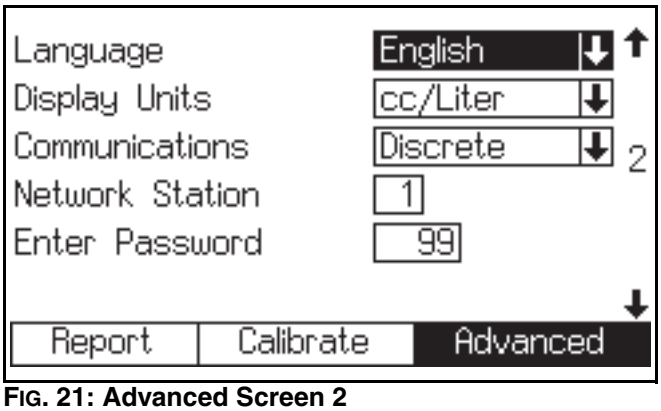


FIG. 21: Advanced Screen 2

Language

1. Select the desired language: U.S. English (default), French, German, Spanish, Japanese (Kanji), Korean, Italian, Dutch, Chinese (simplified), and custom.

Custom screen languages can be loaded, using the Web Interface.

Display Units

1. Select cc/Liter (default) or oz/Gallon.

Communications

The control from the robot can either come from the inputs on the back of the EasyKey panel (discrete) or from a network connection which will be an ethernet connection.

1. Select the appropriate connection:
   - Analog ≠ Digital
   - Ethernet
2. Press the up or down arrow to select the next item or press to exit to run.

Network Station

The modbus address when using the modbus/TCP kit.

Password

Is only used to enter Setup mode. The default is 0, which means no password is required to enter setup. Enter a number from 1-9999 if a password is desired.

1. If **no** password do not enter any number or letters. Leave the box blank.
2. If a password is desired key in the desired letters or numbers.

Be sure to write down the password and keep it in a secure location.

Advanced Screen 3

Use the EasyKey down arrow to navigate from the Advanced screen 2 to Advanced screen 3.

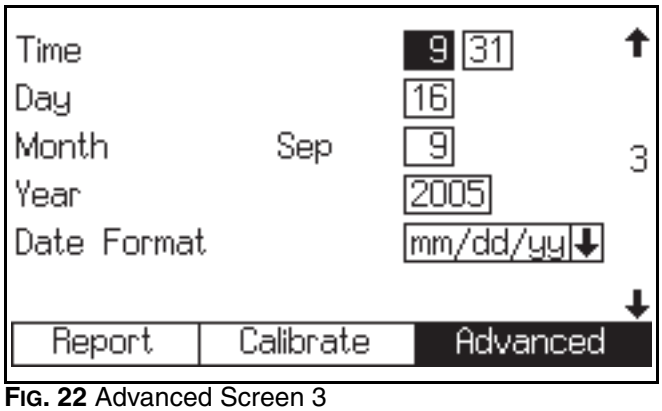


FIG. 22 Advanced Screen 3

Time - Enter current time in hours (24 hour clock) and minutes. Seconds are not adjustable.

Day - Enter current day.

Month - Enter current month.

Year - Enter current year (four digits).

Date Format - Select the desired date format (mm = month, dd = day, yy = year).

Advanced Screen 4

Use the EasyKey down arrow to navigate from the Advanced screen 3 to Advanced screen 4.

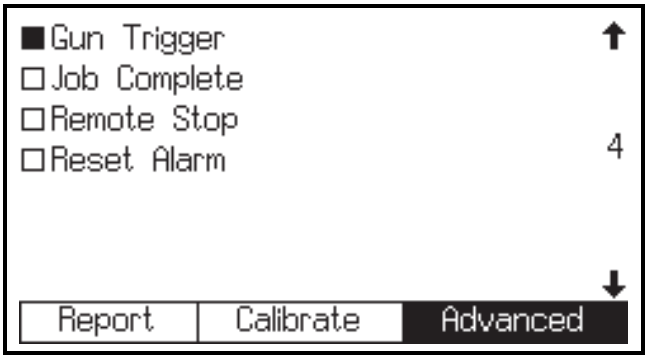


FIG. 23 Advanced Screen 4

If box is shaded, the input is active. If not shaded input is off.

If communications is not operational, check communications setting in Advanced Screen 2. This needs to be set to discrete. If set to Modbus/TCP, it is waiting for network commands.

Advanced Screen 5

Use the EasyKey down arrow to navigate from the Advanced screen 4 to Advanced screen 5.

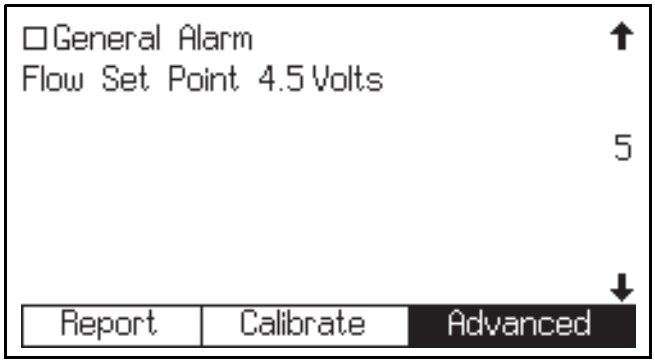


FIG. 24 Advanced Screen 5

If box is shaded, alarm is on. If not shaded alarm is off.

Calibrate Screen

Select this screen to calibrate the ProControl meter to ensure that the ProControl is controlling the desired flow rate amount.

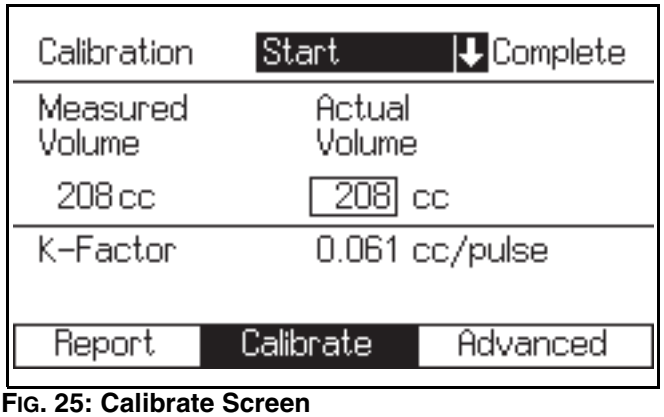


FIG. 25: Calibrate Screen

See **Meter Calibration**, page 33, for when and how to calibrate meter.

Report Screen

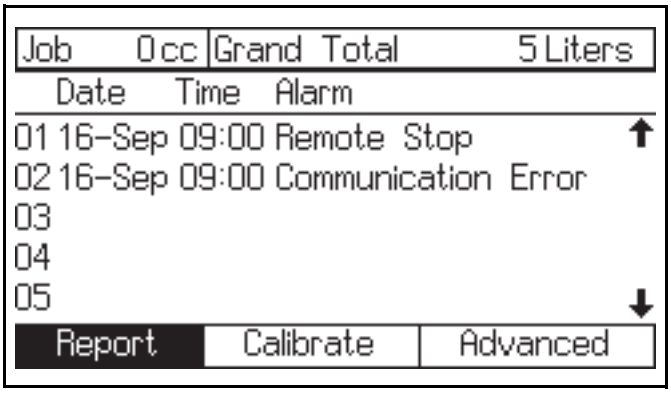


FIG. 26: Report Screen

The Report Screen shows the most recent 10 alarms, with the date and time. Use the ▲ or ▼ keys to see all the alarms.

Two type of alarms appear:

- Remote Stop - designates a signal sent by the robot controller that shuts the system down.
- Communications Error - indicates an internal error when the EasyKey cannot communicate with the ProControl components.

There are no selectable settings on the Report Screen.

The Web Interface enables you to download and view the most recent 100 alarms or events.

Start Up

1. Go through **Checklist**.

✓	Checklist
	System grounded Verify all grounding connections were made. See **Grounding**, page 21.
	All connections tight and correct Verify all electrical, fluid, air, and system connections are tight and installed according to **Installation**, page 11.
	Fluid supply container filled Check component supply container.
	Identify K_1 and Kp values in setup Advanced. K1 on 10 Kp on 100
	Gun trigger input signal is required to activate flow control.
	Regulator outlet use 0-100 psi gauge.
	Select flow rate set point and allow paint flow until graph indicates acceptable tolerance.
	Flow control range must be selected. 0-300, 0-600, 0-1200
	Fluid flow restriction of gun. Spray gun needle nozzle selection setting must create a minimum of 7 psi back restriction of the lowest desired flow rate. **Note:** use fluid pressure gauge for verification.
	Fluid supply valve open and pressure set Component fluid supply pressures should be equal unless one component is more viscous and requires a higher pressure setting.

Adjust the flow rate

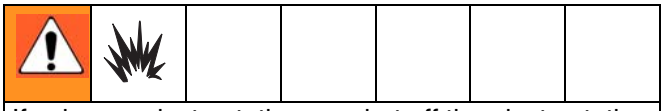
1. If the flow rate is not low enough, increase restriction of the spray valve to maintain a minimum 7 psi fluid pressure of regulator assembly outlet.
2. If the flow rate is not high enough, reduce restriction down stream from flow control regulator.
   a. Increase fluid line size.
   b. Increase gun needle nozzle setup size.
   c. Increase fluid supply pressure.

The first time a flow rate is selected the ProControl learns the correct setting for proper flow. When a job complete signal is set the ProControl will store this information into permanent memory. As a result flow rates will be selected much faster the second time.

Once the job is complete the data will be retained through power on/off cycle at this point. Each time the job complete input is active the current data replaces prior calibration data.

Shutdown

1. Release the gun trigger.



If using an electrostatic gun, shut off the electrostatics before placing the gun in the grounded waste container.

Purging

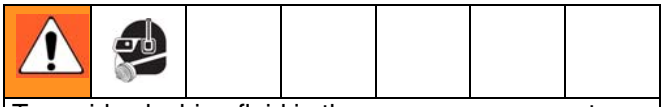
Purging Fluid Supply System

Follow this procedure before:

- the first time material is loaded into equipment*
- servicing
- shutting down equipment for an extended period of time
- putting equipment into storage

* Some steps are not necessary for initial flushing, as no material has been loaded into the system yet.

1. Put solvent in supply container.
2. Adjust the solvent fluid supply pressure. Use the lowest possible pressure to avoid splashing.
3. Select flow control flow rate. Use manual flow control mode.
4. Allow solvent to flow until system is clean.



To avoid splashing fluid in the eyes, wear eye protection.

Meter Calibration

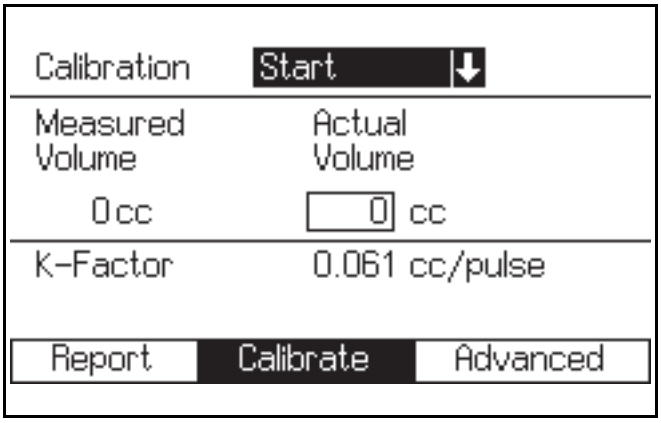
To avoid splashing fluid in the eyes, wear eye protection.

Calibrate the meter:

- The first time the system is operated.
- Whenever new materials are used in the system, especially if the materials have viscosities that differ significantly.
- At least once per month as part of regular maintenance.
- Whenever a flow meter is serviced or replaced.

- K-Factor on the Calibrate Screen is updated automatically after the calibration procedure is completed.
- K-Factor value on the screen is viewable only. If needed, you can manually edit the K-Factor in Advanced Screen 1 (see page 26).
- All values on this screen are in cc, independent of the units set in Advanced Screen 1.

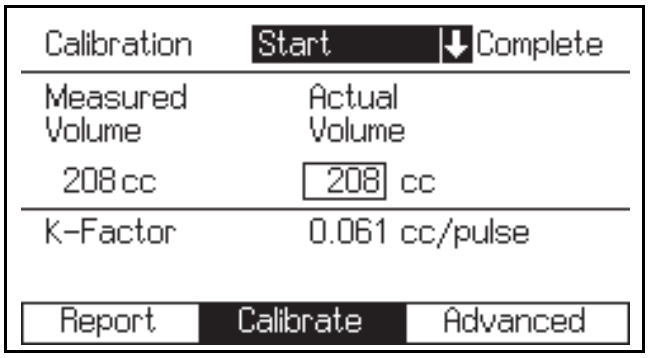
1. Remove gun trigger.
2. Shut off all spray or dispense devices connected to the ProControl.
3. On the EasyKey Display, press Setup key to access setup screens.
1. Press key to select the Calibrate screen Press key and select Start from the drop-down list. Press to activate Dispense.



2. Dispense component into a beaker.
   a. Trigger gun and dispense fluid into a beaker.

Shut off atomizing air to the gun.

   b. For more accurate calibration, adjust the flow rate range to dispense at a flow rate similar to your production spray flow rate.
   c. Dispense a minimum of 250 cc; make sure enough material is dispensed to accurately read the volume with your beaker.
   d. Shut off gun.
3. The volume that the ProControl measured displays on the EasyKey Display.



4. Compare the amounts on the EasyKey Display to the amount in the beaker.

   For maximum accuracy, use a gravimetric (mass) method to determine the actual volumes dispensed.

5. If the screen and actual volumes are different, enter the actual dispensed volume in cc and press  .

   If the values were substantially different, repeat the calibration process.

   If the screen and actual volumes are the same or if for any reason you want to cancel the calibration procedure, scroll to Abort on the Calibration drop-down list and press  .

6. After the volume is entered, the controller calculates the new flow meter K-Factor and shows them on the Calibration screen.

   K-Factor value on the screen are viewable only. If needed, you can manually edit the K-Factor in Advanced Screen 1 (see page 26).

Alarm Troubleshooting

Follow **Pressure Relief Procedure** on page 10, when you stop spraying, before changing spray tips, and before cleaning, checking, or servicing equipment. Read warnings, page 5.

ProControl Alarms

The ProControl alarms alert you of a problem and help prevent over or under painted parts. If an alarm occurs, operation stops and the following occurs:

- Alarm sounds.
- Status bar on the EasyKey Display shows the alarm with a description.
- Alarm signal sent to I/O.

Remote Stop alarms can be cleared by pressing the Error Clear key on the EasyKey Display or by alarm reset signal from process controller. There are some non-clearable alarms. See **Alarm Troubleshooting** on page 35 for more information.

Note: This alarm is not clearable. It is cleared when communications are restored.	
Cause	**Solution**
• The communication signal between the EasyKey Display, Smart Meter Panel, or EasyKey Display was interrupted.	• Verify that all cables are correctly connected. See **Cable Connections**, page 16.
• The fiber optic cable is cut or bent.	• Verify cables have not been cut or bent at a radius smaller than 1.6 in. (40 mm).
• Dirty fiber optic cable ends.	• Disconnect fiber optic cable ends and clean with a lint-free cloth.
• A communication cable or connector failed.	• Replace cable.

Remote Stop
The automation has requested that the system abort all operations.

ProControl Warnings

The following conditions are considered system Warnings. They do not stop operation or sound an alarm, but the signal is sent to the I/O. They are saved in the date/time stamped error log, which can be viewed on a PC.

Setup Changed
One of the setup parameters has been changed and saved.
Power Up
The power to the system has been cycled.
Defaults Loaded
The factory defaults have been installed on the system.
High Flow
The flow rate has been above tolerance for 1 second.
Low Flow
The flow rate has been below tolerance for 1 second.

Circuit Board Indicators

Part Number	Board	Button	LED
249306	Display	SW2 - Force software upgrade when held at power-on.	D1 - 1-second heartbeat
249183	Ethernet	none	Two LEDs on bottom. Left is network connection. Right is network activity.
249179	Fluid Regulator	none	none
249190	Fluid Plate	S2 - Force software upgrade when held at power on. Not at power on, hold for 10 seconds to reset pressure flow table.	D4 - 1-second heartbeat

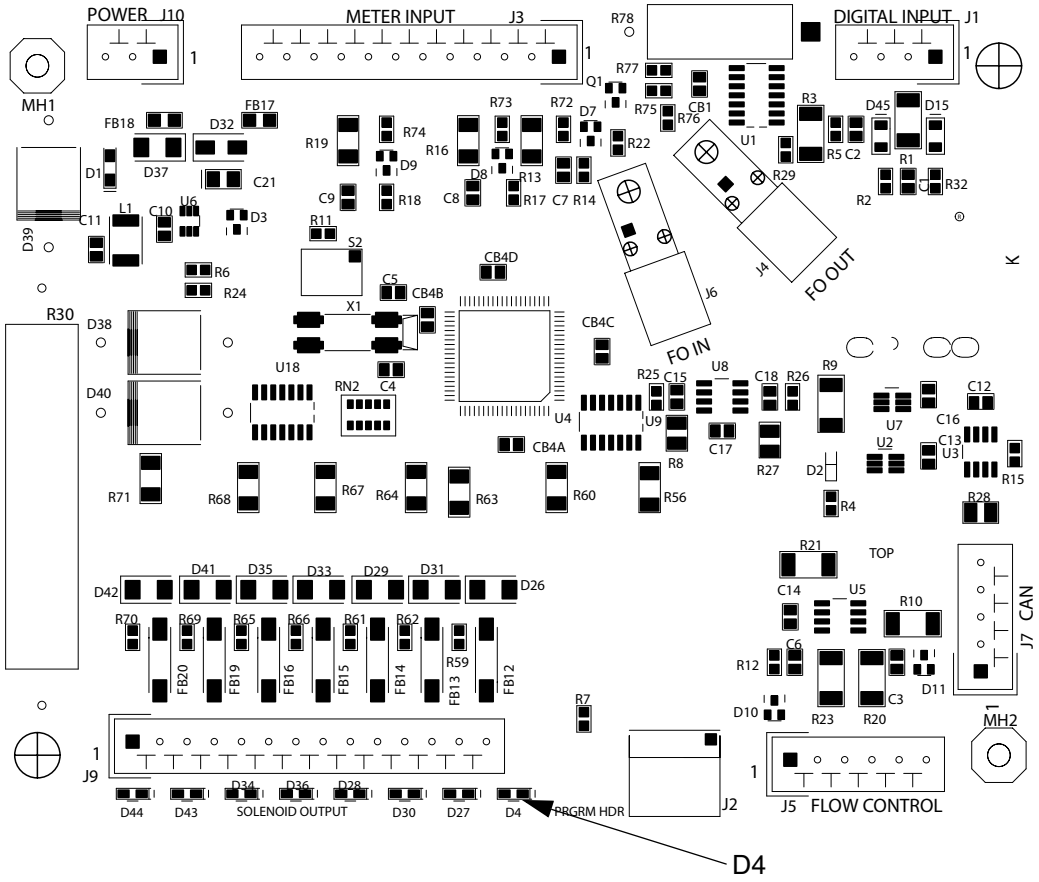


FIG. 27: Part Number 249190

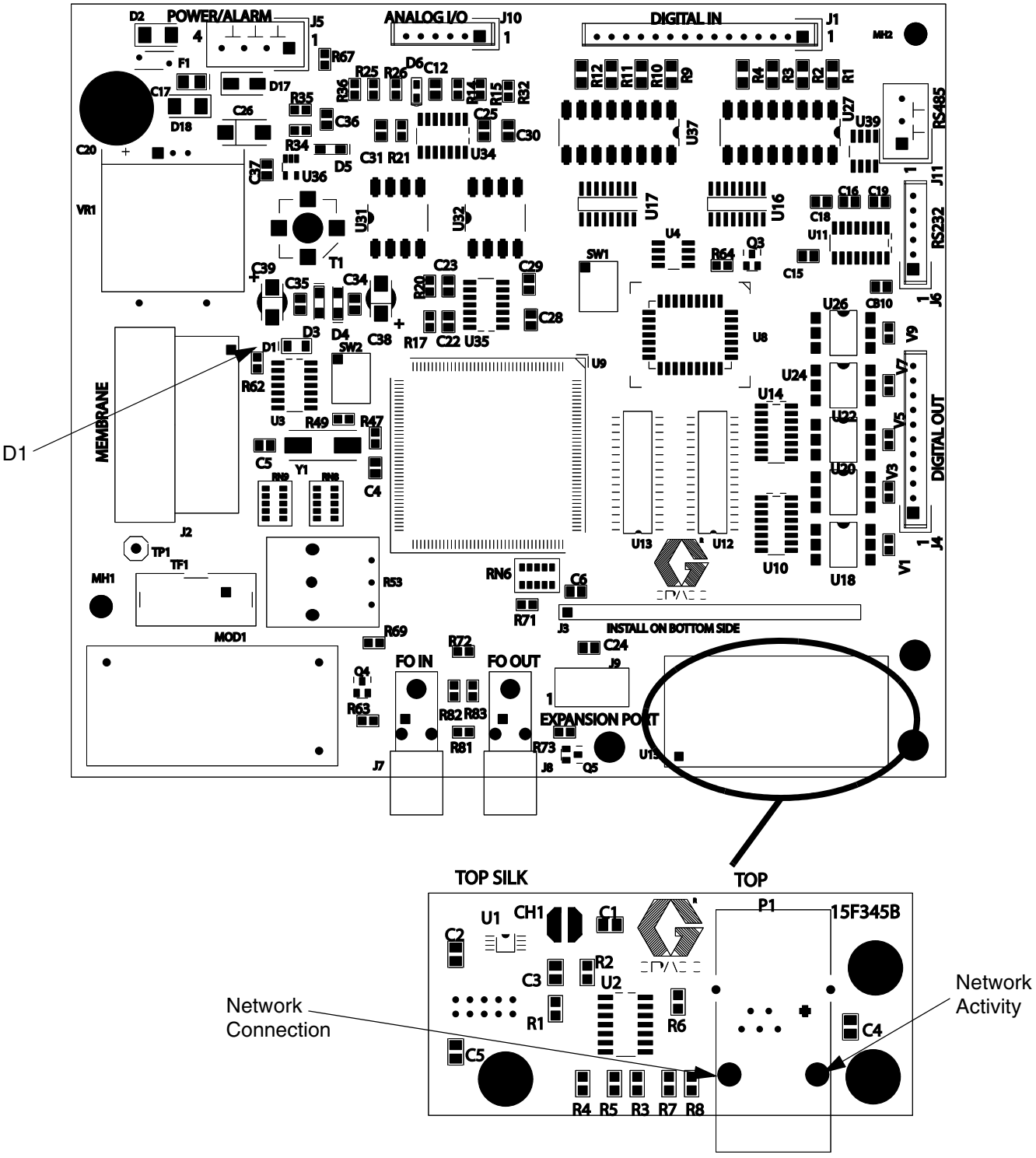

D1
MEMBRANE
POWER/ALARM
ANALOG I/O
DIGITAL IN
RS485
RS232
DIGITAL OUT
INSTALL ON BOTTOM SIDE
FO IN
FO OUT
EXPANSION PORT
MOD1
TOP SILK
TOP
15F345B
Network
Connection
Network
Activity

FIG. 28

Service

Before Servicing

- To avoid electric shock, turn off EasyKey power before servicing.
- Servicing EasyKey display exposes you to high voltage. Shut off power at main circuit breaker before opening enclosure.
- 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.

1. Follow **Shutdown** procedure, page 10.
2. Close main air shutoff valve on air supply line and on ProControl.
3. Shut off ProControl power (0 position). FIG. 29.
4. If servicing EasyKey Display, also shut off power at main circuit breaker.

FIG. 29

After Servicing

After servicing the system, be sure to follow the **Start Up** checklist and procedure in the ProControl Operation section.

EasyKey™ Display

- Updating Software
- Replacing Power Supply Board
- Replacing Power Supply Fuses

If you need to replace the EasyKey™ display board, display backlight, or keypad, replace with Display Kit 253025.

CAUTION
To avoid damaging circuit board when servicing, wear grounding strap on wrist and ground appropriately.

Updating Software

- Install new software chip using Kit 249988. Kit includes software chip, chip extractor tool, and grounding wrist strap. Follow **Installing New Software Chip** procedure.

Installing New Software Chip

1. Follow **Before Servicing** procedure, page 39.
2. Unlock and open EasyKey door with its key.
3. Remove display board chip (C - FIG. 30) with removal tool.
   a. Press removal tool into flash chip socket open holes.
   b. Squeeze the tool to grip the chip and carefully pull it straight out of the socket.

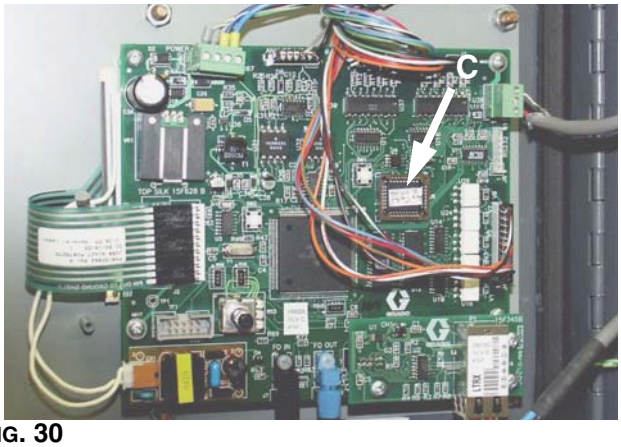


FIG. 30

4. Align beveled corner of new chip with beveled corner of socket and press chip into place. Make sure the pins are not bent or touching.
5. Close and lock EasyKey door with key.
6. Turn EasyKey power on to test circuit boards.

Replacing Power Supply Board

Servicing the power supply board exposes you to high voltage. To avoid electric shock, turn off EasyKey™ power and shut off power at main circuit breaker before servicing.

1. Follow **Before Servicing** procedure, page 39.
2. Unlock and open EasyKey door with its key.
3. Disconnect cables (G1, G2, G3). FIG. 31.
4. Remove 2 screws (H) and remove cover (J).
5. Noting their locations, remove the 5 screws (Y) from power supply board (521a). Remove the board.
6. Apply thermal compound to the heatsink (Z) on the back of the new power supply board (521a).
7. Install the new power supply board with the 5 screws (Y).
8. Install cover (J) with 2 screws (H).
9. Connect cables (G1, G2, G3).
10. Close and lock EasyKey door with key.
11. Turn on power at main circuit breaker.
12. Turn EasyKey power on to test operation.

Replacing Power Supply Fuses

Servicing the power supply board exposes you to high voltage. To avoid electric shock, turn off EasyKey™ power and shut off power at main circuit breaker before servicing.

Fuse	Part No.	Description
F1, F2	114899	2 amp, time lag
F3, F4	15D979	.4 amp, quick acting

1. Follow **Replacing Power Supply Board**, steps 1-4.
2. Remove the fuse (F1, F2, F3, or F4) from its fuse holder. FIG. 31.
3. Snap new fuse into holder.
4. Follow **Replacing Power Supply Board**, steps 8-12.

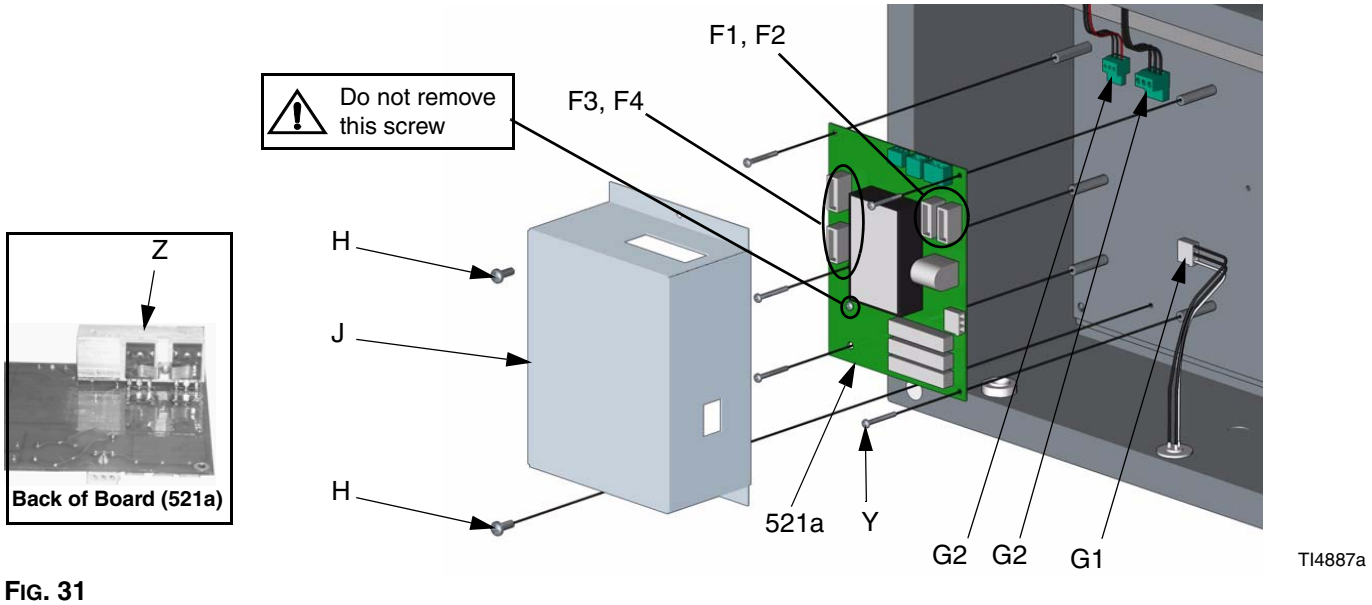
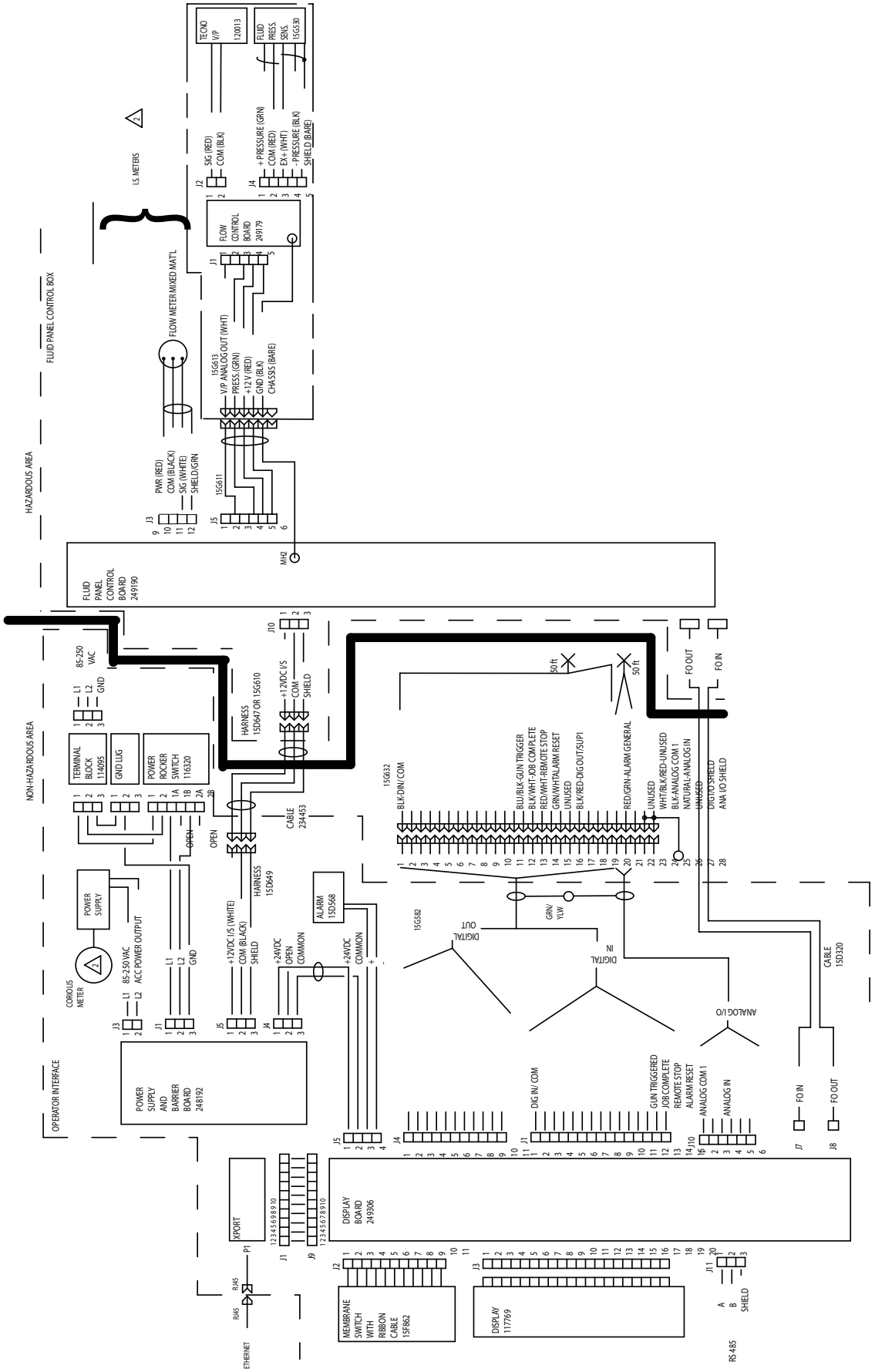


FIG. 31

Schematics - ProControl Electrical Schematic



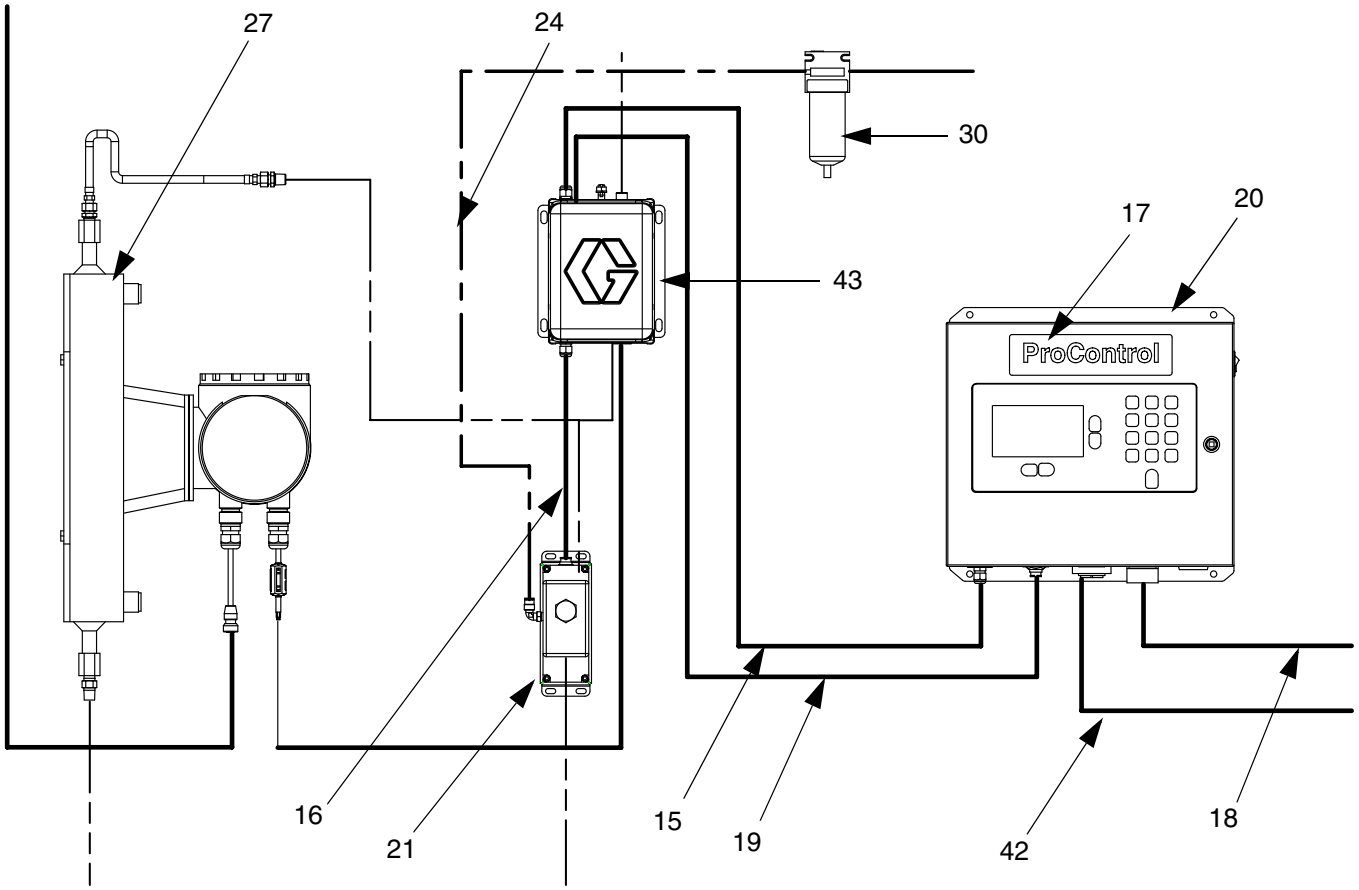
Parts

Standard ProControl Parts

Ref. No.	Part No.	Description	Qty.
15	15D320	CABLE, Fiber Optic	1
16	15G611	CABLE, flow control	1
17	15G535	LABEL	1
18	15G632	CABLE, discrete I/O wire, 50 ft.	1
19	234453	CABLE, installation	1
20	249965	CONTROL BOX, EasyKey; see page 45	1
21	249849	CONTROL, Fluid Regulator; see page 49	1
24	590332	TUBE, poly flow, 30 ft.	1
27	243563	KIT, Coriolis meter, assembly	1
28▲	189919	LABEL, kit (not shown)	1
29	292954	LABEL, identification (not shown)	1
30	117629	FILTER, air, 3/8 NPT	1
31▲	552069	LABEL (not shown)	2
32▲	292949	LABEL, identification (not shown)	2
42	15G869	CABLE, ethernet 6 ft. crossover	1
43	249995	MODULE, Flow Control; see page 47	1

▲*Replacement Danger and Warning labels, tags, cards are available at no cost.*

Standard ProControl Parts



EasyKey™ Display

Part No. 249965

Ref. No.	Part No.	Description	Qty.
1*		ENCLOSURE	1
2	116320	SWITCH, rocker, power	1
3	117787	LATCH, quarter turn with key, includes 3a	1
3a	117818	• KEY	1
4	111987	CONNECTOR, cord strain relief	1
5		NUT, hex; M5	4
6	111307	WASHER, lock, M5	8
8	C19293	NUT, machine hex; 10-32 UNF	6
9		WIRE, grounding, door	1
10	253025	DISPLAY, kit	1
11	15D568	ALARM	1
12▲	118334	LABEL, warning	1
13†	223547	WIRE, grounding, unit; 25 ft. (7.6 m)	1
14*	234446	PLATE, application; includes 14a-14c	1
14a	255240	• KIT, circuit board; includes items 14b-14c	1
14b	15D979	• FUSE, quick acting; 0.4 amp	2
14c		• BOARD, circuit	1
15	15D649	HARNESS, connection	1
17	198165	KIT, accessory, RJ45, jack/con	1
18†	120050	CABLE, modular, RJ45, 7 ft	1
19	15G659	LABEL, instruction	1
20	114606	PLUG, hole	1
21†	15G582	HARNESS, wire	1

▲ *Replacement Danger and Warning labels, tags, cards are available at no cost.*

† *Not shown.*

* *Not a replacement part*

Kits available:

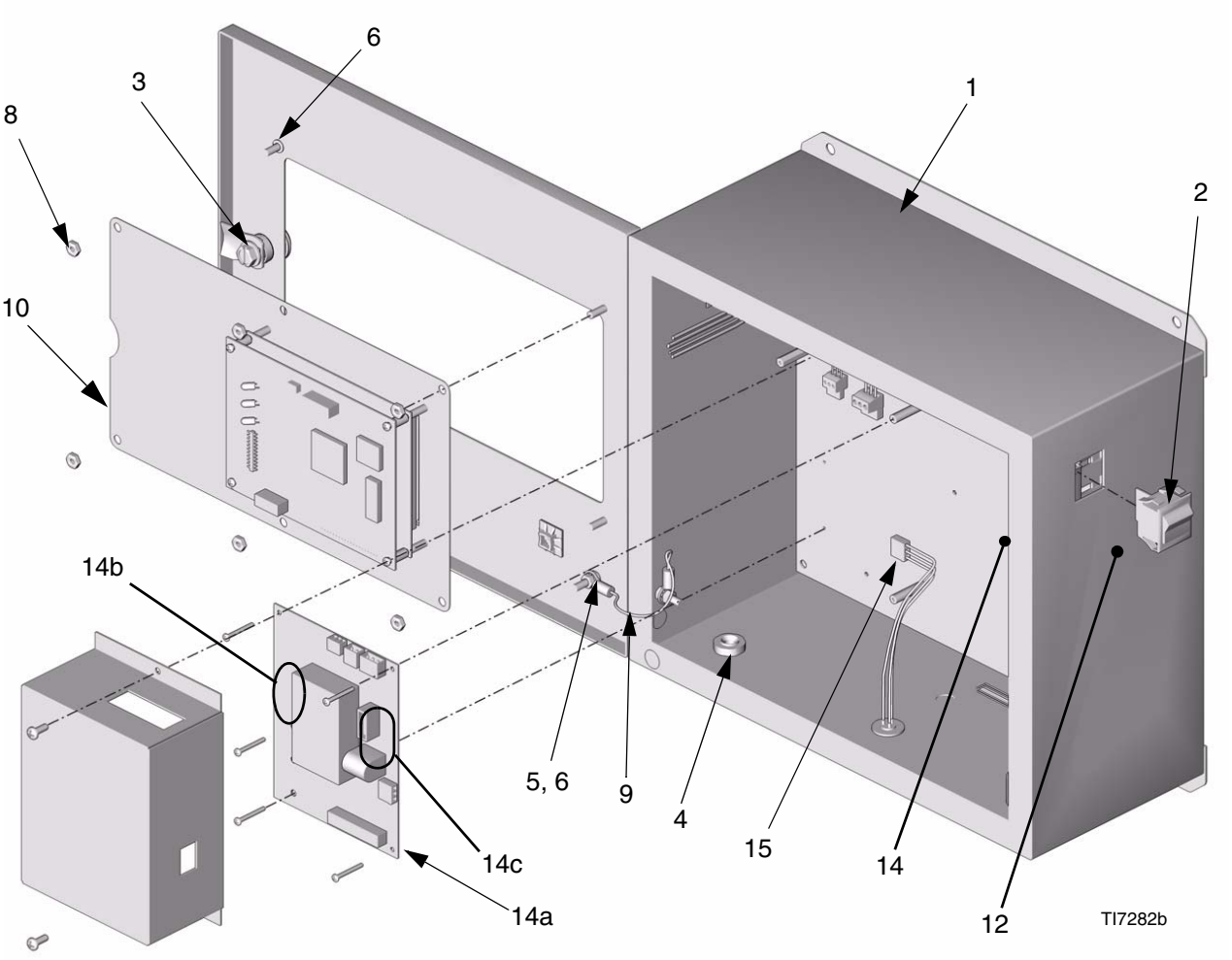
Part No.	Description
197902	EasyKey Display Paint Shields, package of 10
249988	ProControl Software Upgrade Kit; includes software chip, chip extractor tool, and grounding wrist strap

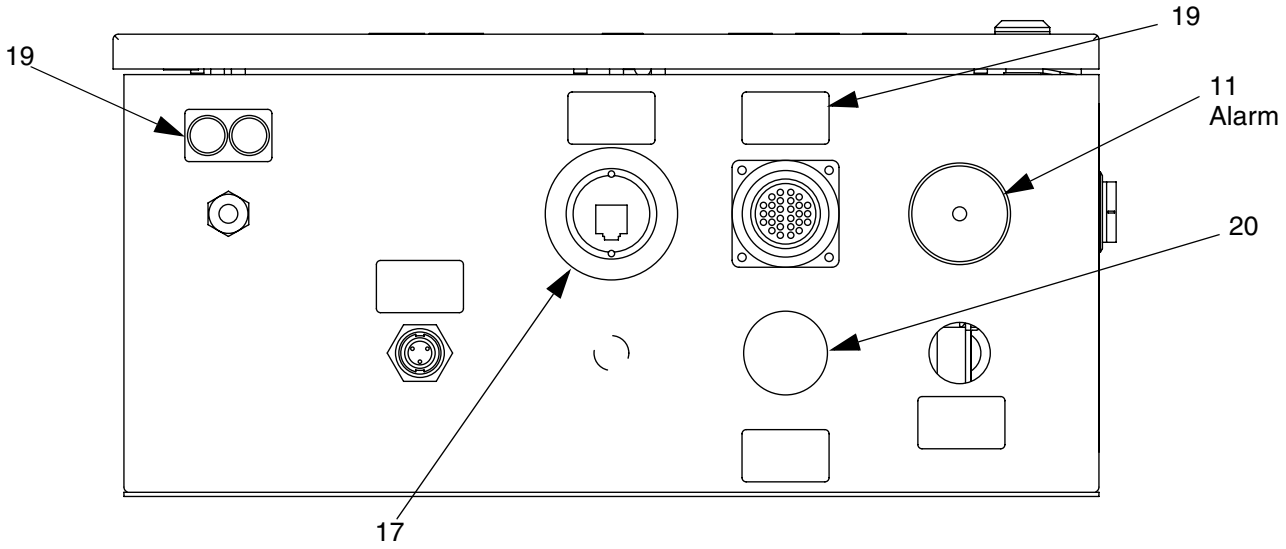
Replacement Cables:

Part No.	Description
15G869	Ethernet Cable, 6 ft. crossover
15G632	Discrete I/O

EasyKey™ Display

Part No. 249965





Smart Meter Panel (Replacement)

Part No. 249995

Ref. No.	Part No.	Description	Qty.
1		SCREW, mach, pan hd	4
2		SCREW, cap, SCH (M6 x 8)	2
3	111987	CONNECTOR, cord strain relief	2
4	114339	FITTING, union, swivel, 1/4 NPT, SST	1
5		GROMMET	1
6		PANEL, IK	1
7	166421	FITTING, pipe	1
8	249190	BOARD, circuit, assembly	1
10	15D647	HARNESS, connection	1
11	241801	CABLE, meter, assembly	1
12	104029	CLAMP, GND, ELEC	1
13		NUT, hex, M5 x .8	1
14	111307	WASHER, lock, external	1
25	172953	LABEL	1
26		GROMMET	1
31†	552069	LABEL	2
34†	117369	CONNECTOR, plug, 11 position	1
39	15G046	COVER	1
40▲†	15G809	LABEL, safety	1

▲*Replacement Danger and Warning labels, tags, cards are available at no cost.*

†Not shown.

Meter is shown as reference for mounting. It is not included with part no. 249995.

Replacement Meter Options:

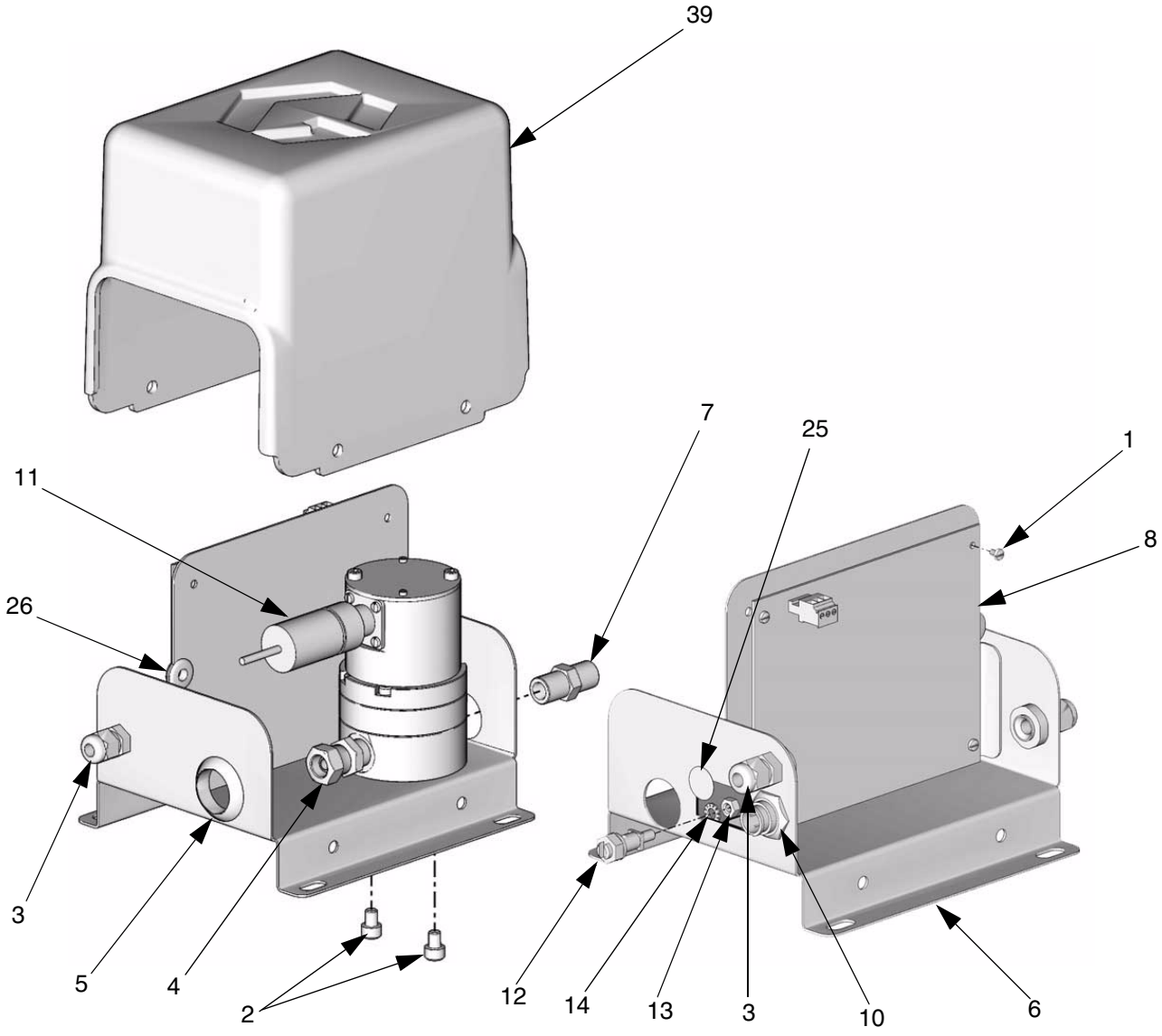
Part No.	Description
249426	G250; see manual 308778
249427	G250HR; see manual 308778
234563	Coriolis; see manual 310696

Replacement Cables:

Part No.	Description
15D320	Fiber optic, twin
234453	IS power
15G611	Flow control

Smart Meter Panel (Replacement)

Part No. 249995



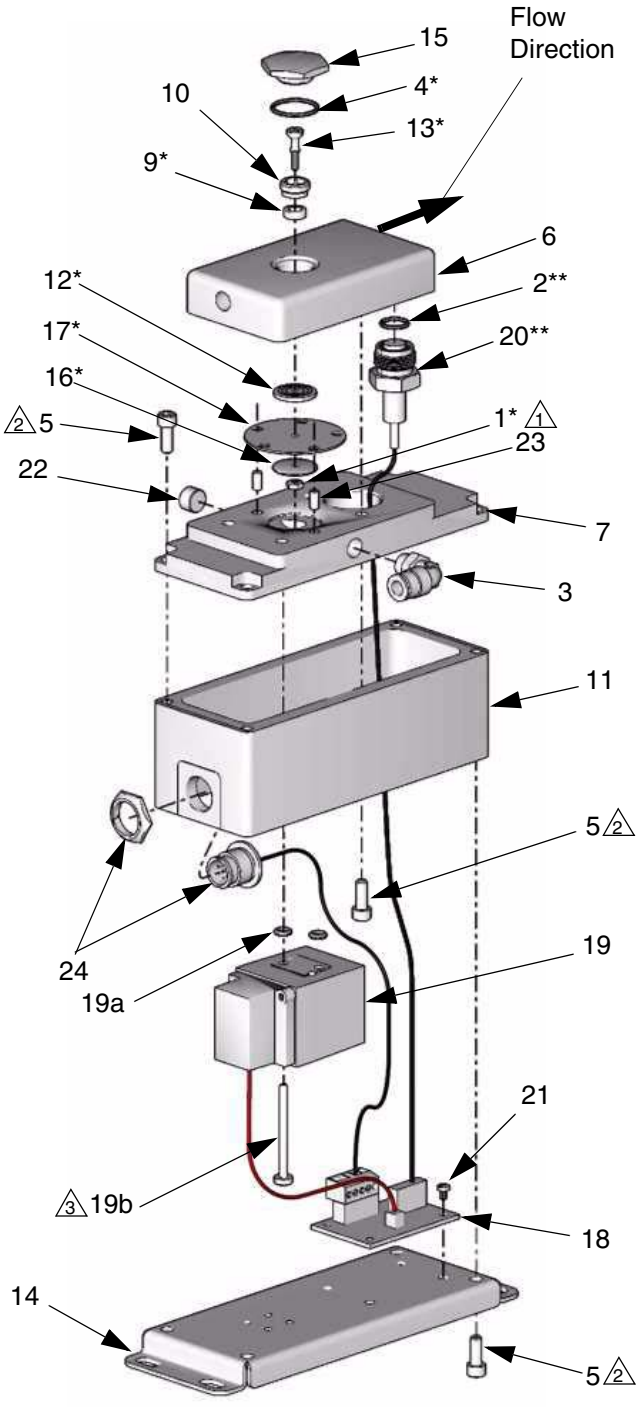
Fluid Regulator Assembly

Part No. 249849

Ref. No.	Part No.	Description	Qty.
1*	102980	NUT, full hex	1
2**	111316	O-RING, packing	1
3	112698	ELBOW, male, swivel	1
4*	117610	O-RING	1
5		FASTENER, shcs, 10-32X.5	12
6		PLATE, fluid, regulator	1
7	15F799	PLATE, air, regulator	1
9*		SEAT, regulator	1
10*		RETAINER, seat	1
11		HOUSING, flow control	1
12*		SPACER, regulator	1
13*		NEEDLE, regulator	1
14		BRACKET, flow control	1
15	15F806	PLUG, regulator	1
16*	168881	GASKET, non-metallic	1
17*	178321	DIAPHRAGM, regulator	1
18	249179	BOARD, circuit assembly	1
19	120013	VALVE, proportional, V/P (includes 19a and 19b	1
19a		SCREW; M3 x 0.5 x 40 mm mounting socket head cap screw	2
19b		O-RING, mounting	2
20**		SENSOR, flushmount	1
21		SCREW, mach, pan hd	4
22	104765	PLUG, pipe headles	1
23*	192387	PIN, dowel	2
24	15G613	HARNESS, flow control	1

* Included in Regulator Service Kit 15G843.

** Included in Sensor Service Kit 15G867.



1 Torque to 8-10 in-lb (0 .9- 1.1 N•m)

2 Torque to 30-40 in-lb (3.4 - 4.5 N•m)

3 Torque to 5-7 in-lb (0.6 - 0.8 N•m)

Notes

Technical Data

Maximum fluid working pressure	200 psi (1.38 MPa, 13.8 bar)
Maximum working air pressure.	100 psi (0.7 MPa, 7 bar)
Air supply	75–100 psi (0.5–0.7 MPa, 5.2–7 bar)
Air filtration	5 micron (minimum) filtration required (user to supply clean, dry air filtered to 10 microns)
Fluids handled	one component: • solvent and waterborne paints • polyurethanes • epoxies • acid catalyzed varnishes • moisture sensitive isocyanates
Viscosity range of fluid	20–5000 cps*
Fluid filtration	100 mesh minimum
Fluid flow rate range*	
G250 Meter	75–1500 cc/min. (0.02–0.79 gal./min.)
G250HR Meter	38–1500 cc/min. (0.01–0.40 gal./min.)
Coriolis Meter	20–1500 cc/min. (0.005–1.00 gal./min.)
External Power Supply Requirements	85–250 Vac, 50/60 Hz, 2 amps maximum draw 15 amp maximum circuit breaker required 8 to 14 AWG power supply wire gauge
Operating temperature range	41–122° F (5–50° C)
Environmental Conditions Rating	Indoor use, Pollution degree (2). Installation category II.
Noise Level	
Sound pressure level	below 70 dBA
Sound power level	below 85 dBA
Wetted parts	303, 304 SST, 17–4 SST, Tungsten carbide (with nickel binder), perfluoroelastomer; PTFE; CV75
Weight	
Base System	31 lbs (14.1 kg)
EasyKey Display	22.2 lbs (10.0 kg)
Smart Meter Panel	6 lbs (2.8 kg)
FC Regulator Panel	4 lbs (1.8 kg)
Optional Components	
G250 / G250HR Flow Meter	2.6 lbs (1.8 kg) each
Coriolis Flow Meter	33 lbs (15 kg) each

* Dependent on programmed K-factor and application. The ProControl maximum allowable flow meter pulse frequency is 425 Hz (pulses/sec.). For more detailed information on viscosities, flow rates, or mixing ratios, consult your Graco distributor.

See individual component manuals for additional technical data.

Graco Standard Warranty

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

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