

ProControl™ 1KS

3A1163A
ENG

Automatic system for fluid management of single component coatings. Includes flow control, flushing, and color change. For professional use only.

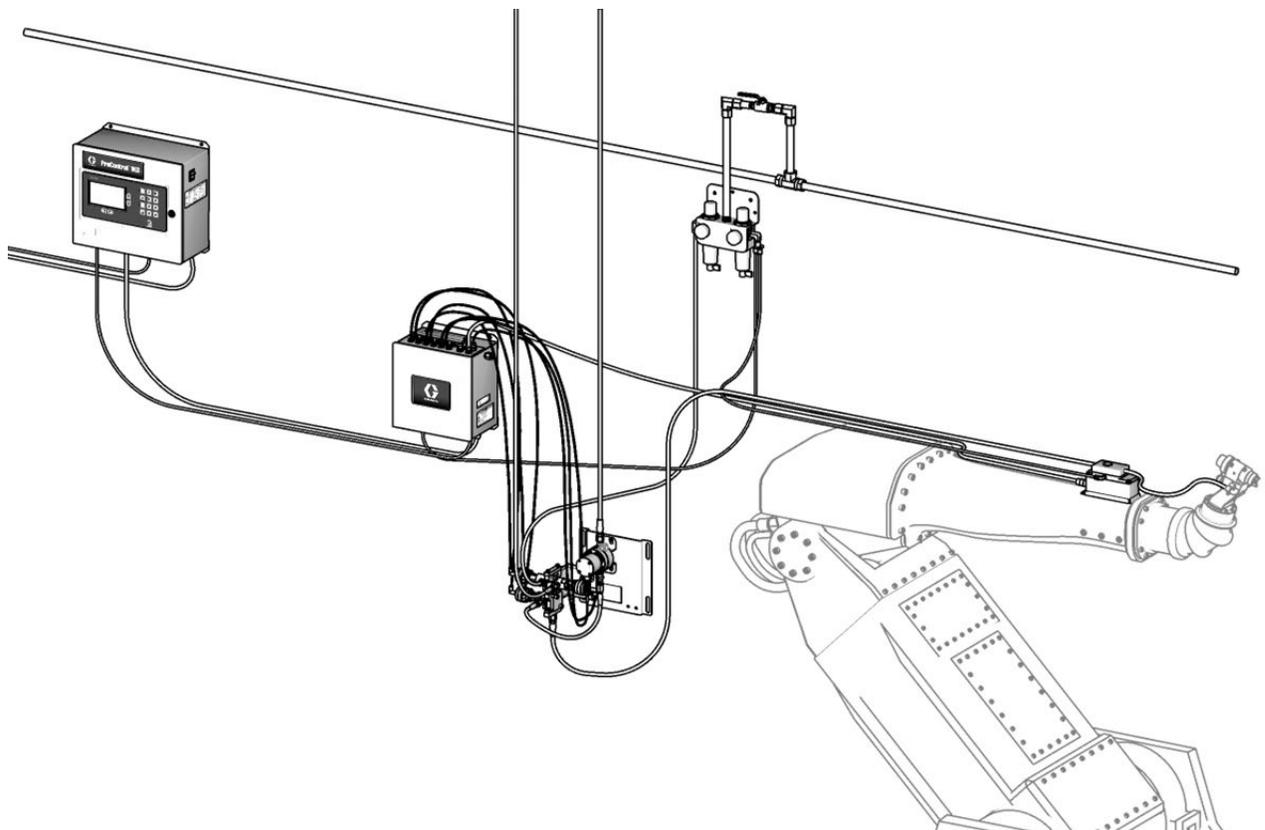
Approved for use in explosive atmospheres (except the EasyKey).



Important Safety Instructions

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

See pages 4-5 for model information, including maximum working pressure. Equipment approval labels are on page 3. Some components shown are not included with all systems.



TI16328a



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Related Manuals

Component Manuals in English

Manual	Description
3A1080	ProControl 1KS Operation
3A1164	ProControl 1KS Repair-Parts
312782	Dispense Valve
312783	Color Change Valve Stacks
312787	Color Change Module Kit
312784	Gun Flush Box Kits
310745	Gun Air Shutoff Kit
312786	Dump Valve and Third Purge Valve Kits
312785	Network Communication Kits
308778	G3000/G3000HR/G250/G250HR Flow Meter
313599	Coriolis Flow Meter
313212	Gun Flush Box Integration Kit
313290	Floor Stand Kit
313542	Beacon Kit
313386	Basic Web Interface/Advanced Web Interface
406800	15V825 Discrete I/O Board Kit

Equipment Approvals

Equipment approvals appear on the following labels which are attached to the Fluid Station Control Box and EasyKey™. See FIG. 1 on page 4 for label locations.

EasyKey and Fluid Station Control Box Label

ATEX Certificate is listed here

ProControl 1KS Electronic Proportioner

Intrinsically Safe (IS) System. Install per IS Control Drawing No. 289833. EasyKey Interface IS Associated Apparatus for use in non hazardous location, with IS Connection to Smart Fluid Plate IS Apparatus for use in: Class I, Division 1, Group D T3 C Hazardous Locations

Read Instruction Manual
Warning: Substitution of components may impair intrinsic safety.

Part No. Series Serial

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MFG. YR.

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GRACO INC. P.O. Box 1441 Minneapolis, MN 55440 U.S.A.

FM08ATEX0074 II 2 G Ex ia IIA T3

CE 0359

MAX AIR WPR

.7	7	100
MPa	bar	PSI

MAX FLUID WPR

1.31	13.1	190
MPa	bar	PSI

MAX TEMP 50°C (122°F)

Fluid Station Control Box Label

ProControl FLUID PANEL

Part No. Series Serial

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MAX AIR WPR

.7	7	100
MPa	bar	PSI

Intrinsically safe equipment for Class I, Div 1, Group D, T3 Ta = -20°C to 50°C Install per 289833

CE 0359

FM08ATEX0073 II 2 G Ex ia IIA T3

GRACO INC. P.O. Box 1441 Minneapolis, MN 55440 U.S.A.

ATEX Certificate is listed here

EasyKey Label

ProControl 1KS POWER REQUIREMENTS

Part No. Series No. Mfg. Yr.

277869		
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VOLTS 85-250 ~

AMPS 2 AMPS MAX

50/60 Hz

GRACO INC. P.O. Box 1441 Minneapolis, MN 55440 U.S.A.

Um: 250 V

Intrinsically safe connections for Class I, Div 1, Group D Ta = -20°C to 50°C Install per 289833

CE 0359

II (2) G Ex ia IIA FM08ATEX0072

ATEX Certificate is listed here

System Configuration and Part Numbers

Models

The part number for your equipment is printed on the equipment identification labels. See FIG. 1 for location of the identification labels.

Part No.	Series	Description	Meter			Flow Control	
			None	G3000	Coriolis	No	Yes
262380	A	ProControl 1KS	✓			✓	
262381	A	ProControl 1KS		✓		✓	
262382	A	ProControl 1KS		✓			✓
262383	A	ProControl 1KS			✓		✓

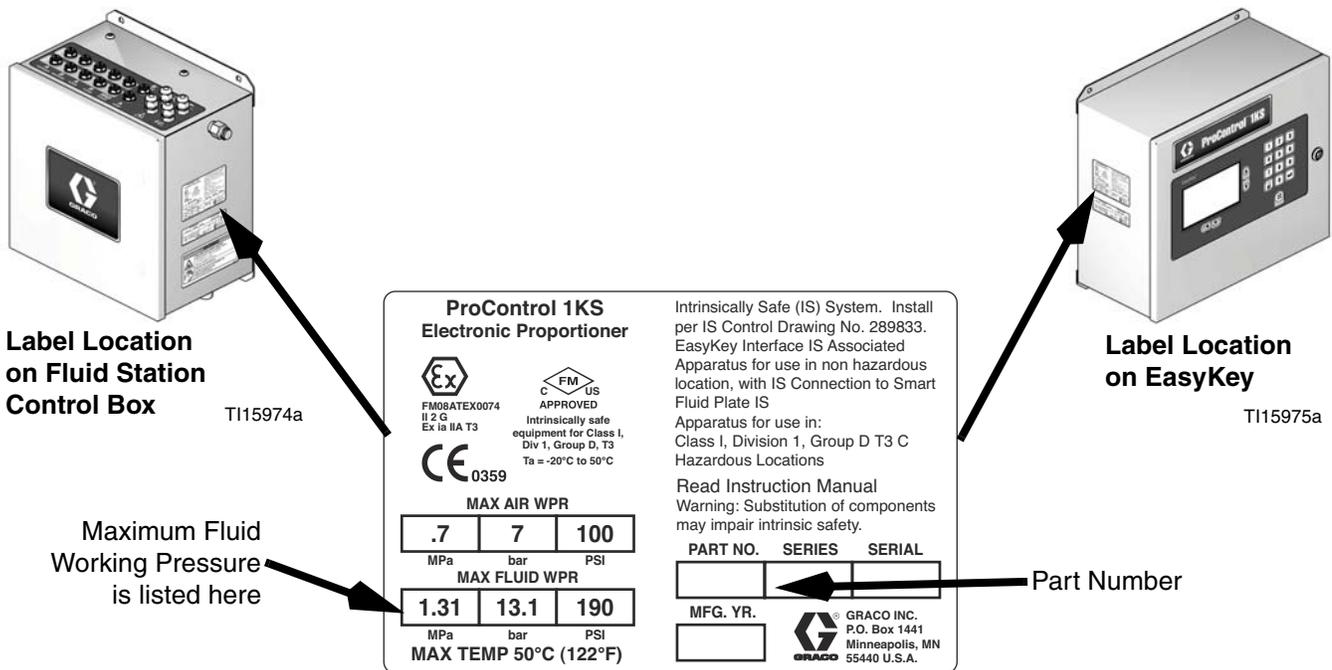


FIG. 1: Identification Label, ProControl 1KS Systems

Hazardous Location Approval

Models using a G3000, G3000HR, or intrinsically safe Coriolis meter for both A and B meters are approved for installation in a Hazardous Location - Class I, Div I, Group D, T3 or Zone I Group IIA T3.

Maximum Working Pressure

Maximum working pressure rating is dependent on the fluid component options selected. **The pressure rating is based on the rating of the lowest rated fluid component.** Refer to the component pressure ratings below.
Example: Model 262383 has a maximum working pressure of 190 psi (1.31 MPa, 13.1 bar).

Check the identification label on the EasyKey or fluid station for the system maximum working pressure. See FIG. 1.

ProControl Fluid Components Maximum Working Pressure

Base System (no meter, no color/catalyst change option, and no flow control [option])	4000 psi (27.58 MPa, 275.8 bar)
G3000 Meter Option	4000 psi (27.58 MPa, 275.8 bar)
Coriolis Meter Option	2300 psi (15.86 MPa, 158.6 bar)
Color Change Option	300 psi (2.07 MPa, 20.6 bar)
Flow Control Option	190 psi (1.31 MPa 13.1 bar)

Flow Meter Fluid Flow Rate Range

G3000	75-3800 cc/min. (0.02-1.0 gal./min.)
G3000HR	38-1900 cc/min. (0.01-0.50 gal./min.)
Coriolis Meter	20-3800 cc/min. (0.005-1.00 gal./min.)
S3000 Solvent Meter (accessory)	38-1900 cc/min. (0.01-0.50 gal./min.)

Standard Features

Feature
EasyKey with LCD
RS 485 Network Cable, 50 ft (15.25 m)
Fiber Optic and Power Cables, 50 ft (15.25 m)
Fluid Station Control Box
Discrete I/O Board
A Side Dump Valve, if color valve(s) selected
Flow Control with 15 ft (4.57 m) Cable (if selected)
Basic Web Interface

Accessories

Accessory
15V536 Solvent Flow Switch Kit
15V213 Power Cable, 100 ft (30.5 m)
15G710 Fiber Optic Cable, 100 ft (30.5 m)
15G614 Flow Control Extension Cable, 40 ft (12.2 m)
15W034 Strobe Light Alarm Indicator Kit
15V331 Gateway Ethernet Communication Kit
15V963 Gateway DeviceNet Communication Kit
15V964 Gateway Profibus Communication Kit
15V337 Advanced Web Interface

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.

 <h2 style="margin: 0;">WARNING</h2>	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • 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.
	<p>ELECTRIC SHOCK HAZARD</p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • 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.
	<p>INTRINSIC SAFETY</p> <p>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.</p> <ul style="list-style-type: none"> • Only models with a G3000, G250, G3000HR, G250HR, or intrinsically safe Coriolis meter are approved for installation in a Hazardous Location - Class I, Div I, Group D, T3 or Zone I Group IIA T3. • 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 or modify 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 spray without tip guard and trigger guard installed.
- Engage trigger lock when not spraying.
- 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.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.



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 from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the **Pressure Relief Procedure** 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.



WARNING



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 MSDSs 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 chemically impermeable gloves when spraying, dispensing, 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, hearing loss, inhalation of toxic fumes, and burns. This equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Important Two-Component Material Information

Isocyanate Conditions



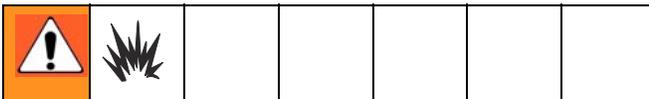
Spraying or dispensing materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.

Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.

Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.

To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.

Material Self-ignition



Some materials may become self-igniting if applied too thickly. Read material manufacturer's warnings and material MSDS.

Keep Components A and B Separate



Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination of the equipment's wetted parts, **never** interchange component A (isocyanate) and component B (resin) parts.

Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

NOTE: The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

To prevent exposing ISO to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always lubricate threaded parts with ISO pump oil or grease when reassembling.

Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- Most materials use ISO on the A side, but some use ISO on the B side.

Component Identification and Definition

See Table 1, and FIG. 2 for the system components.

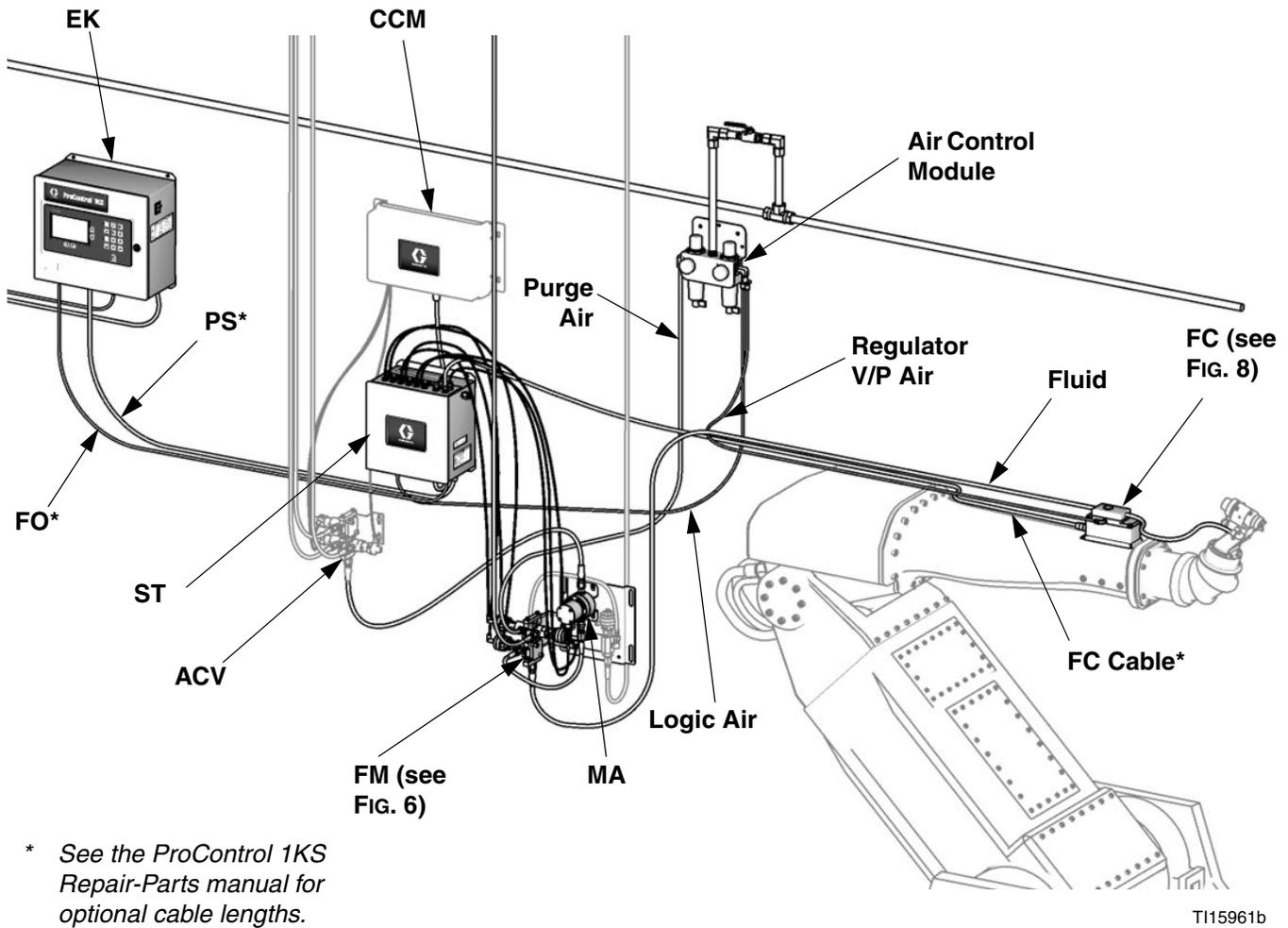


FIG. 2. ProControl 1KS System, shown with G3000 Meter, Color Change, and Flow Control

Table 1: Component Descriptions

Component	Description
EasyKey (EK)	Used to set up, display, operate, and monitor the system. The EasyKey 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.
Fluid Station Control Box (ST)	Includes air control solenoids. Its control board manages all fluid functions.

Table 1: Component Descriptions

Component	Description
Fluid Manifold (FM)	Includes wall mounting bracket and mountings for the fluid meter and the following valves: <ul style="list-style-type: none"> • Pneumatically Operated Dose Valve for component A • Purge Valves for solvent and air purge
Flow Meters (MA, MS)	Four optional flow meters are available from Graco: <ul style="list-style-type: none"> • G3000 is a general purpose gear meter typically used in flow ranges of 75-3800 cc/min. (0.02–1.0 gal/min.), pressures up to 4000 psi (28 MPa, 276 bar), and viscosities of 20–3000 centipoise. The K-factor is approximately 0.119 cc/pulse. • G3000HR is a high resolution version of the G3000 meter. It is typically used in flow ranges of 38–1900 cc/min. (0.01–0.5 gal/min.), pressures up to 4000 psi (28 MPa, 276 bar), and viscosities of 20–3000 centipoise. The K-factor is approximately 0.061 cc/pulse. • S3000 is a gear meter used for solvents in flow ranges of 38-1900 cc/min. (0.01–0.50 gal/min.), pressures up to 3000 psi (21 MPa, 210 bar), and viscosities of 20–50 centipoise. The K-factor is approximately 0.021 cc/pulse. • Coriolis is a specialty meter capable of a wide range of flow rates and viscosities. This meter is available with 1/8 in. or 3/8 in. diameter fluid passages. For detailed information on the Coriolis meter, see manual 313599. The K-factor is user-settable; at lower flow rates use a lower K-factor. <ul style="list-style-type: none"> → 1/8 in. fluid passages: set K-factor to .020 or .061. → 3/8 in. fluid passages: set K-factor to .061 or 0.119.
Color Change Valves (ACV) and Color Change Module (CCM)	An optional component. It is available as a color change valve stack for either low or high pressure with up to 30 color change valves. Each stack includes one additional valve for solvent to clean the fluid line between color changes.
Dual Fiber Optic Cable (FO)	Used to communicate between the EasyKey and Fluid Station Control Box.
Fluid Station Control Box Power Supply Cable (PS)	Used to provide power to the Fluid Station Control Box.
Flow Control Regulator Assembly (FC)	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.

Location

Location Requirements

						
<p>Do not substitute or modify system components as this may impair intrinsic safety. For installation, maintenance or operation instructions, read instruction manuals. Do not install equipment approved only for non-hazardous location in a hazardous area. See the identification label (FIG. 1) on the EasyKey or fluid station for the intrinsic safety rating for your model.</p>						

- Mount EasyKey and Fluid Station within 50 ft (15.2 m) of each other, using 15U533 cable.
- NOTE:** An optional 15V213 100 ft (30.5 m) cable is also available.
- **EasyKey:** Install in the non-hazardous area at a convenient location for the operator to view and operate.
 - **Fluid Station:** Install according to requirements for Intrinsically Safe Installation (FIG. 3) and at a convenient location to connect to paint and solvent supplies.
- NOTE:** For an Intrinsically Safe Installation, the Fluid Station may be located inside or outside the hazardous location. Install according to appropriate electrical codes.

Intrinsically Safe Installation Requirements

See FIG. 3 on page 13.

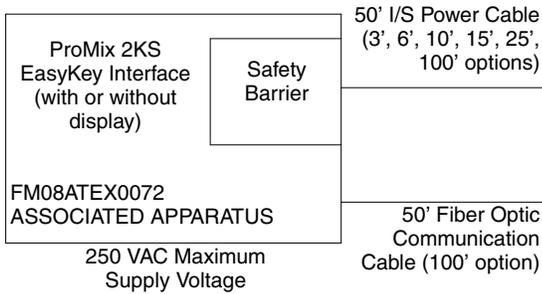
1. The non-intrinsically safe terminals (power rail) must not be connected to any device which uses or generates more than 250 Vrms or dc unless it has been determined that the voltage has been adequately isolated.
2. The installation must meet the requirements of the National Electric Code, Canadian 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.
5. For ATEX, install per EN 60079-14 and applicable local and national codes.
6. Install Coriolis flow meters as explosion proof (USA, Canada)/flameproof Ex d (ATEX) with passive intrinsically safe connections per the manufacturer's installation instructions and applicable codes.
7. Terminals 24 and 25 of optional Endress+Hauser Coriolis flow meters installed using intrinsically safe wiring methods. 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. Observe manufacturer's instructions for installation and use.
8. For ATEX installations, interconnecting cabling specified is Type A cable in accordance with EN 60079-14.

Optional Cables

Optional CAN cables and fiber optic cables are available from Graco. See the ProControl 1KS Repair-Parts manual for available part numbers and lengths.

FM08ATEX0074 SYSTEM ASSEMBLY CERTIFICATE

NON-HAZARDOUS LOCATION ONLY



NOTE: See **Intrinsically Safe Installation Requirements** on page 12.

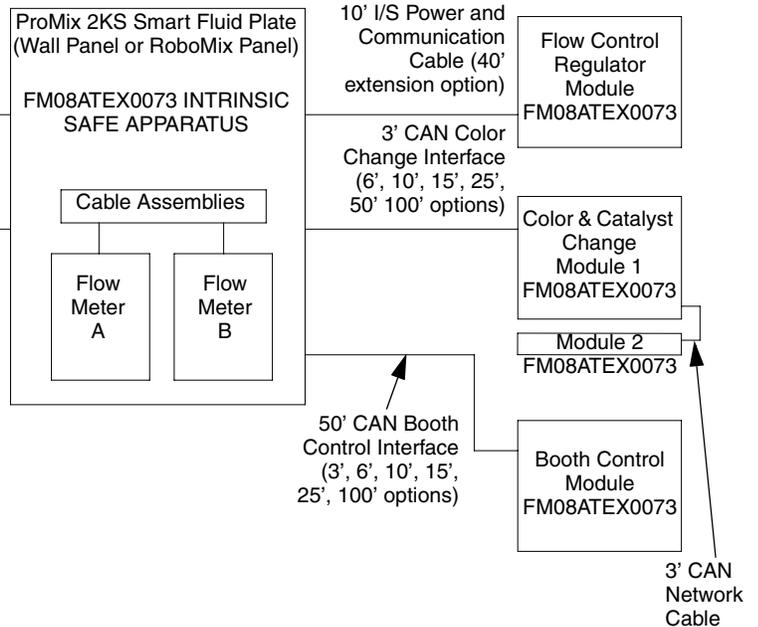
WARNING: Substitution of components may impair intrinsic safety. For installation, maintenance or operation instructions, see instruction manual.

ADVERTISSEMENT: La substitution de composants peut compromettre la securite intrinseque.

NOTE: This IS control drawing also applies to the ProControl 1KS. See also FIG. 4 on page 15.

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, DIV I, GROUP D, T3 (US AND CANADA)
CLASS I, ZONE I GROUP IIA T3 (ATEX ONLY)
TAUB = -20°C TO 50°C



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*	801-08-A-999-9-A-N-A-B-B-A-S

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.

IS Control Drawing 289833

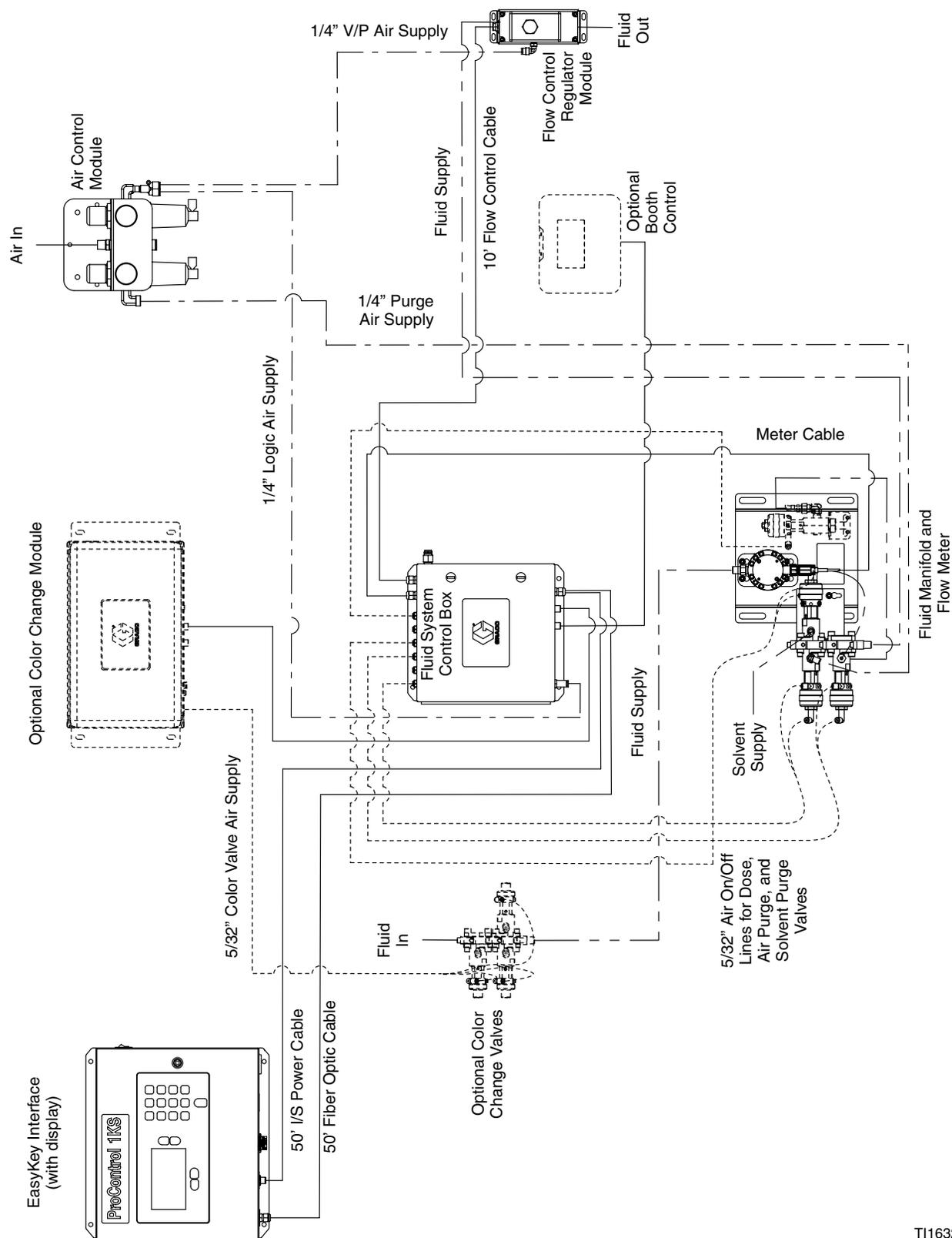
FIG. 3. Intrinsically Safe Installation

General Information

- Reference numbers and letters in parentheses in the text refer to numbers and letters in the illustrations.
- FIG. 2 on page 10 shows the basic components of a ProControl 1KS system, and FIG. 4 on page 15 shows a basic system layout. Contact your Graco distributor for an actual system design.
- Be sure all accessories are adequately sized and pressure-rated to meet system requirements.
- There must be a shutoff valve between each fluid supply line and the ProMix system.
- A 100 mesh minimum fluid filter must be installed on component A fluid supply line.
- To protect the EasyKey screens from paints and solvents, clear-plastic protective shields are available in packs of 10 (Part No. 197902). Clean the screens with a dry cloth if necessary.

Wall Mounting

1. See **Dimensions and Mounting Hole Layouts**, page 32.
2. Ensure that the wall and mounting hardware are strong enough to support the weight of the equipment, 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.
4. Drill mounting holes in the wall. Install anchors as needed.
5. Bolt equipment securely.



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FIG. 4. ProControl 1KS System Layout Drawing

Air Supply

Requirements

- **Compressed air supply pressure:** 75-100 psi (517-700 kPa, 5.2-7 bar).
- **Air hoses:** use grounded hoses that are correctly sized for your system.



Trapped air can cause a pump or dispense valve to cycle unexpectedly, which could result in serious injury from splashing or moving parts. Use bleed-type shutoff valves.

- **Air regulator and bleed-type shutoff valve:** include in each air line to fluid supply equipment. Install an additional shutoff valve upstream of all air line accessories to isolate them for servicing.
- **Air line filter:** a 10 micron or better air filter is recommended to filter oil and water out of the air supply and help avoid paint contamination and clogged solenoids. See FIG. 5.

Air Connections

See the **System Pneumatic Schematic** on page 29.

1. Tighten all ProControl system air and fluid line connections as they may have loosened during shipment.
2. Install a bleed-type air shutoff valve into the control air filter inlet. See FIG. 5.

NOTICE

Use separate air supply lines for the following two connections to avoid contaminating the purge air line with fluid if the air purge valve and a check valve failed.

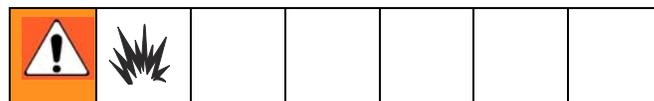
3. Connect a clean air supply line to the shutoff valve. This air line supplies air to operate the gun, solenoids, and dispense valves.

NOTE: See **Technical Data** on page 35 for additional air supply/consumption information.

4. Install a bleed-type shutoff valve into the air purge valve inlet line.
5. See FIG. 6. Use the air purge valve tubing (AT, supplied) to connect the air purge valve (APV) inlet to a clean, dry air supply (install filters/dryers as needed).

NOTICE

The ProControl potlife timer will not function properly when used with multiple guns operating simultaneously. To avoid having mixed material set in the equipment, carefully monitor potlife by some other means.



If using a Graco electrostatic PRO™ Gun, a shutoff valve must be installed in the gun air line to shutoff the atomizing and turbine air to the gun. Contact your Graco distributor for information on air shutoff valves for electrostatic applications.

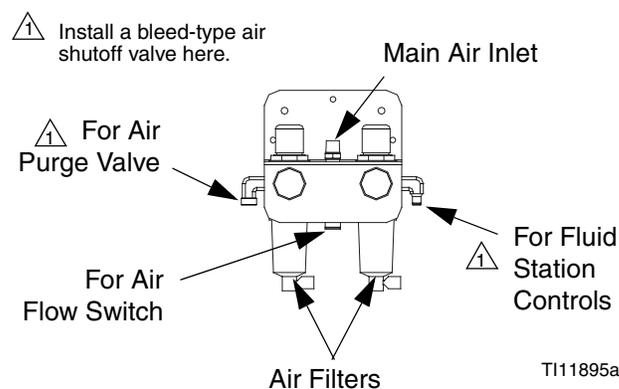


FIG. 5. Air Supply Control

Fluid Supply

Requirements

						
Do not exceed the pressure rating of the lowest rated component. See the identification label (FIG. 1 on 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.						

ProControl models are available to operate air spray or air-assisted systems with a capacity of up to 3800 cc/min.

- Fluid supply pressure tanks, feed pumps, or circulating systems can be used.
- Materials can be transferred from their original containers or from a central paint recirculating line.
- For an airless system, the user must supply a gun trigger signal to the ProControl 1KS.
- See manual 313599 for Coriolis meter installation and operation instructions.

NOTE: The fluid supply must be free of pressure spikes, which are commonly caused by pump stroke change-over. If necessary, install pressure regulators or a surge tank on the ProControl fluid inlets to reduce pulsation. Contact your Graco distributor for additional information.

Fluid Connections

1. Connect the solvent supply lines.
 - a. Connect the solvent supply line to the 1/4 npt(f) solvent purge valve inlet. See FIG. 6.
 - b. **Multiple color system:** also connect a solvent supply line to the color change stack (Q), top valve 4 or 5. See FIG. 7.

2. Connect the component supply line(s).
 - **Single color system:** connect component supply line to the component A flow meter inlet.
 - **Multiple color system:** connect supply lines to the color change valve stack (S) inlets. See FIG. 7. The color number is marked on the valve air supply line.

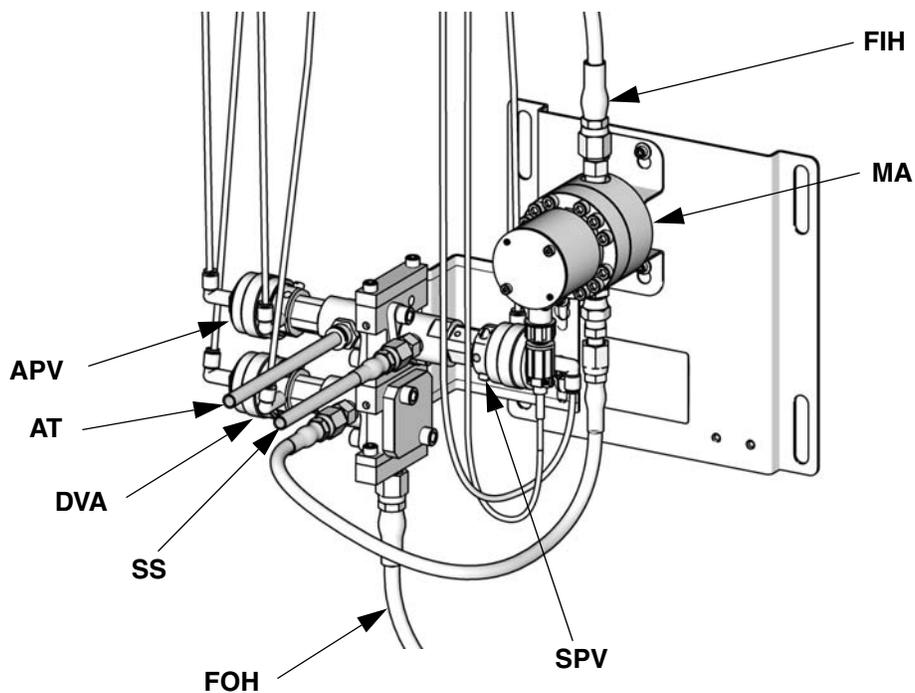
NOTE: Paint Recirculating System Only

- The color change valves have two fluid ports for each individual valve. If you are recirculating paint, plumb the valves in one port and out the other.
- Another option is to use a tee fitting to recirculate.

NOTE: Verify that all unused fluid ports on the color change valve stack are plugged before operation. An open port will leak fluid.

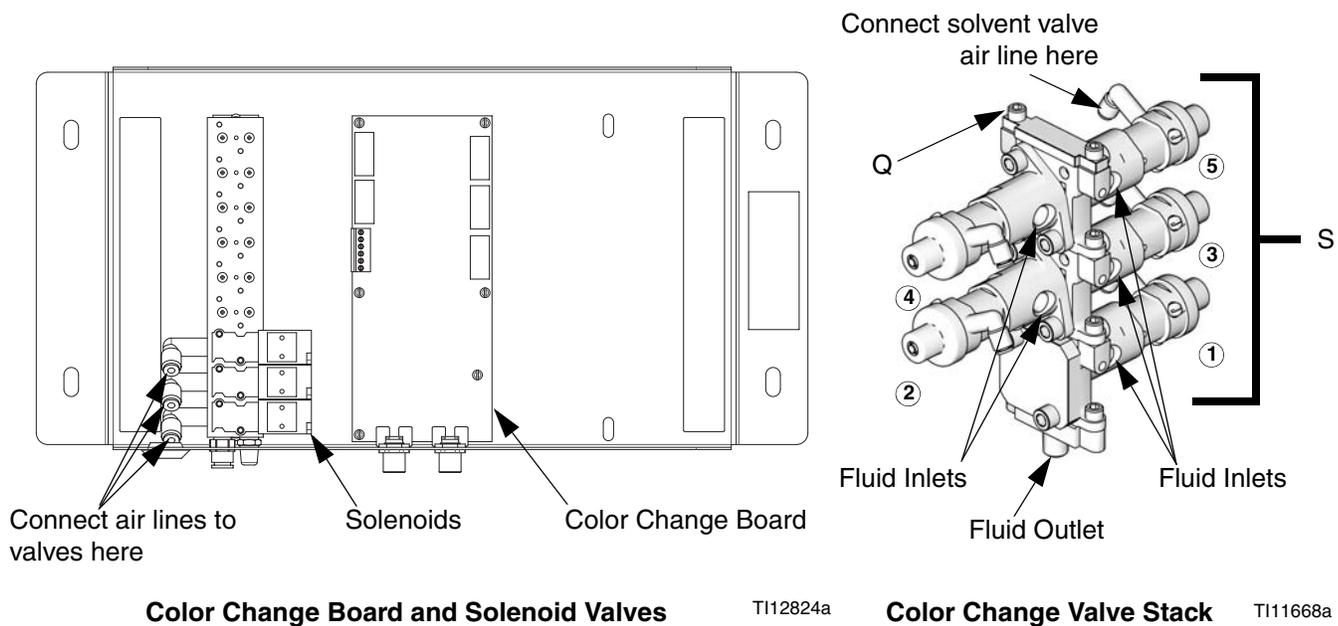
NOTE: The fluid meter inlet has a fluid check valve to prevent backflow from fluid supply pressure fluctuations. Backflow can cause ratio inaccuracies.

3. Connect the gun fluid supply line between the fluid regulator or fluid manifold outlets and the gun fluid inlet.



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FIG. 6. Fluid Manifold



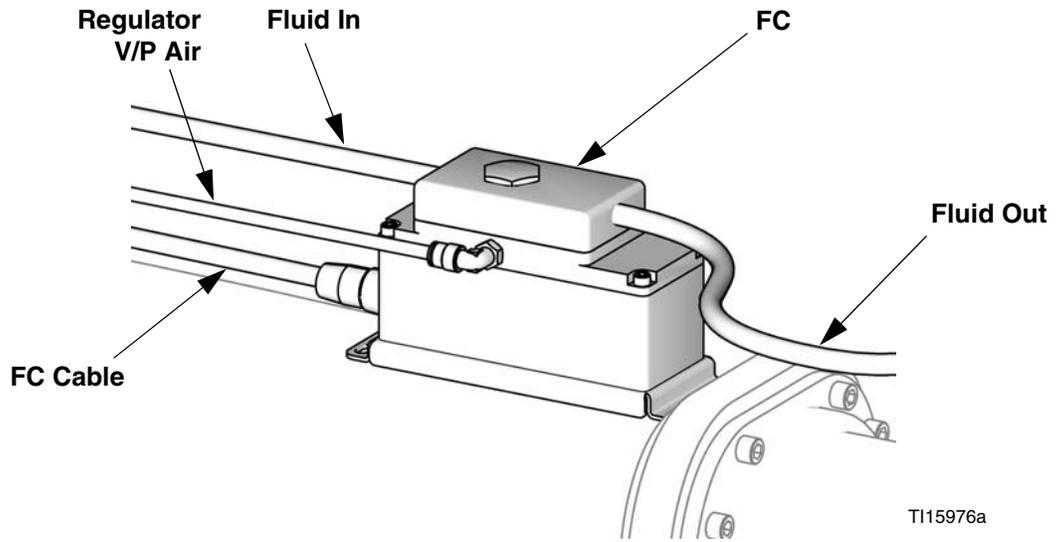
Color Change Board and Solenoid Valves

TI12824a

Color Change Valve Stack

TI11668a

FIG. 7. Color Change Valves Air and Fluid Connections



T115976a

FIG. 8. Flow Control Regulator

Electrical

Requirements

						
<p>All electrical wiring must be completed by a qualified electrician and comply with all local codes and regulations.</p> <p>Enclose all cables routed in the spray booth and high traffic areas in conduit to prevent damage from paint, solvent, and traffic.</p>						

NOTE: All options ordered on the ProControl system are electrically tested at the factory.

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.
- The input power access port  is 22.4 mm (0.88 in.) diameter. It accepts a bulkhead strain relief fitting or conduit. See FIG. 10.

Connect Main Power

1. Provide power to the EasyKey. Install a bulkhead strain relief or conduit bulkhead through the EasyKey port . See FIG. 10.
2. See FIG. 9 and the **System Electrical Schematic** on page 30 for the L1, N, and ground wiring connections inside the EasyKey.
3. Ground the EasyKey to a true earth ground. See **Grounding**, page 27.

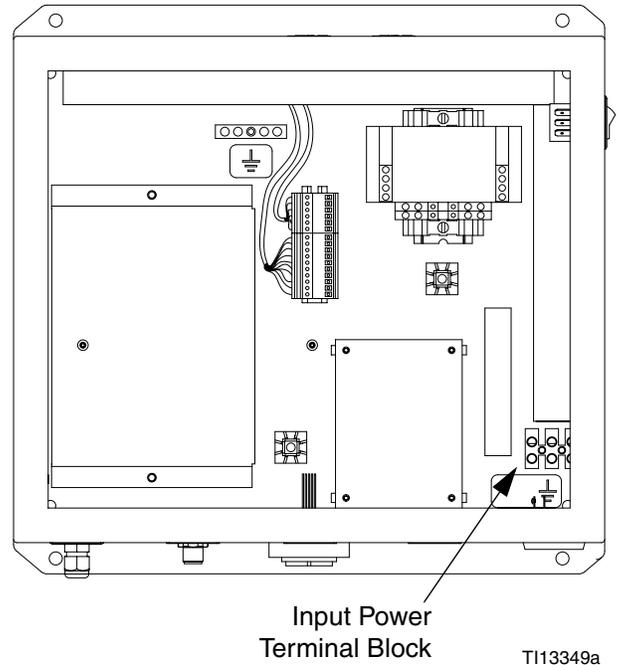


FIG. 9. Main Power Connection

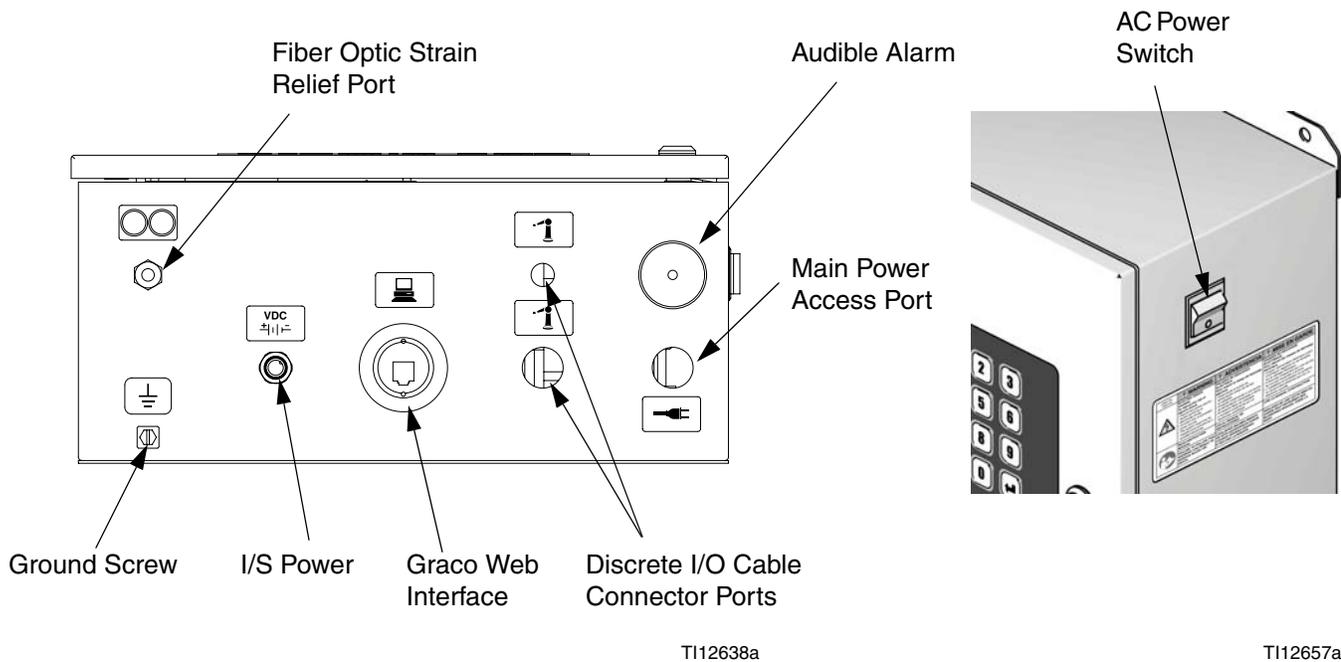


FIG. 10. EasyKey Connections and AC Power Switch

Connect EasyKey to Fluid Station Control

There are two 50 ft (15.2 m) cables to route between the EasyKey and Fluid Station Control: the Fluid Station Power Cable and the Fiber Optic Cable.

1. Connect the appropriate Fluid Station Power Cable end to the EasyKey connector $\overset{\text{VDC}}{\pm}| | \text{—}$. See FIG. 10.
2. Connect the other cable end to the Fluid Station Control connector $\overset{\text{VDC}}{\pm}| | \text{—}$ (J10). See FIG. 11.
3. The Fiber Optic Cable is shipped from the factory attached to the EasyKey connector . See FIG. 10.

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

4. Route the opposite Fiber Optic Cable end through the Fluid Station strain relief connector . Do not route the cable with tight bends or kinks.

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

5. Connect the blue and black cable connectors to the matching connectors on the fluid station circuit board. See FIG. 11. Insert the cable connectors until they bottom out (approximately ¼ in. [6 mm]), then tighten the threaded connector.

NOTICE

To avoid cracking the circuit board, do not over-tighten or cause excessive stress on the circuit board connector.

6. Tighten the strain relief connector .

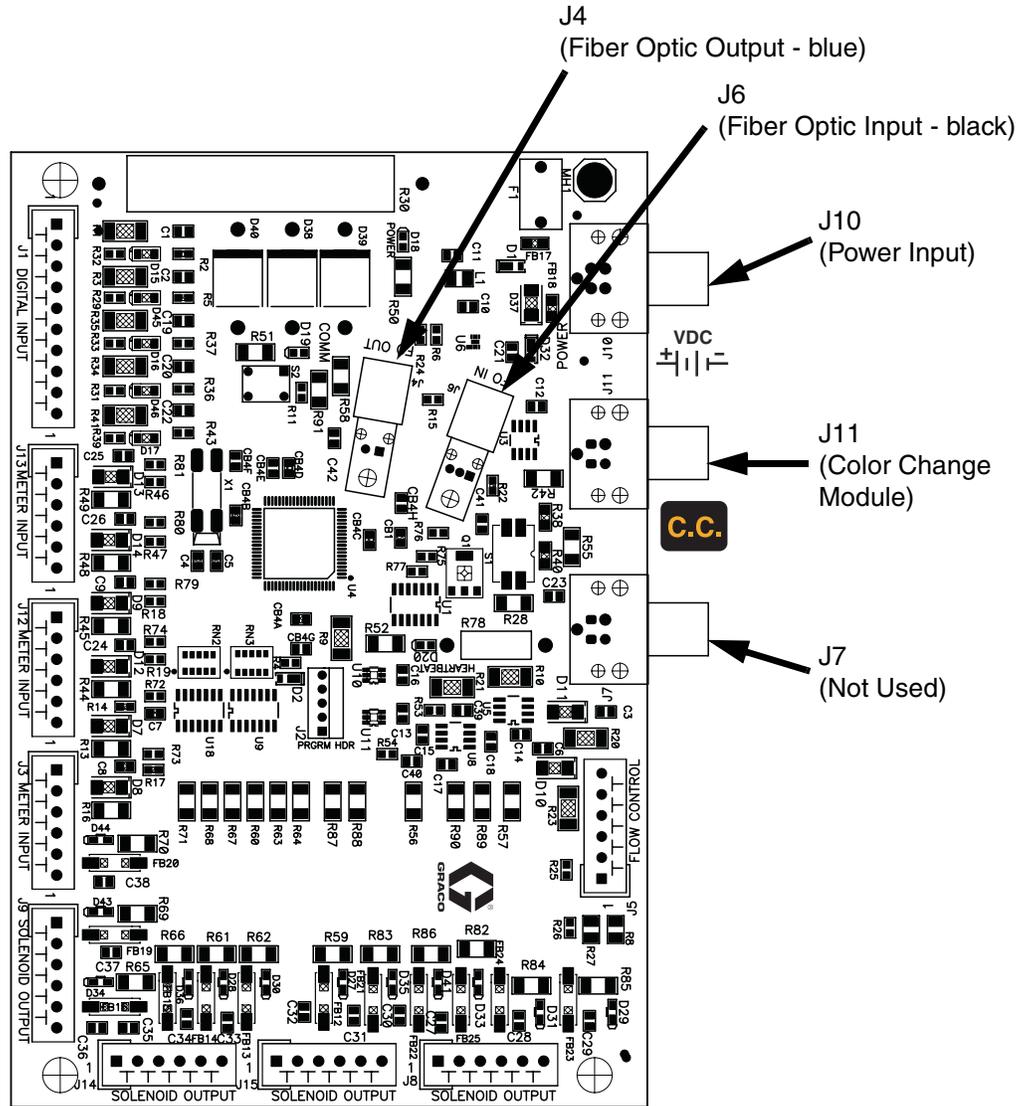


FIG. 11. Fluid Station Board Connections

Connect Color Change Module

To install the color change module(s), see manual 312787.

Connect a 5-pin electrical cable from the labeled connection port **C.C.** (J11) on the fluid station control board to the color change board. See FIG. 12.

If you are using two color change modules to add colors, connect a 5-pin electrical cable from the first color change board to the second color change board.

Set switches S3-S6 on the color change board(s) as shown in Table 2 and FIG. 12, depending on the number of color change boards and color change modules being used in your system.

For wiring between the color change board and the solenoids, see the color change module electrical schematic, FIG. 13.

Table 2: Color Change Board Switch Settings

Two Color Change Boards								
Color Change Board 1				Color Change Board 2				Effect on System
S3	S6	S5	S4	S3	S6	S5	S4	
Termination Resistor	Board ID	Catalyst On/Off	Color On/Off	Termination Resistor	Board ID	Catalyst On/Off	Color On/Off	
OFF	ON	OFF	ON	ON	OFF	NOT USED		0 catalyst valves, 30 color valves
One Color Change Board								
ON	ON	OFF	ON	NOT USED				0 catalyst valves, 12 color valves

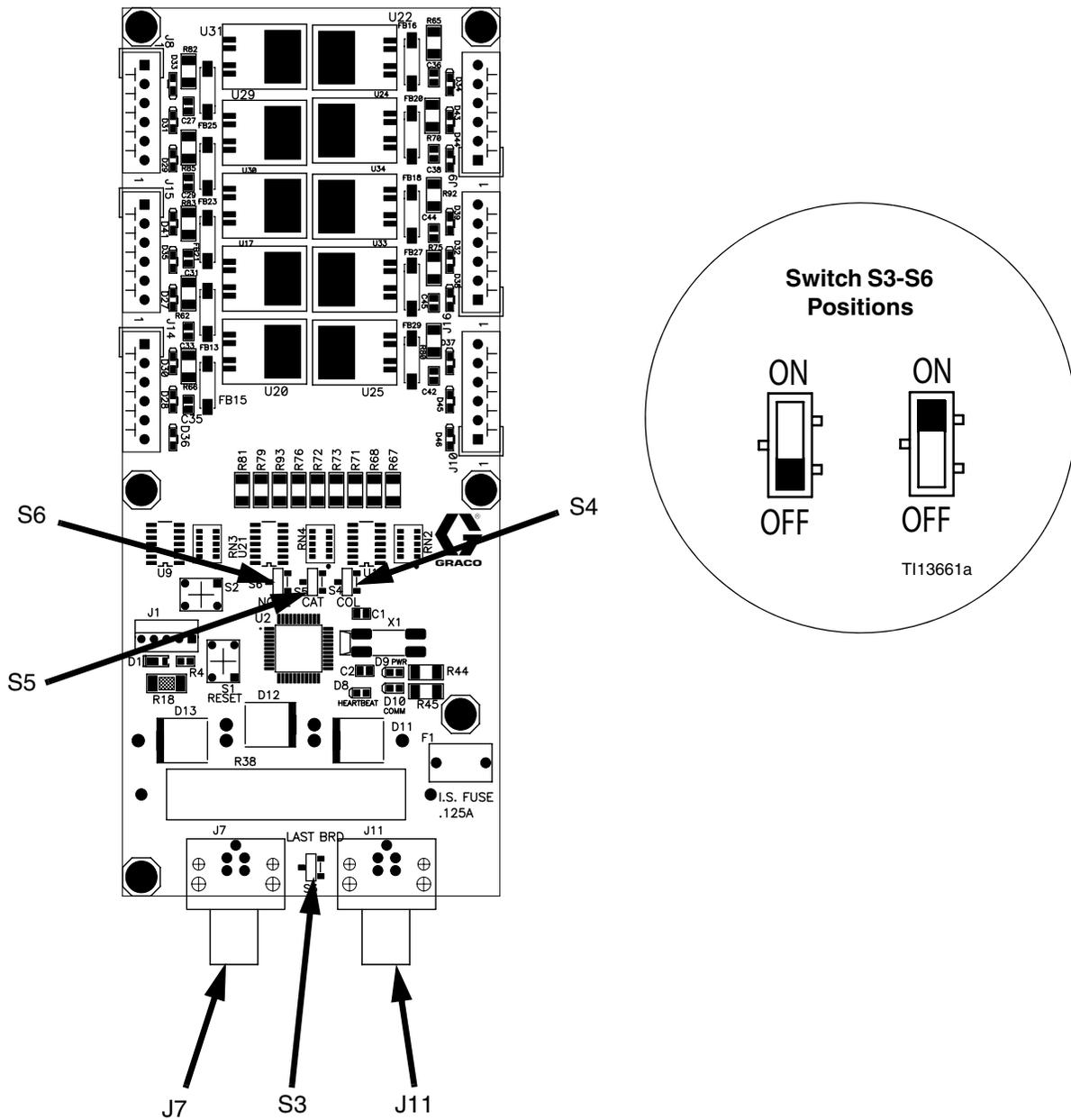


FIG. 12. Color Change Board Switches S3-S6

WIRING DIAGRAM

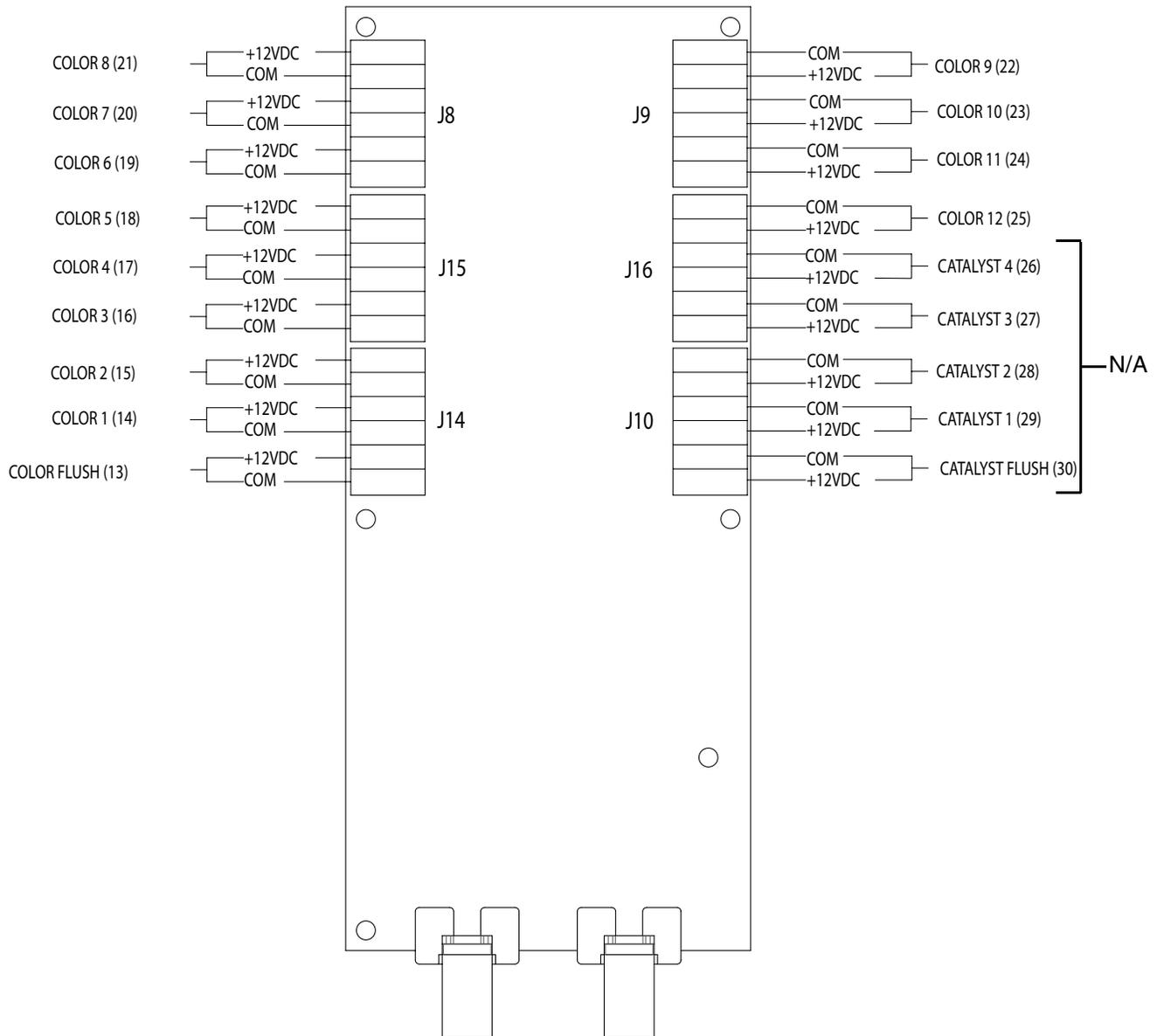


FIG. 13. Color Change Module Electrical Schematic

Grounding

						
<p>Your system must be grounded. Read Warnings, page 6. For intrinsic safety, ground wires for the EasyKey, Fluid Station, and Gun Flush Box must all be connected to the same true earth ground. See FIG. 14, page 28.</p>						

Ground the ProControl system as instructed here and in the individual component manuals. A ground wire and clamp, part no. 223547, is available from Graco.

NOTE: To prevent electrical noise interference from high voltage equipment, do not connect the robot ground to the same ground point used by these ProControl components.

NOTE: Different ground points (unequal potential) may cause current to flow through component cables, causing incorrect signals.

EasyKey

Connect a ground wire from the EasyKey ground screw to a true earth ground. FIG. 14.

Gun Flush Box (Manual or Semi-automatic mode only)

Connect a ground wire from the Gun Flush Box ground lug to a true earth ground. FIG. 14.

Wall Mount Fluid Station

Connect a ground wire from the Wall Mount Fluid Station ground screw to a true earth ground. FIG. 14.

Color Change Module

Connect a ground wire from the Color Change Module ground screw to a true earth ground. A ground wire and clamp, part no. 223547, is available from Graco. FIG. 14.

Flow Meters

Connect the meter cables as shown in the **System Electrical Schematic Hazardous Area** on page 31. 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/containers placed on a grounded surface. Do not place the pail/container on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

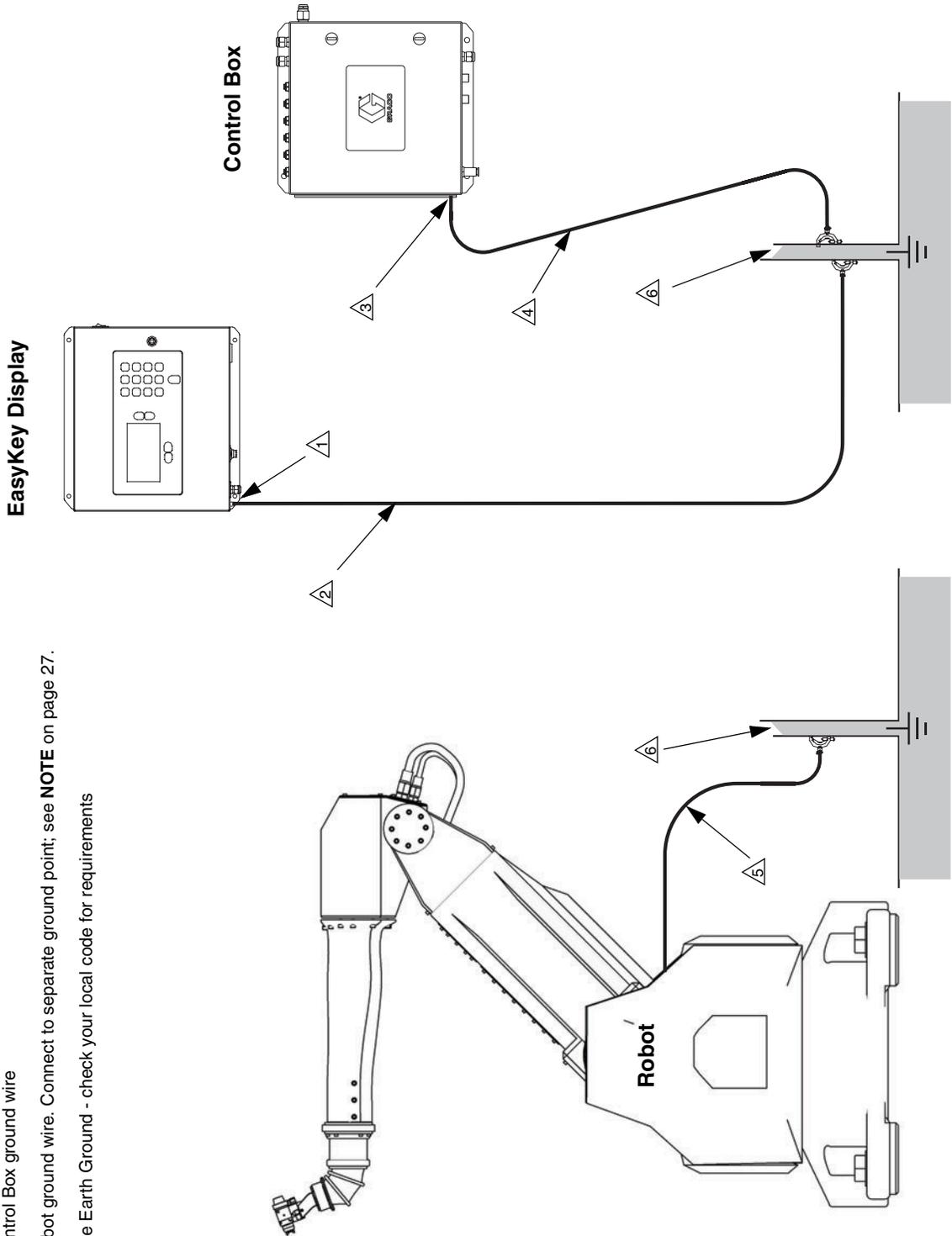
Check Resistance

						
<p>To ensure proper grounding, resistance between Pro-Mix components and true earth ground must be less than 1 ohm. Read Warnings, page 6.</p>						

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.

Key:

- ① EasyKey ground screw
- ② EasyKey ground wire
- ③ Control Box ground screw
- ④ Control Box ground wire
- ⑤ Robot ground wire. Connect to separate ground point; see **NOTE** on page 27.
- ⑥ True Earth Ground - check your local code for requirements

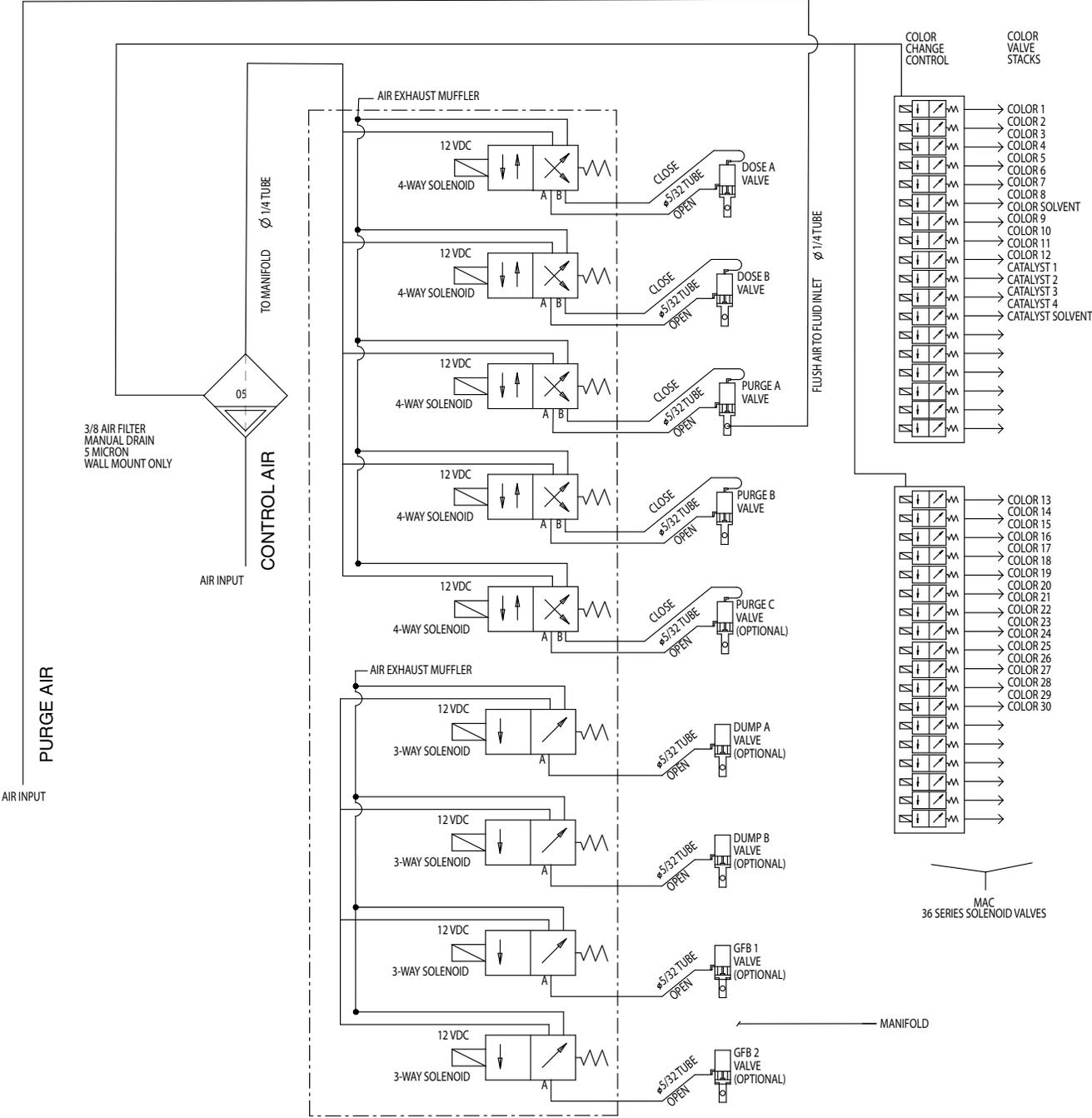


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FIG. 14: Grounding

Schematic Diagrams

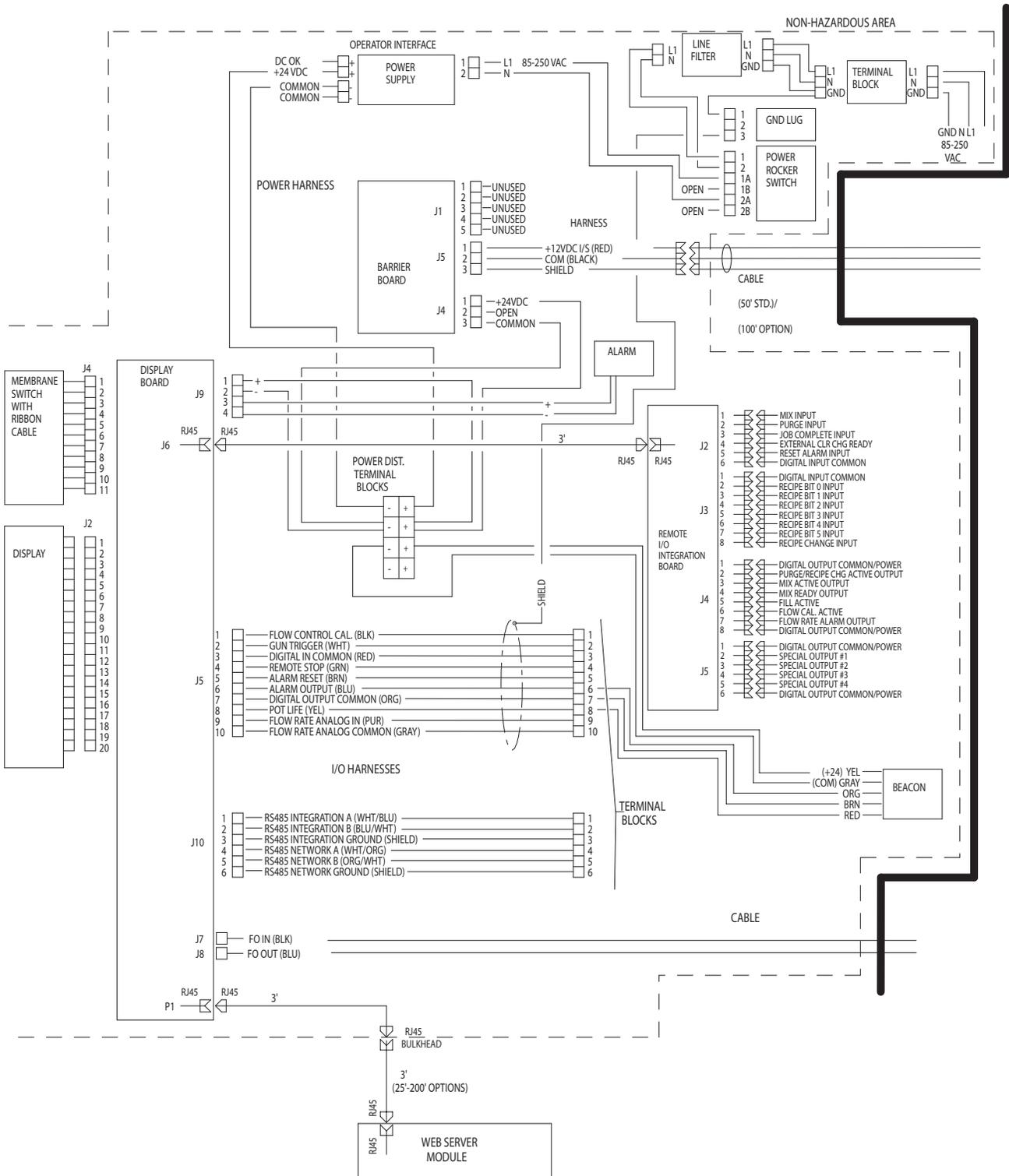
System Pneumatic Schematic



System Electrical Schematic

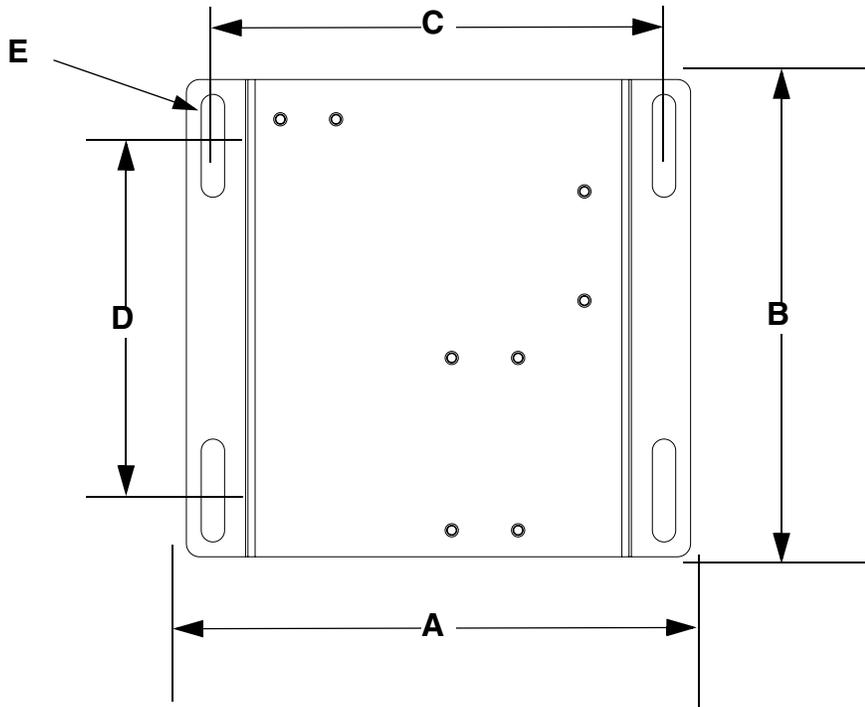
NOTE: The electrical schematic illustrates all possible wiring expansions in a ProControl 1KS system. Some components shown are not included with all systems.

Non-Hazardous Area



Dimensions and Mounting Hole Layouts

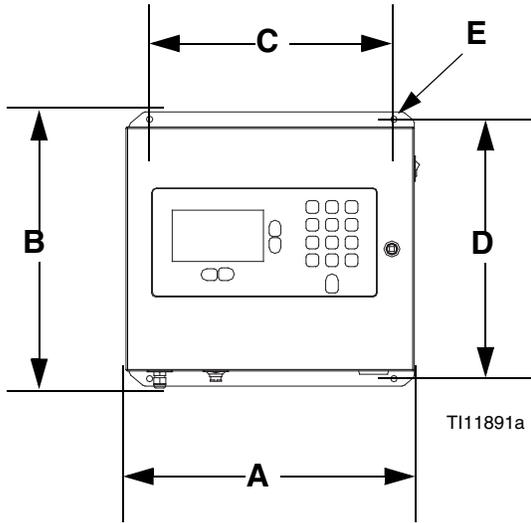
Wall Panel
(mounting bracket only)



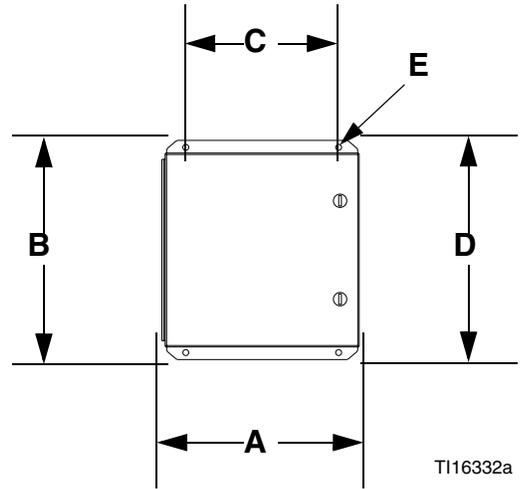
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Module	A Overall Width in. (mm)	Overall Depth in. (mm)	B Overall Height in. (mm)	Mounting Dimensions, Width (C) x Height (D) in. (mm)	E Mounting Hole Size in. (mm)	Weight lb (kg)
EasyKey	14.0 (355.6)	6.6 (167.6)	13.5 (342.9)	12.0 x 12.75 (304.8 x 323.9)	0.3 (7.6)	22.2 (10.1)
Control Box	10.16 (258.0)	6.0 (152.4)	11.48 (291.6)	8.0 x 10.75 (203.2 x 273.0)	0.3 (7.6)	need data
Wall Panel (bracket only)	9.5 (241.3)	0.5 (12.7)	9.0 (228.6)	8.5 x adjustable from 5.0-8.0 (212.5 x 127.0-203.2)	0.5 (12.7)	need data
Air Supply Control	8.9 (226.1)	3.8 (96.5)	9.9 (251.5)	4.75 (120.7)	0.34 (8.73)	4.65 (2.12)
Flow Control Module	7.13 (181.1)	2.52 (64.0)	3.86 (98.0)	6.63 x 1.50 (168.4 x 38.1)	0.25 (6.3)	3.9 (1.78)

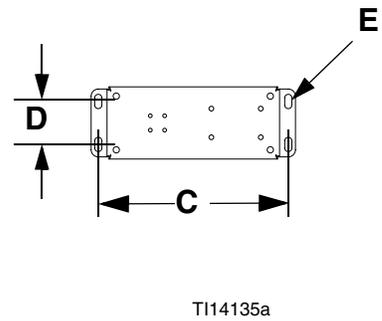
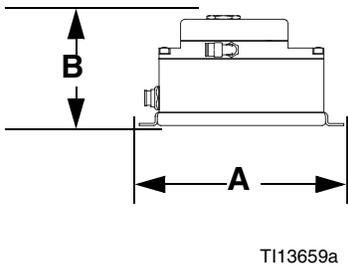
EasyKey



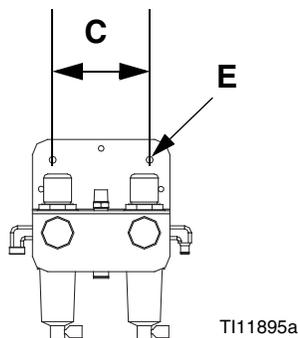
Control Box



Flow Control Module



Air Supply Control



Technical Data

Maximum fluid working pressure	<i>Base system:</i> 4000 psi (27.58 MPa, 275.8 bar) <i>Low pressure color change:</i> 300 psi (2.07 MPa, 20.6 bar) <i>Coriolis meter:</i> 2300 psi (15.86 MPa, 158.6 bar) <i>Flow control:</i> 190 psi (1.31 MPa, 13.1 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 filter inlet size	3/8 npt(f)
Air filtration for air logic and purge air (Graco-supplied).	5 micron (minimum) filtration required; clean and dry air
Air filtration for atomizing air (user-supplied)	30 micron (minimum) filtration required; clean and dry air
Fluids handled	one component: <ul style="list-style-type: none"> • solvent and waterborne paints • polyurethanes • epoxies • acid catalyzed varnishes • moisture sensitive isocyanates
Viscosity range of fluid	20- 5000 cps*
Fluid filtration (user-supplied)	100 mesh minimum
Fluid flow rate range*	
G3000, G250 Meter	75 - 3800 cc/min. (0.02-1.00 gal./min.)
G3000HR, G250HR Meter	38 - 1900 cc/min. (0.01-0.50 gal./min.)
Coriolis Meter	20 - 3800 cc/min. (0.005-1.00 gal./min.)
S3000 Solvent Meter (accessory)	38 - 1900 cc/min. (0.01-0.50 gal./min.)
Fluid inlet sizes	
Flow Meter	1/4 npt(f)
Dose Valve/Color Valve Adapters	1/4 npt(f)
Fluid outlet size (static mixer)	1/4 npt(f)
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, Tungsten carbide (with nickel binder), perfluoroelastomer; PTFE

* Dependent on programmed K-factor and application. The 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.

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