



## ProMix® PD2K Proportioner Integrated for Automatic Spray Applications

3A4129B

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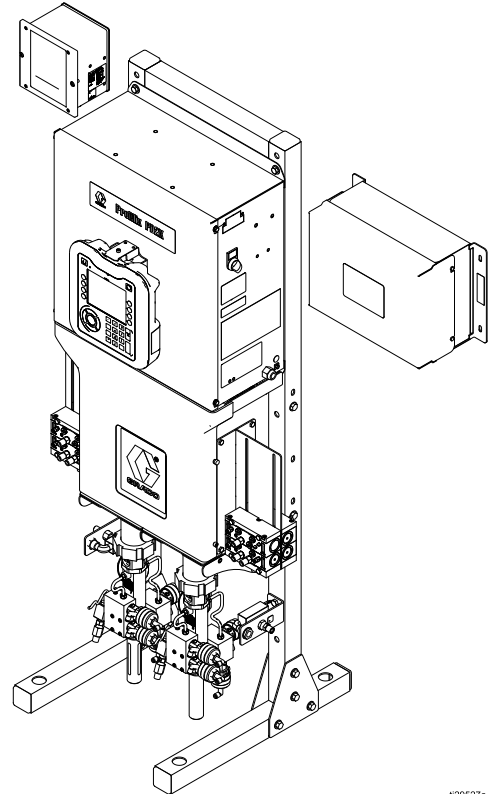
Electronic positive displacement proportioner integrated with air controls and electrostatics for fast-setting two-component materials. Automatic system with Advanced Display Module. For professional use only.



### Important Safety Instructions

Read all warnings and instructions in this manual and in your operation, repair, and associated component manuals. Save these instructions.

*See page 3 for model part numbers and approvals information.*



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## Related Manuals

Current manuals are available at [www.graco.com](http://www.graco.com).

| Manual No. | Description                                                               |
|------------|---------------------------------------------------------------------------|
| 332709     | ProMix PD2K Proportioner for Automatic Spray Applications, Repair — Parts |
| 332458     | ProMix PD2K Proportioner for Automatic Spray Applications, Installation   |
| 332564     | ProMix PD2K Proportioner for Automatic Spray Applications, Operation      |
| 332339     | Dosing Pumps, Instructions — Parts                                        |
| 332454     | Color/Catalyst Dispense Valves, Instructions — Parts                      |
| 333282     | Color Change and Remote Mix Manifold Kits, Instructions — Parts           |
| 332456     | Pump Expansion Kits, Instructions — Parts                                 |
| 334183     | Modbus TCP Gateway Module, Instructions — Parts                           |
| 334494     | ProMix PD2K CGM Installation Kits, Instructions — Parts                   |

| Manual No. | Description                                                    |
|------------|----------------------------------------------------------------|
| 3A3465     | Integrated Air Control, Instructions                           |
| 3A3657     | ProBell Electrostatic Controller, Instructions                 |
| 3A3953     | ProBell Speed Controller, Instructions                         |
| 313516     | Automatic AirPro Spray Guns, Instructions — Parts              |
| 311052     | Automatic G40 Air-Assisted Spray Guns, Instructions — Parts    |
| 332992     | Pro Xpc Auto Electrostatic Air Spray Gun, Instructions — Parts |
| 333266     | Pro Xpc Auto Controller, Instructions                          |
| 313869     | AirPro EFX Automatic Spray Gun, Instructions — Parts           |
| 334452     | ProBell Rotary Applicator, Instructions — Parts                |
| 334626     | ProBell Rotary Applicator, Hollow Wrist, Instructions — Parts  |
| 309919     | In-Line Air Filters and Coalescers, Instructions — Parts       |

# Models

## Positive Displacement Proportioner

| Part No. | Maximum Air Working Pressure | Maximum Fluid Working Pressure                               |
|----------|------------------------------|--------------------------------------------------------------|
| AC0500   | 100 psi (0.7 MPa, 7.0 bar)   | With low-pressure pumps:<br>300 psi (2.068 MPa, 20.68 bar)   |
|          |                              | With high-pressure pumps:<br>1500 psi (10.34 MPa, 103.4 bar) |
| AC1000   | 100 psi (0.7 MPa, 7.0 bar)   | 300 psi (2.068 MPa, 20.68 bar)                               |
| AC2000   | 100 psi (0.7 MPa, 7.0 bar)   | 1500 psi (10.34 MPa, 103.4 bar)                              |



## Integrated Air Control

| Part No. | Description               | Maximum Air Working Pressure |
|----------|---------------------------|------------------------------|
| 26A010   | Integrated Air Controller | 100 psi (0.7 MPa, 7.0 bar)   |



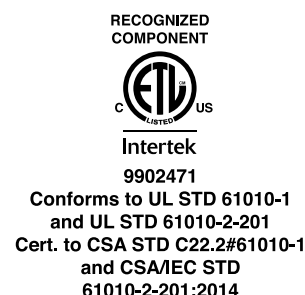
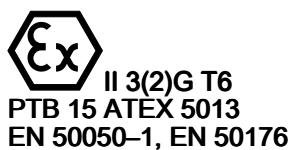
## Speed Controller

| Part No. | Description      | Maximum Air Working Pressure |
|----------|------------------|------------------------------|
| 24Z220   | Speed Controller | 100 psi (0.7 MPa, 7.0 bar)   |



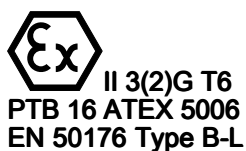
## Pro Xpc Auto Electrostatic Controller

| Part No. | Description                           | Maximum Gun Voltage Output |
|----------|---------------------------------------|----------------------------|
| 24Y307   | Pro Xpc Auto Controller, solventborne | 100 kV                     |



## ProBell Electrostatic Controller

| Controller | Description                                    | Maximum Voltage Output at Applicator |
|------------|------------------------------------------------|--------------------------------------|
| 24Z098     | ProBell Electrostatic Controller, solventborne | 100 kV                               |



# 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 or on warning labels, 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.

|  <b>WARNING</b>                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><br><br> | <b>FIRE AND EXPLOSION HAZARD</b><br>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion: <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Never spray or flush solvent at high pressure.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock, Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul> |
| <br>                                                                                                                                                                         | <b>ELECTRIC SHOCK HAZARD</b><br>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock. <ul style="list-style-type: none"> <li>• Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.</li> <li>• Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



# WARNING

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p><b>INTRINSIC SAFETY</b></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"> <li>• Be sure your installation complies with national, state, and local codes for the installation of electrical apparatus in a Class I, Group D, Division 1 (North America) or Class I, Zones 1 and 2 (Europe) Hazardous Location, including all of the local safety fire codes (for example, NFPA 33, NEC 500 and 516, OSHA 1910.107, etc.).</li> <li>• To help prevent fire and explosion:             <ul style="list-style-type: none"> <li>• Do not install equipment approved only for a non-hazardous location in a hazardous location. See model ID label for the intrinsic safety rating of your model.</li> <li>• Do not substitute system components as this may impair intrinsic safety.</li> </ul> </li> <li>• Equipment that comes in contact with the intrinsically safe terminals must be rated for Intrinsic Safety. This includes DC voltage meters, ohmmeters, cables, and connections. Remove the unit from the hazardous area when troubleshooting.</li> </ul> |
|   | <p><b>SKIN INJECTION HAZARD</b></p> <p>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. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Do not point gun at anyone or at any part of the body.</li> <li>• Do not put your hand over the spray tip.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop spraying/dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                          |
|  | <p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>• Keep clear of moving parts.</li> <li>• Do not operate equipment with protective guards or covers removed.</li> <li>• Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> and disconnect all power sources.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  | <p><b>TOXIC FLUID OR FUMES</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read Safety Data Sheet (SDS) for handling instructions and to know the specific hazards of the fluids you are using, including the effects of long-term exposure.</li> <li>• When spraying, servicing equipment, or when in the work area, always keep work area well ventilated and always wear appropriate personal protective equipment. See <b>Personal Protective Equipment</b> warnings in this manual.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



# WARNING



## PERSONAL PROTECTIVE EQUIPMENT

Always wear appropriate personal protective equipment and cover all skin when spraying, servicing equipment, or when in the work area. Protective equipment helps prevent serious injury, including long-term exposure; inhalation of toxic fumes, mists, or vapors; allergic reactions; burns; eye injury and hearing loss. This protective equipment includes, but is not limited to:

- A properly fitting respirator, which may include a supplied-air respirator, chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority.
- Protective eyewear, and hearing protection.



## 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 Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request SDS 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. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- 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.

## Important Isocyanate (ISO) Information

Isocyanates (ISO) are catalysts used in two component materials.

### Isocyanate Conditions

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                   |                                                                                   |                                                                                   |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| <p>Spraying or dispensing fluids that contain isocyanates creates potentially harmful mists, vapors, and atomized particulates</p> <ul style="list-style-type: none"><li>• Read and understand the fluid manufacturer's warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to isocyanates.</li><li>• Use of isocyanates involves potentially hazardous procedures. Do not spray with the equipment unless you are trained, qualified, and have read and understood the information in this manual and in the fluid manufacturer's application instructions and SDS.</li><li>• Use of incorrectly maintained or mis-adjusted equipment may result in improperly cured material. Equipment must be carefully maintained and adjusted according to instructions in the manual.</li><li>• To prevent inhalation of isocyanate mists, vapors, and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the fluid manufacturer's SDS.</li><li>• Avoid all skin contact with isocyanates. Everyone in the work area must wear chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. After spraying, wash hands and face before eating or drinking.</li></ul> |                                                                                   |                                                                                   |                                                                                   |  |

### Material Self-ignition

|                                                                                                                                         |                                                                                     |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|--|
|                                                        |  |  |  |  |
| <p>Some materials may become self-igniting if applied too thick. Read material manufacturer's warnings and Safety Data Sheet (SDS).</p> |                                                                                     |  |  |  |

### Keep Components A and B Separate

|                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |                                                                                     |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|
|                                                                                                                                                                                                                                                                                           |  |  |  |  |
| <p>Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination:</p> <ul style="list-style-type: none"><li>• <b>Never</b> interchange component A and component B wetted parts.</li><li>• Never use solvent on one side if it has been contaminated from the other side.</li></ul> |                                                                                     |                                                                                     |  |  |



## Moisture Sensitivity of Isocyanates

Exposure to moisture (such as humidity) will cause ISO to partially cure; forming 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.

### NOTICE

Partially cured ISO will reduce performance and the life of all wetted parts.

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the ISO pump wet cup or reservoir (if installed) filled with appropriate lubricant. The lubricant creates a barrier between the ISO and the atmosphere.
- Use only moisture-proof hoses compatible with ISO.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Always lubricate threaded parts with an appropriate lubricant when reassembling.

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

## Changing Materials

### NOTICE

Changing the material types used in your equipment requires special attention to avoid equipment damage and downtime.

- 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.
- When changing between epoxies and urethanes or polyureas, disassemble and clean all fluid components and change hoses. Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the A (color) side.

## General Information

The PD2K Integrated System can coordinate the operation of four systems: a Positive Displacement Proportioner (models AC0500, AC1000, and AC2000), an Integrated Air Control (model 26A010), a Speed Controller (model 24Z220), and Electrostatic Controllers (model 24Y307 or 24Z098). See [Related Manuals, page 2](#) for additional information about each of the integrated systems.

- Reference numbers and letters in parentheses in the text refer to numbers and letters in the illustrations.
- The term “applicator” is used in this manual to refer to either “spray device” or “gun” where applicable.
- Be sure all accessories are adequately sized and pressure-rated to meet system requirements.
- To protect the screens from paints and solvents, clear-plastic protective shields (10 per pack) are available. Order Part No. 197902 for the Advanced Display Module. Clean the screens with a dry cloth if necessary.

# Configure Your System

## 1. Select a Base Model

Choose a PD2K base model that meets your application's requirements. See [Models, page 3](#).

Base unit components are described in the following table.

Base models include components A through F shown in the Typical Installation drawing on the next page.

| Base Model Component                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fluid Pumps (A, B)                          | The base models include two side-by-side fluid pumps, one side for color and the other side for catalyst. Install in the non-hazardous area.<br><br><b>NOTE:</b> By convention, the A side is either color or resin, depending on your needs, and the B side is always catalyst. Throughout this manual, references to "color" may also be applicable to "resin".                                                                                          |
| Solvent Flow Switch (C)                     | Confirms solvent flow to applicator during purge. The base models include two solvent flow switches; one for color, and one for catalyst.                                                                                                                                                                                                                                                                                                                  |
| Electrical Control Box (D)                  | The electrical control box includes a barrier board, intrinsically safe isolation board, 24 Vdc and 48 Vdc power supplies, Enhanced Fluid Control Module, and Pump Control Modules. The Gateway communication module is installed in the electrical control box. It accepts 90–250 Vac line power and converts that power to acceptable low voltage signals used by other system components. Install the electrical control box in the non-hazardous area. |
| Advanced Display Module (E)                 | The Advanced Display Module (ADM) enables the user to set up, monitor, and control the system. Install the ADM in the non-hazardous area.                                                                                                                                                                                                                                                                                                                  |
| CAN cable (F)                               | The CAN cable connects the Gateway communication module in the electrical control box (D) to the IS remote mix control module (R).                                                                                                                                                                                                                                                                                                                         |
| Air Control Component                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Air Control Box (V)                         | The air control box requires its own air supply. Air control provides closed loop pressure control for fan and atomizing air. Also contains applicator trigger output with three auxiliary solenoids for process control. Install the air control box in a non-hazardous area. See the Integrated Air Control Manual in <a href="#">Related Manuals, page 2</a> .                                                                                          |
| Electrostatic Controller Component          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Electrostatic Controller (Solventborne) (U) | The electrostatic controller allows a maximum of 100 kV and 150 $\mu$ A. The controller has built-in arc detection and can be controlled remotely through discrete I/O or Graco CAN. See the <i>Pro Xpc Auto Electrostatic Controller</i> manual or <i>ProBell Electrostatic Controller</i> manual in <a href="#">Related Manuals, page 2</a> .                                                                                                            |
| Speed Controller Component                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Speed Controller (X)                        | The speed controller directs the turbine air and braking air to the applicator. The controller uses a fiber optic signal from the ProBell applicator to provide precise closed-loop control of the cup rotational speed. See the <i>ProBell Speed Controller</i> manual in <a href="#">Related Manuals, page 2</a> .                                                                                                                                       |

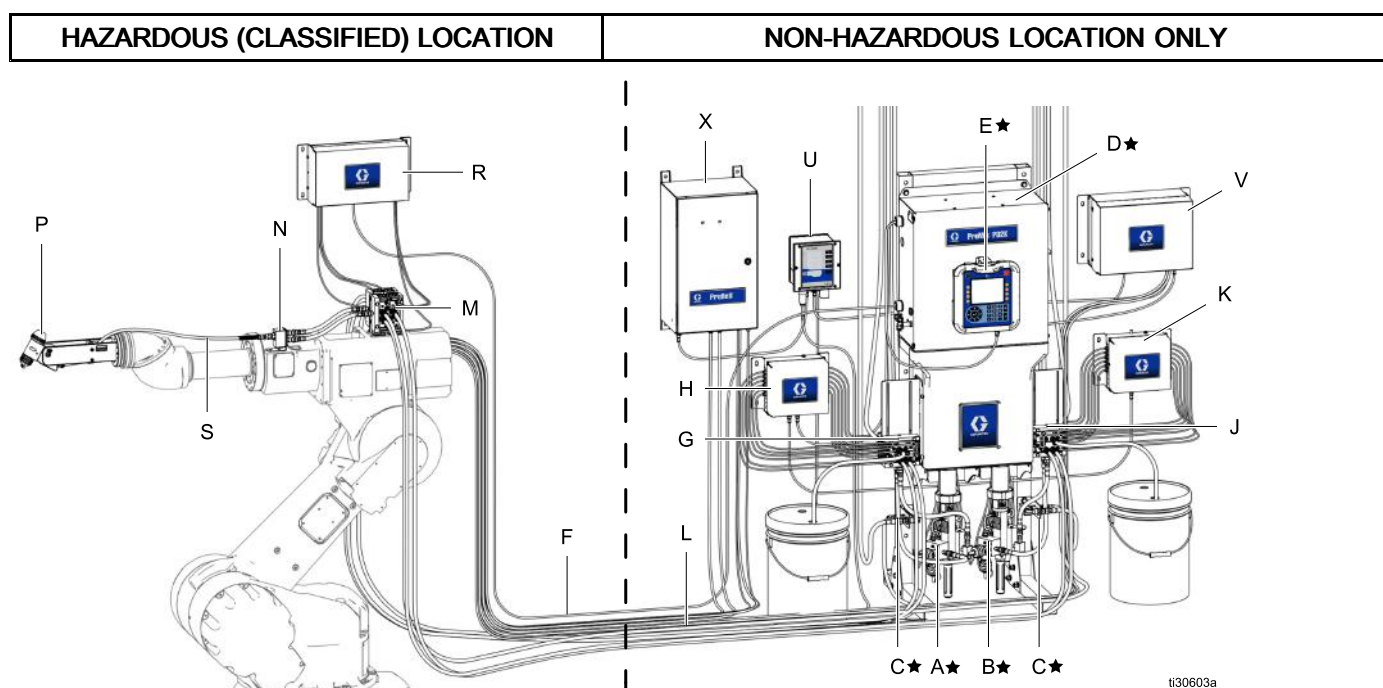


Figure 1 Typical Installation

| Component                                                                     | Description                                               |
|-------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>★ Components A through F are included with the base unit.</b>              |                                                           |
| A★                                                                            | Material A (Color) Pump                                   |
| B★                                                                            | Material B (Catalyst) Pump                                |
| C★                                                                            | Solvent Flow Switch                                       |
| D★                                                                            | Electrical Control Box                                    |
| E★                                                                            | Advanced Display Module                                   |
| F★                                                                            | CAN Communication Cable (not displayed)                   |
| <b>Components G through K are included in optional color change kits.</b>     |                                                           |
| G                                                                             | Color Change Valves (accessory, non-hazardous area)       |
| H                                                                             | Color Change Module (accessory, non-hazardous area)       |
| J                                                                             | Catalyst Change Valves (accessory, non-hazardous area)    |
| K                                                                             | Catalyst Change Module (accessory, non-hazardous area)    |
| <b>Components L through S are accessories and must be ordered separately.</b> |                                                           |
| L                                                                             | Fluid/Air Hose Bundle (accessory)                         |
| M                                                                             | Remote Color Change Manifold (accessory, hazardous area)  |
| N                                                                             | Remote Mix Manifold (accessory, hazardous area)           |
| P                                                                             | Automatic Spray Gun (accessory)                           |
| R                                                                             | IS Remote Mix Control Module (accessory, hazardous area)  |
| S                                                                             | Gun Fluid Hose Integrator (accessory)                     |
| T                                                                             | Supply Line Drain Valves (accessory, required, not shown) |
| U                                                                             | Electrostatic Controller                                  |
| V                                                                             | Air Control Box                                           |
| X                                                                             | Speed Controller                                          |

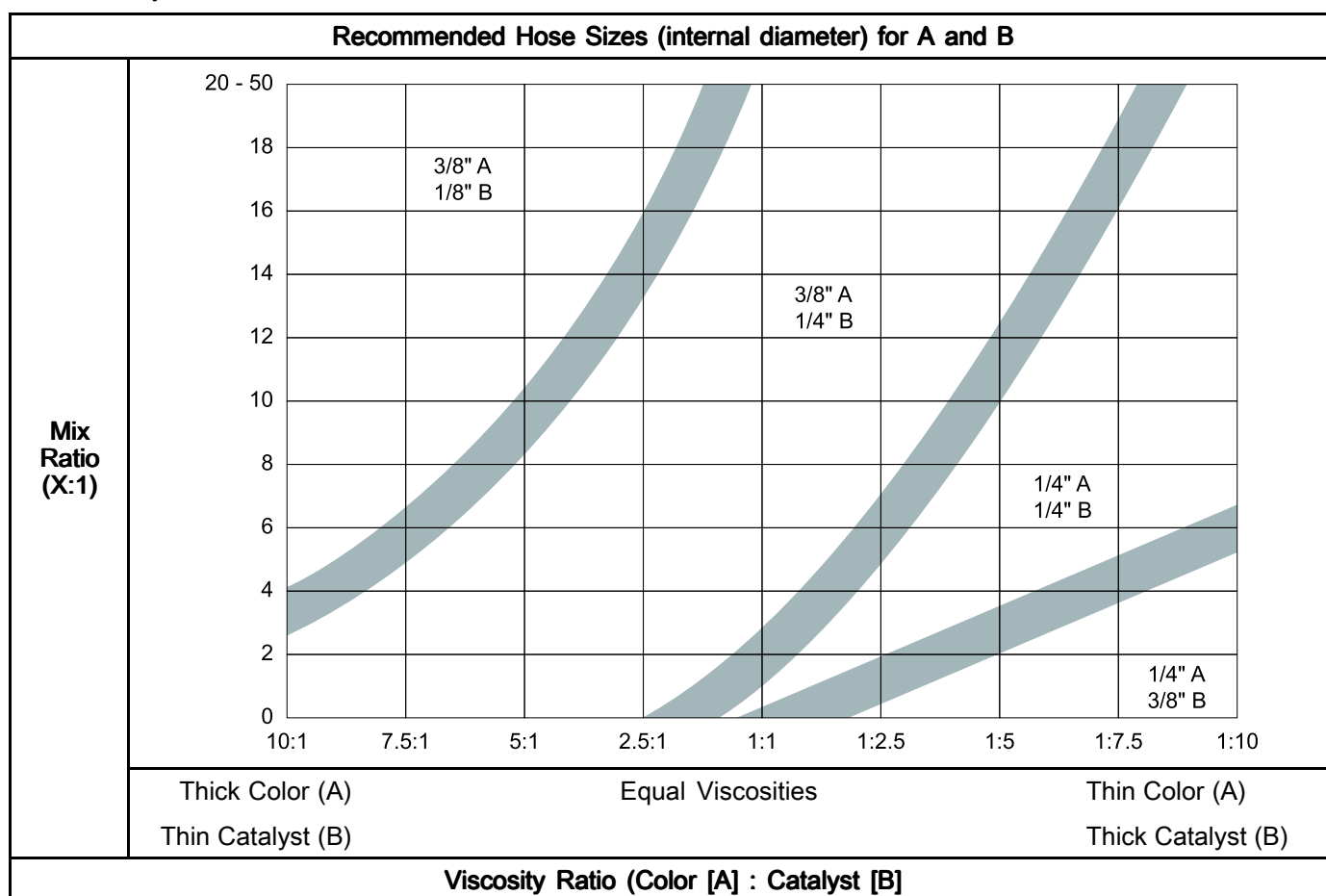
## 2. Select Hoses

### Hose Selection Tool

Use this chart to determine the proper size hoses for your mix ratio and viscosity, then select hoses for your application.

**NOTE:** Shaded areas may use hose sizes from either of the two adjacent areas.

**NOTE:** Always use Graco hoses.



### 1/4 in. (6 mm) ID Hoses

| Application   | Material     | Pressure     | Maximum Fluid Working Pressure | Length        |               |                |
|---------------|--------------|--------------|--------------------------------|---------------|---------------|----------------|
|               |              |              |                                | 15 ft (4.6 m) | 25 ft (7.6 m) | 50 ft (15.2 m) |
| Catalyst      | Moisture-Lok | High and Low | 2000 psi (13.8 MPa, 138 bar)   | 947078        | 24T134        | 24T135         |
|               | Nylon        | Low          | 225 psi (1.6 MPa, 16 bar)      | 17C967        | 24T266        | 24T267         |
|               |              | High         | 4100 psi (28.3 MPa, 283 bar)   | 238825        | 239107        | 239111         |
| Color         | Nylon        | Low          | 225 psi (1.6 MPa, 16 bar)      | 17C967        | 24T266        | 24T267         |
|               |              | High         | 4100 psi (28.3 MPa, 283 bar)   | 238825        | 239107        | 239111         |
| Solvent       | Nylon        | Low          | 225 psi (1.6 MPa, 16 bar)      | 17C967        | 24T266        | 24T267         |
|               |              | High         | 4100 psi (28.3 MPa, 283 bar)   | 238825        | 239107        | 239111         |
| Atomizing Air | Nylon        | Low          | 225 psi (1.6 MPa, 16 bar)      | 17C967        | 24T194        | 24T195         |

### 3. Select a Spray Gun

#### Spray Guns

Select an automatic applicator from the following table.

| Application                          | Gun Model     | Gun Manual No.   | Maximum Fluid Working Pressure | Air Control | Electro-static Controller SB | Speed Controller | Recip Mount Kit | Robot Mount Kit                                |
|--------------------------------------|---------------|------------------|--------------------------------|-------------|------------------------------|------------------|-----------------|------------------------------------------------|
| Conventional Air Spray               | AirPro® Auto  | 313516           | 100 psi (0.7 MPa, 7 bar)       | 26A123      | –                            | –                | –               | 24Y515                                         |
| Conventional Air Spray               | AirPro EFX™   | 313869           | 100 psi (0.7 MPa, 7 bar)       | 26A123      | –                            | –                | –               | 24Y515                                         |
| Conventional Air-Assisted Spray      | G40           | 311052           | 4000 psi (28 MPa, 280 bar)     | 26A123      | –                            | –                | –               | 24Y515                                         |
| Electro-static Air Spray             | Pro Xpc™ Auto | 332992           | 100 psi (0.7 MPa, 7 bar)       | 26A123      | 24Y307                       | –                | 24L044          | 24Y515                                         |
| Electro-static Rotary Atomizer Spray | Pro-Bell™     | 334452<br>334626 | 100 psi (0.7 MPa, 7 bar)       | 26A123      | 24Z098                       | 24Z220           | 24Z178          | (Hollow wrist model includes Quick Disconnect) |

**NOTE:** Pro XP™ Auto not supported by PD2K Integrated.

### 4. Select an Adapter Plate

#### Mount Adapter Plates

Select an adapter from the following table.

| Manufacturer    | Robot Model                 | Graco Adapter |
|-----------------|-----------------------------|---------------|
| Fanuc           | Paint Mate 200iA / 200iA/5L | 24Y768        |
| Fanuc           | P250 / P50                  | 24Y769        |
| Yaskawa Motoman | EPX1250                     | 24Y128        |
| Yaskawa Motoman | EPX2050                     | 24Y634        |
| Yaskawa Motoman | EPX2700/2800/2900           | 24Y650        |
| ABB             | IRB 540                     | 24Y172        |
| ABB             | IRB 1400                    | 24Y173        |
| ABB             | IRB 580/5400                | 24Y634        |

## 5. Select Non-Intrinsically-Safe Color and Catalyst Change Kits

Using the following table, choose the non-IS color/catalyst change kits that meet your application's requirements. The kits include a manifold with valves and a control module for installation in the non-hazardous area. See Color Change and Remote Mix Manifold manual in [Related Manuals, page 2](#) for more information.

**Table 1 . Low Pressure Color/Catalyst Change Kits  
(300 psi [2.068 MPa, 20.68 bar])**

| Kit Part No.                             | Kit Description                     |
|------------------------------------------|-------------------------------------|
| <b>Low Pressure Non-Circulating Kits</b> |                                     |
| 24X316                                   | 1 color or 1 catalyst change valve  |
| 24R915                                   | 2 color or 2 catalyst change valves |
| 24R916                                   | 4 color or 4 catalyst change valves |
| 24R917                                   | 6 color change valves               |
| 24R918                                   | 8 color change valves               |
| <b>Low Pressure Circulating Kits</b>     |                                     |
| 24X317                                   | 1 color or 1 catalyst change valve  |
| 24R919                                   | 2 color or 2 catalyst change valves |
| 24R920                                   | 4 color or 4 catalyst change valves |
| 24R921                                   | 6 color change valves               |
| 24R922                                   | 8 color change valves               |

**Table 2 . High Pressure Color/Catalyst Change Kits  
(1500 psi [10.34 MPa, 103.4 bar])**

| Kit Part No.                                              | Kit Description                     |
|-----------------------------------------------------------|-------------------------------------|
| <b>High Pressure Non-Circulating Kits</b>                 |                                     |
| 24X318                                                    | 1 color or 1 catalyst change valve  |
| 24R959                                                    | 2 color or 2 catalyst change valves |
| 24R960                                                    | 4 color or 4 catalyst change valves |
| 24R961                                                    | 6 color change valves               |
| 24R962                                                    | 8 color change valves               |
| <b>High Pressure Acid-Compatible Non-Circulating Kits</b> |                                     |
| 24T579                                                    | 2 catalyst change valves            |
| 24T580                                                    | 4 catalyst change valves            |
| <b>High Pressure Circulating Kits</b>                     |                                     |
| 24X319                                                    | 1 color or 1 catalyst change valve  |
| 24R963                                                    | 2 color or 2 catalyst change valves |
| 24R964                                                    | 4 color or 4 catalyst change valves |
| 24R965                                                    | 6 color change valves               |
| 24R966                                                    | 8 color change valves               |

## 6. Select Intrinsically-Safe Remote Color Change Kits

IS remote color change manifold kits include a manifold with valves and a control module, which may be installed in the hazardous area. The remote color change manifold kit must have the same number of color valves and catalyst valves as the color/catalyst change kit you selected in the previous step. The remote color change manifolds attach to the robot arm or wall, allowing mixing to occur close to the point of spray. See Color Change and Remote Mix Manifold manual in [Related Manuals](#), page 2 for more information.

**Table 3 . Low Pressure, Non-Circulating Remote Color Change Manifold Kits**  
(300 psi [2.068 MPa, 20.68 bar])

| Number of Color + Solvent Valves | Number of Catalyst + Solvent Valves |        |        |
|----------------------------------|-------------------------------------|--------|--------|
|                                  | 1                                   | 2      | 4      |
| 1                                | 24V157                              |        |        |
| 2                                | 24V158                              | 24V331 |        |
| 4                                | 24V159                              | 24V332 | 24V343 |
| 6                                | 24V160                              | 24V333 | 24V344 |
| 8                                | 24V161                              | 24V334 | 24V345 |
| 12                               | 24V162                              | 24V335 | 24V346 |
| 13–18                            | 24V163                              |        |        |
| 13–24                            | 24V164                              |        |        |
| 13–30                            | 24V165                              |        |        |

**Table 5 . High-Pressure, Non-Circulating Remote Color Change Manifold Kits**  
(1500 psi [10.34 MPa, 103.4 bar])

| Number of Color + Solvent Valves | Number of Catalyst + Solvent Valves |        |        |
|----------------------------------|-------------------------------------|--------|--------|
|                                  | 1                                   | 2      | 4      |
| 1                                | 24V359                              |        |        |
| 2                                | 24V360                              | 24V381 |        |
| 4                                | 24V361                              | 24V382 | 24V396 |
| 6                                | 24V362                              | 24V383 | 24V397 |
| 8                                | 24V363                              | 24V384 | 24V398 |
| 12                               | 24V364                              | 24V385 | 24V399 |
| 13–18                            | 24V365                              |        |        |
| 13–24                            | 24V366                              |        |        |
| 13–30                            | 24V367                              |        |        |

**Table 4 . Low Pressure, Circulating Remote Color Change Manifold Kits**  
(300 psi [2.068 MPa, 20.68 bar])

| Number of Color + Solvent Valves | Number of Catalyst + Solvent Valves |        |        |
|----------------------------------|-------------------------------------|--------|--------|
|                                  | 1                                   | 2      | 4      |
| 1                                | 24V166                              |        |        |
| 2                                | 24V167                              | 24V336 |        |
| 4                                | 24V308                              | 24V337 | 24V347 |
| 6                                | 24V309                              | 24V338 | 24V348 |
| 8                                | 24V326                              | 24V339 | 24V349 |
| 12                               | 24V327                              | 24V340 | 24V350 |
| 13–18                            | 24V328                              |        |        |
| 13–24                            | 24V329                              |        |        |
| 13–30                            | 24V330                              |        |        |

**Table 6 . High-Pressure, Circulating Remote Color Change Manifold Kits**  
(1500 psi [10.34 MPa, 103.4 bar])

| Number of Color + Solvent Valves | Number of Catalyst + Solvent Valves |        |        |
|----------------------------------|-------------------------------------|--------|--------|
|                                  | 1                                   | 2      | 4      |
| 1                                | 24V369                              |        |        |
| 2                                | 24V370                              | 24V389 |        |
| 4                                | 24V371                              | 24V390 | 24V402 |
| 6                                | 24V372                              | 24V391 | 24V403 |
| 8                                | 24V373                              | 24V392 | 24V404 |
| 12                               | 24V374                              | 24V393 | 24V405 |
| 13–18                            | 24V375                              |        |        |
| 13–24                            | 24V376                              |        |        |
| 13–30                            | 24V377                              |        |        |



## 7. Select Pump Expansion Kits

The following table lists available kits to add a third or fourth pump to your system. Each kit includes one pump, a pump control module, solenoid, frame, mounting bracket, and cabling. See the Pump Expansion Kit manual (332456) for further information.

| Kit Part No.                                                 | Kit Description                  |
|--------------------------------------------------------------|----------------------------------|
| <b>Low Pressure Pumps (300 psi [2.068 MPa, 20.68 bar])</b>   |                                  |
| 24R968                                                       | Low pressure color 70cc pump     |
| 24R970                                                       | Low pressure catalyst 35cc pump  |
| <b>High Pressure Pumps (1500 psi [10.34 MPa, 103.4 bar])</b> |                                  |
| 24R969                                                       | High pressure color 70cc pump    |
| 24R971                                                       | High pressure catalyst 35cc pump |

## 8. Select Communication Options

The following table lists available kits to support an alternate PLC protocol. See the CGM Installation Kits manual (334494) for further information.

| Kit Part No. | Kit Description                          |
|--------------|------------------------------------------|
| 26A126       | CGM Kit (PLC protocols)                  |
| CGMEP0       | EtherNet/IP-CGM (alternate PLC protocol) |
| CGMDN0       | DeviceNet-CGM (alternate PLC protocol)   |
| CGMPN0       | PROFINET-CGM (alternate PLC protocol)    |
| 24W462       | Modbus TCP-CGM                           |

## Install the Display Module

1. Use the screws (E2) to mount the bracket (E1) for the Advanced Display Module (E) on the front of the Electrical Control Box or on the wall.
2. Snap the Advanced Display Module into the bracket.

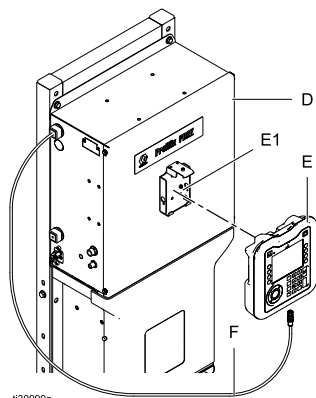


Figure 2 Install Display Module

3. Connect one end of the 5 ft (1.5 m) CAN cable (F) to the CAN Cable Connection (MM) on the Advanced Display Module (E). The other end of the cable comes from the factory connected to the Enhanced Fluid Control Module (EFCM) (D).

**NOTE:** For a list of alternate cable lengths, see [Electrical Schematics, page 41](#). The total length of all cable used in the system must not exceed 150 ft (45 m).

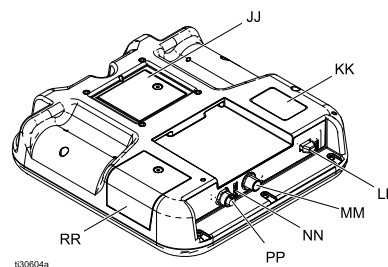


Figure 3 Advanced Display Module Connection Ports

| Item | Description                |
|------|----------------------------|
| JJ   | Battery Cover              |
| KK   | Model Number               |
| LL   | USB Drive Interface        |
| MM   | CAN Cable Connection       |
| NN   | ADM Status LEDs            |
| PP   | Accessory Cable Connection |
| RR   | Token Access Cover         |

# Location

## Mounting the Air Control Box:

- Mount the integrated air control (V) in a non-hazardous location.
- Ensure that the mounting surface and mounting hardware are strong enough to support the weight of the equipment, cables, hoses, and stress caused during operation.
- Secure the air control enclosure to mounting location. See "Mounting the Air Control Enclosure" in the Integrated Air Control manual ( [Related Manuals, page 2](#) ).
- There must be sufficient space on all sides of the equipment for installation, operator access, and maintenance.

## Mounting the Electrostatic Controller:

- Mount the electrostatic controller (U) in a non-hazardous location.
- Ensure that the mounting surface and mounting hardware are strong enough to support the weight of the equipment, cables, hoses, and stress caused during operation.
- Secure the electrostatic controller to mounting location. See "Mount the Controller" in the *Pro Xpc Auto ES Controller* manual or *ProBell ES Controller* manual ( [Related Manuals, page 2](#) ).
- There must be sufficient space on all sides of the equipment for installation, operator access, and maintenance.

## Mounting the Speed Controller:

- Mount the speed controller (X) in a non-hazardous location.
- Ensure that the mounting surface and mounting hardware are strong enough to support the weight of the equipment, cables, hoses, and stress caused during operation.
- Secure the speed controller enclosure to mounting location. See "Mounting the Control" in the *Speed Controller* manual ( [Related Manuals, page 2](#) ).
- There must be sufficient space on all sides of the equipment for installation, operator access, and maintenance.

# Supply Requirements

## Fluid

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                    |                                                                                     |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To reduce the risk of equipment overpressurization and rupture which can cause injury, including skin injection, do not exceed the pressure rating of the lowest rated system component. See the identification label for the maximum working pressure of the equipment.</li> <li>• To reduce the risk of injury, including skin injection, you must install a shutoff valve between each fluid supply line and the mix manifold. Use the valves to shut off fluid during maintenance and service.</li> </ul> |                                                                                    |                                                                                     |  |  |

Models are available to operate air spray (300 psi) or air-assisted (1500 psi) systems with a capacity of up to 800 cc/minute (depending on material viscosity).

- Fluid supply pressure tanks, feed pumps, or circulating systems can be used to supply fluid to the system.
- Materials can be transferred from their original containers or from a central paint recirculating line.
- Install a 100 mesh (minimum) fluid filter in the fluid supply line, with a drain valve.
- The supply line should be sized to avoid pressure loss of greater than a few psi between the circulation header and the proportioner fluid inlet port.

**NOTE:** The fluid supply must be free of pressure spikes, which are commonly caused by pump stroke changeover. Read the supply pressure on the gauge (P, see figure on next page). Supply capability for each pump must be at least 2 times the maximum operating flow rate. Supply pressure must be as close as possible to the pressure setpoint:

- For low pressure systems,  $\pm 100$  psi (0.7 MPa, 7 bar) of setpoint.

**NOTE:** For low pressure systems, it is recommended the supply pressure should be maintained at 1/2 to 2/3 of the system operating spray pressure.

- For high pressure systems,  $\pm 300$  psi (2.1 MPa, 21 bar) of setpoint.

If necessary, install pressure regulators or a surge tank on the pump fluid inlet lines to reduce pulsation. Contact your Graco distributor for additional information.

## Air

- **Compressed air supply pressure:** 85-100 psi (0.6–0.7 MPa, 6.0-7.0 bar).
- **Air hoses:** use grounded hoses that are correctly sized for your system.
- **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.

|                                                                                                                                                                                  |                                                                                   |                                                                                   |                                                                                   |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|
|                                                                                                 |  |  |  |  |
| <p>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.</p> |                                                                                   |                                                                                   |                                                                                   |  |

|                                                                                                                                                                                                                                                                                                                          |                                                                                   |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|--|
|                                                                                                                                                                                                                                         |  |  |  |  |
| <p>To reduce the risk of fire and explosion if using a Graco electrostatic applicator, a shutoff valve must be installed in the applicator air line to shutoff the atomizing and turbine air to the applicator. Contact your Graco distributor for information on air shutoff valves for electrostatic applications.</p> |                                                                                   |  |  |  |

- **Air line filter:** to filter oil and water out of the air supply and help avoid paint contamination and clogged solenoids. See [Technical Specifications, page 54](#), for air filtration requirements.

## Electrical

### PD2K

Enclose all cables routed in the spray booth and high traffic areas in conduit to prevent damage from paint, solvent, and traffic.

The unit operates with 90-250 VAC, 50/60 Hz input power, with a maximum 7 A current draw. The power supply circuit must be protected with a 15 A maximum circuit breaker.

- A power supply cord compatible to your local power configuration is not included. Wire gauge size must be 8-14 AWG.
- The input power access port is 22.4 mm (0.88 in.) in diameter. A strain relief is provided which accepts a cord diameter of 0.157-0.354 in. (4-9 mm). If another cord size is used, a user-supplied, appropriate size strain relief must be installed.

### Integrated Air Control

The unit operates with 24 VDC, with a maximum current draw of 1 Amp. The unit is powered by a Graco non-hazardous CAN cable.

### Electrostatic Controller

The unit operates with 90–250 VAC 50/60 Hz input, with a maximum current draw of 1.2 Amps. Power cord 24Y335 is provided with unit.

### Speed Controller

The unit operates with 24 VDC, with a maximum current of 2.5 Amp. The unit is powered by a Graco non-hazardous CAN cable.

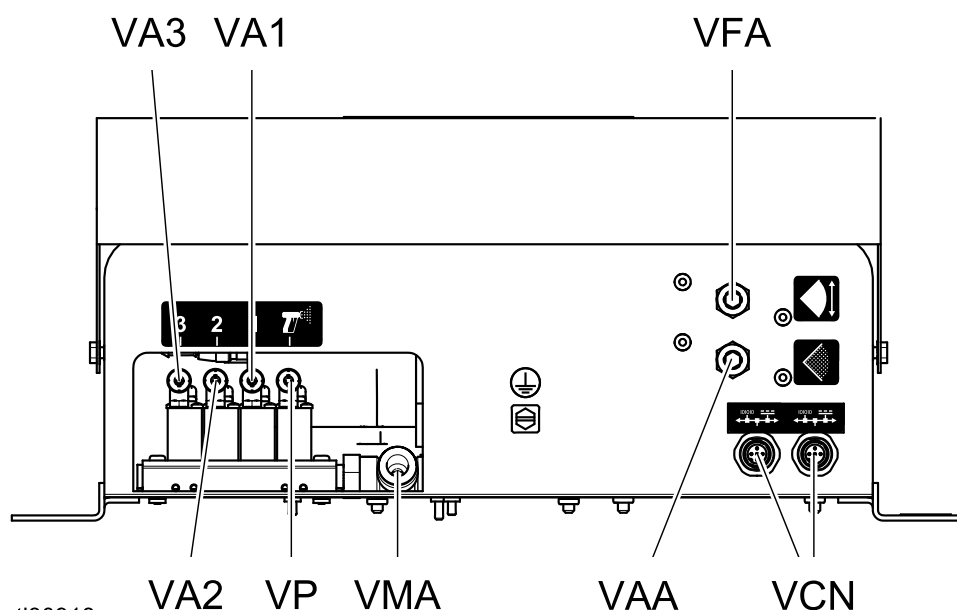
# Supply Connections

## Component Views

The following figures and tables identify key air and electrical connections on the integrated air control and speed control units. These connections will be

referenced in subsequent procedures describing how to connect the integrated PD2K components together for your application.

## Integrated Air Control

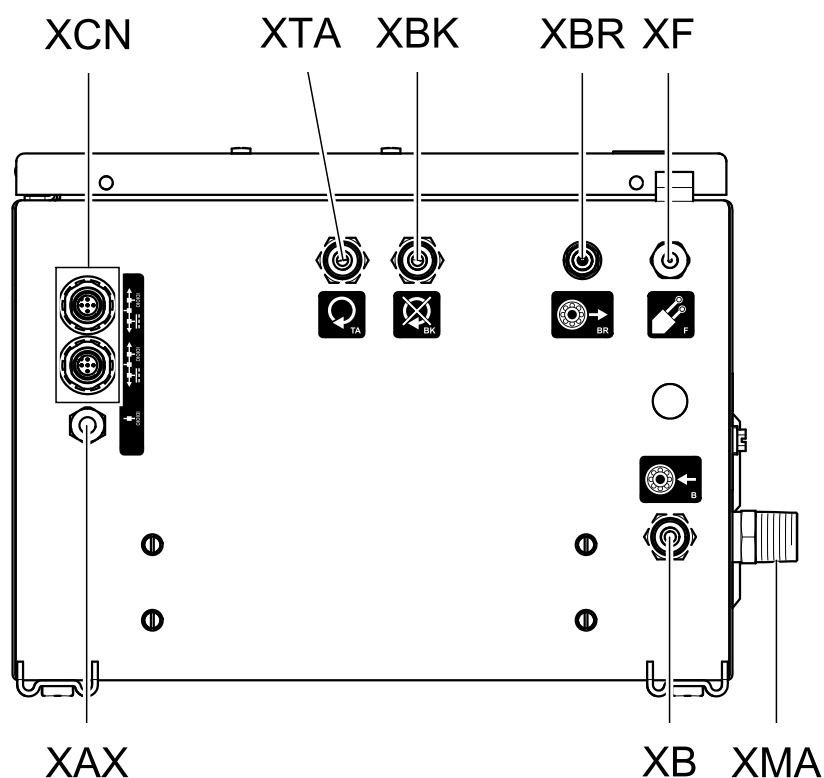


ti30918a

Figure 4

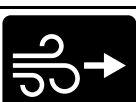
| Ref. | Port Label | Description                                         |
|------|------------|-----------------------------------------------------|
| VP   |            | Paint Trigger Solenoid — Use 4 mm (5/32 in.) tubing |
| VA1  |            | Auxiliary 1 Solenoid — Use 4 mm (5/32 in.) tubing   |
| VA2  |            | Auxiliary 2 Solenoid — Use 4 mm (5/32 in.) tubing   |
| VA3  |            | Auxiliary 3 Solenoid — Use 4 mm (5/32 in.) tubing   |
| VFA  |            | Fan Air Outlet — Use 8 mm (5/16 in.) tubing         |
| VAA  |            | Atomizing Air Outlet — Use 8 mm (5/16 in.) tubing   |
| VCN  |            | CAN Connections — Graco CAN / Power (24 VDC)        |
| VMA  | —          | Main Air — Use 3/8 in. tubing                       |

## Speed Controller



ti31000a

Figure 5

| Ref. | Port Label                                                                          | Label Color | Description                                                                                  |
|------|-------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------|
| XB   |  | Red         | Bearing Air — Use 8 mm (5/16 in) OD tube                                                     |
| XBK  |  | Purple      | Braking Air — Use 8 mm (5/16 in) OD tube with 1 mm (0.04 in) wall to minimize pressure drop. |
| XBR  |  | Red         | Bearing Air Return — Use 4 mm (5/32 in.) tubing.                                             |
| XCN  |  | Black       | Graco CAN / Power (24 VDC)                                                                   |
| XF   |  | Black       | Fiber Optic Speed Sensor Port                                                                |
| XMA  |  | Black       | Main Air Port — 1/2 in. npt                                                                  |
| XTA  |  | Brown       | Turbine Air — Use 8 mm (5/16 in) OD tube with 1 mm (0.04 in) wall to minimize pressure drop. |
| XAX  |  | Black       | Auxiliary port for optional optocoupler wiring.                                              |

## Fluid

### Single Color Connections

**NOTE:** Check valves (AJ, AL) are provided on the inlet (AK) and outlet (AH) manifolds of each pump.

1. Connect the color supply line to the pump fluid inlet fitting (AS).
2. Connect the color outlet line to the pump fluid outlet fitting (AR).
3. Make the same connections on the catalyst side.

**NOTE:** For isocyanate catalyst materials, moisture resistant hose is required to supply fluid to the system and also as a fluid line between the pump and the mix manifold.

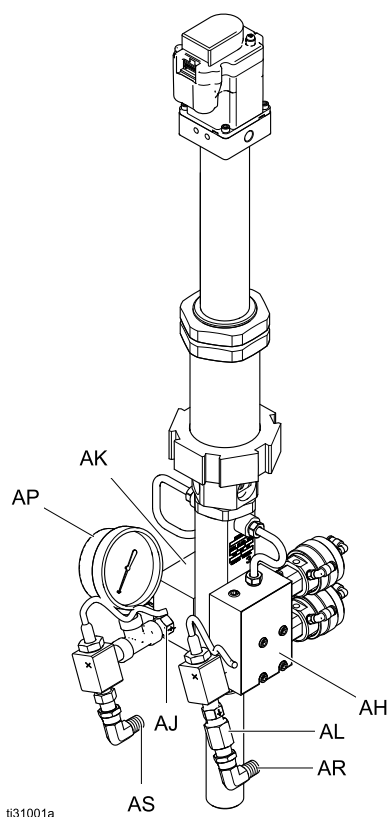


Figure 6 Pump Inlet and Outlet Connections

### Color Change Connections

If you are installing the color change accessory kit, make the fluid connections as described in the Color Change and Remote Mix Manifold manual (see [Related Manuals, page 2](#)).

### Solvent Connections

1. Connect the solvent supply line for the color to the inlet fitting (17) for solvent flow switch 1 (FS1).
2. Connect the solvent supply line for the catalyst to the inlet fitting (17) for solvent flow switch 2 (FS2).
3. Connect the solvent outlet line for the color to the solvent flow switch 1 (FS1) outlet fitting (74) and then to the appropriate remote color change valve.
4. Connect the solvent outlet line for the catalyst to the solvent flow switch 2 (FS2) outlet fitting (74) and then to the appropriate remote color change valve.

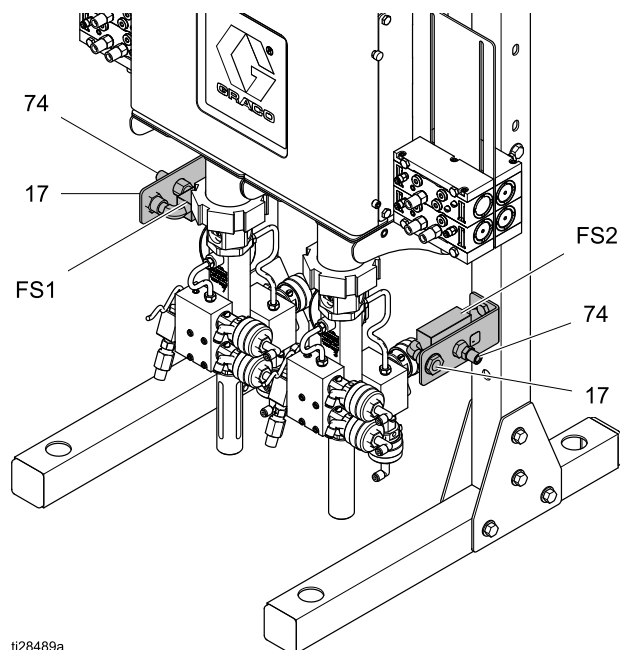
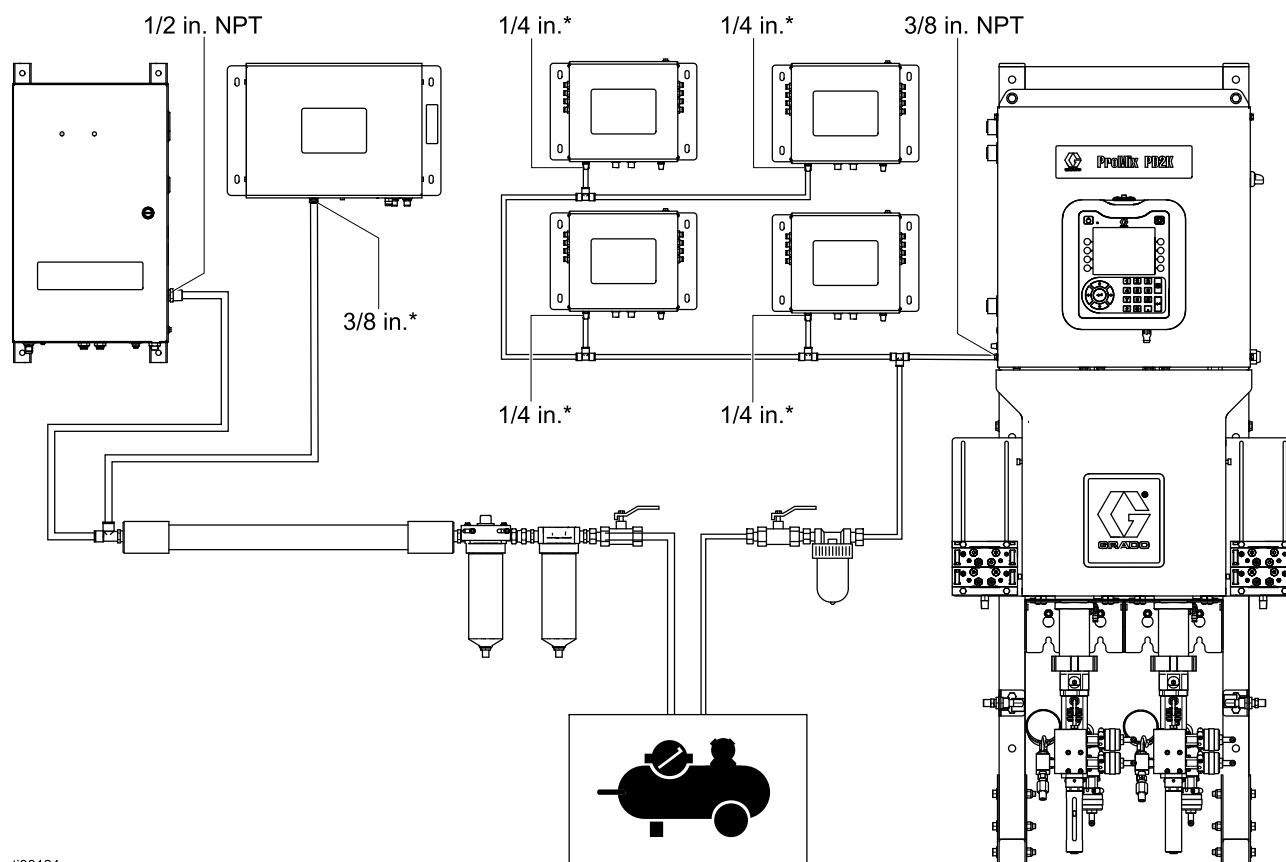


Figure 7 Solvent Connections

## Air

### PD2K Integrated Air Diagram



ti30124a

Figure 8 PD2K Integrated Air with Factory Air Source

\* – Push to Connect



## PD2K Connections

1. Tighten all system air and fluid line connections as they may have loosened during shipment.
2. Connect the main air supply line to the main air inlet (136). This air line supplies the solenoids, valves, and pumps. Do not use this line to supply the applicator's atomizing air.
3. Connect a **separate, dedicated**, clean air supply line to the air inlet of the integrated air control.

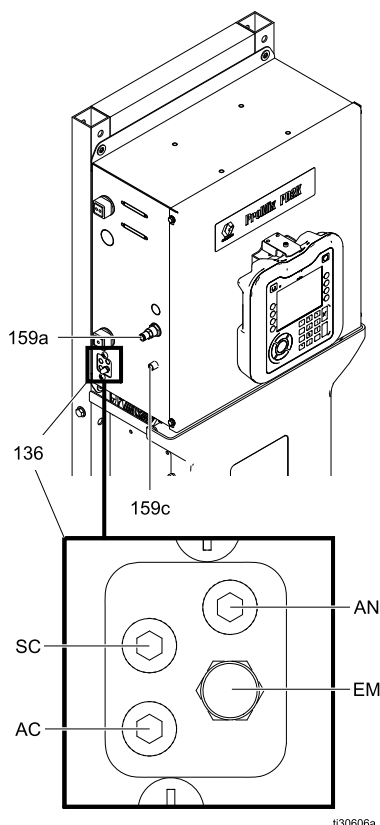


Figure 9 Atomizing Air and Air Manifold Connections  
**Key**

| Connection | Description                     |
|------------|---------------------------------|
| AN         | Air inlet                       |
| AC         | Air cutoff output (plugged)     |
| EM         | Exhaust muffler                 |
| SC         | Solvent cutoff output (plugged) |

## Integrated Air Control Connections

**NOTE:** If your air source does not have a filter, install an air filter to ensure a dry, clean air supply to the applicator. Dirt and moisture can ruin the appearance of your finished workpiece. Refer to the *Integrated Air Control* manual in [Related Manuals, page 2](#), for filtration requirements. Reference letters for integrated air control air connections are identified in [Integrated Air Control, page 21](#).

### Main Air

Connect the compressed air supply inlet using a 3/8 in. (9.5 mm) OD hose.

**NOTE:** An adapter is required for metric hoses.

### Outlet Air

Refer to the installation manual your applicator in [Related Manuals, page 2](#), for air inlet connections on your applicator.

1. Attach one end of a 5/16 in. (8 mm) OD hose to the atomizing/inner air outlet (VAA) on the Integrated Air Control. Route other end to the atomizing/inner air inlet on the applicator.
2. Attach one end of a 5/16 in. (8 mm) OD hose to the fan/outer air outlet (VFA). Route the other end to the fan air/outer inlet on the applicator.
3. Attach one end of a 5/32 in. (4 mm) OD hose to the paint trigger solenoid (VP). Route the other end to the paint trigger inlet on the applicator.
4. Attach one end of a 5/32 in. (4 mm) OD hose to the auxiliary 1 / paint trigger 2\* / dump valve\*\* solenoid (VA1). Route the other end of the hose as appropriate for your application.
5. Attach one end of a 5/32 in. (4 mm) OD hose to the auxiliary 2 / paint trigger 3\* / cup wash\*\* solenoid (VA2). Route the other end of the hose as appropriate for your application.
6. Attach one end of a 5/32 in. (4 mm) OD hose to the auxiliary 3 solenoid (VA3).

**NOTE:** Examples for how to use auxiliary solenoids include air cap cleaners and dump valves.

\* – For multiple applicators, route paint triggers to appropriate applicators.

\*\* – For ProBell applications, refer to [Related Manuals, page 2](#), for proper hose connections.

## Speed Controller Connections

### Filtration

#### NOTICE

Air that is not filtered to specification can clog bearing air passages and cause bearing failure. The warranty does not cover a turbine damaged by contaminated air.

Three air filtration stages are required to prevent contamination of the paint finish and to prevent damage to the air bearing. Refer to the following table for the specifications of each filter. Use only these recommended filters, or filters that meet the same specifications. Refer to the *In-Line Air Filters and Coalescers* manual in [Related Manuals, page 2](#), for filter details, installation, and pipe size recommendations.

- The temperature of the air as it enters the pre-filter (PF) must be close to ambient.
- Air must be dehydrated to a dew point of 10°F (-12°C).
- Filters must remove 99% of all aerosols.
- Filters must remove particles of 0.5 microns and larger. Graco filter 234403 removes particles down to 0.01 microns.
- Standard piping may be used only up to the pre-filters. All piping after the pre-filters should be brass, stainless steel, or plastic hose.

- Do not use any type of thread sealant or PTFE tape downstream of the bearing air filter. Small particles may loosen and plug the air holes in the turbine air bearings.
- Air that is heated above 120°F (49°C) will damage filter elements. If the system includes air heaters to minimize condensation, locate the heaters downstream from all filters.

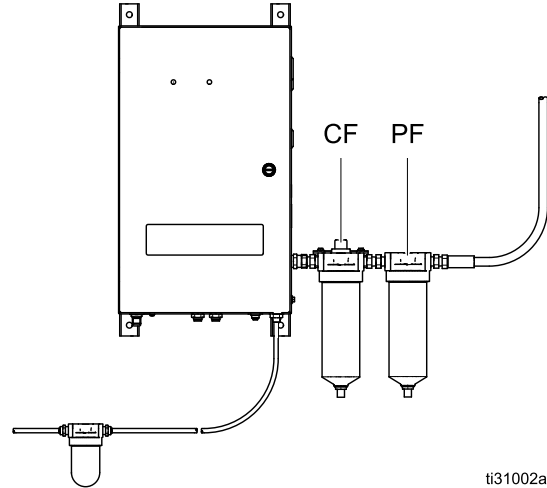


Figure 10 Speed Controller Air Filter

| PN     | Description and Specification                                                                                                                                                                                   | Replacement Element PN                       | Air Inlet and Outlet npt(f) |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------|
| 234402 | <b>Stage 1: Pre-Filter (PF)</b><br>100 SCFM (rated flow of 100 SCFM minimum is required). Removes coarse amounts of oil, moisture, and dirt to 3 microns. Use upstream of 234403.                               | 16W405                                       | 1/2 in.                     |
| 234403 | <b>Stage 2: Grade 6 Coalescing Filter (CF)</b><br>50 SCFM (rated flow of 50 SCFM minimum is required). Removes oil and submicronic particles down to 0.01 microns. Use one filter for each ProBell Applicator.. | 16W407                                       | 1/2 in.                     |
| 17M754 | <b>In Control Box: Bearing Air Grade 6 Coalescing Filter (not shown)</b><br>4 SCFM (rated flow of 4 SCFM minimum is required). One filter is included in ProBell Speed Controller 24X519.                       | Not available. Replace with assembly 17M754. | 1/4 in. push-lock, (m)      |

## Connect Air Lines

Reference letters for speed control air connections are identified in [Speed Controller, page 22](#).

### NOTICE

Use filtered air to prevent contamination of the paint finish and to prevent damage to the air bearing. Air that is not adequately filtered can clog bearing air passages and cause bearing failure. The ProBell Rotary Applicator manual contains detailed filtering specifications.

**NOTE:** For the turbine air (XTA), braking air (XBK) and bearing air (XB) lines, use 8 mm (5/16 in) OD tube with 1 mm (0.04 in) wall. For the bearing air return (XBR), use 4 mm (5/32 in) tube.

### NOTICE

Take great care to connect the air lines to the correct ports. Incorrect air line connections will damage the applicator.

1. Connect the air lines to the applicator first. Refer to your applicator manual in [Related Manuals, page 2](#).
2. Connect the turbine air line into fitting XTA, the braking air line into fitting XBK, and the bearing air line into fitting XB. Connect the bearing air return line into the smaller fitting XBR.
3. Connect the main air supply line into the air fitting (XMA) on the side of the box.

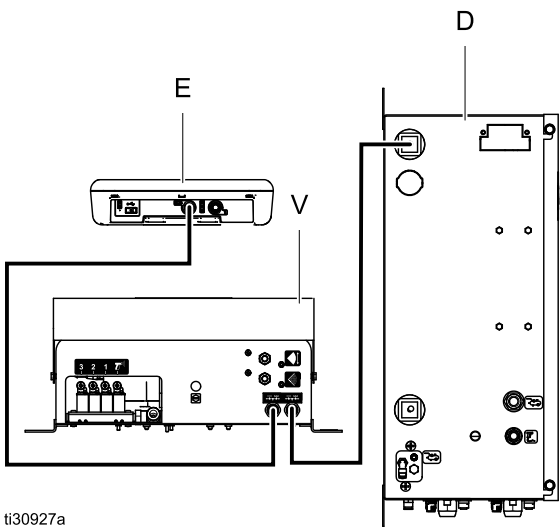
**NOTE:** Once the air is applied, it will flow freely out Port XB. The controller has no option to turn this air off.

# Electrical

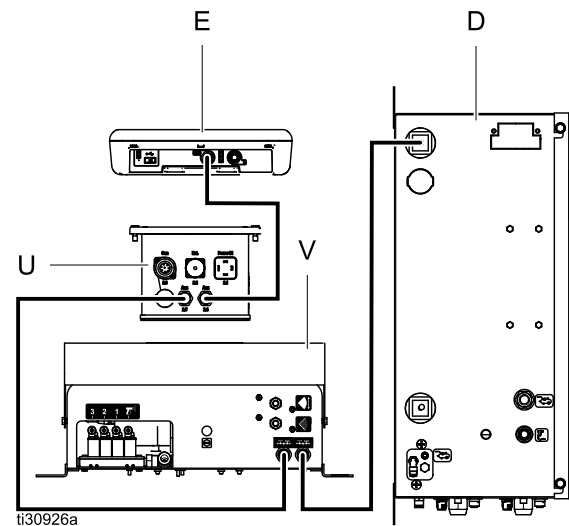
Improper wiring may cause electric shock or other serious injury if work is not performed properly. All electrical wiring must be completed by a qualified electrician and comply with all local codes and regulations.

## PD2K Integrated CAN Wiring

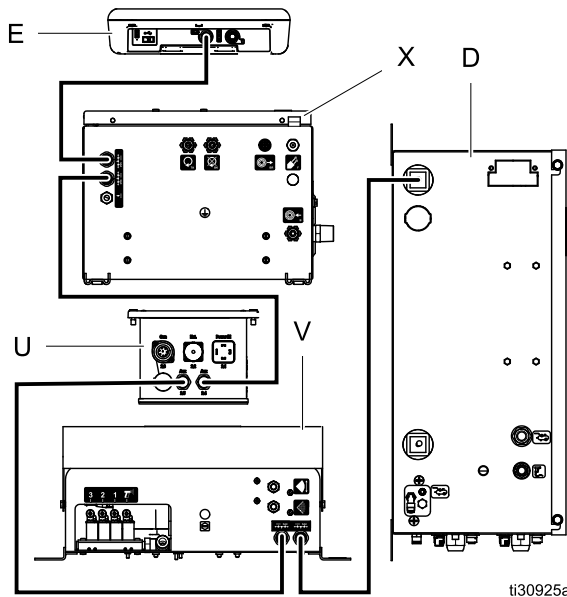
**NOTE:** Refer to [Configure Your System, page 11](#), for letter designations used in the following diagrams.



ti30927a  
Figure 11 Conventional Gun with Air Control



ti30926a  
Figure 12 Conventional Electrostatic Gun with Air Control and Electrostatic Controller



ti30925a  
Figure 13 Rotary Atomizer with Air Control, Electrostatic Controller, and Speed Controller

## PD2K Connections

### Power

See [Electrical Schematics, page 41](#).

1. Verify that electrical power at the main panel is shut off. Open the Control Box cover.
2. Thread the power supply wires from the electrical cord through the strain relief (SR).
3. Connect the wires (LP, NE, GR) securely to the corresponding terminals of the terminal block (TB), as shown.
4. Follow instructions in [Grounding, page 38](#).
5. Tighten the strain relief nut securely.
6. Close the Control Box. Restore power.

### Wire Key

| Wire | Description |
|------|-------------|
| LP   | Line Power  |
| NE   | Neutral     |
| GR   | Ground      |

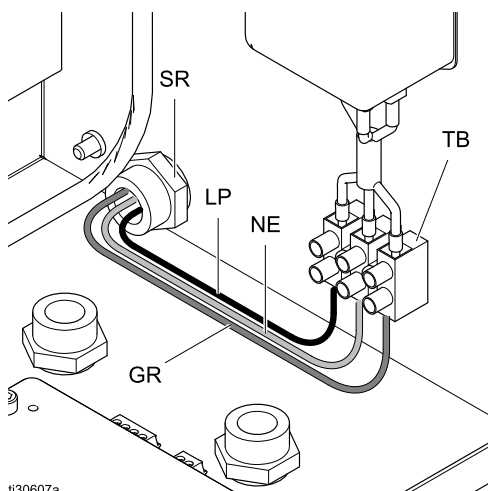


Figure 14 Control Box Electrical Connection

## Discrete I/O

The ProMix PD2K does not supply power for Discrete I/O. A clear understanding of these inputs is necessary to properly integrate the ProMix PD2K with the PLC or networking device. Input and output connections are made at the Discrete I/O terminal strips on the Enhanced Fluid Control Module (EFCM) inside the control box.

Table 7 and Figure 15 show where discrete I/O connections are made on the ProMix PD2K.

**NOTE:** PD2K Discrete I/O are not isolated. Proper operation requires isolation from the PLC.

Table 7 PD2K Discrete I/O Connections

| I/O Description        | EFCM Connector | Pins  | Type                  |
|------------------------|----------------|-------|-----------------------|
| Gun Trigger 1 Input    | 6              | 1,2   | Normally Open Contact |
| Gun Trigger 2 Input    | 6              | 3,4   | Normally Open Contact |
| Gun Trigger 3 Input    | 6              | 5,6   | Normally Open Contact |
| Control Set Point      | 7              | 1,2   | 4-20 mA Input         |
| Safety Interlock Input | 7              | 11,12 | Normally Open Contact |

### Digital Input

#### • Enhanced Fluid Control Module (EFCM)

**Safety Interlock:** This normally open contact works like a soft emergency stop button. If the ProMix PD2K reads the input as CLOSED it interrupts system operation and removes power from the pumps regardless of the current operating mode. If the input is read as OPEN, the system operates normally. Do not toggle this input to put the system into Standby mode.

**NOTE:** This digital input is always enabled.

**Gun Trigger:** This normally open (maintained) contact provides a signal to the system to indicate whether or not an applicator is triggered. This input provides timing for alarm functions and also drives the flow control algorithm. If the input is OPEN the system operates as though the applicator is off. The input must be maintained CLOSED to signal that the applicator is triggered.

**NOTE:** The Gun Trigger discrete input must be enabled via Gun Setup Screen 1 on the ADM. If it is set to 'Local' or 'Network', the discrete input is ignored and the applicator trigger signal is handled via the network communications, or manually.

*If enabled, it is imperative that this signal be sent any time the applicator is triggered. Without the signal, the flow control features will not work.*

### Analog Input

- Enhanced Fluid Control Module (EFCM)

*Flow Control Set Point.* When enabled, this 4-20mA signal input is used to set and adjust the operating flow control set point. The ProMix PD2K scales the set point linearly from 0 to the Max Set Point setting.

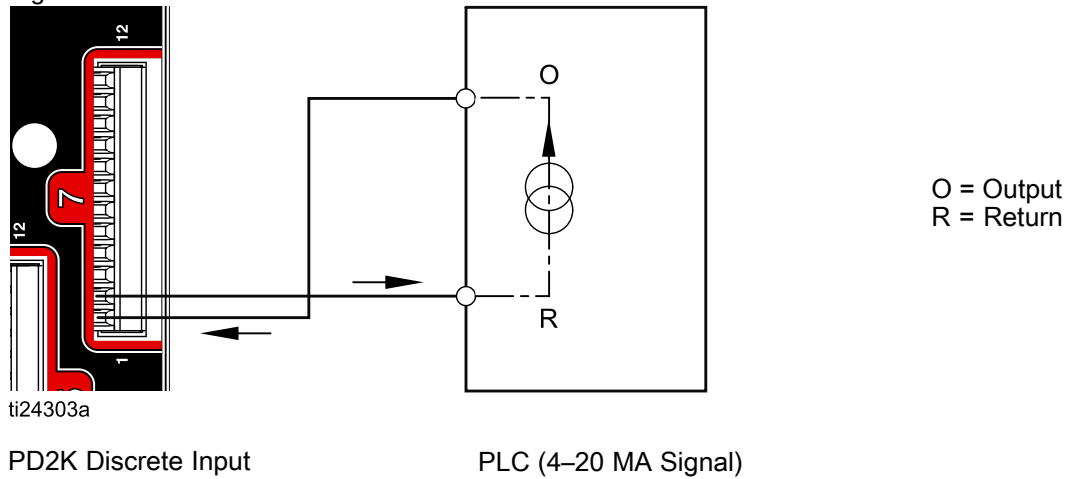
*Examples,*

- **In Flow Control Mode:** If the Max Set Point is 500 cc/min, a 4mA signal is 0 cc/min and a 20mA signal is 500 cc/min.
- **In Pressure Control Mode:** If the Max Set Point is 500 psi, a 4mA signal is 0 psi and a 20mA signal is 500 psi.

**NOTE:** The Flow Control discrete input must be enabled via Configure Screen 5 on the ADM. If set to 'Network' the discrete input is ignored and set point adjustment is handled via the network communications.

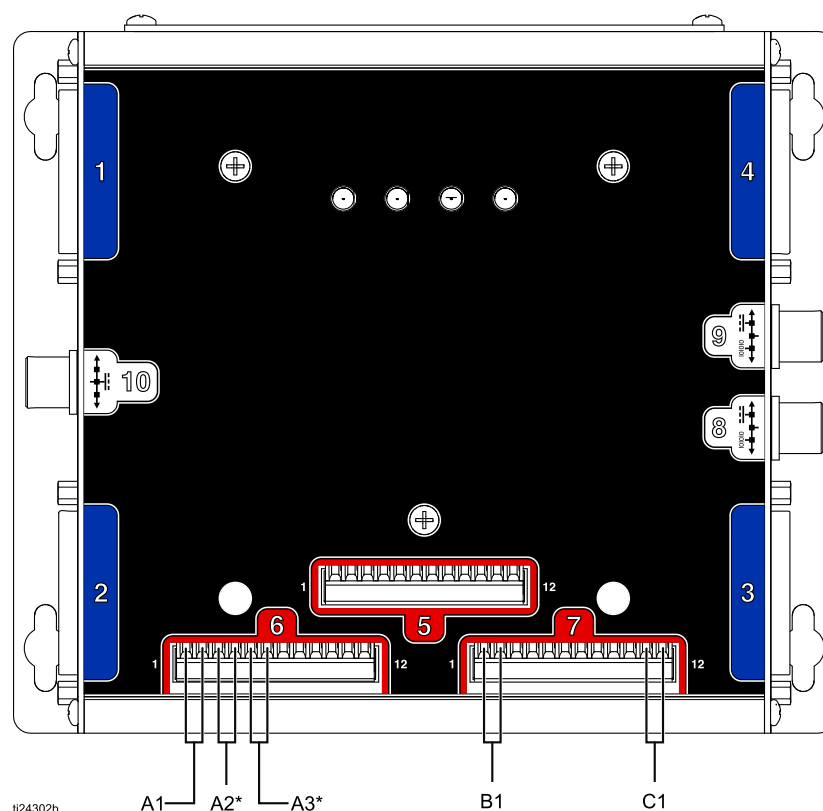
#### 4–20 mA Flow Control Set Point Input

Figure 15



## Discrete I/O Connections on EFCM

Figure 16

**KEY**

A1 Gun Trigger 1 Input

A2\* Gun Trigger 2 Input

A3\* Gun Trigger 3 Input

B1 Analog Set Point Input

C1 Safety Interlock Input

\* Multiple applicator trigger inputs are only supported with Gun Type: AirPro Auto, G40 Auto, and AirPro EFX.

**Integrated Air Control Connections****Power**

The integrated air control is powered by the Graco CAN network. See *Connect Communication Cables* below.

**Connect Communication Cables**

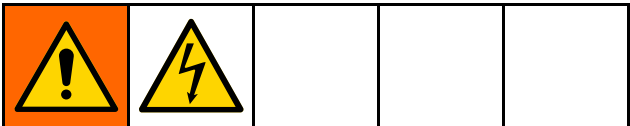
The integrated air control communicates with the rest of the system using Graco CAN. Each component and power supply must be on the Graco CAN network.

1. Connect a Graco CAN cable from the EFCM (D) to the Air Control (V).
2. Connect a second Graco CAN cable from the Air Control (V) to the ADM (for conventional applicators) (E), and to the Electrostatic Controller (for Pro Xpc Auto and ProBell) (U). See [PD2K Integrated CAN Wiring, page 28](#).

**Discrete I/O**

The integrated air control does not have any discrete I/O.

## Electrostatic Controller Connections



- Power**  
Connect the supplied controller input power cord to the input power connection (D) and secure with the connector screw. This connection is required for all installations. The controller can operate at 100–240 VAC (50–60 Hz). Connect the leads to a power source according to local electrical codes. Pin 3 on the input power connection is the system interlock. Pin 3 must have line voltage applied to satisfy the system interlock. When the system interlock pin is connected to line voltage, the **system** icon will appear on the controller.

| Controller Input Power Connection |                |                                            |                     |
|-----------------------------------|----------------|--------------------------------------------|---------------------|
|                                   | <b>Pin No.</b> | <b>Function</b>                            | <b>Wire Marking</b> |
|                                   | 1              | Neutral conductor power supply             | 1                   |
|                                   | 2              | Phase (100-240 VAC)                        | 2                   |
|                                   | 3              | System Interlock ON/OFF (100-240 VAC) = ON | 3                   |
| PE                                |                | Grounding PE                               | Green/Yellow        |

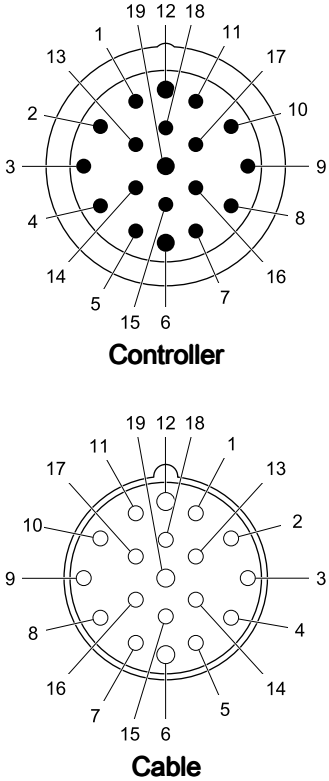
- Cascade/Gun Cable**  
Connect the 7-pin end of the applicator power cable to the applicator power cable connection (F) on the controller. Connect the 4-pin end of the applicator power cable to the applicator. Follow instructions in the applicator manual. This connection is required for all installations.

| Pre-wired Gun Power Cable Connection                                                                                               |       |       |                        |
|------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------------------------|
| Controller                                                                                                                         |       | Gun   |                        |
| Connector (F)                                                                                                                      | Cable | Cable | Power Supply Connector |
|                                                                                                                                    |       |       |                        |
| <p>Electrical Schematic for this cable:</p> <p><b>NOTE:</b> Connector pins not shown are not connected to a wire in the cable.</p> |       |       |                        |



### 3. Discrete I/O

Connect the Discrete I/O cable to the Discrete I/O cable connection (E) on the controller. The Discrete I/O cable is required for any installation that involves integration. Two discrete I/O interlock connections are supplied and must be satisfied.

| Discrete I/O cable Connection                                                                                                   |         |                                       |                           |
|---------------------------------------------------------------------------------------------------------------------------------|---------|---------------------------------------|---------------------------|
|  <p><b>Controller</b></p> <p><b>Cable</b></p> | Pin No. | Function                              | Wire Color                |
|                                                                                                                                 | 1       | Preset Select 1                       | White                     |
|                                                                                                                                 | 2       | Preset Select 2                       | Brown                     |
|                                                                                                                                 | 3       | Error Reset                           | Green                     |
|                                                                                                                                 | 4       | Remote Enable/Disable                 | Yellow                    |
|                                                                                                                                 | 5       | Electrostatics Enable                 | Gray                      |
|                                                                                                                                 | 6       | Safe-to-Move Output                   | Pink                      |
|                                                                                                                                 | 7       | Error Output                          | Blue                      |
|                                                                                                                                 | 8       | I/O Ground                            | Red                       |
|                                                                                                                                 | 9       | Current Setpoint Input                | Black                     |
|                                                                                                                                 | 10      | Voltage Setpoint Input                | Purple                    |
|                                                                                                                                 | 11      | Reserved Input                        | Gray/Pink                 |
|                                                                                                                                 | 12      | I/O Ground                            | Red/Blue                  |
|                                                                                                                                 | 13      | Actual Spraying Current Output        | White/Green               |
|                                                                                                                                 | 14      | Actual Spraying Voltage Output        | Brown/Green               |
|                                                                                                                                 | 15      | Electrostatic Discharge               | White/Yellow              |
|                                                                                                                                 | 16      | Analog Output External Power (24 VDC) | Yellow/Brown              |
|                                                                                                                                 | 17      | I/O Ground                            | White/Gray                |
|                                                                                                                                 | 18      | SAFE POSITION Interlock Input         | Gray/Brown                |
|                                                                                                                                 | 19      | 24VDC Interlock Input                 | Pink/Brown and Pink/White |

### 4. CAN Connections

Refer to [PD2K Integrated CAN Wiring, page 28](#), for necessary connections for your application.

## Speed Controller Connections

Because of system variability, Graco CAN cables (105) have to be ordered separately.

### Power

The speed control is powered by the Graco CAN network. See *Connect Communication Cables* below.

### Connect Communication Cables

The speed controller communicates to the rest of the system using Graco CAN. Each component and the power supply must be on the Graco CAN network.

1. Connect the Graco CAN cable (105) from the Electrostatic Controller (CC) to the Speed Controller CAN port (DD).
2. Connect a Graco CAN cable from the Speed Controller (EE) to the ADM.

Because of system variability, Graco CAN cables (105) have to be ordered separately.

### Connect Fiber Optic Cable

The speed controller uses a fiber optic signal provided by a magnetic pickup sensor assembly in the applicator manifold. Connect the fiber optic cable from Port F on the Speed Controller to Port F on the applicator manifold. The amount of fiber extending past the nut should be 0.44 in. (11.2 mm) on the Speed Controller side. On the applicator side, the amount of extended fiber is either 0.11 in. (2.8 mm) for the standard style or 1.48 in. (37.6 mm) for the hollow wrist style. Refer to the detailed instructions in your ProBell Applicator manual (see [Related Manuals, page 2](#)), especially if you need to cut or repair the cable, so the dimensions at each end remain accurate.

## Discrete I/O

### Wiring the System Status Output Optocoupler

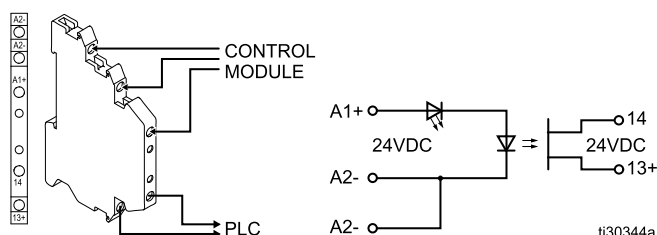
The System Status optocoupler is designed to protect the Graco ProBell speed control box from outside voltages.

The System Status output is active when the system is in Gun Off mode. The System Status output is inactive in all other operation modes. See the System Logic Controller manual (3A3955) for more information on operation modes.

- Optocoupler ports A1+ and A2– are wired to the control module.
- Optocoupler ports 13+ and 14 are wired to the external device or PLC.

For active-low signals/sourcing input: Connect GND to 14. Assuming the input signal is at non ground, monitor when 13+ is connected to GND to tell when the System Status output is active.

For active-high signals/sinking input: Connect 24 VDC to 13+. Monitor when 14 is connected to 24 VDC to tell when the System Status Output is active.



| Function                      | A1+ (relative to A2–) | PLC                      |
|-------------------------------|-----------------------|--------------------------|
| System Status Output Active   | 24 VDC                | 13+ and 14 connected     |
| System Status Output Inactive | Less than 13.5 VDC    | 13+ and 14 not connected |

## Wiring the Optional Interlock Input Optocoupler

The optional interlock optocoupler does not come pre-installed and must be purchased and installed separately. It is designed to protect the Graco ProBell control boxes from outside voltages. Purchase optocoupler kit 24Z246.

Remove the wires in the existing terminal blocks and install in the Optocoupler ports as shown below.

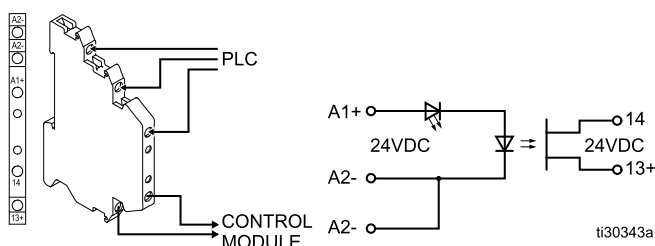
|                      | Speed Controller Terminal |
|----------------------|---------------------------|
| Optocoupler Port 14  | 7                         |
| Optocoupler Port 13+ | 8                         |

### NOTICE

To prevent damage to equipment, do not use these terminal blocks without an optocoupler present.

- Optocoupler ports 13+ and 14 are wired to the control module.
- Optocoupler ports A1+ and A2- are wired to the external device or PLC.

Apply the 24 VDC signal to A1+ and GND to A2-. Only one A2- port needs to be connected to GND, as the two ports labeled A2- are connected internally.



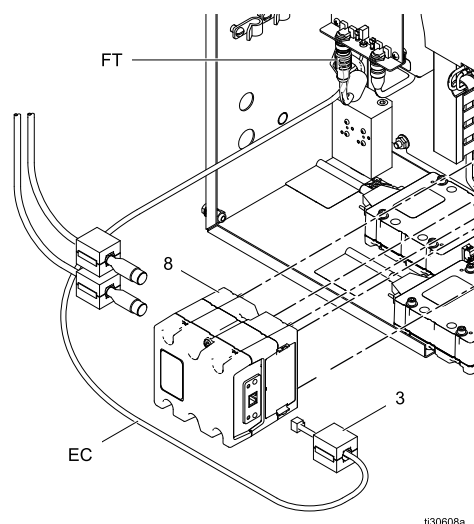
| A1+ (relative to A2-) | Function                          |
|-----------------------|-----------------------------------|
| 24 VDC                | Interlock Activated (system stop) |
| Less than 13.5 VDC    | Interlock Inactive (system run)   |

## FieldBus Connections

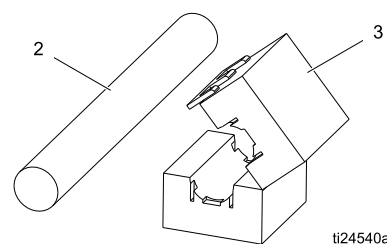
If used, connect the ethernet cable to the CGM (8) in the PD2K Electrical Control Box, as applicable. Connect the other end of the cable to the FieldBus device.

**NOTE:** Connect the CGM (8) to the FieldBus per FieldBus standards. The Modbus TCP interface operates at 100 MBit, full duplex. The interface is auto polarity sensing and auto-crossover capable.

1. Locate fitting (FT) on the Electrical Control Box.



2. Remove the nut on fitting (FT), but leave the cable through the nut.
3. Remove the fitting far enough to allow disassembly of the fitting and to open the grommet.
4. Route FieldBus cable (EC) through the fitting hole in the Electrical Control Box and through the fitting nut. Ensure that the ethernet cable is inserted with enough length to allow for routing within the box and for connection to the CGM.
5. Insert the FieldBus cable into the grommet hole and insert the grommet into the fitting.
6. Insert the fitting through the Electrical Control Box wall and install the nut. Tighten finger tight.
7. Attach a ferrite (3) near the end of the FieldBus cable.



8. Attach the FieldBus cable to the CGM.

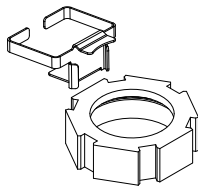
## Additional Installations

### TSL™ Cup Kit

The cup is used for either Throat Seal Liquid (TSL™) or ISO oil. These liquids prevent exposure to air or moisture with the color or catalyst at the pump throat packings and dosing valves. The PD2K Proportioner includes two TSL Cup Kits, one for each pump. The cups supply TSL to the upper throat cartridge of the color (70 cc) pump, to the upper and lower throat cartridges of the catalyst (35 cc) pump, and to the four pump dosing valves. When using isocyanate catalysts, the cup attached to the catalyst side of the PD2K Proportioner is used to supply ISO oil to the upper and lower throat cartridges of the catalyst (35 cc) pump and the catalyst dosing valves.

**NOTE:** TSL and ISO oil must be ordered separately. For TSL, order Part No. 206995, one quart (0.95 liter). For ISO oil, order Part No. 217374, one pint (0.48 liter).

1. Slide the kit mounting bracket onto any side of the pump's hex nut.



**NOTE:** Prior to mounting the cup, use a permanent black marker to mark a horizontal line on the front of the cup approximately half way between the top and bottom of the cup. Mark a second horizontal line approximately 1/4 in. (3 mm) above the first line. Shining a strong light towards these lines will indicate fluid level by casting a shadow that will be visible from inside the TSL cup.

2. Place the TSL cup (73) into the bracket (73a).

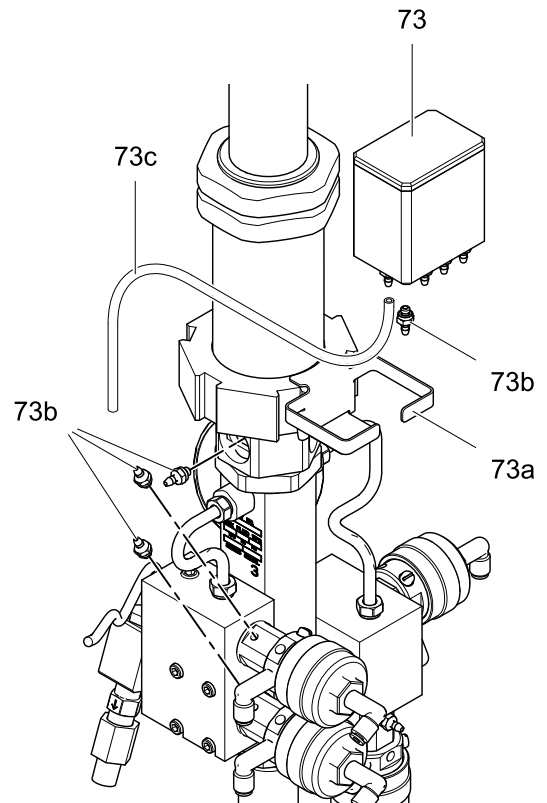
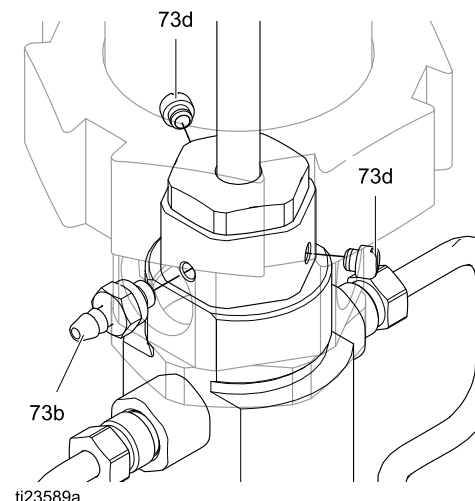


Figure 17 Install TSL Cup Kit

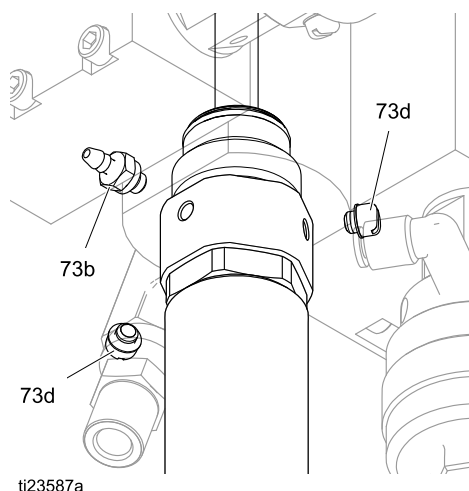
**NOTE:** The pump's upper throat cartridge has three ports (two are plugged). Move a plug (73d) if necessary so the barbed fitting (73b) can be put in the port closest to the TSL cup.

3. Check that the o-ring is in place on the barbed fitting (73b). Apply low strength thread adhesive and install the fitting in the upper throat cartridge port. Be sure the other two ports are plugged (73d).



ti23589a

4. **Catalyst (35 cc) pumps:** Repeat for the lower throat cartridge.

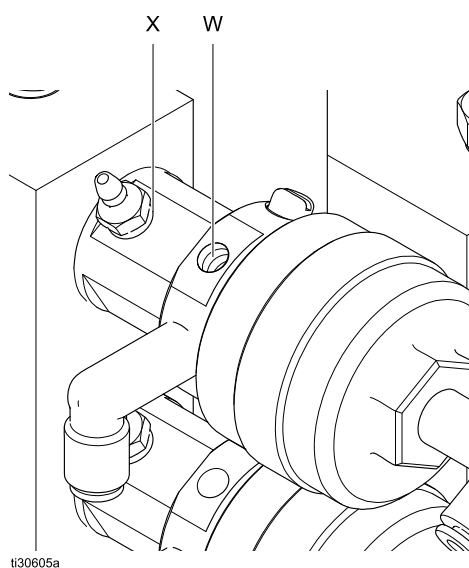


5. If you are lubricating the dosing valves, remove the plug (73d) and gasket from the valve port (X) closest to the TSL cup.

**NOTE:** Choose the valve port in the upward facing position. This will allow liquid to flow into the valve while allowing air to rise out of the valve.

Check that the o-ring is in place on the barbed fitting (73b). Apply low strength thread adhesive and install the fitting in the valve port (X).

**NOTE:** Do not confuse the valve port (X) with the air port (W).



**NOTE:** If you are not lubricating the dosing valves, remove the unused barbed fittings (73b) from the bottom of the TSL cup (73). Apply low strength thread adhesive and install the plugs and gaskets supplied with the kit.

6. Cut the tubing (73c) to length as required. Connect the TSL cup fittings to the fittings on the pump and valves. TSL is gravity-fed from the cup to the pump and valves; position the fittings and tubing to prevent kinks and enable the TSL to flow freely down to the valve and air to rise up and out of the valve.
7. Fill the cup to the level of the lower black horizontal line with either TSL or ISO oil, as appropriate for the color and catalyst materials being used.

**NOTE:** If TSL leaks from the rod guard of the color (70 cc) pump, be sure the lower u-cup seal is installed in the lower throat cartridge.

**NOTE:** The fluid levels in the TSL cups should be checked daily. Fluid levels should remain static for an extended period of time. Rising or falling fluid levels in a TSL cup can be an indication of a condition which needs immediate attention. Refer to the troubleshooting steps in the repair manual for guidance.

## ISO Oil Fill Procedure

When using polyurethane coatings with isocyanate catalysts in high-humidity environments, use of ISO oil on the catalyst pump TSL cup is recommended instead of TSL. The ISO oil will present a barrier that will prevent catalyst hardening from contact with moisture. When performing the first fill of a cup with ISO oil, it will be necessary to bleed the air out of the feed line.

**NOTE:** If not already present on the TSL cup, draw the two horizontal lines at, and slightly above, the vertical center of the front of the cup before filling.

To bleed air:

1. Fill the catalyst pump TSL cup to the lower horizontal line.
2. Remove one plug (73d) from the upper throat cartridge and allow air in that area to flow until no air is being expelled. Replace the plug.
3. Repeat step 2 at the lower throat cartridge.
4. Use absorbent rags to clean up excess ISO oil that escaped from the plug holes.
5. Replenish the ISO oil level in the TSL cup to the lower horizontal line.

## Light Tower Accessory

To install Light Tower Kit 24K337, see the Light Tower Kit instructions (3A1906).

# Grounding

This equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.

The following figure shows the general grounding for a typical system. The following sections describe grounding details for specific system components.

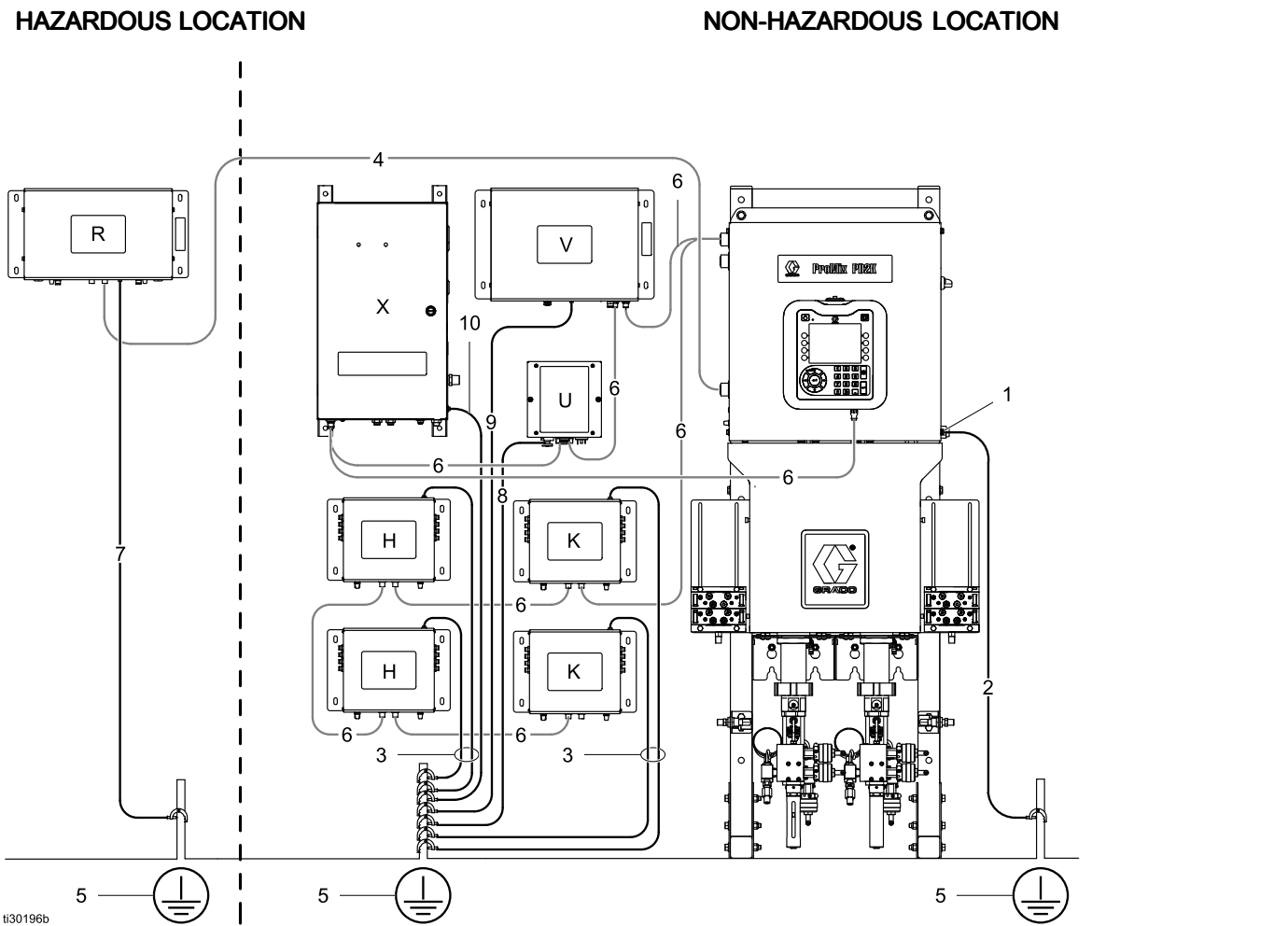


Figure 18 System Grounding

Key

|   |                                                          |
|---|----------------------------------------------------------|
| 1 | Electrical Control Box ground screw                      |
| 2 | Electrical Control Box ground wire                       |
| 3 | Color Change (H)/Catalyst Change (K) Module ground wires |
| 4 | Intrinsically Safe (IS) cable                            |
| 5 | True Earth Ground; check local code for requirements     |

|    |                                           |
|----|-------------------------------------------|
| 6  | Non-Intrinsically Safe cable              |
| 7  | Remote Mix Control Module (R) ground wire |
| 8  | Electrostatic (U) ground wire             |
| 9  | Air Control (V) ground wire               |
| 10 | Speed Controller (X) ground wire          |

## PD2K Electrical Control Box

The electrical control box has two ground points. Both connections must be made.

- Connect the ground wire (Y) to the ground screw (GT) on the Electrical Control Box (D). Connect the clamp end to a true earth ground.
- The power supply must be grounded according to local codes. Connect the power supply ground wire (GR) to the terminal block (TB) in the Electrical Control Box. .

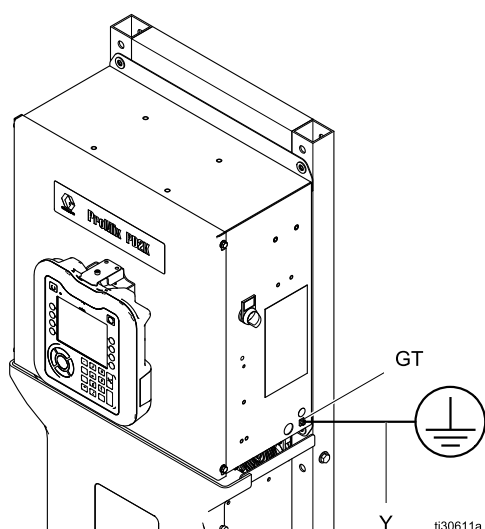


Figure 19 Ground Terminal

## Integrated Air Control

Verify the ground wire is attached to the ground screw (GS), and the screw is attached securely to the air control (V) enclosure. Connect the other end of ground wire to an earth ground.

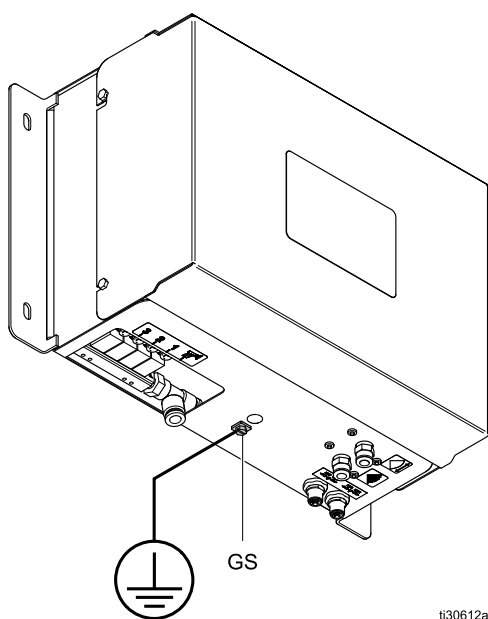


Figure 20 Air Control Ground Screw (GS)

## Speed Controller

|                                                                                                                                                                                                                                                                            |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
|                                                                                                                                                                                                                                                                            |  |  |  |  |
| <p>The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.</p> |  |  |  |  |

For full system grounding instructions and requirements, see the ProBell Rotary Applicator manual (334452 or 334626). Use the ground wire and clamp provided to ground the Speed Controller to a true earth ground

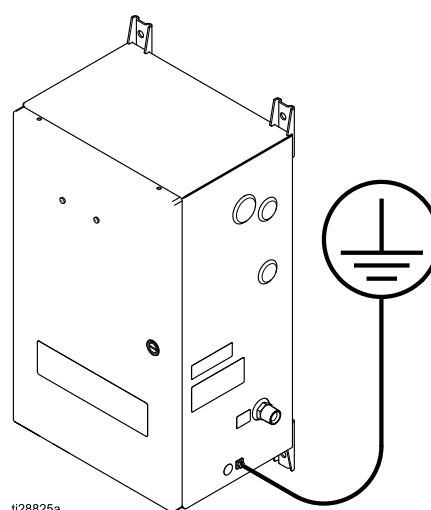


Figure 21 Ground the Controller

## Pro Xpc Auto / ProBell Electrostatic Controller

|                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                   |                                                                                   |                                                                                   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                      |  |  |  |  |
| <p>When operating the electrostatic applicator, any ungrounded objects in the spray location (people, containers, tools, etc.) can become electrically charged. Improper grounding can result in static sparking, which can cause a fire, explosion, or electric shock. Ground all equipment, personnel, object being sprayed, and conductive objects in or close to the spray location. Follow the grounding instructions below.</p> |                                                                                   |                                                                                   |                                                                                   |  |

Ground the Pro Xpc Auto/ProBell Controller (Electrostatic Controller) (U) with a grounded power cord and grounded socket. Also ground the controller with the ground connection (GC) and ground wire.

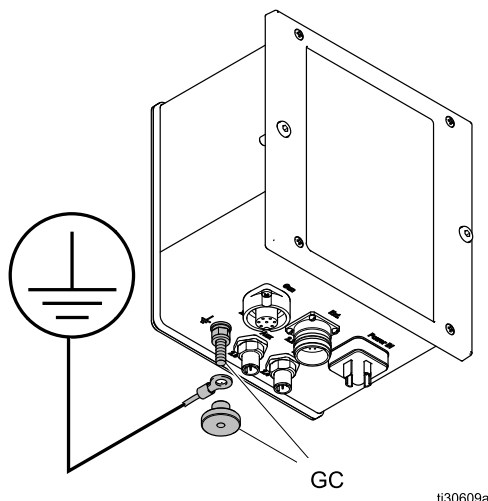


Figure 22 Electrostatic Controller Ground Connection (GC)

## Fluid Supply Container

Follow local code.

## Color Change Module

Connect a ground wire from the color change module (H) to a true earth ground.

Intrinsically safe color change modules located in the hazardous area must be connected to a true earth ground in the hazardous area.

## 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 applicator manual.

- **Non-Electrostatic:** Ground the spray applicator through connection to a Graco-approved grounded fluid supply hose.
- **Electrostatic:** Ground the spray applicator through connection to a Graco-approved grounded air supply hose. Connect the air hose ground wire to a true earth ground.

## Object Being Sprayed

Follow local codes for objects being sprayed. Keep the workpiece hangers clean and grounded at all times.

## Solvent Reservoir or Purge Station

Follow local code. Use only a conductive solvent reservoir or purge station placed on a grounded surface. Do not place the solvent reservoir or purge station on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

## Check Resistance

|                                                                                                                                                              |                                                                                       |                                                                                       |                                                                                       |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
|                                                                           |  |  |  |  |
| <p>To ensure proper grounding and reduce risk of fire and explosion, resistance between components and true earth ground <b>must</b> be less than 1 ohm.</p> |                                                                                       |                                                                                       |                                                                                       |  |



# Electrical Schematics

**NOTE:** The electrical schematic illustrates all possible wiring expansions in an integrated PD2K system. Some components shown are not included with all systems.

**NOTE:** See [Optional Cables and Modules, page 47](#) for a list of cable options.

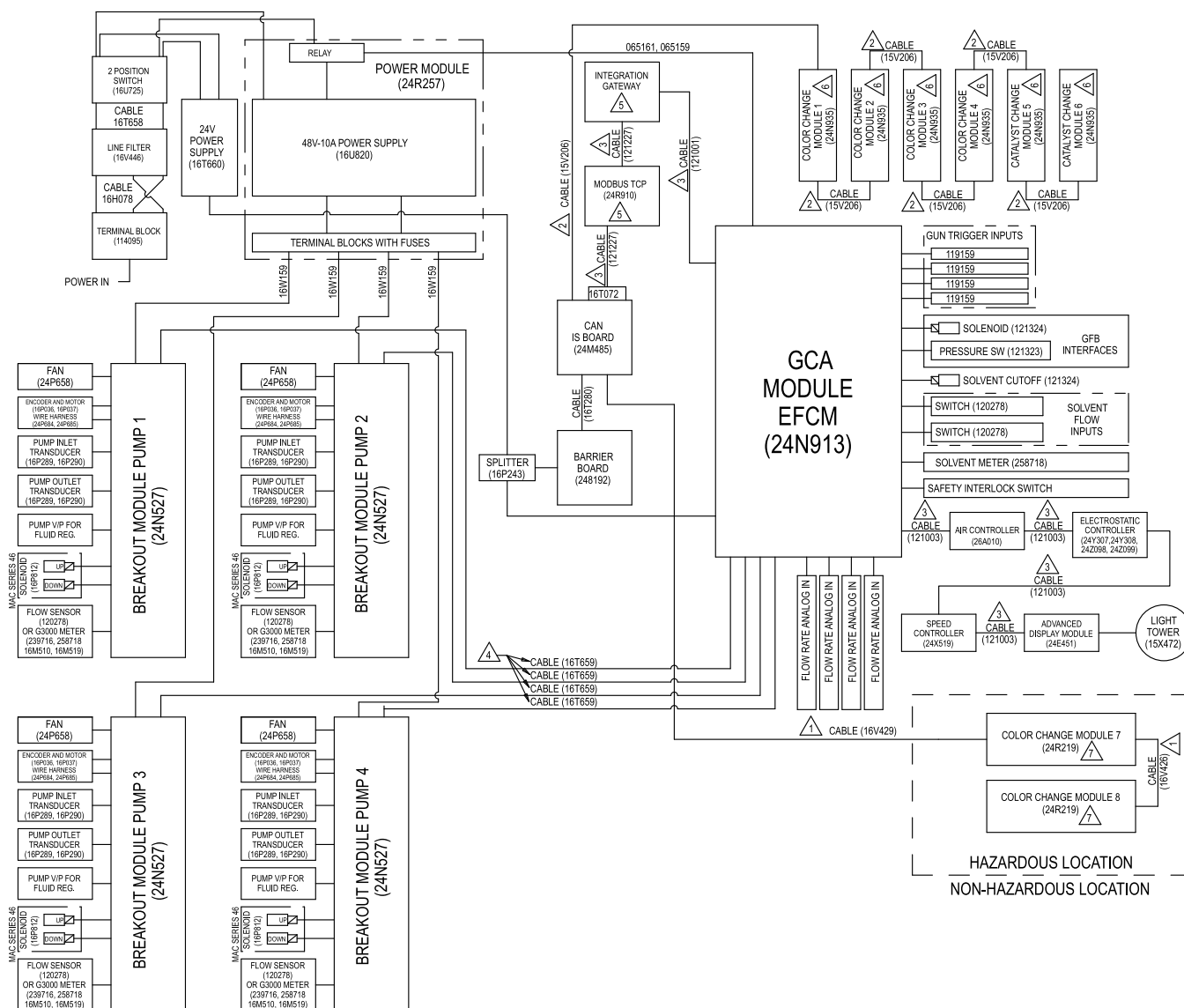


Figure 23 Electrical Schematic, Sheet 1

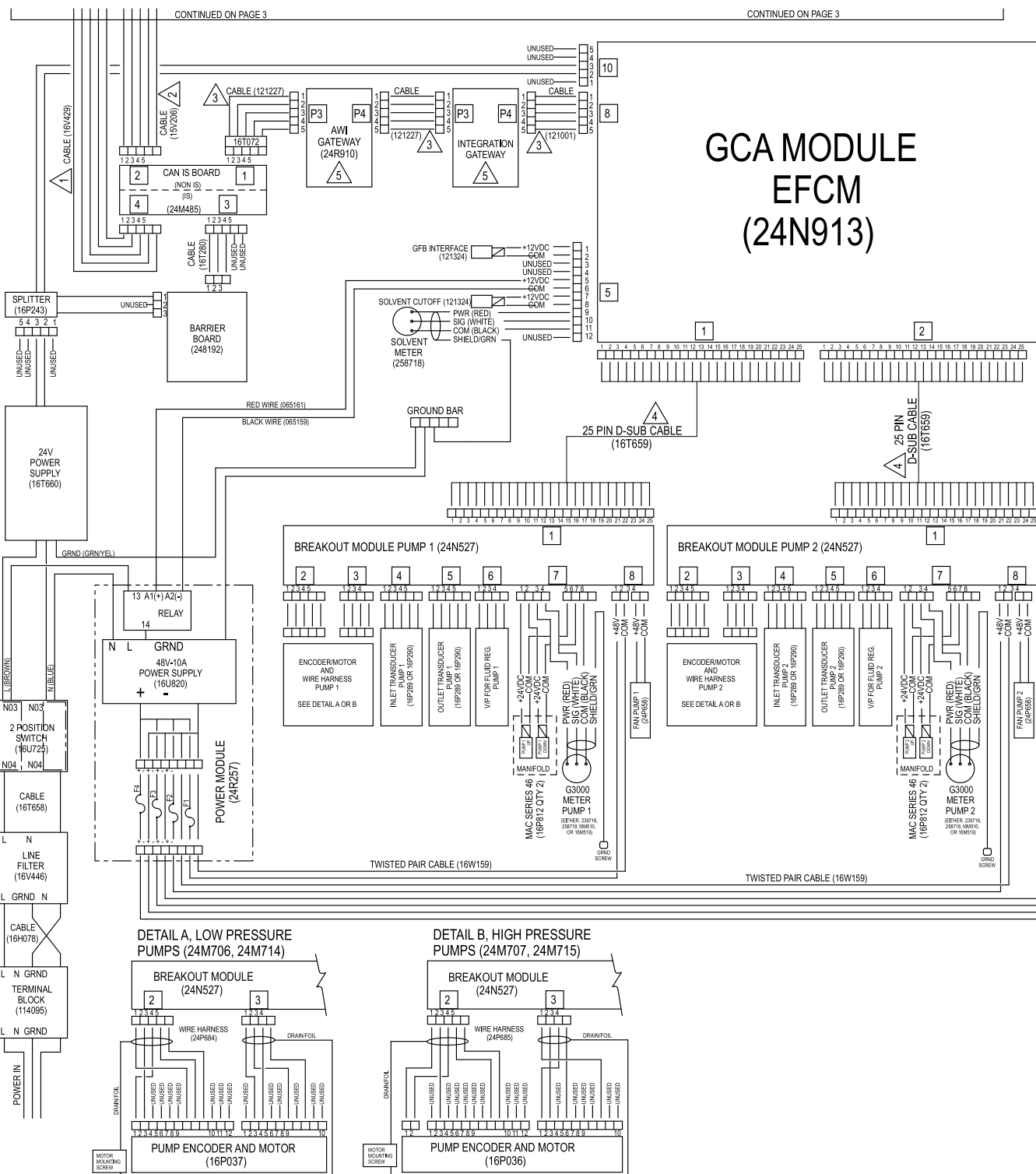


Figure 24 Electrical Schematic, Sheet 2, Part 1

CONTINUED ON THE NEXT PAGE

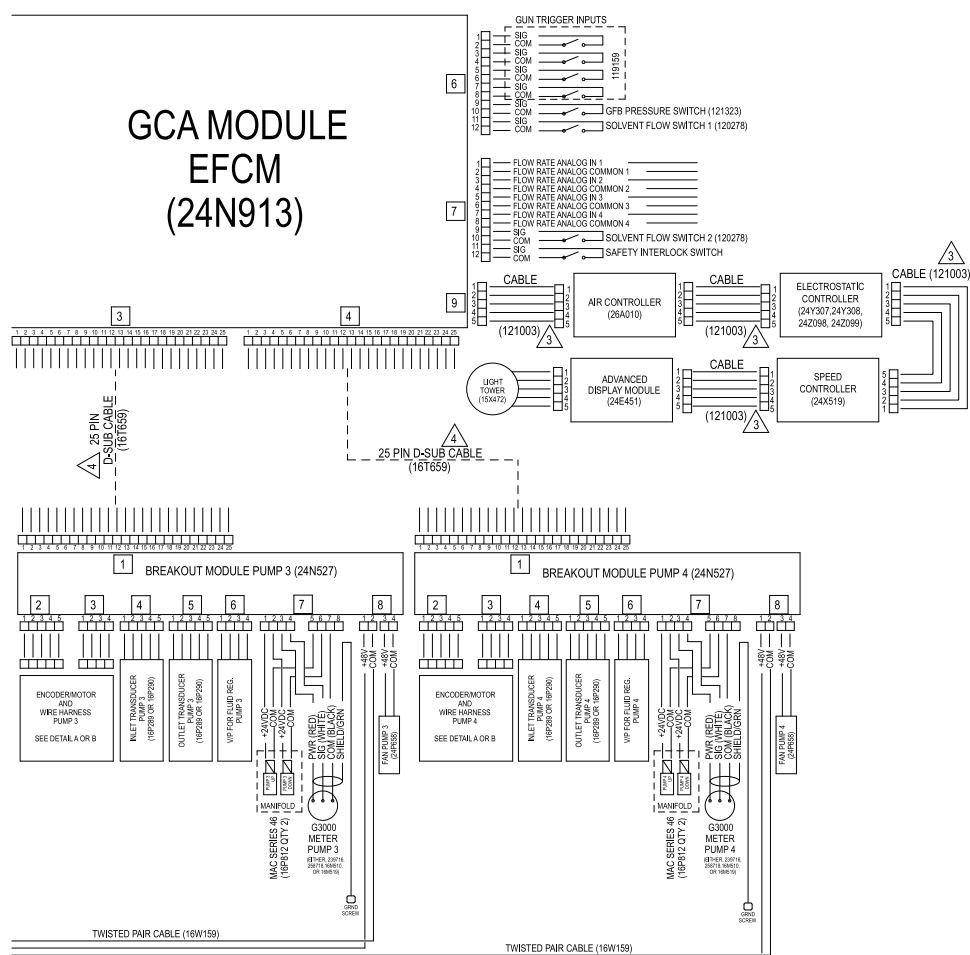


Figure 25 Electrical Schematic, Sheet 2, Part 2

CONTINUED ON THE NEXT PAGE

## Electrical Schematics

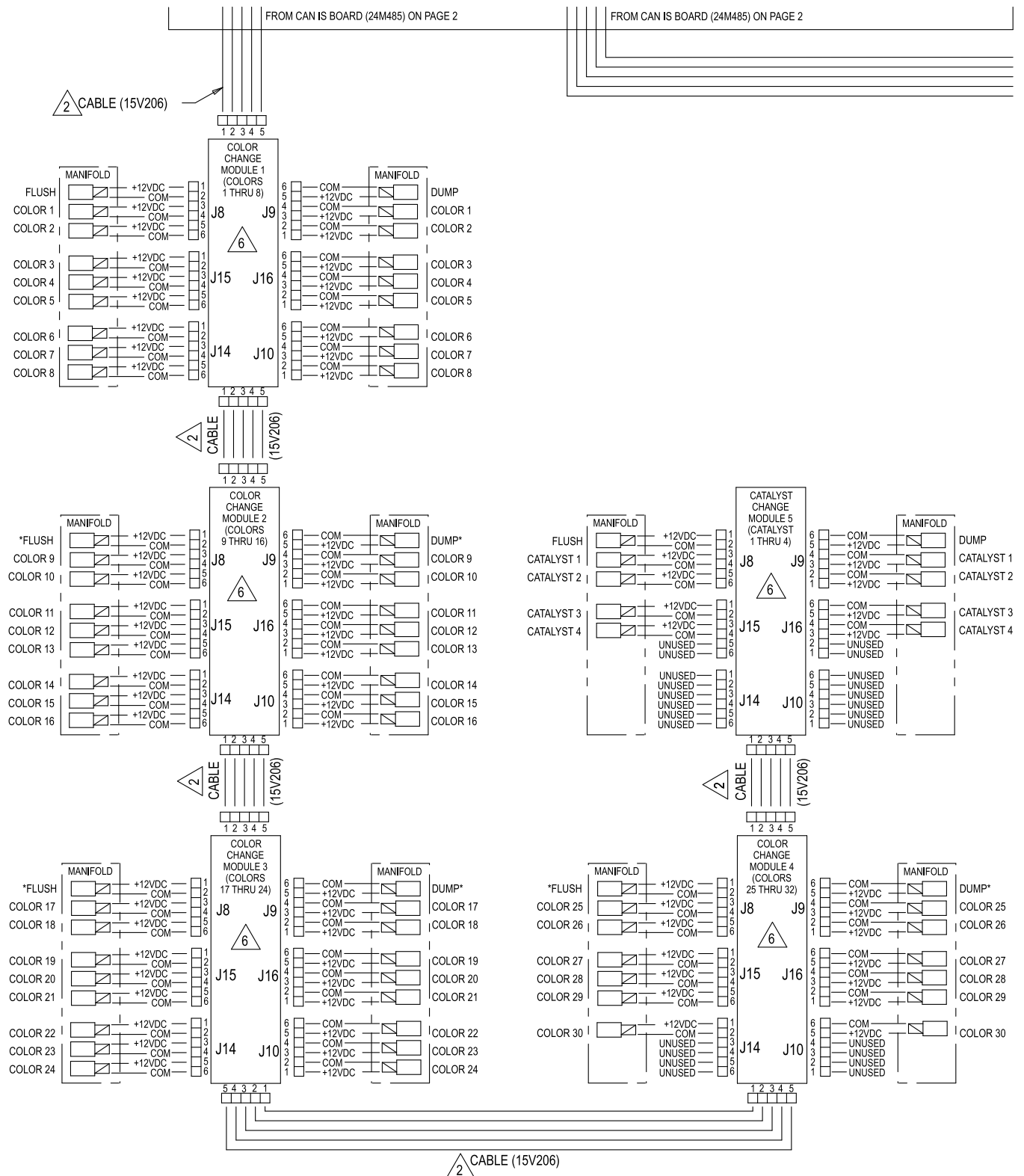


Figure 26 Electrical Schematic, Sheet 3

\* May be unused in some configurations.

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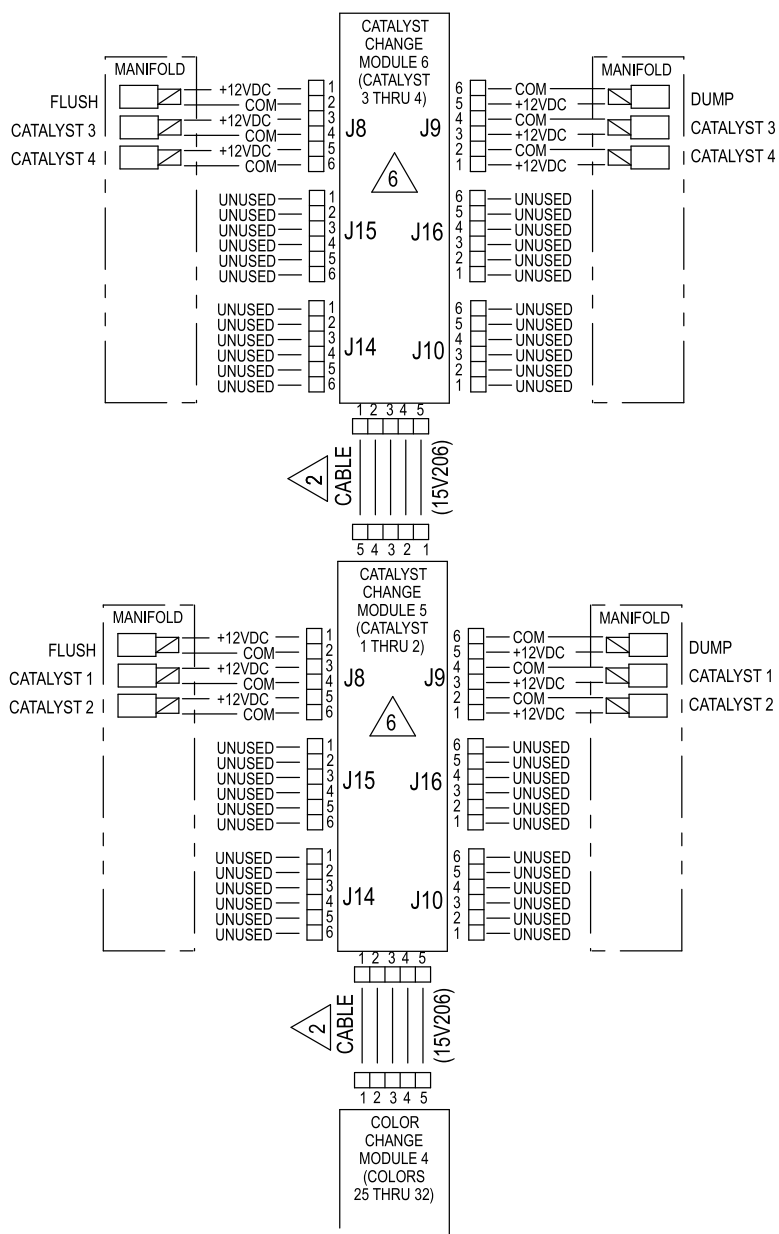


Figure 27 Electrical Schematic, Sheet 3, Alternate Configuration for Catalyst Change Control

CONTINUED ON THE NEXT PAGE

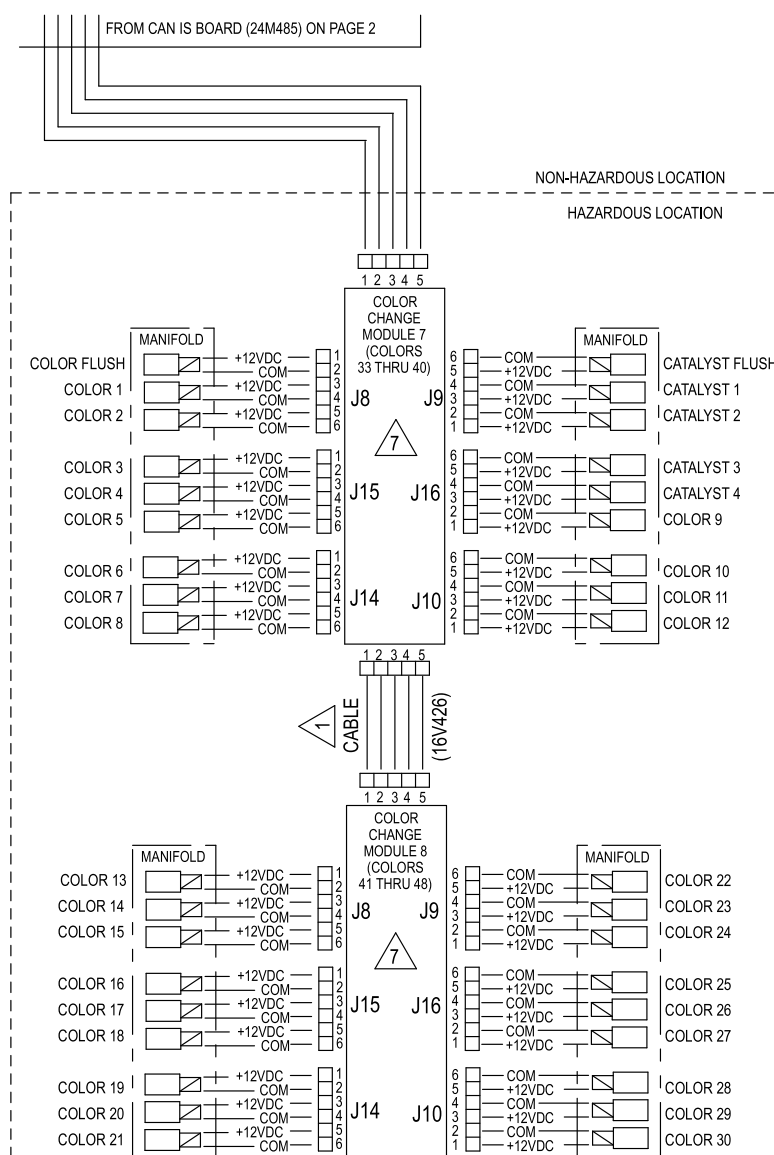


Figure 28 Electrical Schematic, Sheet 3, Hazardous Location

# Optional Cables and Modules

**NOTE:** The total length of all cable used in the system must not exceed 150 ft (45 m). See the [Electrical Schematics, page 41](#).

|                                                                                                                                                          |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1 M12 CAN Cables, for Hazardous Locations</b><br><b>NOTE:</b> The total length of cable used in the hazardous location must not exceed 120 ft (36 m). |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|

| Cable Part No. | Length ft (m) |
|----------------|---------------|
| 16V423         | 2.0 (0.6)     |
| 16V424         | 3.0 (1.0)     |
| 16V425         | 6.0 (2.0)     |
| 16V426         | 10.0 (3.0)    |
| 16V427         | 15.0 (5.0)    |
| 16V428         | 25.0 (8.0)    |
| 16V429         | 50.0 (16.0)   |
| 16V430         | 100.0 (32.0)  |

|                                                           |  |
|-----------------------------------------------------------|--|
| <b>2 M12 CAN Cables, for Non-Hazardous Locations Only</b> |  |
|-----------------------------------------------------------|--|

|        |              |
|--------|--------------|
| 15U531 | 2.0 (0.6)    |
| 15U532 | 3.0 (1.0)    |
| 15V205 | 6.0 (2.0)    |
| 15V206 | 10.0 (3.0)   |
| 15V207 | 15.0 (5.0)   |
| 15V208 | 25.0 (8.0)   |
| 15U533 | 50.0 (16.0)  |
| 15V213 | 100.0 (32.0) |

|                                                       |  |
|-------------------------------------------------------|--|
| <b>3 CAN Cables, for Non-Hazardous Locations Only</b> |  |
|-------------------------------------------------------|--|

| Cable Part No. | Length ft (m) |
|----------------|---------------|
| 125306         | 1.0 (0.3)     |
| 123422         | 1.3 (0.4)     |
| 121000         | 1.6 (0.5)     |
| 121227         | 2.0 (0.6)     |
| 121001         | 3.0 (1.0)     |
| 121002         | 5.0 (1.5)     |
| 121003         | 10.0 (3.0)    |
| 120952         | 13.0 (4.0)    |
| 121201         | 20.0 (6.0)    |
| 121004         | 25.0 (8.0)    |
| 121228         | 50.0 (15.0)   |

|                                                                |  |
|----------------------------------------------------------------|--|
| <b>4 25 Pin D-SUB Cables, for Non-Hazardous Locations Only</b> |  |
|----------------------------------------------------------------|--|

|        |           |
|--------|-----------|
| 16T659 | 2.5 (0.8) |
| 16V659 | 6.0 (1.8) |

| <b>5 Alternates for Communication Module 24W462</b>                      |                   |
|--------------------------------------------------------------------------|-------------------|
| Module Part No.                                                          | Module Part No.   |
| CGMDN0*, DeviceNet                                                       | CGMPN0*, Profinet |
| CGMEP0*, Ethernet IP                                                     |                   |
| * You must purchase CGM Installation Kit 17L710 for use with these kits. |                   |

| <b>6 Alternates for Color Change Modules by Part Number (Factory Configuration), for Non-Hazardous Locations Only</b> |                    |
|-----------------------------------------------------------------------------------------------------------------------|--------------------|
| Module Part No.                                                                                                       | Description        |
| 24T557                                                                                                                | 2 color/2 catalyst |
| 24T558                                                                                                                | 4 color/4 catalyst |
| 24T559                                                                                                                | 6 color/6 catalyst |
| 24T560                                                                                                                | 8 color/8 catalyst |

| <b>7 Alternates for Color Change Modules by Part Number (Factory Configuration), for Hazardous Locations Only</b> |                                  |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Module Part No.                                                                                                   | Description                      |
| 24T571                                                                                                            | 2 color/2 catalyst               |
| 24T572                                                                                                            | 4 color/2 catalyst               |
| 24T573                                                                                                            | 6 color/2 catalyst               |
| 24T574                                                                                                            | 8 color/2 catalyst, 13–24 color  |
| 24T774                                                                                                            | 12 color/2 catalyst              |
| 24T775                                                                                                            | 4 color/4 catalyst               |
| 24T776                                                                                                            | 6 color/4 catalyst               |
| 24T777                                                                                                            | 8 color/4 catalyst               |
| 24T778                                                                                                            | 12 color/4 catalyst, 13–30 color |
| 24T779                                                                                                            | 13–18 color                      |

| <b>8 Gun Power Cables for Pro Xpc Auto Gun</b> |                                 |
|------------------------------------------------|---------------------------------|
| Module Part No.                                | Description                     |
| 17H040                                         | Gun Power Cable; 11 m (36 ft)   |
| 17H041                                         | Gun Power Cable; 20 m (65.6 ft) |
| 17H042                                         | Gun Power Cable; 30 m (98.4 ft) |

# Dimensions

## Proportioner Dimensions

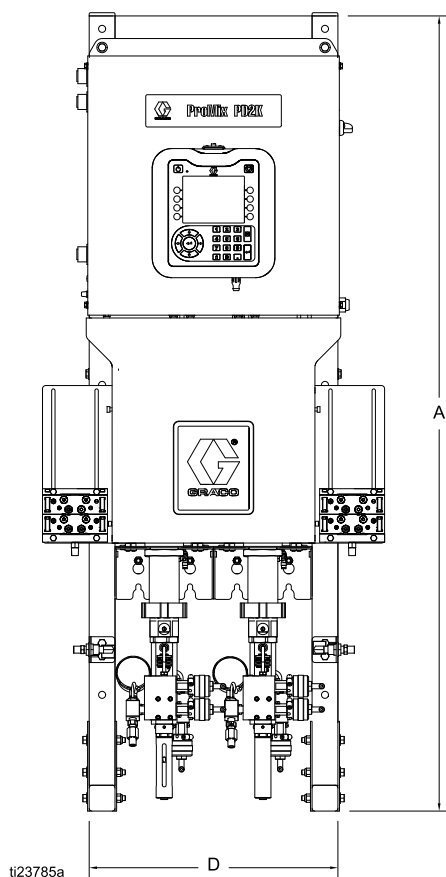


Figure 29

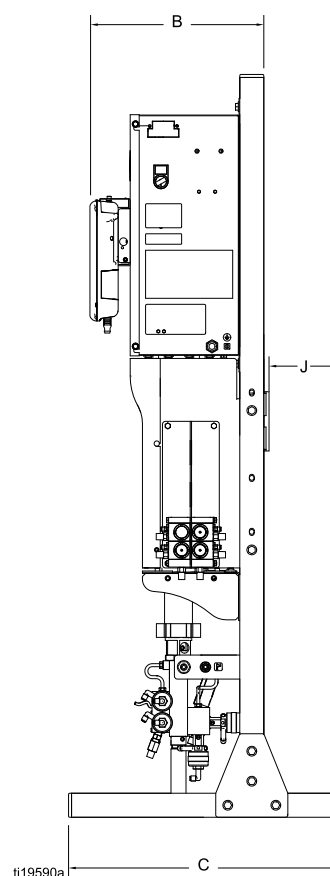


Figure 30

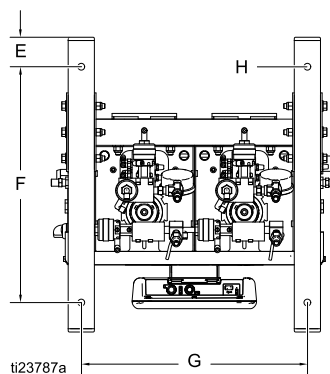


Figure 31

| A                   | B                 |                    | C                 | D                  | E               | F                 | G                  | H                | J                                          |
|---------------------|-------------------|--------------------|-------------------|--------------------|-----------------|-------------------|--------------------|------------------|--------------------------------------------|
|                     | with ADM          | without ADM        |                   |                    |                 |                   |                    |                  |                                            |
| 58.20 in. (1478 mm) | 14.5 in. (368 mm) | 11.12 in. (282 mm) | 22.0 in. (559 mm) | 19.26 in. (489 mm) | 2.0 in. (51 mm) | 18.0 in. (457 mm) | 17.26 in. (438 mm) | 0.52 in. (13 mm) | Minimum 6in (152 mm) from mounting surface |



## Air Control Dimensions

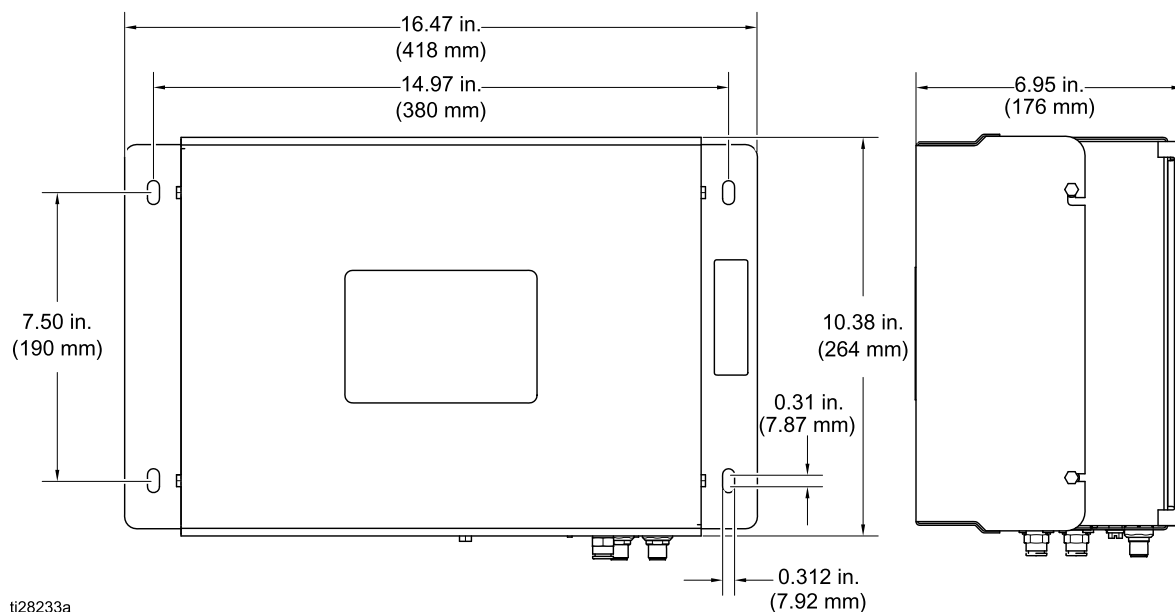


Figure 32

## Speed Controller Dimensions

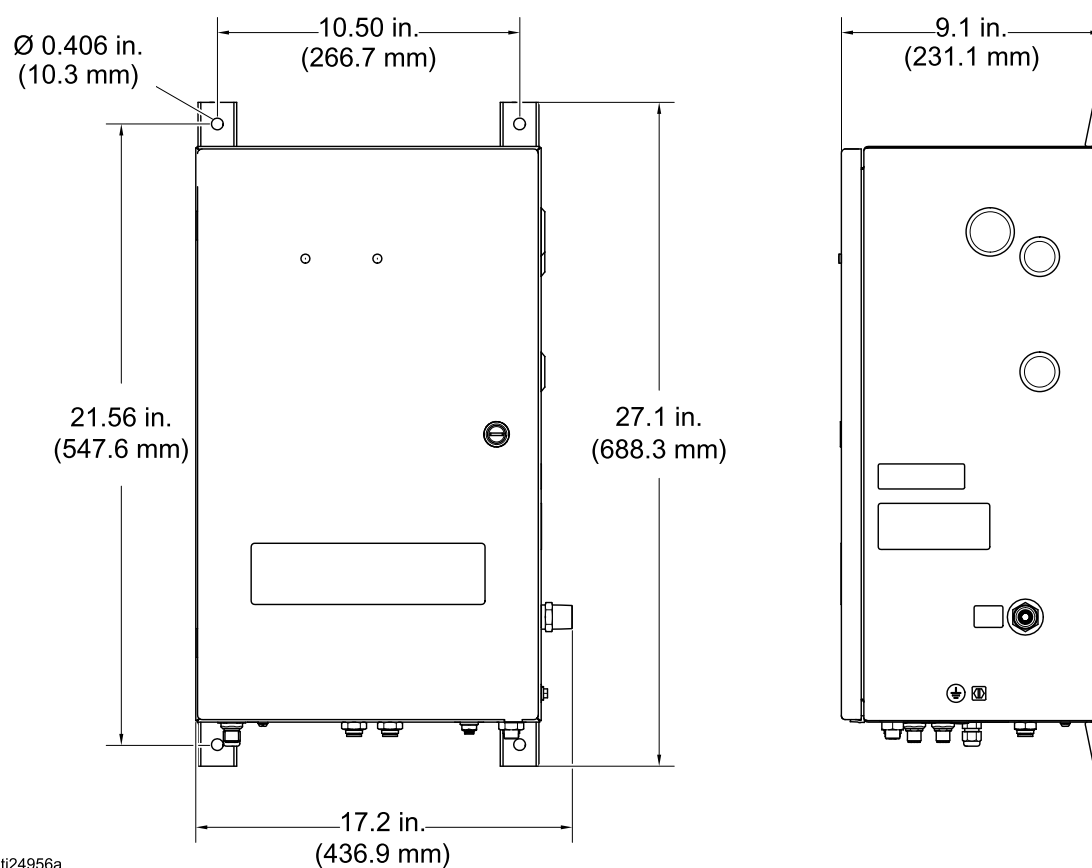
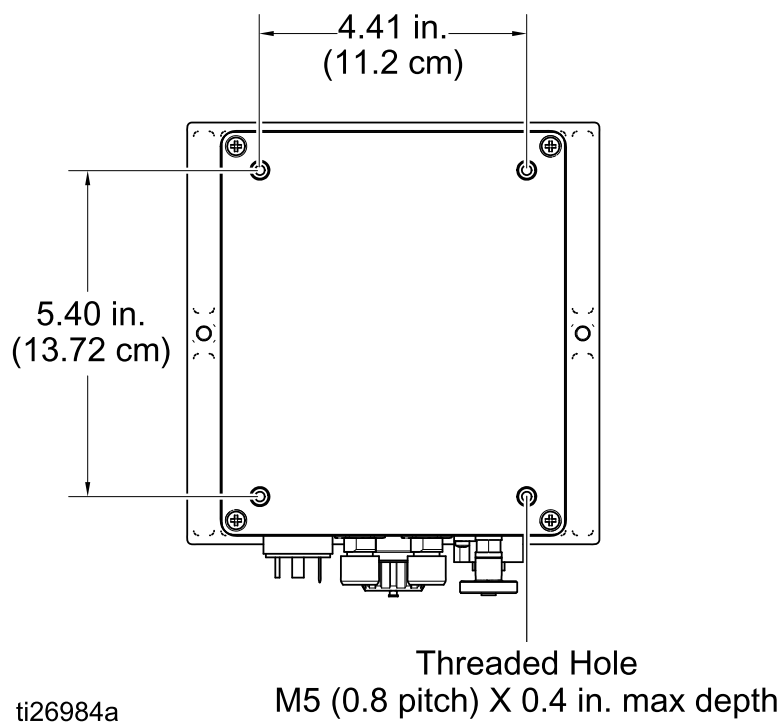
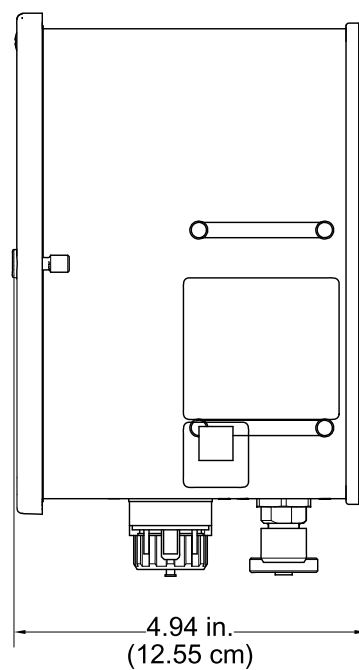
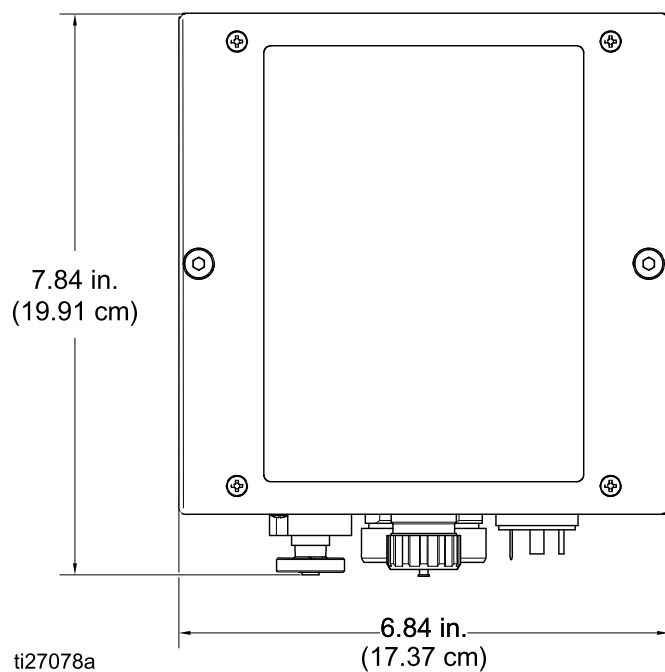


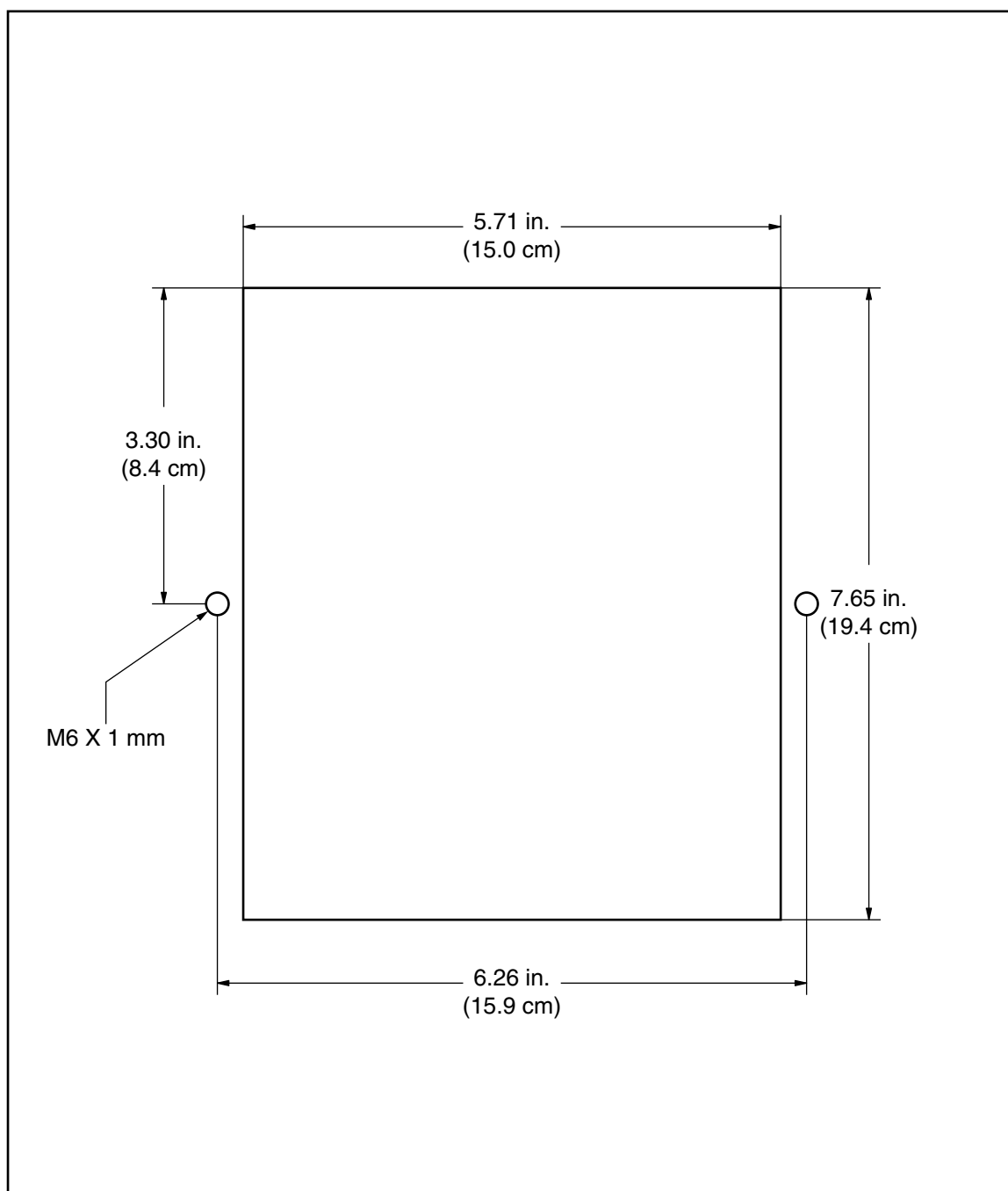
Figure 33

## Electrostatic Dimensions

### Electrostatic Controller

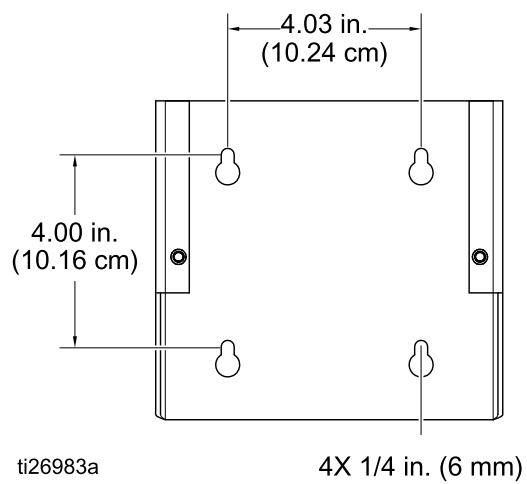


# Electrostatic Controller Flush Mount



*Dimensions*

**Electrostatic Controller Wall Mount  
Bracket 17H288**



## Notes

[illegible]

# Technical Specifications

| Positive Displacement Proportioner                | U.S.                                                                                                                                                                                                                              | Metric                    |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Maximum fluid working pressure:                   |                                                                                                                                                                                                                                   |                           |
| AC0500 Spray Systems                              | Pumps sold separately; see selected pump manual maximum working pressure.                                                                                                                                                         |                           |
| AC1000 Air Spray Systems                          | 300 psi                                                                                                                                                                                                                           | 2.1 MPa, 21 bar           |
| AC2000 Air-Assisted Spray Systems                 | 1500 psi                                                                                                                                                                                                                          | 10.5 MPa, 105 bar         |
| Maximum working air pressure:                     | 100 psi                                                                                                                                                                                                                           | 0.7 MPa, 7.0 bar          |
| Air supply:                                       | 85–100 psi                                                                                                                                                                                                                        | 0.6–0.7 MPa, 6.0–7.0 bar) |
| Air filter inlet size:                            | 3/8 npt(f)                                                                                                                                                                                                                        |                           |
| Air filtration for air logic (user-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                                                                                                                                                                        |                           |
| Mixing ratio range:                               | 0.1:1 to 50:1, ±1%                                                                                                                                                                                                                |                           |
| Fluids handled:                                   | one or two component: <ul style="list-style-type: none"> <li>• solvent and waterborne paints</li> <li>• polyurethanes</li> <li>• epoxies</li> <li>• acid catalyzed varnishes</li> <li>• moisture sensitive isocyanates</li> </ul> |                           |
| Viscosity range of fluid:                         | 20–5000 centipoise                                                                                                                                                                                                                |                           |
| Fluid filtration (user-supplied):                 | 100 mesh minimum                                                                                                                                                                                                                  |                           |
| Maximum fluid flow:                               | 800 cc/minute (depending on material viscosity)                                                                                                                                                                                   |                           |
| Fluid outlet size:                                | 1/4 npt(m)                                                                                                                                                                                                                        |                           |
| External power supply requirements:               | 90 - 250 Vac, 50/60 Hz, 7 amps maximum draw<br>15 amp maximum circuit breaker required<br>8 to 14 AWG power supply wire gauge                                                                                                     |                           |
| Operating temperature range:                      | 36 to 122°F                                                                                                                                                                                                                       | 2 to 50°C                 |
| Storage temperature range:                        | –4 to 158°F                                                                                                                                                                                                                       | –20 to 70°C               |
| Weight of base model (approximate):               | 195 lb                                                                                                                                                                                                                            | 88 kg                     |
| Sound data:                                       | Less than 75 dB(A)                                                                                                                                                                                                                |                           |
| Wetted parts:                                     | 17–4PH SST, 303 SST, 304 SST, Tungsten carbide (with nickel binder), perfluoroelastomer; PTFE, PPS, UHMWPE                                                                                                                        |                           |

| <b>Integrated Air Control</b>   | <b>U.S.</b> | <b>Metric</b> |
|---------------------------------|-------------|---------------|
| Maximum Air Inlet Pressure      | 100 psi     | 7 bar         |
| Inlet Hose                      | 3/8 in.     | 9.5 mm        |
| Outlet Hoses                    |             |               |
| Atomizing Air                   | 5/16 in.    | 8 mm          |
| Fan Air                         | 5/16 in.    | 8 mm          |
| Paint Trigger                   | 5/32 in.    | 4 mm          |
| Auxiliary Air 1                 | 5/32 in.    | 4 mm          |
| Auxiliary Air 2                 | 5/32 in.    | 4 mm          |
| Auxiliary Air 3                 | 5/32 in.    | 4 mm          |
| Voltage                         | 24 VDC      |               |
| Current                         | 1 Amp       |               |
| Environmental Temperature Range | 32 — 122° F | 0 — 50° C     |
| Weight                          | 15 lbs.     | 6.8 kg        |

| <b>Speed Controller</b>                     | <b>U.S.</b>                                                                                     | <b>Metric</b>    |
|---------------------------------------------|-------------------------------------------------------------------------------------------------|------------------|
| Maximum Working Pressure                    | 100 psi                                                                                         | 7 bar            |
| Turbine speed, maximum operating            | 60,000 rpm                                                                                      |                  |
| Bearing air, minimum required               | 70 psi                                                                                          | 0.5 MPa, 5.0 bar |
| Air Connection                              | 1/2" npt                                                                                        |                  |
| Maximum Operating Voltage                   | 24 VDC, 2.5A                                                                                    |                  |
| Power connection for part 24Z224            | Straight IEC 320-C13 male connector and a North American NEMA 5-15P ISP male plug are provided. |                  |
| External Power Requirements for part 24Z224 | 100-240 VAC, 50/60 Hz, 2A maximum draw, 15 amp circuit breaker is recommended                   |                  |
| Operating Temperature Range                 | 32° to 122° F                                                                                   | 0° to 50° C      |
| Storage Temperature Range                   | -22° to 140° F                                                                                  | -30° to 60° C    |
| Weight (Model 24Z219)                       | 34 lb.                                                                                          | 15.4 kg.         |

| <b>Electrostatic Controller</b>            | <b>U.S.</b>      | <b>Metric</b>  |
|--------------------------------------------|------------------|----------------|
| Nominal Input Voltage                      | 100-240 VAC      |                |
| Frequency                                  | 50-60 Hz         |                |
| Input Power                                | 40 VA            |                |
| Nominal Output Voltage (to the applicator) | eff 10V          |                |
| Nominal Output Current (to the applicator) | max 1.2 A        |                |
| Protection Type                            | IP54             |                |
| Ambient Temperature Range                  | 41°F - 104°F     | 5°C - 40°C     |
| Dimensions                                 |                  |                |
| Width                                      | 6.8 in.          | 173 mm         |
| Depth                                      | 4.8 in.          | 122 mm         |
| Height                                     | 7.5 in.          | 191 mm         |
| Weight                                     | approx. 4.5 lbs. | approx. 2.0 kg |

# 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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