

Color Change and Remote Mix

Manifold Kits

333282B
EN

To add optional color change function and at-the-gun mixing of two component materials when used with a ProMix™ PD2K Proportioner for Automatic Spray Applications. For professional use only.

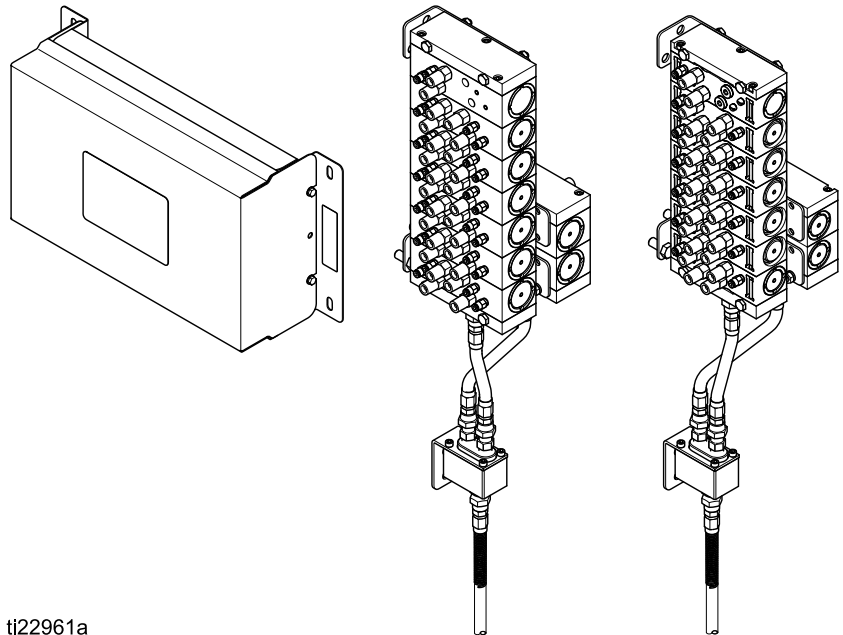


Important Safety Instructions

Read all warnings and instructions in this manual and in your system installation, operation, and repair/parts 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.



| Manual No. | Description |
|------------|--|
| 332458 | PD2K Proportioner, Installation Manual, Systems for Automatic Spray Applications |
| 332564 | PD2K Proportioner Operation Manual, Systems for Automatic Spray Applications |
| 332565 | PD2K Proportioner Repair-Parts Manual, Systems for Automatic Spray Applications |

| Manual No. | Description |
|------------|---|
| 332709 | Pump Repair-Parts Manual |
| 332454 | Color Change Valve Repair-Parts Manual |
| 332456 | 3rd and 4th Pump Kits Instructions-Parts Manual |

Models

Non-Intrinsically Safe Modules

These kits are installed in the non-hazardous location, near the pumps. See the Kit label for the product part number. See the module identification label for maximum air working pressure, approval information and certification.

| | | | | | | |
|--|--------|--------|---|-----------------------------|---------------------------|-----|
| ProMix® PD2K | | | | COLOR CHANGE CONTROL | | |
| PART NO. | SERIES | SERIAL | MFG. YR. | MAX AIR WPR | | |
| [] | [] | [] | [] | .7 | 7 | 100 |
| | | | | MPa | bar | PSI |
|  GRACO INC. P.O. Box 1441 Minneapolis, MN 55440 U.S.A. | | |  | | Artwork No. 294057 Rev. B | |

| | |
|---|-----|
| Kit No. | [] |
| Serial No. | [] |
| Series No. | [] |
|  | |
| Artwork No. 293992 Rev. C | |

Non-Intrinsically Safe Color Change Control Module Label

Kit Identification Label



| Kit No. | Series | Kit Description | Maximum Air Working Pressure (Control Module) | Maximum Fluid Working Pressure (Valves) |
|---|--------|-----------------------|---|---|
| Low Pressure Non-Circulating Color Change Kits | | | | |
| 24R915 | A | 2 color or 2 catalyst | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R916 | A | 4 color or 4 catalyst | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R917 | A | 6 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R918 | A | 8 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| Low Pressure Circulating Color Change Kits | | | | |
| 24R919 | A | 2 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R920 | A | 4 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R921 | A | 6 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |
| 24R922 | A | 8 color | 100 psi (0.7 MPa, 7.0 bar) | 300 psi (2.068 MPa, 20.68 bar) |





| Kit No. | Series | Kit Description | Maximum Air Working Pressure (Control Module) | Maximum Fluid Working Pressure (Valves) |
|---|--------|------------------------------|---|---|
| High Pressure Non-Circulating Color Change Kits | | | | |
| 24R959 | A | 2 color or 2 catalyst | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R960 | A | 4 color or 4 catalyst | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R961 | A | 6 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R962 | A | 8 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| High Pressure Acid Compatible Non-Circulating Catalyst Change Kits | | | | |
| 24T579 | A | 2 catalyst (acid compatible) | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24T580 | A | 4 catalyst (acid compatible) | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| High Pressure Circulating Color Change Kits | | | | |
| 24R963 | A | 2 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R964 | A | 4 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R965 | A | 6 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |
| 24R966 | A | 8 color | 100 psi (0.7 MPa, 7.0 bar) | 1500 psi (10.34 MPa, 103.4 bar) |

NOTE: Systems can use 1 to 30 colors and up to 4 catalysts. To add colors/catalysts:

- **If current control module is full:** If all solenoid ports are in use in your control module(s), an additional control module is needed. Order another complete color change change kit, shown above.
- **If current control module is not full:** If empty solenoid ports remain in your control module, see [Expansion Kits, page 69](#).

Intrinsically Safe Modules

These kits utilize intrinsically safe control modules that are installed in the hazardous area, near the dispense valve. See the kit identification label for the product part number. See the module identification label for maximum air working pressure, approval information and certification.

| ProMix® PD2K | | | | COLOR CHANGE CONTROL | | |
|--|--------|--|----------|----------------------|-----|-----|
| PART NO. | SERIES | SERIAL | MFG. YR. | MAX AIR WPR | | |
| | | | | .7 | 7 | 100 |
|  Intrinsically safe equipment for Class I, Div 1, Group D, T3 Ta = 2°C to 50°C Install per 16P577 | |  II 2 G Ex Ia IIA T3 Gb FM13 ATEX 0026 IECEx FMG 13.0011 | | MPa | bar | PSI |
|  CE 0359 | |  GRACO INC. P.O. Box 1441 Minneapolis, MN 55440 U.S.A. | | | | |
| Artwork No. 294055 Rev. A | | | | | | |

| | |
|--|----------------------|
| Kit No. | <input type="text"/> |
| Serial No. | <input type="text"/> |
| Series No. | <input type="text"/> |
|  CE | |
| Artwork No. 293992 Rev. C | |

Intrinsically Safe Color Change Module Identification Label



Kit Identification Label



Table 1 . Low Pressure, Non-Circulating Remote Mix Manifold Kits
 Maximum Fluid Working Pressure: 300 psi (2.07 MPa, 20.7 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 |
| Control Module Expansion Kits: Use to add a second control module (includes all needed solenoids, manifolds, valves and a CAN cable). | | | |
| 13–18 | 24V163 | | |
| 13–24 | 24V164 | | |
| 13–30 | 24V165 | | |

Table 2 . Low Pressure, Circulating Remote Mix Manifold Kits
Maximum Fluid Working Pressure: 300 psi (2.07 MPa, 20.7 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 |
| Control Module Expansion Kits: Use to add a second control module (includes all needed solenoids, manifolds, valves and a CAN cable). | | | |
| 13–18 | 24V328 | | |
| 13–24 | 24V329 | | |
| 13–30 | 24V330 | | |

Table 3 . High-Pressure, Non-Circulating Remote Mix Manifold Kits
Maximum Fluid Working Pressure: 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 |
| Control Module Expansion Kits: Use to add a second control module (includes all needed solenoids, manifolds, valves and a CAN cable). | | | |
| 13–18 | 24V365 | | |
| 13–24 | 24V366 | | |
| 13–30 | 24V367 | | |

Models continue on next page.

Table 4 . High-Pressure, Circulating Remote Mix Manifold Kits
Maximum Fluid Working Pressure: 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 |
| Control Module Expansion Kits: Use to add a second control module (includes all needed solenoids, manifolds, valves and a CAN cable). | | | |
| 13–18 | 24V375 | | |
| 13–24 | 24V376 | | |
| 13–30 | 24V377 | | |






NOTE: Systems can use 1 to 30 colors and up to 4 catalysts. To add colors/catalysts:

- If current control module is full: If all solenoid ports are in use in your IS control module, an additional IS control module is needed. Order a Control Module Expansion Kit, shown above.
- If current control module is not full: If empty solenoid ports remain in your control module, see [Expansion Kits, page 69](#).

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 symbol refers 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.

|  <h2 style="margin: 0;">WARNING</h2> | |
|---|---|
|     | <p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive. • Stop operation immediately if static sparking occurs or you feel a shock, Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area. |
|   | <p>ELECTRIC SHOCK HAZARD</p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations. |

|  <h1 style="margin: 0;">WARNING</h1> | |
|---|---|
|  | <p>INTRINSIC SAFETY</p> <p>Intrinsically safe equipment that is installed improperly or connected to non-intrinsically safe equipment will create a hazardous condition and can cause fire, explosion, or electric shock. Follow local regulations and the following safety requirements.</p> <ul style="list-style-type: none"> • 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.). • To help prevent fire and explosion: <ul style="list-style-type: none"> • 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. • Do not substitute system components as this may impair intrinsic safety. • 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. |
|  | <p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point dispensing device at anyone or at any part of the body. • Do not put your hand over the fluid outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately. |
|  | <p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources. |
|  | <p>TOXIC FLUID OR FUMES</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"> • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment. |



WARNING



PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

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



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

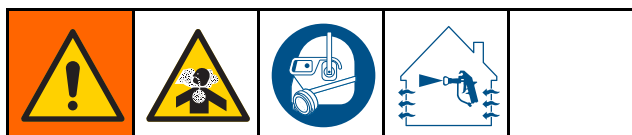


- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. 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



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

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

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

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

Keep Components A and B Separate



Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination:

- **Never** interchange component A and component B wetted parts.
- Never use solvent on one side if it has been contaminated from the other side.

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 |
|---|
| <p>Partially cured ISO will reduce performance and the life of all wetted parts.</p> <ul style="list-style-type: none"> • 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 |
|--|
| <p>Changing the material types used in your equipment requires special attention to avoid equipment damage and downtime.</p> <ul style="list-style-type: none"> • 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 (resin) side. |

Setup the Modules

Setup Non-IS Control Modules

NOTE: The PD2K System can use up to four pumps and six color change modules in the non-hazardous area. Use the following table to understand how many color change modules are needed for the number of pumps in your system, and which module should be associated to which pump.

All Non-IS modules ship from the factory as Module 1 (Colors 1–8). Labels for Modules 2 through 6 are provided with the module kit. Affix the labels according to your system configuration.

Table 5 . Relationship of Non-IS Color Change Control Modules to Pumps

| System Pump Configuration | | | Color Change Control Modules, Colors, and Catalysts | | | | | |
|---------------------------|------------------|-------------|---|------------------------|-------------------------|-------------------------|------------------------|--------------|
| Color Pump(s) | Catalyst Pump(s) | Total Pumps | Module 1 (Colors 1–8) | Module 2 (Colors 9–16) | Module 3 (Colors 17–24) | Module 4 (Colors 25–30) | Catalyst 1–2 | Catalyst 3–4 |
| 1 | 0 | 1 | Pump # 1 | Pump # 1 | Pump # 1 | Pump # 1 | Not Applicable | |
| 1 | 1 | 2 | | | | | Module # 5 Pump # 2 | |
| 2 | 1 | 3 | | | Module # 5 Pump # 2 | | | |
| 2 | 0 | 2 | | | Not Applicable | | | |
| 2 | 2 | 4 | | Module # 5 Pump # 2 | Module # 6 Pump # 4 | | | |
| 3 | 1 | 4 | | Pump # 3 | Pump # 3 | Pump # 3 | Module # 5 Pump # 2 | |
| 3 | 0 | 3 | | | | | Not Applicable | |
| 4 | 0 | 4 | | | Pump # 2 | Not Applicable | | |

Setup the Modules

Configure each module according to its designated number, as follows:

| |
|--|
| NOTICE |
| To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately. |
| To avoid electrical component damage, remove all system power before plugging any connectors. |

1. Remove electrical power from the system.
2. Open the color change module. Locate switches S4, S5, and S6 on the control module board. The switches are shipped in the OFF position.



3. For each module, set the switches to ON or OFF, as shown in the following table.

| Non-IS Control Module Switch Settings | | | |
|---------------------------------------|----|----|----|
| Control Module | S6 | S5 | S4 |
| Module 1 | | | |
| Module 2 | | | |
| Module 3 | | | |
| Module 4 | | | |
| Module 5 | | | |
| Module 6 | | | |

4. Use the following figure and tables to determine the solenoid valve assigned to each valve in the valve manifold.

NOTE: There can be only one solvent valve and one dump valve per pump.

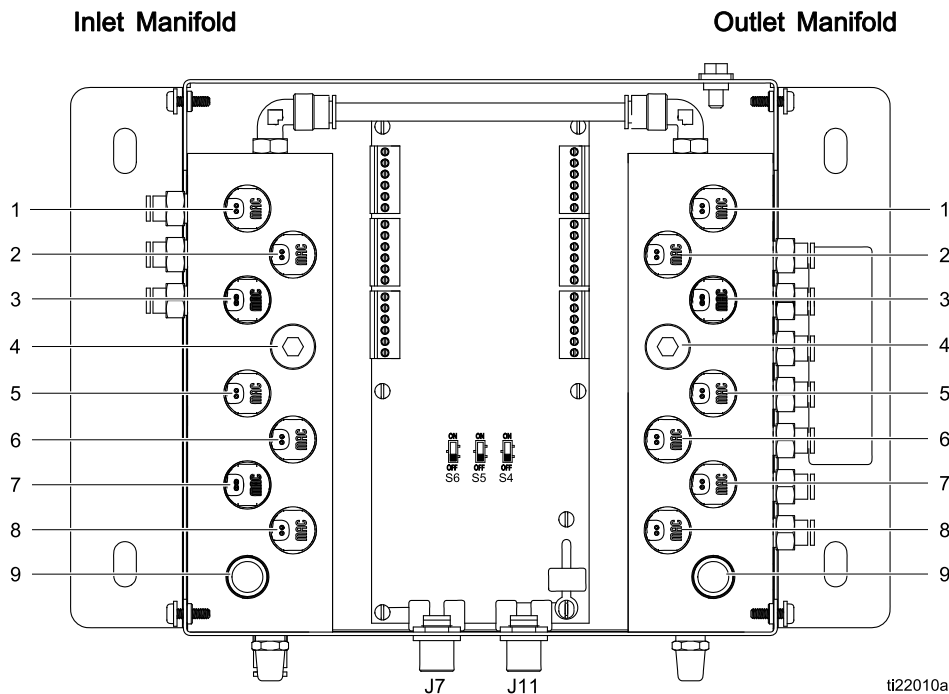


Figure 1 Non-IS Control Module

| Non-IS Control Module 1 | | | |
|-------------------------|---------|-----------------|---------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | Solvent | 1 | Dump |
| 2 | Color 1 | 2 | Color 1 |
| 3 | Color 2 | 3 | Color 2 |
| 4 | Color 3 | 4 | Color 3 |
| 5 | Color 4 | 5 | Color 4 |
| 6 | Color 5 | 6 | Color 5 |
| 7 | Color 6 | 7 | Color 6 |
| 8 | Color 7 | 8 | Color 7 |
| 9 | Color 8 | 9 | Color 8 |

| Non-IS Control Module 4 | | | |
|-------------------------|------------|-----------------|----------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | (Solvent)* | 1 | (Dump)* |
| 2 | Color 25 | 2 | Color 25 |
| 3 | Color 26 | 3 | Color 26 |
| 4 | Color 27 | 4 | Color 27 |
| 5 | Color 28 | 5 | Color 28 |
| 6 | Color 29 | 6 | Color 29 |
| 7 | Color 30 | 7 | Color 30 |
| 8 | Not Used | 8 | Not Used |
| 9 | Not Used | 9 | Not Used |

| Non-IS Control Module 2 | | | |
|-------------------------|------------|-----------------|----------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | (Solvent)* | 1 | (Dump)* |
| 2 | Color 9 | 2 | Color 9 |
| 3 | Color 10 | 3 | Color 10 |
| 4 | Color 11 | 4 | Color 11 |
| 5 | Color 12 | 5 | Color 12 |
| 6 | Color 13 | 6 | Color 13 |
| 7 | Color 14 | 7 | Color 14 |
| 8 | Color 15 | 8 | Color 15 |
| 9 | Color 16 | 9 | Color 16 |

| Non-IS Control Module 5 | | | |
|-------------------------|------------|-----------------|------------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | (Solvent)* | 1 | (Dump)* |
| 2 | Catalyst 1 | 2 | Catalyst 1 |
| 3 | Catalyst 2 | 3 | Catalyst 2 |
| 4 | Catalyst 3 | 4 | Catalyst 3 |
| 5 | Catalyst 4 | 5 | Catalyst 4 |
| 6 | Not Used | 6 | Not Used |
| 7 | Not Used | 7 | Not Used |
| 8 | Not Used | 8 | Not Used |
| 9 | Not Used | 9 | Not Used |

| Non-IS Control Module 3 | | | |
|-------------------------|------------|-----------------|----------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | (Solvent)* | 1 | (Dump)* |
| 2 | Color 17 | 2 | Color 17 |
| 3 | Color 18 | 3 | Color 18 |
| 4 | Color 19 | 4 | Color 19 |
| 5 | Color 20 | 5 | Color 20 |
| 6 | Color 21 | 6 | Color 21 |
| 7 | Color 22 | 7 | Color 22 |
| 8 | Color 23 | 8 | Color 23 |
| 9 | Color 24 | 9 | Color 24 |

| Non-IS Control Module 6 | | | |
|-------------------------|------------|-----------------|------------|
| Inlet Manifold | | Outlet Manifold | |
| Solenoid | Valve | Solenoid | Valve |
| 1 | (Solvent)* | 1 | (Dump)* |
| 2 | Catalyst 3 | 2 | Catalyst 3 |
| 3 | Catalyst 4 | 3 | Catalyst 4 |
| 4 | Not Used | 4 | Not Used |
| 5 | Not Used | 5 | Not Used |
| 6 | Not Used | 6 | Not Used |
| 7 | Not Used | 7 | Not Used |
| 8 | Not Used | 8 | Not Used |
| 9 | Not Used | 9 | Not Used |

* There should be only one solvent valve and one dump valve per pump.

Setup IS Control Modules

NOTE: Two IS color change control modules may be installed in the hazardous area. The module for colors 1–12 is labeled board 7. The module for colors 13–30 is labeled board 8. An alternate label for Module 8 (Colors 13–30) is provided with the module kit. Affix the label according to your system configuration.

Configure each module according to its designated number, as follows:

| NOTICE | |
|--|--|
| To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately. | |
| To avoid electrical component damage, remove all system power before plugging any connectors. | |

1. Remove electrical power from the system.
2. Open the color change module. Locate switches S4, S5, and S6 on the control module board. The switches may be shipped in the OFF position.

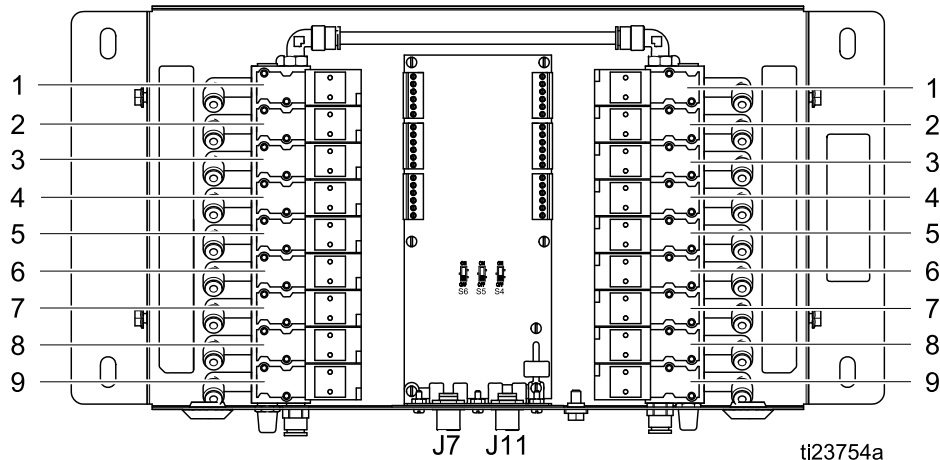
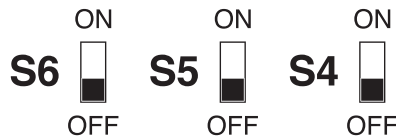


Figure 2 IS Control Module

3. For each module, set the switches to ON or OFF, as shown in the following table.

| IS Control Module Switch Settings | | | |
|--|-----------|-----------|-----------|
| Control Module | S6 | S5 | S4 |
| Module 7 | | | |
| Module 8 | | | |

4. Use the following figure and tables to determine the solenoid valve assigned to each valve in the valve manifold.

| IS Control Module 7 | | | |
|---------------------|---------------|----------|------------------|
| Solenoid | Valve | Solenoid | Valve |
| 1 | Color Solvent | 1 | Catalyst Solvent |
| 2 | Color 1 | 2 | Catalyst 1 |
| 3 | Color 2 | 3 | Catalyst 2 |
| 4 | Color 3 | 4 | Catalyst 3 |
| 5 | Color 4 | 5 | Catalyst 4 |
| 6 | Color 5 | 6 | Color 9 |
| 7 | Color 6 | 7 | Color 10 |
| 8 | Color 7 | 8 | Color 11 |
| 9 | Color 8 | 9 | Color 12 |

| IS Control Module 8 | | | |
|---------------------|----------|----------|----------|
| Solenoid | Valve | Solenoid | Valve |
| 1 | Color 13 | 1 | Color 22 |
| 2 | Color 14 | 2 | Color 23 |
| 3 | Color 15 | 3 | Color 24 |
| 4 | Color 16 | 4 | Color 25 |
| 5 | Color 17 | 5 | Color 26 |
| 6 | Color 18 | 6 | Color 27 |
| 7 | Color 19 | 7 | Color 28 |
| 8 | Color 20 | 8 | Color 29 |
| 9 | Color 21 | 9 | Color 30 |

Installation

| | | | | |
|--|--|--|--|--|
| | | | | |
| <ul style="list-style-type: none"> To avoid electric shock, turn off power at the main circuit breaker before opening the enclosure. All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations. Do not substitute or modify system components as this may impair intrinsic safety. Do not install equipment approved only for non-hazardous location in a hazardous location. See the identification label for the intrinsic safety rating for your model. | | | | |

| | | | | |
|---|--|--|--|--|
| | | | | |
| | | | | |
| <p>This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure in the PD2K Operation Manual before installing the kit.</p> | | | | |

Mounting the Control Modules

- See [Dimensions, page 71](#).
- Ensure that the wall and mounting hardware are strong enough to support the weight of the equipment, fluid, hoses, and stress cause during operation.

- Using the equipment as a template, mark the mounting holes on the wall at a convenient height for the operator and so the equipment is easily accessible for maintenance.

NOTE: The smaller color change control modules must be mounted in the Non-IS area. The larger remote color change module may be mounted in the IS area.

- Drill mounting holes in the wall. Install anchors as needed.
- Bolt the equipment securely.

Air Supply

Connect a clean and dry air supply to the air inlet fitting (317) of each color change control module in the non-hazardous area and each remote module in the hazardous area. The fitting is for 1/4 in. (6 mm) OD tubing. Use a 5 micron filter. Regulate the air pressure to 85–100 psi (0.6–0.7 MPa, 6.0–7.0 bar).

Grounding

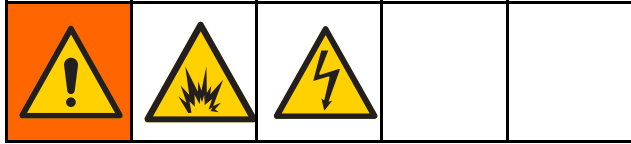
| | | | | |
|---|--|--|--|--|
| | | | | |
| <p>This equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.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

Connect a ground wire from each color change module in the non-hazardous area to a true earth ground.

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

Non-Hazardous Location

Connect the Color Change Control Modules



NOTE: Non-IS color change control modules provide control for the pump's inlet and outlet color/catalyst change valves. Depending on the number of valves in the system, as many as six control modules may be installed in the non-hazardous location.

1. Mount the first non-IS color control module as described in [Mounting the Control Modules, page 18](#).
2. Connect the 5-pin CAN cable (109) to J7 on the color control module (108).

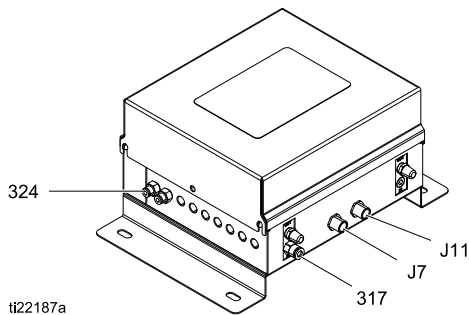


Figure 3 Cable Connector J7 at Non-IS Color Control Module

NOTICE

To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately.

To avoid electrical component damage, remove all system power before plugging any connectors.

3. Remove electrical power from the system.
4. Remove the cover from the PD2K electrical control box.
5. Install the supplied 2-cable grommet (110) on the cable (109) and secure the grommet to the side of the electrical control box.
6. Connect the cable (109) to J2 on the non-IS side of the isolation board inside the electrical control box. See [Electrical Schematics, page 36](#) for a list of M12 CAN cables for use in a non-hazardous area.

7. To install additional color control modules (six maximum), mount the module(s) as described in [Mounting the Control Modules, page 18](#). Connect a 5-pin CAN cable from J11 of the previous color control module to J7 of the next control module.
8. Replace the cover of the PD2K electrical control box before turning on power to the system.

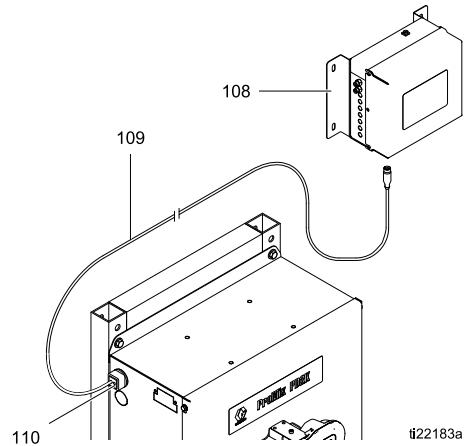


Figure 4 Cable Connection at PD2K Electrical Control Box

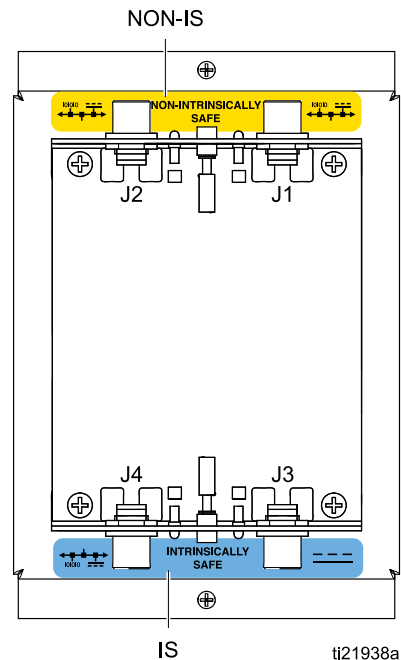
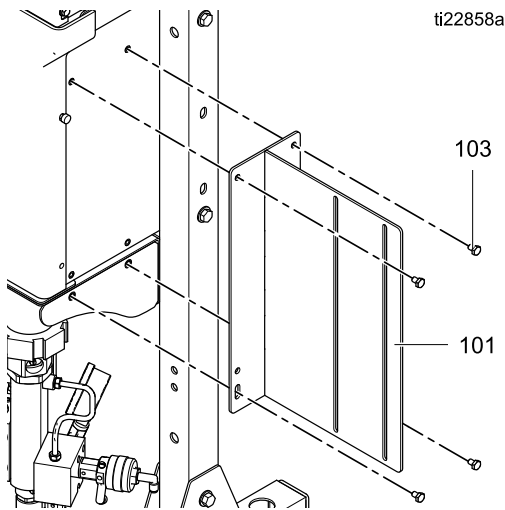


Figure 5 Detail of Isolation Board Cable Connections

Install the Valve Manifolds

NOTE: Always label the color connections to prevent cross-connections. Label the inlet manifold, outlet manifold, and each color valve with its assigned color. The solvent and dump valves should be furthest from the manifold stack primary inlet or outlet.

1. Install a mounting bracket (101) on the PD2K with four screws (103). **High pressure systems:** For stability, be sure to fasten the bottom screws (103) to the pump bracket.



2. Install the inlet and outlet valve manifolds (102) on the mounting bracket (101) with four screws (104), washers (105), and nuts (106).

NOTE: On low pressure systems, the supplied bracket (101) will accommodate a manifold

with 16 valve positions (14 colors). On high pressure systems, the supplied bracket (101) will accommodate a manifold with 14 valve positions (12 colors). A larger valve stack will require a customer supplied/sourced bracket.

3. Repeat for the opposite side of the PD2K.
4. Connect the air lines from the solenoids to the valves. See [Connect the Valve Air Lines, page 24](#).

NOTE: On high pressure systems, see [Install the Back Pressure Regulator \(High Pressure Systems Only\), page 21](#).

5. Connect the fluid supply lines to the valves. See [Connect the Fluid Lines, page 26](#).

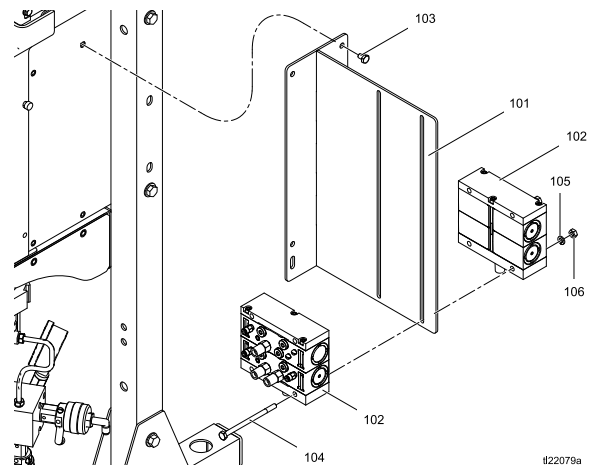


Figure 6 Install the Valve Manifolds

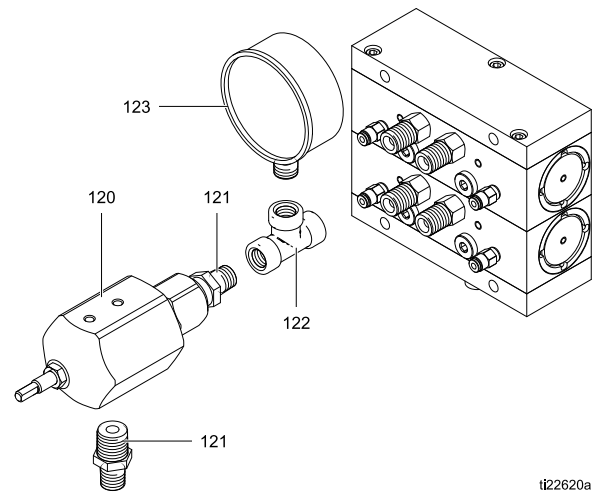
Install the Back Pressure Regulator (High Pressure Systems Only)

NOTE: The back pressure regulator is required on high pressure systems to prevent the system's feed pumps from overdriving the dosing pumps during color change pump flush and color fill operations. Adjust the back pressure during the dump process to be approximately 75% of the supply pressure from the feed pumps, but never more than 300 psi (2.1 MPa, 21 bar) less than the supply pressure.

Install the back pressure regulator (120) and attaching hardware at the dump valve of the outlet manifold stack.

1. Install the gauge (123) in the open port of the tee (122).
2. Screw the tee (122) onto the dump valve fitting of the outlet manifold stack.
3. Assemble the two nipples (121) to the back pressure regulator (120). Screw the regulator assembly into the tee (122) as shown.
4. Connect a 1/4 npt(f) dump line to the downward facing nipple (121).

5. Connect the fluid supply lines to the valves. See [Connect the Fluid Lines, page 26](#).

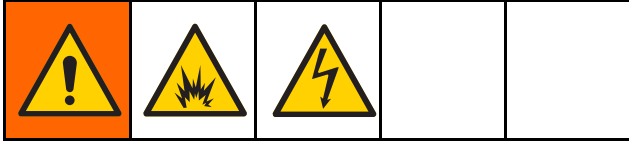


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Figure 7 Install Back Pressure Regulator at Dump Valve of Outlet Stack

Hazardous Location

Connect Remote Color Change Control Module



NOTE: IS color change control modules provide control for remote color/catalyst change valves located in the hazardous location for use with automatic spray systems. A maximum of two IS control modules may be installed in the hazardous location. See [IS Color Change Control Modules, page 66](#) for a list of modules approved for installation in a hazardous location.

NOTICE

To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately.

To avoid electrical component damage, remove all system power before plugging any connectors.

Only approved cables may be used in the hazardous location. Hazardous location cables are marked with a light blue flag next to each connector. See [Optional Cables and Modules, page 42](#) for a list of M12 CAN cables for use in a hazardous area.

1. Remove electrical power from the system.
2. Mount the first remote color change control module as described in [Mounting the Control Modules, page 18](#).

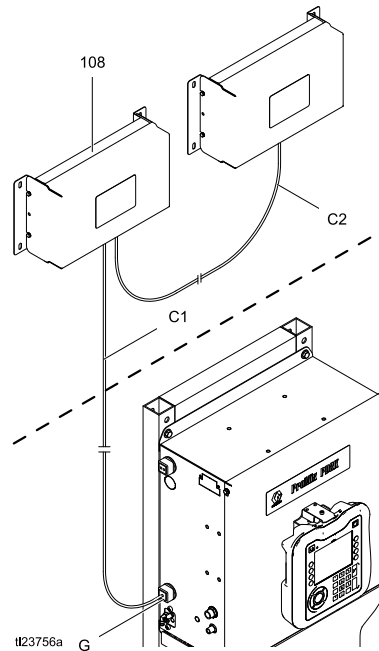


Figure 8 Intrinsically Safe Cable Connections

3. Connect the hazardous location cable (C1) to J7 on the remote color control module (108).

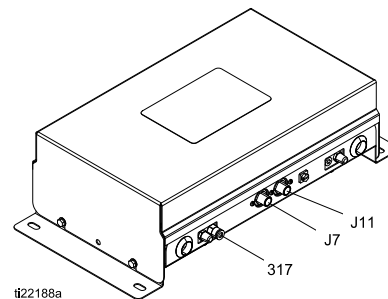


Figure 9 Cable Connectors J7 and J11 at IS Color Control Module

4. Remove the cover from the PD2K electrical control box. Install the grommet (G) on the supplied cable (C1) and secure the grommet to the side of the electrical control box. Locate J4 on the IS side of the isolation board in the electrical control box. Connect the cable (C1) to J4. See [Electrical Schematics, page 36](#).

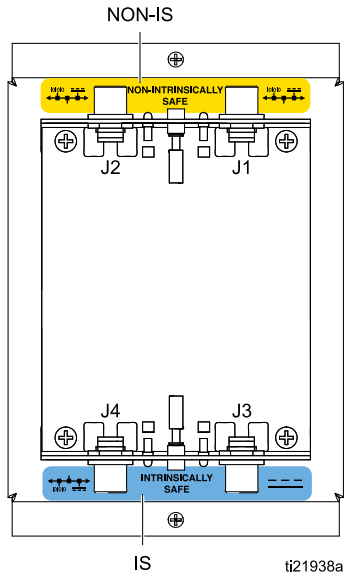


Figure 10 Detail of Isolation Board Cable Connections

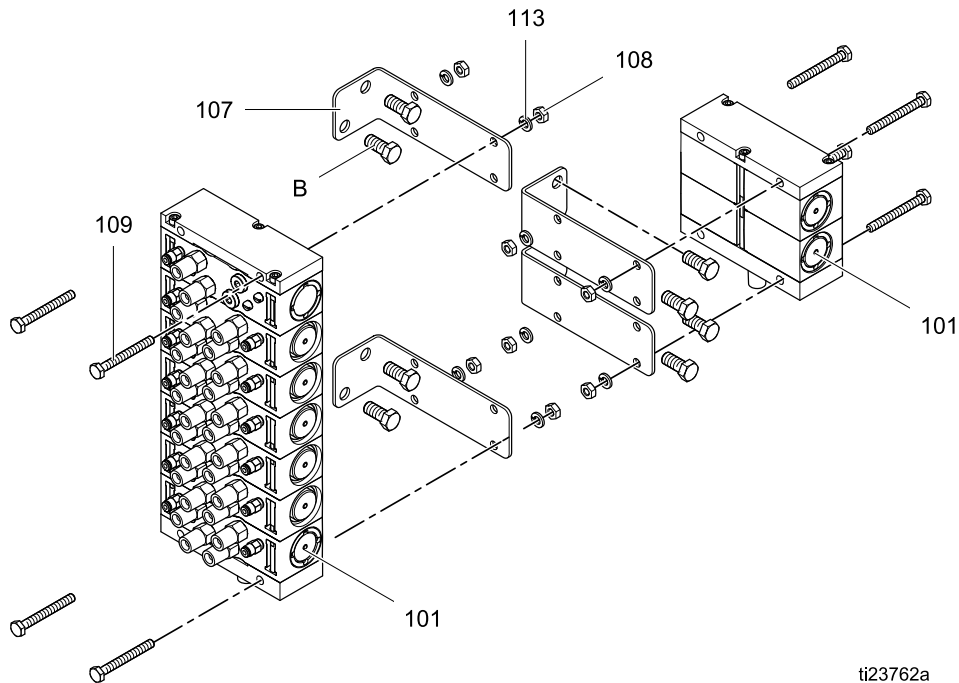
5. If your system includes a second remote color control module mount it as described in [Mounting the Control Modules, page 18](#). Connect the supplied hazardous location cable (C2) from

J11 on the **first** color control module to J7 on the **second** module.

6. Replace the cover of the PD2K electrical control box before turning on power to the system.

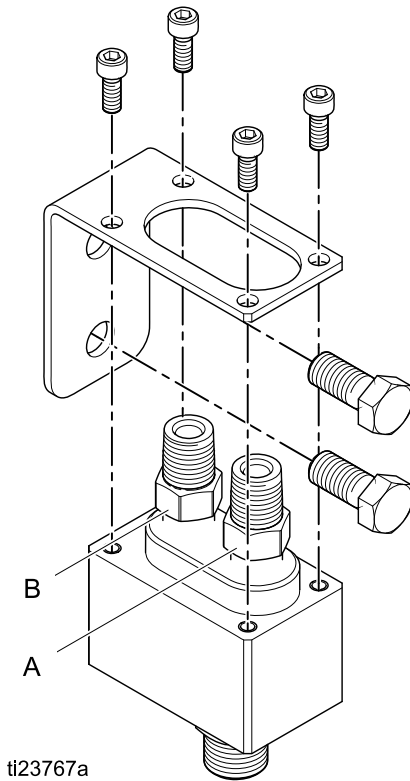
Install the Remote Valve Manifolds

1. Using the equipment as a template, mark the mounting holes on the wall at a convenient height for the operator and so the equipment is easily accessible for maintenance. Mount the remote valve manifolds near the remote color module and the automatic dispensing device.
2. Install the mounting brackets for the color valve manifolds and the catalyst valve manifolds. See [Dimensions, page 71](#). Use bolts to attach the equipment securely.
3. Install the color and catalyst valve manifolds to the brackets with four screws, washers, and nuts.
4. Connect the air lines from the solenoids to the valves. See [Connect the Valve Air Lines, page 24](#).
5. Connect the fluid supply lines to the valves. See [Connect the Fluid Lines, page 26](#).



Install the Remote Mix Manifold

1. Using the equipment as a template, mark the mounting holes on the wall or robot arm, near the automatic dispensing device.
2. Install the remote mix manifold. See [Dimensions, page 71](#). Use two bolts to attach the equipment securely.
3. Install the remote mix manifold to the bracket with four screws.
4. Connect the fluid supply lines to the remote mix valve. See [Connect the Fluid Lines, page 26](#).



Connect the Valve Air Lines

Non-Hazardous Area

1. Connect 5/32 in. (4 mm) OD air tubes from the inlet solenoids to the air inlets of each inlet valve, using the label inside of the color control module as a guide. See [Setup the Modules, page 13](#).
2. Repeat for the outlet valves.

Hazardous Area

Connect 5/32 in (4 mm) OD air tubes from the solenoids to the air inlet of each valve, using the labels inside of the remote color control module as a guide. See [Setup the Modules, page 13](#).

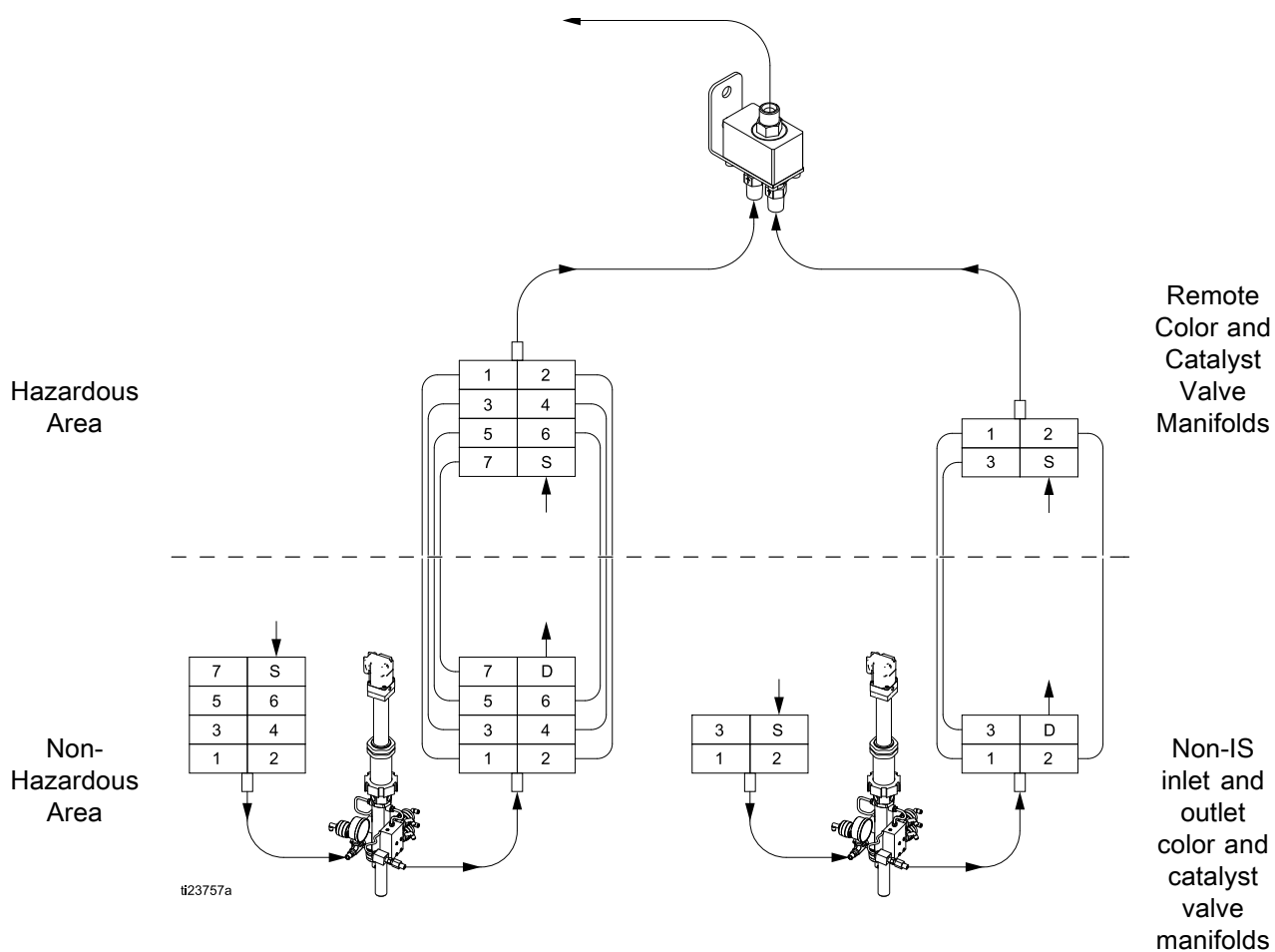
Connect the Fluid Lines

Connect Non-Circulating Fluid Lines

NOTE: There can be only one solvent valve (S) and one dump valve (D) per pump.

NOTE: On high pressure systems, see [Install the Back Pressure Regulator \(High Pressure Systems Only\)](#), page 21.

1. Use the top valve of the **inlet** valve stack as the solvent valve (S). Connect a solvent supply line to the 1/4 npt(m) solvent valve inlet on the color and catalyst valve stacks.
2. Use the top valve of the **outlet** valve stack as the dump valve (D). Connect a waste dump line to the 1/4 npt(m) dump valve outlet on the color and catalyst valve stacks.
3. Connect the supply line for each color to the corresponding color valve fitting (C1, C2, etc.) on the **inlet** color valve stack.
4. Connect a supply line from the bottom fitting of the **inlet** color valve stack to the **inlet** manifold of the material A dosing pump.
5. Connect a supply line from the **outlet** manifold of the material A dosing pump to the bottom fitting of the **outlet** color valve stack.



Valve Manifold Stack Schematic

6. Connect a dedicated supply line for each color to the corresponding color valve fitting (C1, C2, etc.) on the **outlet** color valve stack. Connect the other end of each line to the corresponding color valve fitting on the remote color stack.
7. Connect a supply line from the outlet valve on the bottom of the remote color valve stack to inlet A on the remote mix manifold.
8. Connect the supply line for each catalyst to the corresponding catalyst valve fitting on the **inlet** catalyst valve stack.
9. Connect a supply line from the bottom fitting of the **inlet** catalyst valve stack to the **inlet** manifold of the material B dosing pump.
10. Connect a supply line from the **outlet** manifold of the material B dosing pump to the bottom fitting of the **outlet** catalyst valve stack.
11. Connect a dedicated supply line for each catalyst to the corresponding catalyst valve fitting on the **outlet** catalyst valve stack. Connect the other end of each line to the corresponding catalyst valve fitting on the remote catalyst valve stack.

NOTE: If your system uses more colors than catalysts, branch the catalyst line to connect it to each mix manifold. Install a check valve on each branch of the catalyst line.

NOTE: For ease of maintenance, install a ball valve at all fluid line tees.
12. Connect a supply line from the outlet valve of the remote catalyst valve stack to inlet B on the remote mix manifold.

13. Connect the static mixer to the outlet valve of the remote mix manifold.
14. Connect a fluid line from the static mixer to the automatic dispense device.

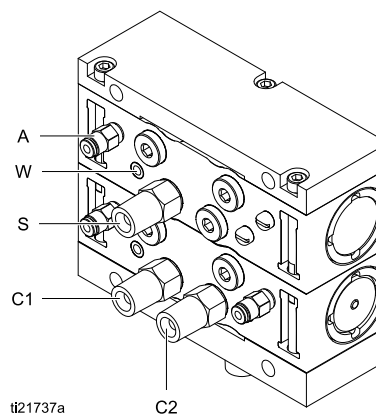


Figure 11 Color Change Connections (Non-Circulating System)

| KEY | |
|-----|--------------------------------|
| A | Air inlet |
| W | Seal weep and lubrication port |
| S | Solvent fitting |
| C1 | Color 1 fitting |
| C2 | Color 2 fitting |

Connect Circulating Fluid Lines

Circulation valves enable constant circulation of a color when that color is not being sprayed:

- When a color valve is **closed**, the system bypasses the dosing pump by directing that color from the inlet color valve to the outlet color valve to the remote color valve, through a circulation line, then back to the color supply.
- When a color valve is **open**, the circulation line is shut off. The color is directed through the material A dosing pump and out to the remote color valve stack and mix manifold, as in normal operation.

NOTE: On circulating systems, install a cap (T) on any unused valve fittings.

NOTE: There can be only one solvent valve (S) and one dump valve (D) per pump.

NOTE: On high pressure systems, see [Install the Back Pressure Regulator \(High Pressure Systems Only\)](#), page 21.

1. Connect all fluid lines as described in [Connect Non-Circulating Fluid Lines](#), page 26. These lines are used during normal mixing and spraying.
2. Connect the circulation lines as follows:
 - a. Connect a 1/4 npt(f) circulation line for each color from the color valve's circulation fitting (R1, R2, etc.) on the **inlet** color valve stack (B) to the corresponding circulation fitting (R1, R2, etc.) on the **outlet** color valve stack (C). This circulation line bypasses the material A dosing pump when the color valve is closed, allowing continuous circulation of that color.

- b. Connect a dedicated fluid supply line for each color to the corresponding color valve (C1, C2, etc.) on the **outlet** color valve stack. Connect the other end of each line to the corresponding color valve on the remote color stack.
- c. Connect a 1/4 npt(f) circulation line from the circulation port on each remote valve back to the fluid supply container.

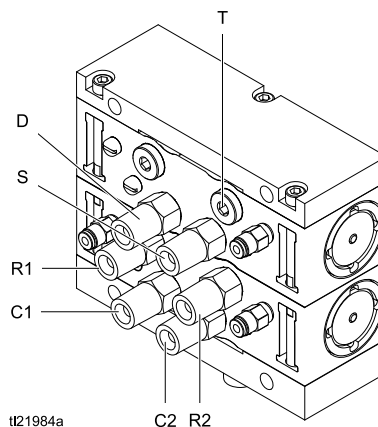
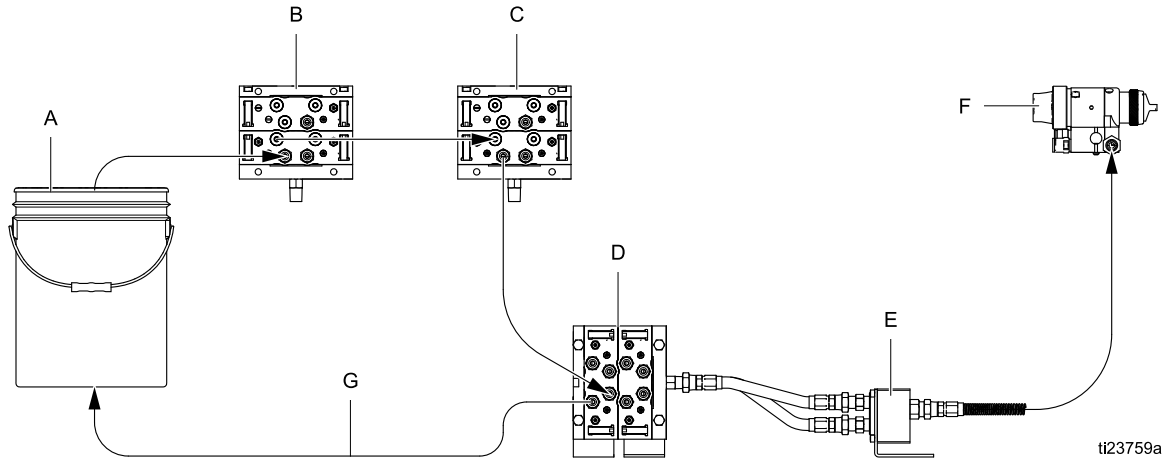


Figure 12 Valve Manifold Connections (Circulating System)

KEY

- | | |
|----|-----------------------------|
| D | Dump valve fitting |
| S | Solvent fitting |
| C1 | Color 1 fitting |
| C2 | Color 2 fitting |
| R1 | Color 1 circulation fitting |
| R2 | Color 2 circulation fitting |



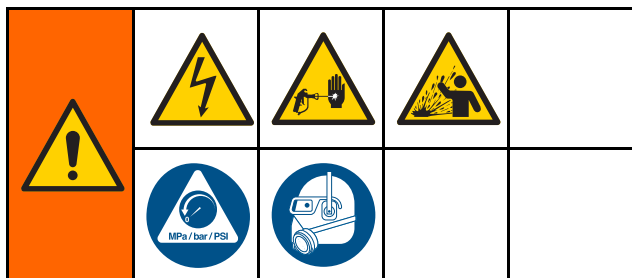
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Fluid Flow Schematic Diagram in Circulating Mode (Pump Not Shown for Clarity)

KEY

- A Color supply
- B Inlet color stack
- C Outlet color stack
- D Remote color stack
- E Remote mix manifold
- F Automatic spray gun
- G Return line to fluid supply

Install an Expansion Kit



Expansion Kits are available to add valves or manifolds to your system. For each additional color/catalyst desired, order a Non-IS Expansion Kit and a corresponding IS Expansion Kit. See [Expansion Kits, page 69](#) for available kits.

NOTE: Remember that you may need up to 6 Non-IS control modules and up to 2 IS control modules.

Follow Steps 1–7 to install solenoids, manifolds, and valves, first in the Non-IS area, and then in the IS area.

1. Remove electrical power from the system.
2. Relieve pressure as described in your PD2K Operation Manual.
3. Open the control module cover. Install the solenoid(s) and air fitting(s) at the appropriate position(s) in the solenoid manifold. See [Setup the Modules, page 13](#). Connect one end of the tubing to the solenoid's air fitting.
4. Connect the solenoid wires to the appropriate pins on the control module board. See [Electrical Schematics, page 36](#).

NOTE: If installing a one valve kit, it is not necessary to disassemble the manifold stack as shown in the figure. Skip step 5 and go on to step 6.

5. If your kit is adding a manifold block (1), remove the screws (10). Slide the existing manifolds off the rods (15, 16), keeping the manifolds in the correct order. Install the new manifold block (1). The new block must be in the bottom position to maintain correct location of the solvent and dump valves. Screw the rods (16) included in the kit into the existing rods. Slide the existing manifold blocks onto the rods, being sure that they are in the same positions as before. Ensure all o-rings (6, 17) are in place, then install the screws (10).

6. Install the valves as follows:
 - a. For a one valve kit, remove the plug (4) and o-ring (2). Install a new o-ring (2), the valve (3), and retainer (5), using the valve installation tool. See [Replace a Color Valve, page 43](#).
 - b. For a manifold kit with one valve, install the o-ring (2), valve (3), and retainer (5), using the valve installation tool. See [Replace a Color Valve, page 43](#). Install the plug (4) in the unused manifold port.
 - c. For a manifold kit with two valves, install the o-rings (2), valves (3), and retainers (5), using the valve installation tool. See [Replace a Color Valve, page 43](#).
7. Install the o-ring(s) (12) and fluid fitting(s) (13).
8. For each color/catalyst, connect fluid lines from the source to the input color/catalyst stack. Then, connect fluid lines from each output valve to the corresponding remote color change valve. Install the air fitting(s) (14).
9. Connect the tubing from the solenoid valve(s) (see step 3) to the fitting(s) in both the IS and Non-IS areas.
10. Install the control module covers.
11. Return the unit to service.

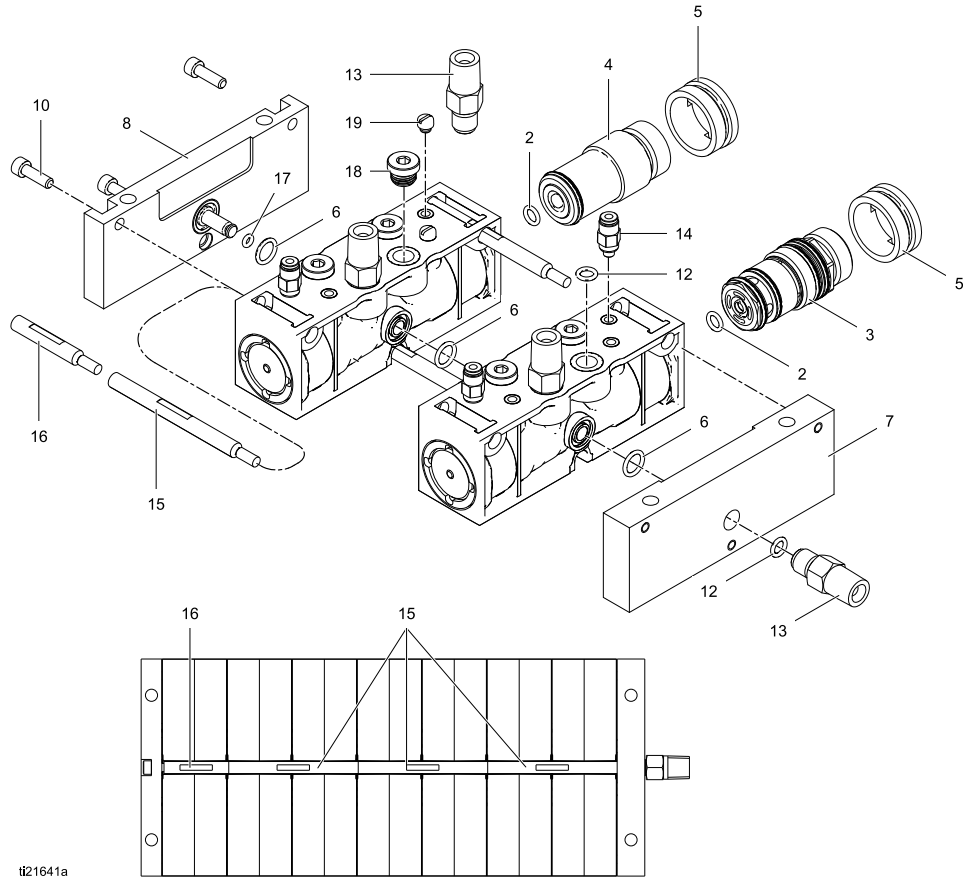
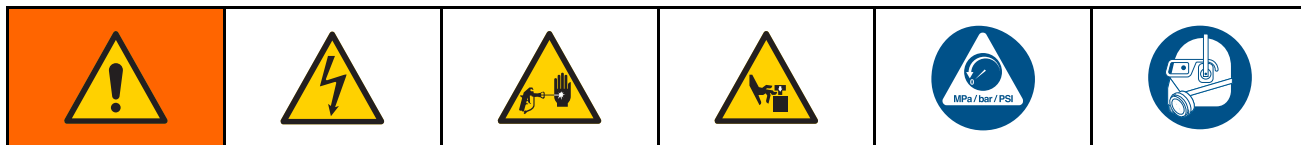


Figure 13 Install an Expansion Kit (Low Pressure Valve Manifold Shown)

Troubleshooting



NOTE: Check all possible remedies before disassembling the system.

Color Change Solenoid Valves

NOTE: Refer to [Electrical Schematics, page 36](#). If the color change valves are not turning on or off correctly, it could be caused by one of the following.

| Cause | Solution |
|--|---|
| 1. Air regulator pressure set too high or too low. | Check that air pressure is at least 85 psi (0.6 MPa, 6.0 bar). Do not go above 100 psi (0.7 MPa, 7.0 bar). |
| 2. Air or electrical lines damaged or connections are loose. | Visually inspect air and electrical lines for kinks, damage, or loose connections. Service or replace as needed. |
| 3. Solenoid failure. | <p>Check the applicable solenoid's LED; see Color Change Board, page 34. If lit, proceed with the following checks. If not lit, go to Cause 4.</p> <p>Remove the connector for the applicable solenoid and measure voltage across the pins on the board:</p> <ul style="list-style-type: none"> • In a non-hazardous location, replace the solenoid if voltage is 24 Vdc. • In a hazardous location, replace the solenoid if voltage is between 9–15 Vdc. <p>Test the valves as explained under Maintenance Screen 4 in your PD2K Operation manual. Valves should open and close quickly. If the valves actuate slowly, it could be caused by:</p> <ul style="list-style-type: none"> • Air pressure to the valve actuators is too low. See Cause 1. • Solenoid is clogged. Make sure the air supply has a 5 micron filter installed. • Something is restricting the solenoid or tubing. Check for air output from the air line for the corresponding solenoid when the valve is actuated. Clear the restriction. |

| Cause | Solution |
|---|---|
| <p>4. Control board or cable failure.</p> | <p>If there is no voltage across the pins on the board or it is less than 9 Vdc, check LEDs D8, D9, and D10. If they are lit and functioning properly, or other solenoids in the module are working properly, replace the color change board.</p> <p>If D9 is not lit:</p> <ul style="list-style-type: none"> • Verify the condition of the fuse (F1) and replace if necessary. See Replace the Color Change Board Fuse, page 44. • Check if the cable is disconnected or damaged. • Check the isolation board. See the PD2K Repair-Parts manual. <p>If D8 is not blinking:</p> <ul style="list-style-type: none"> • Cycle the system power. • Check if the cable is disconnected or damaged. • Check the isolation board. See the PD2K Repair-Parts manual. <p>If D10 is not occasionally blinking:</p> <ul style="list-style-type: none"> • Check if the cable is disconnected or damaged. • Check the isolation board. See the PD2K Repair-Parts manual. |

Color Change Board

NOTICE

To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately.

To avoid electrical component damage, remove all system power before plugging any connectors.

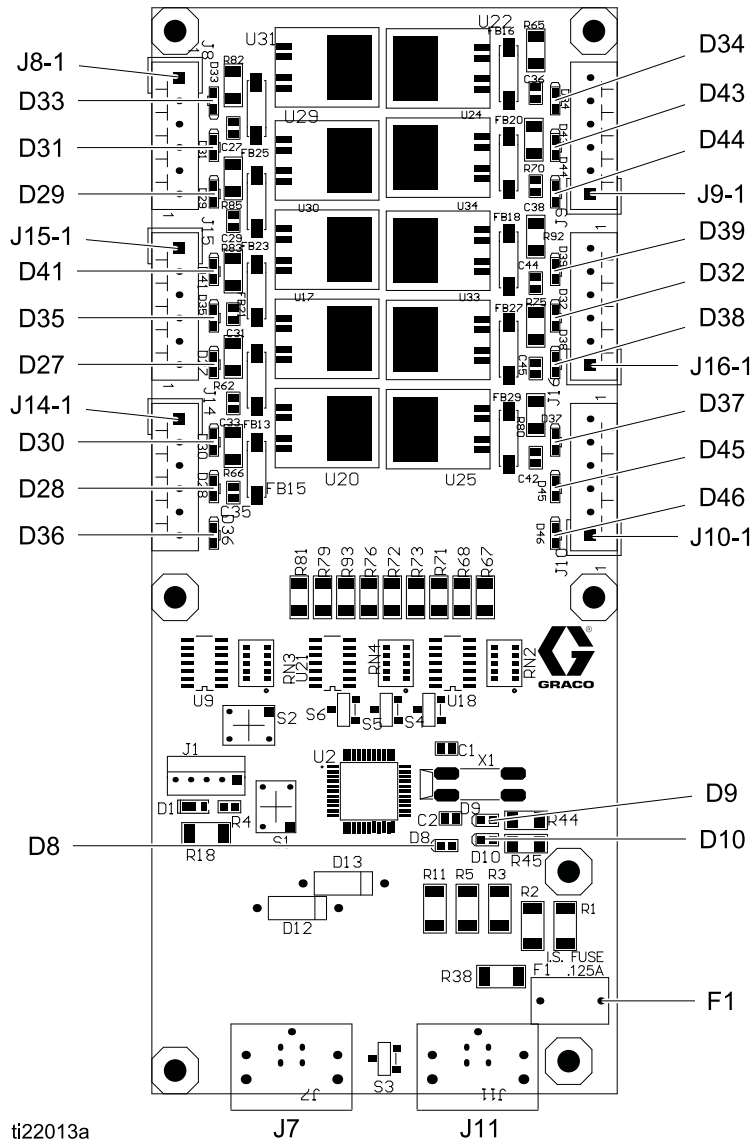


Figure 14 Color Change Board

Color Change Board Diagnostics

| ID | Component or Indicator | Function |
|--------------------------|------------------------|--|
| D8 | LED (green) | Blinks (heartbeat) during normal operation. |
| D9 | LED (green) | Turns on when power is supplied to the board. |
| D10 | LED (yellow) | Turns on when board is communicating with electronic control. |
| D27–D39, D41, D43–D46 | LED (green) | Turn on when a signal is sent to actuate the related solenoid valve. |
| F1 | Fuse, 0.125 A, 125 V | |

Electrical Schematics

NOTE: The electrical schematic illustrates all possible wiring expansions in a ProMix PD2K system. Some components shown are not included with all systems.
NOTE: See [Optional Cables and Modules, page 42](#), for a list of cable options.

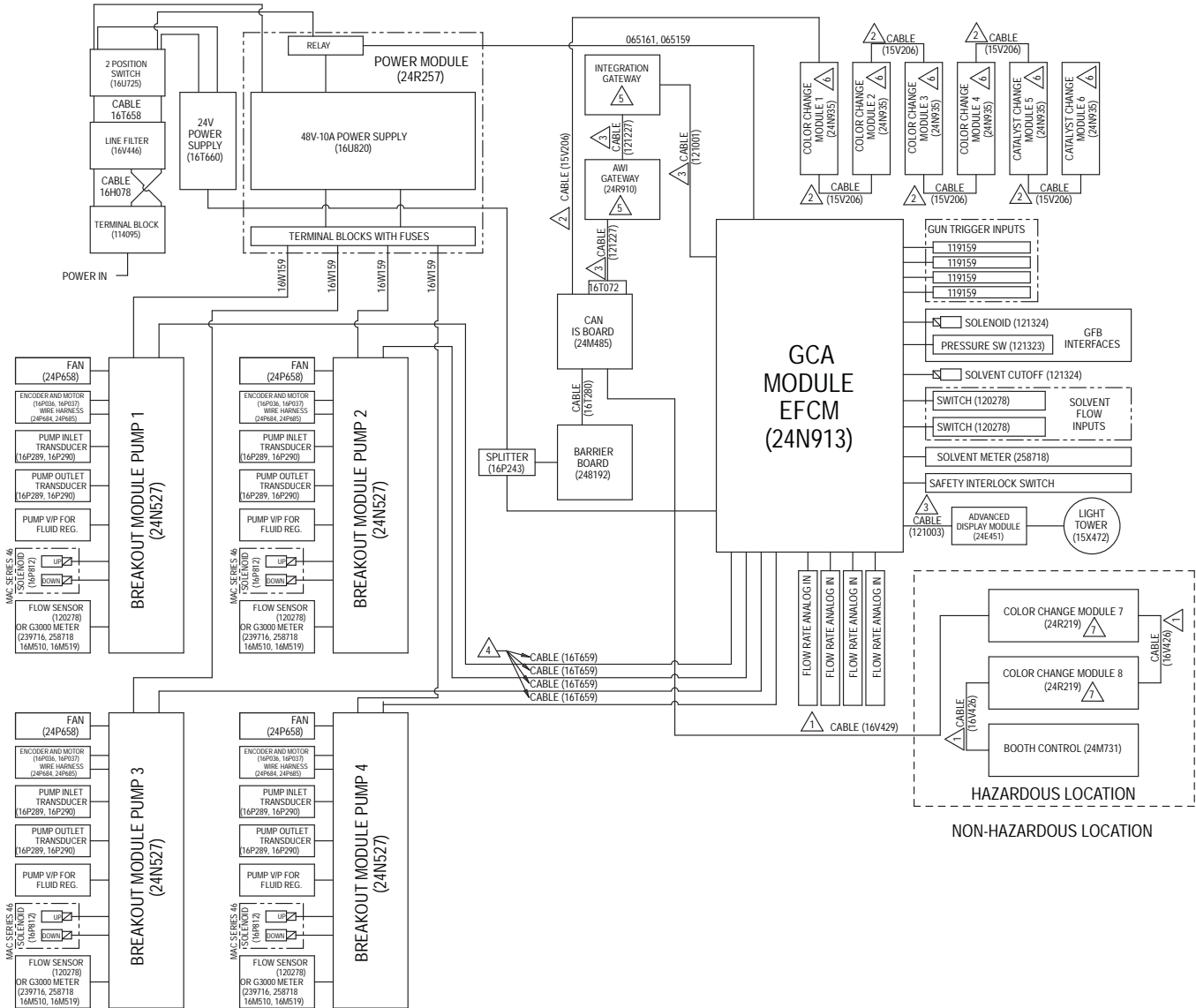


Figure 15 Electrical Schematic, Sheet 1

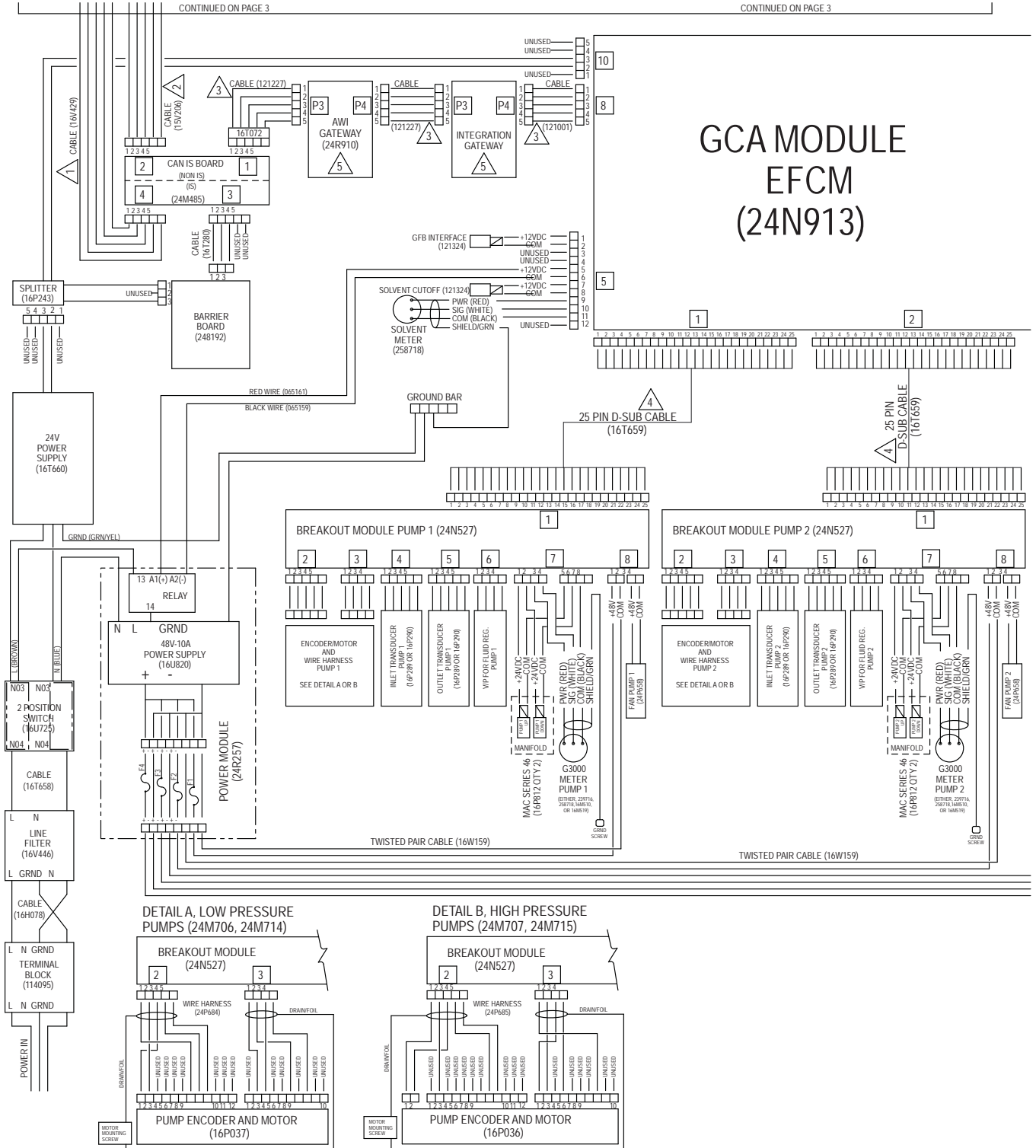


Figure 16 Electrical Schematic, Sheet 2, Part 1

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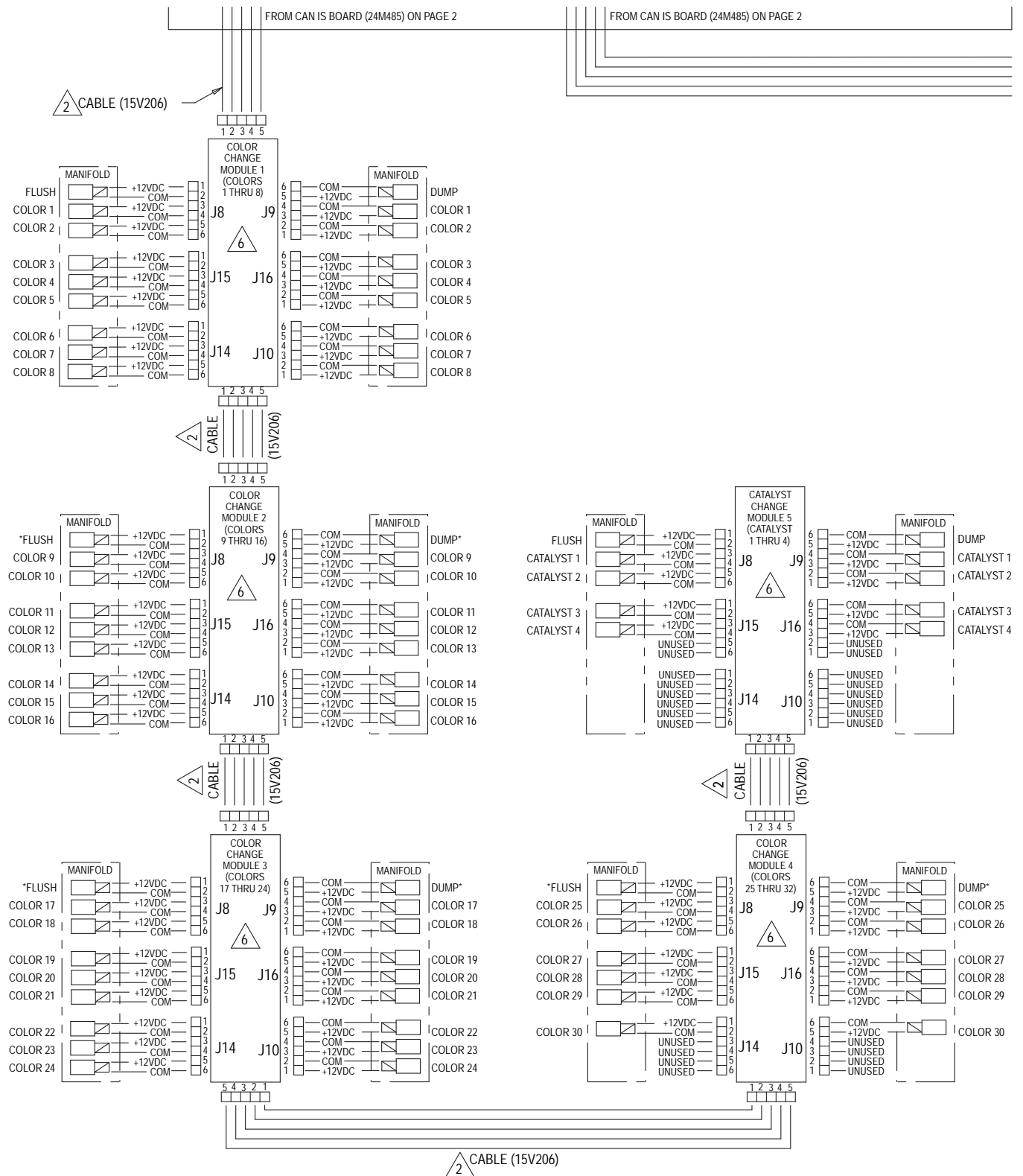


Figure 18 Electrical Schematic, Sheet 3

* May be unused in some configurations.

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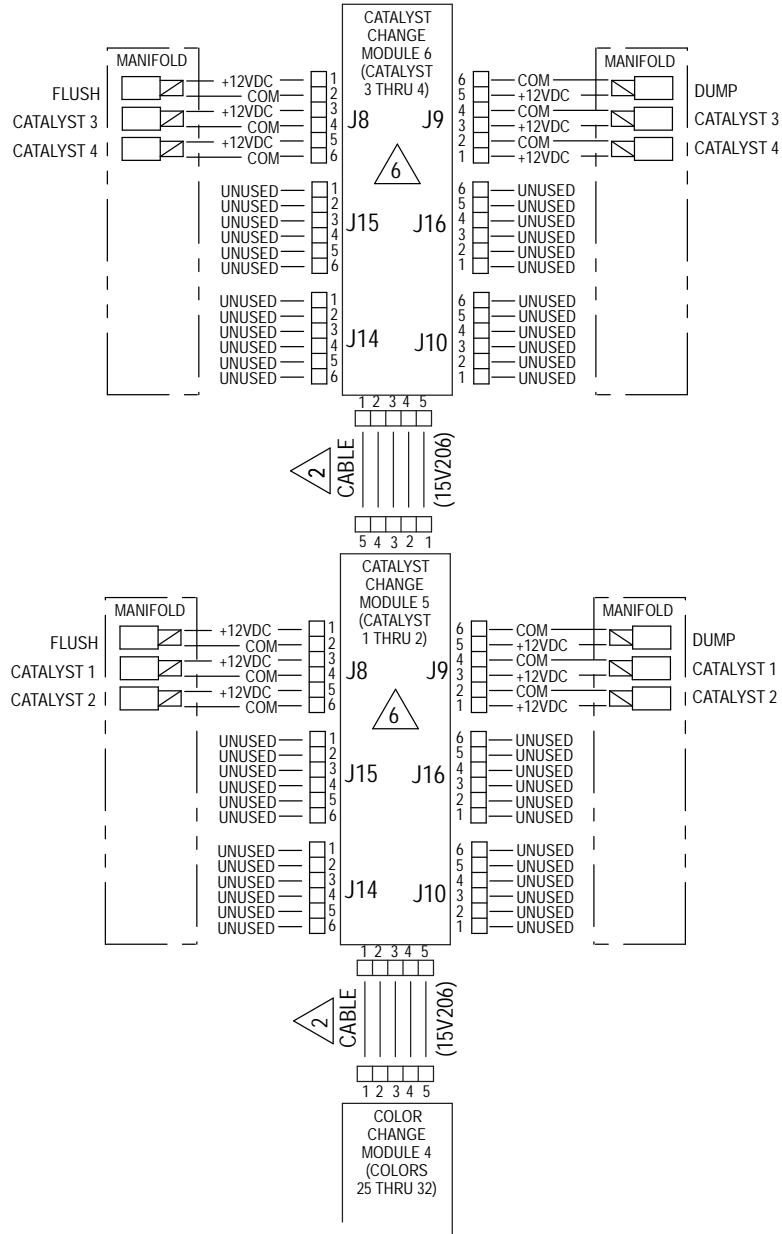


Figure 19 Electrical Schematic, Sheet 3, Alternate Configuration for Catalyst Change Control

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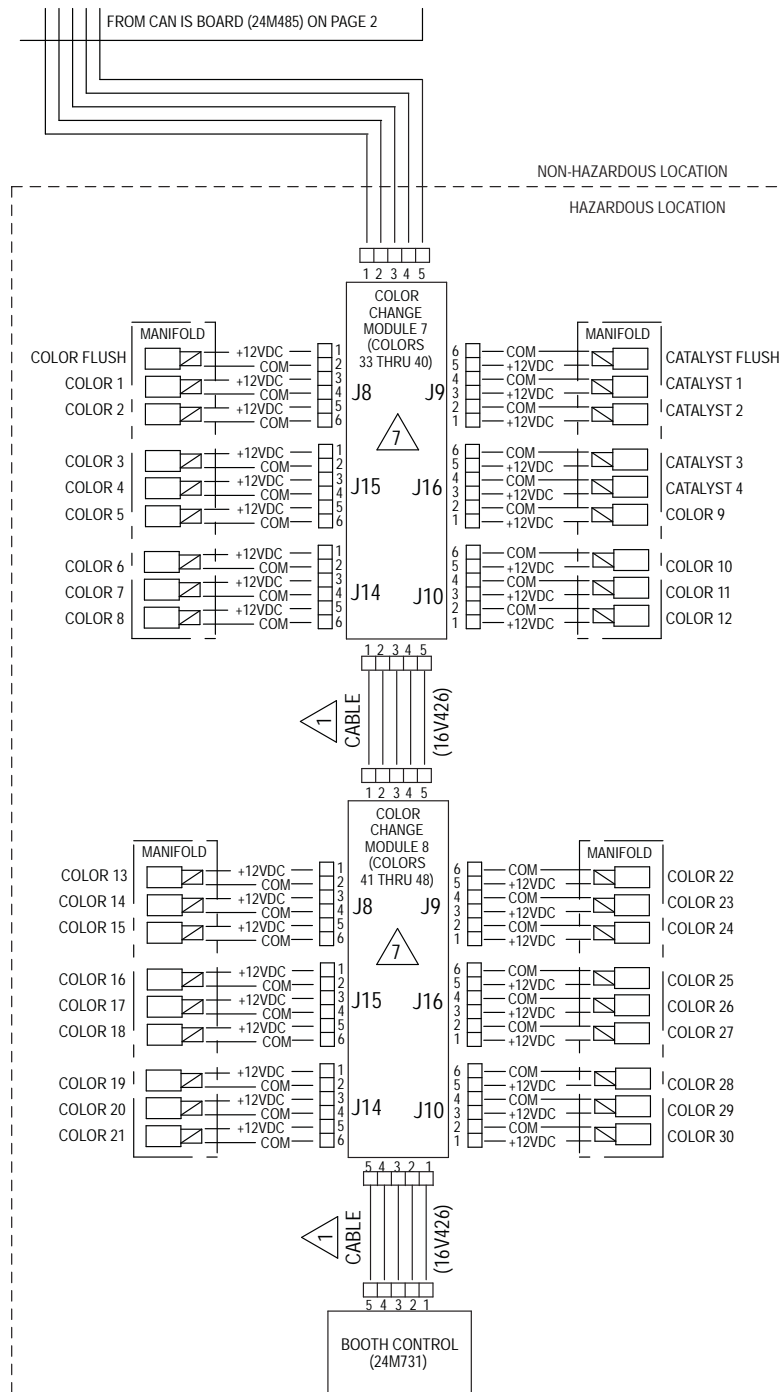









Figure 20 Electrical Schematic, Sheet 3, Hazardous Location




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 36](#).

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

|  25 Pin D-SUB Cables, for Non-Hazardous Locations Only | |
|--|----------------------------------|
| 16T659 | 2.5 (0.8) |
| 16V659 | 6.0 (1.8) |
|  Alternates for Communication Module 24R910, for Non-Hazardous Locations Only | |
| Module Part No. | Module Part No. |
| CGMDN0*, DeviceNet | CGMPB0*, Profibus |
| CGMEP0*, Ethernet IP | CGMPN0*, Profinet |
| <p>* You must purchase Map Token Kit 17C087 for use with these kits.</p> | |
|  Alternates for Color Change Modules by Part Number (Factory Configuration), for Non-Hazardous Locations Only, see page 61 | |
| Module Part No. | Description |
| 24T557 | 2 color/2 catalyst |
| 24T558 | 4 color/4 catalyst |
| 24T559 | 6 color/6 catalyst |
| 24T560 | 8 color/8 catalyst |
|  Alternates for Color Change Modules by Part Number (Factory Configuration), for Hazardous Locations Only, see page 62 | |
| 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 |

Repair

| | | | | |
|--|---|---|--|--|
|  |  |  | | |
| <ul style="list-style-type: none"> • To avoid electric shock, turn off power at the main circuit breaker before opening the control module. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations. • Do not substitute or modify system components as this may impair intrinsic safety. | | | | |

NOTICE

To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately.

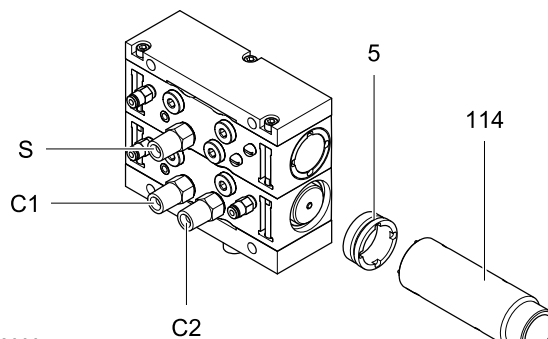
To avoid electrical component damage, remove all system power before plugging any connectors.

Replace a Color Valve

Use the following procedure to replace a valve, whether the valve is part of the color stacks near the pump or part of the remote color stacks.



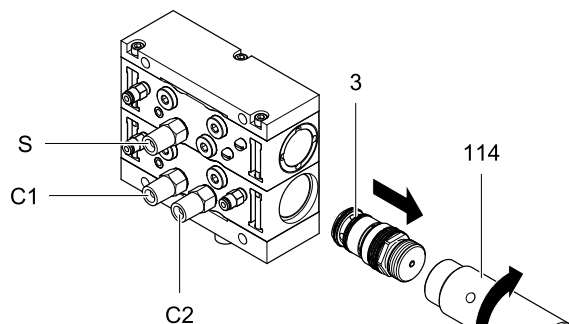
1. Flush and relieve pressure as described in your PD2K operation manual.
2. Engage the pins of the tool (114) with the notches in the retainer (5) and unscrew the retainer.



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Figure 21 Remove Retainer

3. Using the other end of the tool (114), screw it all the way onto the valve (3). Pull the valve from the manifold.



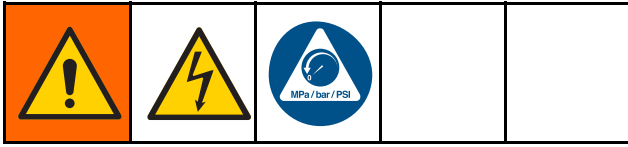
ti22081a

Figure 22 Remove the Valve

NOTE: See manual 332454 to repair the valve.

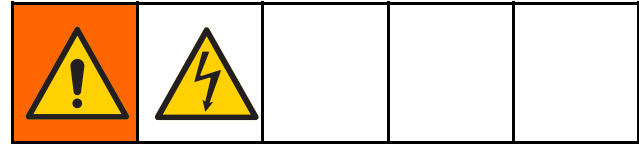
4. Install the valve in the reverse order of disassembly. Be sure all o-rings are in place and lubricated, and that the valve is seated completely in the manifold.
5. Return the system to service.

Replace a Solenoid



1. Remove electrical power from the system.
2. Remove air supply pressure from the system.
3. Remove the color change module cover (304).
4. Disconnect the two solenoid wires from the color change board (302). See the color change board wiring diagrams in the [Electrical Schematics, page 36](#).
5. Remove the solenoid (310) from the manifold (309).
6. Install the new solenoid.
7. Connect the two solenoid wires to the color change board (302). See the color change board wiring diagrams in the [Electrical Schematics, page 36](#).
8. Reinstall the cover.

Replace the Color Change Board Fuse

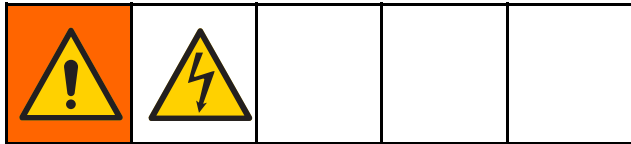


NOTE: Replacing the fuse with a non-Graco fuse voids the IS system safety approval.

| Fuse | Part No. | Description |
|------|----------|----------------------------------|
| F1 | 123690 | Fuse; 125 mA, intrinsically safe |

1. Remove electrical power from the system.
2. Remove the color change module cover (304).
3. Locate fuse F1 (302a) on the color change board. Pull the fuse away from the board.
4. Install the new fuse.
5. Reinstall the cover. Restore electrical power to the system.

Replace the Color Change Board



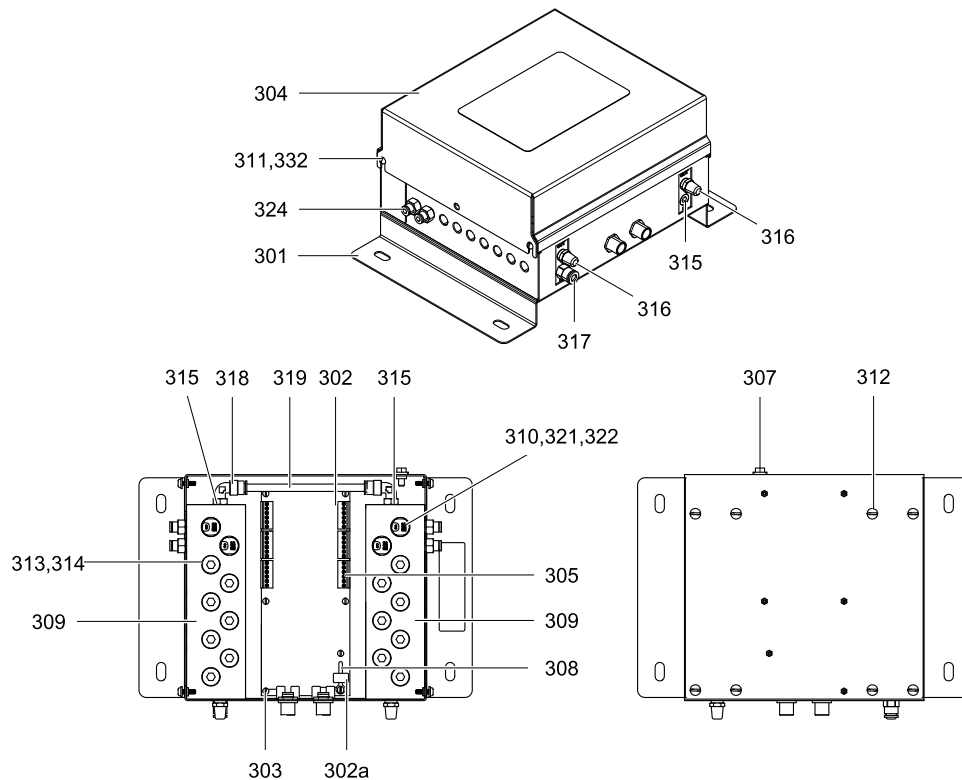
NOTICE

To avoid damaging the circuit boards, wear Part No. 112190 grounding strap on your wrist and ground appropriately.

To avoid electrical component damage, remove all system power before plugging any connectors.

1. Remove electrical power from the system.

2. Remove the color change module cover (304).
3. Note where each cable is connected, then disconnect all cables from the color change board connectors.
4. Remove the seven mounting screws (303) and the board (302).
5. Install the new board. Reinstall the screws.
6. Reconnect the cables to the proper connectors, as noted in step 3. See [Electrical Schematics, page 36](#).
7. Reinstall the cover (304). Restore electrical power to the system.

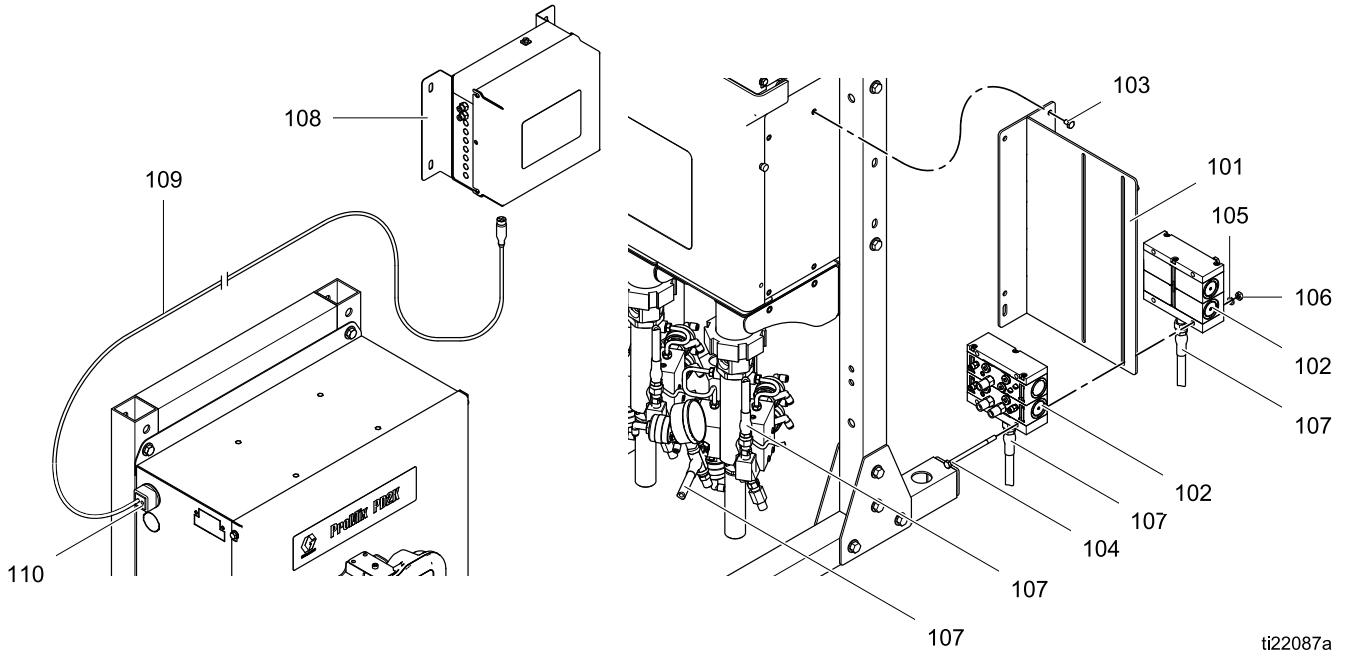


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Figure 23 Control Module Repair (Non-IS Module Shown)

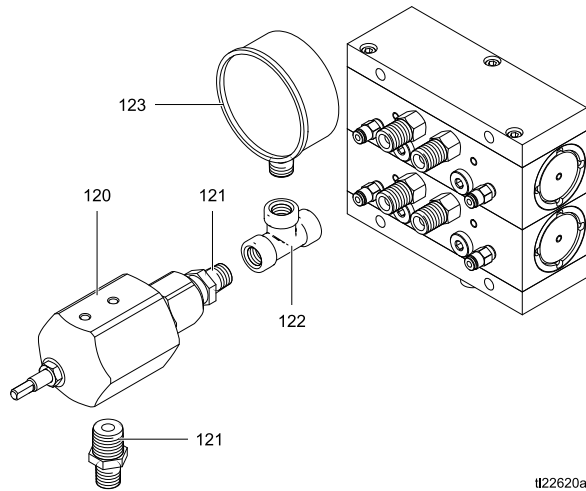
Parts

Non-IS Color Change Kits



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Detail of Back Pressure Regulator (High Pressure Outlet Stack only)



ti22620a

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 101 | 24U237 | BRACKET, mounting | 1 |
| 102 | ♦ | KIT, manifold, valve | 2 |
| 103 | 100157 | SCREW, cap, hex head; 1/4–20 x 0.375 in. (10 mm) | 4 |
| 104 | 103195 | SCREW, cap, hex head; 1/4–20 x 4.0 in. (101 mm) | 4 |
| 105 | 100016 | WASHER, lock; 1/4 | 4 |
| 106 | 100015 | NUT, hex; 1/4–20 | 4 |
| 107 | 24N346 | HOSE, fluid; 1/4 npsm (fbc); 2.5 ft (0.76 m); ptfe | 2 |
| 108 | ♦ | KIT, module, control | 1 |
| 109 | 15V206 | CABLE, CAN; 5–pin female; 10 ft (3.05 m) | 1 |
| 110 | 16V819 | GROMMET, cable | 1 |
| 111 | 24U236 | TOOL, repair, valve (not shown) | 1 |
| 114 | ♦ | TOOL, installation, valve (not shown) | 1 |

| Ref. No. | Part No. | Description | Qty |
|----------|----------|--|-----|
| 115 | 598095 | TUBE; nylon; 5/32 in. (4 mm) OD | ♦ |
| 120 | 222200 | REGULATOR, back pressure; used on high pressure kits only (see detail drawing); see manual 307892 | 1 |
| 121 | 113070 | NIPPLE; 3/8 npt x 1/4 npt; sst; used on high pressure kits only (see detail drawing) | 2 |
| 122 | 110290 | TEE; 1/4 npt(f); sst; used on high pressure kits only (see detail drawing) | 1 |
| 123 | 112564 | GAUGE, pressure, fluid; used on high pressure kits only (see detail drawing) | 1 |

♦ See the following tables for the part number used in your color change kit.

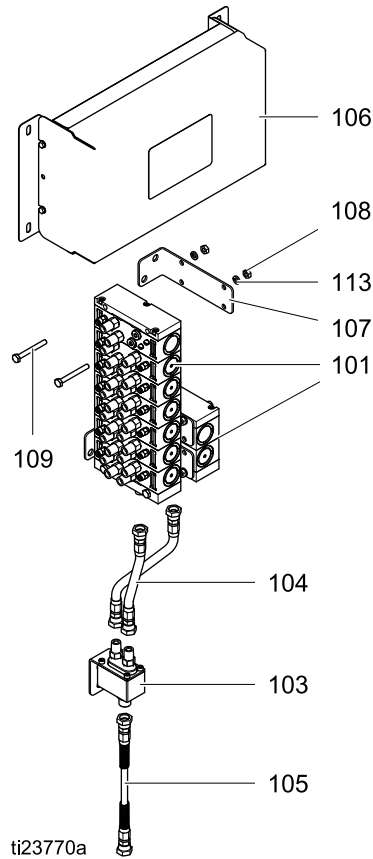
Low Pressure Non-IS Kits

| Kit No. | Kit Description | Standard Valve Manifold Kits (102) [see Low Pressure Valve Manifold Kits, page 53 for all available kits] | Control Module Kit (108) [see Non-IS Color Change Control Modules, page 64 for parts] | Tool (114) | Tube Length (115) |
|---|-----------------------|---|---|------------|-------------------|
| Low Pressure Non-Circulating Color Change Kits | | | | | |
| 24R915 | 2 color or 2 catalyst | 24T458 | 24T557 | 24U239 | 60 ft (18.3 m) |
| 24R916 | 4 color or 4 catalyst | 24T460 | 24T558 | 24U239 | 120 ft (36.6 m) |
| 24R917 | 6 color | 24T462 | 24T559 | 24U239 | 210 ft (64.05 m) |
| 24R918 | 8 color | 24T464 | 24T560 | 24U239 | 360 ft (109.8 m) |
| Low Pressure Circulating Color Change Kits | | | | | |
| 24R919 | 2 color | 24T488 | 24T557 | 24U239 | 60 ft (18.3 m) |
| 24R920 | 4 color | 24T490 | 24T558 | 24U239 | 120 ft (36.6 m) |
| 24R921 | 6 color | 24T492 | 24T559 | 24U239 | 210 ft (64.05 m) |
| 24R922 | 8 color | 24T494 | 24T560 | 24U239 | 360 ft (109.8 m) |

High Pressure Non-IS Kits

| Kit No. | Kit Description | Standard Valve Manifold Kits (102) [see High Pressure Valve Manifold Kits, page 58 for all available kits] | Control Module Kit (108) [see Non-IS Color Change Control Modules, page 64 for parts] | Tool (114) | Tube Length (115) |
|---|-----------------------|--|---|------------|-------------------|
| High Pressure Non-Circulating Color Change Kits | | | | | |
| 24R959 | 2 color or 2 catalyst | 24T648 | 24T557 | 24U240 | 60 ft (18.3 m) |
| 24R960 | 4 color or 4 catalyst | 24T650 | 24T558 | 24U240 | 120 ft (36.6 m) |
| 24R961 | 6 color | 24T652 | 24T559 | 24U240 | 210 ft (64.05 m) |
| 24R962 | 8 color | 24T654 | 24T560 | 24U240 | 360 ft (109.8 m) |
| High Pressure Acid Compatible Non-Circulating Catalyst Change Kits | | | | | |
| 24T579 | 2 catalyst | 24U182 | 24T557 | 24U240 | 60 ft (18.3 m) |
| 24T580 | 4 catalyst | 24U183 | 24T558 | 24U240 | 120 ft (36.6 m) |
| High Pressure Circulating Color Change Kits | | | | | |
| 24R963 | 2 color | 24T678 | 24T557 | 24U240 | 60 ft (18.3 m) |
| 24R964 | 4 color | 24T680 | 24T558 | 24U240 | 120 ft (36.6 m) |
| 24R965 | 6 color | 24T682 | 24T559 | 24U240 | 210 ft (64.05 m) |
| 24R966 | 8 color | 24T684 | 24T560 | 24U240 | 360 ft (109.8 m) |

IS Color Change Kits



| Ref. No. | Part No. | Description | Qty |
|----------|------------------|--|-----|
| 101 | ♦ | KIT, manifold, valve; . See Valve Manifold Kits, page 53 for available kits. | 2 |
| 103 | 24V351 | MANIFOLD, mix, remote | 1 |
| 104 | 24N346 | HOSE, coupled, 2.5 ft. | 2 |
| 105 | 16W564 16W563 | HOSE, static mixer Low Pressure High Pressure | 1 |
| 106 | ♦ | KIT, module, control | 1 |
| 107 | 16Y954 | BRACKET, manifold | 2 |
| 108 | 100015 | NUT, hex | 4 |
| 109 | 104429 113469 | SCREW, cap, hex Low Pressure High Pressure | 4 |

| Ref. No. | Part No. | Description | Qty |
|----------|------------------|--|-----|
| 110 | 24U236 24R124 | TOOL, repair, color change valve, not shown Low Pressure High Pressure | 1 |
| 111 | 24U239 24U240 | TOOL, installation, color change valve, not shown Low Pressure High Pressure | 1 |
| 112 | 223547 | WIRE, assembly, 25 ft. | 2 |
| 113 | 100016 | WASHER, lock | 4 |
| 114 | 16V429 | CABLE, CAN, 50 ft (15.2 m); not shown | 1 |

♦ See the following tables for the part number used in your color change kit.

Low Pressure IS Kits

| Kit No. | Kit Description | Standard Valve Manifold Kits (101) [see Low Pressure Valve Manifold Kits, page 53 for all available kits] | Control Module Kit (106) [see IS Color Change Control Modules, page 66 for parts] |
|---|---------------------------|---|---|
| Low Pressure Non-Circulating Color Change Kits | | | |
| 24V157 | 1 color and 1 catalyst | 24T457 (2) | 24T571 |
| 24V158 | 2 colors and 1 catalyst | 24T458, 24T457 | 24T571 |
| 24V159 | 4 colors and 1 catalyst | 24T460, 24T457 | 24T572 |
| 24V160 | 6 colors and 1 catalyst | 24T462, 24T457 | 24T573 |
| 24V161 | 8 colors and 1 catalyst | 24T464, 24T457 | 24T574 |
| 24V162 | 12 colors and 1 catalyst | 24T468, 24T369 | 24T774 |
| 24V331 | 2 colors and 2 catalysts | 24T458 (2) | 24T571 |
| 24V332 | 4 colors and 2 catalysts | 24T460, 24T458 | 24T572 |
| 24V333 | 6 colors and 2 catalysts | 24T462, 24T458 | 24T573 |
| 24V334 | 8 colors and 2 catalysts | 24T464, 24T458 | 24T574 |
| 24V335 | 12 colors and 2 catalysts | 24T468, 24T458 | 24T774 |
| 24V343 | 4 colors and 4 catalysts | 24T460 (2) | 24T775 |
| 24V344 | 6 colors and 4 catalysts | 24T462, 24T460 | 24T776 |
| 24V345 | 8 colors and 4 catalysts | 24T464, 24T460 | 24T777 |
| 24V346 | 12 colors and 4 catalysts | 24T468, 24T460 | 24T778 |
| Low Pressure Circulating Color Change Kits | | | |
| 24V166 | 1 color and 1 catalyst | 24T487 (2) | 24T571 |
| 24V167 | 2 colors and 1 catalyst | 24T488, 24T487 | 24T571 |
| 24V308 | 4 colors and 1 catalyst | 24T490, 24T487 | 24T572 |
| 24V309 | 6 colors and 1 catalyst | 24T492, 24T487 | 24T573 |
| 24V326 | 8 colors and 1 catalyst | 24T494, 24T487 | 24T574 |
| 24V327 | 12 colors and 1 catalyst | 24T498, 24T487 | 24T774 |
| 24V336 | 2 colors and 2 catalysts | 24T488 (2) | 24T571 |
| 24V337 | 4 colors and 2 catalysts | 24T490, 24T488 | 24T572 |
| 24V338 | 6 colors and 2 catalysts | 24T492, 24T488 | 24T573 |
| 24V339 | 8 colors and 2 catalysts | 24T494, 24T488 | 24T574 |
| 24V340 | 12 colors and 2 catalysts | 24T498, 24T488 | 24T774 |
| 24V347 | 4 colors and 4 catalysts | 24T490 (2) | 24T775 |
| 24V348 | 6 colors and 4 catalysts | 24T492, 24T490 | 24T776 |
| 24V349 | 8 colors and 4 catalysts | 24T494, 24T490 | 24T777 |
| 24V350 | 12 colors and 4 catalysts | 24T498, 24T490 | 24T778 |

High Pressure IS Kits

| Kit No. | Kit Description | Standard Valve Manifold Kits (101) [see Low Pressure Valve Manifold Kits, page 53 for all available kits] | Control Module Kit (106) [see IS Color Change Control Modules, page 66 for parts] |
|--|---------------------------|---|---|
| High Pressure Non-Circulating Color Change Kits | | | |
| 24V359 | 1 color and 1 catalyst | 24T647 (2) | 24T571 |
| 24V360 | 2 colors and 1 catalyst | 24T648, 24T647 | 24T571 |
| 24V361 | 4 colors and 1 catalyst | 24T650, 24T647 | 24T572 |
| 24V362 | 6 colors and 1 catalyst | 24T652, 24T647 | 24T573 |
| 24V363 | 8 colors and 1 catalyst | 24T654, 24T647 | 24T574 |
| 24V364 | 12 colors and 1 catalyst | 24T658, 24T647 | 24T774 |
| 24V381 | 2 colors and 2 catalysts | 24T648 (2) | 24T571 |
| 24V382 | 4 colors and 2 catalysts | 24T650, 24T648 | 24T572 |
| 24V383 | 6 colors and 2 catalysts | 24T652, 24T648 | 24T573 |
| 24V384 | 8 colors and 2 catalysts | 24T654, 24T648 | 24T574 |
| 24V385 | 12 colors and 2 catalysts | 24T658, 24T648 | 24T774 |
| 24V396 | 4 colors and 4 catalysts | 24T650 (2) | 24T775 |
| 24V397 | 6 colors and 4 catalysts | 24T652, 24T650 | 24T776 |
| 24V398 | 8 colors and 4 catalysts | 24T654, 24T650 | 24T777 |
| 24V399 | 12 colors and 4 catalysts | 24T658, 24T650 | 24T778 |
| High Pressure Circulating Color Change Kits | | | |
| 24V369 | 1 color and 1 catalyst | 24T677(2) | 24T571 |
| 24V370 | 2 colors and 1 catalyst | 24T678, 24T677 | 24T571 |
| 24V371 | 4 colors and 1 catalyst | 24T680, 24T677 | 24T572 |
| 24V372 | 6 colors and 1 catalyst | 24T682, 24T677 | 24T573 |
| 24V373 | 8 colors and 1 catalyst | 24T684, 24T677 | 24T574 |
| 24V374 | 12 colors and 1 catalyst | 24T688, 24T677 | 24T774 |
| 24V389 | 2 colors and 2 catalysts | 24T678 (2) | 24T571 |
| 24V390 | 4 colors and 2 catalysts | 24T680, 24T678 | 24T572 |
| 24V391 | 6 colors and 2 catalysts | 24T682, 24T678 | 24T573 |
| 24V392 | 8 colors and 2 catalysts | 24T684, 24T678 | 24T574 |
| 24V393 | 12 colors and 2 catalysts | 24T688, 24T678 | 24T774 |
| 24V402 | 4 colors and 4 catalysts | 24T680 (2) | 24T775 |
| 24V403 | 6 colors and 4 catalysts | 24T682, 24T680 | 24T776 |
| 24V404 | 8 colors and 4 catalysts | 24T684, 24T680 | 24T777 |
| 24V405 | 12 colors and 4 catalysts | 24T688, 24T680 | 24T778 |

Valve Manifold Kits

The low pressure and high pressure valve manifold kits listed in this section are used in both the Non-IS and IS color valve stacks.

Low Pressure Valve Manifold Kits

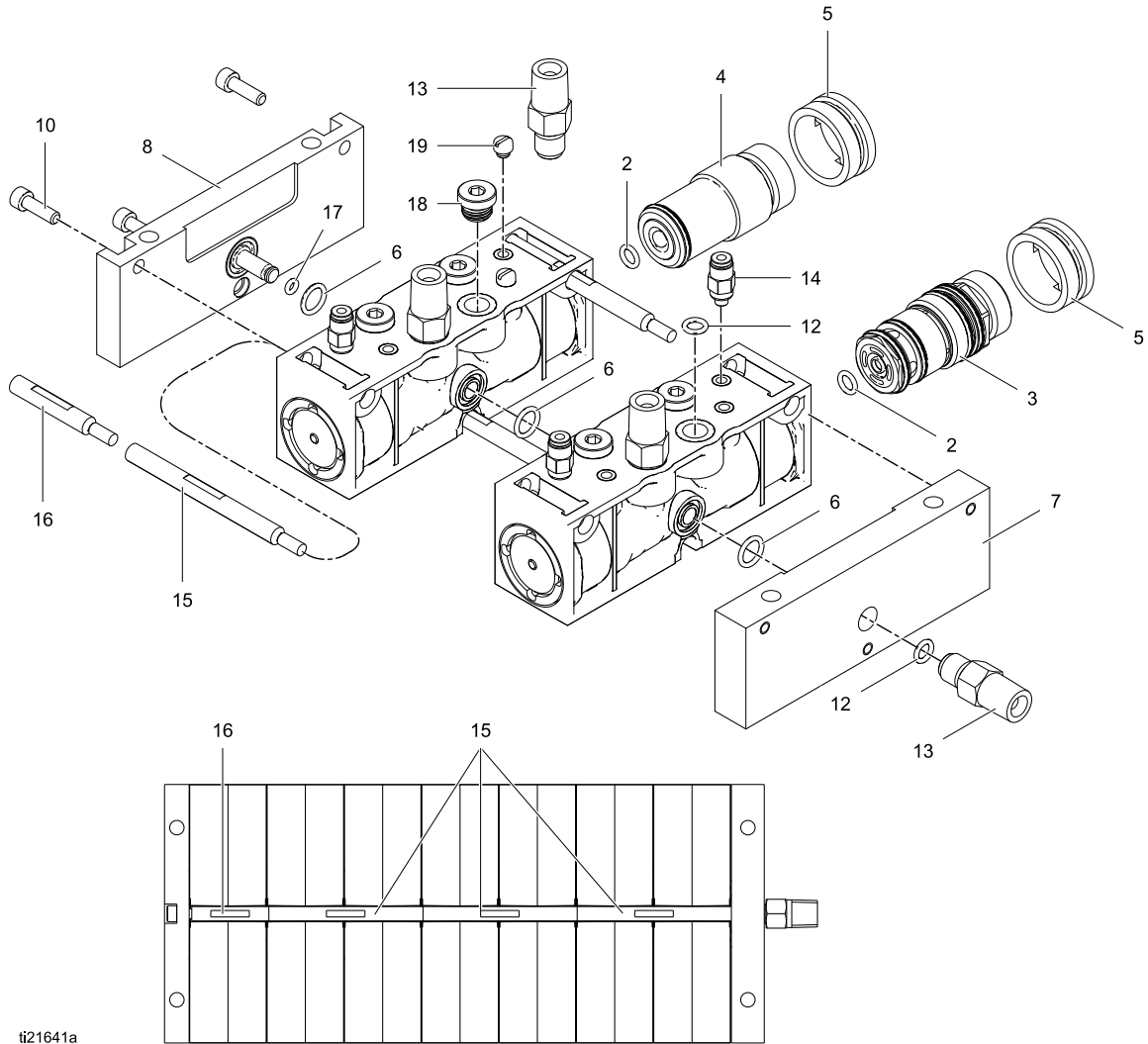
Non-Circulating Valve Manifold Kits

| Kit No. | Series | Kit Description |
|---------|--------|-----------------|
| 24T457 | A | 2 valves |
| 24T458 | A | 3 valves |
| 24T459 | A | 4 valves |
| 24T460 | A | 5 valves |
| 24T461 | A | 6 valves |
| 24T462 | A | 7 valves |
| 24T463 | A | 8 valves |
| 24T464 | A | 9 valves |
| 24T465 | A | 10 valves |
| 24T466 | A | 11 valves |
| 24T467 | A | 12 valves |
| 24T468 | A | 13 valves |
| 24T469 | A | 14 valves |
| 24T470 | A | 15 valves |
| 24T471 | A | 16 valves |
| 24T472 | A | 17 valves |
| 24T473 | A | 18 valves |
| 24T474 | A | 19 valves |
| 24T475 | A | 20 valves |
| 24T476 | A | 21 valves |
| 24T477 | A | 22 valves |
| 24T478 | A | 23 valves |
| 24T479 | A | 24 valves |
| 24T480 | A | 25 valves |
| 24T481 | A | 26 valves |
| 24T482 | A | 27 valves |
| 24T483 | A | 28 valves |
| 24T484 | A | 29 valves |
| 24T485 | A | 30 valves |
| 24T486 | A | 31 valves |

Circulating Valve Manifold Kits

| Kit No. | Series | Kit Description |
|---------|--------|-----------------|
| 24T487 | A | 2 valves |
| 24T488 | A | 3 valves |
| 24T489 | A | 4 valves |
| 24T490 | A | 5 valves |
| 24T491 | A | 6 valves |
| 24T492 | A | 7 valves |
| 24T493 | A | 8 valves |
| 24T494 | A | 9 valves |
| 24T495 | A | 10 valves |
| 24T496 | A | 11 valves |
| 24T497 | A | 12 valves |
| 24T498 | A | 13 valves |
| 24T499 | A | 14 valves |
| 24T500 | A | 15 valves |
| 24T501 | A | 16 valves |
| 24T502 | A | 17 valves |
| 24T503 | A | 18 valves |
| 24T504 | A | 19 valves |
| 24T505 | A | 20 valves |
| 24T506 | A | 21 valves |
| 24T507 | A | 22 valves |
| 24T508 | A | 23 valves |
| 24T509 | A | 24 valves |
| 24T510 | A | 25 valves |
| 24T511 | A | 26 valves |
| 24T512 | A | 27 valves |
| 24T513 | A | 28 valves |
| 24T514 | A | 29 valves |
| 24T515 | A | 30 valves |
| 24T516 | A | 31 valves |

Valve Manifold Kit Parts



ti21641a

| Ref. No. | Part No. | Description | Qty |
|----------|----------|--|-----|
| 1 | 16P259 | MANIFOLD | ★ |
| 2 | 111450 | O-RING; chemically resistant | |
| 3 | 24T441 | VALVE, for non-circulating kits; includes item 2 | |
| | 24T442 | VALVE, for circulating kits; includes item 2 | |
| 4 | 24R051 | PLUG, cc valve | |
| 5 | 16N256 | RETAINER, nut | |
| 6 | 111457 | O-RING; ptfe | |
| 7 | 24T521 | PLATE, outlet, manifold | |
| 8 | 24T522 | PLATE, end, manifold | |
| 9 | 157974 | WASHER, plain | |
| 10 | 104092 | SCREW, cap, socket head; 10-24 x 0.625 in. (16 mm) | |
| 11 | 100179 | NUT, hex; 10-24 | |

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 12 | 104893 | O-RING; ptfe | ★ |
| 13 | 24T523 | FITTING, fluid; 7/16-20 x 1/4 npt(m) | |
| 14 | 111328 | CONNECTOR, tube; 10-32(m) x 5/32 in. (4 mm) OD tube | |
| 15 | 24T525 | ROD, connecting; 3 in. (76 mm) | |
| 16 | 24T524 | ROD, connecting; 1.5 in. (38 mm) | |
| 17 | 111504 | O-RING; chemically resistant | |
| 18 | 557716 | PLUG; 7/16-20 | |
| 19 | 104644 | PLUG, screw; 10-32 x 0.156 in. (4 mm) | |

★ See the following tables to determine the quantity of each part in your valve manifold kit.

Low Pressure Non-Circulating Valve Manifold Kit Part Quantities

| Kit No. | Reference Numbers | | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 24T457 | 1 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 3 | 3 | 2 | 0 | 3 | 1 | 2 | 0 |
| 24T458 | 2 | 4 | 3 | 1 | 4 | 3 | 1 | 1 | 3 | 4 | 4 | 3 | 3 | 0 | 1 | 5 | 2 |
| 24T459 | 2 | 4 | 4 | 0 | 4 | 3 | 1 | 1 | 3 | 5 | 5 | 4 | 3 | 0 | 1 | 4 | 0 |
| 24T460 | 3 | 6 | 5 | 1 | 6 | 4 | 1 | 1 | 3 | 6 | 6 | 5 | 3 | 3 | 1 | 7 | 2 |
| 24T461 | 3 | 6 | 6 | 0 | 6 | 4 | 1 | 1 | 3 | 7 | 7 | 6 | 3 | 3 | 1 | 6 | 0 |
| 24T462 | 4 | 8 | 7 | 1 | 8 | 5 | 1 | 1 | 3 | 8 | 8 | 7 | 6 | 0 | 1 | 9 | 2 |
| 24T463 | 4 | 8 | 8 | 0 | 8 | 5 | 1 | 1 | 3 | 9 | 9 | 8 | 6 | 0 | 1 | 8 | 0 |
| 24T464 | 5 | 10 | 9 | 1 | 10 | 6 | 1 | 1 | 3 | 10 | 10 | 9 | 6 | 3 | 1 | 11 | 2 |
| 24T465 | 5 | 10 | 10 | 0 | 10 | 6 | 1 | 1 | 3 | 11 | 11 | 10 | 6 | 3 | 1 | 10 | 0 |
| 24T466 | 6 | 12 | 11 | 1 | 12 | 7 | 1 | 1 | 3 | 12 | 12 | 11 | 9 | 0 | 1 | 13 | 2 |
| 24T467 | 6 | 12 | 12 | 0 | 12 | 7 | 1 | 1 | 3 | 13 | 13 | 12 | 9 | 0 | 1 | 12 | 0 |
| 24T468 | 7 | 14 | 13 | 1 | 14 | 8 | 1 | 1 | 3 | 14 | 14 | 13 | 9 | 3 | 1 | 15 | 2 |
| 24T469 | 7 | 14 | 14 | 0 | 14 | 8 | 1 | 1 | 3 | 15 | 15 | 14 | 9 | 3 | 1 | 14 | 0 |
| 24T470 | 8 | 16 | 15 | 1 | 16 | 9 | 1 | 1 | 3 | 16 | 16 | 15 | 12 | 0 | 1 | 17 | 2 |
| 24T471 | 8 | 16 | 16 | 0 | 16 | 9 | 1 | 1 | 3 | 17 | 17 | 16 | 12 | 0 | 1 | 16 | 0 |
| 24T472 | 9 | 18 | 17 | 1 | 18 | 10 | 1 | 1 | 3 | 18 | 18 | 17 | 12 | 3 | 1 | 19 | 2 |
| 24T473 | 9 | 18 | 18 | 0 | 18 | 10 | 1 | 1 | 3 | 19 | 19 | 18 | 12 | 3 | 1 | 18 | 0 |
| 24T474 | 10 | 20 | 19 | 1 | 20 | 11 | 1 | 1 | 3 | 20 | 20 | 19 | 15 | 0 | 1 | 21 | 2 |
| 24T475 | 10 | 20 | 20 | 0 | 20 | 11 | 1 | 1 | 3 | 21 | 21 | 20 | 15 | 0 | 1 | 20 | 0 |

Parts

| Kit No. | Reference Numbers | | | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| 24T476 | 11 | 22 | 21 | 1 | 22 | 12 | 1 | 1 | 3 | 22 | 22 | 21 | 15 | 3 | 1 | 23 | 2 | |
| 24T477 | 11 | 22 | 22 | 0 | 22 | 12 | 1 | 1 | 3 | 23 | 23 | 22 | 15 | 3 | 1 | 22 | 0 | |
| 24T478 | 12 | 24 | 23 | 1 | 24 | 13 | 1 | 1 | 3 | 24 | 24 | 23 | 18 | 0 | 1 | 25 | 2 | |
| 24T479 | 12 | 24 | 24 | 0 | 24 | 13 | 1 | 1 | 3 | 25 | 25 | 24 | 18 | 0 | 1 | 24 | 0 | |
| 24T480 | 13 | 26 | 25 | 1 | 26 | 14 | 1 | 1 | 3 | 26 | 26 | 25 | 18 | 3 | 1 | 27 | 2 | |
| 24T481 | 13 | 26 | 26 | 0 | 26 | 14 | 1 | 1 | 3 | 27 | 27 | 26 | 18 | 3 | 1 | 26 | 0 | |
| 24T482 | 14 | 28 | 27 | 1 | 28 | 15 | 1 | 1 | 3 | 28 | 28 | 27 | 21 | 0 | 1 | 29 | 2 | |
| 24T483 | 14 | 28 | 28 | 0 | 28 | 15 | 1 | 1 | 3 | 29 | 29 | 28 | 21 | 0 | 1 | 28 | 0 | |
| 24T484 | 15 | 30 | 29 | 1 | 30 | 16 | 1 | 1 | 3 | 30 | 30 | 29 | 21 | 3 | 1 | 31 | 2 | |
| 24T485 | 15 | 30 | 30 | 0 | 30 | 16 | 1 | 1 | 3 | 31 | 31 | 30 | 21 | 3 | 1 | 30 | 0 | |
| 24T486 | 16 | 32 | 31 | 1 | 32 | 17 | 1 | 1 | 3 | 32 | 32 | 31 | 24 | 0 | 1 | 33 | 2 | |

Low Pressure Circulating Valve Manifold Kit Part Quantities

| Kit No. | Reference Numbers | | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 24T487 | 1 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 5 | 5 | 2 | 0 | 3 | 1 | 0 | 0 |
| 24T488 | 2 | 4 | 3 | 1 | 4 | 3 | 1 | 1 | 3 | 7 | 7 | 3 | 3 | 0 | 1 | 2 | 2 |
| 24T489 | 2 | 4 | 4 | 0 | 4 | 3 | 1 | 1 | 3 | 9 | 9 | 4 | 3 | 0 | 1 | 0 | 0 |
| 24T490 | 3 | 6 | 5 | 1 | 6 | 4 | 1 | 1 | 3 | 11 | 11 | 5 | 3 | 3 | 1 | 2 | 2 |
| 24T491 | 3 | 6 | 6 | 0 | 6 | 4 | 1 | 1 | 3 | 13 | 13 | 6 | 3 | 3 | 1 | 0 | 0 |
| 24T492 | 4 | 8 | 7 | 1 | 8 | 5 | 1 | 1 | 3 | 15 | 15 | 7 | 6 | 0 | 1 | 2 | 2 |
| 24T493 | 4 | 8 | 8 | 0 | 8 | 5 | 1 | 1 | 3 | 17 | 17 | 8 | 6 | 0 | 1 | 0 | 0 |
| 24T494 | 5 | 10 | 9 | 1 | 10 | 6 | 1 | 1 | 3 | 19 | 19 | 9 | 6 | 3 | 1 | 2 | 2 |
| 24T495 | 5 | 10 | 10 | 0 | 10 | 6 | 1 | 1 | 3 | 21 | 21 | 10 | 6 | 3 | 1 | 0 | 0 |
| 24T496 | 6 | 12 | 11 | 1 | 12 | 7 | 1 | 1 | 3 | 23 | 23 | 11 | 9 | 0 | 1 | 2 | 2 |
| 24T497 | 6 | 12 | 12 | 0 | 12 | 7 | 1 | 1 | 3 | 25 | 25 | 12 | 9 | 0 | 1 | 0 | 0 |
| 24T498 | 7 | 14 | 13 | 1 | 14 | 8 | 1 | 1 | 3 | 27 | 27 | 13 | 9 | 3 | 1 | 2 | 2 |
| 24T499 | 7 | 14 | 14 | 0 | 14 | 8 | 1 | 1 | 3 | 29 | 29 | 14 | 9 | 3 | 1 | 0 | 0 |
| 24T500 | 8 | 16 | 15 | 1 | 16 | 9 | 1 | 1 | 3 | 31 | 31 | 15 | 12 | 0 | 1 | 2 | 2 |
| 24T501 | 8 | 16 | 16 | 0 | 16 | 9 | 1 | 1 | 3 | 33 | 33 | 16 | 12 | 0 | 1 | 0 | 0 |
| 24T502 | 9 | 18 | 17 | 1 | 18 | 10 | 1 | 1 | 3 | 35 | 35 | 17 | 12 | 3 | 1 | 2 | 2 |
| 24T503 | 9 | 18 | 18 | 0 | 18 | 10 | 1 | 1 | 3 | 37 | 37 | 18 | 12 | 3 | 1 | 0 | 0 |
| 24T504 | 10 | 20 | 19 | 1 | 20 | 11 | 1 | 1 | 3 | 39 | 39 | 19 | 15 | 0 | 1 | 2 | 2 |
| 24T505 | 10 | 20 | 20 | 0 | 20 | 11 | 1 | 1 | 3 | 41 | 41 | 20 | 15 | 0 | 1 | 0 | 0 |
| 24T506 | 11 | 22 | 21 | 1 | 22 | 12 | 1 | 1 | 3 | 43 | 43 | 21 | 15 | 3 | 1 | 2 | 2 |
| 24T507 | 11 | 22 | 22 | 0 | 22 | 12 | 1 | 1 | 3 | 45 | 45 | 22 | 15 | 3 | 1 | 0 | 0 |
| 24T508 | 12 | 24 | 23 | 1 | 24 | 13 | 1 | 1 | 3 | 47 | 47 | 23 | 18 | 0 | 1 | 2 | 2 |
| 24T509 | 12 | 24 | 24 | 0 | 24 | 13 | 1 | 1 | 3 | 49 | 49 | 24 | 18 | 0 | 1 | 0 | 0 |
| 24T510 | 13 | 26 | 25 | 1 | 26 | 14 | 1 | 1 | 3 | 51 | 51 | 25 | 18 | 3 | 1 | 2 | 2 |
| 24T511 | 13 | 26 | 26 | 0 | 26 | 14 | 1 | 1 | 3 | 53 | 53 | 26 | 18 | 3 | 1 | 0 | 0 |
| 24T512 | 14 | 28 | 27 | 1 | 28 | 15 | 1 | 1 | 3 | 55 | 55 | 27 | 21 | 0 | 1 | 2 | 2 |
| 24T513 | 14 | 28 | 28 | 0 | 28 | 15 | 1 | 1 | 3 | 57 | 57 | 28 | 21 | 0 | 1 | 0 | 0 |
| 24T514 | 15 | 30 | 29 | 1 | 30 | 16 | 1 | 1 | 3 | 59 | 59 | 29 | 21 | 3 | 1 | 2 | 2 |
| 24T515 | 15 | 30 | 30 | 0 | 30 | 16 | 1 | 1 | 3 | 61 | 61 | 30 | 21 | 3 | 1 | 0 | 0 |
| 24T516 | 16 | 32 | 31 | 1 | 32 | 17 | 1 | 1 | 3 | 63 | 63 | 31 | 24 | 0 | 1 | 2 | 2 |

High Pressure Valve Manifold Kits

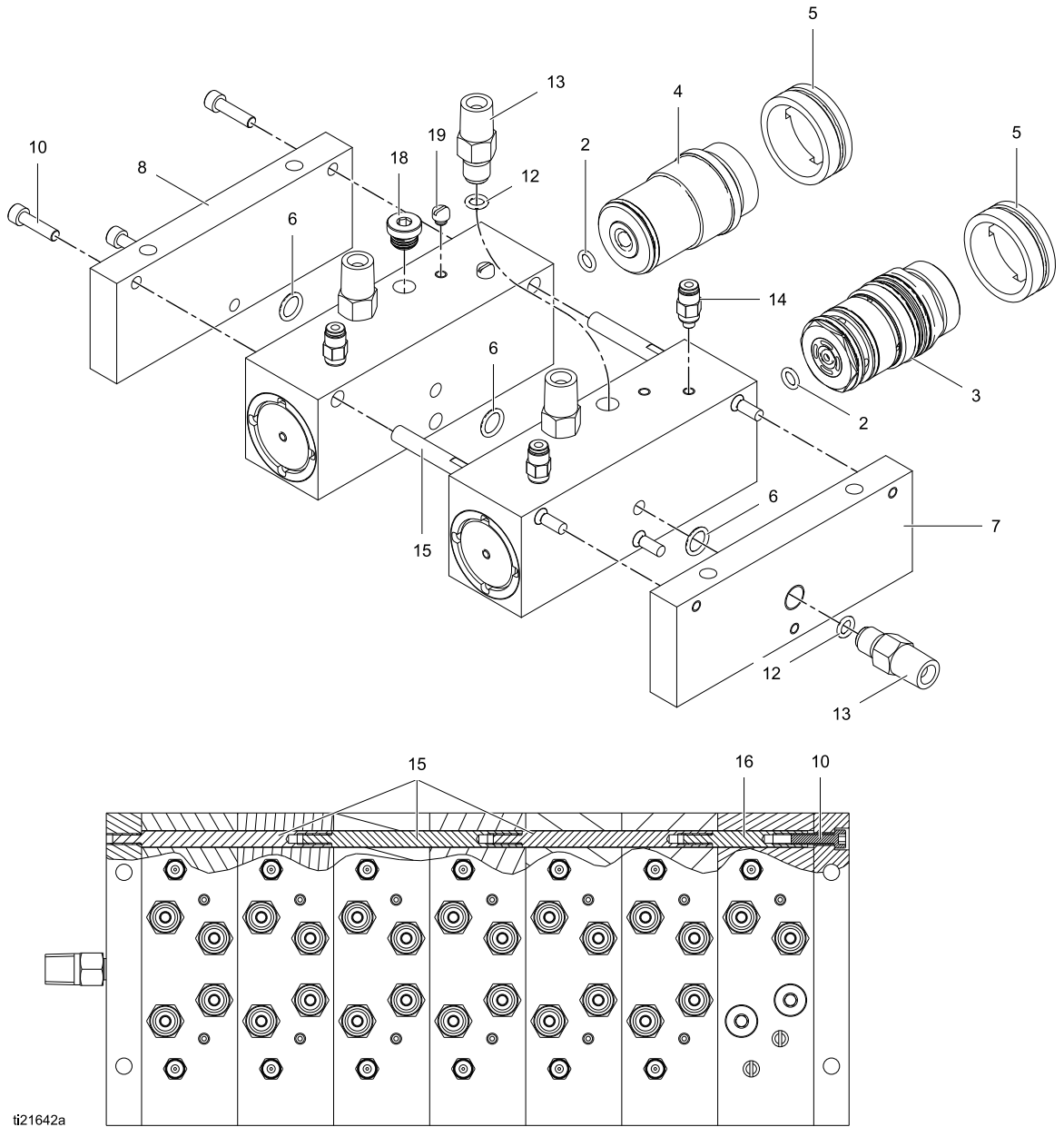
Non-Circulating Valve Manifold Kits

| Kit No. | Series | Kit Description |
|-------------------------|--------|-----------------|
| 24T647 | A | 2 valves |
| 24T648 | A | 3 valves |
| 24T649 | A | 4 valves |
| 24T650 | A | 5 valves |
| 24T651 | A | 6 valves |
| 24T652 | A | 7 valves |
| 24T653 | A | 8 valves |
| 24T654 | A | 9 valves |
| 24T655 | A | 10 valves |
| 24T656 | A | 11 valves |
| 24T657 | A | 12 valves |
| 24T658 | A | 13 valves |
| 24T659 | A | 14 valves |
| 24T660 | A | 15 valves |
| 24T661 | A | 16 valves |
| 24T662 | A | 17 valves |
| 24T663 | A | 18 valves |
| 24T664 | A | 19 valves |
| 24T665 | A | 20 valves |
| 24T666 | A | 21 valves |
| 24T667 | A | 22 valves |
| 24T668 | A | 23 valves |
| 24T669 | A | 24 valves |
| 24T670 | A | 25 valves |
| 24T671 | A | 26 valves |
| 24T672 | A | 27 valves |
| 24T673 | A | 28 valves |
| 24T674 | A | 29 valves |
| 24T675 | A | 30 valves |
| 24T676 | A | 31 valves |
| 24T845 (acid-catalyzed) | A | 3 valves |
| 24T846 (acid-catalyzed) | A | 5 valves |

Circulating Valve Manifold Kits

| Kit No. | Series | Kit Description |
|---------|--------|-----------------|
| 24T677 | A | 2 valves |
| 24T678 | A | 3 valves |
| 24T679 | A | 4 valves |
| 24T680 | A | 5 valves |
| 24T681 | A | 6 valves |
| 24T682 | A | 7 valves |
| 24T683 | A | 8 valves |
| 24T684 | A | 9 valves |
| 24T685 | A | 10 valves |
| 24T686 | A | 11 valves |
| 24T687 | A | 12 valves |
| 24T688 | A | 13 valves |
| 24T689 | A | 14 valves |
| 24T690 | A | 15 valves |
| 24T691 | A | 16 valves |
| 24T692 | A | 17 valves |
| 24T693 | A | 18 valves |
| 24T694 | A | 19 valves |
| 24T695 | A | 20 valves |
| 24T696 | A | 21 valves |
| 24T697 | A | 22 valves |
| 24T698 | A | 23 valves |
| 24T699 | A | 24 valves |
| 24T700 | A | 25 valves |
| 24T701 | A | 26 valves |
| 24T702 | A | 27 valves |
| 24T703 | A | 28 valves |
| 24T704 | A | 29 valves |
| 24T705 | A | 30 valves |
| 24T706 | A | 31 valves |

Valve Manifold Kit Parts



fi21642a

Parts

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 1 | 16N271 | MANIFOLD, for circulating kits | ★ |
| 2 | 111450 | O-RING; chemically resistant | |
| 3 | 24T581 | VALVE, for non-circulating kits; includes item 2 | |
| | 24T582 | VALVE, for circulating kits; includes item 2 | |
| | 24T583 | VALVE, for non-circulating, acid compatible kits; includes item 2 | |
| 4 | 24R052 | PLUG, cc valve | |
| 5 | 16N269 | RETAINER, nut | |
| 6 | 111457 | O-RING; ptfе | |
| 7 | 24T725 | PLATE, outlet, manifold | |
| 8 | 24T726 | PLATE, end, manifold | |
| 10 | 111820 | SCREW, cap, socket head; 10–24 x 0.75 in. (19 mm) | |
| 12 | 104893 | O-RING; ptfе | |

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 13 | 24T523 | FITTING, fluid; 7/16–20 x 1/4 npt(m) | ★ |
| 14 | 111328 | CONNECTOR, tube; 10–32(m) x 5/32 in. (4 mm) OD tube | |
| 15 | 24T729 | ROD, connecting; 3.290 in. (84 mm) | |
| 16 | 24T728 | ROD, connecting; 1.645 in. (42 mm) | |
| 18 | 557716 | PLUG; 7/16–20 | |
| 19 | 104644 | PLUG, screw; 10–32 x 0.156 in. (4 mm) | |

★ See the following tables to determine the quantity of each part in your valve manifold kit.

High Pressure Non-Circulating Valve Manifold Kit Part Quantities

| Kit No. | Reference Numbers | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 18 | 19 |
| 24T647 | 1 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 3 | 3 | 2 | 0 | 1 | 0 | 0 |
| 24T648 | 2 | 4 | 3 | 1 | 4 | 3 | 1 | 1 | 3 | 4 | 4 | 3 | 1 | 0 | 1 | 2 |
| 24T649 | 2 | 4 | 4 | 0 | 4 | 3 | 1 | 1 | 3 | 5 | 5 | 4 | 1 | 0 | 0 | 0 |
| 24T650 | 3 | 6 | 5 | 1 | 6 | 4 | 1 | 1 | 3 | 6 | 6 | 5 | 1 | 1 | 1 | 2 |
| 24T651 | 3 | 6 | 6 | 0 | 6 | 4 | 1 | 1 | 3 | 7 | 7 | 6 | 1 | 1 | 0 | 0 |
| 24T652 | 4 | 8 | 7 | 1 | 8 | 5 | 1 | 1 | 3 | 8 | 8 | 7 | 2 | 0 | 1 | 2 |
| 24T653 | 4 | 8 | 8 | 0 | 8 | 5 | 1 | 1 | 3 | 9 | 9 | 8 | 2 | 0 | 0 | 0 |
| 24T654 | 5 | 10 | 9 | 1 | 10 | 6 | 1 | 1 | 3 | 10 | 10 | 9 | 2 | 1 | 1 | 2 |
| 24T655 | 5 | 10 | 10 | 0 | 10 | 6 | 1 | 1 | 3 | 11 | 11 | 10 | 2 | 1 | 0 | 0 |
| 24T656 | 6 | 12 | 11 | 1 | 12 | 7 | 1 | 1 | 3 | 12 | 12 | 11 | 3 | 0 | 1 | 2 |
| 24T657 | 6 | 12 | 12 | 0 | 12 | 7 | 1 | 1 | 3 | 13 | 13 | 12 | 3 | 0 | 0 | 0 |
| 24T658 | 7 | 14 | 13 | 1 | 14 | 8 | 1 | 1 | 3 | 14 | 14 | 13 | 3 | 1 | 1 | 2 |
| 24T659 | 7 | 14 | 14 | 0 | 14 | 8 | 1 | 1 | 3 | 15 | 15 | 14 | 3 | 1 | 0 | 0 |
| 24T660 | 8 | 16 | 15 | 1 | 16 | 9 | 1 | 1 | 3 | 16 | 16 | 15 | 4 | 0 | 1 | 2 |
| 24T661 | 8 | 16 | 16 | 0 | 16 | 9 | 1 | 1 | 3 | 17 | 17 | 16 | 4 | 0 | 0 | 0 |
| 24T662 | 9 | 18 | 17 | 1 | 18 | 10 | 1 | 1 | 3 | 18 | 18 | 17 | 4 | 1 | 1 | 2 |

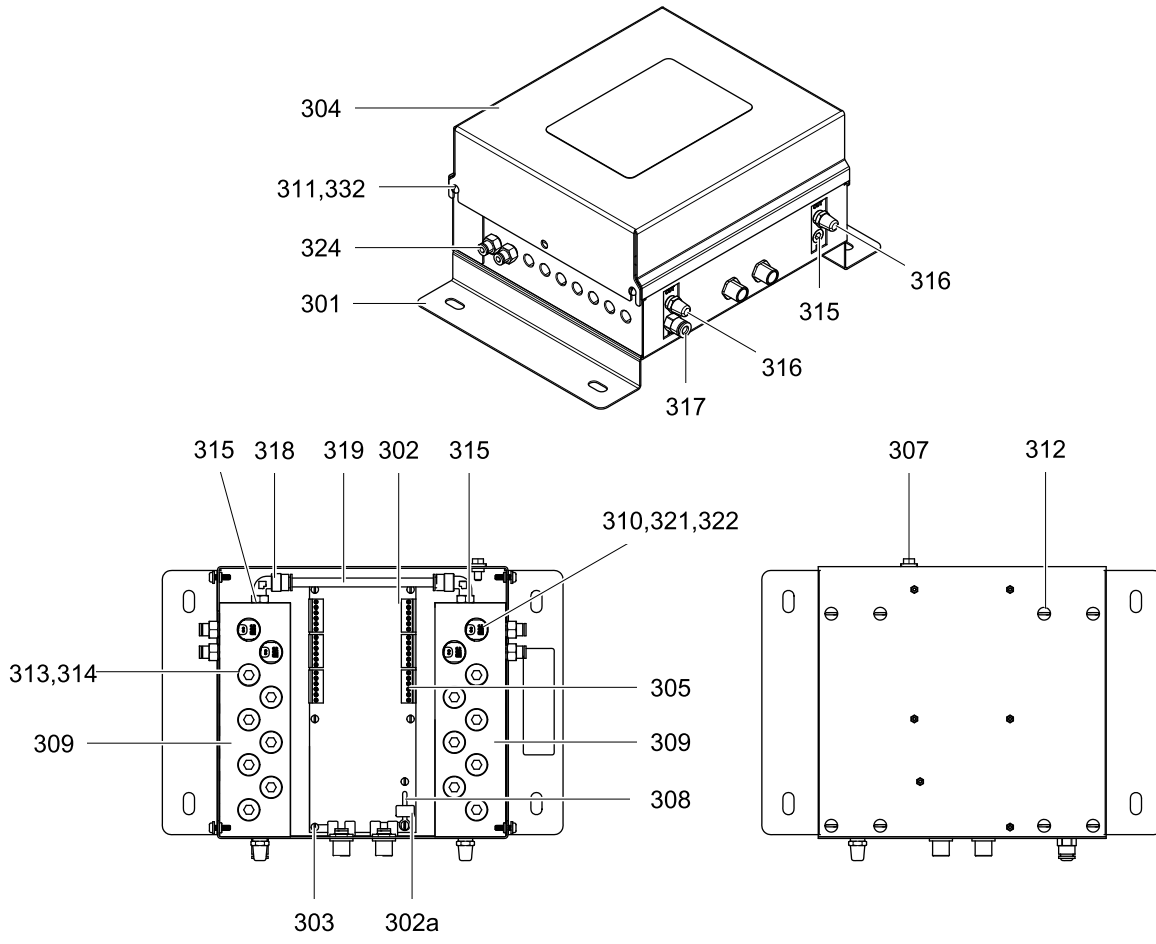
| Kit No. | Reference Numbers | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 18 | 19 |
| 24T663 | 9 | 18 | 18 | 0 | 18 | 10 | 1 | 1 | 3 | 19 | 19 | 18 | 4 | 1 | 0 | 0 |
| 24T664 | 10 | 20 | 19 | 1 | 20 | 11 | 1 | 1 | 3 | 20 | 20 | 19 | 5 | 0 | 1 | 2 |
| 24T665 | 10 | 20 | 20 | 0 | 20 | 11 | 1 | 1 | 3 | 21 | 21 | 20 | 5 | 0 | 0 | 0 |
| 24T666 | 11 | 22 | 21 | 1 | 22 | 12 | 1 | 1 | 3 | 22 | 22 | 21 | 5 | 1 | 1 | 2 |
| 24T667 | 11 | 22 | 22 | 0 | 22 | 12 | 1 | 1 | 3 | 23 | 23 | 22 | 5 | 1 | 0 | 0 |
| 24T668 | 12 | 24 | 23 | 1 | 24 | 13 | 1 | 1 | 3 | 24 | 24 | 23 | 6 | 0 | 1 | 2 |
| 24T669 | 12 | 24 | 24 | 0 | 24 | 13 | 1 | 1 | 3 | 25 | 25 | 24 | 6 | 0 | 0 | 0 |
| 24T670 | 13 | 26 | 25 | 1 | 26 | 14 | 1 | 1 | 3 | 26 | 26 | 25 | 6 | 1 | 1 | 2 |
| 24T671 | 13 | 26 | 26 | 0 | 26 | 14 | 1 | 1 | 3 | 27 | 27 | 26 | 6 | 1 | 0 | 0 |
| 24T672 | 14 | 28 | 27 | 1 | 28 | 15 | 1 | 1 | 3 | 28 | 28 | 27 | 7 | 0 | 1 | 2 |
| 24T673 | 14 | 28 | 28 | 0 | 28 | 15 | 1 | 1 | 3 | 29 | 29 | 28 | 7 | 0 | 0 | 0 |
| 24T674 | 15 | 30 | 29 | 1 | 30 | 16 | 1 | 1 | 3 | 30 | 30 | 29 | 7 | 1 | 1 | 2 |
| 24T675 | 15 | 30 | 30 | 0 | 30 | 16 | 1 | 1 | 3 | 31 | 31 | 30 | 7 | 1 | 0 | 0 |
| 24T676 | 16 | 32 | 31 | 1 | 32 | 17 | 1 | 1 | 3 | 32 | 32 | 31 | 8 | 0 | 1 | 2 |
| 24T845 | 2 | 4 | 3 | 1 | 4 | 3 | 1 | 1 | 3 | 4 | 4 | 3 | 1 | 0 | 1 | 2 |
| 24T846 | 3 | 6 | 5 | 1 | 6 | 4 | 1 | 1 | 3 | 6 | 6 | 5 | 1 | 1 | 1 | 2 |

High Pressure Circulating Valve Manifold Kit Part Quantities

| Kit No. | Reference Numbers | | | | | | | | | | | | | | | |
|---------|-------------------|----|----|---|----|----|---|---|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 13 | 14 | 15 | 16 | 18 | 19 |
| 24T677 | 1 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 5 | 5 | 2 | 0 | 1 | 0 | 0 |
| 24T678 | 2 | 4 | 3 | 1 | 4 | 3 | 1 | 1 | 3 | 7 | 7 | 3 | 1 | 0 | 2 | 2 |
| 24T679 | 2 | 4 | 4 | 0 | 4 | 3 | 1 | 1 | 3 | 9 | 9 | 4 | 1 | 0 | 0 | 0 |
| 24T680 | 3 | 6 | 5 | 1 | 6 | 4 | 1 | 1 | 3 | 11 | 11 | 5 | 1 | 1 | 2 | 2 |
| 24T681 | 3 | 6 | 6 | 0 | 6 | 4 | 1 | 1 | 3 | 13 | 13 | 6 | 1 | 1 | 0 | 0 |
| 24T682 | 4 | 8 | 7 | 1 | 8 | 5 | 1 | 1 | 3 | 15 | 15 | 7 | 2 | 0 | 2 | 2 |
| 24T683 | 4 | 8 | 8 | 0 | 8 | 5 | 1 | 1 | 3 | 17 | 17 | 8 | 2 | 0 | 0 | 0 |
| 24T684 | 5 | 10 | 9 | 1 | 10 | 6 | 1 | 1 | 3 | 19 | 19 | 9 | 2 | 1 | 2 | 2 |
| 24T685 | 5 | 10 | 10 | 0 | 10 | 6 | 1 | 1 | 3 | 21 | 21 | 10 | 2 | 1 | 0 | 0 |
| 24T686 | 6 | 12 | 11 | 1 | 12 | 7 | 1 | 1 | 3 | 23 | 23 | 11 | 3 | 0 | 2 | 2 |
| 24T687 | 6 | 12 | 12 | 0 | 12 | 7 | 1 | 1 | 3 | 25 | 25 | 12 | 3 | 0 | 0 | 0 |
| 24T688 | 7 | 14 | 13 | 1 | 14 | 8 | 1 | 1 | 3 | 27 | 27 | 13 | 3 | 1 | 2 | 2 |
| 24T689 | 7 | 14 | 14 | 0 | 14 | 8 | 1 | 1 | 3 | 29 | 29 | 14 | 3 | 1 | 0 | 0 |
| 24T690 | 8 | 16 | 15 | 1 | 16 | 9 | 1 | 1 | 3 | 31 | 31 | 15 | 4 | 0 | 2 | 2 |
| 24T691 | 8 | 16 | 16 | 0 | 16 | 9 | 1 | 1 | 3 | 33 | 33 | 16 | 4 | 0 | 0 | 0 |
| 24T692 | 9 | 18 | 17 | 1 | 18 | 10 | 1 | 1 | 3 | 35 | 35 | 17 | 4 | 1 | 2 | 2 |
| 24T693 | 9 | 18 | 18 | 0 | 18 | 10 | 1 | 1 | 3 | 37 | 37 | 18 | 4 | 1 | 0 | 0 |
| 24T694 | 10 | 20 | 19 | 1 | 20 | 11 | 1 | 1 | 3 | 39 | 39 | 19 | 5 | 0 | 2 | 2 |
| 24T695 | 10 | 20 | 20 | 0 | 20 | 11 | 1 | 1 | 3 | 41 | 41 | 20 | 5 | 0 | 0 | 0 |
| 24T696 | 11 | 22 | 21 | 1 | 22 | 12 | 1 | 1 | 3 | 43 | 43 | 21 | 5 | 1 | 2 | 2 |
| 24T697 | 11 | 22 | 22 | 0 | 22 | 12 | 1 | 1 | 3 | 45 | 45 | 22 | 5 | 1 | 0 | 0 |
| 24T698 | 12 | 24 | 23 | 1 | 24 | 13 | 1 | 1 | 3 | 47 | 47 | 23 | 6 | 0 | 2 | 2 |
| 24T699 | 12 | 24 | 24 | 0 | 24 | 13 | 1 | 1 | 3 | 49 | 49 | 24 | 6 | 0 | 0 | 0 |
| 24T700 | 13 | 26 | 25 | 1 | 26 | 14 | 1 | 1 | 3 | 51 | 51 | 25 | 6 | 1 | 2 | 2 |
| 24T701 | 13 | 26 | 26 | 0 | 26 | 14 | 1 | 1 | 3 | 53 | 53 | 26 | 6 | 1 | 0 | 0 |
| 24T702 | 14 | 28 | 27 | 1 | 28 | 15 | 1 | 1 | 3 | 55 | 55 | 27 | 7 | 0 | 2 | 2 |
| 24T703 | 14 | 28 | 28 | 0 | 28 | 15 | 1 | 1 | 3 | 57 | 57 | 28 | 7 | 0 | 0 | 0 |
| 24T704 | 15 | 30 | 29 | 1 | 30 | 16 | 1 | 1 | 3 | 59 | 59 | 29 | 7 | 1 | 2 | 2 |
| 24T705 | 15 | 30 | 30 | 0 | 30 | 16 | 1 | 1 | 3 | 61 | 61 | 30 | 7 | 1 | 0 | 0 |
| 24T706 | 16 | 32 | 31 | 1 | 32 | 17 | 1 | 1 | 3 | 63 | 63 | 31 | 8 | 0 | 2 | 2 |

Color Change Control Module Kits

Non-IS Color Change Control Modules



ti21639a

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 301 | — — — | PANEL | 1 |
| 302 | 24T566 | BOARD, circuit | 1 |
| 302a | 123690 | FUSE; 125 mA | 1 |
| 303 | 112324 | SCREW, machine, pan head; 4-40 x 0.25 in. (6 mm) | 6 |
| 304 | 24T562 | COVER | 1 |
| 305 | 119162 | CONNECTOR, 6-position | ★ |
| 307 | 116343 | SCREW, ground; M5 x 0.8 | 1 |
| 308 | 123691 | HOLDER, fuse | 1 |
| 309 | 24T563 | MANIFOLD | 2 |
| 310 | 16P316 | SOLENOID | ★ |
| 311 | 117831 | SCREW, machine, pan head; 6-32 x 0.5 in. (13 mm) | 4 |
| 312 | 103833 | SCREW, machine, pan head; 10-32 x 0.375 in. (10 mm) | 8 |
| 313 | 24T565 | PLUG; 5/8-32; includes item 314 | ★ |
| 314 | 113418 | O-RING; buna-N | 14 |
| 315 | 100139 | PLUG, pipe; 1/8 npt | 3 |

| Ref. No. | Part No. | Description | Qty |
|----------|----------|--|-----|
| 316 | C06061 | MUFFLER | 2 |
| 317 | 115671 | FITTING, connector; 1/8 npt(m) x 1/4 in. (6 mm) OD tube | 1 |
| 318 | 112698 | ELBOW; 1/8 npt(m) x 1/4 in. (6 mm) OD tube | 2 |
| 319 | 590332 | TUBE; polyethylene; 1/4 in. (6 mm) OD | 1 |
| 320 | 598095 | TUBE; nylon; 5/32 in. (4 mm) OD | 1 |
| 321 | — — — | STRAP, tie | ★ |
| 322 | — — — | FERRULE | ★ |
| 324 | 114263 | FITTING, connector; 1/8 npt(m) x 5/32 in. (4 mm) OD tube | ★ |
| 332 | 151395 | WASHER | 4 |

★ See the following table to determine the quantity of each part in your control module kit.

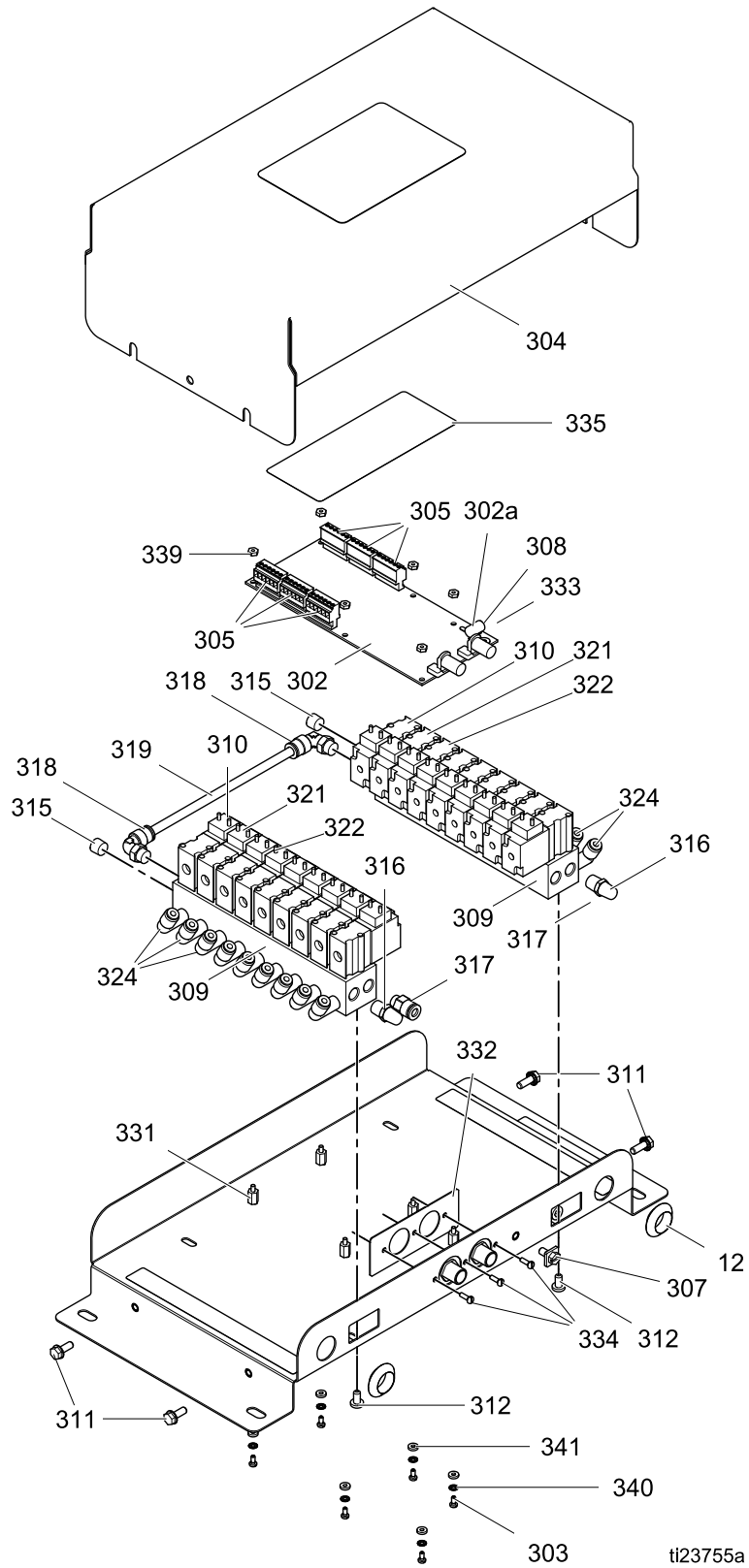
Parts labeled — — — are not available separately.

Non-IS Control Module Part Quantities

Find your module kit no. in the left column and the desired reference number in the top row to find the part quantity used in your control module kit.

| Kit No. | Kit Description | 6-Position Connector (305) | Solenoid (310) | Plug (313) | Tie Strap (321) | Ferrule (322) | Connector Fitting (324) |
|---------|-----------------|----------------------------|----------------|------------|-----------------|---------------|-------------------------|
| 24T557 | 2 color | 2 | 6 | 12 | 4 | 12 | 6 |
| 24T558 | 4 color | 4 | 10 | 8 | 4 | 20 | 10 |
| 24T559 | 6 color | 6 | 14 | 4 | 4 | 28 | 14 |
| 24T560 | 8 color | 6 | 18 | 0 | 4 | 36 | 18 |

IS Color Change Control Modules



| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 301 | — — — | PANEL | 1 |
| 302 | 24T566 | BOARD, circuit | 1 |
| 302a | 123690 | FUSE; 125 mA | 1 |
| 303 | 112324 | SCREW, machine, pan head; 4–40 x 0.25 in. (6 mm) | 6 |
| 304 | 24U567 | COVER | 1 |
| 305 | 119162 | CONNECTOR, 6–position | 6 |
| 307 | 116343 | SCREW, ground; M5 x 0.8 | 1 |
| 308 | 123691 | HOLDER, fuse | 1 |
| 309 | 15T636 | MANIFOLD | 2 |
| 310 | 121324 | SOLENOID | ★ |
| 311 | 16M007 | SCREW, machine, serrated head; 10–32 x 0.5 in. (13 mm) | 4 |
| 312 | 103833 | SCREW, machine, pan head; 10–32 x 0.375 in. (10 mm) | 4 |
| 313 | 121628 | SCREW, self-sealing; 4–40 x 0.25 in. (6 mm) | ★ |
| 315 | 100139 | PLUG, pipe; 1/8 npt | 3 |
| 316 | C06061 | MUFFLER | 2 |
| 317 | 115671 | FITTING, connector; 1/8 npt(m) x 1/4 in. (6 mm) OD tube | 1 |

| Ref. No. | Part No. | Description | Qty |
|----------|----------|---|-----|
| 318 | 112698 | ELBOW; 1/8 npt(m) x 1/4 in. (6 mm) OD tube | 2 |
| 319 | 590332 | TUBE; polyethylene; 1/4 in. (6 mm) OD | 1 |
| 320 | 598095 | TUBE; nylon; 5/32 in. (4 mm) OD | 1 |
| 321 | — — — | STRAP, tie | 2 |
| 322 | — — — | FERRULE | ★ |
| 324 | 109193 | ELBOW, connector; 10–32 (m) x 5/32 in. (4 mm) OD tube | ★ |
| 331 | 16U743 | SPACER | 6 |
| 332 | 16U744 | PLATE, non-conductive | 1 |
| 333 | 16U745 | PLATE, ground | 1 |
| 334 | 16U746 | SCREW, pan-head; 4–40 | 3 |
| 335 | 16W501 | LABEL, instructions | 1 |
| 339 | 102794 | NUT, hex | 7 |
| 340 | 101764 | WASHER, lock | 7 |
| 341 | 188773 | WASHER, flat | 7 |

★ See the following table to determine the quantity of each part in your control module kit.

Parts labeled — — — are not available separately.

IS Control Module Part Quantities

Find your module kit no. in the left column and the desired reference number in the top row to find the part quantity used in your control module kit.

| Kit No. | Kit Description | Solenoid (310) | Plug (313) | Tube (320) | Ferrule (322) | Connector Fitting (324) |
|---------|---|----------------|------------|----------------|---------------|-------------------------|
| 24T571 | 2 color and 2 catalyst | 6 | 24 | 30 ft (9.1 m) | 12 | 6 |
| 24T572 | 4 color and 2 catalyst | 8 | 20 | 40 ft (12.2 m) | 16 | 8 |
| 24T573 | 6 color and 2 catalyst | 10 | 16 | 50 ft (15.2 m) | 20 | 10 |
| 24T574 | 8 color and 2 catalyst | 12 | 12 | 60 ft (18.3 m) | 24 | 12 |
| 24T774 | 12 color and 2 catalyst; 13–24 color | 16 | 4 | 80 ft (24.4 m) | 32 | 16 |
| 24T775 | 4 color and 4 catalyst | 10 | 16 | 50 ft (15.2 m) | 20 | 10 |

Parts

| Kit No. | Kit Description | Solenoid (310) | Plug (313) | Tube (320) | Ferrule (322) | Connector Fitting (324) |
|----------------|---|-----------------------|-------------------|-------------------|----------------------|--------------------------------|
| 24T776 | 6 color and 4 catalyst | 12 | 12 | 60 ft (18.3 m) | 24 | 12 |
| 24T777 | 8 color and 4 catalyst | 14 | 8 | 70 ft (21.3 m) | 28 | 14 |
| 24T778 | 12 color and 4 catalyst; 13–30 color | 18 | 0 | 90 ft (27.4 m) | 36 | 18 |
| 24T779 | 13–18 color | 6 | 24 | 30 ft. (9.1 m) | 12 | 6 |

Expansion Kits

To add colors/catalysts, order the correct Non-IS Expansion Kit. Also order the corresponding IS Expansion Kit. See [IS Expansion Kits, page 70](#).

Non-IS Expansion Kits

The following kits are available to add color valves in a non-IS area. Order a kit without a manifold if you have room for a valve on an existing manifold. Order a kit with a manifold if all ports on your existing manifolds have valves already. See [Install an Expansion Kit, page 30](#) for instructions.

Low Pressure Expansion Kits

| Kit No. | Kit Description |
|-------------------------|--|
| Without Manifold | |
| 24T443 | One non-circulating valve (replaces a plug). Includes valve, solenoid, fittings, and tubing. |
| 24T444 | One circulating valve (replaces a plug). Includes valve, solenoid, fittings, and tubing. |
| With Manifold | |
| 24T445 | Manifold with one non-circulating valve. Includes valve, plug, solenoid, fittings, and tubing. |
| 24T446 | Manifold with one circulating valve. Includes valve, plug, solenoid, fittings, and tubing. |
| 24T447 | Manifold with two non-circulating valves. Includes valves, solenoids, fittings, and tubing. |
| 24T448 | Manifold with two circulating valves. Includes valves, solenoids, fittings, and tubing. |

High Pressure Expansion Kits

| Kit No. | Kit Description |
|-------------------------|--|
| Without Manifold | |
| 24T584 | One non-circulating valve (replaces a plug). Includes valve, solenoid, fittings, and tubing. |
| 24T585 | One circulating valve (replaces a plug). Includes valve, solenoid, fittings, and tubing. |
| With Manifold | |
| 24T586 | Manifold with one non-circulating valve. Includes valve, plug, solenoid, fittings, and tubing. |
| 24T587 | Manifold with one circulating valve. Includes valve, plug, solenoid, fittings, and tubing. |
| 24T588 | Manifold with two non-circulating valves. Includes valves, solenoids, fittings, and tubing. |
| 24T589 | Manifold with two circulating valves. Includes valves, solenoids, fittings, and tubing. |

High Pressure Acid-Compatible Expansion Kits

| Kit No. | Kit Description |
|-------------------------|--|
| Without Manifold | |
| 24T590 | One non-circulating acid-compatible valve (replaces a plug). Includes valve, solenoid, fittings, and tubing. |
| With Manifold | |
| 24T591 | Manifold with one non-circulating acid-compatible valve. Includes valve, plug, solenoid, fittings, and tubing. |
| 24T592 | Manifold with two non-circulating acid-compatible valves. Includes valves, solenoids, fittings, and tubing. |

IS Expansion Kits

The following kits are available to add color valves in an IS area. Order a kit without a manifold if you have room for a valve on an existing manifold. Order a kit with a manifold if all ports on your existing manifolds have valves already. See [Install an Expansion Kit, page 30](#) for instructions.

Low Pressure Expansion Kits

| Kit No. | Kit Description |
|-------------------------|---|
| Without Manifold | |
| 24T449 | One non-circulating valve (replaces a plug). Includes valve, IS solenoid, fittings, and tubing. |
| 24T450 | One circulating valve (replaces a plug). Includes valve, IS solenoid, fittings, and tubing. |
| With Manifold | |
| 24T451 | Manifold with one non-circulating valve. Includes valve, plug, IS solenoid, fittings, and tubing. |
| 24T452 | Manifold with one circulating valve. Includes valve, plug, IS solenoid, fittings, and tubing. |
| 24T453 | Manifold with two non-circulating valves. Includes valves, IS solenoids, fittings, and tubing. |
| 24T454 | Manifold with two circulating valves. Includes valves, IS solenoids, fittings, and tubing. |

High Pressure Expansion Kits

| Kit No. | Kit Description |
|-------------------------|---|
| Without Manifold | |
| 24T712 | One non-circulating valve (replaces a plug). Includes valve, IS solenoid, fittings, and tubing. |
| 24T713 | One circulating valve (replaces a plug). Includes valve, IS solenoid, fittings, and tubing. |
| With Manifold | |
| 24T714 | Manifold with one non-circulating valve. Includes valve, plug, IS solenoid, fittings, and tubing. |
| 24T715 | Manifold with one circulating valve. Includes valve, plug, IS solenoid, fittings, and tubing. |
| 24T716 | Manifold with two non-circulating valves. Includes valves, IS solenoids, fittings, and tubing. |
| 24T717 | Manifold with two circulating valves. Includes valves, IS solenoids, fittings, and tubing. |

High Pressure Acid-Compatible Expansion Kits

| Kit No. | Kit Description |
|-------------------------|---|
| Without Manifold | |
| 24T718 | One non-circulating acid-compatible valve (replaces a plug). Includes valve, IS solenoid, fittings, and tubing. |
| With Manifold | |
| 24T719 | Manifold with one non-circulating acid-compatible valve. Includes valve, plug, IS solenoid, fittings, and tubing. |
| 24T720 | Manifold with two non-circulating acid-compatible valves. Includes valves, IS solenoids, fittings, and tubing. |

Dimensions

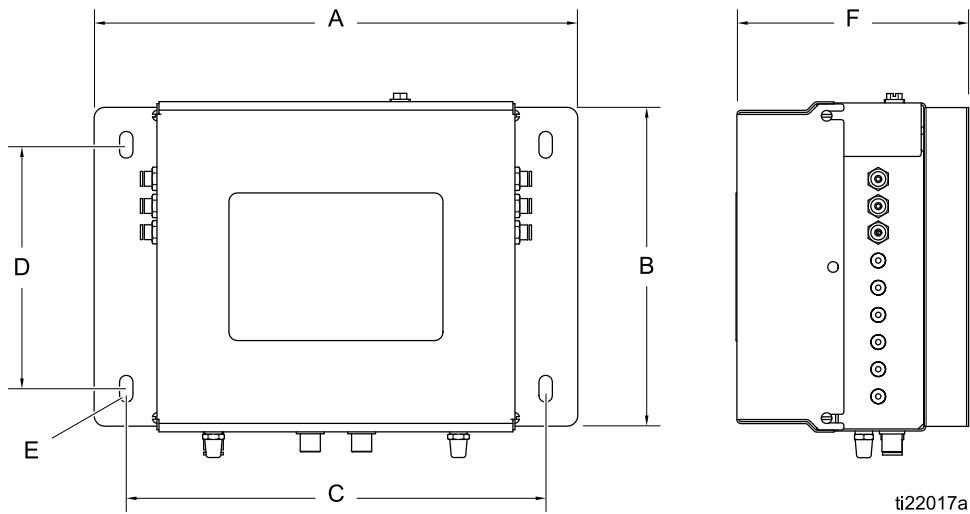


Figure 24 Non-IS Control Module

| A | B | C | D | E | F |
|---------------------|-------------------|------------------|-------------------|-----------------|-------------------|
| 11.30 in. (1478 mm) | 7.67 in. (195 mm) | 9.8 in. (249 mm) | 5.70 in. (145 mm) | 0.31 in. (8 mm) | 5.80 in. (147 mm) |

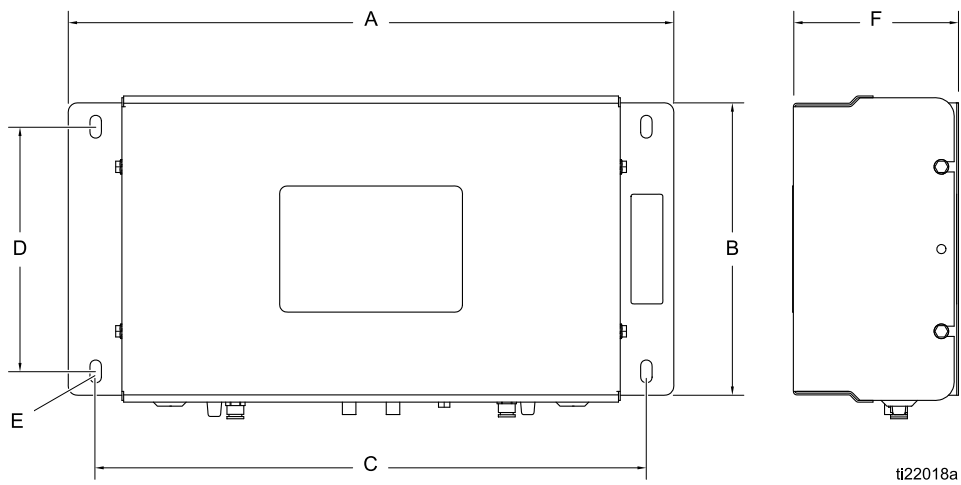


Figure 25 IS Control Module

| A | B | C | D | E | F |
|--------------------|-------------------|--------------------|-------------------|-----------------|-------------------|
| 16.57 in. (421 mm) | 8.22 in. (209 mm) | 15.07 in. (383 mm) | 6.70 in. (170 mm) | 0.31 in. (8 mm) | 4.52 in. (115 mm) |

Dimensions

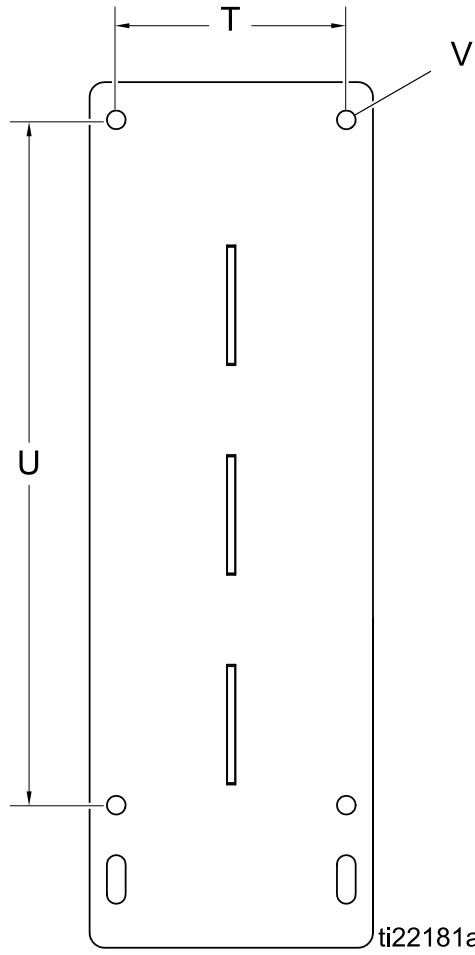
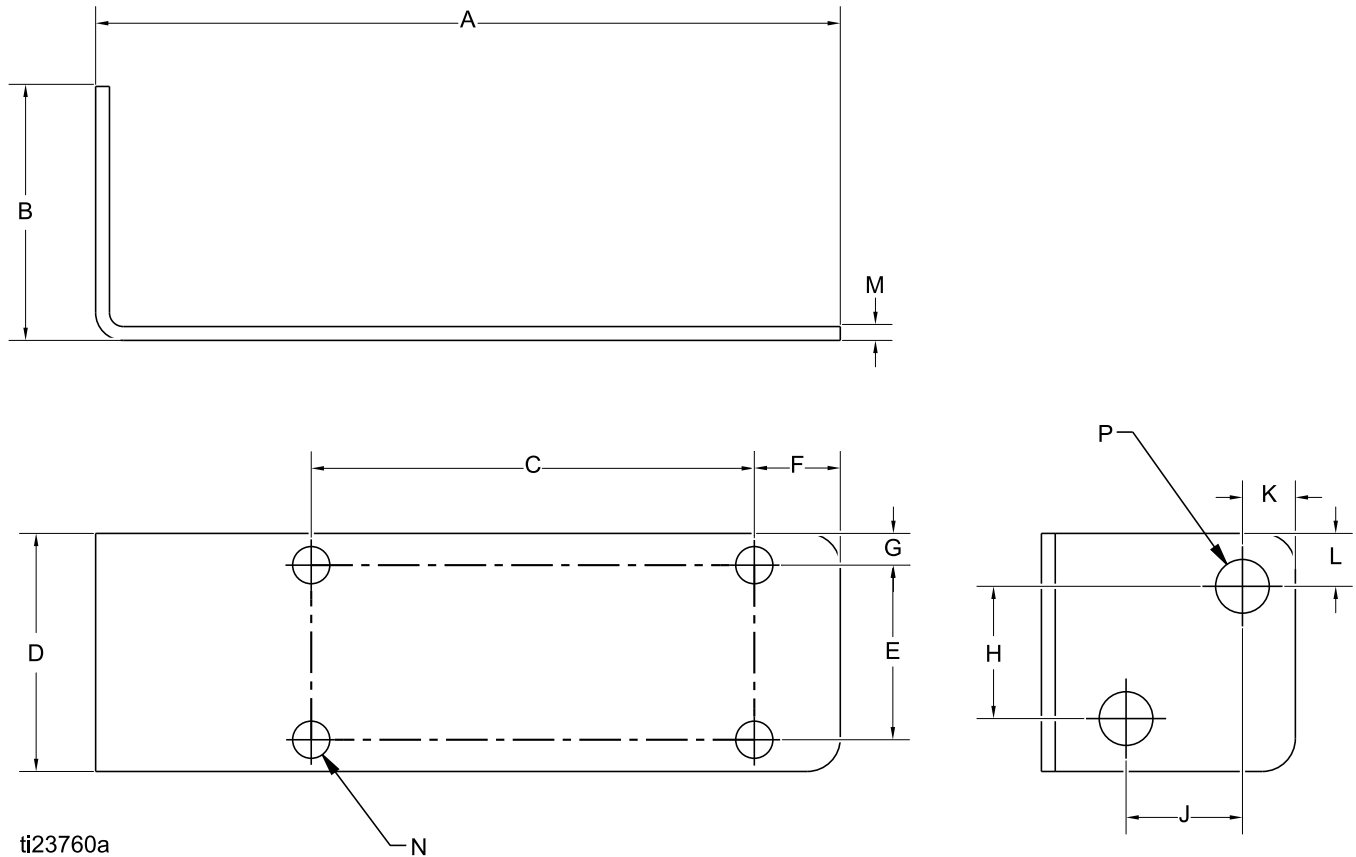


Figure 26 Manifold Mounting Bracket, Non-IS

| T | U | V |
|------------------|--------------------|---------------------------|
| 3.84 in. (98 mm) | 11.44 in. (291 mm) | 0.312 in. (8 mm) diameter |

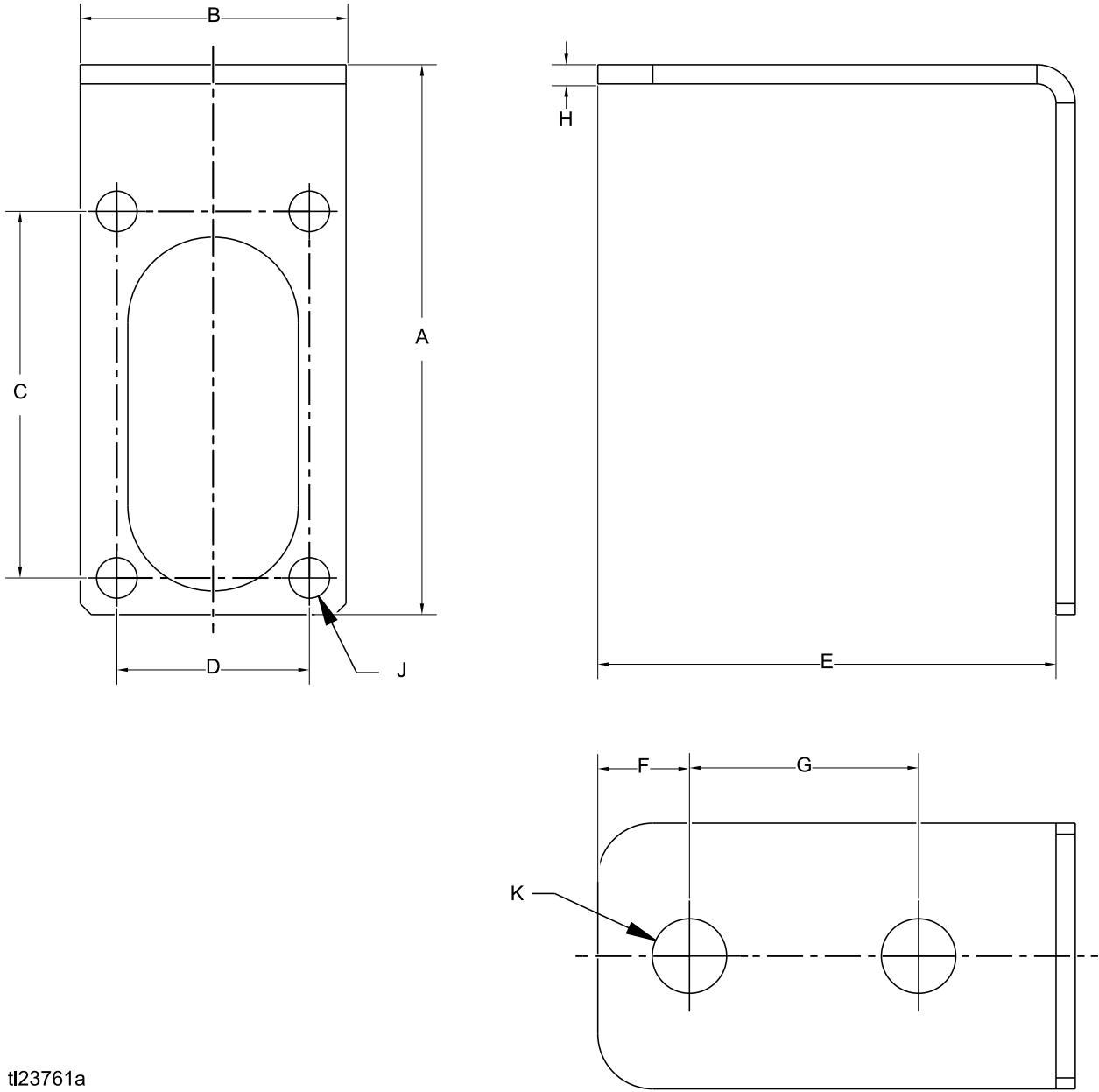


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Figure 27 IS Valve Manifold Bracket

| A | B | C | D | E | F |
|--------------------|---------------------|-----------------|-----------------|-----------------|------------------|
| 5.63 in (168 mm) | 1.92 in (49 mm) | 3.35 in (85 mm) | 1.80 in (46 mm) | 1.32 in (34 mm) | 0.65 in. (17 mm) |
| G | H | J | K | L | M |
| 0.24 in (6 mm) | 1.00 in (25 mm) | 0.88 in (22 mm) | 0.40 in (10 mm) | 0.40 in (10 mm) | 0.11 in (3 mm) |
| N | P | | | | |
| 4 x 0.28 in (7 mm) | 2 x 0.41 in (10 mm) | | | | |

Dimensions



ti23761a

Figure 28 Remote Mix Manifold Bracket

| A | B | C | D | E | F |
|-----------------|-----------------|--------------------|------------------|-----------------|-----------------|
| 3.00 in (76 mm) | 1.45 in (37 mm) | 2.00 in (51 mm) | 1.05 in (27 mm) | 2.50 in (64 mm) | 0.50 in (13 mm) |
| | | | | | |
| G | H | J | K | | |
| 1.25 in (32 mm) | 0.11 (3 mm) | 4 x 0.22 in (6 mm) | 2 x 0.41 (10 mm) | | |

Technical Data

| Color Change Kits | U.S. | Metric |
|---------------------------------|---|--------------------------|
| Maximum fluid working pressure: | | |
| Low pressure kits | 300 psi | 2.1 MPa, 21 bar |
| High pressure kits | 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 |
| Viscosity range of fluid: | 20–5000 centipoise | |
| Fluid inlet size: | 1/4 npt(f) | |
| Fluid outlet size: | 1/4 npt(f) | |
| Air inlet size: | 5/32 in. OD tube | 4 mm OD tube |
| Wetted parts: | | |
| Valve manifold | Glass-filled polyphenylene sulfide, 316 SST, PTFE, chemically resistant o-rings | |
| Valve | See valve manual 332454. | |

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