

Pump Function Module System

310766 rev.E

Single I/O module intended for remote control of tandem bulk pump unloaders, including pump run-away, depressurization, and material filter differential pressure.

Part No. 248785

Pump Function Module System

4875 psi (33.6 MPa, 336 bar) Maximum Working Pressure

Part No. 234957

Optional Pump Control Module Kit

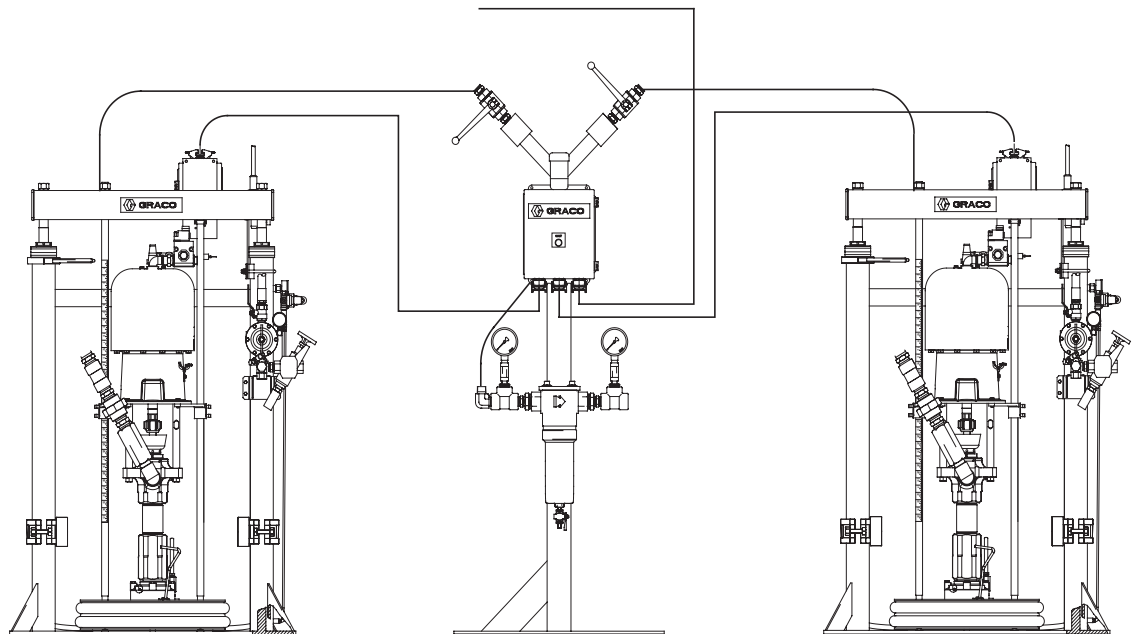


Important Safety Instructions

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

Other Required Instruction Manuals

- 306934
- 306861
- 307375
- 308027
- 308167
- 308168
- 308351
- 309348



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Manual Conventions

WARNING

Hazard Symbol

WARNING: a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Warnings in the instructions usually include a symbol indicating the hazard. Read the general **Warnings** section for additional safety information.

CAUTION
<p>CAUTION: a potentially hazardous situation which, if not avoided, may result in property damage or destruction of equipment.</p>





Note



Additional helpful information.

Warnings

The following warnings include general safety information for this equipment. More specific warnings are included in the text where applicable.

 WARNING	
	<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 equipment and conductive objects in work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a fire extinguisher in the work area.
	<p>INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.
	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • 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. • Check equipment daily. Repair or replace worn or damaged parts immediately. • Do not alter or modify equipment. • For professional use only. • Use equipment only for its intended purpose. Call your Graco distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Comply with all applicable safety regulations.



WARNING



MOVING PARTS HAZARD

Moving parts can pinch or amputate fingers and other body parts.

- 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** in this manual. Disconnect power or air supply.



TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDS's to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.



ELECTRIC SHOCK HAZARD

Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

Component Information

This manual provides information only for the Pump Function Module System and the Optional Pump Control Module Kit. **Specific information concerning safety, setup, operation, maintenance and repair is contained in other instruction manuals supplied with the Ram System. Please refer to them for detailed information.**

Pump Function Module System Description

Each air-powered ram pushes a follower plate into a drum of material, while the pump removes material from the drum and pushes it through a supply hose to a customer-supplied header. Material flows through the header to individual dispense drops.

The Pump Function Module System monitors and controls system functions and outputs a signal from the module system through the cell communications cable to the controlling equipment. **The standard information sent from the Pump Function Module Control System through the communications cable must be interpreted by the monitoring/controlling system (cell controller) being used that is supplied by others. An optional controlling system (234597) can be ordered through Graco.**

Optional Pump Control Module Description

The Optional Pump Control Module interprets the standard information signal sent by the Pump Function Module System through the Optional Pump Control Cable. The Optional Pump Control Module displays system data, such as pump status, input/output status, and depressurization status; and allows remote control of the tandem bulk pump unloader system. An Optional Pump Control Cable (234596) is also available.



WARNING



A main air bleed valve and pump air bleed valve are included with the equipment. These items help reduce the risk of serious injury, including fluid injection and splashing of fluid in the eyes or on the skin, and injury from moving parts if you are adjusting or repairing the pump.

The main air bleed valve shuts off and relieves the air to the pump and ram. The ram will hold pressure if the ram director valve is in the horizontal (neutral) position. To relieve air pressure in the ram, close the main air bleed valve and move the director valve to DOWN. The ram will slowly drop.

The pump air bleed valve relieves air trapped between it and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly. Locate the valve close to the pump.

The fluid drain valve assists in relieving fluid pressure in the displacement pump, hose, and gun.

Triggering the gun to relieve pressure may not be sufficient.

Component Description

Before you install the system, you should be familiar with the parts discussed in the following paragraphs.



Reference numbers in parentheses in the text refer to the callouts in FIG. 1.

Supply Unit Features

Pump (1) - supplies power for rams.

Air Bleed Lockout Valve (2) - shuts off and relieves the air to the pump and ram.

Air Motor Solenoid (3) - turns air on to the pump from the cell controller.

Pump Air On Pressure Switch (4) - pressure switch that verifies there is pressure to the pumps.

Empty Level Limit Switch (5) - indicates when a low material level has been reached and sends a signal back to the cell controller. This switch is adjustable.

Depressurization Valve/Solenoid (6) - relieves material pressure in the system through the cell controller which controls the on and off solenoid.

Level Indicator (7) - visual indicator of the remaining material in the drum.

Pump Stroke Detector Proximity Switch (8) - sends pump stroke signal count back to cell controller.

Material Check Valve (9) - prevents back flow from one ram system to the other.

Control Stand Features

Standard Interface Cable Electrical Connection (10) - electrical connection to cell controller.

Filter Module (11) - filters out foreign objects from fluid.

Filter Plugged Detector (12) - pressure switch across the filter sends a signal to the cell controller indicating when the filter is plugged. This switch is adjustable.

Fault Beacon (13) - illuminates when there is a fault in the system.

Material Isolation Ball Valves (14) - shuts off material flow to one ram unit. This is used when maintenance is required for only one unit of the system.

Supply Hoses (15) - provides drum material to pump control.

Electrical Cables (16) - controls each ram to pump function control monitor.

Pump Function Module (17) - The Pump Function Module monitors and controls system functions and outputs a signal from the module system through the cell communications cable to the controlling equipment.

Optional Pump Control Module Features

Pump Control Box (18) - houses the terminal block and panel view display and controls.

Pump Control Panel View (19) - displays system information and houses programmable controls.

Pump Control Cable (20) - connects the optional pump control module to the tandem bulk pump unloader.

Component Identification

Key:

- | | |
|-----------------------------------------|---------------------------------------------------|
| 1 Pump | 10 Standard Interface Cable Electrical Connection |
| 2 Air Bleed Lock Out Valve | 11 Filter Module |
| 3 Air Motor Solenoid | 12 Filter Plugged Detector |
| 4 Pump Air On Pressure Switch | 13 Fault Beacon |
| 5 Empty Level Limit Switch | 14 Material Isolation Ball Valves |
| 6 Depressurization Valve/Solenoid | 15 Supply Hoses |
| 7 Level Indicator | 16 Electrical Cables |
| 8 Pump Stroke Detector Proximity Switch | 17 Pump Function Module |
| 9 Material Check Valve | 18 Pump Control Box (optional) |
| | 19 Pump Control Panel View (optional) |
| | 20 Pump Control Cable (optional) |

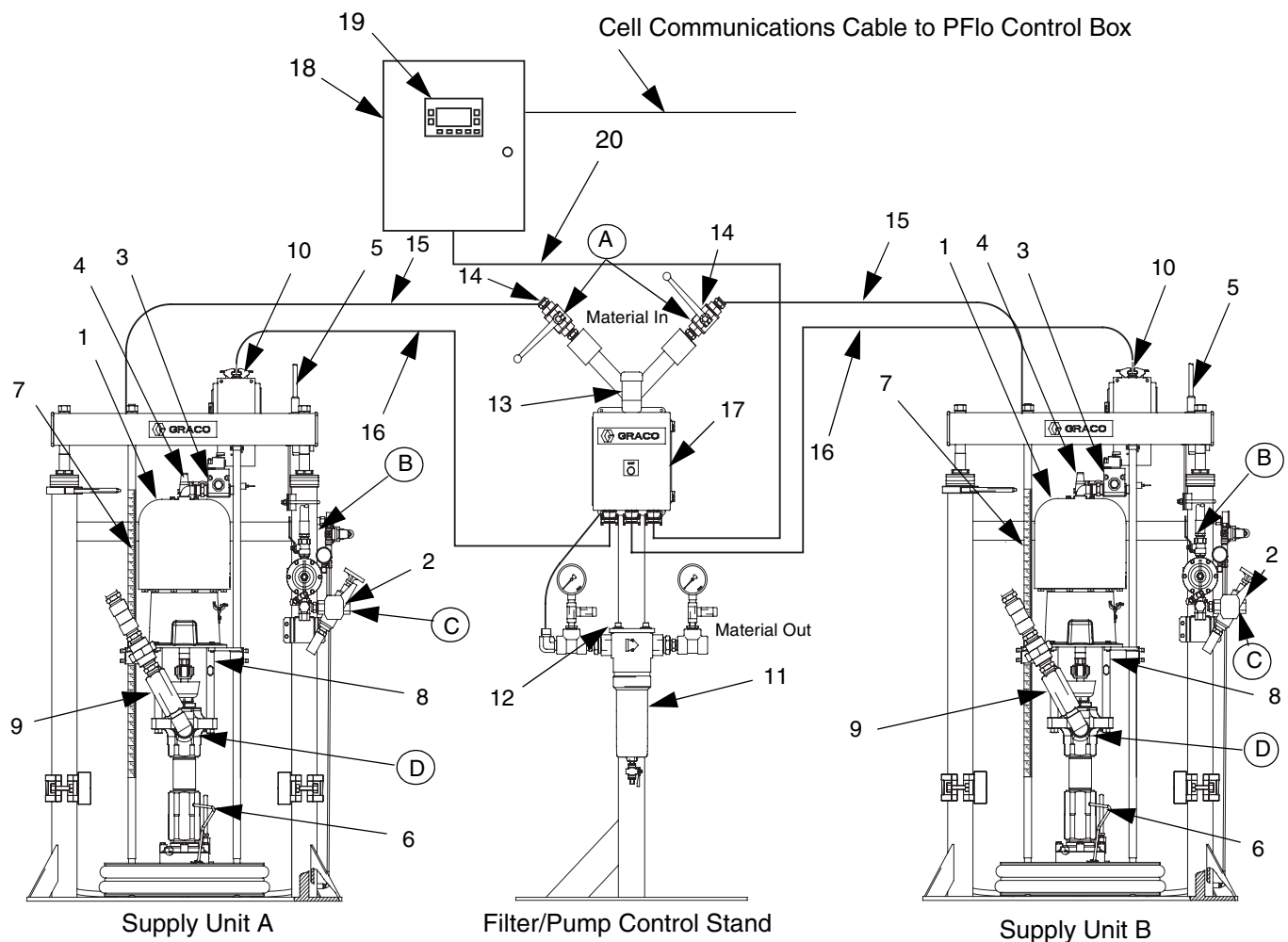



FIG. 1

Pump Function Module System Operation

Manual Pressure Relief Procedure

 Automatic pressure relief is actuated by the cell controller.

WARNING

Follow **Manual Pressure Relief Procedure (automatic pressure relief is actuated by the cell controller)** when you stop spraying and before cleaning, checking, servicing, or transporting equipment. Read warnings, page 3.

1. Relieve system pressure to which Graco module supply units are attached. (See manual 308027).
2. Close dispenser ball valves (A). Disconnect ball valves from system. See FIG. 1.
3. Close pump air bleed valve (B).
4. Shut off main air bleed valve (C) required in your system. Set ram director valve to DOWN. Ram will slowly drop.
5. Open the drain valve (required in your system) and/or the pump bleeder valve (D). Have a container ready to catch the drainage.
6. Leave the drain valve open until you are ready to spray/dispense again.
7. Repeat procedure for each ram.

Always engage the trigger lock when you stop spraying to prevent the gun from being triggered accidentally by hand or if dropped or bumped.

Differential Pressure Switch

WARNING

Read warnings, page 3.

The differential pressure switch measure the fluid pressure difference between the inbound and outbound side of the filter. The pump function module system is shipped from the factory with the differential pressure set at 100 PSI.

Adjusting the Differential Pressure

1. Enter the set up mode by pressing button (F). Set point 1 (SP1) will display. See FIG. 2.

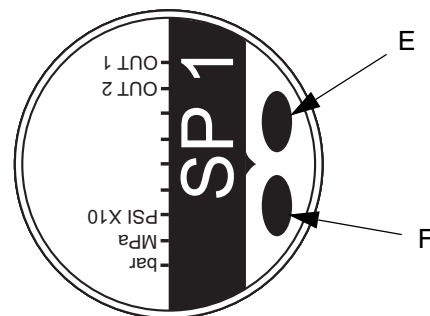
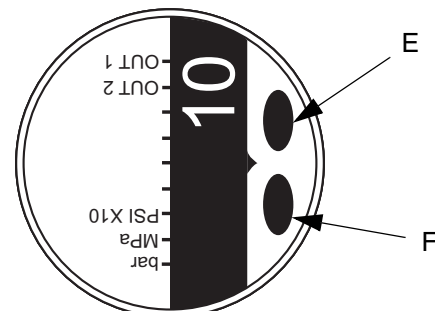


FIG. 2

2. To display the current psi value press and release button (E). **The actual psi value is the number displayed times 10.** See FIG. 3.



**Actual pressure is 100 psi
(psi number displayed x 10)**

FIG. 3

- To change the psi value press and hold button (E). The display will blink and after several seconds the value will increase slowly at first and then at a faster rate. Release the button when the desired psi value has been reached. See FIG. 3.



If you go past the desired number keep going to recycle through the numbers.

Differential Pressure Reset Point

The differential pressure reset point is the psi value where the output shuts off. It automatically is set to one number below the psi value for set point one (SP1). To change the reset point to a different value:

- Enter the set up mode by pressing button (F). Set point 1 (SP1) will display. See FIG. 4.
- Press button (F) again to display the reset point (rP1).
- Press and release button (E) to display the current pressure reset point. **The actual psi value is the number displayed times 10.**
- To change the reset point press and hold button (E) until the desired psi number appears.

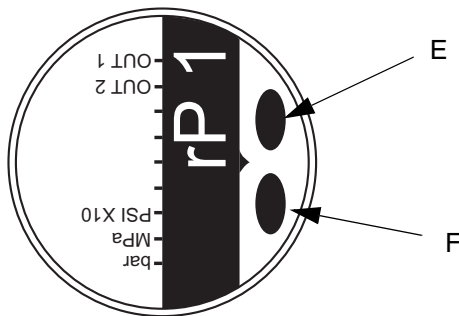


FIG. 4

Filter Change



WARNING



Follow **Manual Pressure Relief Procedure (automatic pressure relief is actuated by the cell controller)** when you stop spraying and before cleaning, checking, servicing, or transporting equipment. Read warnings, page 3.

The filter needs to be cleaned on a regular basis or when it becomes plugged.

- Drain the filter (11) using the drain valve (H). See FIG. 5.
- Remove the filter cover (G) and clean the screen located within.
- Replace the filter, screen, and filter cover (G). Be sure to lubricate threads when assembling.
- Close the drain valve (H).

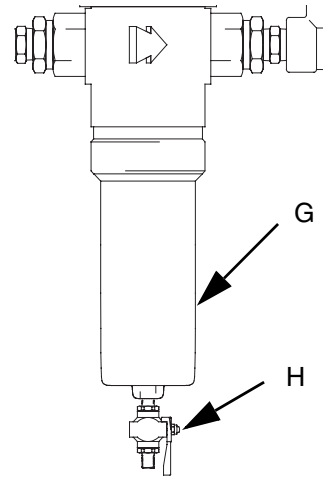


FIG. 5

Optional Pump Control Module Kit Installation

1. Mount the pump control box (18) near the tandem bulk pump unloaders. To function correctly the pump control box must be located within 20 ft of the pump function module (17). See FIG. 1.



The length of the Optional Pump Control Cable (234956) to connect the pump control box and the pump function module is 20 ft.

2. Install the terminal blocks (202) by snapping it into place in the dinrail of the PrecisionFlo control box. See FIG. 6 and FIG. 7.



FIG. 6



FIG. 7

3. Wire the cell communication cable to the terminal block by connecting the four tagged wires (1, 2, 3, and 4). See FIG. 8.

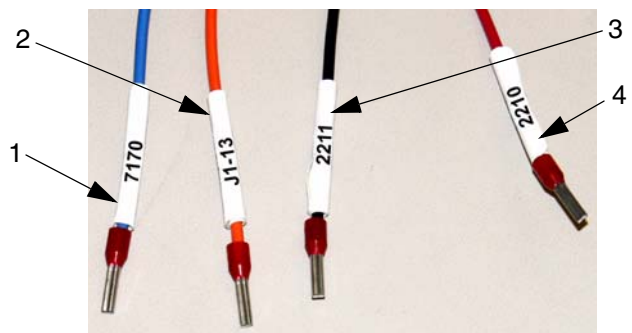
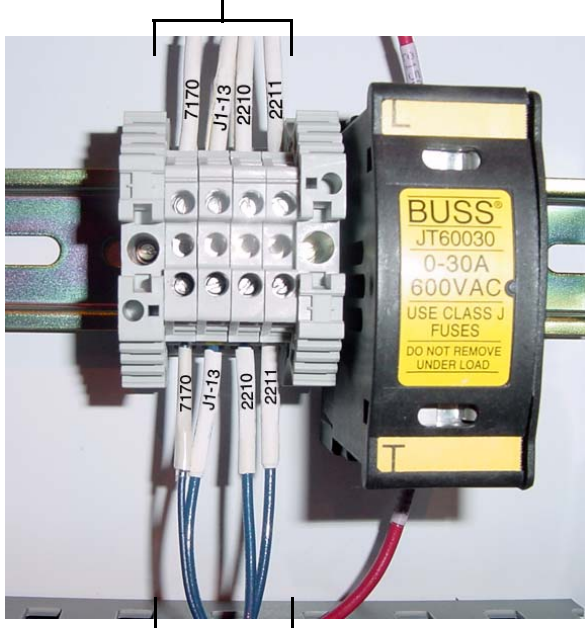


FIG. 8

4. Wire these terminal blocks to the existing Precision-Flo terminal blocks. See FIG. 9.

To PrecisionFlo Wiring Terminals



From Pump Function Control Cable

FIG. 9

5. Connect plug (A) of the pump control cable (234956) to plug (B) on the side of the pump control box (202). See FIG. 10 and FIG. 11.

6. Connect plug (C) of the pump control cable (234956) to the pump function module box. See FIG. 10.

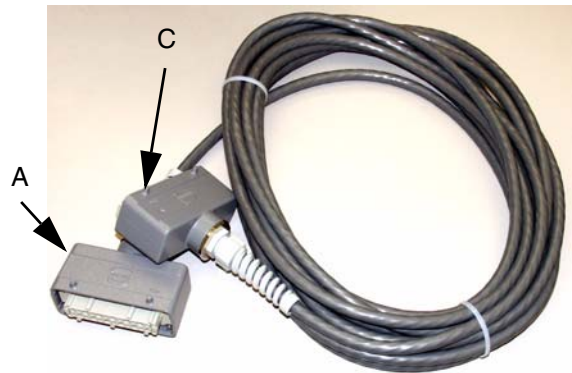


FIG. 10

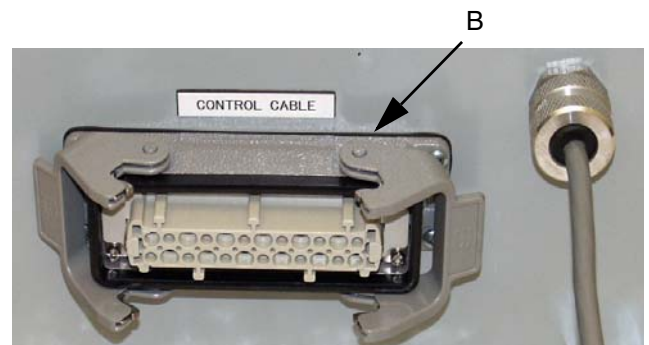


FIG. 11

Optional Pump Control Module Kit Operation

Screen Displays

Four screens are available. They are:

- Pump Status Screen
- Troubleshooting Screen
- Depressurization Screen
- Pump Control Module Screen (main screen)



Press F4 on the control panel to return to the main screen anytime during operation.

F1 Pump Status Screen

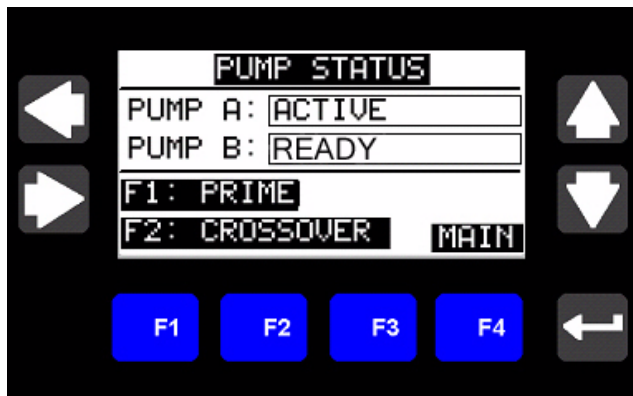


FIG. 12 Pump Status Screen

Pressing the F1 key on the main screen displays the Pump Status Screen. This screen indicates the status of each pump. The screen displays the following possible messages:

- Active
- Empty
- Priming
- Runaway
- Depressurized
- Ready

1. Select Prime when new material is loaded.
2. Select Crossover when necessary to manually switch pumps.

F2 Troubleshooting Screen

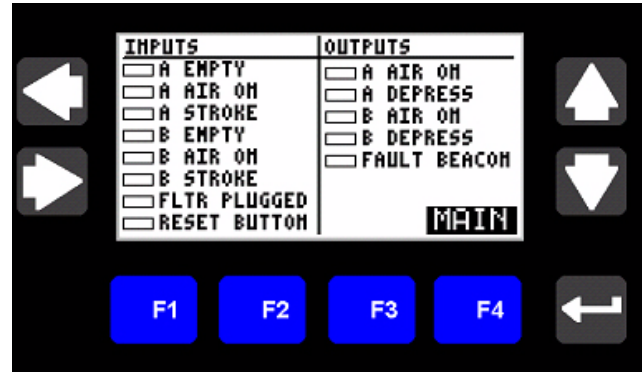


FIG. 13 Troubleshooting Screen

Pressing F2 on the main screen displays the trouble-shooting screen. Any box that is solid black or flashing black indicates a system error that must be corrected before restarting. Any box that is solid black indicates that input or output is out.

F3 Depressurization Screen

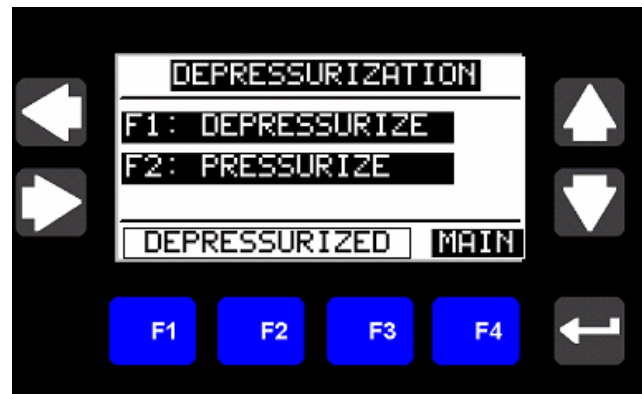


FIG. 14 Depressurization Screen



Pump is normally pressurized.

Pressing F3 on the main screen displays the Depressurization Screen.

F4 Pump Control Module Screen

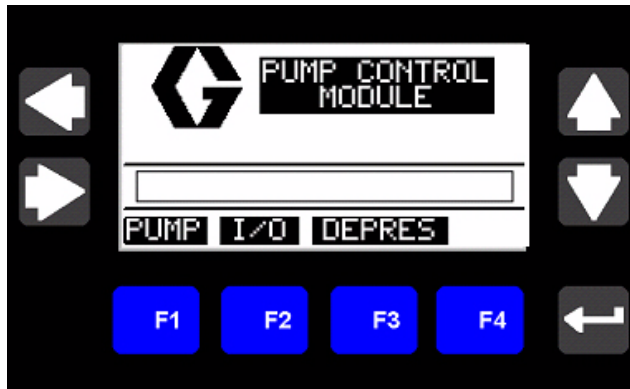


FIG. 15 Pump Control Module Screen

Screen F4 (see FIG. 15) appears when the power is turned on from the PrecisionFlo Control box. This screen displays the status of the system at the time the power was last turned off.

This screen displays the following possible messages:

- Pump A is empty
- Pump A is active
- Pump B is empty
- Pump B is active
- B air is not on
- Filter Plugged
- Pump Runaway
- Both Pumps Empty
- A air is not on
- Depressurized

Fault Beacon

A flashing or solid beacon light indicates a fault that must be corrected.

Major Faults

Solid Red Light
Both pumps empty
Depressurization
Pump runaway

Minor Faults

Flashing Red Light
No air A
No air B
Empty A
Empty B
Plugged filter

Start Up Procedure

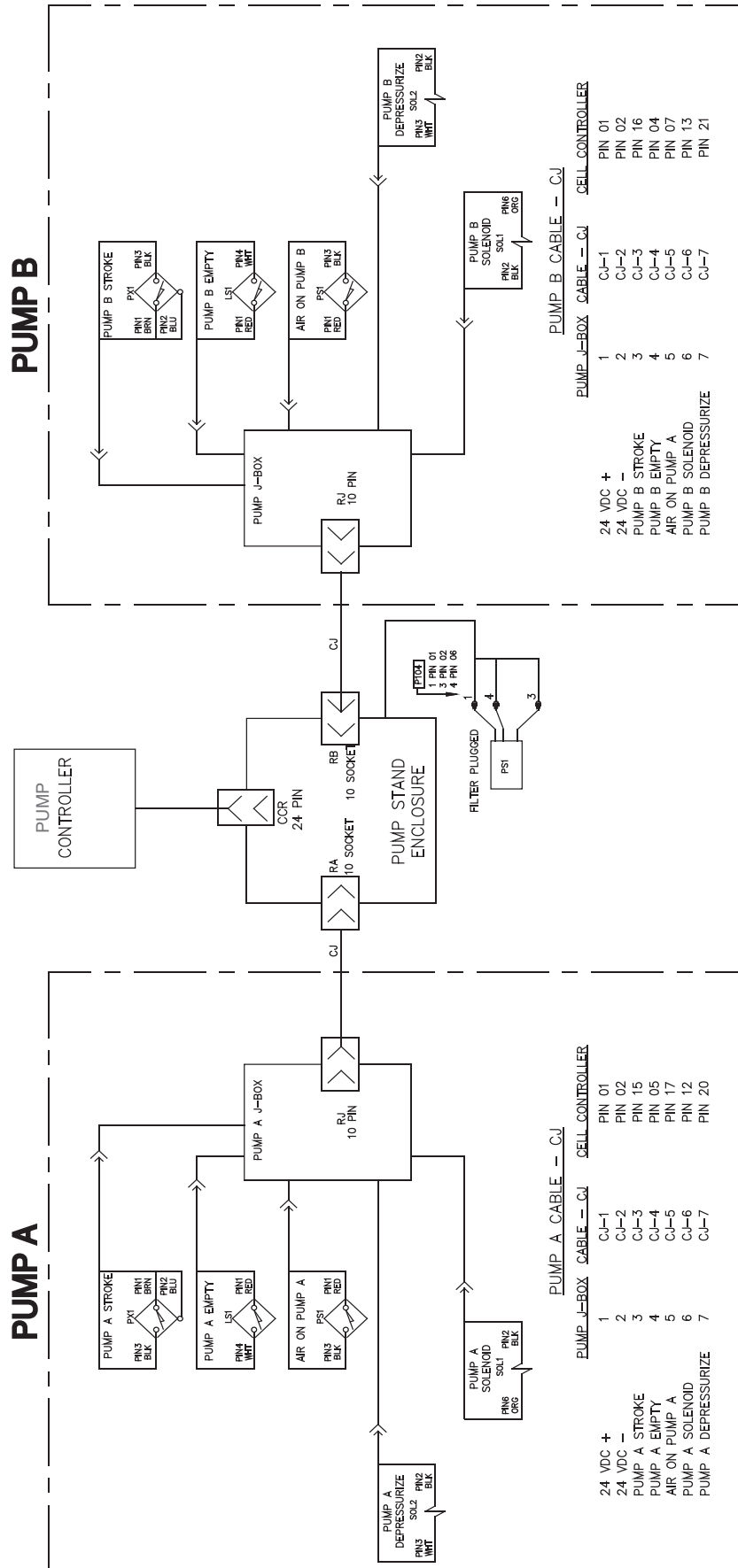
1. Turn the power on to the system.
2. The Pump Control Module Screen displays with the same information that appeared when the system was powered off.
3. Press F3 to navigate to the Depressurization Screen and then press F2 to pressurize the pump.

Shut Down Procedure

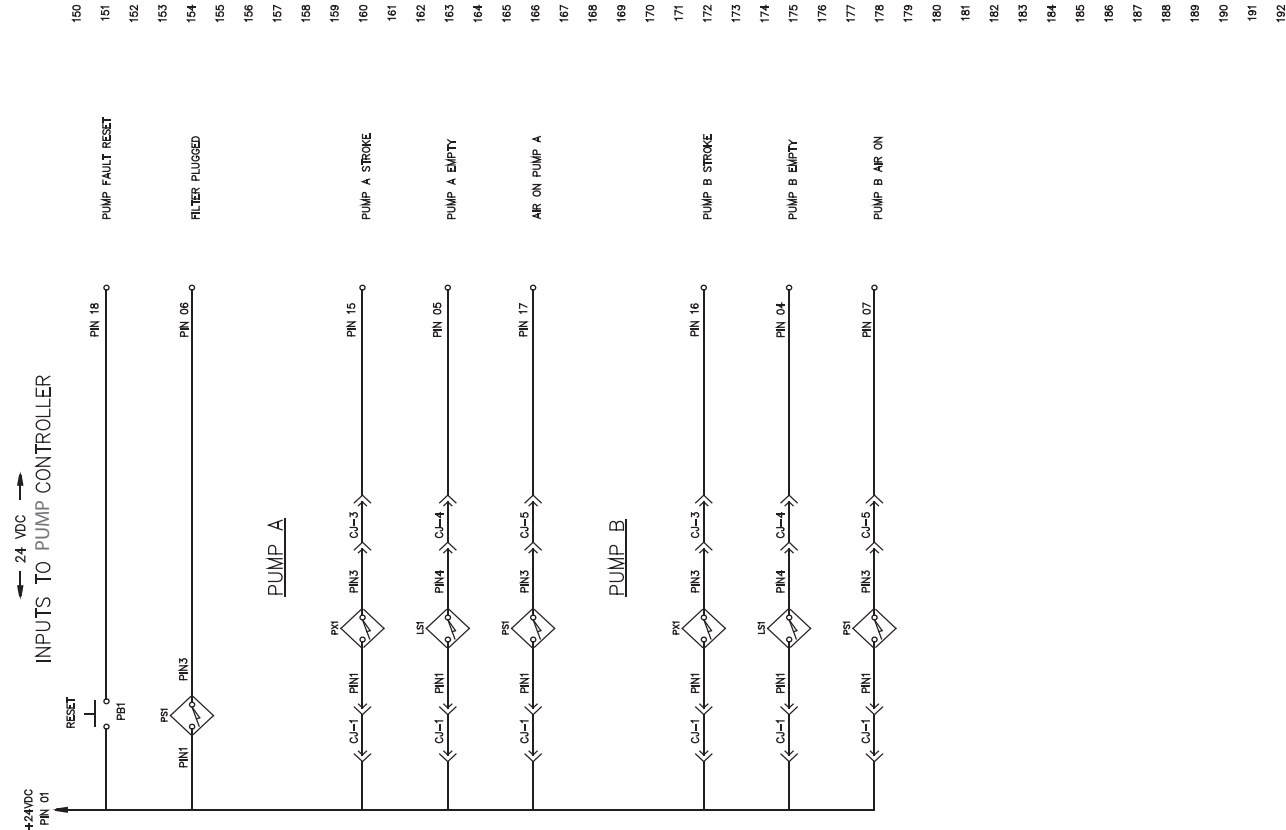
When shutting down the system for an extended period of time both pumps must be depressurized.

1. Press F3 on the main screen to navigate to the Depressurization screen.
2. Press F1 to depressurize the pumps.

Pump Function Module Interconnect Diagram

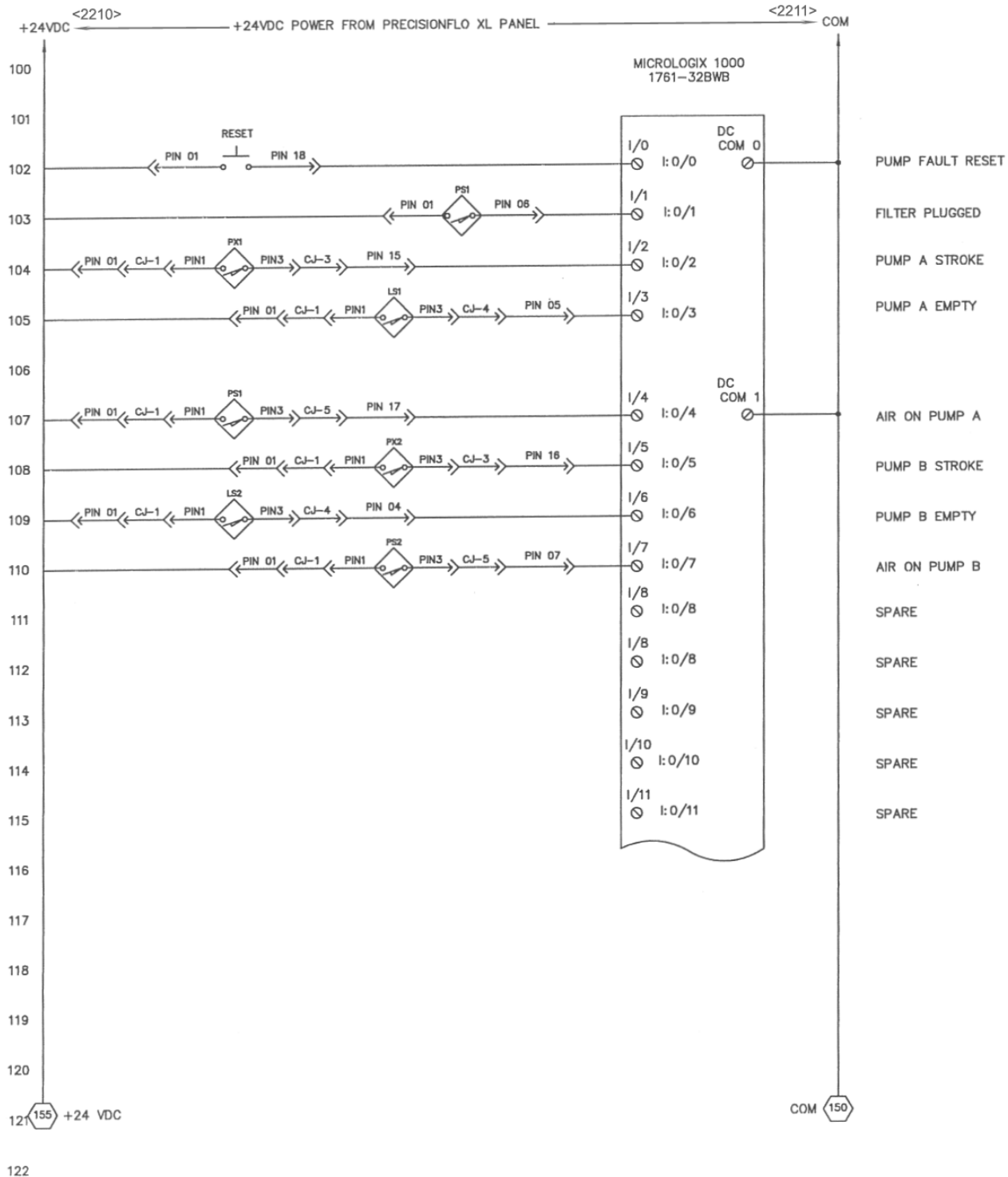


15

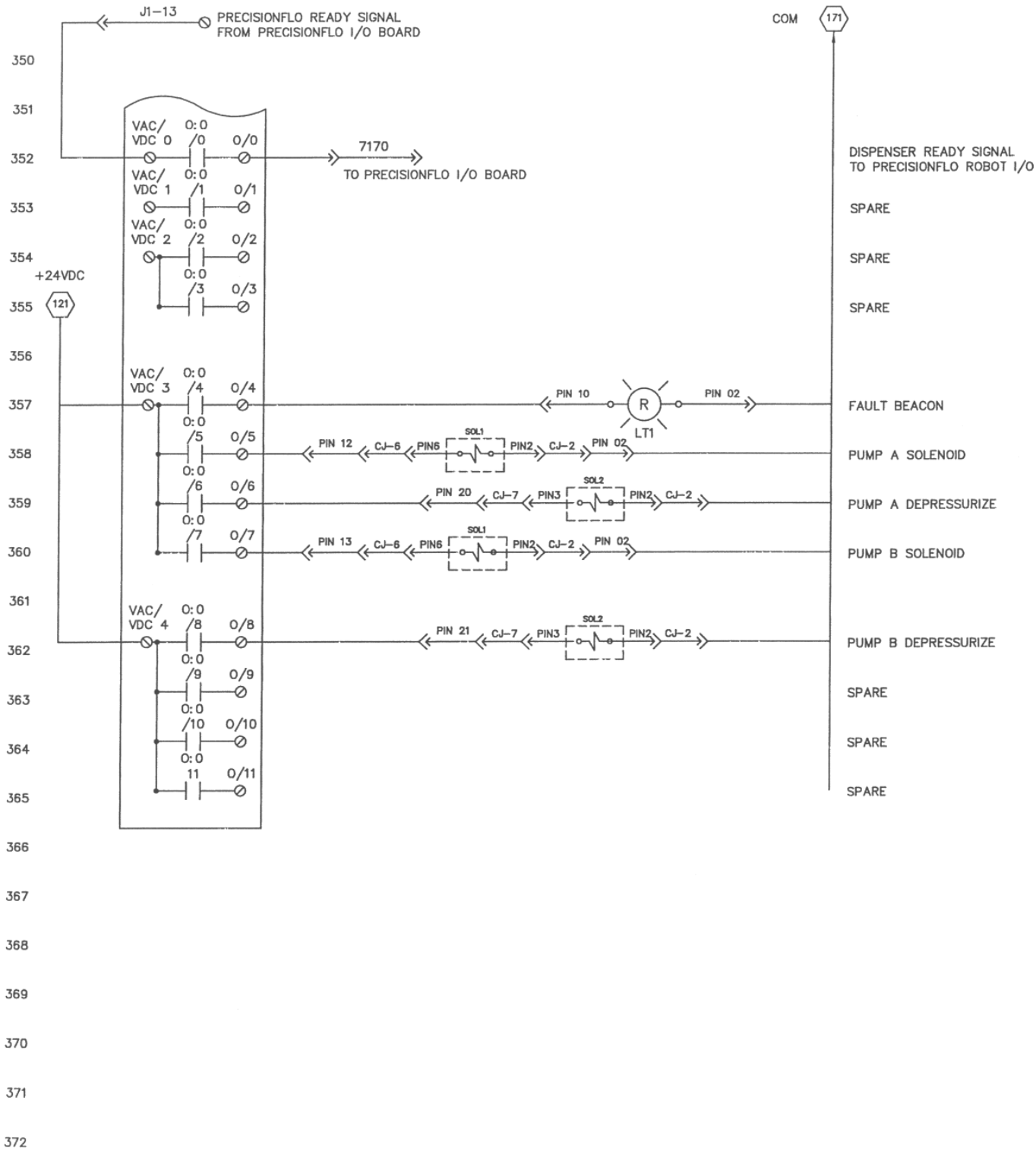


Optional Pump Control Module Kit Electrical Diagram

(continued on page 17)

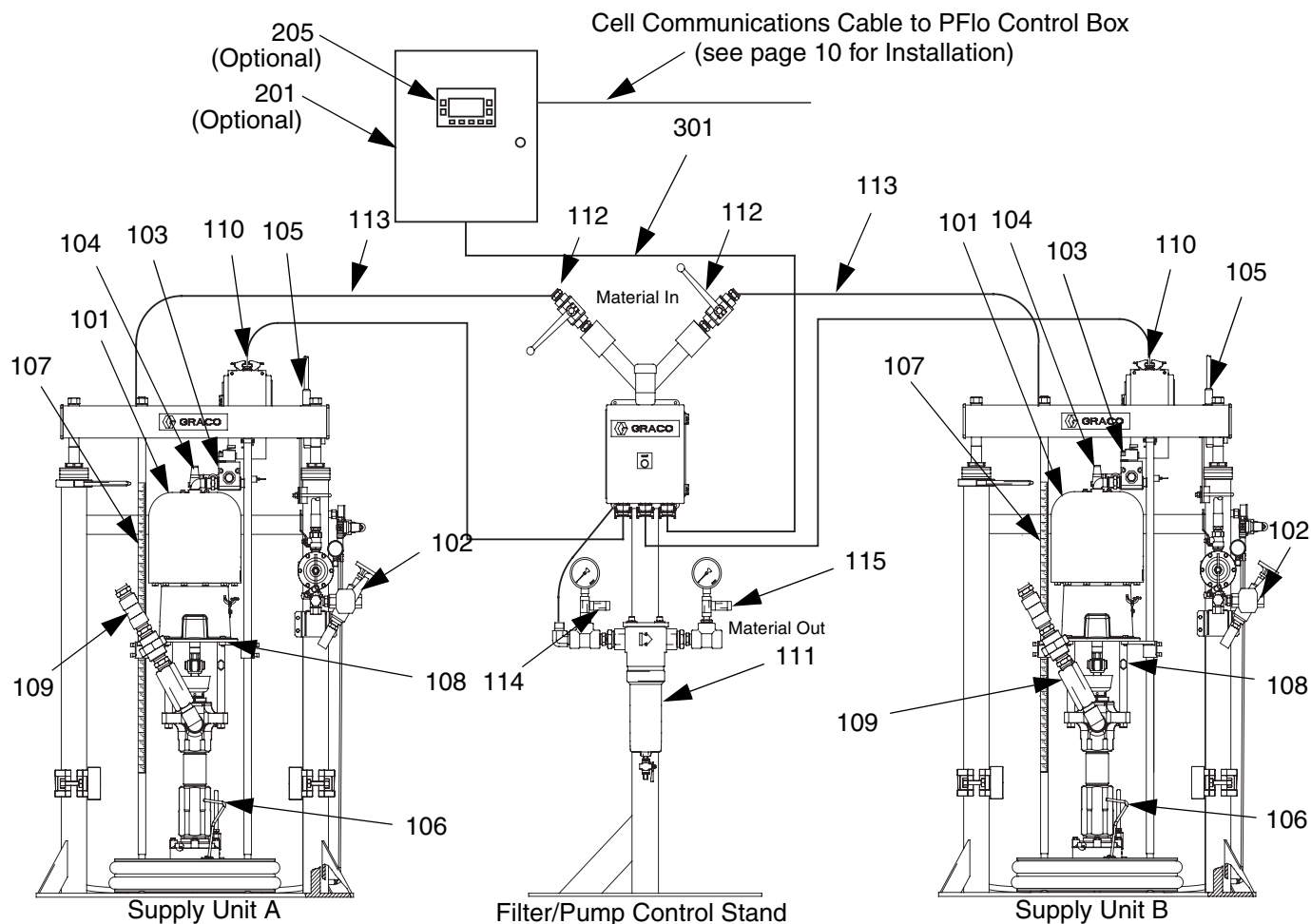


Optional Pump Control Module Kit Electrical Diagram



Parts

Part No. 248785, Pump Function Module System



Part No. 248785, Pump Function Module System

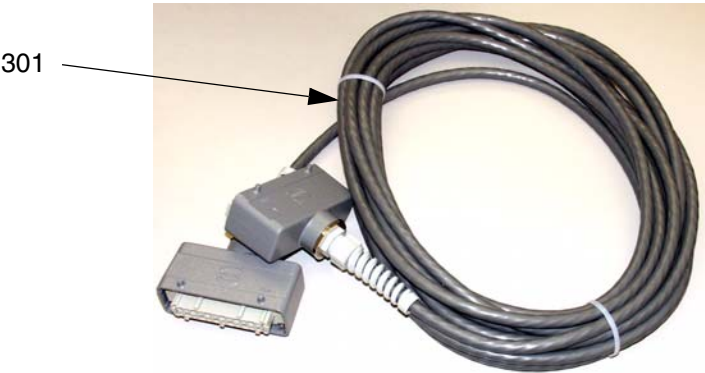
Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
101	C59521	PUMP, ram, 55 gal, 65:1 King assembly	2	110	119497	CABLE, interface 20 ft.	2
102	119504	VALVE, air lockout	2	111	C58997	FILTER, module	1
103	119502	VALVE, solenoid	2	112	521477	VALVE, ball 1 in.	2
104	119503	SWITCH, pressure	2	113	119496	HOSE, 1 in. x 10 ft.	2
105	119499	BRACKET, limit switch assembly	2	114	120084	SENSOR, pressure	1
106	119495	KIT, operations, depressurizing	2	115	120085	TRANSMITTER	1
107	119492	KIT, operations, level	2	Replacement Danger and Warning labels, tags, and cards are available at no cost.			
108	119493	KIT, operations, stroke detect	2				
109	521850	VALVE, check	2				

Part No. 234957, Optional Pump Control Module



Ref. No.	Part No.	Description	Qty.
201		BOX, pump control	1
202		BLOCK, terminal (not shown)	1
203		HARNESS, cable, interface (ns) <ul style="list-style-type: none"> • includes cabling and strain relief necessary to connect to Precision-Flo XL controller, see page 10 for Installation 	1
204	119921	CONTROL, programmable (not shown)	1
205	119922	DISPLAY, panel view	1

Part No. 234956, Optional Pump Control Cable



Ref. No.	Part No.	Description	Qty.
301		• HARNESS, cable, interface	1

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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PARA REMITIR UN PEDIDO O SOLICITAR SERVICIO, póngase en contacto con el distribuidor de Graco.

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MM 310766

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Printed in USA 310766E

10/2005