Instructions - Parts

Gear Meter System

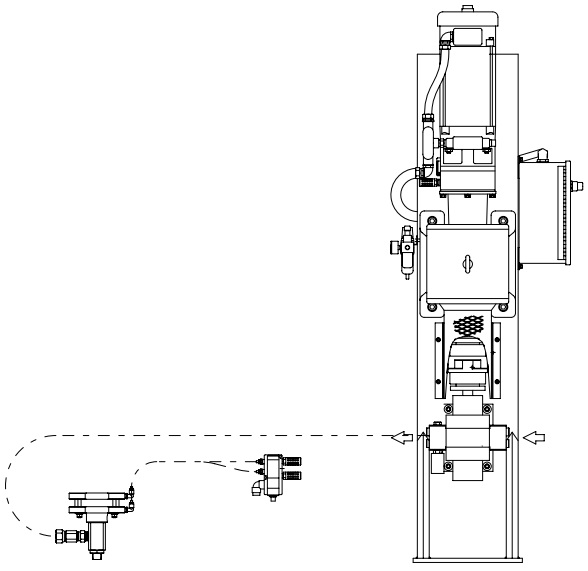
312744B
ENG

For continuous bead dispense control. For professional use only.
Not approved for explosive atmospheres.

970175, Bottom Inlet Gear Meter
970176, Top Inlet Gear Meter
970177, Horizontal Inlet Gear Meter
970194, Heated Hose Horizontal Inlet Gear Meter
918465, 918473, 918477 Gear Pump
617517, Electrical Control

5000 psi (34.47 MPa, 344 bar) Maximum Working Pressure

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



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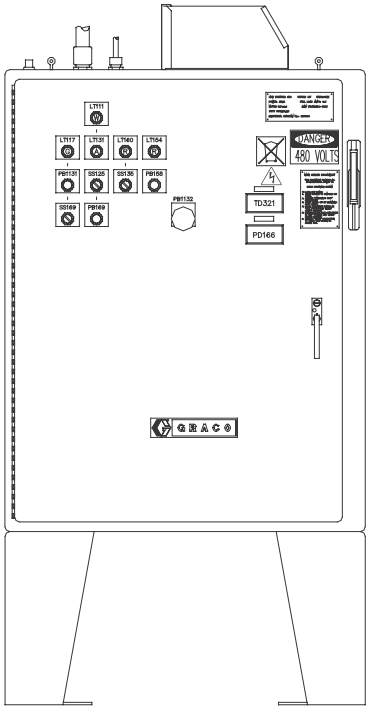

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PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

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 risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

⚠ WARNING

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.

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:

- Use and clean 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 lights on or off when flammable fumes are present.
- Ground equipment, personnel, object being sprayed, and conductive objects in work area. See **Grounding** instructions.
- Use only Graco grounded hoses.
- Check gun resistance daily.
- If there is static sparking or you feel a shock, **stop operation immediately.** Do not use equipment until you identify and correct the problem.
- Do not flush with gun electrostatics on. Do not turn on electrostatics until all solvent is removed from system.
- Keep a working fire extinguisher in the work area.

⚠ WARNING

SKIN INJECTION HAZARD

High-pressure fluid from dispense valve, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not point dispense valve at anyone or at any part of the body.
- Do not put your hand over the end of the dispense nozzle.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow **Pressure Relief Procedure** in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.

PRESSURIZED EQUIPMENT HAZARD

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

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

MOVING PARTS HAZARD

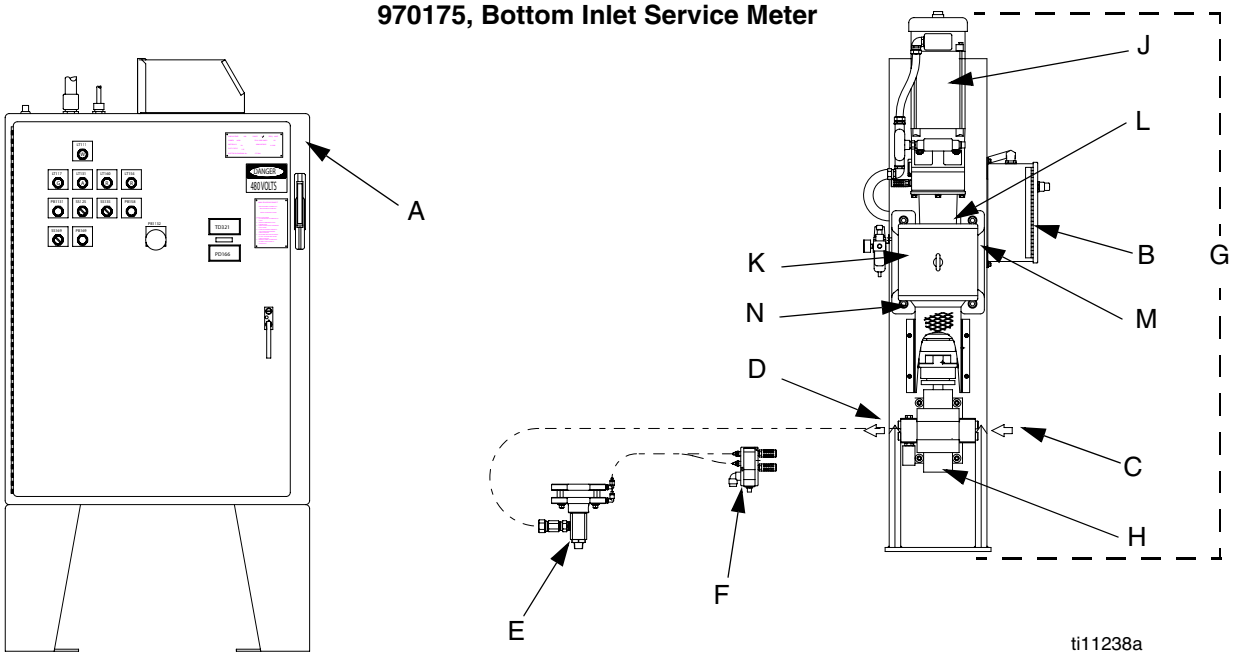
Moving parts can pinch or amputate fingers and other body parts.

- 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.

Component Identification

Gear Meter System

970175, Bottom Inlet Service Meter



970177, Horizontal Inlet Service Meter

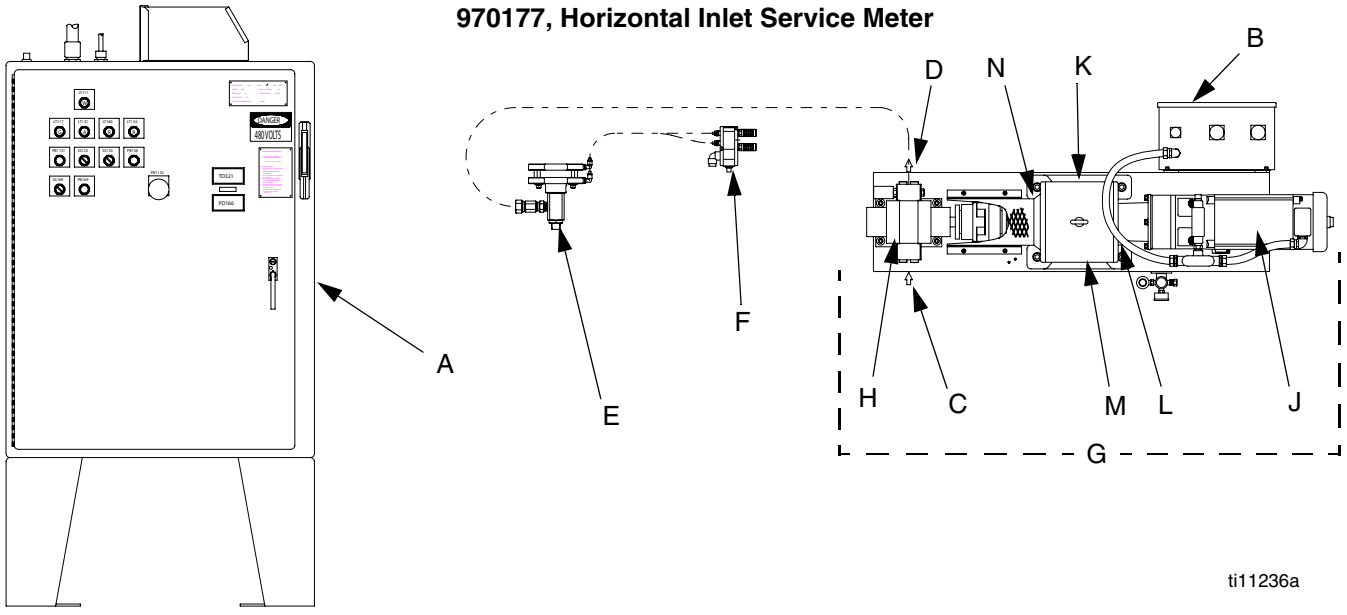


FIG. 1

A	Gear Meter Control Panel	H	Gear Pump
B	Gear Meter Junction Box	J	Electric Motor
C	Material Inlet	K	Gear Reducer
D	Material Outlet	L	Breather
E	Applicator	M	Fill Port
F	Air Valve	N	Drain Port
G	Gear Meter		

Electrical Control Unit

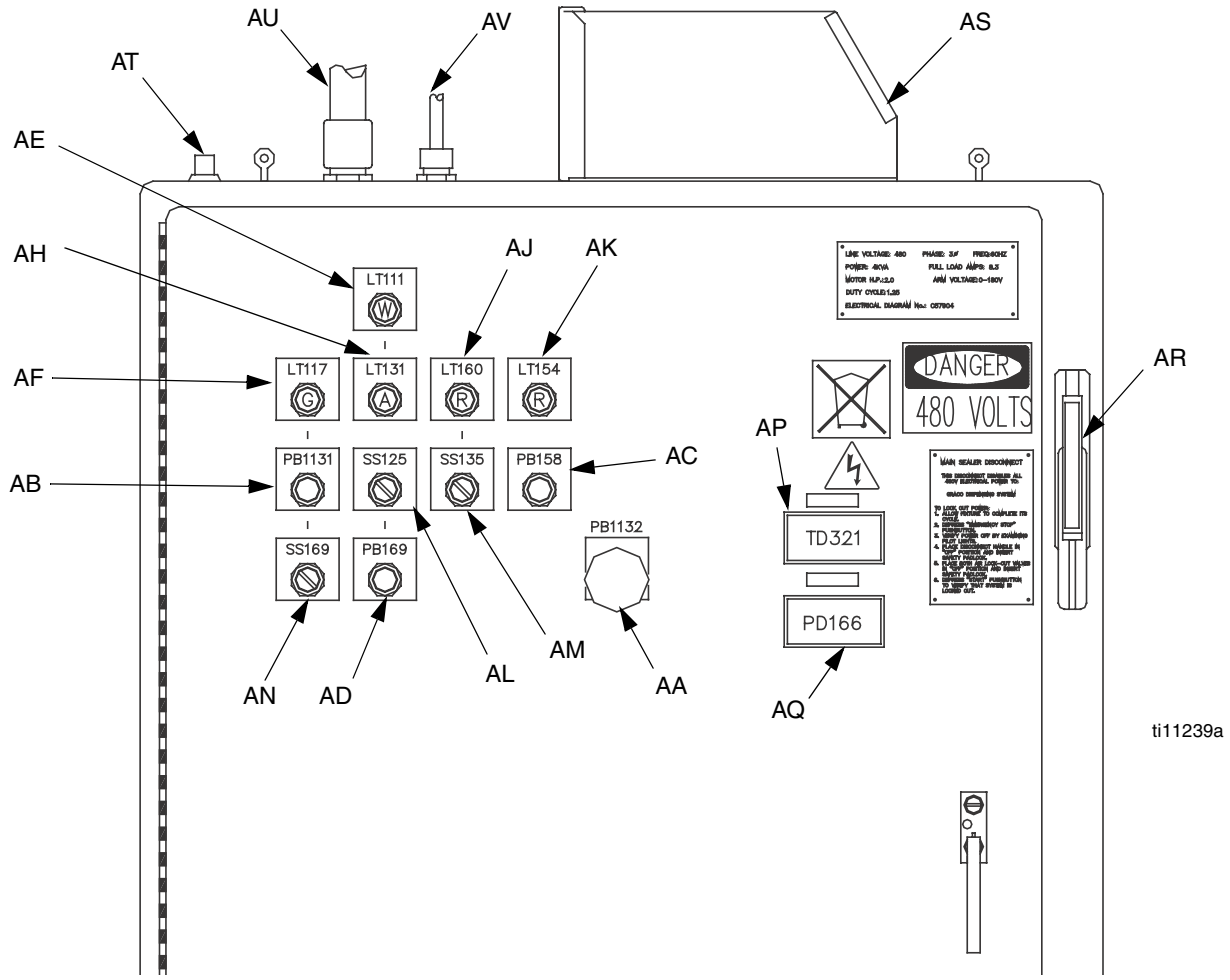


FIG. 2

AA Emergency Stop Button
AB Start Button
AC Fault Reset Button
AD Manual Mode Dispense Button
AE Power Indicator Light
AF Control Active Light
AH Motor Active Light
AJ Over Pressure Fault Light
AK Material Outlet Pressure Below Minimum Light
AL Motor On/Off Switch
AM Speed Signal Input (POT / ANALOG) Switch
AN Dispense (MANUAL / ROBOT)
AP Tachometer Display
AQ Pressure Display
AR Main Sealer Disconnect Lever
AS Transformer
AT R53 - Analog Robot Interface Connector
AU P50 - Meter Interface Cable
AV P176 - Transducer Cable

Gear Meter Junction Box

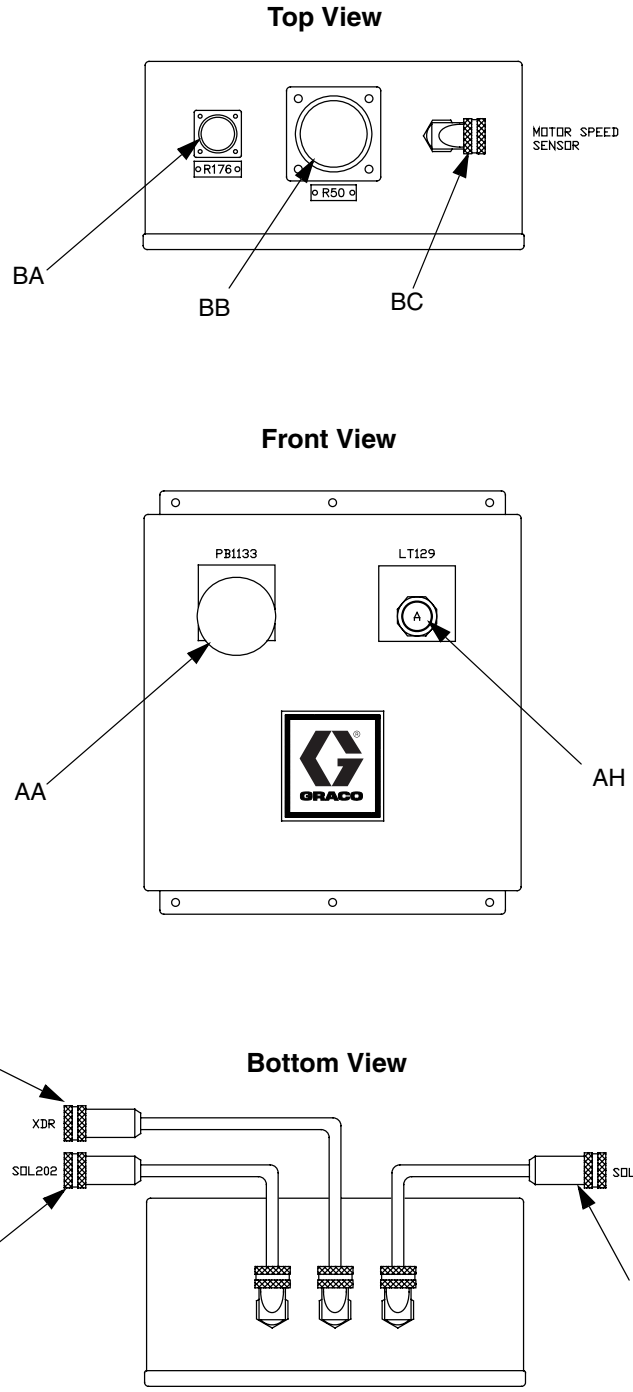


FIG. 3

Key:

BA R176 Connector
BB R50 Connector
BC Motor Speed Sensor Connector
BD XDR Cable
BE SOL 206 Cable
BF SOL 202 Cable

Buttons

PB1132 and PB1133 - Emergency Stop Buttons (AA): Engage either of these buttons to stop system operation. PB1132 is located on the Gear Meter Control Panel, while PB1133 is located on the Gear Meter Junction Box.

PB1131 - Start Button (AB): Engage button to put the system into an “ON” state when both emergency stop buttons (PB1132 & PB1133) are disengaged and the Main Sealer Disconnect Lever is on. The green Control Active Indicator light LT117 (AF) will illuminate.

PB158 - Fault Reset Button (AC): Engage button when the system has faulted due to an overpressure condition. The system will resume normal operation as long as the pressure has gone back down to an acceptable level. See **Dispense** on page 17 for more information.

PB169 - Manual Mode Dispense Button (AD): Engage button to open the dispense gun when selector switch SS169 is set to “MANUAL”.

Lights

LT111 - Power Indicator Light (AE): This white indicator light is illuminated when there is power to the system and the Main Sealer Disconnect Lever (AR) is on. The states of the emergency stop buttons (PB1132 and PB1133) do not affect this light.

LT117 - Control Active (AF): This green indicator light illuminates after the Start Button (PB1131) has successfully put the system into the “on” state and remains lit until either of the emergency stop buttons (PB1132 and PB1133) have been pressed or the Main Sealer Disconnect Lever (AR) has been turned off.

LT131 AND LT129 - Motor Active (AH): These amber indicator lights illuminate when the motor is on (SS125 is set to “On”). LT131 is located on the Gear Meter Control Panel, while LT129 is located on the Gear Meter Junction Box.

LT160 - Over Pressure Fault (AJ): This red indicator light is illuminated when the outlet pressure transducer detects that the pressure is above a maximum limit. When this condition occurs the motor disconnects from the gear pump via a clutch. To program the over pressure set point see **Set Pressure Display** on page 15.

LT154 - Material Outlet Pressure Below Minimum (AK): This red indicator light is illuminated when the pressure transducer detects that the pressure is below a set point. To program the minimum pressure set point see **Set Pressure Display** on page 15.

Switches

SS125 - Motor ON/OFF (AL): In the “off” state, the motor and the supply pump will be off. In the “on” state, the motor will turn on. The system will not dispense, however, until a dispense signal is present and the pressure is within an acceptable range.

SS135 - Speed Signal Input (POT / ANALOG) (AM): This selector switch determines how the motor speed is set.

- “POT” Mode: the motor speed is determined by the settings on the potentiometers POT 1 – POT4.
- “ANALOG” Mode: the voltage present on wires 3131 and 3105 (pins A and B of connector R53) determines the motor speed.

See **Potentiometer Settings** on page 16 for descriptions of each potentiometer.

SS169 - Dispense (MANUAL / ROBOT) (AN): This selector switch determines how the dispense signal is issued to the system.

- “MANUAL: the dispense push button (PB169) controls the dispense signal.
- “ROBOT”: the robot dispense signal on wires 1711 and 1083 (pins A and B of connector R52) control the dispense state.
- The output control signals “Sealer in Cycle”, “Sealer Ready”, and “Sealer Maintenance Required” are only valid when SS169 is set to “ROBOT”.

Displays

TD321 - Tachometer Display (AP): This digital display shows the current speed (RPM) of the gear motor.

PD166 - Pressure Display (AQ): This digital display shows the current output pressure as measured by the pressure sensor near the material outlet port. This module controls the system’s minimum and maximum pressure limits. To program see **Set Pressure Display** on page 15.

Communications Diagram

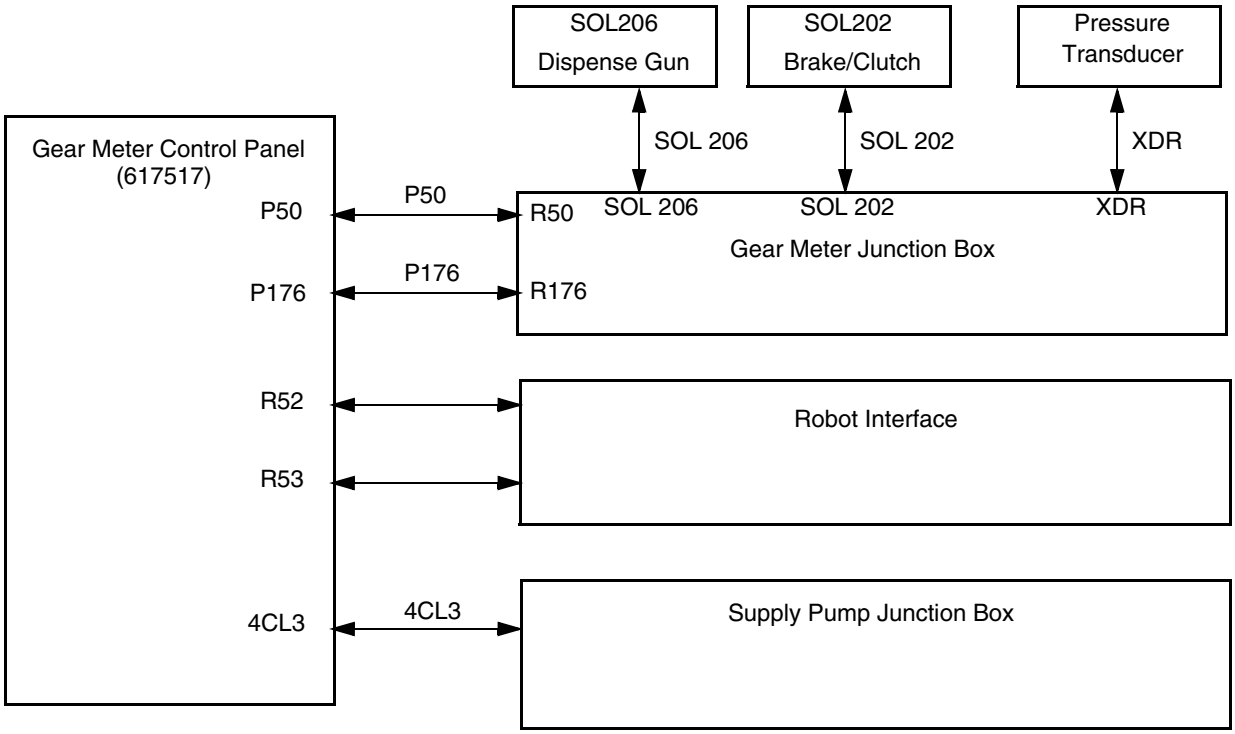


FIG. 4

Cables

R52 – Discrete Robot Interface Connector

This connector provides a means to connect a cable between the Gear Meter Control Panel and a robot controller that carries discrete signals. This cable carries the following signals:

- Robot Dispense Signal
- Sealer Ready
- Sealer in Cycle
- Sealer Maintenance Required
- Select Speed 2
- Select Speed 3
- Select Speed 4
- Power

R53 – Analog Robot Interface Connector

This connector provides a means to connect a cable between the Gear Meter Control Panel and a robot controller that carries an analog speed signal.

P50 – Meter Interface Cable

This cable runs between the Gear Meter Control Panel and the Gear Meter Junction Box.

P176 – Transducer Cable

This cable runs between Gear Meter Control Panel and Gear Meter Junction Box.

4CL3 – Supply Pumps Interface Cable

This cable runs between the Main Electrical Control Panel and the Supply Pump Junction Box.

SOL 206– Solenoid Cable

This cable runs between the Gear Meter Junction Box and the Dispense Gun (SOL206).

SOL 202– Solenoid Cable

This cable runs between the Gear Meter Junction Box and the Brake/Clutch (SOL202).

XDR – Transducer Cable

This cable runs between the Gear Meter Junction Box and the Pressure Transducer.

Setup

Supply hoses are not included with the Gear Meter. We recommend 1-1.5 in. ID hose with nylon or PTFE core and SST overbraid for 5000 psi (34.47 MPa, 344 bar).

High pressure fluid filters should be used between the supply unit and the gear meter inlet. See **Fluid Filters** on page 44.

Connections

Power

The system requires 480 VAC, 3-phase, 60 Hz line voltage with ground. The system is not approved for use with 50 Hz line voltage. All electrical wiring must be performed by a qualified electrician and comply with all local codes and regulations.

1. Wire each phase to a separate terminal on Main Sealer Disconnect DISC100 (AR).
2. You must connect ground to the Gear Meter Control Panel (A). The ground wire must be connected to the ground bar above DISC100.

System Cables

1. Connect P50 cable from the Gear Meter Control Panel (A) to the Gear Meter Junction Box (B). Cable P50 provides ground to the gear meter. See page 41 for a detailed pin out.

Use only cables supplied by Graco or cables that meet the requirements shown in the wiring schematic on page 41.

2. Verify that there is a good connection between the ground in the Gear Meter Junction Box (B) and the ground of the Gear Meter Control Panel (A).
3. Connect cable P176 from the Gear Meter Control Panel (A) to the Gear Meter Junction Box (B).
4. Connect cable 4CL3 from the Gear Meter Control Panel (A) to the Supply Pump Junction Box.

Robot Connections

Two connectors are available for external robot controller I/O signals. The R52 connector is available for discrete communication signals, while the R53 connector is available for an analog speed input. See **R53 Connector** on page 14.

R52 Connector

The input and output signals on R52 use a 120 VAC interface. Three types of signals are available from this connector:

Output – Output signals are driven by the Gear Meter Control Panel and provide feedback to the robot controller. An output signal is a 120 VAC signal as referenced between the wire corresponding to the desired output and wire 1083.

Input – Input signals originate from an external robot controller and can command the Gear Meter to dispense or change speeds. Input signals must be of the dry-contact type between wire 1711 and the wire corresponding to the desired input.

Power – 120 VAC power signals are provided on R52.

Table 1: R52 Signals on page 11 identifies available R52 signals and provides a brief description of each signal. The Pin ID correlates to that shown in FIG. 5 on page 13.

Table 1: R52 Signals

Pin ID	Wire ID	Color	Pin Type	Usage: Description
A	1711	Red	Power	**Power for Sealant Interface:** Power is connected to this wire when the Dispense Mode Switch SS169 (AN) is set to robot mode.
B	1083	White	Power	**Power for Sealant Interface (Common):** This wire is not affected by the state of the Dispense Mode Switch SS169 (AN). This common power line is also connected to ground**.**
C	GND	Green	Power	**Ground**
D	R52-D	Red	-	-
E	R52-E	Red	-	-
F	1832	Red	Output	**Sealer in Cycle:** An active signal is put on this wire when all of the following conditions are true: • The Dispense Mode Switch SS169 (AN) is set to “Robot”. • The Motor Selector Switch SS125 (AL) is set to “On”. • Outlet pressure is above the minimum pressure set point. • Outlet pressure is not above the maximum pressure. • The Robot Dispense Signal is active on R52-Y.
G	R52-G	Red	-	-
H	R52-H	Red	-	-
J	R52-J	Red	-	-
K	2261	Red	Input	**Engage POT #2* (Select Speed #2):** This signal is activated by closing a dry contact between wire 1711 and wire 2261 at the robot controller. An active signal on this wire will set the speed of the motor according to the mechanical setting of POT2.
L	2281	Red	Input	**Engage POT #3* (Select Speed #3):** This signal is activated by closing a dry contact between wire 1711 and wire 2281 at the robot controller. An active signal on this wire will set the speed of the motor according to the mechanical setting of POT3.
M	2301	Red	Input	**Engage POT #4* (Select Speed #4):** This signal is activated by closing a dry contact between wire 1711 and wire 2301 at the robot controller. An active signal on this wire will set the speed of the motor according to the mechanical setting of POT4.
N	R52-N	Red	-	-

Pin ID	Wire ID	Color	Pin Type	Usage: Description
P	R52-P	Red	-	-
Q	R52-Q	Red	-	-
R	R52-R	Red	-	-
S	R52-S	Red	-	-
T	1831	Red	Output	**Sealer Maintenance Required:** An active signal is put on this wire when the Dispense Mode Switch SS169 (AN) is set to “ROBOT” and one or more of the following conditions is true: • The Motor Selector Switch SS125 (AL) is set to “Off”. • Outlet pressure is not above the minimum pressure of set point. • Outlet pressure is above the maximum pressure.
U	1831	Red	Output	**Sealer Ready:** An active signal is put on this wire when all of the following conditions are true: • The Dispense Mode Switch SS169 (AN) is set to “ROBOT”. • The Motor Selector Switch SS125 (AL) is set to “On” • Outlet pressure is above the minimum pressure set point. • Outlet pressure is not above the maximum pressure.
V	R52-V	Red	-	-
W	R52-W	Red	-	-
X	R52-X	Red	-	-
Y	1712	Red	Input	**Robot Dispense Signal:** This signal is activated by closing a dry contact between wire 1711 and wire 1712 at the robot controller. Asserting a signal on this line will do the following: • Open dispense gun. • If the Motor Selector Switch SS125 (AL) is set to “on”, the supply pumps on will be activated. • If the motor is on and the supply pressure is below the maximum limit, the brake will be disengaged and the clutch will be engaged.
Z	R52-Z	Red	-	-
a	R52-a	Red	-	-

Pin ID	Wire ID	Color	Pin Type	Usage: Description
b	R52-b	Red	-	-
c	R52-c	Red	-	-
d	R52-d	Red	-	-
e	R52-e	Red	-	-
f	R52-f	Red	-	-
g	R52-g	Red	-	-

By default, POT 1 is engaged only if POT 2, POT 3, and POT 4 are disengaged.

FIG. 5 depicts the pin-out of the R52 receptacle (Amphenol SINE type A431-2P04-E5).

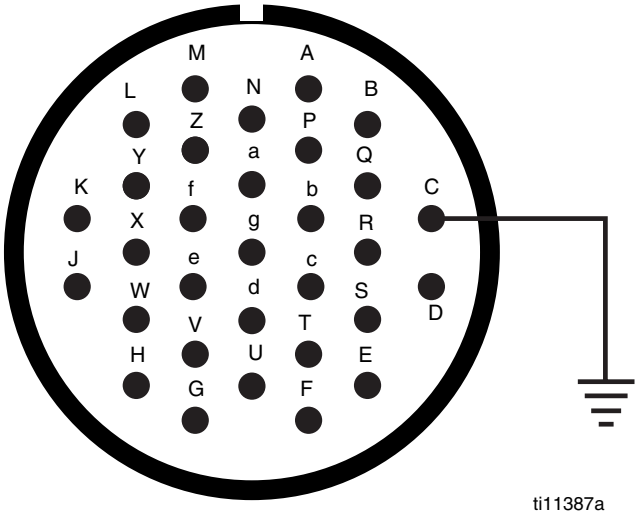


FIG. 5: R52 Pin-Out Receptacle

R53 Connector

The R53 connector is available as an analog speed input from a robot controller. An acceptable signal from a robot controller is a 0 – 10 VDC signal.

Table 2: R53 Signals identifies the available R53 signals and provides a brief description of each signal. The Pin ID correlates to the pins identified in FIG. 6.

Table 2: R53 Signals

Pin ID	Wire ID	Color	Usage: Description
A	3131	Blue	**Analog Speed Command Input 0 - 10 VDC From Robot (+):** Connect to the (+) wire of a 0-10 VDC analog controller. The speed of the motor directly correlates to this voltage, where 0 volts commands the slowest possible speed and 10 volts commands the fastest possible speed.
B	3105	Blue	**Analog Speed Command Input 0 - 10 VDC From Robot (-):** Connected to the (-) wire of a 0-10 VDC analog controller.
C	Do Not Wire	-	**Do Not Connect**
D	GND	Green	Ground
E	Do Not Wire	-	**Do Not Connect**

FIG. 6 depicts the pin-out of the R53 receptacle (Amphenol type 97-3102A-14S-5P).

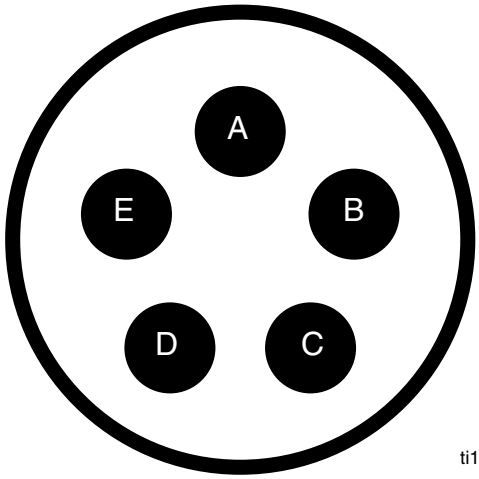


FIG. 6: R53 Pin-Out Receptacle

Set Pressure Display

Pressure Display PD166 (AQ) shows the outlet pressure. The pressure display is factory programmed with default over pressure and minimum outlet pressure values.

1. Press the “Down” arrow key on PD166 (AQ) and verify that the display is set to “Input” and not “Totalized.” This will display the outlet pressure value, not a totalized sum.

The optimum values vary from system to system based on variables such as hose length and material viscosity. The best settings for a particular application may be found empirically.

Graco Set Values

Programming of the pressure display is divided into modular steps. Use the up and down arrows beneath the display to navigate the set-up menu and change the function values. The “P” button is used to select a programming module or function and to save the function values.

1. Press “P” to enter programming mode. The message “Pro”, followed by a number, should appear. The number identified is the selected Program Module.

2. Press the “Up” or “Down” arrow keys to scroll the functions in the current program module.

3. Press “P” to select the highlighted function. Use the “Up” or “Down” arrows to change the value.

4. Press “P” to save the function value.

The following tables show the functions and Graco set values used. Program Modules 1, 4, 5, 7, 8, 9 are not used. See the **Red Lion Controls Model IMP Instruction Manual** (not provided by Graco) for all of the default programming values and description of all the Program Modules.

The over pressure set point is controlled by Alarm 2 (AL-2) and has a factory default setting of 5000 psi (34.47 MPa, 344 bar).

The under pressure set point is controlled by Alarm 1 (AL-1) and has a factory default setting of 1000 psi (6.89 MPa, 68.94 bar).

Program Module #2 Scaled by Signal Method	
Function	**Value**
dECPNt	0
round	1
SCALE	yes
dSP 1	0
INP 1	4.00
dSP	1000
INP 2	7.19

Program Module #3 Front Panel Lockout	
Function	**Value**
dSP AL	yes
Ent AL	yes
dSPHYS	yes
ENthYS	yes
rSt AL	yes
dSPbUF	no
rStbUF	no
SELdSP	no
RSttOt	no
tArE	no

Program Module #6 Alarms	
Function	**Value**
trAC	no
dISP	no
LAtC-1	no
ASN-1	input
AL-1	1000
HyS-1	1
Act-1	hi
LAtC-2	no
ASN-2	input
AL-2	5000
HyS-2	1
Act-2	hi

Potentiometer Settings

The Speed Signal Input Selector Switch SS135 (AM) determines how the gear motor speed is set. SS135 can be set to “POT” or “ANALOG.”

“POT” - The speed is based on the physical settings of one of the potentiometers.

Each potentiometer, POT 1 – POT 4, can scale the motor speed between the minimum and maximum motor speed. Therefore, each potentiometer can be set to a unique “speed” and can be called upon by activating the corresponding pin on connector R52. Only one signal (pin K, L, or M of connector R52) should be activated at a time.

“ANALOG” - The speed of the gear motor is determined by the analog voltage signal that is supplied by the robot controller and the setting on the “ANALOG SPAN” potentiometer.

POT 1

The POT 1 potentiometer can be used to set the speed of the Gear Meter motor while in “MANUAL” or “ROBOT” dispense mode. This is the only potentiometer that can control the gear meter speed when the Dispense Mode Switch SS169 (AN) is set to “MANUAL”.

When Dispense Mode Switch SS169 (AN) is set to “ROBOT”, POT 1 is the default potentiometer if no other active signals are detected on pins K-M of connector R52.

POT 2 - 4

In addition to POT 1, potentiometers POT 2 – POT4 can be used to set the speed of the Gear Meter motor when a robot controller is connected. Each potentiometer represents a speed setting that can be saved and called upon by the robot controller. These settings can only be accessed via an external signal from a robot controller on pins K-M of connector R52.

ANALOG SPAN

This potentiometer can be used to scale the analog input voltage from the robot controller. This potentiometer should be set to 500 when programming the robot.

Adjust Gear Motor Speed

1. Turn Main Sealer Disconnect Lever (AR) off.
2. Open the Gear Meter Control Panel (A) door and locate the potentiometers. See **Part No. 617517, Electrical Control** on page 35.
3. Slide the lever beneath the potentiometer to the left and adjust the value.
4. Turn each potentiometer knob to increase or decrease the motor speed.
5. Slide the lever to the right to lock the potentiometer.

Calibrate Flowrate

1. See **Startup** on page 17.
2. Chart the flowrate for each analog VDC set point and determine the desired flowrate.
3. VDC setpoints need to be programmed into the robot if dispensing in “ROBOT” mode.

Pressure Relief

1. Turn off air supply to supply unit.
2. Turn off gear pump at gear meter control panel (A) using Motor On/Off switch SS125 (AL).
3. Set Dispense Mode Switch SS169 (AN) to “MANUAL” and push Manual Mode Dispense Button PB169 (AD).

Flushing

Refer to material manufacturer for recommended flushing compound.

CAUTION
Urethane material should not be exposed to atmosphere. Use grease or petroleum jelly to seal off urethane material in components from atmosphere.

Operation

Startup

1. Turn Main Sealer Disconnect Lever (AR) on. The Power Indicator Light LT111 (AE) should illuminate, indicating that power is on and that ground is connected.

2. Depress Start button PB1131 (AB). The Control Active Light LT117 (AF) should illuminate.

3. Turn Motor Selector Switch SS125 (AL) on. The Motor Active Lights LT129 and LT131 (AH) should illuminate.

4. Set the Dispense Mode Switch SS169 (AN) to “MANUAL” or “ROBOT” dispense mode.

5. Select speed with the Speed Signal Input Selector Switch SS135 (AM).

   a. *POT Mode*: See **Potentiometer Settings** on page 16.

   b. *Analog Mode*: the motor speed is controlled by a 0-10 VDC signal applied to wires 3131 (+) and 3105 (common). It is suggested that ANALOG SPAN potentiometer be set to 500 to allow easier adjustment when reprogramming the robot output speed signal.

Dispense

Once the system has been setup, the system is ready to dispense.

Pump activation is controlled by a pushbutton or a robotic dispense signal. The supply pump is only activated when dispensing occurs in order to prevent large pressure increases downstream of the gear meter. This helps prevent stall pressure build up in the gear meter that can result in downstream pressure creep depending on the material viscosity.

MANUAL Dispense Mode

1. Set SS169 (AN) to “MANUAL.”

2. Depress Manual Mode Dispense Button PB169 (AD) to dispense material. This button must be held down to maintain a flow of material.

ROBOT Dispense Mode

1. Set Dispense Mode Switch SS169 (AN) to “ROBOT.”

2. Close dry contacts in the robot control panel between wires 1711 and 1712 to dispense.

- The sealer ready signal (wire 1813) will be on if the following conditions are present:
  - Motor is on.
  - Pressure is greater than the allowable minimum
  - Pressure is less than the allowable maximum.

- The sealer in cycle signal (wire 1832) will be on if the following conditions are present:
  - Sealer ready is true.
  - Robotic dispense signal is present.

- The sealer maintenance required signal will be on if the following conditions are present:
  - Motor is not on.
  - Material pressure is below minimum.
  - Material pressure is above maximum.

Overpressure Fault

The Overpressure Fault Light LT160 (AJ) illuminates when the pressure transducer detects that the pressure is above a maximum limit. An overpressure condition will turn the supply pumps off.

1. Open the dispense gun and disengage the drive system.

2. Depress the Fault Reset Button PB158 (AC) to reset the system after the cause for the fault is rectified.

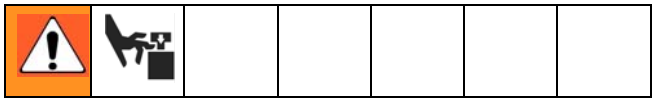
Shutdown

At any time, Emergency Stop Buttons PB1132 or PB1133 (AA) may be pushed to stop dispensing operations.

1. Turn Motor Selector Switch SS125 (AL) off. The Motor Active Lights LT129 and LT131 (AH) will turn off indicating that the motor is inactive.

2. Turn Main Sealer Disconnect Lever (AR) off. The Power Indicator Light LT111 (AE) will turn off.

Maintenance



CAUTION
Urethane material should not be exposed to atmosphere. Use grease or petroleum jelly to seal off urethane material in components from atmosphere.

Reference the following manuals for detailed maintenance and repair procedures of the Gear Meter components listed below. These manuals are not provided by Graco.

Part	Manual
Gear Pump (35)	Kawasaki Gear Pump Technical Bulletin No. 703M
Gear Reducer (19)	SEW-EURODRIVE Gearmotors and Gear Reducers Operating Instructions 01 805 52 US
Electric Motor (31)	Baldor Electric Company Intergral Horsepower D.C. Motor Installation and Operation User Manual MN605
Brake Clutch (25)	Nexen Air Champ Products User Manual FORM NO. L-20134-F-0200
Pressure Display	Red Lion Controls Model IMP Instruction Manual

Troubleshooting

Problem	Cause	Solution
Supply pumps are off.	Overpressure condition	Open the dispense gun and disengage the drive system. Depress Fault Reset Button PB158 (AC) to reset.
Pressing the Manual Mode Dispense Button PB169 (AD) does not dispense material	System is in “ROBOT” mode.	Turn Dispense Mode Switch SS169 (AN) to “MANUAL” mode. The manual dispense button does not have an effect on the system while SS169 (AN) is set to “ROBOT”.
Gear motor does not respond to analog speed control mode.	System is in “POT” speed mode.	The Speed Signal Input Selector Switch SS135 (AM) must be manually set to “ANALOG” in order for an analog signal to drive the motor control board.
	ANALOG SPAN potentiometer is set to 0%.	Increase the ANALOG SPAN potentiometer setting. It is recommended that this potentiometer be set to 50% when programming the robot controller. The potentiometer proportionally weights the analog signal.

Repair

Each figure in the repair section includes an identification table. Use the two letters in the left column of the table to identify a reference number used in one of the three gear pump parts lists.

Remove Gear Pump

1. Relieve pressure. See **Pressure Relief** on page 16.
2. Turn power off with Main Sealer Disconnect Lever (AR). The Power Indicator Light LT111 (AE) will turn off.
3. Disconnect input and output fluid hoses from gear pump (CJ).

CAUTION
Urethane material should not be exposed to atmosphere. Use grease or petroleum jelly to seal off urethane material in components from atmosphere.

4. Remove four screws (CA), lockwashers (CB), and coupling guard (BC). See FIG. 7.

	918465	918473	918477
CA	138	238	338
CB	139	239	339
CC	143	243	343

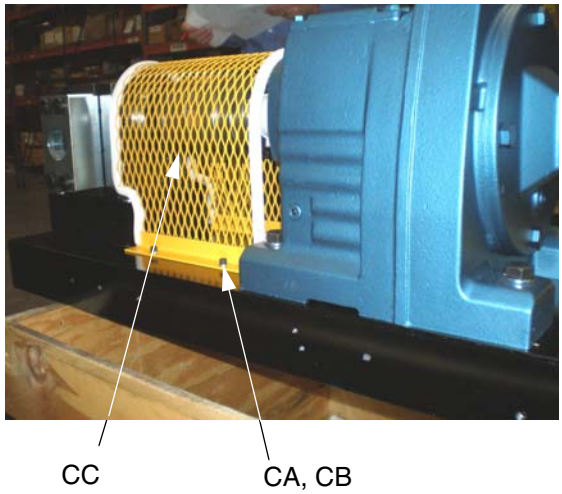


FIG. 7: Coupling Guard

5. Remove four screws (CE) and lockwashers (CG) from gear pump spacer (CD). See FIG. 8.

	918465	918473	918477
CD	105	205	305
CE	106	206	306
CF	109	209	309
CG	117	217	317
CH	133	233	333
CJ	135	235	335
CK	136	236	336
CL	137	237	337

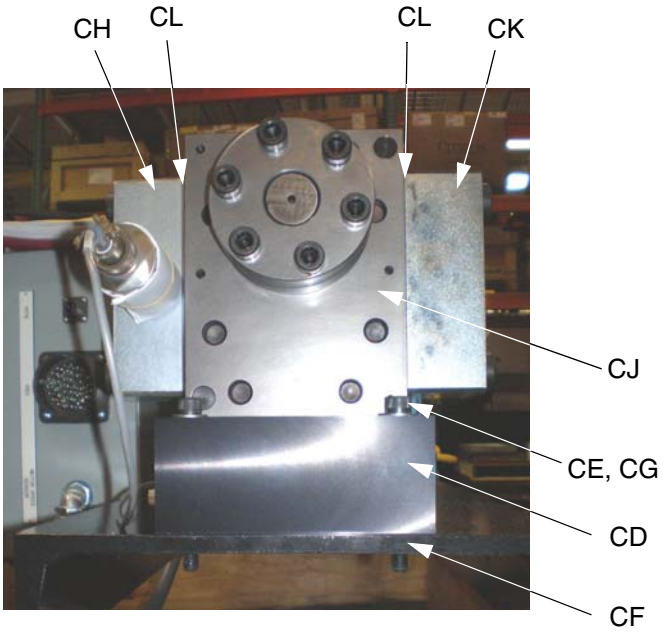


FIG. 8: Gear Pump

6. Remove four screws (CM), lockwashers (CN), and two o-rings (CL) from the inlet flange (CK) and outlet flange (CH). Check the o-rings for damage and replace as necessary. See FIG. 8 and FIG. 9.

	918465	918473	918477
CM	132	232	332
CN	153	253	353

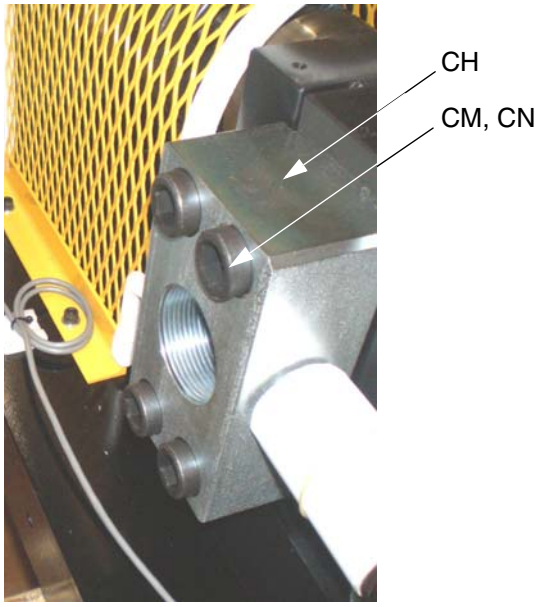


FIG. 9: Gear Pump Outlet Flange

7. Carefully pull away from the gear reducer the gear pump (CJ), gear spacer (CD) and half of coupling (118, 218, 318) attached to pump. Lay on a clean worksurface. See FIG. 8.

8. Remove three screws (101, 201, 301) from the bottom of gear spacer (CD). See FIG. 8.

9. Install bypass manifold (104, 204. 304) or spare gear pump (CJ). See FIG. 8.

It is recommended that you have an extra gear pump on hand to continue operating the gear meter system while the gear pump is repaired.

See **Kawasaki Gear Pump Technical Bulletin No. 703M** for detailed gear pump repair procedures.

Install Gear Pump

1. Connect gear pump (CJ) to gear spacer with three screws (101, 201, 301).

2. Carefully lower and align the gear pump and gear reducer coupling parts together. Ensure coupling (118, 218, 318) is connected.

3. Connect gear pump (CJ) and spacer (CD) to frame (CF) with screws (CE) and lockwashers (CG). See FIG. 8.

4. Install inlet flange (CK) and outlet flange (CH), two o-rings (CL), four lockwashers (CN), and screws (CM). See FIG. 9.

5. Install coupling guard (CC), four lockwashers (CB), and screws (CA). See FIG. 7 on page 20.

6. Connect input and output fluid hoses to gear pump (CJ).

Remove Electric Motor

1. Relieve Pressure. See **Pressure Relief** on page 16.

2. Turn motor selector switch SS125 (AL) off. LT129 and LT131 (AH) will turn off, indicating that the motor is inactive.

3. Turn power off with Main Sealer Disconnect Lever (AR). The Power Indicator Light LT111 (AE) will turn off.

4. Open wire box on the electric motor and disconnect A1, A2, and ground wires. See FIG. 10.

FIG. 10

5. Remove two screws from clutch housing guards; remove guards. Disconnect black air hoses from the clutch assembly. See FIG. 11.

6. Open the wire box on the speed sensor motor adapter (CP). Disconnect the white, red, and black wires. See FIG. 11.

7. Loosen fitting (CR) at top of speed sensor motor adapter (CP). See FIG. 11.

	918465	918473	918477
CP	128	228	328
CQ	131	231	331
CR	145	245	345

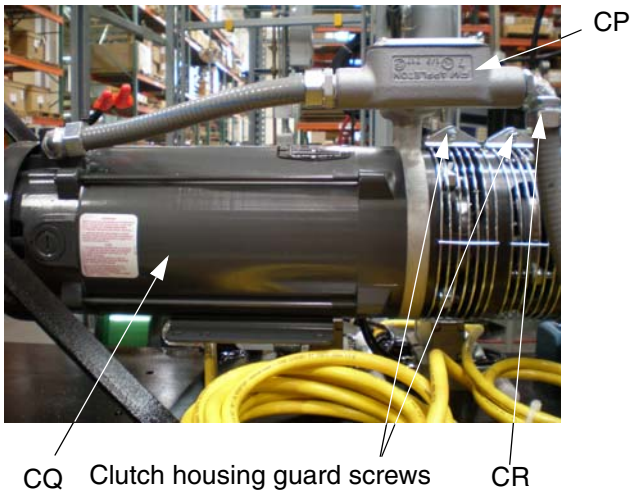


FIG. 11

8. Secure electric motor (CQ) to hoist.

9. Remove four black socket head cap screws that connect the module brake unit and the module drive unit.

10. Pull the electric motor (CQ) and the module drive unit of the clutch assembly away from the module brake unit; lay on worksurface.

CAUTION
The Modular Drive Unit ball bearing is loose fitting by design. Do not allow the ball bearing to fall off the Modular Drive Unit.

11. Disconnect the module drive unit and the electric motor (CQ).

See the Baldor Electric Company Intergral Horsepower **D.C. Motor Installation and Operation user manual MN605** for detailed repair procedures.

Install Electric Motor

1. Connect electric motor (CQ) and the module drive unit of the clutch assembly.

2. Install electric motor (CQ) and module drive unit to the module brake unit with four black socket head cap screws.

3. Tighten fitting (CR) on top of speed sensor motor adapter (CP). See FIG. 11.

4. Connect A1, A2, and ground wires in the wire box on the electric motor.

5. Install clutch housing guard and connect black air hoses.

The motor must turn counterclockwise. Reverse A1 and A2 wires if necessary.

Remove Brake Clutch

1. See **Remove Electric Motor**.

2. Remove four bolts and lockwashers from the gear reducer adapter.

3. Disconnect the module brake unit of clutch.

See the Nexen **Air Champ Products user manual FORM NO. L-20134-F-0200** for detailed repair procedures of the brake clutch (125, 225, 325).

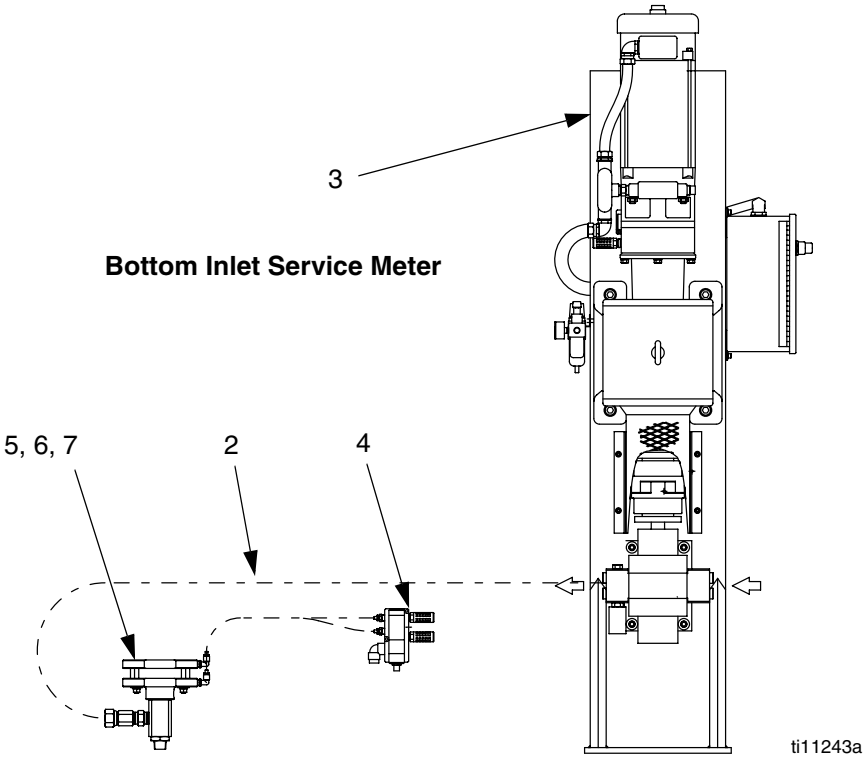
Install Brake Clutch

1. Install module brake unit of clutch to gear reducer adapter with four bolts and lockwashers.

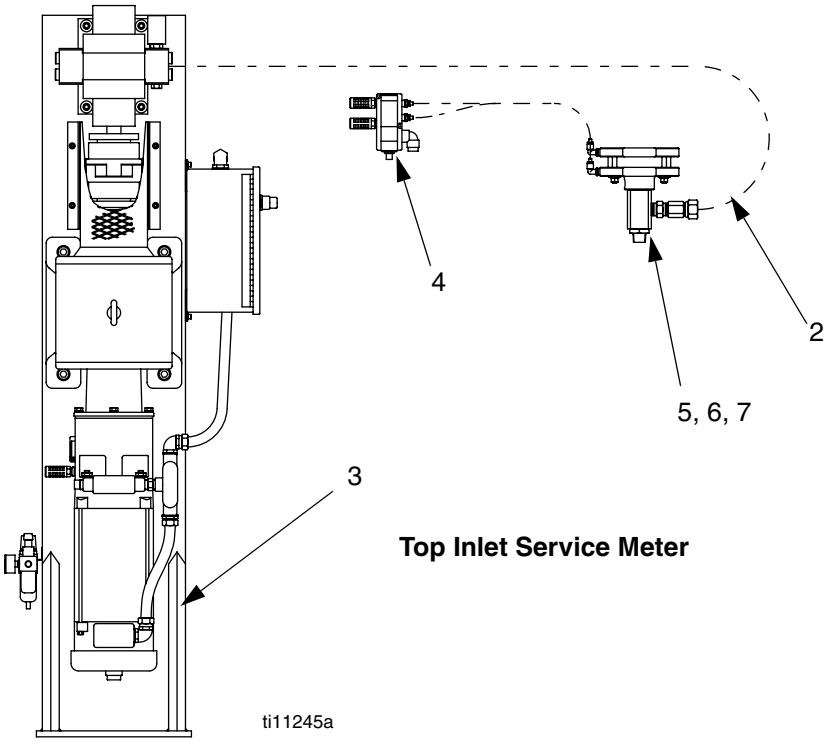
2. See **Install Electric Motor**.

Parts

Part No. 970175, Bottom Inlet Service Meter
Part No. 970176, Top Inlet Service Meter

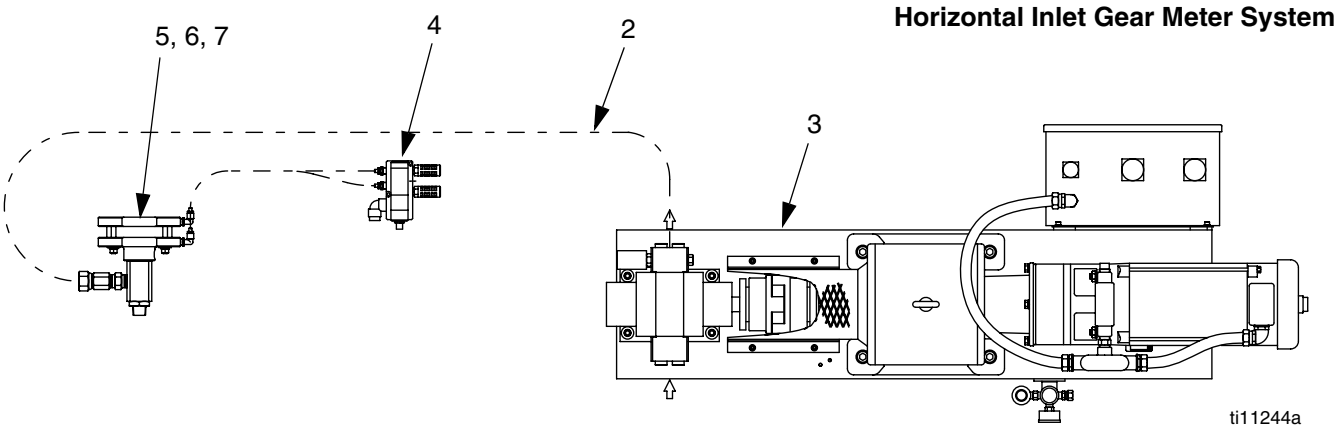


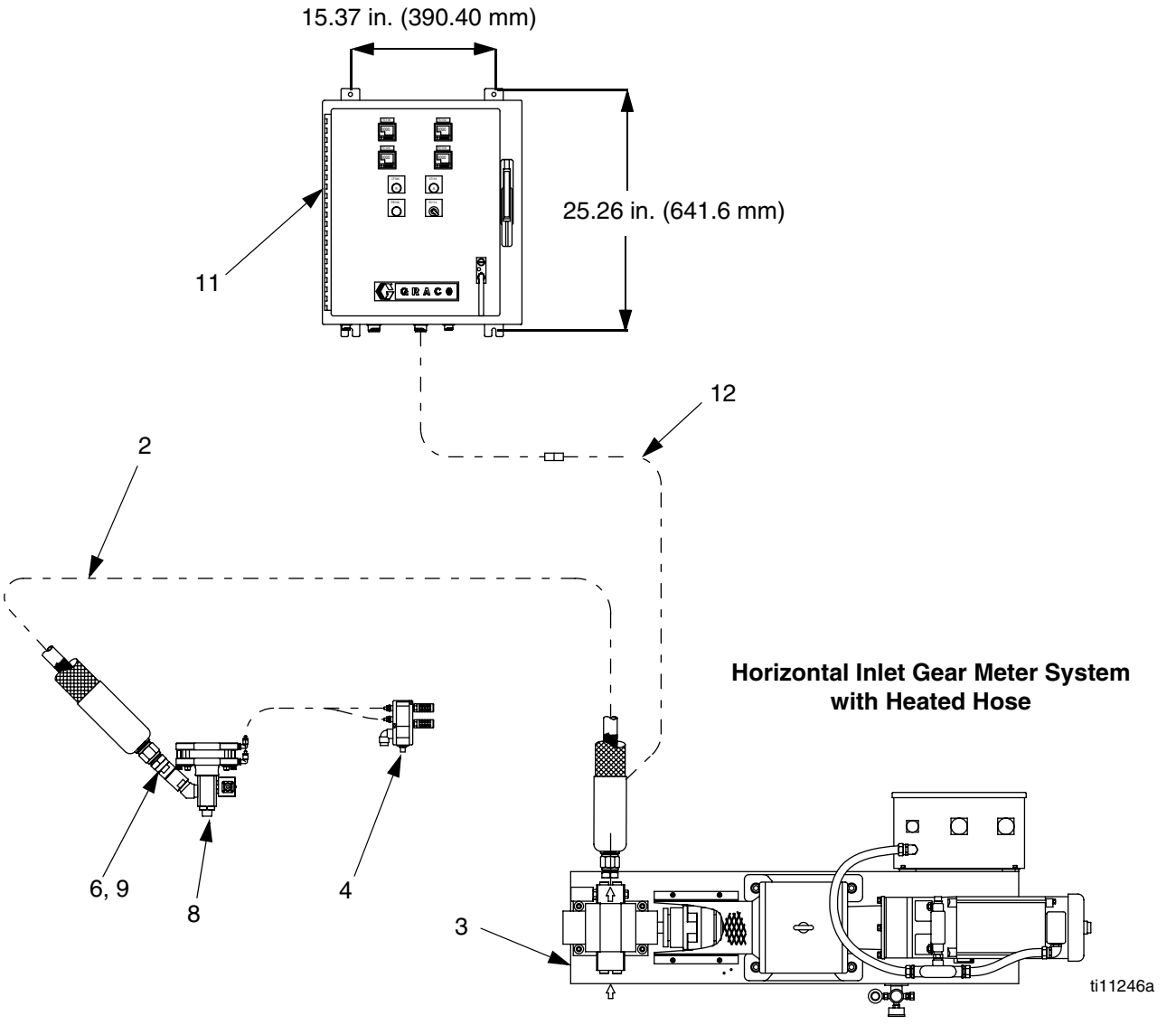
Bottom Inlet Service Meter



Top Inlet Service Meter

Part No. 970177, Horizontal Inlet Gear Meter System
Part No. 970194, Horizontal Inlet Gear Meter System with Heated Hose

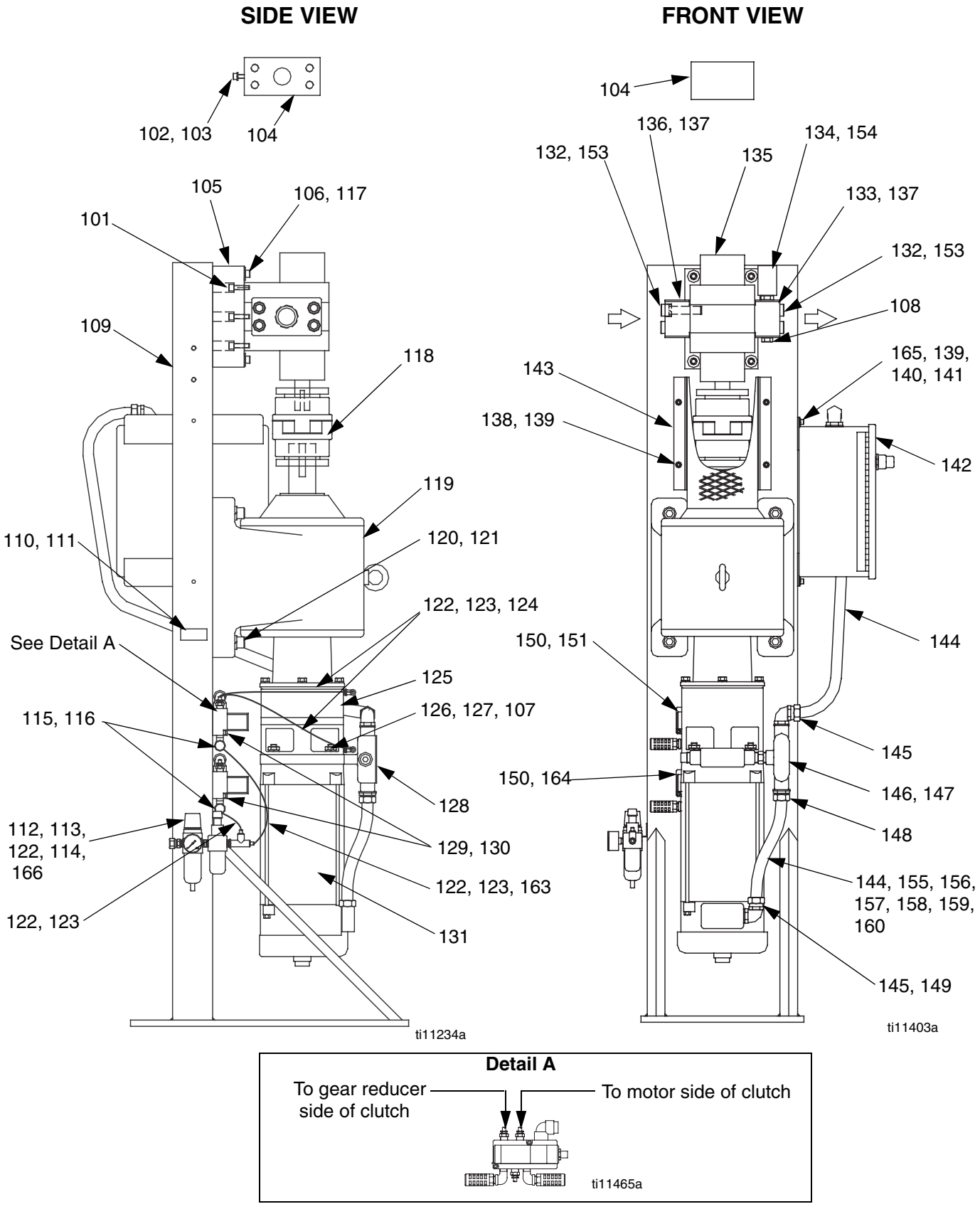




Part No. 970175, 970176, 970177, 970194, Gear Meter Systems

Ref. No.	Part No.	Description	Gear Meter Systems			
			Bottom Inlet Service Meter, 970175	Top Inlet Service Meter, 970176	Horizontal Inlet Service Meter, 970177	Horizontal Inlet Gear Meter with Heated Hose, 970194
1	617517	CONTROL, electrical; see page 33	✔	✔	✔	✔
2	C59755	KIT, installation, 1 ft disp hose	✔	✔	✔	
	C59758	KIT, 1 ft urethane heated dispense hose				✔
3		PUMP, gear pump assembly	918477 See page 31	918465 See page 27	918473 See page 29	918473 See page 29
4	918490	KIT, repair	✔	✔	✔	✔
5	918539	APPLICATOR, ball seat, 3/4 port, 42:1	✔	✔	✔	
6	156172	FITTING, union, swivel	✔	✔	✔	✔
7	C20487	FITTING, nipple, hex	✔	✔	✔	
8	15B919	MODULE, isolation valve				✔
9		FITTING, swivel				✔
11	C59555	CONTROL, 4 zone controller				✔
12	C07738	CABLE, jumper 14 soc to 14 pin				✔

Part No. 918465, Top Inlet Gear Pump

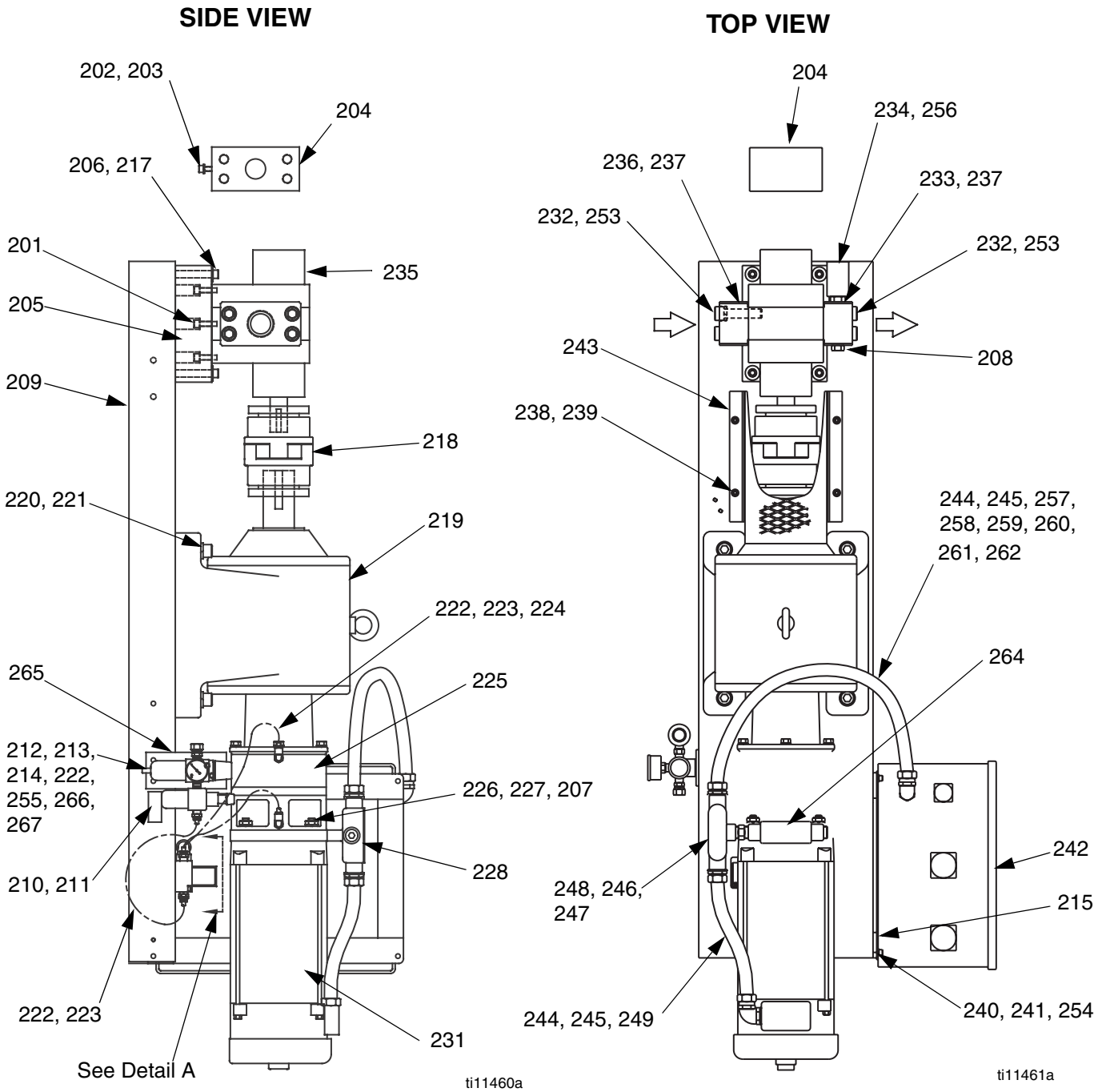


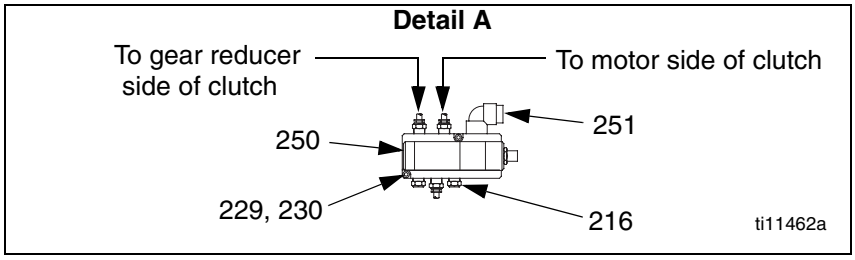
Part No. 918465, Top Inlet Gear Pump

Ref. No.	Part No.	Description	Qty.
101	109114	SCREW, cap, socket hd	3
102	100214	WASHER, lock	2
103	101864	SCREW, cap socket hd	2
104	617465	MANIFOLD	1
105	617505	SPACER, gear pump	1
106	C19835	SCREW, cap socket head	4
107	100133	WASHER, lock	4
108		PLUG, o-ring	1
109		FRAME	1
110	C19736	SCREW, drive	6
111		MARKER	1
112	C19008	FITTING, adapter, swivel	1
113	C06187	FILTER	1
114	C50125	BRACKET	1
115	C19445	FITTING, elbow, streeT	4
116	C36183	MUFFLER	4
117	100731	WASHER	4
118	517458	COUPLING, jaw type flex	1
119	517456	GEAR, reducer	1
120	C19075	SCREW, cap, hex hd	4
121	100128	WASHER, lock	4
122	C19407	FITTING, connector, male	6
123	C12509	TUBE, nylon, rnd; 7 ft	1
124	597151	FITTING, elbow	2
125	C52543	CLUTCH, brake	1
126	C52546	STUD, threaded	4
127	100131	NUT, full hex	4
128	C52559	ADAPTER, motor, speed sensor	1
129	104472	SCREW, cap	4
130	100020	WASHER, lock	4
131	C52556	MOTOR, D.C.	1
132		SCREW	8
133	617449	FLANGE	1
134	517473	TRANSDUCER	1
135†	517457	PUMP, hi-flo precision gear	1
136	617448	FLANGE	1
137	C20261	O-RING	2
138	112166	SCREW, cap, socket hd	4
139	100016	WASHER, lock	6
140	110755	WASHER, plain	2
141	100015	NUT, hex mscr	2
142		JUNCTION BOX	1
143	C52545	GUARD, coupling	1
144	C20720	FITTING, flex conduit; 5 ft	1
145	C20721	FITTING, flex conduit	3
146	C20819	FITTING, conduit, tee	1
147	158491	FITTING, nipple	1
148	110138	CONNECTOR, conduit straight	1
149	C20874	PACKING, o-ring, conduit sealing	1
150	C06022	VALVE	2
151	C07430	CONNECTOR, sealed	1
153		WASHER, lock	8
154	517474	PACKING	1
155	C19766	SCREW, machine, binding	5
156		RING	6
157		WIRE, copper, electrical	9
158	157021	WASHER, lock	5
159	C07501	WIRE, copper, electrical	18
160	100284	NUT, hex mscr	5
163	C20365	FITTING, tee, air	1
164	C07431	CONNECTOR, sealed	1
165	103345	SCREW, cap socket hd	4
166	C20004	SCREW, cap	2

† *See **Repair Kits** on page 44 for Gear Pump repair parts (purchase separately).*

Part No. 918473, Horizontal Inlet Gear Pump



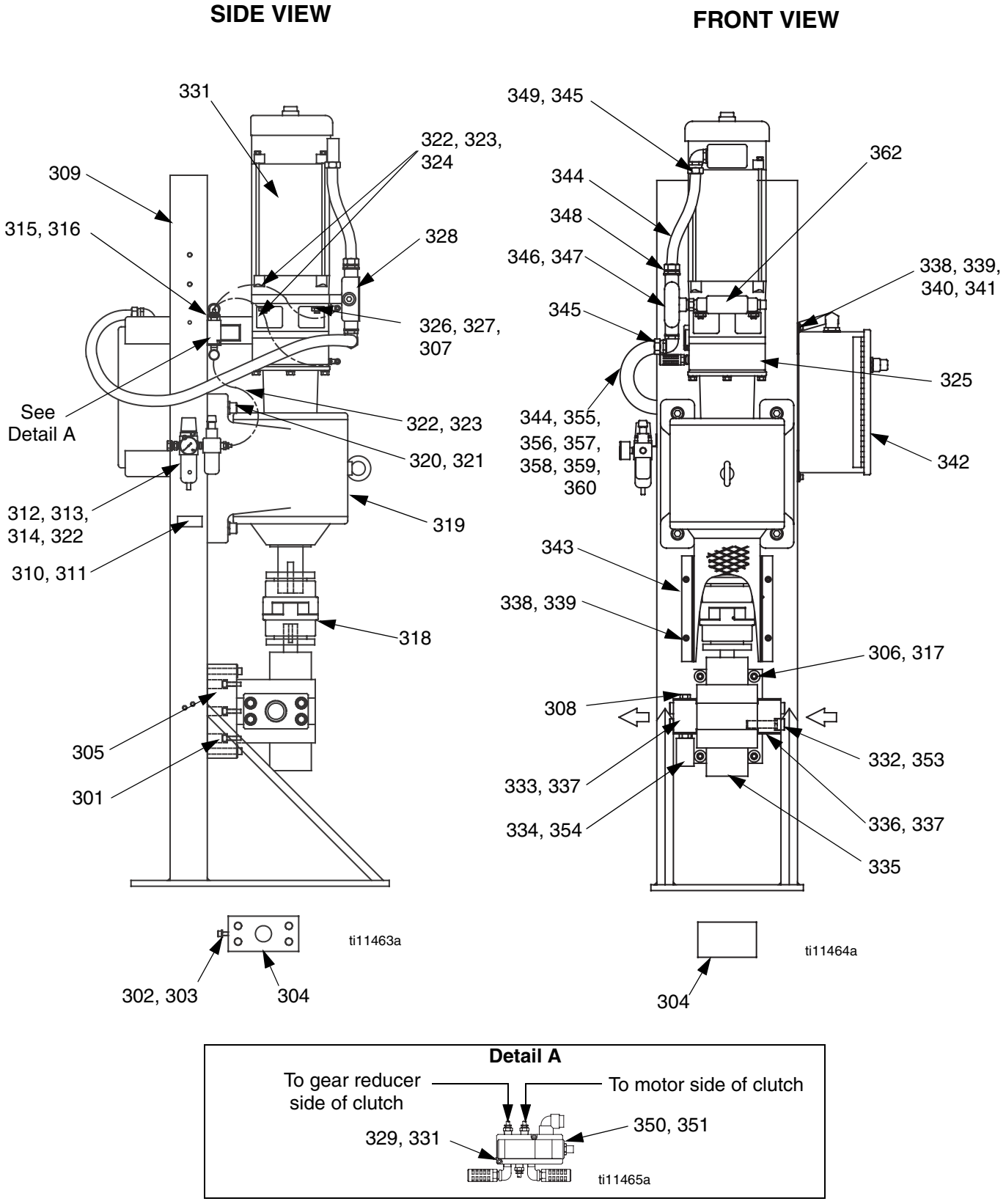


Part No. 918473, Horizontal Inlet Gear Pump

Ref. No.	Part No.	Description	Qty.
201	109114	SCREW, cap, socket hd	3
202	100214	WASHER, lock	2
203	101864	SCREW, cap socket hd	2
204	617465	MANIFOLD	1
205	617505	SPACER, gear pump	1
206	C19837	SCREW, cap, socket hd	4
207	100133	WASHER, lock	4
208		PLUG, o-ring	1
209		FRAME, gear pump	1
210	C19736	SCREW, drive	6
211		MARKER	1
212	C19008	FITTING, adapter, swivel	1
213	C06187	FILTER	1
215		BRACKET, J-Box	2
216	C32390	FILTER, vent, breather	2
217	100731	WASHER	4
218	517458	COUPLING, jaw type flex	1
219	517456	GEAR, reducer	1
220	C19075	SCREW, cap, hex hd	4
221	100128	WASHER, lock	4
222	C19407	FITTING, connector, male	2
223	C12509	TUBE, nylon, rnd	4
224	C19391	FITTING, elbow	2
225	C52543	CLUTCH, brake	1
226	C52546	STUD, threaded	4
227	100131	NUT, full hex	4
228	C52559	ADAPTER, motor, speed sensor	1
229	104472	SCREW, cap	4
230	100020	WASHER, lock	4
231	C52556	MOTOR, D.C.	1
232		SCREW	8
233	617449	FLANGE	1
234	517473	TRANSDUCER	1
235†	517457	PUMP, hi-flo precision gear	1
236	617448	FLANGE	1
237	C20261	O-RING	2
238	112166	SCREW, cap, socket hd	6
239	100016	WASHER, lock	6
240	110755	WASHER, plain	6
241	100015	NUT, hex mscr	6
242		JUNCTION BOX	1
243	C52545	GUARD, coupling	1
244	C20720	FITTING, flex conduit; 3 ft	1
245	C20721	FITTING, flex conduit	2
246	C20819	FITTING, conduit, tee	1
247	158491	FITTING, nipple	1
248	110138	CONNECTOR, conduit straight	2
249	C20874	PACKING, o-ring, conduit sealing	1
250	C06022	VALVE	1
251	C07430	CONNECTOR, sealed	1
253		WASHER, lock	8
254	100643	SCREW, cap, socket hd	6
255	C50125	BRACKET	1
256	517474	PACKING	1
257	C19766	SCREW, machine, binding	5
258		RING	6
259		WIRE, copper, electrical	7
260	157021	WASHER, lock, int	5
261	C07501	WIRE, copper, electrical	14
262	100284	NUT, hex mscr	5
264	513421	WIRE, 3 cond. 18 gauge	5
265		BRACKET, FRL mounting	1
266	100166	NUT, full hex	1
267	C20004	SCREW, cap	1

† *See **Repair Kits** on page 44 for Gear Pump repair parts (purchase separately).*

Part No. 918477, Bottom Inlet Gear Pump

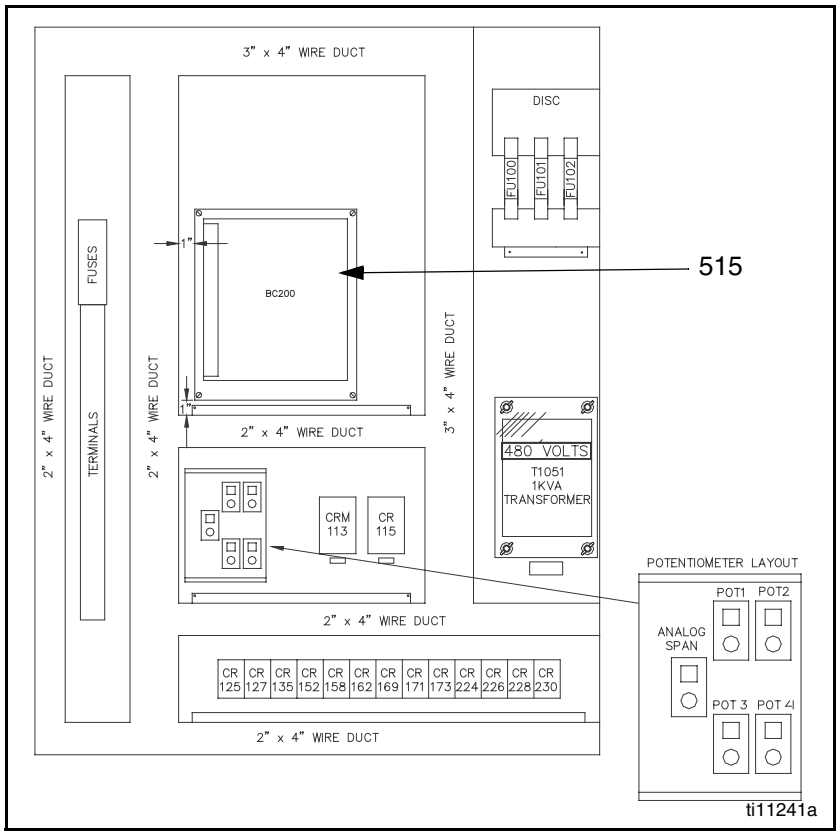


Part No. 918477, Bottom Inlet Gear Pump

Ref. No.	Part No.	Description	Qty.
301	109114	SCREW, cap, socket hd	3
302	100214	WASHER, lock	2
303	101864	SCREW, cap socket hd	2
304	617465	MANIFOLD	1
305	617505	SPACER, gear pump	1
306	C19835	SCREW, cap, socket hd	4
307	100133	WASHER, lock	4
308		PLUG, o-ring	1
309		FRAME	1
310	C19736	SCREW, drive	6
311		MARKER	1
312	C19008	FITTING, adapter, swivel	1
313	C06187	FILTER	1
314	C50125	BRACKET	1
315	C19445	FITTING, elbow, street	2
316	C36183	MUFFLER	2
317	100731	WASHER	4
318	517458	COUPLING, jaw type flex	1
319	517456	GEAR, reducer	1
320	C19075	SCREW, cap, hex hd	4
321	100128	WASHER, lock	4
322	C19407	FITTING, connector, male	2
323	C12509	TUBE, nylon, rnd; 6 ft	1
324	C19391	FITTING, elbow	2
325	C52543	CLUTCH, brake	1
326	C52546	STUD, threaded	4
327	100131	NUT, full hex	4
328	C52559	ADAPTER, motor, speed sensor	1
329	104472	SCREW, cap	2
330	100020	WASHER, lock	2
331	C52556	MOTOR, D.C.	1
332		SCREW	8
333	617449	FLANGE	1
334	517473	TRANSDUCER	1
335†	517457	PUMP, hi-flo precision gear	1
336	617448	FLANGE	1
337	C20261	O-RING	2
338	112166	SCREW, cap, socket hd	8
339	100016	WASHER, lock	8
340	110755	WASHER, plain	2
341	100015	NUT, hex mscr	2
342		JUNCTION BOX	1
343	C52545	GUARD, coupling	1
344	C20720	FITTING, flex conduit; 5 ft	1
345	C20721	FITTING, flex conduit	2
346	C20819	FITTING, conduit, tee	1
347	158491	FITTING, nipple	1
348	110138	CONNECTOR, conduit straight	1
349	C20874	PACKING, o-ring, conduit sealing	1
350	C06022	VALVE	1
351	C07430	CONNECTOR, sealed	1
353		WASHER, lock	8
354	517474	PACKING	1
355	C19766	SCREW, machine, binding	5
356		RING	6
357		WIRE, copper, electrical	9
358	157021	WASHER, lock	5
359	C07501	WIRE, copper, electrical	18
360	100284	NUT, hex mscr	5
362	513421	WIRE, 3 cond. 18 gauge	8

† *See **Repair Kits** on page 44 for Gear Pump repair parts (purchase separately).*

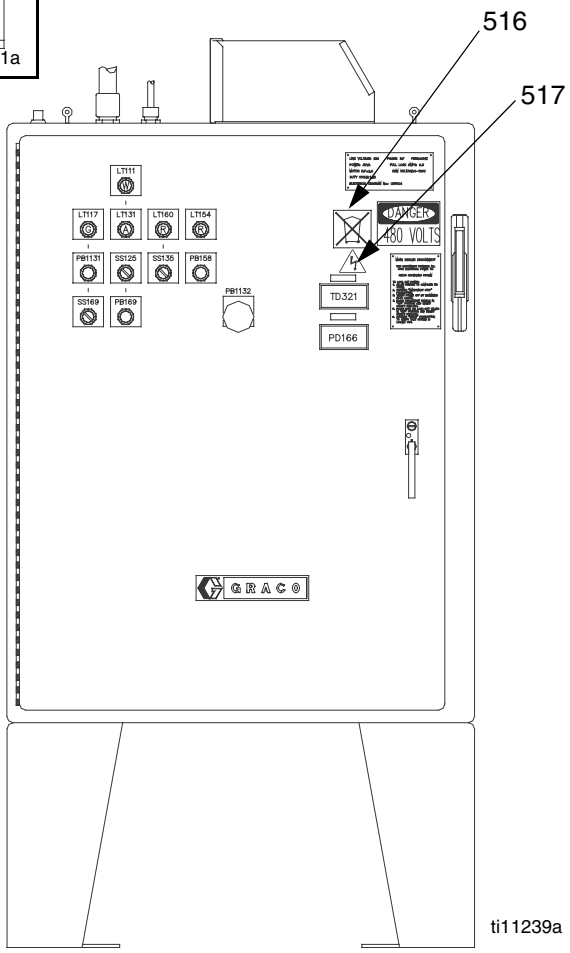
Part No. 617517, Electrical Control



Inside Electrical Control Panel

See **Wiring Schematics** on page 35.

Front of Electrical Control Panel



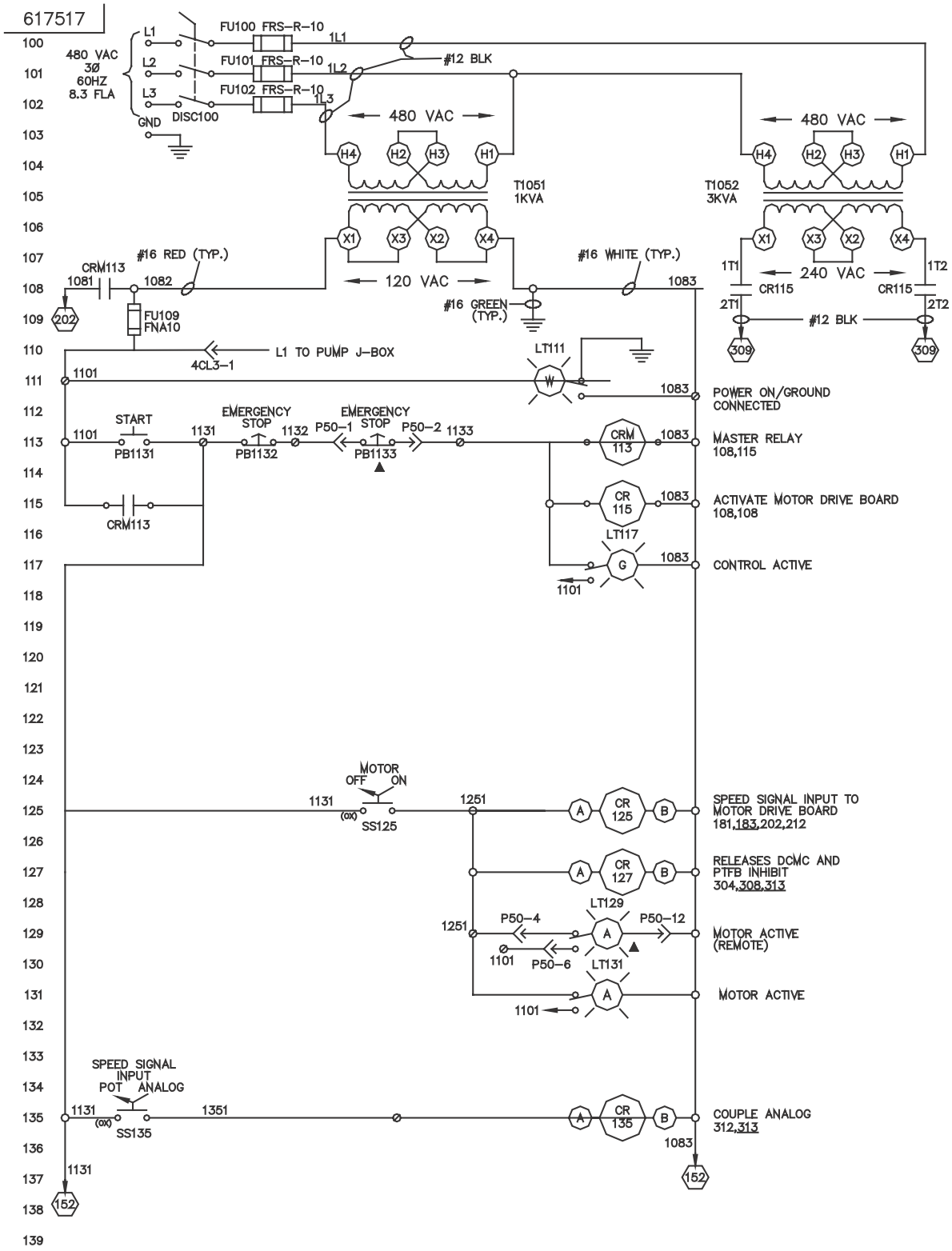
Part No. 617517, Electrical Control

Ref. No.	Part No.	Description	Qty.
515	196165	BOARD, dc motor drive	1
516▲	15F279	LABEL	1
517▲	196548	LABEL	1

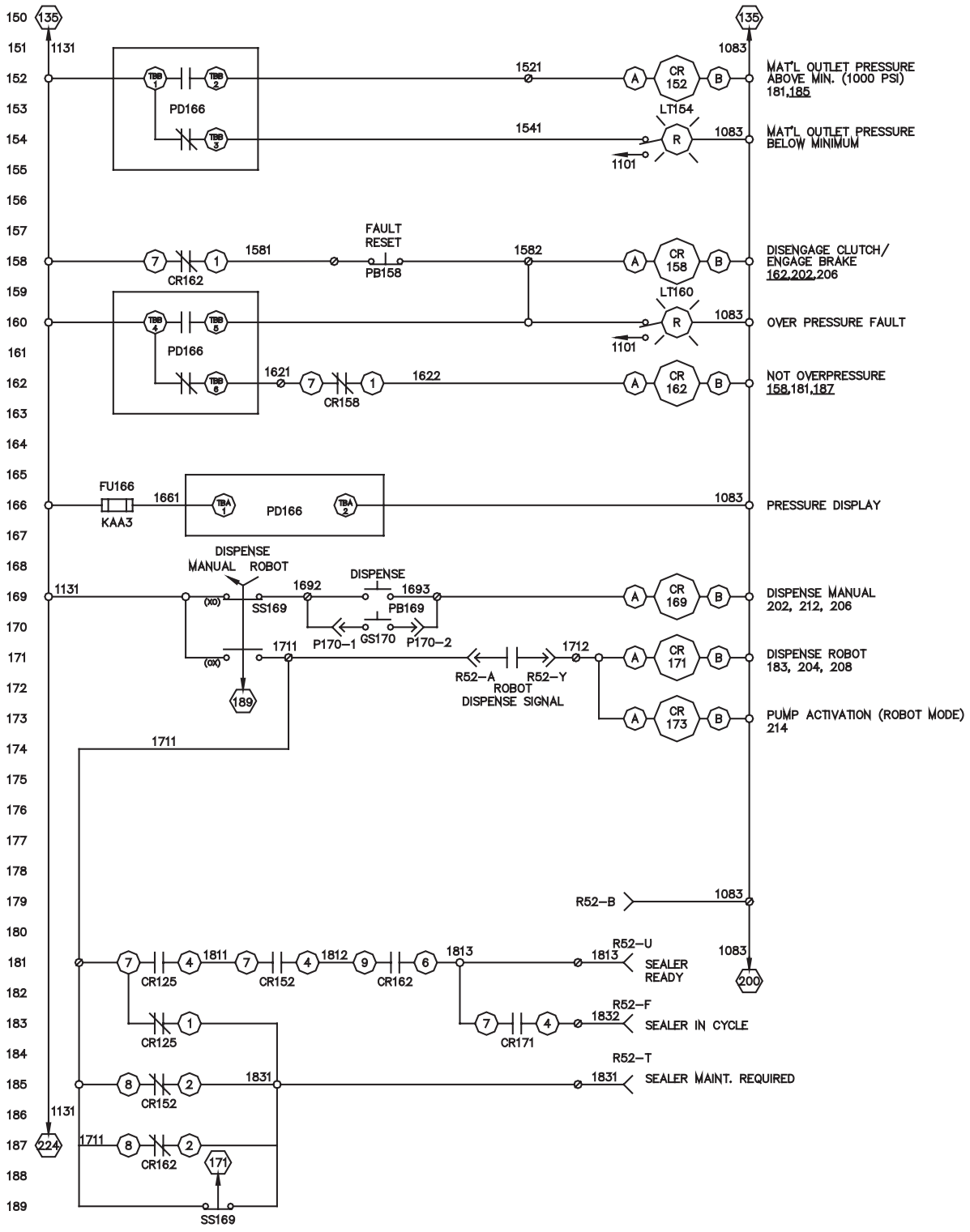
▲ *Replacement Danger and Warning labels, tags, and cards are available at no cost.*

Wiring Schematics

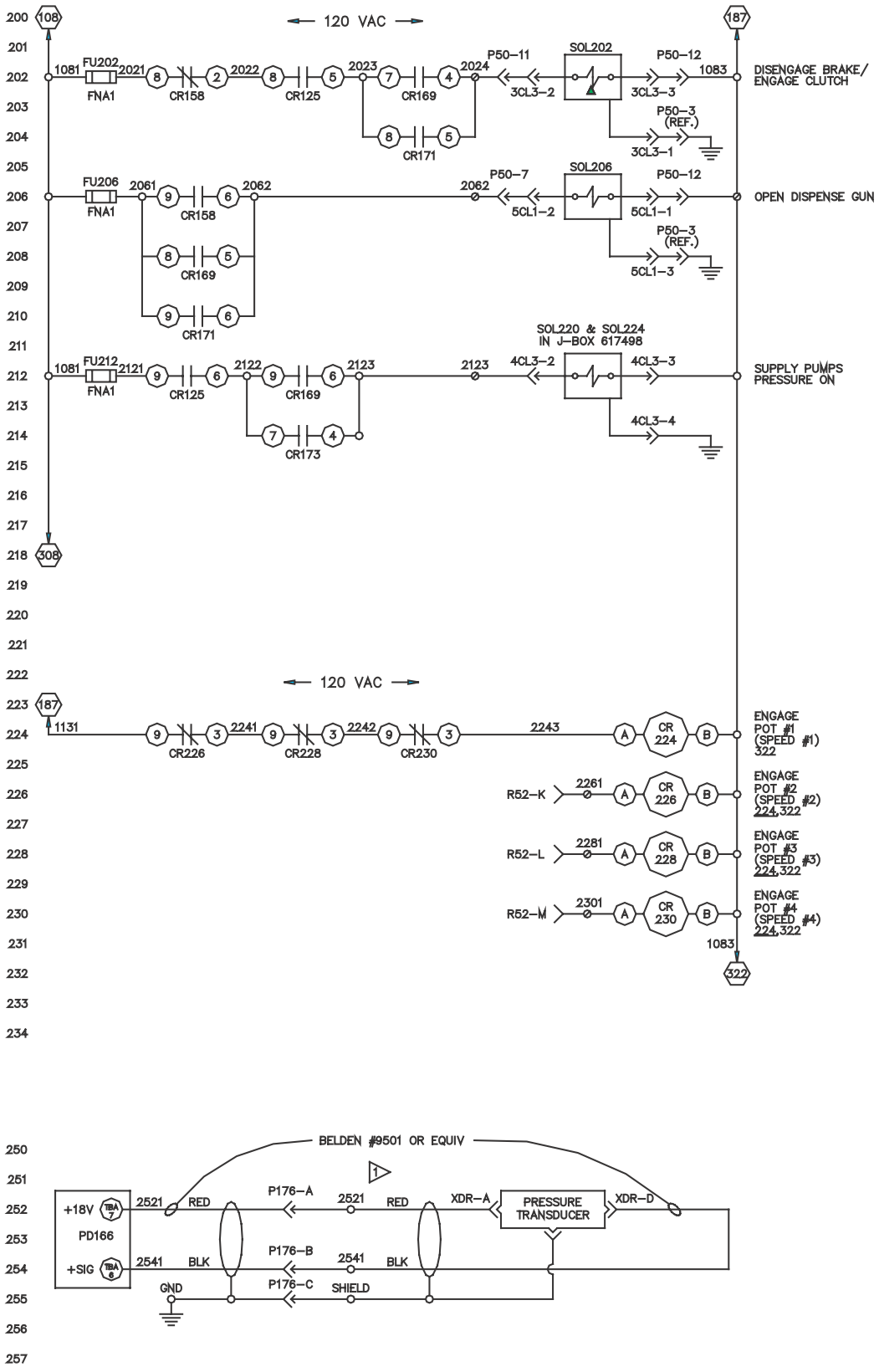
Part No. 617517, Electrical Control



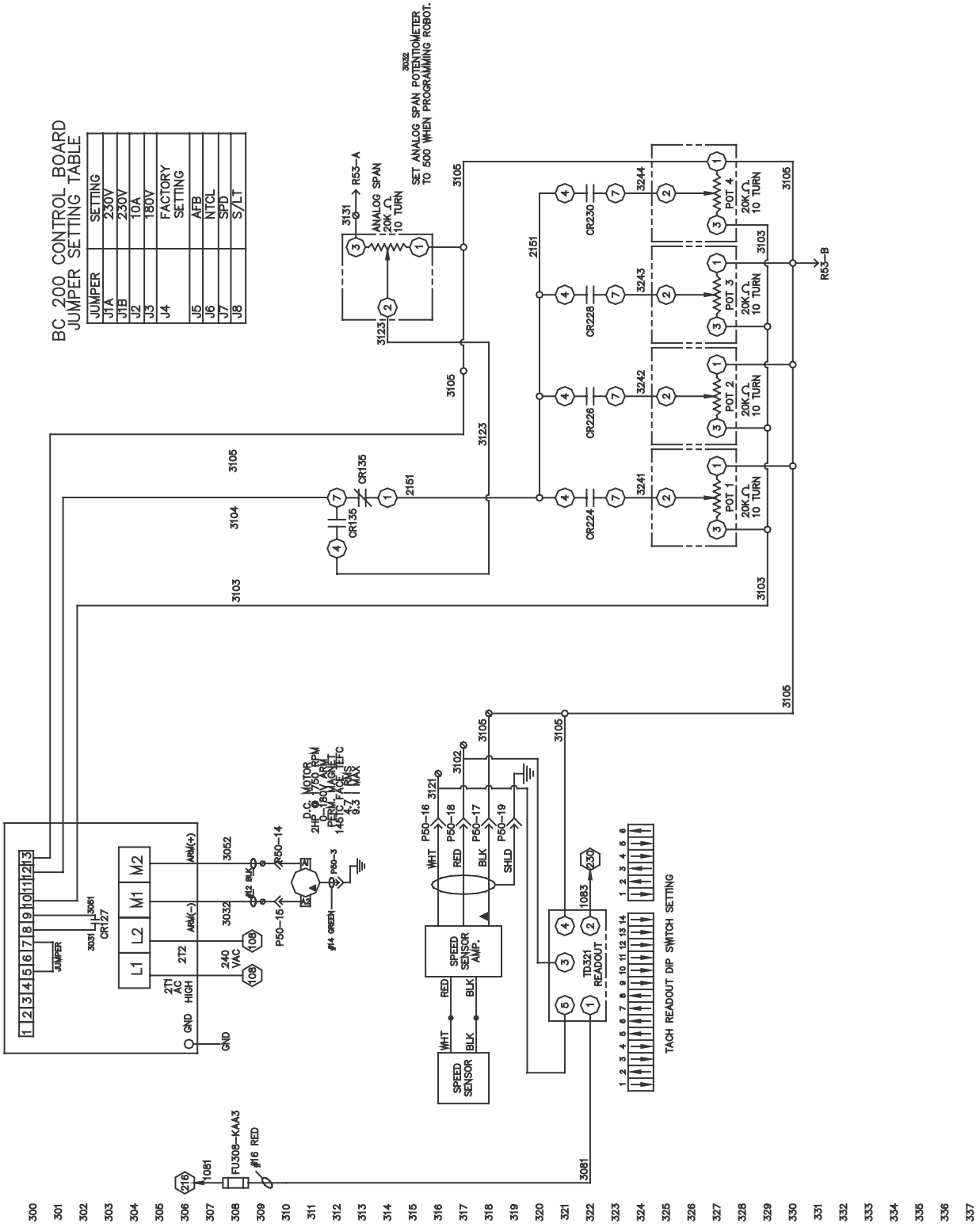
Part No. 617517, Electrical Control



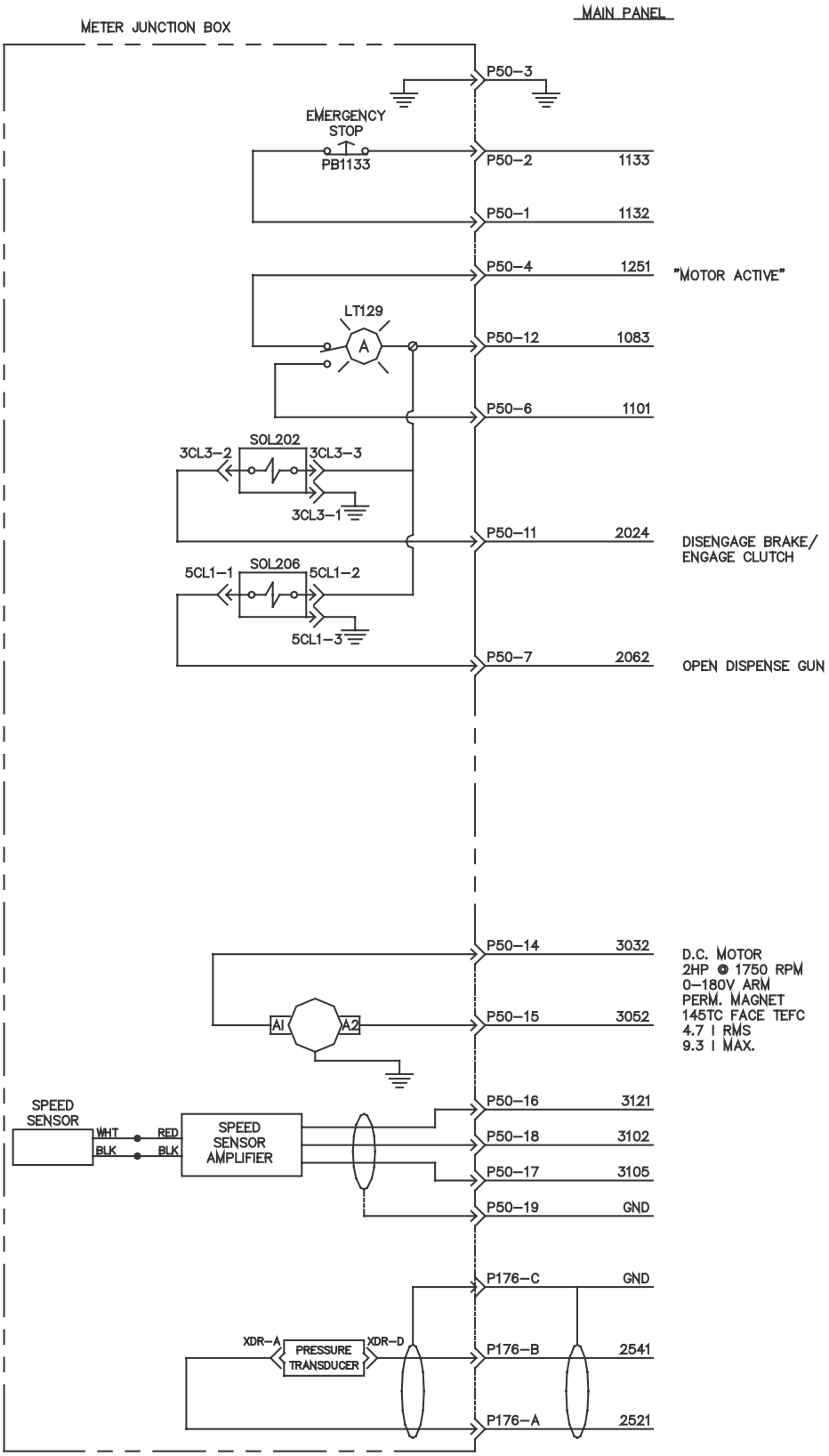
Part No. 617517, Electrical Control



Part No. 617517, Electrical Control



Part No. 617517, Electrical Control



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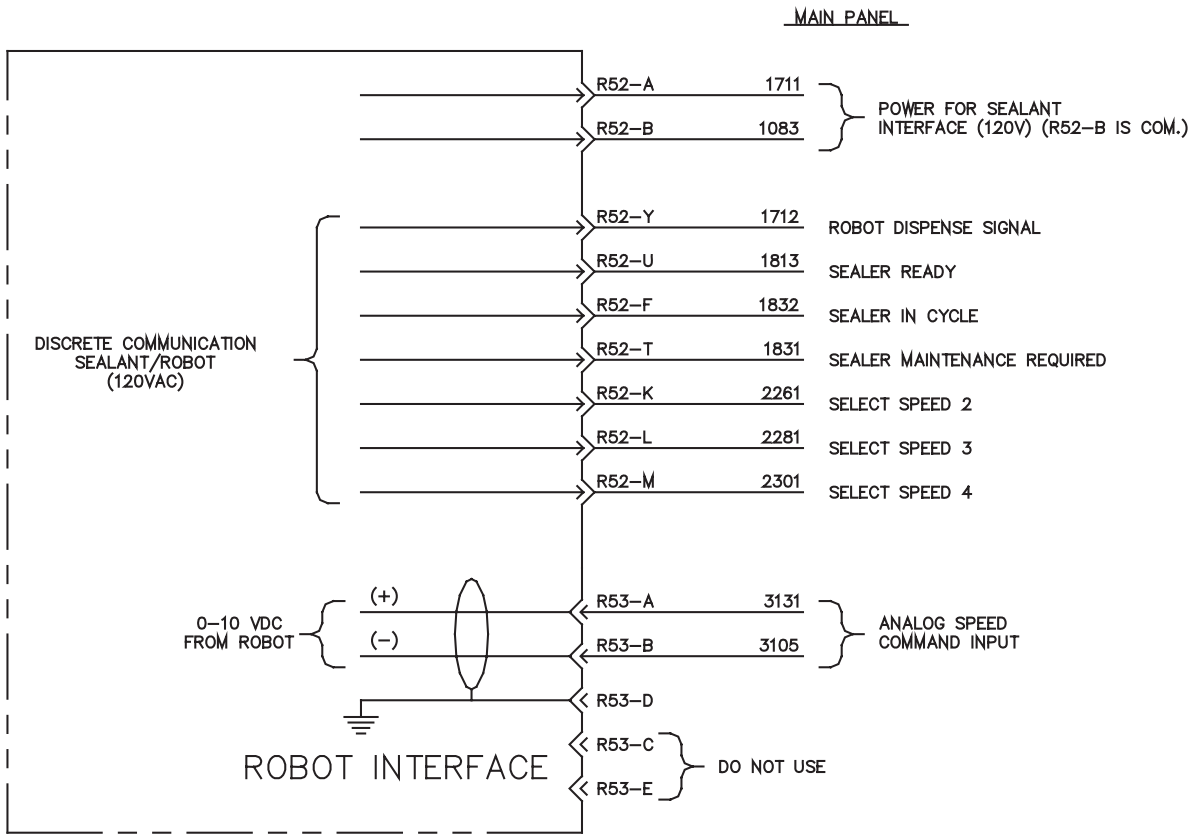
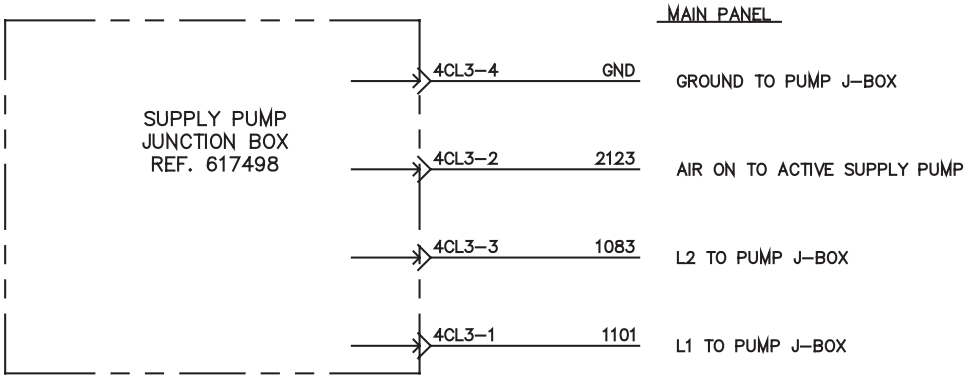




Part No. 617517, Electrical Control

(8)

PIN CHART: 120V ROBOT INTERFACE (R52)
TYPE: SINE A431-2P02-1816-E5

PIN I.D.	WIRE I.D.	COLOR
A	1711	RED
B	1083	WHITE
C	GND	GREEN
D	R52-D	RED
E	R52-E	RED
F	1832	RED
G	R52-G	RED
H	R52-H	RED
J	R52-J	RED
K	2261	RED
L	2281	RED
M	2301	RED
N	R52-N	RED
P	R52-P	RED
Q	R52-Q	RED
R	R52-R	RED
S	R52-S	RED
T	1831	RED
U	1813	RED
V	R52-V	RED
W	R52-W	RED
X	R52-X	RED
Y	1712	RED
Z	R52-Z	RED
a	R52-a	RED
b	R52-b	RED
c	R52-c	RED
d	R52-d	RED
e	R52-e	RED
f	R52-f	RED
g	R52-g	RED

(41)

PIN CHART: ANALOG INTERFACE ROBOT (R53)
TYPE: AMPHENOL 97-3102A-14S-5P
WIRE 16AWG BLUE, LENGTH 48"

PIN I.D.	WIRE I.D.	COLOR
A	3131	BLUE
B	3105	BLUE
C	DO NOT WIRE	-
D	GND	GREEN
E	DO NOT WIRE	-

(48)

PIN CHART: SUPPLY PUMPS INTERFACE (4CL3)
TYPE: CROUSE HINDS 4 POLE PLUG W/ 50' CABLE
#5000109-67K OR EQUIV.

PIN I.D.	WIRE I.D.	COLOR
1	1101	BLACK
2	2123	BLUE
3	1083	BROWN
4	GND	WHITE

(10)

PIN CHART: TRANSDUCER CABLE ASS'Y (P176)
TYPE: AMPHENOL 97-3106A-10SL-3S
W/ 97-3057-1004-1 CLAMP
WIRE TYPE BELDEN 9501, LENGTH 600"

PIN I.D.	WIRE I.D.	COLOR
A	2521	RED
B	2541	BLACK
D	SHIELD	

PLUG FACE VIEW
LUMBERG "MINI" STYLE

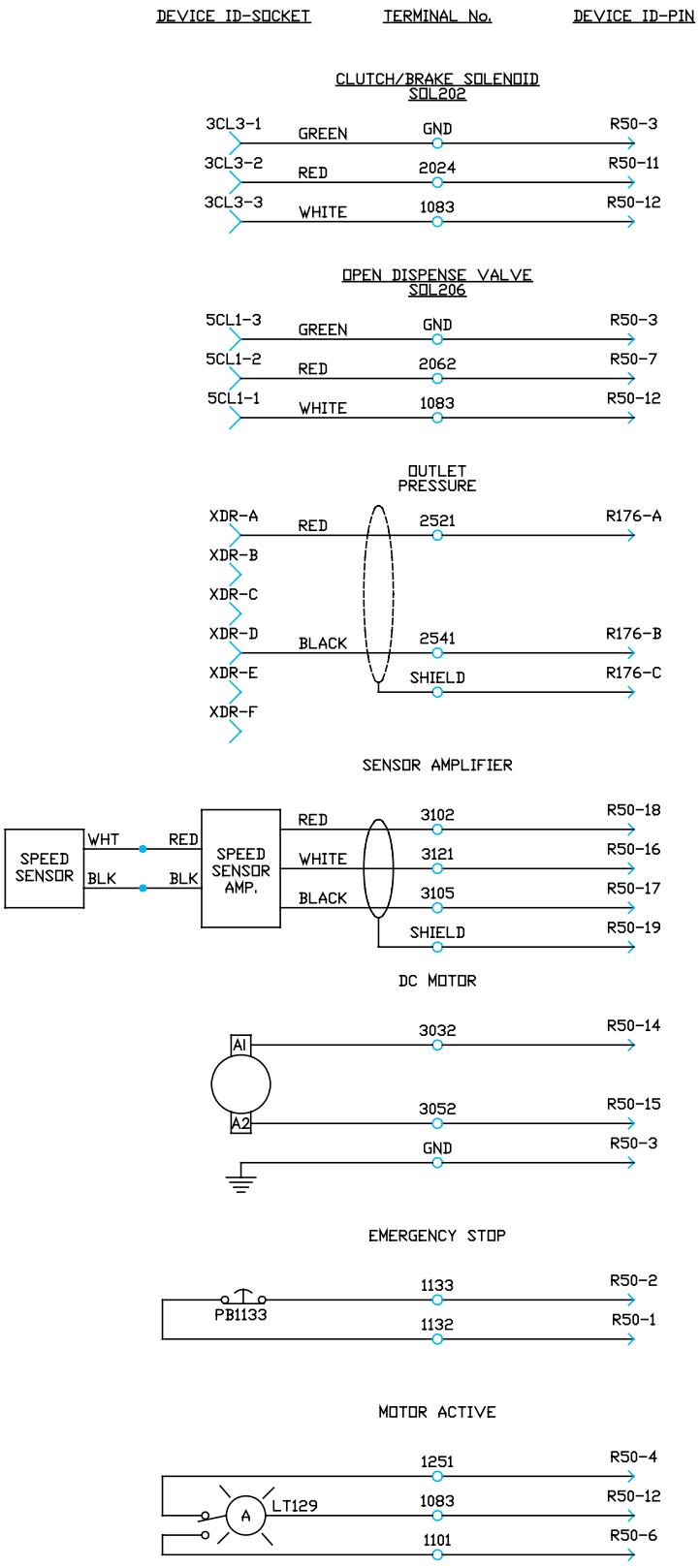
(9)

PIN CHART: METER INTERFACE (P50)
TYPE: SINE X237-41F2-P20428-E34 (1)

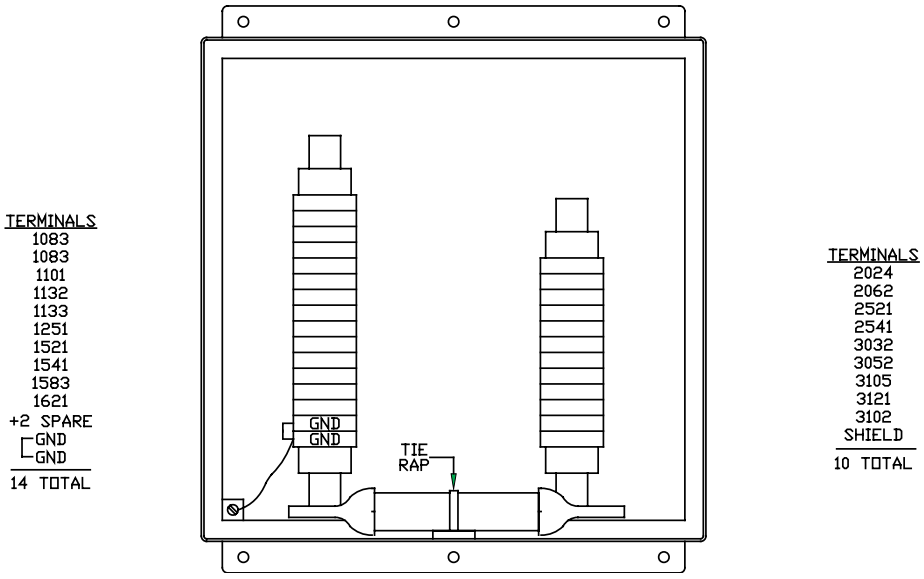
PIN I.D.	WIRE I.D.	AWG	COLOR	
1	1132	16	RED	
2	1133	16	RED	
3	GND	16	GREEN	
4	1251	16	RED	
5	P50-5	16	RED	
6	1101	16	RED	
7	2062	16	RED	
8	P50-8	16	RED	
9	P50-9	16	RED	
10	P50-10	16	RED	
11	2024	16	RED	
12	1083	16	WHITE	
13	P50-13	16	RED	
14	3032	12	BLACK	
15	3052	12	BLACK	
16	3121	20	A 72	USE SINE TYPE 7220 CABLE (1)
17	3105	20	B 72	2 PAIR 5 COND
18	3102	20	D 72	
19	GND	20	SHIELDS	
20	P50-20	20	E 72	
21	P50-21	20	F 72	
22	P50-22	16	RED	
23	P50-23	16	RED	
24	P50-24	16	RED	
25	P50-25	16	RED	
26	P50-26	16	RED	
27	P50-27	16	RED	
28	P50-28	16	RED	
29	P50-29	16	RED	
30	P50-30	16	RED	
31	P50-31	16	RED	
32	P50-32	16	RED	
33	P50-33	16	RED	
34	P50-34	16	RED	
35	P50-35	16	RED	
36	P50-36	16	RED	
37	P50-37	16	RED	

(1) NOTED ITEMS CAN BE REPLACED WITH X237-4KF2-KALKRC-E36 AND 2 PAIR BELDEN 9463

Gear Meter Junction Box



Gear Meter Junction Box



Accessories

Windshield Nozzles

Part No.	Description	Qty.
C51172	End Cut Windshield Nozzle	1

Fluid Filters

C58997, Module Filter

Part No.	Description	Qty.
518779	ADAPTER, pipe, female	2
515216	HOUSING, filter	1
210658	VALVE, ball	1
116586	O-RING	1
515222	ELEMENT, filter	1

970126, Header Assembly Filter

Part No.	Description	Qty.
210658	VALVE, ball	2
617122	FRAME, header stand	1
102814	GAUGE, press, fluid	2
118854	VALVE, ball, high pressure	4
521975	FITTING, union, pipe	4
518779	ADAPTER, pipe, female	4
518741	BUSHING	4
C20490	FITTING, nipple, hex	8
515216	HOUSING, filter	2
516715	ELEMENT, filter	2
100840	FITTING, elbow, street	2
116586	O-RING	2

Repair Kits

Gear Pump Repair Kits

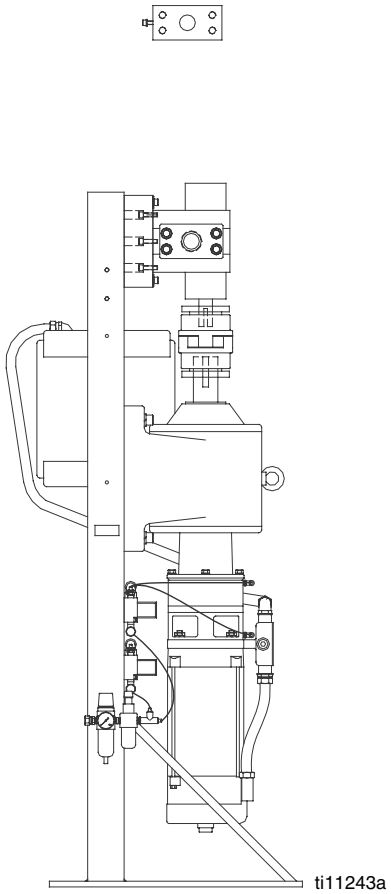
Part No.	Description	Qty.
241403	SHAFT, gear	1
248253	SEAL	4
108357	O-RING	2

241404, Hard Metal Repair Kit

Description	Qty.
SHAFT, gear	1
SHAFT, gear	1
SEAL	4
DRIVE GEAR	1
DRIVEN GEAR	1
SPACER	4

Dimensions

Model 970175, Gear Meter



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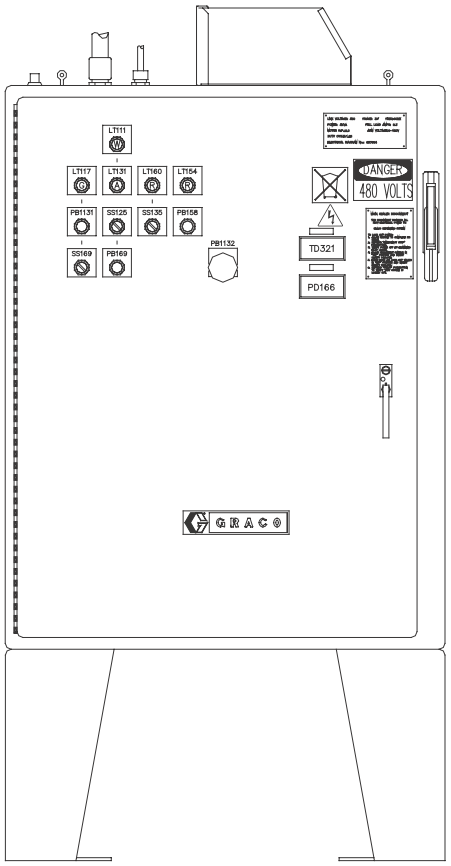
617517, Electrical Control



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Part No.	Width	Height	Depth
Gear Meter			
970175	26 in (660 mm)	59 in. (1498 mm)	23 in. (584 mm)
970176			
970177			
970194			
Electrical Control			
617517	38 in. (965 mm)	64 in. (1626 mm)	12 in. (305 mm)

Technical Data

D.C. Electric Motor	
Horsepower	2 HP @ 1750 RPM
Maximum current drive	9.3 amps
Average current draw	4.7 amps
Baldor P/N	CDP3585
Air Clutch Assembly	
Shaft size	0.875 in. diameter bore and output shaft
Maximum air supply	50 psi (0.34 MPA, 3.44 bar)
Nexen P/N	MDB875
Gear Reducer Assembly	
Description	Foot mount parallel helical gear reducer, c-face input, 36.84:1 reduction with flexible coupling
SEW Eurodrive P/N	R87AM145
Gear Pump Assembly	
Description	Inline type, high flow precision gear pump
Capacity	152 cubic in./min
Inlet Thread (on flange)	1.5 in.-11.5 in. npt (f)
Outlet Thread (on flange)	1.5- 11.5 in. npt (m)
Maximum inlet pressure	4267 psi (29.4 MPa, 294.19 bar)
Maximum outlet pressure	5689 psi 39.2 MPa, 392.24 bar)
Maximum temperature	250 °F (121 °C)
Maximum viscosity	100,000 poise (10,000 Pa.s)
Maximum rotational speed	50 rpm
Displacement	50 cc/rev (3.05 cubic in./rev)
Recommended fluid filtration	200 mesh or finer
Kawasaki P/N	HF50-CM-28
Wetted parts	D2 tool steel with tuftride coating; 1018 carbon steel; fluoroelastomer
Electrical Control Enclosure	
Required Voltage Supply	480 VAC, 3-phase, 60 Hz (not rated for 50 Hz service)
FLA	8.3 Amps

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

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

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

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Original instructions. This manual contains English. MM 312744

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