Instructions

Progressive Cavity Pump System

3B0393B

EN

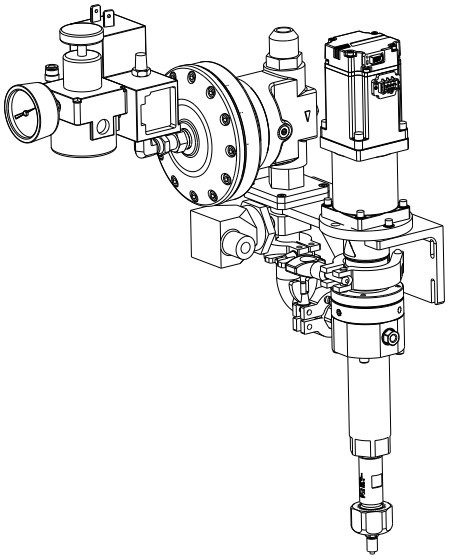
For the dispensing of highly filled single component fluids for the electronics industry. For professional use only.

Not approved for use in explosive atmospheres or hazardous (classified) locations.

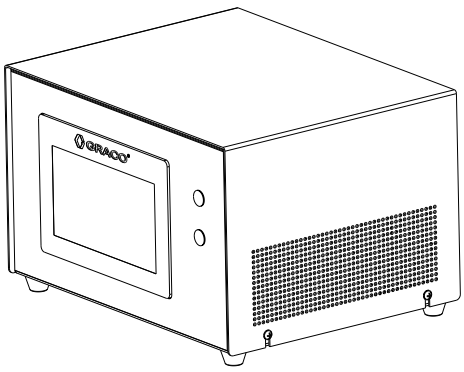
290 psi (2.0 MPa, 20 bar) Maximum Working Pressure

Important Safety Instructions

Read all warnings and instructions in this manual and all related manuals before using the equipment. Be familiar with the proper control and usage of the equipment.Save all instructions.



Progressive Cavity Pump Assembly



Progressive Cavity Pump Control Box

PROVEN QUALITY. LEADING TECHNOLOGY.

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Related manuals

Manual	Description
3A5364	Progressive Cavity Pump Repair-Parts Manual
3B0400	High Pressure Elite Fluid Pressure Regulators Instructions Manual
3B0431	DM-22 1 Gallon Supply System Instructions Manual

Models

Part	Maximum Working Pressure psi (MPa, bar)	Description	Progressive Cavity Pump[1]
2010630	290 psi (2.0 MPa, 20 bar)	Assembly, machine, PC pump, 0.3cc, I/O[2]	25B192
2010629		Assembly, machine, PC pump, 1.0cc, I/O[2]	25B193
2010628		Assembly, machine, PC pump, 1.45cc, I/O[2]	25B055

[1] See Progressive Cavity Pump Repair-Parts manual (3A5364) for details.

[2] Any PR-X system can be converted to Profinet or Ethernet IP communication mode. Order Profinet Modbus kit 2011015 for converting to Profinet communication mode, and Ethernet Modbus kit 2011014 for converting to Ethernet IP communication mode.

Safety Symbols

The following safety symbols appear throughout this manual and on warning labels. Read the table below to understand what each symbol means.

Symbol	Meaning
	Burn Hazard
	Electric Shock Hazard
	Equipment Misuse Hazard
	Fire and Explosion Hazard
	Moving Parts Hazard
	Pressurized Equipment Hazard

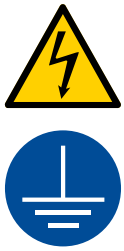
Symbol	Meaning
	Splash Hazard
	Toxic Fluid or Fumes Hazard
	Eliminate Ignition Sources
	Follow Pressure Relief Procedure
	Ground Equipment
	Ventilate Work Area

Safety Alert Symbol
This symbol indicates: Attention! Become Alert! Look for this symbol throughout the manual to indicate important safety messages.

General Warnings

The following warnings apply throughout this manual. Read, understand, and follow the warnings before using this equipment. Failure to follow these warnings can result in serious injury.

⚠ WARNING



ELECTRIC SHOCK HAZARD

This equipment must be grounded. 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 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.

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:

- 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 sparking).
- Ground all equipment in the work area. See **Grounding** instructions.
- Never spray or flush solvent at high pressure.
- 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.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static 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.

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.
- 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.

⚠ WARNING


MOVING PARTS HAZARD

Moving parts can pinch, cut 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, relieve pressure and disconnect all power sources.

BURN HAZARD

Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.

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 Safety Data Sheets (SDSs) 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.


PRESSURIZED EQUIPMENT HAZARD

Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow the **Pressure Relief Procedure** when you stop spraying/dispensing 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.

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. 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.

Typical Installation

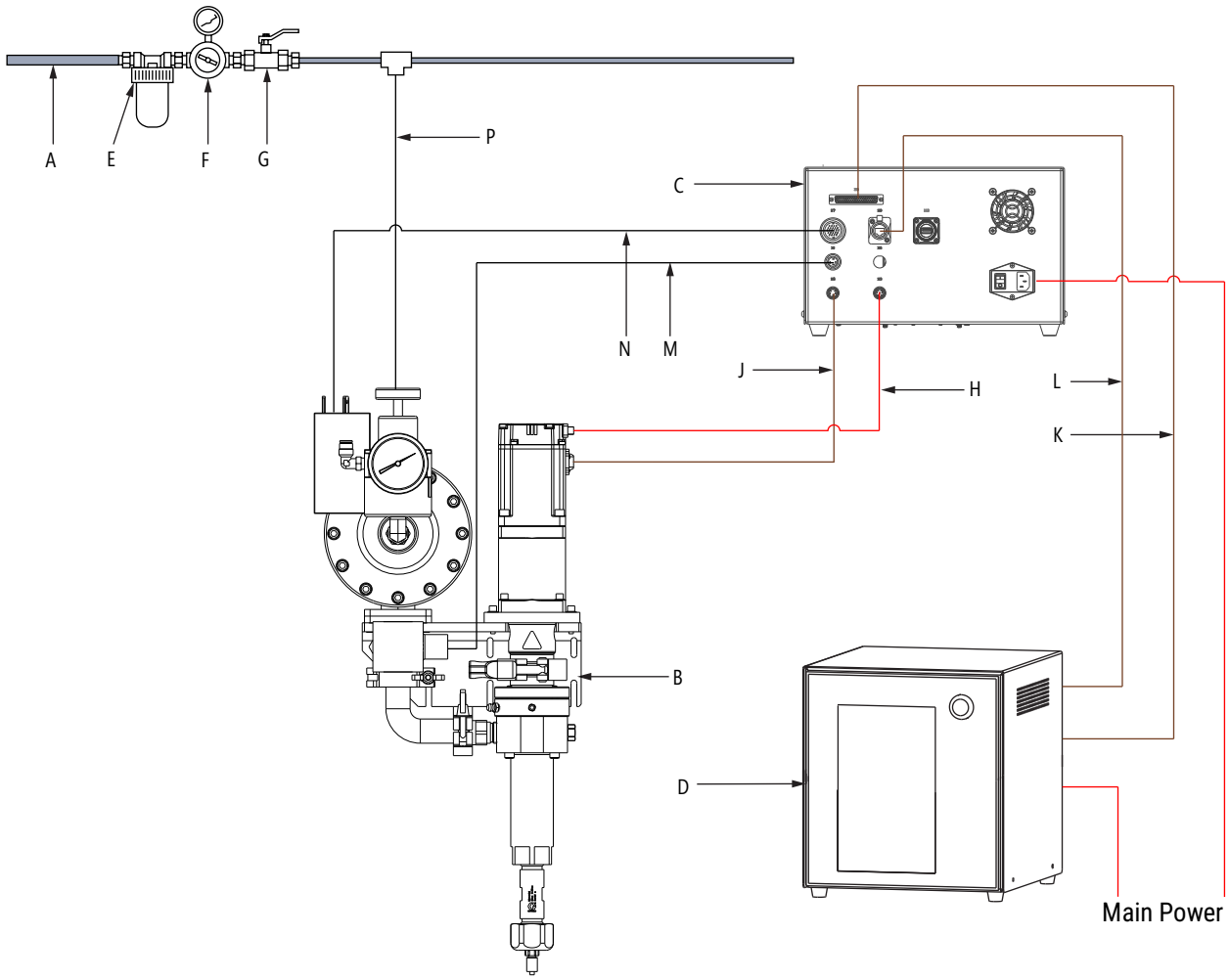


FIG. 1: Typical Installation

Key:

A Main Air Line
B Progressive Cavity (PC) Pump Assembly
C Progressive Cavity (PC) Pump Control Box
D Customer's Control Box
E Air Filter (1)
F Air Regulator (1)
G Bleed-type Master Air Valve (1)
H Servo Motor Power Cable
J Servo Motor Encoder Cable
K I/O Communication Cable
L Gateway Communication Cable
M Pressure Sensor Cable
N Solenoid Valve Cable
P Progressive Cavity (PC) Pump Air Line

(1) Required, but not supplied

Component Identification

Progressive Cavity Pump System

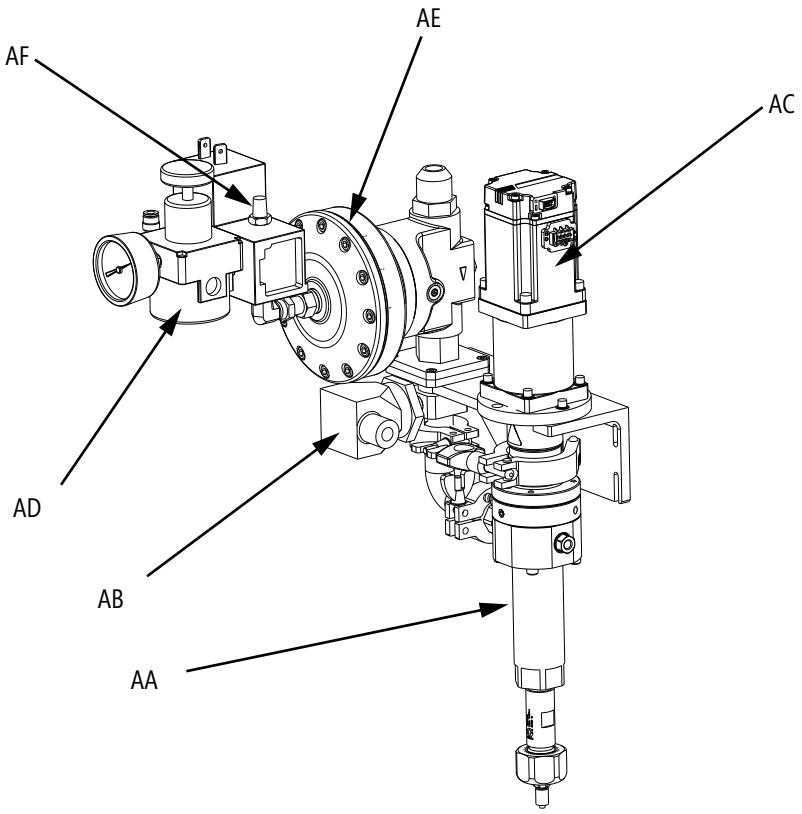


FIG. 2: Progressive Cavity Pump System

Key:
AA Progressive Cavity Pump
AB Pressure Sensor
AC Servo Motor
AD Air Regulator
AE Fluid Pressure Regulator
AF Solenoid Valve

Progressive Cavity Pump Control Box

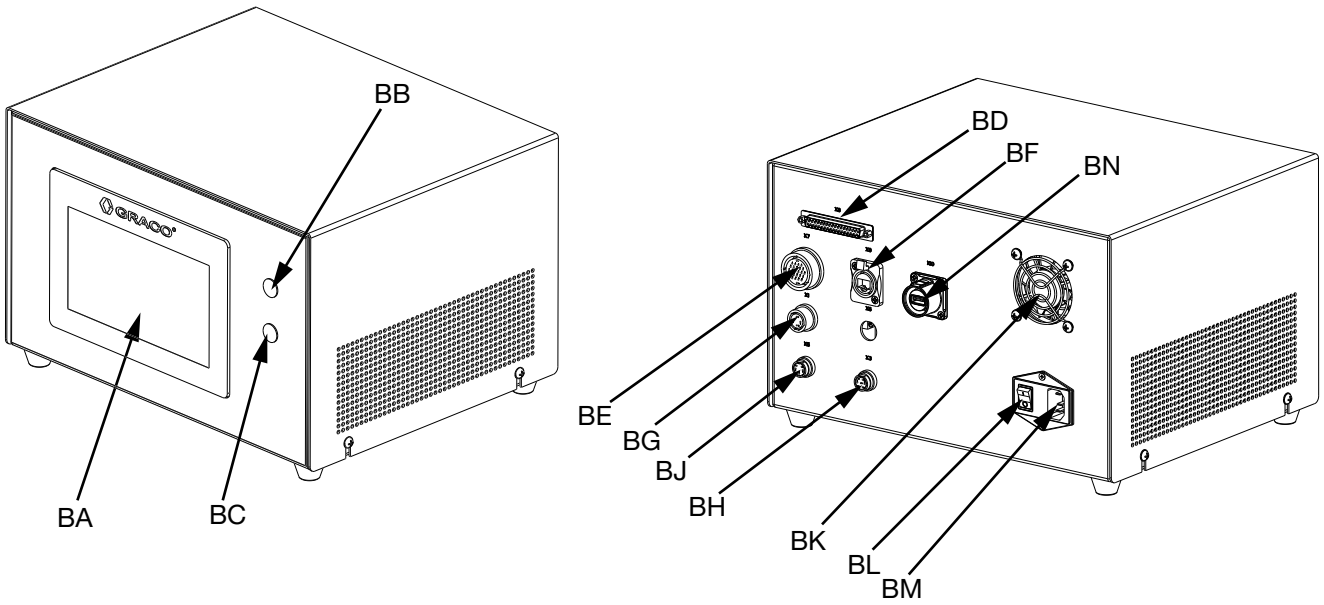


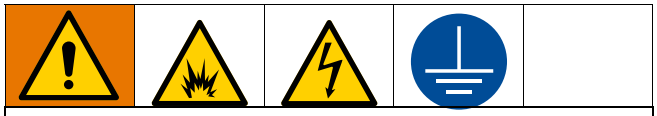
FIG. 3: Progressive Cavity Pump Control Box

Key:

BA Display
BB Servo Motor On Button
BC Servo Motor Off Button
BD Remote I/O Connection (37 pin)
BE Sensor Valve Connection
BF Gateway Connection (RJ45)
BG Pressure Sensor Connection
BH Servo Motor Connection
BJ Servo Encoder Connection
BK Cooling Fan
BL Power Switch
BM Power Connection
BN USB Interface

Installation

Grounding



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

PC pump System: this system is equipped with a cord integrated with a grounding wire and an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and regulations.

Air and fluid hoses: use only electrically conductive hoses to ensure grounding continuity.

Fluid supply container: follow local codes and regulations.

Solvent pails used when flushing: follow local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts grounding continuity.

Locate and Install

1. The PC pump Assembly (B, page 7) can be directly mounted on a customer robot or remotely mounted on a motion table or table top. Verify the location has access to compressed air and AC power.
2. Place the PC pump Assembly (B, page 7) onto the designated location.
3. Attach the PC pump assembly bracket to the selected location. Refer to FIG. 4 for mounting hole dimensions.

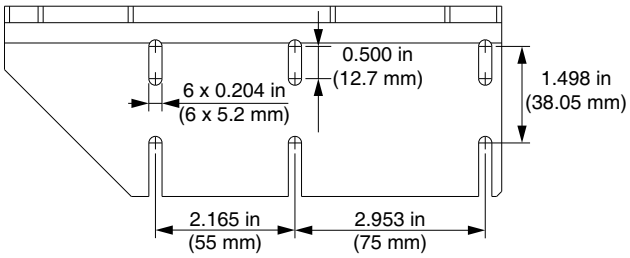


FIG. 4 Mounting Hole Dimensions

Setup and Startup

1. Use cables to connect solenoid valve, pressure sensor, servo motor power and servo motor encoder from PC pump Assembly (B, page 7) to PC pump Control Box (C, page 7).

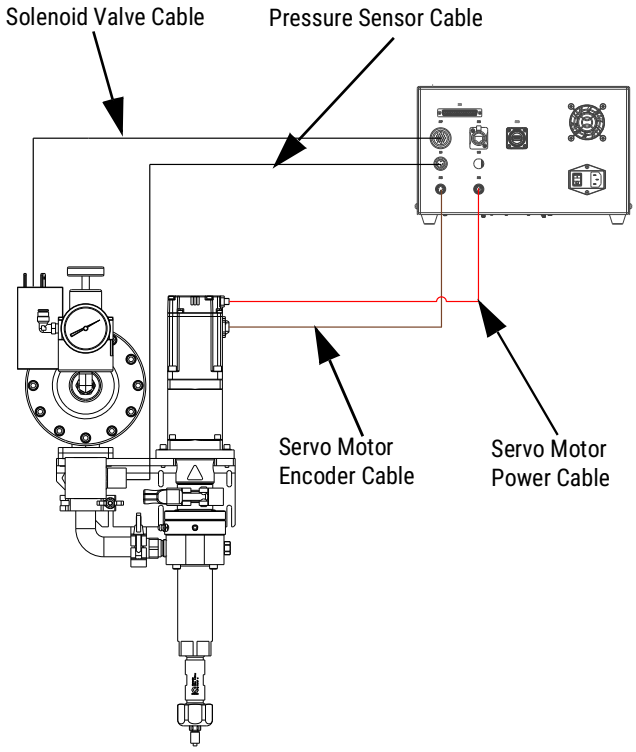


FIG. 5 Cables Connection

2. Using the power cord provided, connect AC power (220 VAC ± 10%, 50/60 Hz, single phase) to the Power Connection (BM, page 9) on the back of Control Box.

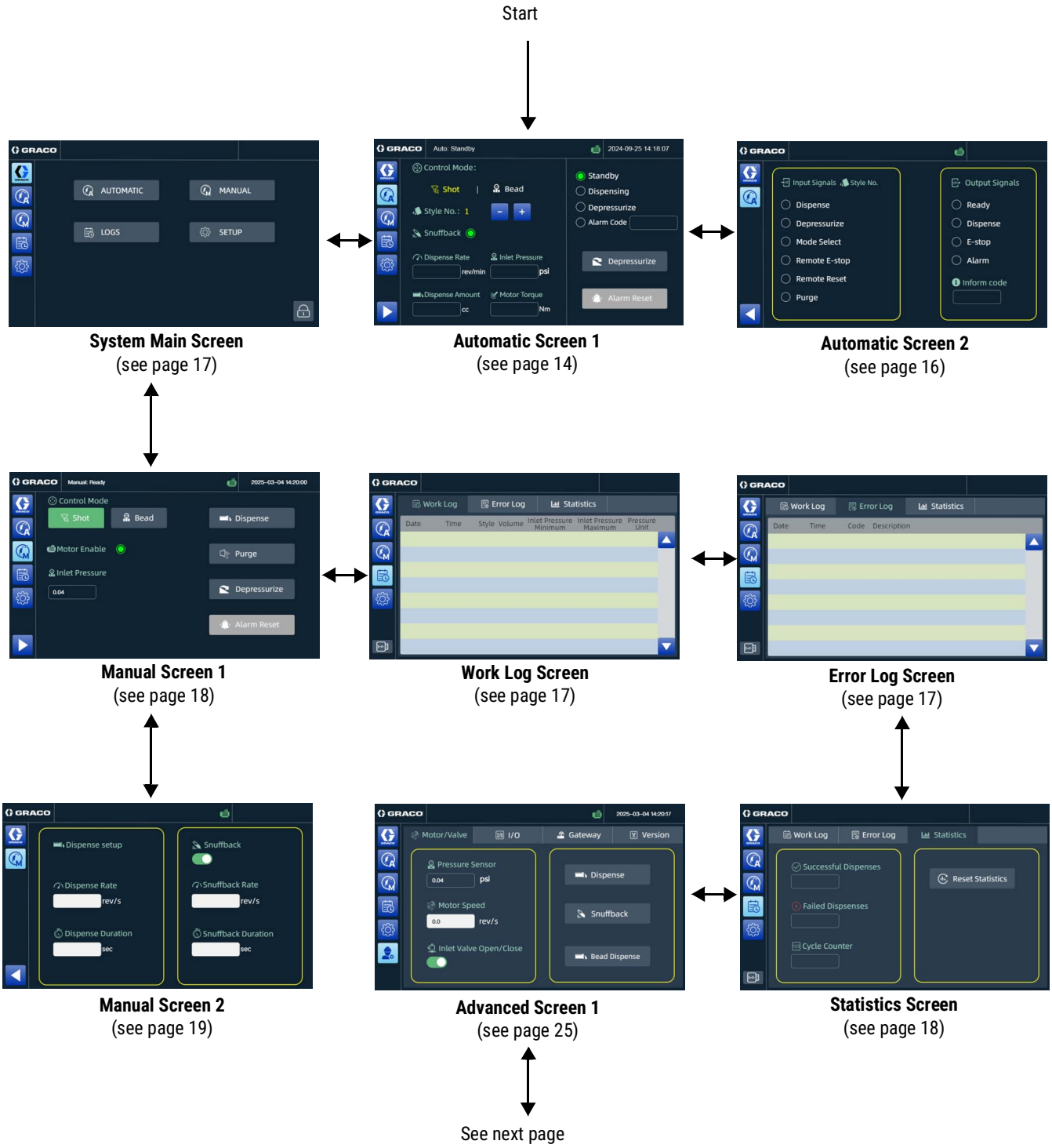
3. Adjust the Air Regulator (AD, page 8), so the air pressure input is between 80 psi (0.6 MPa, 6 bar) and 100 psi (0.7 MPa, 7 bar).

4. Press the Power Switch (BL, page 9) to turn on the PC pump control box.

5. Press the Servo Motor On Button (BB, page 9) to turn on the servo.

HMI Display Operation and Identification

Screen Navigation Diagrams



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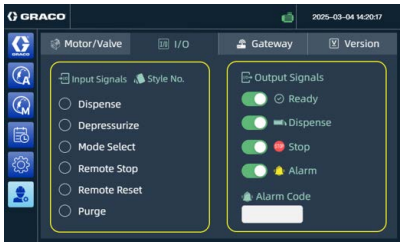
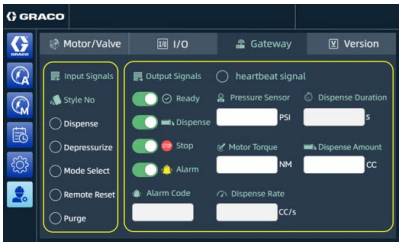
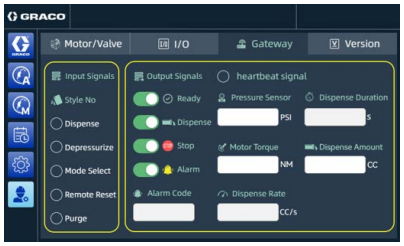


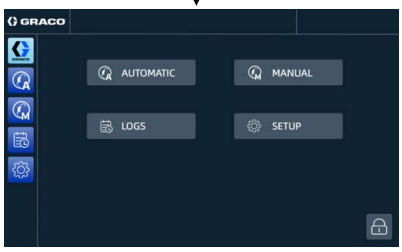
Advanced Screen 2
(see page 25)



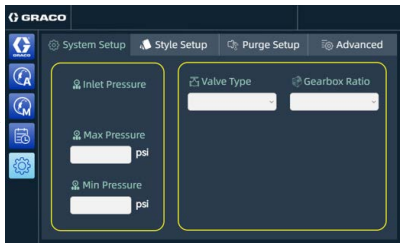
Advanced Screen 3
(see page 26)



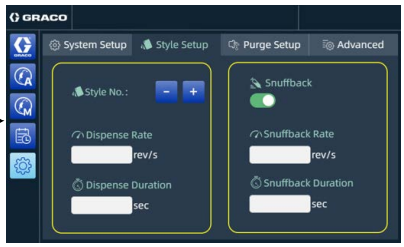
Advanced Screen 4
(see page 26)



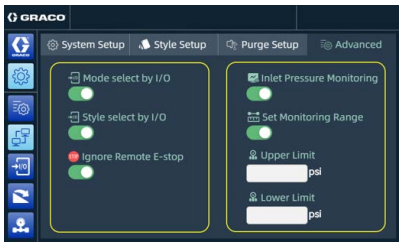
System Main Screen
(see page 17)



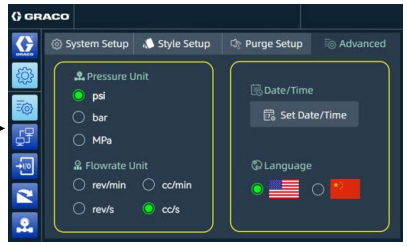
Setup Screen 1 - System
(see page 20)



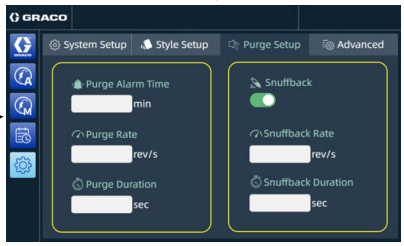
Setup Screen 2 - Style
(see page 21)



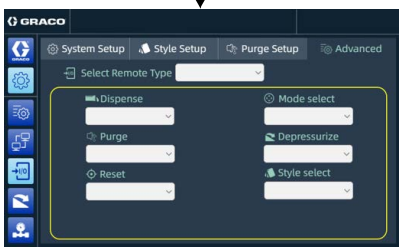
Setup Screen 4 - Advanced 2
(see page 23)



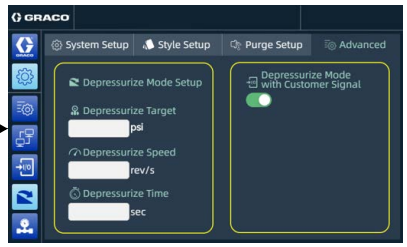
Setup Screen 4 - Advanced 1
(see page 22)



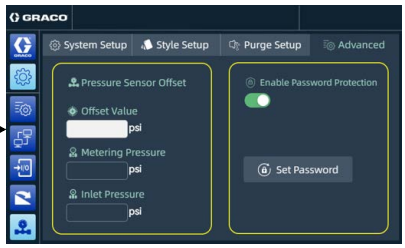
Setup Screen 3 - Purge
(see page 22)



Setup Screen 4 - Advanced 3
(see page 23)



Setup Screen 4 - Advanced 4
(see page 24)



Setup Screen 5 - Advanced 5
(see page 24)

Automatic Screen 1

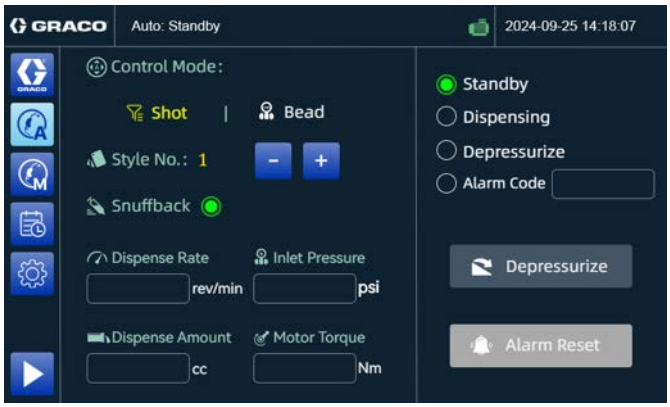


FIG. 6 Automatic Screen 1

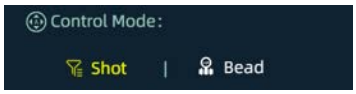
When the control box is powered on, the system automatically boots to Automatic Screen 1. Select the button to display Automatic Screen 2. Select the button to display the System Main Screen, this button can only be used when the system is in standby or has an alarm. When on the System Main Screen, the system will not work in automation mode.

The content and functions of this screen are as follows:

Information bar

- Illustrate current system status, such as Auto-Standby or Auto-Shot Dispense.
- Shows error information when an alarm is active.
- : The signal displays the status of servo, and it turns green when servo is enabled.

Control mode

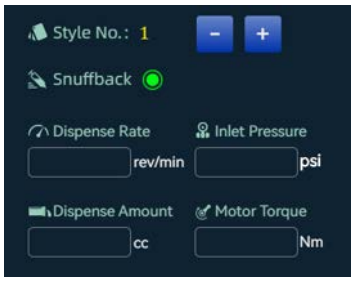


Automatic mode includes two control modes: Shot mode and Bead mode.

- Shot mode: In this mode, the system will dispense a shot at the present volume and flow rate. When the external control system sends out a start signal of more than 200 ms, the system automatically dispenses a shot, then closes the PC pump after completing the target dispensing volume.
- Bead mode: The system will dispense at the preset flow rate as long as the control system maintains the start signal. In this mode, the external control system must maintain the start signal until the dispensing is completed.

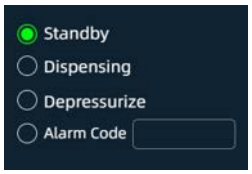
Note: The operating mode cannot be switched during the system's dispensing process.

Style settings and specified shot size and shot rate



- The style setting modes includes two modes: external signal control mode and local operation panel control mode. The style setting mode is specified in the advanced settings on the parameter setting screen. The system offers setting numbered 0-7, a total of 8 style settings to fit varied process requirements.
- The system will display the shot size and shot rate for the selected style.
- The system will display the inlet pressure and the motor torque in the area.

Current system status

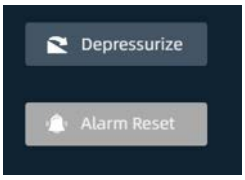


- Standby: The system is not doing any work. There is no failure or alarm.
- Dispensing: The system is dispensing material.
- Depressurize: The system is relieving the fluid pressure.

The output signals display shows the current signal status from the PC pump control box.

Alarm code	Alarm Type	Comment
0	/	No error
1	Alarm	Emergency Stop
2	Warning	Illegal Instruction
3	Warning	Illegal Style Settings
4	Alarm	Inlet Pressure too Low
5	Alarm	Inlet Pressure too High
6	Warning	Purge Timeout
7	Alarm	Motor Alarm
8	Warning	Pressure Relief Timeout, Not Reach
9	Warning	Invalid Relief Speed
10	Error	Pressure Sensor Error
11	Alarm	Servo Motor Power Lost
12	Alarm	Servo Input Error
13	Alarm	Motor Torque Limit
15	Error	Watchdog Reset

Depressurize and ALM Reset



- Depressurize Mode: the system performs in a depressurize mode setting. Before select the depressurize mode, the supply system's air control valve must be closed. Then the PC pump will operate to purge material and relieve pressure according to the preset flow rate until the inlet pressure is lower than the preset value. This operation keeps the material in the system at low pressure.
- Alarm Reset: the system will stop and display this button when the motor drive alarm, emergency stop trigger, improper parameter setting or other error is found. At this time, the operator must select this button to reset the controller.

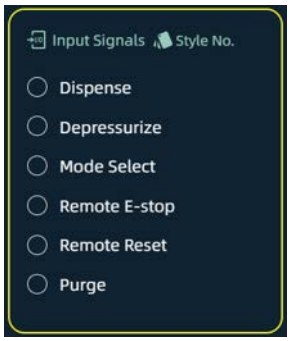
Automatic Screen 2

FIG. 7 Automatic Screen 2

On Automatic Screen 2, select the button or button to display Automatic Screen 1.

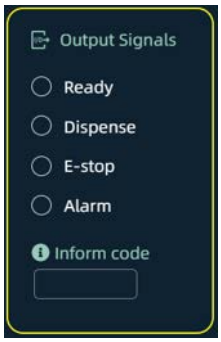
The content and functions on this screen are as follows:

Input signal status



- Dispense: Perform dispense.
- Depressurize: Perform depressurize mode.
- Mode Select: Select mode.
- Remote Stop: External emergency stop.
- Remote Reset: External alarm reset.
- Purge: Perform purge.
- Style number: Selected style setting number.

Output signal status



- Ready: Equipment ready.
- Dispense: Dispensing in progress.
- Stop: Emergency stop is in effect.
- Alarm: System alarm is activated.

The output signals display shows the current signal status from the PC pump control box.

Inform code	Inform Type	Comment
0	Status	Idle
1	Status	Automatic: Standby
2	Status	Automatic: Shot dispense
3	Status	Automatic: Bead dispense
4	Status	Automatic: In purging
5	Status	Automatic: In depressurize mode
6	Status	Manual: Ready
7	Status	Manual: Shot dispense
8	Status	Manual: Bead dispense
9	Status	Manual: Purging
10	Status	Manual: In depressurize mode

System Main Screen

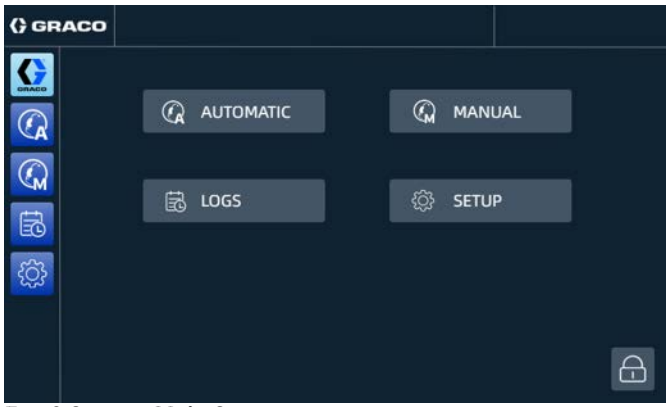


FIG. 8 System Main Screen

On Automatic Screen 1, select the button to display System Main Screen. On this screen, the operator can switch the system to Automatic mode, Manual mode, Logs mode or Setup mode.

If the operator has already set up password protection on **Setup Screen 4 - Advanced 4**, see page 24, the password must be entered to visit the Setup Screens.

System Logs Screen

On Automatic Screen 1, select button to display System Logs Screen. General system logs can be found in these screens. Select the button to display the System Main Screen.

System Logs Screen records system work and error information.

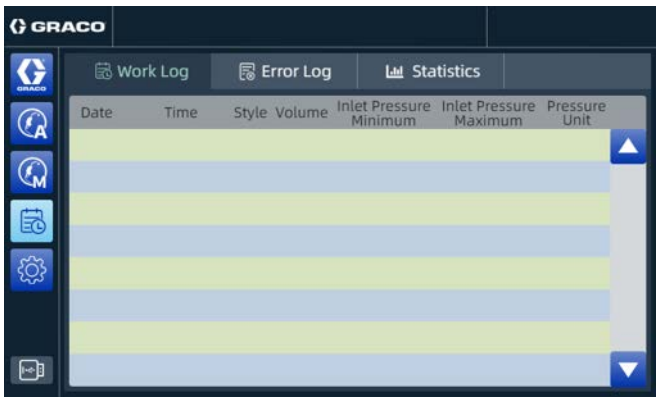


FIG. 9 Work Log Screen

Work Log Screen records details of date, time, style, dispense volume, minimum and maximum pressure and pressure unit for each work.

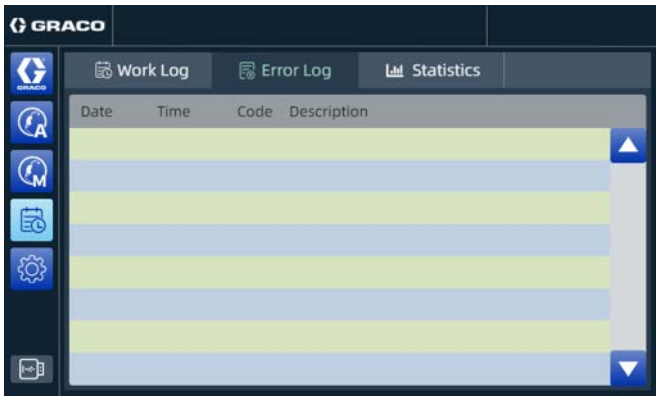


FIG. 10 Error Log Screen

Error Log records details of date, time, error code, and description for each work.

Work and error log export

Insert USB, click and select OK in the pop-up dialogue box to export work log and error log as files.

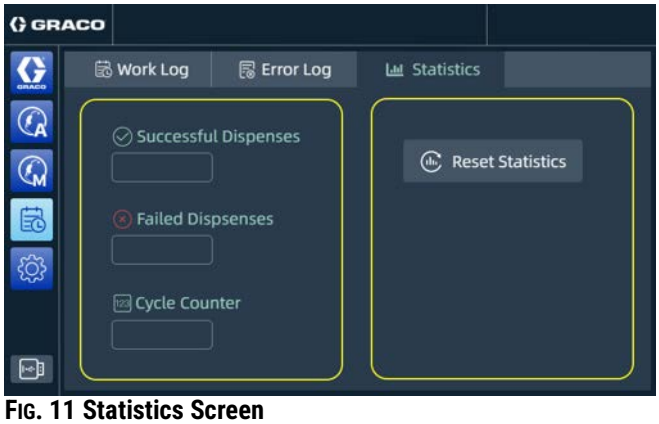


FIG. 11 Statistics Screen

Statistics Screen records successful dispenses and failed dispenses. If dispenses arise alarms and errors, they are counted as failed dispenses. Successful dispenses plus failed dispenses equals cycle counter. Click 

.

Manual Screen 1

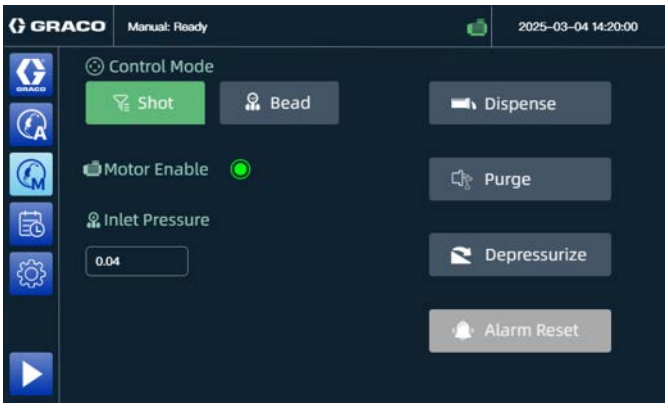
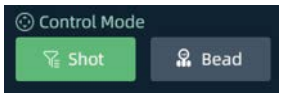


FIG. 12 Manual Screen 1

On Manual Screen 1, select the  button to display Manual Screen 2. Select the  button to display the System Main Screen. This button can only be selected when the system is in standby or alarm mode. When on the System Main Screen, the system will not work in Automation mode.

The content and functions on this screen are as follows:

Control mode



Manual mode includes two control modes: Shot mode and Bead mode

- Shot mode: the system will operate according to the target dispense duration and flow rate on the Manual Screen 2. In this mode, the operator may press the 'Dispense' button to automatically start dispensation. The system will automatically close the PC pump after completing the target dispense duration.
- Bead mode: the system will operate according to the flow rate on the Manual Screen 2. In this mode, the operator must press and hold the 'Dispense' button until dispensing is completed.

Note: The operating mode cannot be switched during the system's dispensing process.

Servo enable

The green signal is on when servo is enable.

Inlet pressure

The operator may set a value for fluid inlet pressure.

Operation button

- Dispense: the system starts to dispense. For detailed instructions, see the control mode section.
- Purge: the system will purge according to the pre-set purge volume and flow rate. In manual mode, the operator only needs to press the button once for the system to automatically start the purging. The system will automatically close the PC pump after completing the target purging volume.
- Depressurize: the system performs in a depressurize mode setting. Before select the depressurize mode, the supply system's bleed type air valve must be closed. Then the PC pump will operate to purge material and relieve pressure according to the preset flow rate until the inlet pressure is lower than the preset value. This operation keeps the material in the system at low pressure.
- ALM Reset: the system will stop and display this button when the motor drive alarm, emergency stop trigger, improper parameter setting or other error is found. At this time, the operator must select this button to reset the controller.

Manual Screen 2

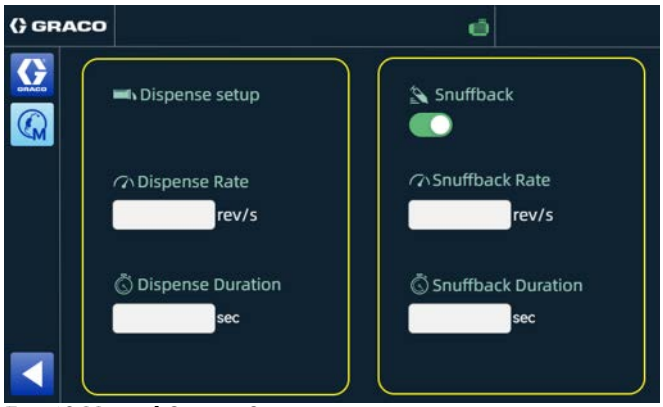


FIG. 13 Manual Screen 2

On Manual Screen 2, select the button to display Manual Screen 1.

The content and functions on this screen are as follows:

Dispense setup

- Dispense Rate: Set values for dispense rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Dispense Duration: Set values for dispense duration.

NOTE: Input up to 1 decimal place at most.

Snuff back setup

- : Select to enable snuff back, or deselect to disable snuff back function.
- Snuffback Rate: Set values for snuff back rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Snuffback Duration: Set values for snuff back duration.

NOTE: Input up to 1 decimal place at most.

Setup Screen

Setup Screen 1 - System

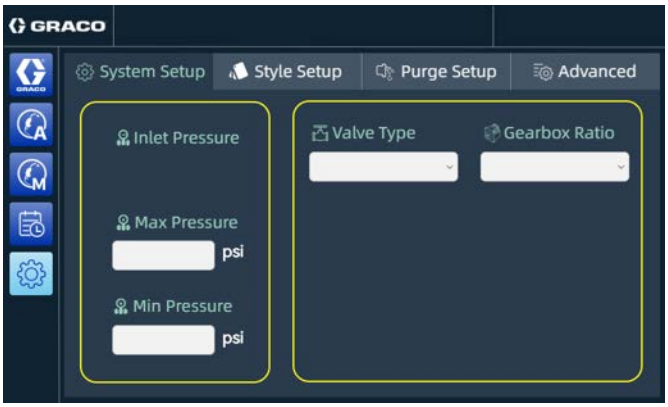


FIG. 14 Setup Screen 1 - System

In the setup mode, each screen can be switched to this screen by selecting System Setup.

The content and functions on this screen are as follows:

Inlet pressure monitoring range

- Max Pressure: set the maximum inlet pressure value. When the inlet pressure is higher than this value, the voltage regulator solenoid valve will cut off the pressure, and the system alarm will be activated.
- Min Pressure: set the minimum inlet pressure value. When the inlet pressure is lower than this value, the voltage regulator solenoid valve will cut off the pressure, and the system alarm will be activated.

NOTE: Input up to 1 decimal place at most.

Basic servo setup

- Valve Type: this control box supports PCP 0.30 cc, PCP 1.00 cc and PCP 1.45 cc.
- Gearbox Ratio: the default reduction ratio setting of Reduction gearbox is 10:1.

NOTE: Input up to 1 decimal place at most.

Setup Screen 2 - Style

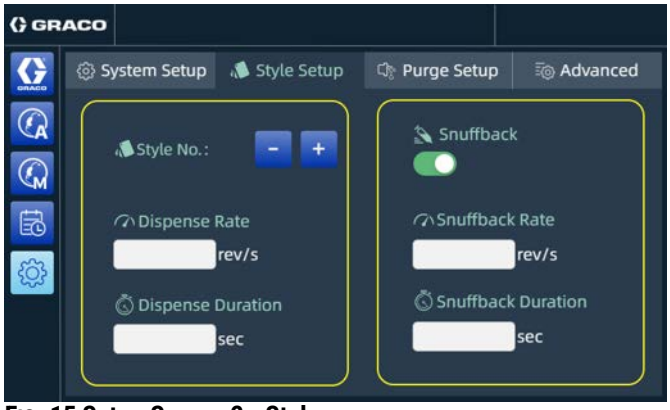


FIG. 15 Setup Screen 2 - Style

In the setup mode, each screen can be switched to this screen by selecting Style Setup.

The contents and functions on this screen are as follows:

Style setup

- Style No.: Select the − or + button to change style number. A total of 16 styles from 0 to 15 can be set. Dispense and snuff back details can be set separately for each style.
- Dispense Rate: Set values for dispense rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Dispense Duration: Set values for dispense duration.

NOTE: Input up to 1 decimal place at most.

snuff back setup for style

- : Select to enable snuff back, or deselect to disable snuff back for each style.
- Snuffback Rate: Set values for snuff back rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Snuffback Duration: Set values for snuff back duration.

NOTE: Input up to 1 decimal place at most.

Setup Screen 3 - Purge

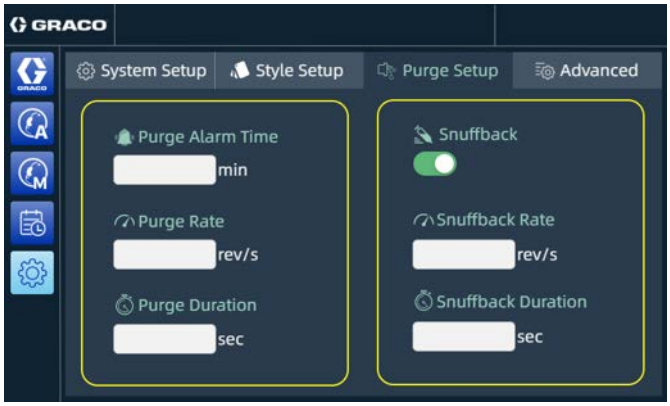


FIG. 16 Setup Screen 3 - Purge

In the setup mode, each screen can be switched to this screen by selecting Purge Setup.

The contents and functions on this screen are as follows:

Purge setup

- Purge Alarm time: If the system is not working within the set time, the system will automatically purge some material to prevent the material from solidifying.
- Purge Rate: set the values for purge rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Purge Duration: Set values for purge duration.

NOTE: Input up to 1 decimal place at most.

Snuff back setup for purge

- : Select to enable snuff back, or deselect to disable snuff back for purge.
- Snuffback Rate: Set values for snuff back rate. For 1.00cc, a maximum input value of 300cc/min is allowed. For 1.45cc, a maximum of 435cc/min is allowed. For 0.3cc, a maximum of 90cc/min is allowed.
- Snuffback Duration: Set values for snuff back duration.

NOTE: Input up to 1 decimal place at most.

Setup Screen 4 - Advanced

In setup mode, this screen can be accessed by selecting Advanced. The advanced setup includes four screens.

Setup Screen 4 - Advanced 1

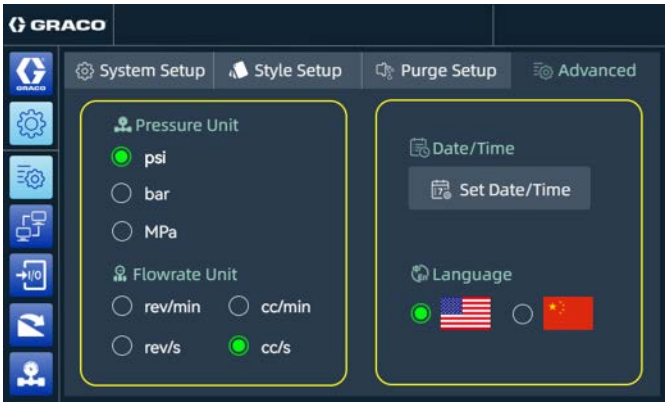


FIG. 17 Advanced setup screen 1

The content and functions on this screen are as follows:

Date/Time

The operate may set the system date and time.

Pressure unit

The operator may select psi, bar or MPa to customize the units used for pressure setup. Unit of psi is the default setting.

Flowrate unit

The operator may select either rev/min, rev/s, cc/min or cc/s to customize the units used for flowrate setup. The default setting is rev/s.

Language

The operator may select either Chinese (by selecting the Chinese flag) or English (by selecting British flag) to change the language used on the system's user interface.

Setup Screen 4 - Advanced 2

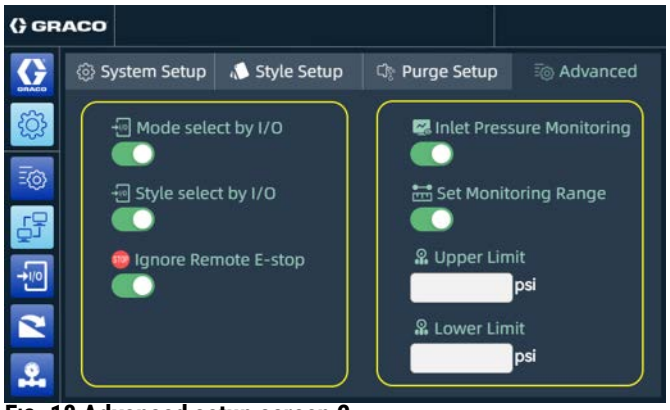


FIG. 18 Advanced setup screen 2

The content and functions on this screen are as follows:

Mode select by I/O

If this function is selected, the control mode is selected by the external control system.

Style select by I/O

If this function is selected, the style number is controlled by the external control system.

Ignore Remote E-Stop

Select this function to ignore external emergency stop signals.

Inlet Pressure Monitoring

If this function is selected, when the inlet pressure is higher than max pressure or lower than min pressure setting on the **Setup Screen 1 - System**, see page 20, the system alarm will be activated.

Set Monitoring Range

- Upper Limit: when the actual pressure is higher than the upper pressure, the inlet valve closes.
- Lower Limit: when the actual pressure is lower than the lower pressure, the inlet valve opens again.

Setup Screen 4 - Advanced 3

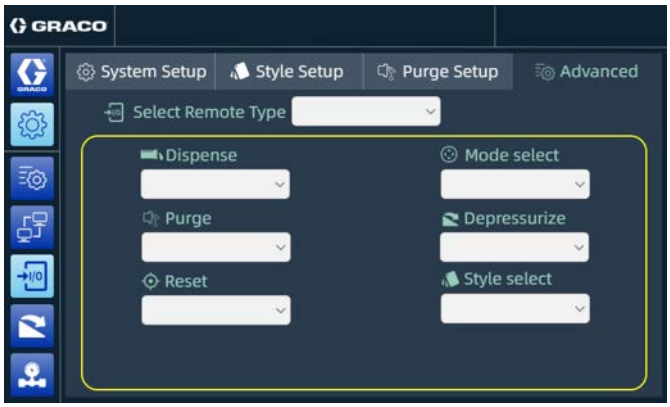


FIG. 19 Advanced setup screen 3

The content and functions on this screen are as follows:

Two types of I/O and Network are under selection of Select Remote Type. When I/O is selected, all gateway communications for these operations are defaulted as I/O. When Network is selected, either network or I/O communication can be selected for each of these operations.

Setup Screen 4 - Advanced 4

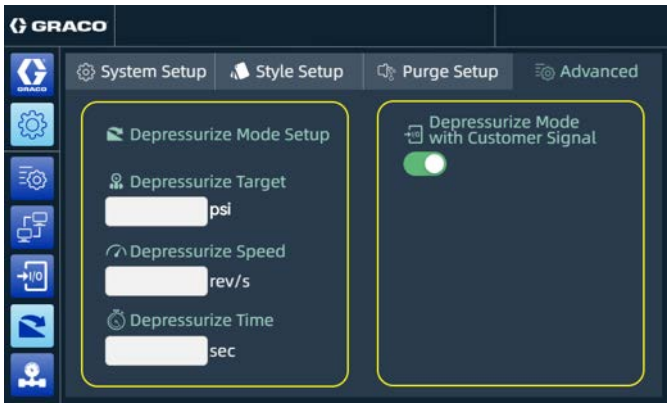


FIG. 20 Advanced setup screen 4

The content and functions on this screen are as follows:

Depressurize mode setup

- Depressurize target: set the target value for pressure relief.
- Depressurize speed: set the value for speed of system depressurization.
- Depressurize time: if the pressure does not reach the target value within the specified time, the system alarm will be activated.

NOTE: Input up to 1 decimal place at most.

Depressurize mode with customer signal

Select this function when depressurize mode is controlled by external signal.

Setup Screen 5 - Advanced 5

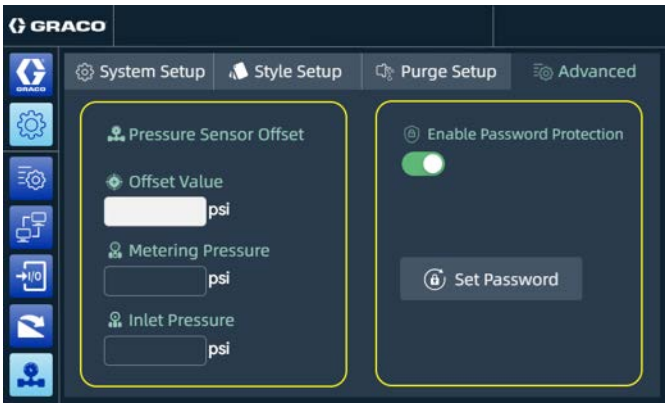


FIG. 21 Advanced setup screen 5

The content and functions on this screen are as follows:

Pressure sensor offset

- Offset Value: Enter a value to offset the pressure between metering pressure and the actual pressure. Input up to 1 decimal place at most.
- Metering Pressure: display the value detected by pressure sensor.
- Inlet Pressure: display the pressure value after offset. Inlet pressure equals metering pressure and offset value. The inlet pressure value on the **Automatic Screen 1** or **Manual Screen 1** is this inlet pressure value.

Enable password protection and set password

If this function is selected, a 4-digit number should be set. After the 4-digit number is set, the operator will be prompted to input the password before navigating to Advance screens. Follow the steps for setting the password.

1. Select Set Password.
2. Click CE in the pop-up password keyboard.
3. Enter the 4-digit password you intend to set.
4. Click OK to complete the password setting.

Advanced Screen

Advanced screen is dedicated to repairing and testing the system. After navigating to this screen, the logic relationship between the drive motor, reloading valves and dispense valves will be overrode and the operator may control each part individually. For this reason, only qualified personnel who have received equipment maintenance training should be authorized to navigate to this screen and perform system check.

Advanced Screen 1

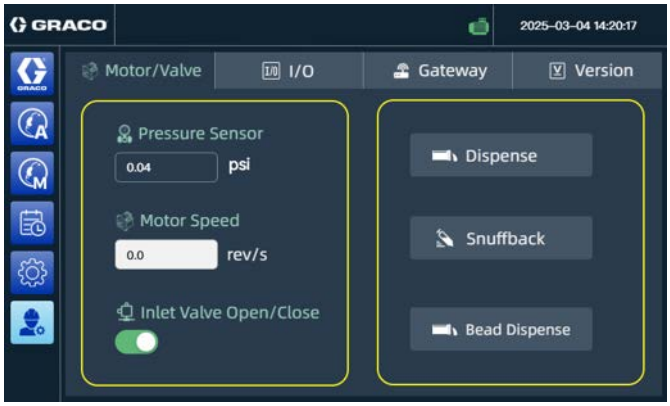


FIG. 22 Advanced Screen 1

On System Main Screen, select  , enter default password 1492 to display Advanced Screen 1. See **Enable password protection and set password**, page 24 for changing the default password.

Motor Speed
This box is for setting the speed of the slide block. A maximum input value of 50 rev/s is allowed and input up to 1 decimal place at most

Inlet Valve Open/Close
Select to open and close the solenoid valve.

Dispense
Click once to check if the motor normally rotate forward. Long press this button to let the motor continuously rotate forwardly.

Snuffback
Click once to check if the motor normally rotate backward. Long press this button to let the motor continuously rotate backward.

Bead Dispense
Click to check if the motor continuously rotate forward normally. Click again to stop the rotation of the motor.

Advanced Screen 2

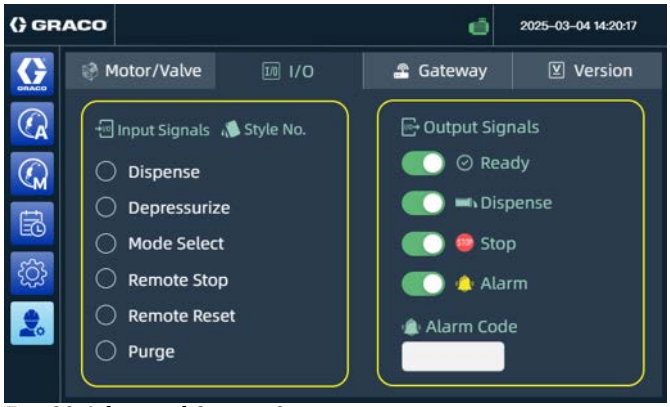


FIG. 23 Advanced Screen 2

On Advanced Screens, select 

to display Advanced Screen 2.

Advanced Screen 2 is used to check signal exchange in I/O communication mode.

Advanced Screen 3

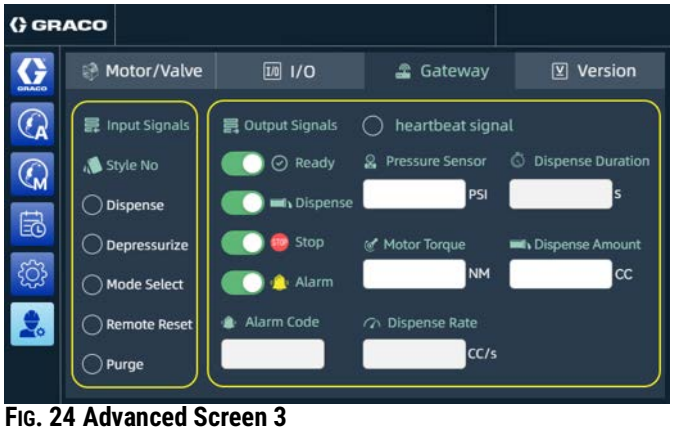


FIG. 24 Advanced Screen 3

On Advanced Screens, select Gateway to display Advanced Screen 3.

Advanced Screen 3 is used to check signal exchange in Profinet or Ethernet IP communication mode.

Advanced Screen 4

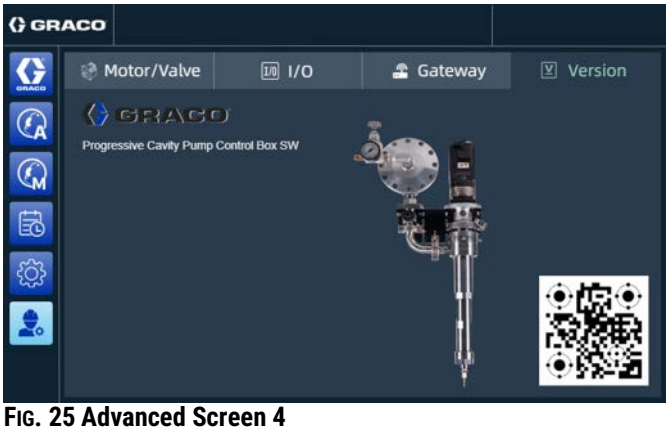


FIG. 25 Advanced Screen 4

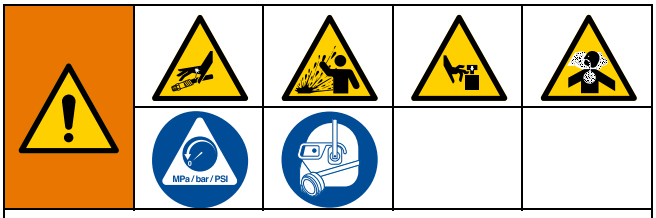
On Advanced Screens, select Version to display Advanced Screen 4.

Advanced Screen 4 displays the general information of PC pump system. Scan the QR code at the lower right corner for more product details.

Operation

Pressure Relief Procedure

Follow the Pressure Relief Procedure whenever you see this symbol.



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 when you stop spraying and before cleaning, checking, or servicing the equipment.

To avoid injury from toxic fluids or fumes, such as splashing in the eyes or on skin, wear appropriate personal protective equipment.

1. Turn off the air supply for the fluid pressure regulator (AE, page 8).
2. Go to Manual Screen 1 of the PCP control box, then select “Dispense”.

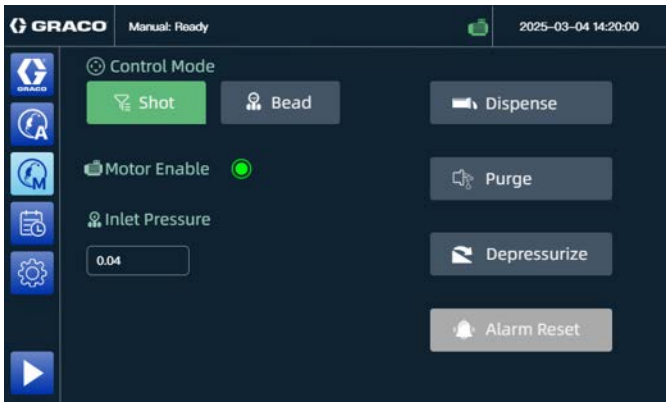


FIG. 26 Manual Screen 1

3. When the inlet pressure drop to ZERO, press Servo Motor Off Button (BC, page 9) to shut down the servo.

Prime the Pump

The pump is self-priming when certain conditions are met. However, with higher viscosity media, the material must be introduced first (pre-pressure). For more information on the priming conditions of specific material, refer to information provided by the material supplier.

Purge the Pump

For the pump to operate properly, all air needs to be removed and the pump needs to be filled with material.

1. Apply pressure to the inlet (25) of the pump.
2. Loosen the pressure bleed (20) one to two turns using a 1/2 inch wrench so air can escape. Material can flow without this pressure bleed being completely removed.

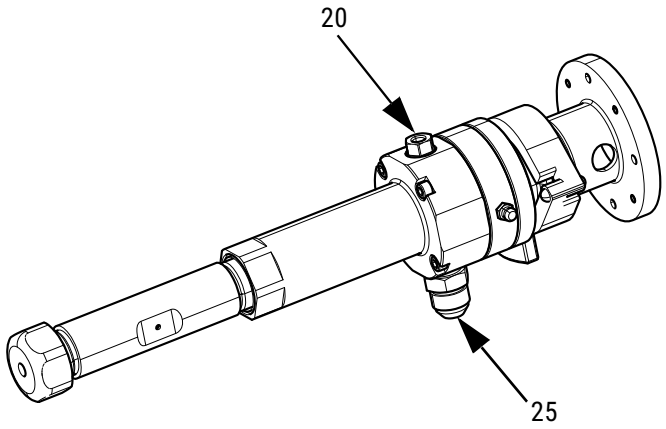


FIG. 27

Flush the equipment

- Flush out old fluid with compatible solvent before introducing a new fluid.
- Use the lowest possible pressure when flushing. All fluid components are compatible with common solvents.
- To flush the system, put a waste container below PC pump, and circulate a compatible solvent through the system for several times until the pump dispenses the compatible solvent. Then drain the compatible solvent.

Job Suspend and Restart

To stop the job for a short time and restart the job, follow the instructions.

1. Press the Servo Motor Off Button (BC, page 9), the system suspends the job.
2. When restarting the job, press Alarm Reset on automatic or manual screens. Then Press the Servo Motor On Button (BB, page 9) to restart job.

E-stop

E-stop function is not provided by default, but the customers can apply this function by removing the terminal jumper (TX1: 1 and 2) in the control box and connect to remote control of E-stop.

Shutdown

1. Make sure the system finishes current job.
2. Place a waste container below the pump and activate a small shot to flush the material out of the pump.
3. Perform the **Pressure Relief Procedure** on page 27.
4. Press Servo Motor Off Button (BC, page 9).
5. Turn off the Power Switch (BL, page 9) of the control box.
6. Turn off the air supply.

Recycling and Disposal

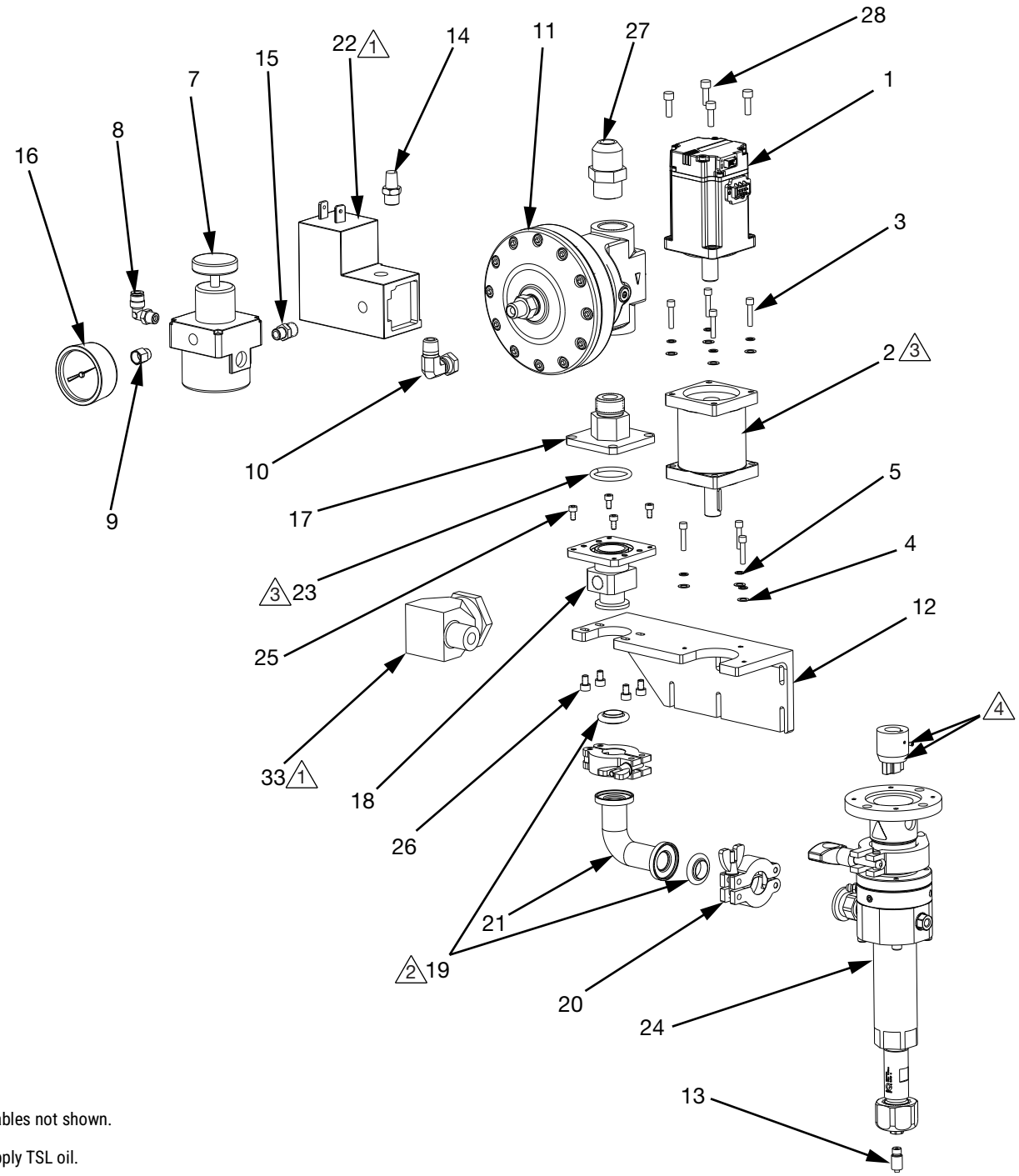
End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedure**.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Deliver remaining product to a recycling facility.

Parts

PC Pump Assembly



1 Cables not shown.

2 Apply TSL oil.

3 Apply high temperature lubricant grease.

4 Included in part 24.

FIG. 28

Ref.	Part	Description	Quantity		
			2010630	2010629	2010628
1	18D881	MOTOR, servo, 220V, 400W, INO	1	1	1
2	2003864	GEAR REDUCER, PC pump, 10:1	1	1	1
3	18B915	SCREW, M4 × 0.7-20, socket	7	7	7
4	186114	WASHER, SST	7	7	7
5	---	WASHER, lock	7	7	7
7	2004073	REGULATOR, air, IR1010-01	1	1	1
8	2004074	CONNECTOR, air hose, G1/8-08mm	1	1	1
9	2004078	FITTING, G1/8 male × 1/8npt female	1	1	1
10	155541	FITTING, swivel, 90 degree	1	1	1
11	2008938	REGULATOR, pressure, ORFS, P60-VP, DN7	1	1	1
12	---	BRACKET, PC pump	1	1	1
13	E4000016	ADAPTER, NDL, LL, 5/16-28, M, chrome P	1	1	1
14	---	MUFFLER, G1/4	1	1	1
15	2004075	FITTING, G1/4 male × G1/8 male	1	1	1
16	108190	GAUGE, pressure, air	1	1	1
17	2009270	CONNECTOR, PC pump	1	1	1
18	2004080	CONNECTOR, pressure sensor	1	1	1
19†	---	SEAL, clamp, PC pump	2	2	2
20	---	CLAMP, PC pump	2	2	2
21	---	TUBE, PC pump	1	1	1
22	2008773	KIT, solenoid valve cable, PCP	1	1	1
23†	---	O-RING, FKM, ID30, CS 3.5	1	1	1
24	25B192	PUMP, lower, PC, 0.30cc/rev, FKM	1		
	25B193	PUMP, lower, PC, 1.00cc/rev, FKM		1	
	25B055	PUMP, lower, PC,1.45cc/rev, FKM			1
25	---	SCREW, M4 × 0.7-8, socket head, SST	4	4	4
26	---	SCREW, M5 × 0.8-8, socket head, SST	4	4	4
27	2009272	CONNECTOR, JIC12-1"ORFS	1	1	1
28	---	SCREW, M5 × 0.8-16, socket head, SST	4	4	4
33	2008774	KIT, pressure sensor cable, PCP	1	1	1
35*	2000277	CABLE, servo motor-A10	1	1	1
36*	2000274	CABLE, servo encoder-A10	1	1	1
37*	2009638	CABLE, remote I/O, 10m	1	1	1

--- *Not available for individual sale.*

* *Not shown on the sketch.*

† *Parts and part 17L270 (included in 24) are included in PCP system seal kit 2010888.*

PC Pump Control Box

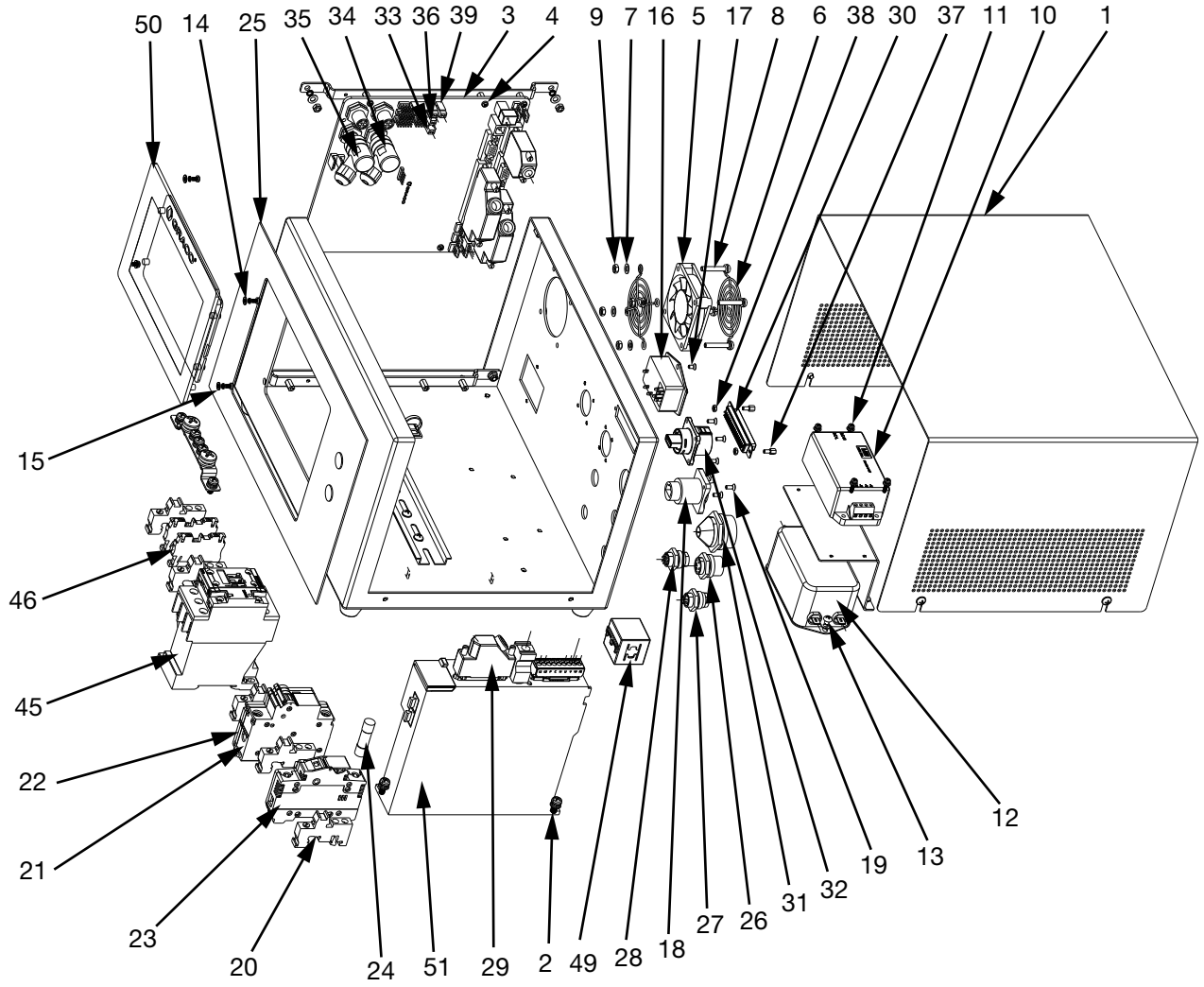


FIG. 29

Ref.	Part	Description	Quantity
1	---	ENCLOSURE, assy, 265W × 334H × 216.5D mm	1
2	---	SCREW, grounding, M5 × 12	2
3	2000267	BOARD, PCB, assembly	1
4	---	SCREW, M3 × 5, cross head, SST	10
5	CU1806	FAN, cooler	1
6	---	COVER, protection, fan	2
7	---	WASHER, flat, M4, SST	10
8	---	SCREW, M4 × 25, cross head, SST	4
9	---	NUT, M4, SST	4
10	CU1670	POWER SUPPLY, 60W, 24VDC, MW	1
11	---	SCREW, grounding, M3 × 12	4
12	---	CABLE, power supply, inside	1
13	---	SCREW, M4 × 5, cross head, SST	2

Ref.	Part	Description	Quantity
14	---	WASHER, flat, M3, SST	4
15	---	WASHER, spring, M3	4
16	CU1674	SOCKET, power	1
17	---	SCREW, M3 × 6, cross countersunk, SST	2
18	---	CONNECTOR, network	1
19	---	SCREW, M3 × 8, cross countersunk, SST	2
20	---	TERMINAL, end clamp	4
21	CU1640	CIRCUIT BRKR, 1P, 6A, Schneider	1
22	CU1641	CONTACT, block, 1CO	1
23	CU0018	HOLDER, fuse, ABB	1
24	CU0341	FUSE, FLM 4A	1
25	---	BUTTON, key pad, PCB	1
26	CU1789	CABLE, pressure sensor	1
27	CU1788	CABLE, X3 to U202	1
28	CU1787	CABLE, X5 to U202	1
29	CU1795	CABLE, U202 to CON5	1
30	CU1791	CABLE, CON9 to X8	1
31	CU1790	CABLE, CON8 to X7	1
32	CU1758	SOCKET, USB	1
33	---	CABLE, P14 to KM124	1
34	CU1794	CABLE, CON2 to U202	1
35	CU1793	CABLE, CON4 to U219	1
36	CU1796	CABLE, P13 to CB115	1
37	---	STAND, M3	1
38	---	NUT, M5, SST	2
39	---	CABLE, key pad to P24, P15	2
40	---	CABLE, power supply, 24VDC	1
41	---	CABLE, X10	1
42	---	CABLE, FU142 to U141	1
43	---	CABLE, CB115 to KM124	1
44	---	CABLE, U202 to G105	1
45	CU0017	CONTACT, 3P, 1NO+1NC, Siemens	1
46	2009739	TERMINAL, gray	1
47	---	CABLE, U202 to G105	2
48	---	CABLE, KM124 to U202	1
49	121901	SUPPRESSOR, box snap, ferrite	1
50	CU7788	DISPLAY, PCB	1
51	2000343	DRIVER, servo, INNOVANCE	1

Kits and Accessories

Communication Module Kits

Part	Description	Qty.
2011015	KIT, Modbus-Profinet, PCP, PCB	1
2011014	KIT, Modbus-Ethernet IP, PCP, PCB	1

Seal Kits

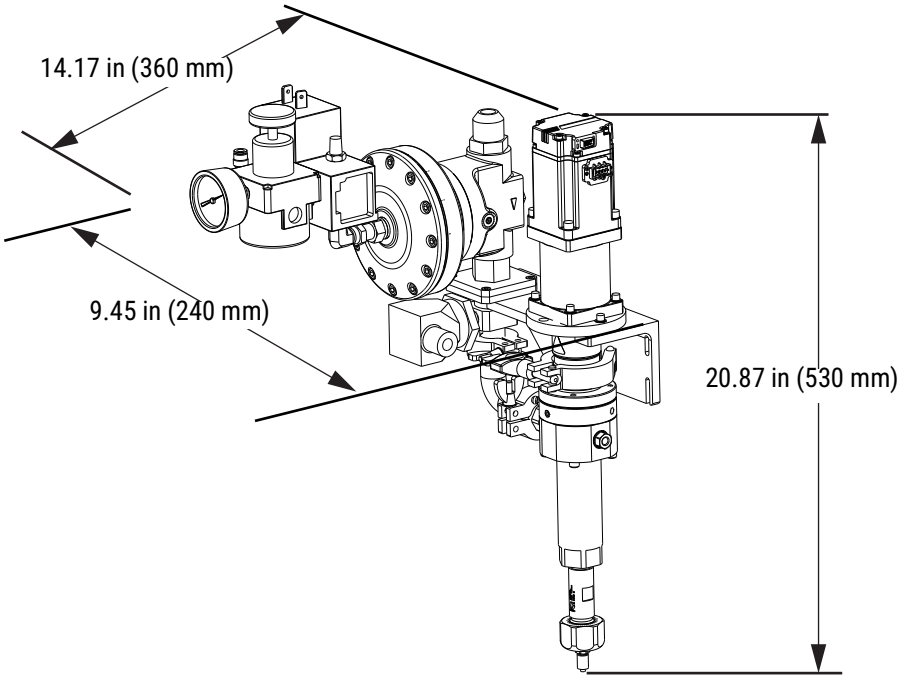
Part	Description	Qty.
2010888	KIT, seal PCP system	1

Cables

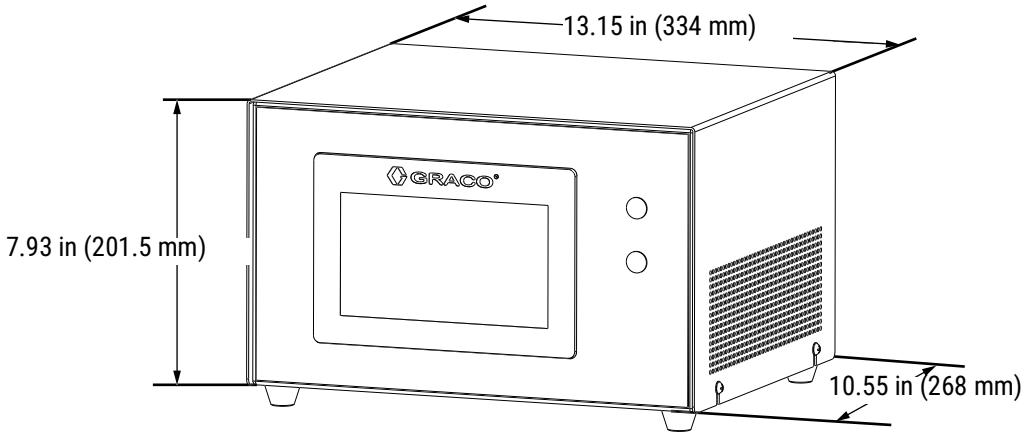
Part	Description	Qty.
2009245	CABLE, pressure sensor, 10m	1
2009246	CABLE, pressure sensor, 15m	1
2010974	CABLE, pressure sensor, 20m	1
2010979	CABLE, remote I/O, 20m	1
2010978	CABLE, remote I/O, 15m	1
2009638	CABLE, remote I/O, 10m	1
2010977	CABLE, sensor valve, 20m	1
2010976	CABLE, sensor valve, 10m	1
2010975	CABLE, sensor valve, 15m	1

Dimensions

PC pump Assembly

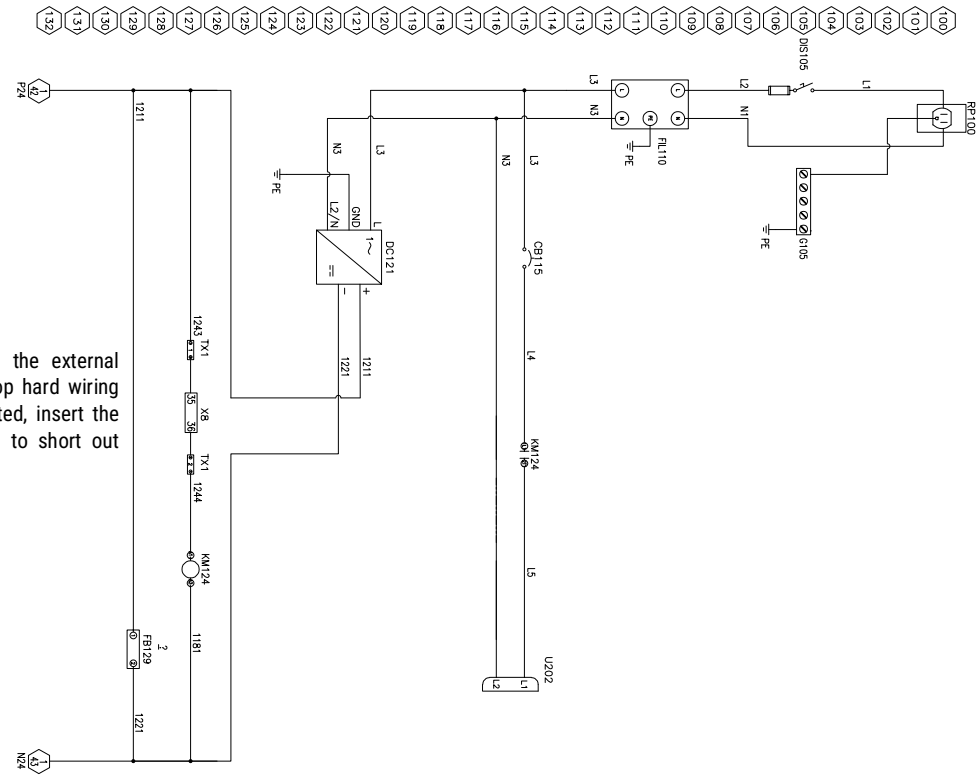


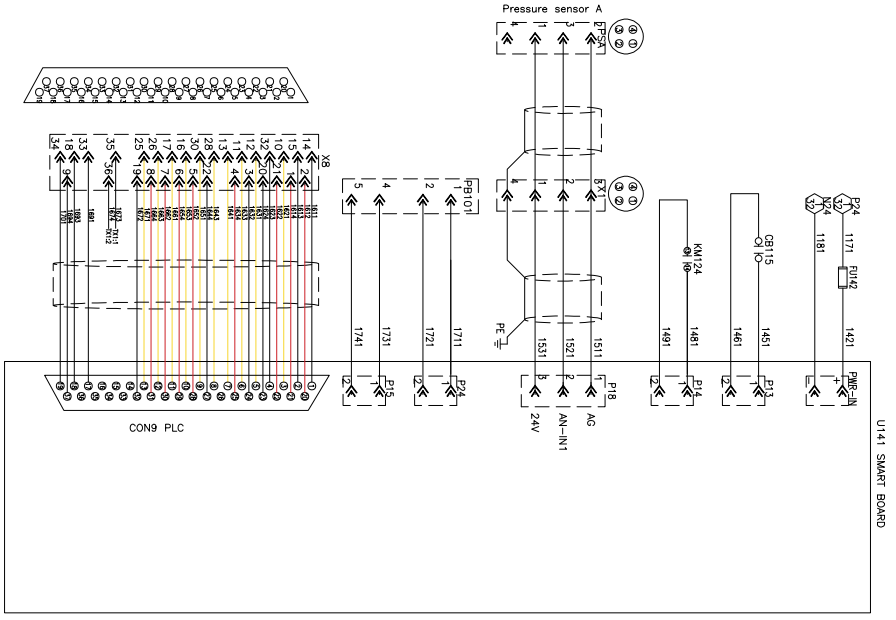
PC pump Control Box

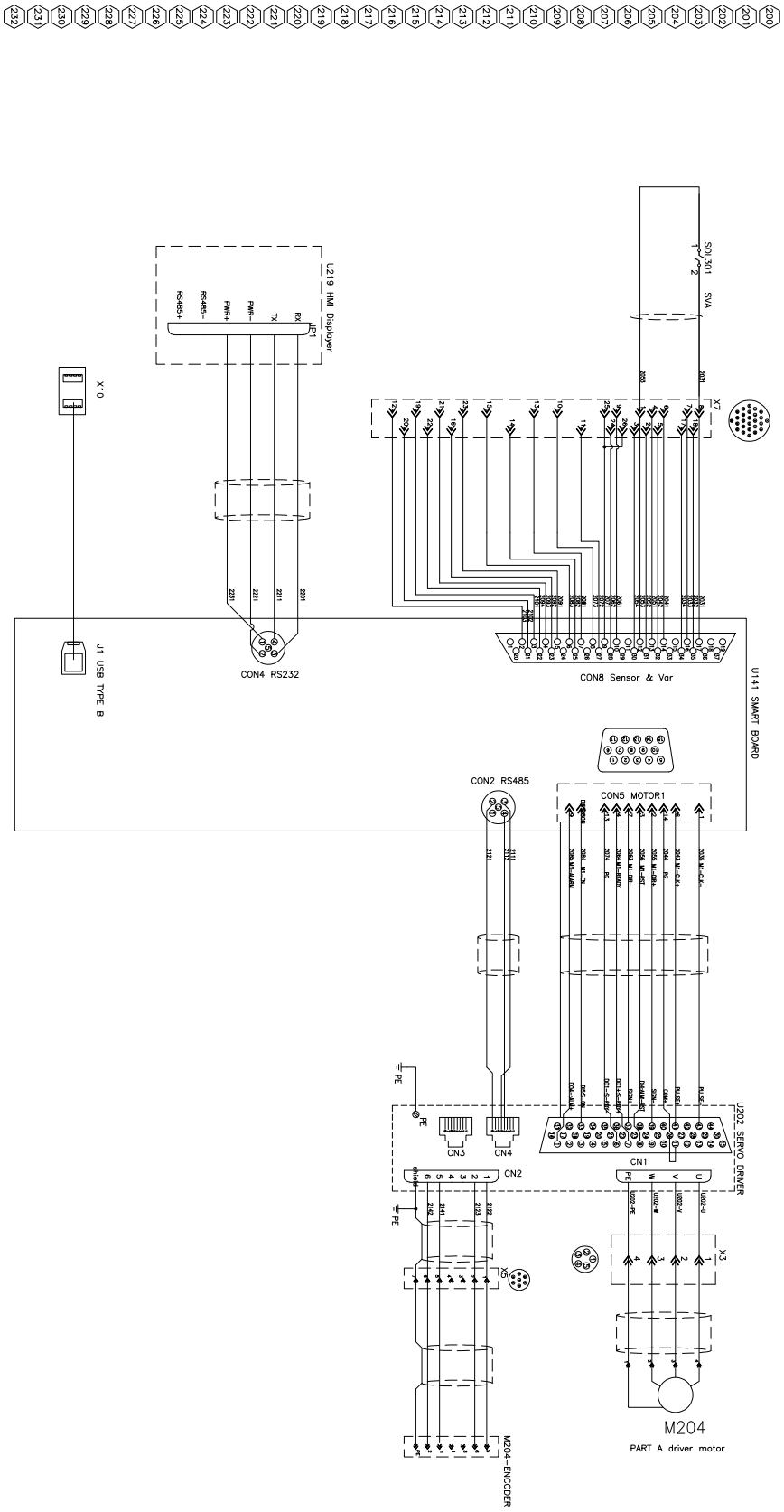


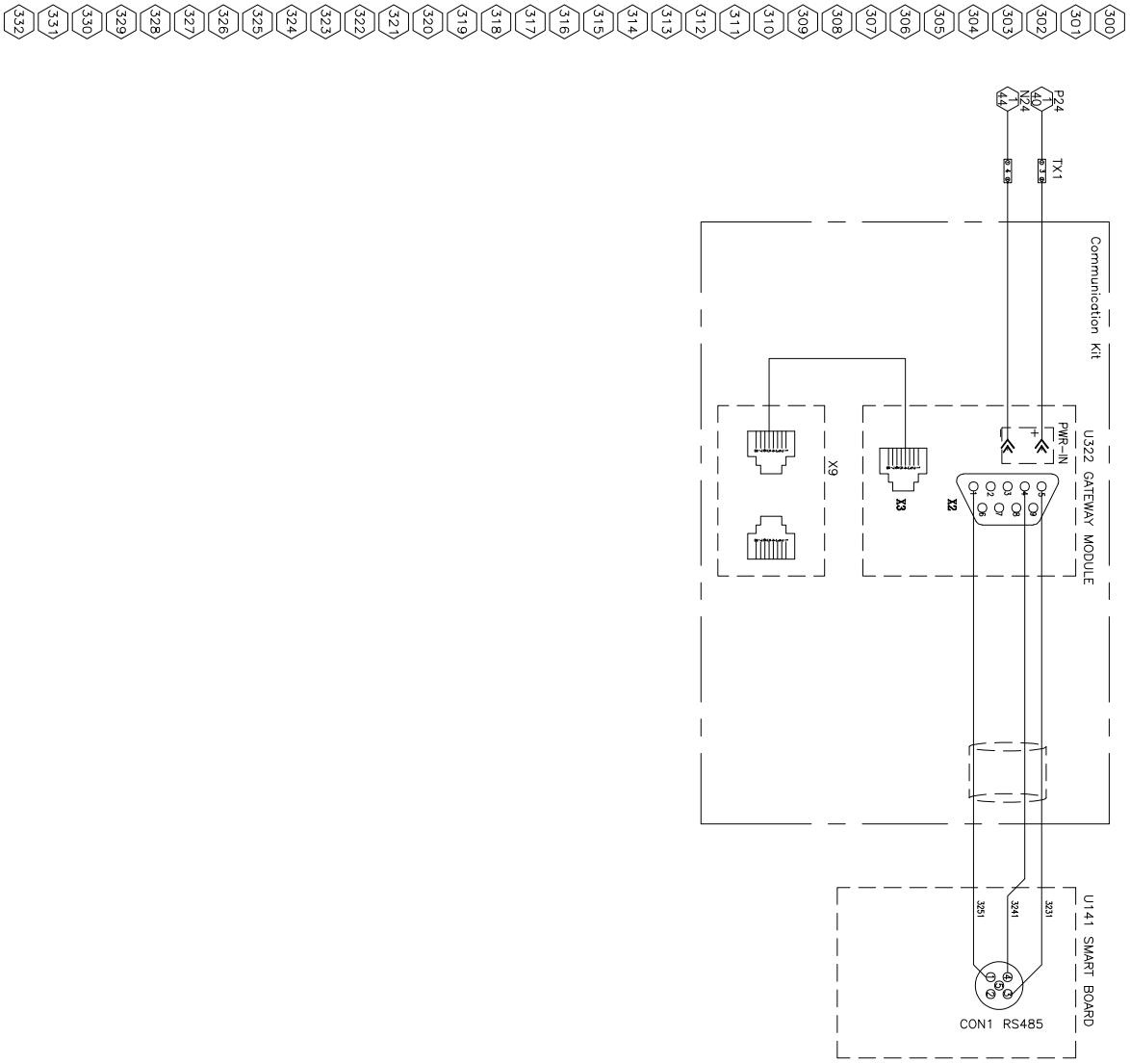
Schematics

NOTES: When the external emergency stop hard wiring is not connected, insert the shorting piece to short out TX1: 1 & 2.

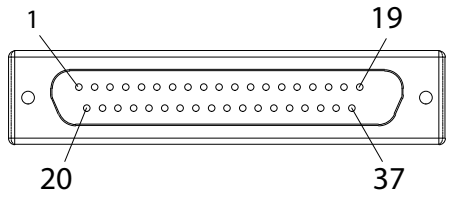





U219 HMI Displayer
RS485+
RS485-
PWR+
PWR-
TX
RX
J1
SOL301
SVA
X7
X10
J1 USB TYPE B
CON4 RS232
CON8 Sensor & Var
U141 SMART BOARD
CON2 RS485
CON5 MOTOR1
PE
CN3
CN4
CN1
CN2
U202 SERVO DRIVER
X5
X3
M204
PART A driver motor
M204--ENCODER


332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307 306 305 304 303 302 301 300
P24
TX1
Communication Kit
U322 GATEWAY MODULE
PWR-IN
X9
X3
X2
U141 SMART BOARD
CON1 RS485

I/O Signals



No.	Signal Type	I/O Pin No.	Mark	Signal Name	Description
1	Input	10	1621	I/O CUST_IN_DISPENSE_Start	To work with CUST_ IN COMMON, dry contact, normally open. When connected to CUST_ IN COMMON, signal is ON. When disconnected to CUST_ IN COMMON, signal is OFF.
2		12	1631	I/O CUST_IN_Purge start	
3		13	1641	I/O CUST_IN_Remote_Reset	
4		28	1643	I/O CUST_IN_MODE_SELECT	
5		30	1651	I/O CUST_IN_System_Relief	
6		16	1653	I/O CUST_IN_Style_BIT0	
7		17	1661	I/O CUST_IN_Style_BIT1	
8		26	1663	I/O CUST_IN_Style_BIT2	
9		25	1671	I/O CUST_IN_Style_BIT3	
10		18	1693	Output Comm	
11		11	1633	I/O CUST_IN_REMOTE_ESTOP (PLC Single)	PLC E-stop signal, normally closed
12		35	1481	I/O CUST_IN_REMOTE_ESTOP+	Remote control for E-stop (Dry contact and NC). Remove Terminal jumper (TX1: 1 and 2) in the control box before applying this function.
13		36	1491	I/O CUST_IN_REMOTE_ESTOP-	
14	Output	1	1614	I/O CUST_OUT_Ready	To work with CUST_ OUT COMMON, dry contact, normally open. When the signal output is ON, the signal line is connected to the CUST_ IN COMMON; When the signal output is OFF, the signal line is disconnected with the CUST_ IN COMMON.
15			1612	I/O CUST_OUT_ESTOP	
16		4	1634	I/O CUST_OUT_ALARM	
17		5	1652	I/O CUST_INFORM_CODE_BIT0	
18		6	1654	I/O CUST_INFORM_CODE_BIT1	
19		7	1662	I/O CUST_INFORM_CODE_BIT2	
20		8	1664	I/O CUST_INFORM_CODE_BIT3	
21		21	1622	I/O CUST_OUT_RUNNING	
22		9	1694	Output Comm	

Gateway Map (Profinet)

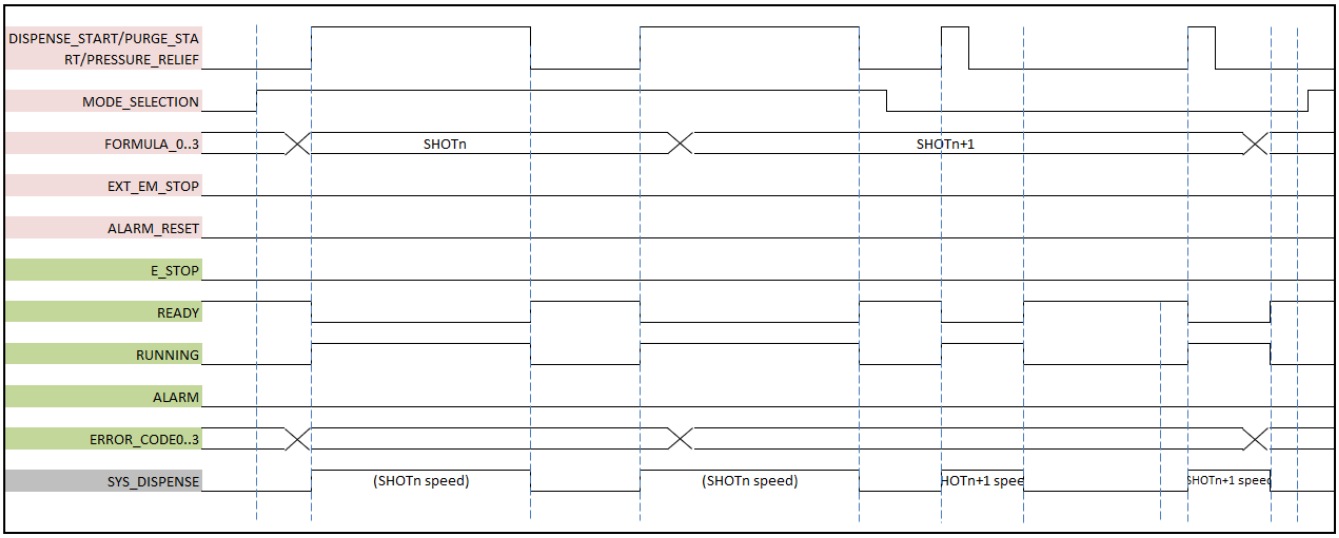
Controller input from PLC output

Name	PLC Address	Units		In Byte	Description
GATE_IN_CMD_BIT0-15	IW100	1	Dispense	1-2	used to start dispensing in bead mode or shot mode
		3	Purge		used to start purge.
		4	Alarm Reset		used to reset error
		5	Mode Select		used to set working mode in automatic 0 means shot mode 1 means bead mode
		6	Pressure Relief		used to open dispense valve and relief pressure in metering system
GATE_IN_STYLE_NO	IW102			3-4	0-15, for select style

Controller output to PLC input

Name	PLC Address	Units		Byte	Description
GATE_OUT_STATUS	QW100	0	Ready	1-2	
		1	E-Stop		
		6	Alarm		
		8	Running		
		15	Heart Beat		
GATE_OUT_ERR_CODE	QW102			3-4	
GATE_OUT_DISP_RATE	QW106			7-8	Integer, should multiply by 0.001, unit is CC/s
GATE_OUT_PRESS	QW108			9-10	Integer, should multiply by 0.1, unit is PSI
GATE_OUT_MTR_TRQ	QW110			11-12	Integer, should multiply by 0.001, unit is NM
GATE_OUT_DISP_DURATION	QW112			13-14	Integer, should multiply by 0.1, unit is s
GATE_OUT_DISP_VOL	QW114			15-18	Integer, should multiply by 0.01, unit is CC

Timing Chart



Technical Specifications

Progressive Cavity Pump		
Maximum pump speed	300 revolutions per minute	
Viscosity	5000 - 1,000,000 mPa • s (depending on size)	
Motor Information	**Series B:** Stepper Motor; 24-75 VDC - 10A **Series C:** Servo Motor; 200-240 VAC (+10% to -15%), 10.1A, 400W	
Wetted Parts	SST, FKM, UHMWPE, Alloy Steel, Acetal	
Displacement		
25B055	1.45 cc/rev	
25B193	1.00 cc/rev	
25B192	0.30 cc/rev	
	US	**Metric**
Maximum Operating Pressure	290 psi	2.0 MPa, 20 bar
Operating Temperature*		
Ambient temperature range	50-120 °F	10-50 °C
Maximum material temperature	167 °F	75 °C
Progressive Cavity Pump Control Box		
	US	**Metric**
Power Supply	220 VAC ± 10%, 50/60 Hz	
Maximum Operating Current	10 A	
Notes		
* *Refer to the **Temperature** section below for more information.*		

NOTE: The maximum operating pressures stated in the table above must not be exceeded. These values may change, depending on the material viscosity.

Temperature

The minimum and maximum temperature depends on the sealing material. Please note that there is a possible change in the material's viscosity when the temperature changes.

Speed Recommendation / Viscosity Ranges

Without pre-pressure; p1 = 0 bar

These recommendations are only guideline values and depend greatly on the application and in situ conditions. The maximum permitted speed is crucial for the service life or wear of the pump. The inlet pressure must be selected within the permissible limits so that continuous filling of the pump is guaranteed.

California Proposition 65

CALIFORNIA RESIDENTS

⚠ **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

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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.

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Revision B, July 2025