Setup - Operation - Repair

PR-X

Fixed Ratio System

333589A

EN

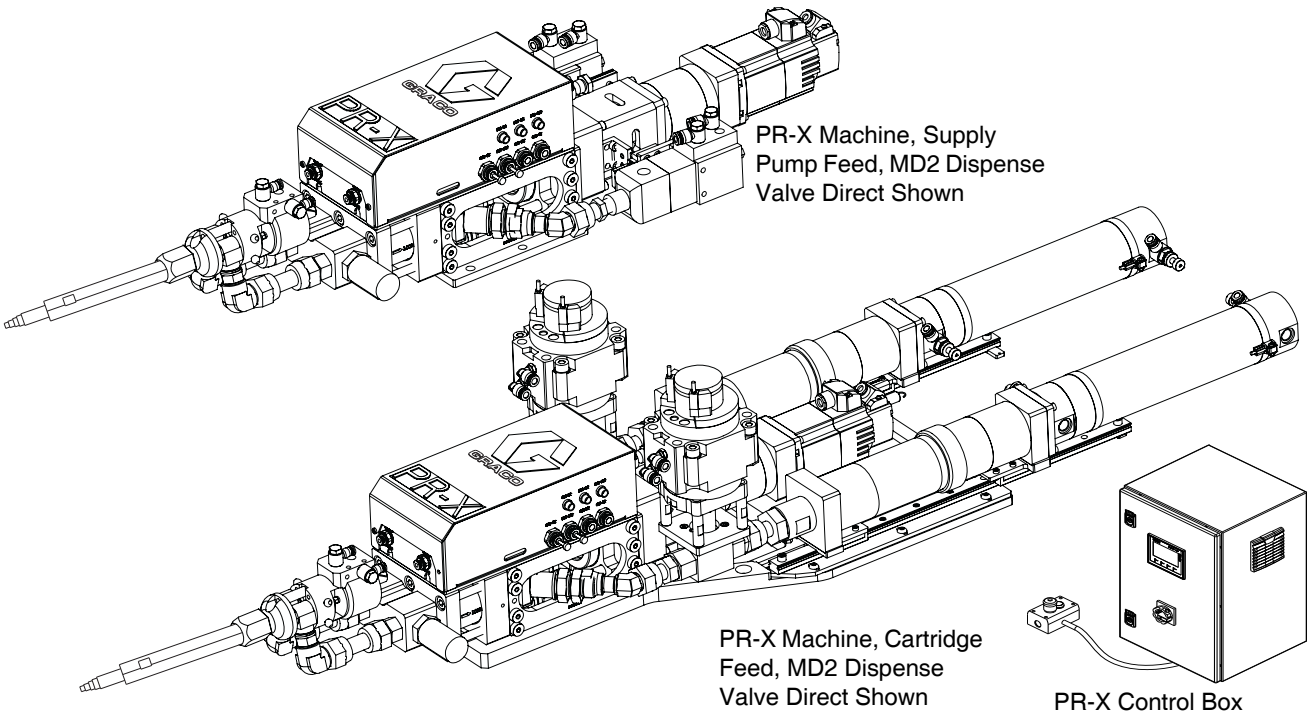
For accurate metering, mixing, and dispensing of two-component materials. For professional use only.

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

1200 psi (8.3 MPa, 83 bar) Maximum Working Pressure
100 psi (0.7 MPa, 7 bar) Maximum Air Inlet Pressure

Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment. Save these instructions.



PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

Related Manuals

Manuals in English	Description
312185	MD2 Dispense Valve Instructions and Parts Manual
308876	1K Ultra-Lite™ Instructions and Parts List Manual

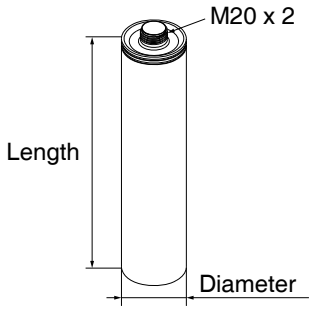
Models

Part	Description	Includes:					
		PR-X Machine	PR-X Control Box (part 133656)	MD2 Dispense Valve	Static Mixer Package	Hose Package	Direct Connection
133646	PR-X System, Supply Pump Feed, Direct, SST (1), 50 CC, I/O	✔	✔	✔	✔		✔
133647	PR-X System, Supply Pump Feed, Direct, HW (2), 50 CC, I/O	✔	✔	✔	✔		✔
133648	PR-X System, Supply Pump Feed, Remote, SST (1), 50 CC, I/O	✔	✔	✔	✔	✔	
133649	PR-X System, Supply Pump Feed, Remote, HW (2), 50 CC, I/O	✔	✔	✔	✔	✔	
133650	PR-X System, Cartridge Feed (3), Direct, SST (1), 50 CC, I/O	✔	✔	✔	✔		✔
133651	PR-X System, Cartridge Feed (3), Direct, HW (2), 50 CC, I/O	✔	✔	✔	✔		✔
133652	PR-X System, Cartridge Feed (3), Remote, SST (1), 50 CC, I/O	✔	✔	✔	✔	✔	
133653	PR-X System, Cartridge Feed (3), Remote, HW (2), 50 CC, I/O	✔	✔	✔	✔	✔	

(1) SST: Stainless steel material

(2) HW: High wear resistant abrasive material

(3) For plastic cartridge, M20 x 2, length < 220 mm, diameter: 49-50 mm only.



If the cartridge size or material is different, please contact Graco sales representative for a custom solution.

NOTE: All PR-X systems are 1:1 fixed ratio systems. If you want to order other ratio systems (1:1 - 2.4:1), please contact Graco sales representative for a custom solution.

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

⚠ 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.

SKIN INJECTION HAZARD

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

- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

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.

⚠ WARNING

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. 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.

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.

⚠ WARNING

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.

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.
- Equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.

Keep Components A and B Separate

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

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

Changing Materials

NOTICE

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

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- When changing between epoxies and urethanes or polyureas, disassemble and clean all fluid components and change hoses. Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.

Typical Installation

In Line

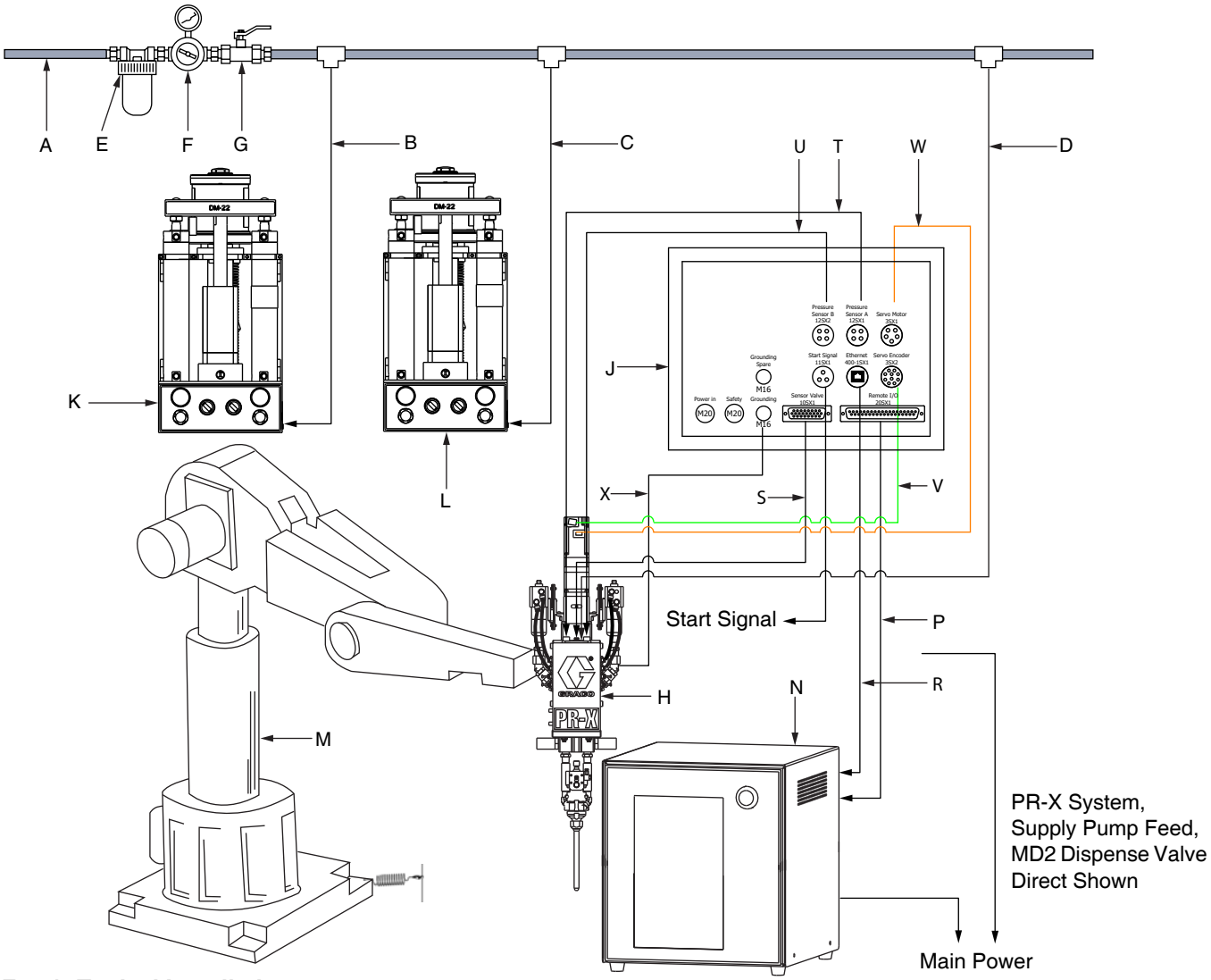
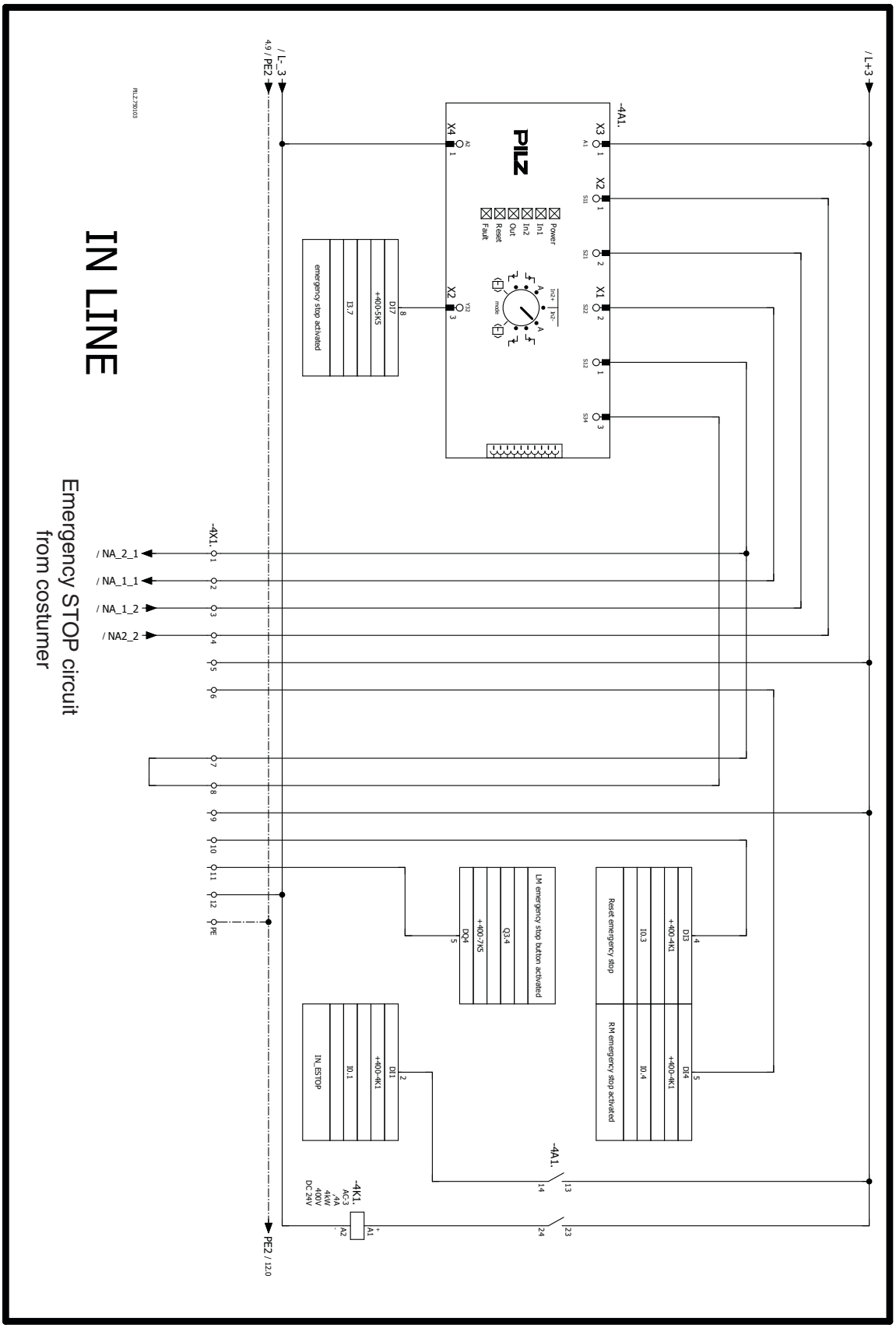


FIG. 1: Typical Installation

Key:

A Main Air Line
B Air Line of Supply Pump System A
C Air Line of Supply Pump System B
D PR-X System Air Line
E Air Filter (1)
F Pressure Regulator Valve (1)
G Bleed-type Master Air Valve (1)
H PR-X Machine
J PR-X Control Box
K Supply Pump System A
L Supply Pump System B
M Customer Robot
N Customer Control Box
P I/O Communication Cable (37 pin, T type)
R Profinet Communication Cable (RJ45)
S Junction Box Cable
T Pressure Sensor A Cable
U Pressure Sensor B Cable
V Servo Motor Encoder Cable
W Servo Motor Power Cable
X Grounding Cable

(1) Required, but not supplied


IN LINE
Emergency STOP circuit
from costumer
/ L+3
/ L_3
4.9 / PE2
-4A1.
PILZ
Power
In1
In2
Out
Reset
Fault
emergency stop activated
+400-5K5
DI7
I3.7
-4X1.
/ NA_2_1
/ NA_1_1
/ NA_1_2
/ NA2_2
PE
LM emergency stop button activated
+400-7K5
DQ4
Q3.4
Reset emergency stop
+400-4K1
DI3
I0.3
RM emergency stop activated
+400-4K1
DI4
I0.4
IN_ESTOP
+400-4K1
DI1
I0.1
-4K1.
AC-3
4A
4kW
400V
DC 24V
PE2 / 12.0

Stand Alone

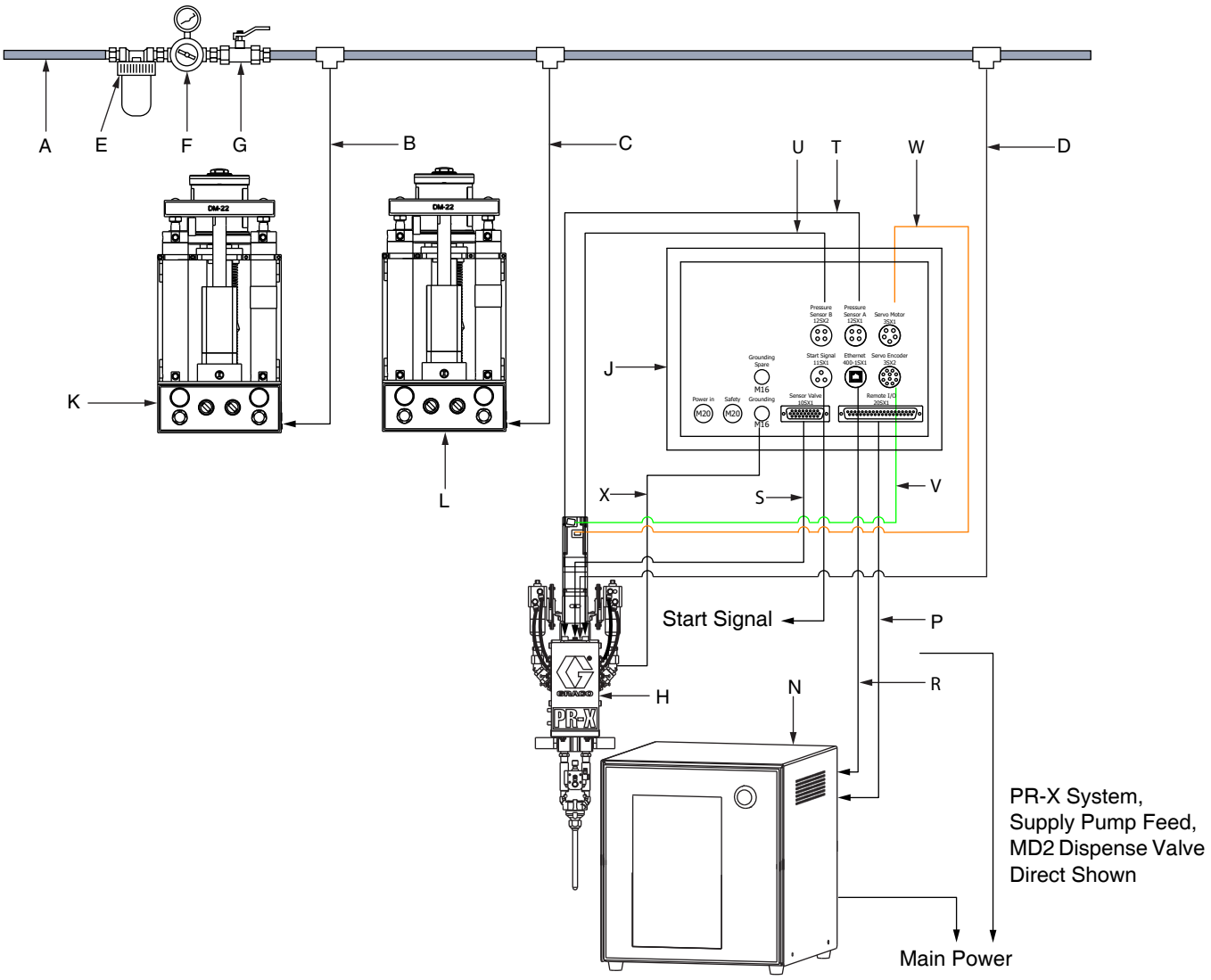
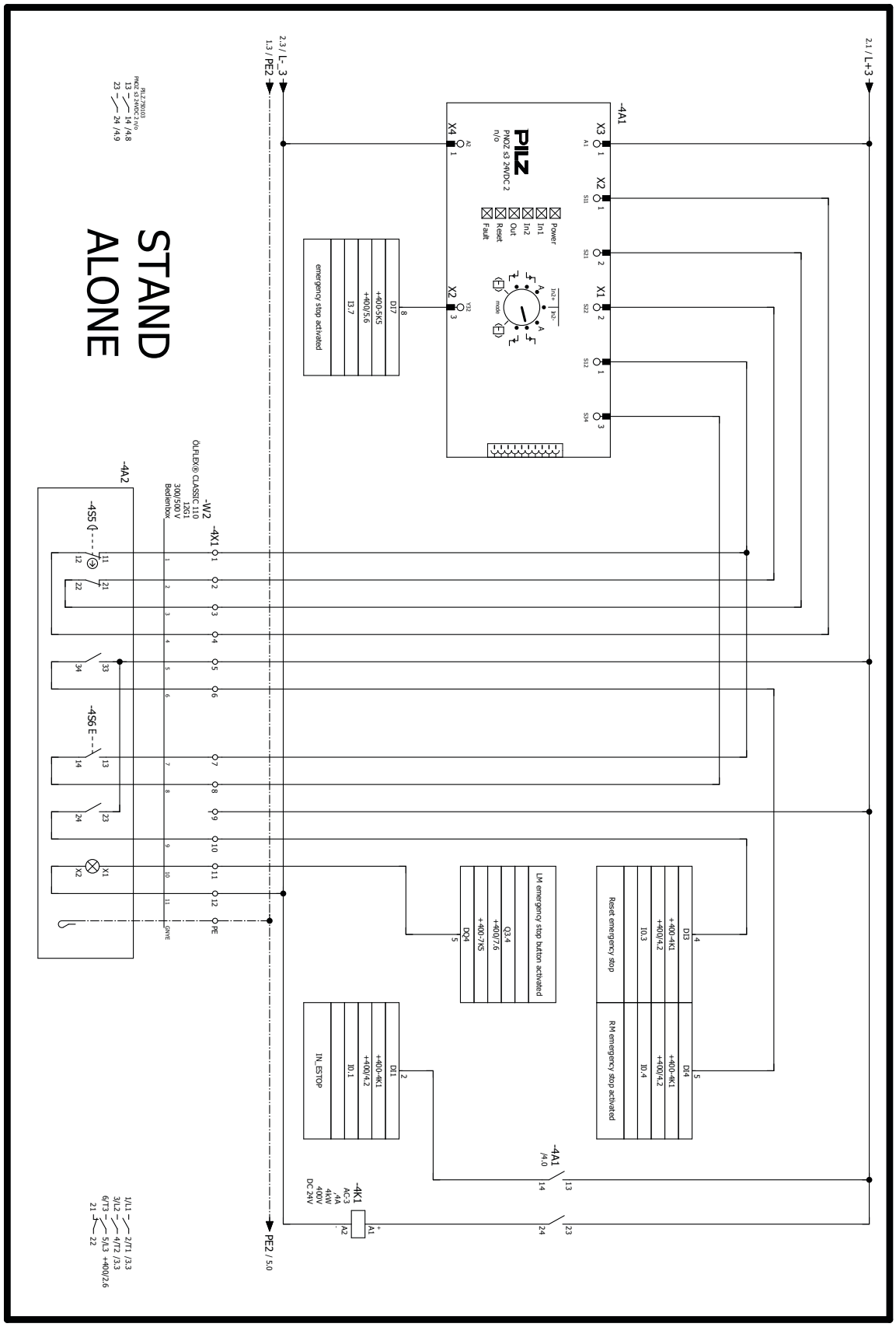


FIG. 2: Typical Installation

Key:

A Main Air Line
B Air Line of Supply Pump System A
C Air Line of Supply Pump System B
D PR-X System Air Line
E Air Filter (1)
F Pressure Regulator Valve (1)
G Bleed-type Master Air Valve (1)
H PR-X Machine
J PR-X Control Box
K Supply Pump System A
L Supply Pump System B
N Customer Control Box
P I/O Communication Cable (37 pin, T type)
R Profinet Communication Cable (RJ45)
S Junction Box Cable
T Pressure Sensor A Cable
U Pressure Sensor B Cable
V Servo Motor Encoder Cable
W Servo Motor Power Cable
X Grounding Cable

(1) Required, but not supplied


STAND ALONE
2.1 / L+3
1.3 / PE2
2.3 / L- 3
-4A1
PNOZ s3 24VDC 2 n/o
PILZ
Power
In1
In2
Out
Reset
Fault
X3
X2
X1
X4
X2
-4A2
-4S5
-4S6
-W2
ÖLFLEX® CLASSIC 110
12G1
300/500 V
Bedienbox
-4X1
PE
emergency stop activated
+400-5K5
+400/5.6
I3.7
DI7
LM emergency stop button activated
Q3.4
+400/7.6
+400-7K5
DQ4
Reset emergency stop
+400-4K1
+400/4.2
I0.3
DI3
RM emergency stop activated
+400-4K1
+400/4.2
I0.4
DI4
IN_ESTOP
+400-4K1
+400/4.2
I0.1
DI1
-4A1
/4.0
-4K1
AC-3
4A
4kW
400V
DC 24V
A1
A2
PE2 / 5.0
1/L1
3/L2
6/T3
2/T1 /3.3
4/T2 /3.3
5/L3 +400/2.6
21
22
PILZ 793103
PNOZ s3 24VDC 2n/o
13
14 /4.8
23
24 /4.9

Component Identification

PR-X Machine, Supply Pump Feed

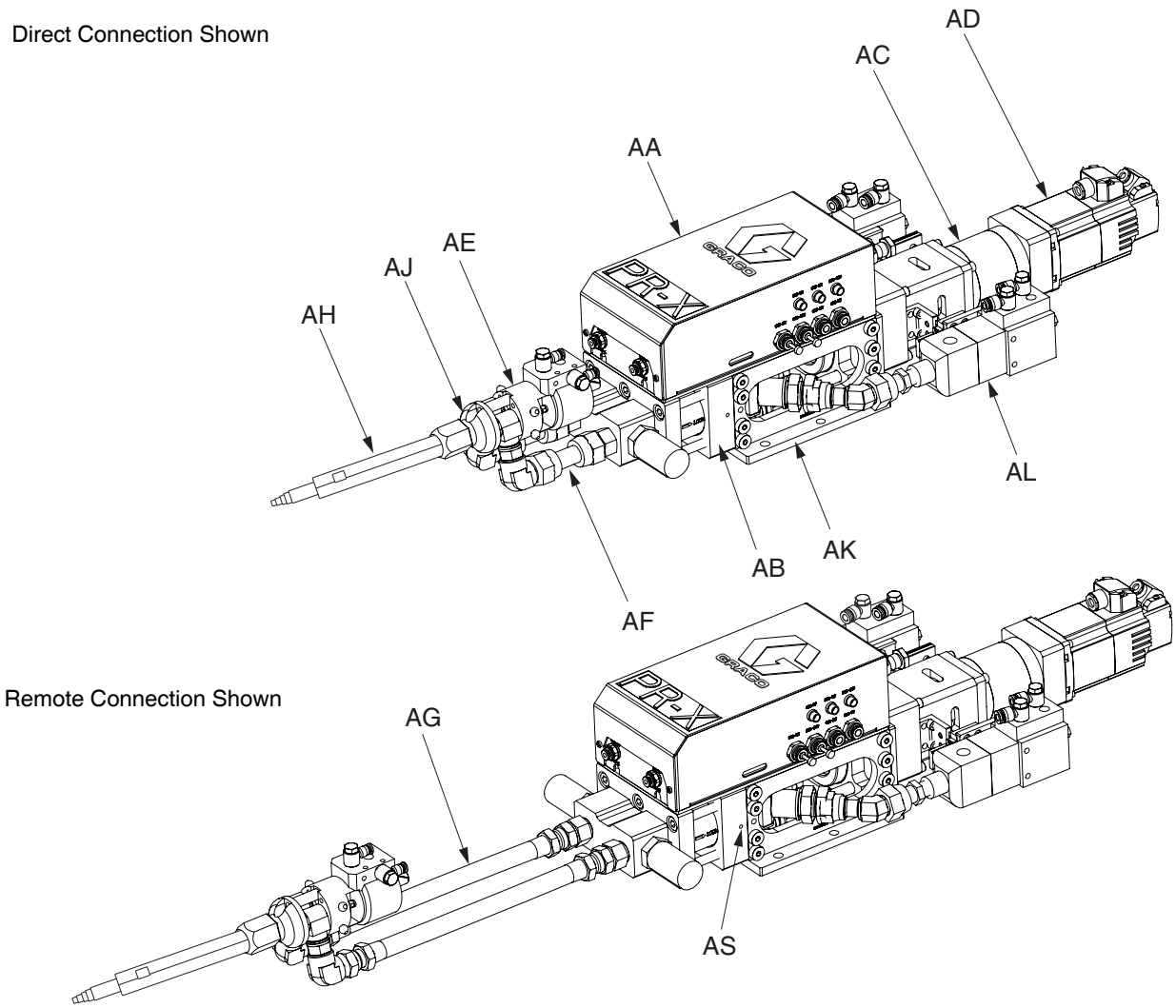


FIG. 3: PR-X Machine, Supply Pump Feed

Key:

AA Junction Box Assembly
AB Fixed Ratio Base Frame Assembly
AC Ball Screw Assembly
AD PR-X Drive
AE MD2 Dispense Valve
AF Direct Connection (1)
AG Remote Hose Connection (2)
AH Static Mixer Package
AJ Nose Piece
AK PR-X Bottom Plate
AL Inlet Valve (1K Ultra-Lite Valve) (3)
AS Leaking Hole

(1) For direct version only
(2) For remote version only
(3) For supply pump feed version only

PR-X Machine, Cartridge Feed

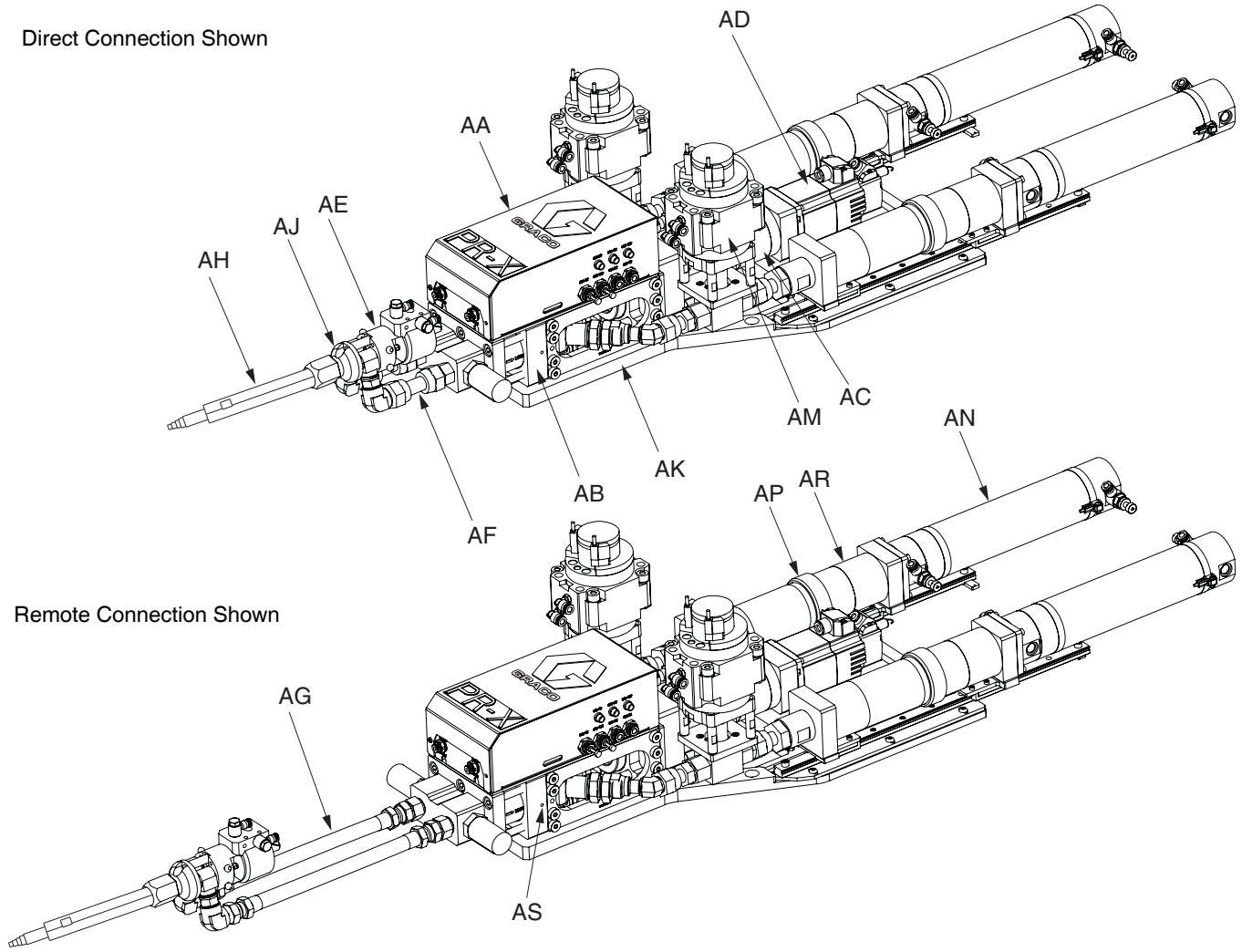


FIG. 4: PR-X Machine, Cartridge Feed

Key:

AA Junction Box Assembly
AB Fixed Ratio Base Frame Assembly
AC Ball Screw Assembly
AD PR-X Drive
AE MD2 Dispense Valve
AF Direct Connection (1)
AG Remote Hose Connection (2)
AH Static Mixer Package
AJ Nose Piece
AK PR-X Bottom Plate
AM Inlet Valve (3)
AN Cylinder Assembly (3)
AP Cartridge Sleeve Nut (3)
AR Cartridge Sleeve Assembly (3)
AS Leaking Hole

(1) For direct version only

(2) For remote version only

(3) For cartridge feed version only

PR-X Control Box

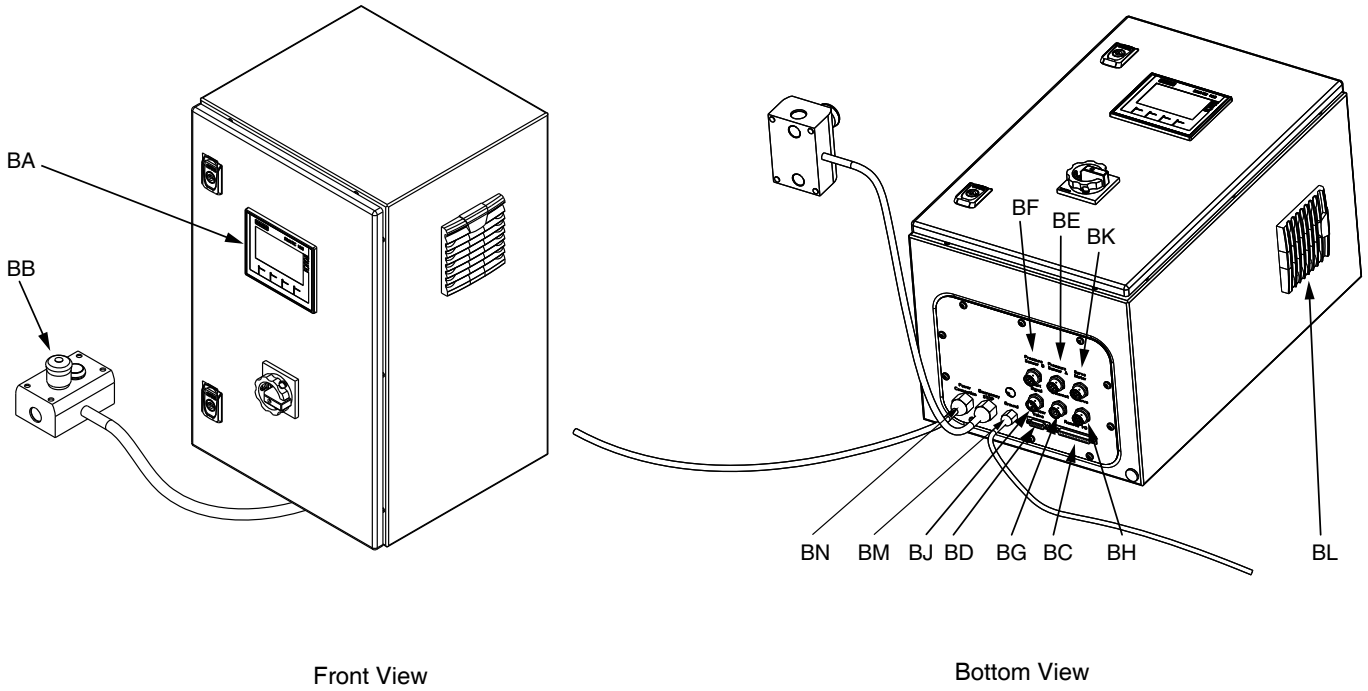


FIG. 5: PR-X Control Box

Key:

BA Human Machine Interface (HMI) Display
BB Emergency Stop Switch
BC Remote I/O Connection (37 pin, T type)
BD Junction Box Connection
BE Pressure Sensor A Connection
BF Pressure Sensor B Connection
BG Remote Ethernet Connection (RJ45)
BH Servo Encoder Connection
BJ Start Signal Connection
BK Servo Motor Connection
BL Cooling Fan
BM Grounding
BN Power Connection

General Information

Different types of Static Mixer Package (AH) and Remote Hose Connection (AG) or Direct Connection (AF) are available from Graco. Make certain the Static Mixer Package (AH) and Remote Hose Connection (AG) or Direct Connection (AF) are adequately sized and pressure-rated to meet your system needs.

FIG. 3, FIG. 4 and FIG. 5 are only a guide for identifying system components and for assisting in installation. Contact your Graco distributor or Graco China Customer Service for assistance in designing a system to suit your specific needs.

Installation

All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

Unpacking

1. Inspect the shipping container carefully for damage. Contact the carrier promptly if there is damage.
2. Open the box and inspect the contents carefully. There should not be any loose or damaged parts in the container.
3. Compare the packing slip against all the items in the box. Report any shortage or other inspection problems immediately.
4. Remove the PR-X system components from the container.

Locate and Install

1. The PR-X Machine (H) can be directly mounted on a Customer Robot (M) or remotely mounted on a motion table or table top. Verify the location has access to compressed air and AC power.
2. Place the PR-X Machine (H) onto the designated location.
3. Attach the PR-X Bottom Plate (AK) to the selected location by installing fasteners (not provided with the PR-X machine) through the four mounting holes. There are also two position pin holes. Refer to FIG. 6 or FIG. 7 for mounting hole dimensions.

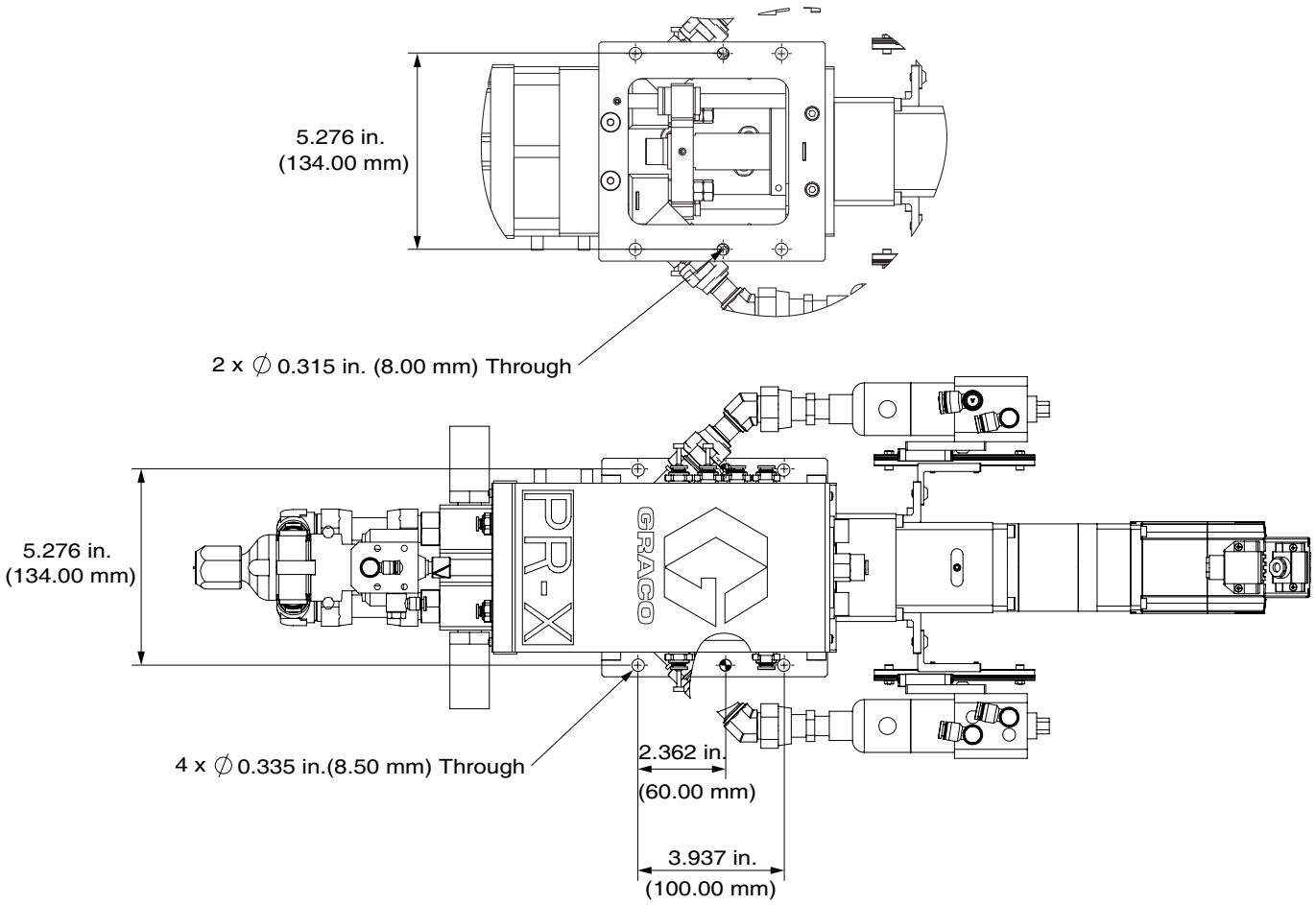


FIG. 6: Mounting Hole Dimensions for Installing the PR-X Machine - Supply Pump Feed

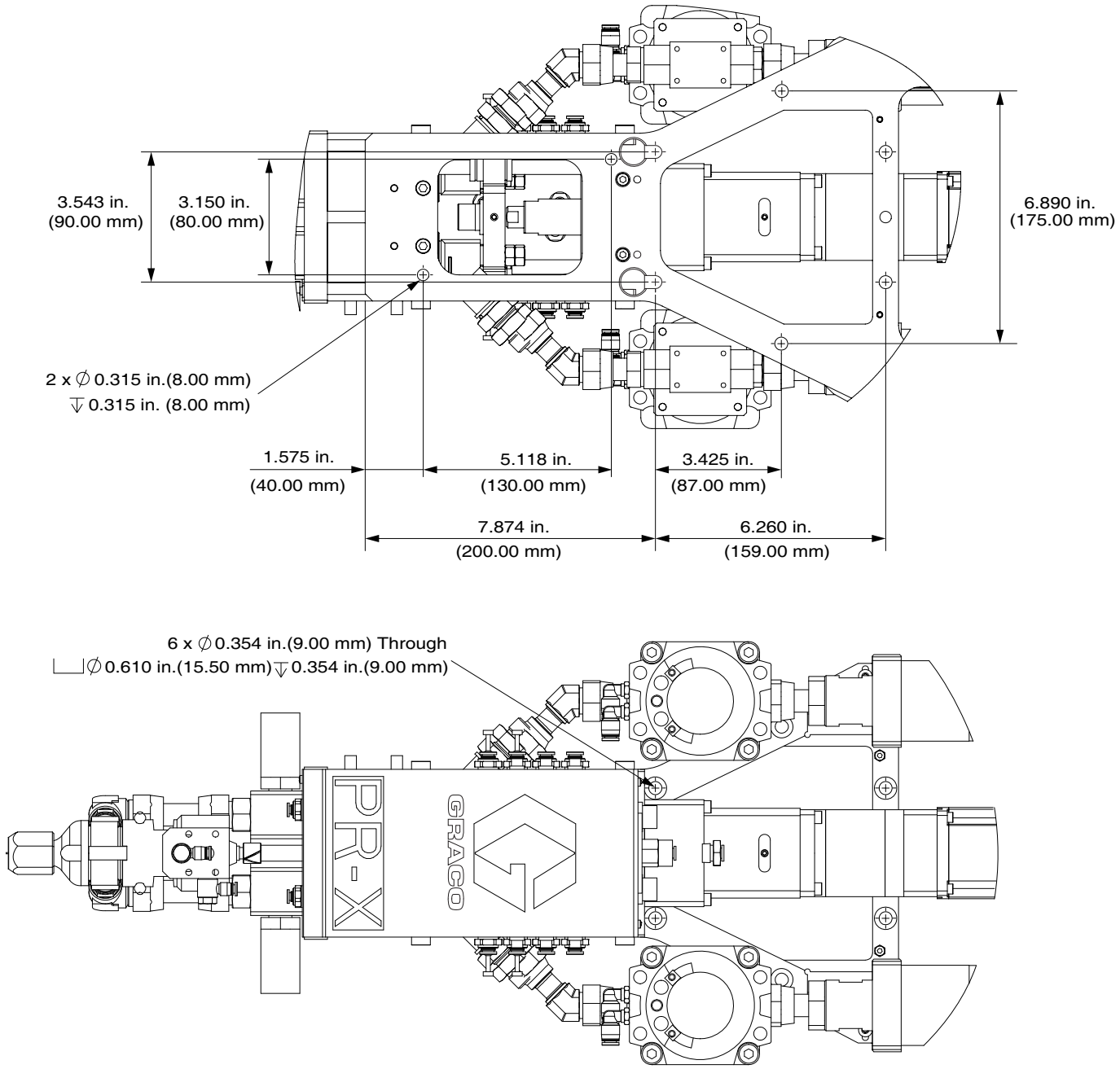
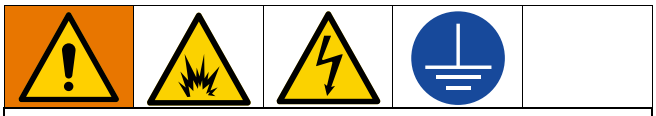


FIG. 7: Mounting Hole Dimensions for Installing the PR-X Machine - Cartridge Feed

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.

PR-X Machine (H): grounded through the PR-X Bottom Plate (AK). Use the supplied ground wire and clamp to ground the metal PR-X Bottom Plate (AK) or Customer Robot (M) to a true earth ground.

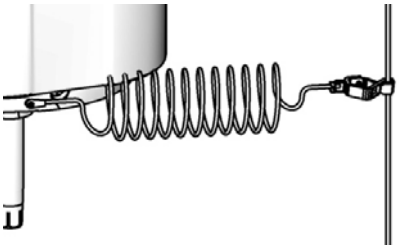


FIG. 8 Grounding

PR-X Control Box (J): grounded through the power cord.

Air and fluid hoses: use only electrically conductive hoses with a maximum of 500 ft. (150 m) combined hose length to ensure grounding continuity. Check electrical resistance of hoses. If total resistance to ground exceeds 29 megohms, replace hose immediately.

Air compressor: follow manufacturer's recommendations.

MD2 Dispense Valve (AE): ground through connection to a properly grounded fluid hose and pump.

Fluid supply container: follow local code.

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 nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

System Connections

1. Connect the PR-X System Air Line (D) to the air inlet at the rear of Junction Box Assembly (AA). The maximum air pressure is 100 psi (0.7 MPa, 7 bar).
2. For supply pump feed version, connect the Material Supply Lines (M and N) to the corresponding material inlet at the top of Inlet Valve (AL or AM). For cartridge feed version, remove the Cartridge Sleeve Nut (AP), put the customer's cartridge into the Cartridge Sleeve Assembly (AR).
3. Using the power cord provided, connect AC power (220 V, 50/60 Hz, single phase) to the Power Connection (BN) on the back of PR-X Control Box (J).
4. Use cables to connect junction box, pressure sensor A and B, servo motor power and servo motor encoder from the PR-X Machine (H) to PR-X Control Box (J).

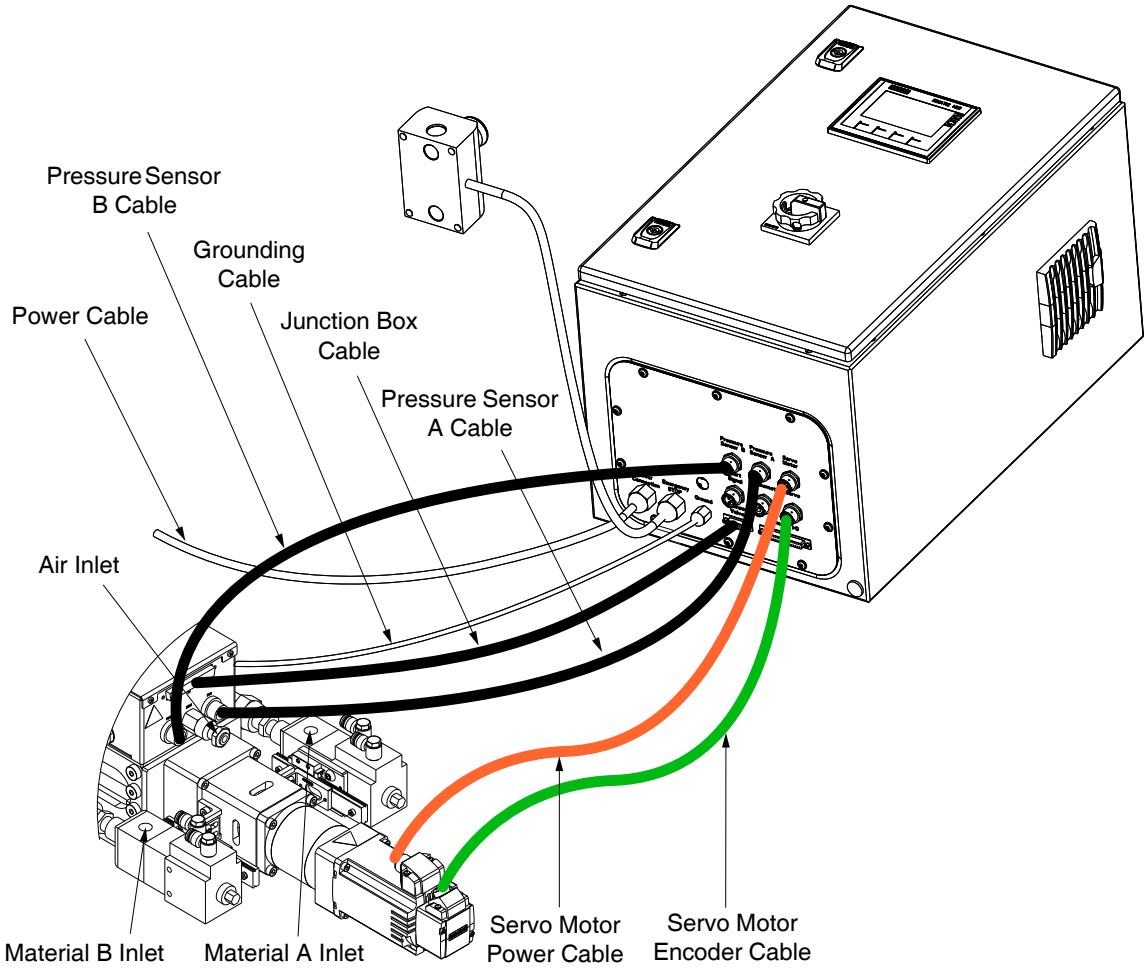


FIG. 9: Cable Connections - Supply Pump Feed Version

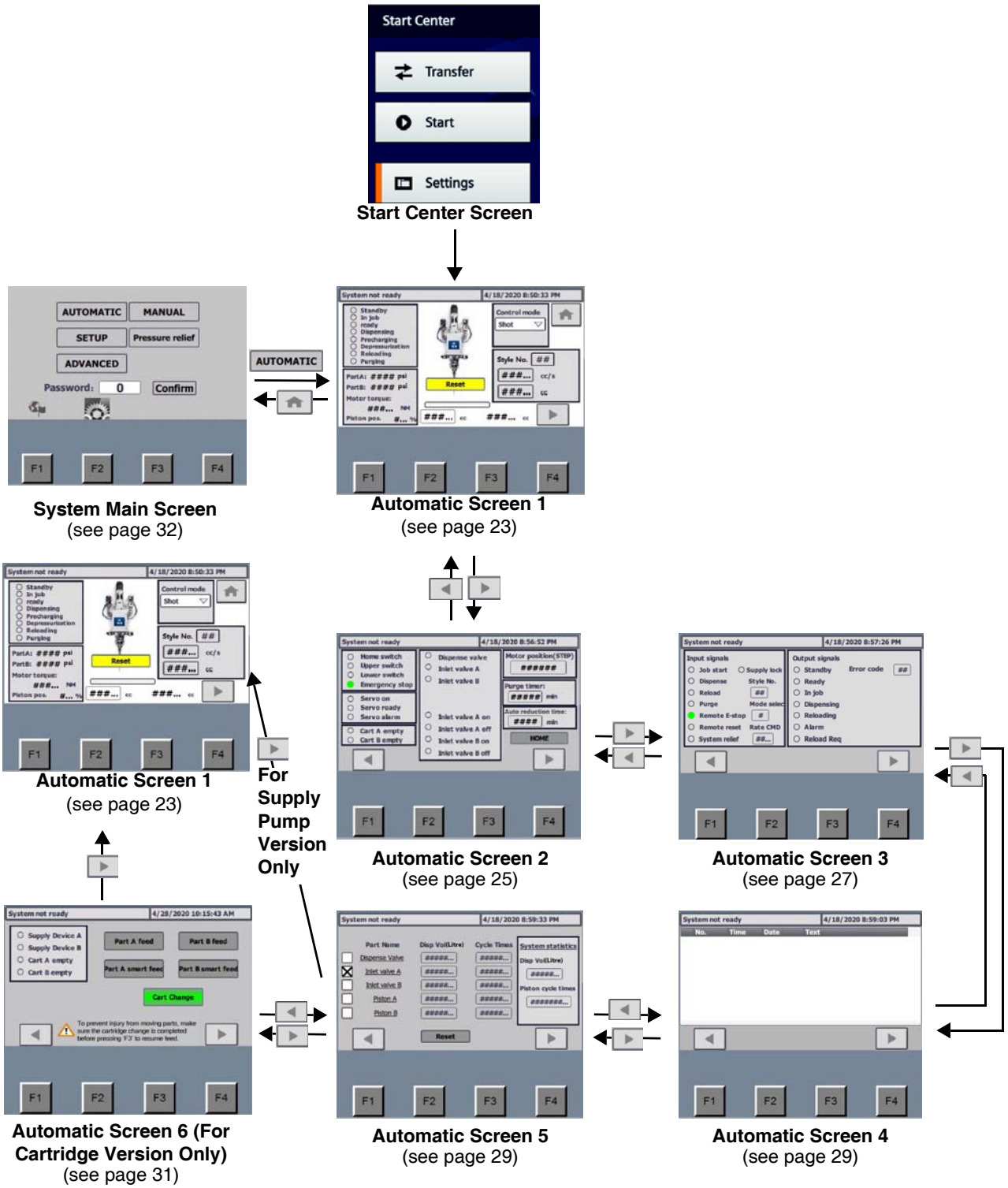
Flush Before Using Equipment

The equipment was tested with lightweight oil, which is left in the fluid passages to protect parts. To avoid contaminating your fluid with oil, flush the equipment with a compatible solvent before using the equipment. Follow **Flush the Equipment** on page 50.

HMI Display Operation and Identification

Screen Navigation Diagrams

NOTE: 'Automatic Screen 1' is the start screen after 'Start' is selected in the 'Start Center' screen.



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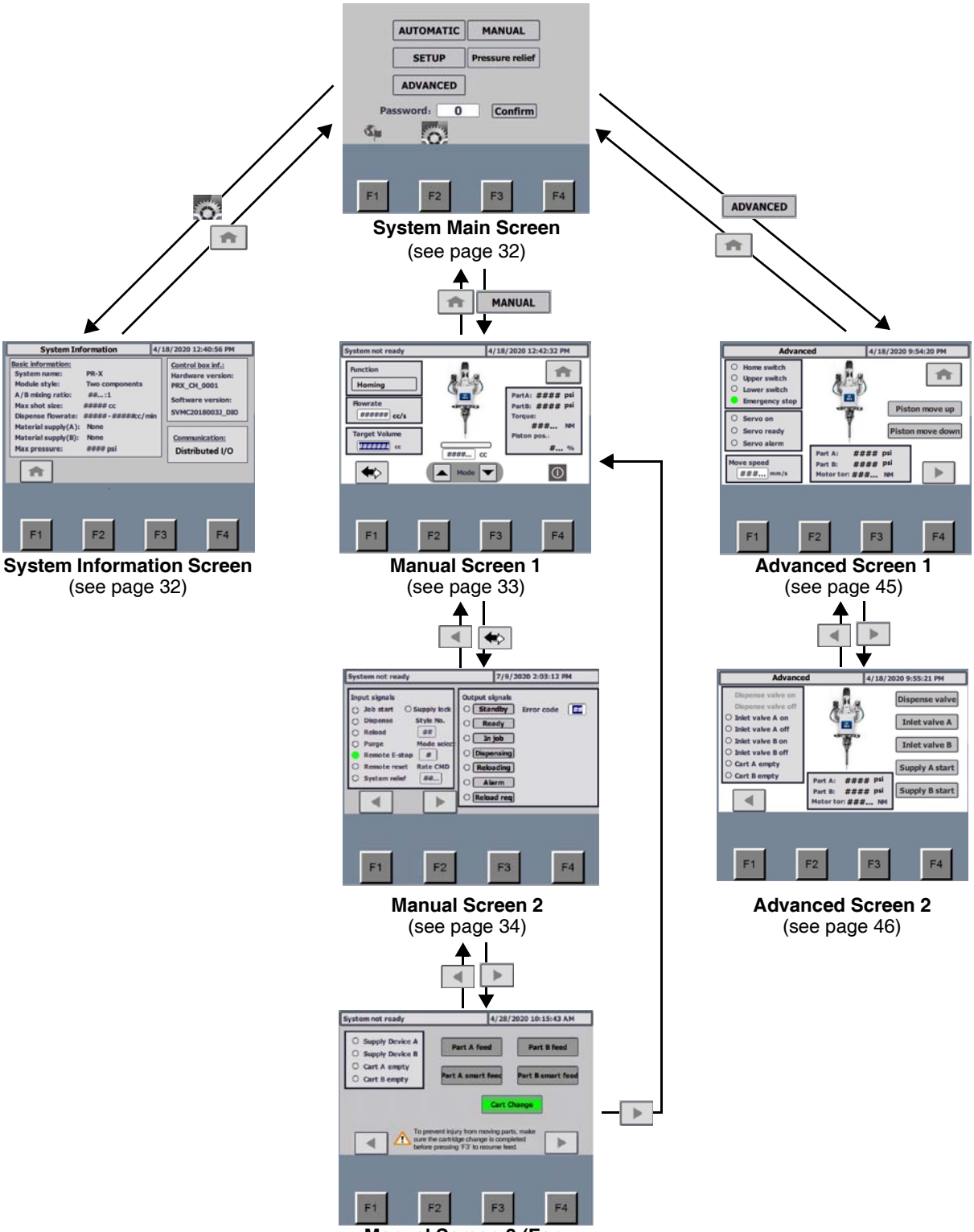


System Main Screen
(see page 32)

System Information Screen
(see page 32)

Manual Screen 1
(see page 33)

Advanced Screen 1
(see page 45)

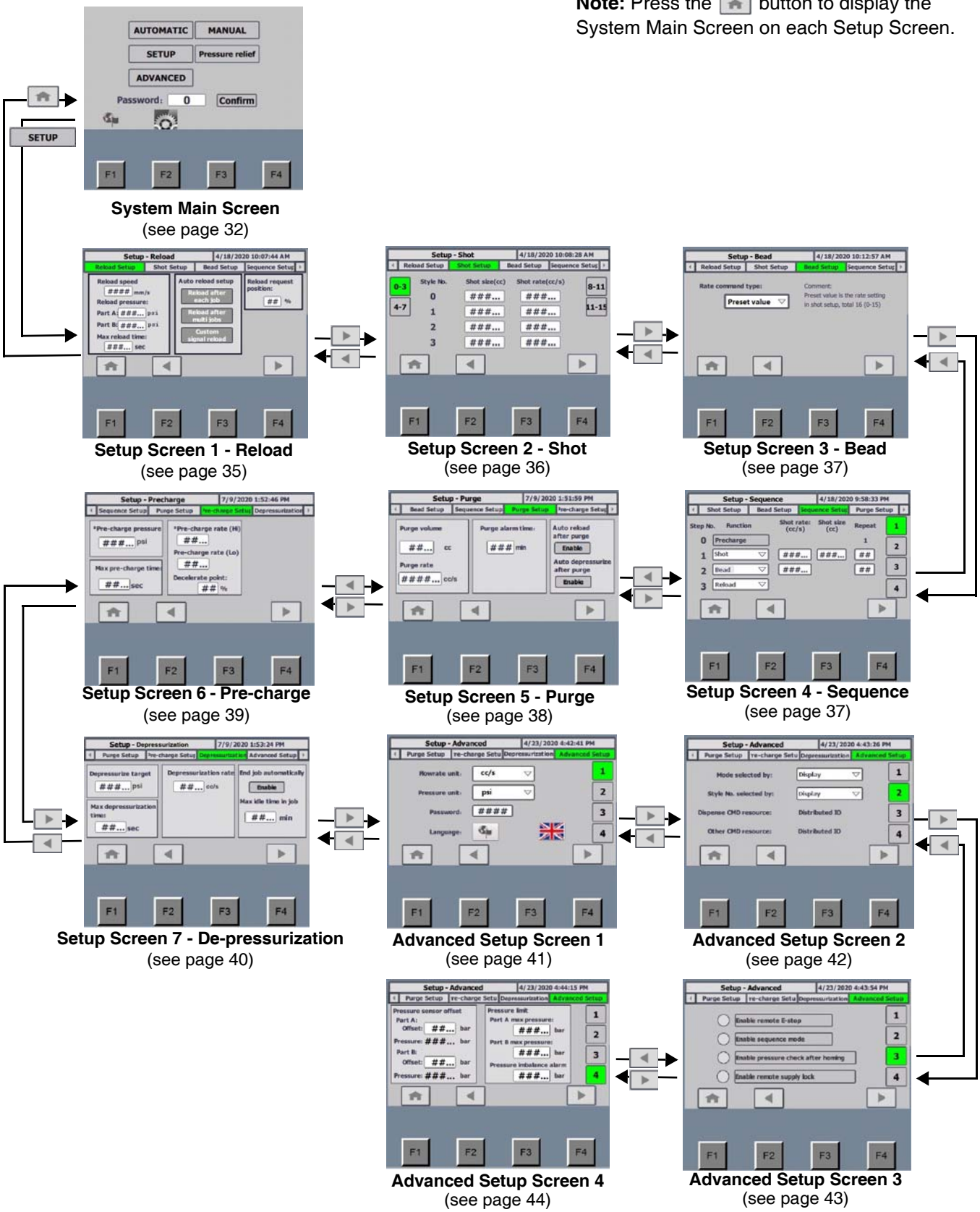
Manual Screen 2
(see page 34)

Advanced Screen 2
(see page 46)

Manual Screen 3 (For Cartridge Version Only)
(see page 34)

Continued

Note: Press the button to display the System Main Screen on each Setup Screen.



System Main Screen
(see page 32)

Setup Screen 1 - Reload
(see page 35)

Setup Screen 2 - Shot
(see page 36)

Setup Screen 3 - Bead
(see page 37)

Setup Screen 6 - Pre-charge
(see page 39)

Setup Screen 5 - Purge
(see page 38)

Setup Screen 4 - Sequence
(see page 37)

Setup Screen 7 - De-pressurization
(see page 40)

Advanced Setup Screen 1
(see page 41)

Advanced Setup Screen 2
(see page 42)

Advanced Setup Screen 4
(see page 44)

Advanced Setup Screen 3
(see page 43)

Automatic Screen 1

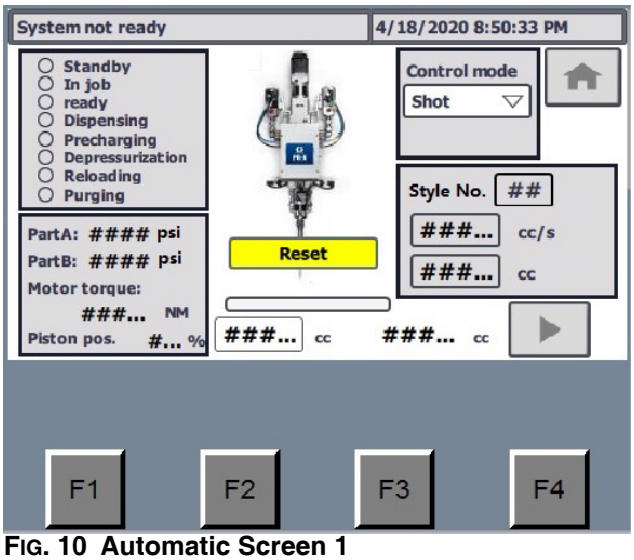


FIG. 10 Automatic Screen 1

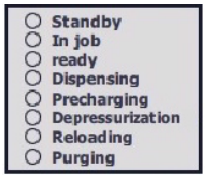
After power up, the PLC program will be loaded automatically or by pressing 'Start' button at 'Siemens Start Center Screen'. Automatic Screen 1 will be shown on the display. Press 'F4' or select the button to display the Automatic Screen 2. Press the button to display the System Main Screen. This button can only be used when the system is in standby mode or is in alarm free state. While System Main Screen is shown on the screen, the system will not operate in automatic mode.

The content and functions of this screen are as follows:

Information bar

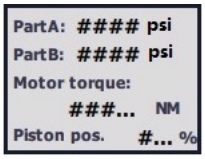
- To illustrate the current status of equipment, such as Auto-Standby or Auto-Shot dispense.
- To show error information when an alarm is active.

System working status



- Standby: The system has checked the home position, but is not pre-charged.
- In Job: The job starts from pressure pre-charge and ends after depressurization. The system will record the dispense volume for each job. In shot or bead mode, 'job start' signal must be '1' during one job. In sequence mode, step 0 to step 15 will be considered one job.
- Ready: Pre-charge has been completed and the system is ready to dispense material.
- Dispensing: The system is dispensing material.
- Precharging: The system is pre-charging pressure for current job.
- Depressurization: The system is in the last step of the current job. In shot or bead mode, when 'job start' is from '1' to '0', system completes de-pressurization and finishes the current job.
- Reloading: The system is reloading material.
- Purging: The system is purging some material based on the preset flow rate and volume.

Current pressure, motor torque and piston position



- Current pressure
  - Part A: Current pressure of A material.
  - Part B: Current pressure of B material.
- Motor torque: The torque of the drive motor is shown in NM.
- Piston position: Display how much material is in the cylinders (0-100%). When the rod slider is at the home position, 'Piston position' will show 100%. When the slider moves to the 'empty' position, 'Piston position' will show 0%.

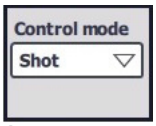
'Reset' Button

Reset button will reset all non-standing alarms and warnings.

Progress bar and dispense volume

- Progress bar
  - Shot mode: The progress bar displays the completion of the current target.
  - Bead mode: the progress bar always displays 100%.
- Dispense volume: There are two dispense volume values. The left is the volume for current dispense, and the right is the current job's accumulative volume.

Control mode



Automatic mode includes three control modes: shot mode, bead mode and sequence mode.

- Shot mode: Per the style selected, the system will dispense a shot at the volume of flow rate preset in the style selected.
- Bead mode: The system according to the selected style will complete the dispensing at the preset flow rate.
- Sequence mode: When the system works in automatic status, the Customer Control Box (N) can send 'dispense' signal to initiate the sequence. The working sequence can only be edited before dispense starts. (The sequence includes 16 steps maximum, and the operator can edit step 1 to 14, as step 0 and 15 are reserved respectively for pre-charge and depressurization).
  - When 'Enable Sequence Mode' option is not selected and the system is not dispensing, the operator may choose between 'Bead' or 'Shot' mode by using the touch screen or customer signal.
  - When 'Enable Sequence Mode' option is selected, control mode will be fixed as 'Sequence' mode. 'Bead' or 'Shot' mode will be inaccessible.

NOTE: 'Enable Sequence Mode' option is in screen 3 of Advanced setup. See **Advanced Setup Screen 3** on page 43.

System working information

This area will show information unique to each control mode.

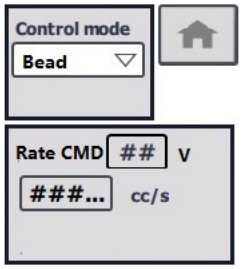
- Shot mode

In Shot mode, the selected style number, target flow rate and target volume will be shown. Shot style can be selected by touch screen or customer signals. Preset styles include 16 styles, 0-15.

- Bead mode with preset value

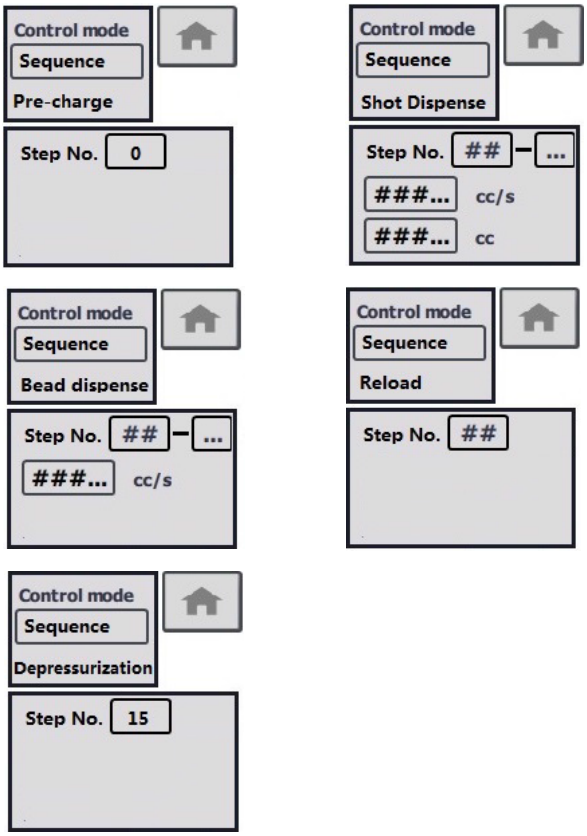
In Bead mode with preset value, the selected style number and target flow rate will be shown. The process for style number selection is the same as in Shot mode.

- Bead mode with custom setting



In Bead mode with custom setting, ‘Rate CMD’ will be shown as voltage value and target flow rate will be shown. The flow rate will change based on rate command.

- Sequence mode



In Sequence mode, the step number, remaining repeat times, target flow rate and volume will be shown in different screens based on different step types. The operator can edit the step by using the touch screen prior to or following the current job. Once dispensing has begun, the ‘Control mode’ display will show the current step, including pre-charge, shot dispense, bead dispense, reload and depressurization.

Automatic Screen 2

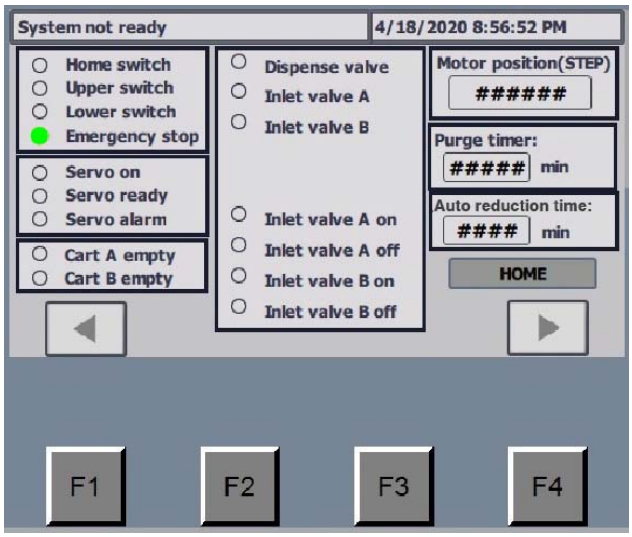
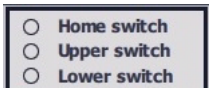


FIG. 11 Automatic Screen 2

On the Automatic Screen 2, press ‘F1’ or select the ◄ button to display the Automatic Screen 1. Press ‘F4’ or select the ► button to display the Automatic Screen 3.

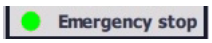
The content and functions of this screen are as follows:

Sensors status



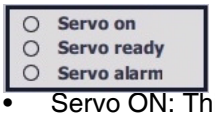
To show the 3 slider position sensors.

Emergency stop status



- Red circle: E-stop button is pushed in.
- Green circle: E-stop button is released.

Servo motor signals

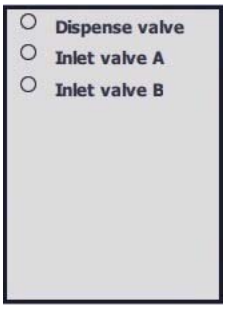


- Servo ON: This signal will be shown as green after system start.
- Servo ready: Motor can be used or is working without problem.
- Servo alarm: Something is wrong with the motor. Operator should push the reset button or send a remote reset signal. If reset does not work, the PR-X control box needs to be restarted.

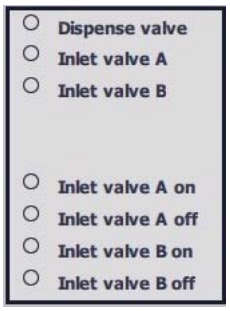
Supply cartridge empty sensor

When the PR-X system is cartridge feed version, this area will be displayed.

Dispense valve and inlet valves status



Supply Pump Version



Cartridge Version

If the system is a cartridge version, because the Inlet Valve (AM) is used for reloading, the on/off sensor status will be displayed.

Motor position

This display shows the number of motor steps. Each revolution of motor is 150 steps.

Purge time

If the operator has set the ‘Purge alarm time’ on **Setup Screen 5 - Purge**, see page 38, the purge timer will be shown and the time displayed will count down. If the timer reaches ZERO, the system will send a ‘purge request’ signal and show ‘purge request’ in the information bar.

Auto reduction time

If the operator enabled ‘End job automatically’ and set ‘Max idle time in job’ on **Setup Screen 7 - De-pressurization**, see page 40, the auto reduction time will be shown in box. If the timer times out, the system will automatically reduce the pressure and end the current job.

‘HOME’ button

This is the return to the Home point command. When the ‘HOME’ button is selected, the system must be inactive. Once the button to start the Home operation is selected, the button will blink until the piston returns to the Home point, and then the button will remain on until the next operation is started.

Automatic Screen 3

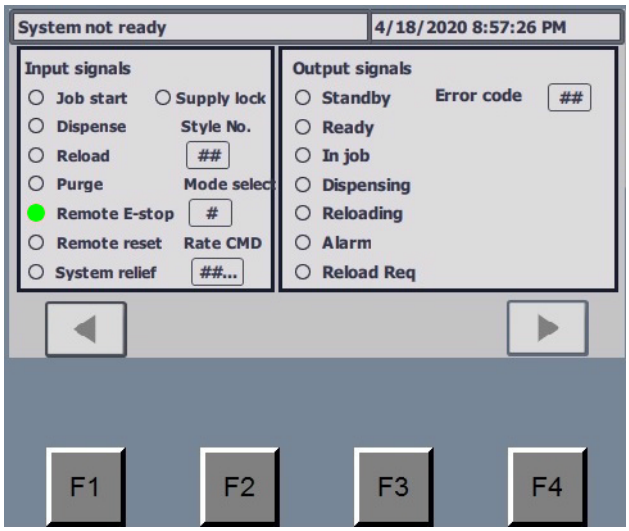


FIG. 12 Automatic Screen 3 (I/O Communication Mode)

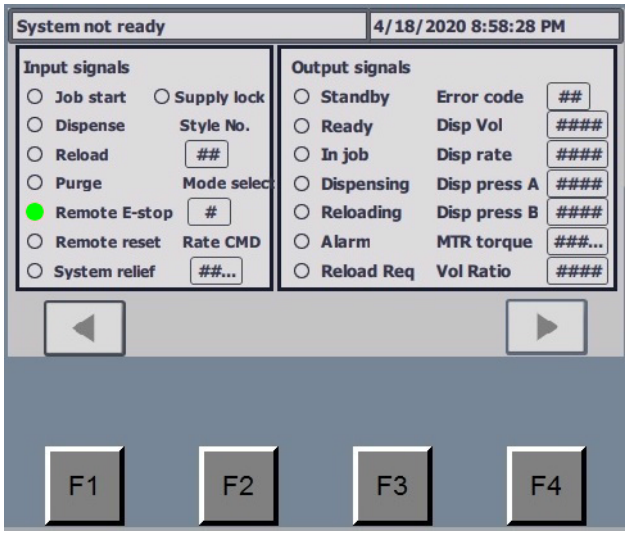


FIG. 13 Automatic Screen 3 (Profinet Communication Mode)

On the Automatic Screen 3, press ‘F1’ or select the ◄ button to display the Automatic Screen 2. Press ‘F4’ or select the ► button to display the Automatic Screen 4.

The content and functions of this screen are as follows:

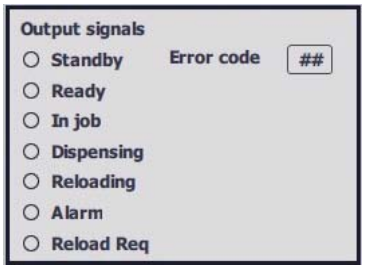
Input signals status

The input signals display shows the current signal status from customer inputs.

- Rate CMD
  - If ‘distributed IO’ is selected as ‘Other CMD Resource’ on **Advanced Setup Screen 2**, see page 42, the input voltage signal will be shown as 0-10.0, where 0 means 0 voltage, 10.0 means 10 V.
  - If ‘Gateway’ is selected as ‘Other CMD Resource’ on **Advanced Setup Screen 2**, see page 42, the input data sent by Profinet will be shown as a value from 0 to 1000.

NOTE: The Gateway option is only included in the Profinet communication mode. Any PR-X system can be converted to use Profinet communication mode.

Output signals status



I/O communication mode

Profinet communication mode

The output signals display shows the current signal status from the PR-X control box.

Error code	Port code	Error Type	Comment
0	00000	----	No Error
1	00001	Error	Estop
2	00010	Error	Lowest limit has been reached
3	00011	Error	Highest limit has been reached
4	00100	Error	Pre-charge time out
5	00101	Error	Pressure relief time out
6	00110	Error	Reload time out
7	00111	Error	Servo fault
8	01000	Error	Part A Supplier is in low level
9	01001	Error	Part B Supplier is in low level
10	01010	Error	Part A pressure exceeds system limit
11	01011	Error	Part B pressure exceeds system limit
12	01100	Error	Part A/B pressure is not balanced
13	01101	Error	Servo unit lost power
14	01110	Error	Inlet valve A does not turn on in time
15	01111	Error	Inlet valve B does not turn on in time
16	10000	Error	Dispense valve does not turn on in time
17	10001	Error	Inlet valve A does not turn off in time
18	10010	Error	Inlet valve B does not turn off in time
19	10011	Error	Dispense valve does not turn off in time
20	10100	Error	Pressure relief fault
21	10101	Error	Pre-charge fault
22	10110	Error	Homing fault
23	10111	Error	Motor torque is over limit
24	11000	Error	Motor peak torque is over limit
25	11001	Deviation	Illegal setting
26	11010	Deviation	Illegal command
27	11011	Deviation	Home is lost
28	11100	Deviation	Reload is requested (System is in job) or metering tube pump is empty (System is not in job)
29	11101	Deviation	Purge is requested
30	11110	Deviation	Automatic relief after idle

NOTE: The information below is exclusive to the Profinet communication mode.

- Disp vol: Dispense volume during current shot. The value from the PR-X control box is an integer and must be multiplied by 0.01 to calculate the requested volume. The unit is cc.
- Disp rate: Dispense flow rate. The value from the PR-X control box is an integer and must be multiplied by 0.001 to calculate the requested volume. The unit is cc/s.
- Disp press A: Current working pressure value of part A. The value from the PR-X control box is an integer and the unit is psi.
- Disp press B: Current working pressure value of part B. The value from the PR-X control box is an integer and the unit is psi.
- MTR torque: Current driver motor working torque. The value is an integer and must be multiplied by 0.001 to calculate the requested volume. The unit is NM.
- Vol ratio: Current dispense mixing ratio. The value is an integer and must be multiplied by 0.01 to calculate the requested volume.

Automatic Screen 4

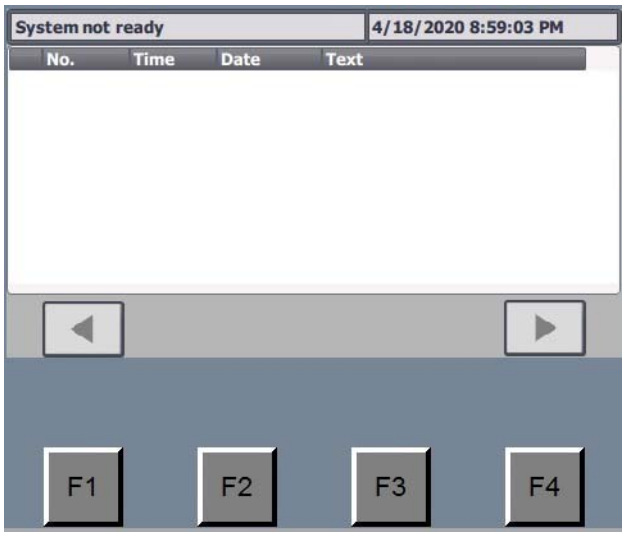


FIG. 14 Automatic Screen 4

On the Automatic Screen 4, press ‘F1’ or select the ◄ button to display the Automatic Screen 3. Press ‘F4’ or select the ► button to display the Automatic Screen 5. This screen shows the error history. It will record the error number, time, date and explanation text for the last 50 system errors.

Automatic Screen 5

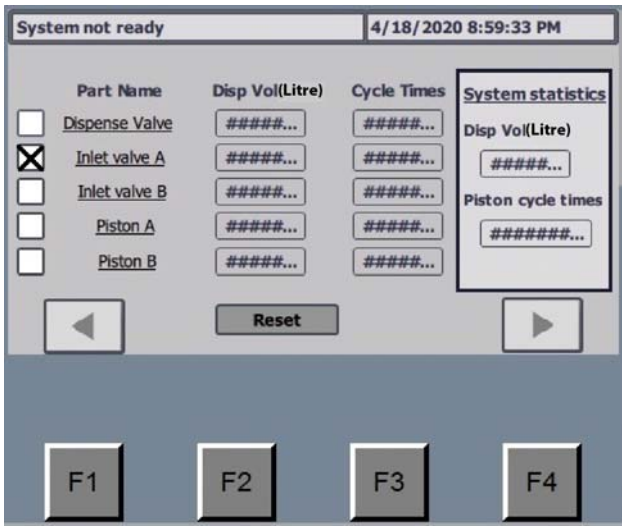


FIG. 15 Automatic Screen 5

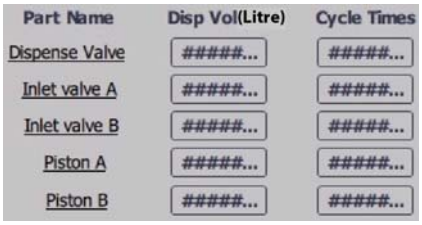
On the Automatic Screen 5, press ‘F1’ or select the ◄ button to display the Automatic Screen 4. If the system is supply pump feed version, press ‘F4’ or select the ► button to display the Automatic Screen 6. If the system is cartridge feed version, press ‘F4’ or select the ► button to return to the Automatic Screen 1.

The content and functions of this screen are as follows:

Select box

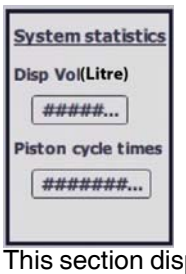
After one or several selection boxes are selected, the ‘Reset’ button will appear. The operator can clear the selected record and restart data recording.

Workload record



To record the workload of important parts.This data can be reset.

System statistics



This section displays the whole system workload record. This data cannot be reset.

Automatic Screen 6 (For Cartridge Version Only)

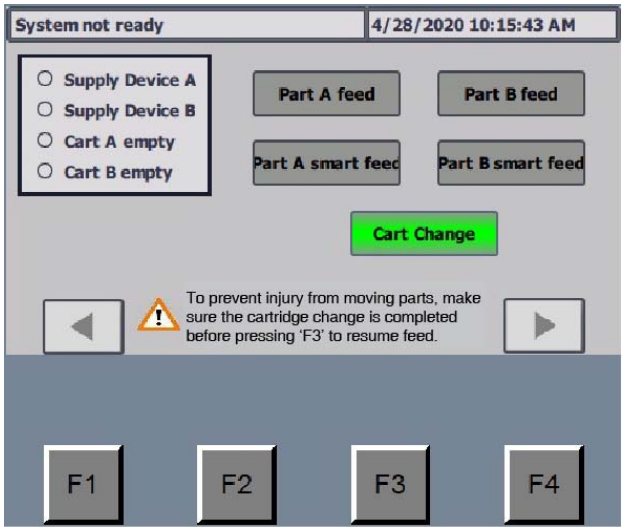
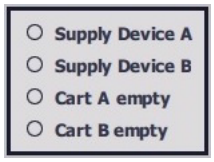


FIG. 16 Automatic Screen 5

On the Automatic Screen 6, press 'F1' or select the ◄ button to display the Automatic Screen 5. Press 'F4' or select the ► button to return to the Automatic Screen 1.

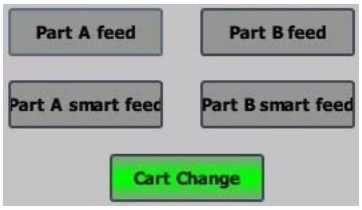
The content and functions of this screen are as follows:

Part A and Part B supply status

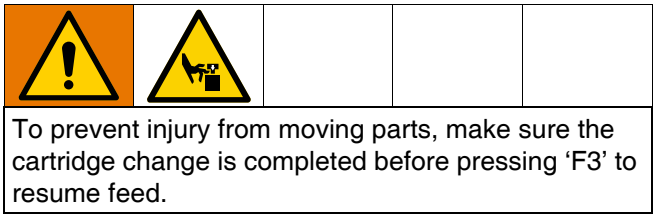


To show the supply status of Part A and part B.

Supply system operation



- Part A or B feed: Activate to start or stop supply device A or B, regardless of supply type (supply pump feed or cartridge feed).
- Part A or B smart feed: Only activate to drive supply device in reloading.
  - For supply pump feed, the system will start the pump only while reloading.
  - For cartridge feed, the piston is only active in reloading. When the system is dispensing, the piston is in a neutral position.



To prevent injury from moving parts, make sure the cartridge change is completed before pressing 'F3' to resume feed.

- Cart change: Only activate to change cartridge after the job is finished. Select 'Cart Change" to move back the cartridge cylinder rod. Press 'F3' to move forward the cartridge cylinder rod.

System Main Screen

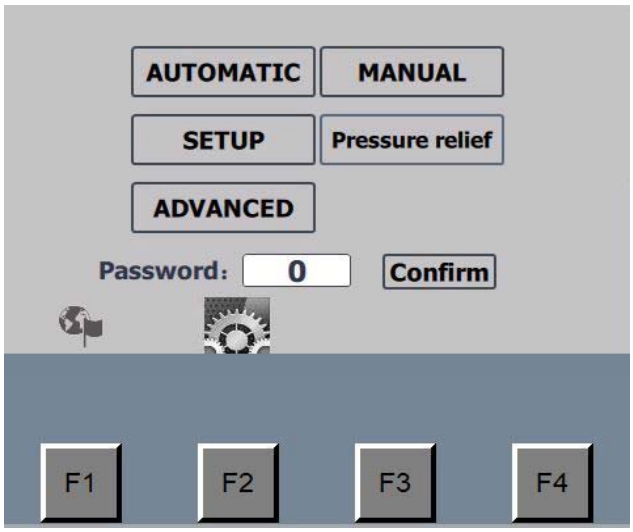


FIG. 17 System Main Screen

On the Automatic Screen 1, press button to display the System Main Screen. On this screen, the operator can switch the system to Automatic mode, Manual mode, Setup mode, Pressure relief function or Advanced Mode.

Press ‘F1’ or select the button to display language options (Chinese or English). Press ‘F2’ or select the button to display the System Information Screen.

If the operator has already set up password protection on **Advanced Setup Screen 1**, see page 41, the password must be entered to open the Setup Screens.

To open the Advanced mode, the operator must enter the password **1492**. The Advanced option won’t show until the password has been entered.

Select ‘Pressure relief’ button, the system will identify whether the inlet valve (AL or AM) is closed. If the Inlet Valve (AL or AM) is opened, it will be closed. Then the MD2 Dispense Valve (AE) will be opened. The whole system pressure is relieved. When the ‘Pressure relief’ is selected, the real-time pressure of part A and part B will be displayed on the System Main Screen.

System Information Screen

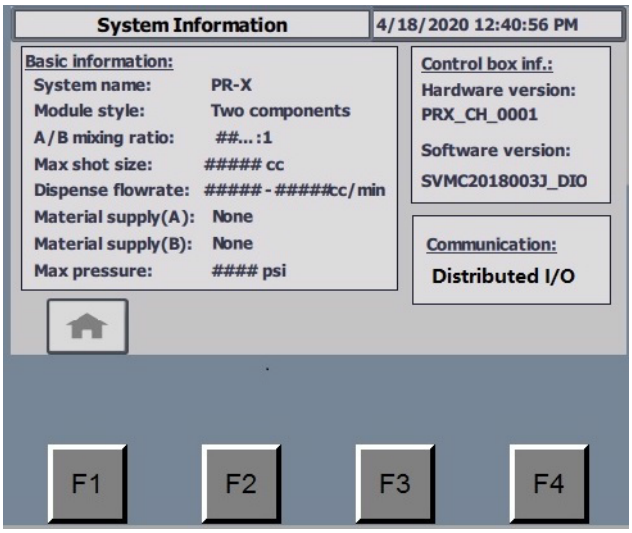


FIG. 18 System Information Screen

General system information can be found in this screen. Press ‘F1” or select the button to return to the System Main Screen.

Manual Screen 1

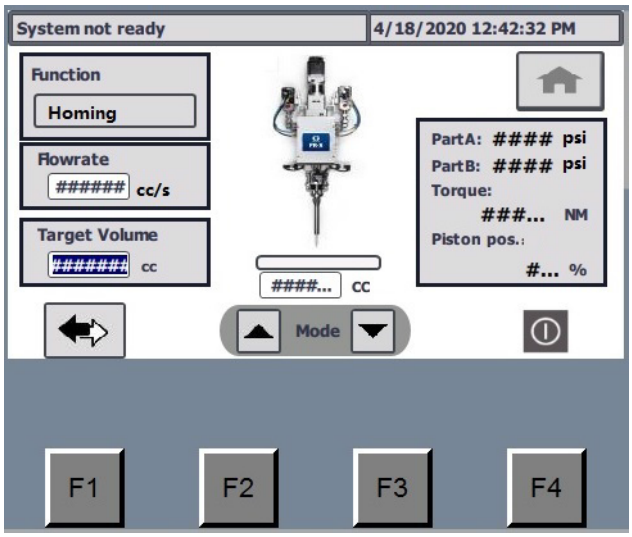
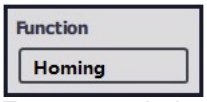


FIG. 19 Manual Screen 1

On the Manual Screen, press ‘F1’ or select the button to display the Manual Screen 2. Press ‘F4’ or select the button to execute the operation which is selected in ‘Function mode’ dropdown list . 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 the operator has entered the System Main Screen, the system will not work in Automation mode.

The content and functions of this screen are as follows:

Function mode operation select



Function includes 7 operations: Homing, Pre-charge, Shot dispense, Bead dispense, Reload, Depressurization and Purge.

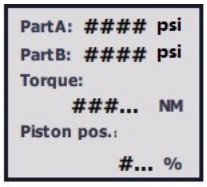
Flowrate and target volume

Parameter setting of flow rate and target volume.

Progress bar and actual dispense volume

- Shot mode: Displays the progress bar showing the completion of the current target and the actual dispensing volume.
- Bead mode: The progress bar always displays 100%. The actual dispensing volume will increase during bead dispensing and the target volume will display a value consistent with the actual volume.

Current pressure, motor torque and piston position



- Current pressure
  - Part A: Current pressure of A material.
  - Part B: Current pressure of B material.
- Motor torque: The torque of the drive motor is shown in NM.
- Piston position: Displays how much material is in the cylinders (0-100%). When the rod slider is at the home position, ‘Piston position’ will show 100%. When the slider moves to the ‘empty’ position, ‘Piston position’ will show 0%.

Manual Screen 2

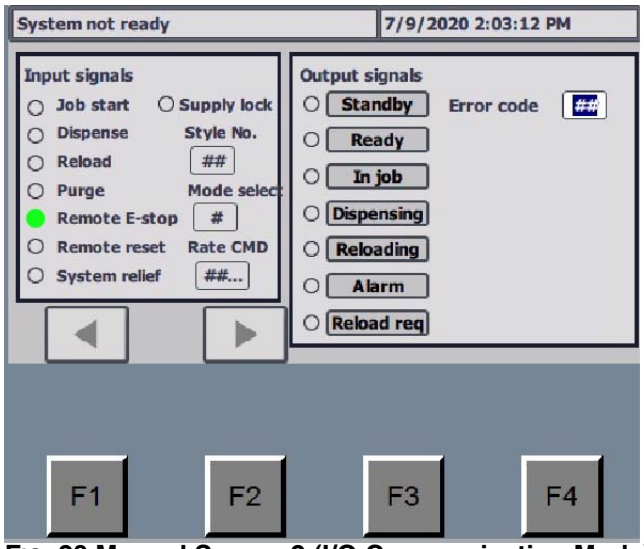


FIG. 20 Manual Screen 2 (I/O Communication Mode)

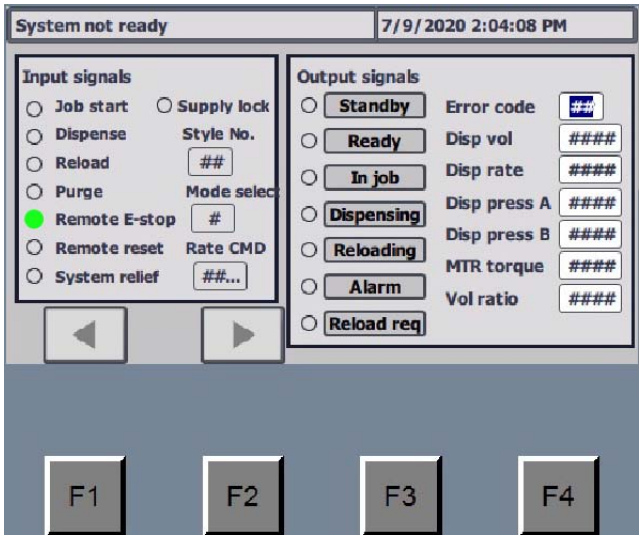


FIG. 21 Manual Screen 2 (Profinet Communication Mode)

On the Manual Screen 2, press ‘F1’ or select the button to display the Manual Screen 1. If the system is cartridge feed version, press ‘F2’ or select the button to display the Manual Screen 3.

The Manual Screen 2 is used to check the signal exchange only.

Manual Screen 3 (For Cartridge Version Only)

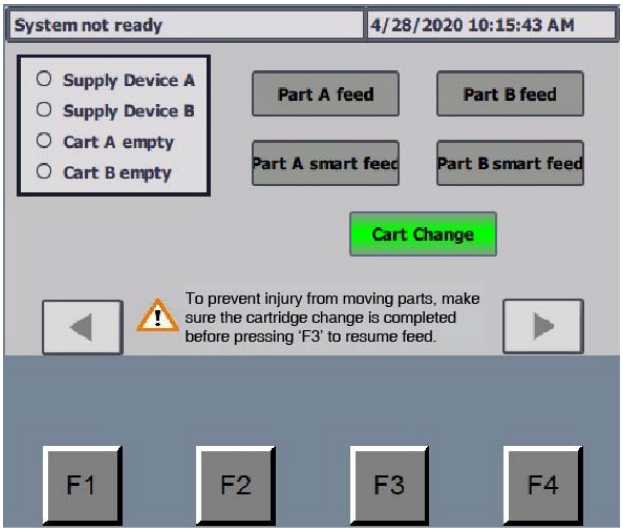
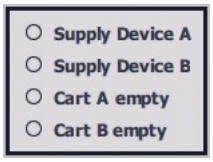


FIG. 22 Manual Screen 3

On the Manual Screen 3, press ‘F1’ or select the button to display the Manual Screen 2. Press ‘F4’ or select the button to return to the Manual Screen 1.

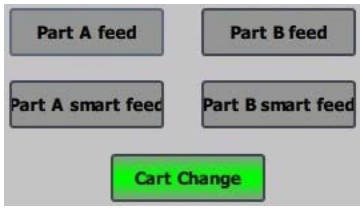
The content and functions of this screen are as follows:

Part A and Part B supply status



To show the supply status of Part A and part B.

Supply system operation



- Part A or B feed: Activate to start or stop supply device A or B, regardless of supply type (supply pump feed or cartridge feed).
- Part A or B smart feed: Only activate to drive supply device in reloading.
  - For supply pump feed, the system will start the pump only while reloading.
  - For cartridge feed, the piston is only active in reloading. When the system is dispensing, the piston is in a neutral position.

To prevent injury from moving parts, make sure the cartridge change is completed before pressing ‘F3’ to resume feed.

- Cart change: Only activate to change cartridge after the job is finished. Select ‘Cart Change” to move back the cartridge cylinder rod. Press ‘F3’ to move forward the cartridge cylinder rod.

Setup Screen

Setup Screen 1 - Reload

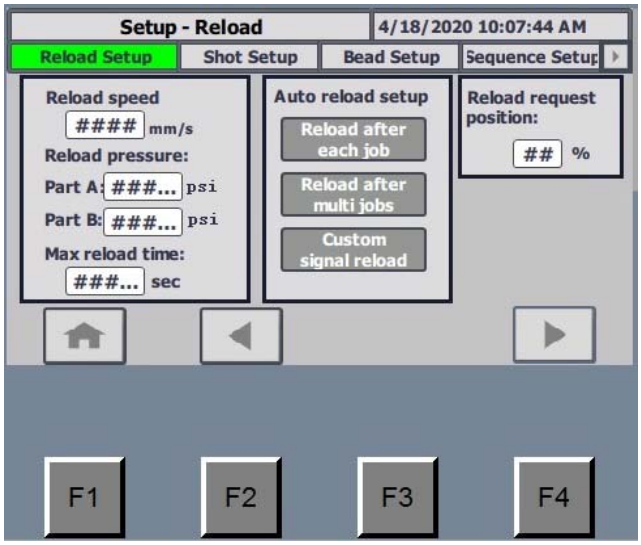


FIG. 23 Reload Setup Screen

On the Reload Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

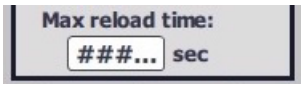
Reload speed setup

Set both the reloading speed and ‘Home' operations speed.

Reload pressure setup

Set the reload pressure for part A and B. During reloading, after piston returns to home position, the system will keep the Inlet Valve (AL or AM) open until part A and B pressure has exceeded the preset reload pressure.

Maximum reload time



Set reload time limit. If the reload process exceeds the time limit, the system will send out an alarm as a reload time out.

Reload type setup

- Reload after each job: The system automatically reloads after each job.
- Reload after multi jobs: The system automatically reloads after multiple jobs.
- Custom signal reload: The system will not reload automatically. The system will reload only when prompted by external signal.

Reload request position

- When the material in the supply pump system or supply cartridge is less than the percentage set here, the system will send out an alarm, but the system can still work.
- If Reload after each job or Reload after multi jobs is selected, and the material in the supply pump system or supply cartridge is less than the percentage set here, the system automatically reloads after each job or multiple jobs.

Setup Screen 2 - Shot

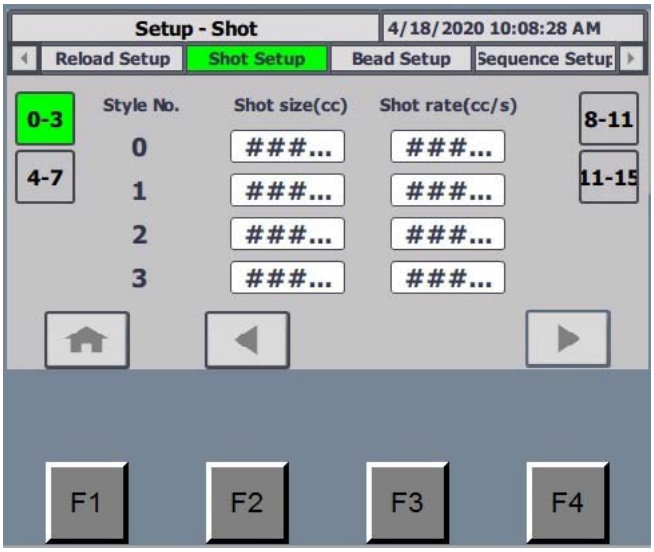


FIG. 24 Shot Setup Screen

On the Shot Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

This screen includes 4 pages to set flowrate and target volume for 16 styles.

Setup Screen 3 - Bead

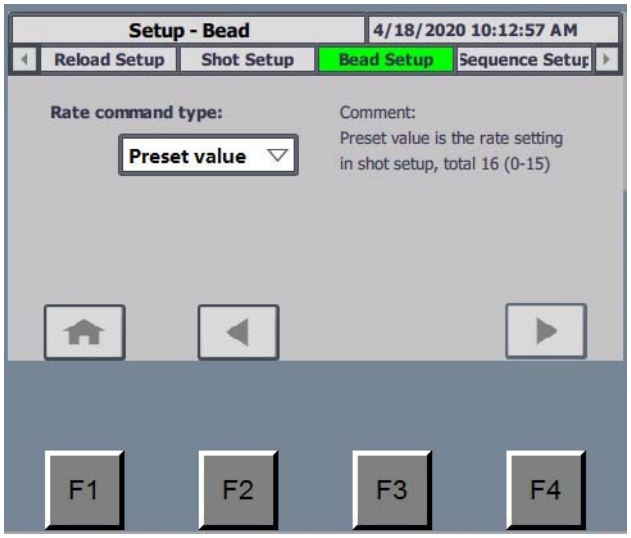


FIG. 25 Bead Setup Screen (Preset value)

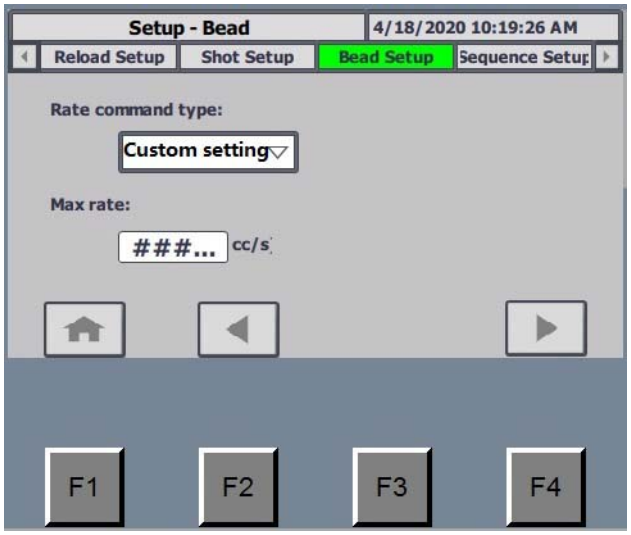


FIG. 26 Bead Setup Screen (Custom setting)

On the Bead Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

There are two Rate command types:

- Preset value: The flow rate is defined on **Setup Screen 2 - Shot**, see page 36. ‘Shot bit 0-3’ signals or style numbers are used to select flow rate.
- Custom setting: The operator should set ‘Max Rate’ first. The Operator can use 0-10 V signal to control flow rate.

Setup Screen 4 - Sequence

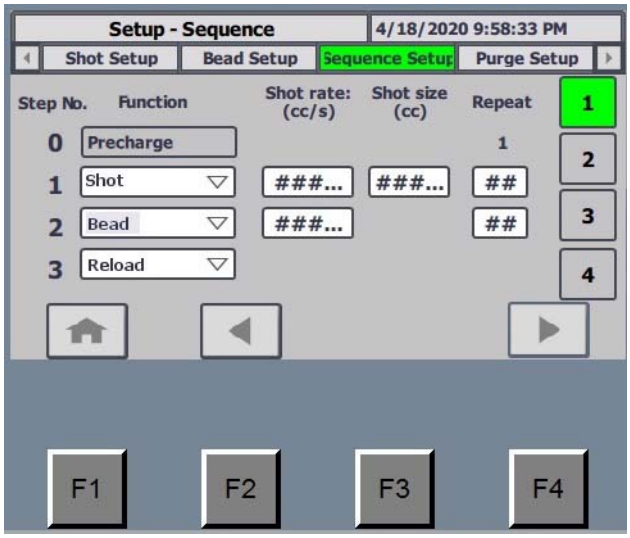


FIG. 27 Sequence Setup Screen

On the Sequence Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

Sequence includes 16 steps maximum. Step 0 and step 15 are used to start job (Pre-charge) and end job (Depressurization). Operator can select functions including shot, bead, reload and none. If the shot or bead function is selected, repeat time can be set (1-99).

Setup Screen 5 - Purge

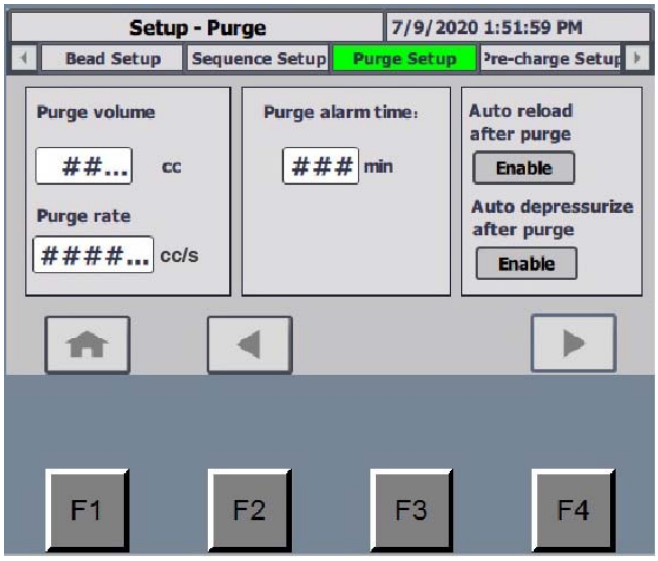
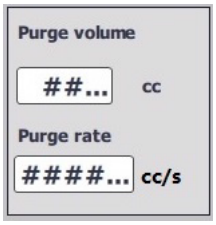


FIG. 28 Purge Setup Screen

On the Purge Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

Purge volume and rate setup

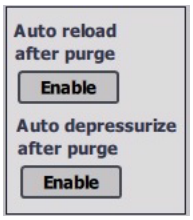


- Purge volume: Set the target purge volume.
- Purge rate: Set the purge flowrate.

Purge alarm time

Set the purge request timer. When the equipment doesn’t dispense, the PR-X control box will start the countdown for the time chosen by the operator. When the time is 0, the system will send out the purge alarm signal.

Purge type setup



- Auto reload after purge button: When enabled, the system automatically reloads after purge is completed.
- Auto depressurize after purge button: When enabled, the system automatically performs depressurization after purge is completed.

Setup Screen 6 - Pre-charge

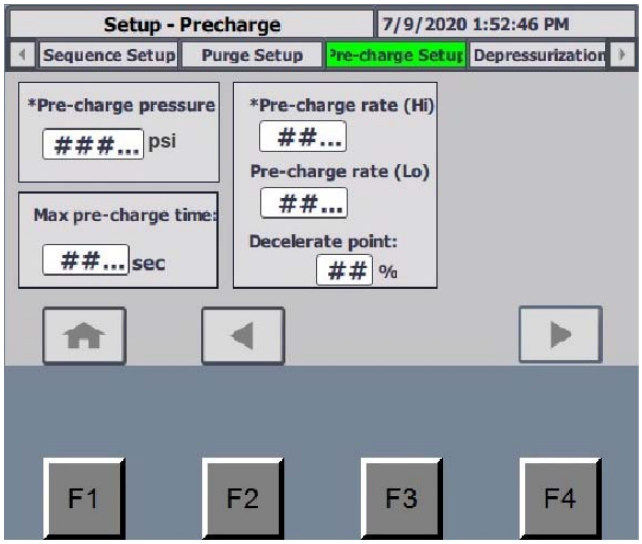
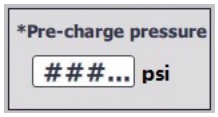


FIG. 29 Pre-charge Setup Screen

On the Pre-charge Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

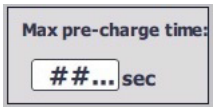
The content and functions of this screen are as follows:

Pre-charge pressure



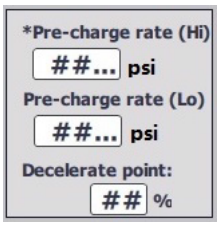
The operator may set the pre-charge pressure in psi.

Maximum pre-charge time limit



The operator may set the time in seconds the system may spend pre-charging. If pre-charging exceeds the set time, the system will activate the alarm to alert the operator the limit has been reached.

Pre-charge speed



The operator may set two separate pre-charge rates. The system will pre-charge at the set ‘Hi’ speed until reaching the decelerate point. The decelerate point is the target pressure at which the system will switch from the "Hi" to the "Lo" pre-charge rate. Enter the decelerate point as a percentage of the Pre-charge pressure. For example, if the pre-charge pressure is 500 psi and the decelerate point is 75%, the system will switch to the ‘Lo’ speed once pressure has reached 375 psi. The system will then continue pre-charging at the set ‘Lo’ speed until system confirms the pressure has exceeded the set target pressure.

Setup Screen 7 - De-pressurization

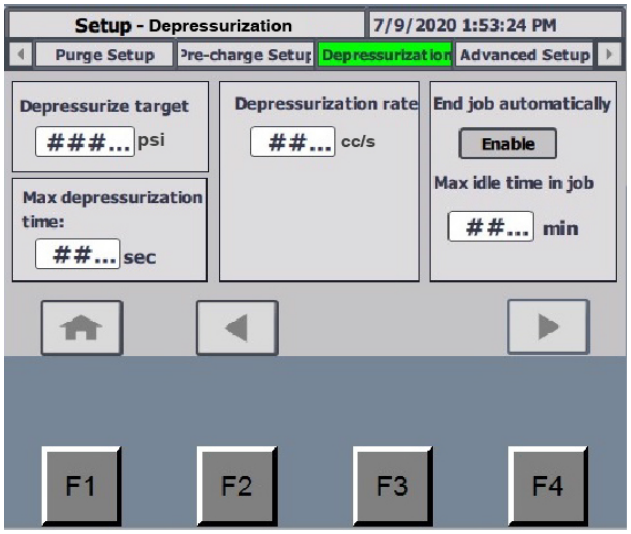
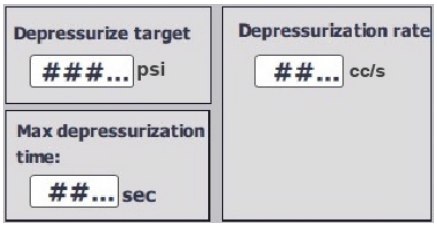


FIG. 30 De-pressurization Setup Screen

On the De-pressurization Setup Screen, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

De-pressurization setup



- Depressurization target: The operator may set the depressurization target. The system will reduce the pressure to the target value automatically when the job is finished.

NOTE: Set different depressurization targets according to different materials. For detailed information, please contact your Graco distributor.

- Max depressurization time: The operator may set a maximum time in seconds for the system to perform depressurization. If depressurization function exceeds the set time, the system alarm will be activated.
- Depressurization rate: The operator may input a value here to set the piston speed during depressurization.

End job automatically

After this option is enabled, the operator must set the maximum idle time for the system while performing a job. After the set period passes without any operation, the depressurization program will be automatically executed and the current job ended.

Advanced Setup Screen

Advanced Setup Screen 1

FIG. 31 Advanced Setup Screen - 1

On the Advanced Setup Screen 1, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

Flowrate unit

The operator may select either cc/minute or cc/second from the dropdown list to customize the units used for flowrate setup.

Pressure unit

The operator may select psi, bar or MPa from the dropdown list to customize the units used for pressure setup.

Password

If this function is selected, a 4-digit number should be set. After the 4-digit number is set, the operator must be prompted to input the password before navigating to any of the setup screens.

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.

Advanced Setup Screen 2

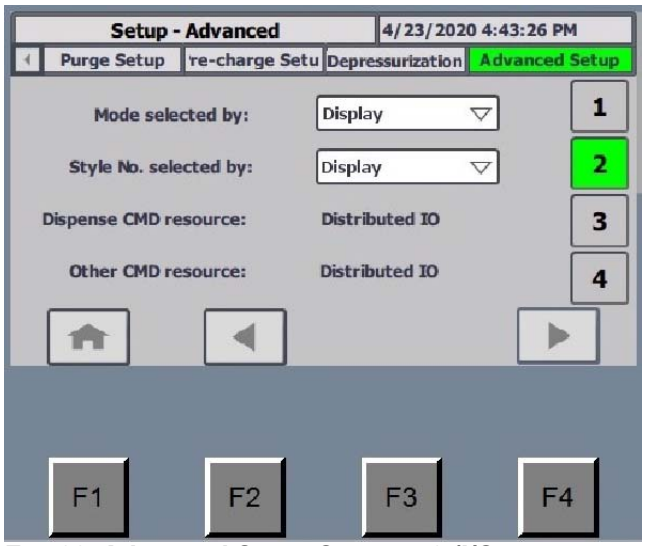


FIG. 32 Advanced Setup Screen - 2 (I/O Communication Mode)

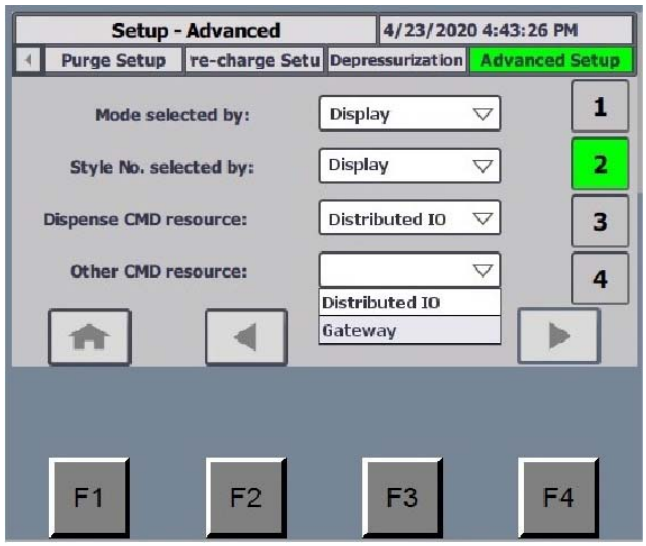


FIG. 33 Advanced Setup Screen - 2 (Profinet Communication Mode)

On the Advanced Setup Screen 2, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

Mode selected by

Options for mode selection input include Display, Distributed IO or Gateway.

- If ‘Distributed IO’ or ‘Gateway’ is selected, in Automatic mode, the shot or bead working mode (Sequence mode will be inaccessible) must be controlled by customer signals. The operator will not be able to change working mode using the touch screen.
- If ‘Display’ is selected, working mode will include Shot, Bead and Sequence mode. The operator will be able to change working mode using the touch screen.

Style No. selected by

The operator may choose whether the style number may be changed by Display, Distributed IO or Gateway.

Dispense CMD resource

The operator may choose whether the Dispense Command (CMD) resource comes from Distributed I/O communication or Gateway (Profinet) communication. Display option is unavailable.

Other CMD resource

The operator may choose whether the Other Command (CMD) Resource comes from Distributed I/O communication or Gateway (Profinet) communication. Display option is unavailable.
Other command (CMD) includes job start, reload, purge start, remote reset.

NOTE: The Gateway option is only included in the Profinet communication mode. Any PR-X system can be converted to use Profinet communication mode.

Advanced Setup Screen 3

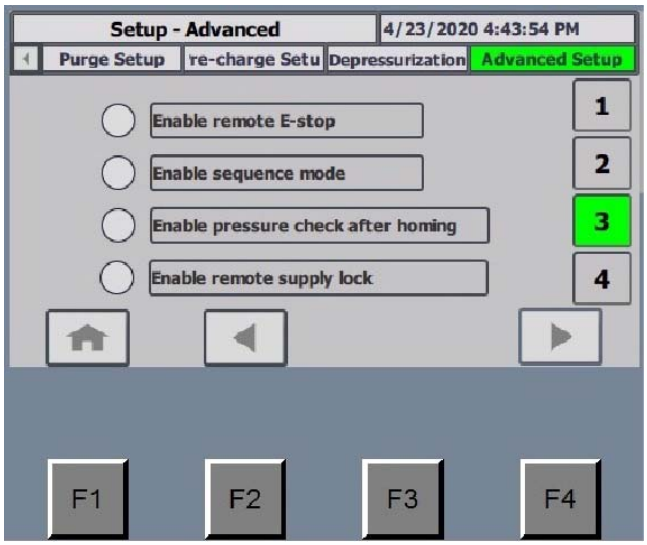


FIG. 34 Advanced Setup Screen - 3

On the Advanced Setup Screen 3, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

The content and functions of this screen are as follows:

Enable remote E-stop

If this function is selected, the PR-X system can be shut down from an external signal. When the signal changes to a `0', the PR-X system will shut down. This function acts the same as the Emergency Stop Switch (BB) on the front of the PR-X control box.

Enable sequence mode

If this function is selected, the PR-X system will run in sequence mode. In this mode, the operator can edit the working sequence (The sequence includes 16 steps maximum. The operator can edit step 1 to 14, as step 0 and 15 are tied to pre-charge and depressurization). When the system works in automatic status, the Customer Control Box (N) can send ‘dispense’ signal to start the sequence mode and then dispense step by step.

Enable pressure check after homing

If this function is selected, the system pressure will be checked when the piston is in the home position.

Enable remote supply lock (For cartridge version only)

If this function is selected, the supply cartridge can not feed the material until the customer’s control system sends out the unlock signal.

Advanced Setup Screen 4

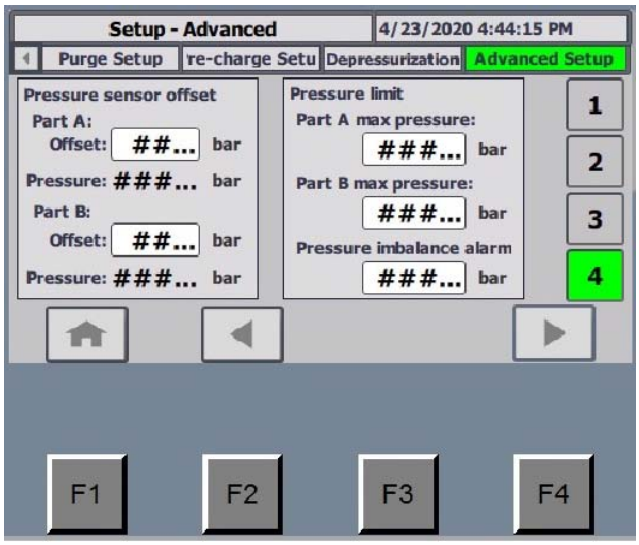
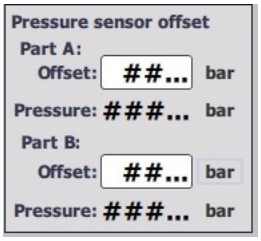


FIG. 35 Advanced Setup Screen - 4

On the Advanced Setup Screen 4, press ‘F1’ or select the button to display the System Main Screen. Press ‘F2’ or select the button to return to the previous screen. Press ‘F4’ or select the button to continue to the next screen.

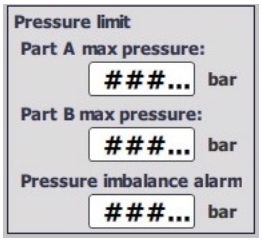
The content and functions of this screen are as follows:

Pressure sensor offset



The operator may input values to adjust the pressure offset on the sensors.

Pressure limit



If the Part A or B pressure is higher than the preset max pressure, the system will activate the alarm and send the alarm signal to customer system.
During dispensing, the system will check the difference between part A and B. If the pressure difference is higher than preset limit, the system will send the alarm signal and stop dispensing.

Advanced Screen 1

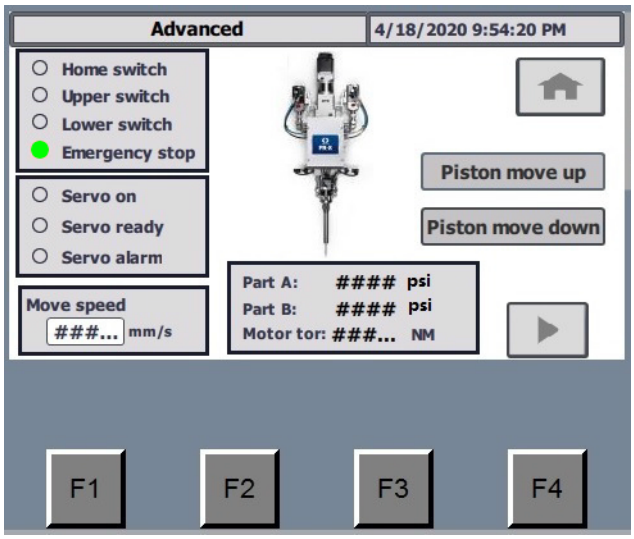


FIG. 36 Advanced Screen 1

On the Advanced Screen 1, press 'F4' or select the button to display the Advanced Screen 2. Advanced screens 1 and 2 are 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.

The content and functions of this screen are as follows:

Move speed

This box is for setting the speed of the slide block.

Piston move up

This button is for motor, slide block and piston tests. Jog control pistons and slide block move away from the outlet port.

Piston move down

Jog control pistons and slide block move toward the outlet port.

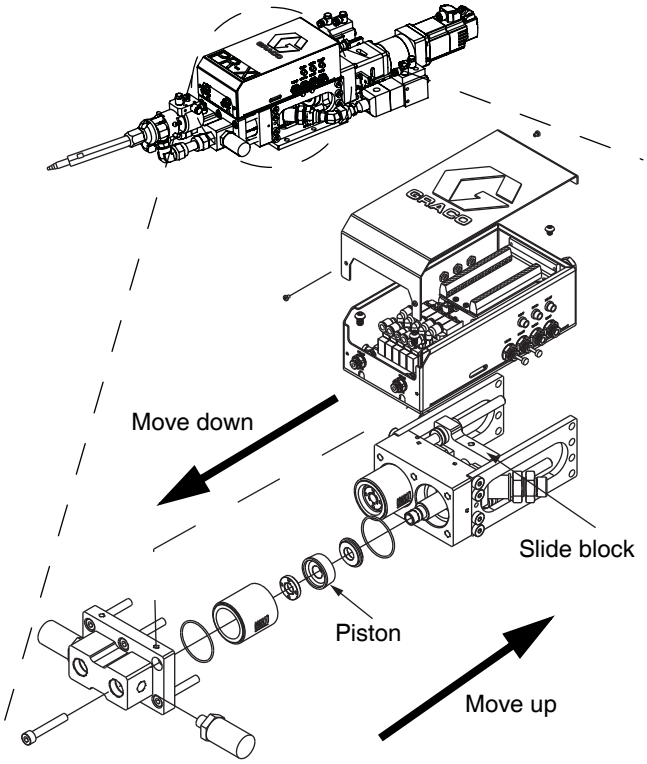


FIG. 37 Piston move up or down

Advanced Screen 2

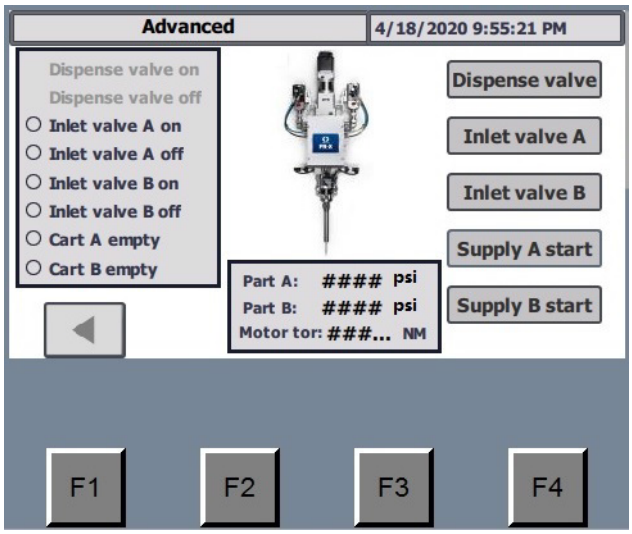


FIG. 38 Advanced Screen 2

On the Advanced Screen 2, press 'F1' or select the ◄ button to return to the Advanced Screen 1.

The content and functions of this screen are as follows:

Dispense valve

Dispense valve

Selecting this button enables testing of the MD2 Dispense Valve (AE) by controlling the opening or closing of the valve. When the MD2 Dispense Valve (AE) is open, the button will be green; when the MD2 Dispense Valve (AE) is closed, the button will be gray.

Inlet valve A and inlet valve B

Inlet valve A

Inlet valve B

Selecting each of these buttons enables testing of inlet valve A and B (AL or AM), respectively, by controlling the opening or closing of the valve. When the Inlet Valve (AL or AM) is open, the button will be green; when the Inlet Valve (AL or AM) is closed, the button will be gray.

Supply A start and supply B start (For cartridge version only)

Supply A start

Supply B start

Selecting each of these buttons enables starting supply cartridges.

Operation

Startup

1. Locate the Power Switch (BM) at the rear of the PR-X Control Box (J) and turn the power on.

2. With the air line (C) connected to the PR-X Machine (H), go to the Advanced Screen 2 of the PR-X Control Box (J), then select ‘Inlet valve A’ and ‘Inlet valve B’ to turn on Inlet Valve A and B (AL or AM).

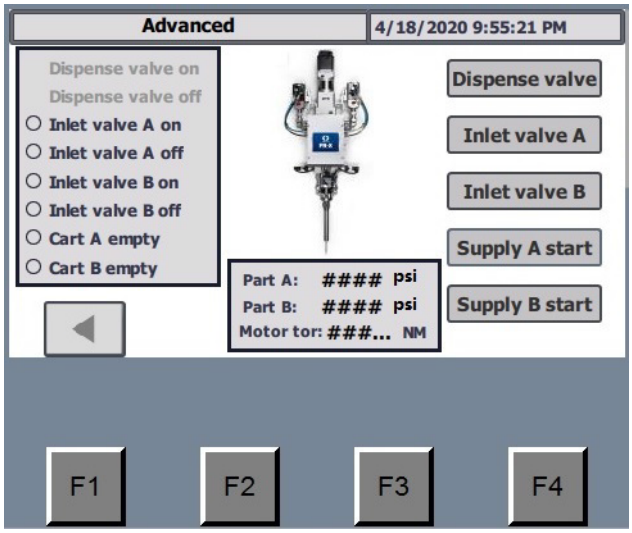


FIG. 39 Advanced Screen 2

3. Adjust the Pressure Regulating Valve (F) so the air pressure provided by the customer is at least 80 psi (0.6 MPa, 6 bar), and no higher than 100 psi (0.7 MPa, 7 bar).

NOTE: If needed, add the pressure relief valve to reduce pressure to 100 psi (0.7 MPa, 7 bar).

4. Perform **Prime the System** on page 48.

5. Perform the **Ratio Check Procedure** on page 49.

6. Install Static Mixer Package (AH).

7. Dispense several full stroke shots until the PR-X Machine (H) is free of air and there is no leakage at the Nose Piece (AJ) after shutoff.

NOTE: Very viscous, compressible materials may continue to leak after system is primed. Reduce flow rate as required to produce air-free dispensation. Very thin materials may require tilting the valve greater than 45 degrees and dispensing shots until material is air-free.

NOTE: Air entering the machine should be filtered.

Prime the System

1. Remove Static Mixer Package (AH) from the MD2 Dispense Valve (AE) (if installed) and place a waste container below it.

2. Pressurize the A and B Material Feed System (K and L); set the lower pressure to 20 psi (0.14 MPa, 1.4 bar).

3. Go to the Advanced Screen 1 of the PR-X control box (J). Select ‘Piston move up’, the piston moves up until the sensor sends out the stop signal, then set the move speed to 0.2 cc/s.

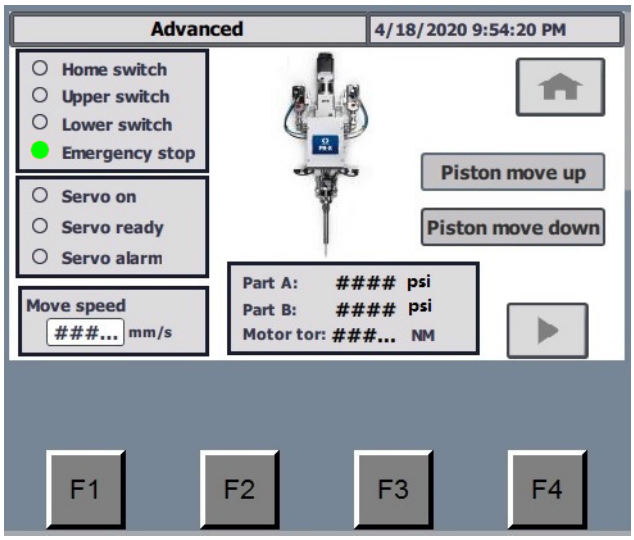


FIG. 40 Advanced Screen 1

4. Select ‘Dispense valve’, ‘Inlet valve A’ and ‘Inlet valve B’ to turn on MD2 Dispense Valve (AE) and Inlet Valve A and B (AL or AM).

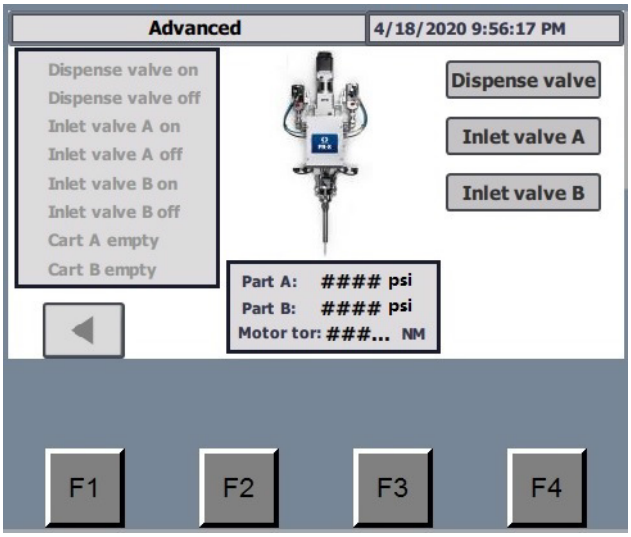


FIG. 41 Advanced Screen 2

5. When both sides of the system have a continuous and stable flow, select ‘Dispense valve’ again to turn off the MD2 Dispense Valve (AE).

6. Return to the Manual screen 1. Change the function to reload, then run the system.

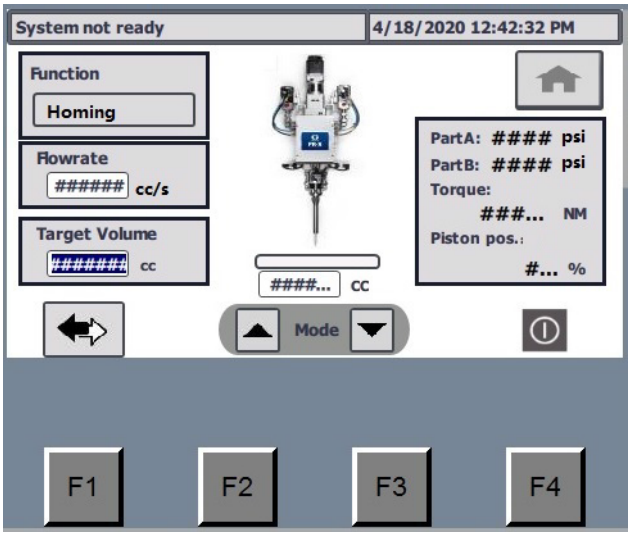


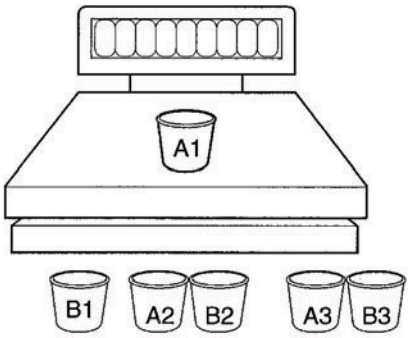
FIG. 42 Manual Screen 1

7. Dispense several full stroke shots until the PR-X Machine (H) is free of air.

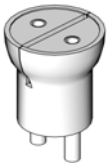
Ratio Check Procedure

Perform the Ratio Check Procedure at startup and after rebuild.

1. Weigh six small cups and label as indicated. Record weights.



2. Remove Static Mixer Package (AH) from MD2 Dispense Valve (AE).
3. Install the ratio check nozzle onto the MD2 Dispense Valve (AE).



4. Dispense into a waste container to prime the ratio check nozzle.
5. Place cups as indicated under ratio check nozzle and cycle the machine one time.
6. Repeat until all three sets of cups have been used.
7. Re-weigh all six cups and record weights.
8. Subtract weight of empty cups from weight of filled cups to get material weights.
9. Complete ratio calculations.

The following formula can be used when the density or specific gravity of both the “A” and “B” components are known and only one of the ratios:

$$\frac{\text{Weight Ratio}}{\text{Volume Ratio}} = \frac{\text{Specific Gravity}}{\text{Specific Gravity}}$$

Example:

A material has a weight ratio of 10:1, the “A” material has a specific gravity of 1.20 and the “B” material has a specific gravity of 1.00. To calculate volume ratio:

$$\frac{10:1}{\text{Volume Ratio}} = \frac{1.20}{1.00}$$

$$\text{Volume Ratio} = \frac{10}{1.20}$$

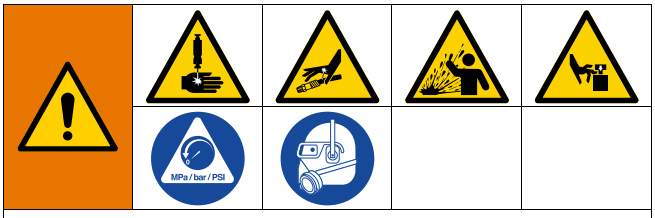
$$\text{Volume Ratio} = 8.33:1$$

Shutdown

1. Remove Static Mixer Package (AH) from MD2 Dispense Valve (AE).
2. Place a waste container below the MD2 Dispense Valve (AE) and activate a small shot to flush mixed material out of the valve.
3. Perform the **Pressure Relief Procedure** on page 50.
4. Turn off the system power.
5. Wipe the Nose Piece (AJ) with a clean rag, being careful to avoid contact between dispense materials.
6. Install the PTFE night cap (1:1 valves - 15K652) and retaining nut (15K688) on the MD2 Dispense Valve (AE).

Pressure Relief Procedure

Follow the Pressure Reduction 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 Reduction Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

1. Remove Static Mixer Package (AH) from MD2 Dispense Valve (AE).
2. Close the Bleed-type Master Air Valve (G, page 7) (required in the system).
3. Place a waste container below the MD2 Dispense Valve (AE).
4. Go to System main screen of the PR-X control box (J), then select ‘Pressure relief’.

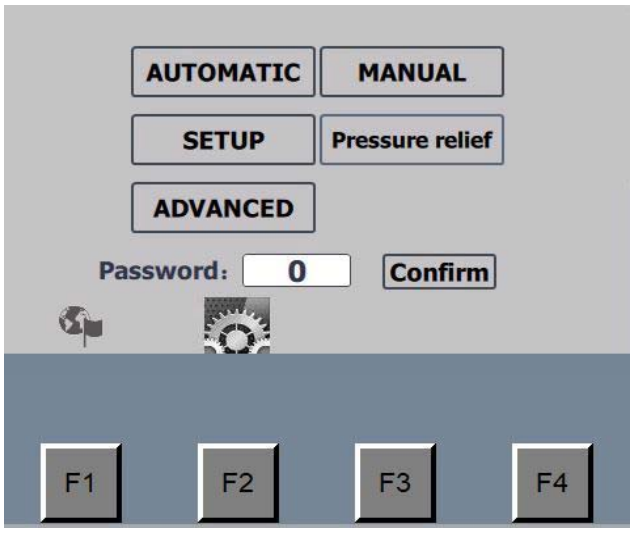


FIG. 43 System Main Screen

5. Turn off the system power and the air supply when the fluid pressure drops to ZERO.

Flush the Equipment

To avoid fire and explosion, always ground equipment and waste container. To avoid static sparking and injury from splashing, always flush at the lowest possible pressure.

- Flush out old fluid with new fluid or 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 entire system, circulate through the MD2 Dispense Valve (AE), then drain the valve.

Software Setup

Insert the SD card

1. Turn off and disconnect the control box power.
2. Remove the control box cover.
3. Insert the SD card.
4. Change the toggle switch position into run.
5. Put the cover back on and restart the control box again.

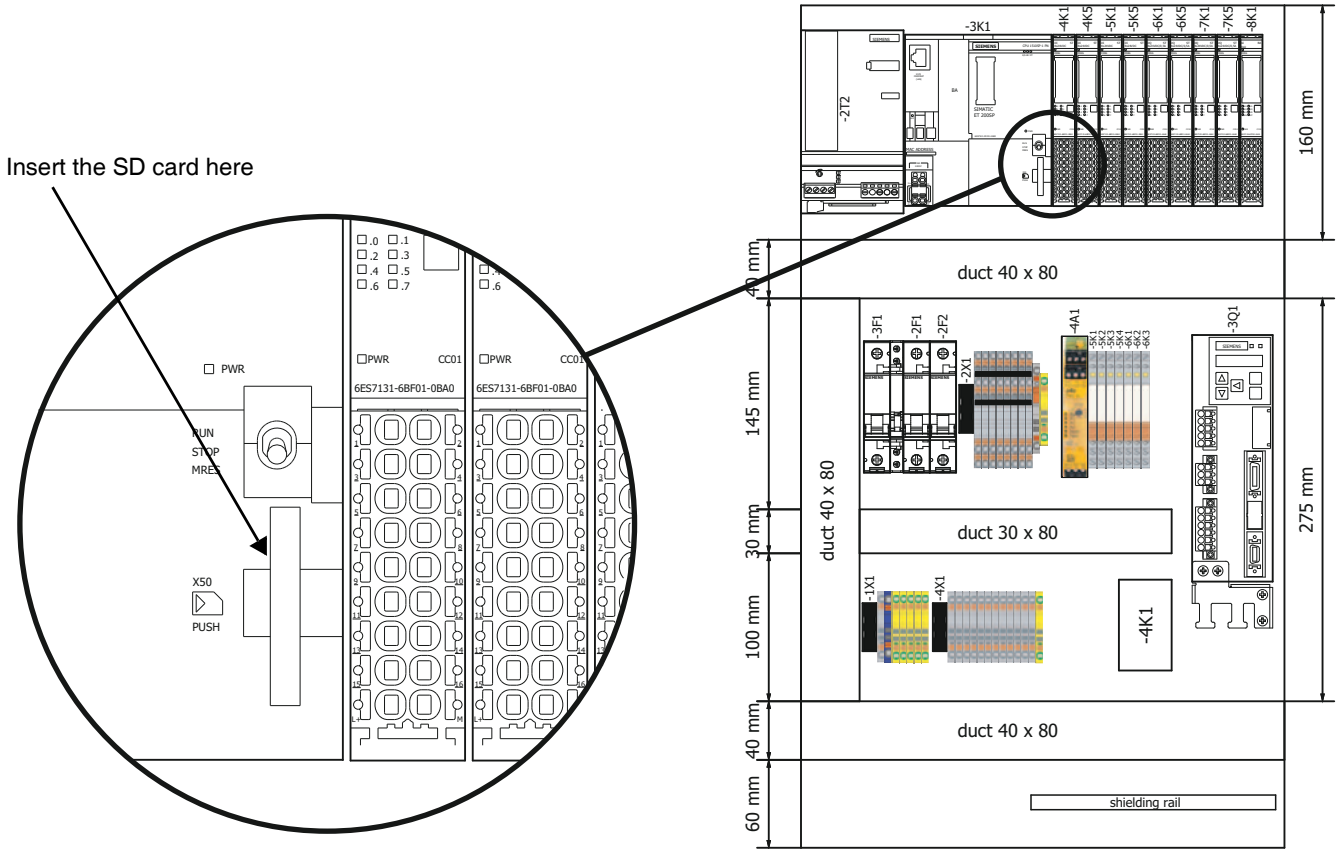
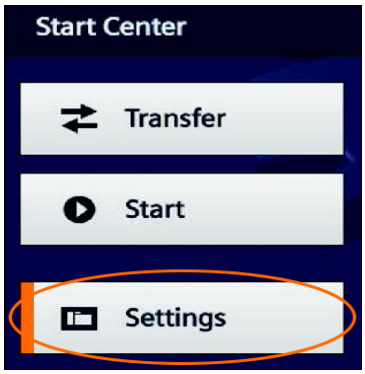


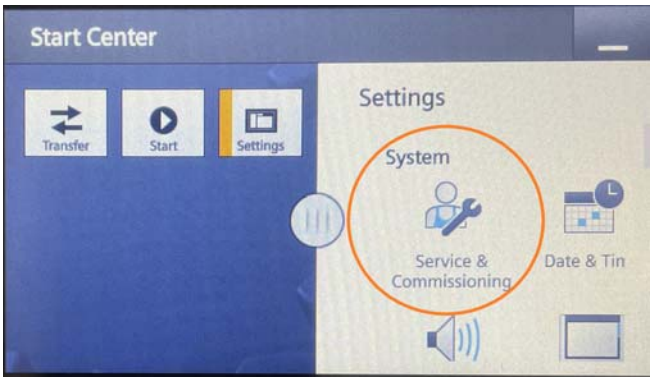
FIG. 44 Insert the SD Card

PLC IP Address Setup

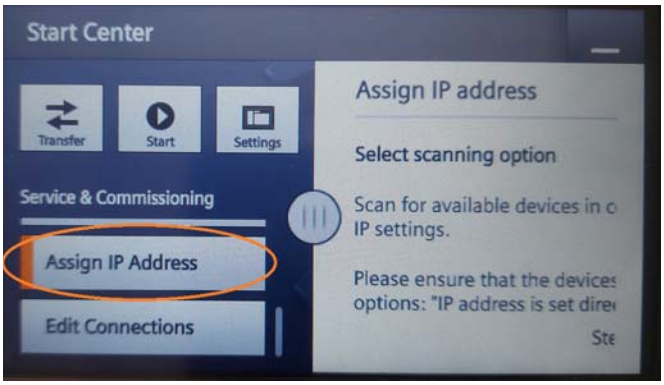
1. Start PR-X control box and push ‘Settings’ button on the ‘Start Center’ screen.



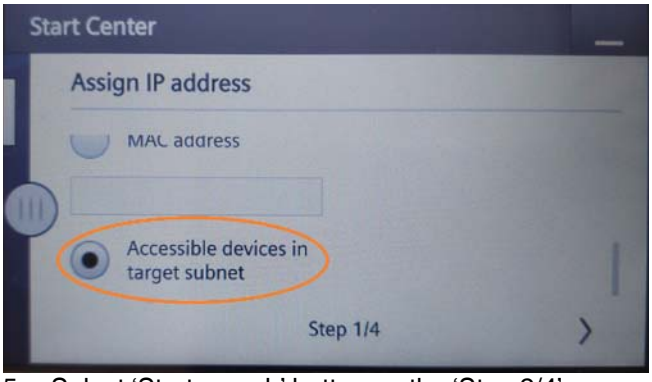
2. Select ‘Service & Commissioning’ on the ‘Settings’ screen.



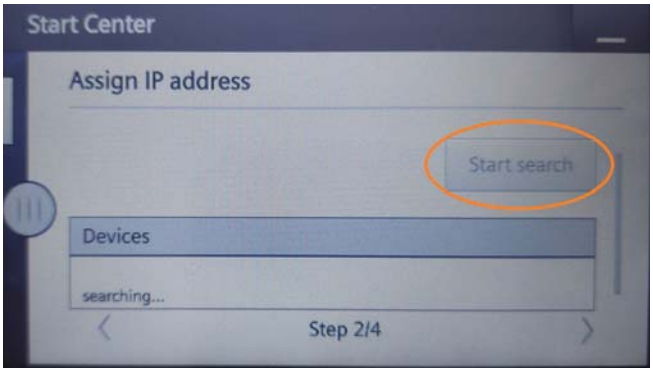
3. Select ‘Assign IP Address’ from the ‘Service & Commissioning’ list, then touch the cycle in the middle of screen to see complete information.

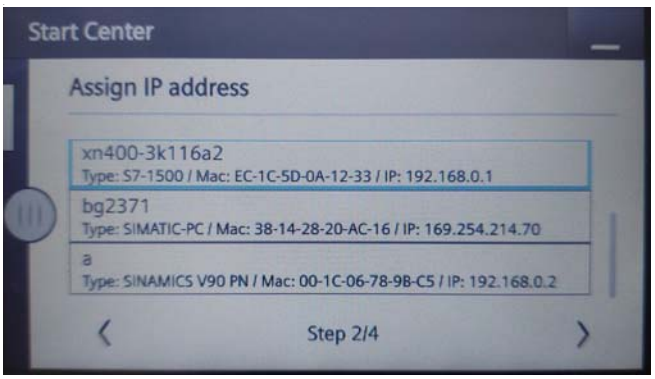


4. Select ‘Accessible devices in target subnet’ on the ‘Step 1/4’ screen. Then select ‘>‘ to proceed to the next screen.

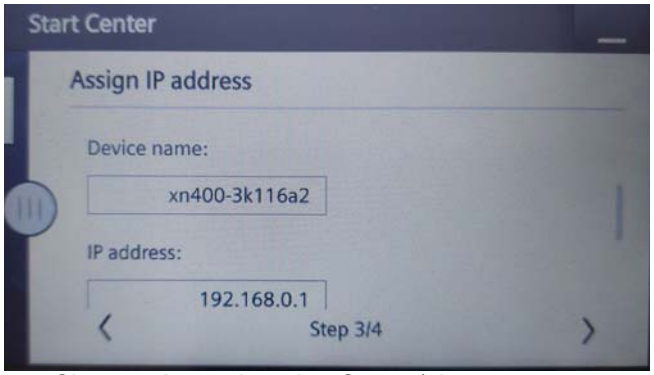


5. Select ‘Start search’ button on the ‘Step 2/4’ screen, HMI will then find PLC in the Net. Select the device with the IP address you want to change. Then select ‘>‘ to proceed the next screen.

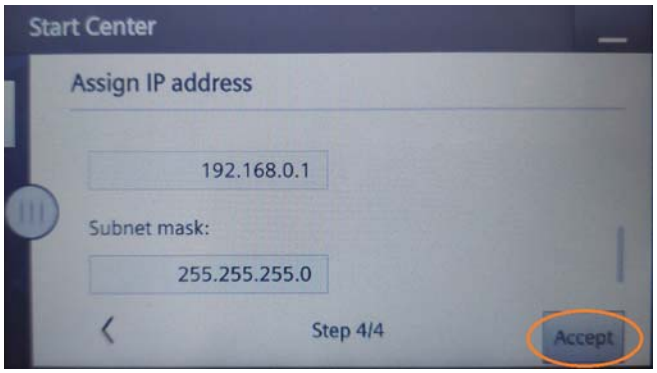




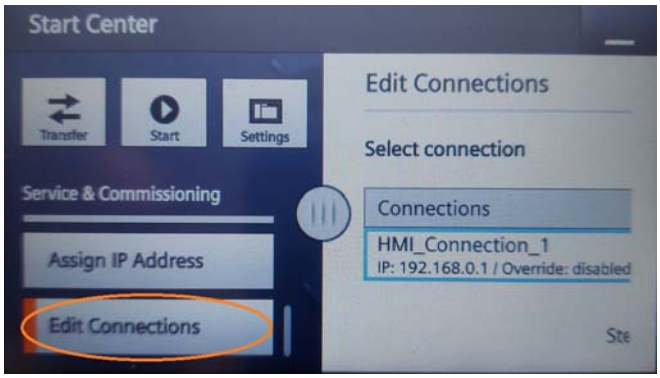
6. Edit IP address directly on the ‘Step 3/4’ screen. Then select ‘>‘ to proceed to the next screen.



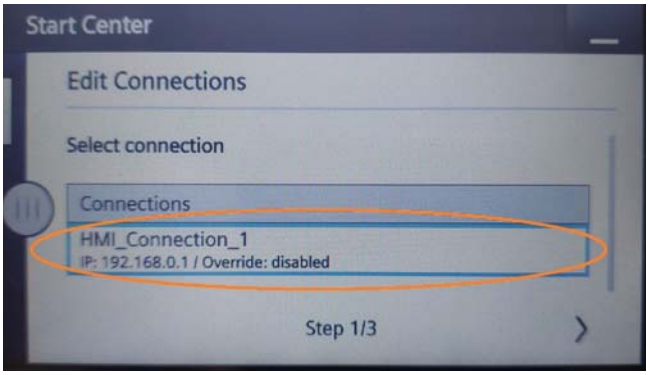
7. Choose ‘Accept’ on the ‘Step 4/4’ screen.



8. Select ‘Edit Connections’ from the ‘Service & Commissioning’ list. Next, touch the middle cycle to open the whole screen.

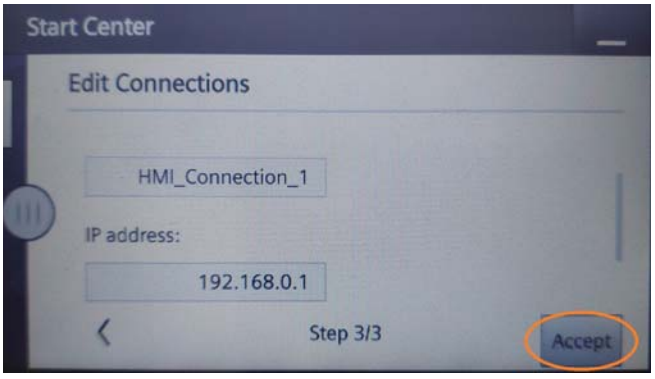


9. Select ‘HMI_Connection_1’ on the ‘Step 1/3’ screen. Then select ‘>‘ to proceed to the next screen.

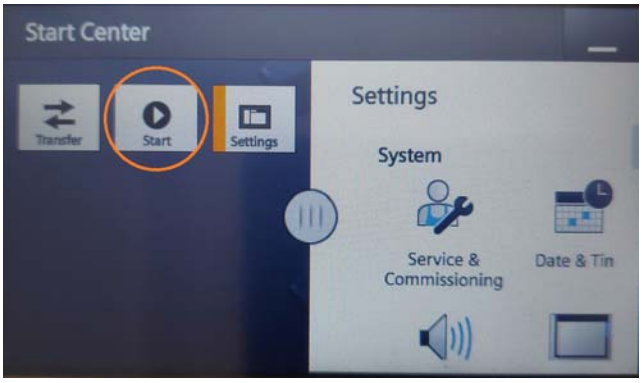


10. Select ‘ON’ for the ‘Override’ item on the ‘Step 2/3’ screen. Then select ‘>‘ to proceed to the next screen.

11. Select ‘Accept’ on the ‘Step 3/3’ screen.

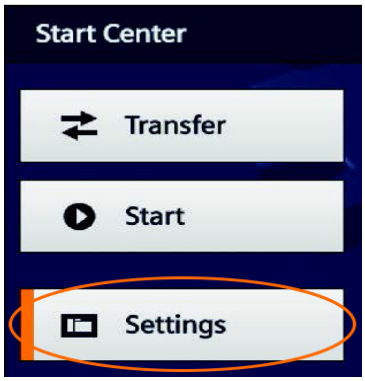


12. Return to the ‘Start Center’ screen and restart HMI before HMI IP address setup.

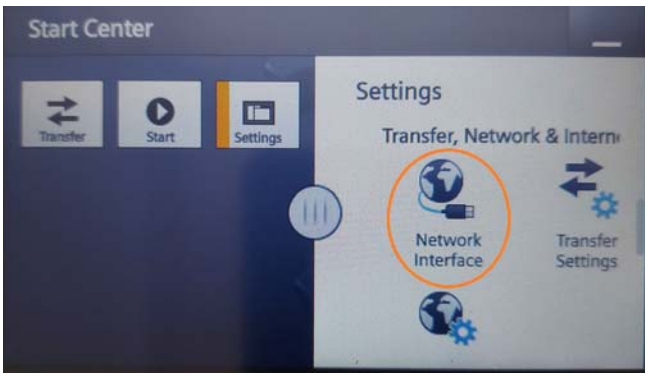


HMI IP Address Setup

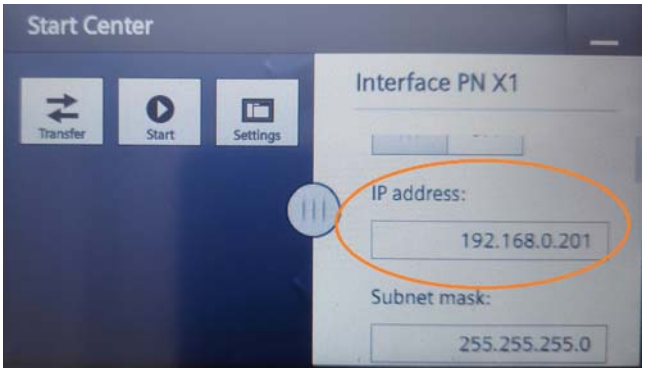
1. Start PR-X control box and select ‘Settings’ on the ‘Start Center’ screen.



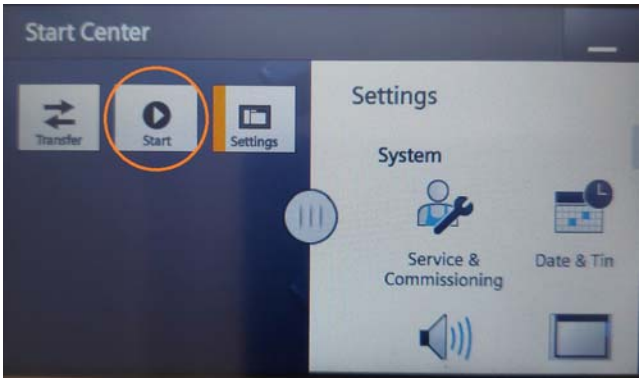
2. Select ‘Network Interface’ on the ‘Settings’ screen.



3. Edit IP address directly from the ‘Network Interface’ screen.



4. Return to the ‘Start Center’ main screen and restart HMI.



Maintenance

Preventive Maintenance

There is a grease filled secondary seal/bearing area on each valve shaft (MD2 Dispense Valve (AE) and Inlet Valve (AL or AM). Every 10,000 cycles or twice each month, new grease should be flushed across this area.

To grease the valve:

1. Remove the fitting from each side of the front or back of the valve. For the detailed information, please check MD2 Dispense Valve (AE) Instruction and Parts Manual 312185 and 1K Ultra-Lite Instructions and Part List Manual 308876.
2. Pump grease (115982) with grease gun (117792) across the valve until clean grease comes out the other side.
3. Reinstall the fitting.

Maintenance Schedule

Item	Task	Daily	Monthly	Quarterly	Yearly
1	Inspect cable and air tubes for leaks	✔			
2	Clean up all material and dust of supply pump or cartridge	✔			
3	Clean dust and foreign matter from the PR-X machine and the PR-X control box	✔			
4	Inspect fluid lines and adapters for leaks	✔			
5	Inspect inlet air filter equipment, expel water and clean filter	✔			
6	Use dry and clean compressed air to remove dust buildup on motor, control boards and fan		✔		
7	Clean and grease Inlet Valve (AL or AM) and MD2 Dispense Valve (AE) and repair broken seal components (see valve manual)		✔		
8	Inspect supply pumps' wet cup, cleanup leaking material and fill TSL oil		✔		
9	Inspect leaking holes (AS) on the both side of PR-X machine		✔		
10	Grease the ball screw, slides and bearings			✔	
11	Inspect sealant condition with high pressure and repair broken seal components			✔	
12	Inspect and tighten screws and nuts on moving parts			✔	
13	Verify sensors are affixed correctly			✔	
14	Inspect and calibrate pressure sensor				✔
15	Replace PR-X machine's pistons and O-rings				✔
16	Replace valve seal components (MD2 Dispense Valve (AE) and Inlet Valve (AL or AM)				✔
17	Replace supply pump seal components				✔

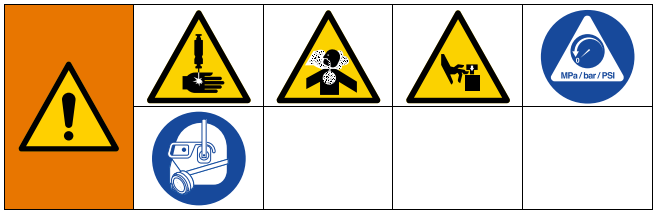
Recycling and Disposal

End of Product Life

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

- Perform the **Pressure Reduction Procedure** on page 50.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Remove motors, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of electronic components with household or commercial waste. 
- Deliver remaining product to a recycling facility.

Troubleshooting



1. Follow **Pressure Relief Procedure** on page 50, before checking or repairing the system.
2. Disconnect AC power from the system.

Problem	Cause	Solution
Display module completely dark	No power	Verify AC power switch (BM) is ON
	Thrown breaker	Check machine breakers and reset
	Loose connection	Tighten screen data cable
	Bad display module	Replace display module
No or incorrect amount of material dispensed from either side	MD2 Dispense Valve (AE) closed	Verify supply air pressure
	Needle or Static Mixer Package (AH) clogged	Replace needle or Static Mixer Package (AH)
	Supply pump ball valve closed (if installed)	Open ball valve
	Cartridge or pail empty	Exchange cartridge or pail
	Supply pump clogged	Clean supply pump
	Air in PR-X machine	Purge and prime the system
Significant material leaking from pump seal	Pump shaft and/or shaft seal worn	Remove pump shaft assembly and reinstall pump rebuild kit
Material weight incorrectly dispensed	Needle or Static Mixer Package (AH) clogged	Replace needle or Static Mixer Package (AH). Incorporate purge timer or decrease purge timer delay to prevent Static Mixer Package (AH) blockage
	MD2 Dispense Valve (AE) or fluid lines clogged	Clean MD2 Dispense Valve (AE) or fluid lines
	MD2 Dispense Valve (AE) opened or closed incorrectly	1. Verify MD2 Dispense Valve's (AE) inlet air pressure. 2. Inspect MD2 Dispense Valve (AE) air cylinder and adapters for leaks.
	Input air reduced or removed	Reconnect input air line to system. Increase air pressure regulator adjustment
	Inlet Valve (AL or AM) not closed (if installed)	1. Inspect the Inlet Valve (AL or AM) for wear and tear. 2. Verify rotary cylinder inlet pressure.
	Inlet 1K Ultra-Lite valve leaking (if installed)	Inspect needle and seal components
	Piston worn out or broken	Replace piston

Problem	Cause	Solution
Leakage from Static Mixer Package (AH) tip	Air in Static Mixer Package (AH)	Slow speed purging
	MD2 Dispense Valve (AE) not closed	1. Verify MD2 Dispense Valve's (AE) inlet air pressure. 2. Clean blockage between needle and seat. 3. Verify solenoid valve status.
	MD2 Dispense Valve (AE) needle and/or seat worn out (pressure reduces after closing the valve)	Replace MD2 Dispense Valve (AE) needle and/or seat
	Damaged or missing gasket (O-ring) between seat and housing (hard seat only)	Replace gasket (O-ring)
	Insufficient valve off time	Increase valve off time to release pressure in Static Mixer Package (AH)
High pressure	MD2 Dispense Valve (AE) clogged	Clean MD2 Dispense Valve (AE)
	Material in Static Mixer Package (AH) and/or needle cured	Replace Static Mixer Package (AH) and/or needle
	Dispense speed unsuitable for Static Mixer Package (AH) and needle	1. Replace the current Static Mixer Package (AH) and/or needle with a bigger gauge. 2. Slow down dispensing speed to decrease working pressure (continuous and stable dispensing pressure should be within a range of 150-400 psi).
	Pressure sensor error	Replace pressure sensor
Pressure imbalance	One side of MD2 Dispense Valve (AE) or fluid lines clogged	Clean the high pressure side of MD2 Dispense Valve (AE) or fluid lines
	Air or hole in material	Prime the system
	Low pressure side piston worn out	Replace the piston
"Home" error	Error not reset	Pull up E-stop button and press "reset"
	Pressure higher than set point	Go to the Advanced Screen of control box, select 'Dispense valve' to open MD2 Dispense Valve (AE) to reduce pressure
	"Home" button flashing and waiting	1. Verify reload pressure value is correctly set. 2. Verify air supply. 3. Inspect low level sensor status. 4. Confirmed inlet ball valve is opened (if installed). 5. Verify cartridge or pail is not empty. 6. Verify supply pump is working.
	Servo motor alarm	1. Inspect ball screw and slides are functional. 2. Verify motor and encoder cable are connected.

Problem	Cause	Solution
System does not dispense or dispenses in the incorrect amount/mode	Signal error between platform and PR-X control box	1. Verify signal was correctly sent and received. 2. Verify signal cable is correctly connected.
	Wrong “Dispense mode”	Choose correct mode
	Wrong “Dispense type”	Choose correct type
	Wrong mode and/or type trigger method	Choose correct trigger method in “Setup” menu (job can be trigged by outside signal or manually)
Incorrect pressure value	Loose pressure sensor cable or adapters	Exchange cable, tighten adapters
	Pressure sensor error	Replace pressure sensor
	Pressure sensor signal incorrect	Calibrate pressure sensor

Repair

Prepare Machine for Piston/Cylinder Replacement Kit Installation

NOTE: Graco suggests using TSL™ only in repair procedures. All procedures should be performed by an appropriate professional.

1. Perform the step 1 to step 4 of **Pressure Relief Procedure** on page 50.
2. Turn off the air supply when the fluid pressure drops to ZERO.
3. Go to the Advanced Screen of the PR-X control box (J). Set the move speed at about 0.2 cc/s, then jog select “Piston move down” until the lower switch light is activated.

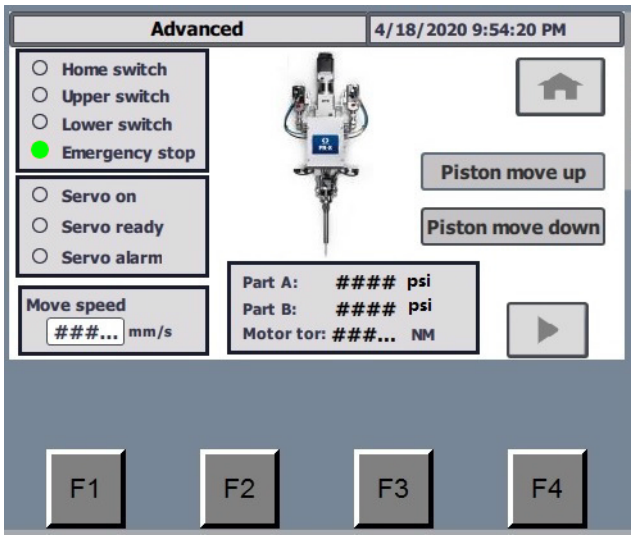


FIG. 45 Advanced Screen 1

NOTE: To open the Advanced mode, the operator must enter the password **1492**.

4. Turn off the system power.
5. Disconnect all cables and tubes from Junction Box Assembly (AA).
6. Open the top cover of the Junction Box (AA) and loosen the four fix screws in the cylinder housing (10202a). Next, take off the Junction Box Assembly (AA).

Disassemble Cylinder

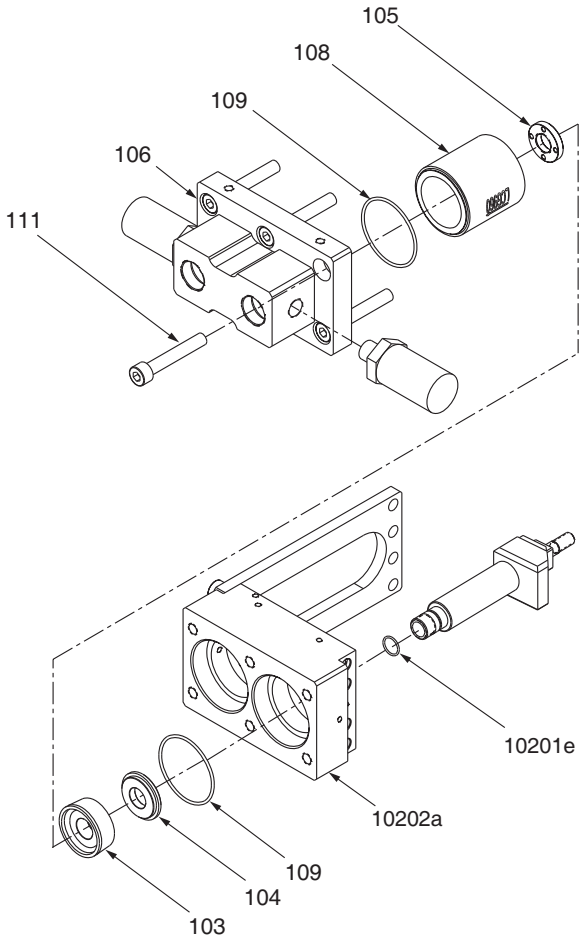


FIG. 46 Disassemble Cylinder

1. Remove the MD2 Dispense Valve (AE).
2. Remove the six end cap screws (111).
3. Remove the cylinder end caps (106).
4. Remove the cylinder (108) and O-rings (109) from the cylinder housing (10202a).
5. Use the specific tools remove the piston nut (105).
6. Remove the piston (103) and piston plate (104) from the rod.
7. Remove the O-ring (10201e) from the rod.
8. Clean all parts that have been removed.

Install Cylinder

1. Install the new O-ring (10201e) to the rod with TSL oil.
2. Install the piston plate (104) and the new piston in the correct direction.
3. Install the piston nut (105) (Tighten the piston screw with correct torque).
4. Lubricate the new O-rings (109) and inside the cylinder (108) with TSL oil.
5. Insert the lubricated O-rings (109) into the grooves of the Cylinder housing (10202a) and cylinder end caps (106).
6. Carefully slide the end of the cylinder into the cylinder housing (10202a) in the correct direction. Ensure the cylinder doesn't damage the sides of the piston as the cylinder is inserted.
7. Install the cylinder end caps (106).
8. Secure cylinder in place with the six end cap screws (111). Diagonally tighten the screw by slowly and progressively increasing torque until the screws are securely housed.
9. Install the Junction Box Assembly (AA) and connect all cables or tubes.
10. Install the MD2 Dispense Valve (AE).
11. Turn on the air supply and power.

Prepare Machine for Operation

1. Pressurize Supply Pump Systems A and B (K and L) connected to the PR-X Inlet Valve (AL or AM). Perform **Prime the System** on page 48.
2. Perform the **Ratio Check Procedure** on page 49.
3. Install Static Mixer Package (AH).
4. Dispense several full stroke shots until the PR-X Machine (H) is free of air and there is no leakage at the nose piece after shutoff.

Parts

Overview

PR-X System, Supply Pump Feed, Direct, 133646 and 133647

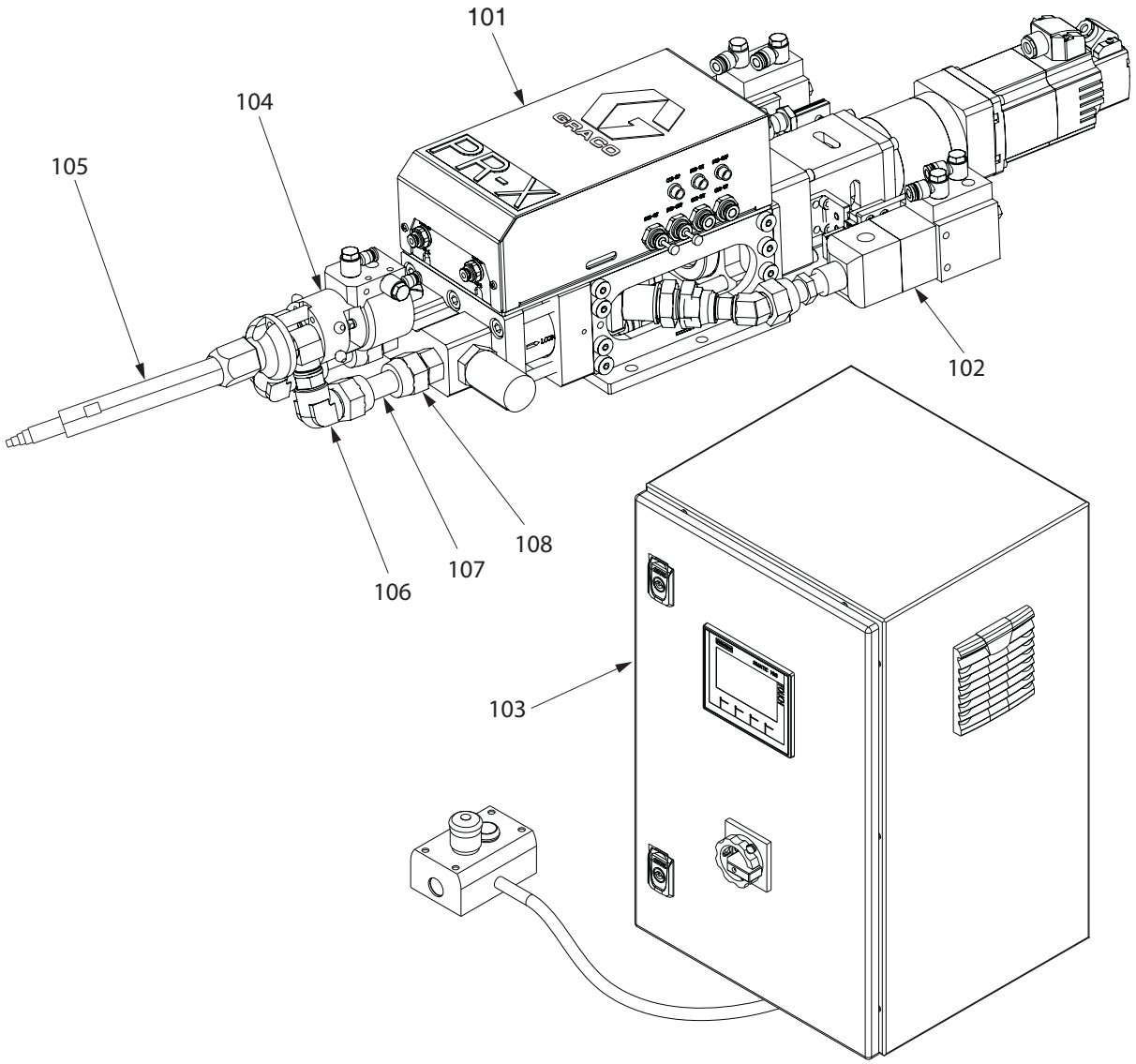


FIG. 47: PR-X System, Supply Pump Feed, Direct

Ref.	Part	Description	Qty.
101	----	ASSEMBLY, PR-X base, ceramic, see page 67	1
	----	ASSEMBLY, PR-X base, SST, see page 67	1
102	----	ASSEMBLY, supply pump, see page 79	1
103	133656	PR-X CONTROL BOX	1
104	255180	VALVE, MD2	1
105	LC0058	PACKAGE, static mixer	1
106	18C123	FITTING, UN13/16-16, UN9/16-18	2
107	18C122	FITTING, UN13/16-16, female	2
108	18C121	FITTING, UN13/16-16, male	2

PR-X System, Supply Pump Feed, Remote, 133648 and 133649

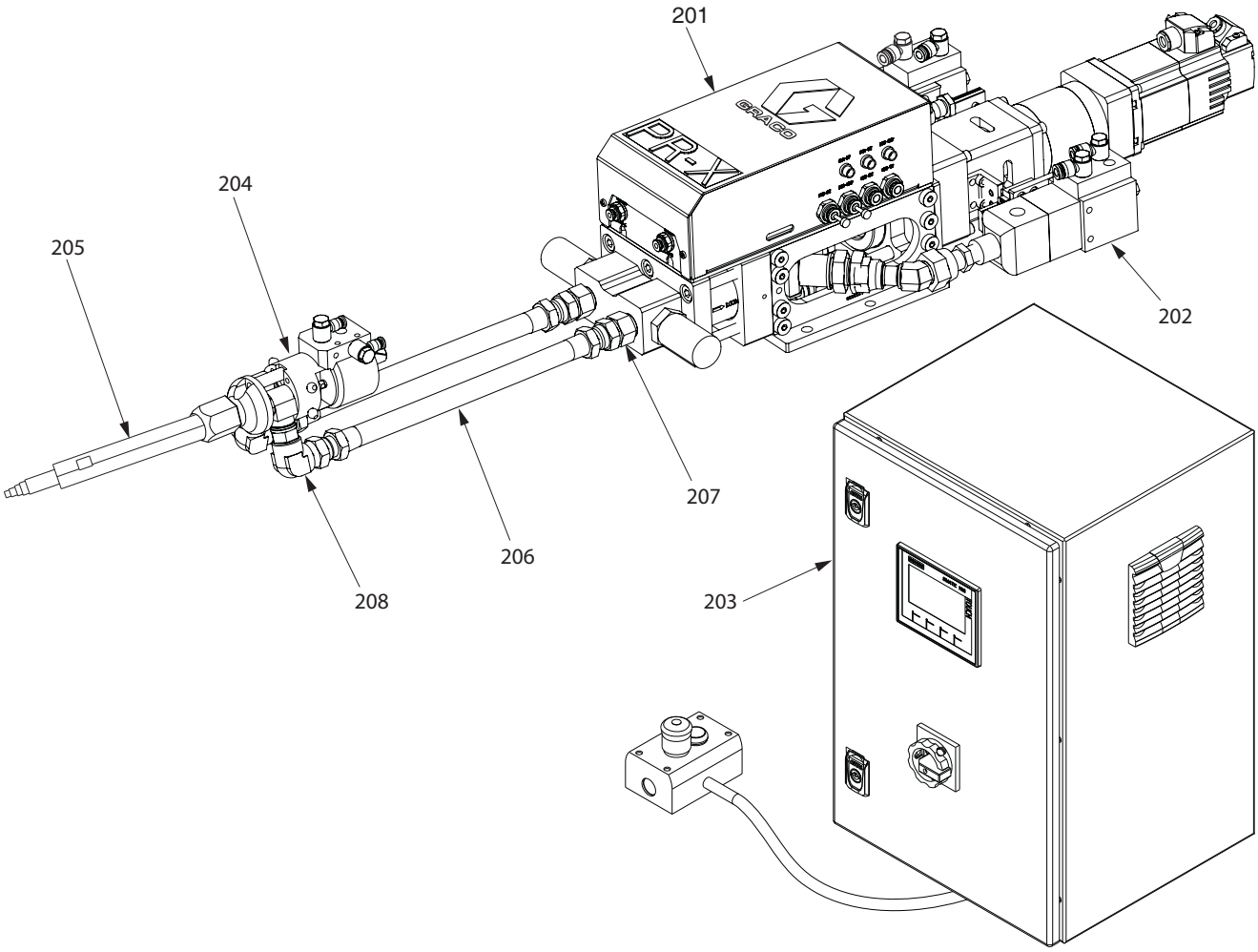


FIG. 48: PR-X System, Supply Pump Feed, Remote

Ref.	Part	Description	Qty.
201	----	ASSEMBLY, PR-X base, ceramic, see page 67	1
	----	ASSEMBLY, PR-X base, SST, see page 67	1
202	----	ASSEMBLY, supply pump, see page 79	1
203	133656	PR-X CONTROL BOX	1
204	255180	VALVE, MD2	1
205	LC0058	PACKAGE, static mixer	1
206	16C522	PACKAGE, hose with JIC fitting (model 133648 only)	2
	18C198	PACKAGE, hose with ORFS fitting (model 133649 only)	2
207	18C124	FITTING, UN13/16-16, JIC9/16-18 (model 133648 only)	2
	18C226	FITTING, UN13/16-16 (model 133649 only)	2
208	18C727	FITTING, UN9/16-18, JIC9/16-18, 90° (model 133648 only)	2
	18C220	FITTING, UN9/16-18 (model 133649 only)	2

PR-X System, Supply Cartridge Feed, Direct, 133650 and 133651

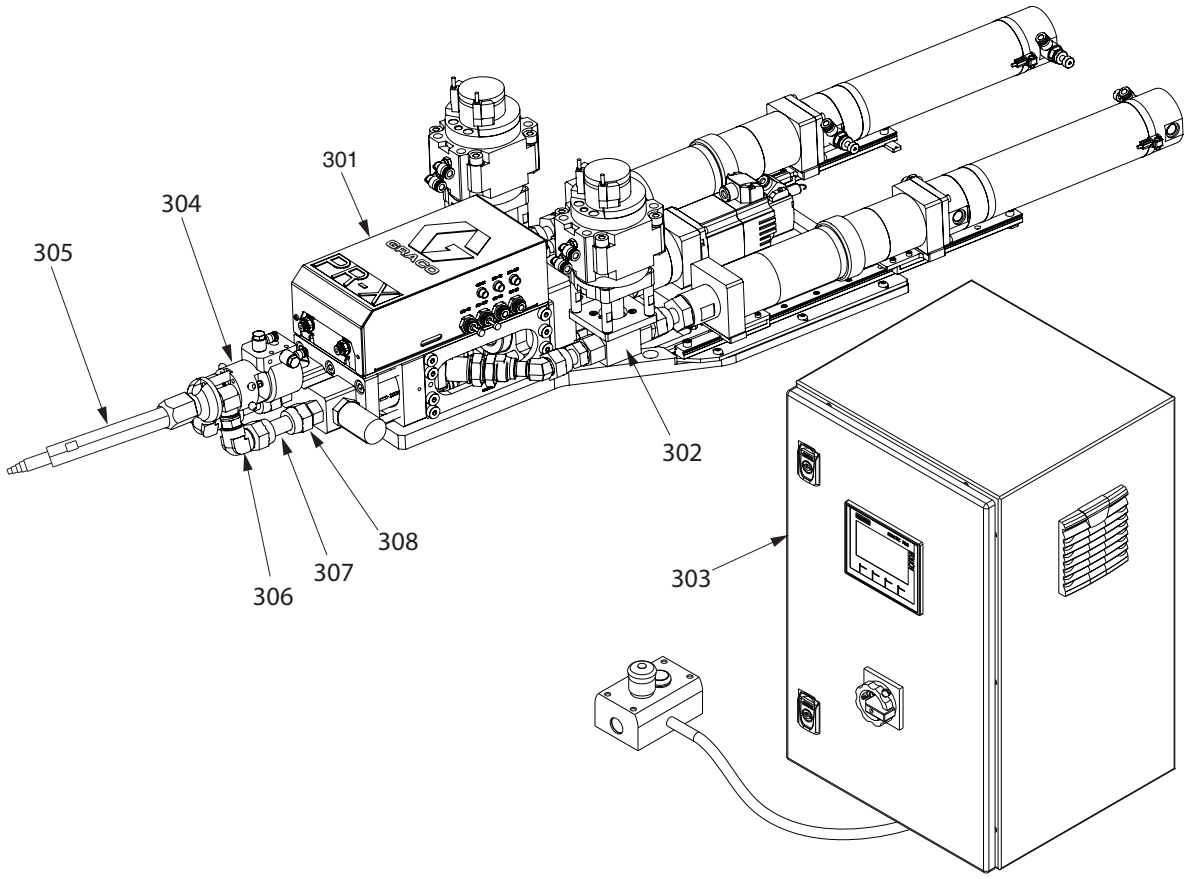


FIG. 49: PR-X Machine, Supply Cartridge Feed, Direct

Ref.	Part	Description	Qty.
301	----	ASSEMBLY, PR-X base, ceramic, see page 68	1
	----	ASSEMBLY, PR-X base, SST, see page 68	1
302	25R425	ASSEMBLY, supply cartridge, see page82	1
303	133656	PR-X CONTROL BOX	1
304	255180	VALVE, MD2	1
305	LC0058	PACKAGE, static mixer	1
306	18C123	FITTING, UN13/16-16, UN9/16-18	2
307	18C122	FITTING, UN13/16-16, female	2
308	18C121	FITTING, UN13/16-16, male	2

PR-X System, Supply Cartridge Feed, Remote, 133652 and 133653

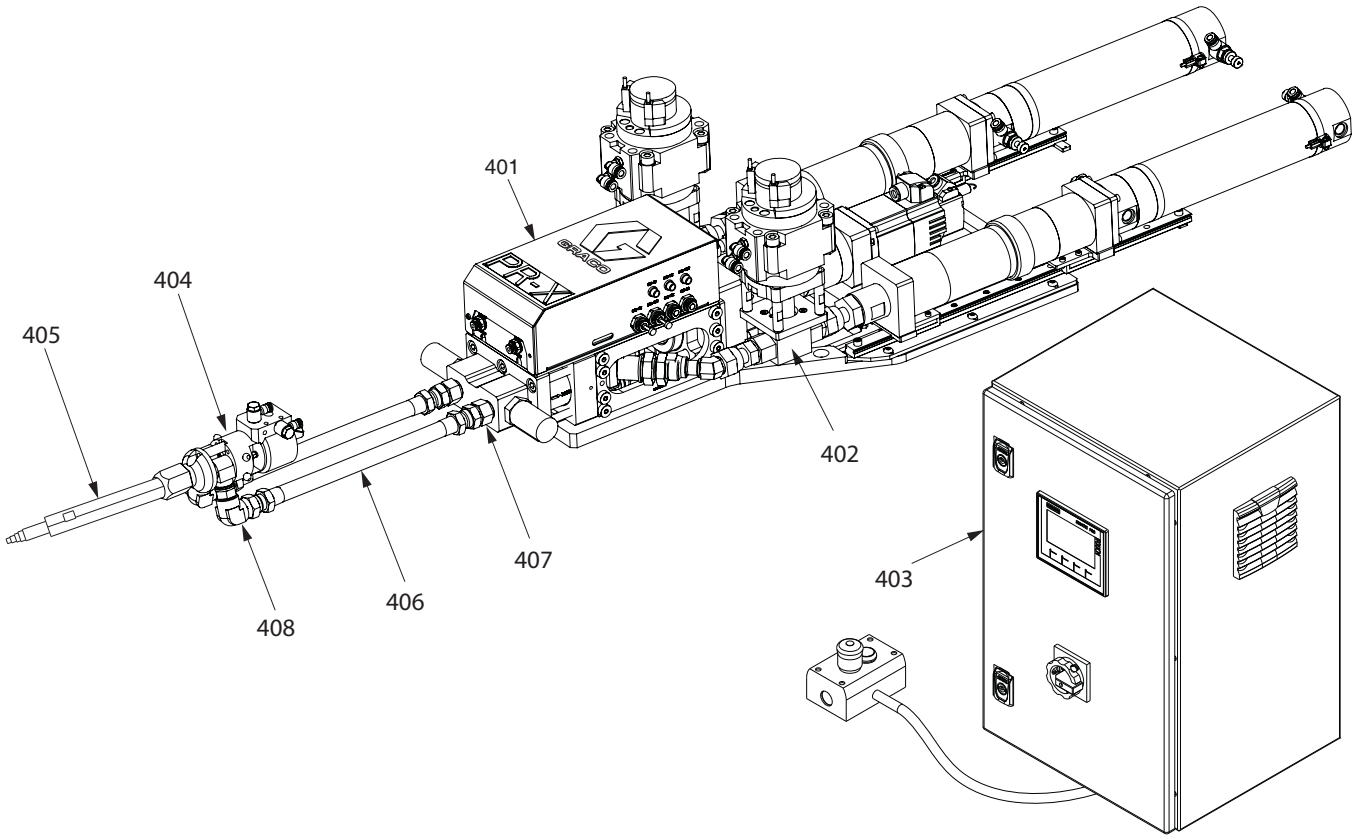
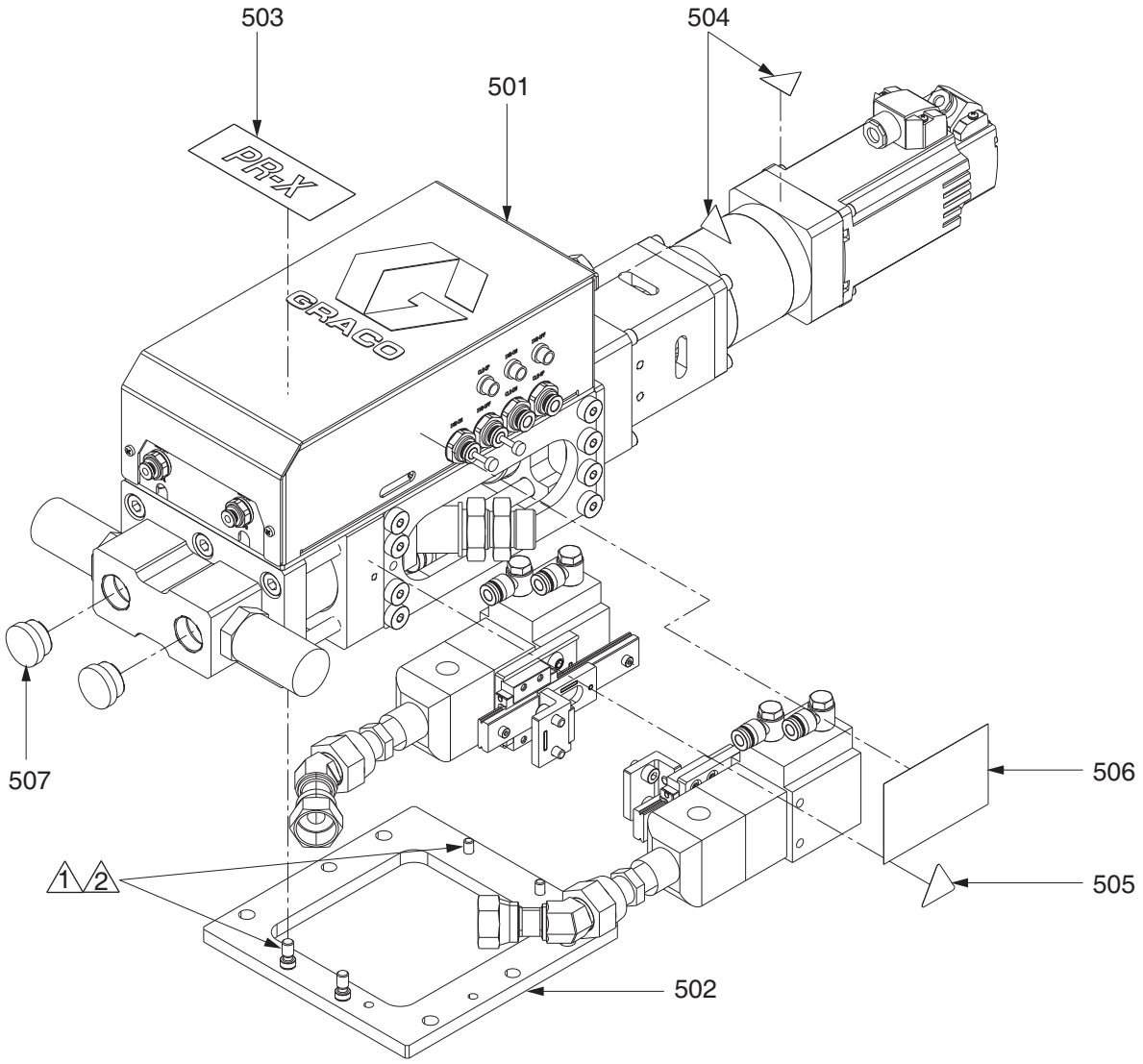


FIG. 50: PR-X Machine, Supply Cartridge Feed, Remote

Ref.	Part	Description	Qty.
401	----	ASSEMBLY, PR-X base, ceramic, see page 68	1
	----	ASSEMBLY, PR-X base, SST, see page 68	1
402	25R425	ASSEMBLY, supply cartridge, see page82	1
403	133656	PR-X CONTROL BOX	1
404	255180	VALVE, MD2	1
405	LC0058	PACKAGE, static mixer	1
406	16C522	PACKAGE, hose with JIC fitting (model 133652 only)	2
	18C198	PACKAGE, hose with ORFS fitting (model 133653 only)	2
407	18C124	FITTING, UN13/16-16, JIC9/16-18 (model 133652 only)	2
	18C226	FITTING, UN13/16-16 (model 133653 only)	2
408	18C727	FITTING, UN9/16-18, JIC9/16-18, 90°(model 133652 only)	2
	18C220	FITTING, UN9/16-18 (model 133653 only)	2

PR-X Base Assembly, Supply Pump Feed



1 Torque to 3.0-3.7 ft-lb (4-5 N•m).

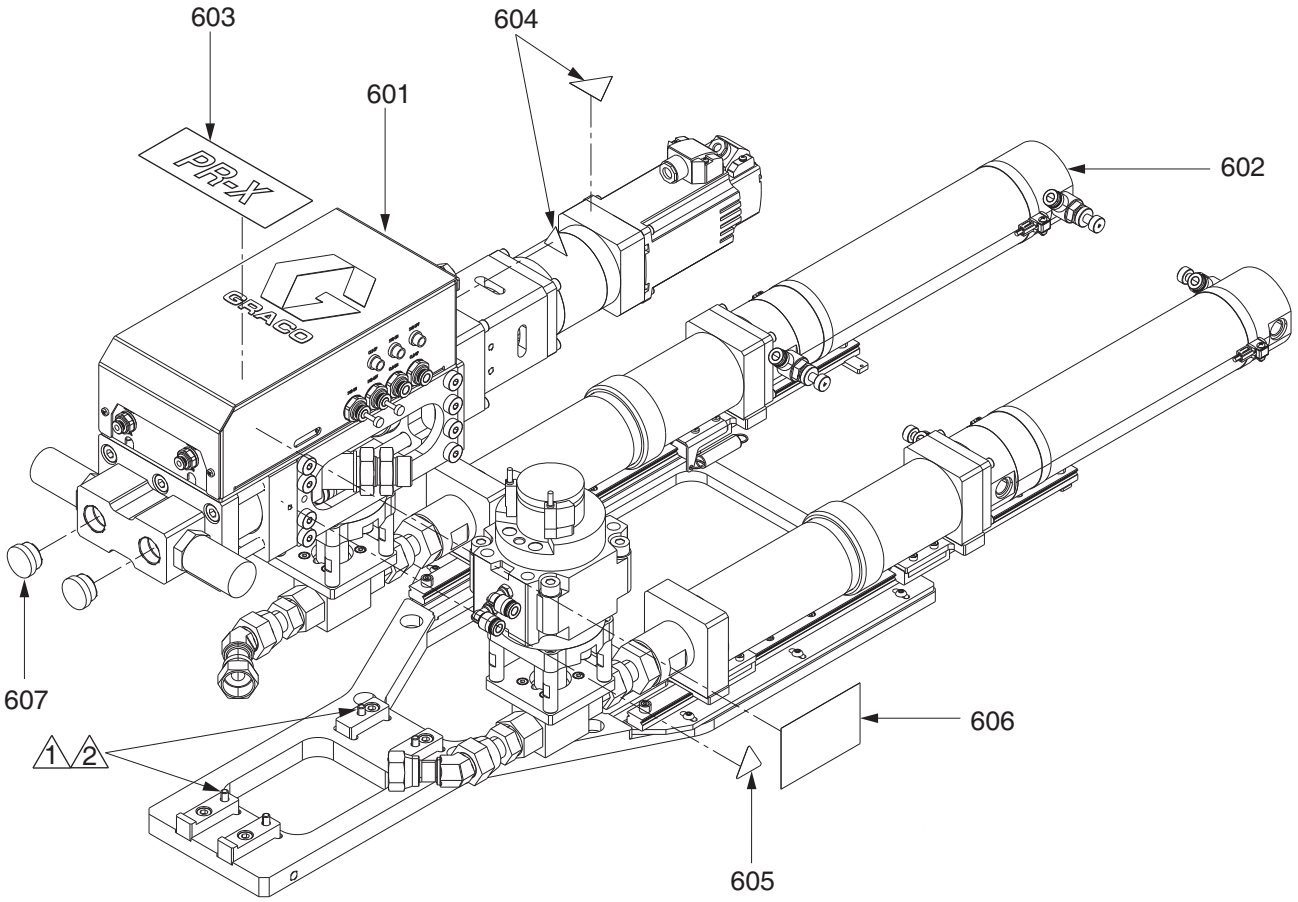
2 Apply sealant, Anaerobic, blue.

FIG. 51: PR-X Base Assembly, Supply Pump Feed

Ref.	Part	Description	Qty.
501	----	ASSEMBLY, fixed ratio base, see page 69	1
502	----	ASSEMBLY, supply, pump, see page 79	1
503	----	BRANDING LABEL	1
504▲	189930	LABEL, caution, electric shock	2
505▲	15H108	LABEL, caution, pinch	2
506	----	SERIES LABEL	1
507	----	PLUG, UN13/16-16	2

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

PR-X Base Assembly, Supply Cartridge Feed



1 Torque to 3.0-3.7 ft-lb (4-5 N•m).

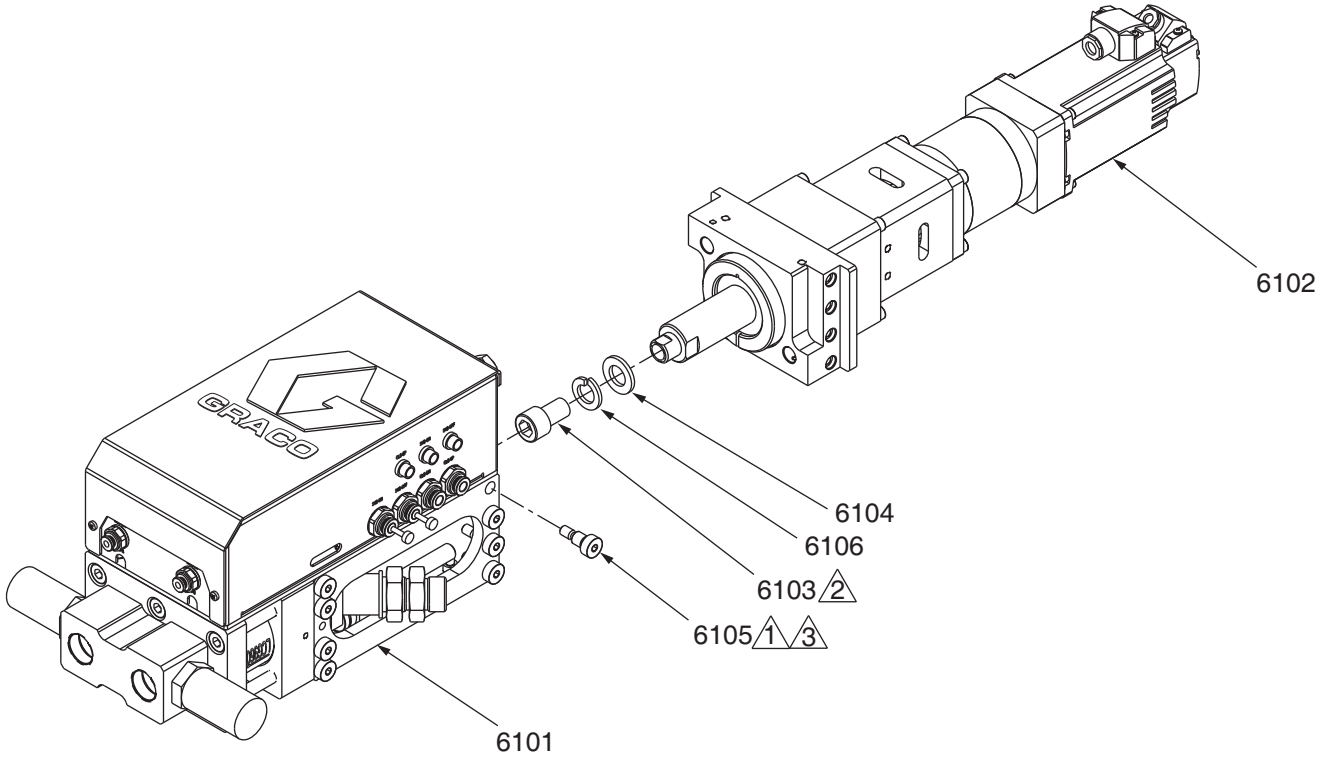
2 Apply sealant, Anaerobic, blue.

FIG. 52: PR-X Base Assembly, Supply Cartridge Feed

Ref.	Part	Description	Qty.
601	----	ASSEMBLY, fixed ratio base, see page 69	1
602	25R425	ASSEMBLY, supply, cartridge, see page 82	1
603	----	BRANDING LABEL	1
604▲	189930	LABEL, caution, electric shock	2
605▲	15H108	LABEL, caution, pinch	2
606	----	SERIES LABEL	1
607	----	PLUG, UN13/16-16	2

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

Fixed Ratio Base Assembly



1 Torque to 3.7-4.4 ft-lb (5-6 N•m).

2 Torque to 11.1 ft-lb (15 N•m).

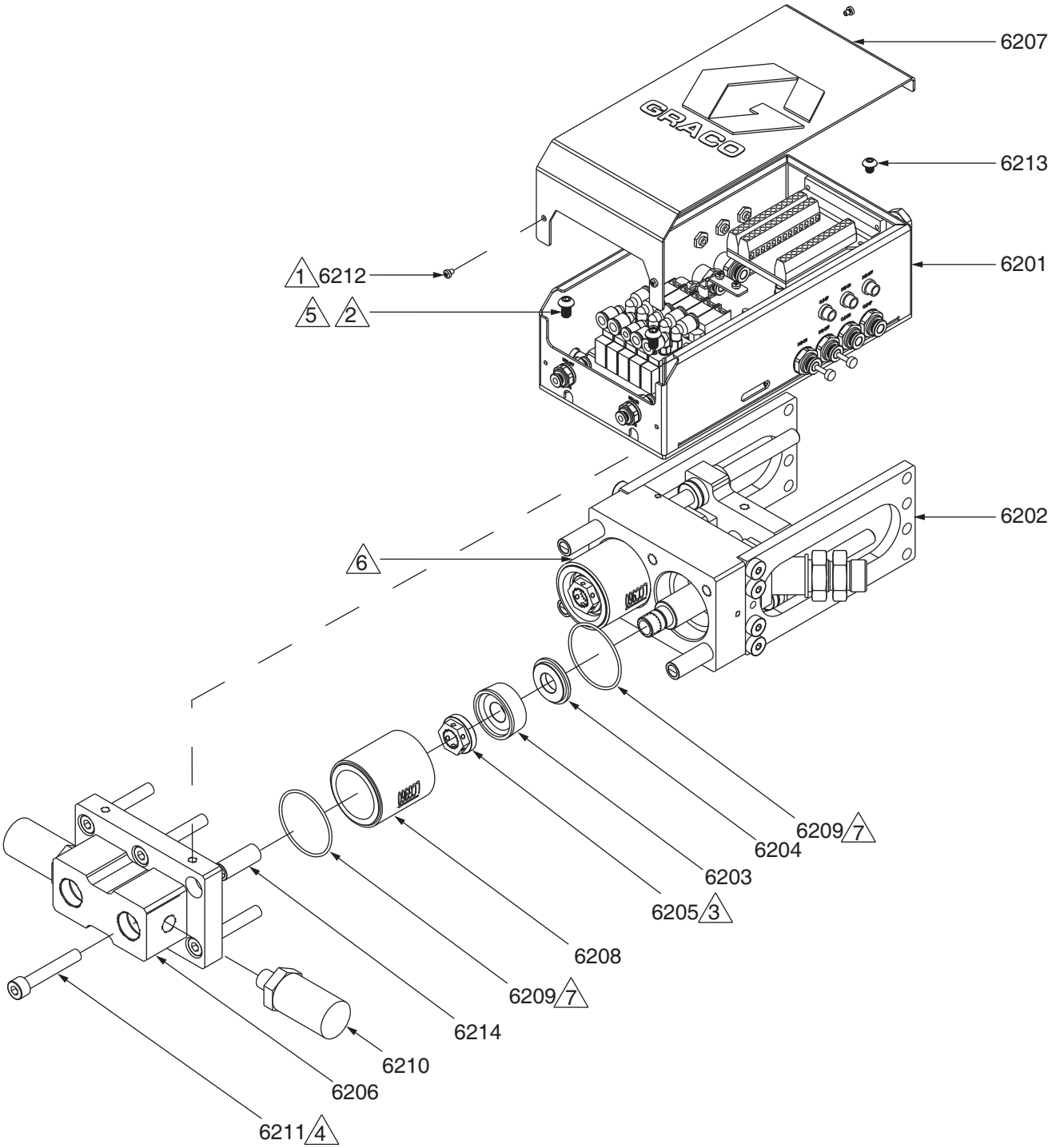
3 Apply sealant, Anaerobic, blue.

FIG. 53: Fixed Ratio Base Assembly

Ref.	Part	Description	Qty.
6101	----	ASSEMBLY, junction box and fixed ratio base frame, see page 70	1
6102	----	ASSEMBLY, power transmission, see page 76	1
6103*	----	SCREW, M12 x 1.75-20, SST	1
6104*	----	WASHER, flat, M12	1
6105	18B949	SCREW, shoulder, DIA 8,M6	8
6106*	----	WASHER, spring, DIA 12	1

* *Parts included in Kit 25R588 (purchase separately).*

Junction Box Assembly and Fixed Ratio Base Frame Assembly



1 Torque to 0.74-1.29 ft-lb (1-1.75 N•m).

2 Torque to 3.69-4.79 ft-lb (5-6.5 N•m).

3 Torque to 5.2-5.9 ft-lb (7-8 N•m).

4 Torque to 7.4-8.9 ft-lb (10-12 N•m).

5 Apply sealant, Anaerobic, blue.

6 Metering tube direction should be appointing as shown.

7 Must use TSL oil to seal.

FIG. 54: Junction Box and Fixed Ratio Base Frame Assembly

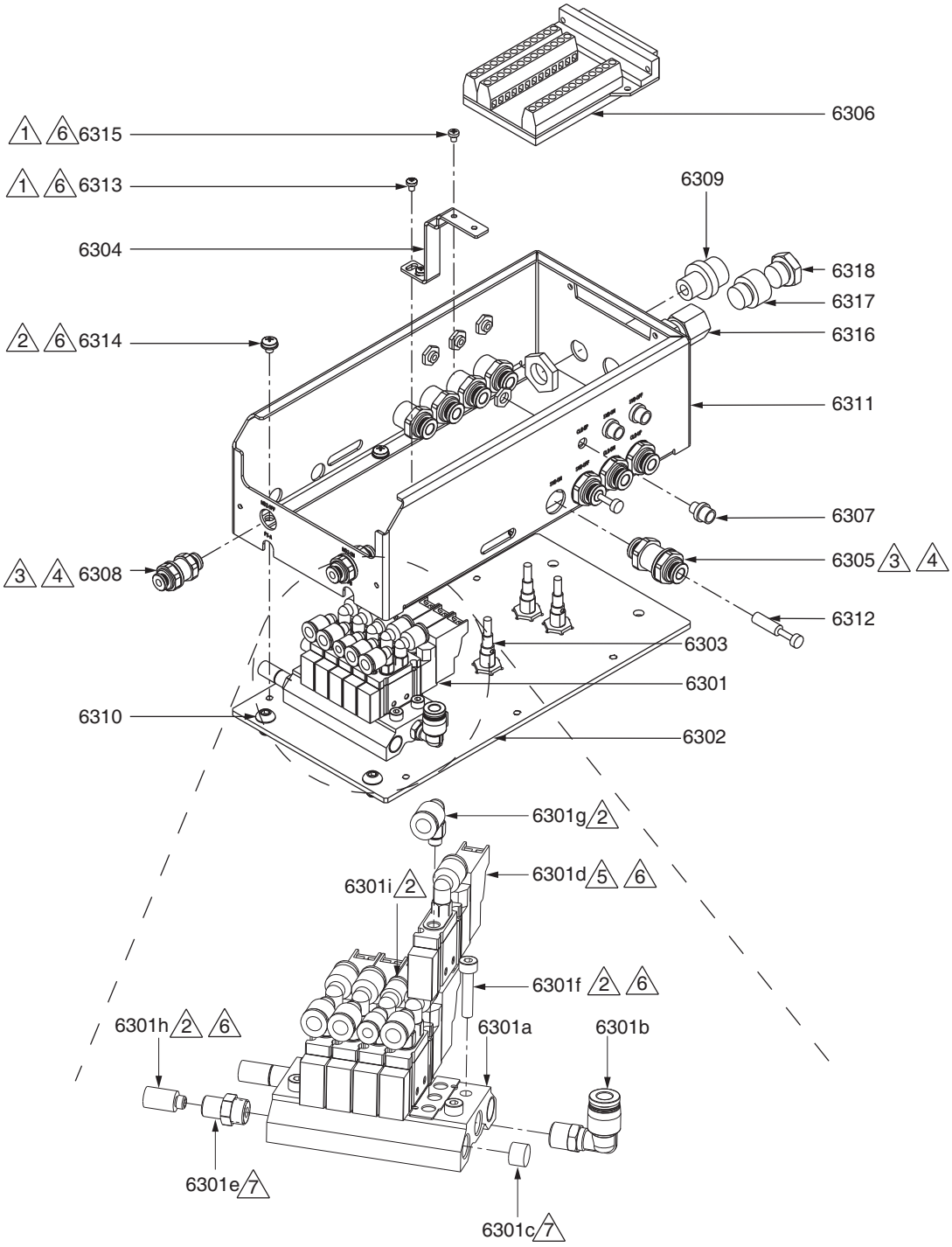
Junction Box Assembly and Fixed Ratio Base Frame Assembly

Ref.	Part	Description	Qty.
6201	133890	ASSEMBLY, junction box, see page 72	1
6202	----	ASSEMBLY, fixed ratio base frame, see page 74	1
6203*†	18B482	PISTON	2
6204*†	18B952	PLATE, support back, tube	2
6205*†	18B953	NUT, cylinder piston	2
6206	18B954	CYLINDER END CAPS	1
6207	----	COVER, control	1
6208*	LCC960	TUBE, pump, SST Metering Tube assy, PR70, SIC	2
†	LCG960	TUBE, pump, Ceramic Metering Tube assy, PR70, SIC	2
6209*†	120874	O-RING	4
6210	18C018	TRANSMITTER, pressure	2
6211	18B956	SCREW, M8 x 1.25-50, SST, Partially	6
6212	----	SCREW, M3 x 0.5-4, pan head, SST	4
6213	----	SCREW, M5 x 0.8-6, button head, hex	2
6214	----	SLEEVE, screw	4

* *Parts included in Kit CU2960 (purchase separately).*

† *Parts included in Kit CU3960 (purchase separately).*

Junction Box Assembly



1 Torque to 0.74-1.29 ft-lb (1-1.75 N•m).

2 Torque to 1.70-2.58 ft-lb (2.3-3.5 N•m).

3 Fitting top surface to mounting plate 12±0.5 mm.

4 Rubber gasket should be assembled on the outer surface.

5 Torque to 0.52-0.92 ft-lb (0.7-1.25 N•m).

6 Apply sealant, Anaerobic, blue.

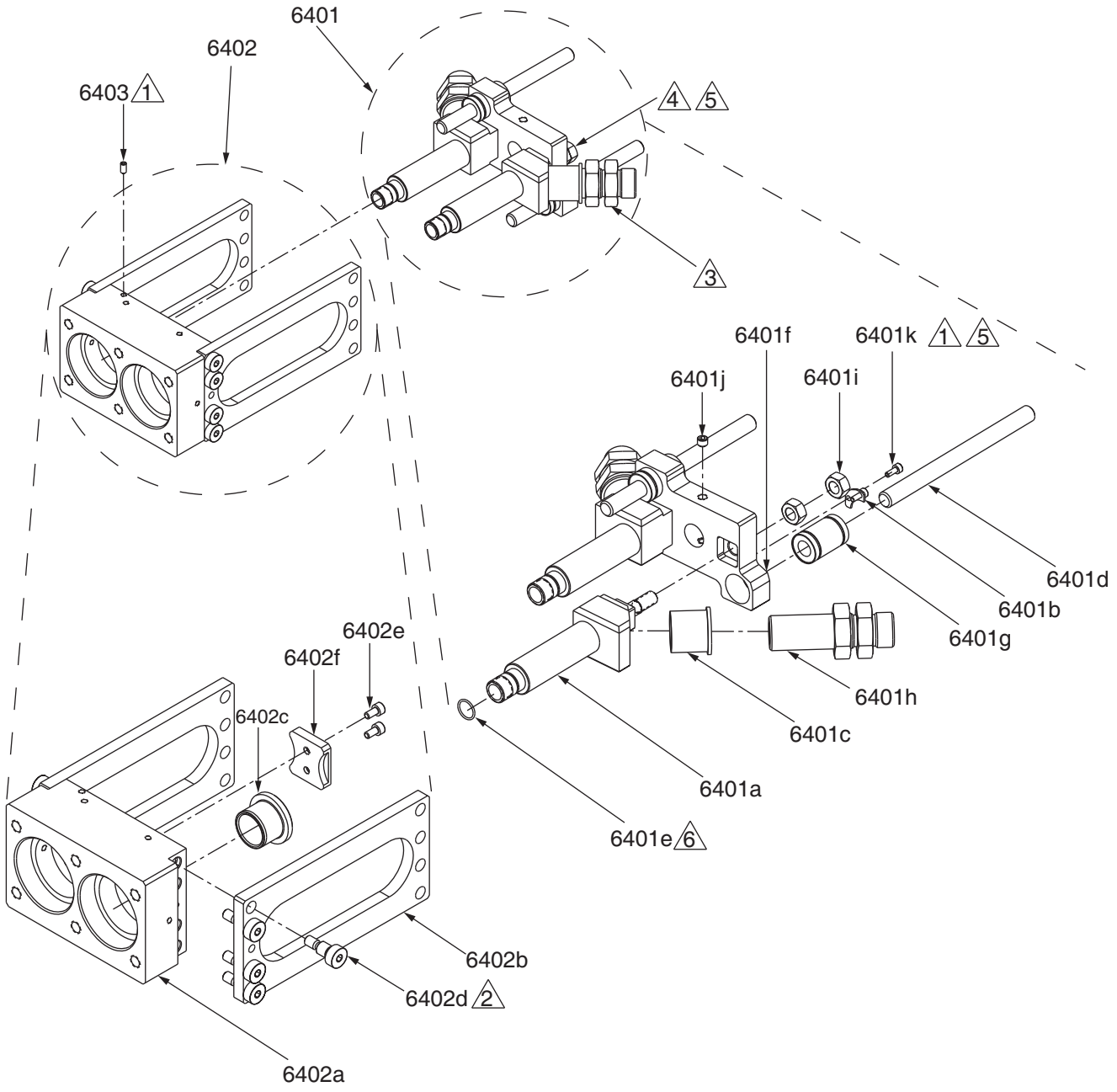
7 Apply sealant, pipe, SST.

FIG. 55: Junction Box Assembly

Junction Box Assembly

Ref.	Part	Description	Qty.
6301	----	ASSEMBLY, solenoid valve	1
6301a	----	BASE, manifold	1
6301b	----	FITTING, DIA 6, PT1/8	1
6301c	----	PLUG, socket, PT1/8	3
6301d	----	VAVLE, solenoid	5
6301e	----	FITTING, M5 x 0.8, Rc1/8	2
6301f	----	SCREW, M4 x 0.7-20, socket	4
6301g	----	FITTING, DIA 6, M5 x 0.8	8
6301h	----	MUFFLER, M5	2
6301i	----	FITTING, DIA 4, M5 x 0.8	2
6302	----	PLATE, top	1
6303	----	SENSOR, close	3
6304	----	BRACKET, support	1
6305	----	FITTING, DIA 6, M14 x 1	8
6306	----	TERMINAL, integrated, connector	1
6307	----	FITTING, PIN 4, M6	6
6308	----	FITTING, DIA 4, M12 x 1	2
6309	----	FITTING, PIN 3, M12	2
6310	----	SCREW, M6 x 1-10, button head, hex	2
6311	----	FRAME, control	1
6312	----	PLUG, DIA 6	4
6313	----	SCREW, M3 x 0.5-4, Phillips	2
6314	----	SCREW, M4 x 0.7-5, Phillips, w washer	6
6315	----	SCREW, M3 x 0.5-4, pan head, SST	2
6316	----	FITTING, DIA 6, NPT 1/4	1
6317	----	FITTING, DIA 6, NPT 1/4 male	1
6318	----	FITTING, DIA 1/4 in, NPT 1/4 male	1

Fixed Ratio Base Frame Assembly



1 Torque to 1.70-2.58 ft-lb (2.3-3.5 N•m).

2 Torque to 2.95-3.69 ft-lb (4-5 N•m).

3 Torque to 3.69-4.42 ft-lb (5-6 N•m).

4 Torque to 7.4-8.9 ft-lb (10-12 N•m).

5 Apply sealant, Anaerobic, blue.

6 Must use TSL oil to seal.

FIG. 56 Fixed Ratio Base Frame Assembly

Fixed Ratio Base Frame Assembly

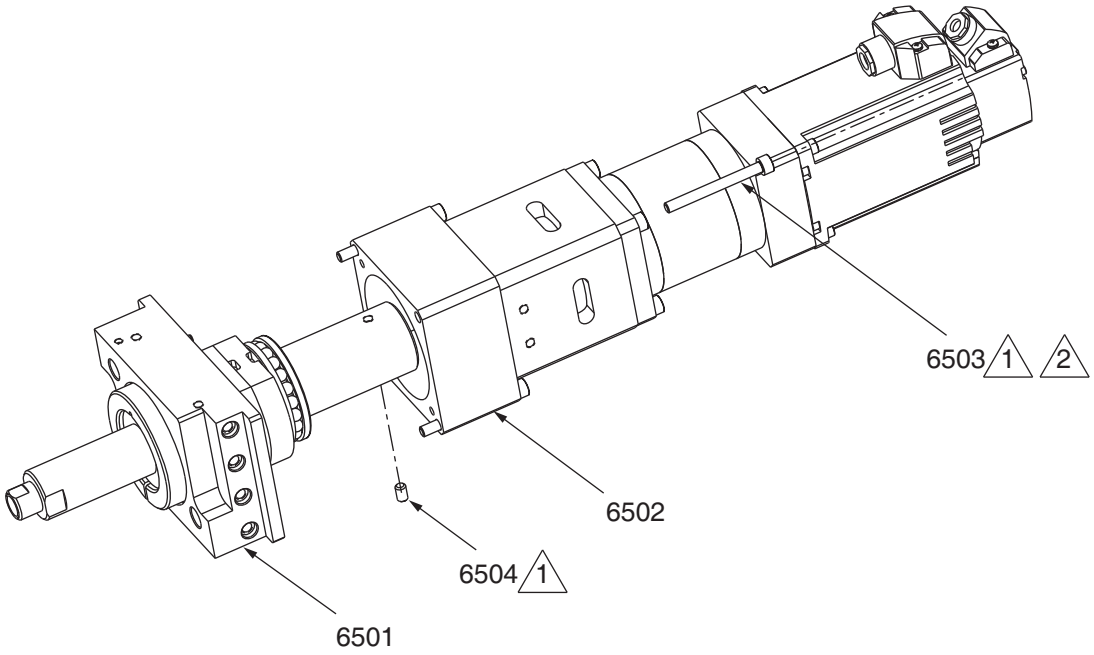
Ref.	Part	Description	Qty.
6401	----	ASSEMBLY, piston rod	1
6401a*	----	ROD, piston	2
6401b❖	----	PLATE, bearing limit	2
6401c†	----	BUSH	2
6401d❖	----	ROD, guide	2
6401e*	18B940	O-RING	2
6401f	18B941	BLOCK, push	1
6401g❖	----	BEARING	2
6401h†	----	FITTING, w nut	2
6401i*	----	NUT, M8	4
6401j	----	SCREW, SET, M6 x 1.0-5, flat	2
6401k❖	----	SCREW, M3 x 0.5-8, socket	4
6402	----	ASSEMBLY, block, piston rod	1
6402a	18D946	SEAT, tube	1
6402b	18B947	PLATE, side	2
6402c	18B948	SLEEVE, guide	2
6402d	18B949	SCREW, shoulder, DIA 8, M6	8
6402e	----	SCREW, M4 x 0.7-8, sockethead, SST	2
6402f	----	PLATE, PR-X	1
6403	----	SCREW, SET, M4 x 0.7-8	2

* *Parts included in Kit 25R589 (purchase separately).*

† *Parts included in Kit 25R590 (purchase separately).*

❖ *Parts included in Kit 25R591 (purchase separately).*

Power Transmission Assembly



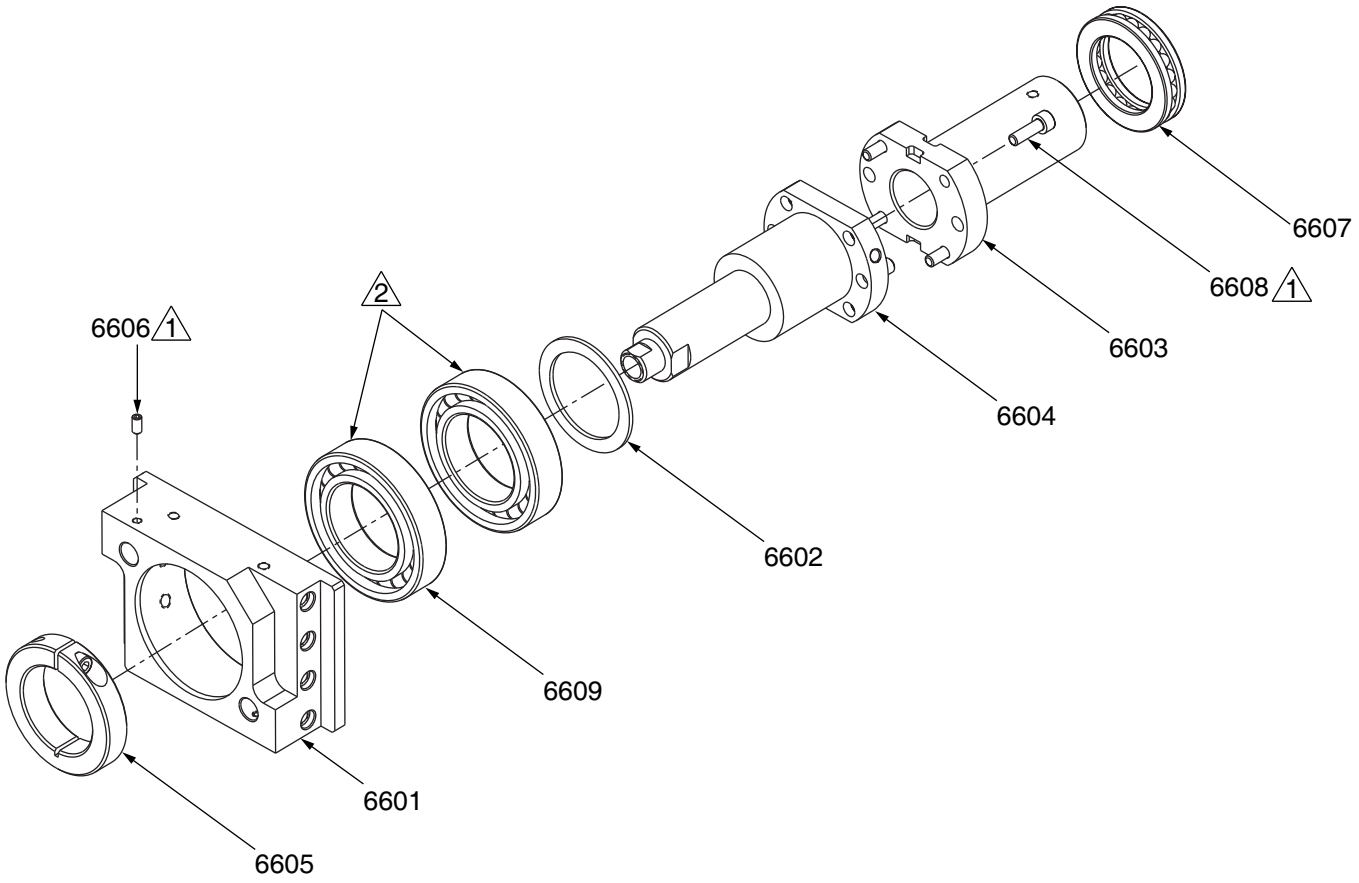
1 Torque to 2.95-3.69 ft-lb (4-5 N•m).

2 Apply sealant, Anaerobic, blue.

FIG. 57: Power Transmission Assembly

Ref.	Part	Description	Qty.
6501	----	ASSEMBLY, ball screw, see page 77	1
6502	----	PR-X Drive, see page 78	1
6503	18B956	SCREW, M8 x 1.25-50, socket head, Steel	4
6504	----	SCREW, SET, M5 x 0.8-8	2

Ball Screw Assembly



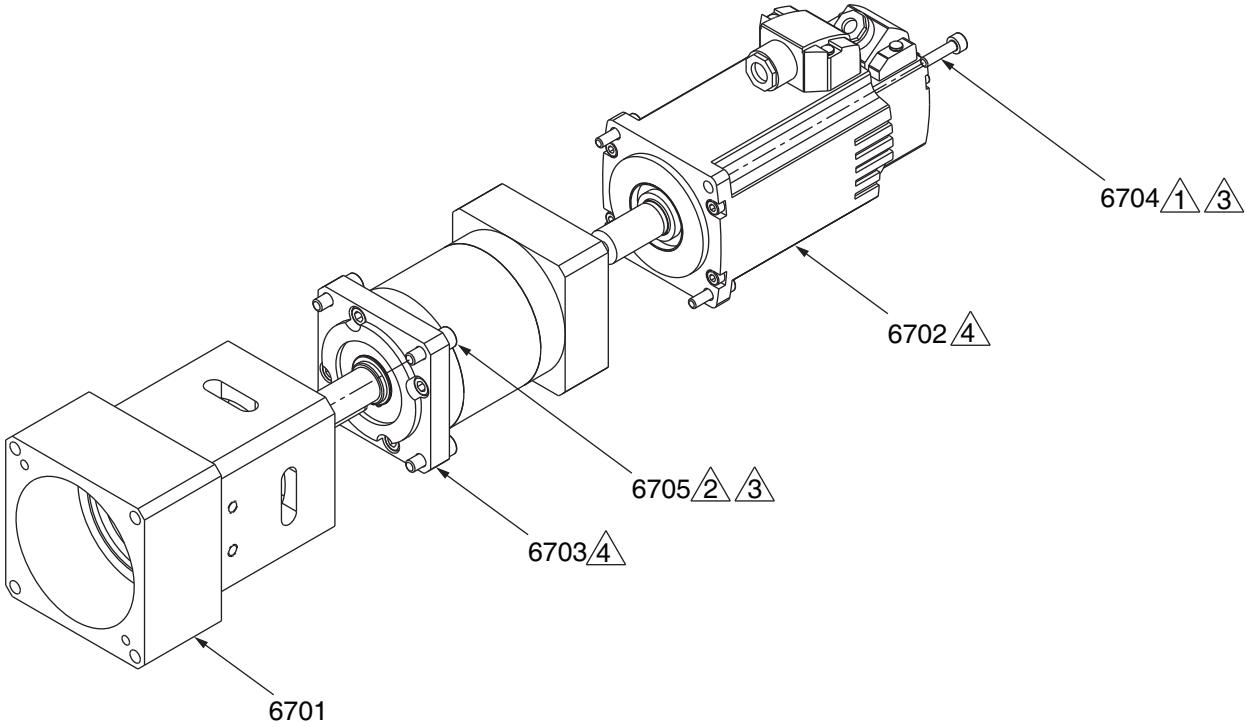
1 Torque to 1.70-2.58 ft-lb (2.3-3.5 N•m).

2 Open direction face to motor side.

FIG. 58: Ball Screw Assembly

Ref.	Part	Description	Qty.
6601	18D959	SEAT, sleeve	1
6602	18B962	WASHER	1
6603	18B963	COUPLER, lead screw	1
6604	25R237	ASSEMBLY, ball screw w nut	1
6605	18B968	RING, bearing retaining	1
6606	18B950	SCREW, SET, M4 x 0.7-8	2
6607	18B969	BEARING, thrust	1
6608	18B970	SCREW, M5 x 0.8-16, socket head, SST	4
6609	18B971	BEARING, ball, angular contact	2

PR-X Drive



1 Torque to 3.69-4.79 ft-lb (5-6.5 N•m).

2 Torque to 5.53-5.90 ft-lb (7.5-8 N•m).

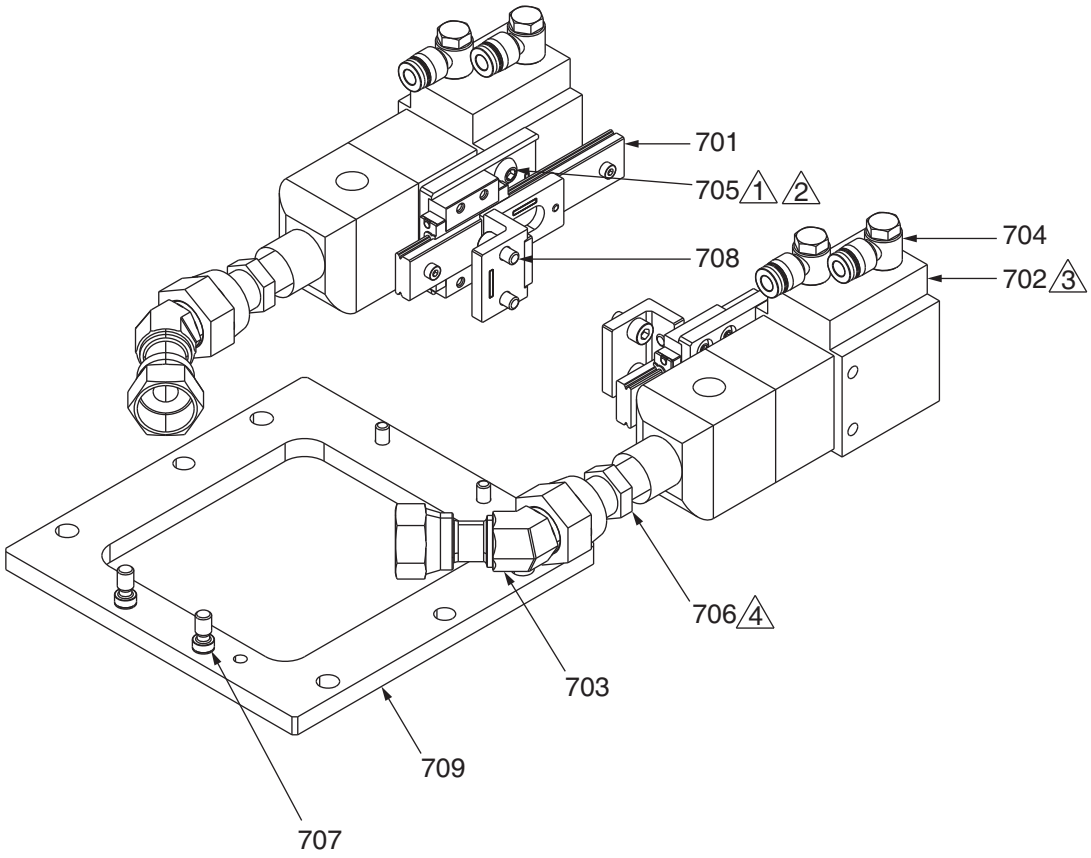
3 Apply sealant, Anaerobic, blue.

4 Installation direction as show.

FIG. 59: PR-X Drive

Ref.	Part	Description	Qty.
6701	18D972	SEAT, reduction	1
6702	133663	MOTOR, PR-X drive, servo, 4 frame	1
6703	18B973	GEAR REDUCER, PR-X drive, 20:1	1
6704	18B974	SCREW, M4 x 0.7-16, socket head, SST	4
6705	18B970	SCREW, M5 x 0.8-16, socket head, SST	4

Supply Pump Assembly



1 Torque to 3.0-3.7 ft-lb (4-5 N•m).

2 Apply sealant, Anaerobic, blue.

3 Adjust the fitting thread direction as shown.

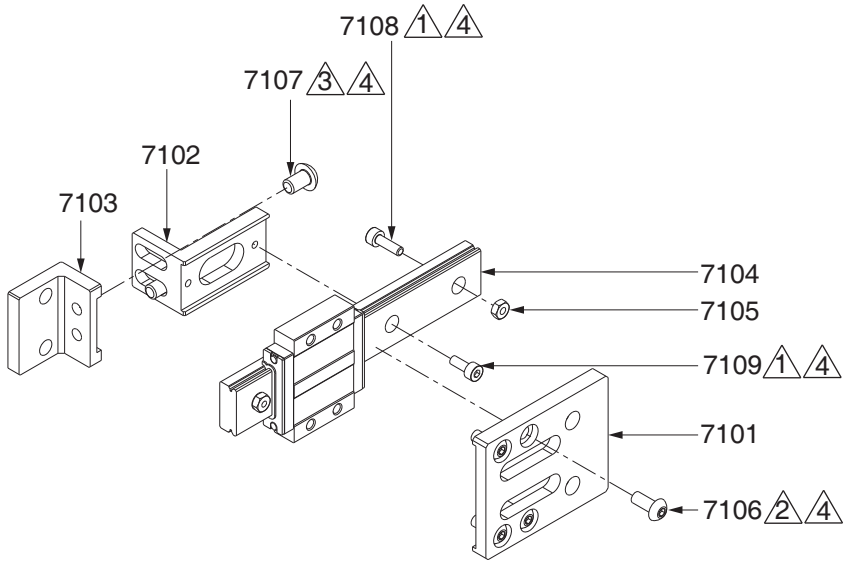
4 Apply sealant, pipe, SST.

FIG. 60: Supply Pump Kit

Ref.	Part	Description	Qty.
701	25R430	ASSEMBLY, slide, pump, see page 80	2
702	243666	VALVE, 1K Ultra-Lite	2
703*	----	FITTING, UN13/16-16, male, female	2
704	18C103	FITTING, DIA 6, PT1/8, PV	4
705	----	SCREW, M6 x 1-6, button head	4
706*	----	FITTING, UN13/16-16, NPT1/4	2
707	18B951	SCREW, shoulder, DIA 8, M6	2
708	----	SCREW, M5 x 0.8-10, socket head, SST	6
709	18C106	PLATE, bottom, base, pump	1

* *Parts included in Kit 25R592 (purchase separately).*

Pump Slide Assembly, 25R430



1 Torque to 0.74-1.29 ft-lb (1-1.75 N•m).

2 Torque to 1.70-2.85 ft-lb (2.3-3.5 N•m).

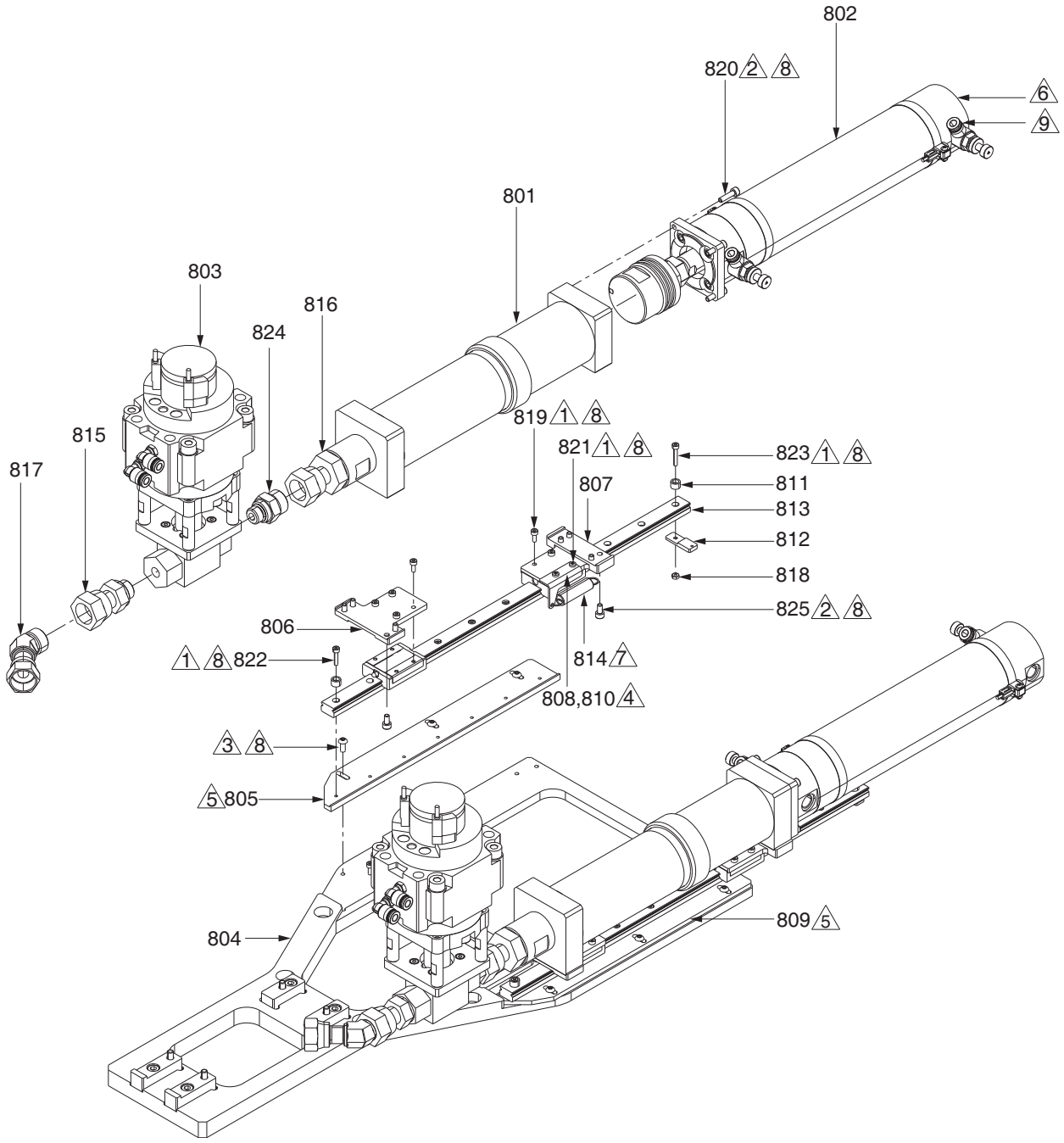
3 Torque to 3.0-3.7 ft-lb (4-5 N•m).

4 Apply sealant, Anaerobic, blue.

FIG. 61: Pump Slide Assembly

Ref.	Part	Description	Qty.
7101	18C094	PLATE, mounting, valve	1
7102	18C095	PLATE, mounting, slide	1
7103	18C096	PLATE, mounting, base	1
7104	18C097	RAIL, pump	1
7105	----	NUT, M3 x 0.5, THK2.4, SST	2
7106	----	SCREW, M4 x 0.7-10, button head, SST	4
7107	----	SCREW, M5 x 0.8-8, button head, SST	2
7108	----	SCREW, M3 x 0.5-10, socket head, SST	2
7109	----	SCREW, M3 x 0.5-8, socket	2

Supply Cartridge Assembly, 25R425



1 Torque to 0.74-1.29 ft-lb (1-1.75 N•m).

2 Torque to 1.70-2.58 ft-lb (2.3-3.5 N•m).

3 Torque to 3.0-3.7 ft-lb (4-5 N•m).

4 Right spring bracket is at mirror side.

5 Adjust the position to be align with fixed ratio base assembly.

6 Keep bottom hole as down side.

7 Connect the spring to the spring bracket after assembly.

8 Apply sealant, Anaerobic, blue.

9 Keep air outlet as shown.

FIG. 62: Supply Cartridge Assembly

Supply Cartridge Assembly

Ref.	Part	Description	Qty.
801	25R426	ASSEMBLY, cartridge sleeve, see page 84	2
802	25R597	ASSEMBLY, Cylinder, see page 85	2
803	25R427	UNIT, inlet valve, see page 86	2
804	25R428	UNIT, bottom plate, see page 87	1
805*	----	PLATE, mounting sliding rail left	1
806*†	----	PLATE, mounting sliding block front	2
807*†	----	PLATE, mounting sliding block top	2
808*	----	BRACKET, spring, left	1
809†	----	PLATE, mounting sliding rail right	1
810†	----	BRACKET, spring, right	1
811*†	----	RING, check	4
812*†	----	BRACKET, spring, top	2
813*†	----	RAIL, sliding block	2
814*†	----	SPRING	2
815	18C087	FITTING, UN13/16-16, G3/8	2
816	18C088	FITTING, UN13/16-16, G3/4	2
817	18C102	FITTING, UN13/16-16, male, female	2
818*†	----	NUT, M3 x 0.5, THK2.4, SST	2
819*†	----	SCREW, M3 x 0.5-8, socket	24
820	----	SCREW, M4 x 0.7-16, socket head, SST	8
821*†	----	SCREW, M3 x 0.5-8, pan, Philips	4
822*†	----	SCREW, M3 x 0.5-14, socket	2
823*†	----	SCREW, M3 x 0.5-18, socket	2
824	18C093	FITTING, UN13/16-16, G3/8	2
825*†	----	SCREW, M4 x 0.7-8, socket head, SST	16

* *Parts included in Kit 25R593 (purchase separately).*

† *Parts included in Kit 25R594 (purchase separately).*

Cartridge Sleeve Assembly, 25R426

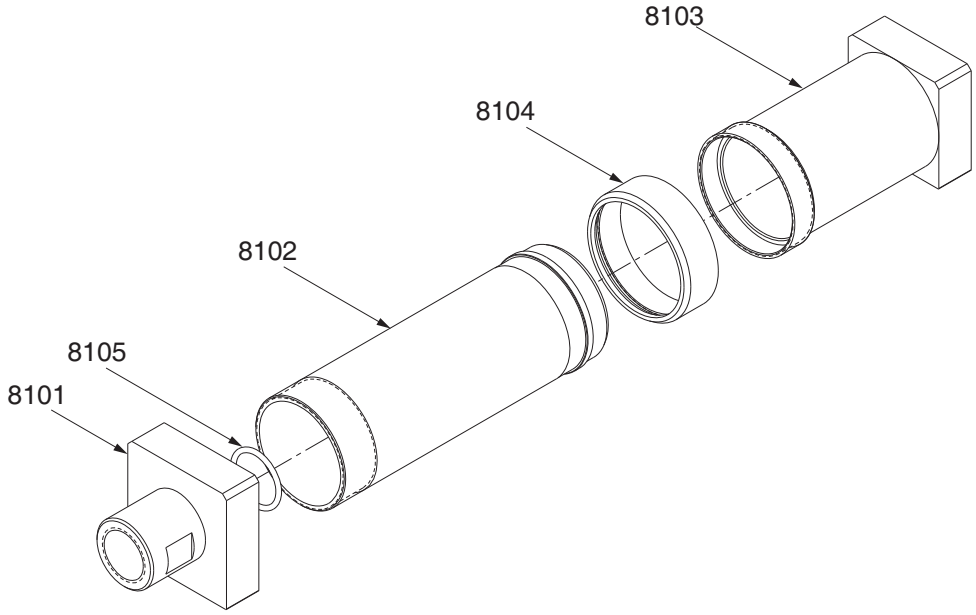
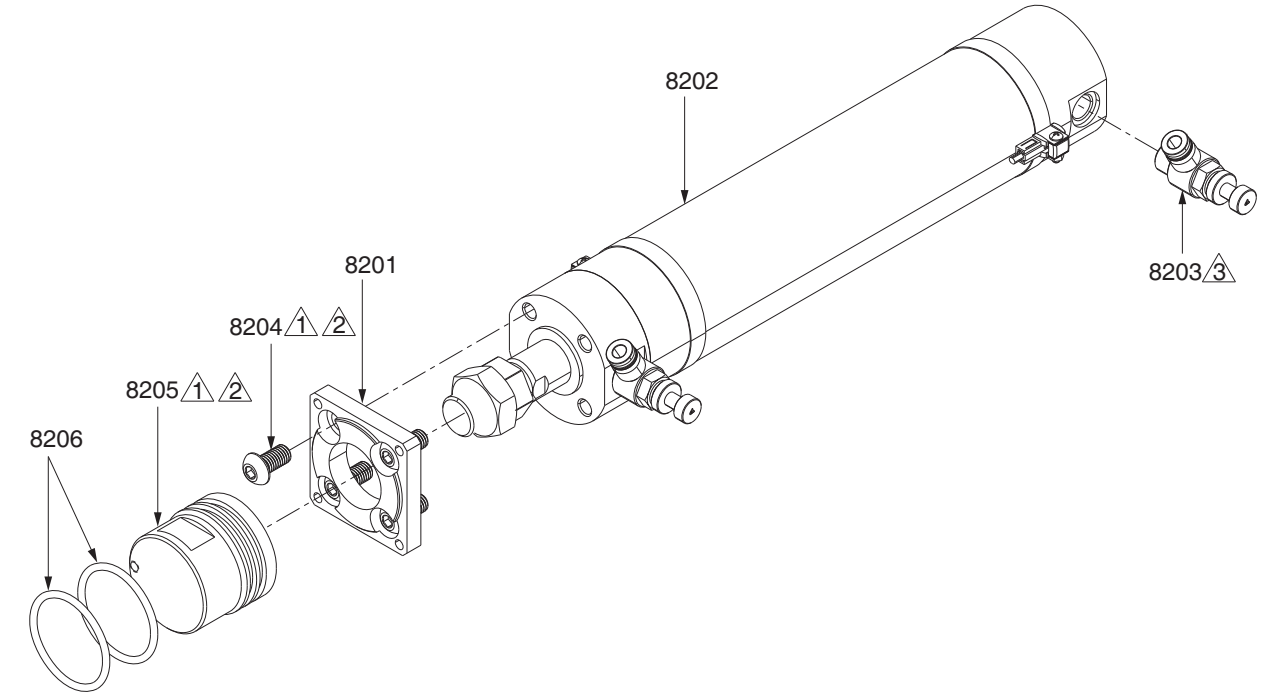


FIG. 63: Cartridge Sleeve Assembly

Ref.	Part	Description	Qty.
8101	18C054	SEAT, sleeve bottom	1
8102	18C055	SLEEVE, middle, 200	1
8103	18C056	SLEEVE, top	1
8104	18C057	NUT, sleeve	1
8105	18C108	O-RING	1

Cylinder Assembly, 25R597



1 Apply sealant, Anaerobic, blue.

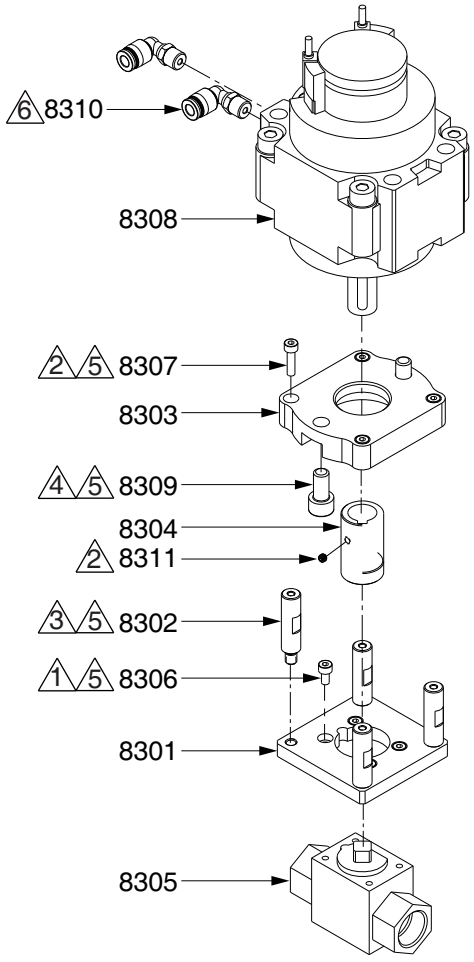
2 Torque to 3.0-3.7 ft-lb (4-5 N•m).

3 Keep air outlet as shown.

FIG. 64: Cylinder Assembly

Ref.	Part	Description	Qty.
8201	18C075	PLATE, mounting cylinder	1
8202	18C084	CYLINDER	1
8203	18C089	FITTING, DIA 6, PT1/4	2
8204	----	SCREW, M8 x 1.25-16, button head, socket, SST	4
8205	18C058	PISTON, plug	1
8206	18C059	O-RING	2

Inlet Valve, 25R427



1 Torque to 1.70-2.58 ft-lb (2.3-3.5 N•m).

2 Torque to 2.21-3.32 ft-lb (3.0-4.5 N•m).

3 Torque to 3.0-3.7 ft-lb (4-5 N•m).

4 Torque to 7.4-8.9 ft-lb (10-12 N•m).

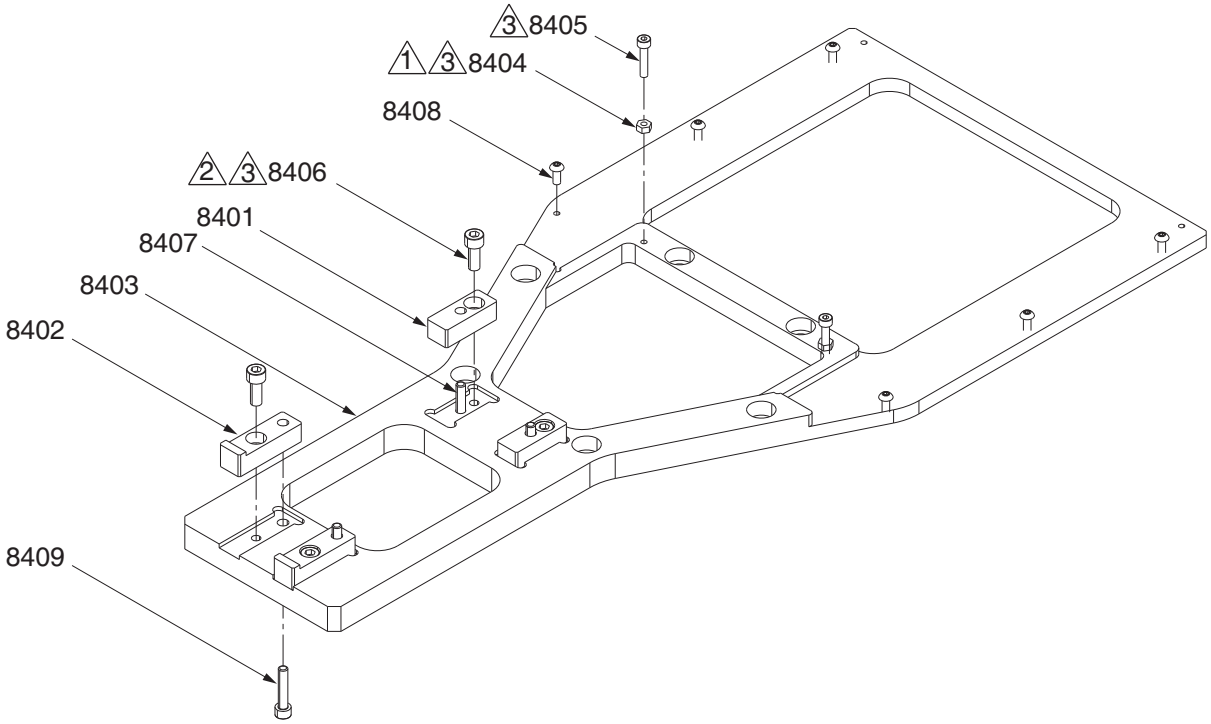
5 Apply sealant, Anaerobic, blue.

6 Apply sealant, pipe, SST.

FIG. 65: Inlet Valve

Ref.	Part	Description	Qty.
8301	18C060	PLATE, bottom	1
8302	18C061	BOSS, support	4
8303	18C062	PLATE, mounting cylinder	1
8304	18C063	COUPLING	1
8305	18C064	VALVE, high pressure	1
8306	----	SCREW, M4 x 0.7-8, socket head, SST	4
8307	----	SCREW, M4 x 0.7-16, socket head, SST	4
8308	18C066	CYLINDER, double vane rotary	1
8309	----	SCREW, M8 x 1.25-16, SST	2
8310	18B911	FITTING, DIA 6, PT1/8	2
8311	----	SCREW, SET, M4 x 0.7-3	2

Bottom Plate, 25R428



1 Torque to 1.70-2.85 ft-lb (2.3-3.5 N•m).

2 Torque to 3.0-3.7 ft-lb (4-5 N•m).

3 Apply sealant, Anaerobic, blue.

FIG. 66: Bottom Plate

Ref.	Part	Description	Qty.
8401	----	BLOCK, support, top	2
8402	----	BLOCK, support, bottom	2
8403	----	PLATE, bottom	1
8404	----	NUT, M4 x 0.7, SST	2
8405	----	SCREW, M4 x 0.7-20, socket	2
8406	----	SCREW, M6 x 1-16, socket, SST	4
8407	----	SCREW, M5 x 0.8-25, socket, SST	2
8408	----	SCREW, M4 x 0.7-10, button head, SST	6
8409	----	SCREW, SHSC, M6 x 1.0-30, SST	2

Kits and Accessories

Cable

Part	Description
18C295	CABLE, 3 m, remote I/O connection
133839	CABLE, 5 m, servo motor
133838	CABLE, 5 m, servo encoder
18C298	CABLE, 5 m, start signal
18C299	CABLE, 5 m, pressure sensor, PR-X
18C300	CABLE, 5 m, junction box

Dimensions

PR-X Machine, Supply Pump Feed

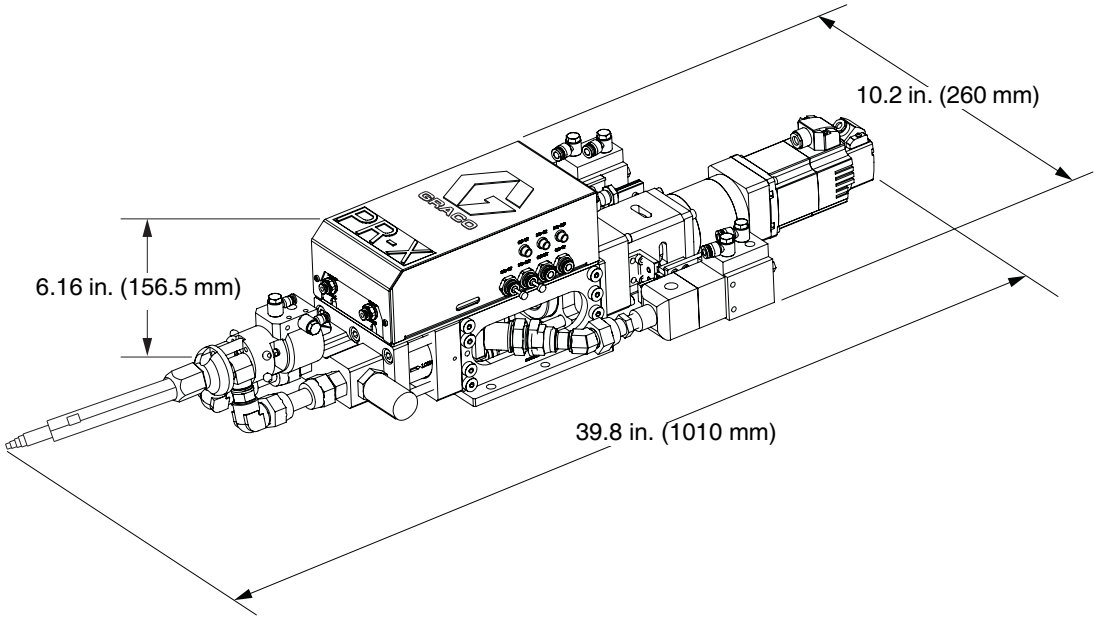


FIG. 67: PR-X Machine Dimensions, Supply Pump Feed

PR-X Machine, Cartridge Feed

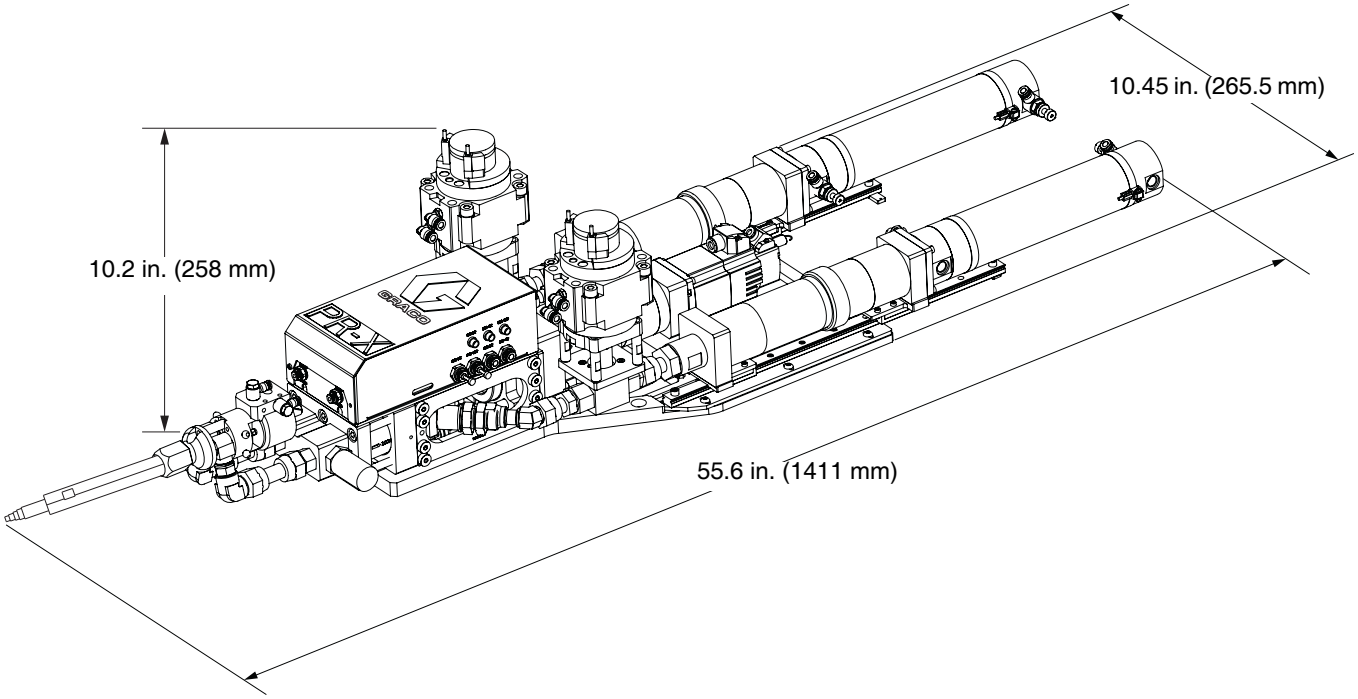


FIG. 68: PR-X Machine Dimensions, Cartridge Feed

PR-X Control Box

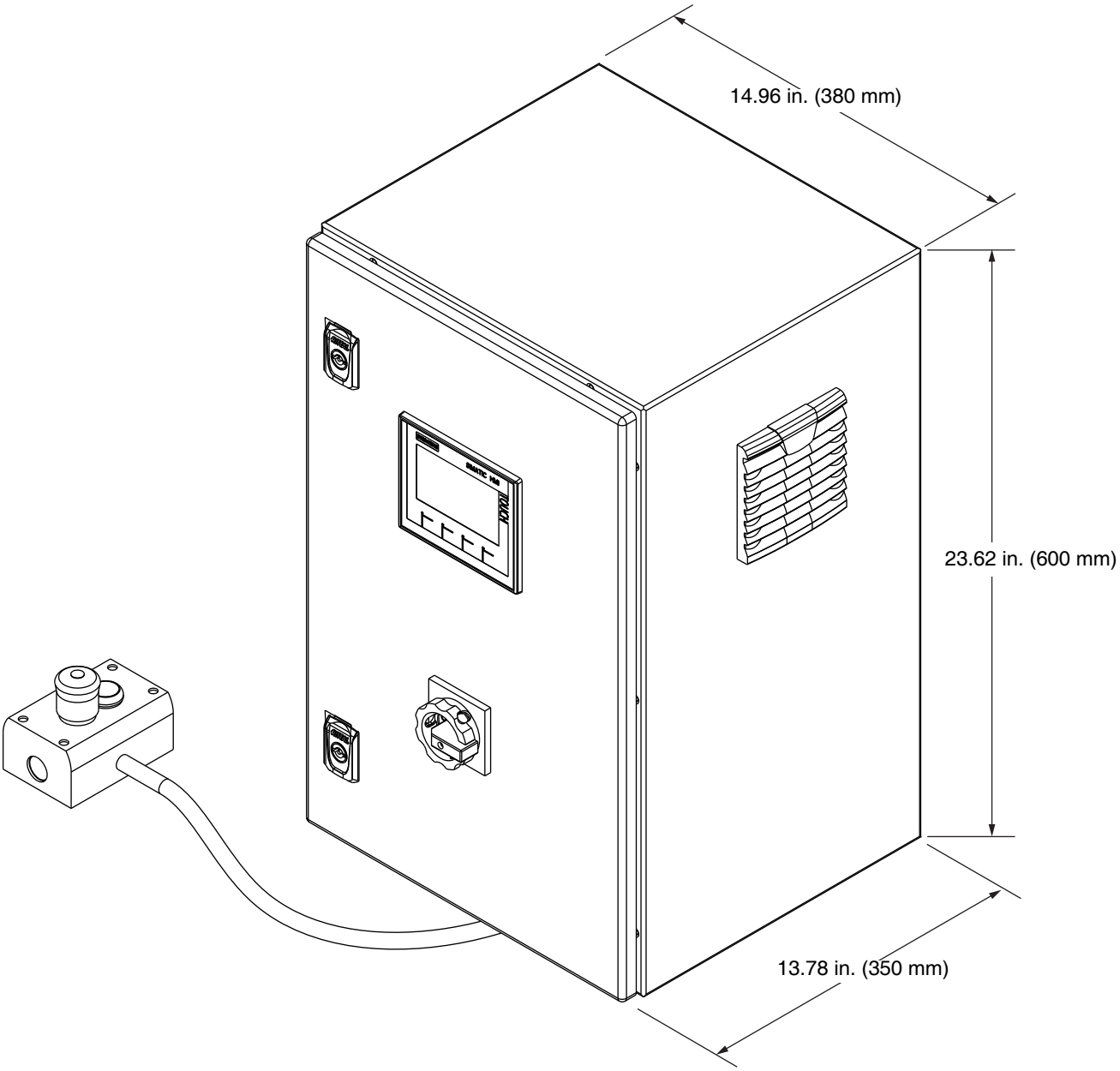
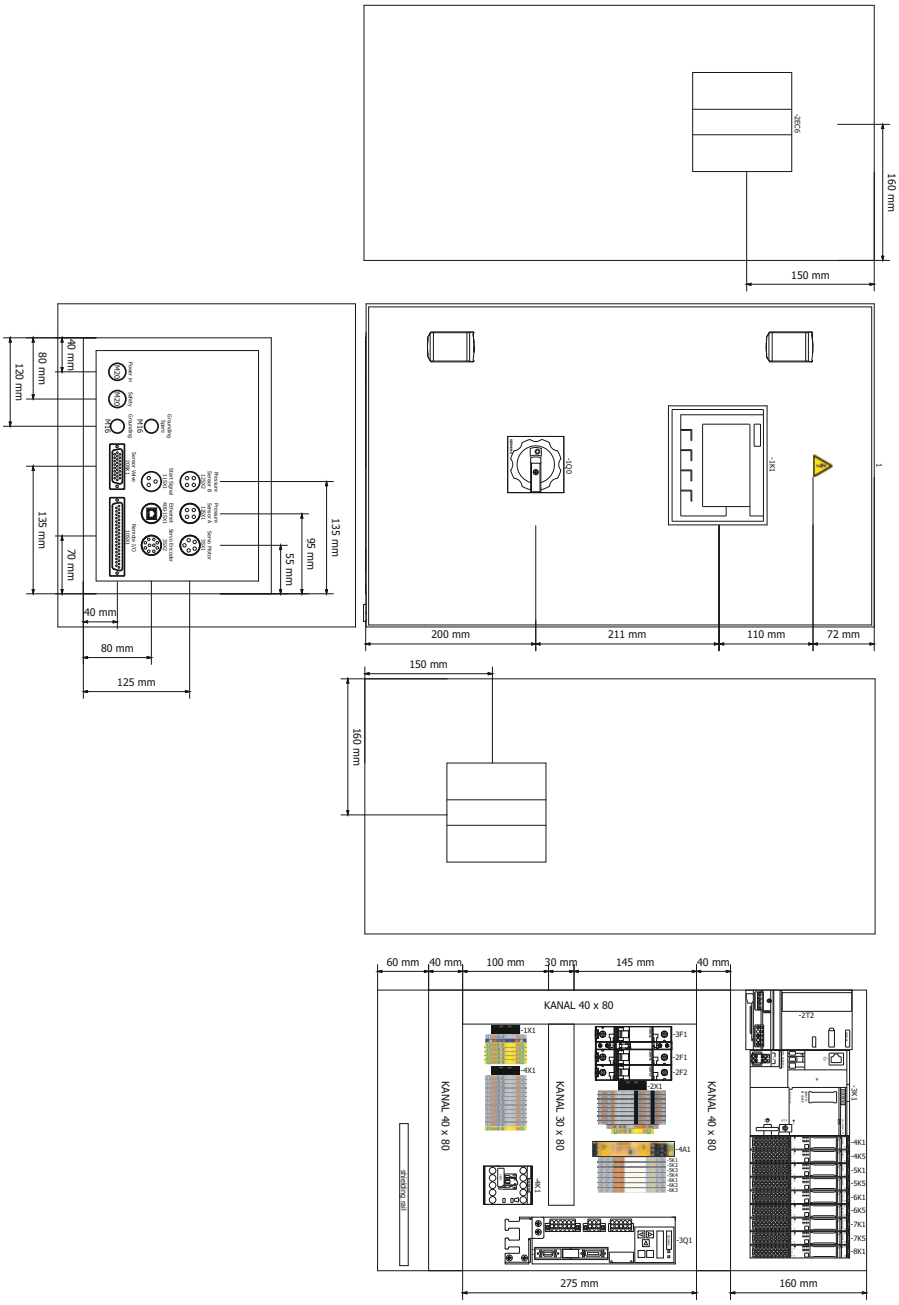


FIG. 69: Control Box Dimensions

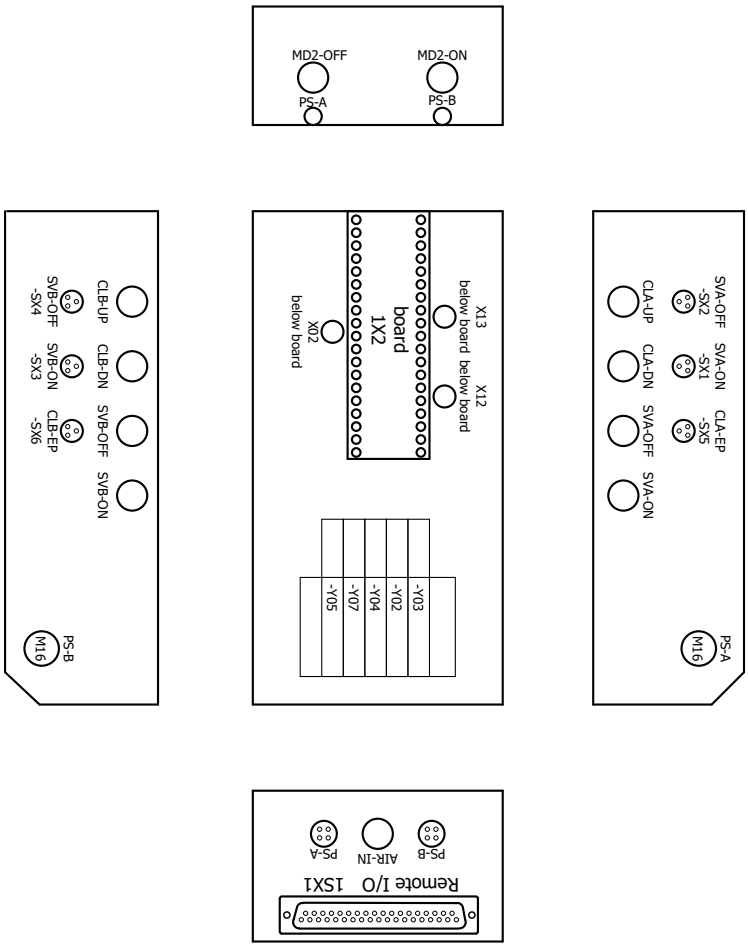
Schematics

All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

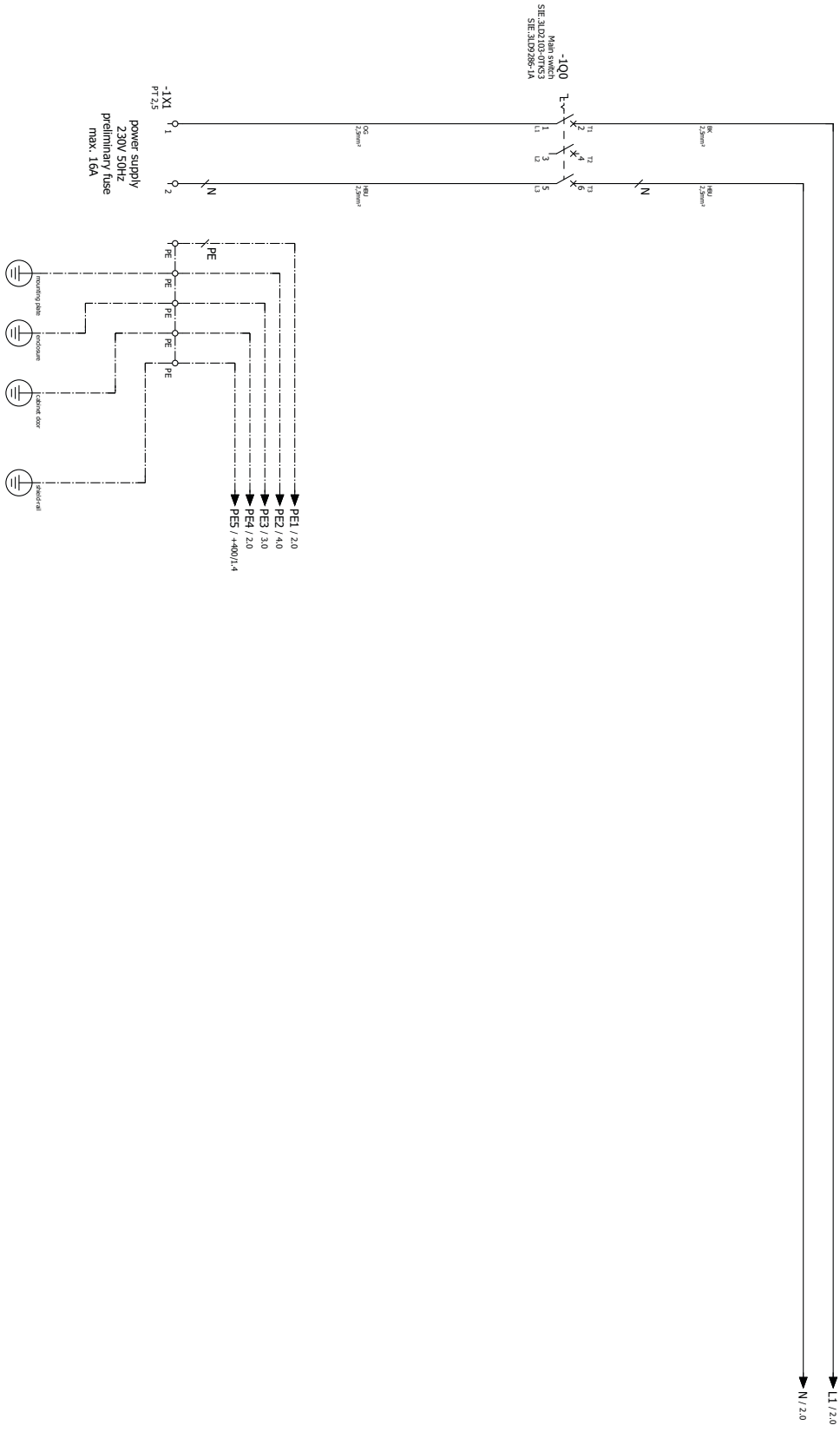
Schematic Diagram Control Box



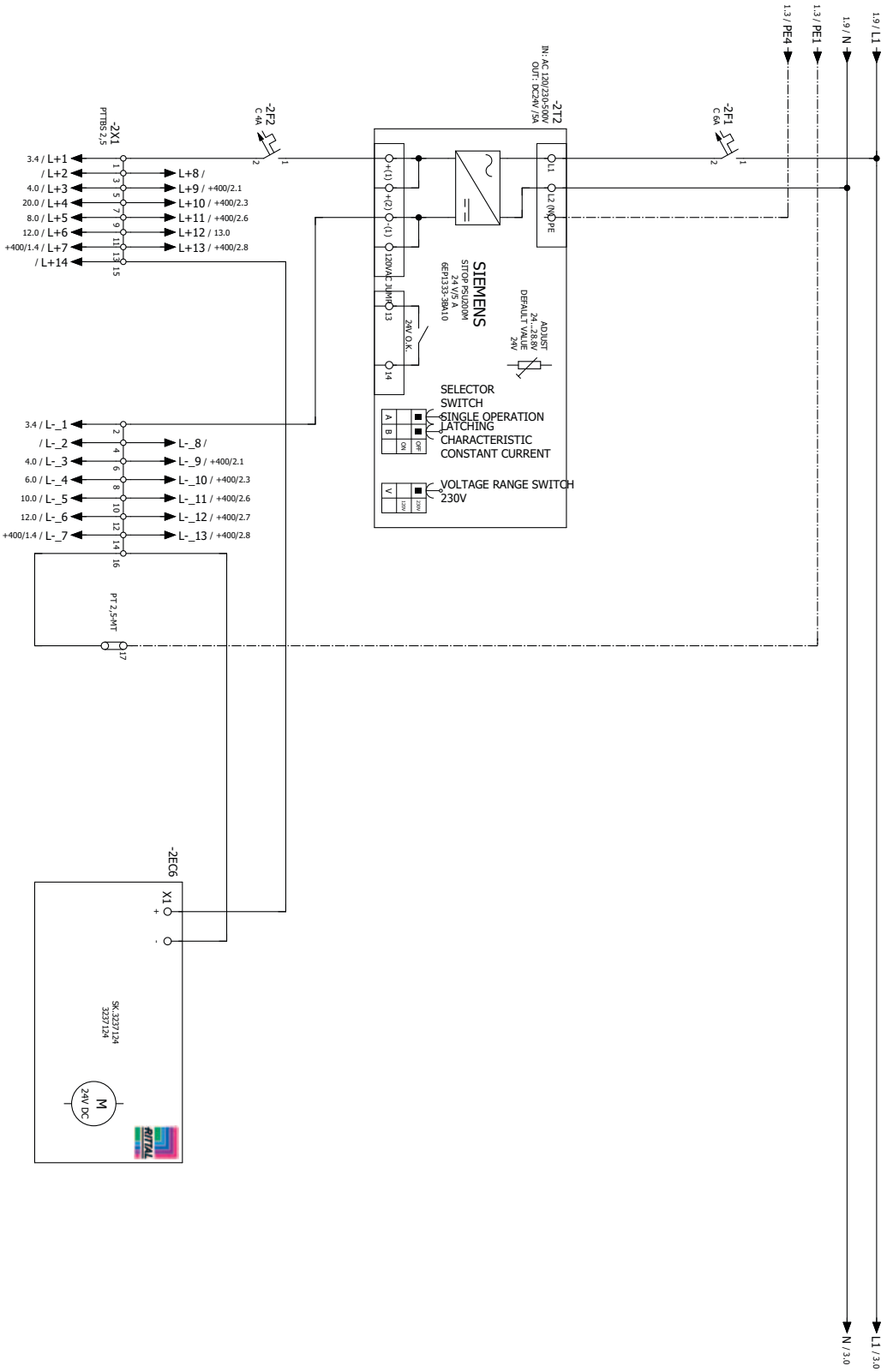
Schematic Diagram Junction Box



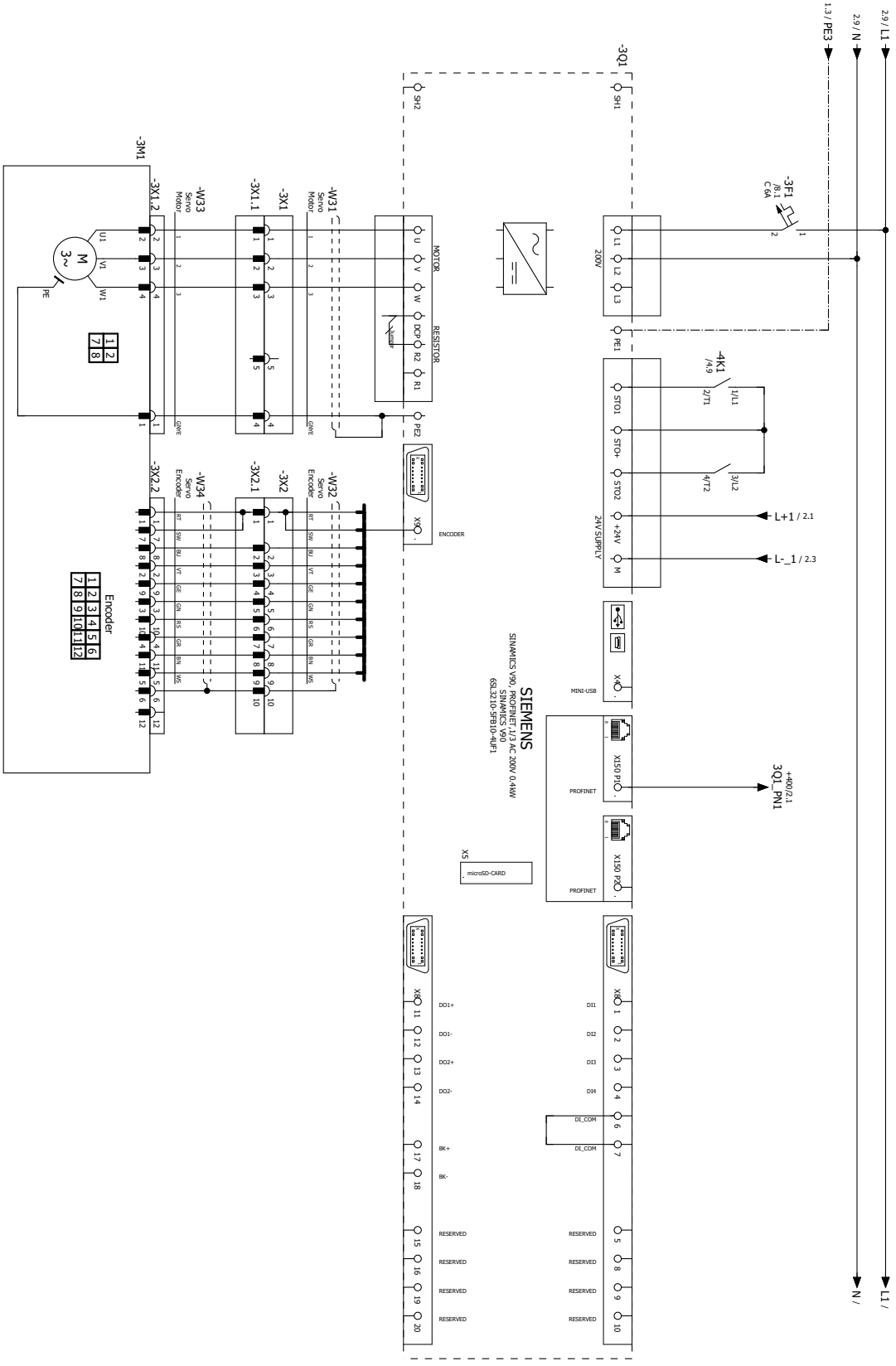
Power Supply



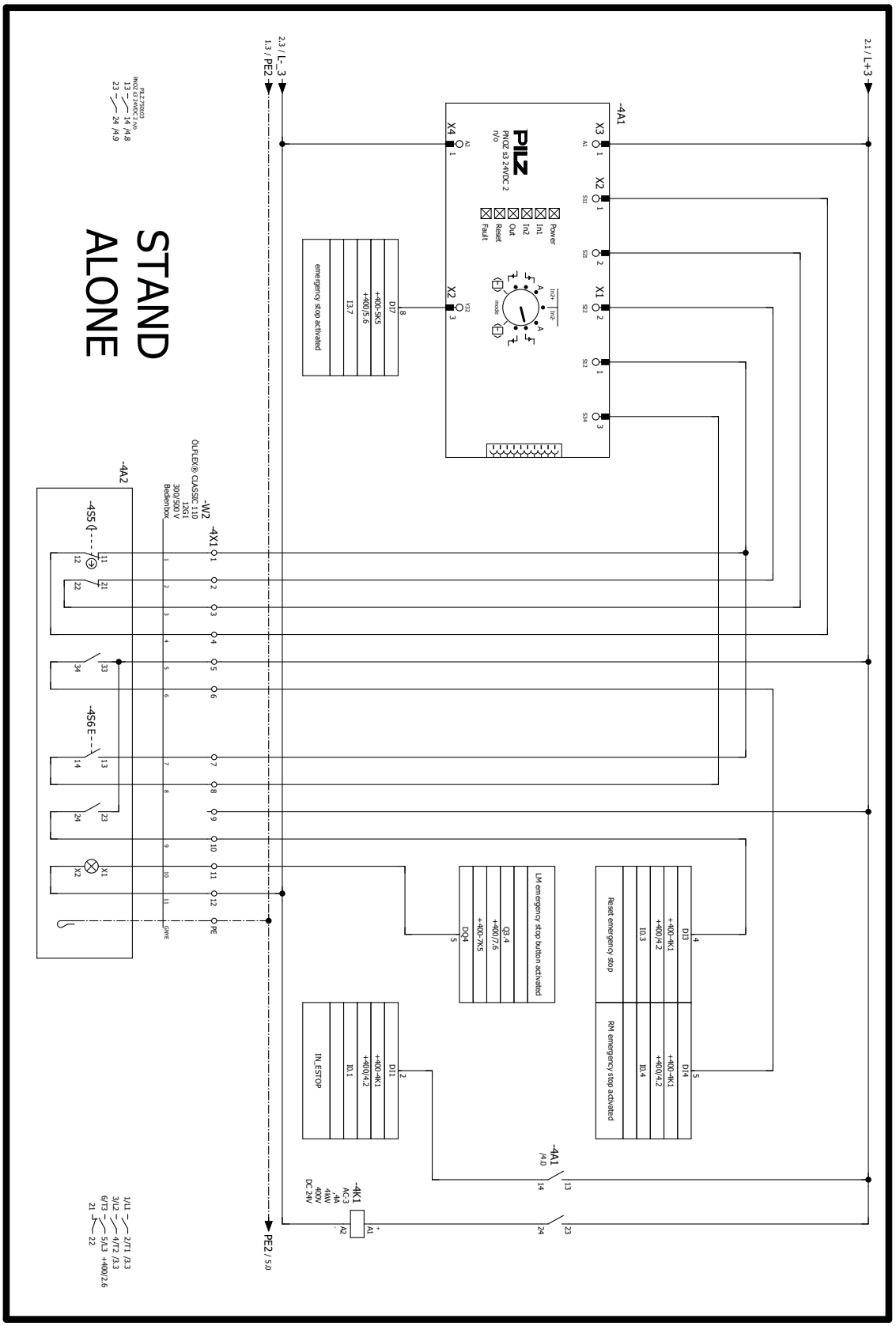
Power Supply 24 V DC



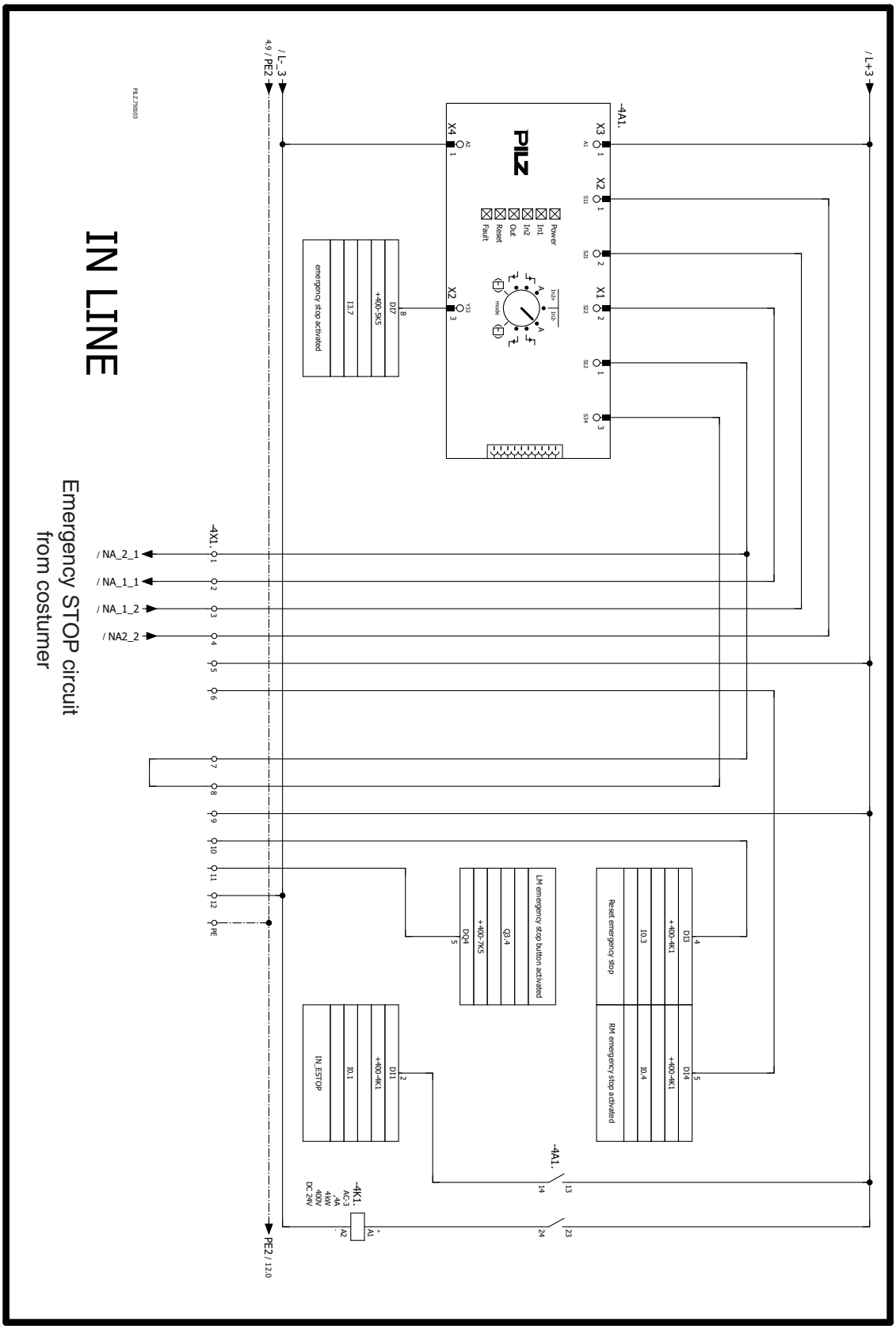
Servo Drive Power



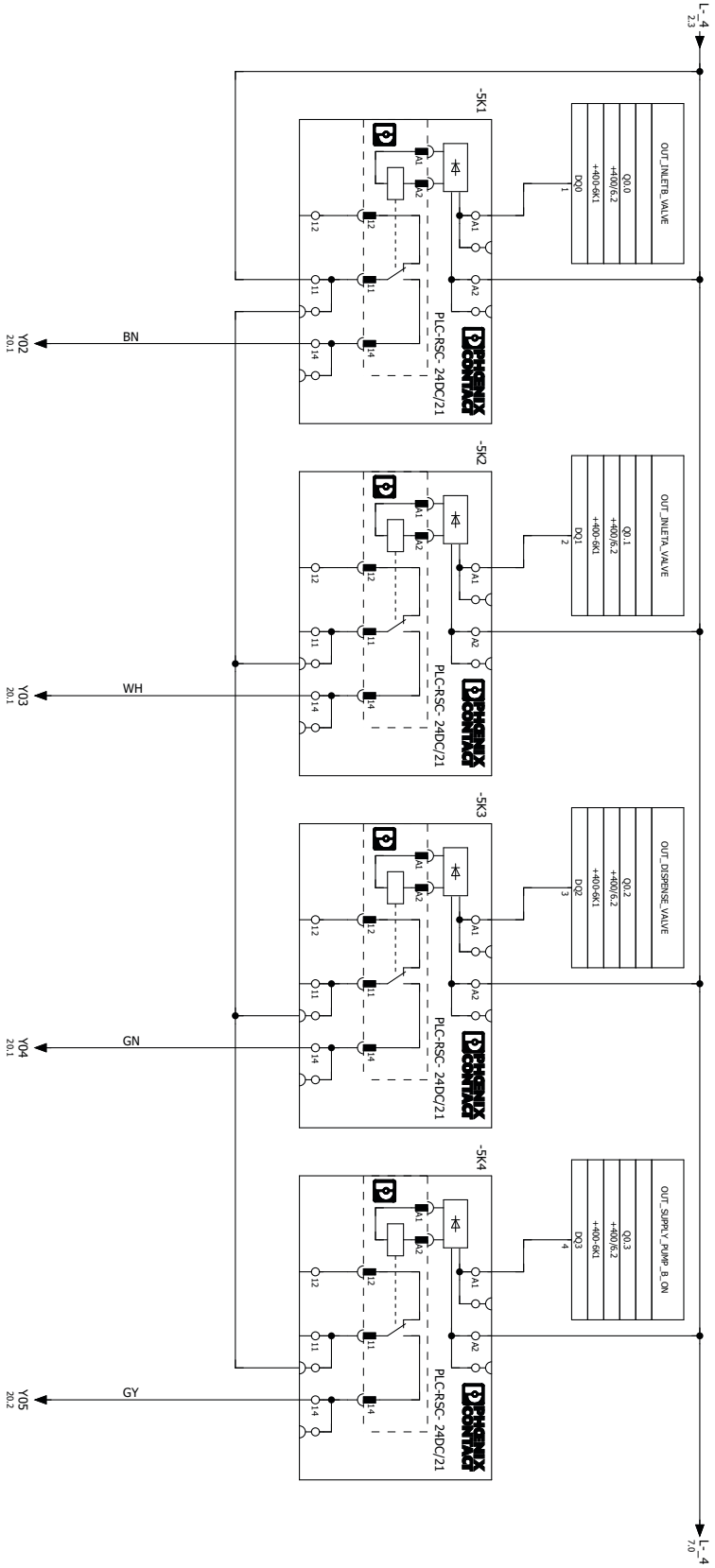
Emergency Stop Stand Alone



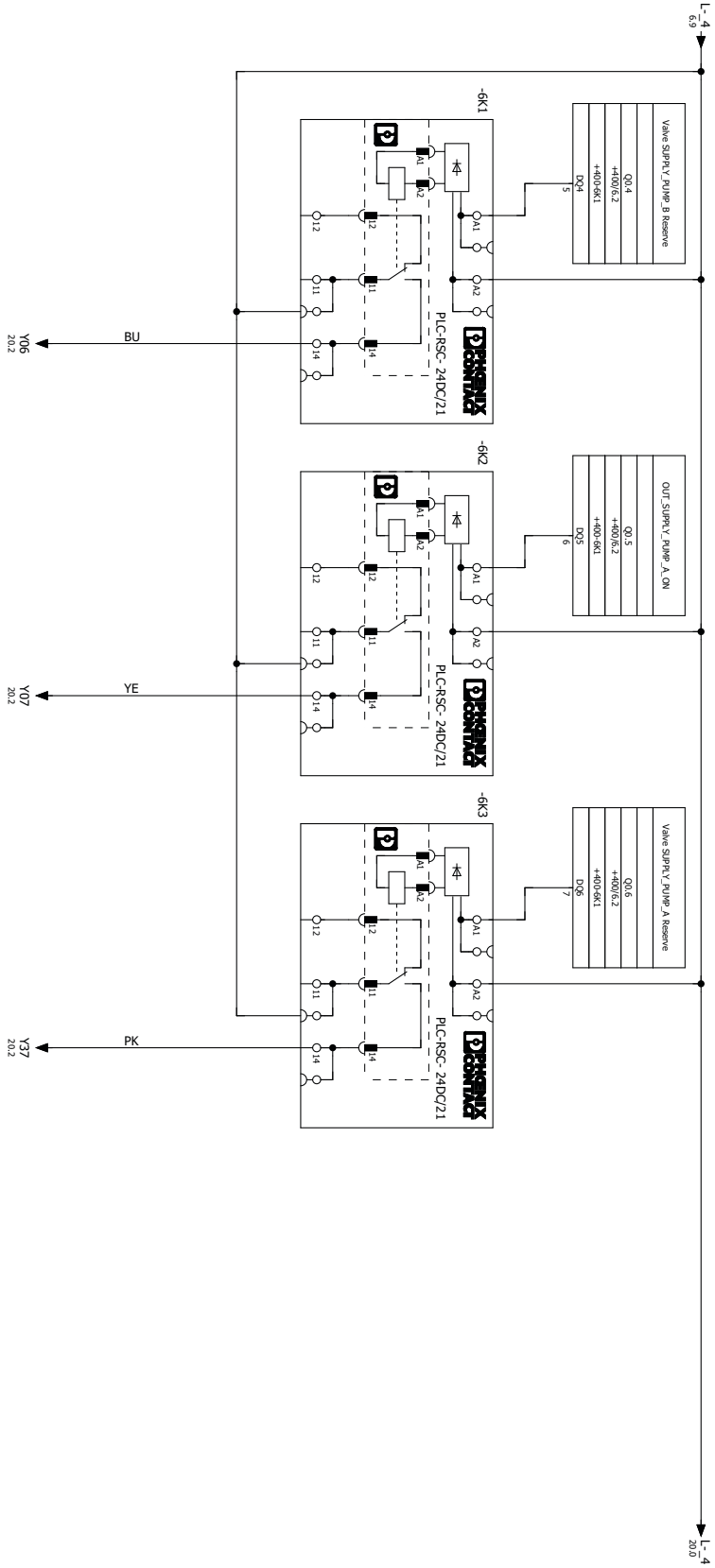
Emergency Stop In Line



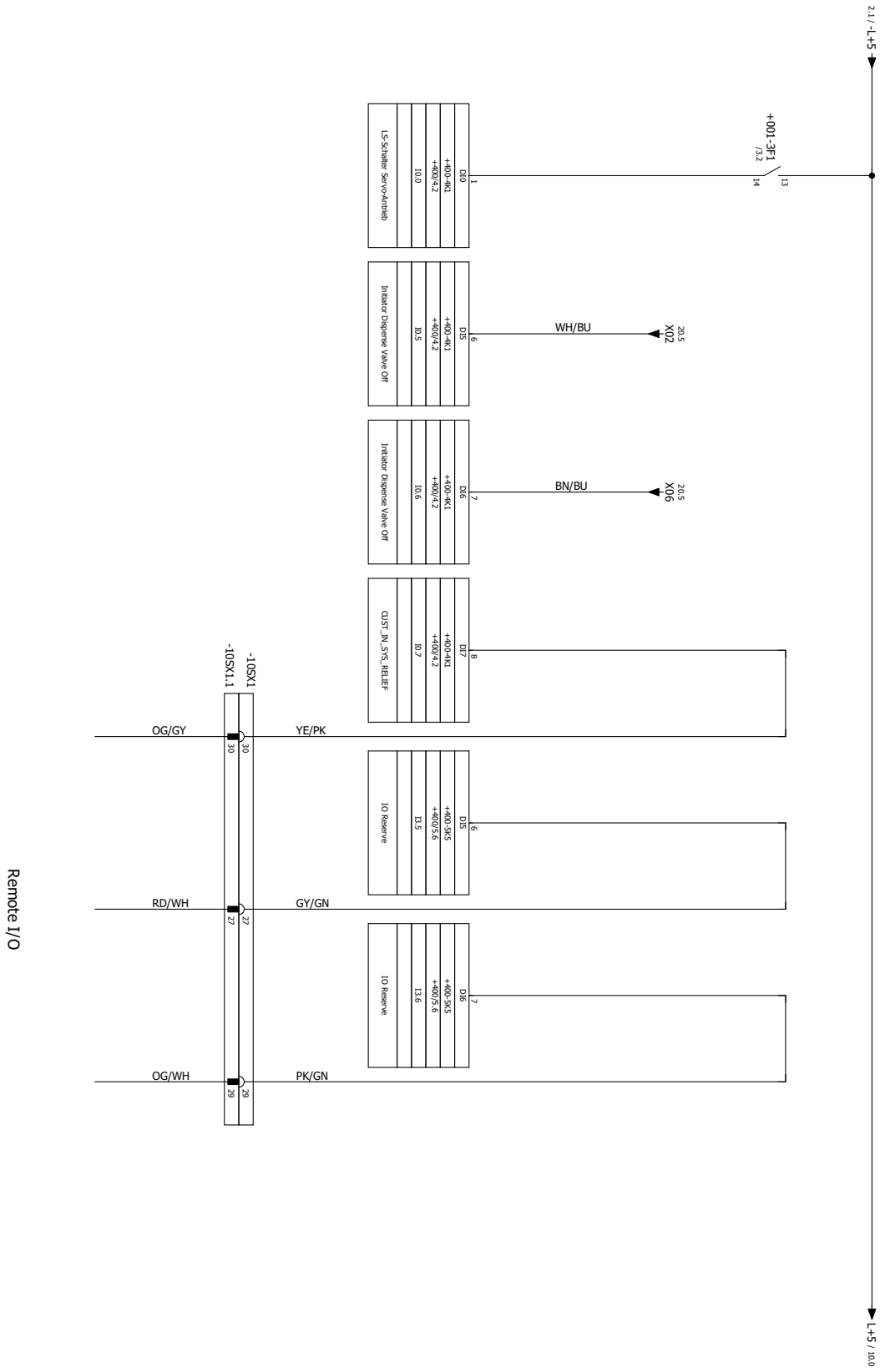
Output Valve 1-4



Output Valve 5-7

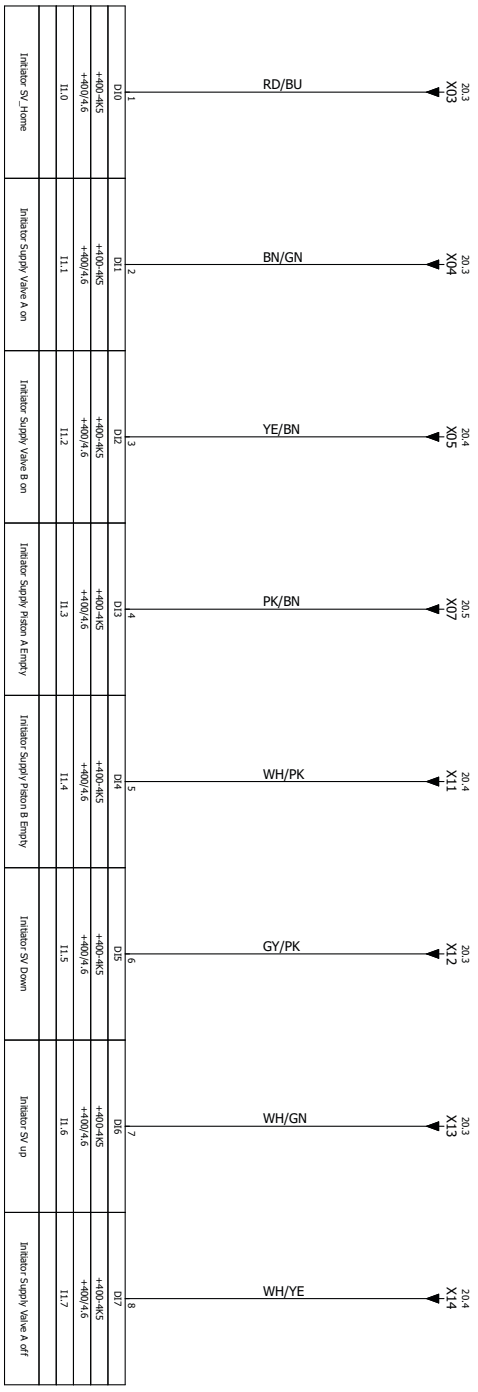


Digital Input

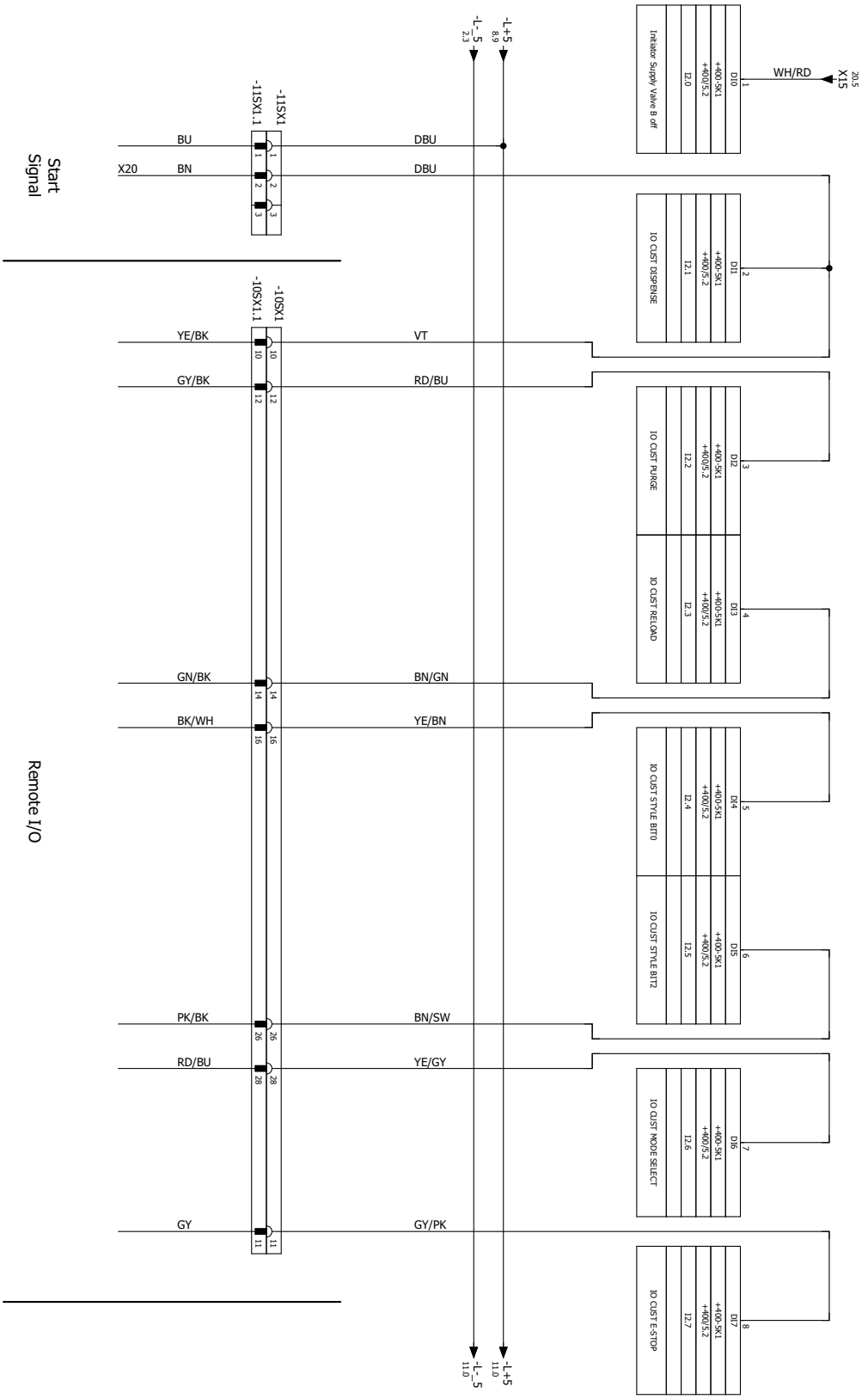


Remote I/O

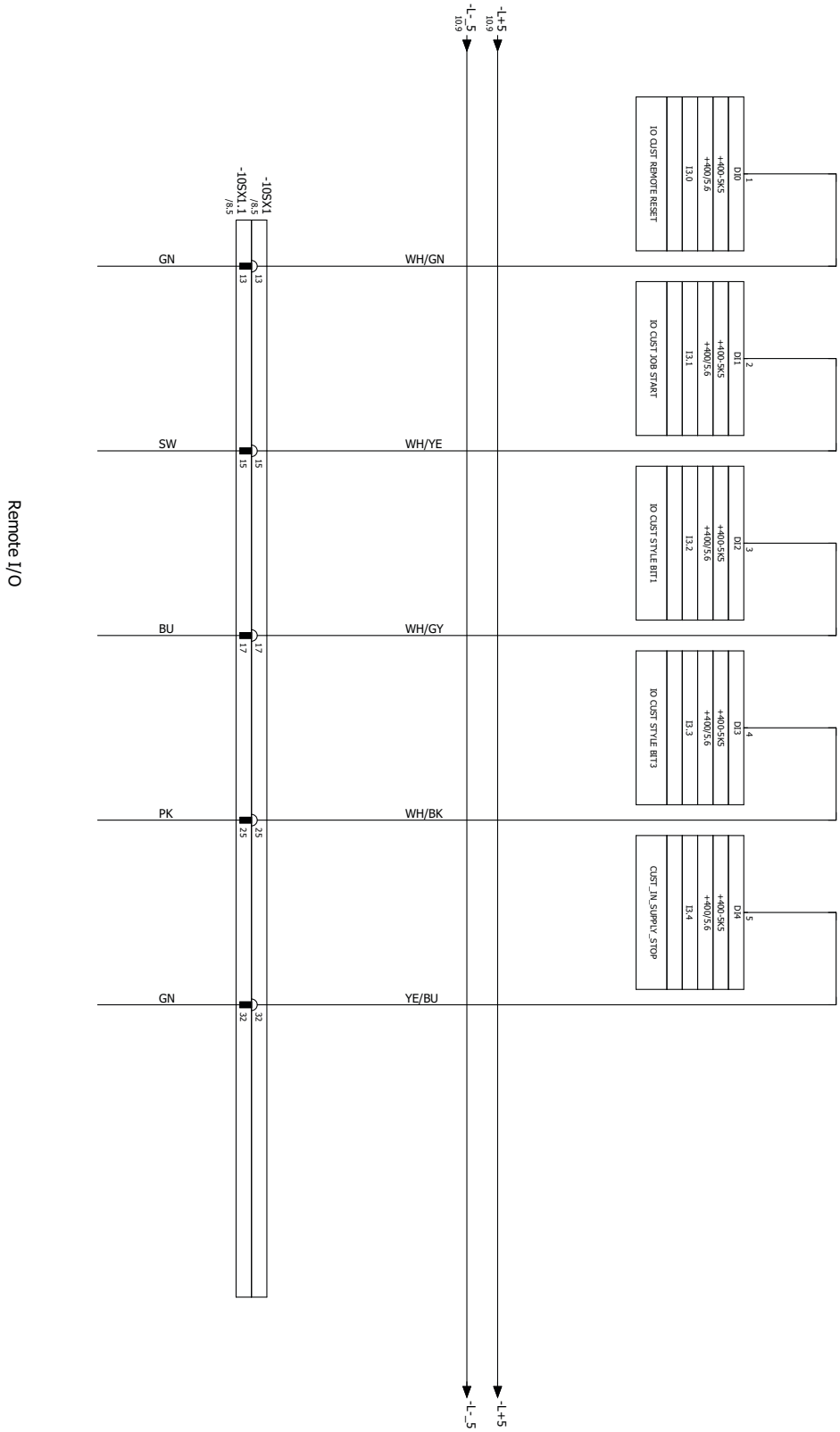
Digital Input_1



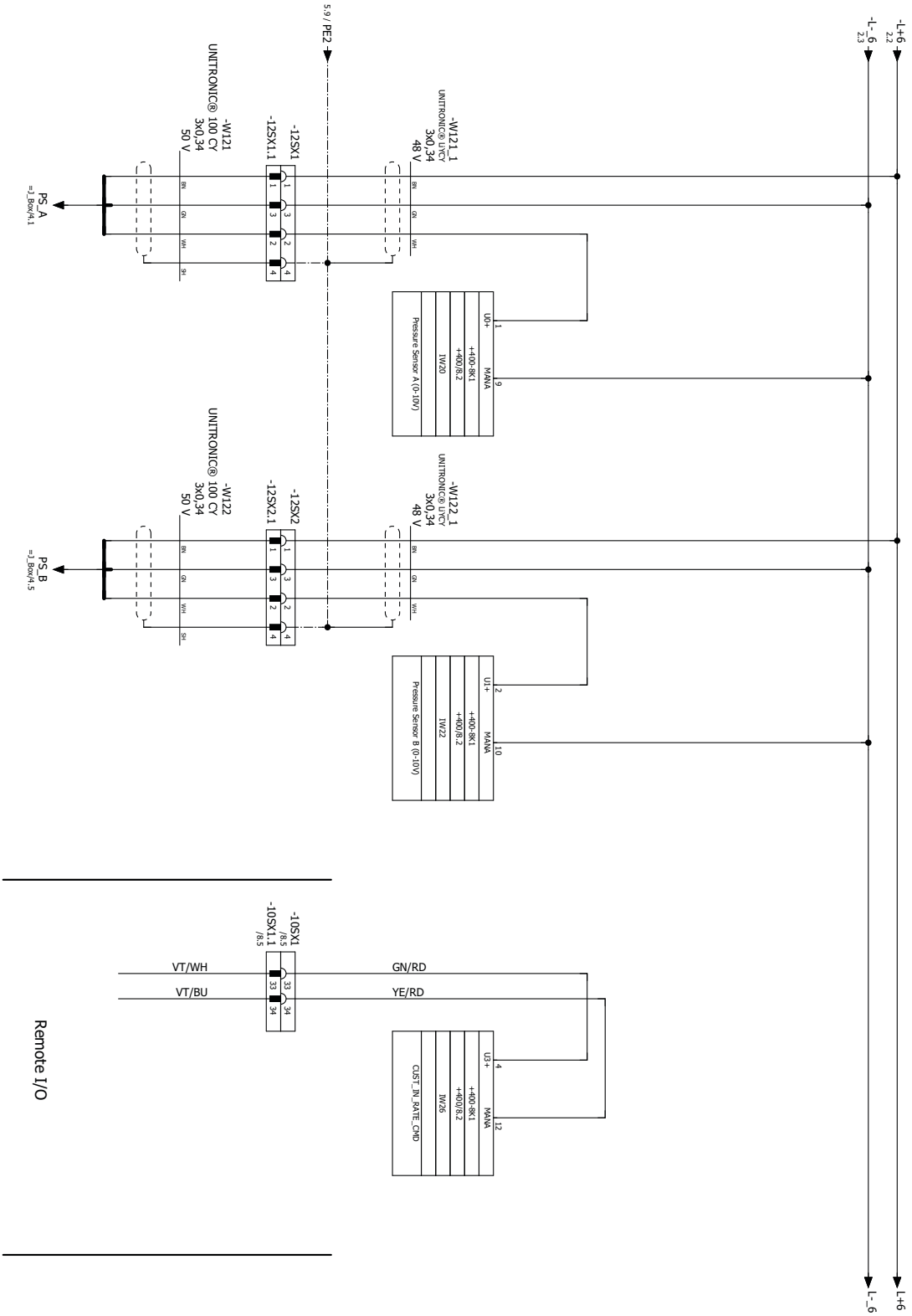
Digital Input_2



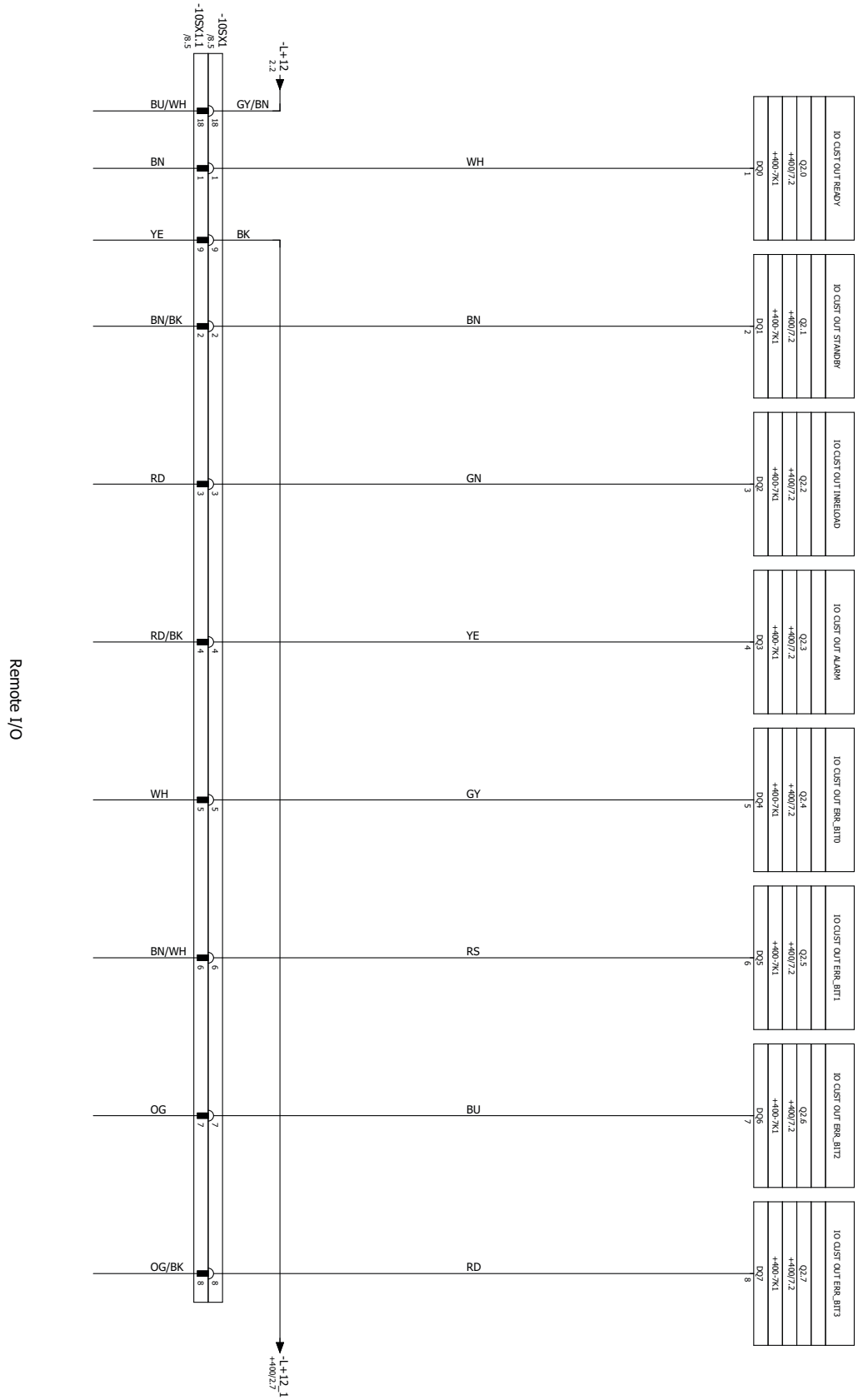
Digital Input_3



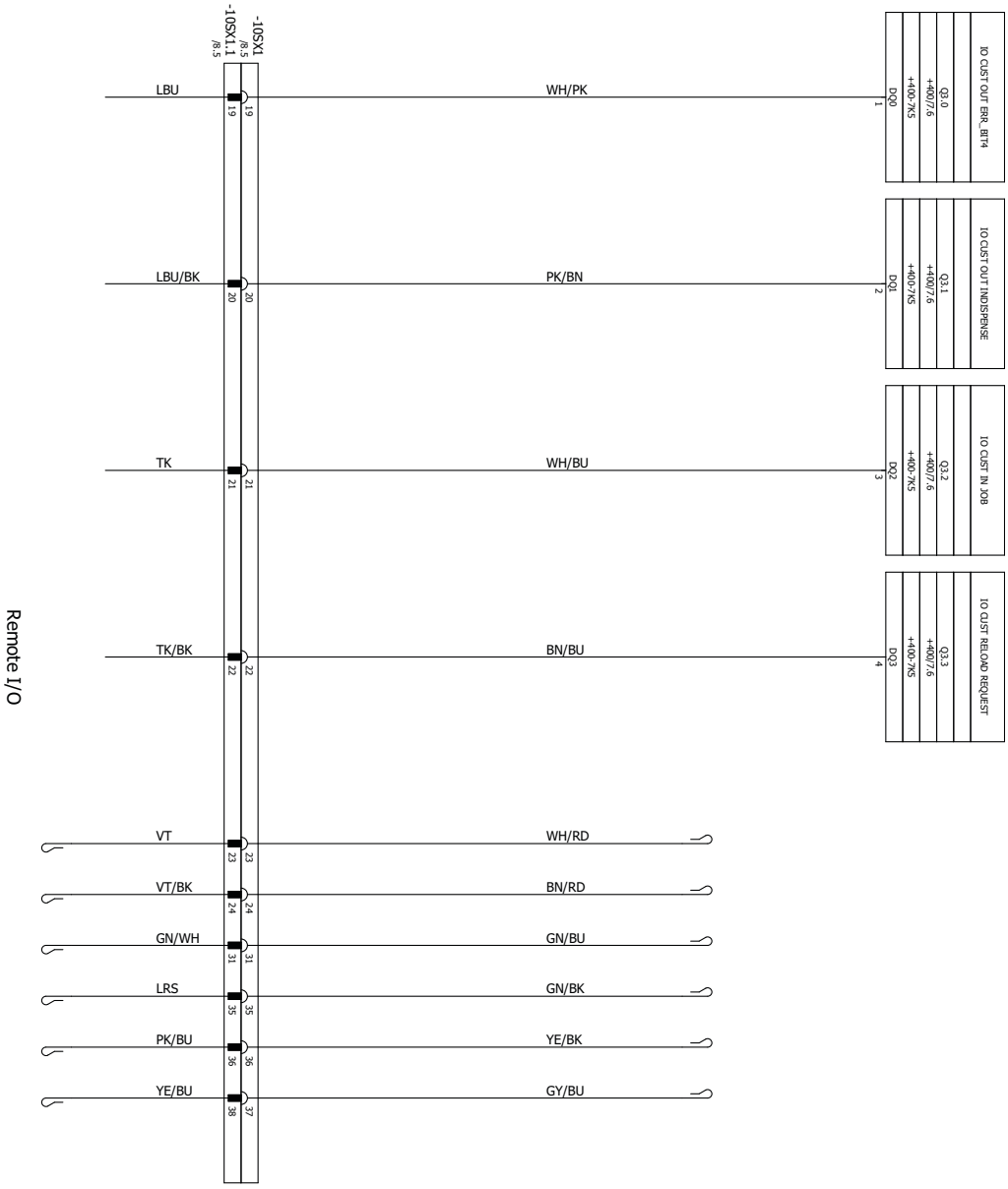
Pressure Sensor



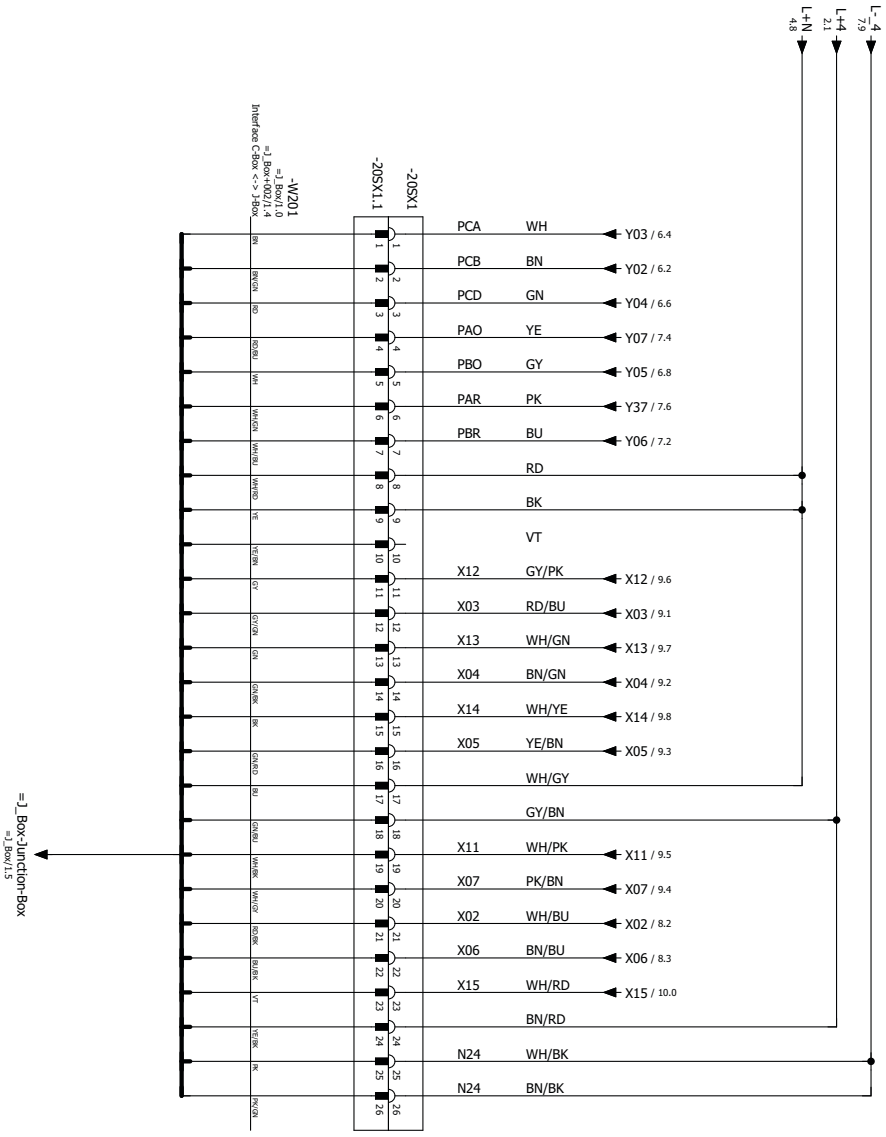
Digital Output



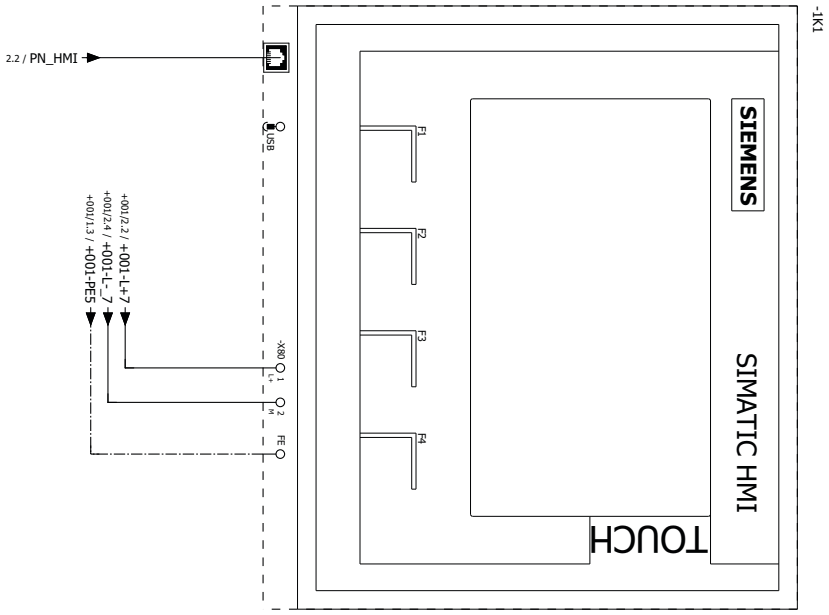
Digital Output_1



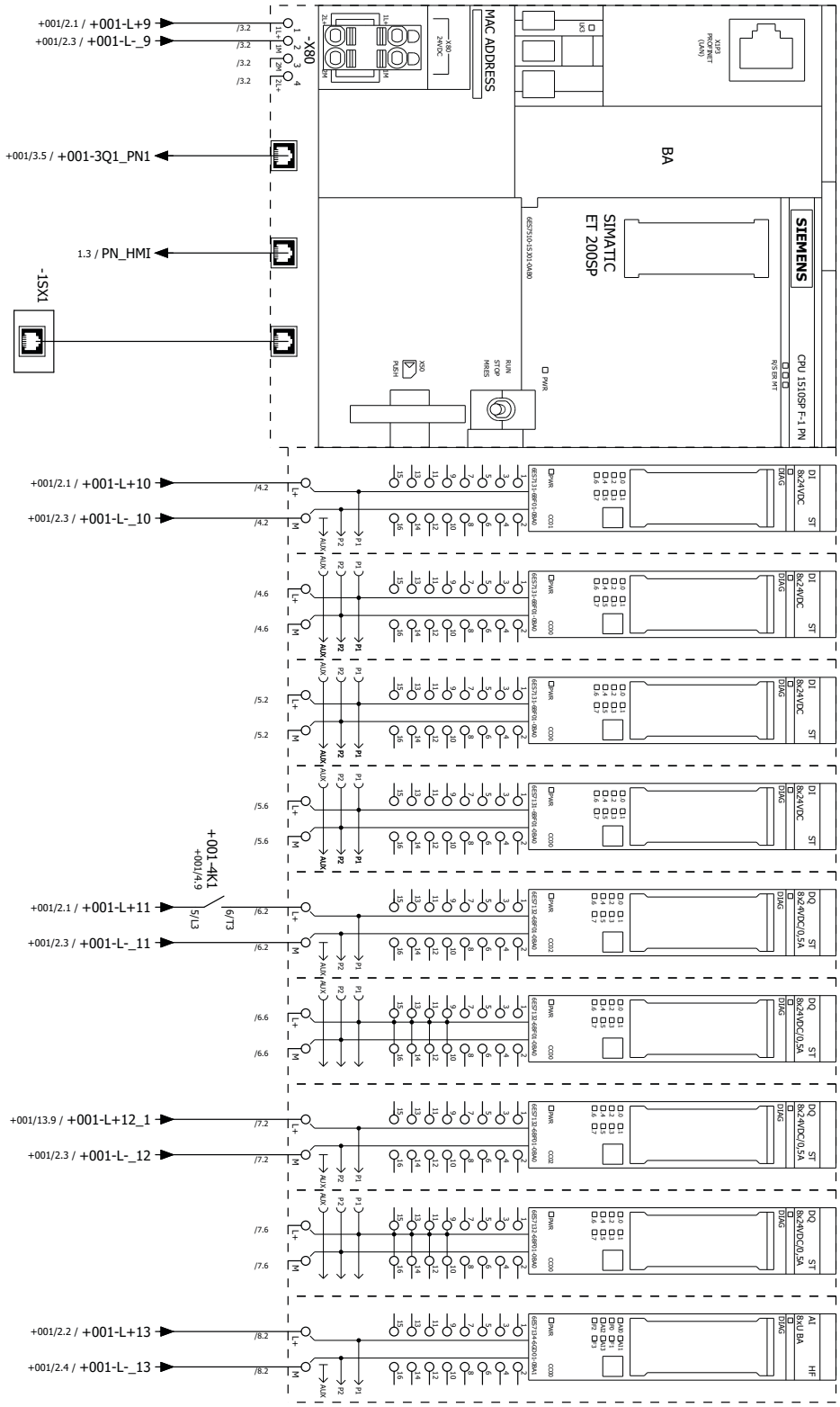
Interface C-Box - J-Box



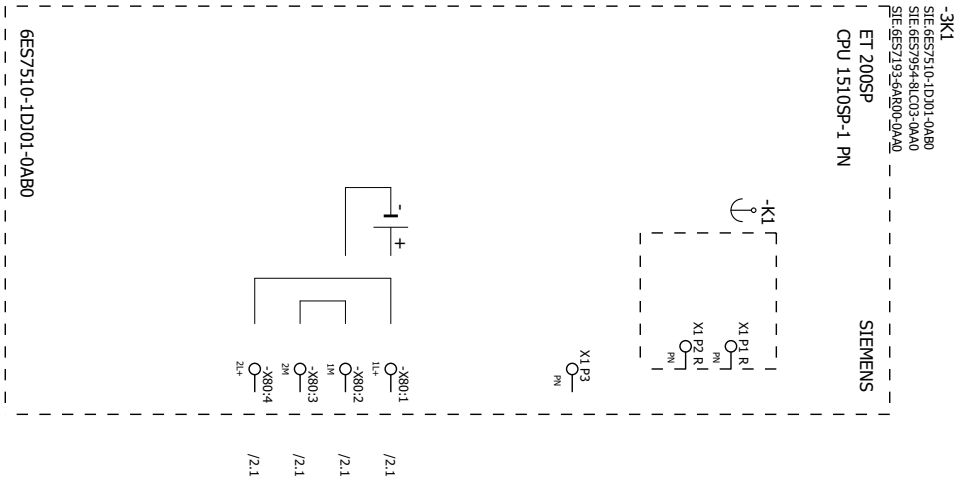
Control Panel



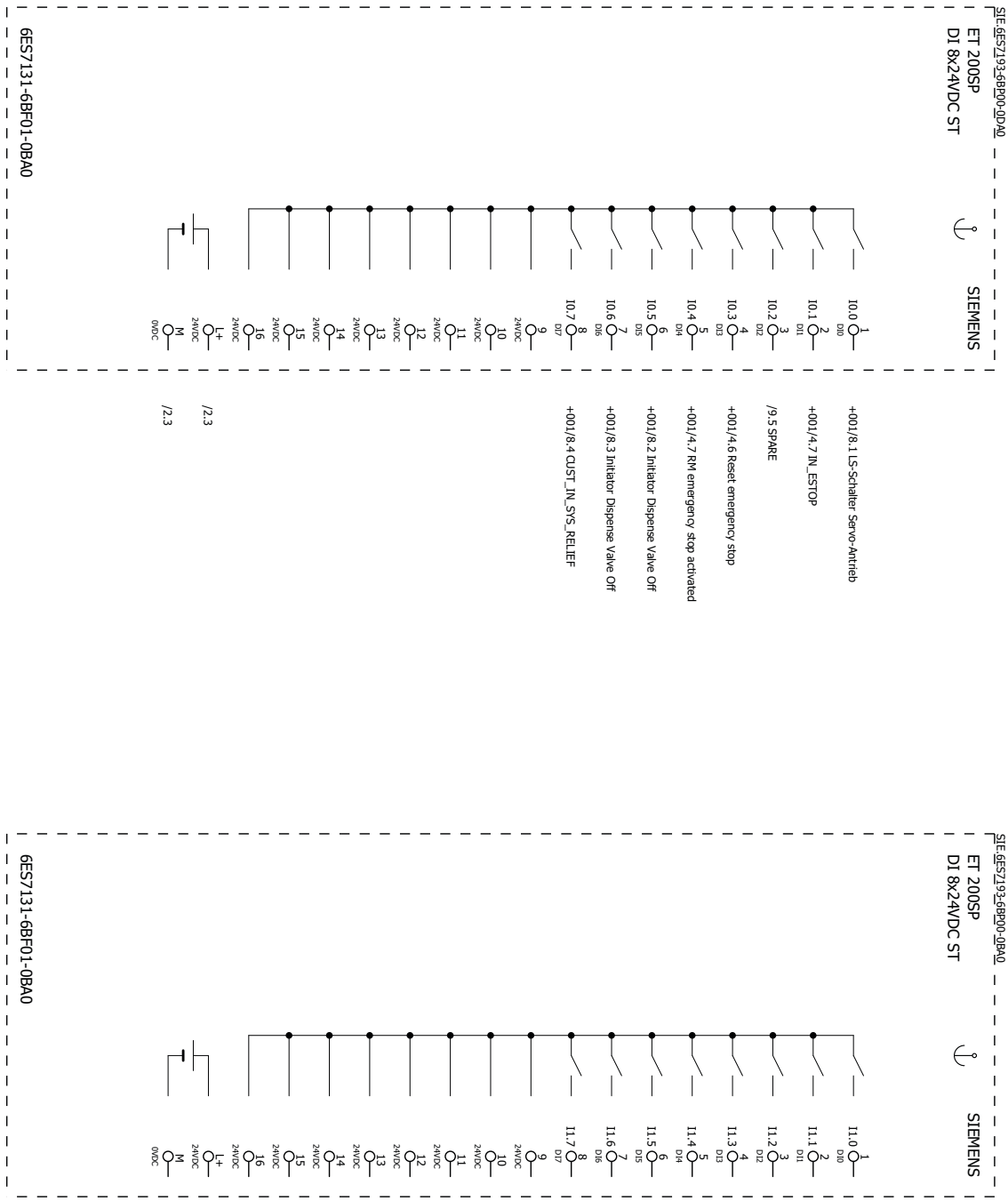
PLC


1
2
3
4
5
6
7
8
9
10
-3K1
/3.1
-4K1
/4.1
-4K5
/4.5
-5K1
/5.1
-5K5
/5.5
-6K1
/6.1
-6K5
/6.5
-7K1
/7.1
-7K5
/7.5
-8K1
/8.1
-X80
-1SX1
SIEMENS
SIMATIC
ET 200SP
CPU 1510SP F-1 PN
BA
MAC ADDRESS
PN_HMI
+001/2.1 / +001-L+9
+001/2.3 / +001-L-_9
+001/3.5 / +001-3Q1_PN1
1.3 / PN_HMI
+001/2.1 / +001-L+10
+001/2.3 / +001-L-_10
+001/2.1 / +001-L+11
+001/2.3 / +001-L-_11
+001/13.9 / +001-L+12_1
+001/2.3 / +001-L-_12
+001/2.2 / +001-L+13
+001/2.4 / +001-L-_13
+001-4K1
+001/4.9
6/T3
5/L3

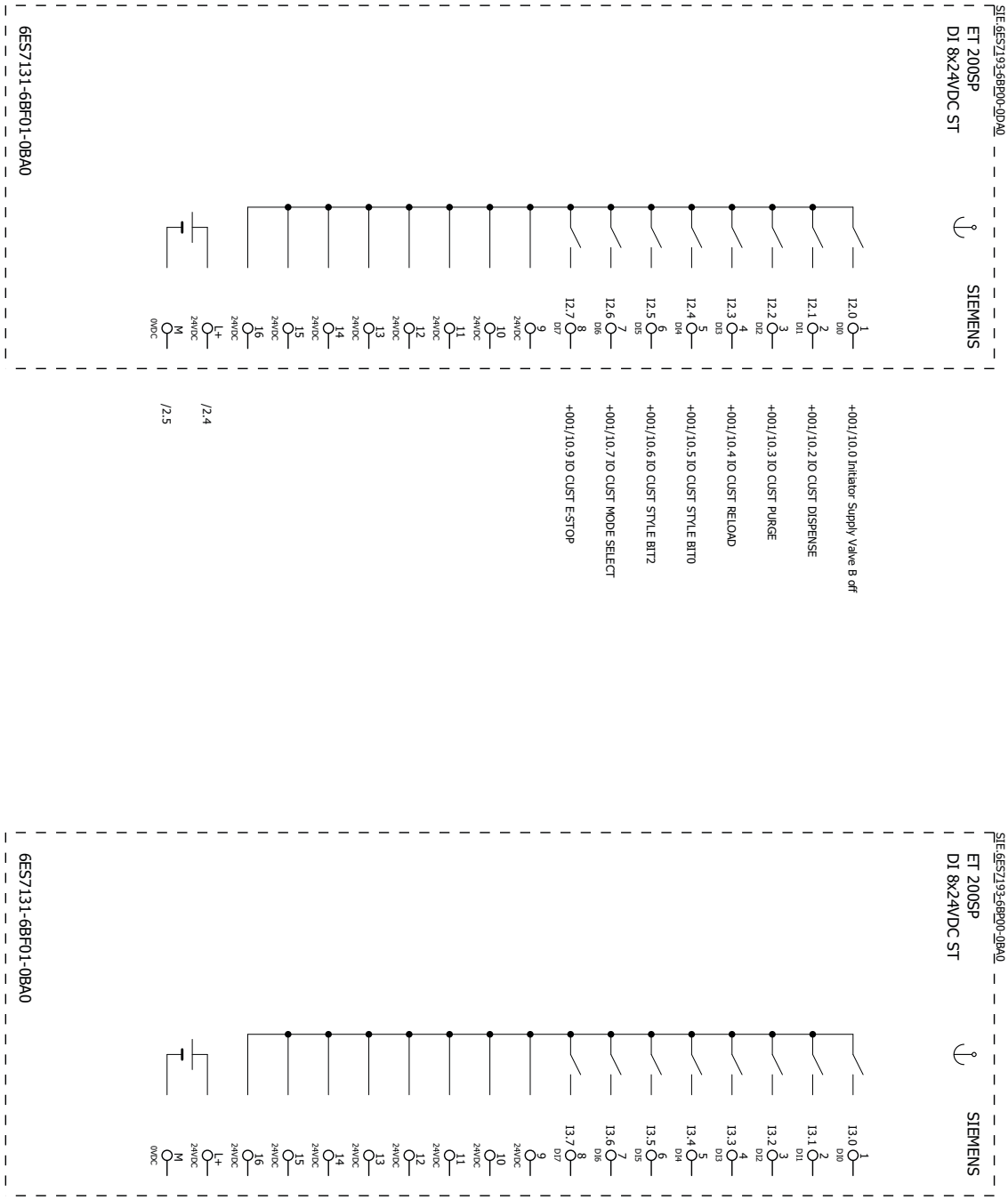
CPU


-3K1
SIE.6ES7510-1DJ01-0AB0
SIE.6ES7954-8LC03-0AA0
SIE.6ES7193-6AR00-0AA0
ET 200SP
CPU 1510SP-1 PN
SIEMENS
-K1
X1 P1 R
PN
X1 P2 R
PN
X1 P3
PN
-X80:1
1L+
-X80:2
1M
-X80:3
2M
-X80:4
2L+
/2.1
/2.1
/2.1
/2.1
6ES7510-1DJ01-0AB0

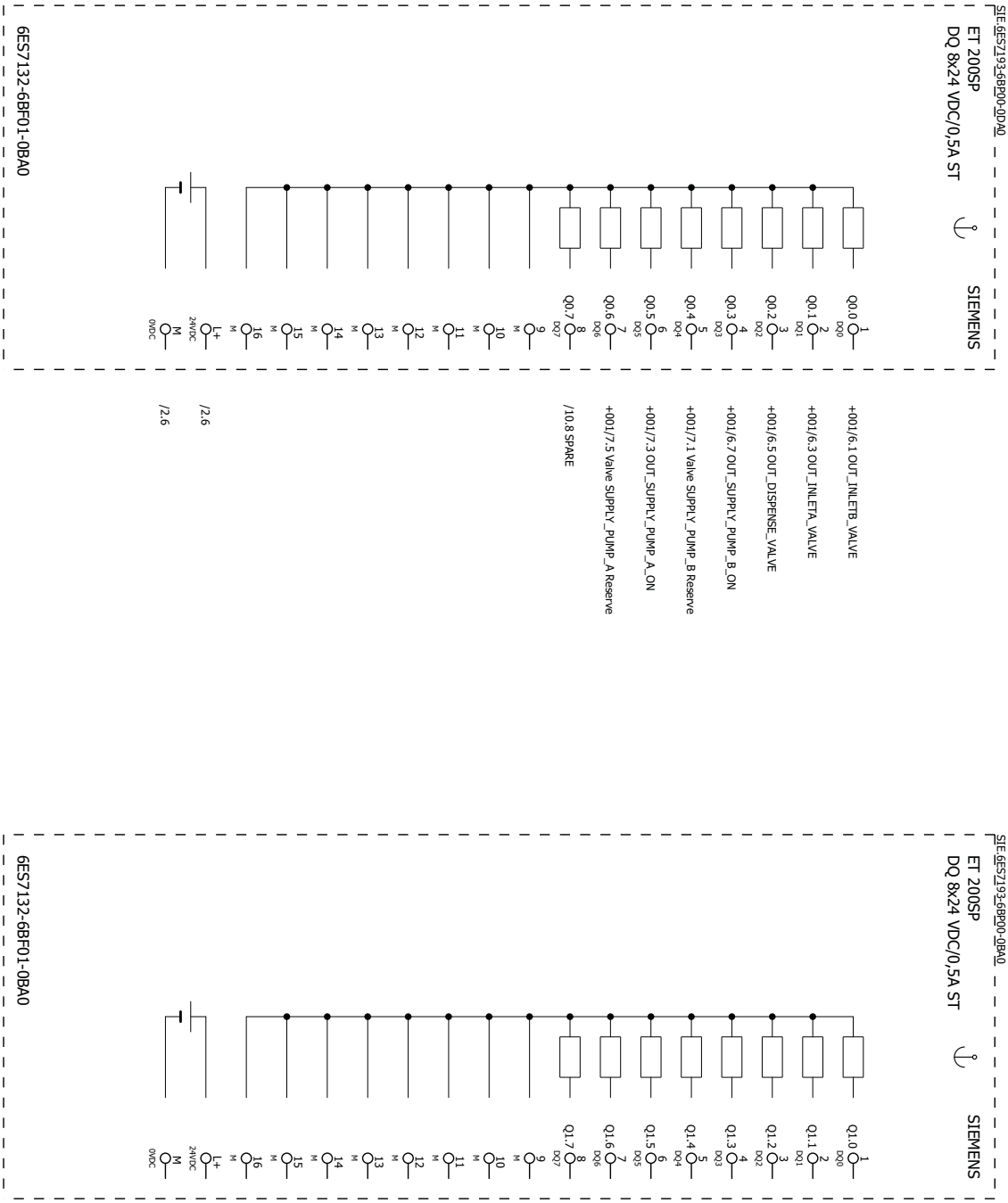
Digital Input 4K1 / 4K5



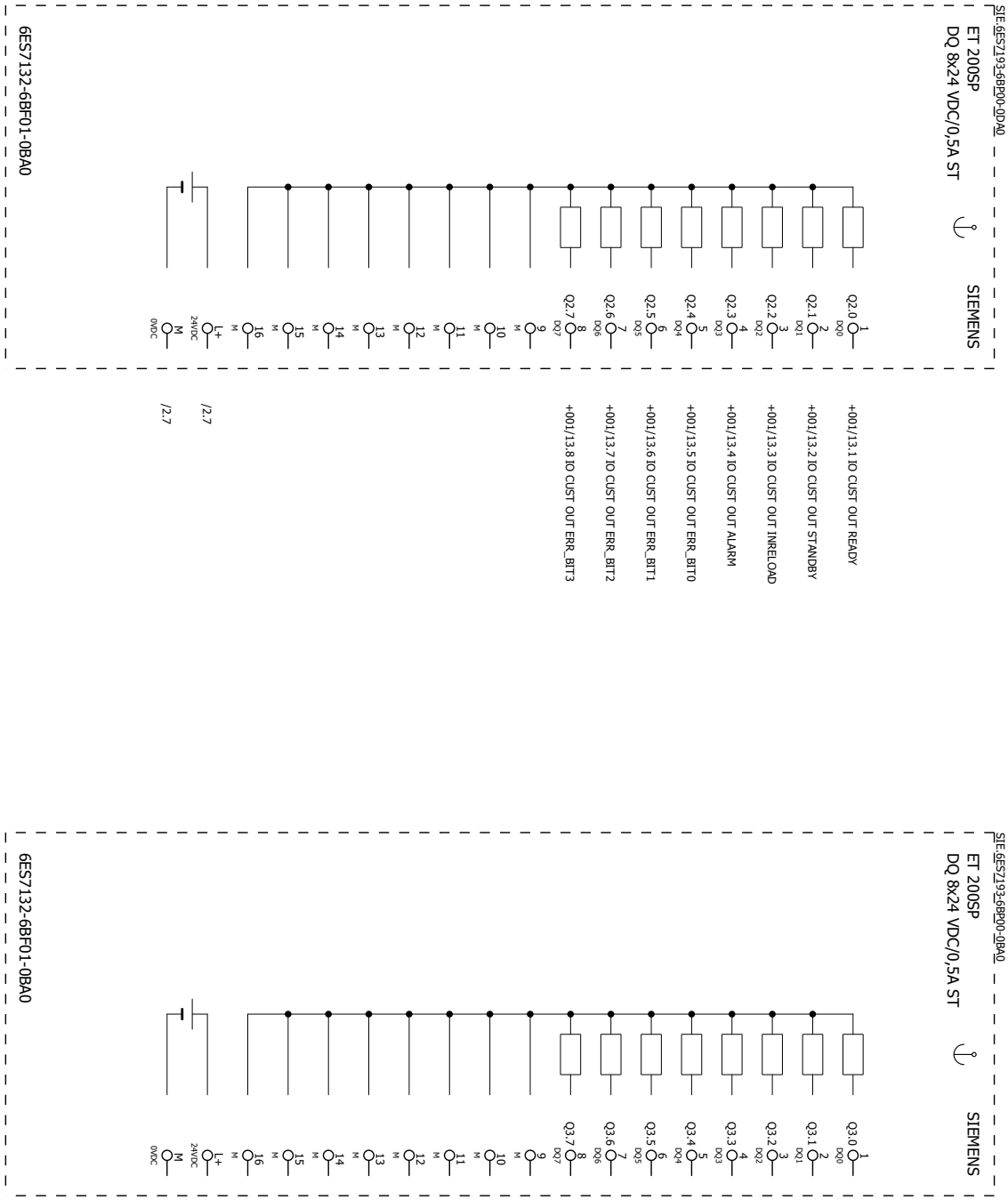
Digital Input 5K1 / 5K5



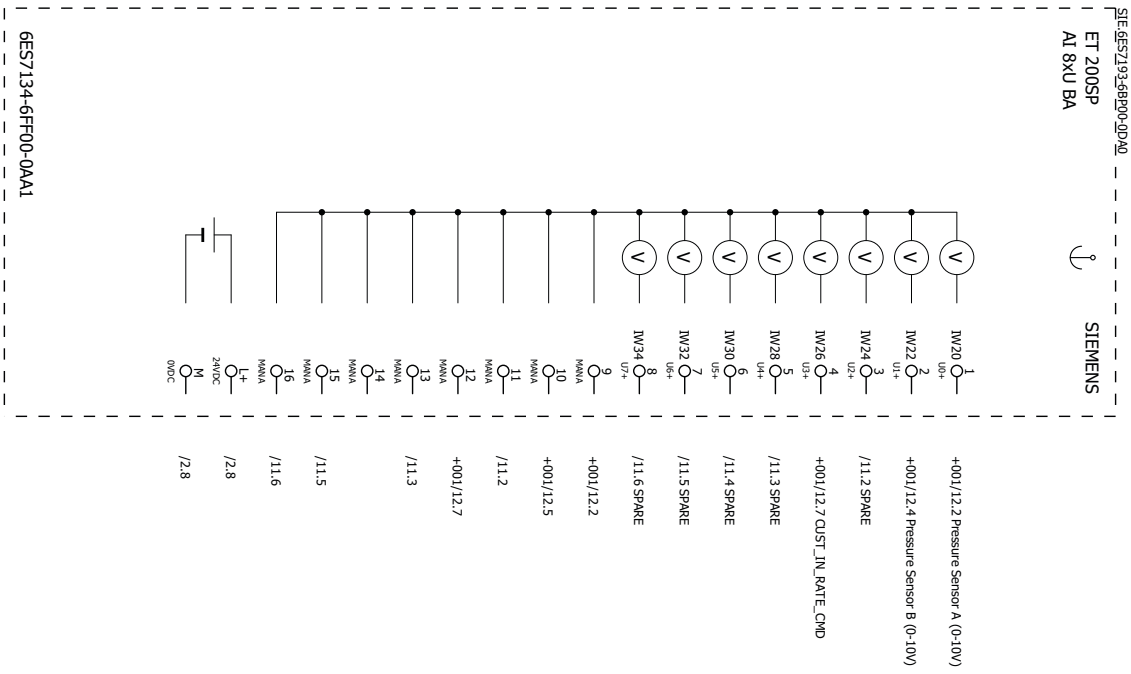
Digital Output 6K1 / 6K5



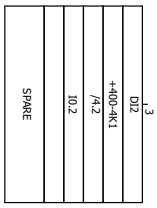
Digital Output 7K1 / 7K5



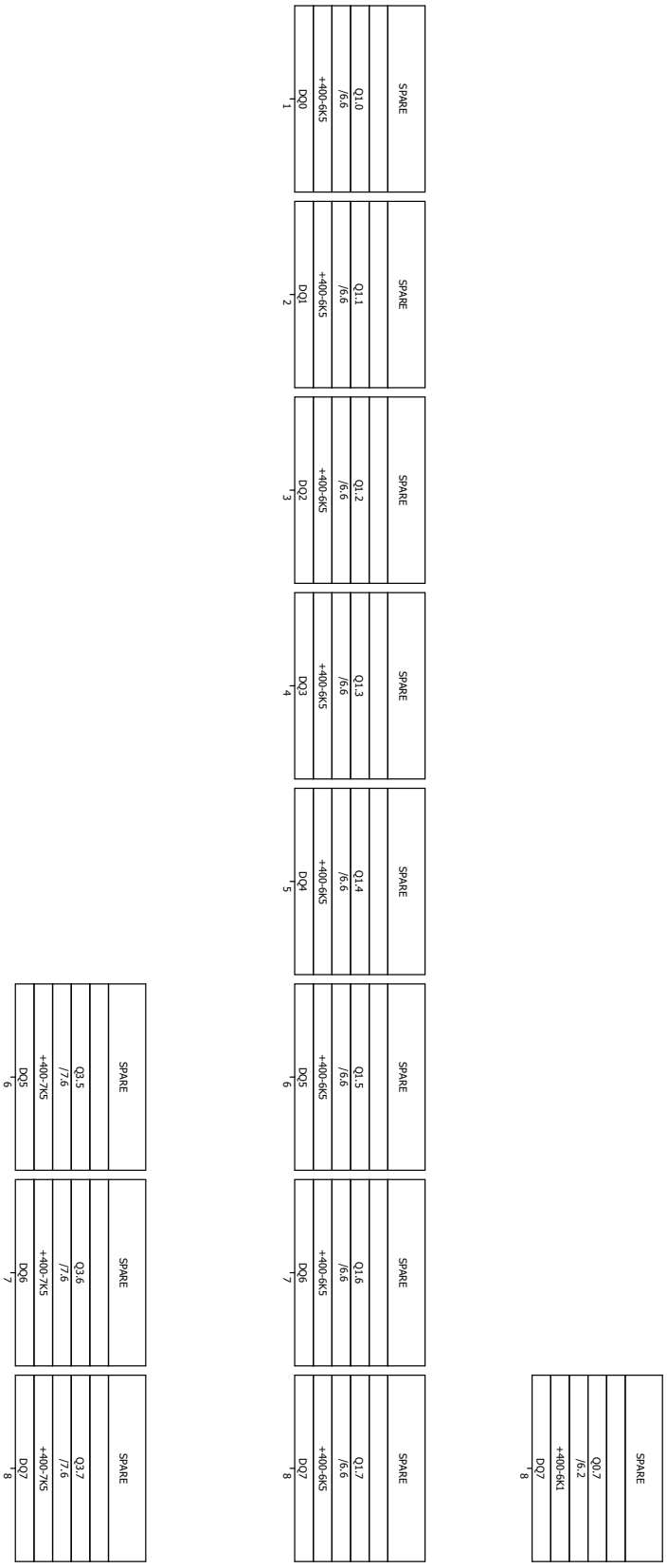
Analog Input



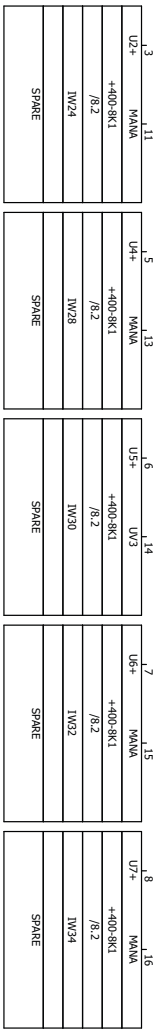
Digital Input Spare



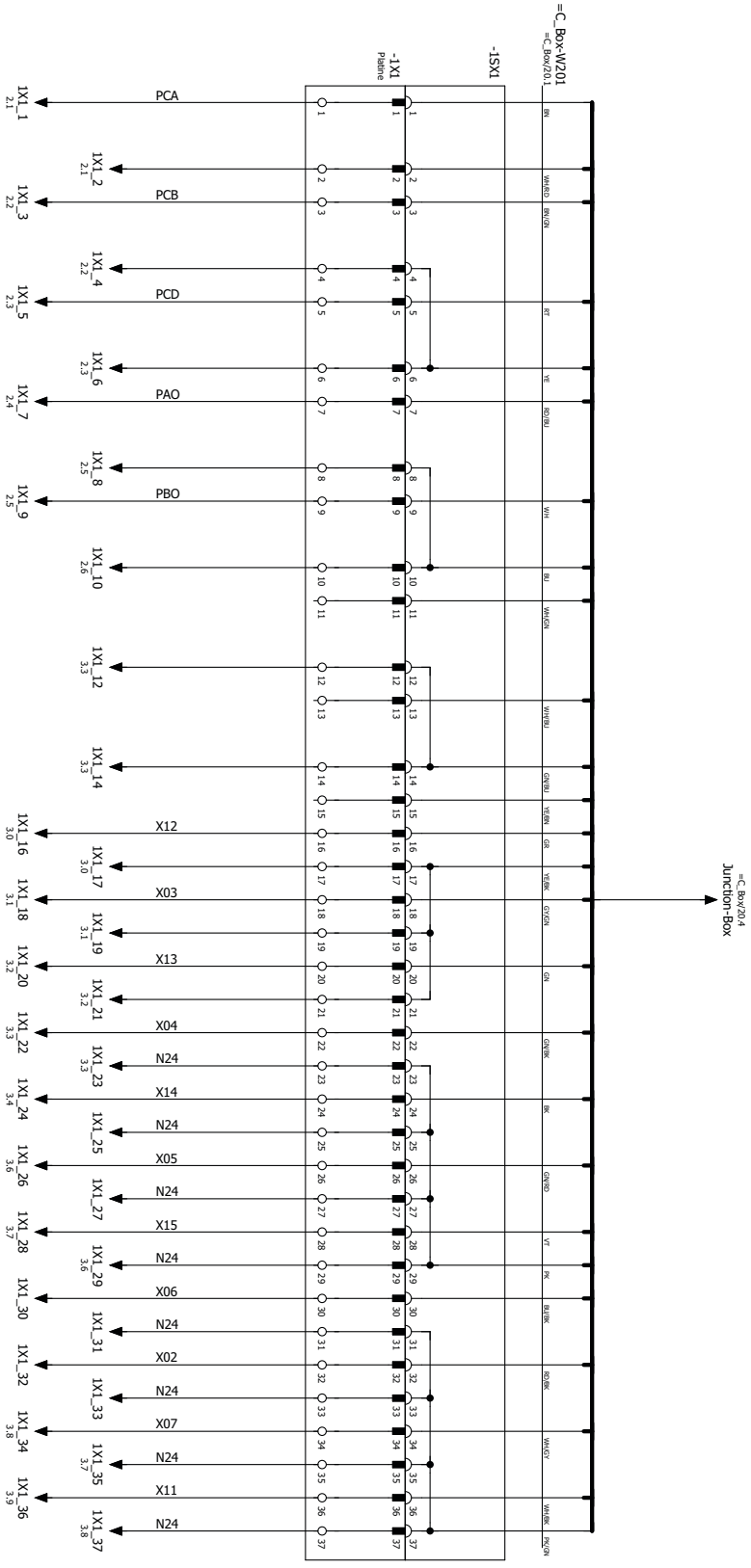
Digital Output Spare



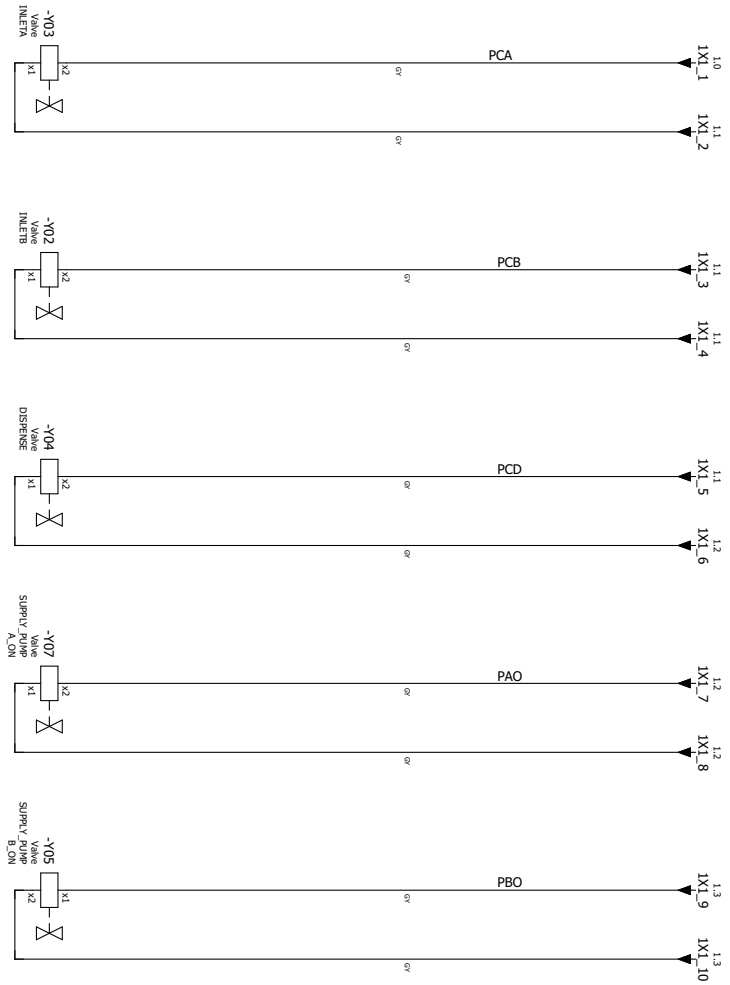
Analog Input Spare



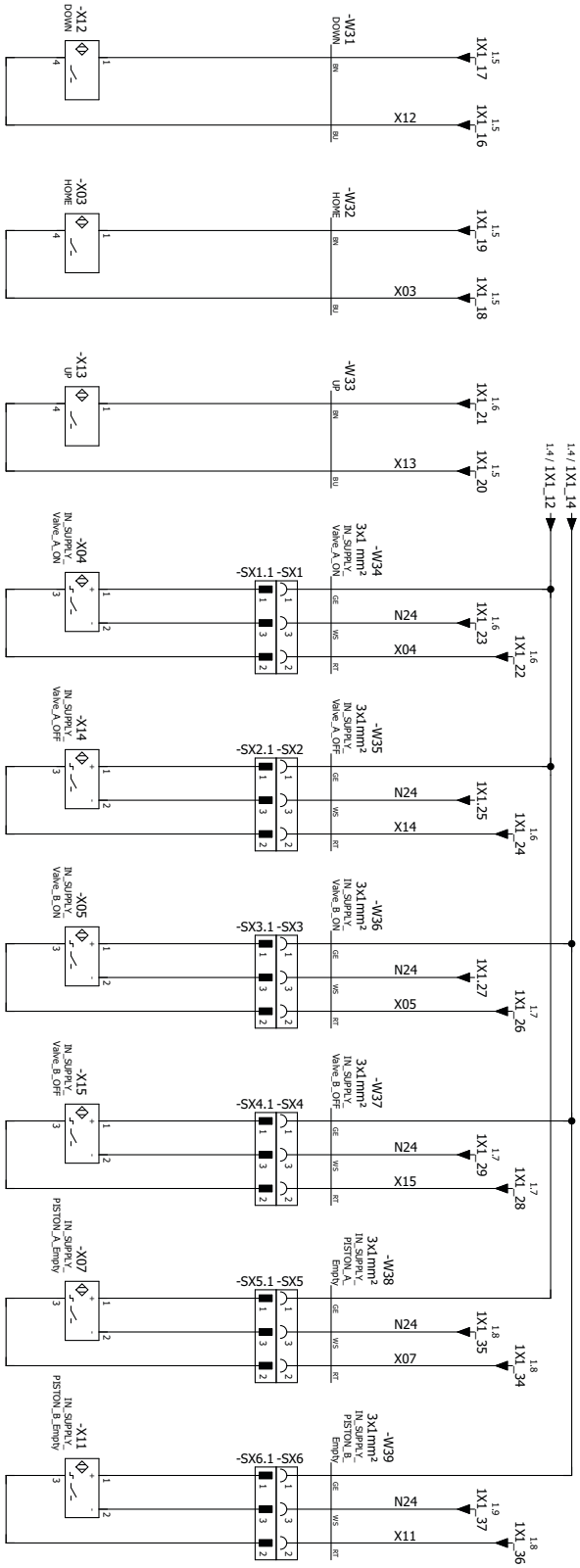
Interface C-Box - J-Box



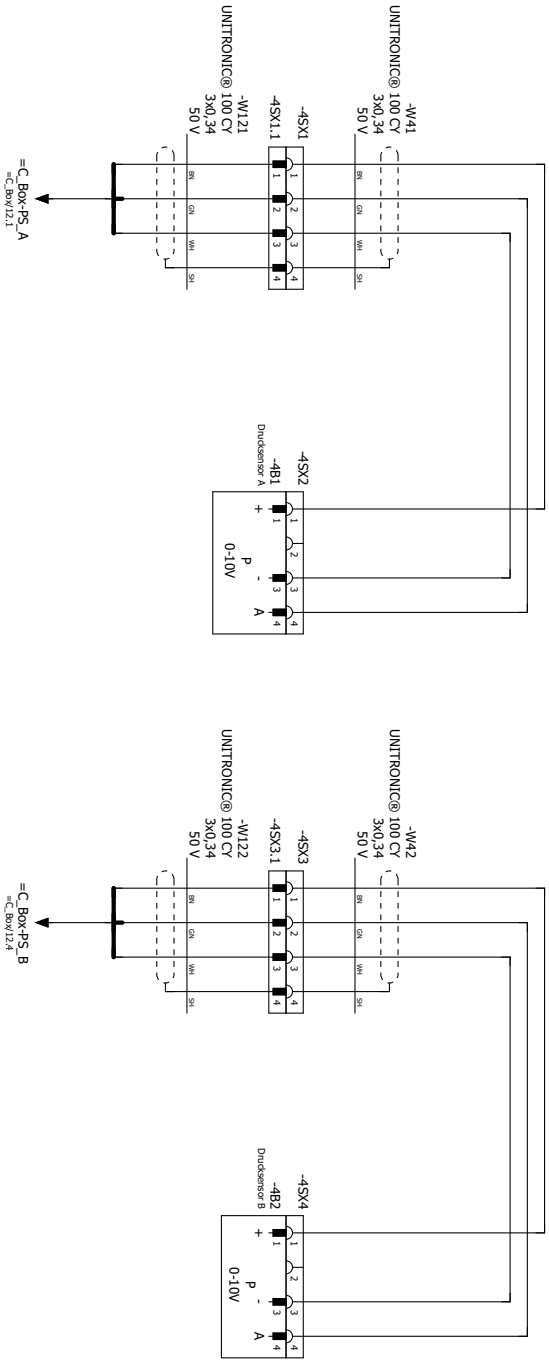
Valves J-Box


-Y03
INLET A
PCA
1X1_1
1X1_2
-Y02
INLET B
PCB
1X1_3
1X1_4
-Y04
DISPENSE
PCD
1X1_5
1X1_6
-Y07
SUPPLY PUMP A_ON
PAO
1X1_7
1X1_8
-Y05
SUPPLY PUMP B_ON
PBO
1X1_9
1X1_10

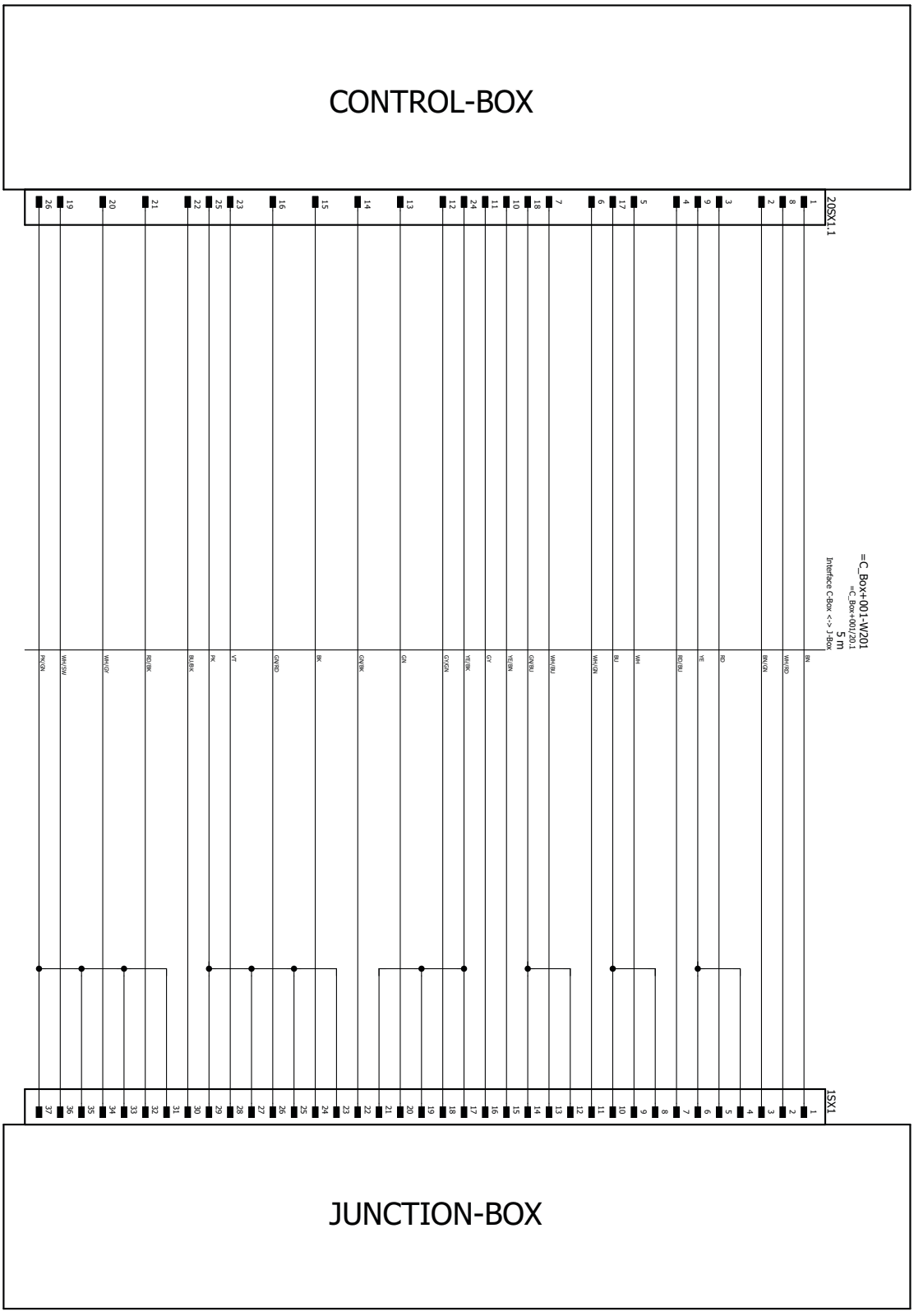
Sensor J-Box


-X12
DOWN
-W31
DOWN
1X1_17
1X1_16
X12
-X03
HOME
-W32
HOME
1X1_19
1X1_18
X03
-X13
UP
-W33
UP
1X1_21
1X1_20
X13
1.4 / 1X1_12
1.4 / 1X1_14
-X04
IN_SUPPLY_Valve_A_ON
-SX1.1 -SX1
-W34
3x1 mm²
IN_SUPPLY_Valve_A_ON
N24
X04
1X1_23
1X1_22
-X14
IN_SUPPLY_Valve_A_OFF
-SX2.1 -SX2
-W35
3x1mm²
IN_SUPPLY_Valve_A_OFF
N24
X14
1X1_25
1X1_24
-X05
IN_SUPPLY_Valve_B_ON
-SX3.1 -SX3
-W36
3x1mm²
IN_SUPPLY_Valve_B_ON
N24
X05
1X1_27
1X1_26
-X15
IN_SUPPLY_Valve_B_OFF
-SX4.1 -SX4
-W37
3x1mm²
IN_SUPPLY_Valve_B_OFF
N24
X15
1X1_29
1X1_28
-X07
IN_SUPPLY_PISTON_A_Empty
-SX5.1 -SX5
-W38
3x1mm²
IN_SUPPLY_PISTON_A_Empty
N24
X07
1X1_35
1X1_34
-X11
IN_SUPPLY_PISTON_B_Empty
-SX6.1 -SX6
-W39
3x1mm²
IN_SUPPLY_PISTON_B_Empty
N24
X11
1X1_37
1X1_36

Pressure Sensor



Connection lines C-Box <-> J-Box



Summarized Parts List

Summarized parts list

F02_006-Graco

Quantity	Order number	Type number	Designation	Manufacturer	Pos.
1	65319	65319	Adapter, D-Sub, 37-polig, Buchse mit Platine	Delock	1
1	216537	M22-12	Aufbaugehäuse, 2 Taster	Eaton	2
1	216876	M22-PV	Emergency-stop pushbutton, non-illuminated	Eaton	3
2	216382	M22-KC01	Contact element, 1 N/C, base fixing, 6. contact, screw connection	Eaton	4
3	216380	M22-KC10	Contact element, 1N/O, base fixing, 6. contact, screw connection	Eaton	5
1	216931	M22-DL-B	Illuminated pushbutton actuator, flush, blue, momentary	Eaton	6
1	218058	M22-LEDC-B	Light element, LED, blue, base fixing, 12-30VAC/DC, screw connection	Eaton	7
1	MHDM375S	MHDM375S	D-Sub Buchsenleiste, 180°, 37-polig, numerisch, Lötkontakte	MH Connectors	8
1	MHHDS26-F-T-B-S	MHHDS26-F-T-B-S	D-Sub Buchsenleiste, 180°, 26-polig, numerisch, Lötkontakte	MH Connectors	9
3	E2E-X4MD1-M1	E2E-X4MD1-M1	Inductive sensors, Compact - cylindrical, E2E	OMRON ELECTRONICS GmbH	10
1	750103	PNOZ s3 24VDC 2 n/o	Device for monitoring of safety-related circuits	Pilz GmbH & Co. KG	11
7	2966171	PLC-RSC- 24DC/21	Relay Module	Phoenix Contact	12
1	1338000	AX.1338000	Compact enclosure AX	Rittal	13
2	3237200	SK.3237200	Outlet filter	Rittal	14
1	3237124	SK.3237124	TopTherm fan-and-filter units	Rittal	15
2	5SY6106-7	5SY6106-7	CIRCUIT BREAKER 6KA 1POL C6	Siemens AG	16
1	5SY6104-7	5SY6104-7	CIRCUIT BREAKER 6KA 1POL C4	Siemens AG	17
1	5ST3010	5ST3010	AUXILLARY SWITCH 1S1OE	Siemens AG	18
1	3RH2131-1BB40	3RH2131-1BB40	CONT.RELAY;3NO+1NC;DC24V	Siemens AG	19
1	3LD2103-0TK53	3LD2103-0TK53	EM. STOP SWITCH 25A/690V 400V/9.5KW	Siemens AG	20
1	3LD9286-1A	SIE.3LD9286-1A	extra rating plate, German/English, 47 mm x 17 mm	Siemens AG	21
1	6SL3210-5FB10-4UF1	6SL3210-5FB10-4UF1	SINAMICS V90, PROFINET,1/3 AC 200V 0.4kW	Siemens AG	22
1	6EP1333-3BA10	6EP1333-3BA10	SITOP PSU200M	Siemens AG	23
1	6AV2123-2DB03-0AX0	6AV2123-2DB03-0AX0	SIMATIC HMI KTP400 BASIC	Siemens AG	24
1	6ES7510-1DJ01-0AB0	6ES7510-1DJ01-0AB0	CPU 1510SP-1 PN, 100KB Prog./750KB Data	Siemens AG	25
1	6ES7954-8LC03-0AA0	6ES7954-8LC03-0AA0	SIMATIC S7 memory card, 4 MB	Siemens AG	26
1	6ES7193-6AR00-0AA0	6ES7193-6AR00-0AA0	BA 2XRJ45	Siemens AG	27
4	6ES7131-6BF01-0BA0	6ES7131-6BF01-0BA0	ET 200SP, DI 8x 24V DC ST, PU 1	Siemens AG	28

Summarized Parts List_1

Summarized parts list

F02_006-Graco

Quantity	Order number	Type number	Designation	Manufacturer	Pos.
5	6ES7193-6BP00-0DA0	6ES7193-6BP00-0DA0	BASEUNIT TYPE A0, BU15-P16+A0+2D	Siemens AG	29
4	6ES7193-6BP00-0BA0	6ES7193-6BP00-0BA0	BASEUNIT TYPE A0, BU15-P16+A0+2B	Siemens AG	30
4	6ES7132-6BF01-0BA0	6ES7132-6BF01-0BA0	ET 200SP. DQ 8x 24V DC/0,5A ST, PU 1	Siemens AG	31
1	6ES7134-6FF00-0AA1	6ES7134-6FF00-0AA1	ET 200SP, AI 8XU BASIC	Siemens AG	32
3	7V0500M5FG	7V0500M5FG		Straubel Automation GmbH	33
5	7V0510M5B050	7V0510M5B050		Straubel Automation GmbH	34
1	SF1612/S3-1	SF1612/S3-1	Buchsenstecker, 3-polig	WEIPU Connector	35
6	SF1612/S4-1	SF1612/S4-1	Buchsenstecker, 4-polig	WEIPU Connector	36
2	SF1612/S5-1	SF1612/S5-1	Buchsenstecker, 5-polig	WEIPU Connector	37
1	SF1612/S10-1	SF1612/S10-1	Buchsenstecker, 10-polig	WEIPU Connector	38
6	SF612B/S3	SF612B/S3	Buchsenstecker, 3-polig	WEIPU Connector	39

Cable diagram =C_Box+001-W2

Cable diagram

F09_001

Cable name =C_Box+001-W2		Cable type ÖLFLEX® CLASSIC 110		No. of conductors 12G		Cross-section 1	Cable length		Function text Bedienbox
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/4.4	-4X1	1:2	1	-4A2-4S5	11	/4.4	
	/4.4	-4X1	2:2	2	-4A2-4S5	21	/4.4	
	/4.4	-4X1	3:2	3	-4A2-4S5	22	/4.4	
	/4.4	-4X1	4:2	4	-4A2-4S5	12	/4.4	
	/4.4	-4X1	5:2	5	-4A2-4S5	33	/4.4	
	/4.5	-4X1	6:2	6	-4A2-4S5	34	/4.4	
	/4.5	-4X1	7:2	7	-4A2-4S6	13	/4.5	
	/4.5	-4X1	8:2	8	-4A2-4S6	14	/4.5	
	/4.6	-4X1	10:2	9	-4A2-4S6	24	/4.6	
	/4.6	-4X1	11:2	10	-4A2-4S6	X1	/4.6	
	/4.6	-4X1	12:2	11	-4A2-4S6	X2	/4.6	
	/4.6	-4X1	PE:2	GNYE	-4A2		/4.6	

Cable diagram =C_Box+001-W31

Cable diagram

Cable name =C_Box+001-W31		Cable type		No. of conductors		Cross-section		Cable length		Function text Servo Motor
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text		
	/3.2	-3X1	1	1	-3Q1	U	/3.2			
	/3.2	-3X1	2	2	-3Q1	V	/3.2			
	/3.2	-3X1	3	3	-3Q1	W	/3.2			
	/3.3	-3X1	4	GNYE	-3Q1	PE2	/3.3			

F09_001

Cable diagram =C_Box+001-W33

Cable diagram

F09_001

Cable name =C_Box+001-W33	Cable type		No. of conductors		Cross-section	Cable length		Function text Servo Motor
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/3.2	-3X1.1	1	1	-3X1.2	2	/3.2	
	/3.2	-3X1.1	2	2	-3X1.2	3	/3.2	
	/3.2	-3X1.1	3	3	-3X1.2	4	/3.2	
	/3.3	-3X1.1	4	GNYE	-3X1.2	1	/3.3	

Cable diagram =C_Box+001-W34

Cable diagram

F09_001

Cable name =C_Box+001-W34	Cable type		No. of conductors		Cross-section	Cable length		Function text Servo Encoder
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/3.4	-3X2.1	8	BN	-3X2.2	11	/3.4	
	/3.4	-3X2.1	2	BU	-3X2.2	8	/3.4	
	/3.4	-3X2.1	4	GE	-3X2.2	9	/3.4	
	/3.4	-3X2.1	5	GN	-3X2.2	3	/3.4	
	/3.4	-3X2.1	7	GR	-3X2.2	4	/3.4	
	/3.4	-3X2.1	6	RS	-3X2.2	10	/3.4	
	/3.4	-3X2.1	1	RT	-3X2.2	1	/3.4	
	/3.4	-3X2.2	1	RT	-3X2.2	7	/3.4	
	/3.4	-3X2.1	3	VT	-3X2.2	2	/3.4	
	/3.5	-3X2.1	9	WS	-3X2.2	5	/3.5	

Cable diagram =C_Box+001-W121

Cable diagram

F09_001

Cable name =C_Box+001-W121		Cable type UNITRONIC® 100 CY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor A
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text	
				BN					
				GN					
				WH					
				YE					
				SH					

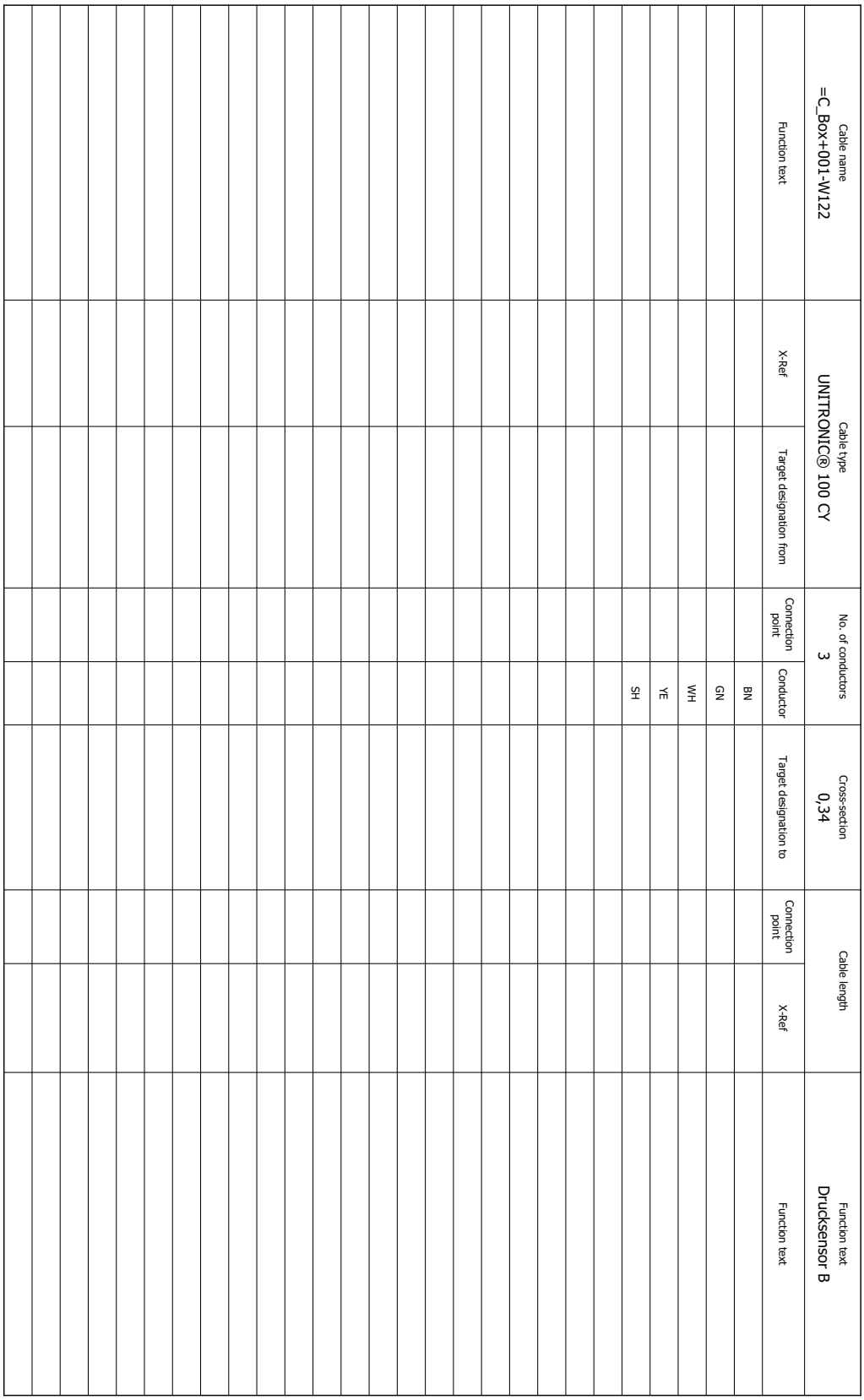
Cable diagram =C_Box+001-W121_1

Cable diagram

Cable name =C_Box+001-W121_1		Cable type UNITRONIC® LiYCY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor A
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/12.1	-12SX1	2	WH	+400-8K1	1	/12.2	Pressure Sensor A (0-10V)
	/12.1	-12SX1	1	BN	-2X1	11:3	/2.2	
	/12.1	-12SX1	3	GN	-2X1	12:2	/2.3	
				SH				
	/12.1	-12SX1	1	BN	-12SX2	1	/12.4	
	/12.1	-12SX1	3	GN	+400-8K1	9	/12.2	

F09_001

Cable diagram =C_Box+001-W122



Cable diagram =C_Box+001-W122_1

Cable diagram

Cable name =C_Box+001-W122_1		Cable type UNITRONIC® LiYCY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor B
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/12.4	-12SX2	2	WH	+400-8K1	2	/12.4	Pressure Sensor B (0-10V)
				BN				
	/12.4	-12SX2	3	GN	+400-8K1	9	/12.2	
				SH				
	/12.4	-12SX2	3	GN	+400-8K1	10	/12.5	

F09_001

Cable diagram =C_Box+001-W201

Cable diagram

F09_001

Cable name =C_Box+001-W201	Cable type		No. of conductors		Cross-section		Cable length 5		Function text Interface C-Box <-> J-Box
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text	
	=J_Box+002/1.1		15	BK		24	=J_Box+002/1.7		
	=J_Box+002/1.1		16	BK/WH		26	=J_Box+002/1.7		
	=J_Box+002/1.7		1	BN		1	=J_Box+002/1.1		
	=J_Box+002/1.1		2	BN/BK		3	=J_Box+002/1.7		
	=J_Box+002/1.7		8	BU		17	=J_Box+002/1.1		
	=J_Box+002/1.7		12	BU/BK		18	=J_Box+002/1.1		
	=J_Box+002/1.1		13	GN		20	=J_Box+002/1.7		
	=J_Box+002/1.1		14	GN/BK		22	=J_Box+002/1.7		
	=J_Box+002/1.1		11	GY		16	=J_Box+002/1.7		
	=J_Box+002/1.1		12	GY/BK		18	=J_Box+002/1.7		
	=J_Box+002/1.1		19	LBU		36	=J_Box+002/1.7		
	=J_Box+002/1.1		20	LBU/BK		34	=J_Box+002/1.7		
	=J_Box+002/1.1		7	OG		13	=J_Box+002/1.7		
	=J_Box+002/1.7		2	OG/BK		8	=J_Box+002/1.1		
	=J_Box+002/1.1		25	PK		35	=J_Box+002/1.7		
	=J_Box+002/1.7		17	PK/BK		26	=J_Box+002/1.1		
	=J_Box+002/1.7		19	PK/BK		26	=J_Box+002/1.1		
	=J_Box+002/1.1		3	RD		5	=J_Box+002/1.7		
	=J_Box+002/1.1		4	RD/BK		7	=J_Box+002/1.7		
	=J_Box+002/1.1		21	TK		32	=J_Box+002/1.7		
	=J_Box+002/1.1		22	TK/BK		30	=J_Box+002/1.7		
	=J_Box+002/1.1		23	VT		28	=J_Box+002/1.7		
	=J_Box+002/1.1		24	VT/BK		27	=J_Box+002/1.7		
	=J_Box+002/1.1		5	WH		9	=J_Box+002/1.7		
	=J_Box+002/1.1		6	WH/BK		11	=J_Box+002/1.7		
	=J_Box+002/1.7		4	YE		9	=J_Box+002/1.1		
	=J_Box+002/1.1		10	YE/BK		15	=J_Box+002/1.7		

Cable diagram =J_Box+001-W31

Cable diagram

Cable name =J_Box+001-W31	Cable type		No. of conductors		Cross-section	Cable length		Function text DOWN
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/1.5	-1X1		BN	-X12	1	/3.0	DOWN
	/1.5	-1X1		BU	-X12	4	/3.0	=

F09_001

Cable diagram =J_Box+001-W32

Cable diagram

F09_001

Cable name =J_Box+001-W32	Cable type		No. of conductors		Cross-section	Cable length		Function text HOME
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/1.5	-1X1		BN	-X03	1	/3.1	HOME
	/1.5	-1X1		BU	-X03	4	/3.1	=

Cable diagram =J_Box+001-W33

Cable diagram

Cable name =J_Box+001-W33	Cable type		No. of conductors		Cross-section	Cable length		Function text UP
Function text	Target designation from	X-Ref	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	-1X1	/1.9		BN	-X13	1	/3.2	UP
	-1X1	/1.5		BU	-X13	4	/3.2	=

F09_001

Cable diagram =J_Box+001-W34

Cable diagram

F09_001

Cable name =J_Box+001-W34	Cable type		No. of conductors 3		Cross-section 1 mm²	Cable length		Function text IN_SUPPLY_ Valve_A_ON
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/3.3	-SX1	1	GE	-1X1		/1.4	
	/3.3	-SX1	1	GE	-SX2	1	/3.4	
	/3.3	-SX1	2	RT	-1X1		/1.6	
	/3.3	-SX1	3	WS	-1X1		/1.6	

Cable diagram =J_Box+001-W35

Cable diagram

F09_001

Cable name =J_Box+001-W35	Cable type		No. of conductors 3		Cross-section 1mm²		Cable length		Function text IN_SUPPLY_Valve_A_OFF
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text	
	/3.4	-SX2	1	GE	-SX5	1	/3.7		
	/3.4	-SX2	2	RT	-1X1		/1.6		

Cable diagram =J_Box+001-W36

Cable diagram

F09_001

Cable name =J_Box+001-W36	Cable type		No. of conductors 3		Cross-section 1mm²		Cable length		Function text IN_SUPPLY_ Valve_B_ON
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text	
	/3.5	-SX3	1	GE	-1X1		/1.4		
	/3.5	-SX3	1	GE	-SX4	1	/3.6		
	/3.6	-SX3	2	RT	-1X1		/1.7		

Cable diagram =J_Box+001-W37

Cable diagram

Cable name =J_Box+001-W37		Cable type		No. of conductors 3		Cross-section 1mm²		Cable length		Function text IN_SUPPLY_ Valve_B_OFF
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
	/3.6	-SX4	1	GE	-SX6	1	/3.8	
	/3.7	-SX4	2	RT	-1X1		/1.7	
	/3.6	-SX4	3	WS	-1X1		/1.7	

F09_001

Cable diagram =J_Box+001-W38

Cable diagram

F09_001

Cable name =J_Box+001-W38	Cable type		No. of conductors 3		Cross-section 1mm²		Cable length		Function text IN_SUPPLY_ PISTON_A_ Empty
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref		Function text
	/3.8	-SX5	2	RT	-1X1		/1.8		
	/3.7	-SX5	3	WS	-1X1		/1.8		

Cable diagram =J_Box+001-W39

Cable diagram

Cable name =J_Box+001-W39		Cable type		No. of conductors 3		Cross-section 1mm²		Cable length		Function text IN_SUPPLY_ PISTON_B_ Empty
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text		
	/3.9	-SX6	2	RT	-1X1		/1.8			
	/3.8	-SX6	3	WS	-1X1		/1.6			

F09_001

Cable diagram =J_Box+001-W41

Cable diagram

Cable name =J_Box+001-W41	Cable type UNITRONIC® 100 CY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor A
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
				BN				
	/4.1	-4SX1	2	GN	-4SX2	4	/4.3	
	/4.1	-4SX1	3	WH	-4SX2	3	/4.3	
				YE				
				SH				
	/4.1	-4SX1	1	BN	-4SX2	1	/4.3	

F09_001

Cable diagram =J_Box+001-W42

Cable diagram

Cable name =J_Box+001-W42		Cable type UNITRONIC® 100 CY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor B
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
				BN				
	/4.5	-4SX3	2	GN	-4SX4	4	/4.7	
	/4.5	-4SX3	3	WH	-4SX4	3	/4.7	
				YE				
				SH				
	/4.5	-4SX3	1	BN	-4SX4	1	/4.7	

F09_001

Cable diagram =J_Box+001-W121

Cable diagram

F09_001

Cable name =J_Box+001-W121		Cable type UNITRONIC® 100 CY		No. of conductors 3		Cross-section 0,34		Cable length		Function text Drucksensor A
Function text		X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref		Function text
					BN					
					GN					
					WH					
					YE					
					SH					

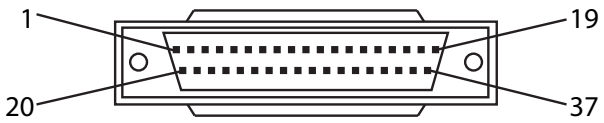
Cable diagram =J_Box+001-W122

Cable diagram

F09_001

Cable name =J_Box+001-W122	Cable type UNITRONIC® 100 CY		No. of conductors 3		Cross-section 0,34	Cable length		Function text Drucksensor B
Function text	X-Ref	Target designation from	Connection point	Conductor	Target designation to	Connection point	X-Ref	Function text
				BN				
				GN				
				WH				
				YE				
				SH				

I/O signals



No.	Signal Style	I/O Pin No.	Mark	Color	Signal Name
1	Input	15	X32	Black	JOB_START
2		10	X20	Black Yellow	DISPENSE*
3		14	X22	Green Black	RELOAD
4		12	X21	Grey Black	PURGE
5		11	X30	Grey	E_STOP
6		13	X31	Green	REMOTE_RST
7		30	X26	Orange Blue	SYS_RELIEF
8		32	X27	Green Blue	SUPPLY_STOP
9		28	X25	Red Blue	MODE_SELECT
10		16	X23	Black White	STYLE BIT0
11		17	X33	Blue	STYLE BIT1
12		26	X24	Pink Black	STYLE BIT2
13		25	X34	Pink	STYLE BIT3
14		18	P24	Blue White	Input Common
15	Analog Input	33	V4+	Purple White	RATE_CMD+
16		34	V4-	Purple Blue	RATE_CMD-
17	Output	1	31	Brown	READY
18		2	32	Brown Black	STANDBY
19		3	33	Red	INRELOAD
20		4	34	Red Black	ALARM
21		5	35	White	ERR_BIT0
22		6	36	Brown White	ERR_BIT1
23		7	37	Orange	ERR_BIT2
24		8	38	Orange Black	ERR_BIT3
25		9	30	Yellow	Output Common
26		19	39	Light Blue	ERR_BIT4
27		20	40	Light Blue Black	INDISPENSE
28		21	41	Light Green	IN_JOB
29		22	42	Light Green Black	RELOAD_REQUEST

* The Start Signal Connection (BJ) is only connected to the "Start" signal, and its logic function is the same as the "Dispense" signal of the Remote I/O Connection (BC).

Profinet Map

Controller input from PLC output

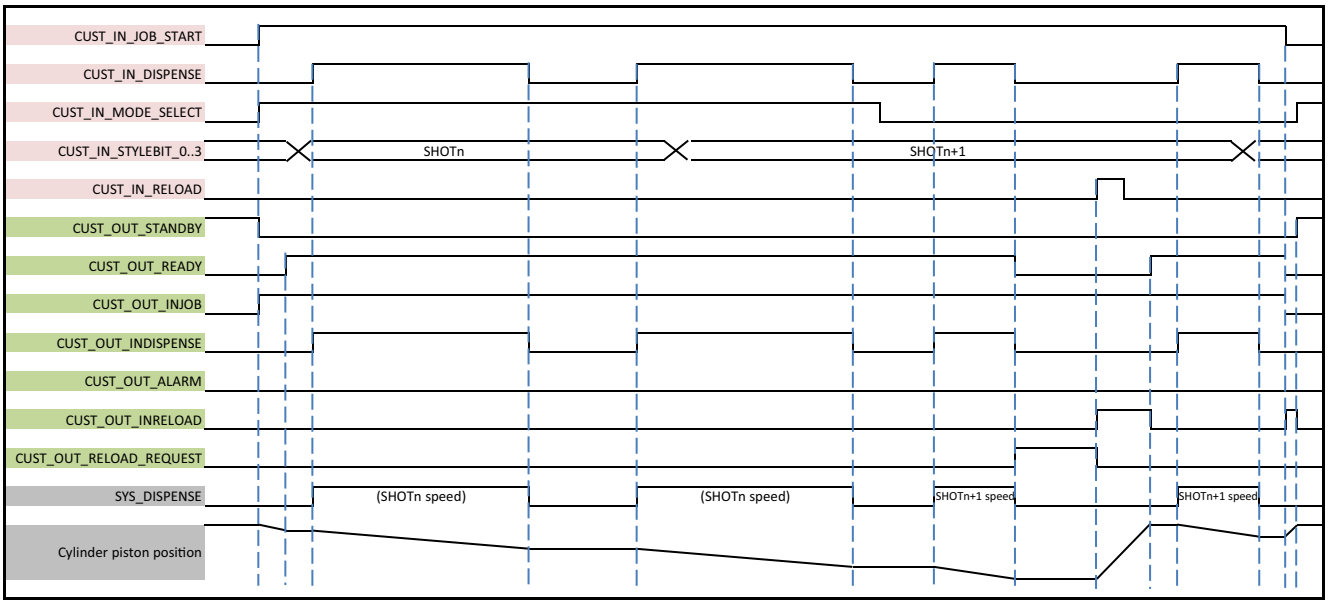
Name	Units		In Byte	Description
GATE_IN_CMD_BITS	0	JOB_START	1	Used to start job
	1	DISPENSE		Used to dispense in bead mode or shot mode
	2	RELOAD		Used to reload material
	3	PURGE		Used to purge
	4	REMOTE_RESET		Used to reset error
	5	MODE_SELECT		Used to set control mode in automatic 0 means shot mode 1 means bead mode
	6	SYS_RELIEF		Used to open dispense valve and relief pressure in metering system
	7	SUPPLY_STOP		Used to stop cartridge material supply
GATE_IN_NOTUSED			2	Not Used
GATE_IN_STYLE_NO			3-4	0-15, used to select style
GATE_IN_RATE_CMD			5-6	0-5000, used to control the dispense flowrate

Controller output to PLC input

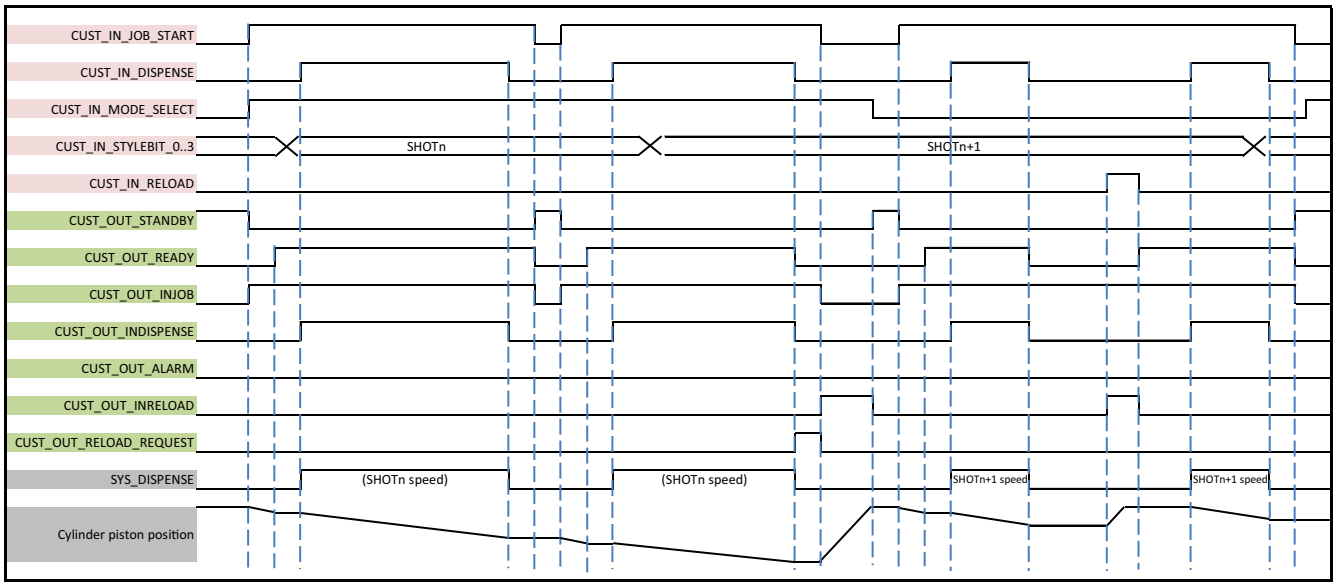
Name	Units		In Byte	Description
GATE_OUT_STATUS_0	0	READY	1	
	1	INDISPENSE		
	2	COMPLETED		
	3	INRELOAD		
	4	PURGE_REQUEST		
	5	RELOAD_REQUEST		
	6	ALARM		
	7	STANDBY		
GATE_OUT_STATUS_1	0	INJOB	2	
	1	INPURGE		
GATE_OUT_ERR_CODE			3-4	
GATE_OUT_DISP_VOL			5-6	Integer, should multiply by 0.1, unit is cc
GATE_OUT_JOB_VOL			7-8	Integer, should multiply by 0.1, unit is cc
GATE_OUT_DISP_RATE			9-10	Integer, should multiply by 0.1, unit is cc
GATE_OUT_PRESS_A			11-12	Integer, unit is psi
GATE_OUT_PRESS_B			13-14	Integer, unit is psi
GATE_OUT_MTR_TRQ			15-16	Integer, should multiply by 0.001, unit is NM
GATE_OUT_DISP_RATIO			17-18	Integer, should multiply by 0.01

Timing Chart

Reload after each job



Reload after multi job



Technical Specifications

PR-X System		
	US	**Metric**
Maximum Inlet Fluid Pressure	1200 psi	8.3 MPa, 83 bar
Maximum Working Fluid Pressure	1200 psi	8.3 MPa, 83 bar
Maximum Air Pressure	100 psi	0.7 MPa, 7 bar
Electrical Power	200 - 240 VAC, 50/60 Hz, 16 A	
Viscosity Range	20 - 1,000,000 cps	
Wetted Parts	303/304 Stainless Steel, Hard Chrome, Ceramic, UHMWPE, NBR, Carbon Steel, PTFE	
Shot Size Range	0.03 - 50 cc	
Shot Size Repeatability	1 %	
Flowrate	0.01 - 24.9 cc/s (Depend on material viscosity)	
Material Ratio	1:1[(1)]	
Inlet / Outlet Sizes		
Air Inlet size	1/4 in.	6 mm
Fluid Inlet size	1/4 in. npt (f)	
Fluid Outlet size	7/8-9 bell outlet	
Weight		
Supply Pump Feed	35 lb	16 kg
Cartridge Feed	70 lb	32 kg
Maximum Operating Temperature		
UHMWPE Pistons	120 °F	50 °C
PEEK Bearings	300 °F	150 °C
Notes		
All trademarks or registered trademarks are the property of their respective owners.		

[(1)] All PR-X systems are 1:1 fixed ratio systems. If you want to order other ratio systems (1:1 - 2.4:1), please contact Graco sales representative for a custom solution.

California Proposition 65

CALIFORNIA RESIDENTS

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

Graco Standard Warranty

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

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

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

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Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

GRACO INC. AND SUBSIDIARIES • P.O. BOX 1441 • MINNEAPOLIS MN 55440-1441 • USA

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