

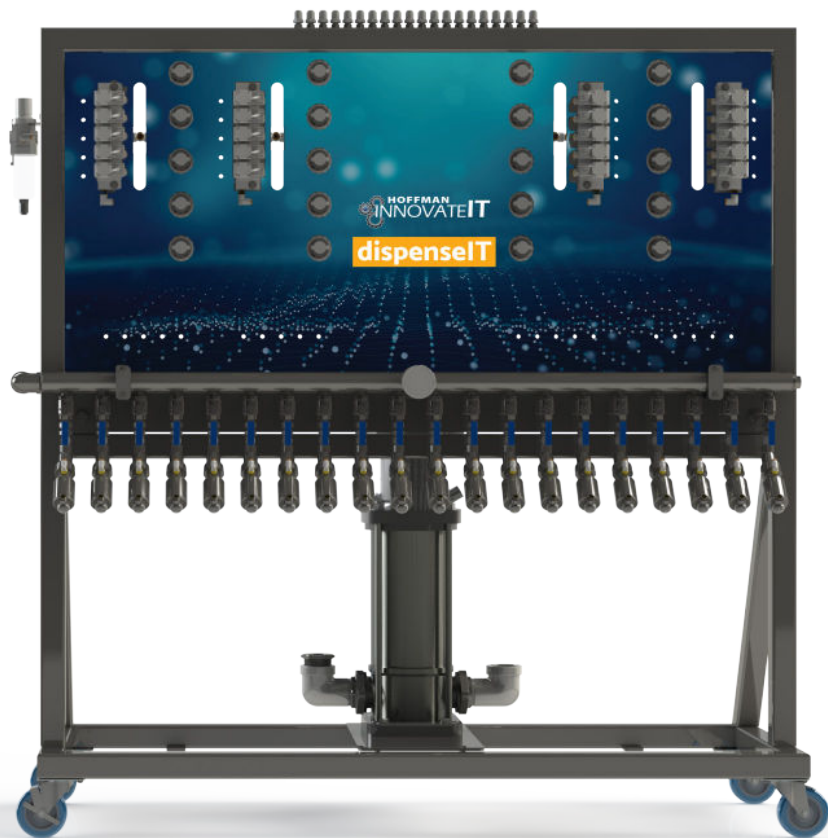


dispenseIT

C H E M I C A L D E L I V E R Y S Y S T E M

Instruction Manual

V 2.0, 10-31-24



For Further Assistance Please Contact
innovateIT Car Wash Equipment LLC
518-741-4200 option 2
support@innovateITcarwash.com

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Introduction

1. Introduction

The manufacturer innovateIT Car Wash Equipment LLC is committed to the continuous improvement of its equipment construction quality and the safe operation of its equipment.

1.1 Warranty

This manual covers the installation, intended use, and maintenance of the dispenseIT Chemical Delivery System. Misuse or improper operation of this device will void the manufacturer's warranty.

The dispenseIT is covered by a 1-year limited warranty from the date of shipment. This warranty shall be void and of no effect if:

1. Any installation defect that was apparent or ascertainable at the time of installation was completed but was not promptly reported to innovateIT Car Wash Equipment LLC.
2. Damage occurs due to the customer's failure to observe any instructions from innovateIT Car Wash Equipment or an authorized distributor and/or requirements of the manufacturer with respect to the product.
3. The breach results from misuse of the equipment as outlined in the instruction manual.

When purchasing through a distributor, please ask about their warranty coverage on the unit.

1.2 Safety Information

The instructions in this manual provide you with the information necessary to install and operate the dispenseIT. Before starting installation, the instruction manual should be carefully read and understood. This relates to all dispenseIT documents from innovateIT Car Wash Equipment.

The basic pre-requisite for safe working is compliance with all the safety and handling instructions stated in this manual. Furthermore, follow all local accident, hazard prevention regulations or general safety regulations when installing and operating the dispenseIT.

The equipment's operation, maintenance, and troubleshooting must only be carried out by trained personnel. Personnel should be able to interpret a wiring diagram, use a multimeter to read AC and DC power, and apply Lock Out Tag Out (LOTO) safety procedures specific to the equipment.

Electrical installation must adhere to local codes and the National Electrical Code, ANSI/NFPA 70 for electrical wiring. To avoid electrical shock hazards, do not operate this device when controller enclosures are open and energized. Electrical power must be shut off and a lock-out procedure utilized to ensure all electrical power is disabled before performing maintenance to any portion of the system.

Plumbing installation must adhere to a local code and Uniform Plumbing Code (UPC), and plumbing connections and drains must adhere to local standards and facility codes.

Do not remove any Caution, Warning, or any other descriptive labels from the dispenseIT. Do not operate this device in an explosive environment or in the presence of flammable materials.

Movement or vibrations during shipment may cause connections to loosen. Check all connections before starting up a unit.

This unit's electrical enclosure is intended for installation in ordinary locations, by the National Electrical Code, ANSI/NFPA 70, where the ambient temperature does not exceed 104°F maximum.

innovateIT Car Wash Equipment LLC does not accept liability for accidents or damages due to negligence or disregard for the instructions in this manual. Also, the Company does not accept liability for damages due to improper use of the equipment.

This instruction manual should always be kept in a safe and easily accessible place near the equipment's site of installation and operation, and be available for the operator at the user site at any time.

If the manual is damaged, lost, or misplaced, you should immediately request a new copy from innovateIT Car Wash Equipment LLC.

1.2.1 Notifications & Symbols



DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

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



CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTE

NOTE is used to address practices not related to physical injury.

System Overview

2. System Overview

The dispenseIT Chemical Delivery System is a reliable, automated chemical delivery solution designed to ensure precise and consistent mixing and application of cleaning chemicals in car wash systems. Its primary function is to automate the accurate dilution and distribution of chemicals, ensuring optimal performance for a wide variety of car wash applications.

By using controlled solenoids and a highly efficient siphoning mechanism, the dispenseIT delivers the correct chemical concentration at precise intervals, reducing chemical waste and improving wash quality. The system integrates easily with a car wash's existing control infrastructure and can be tailored to different setups through adjustable components, ensuring flexibility for any wash size or configuration.

2.1 Features & Functions

innovateIT Car Wash Equipment LLC has developed the dispenseIT system as a reliable and precise chemical delivery solution designed to streamline the mixing and application of cleaning chemicals in car wash systems.

The dispenseIT uses Dema Rocket Injectors to accurately mix chemicals with water. The injectors create a siphon effect as water flows through them at high pressure, drawing the chemical from its container and mixing it with water. Adjustable dilution tips control the chemical-to-water ratio, ensuring accurate chemical dosing for each application.

All valves can be individually isolated, allowing the operator to repair or replace individual components or functions for maintenance or troubleshooting without shutting down the entire system. This improves efficiency and reduces downtime during repairs.

The system includes a Grundfos variable frequency drive (VFD) pump, which provides precise control over water flow and pressure. This allows for energy-efficient operation and consistent chemical delivery even under varying load conditions.

Additionally, the dispenseIT features an integrated electrical enclosure that houses the controls for both the chemical delivery system and the Grundfos pump. This enclosure simplifies installation and ensures that all electrical components are safely contained and protected, meeting local electrical codes.

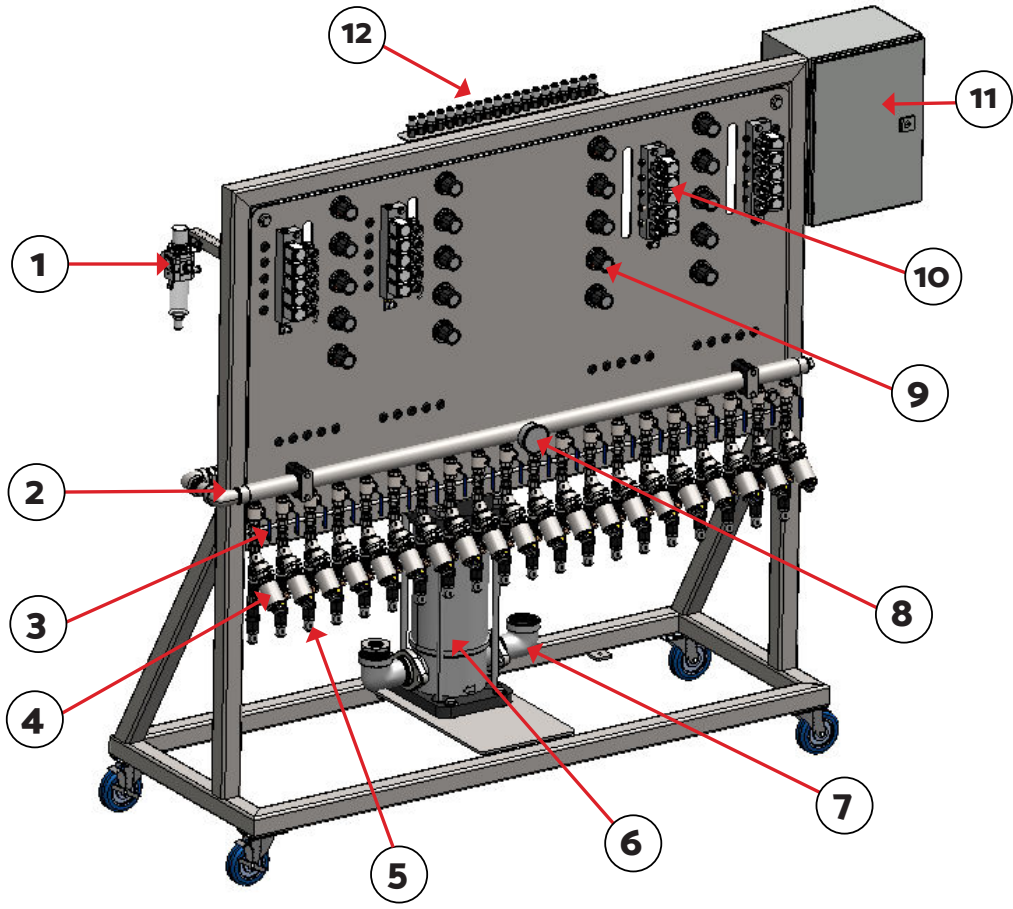


Fig. 2.1 - 1 - dispenseIT identification

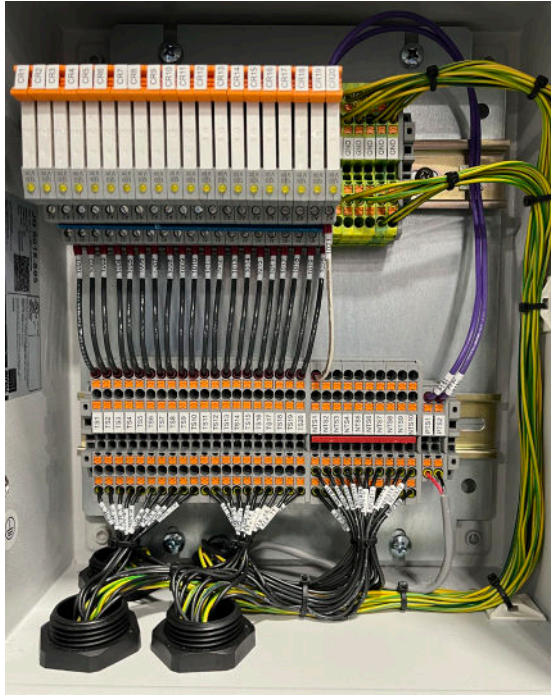


Fig. 2.1 - 2 - dispenseIT electrical enclosure

Table 2.1 - 1 - dispenseIT component features and functions

#	Component	Features/Functions
1	Main Air Regulator	- Adjusts system air pressure for appropriate valve operation
2	Manifold	- Supplies process water to function valves
3	Isolation Valves	- Allows individual functions to be isolated during maintenance or troubleshooting without shutting down the entire system
4	Process Valves/Solenoids	- Air operated valve to regulate the flow of process water
5	DEMA Rocket Injectors	- Creates a siphon effect to accurately mix chemicals with water, controlled by adjustable dilution tips for precise chemical concentration
6	Grundfos VFD Pump	- Provides controlled water flow and pressure with energy-efficient operation, ensuring consistent chemical delivery under various conditions
7	Main Water Inlet	- Entry point for site water supply
8	Mainfold Pressure Gauge	- Mechanical gauge to show live manifold water pressure
9	Foam Air Regulators	- Allows individual function foam air control
10	Air Manifold and Solenoids	- Controls flow of air for foam regulators and process valves
11	Electrical Enclosure	- Customer connection point for function control signals
12	Foaming Air Output To Tunnel	- Connection point for foam applicator process air

2.2 System Specifications

Table 2.2 - 1 - dispenseIT specifications

Pump Output	5 HP - 30 GPM @ 200 psi 7.5 HP - 40 GPM @ 200 psi
Solution Output (Flow Rates)	0.3-15 GPM @ 200 psi
Voltage (Pump)	208VAC / 3PH 480VAC / 3PH
Max Current (Pump)	17 A (208) 11 A (480)
Power Requirement (Controls)	24VAC - 0.3 A per function 120VAC - 0.1 A per function
Air Supply [^]	2 SCFM @ 80-100 psi
Air Connection	3/8 Poly tube
Water Connections	2" FNPT Municipal supply 1/2" - 3/4" Discharge per function
Dimensions - 10 Function Floor Mount	45.5" w x 64.5" h x 23" d
Dimensions - 15 Function Floor Mount	63.875" w x 64.5" h x 23" d
Dimensions - 20 Function Floor Mount	70.5" w x 64.5" h x 23" d
Dimensions - 10 Function Wall Mount	45.5" w x 38.5" h x 14.5" d
Dimensions - 15 Function Wall Mount	63.875" w x 38.5" h x 14.5" d
Dimensions - 20 Function Wall Mount	70.5" w x 38.5" h x 14.5" d
Dimensions - Pump	16" w x 16" d x 48" h

Installation

3. Installation

Installation of the dispenseIT must conform to local plumbing, electrical, and sanitation codes. The customer is responsible for obtaining all permits and ensuring the following conform to all state and local codes before installing the dispenseIT.

3.1 Installation Preparation

Locate where the dispenseIT will be installed with your installer. Take into consideration the following points:

- Location of the water supply, air supply, and 3PH electrical supply for the dispenseIT
- Location of the control wiring from tunnel controller for the dispenseIT
- Location of any equipment that may be spraying water
- Distance from the dispenseIT to the applicator arches

Refer to Fig. 3.1 - 1 for solenoid, air regulator, and valve alignment for each function.

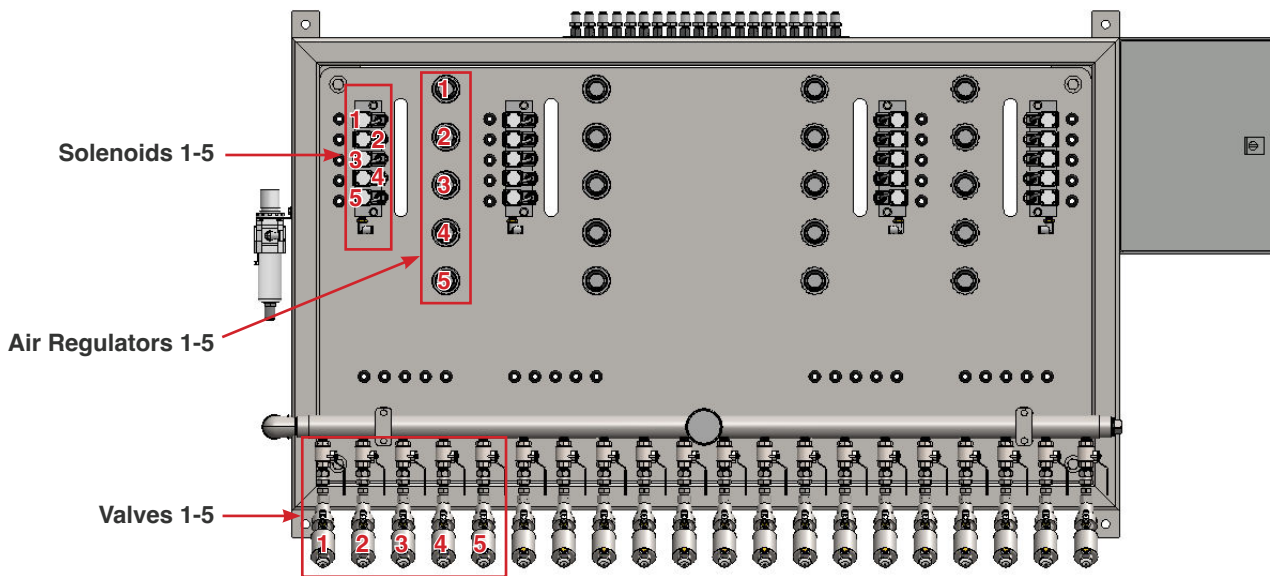


Fig. 3.1 - 1 - Solenoid, air regulator, and valve alignment

3.2 Mechanical Installation

Place equipment in the equipment room where the installation will take place. If possible, have the unit away from areas where the pump could take a direct spray from liquids.

- **Floor Mount:** Turn the swivel casters so the wheels point forward and lock in place to ensure maximum stability
 - Safety chain is not required
- **Wall Mount:** Place the pump on the floor to the right of the unit.
 - Be sure to install a stainless steel guard around the pump's base to avoid damage by barrels, barrel carts, etc.
 - Recommended height is at least 4', measured from the bottom of the frame to the floor

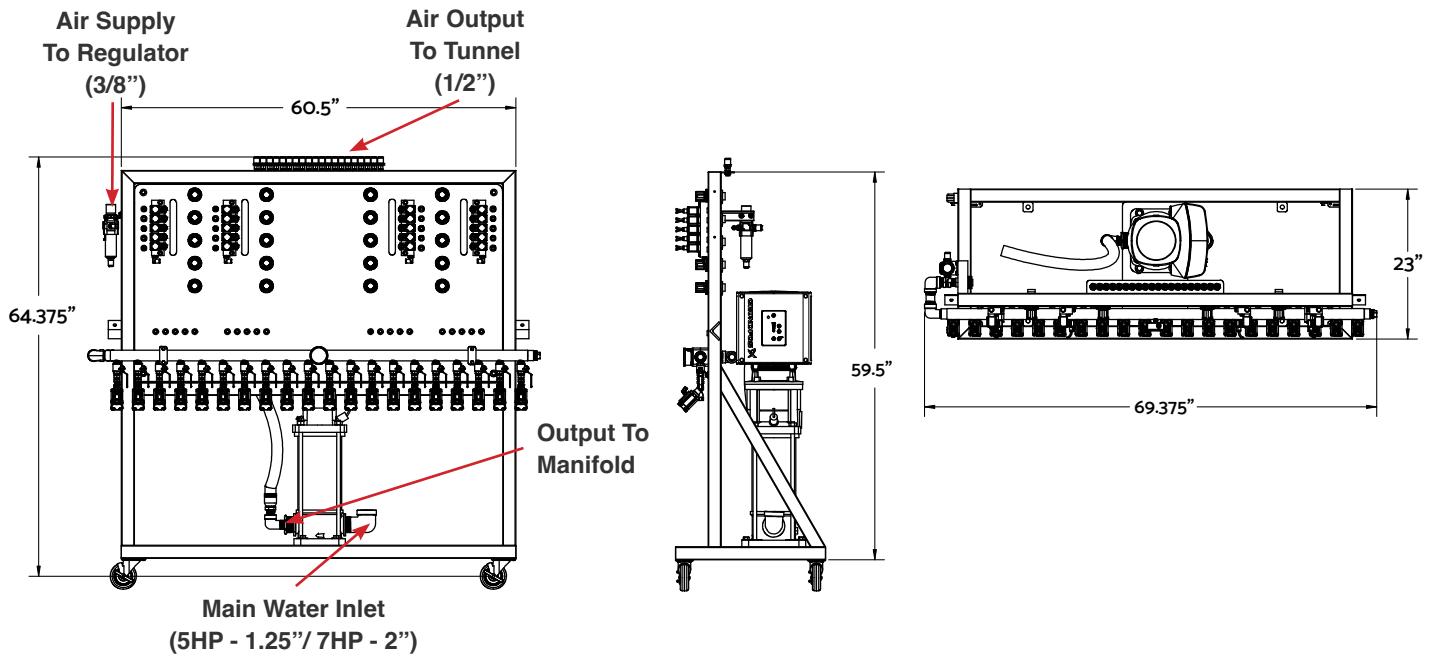


Fig. 3.2 - 1 - 20 Function Floor Mount dispenseIT

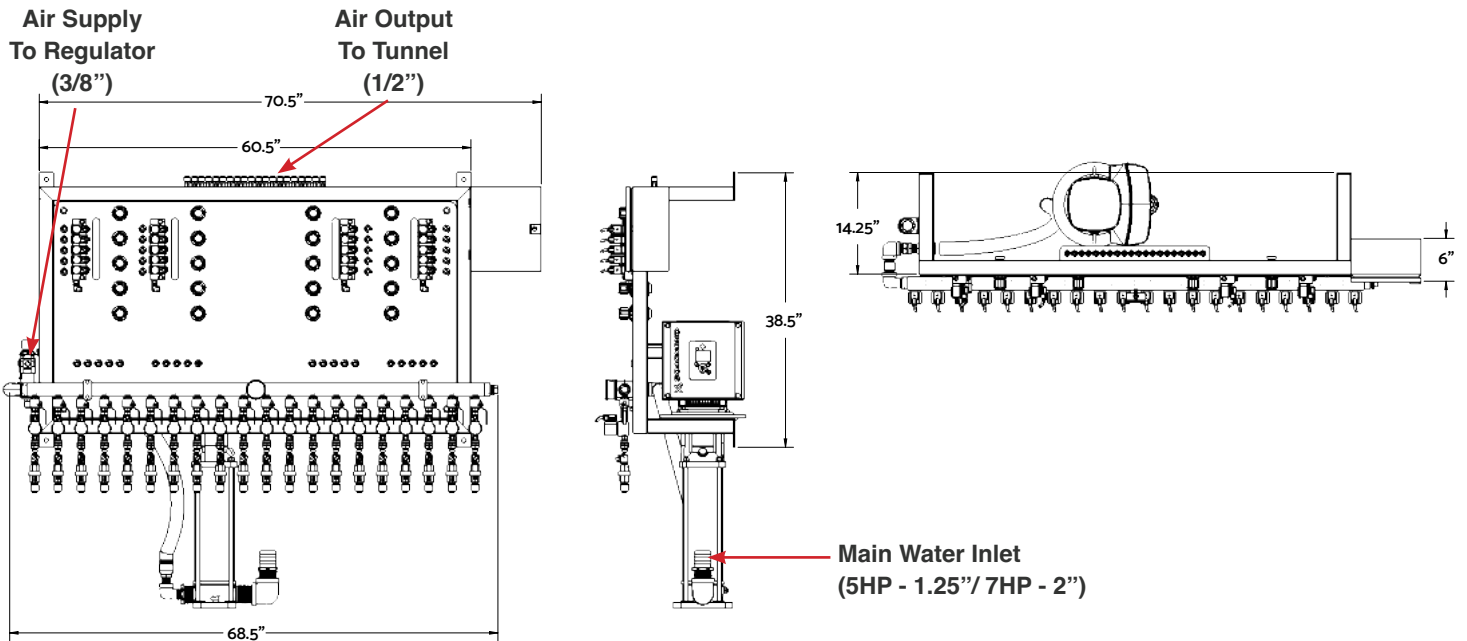


Fig. 3.2 - 2 - 20 Function Wall Mount dispenseIT

3.2.1 Installing Water Line

1. Install the water feed line to the location of the dispenseIT (2" for 7.5HP pump, 1.25" for 5HP pump).
 - **Existing Buildings** - Flush the new water line for a minimum of 5 minutes to ensure that any debris in the water line is completely flushed out
 - **New Buildings** - Flush the water line for a minimum of 15 minutes to ensure that any debris in the water line is completely flushed out

2. Install water feed line to the inlet side of the pump using appropriate fittings for site hosing (Fig.3.2.1 - 1).

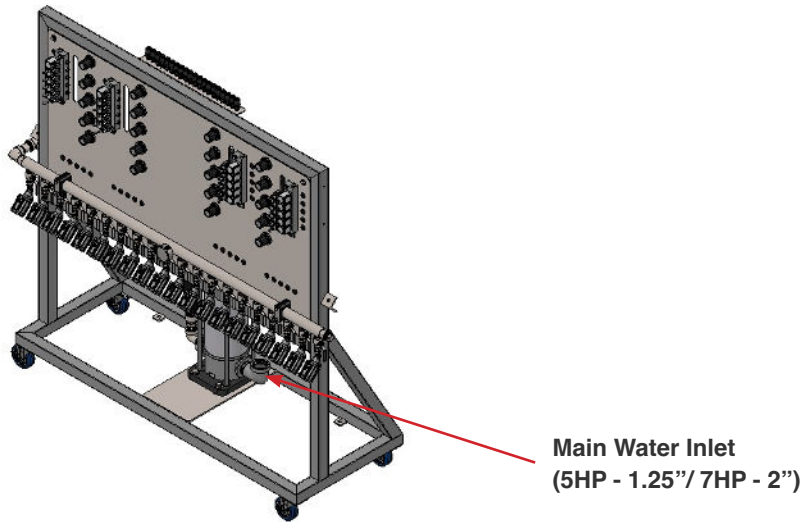


Fig. 3.2.1 - 1 - Water line connection

3.2.2 Installing Air Line

1. Install main airline feed to inlet side of the Main Air Regulator (Fig. 3.3.2 - 1).



Fig. 3.2.2 - 1 - Airline feed to Main Air Regulator

3.2.3 Installing Liquid and Air Connections for Functions

NOTE

High Flow injectors (above 5 gpm) require $\frac{3}{4}$ " process line.

1. Connect $\frac{1}{2}$ " liquid lines to the appropriate injector port as specified in your customer configuration form (Fig. 3.2.3 - 1).



Fig. 3.2.3 - 1 - Liquid connection to injector port

2. Connect $\frac{3}{8}$ " poly tube air lines to the appropriate foam port on top of the system as specified on the customer configuration form. Functions are identified 1-10, 1-15, or 1-20 from left to right.
3. Turn on water and line supplies and check for leaks.

3.3 Electrical Installation

⚠ WARNING!

Electrical installation to be performed by a qualified electrician. Follow all local codes.
3PH breaker power to be supplied by customer.

The electrical schematics and connection points in the controller are designated in **Appendix 4**.

1. Confirm system voltage prior to starting electrical installation.
2. Install the pump's electrical connections.
3. Use the bottom hole of the pump's electrical box for the 3PH incoming power (Fig. 3.3 - 1).



Fig. 3.3 - 1 - Pump 3PH incoming power connection

4. Connect the grounding conductor to the ground lug (Fig. 3.3 - 2).



Fig. 3.3 - 2 - Pump grounding conductor and ground lug

5. Connect the 3PH power to the pump's terminal strip (terminal wiring plug can pull out for wiring ease). Inspect to ensure the terminal plug is fully seated.
6. Make electrical connections as listed in the tables below.

NOTE

Voltage from the tunnel controller relay matches that of the coils on the dispenseIT (110VAC, 24VAC, or 24VDC)

Table 3.3 - 1 - Pump run signal (Wall mount units only)

Enclosure Terminal	Connection
PTS1	Terminal 2 on Grundfos Pump
PTS2	Terminal 6 on Grundfos Pump

Table 3.3 - 2 - Tunnel controller connections for functions

Enclosure Terminal	Connection
TS 1-20	Tunnel controller normally open relay
NTS 1-11	1 neutral wire any of NTS terminals (from same power source that works with the power from the tunnel controller relay)
GND	1 customer supplied ground

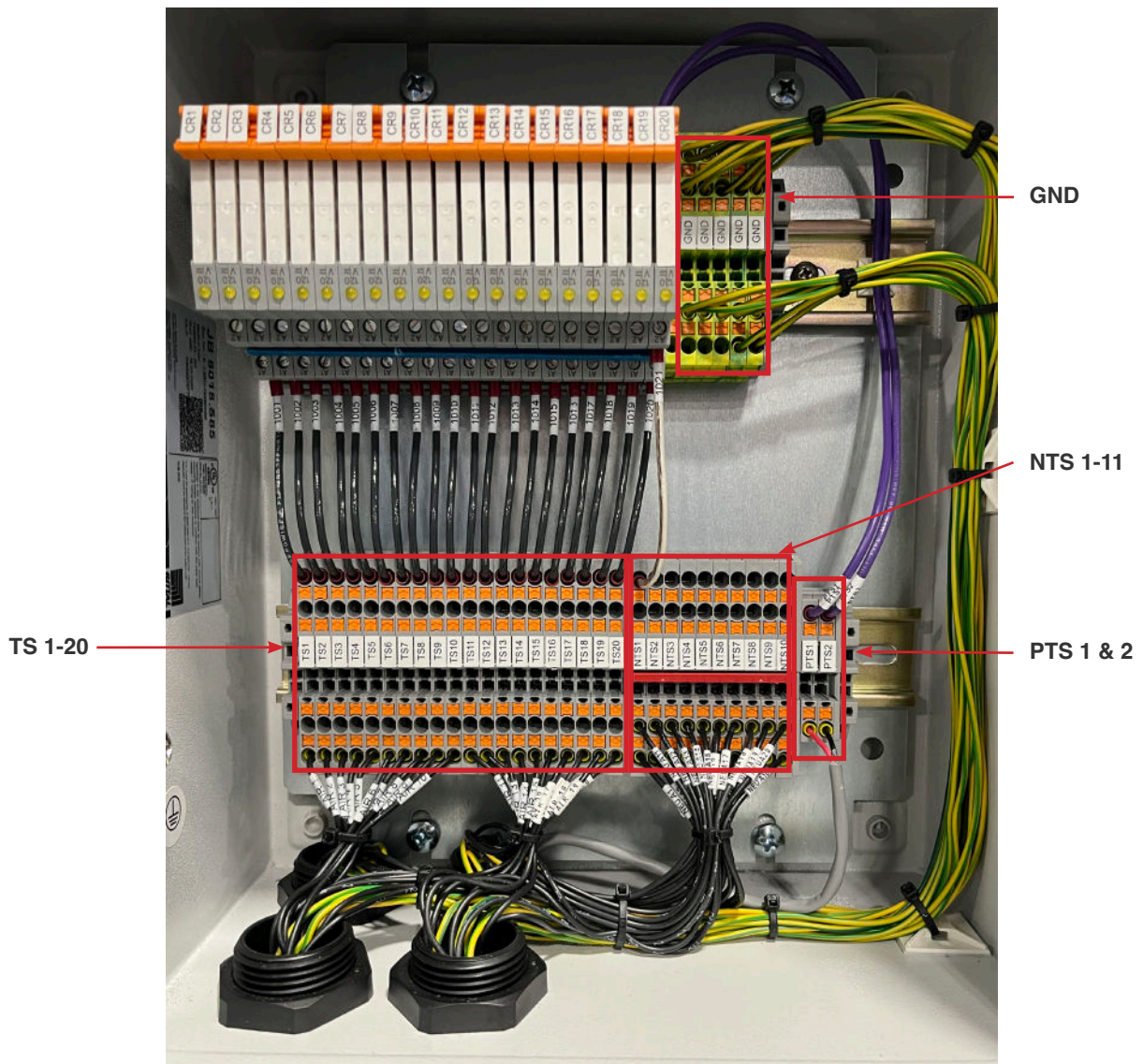


Fig. 3.3 - 3 - Electrical enclosure connection points

3.4 Installing Injectors

The dispenseIT arrives with any High Flow injectors installed from the factory. Standard Flow injectors are shipped with the unit. Installation of Standard Flow injectors is done via provided quick connectors.

1. Install metering tips into the barb of the injector. Consult your chemical solutions provider for dilution rates or refer to Appendix 3.
2. Install a ¼" chemical compatible hose from the chemical barrels to the injector barb.
3. Install chemical compatible foot valves for each function on the draw side of the hose (the part of the hose that rests inside of the product barrel).
 - It is recommended to use a 3' piece of PVC pipe for the line to run through to keep the suction straight down in your chemical barrel.

Startup & Operation

4. Startup & Operation

⚠ WARNING!

Check and verify the tightness of all power distribution lines (screw terminals) before the startup process.

NOTE

Ensure all steps and precautions in Section 3 have been completed before starting up the dispenseIT.

4.1 Priming The Pump

1. Turn on utility power from the wash to the dispenseIT system.
2. Close the pump isolating valve(s) and open the priming plug on the pump head.
3. Gradually open the isolating valve in the suction line until a steady stream of airless water runs out of the priming hole.
4. Close the plug and tighten securely.
5. Completely open the isolating valves.

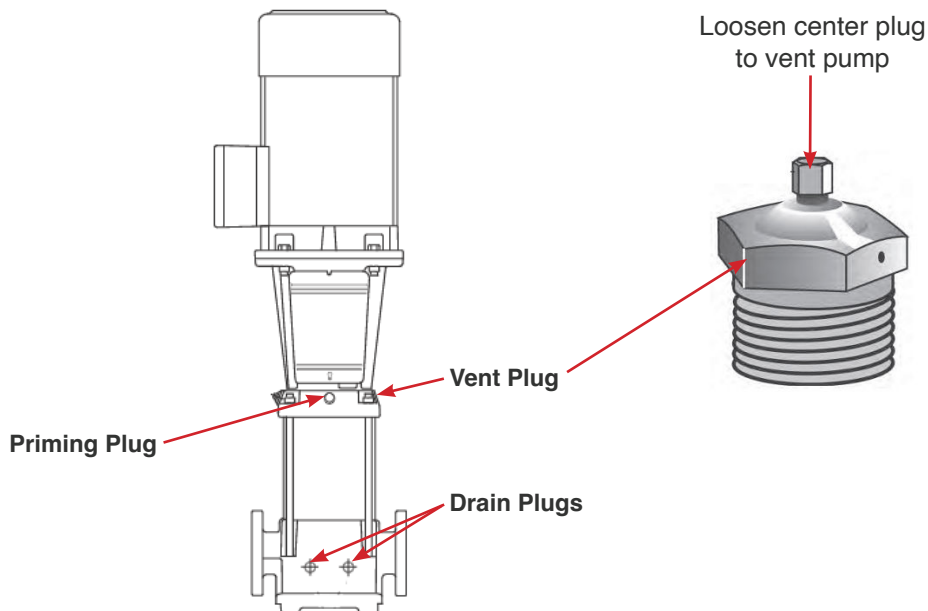


Fig. 4.1 - 1 - Position of pump plugs

6. Verify that the electrical connections are in accordance with the wiring diagram on the motor.
7. Turn on utility power from the wash to the dispenseIT system.
8. Switch on the power and observe the direction of rotation.

9. When viewed from above, the pump should rotate counterclockwise.
10. To reverse the direction of rotation, first switch off the power supply. Interchange any two phases of the power supply.
11. Switch on the power again and check for proper direction of rotation. Once direction of rotation has been verified, switch off the power again.

4.2 Pump Settings

The Grundfos Pump arrives pre-programmed. For additional pump settings and pump programming instructions, refer to Appendix 3 - Pump Programming.

4.3 Verifying System Pressure

1. Verify that the system pressure on the dispenseIT pressure gauge and on the pump's display screen match (min 100 psi - max 200 psi) (Fig. 4.3. - 1). To adjust system pressure, refer to Appendix 3.
2. Check the system for leaks.



Fig. 4.3 - 1 - dispenseIT pressure gauge and pump home screen display

4.4 Verifying System Functions

1. Override each function in your tunnel controller one at a time to ensure that the pump turns on with each function. Both the liquid and air solenoid should open.
2. Check for leaks at the poly tube connections.
3. Confirm each solenoid din coil LED illuminates when the solenoid is energized.

4.4.1 Setting Foaming Functions

To effectively set up and adjust the foaming functions on the dispenseIT, use the air regulator knob to control the foam density and texture (Fig. 4.4.1 - 1).

- **Increase Foam Thickness:**
 - If a thicker or denser foam is desired, increase the air supply to the mixture.
 - To do this, turn the air regulator knob clockwise. This adjustment allows more air into the system, increasing foam density.
- **Decrease Foam Thickness:**
 - For a thinner or less dense foam, reduce the air supply.
 - Turn the air regulator knob counter-clockwise. This reduces air in the mixture, resulting in a lighter application.

It is necessary to set the regulators on non-foaming applicator lines at 2-5 psi in order to exhaust air from the process valves so that they can close fully. Refer to Section 6 - Troubleshooting if any of the following issues occur:

- Injector is not drawing any chemical.
- Injector draws the chemical for only a brief moment.
- Injector has a low but consistent vacuum chemical draw.

Air Regulator Knob

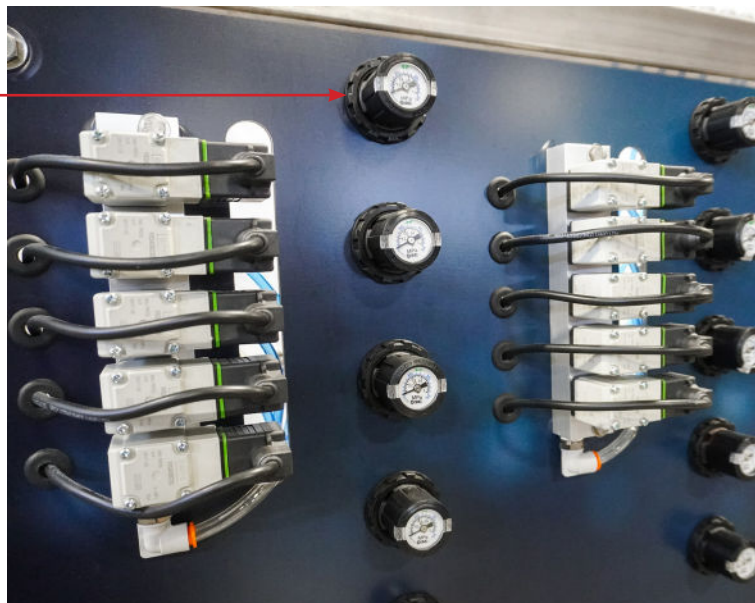


Fig. 4.4.1 - 1 - Air regulator knob

Service & Maintenance

5. Service & Maintenance

The best method to maintain the dispenseIT is to take a few minutes daily to examine the unit for leaks or any indication of a mechanical or electrical fault.

If a change in performance or operation is observed, it is essential to take corrective action quickly to minimize the potential damage to the system.

There are elements of the system that will require normal maintenance actions. These items are listed in the following section.

5.1 Service Schedule

Table 5.1 - 1 - Service schedule

Check	Frequency	Process
Visual Inspection	Daily	<ul style="list-style-type: none">Inspect entire system for leaks, loose connections, or visible damage.
Chemical Draw Lines	Daily	<ul style="list-style-type: none">Ensure chemical draw lines are clear and unobstructed. Replace if damaged or clogged.
Injectors	Weekly	<ul style="list-style-type: none">Check injectors for any chemical buildup or blockages.Air and water are preferred cleaning method. Take care with any mechanical cleaning to ensure that orifice sizes of metering tips are not altered.
Compressed Air Lines	Weekly	<ul style="list-style-type: none">Ensure compressed air lines are free of leaks and delivering consistent air pressure.Confirm no moisture is present in air lines or main regulator moisture trap.
Process Air Valves	Monthly	<ul style="list-style-type: none">Test process air valves to ensure proper activation and closing during chemical delivery.
Manifold Assembly	Monthly	<ul style="list-style-type: none">Inspect the manifold for any blockages or signs of wear; ensure proper flow.

Troubleshooting

6. Troubleshooting

For product support, contact support@innovateITcarwash.com, or call (518) 741-4200 (option 2).

Symptom	Potential Causes	Solution
Pump Will Not Run	<ul style="list-style-type: none"> No 3PH power to pump. 	<ul style="list-style-type: none"> Verify pump has constant voltage. Check any breakers, disconnect switches, and/or fuses installed in the electrical system.
	<ul style="list-style-type: none"> Incorrect 3PH voltage supplied to pump. 	<ul style="list-style-type: none"> Verify that the supplied 3PH voltage matches the pump.
	<ul style="list-style-type: none"> Pump not in 'run'. 	<ul style="list-style-type: none"> Press the power button on the pump screen.
	<ul style="list-style-type: none"> Relay in dispenseIT electrical enclosure is not energized. 	<ul style="list-style-type: none"> Verify the relay for the function is energized when the tunnel controller is on. The LED relay should be on. The voltage on A1 and A2 of the relay should match the system control voltage.
Pump Leaks Water	<ul style="list-style-type: none"> Not enough thread tape/pipe sealant. 	<ul style="list-style-type: none"> Install new thread tape/pipe sealant.
	<ul style="list-style-type: none"> Loose pipe thread fittings or flange bolts. 	<ul style="list-style-type: none"> Tighten the fittings and the flange bolts.
	<ul style="list-style-type: none"> Bad flange gasket. 	<ul style="list-style-type: none"> Replace the old gaskets.
	<ul style="list-style-type: none"> Failed pump seals. 	<ul style="list-style-type: none"> Replace/repair pump seals.

Symptom	Potential Causes	Solution
Low Water Pressure On System	<ul style="list-style-type: none"> Pump is not running. 	<ul style="list-style-type: none"> Verify items listed in 'Pump Will Not Run' section.
	<ul style="list-style-type: none"> Pump setpoint is too low. 	<ul style="list-style-type: none"> Raise the pump setpoint to the desired pressure.
	<ul style="list-style-type: none"> Insufficient water supply to pump. 	<ul style="list-style-type: none"> Check water supply to pump.
	<ul style="list-style-type: none"> Pump is not primed. 	<ul style="list-style-type: none"> Follow instructions in Section 4.1 to properly prime the pump.
	<ul style="list-style-type: none"> Motor rotation is incorrect. 	<ul style="list-style-type: none"> Follow the instructions in Section 4.1 to verify motor rotation.
	<ul style="list-style-type: none"> Defective gauge on system. 	<ul style="list-style-type: none"> Compare the dispenseIT system gauge reading to the pressure on the pump screen. Replace the gauge if necessary.
	<ul style="list-style-type: none"> Defective pump. 	<ul style="list-style-type: none"> Replace pump.
	<ul style="list-style-type: none"> Defective transducer on pump. 	<ul style="list-style-type: none"> Consult Grundfos factory technical support.
Injector Not Drawing Chemical	<ul style="list-style-type: none"> Clogged chemical feed line from chemical barrel. 	<ul style="list-style-type: none"> Check the hose, foot valve, metering tips, and injector barb for clogs.
	<ul style="list-style-type: none"> Too much back pressure on the injector. 	<ul style="list-style-type: none"> Check for clogged lines or clogged nozzles on applicator arch. Verify injector sizing and install a smaller injector if necessary.
	<ul style="list-style-type: none"> Clogged injector. 	<ul style="list-style-type: none"> Rinse the injector with hot water. Blow compressed air through the injector chemical hose barb and the injector nozzle. Remove the injector nozzle, clean, and reassemble.
Injector Draws Chemical For A Brief Moment	<ul style="list-style-type: none"> Injector is too large. 	<ul style="list-style-type: none"> Install a smaller injector. Install larger or more spray nozzles on the applicator.
	<ul style="list-style-type: none"> Too much back pressure on injector. 	<ul style="list-style-type: none"> Check for clogged lines or nozzles on applicator arch. Install a smaller injector.
Injector Has A Low But Consistent Vacuum Chemical Draw	<ul style="list-style-type: none"> Injector is too small. 	<ul style="list-style-type: none"> Install a larger injector. Install smaller spray nozzles on the applicator. Remove spray nozzles from the applicator.

Symptom	Potential Causes	Solution
No Water Flow Through Injectors	<ul style="list-style-type: none"> Manifold solenoid isolation ball valve is closed. 	<ul style="list-style-type: none"> Open the ball valve and verify water flow through the solenoid to the injector.
	<ul style="list-style-type: none"> Debris in solenoid. 	<ul style="list-style-type: none"> Isolate the solenoid. Disassemble the solenoid and check for debris. Clean as necessary. Reassemble the solenoid.
	<ul style="list-style-type: none"> Fault solenoid. 	<ul style="list-style-type: none"> Install repair kit in solenoid or replace solenoid.
Water Constantly Flowing Through Applicator Lines	<ul style="list-style-type: none"> Process valve is not fully closing 	<ul style="list-style-type: none"> If connected to a non-foaming applicator, bleed air (2-5 psi) through the regulator.
	<ul style="list-style-type: none"> Check valve with excessive spring force is holding air in the line 	<ul style="list-style-type: none"> Reduce closing force on the check valve that allows the process valve to fully close. If on a foaming applicator - move check valve upstream of the foam generator. Remove the check valve
Nonstop Water Flow To Applicator	<ul style="list-style-type: none"> Function is energized 	<ul style="list-style-type: none"> Check tunnel controller for overrides and stuck relays.
	<ul style="list-style-type: none"> Debris in solenoid. 	<ul style="list-style-type: none"> Isolate the function's solenoid using the ball valve. Disassemble the solenoid and check the valve for debris or worn parts.
	<ul style="list-style-type: none"> Fault solenoid. 	<ul style="list-style-type: none"> Install repair kit in solenoid or replace solenoid.

Spare Parts

7. Recommended Spare Parts

Below is a list of recommended spare parts that may require replacement during the course of system operation.

innovateIT Product Number	Description
DS-REG-4-SMC	Foaming Regulator
7303664	Process Air Valve
DS-CV0074	Standard Flow Injector Check Valve
DS-CV0072	High Flow Injector Check Valve
7903683	Standard Metering Tips
7903684	

7.1 Spare Part Replacement

7.1.1 Replacing Foaming Regulator

The following tools are needed to complete this task:

- 9/16" Wrench
1. Turn off electrical supply to the unit.
 2. Turn off the main air supply to the unit.
 3. Open the regulator fully to vent all air out of the line.
 4. Disconnect the three poly tube lines at the rear of the regulator (Fig. 7.1.1 - 1):
 - Solenoid to regulator
 - Regulator to valve
 - Regulator to foaming output

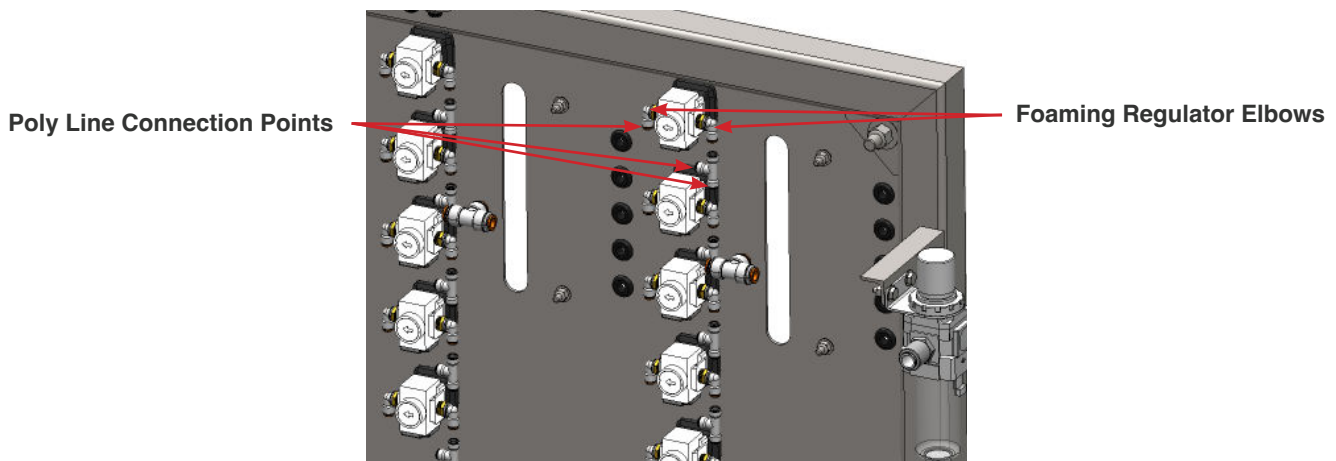


Fig. 7.1.1 - 1 - Foaming regulator poly line connection points

5. Remove the elbows from the rear of the regulator (Fig. 7.1.1 - 1).
6. Unthread the capture nut on the regulator (Fig. 7.1.1 - 2).

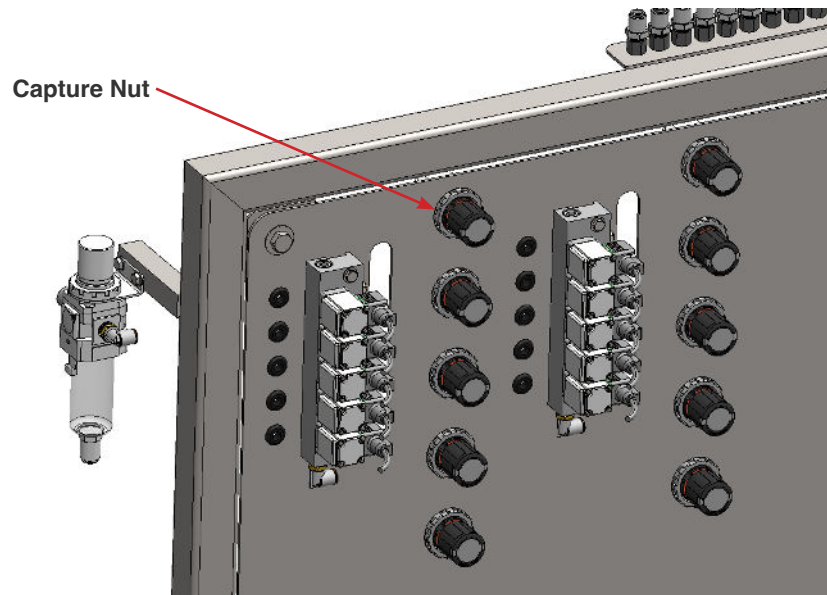


Fig. 7.1.1 - 2 - Regulator capture nut location

7. Remove regulator.
8. Remove the elbows from the rear of the regulator
9. Reinstall elbows into the rear of the new regulator.
10. Install the new regulator on the panel with the new capture nut.
11. Reconnect the three poly lines listed in step 4.
12. Turn on the main air supply.
13. Turn on the electrical supply to the unit.

7.1.2 Replacing Process Air Valve

The following tools are needed to complete this task:

- 1 1/16" Wrench
- 15/16" Wrench
- 9/16" Wrench

1. Turn off the main air supply to the unit.
2. Close the ball valve on the selected function (Fig. 7.1.2 - 1).
3. Disconnect the quick connect fitting or unthread the high flow adapter depending on the type of function.
4. Disconnect the air line to the valve.
5. Disconnect the valve at the swivel fitting.
6. Remove the hex nipple and the two air fittings from the head of the valve.
7. Replace the hex nipple and the two air fittings on the new valve.
8. Reinstall into the swivel fitting.
9. Reinstall the injector kit.
10. Reconnect the air line to the valve.
11. Open the ball valve on the selected function.
12. Turn on the main air supply.

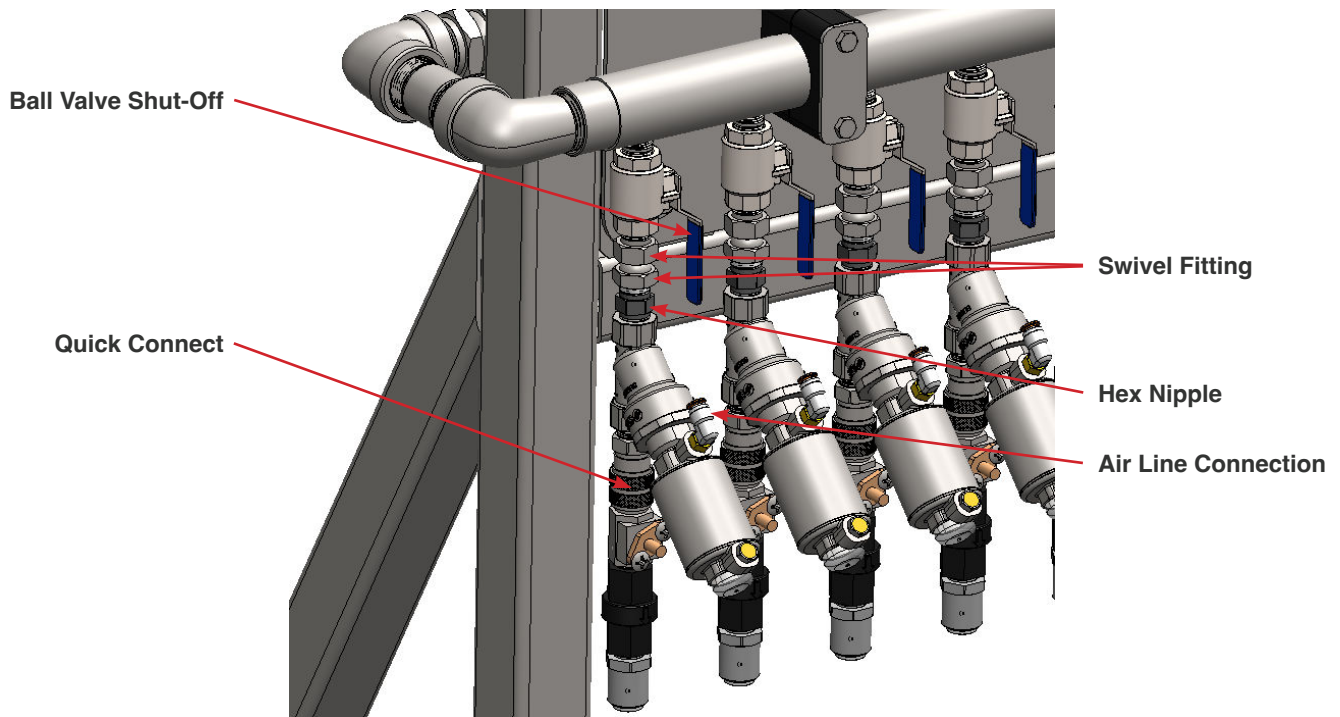


Fig. 7.1.2 - 1 - Process air valve replacement

7.1.3 Replacing Check Valve

The following tools are needed to complete this task:

- 2 Adjustable Wrenches

1. Close the ball valve to the function.
2. Disconnect output line from the poly tube fitting.

3. Unthread the check valve from the injector (Fig. 7.1.3 - 1).

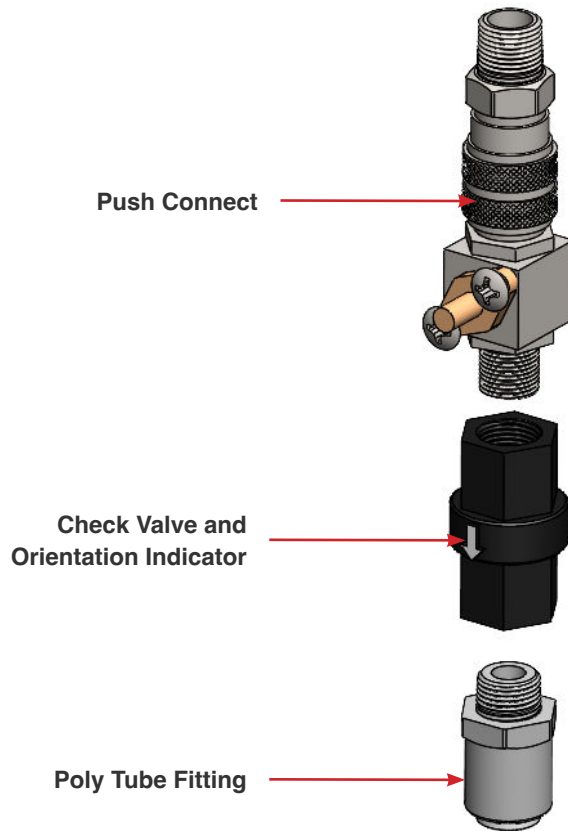


Fig. 7.1.3 - 1 - Check valve replacement

4. Replace poly tube fitting onto the new check valve.
5. Reinstall the push connect onto the injector.
6. Confirm the orientation of the arrow on the check valve (Fig. 7.1.3 - 1).
7. Reconnect poly tube.
8. Open the ball valve.

7.1.4 Replacing Metering Tip

1. Disconnect poly tube.
2. Unscrew metering tip (Fig. 7.1.4 - 1).
3. Install new tip.

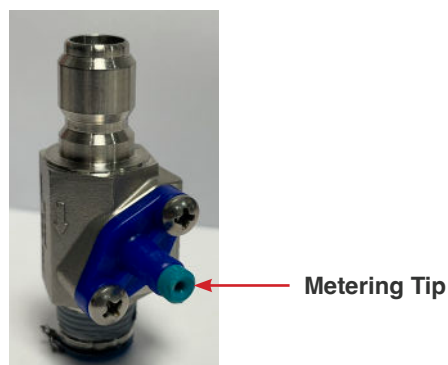
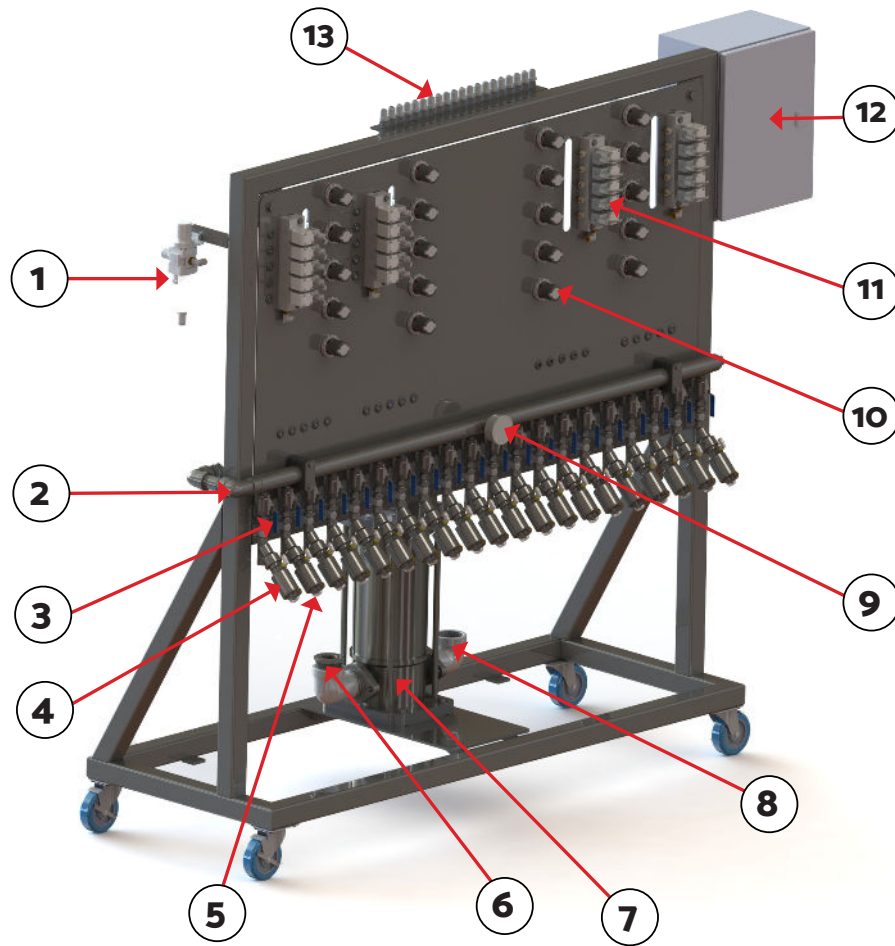


Fig. 7.1.3 - 1 - Metering tip replacement

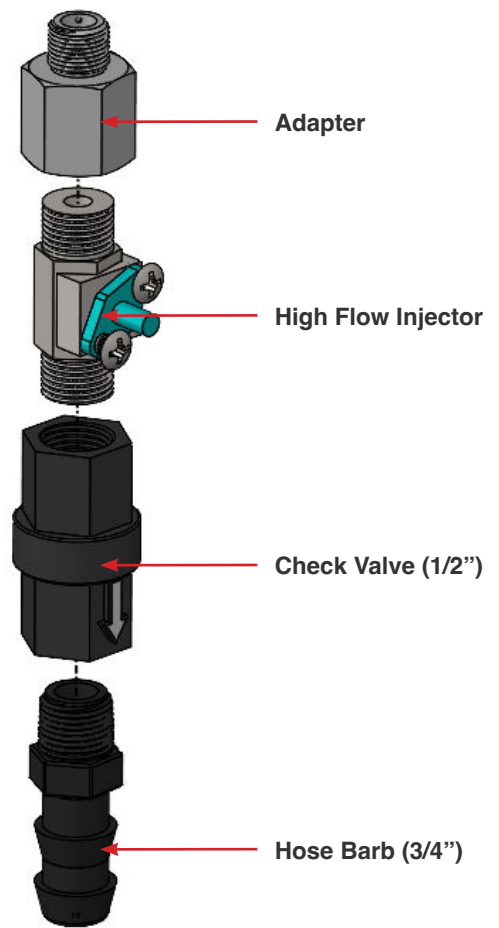
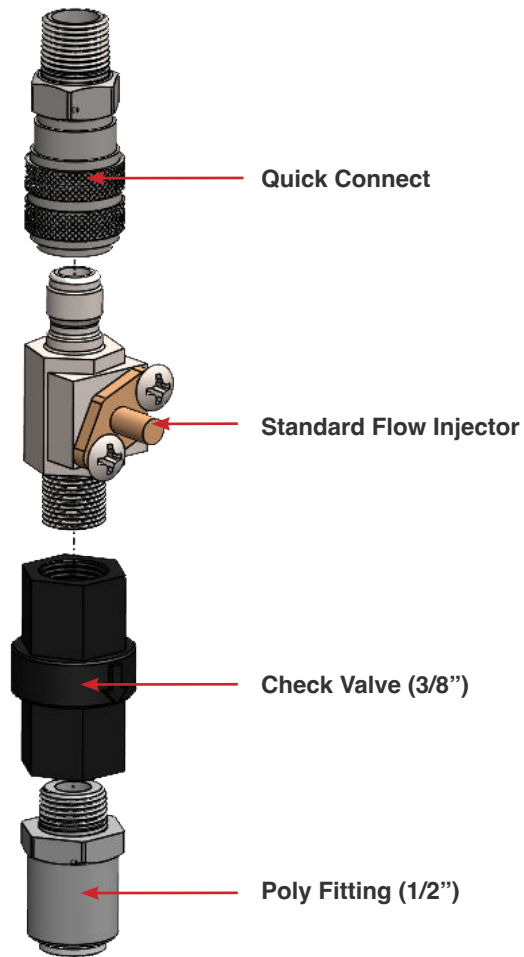
Appendix 1 - System Identification



#	Component
1	Air Regulator
2	Manifold
3	Shut-Off Valves
4	Solenoids
5	DEMA Rocket Injectors
6	Output to Manifold
7	Grundfos VFD Pump

#	Component
8	Main Water Input
9	Manifold Pressure Gauge
10	Air Controls (1 Per Function)
11	Air Manifolds
12	Electrical Enclosure
13	Air Output (To Tunnel)

Injectors



Appendix 2 - Injector PSI Flow/Dilution Data

Flow Rate (GPM) @ 200 PSI		0.30	0.55	0.85	1.1	1.7	2.4	2.6	3.4	4.3	5.3	6.1
Outlet Pressure		50 PSI	60 PSI	70 PSI	90 PSI	90 PSI	90 PSI	90 PSI	90 PSI	90 PSI	90 PSI	90 PSI
Nozzle Size		0.029"	0.040"	0.051"	0.057"	0.070"	0.083"	0.086"	0.098"	0.116"	0.125"	0.136"
Copper - 100.15.14		1:96	1:141	1:130	1:277	1:426	1:582	1:715	1:812	1:1108	1:1441	1:1420
Pumpkin - 100.15.15		1:77	1:116	1:118	1:179	1:283	1:389	1:440	1:603	1:709	1:878	1:948
Burgundy - 100.15.16		1:57	1:91	1:107	1:157	1:260	1:366	1:395	1:519	1:608	1:777	1:845
Lime - 100.15.17		1:38	1:66	1:96	1:114	1:197	1:274	1:299	1:408	1:459	1:601	1:633
Tan - 100.15.0		1:35	1:64	1:85	1:101	1:178	1:207	1:269	1:366	1:418	1:545	1:543
Orange - 100.15.1		1:26	1:47	1:64	1:87	1:136	1:170	1:201	1:259	1:389	1:405	1:475
Turquoise - 100.15.2		1:20	1:35	1:46	1:85	1:135	1:169	1:200	1:257	1:277	1:404	1:401
Pink - 100.15.3		1:13	1:23	1:31	1:50	1:74	1:103	1:114	1:152	1:185	1:229	1:254
Lt. Blue - 100.15.4		1:13	1:20	1:29	1:38	1:58	1:71	1:90	1:119	1:146	1:182	1:191
Brown - 100.15.5		1:12	1:17	1:26	1:34	1:56	1:66	1:86	1:113	1:133	1:172	1:185
Red - 100.15.6		1:11	1:15	1:22	1:28	1:42	1:60	1:64	1:87	1:110	1:132	1:143
White - 100.15.7		1:10	1:12	1:18	1:24	1:37	1:56	1:58	1:76	1:95	1:114	1:129
Green - 100.15.8		1:10	1:10	1:16	1:22	1:33	1:46	1:48	1:68	1:82	1:103	1:116
Blue - 100.15.9		1:9.9	1:8.4	1:13	1:17	1:25	1:35	1:31	1:53	1:64	1:75	1:86
Yellow - 100.15.10		1:9.5	1:7	1:10	1:11	1:17	1:23	1:24	1:33	1:43	1:51	1:60
Black - 100.15.11		1:9	1:5.6	1:7.8	1:8.7	1:13	1:19	1:19	1:25	1:31	1:40	1:42
Purple - 100.15.12		1:8.6	1:5.2	1:6.9	1:6.4	1:6.5	1:9	1:10	1:13	1:16	1:19	1:22
Gray - 100.15.13		1:8.2	1:4.8	1:5.9	1:6.3	1:5.9	1:7.8	1:8	1:10	1:12	1:15	1:16
No Tip		1:8.1	1:4.7	1:5.5	1:6.1	1:5.1	1:6.4	1:6.5	1:7.4	1:7.6	1:9.5	1:11.1

Metering Tip & Part Numbers

NOTE: Dilution Ratios are based on 200 PSI inlet pressure and 90 PSI outlet pressure. Dilution Ratios are based on drawing water or water-thin product through the metering tip. Different viscosities and temperatures will affect the draw rates and lower the amount of fluid inducted increasing the overall dilution ratio making the injectors more lean.

Dual Metering Barb Information Available Upon Request

Rocket XL Dilution Chart (100 PSI) 1/4 Barb				
Metering Tip Color and Part Numbers	Nozzle Size			
	161 (8 GPM)	177 (10 GPM)	185 (12 GPM)	206 (15 GPM)
Copper - 100.15.14	1:1502	1:1818	1:1994	1:2204
Pumpkin - 100.15.15	1:1001	1:1215	1:1327	1:1780
Burgundy - 100.15.16	1:859	1:1009	1:1144	1:1633
Lime - 100.15.17	1:669	1:835	1:884	1:1309
Tan - 100.15.0	1:588	1:697	1:795	1:983
Orange - 100.15.1	1:536	1:667	1:707	1:913
Turquoise - 100.15.2	1:432	1:522	1:570	1:653
Pink - 100.15.3	1:275	1:345	1:362	1:490
Lt. Blue - 100.15.4	1:199	1:247	1:262	1:341
Brown - 100.15.5	1:183	1:222	1:241	1:301
Red - 100.15.6	1:152	1:188	1:200	1:231
White - 100.15.7	1:144	1:177	1:189	1:217
Green - 100.15.8	1:123	1:151	1:153	1:201
Blue - 100.15.9	1:81	1:105	1:107	1:149
Yellow - 100.15.10	1:54	1:70	1:72	1:97
Black - 100.15.11	1:45	1:56	1:59	1:76
Purple - 100.15.12	1:23	1:28	1:29	1:37
Gray - 100.15.13	1:17	1:21	1:22	1:27
No Tip	1:9.3	1:10.7	1:10.5	1:12.8

Rocket XL Dilution Chart (100 PSI) 3/8 Barb

Metering Tip Color and Part Numbers	Nozzle Size			
	161 (8 GPM)	177 (10 GPM)	185 (12 GPM)	206 (15 GPM)
Clear	1:424	1:522	1:560	1:694
Purple - 100.15.12	1:260	1:320	1:344	1:425
Yellow - 100.15.10	1:187	1:230	1:247	1:306
Green - 100.15.8	1:120	1:148	1:159	1:196
Pink - 100.15.3	1:98	1:120	1:129	1:160
Turquoise - 100.15.2	1:55	1:68	1:73	1:91
Black - 100.15.11	1:43	1:53	1:57	1:71
Gray - 100.15.13	1:34	1:42	1:45	1:55
Red - 100.15.6	1:28	1:34	1:37	1:46
Blue - 100.15.9	1:22	1:27	1:28	1:35
Brown - 100.15.5	1:16	1:20	1:21	1:26
White - 100.15.7	1:14	1:17	1:18	1:22
Orange - 100.15.1	1:10	1:13	1:14	1:17
Lt. Blue - 100.15.4	1:9	1:11	1:11	1:14
Tan - 100.15.0	1:7	1:8.5	1:9	1:11
No Tip	1:6.5	1:8.2	1:7.4	1:9.5

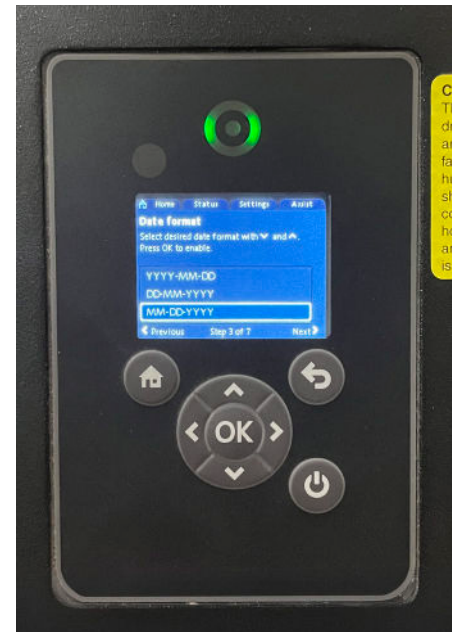
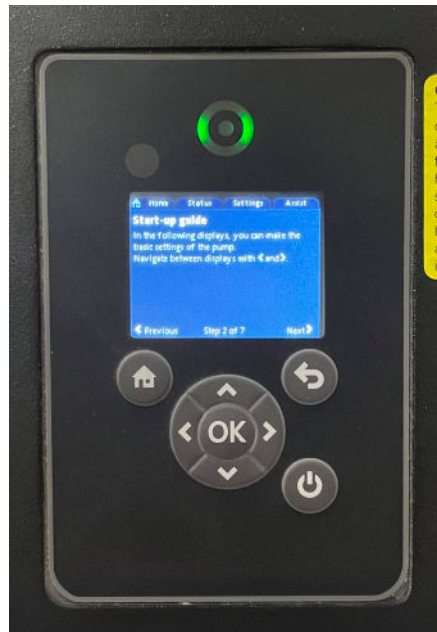
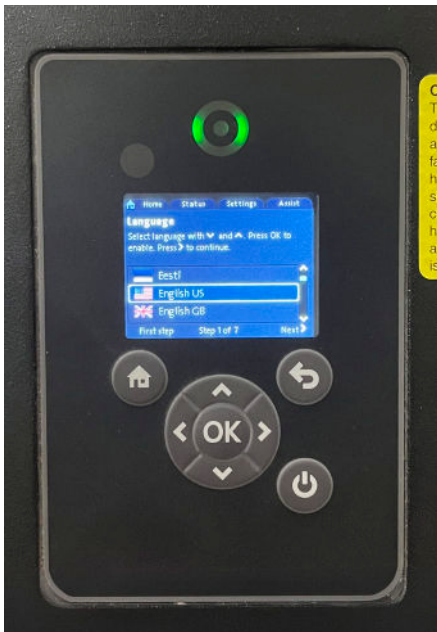
	Rocket #	Incoming Pressure (in PSI)					
		20	60	100	150	200	250
Rocket Low Flow	211.029	0.12	0.17	0.20	0.25	0.30	0.35
	211.040	0.28	0.35	0.4	0.48	0.55	0.6
	211.051	0.4	0.50	0.6	0.75	0.85	0.95
Rocket	211.057	0.6	0.70	0.8	0.95	1.1	1.25
	211.070	0.7	1.08	1.3	1.5	1.7	1.9
	211.083	0.95	1.3	1.6	1.9	2.4	2.65
	211.086	1	1.5	1.75	2.2	2.6	2.8
	211.098	1.4	1.9	2.3	2.9	3.4	3.6
	211.116	1.7	2.6	3.2	3.8	4.3	4.8
	211.125	2.1	3	3.7	4.4	5.3	5.6
	211.136	2.2	3.60	4	5	6.1	6.3
Rocket XL	211.161	3.9	5.10	6.4	7.6	8.8	9.4
	211.177	4.7	6.20	7.6	9.1	10.6	11.3
	211.186	5.2	6.70	8.5	10	11.4	12.2
	211.207	6.7	8.70	10.6	12.6	14.5	15.5
All flowrates listed in gallons per minute							

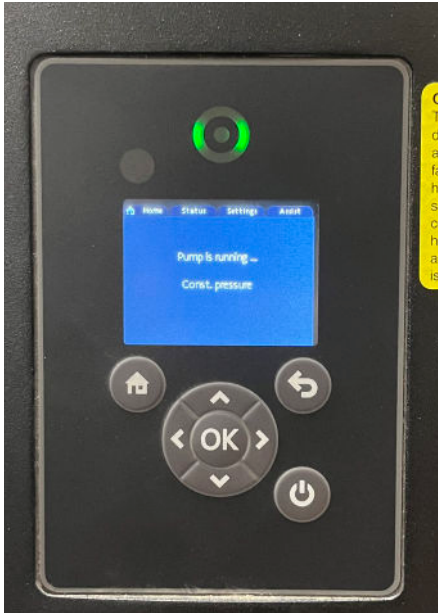
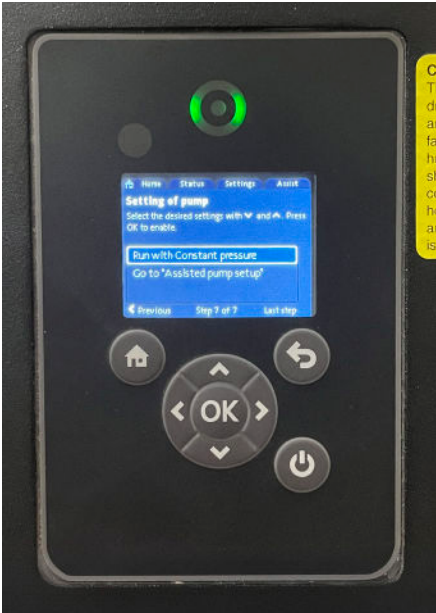
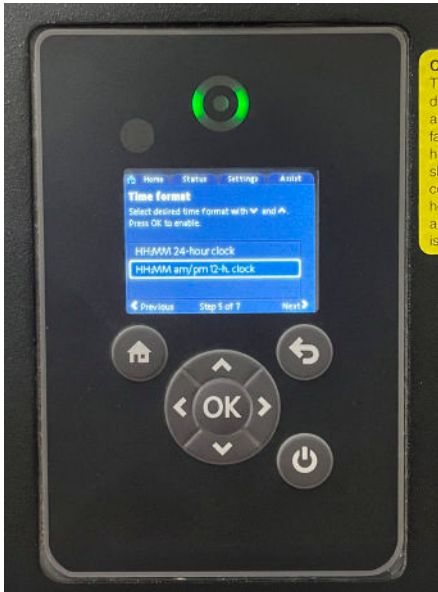
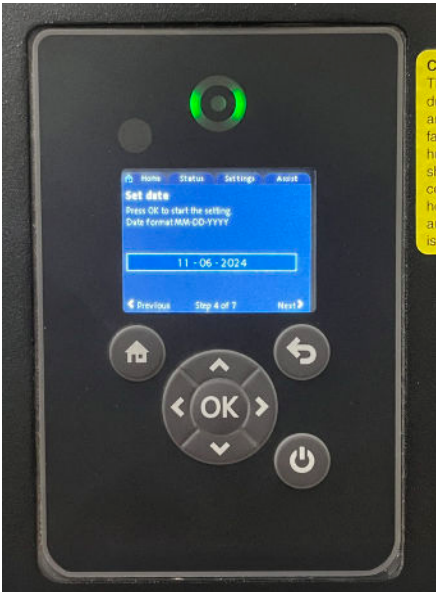
Appendix 3 - Pump Programming

Pump Programming

The Grundfos Pump arrives pre-programmed. In the event that the pump settings are reset—whether due to an accidental reset or maintenance requirement—follow the steps below to reprogram the pump with the factory-default settings provided by innovateIT. After selecting your language, the pump incorporates a startup guide, after which the main menus appear in the display.

1. Select your language.
2. Press **>** to begin the startup guide.
3. Select your preferred date format. Press **OK** to enable. Press **>** to move to the next step.
4. Set the current date. Press **OK** to start the setting. Press **>** to move to the next step.
5. Select your preferred time format. Press **>** to move to the next.
6. Set the current time Press **OK** to start the setting. Press **>** to move to the step next.
7. Under 'Setting of pump' select 'Run with Constant pressure.' Press **OK** to enable.
8. The screen will now display the message 'Pump is running...Const. pressure,' followed by the Home screen.
9. From the Home screen, select 'Setpoint' and press **OK**.
10. Using the arrows, adjust the setpoint to 180-200 psi based on preferred setting. Select the digit with **<** and **>** and adjust with **^** and **v**. Press **OK** to start the setting.
11. Press **<** to return to the Settings screen. Navigate down to 'Ramps' and press **OK**.
12. Select 'Ramp-up.'
13. Set the ramp-up time to 1.0 sec. Press **OK** to start the setting.
14. Press **<** to return to the Settings screen.
15. Select 'Ramp-down.'
16. Set the ramp-down time to 1.0 sec. Press **OK** to start the setting.
17. The pump is now reset to its factory-default settings.









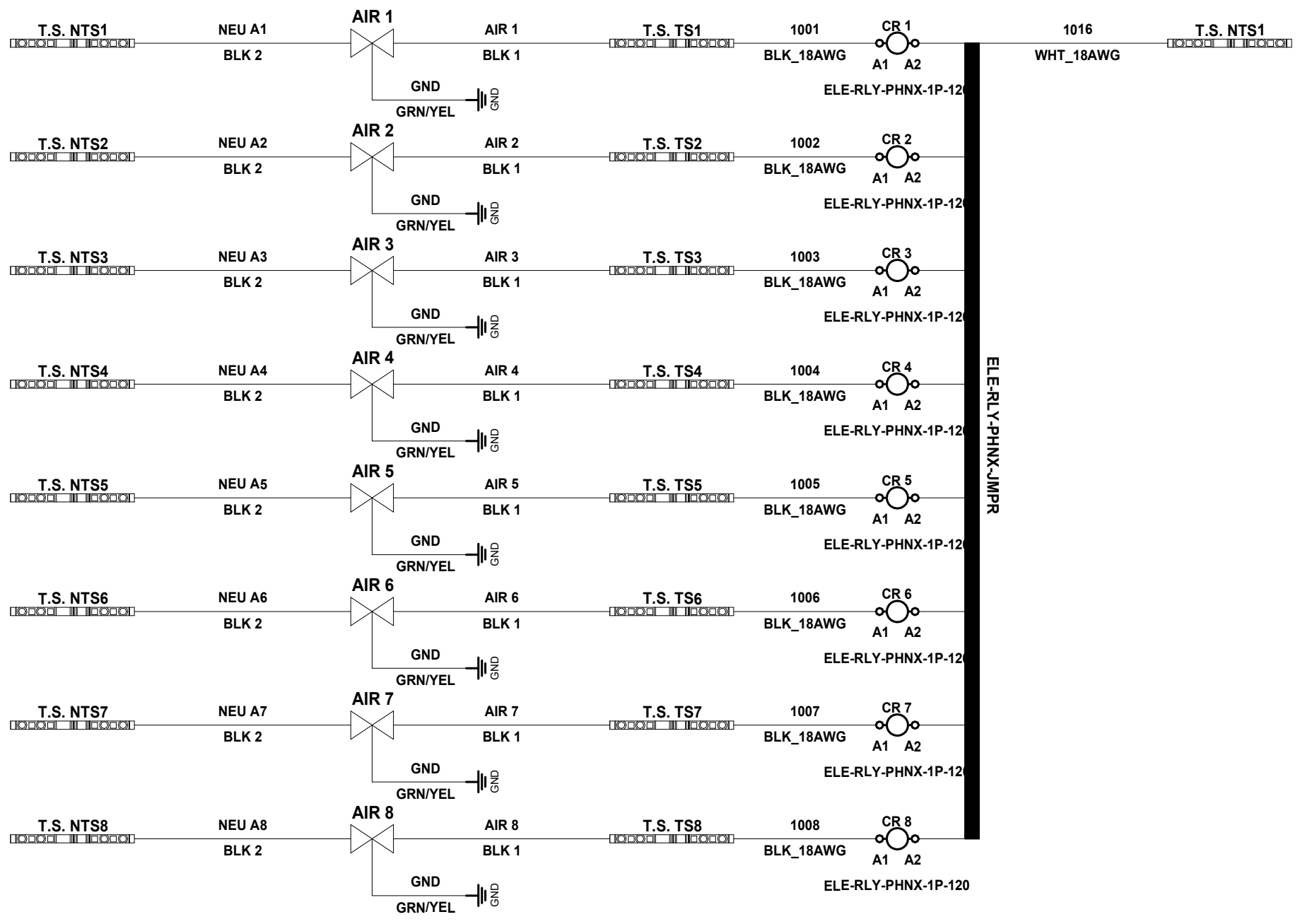
Appendix 4

Electrical Schematics

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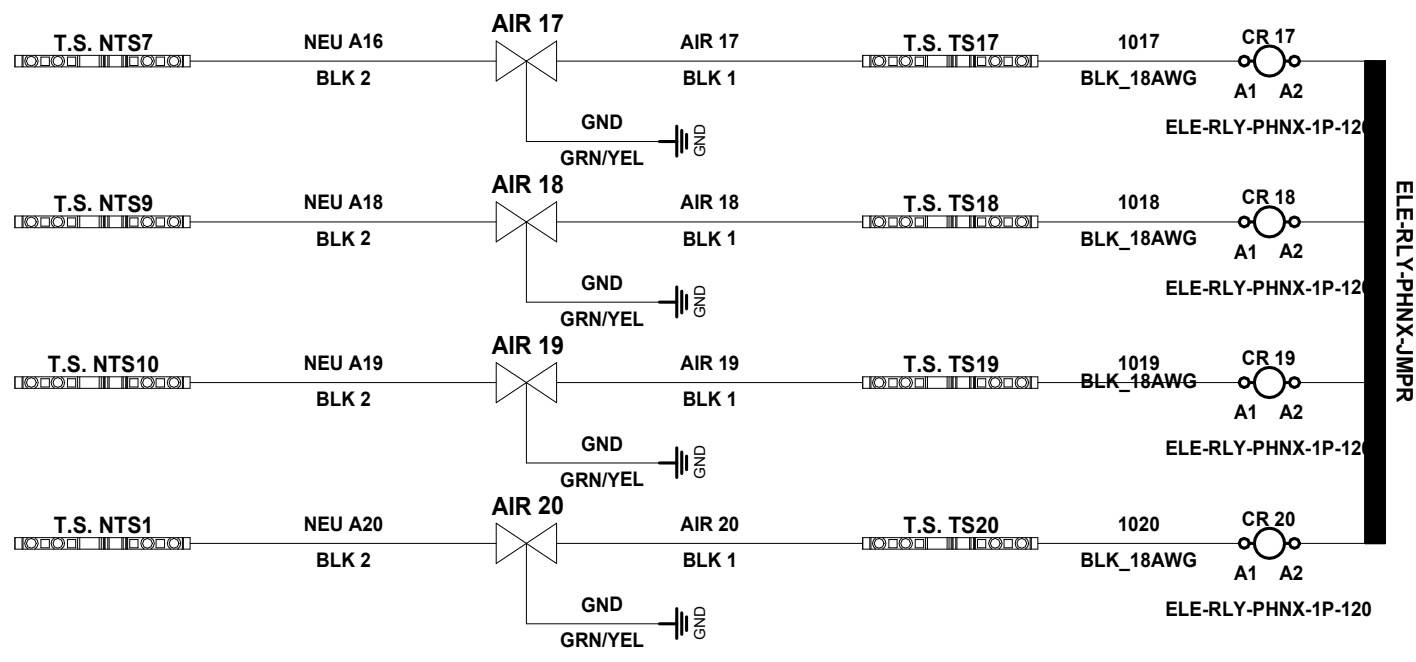
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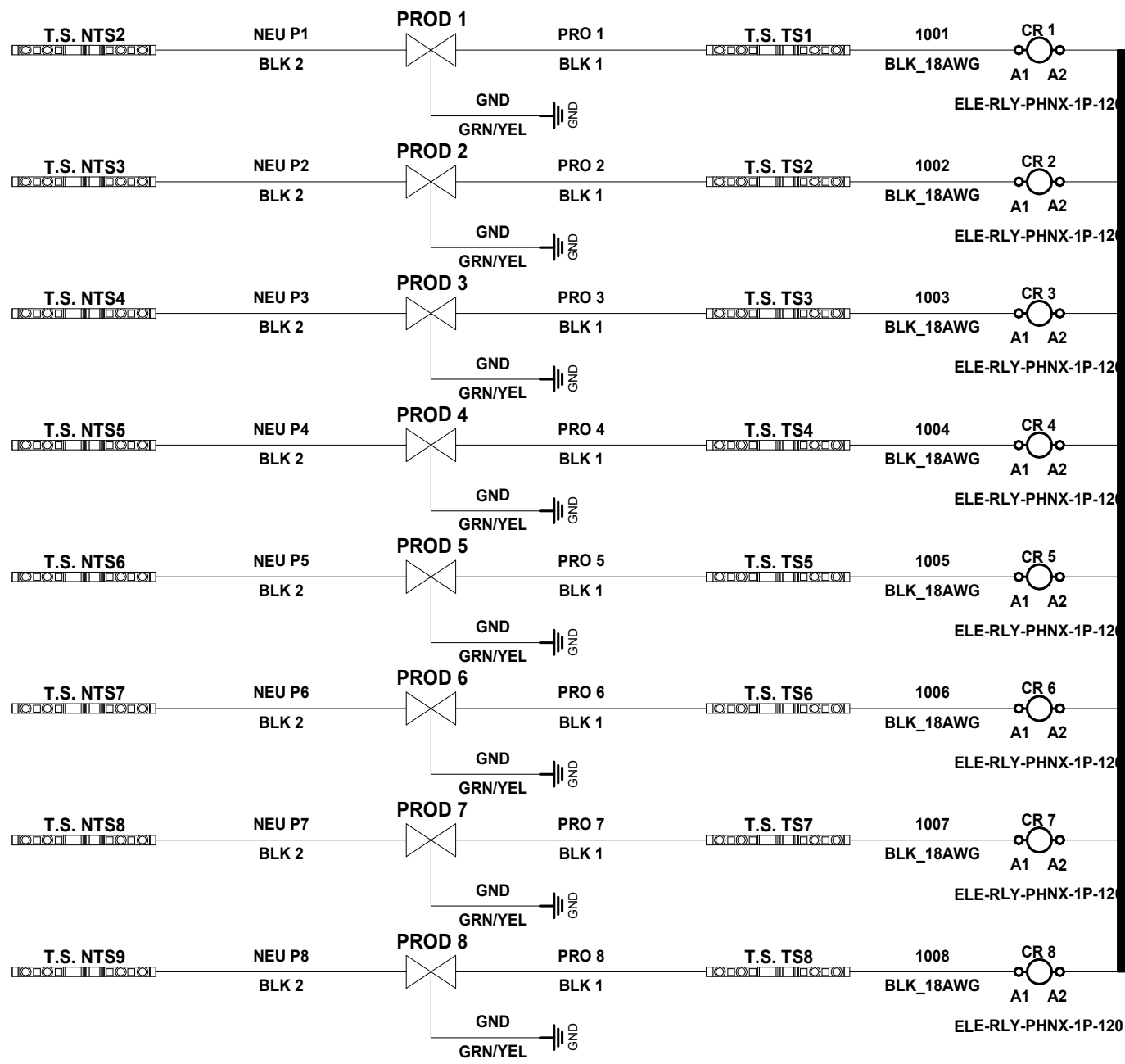
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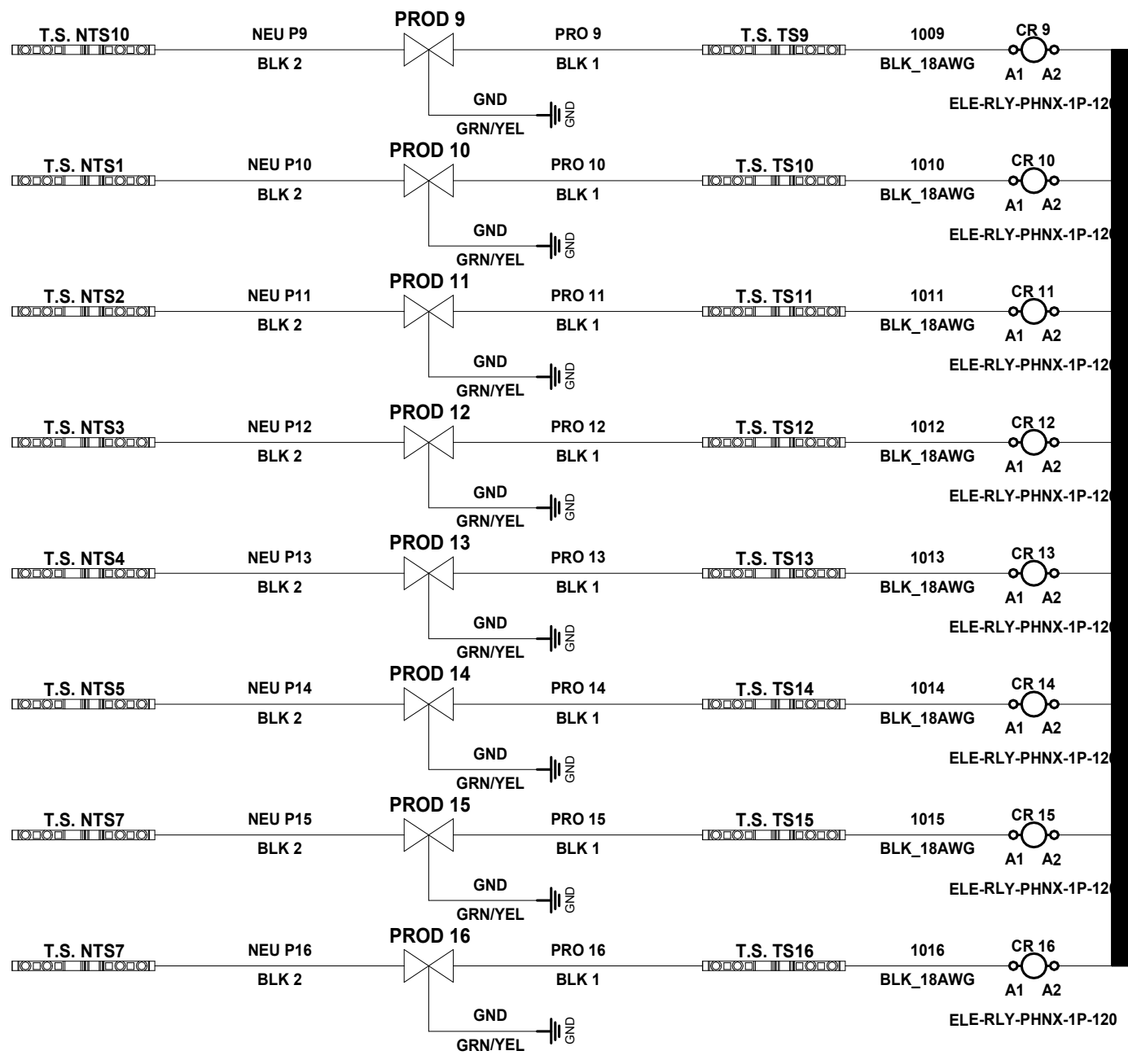
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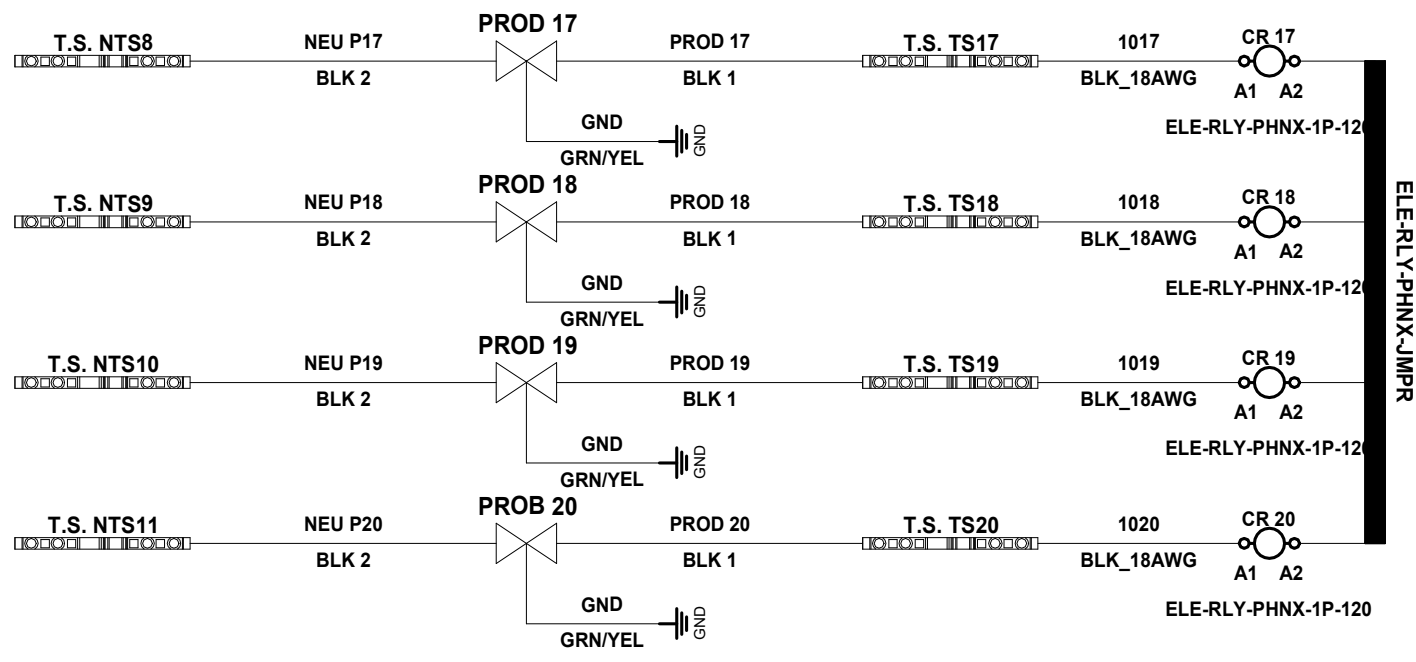
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CHKD		TITLE: Product Solenoids 9-16	
APPRVD		DRAWING NO: xxxxx	
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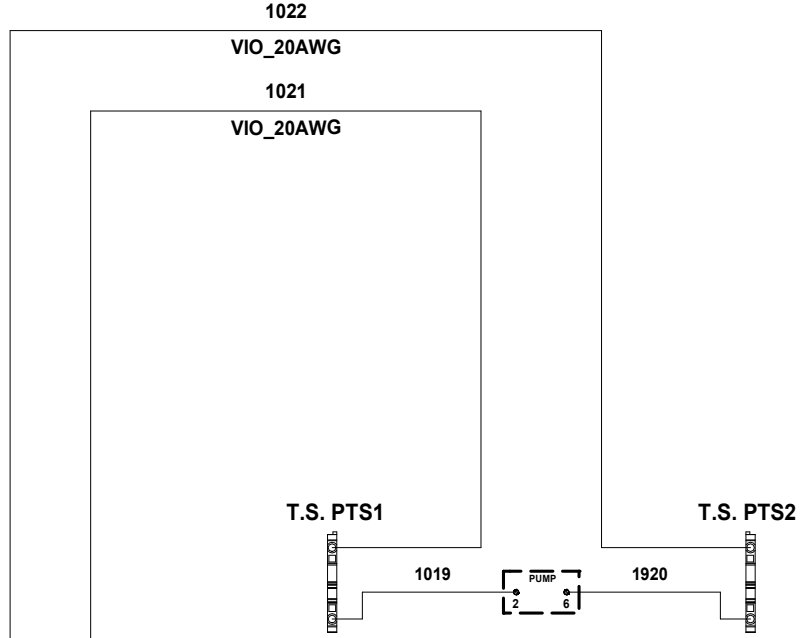
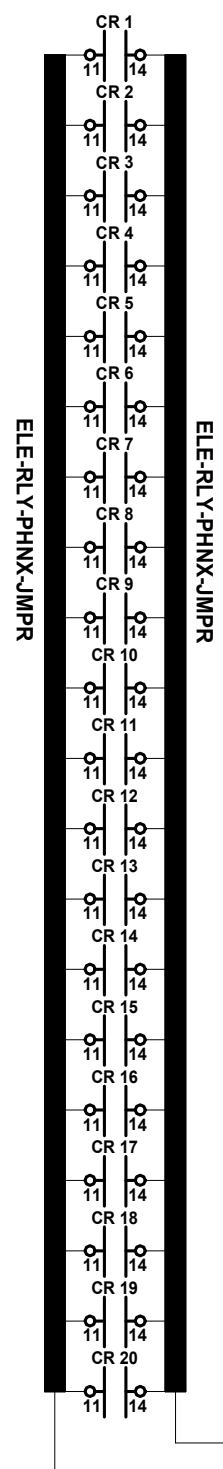
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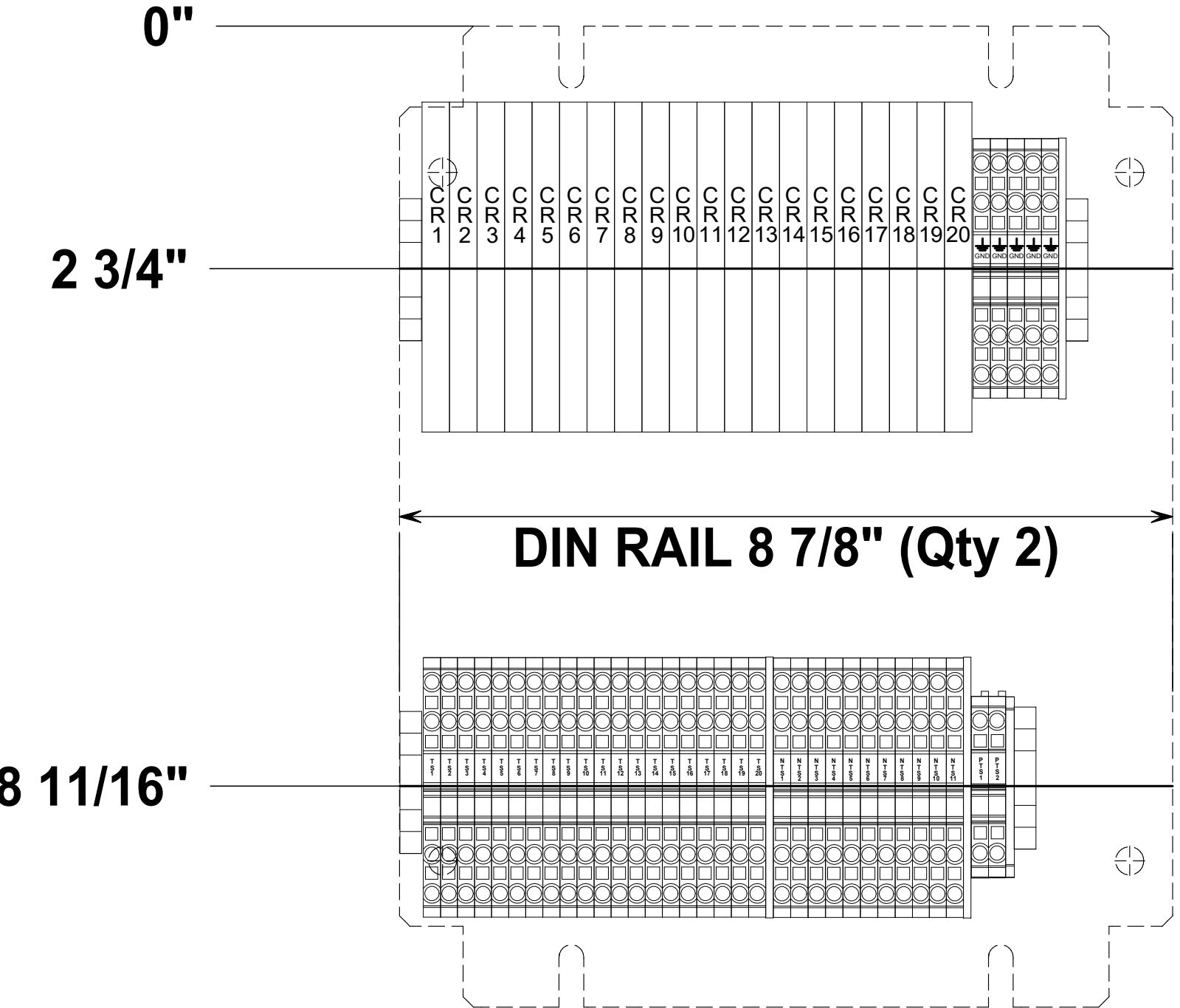
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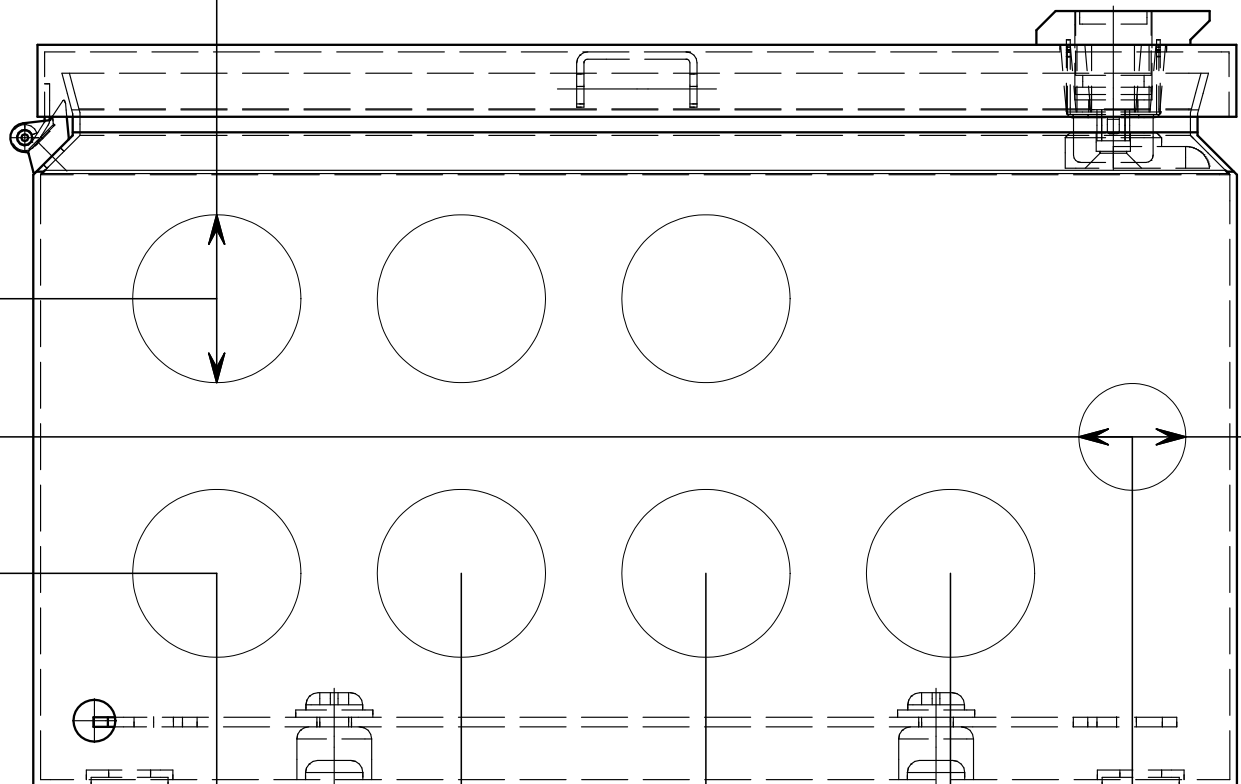
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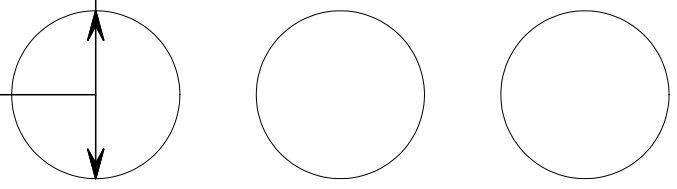
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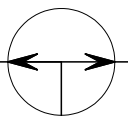
1 3/8" (Qty 6)



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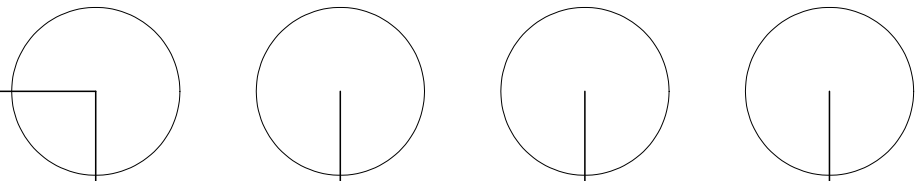


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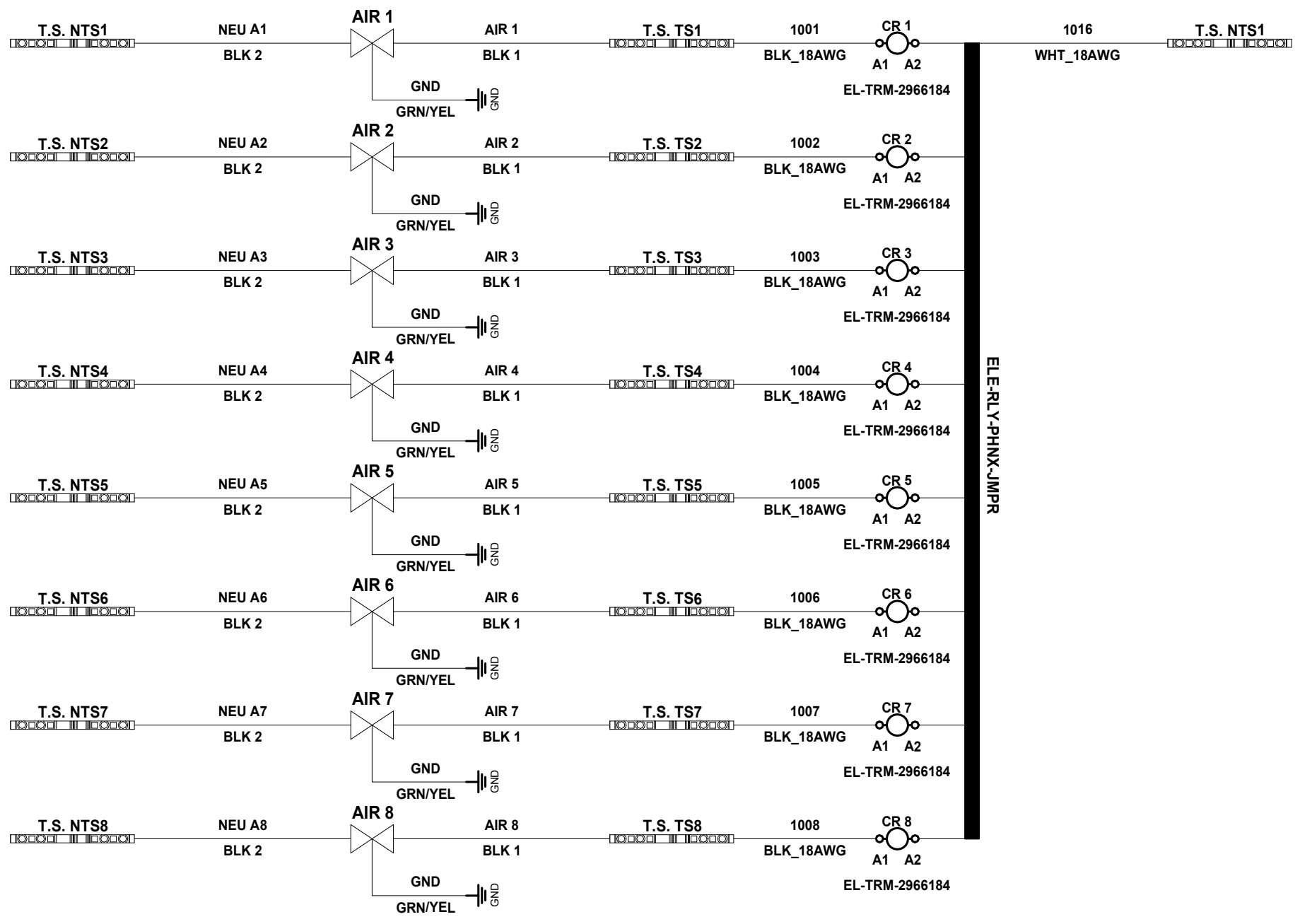
Appendix 4

Electrical Schematics

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CHKD		TITLE:	Air Solenoids 1-8
APPRVD		DRAWING NO:	XXXX
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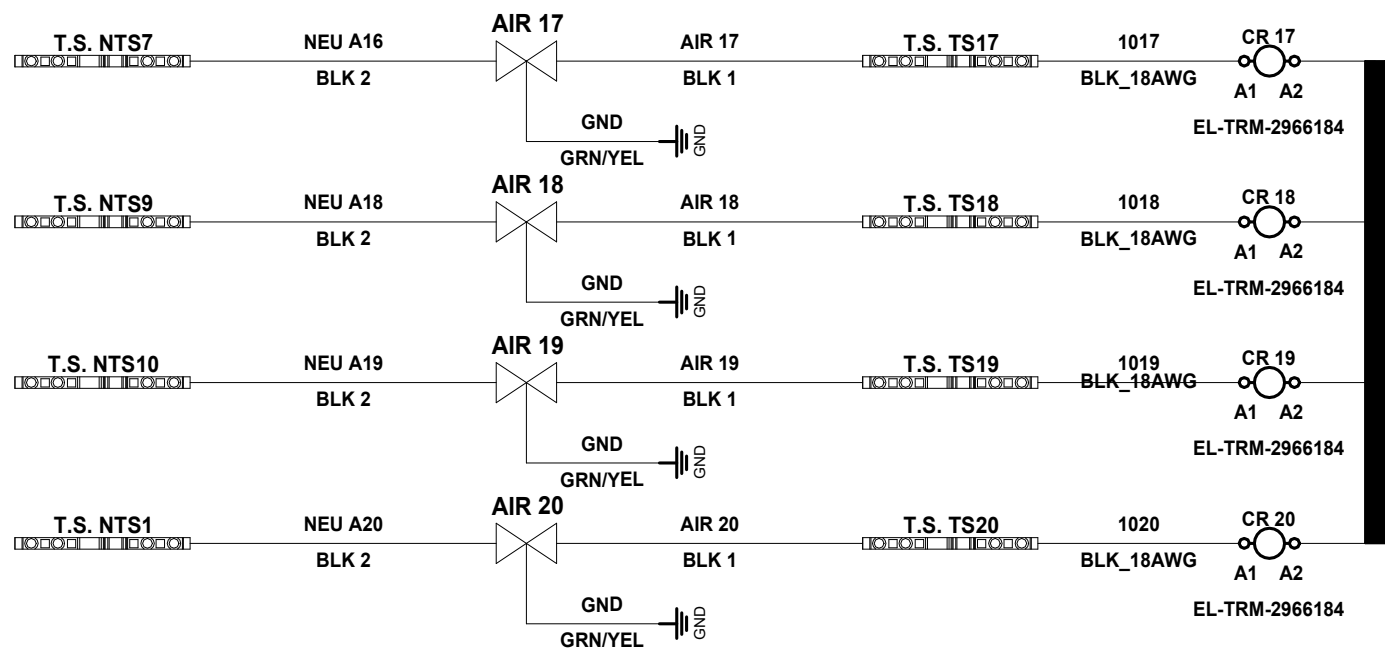
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CHKD		TITLE: Air Solenoids 9-16	
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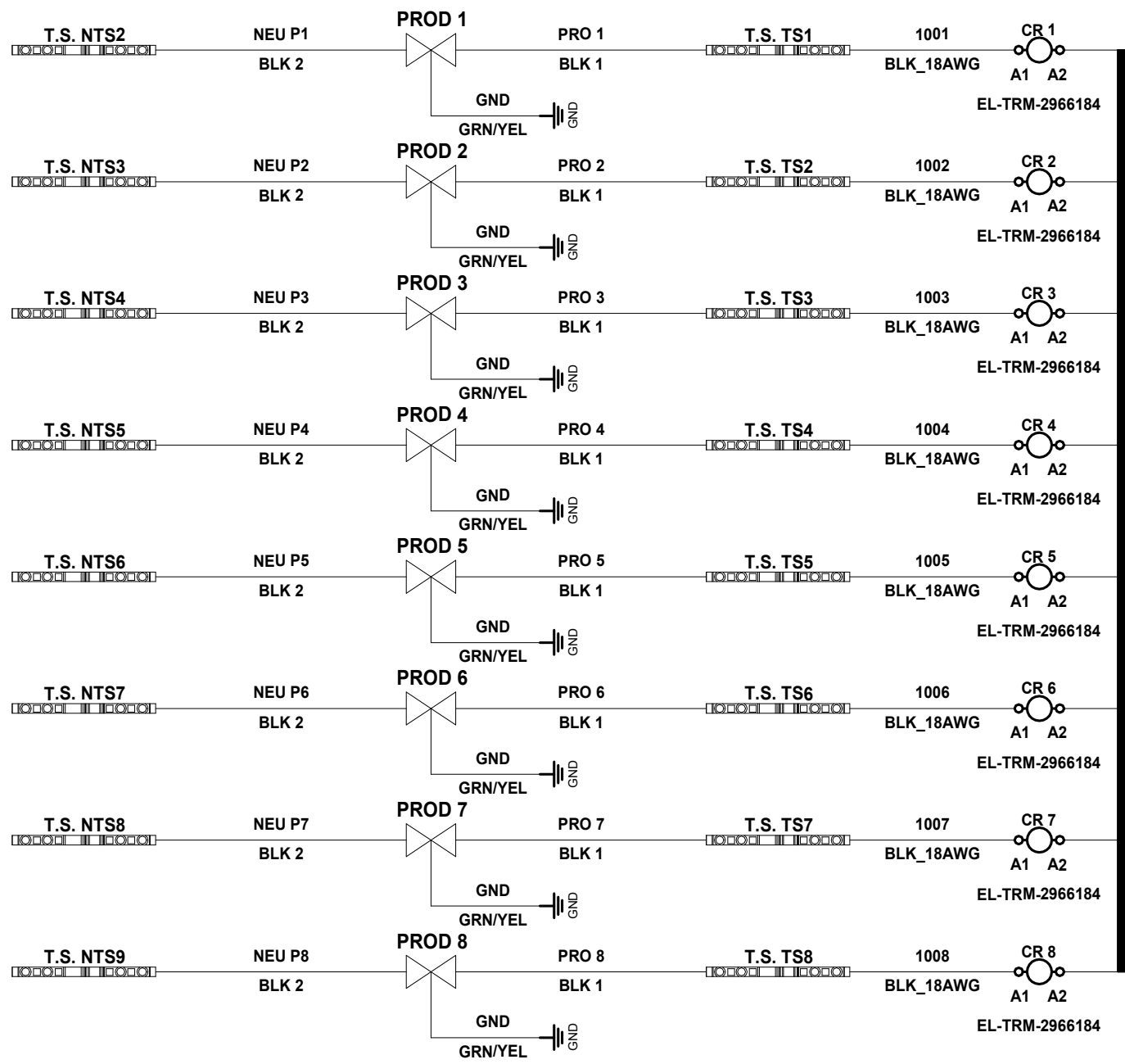
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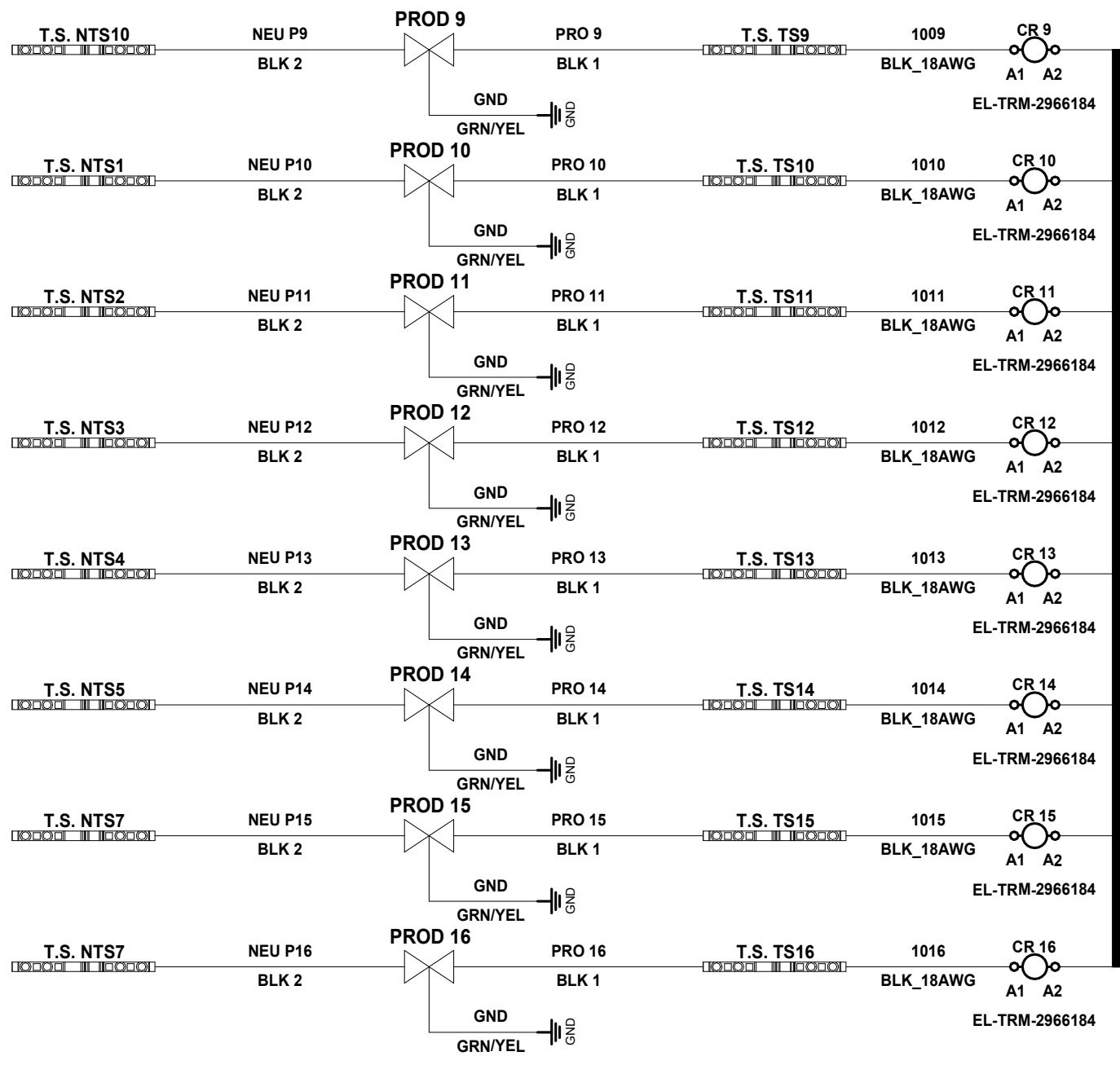
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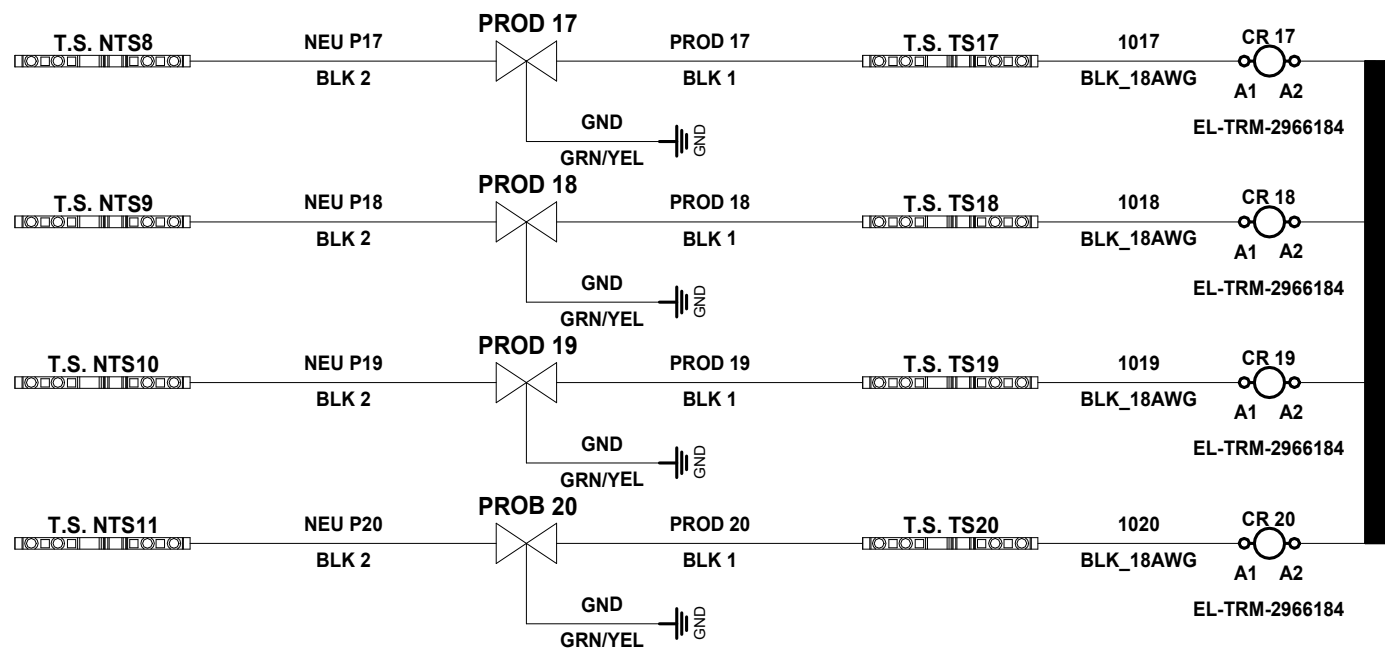
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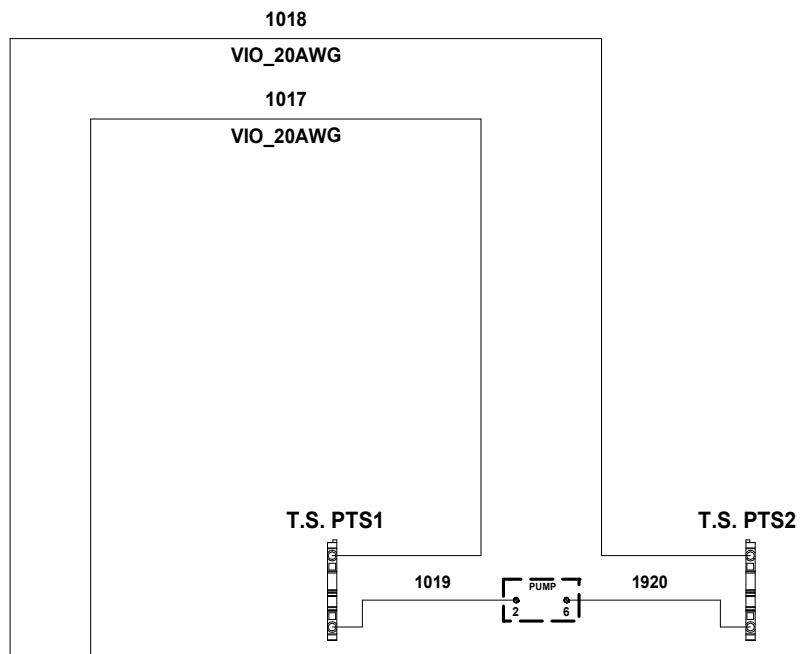
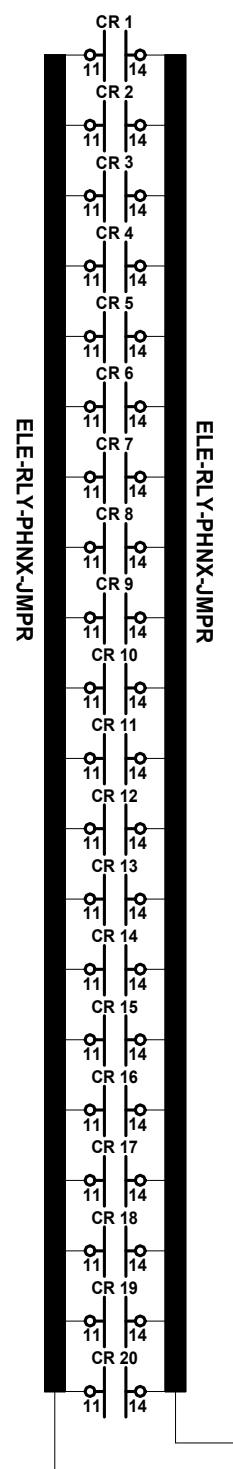
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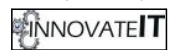
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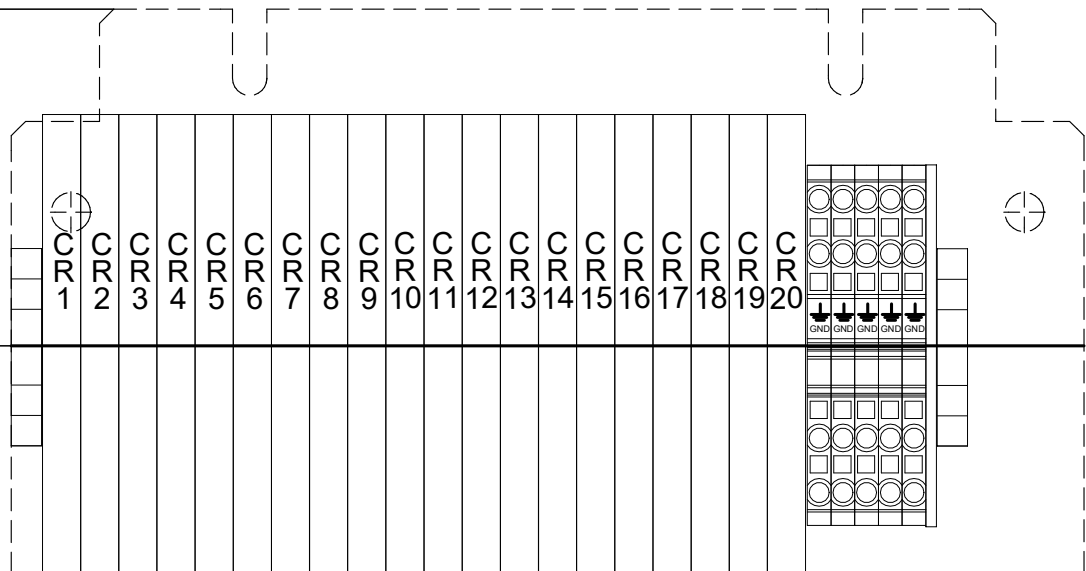
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