



Installation and Maintenance Manual

GPL Z10000

Natural Gas Odorization System

Patented



GPL Odorizers

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Thank you for your purchase of the GPL Z1000 Natural Gas Odorization System. In the pages to follow you will find the Installation and Maintenance manual for this product.

Please understand that failing to adhere to these instructions may result in the void of warranty, destruction of property, injury or even death. For your convenience, we have included a checklist on the following page to document the required annual maintenance for this unit.

If you are interested in learning more about our GPL Odorizers Maintenance Program to ensure that your unit remains functioning correctly, please call us today at (303) 927-7683. Our service contracts are a convenient and cost-effective way to protect your warranty coverage as well as your property.

Thank you for your trust in our products.

Brian Cox
General Manager
GPL Odorizers LLC

GPL Odorizer Maintenance Checklist

Equip ID (Serial Number)
 Location
 Date Acquired

Annual Maintenance Requirements **Date Performed** **Performed By (trained technician name)** **Notes**

YEARLY ANNUAL 1

Physical inspection
 Filter change
 Change O-rings on metering valve
 Computerized analysis (optional)
Observations, recommendations and plan of action resulting from inspection

YEARLY ANNUAL 2

Physical inspection
 Filter change
 Change O-rings on metering valve
 Computerized analysis (optional)
Observations, recommendations and plan of action resulting from inspection

YEARLY ANNUAL 3

Physical inspection
 Filter change
 Change O-rings on metering valve
 Computerized analysis (optional)
Observations, recommendations and plan of action resulting from inspection

Failing to adhere to the Installation and Maintenance Manual's instructions may result in the void of warranty, destruction of property, injury or even death. We recommend that the owner/operator of the equipment keep a detailed record of the equipment's maintenance and service.



Do not install, maintain, or operate this equipment without reading, understanding and following the proper GPL Odorizers instructions. Otherwise, injury or damage or both may result.

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Note

The information contained in this document is subject to change without notice.

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Safety Information

Please read the entire manual before attempting to unpack, set up or operate this product. Pay careful attention to all **Warnings**, **Cautions**, and **Notes**. Failure to do so could result in serious personal injury and equipment damage.

Use of Hazard Information

If multiple hazards exist, the signal word corresponding to the greatest hazard shall be used.

Definitions



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



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



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to personal injury, but that could lead to property damage.

NOTE: Information that requires special emphasis.

SHALL: This word is understood to be mandatory.

SHOULD: This word is understood to be advisory.

General Safety Precautions

Selection, Installation, and Use



Improper selection, installation, or use can cause personal injury or property damage. It is solely the responsibility of the user, through its own analysis and testing, to select products suitable for their specific application requirements, ensure they are properly maintained, and limit their use to their intended purpose.

Follow proper local, state and federal regulations for proper installation and operational requirements.

Always use caution and common sense when working with any chemical. Read the product label and MSDS carefully and follow the instructions exactly.

Potential Equipment Hazards



Hot surfaces! This equipment may have very hot surfaces. If an operator contacts a hot surface, injury may occur. Use protective clothing to prevent injury. If other equipment comes in contact with a hot surface, damage to the equipment may occur. Ensure the area around this equipment is kept clear to prevent damage from occurring.

High pressures! This equipment may contain fluids at very high pressures. Prior to installing, removing or maintaining this equipment, ensure that the equipment is isolated from all connecting piping, the equipment is depressurized, the contents have been drained, and the equipment is cool.



When changing any electrical or electronic parts, the power must be turned off, or the warranty is null and void.

Warning Labels

Location	Content
Power Strip	Before connecting power <ol style="list-style-type: none"> 1. 6A use 2. Wire Sized for 24VDC@6A 3. Isolated from Pipeline 4. Proper power protection 5. Conduit per Class I Division 2 Standards
Storage Tank	<p><i>(This tank has been pressure tested at the factory)</i></p> <p>Important procedure to follow before filling the tank with odorant: Evacuate air and pressure test prior to filling the tank with odorant.</p>

1. Specifications

Power	Odorizer: Typical: 24 VDC, 1.12 A Maximum: 24 VDC, 5.20 A HMI: Typical: 24 VDC, 0.13 A Maximum: 24 VDC, 0.39 A
Gas Pipeline Pressure	0 to 1480 psi (102 bar) max
Odorant Blanket Pressure	15 to 30 PSIG (1 to 2 BAR)
Odorant Injection Rate: Continuous*	0.50–50 cc/min (.008–.793 gal/hr.) at natural gas flow rate of .107–10.7 MMSCFH
Odorant Injection Rate: Batch	for natural gas flow rates below 100,000 SCFH down to virtually 0
Connections	Myers Hub: (3) 3/4" NPT; (2) 1/2" NPT; Odorant Outlet, Odorant Return, Odorant Inlet: 1/4" comp
User Interface Options	HMI via serial interface; TechView† via Ethernet or Internet; Serial RS-485 Modbus; Open/TCP Modbus via cell modem
Data Logging	Hourly archives; Audit trail
Enclosure	Odorizer: 304 Stainless Steel HMI: NEMA 4-X
Options	Wireless modem; battery pack; heater; solar panel, odorant tanks, and containments
Ambient Temperature	Odorizer: 0°F to 40°F (-18°C to 60°C); heater assembly option available for temperatures below 0°F (-18°C) HMI: -40°F to 122°F (-40°C to 50°C)
Shipping Weight	150 lb.
Hazardous Classification	Class I, Division 2, Groups C and D
Humidity	Odorizer: 15–95% HMI: 5–95%

*at injection rate of 0.5# odorant/MMSCF

†TechView is a freeware program from Emerson Process Management configured by GPL Odorizers for use with the GPL Z10000 odorizer.

2. Overview

The GPL Z10000 Natural Gas Odorization System is a feature-rich, complete odorization package that avoids the operational and functional complexities associated with other odorizers or the odorization process. Every action is intuitive and predictable. The GPL Z10000 is a proven system, working reliably in some of the most sensitive areas imaginable, including major cities that experience blizzard conditions year after year. Remote locations are also accommodated as virtually everything can be taken care of via communications features.

2.1 Principles of Operation

The GPL Z10000 automatically calculates and dispenses measured doses of odorant into natural gas pipelines proportional to the gas flow rate.

1. An odorant storage vessel is pressurized to about 25 psi. An upstream regulator or nitrogen source is commonly used.
2. Odorant moves from the vessel probe through the filter to the isolation valve.
3. The controller simultaneously sends *pump on* command and isolation *valve open* command which allows the odorant to flow and get pumped through the GPL Z10000 system into the pipeline.
4. If the controller needs to stop odorant injection into the pipeline, it simultaneously sends *pump off* and isolation *valve close* command.
5. As the pump operates, a flow meter measures the odorant flow rate.
6. The measured flow rate is communicated to the controller, and the pump speed is adjusted accordingly.
7. The system controller interfaces with the flow meter, gas flow information, local interface, remote interface, etc., to maintain a constant odorant injection proportional to the gas flow rate.

2.2 Continuous Mode

The continuous mode provides a constant flow of odorant into the stream at appropriate proportions. Continuous mode is used for gas flow rates higher than 100 MSCFH.

2.3 Batch Mode

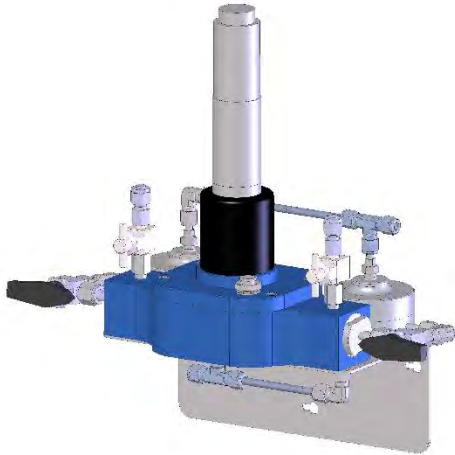
Batch mode periodically provides a small, metered dose of odorant, then shuts until a sufficient volume of gas has flowed to justify another batch to achieve desired injection rates. Batch mode is used for gas flow rates lower than 100 MSCFH.

2.4 System Components

There are three main elements to the GPL Z10000 Natural Gas Odorization System:

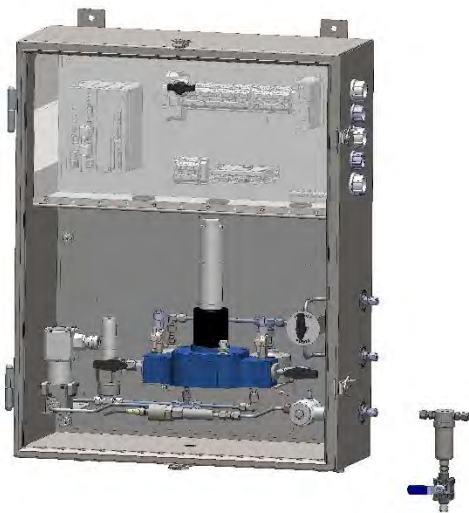
- GPL Z10000 Injector
- System controller
- Odorant storage vessel

2.4.1 GPL Z10000 Injector



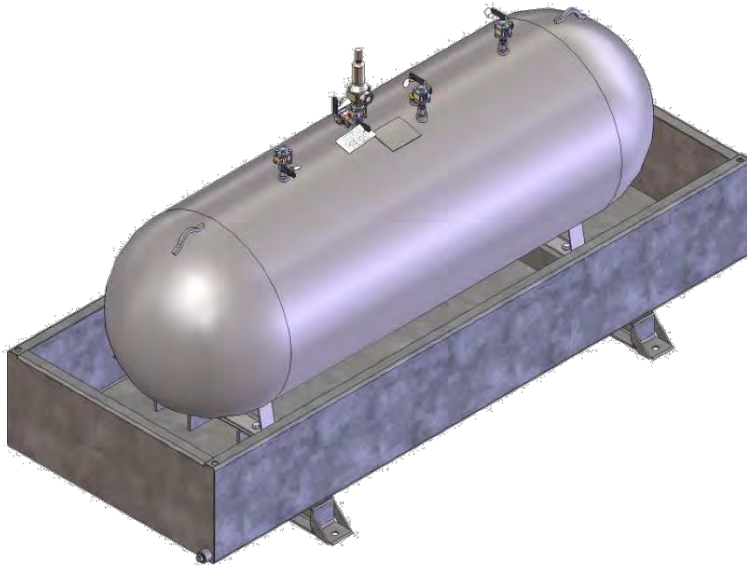
2.4.2 System Controller

The System Controller interfaces with the GPL Z10000 injector, precision odorant flow measurement and gas flow information, local interface, remote interface, etc., to maintain a constant odorant injection proportional to the gas flow rate.



2.4.3 Odorant Storage Vessel

The blanket pressure of the odorant storage vessel should be kept low—less than 30 psi. Regulated pipeline gas or nitrogen is commonly used. Odorant moves from the vessel probe through the filter to the isolation valve (that automatically closes with loss of pipeline pressure).



Note:

The customer must supply a pressure regulator/ relief device on the tank.

3. Installation



Qualified personnel should perform the installation by applicable state/ provincial and local codes and procedures.

3.1 Site Requirements

3.1.1 Unit Location

If possible install the GPL Z10000 at or below the odorant storage vessel. This allows further reduction of blanket pressures on the odorant storage tank.

3.1.2 Blanket Gas

Blanket pressure on the odorant tank provides the inlet pressure head to the pump to help prevent cavitation

- 15–30 psig needed
- Nitrogen or pipeline gas

Note:

The customer must supply a pressure regulator/relief device on the blanket gas port.

3.1.3 Electrical Power

- Typical: 24 VDC, 1.127 Amps
- Maximum: 24 VDC, 5.2 Amps

3.2 Equipment and Tools

Tools needed for installation of the GPL Z10000 include:

- Hydraulic Pump Bleed Kit (GPL Odorizers P/N 6-05488Q)
- Tube Fitting Tools
- Electrical Wiring Tools

Note:

A pressure switch prevents system damage by triggering an alarm and stopping operation of the unit if blanket pressure drops below recommended value.

3.3 Tubing

Once an appropriate location has been determined for the GPL Z10000 and the unit has been properly mounted, install the tubing per your company’s procedures and applicable code.

3.4 Wiring



Always disconnect power before servicing connections.

Use the guidelines below to wire any necessary connections. Please note that not every connection described in this section is used for every site. If you have any questions, please contact GPL Odorizers

Note:

Field wiring used for 24VDC input must be suitably rated.

3.4.1 Electrical Connections

1. With power off, open the enclosure and open the electronic access door.
2. Connect +24 VDC to TB-1, Terminal 1.
3. Connect -24 VDC to TB-1, Terminal 6.
4. Connect proper ground to ground bus bar located inside the enclosure.
5. Close the electronic access door.
6. Connect conduit per applicable code.

3.4.2 Wiring Termination

Alarm Output

Sends a pulse to the RTU to notify regarding an alarm state.

- TB-2, Terminal 7: +, 4–28 VDC
- TB-2, Terminal 6: -, 4–28 VDC

Pulse Output

Used to monitor odorant usage by sending pulses to an RTU / external counter after a set volume

has passed.

- TB-2, Terminal 5: +, 4–28 VDC
- TB-2, Terminal 6: -, 4–28 VDC

High-Speed Counter Input

Used for pulsed flow signal.

- TB-2, Terminal 11: +, 4–28 VDC
- TB-2, Terminal 10: -, 4–28 VDC

Note:

Wiring the High-Speed Counter Input to the GPL Z10000 power strip is not recommended as this increases the potential for signal interference.

3.4.3 Flow Signal and Level Gauge Signal

If you are using a 4–20 mA flow signal or level gauge signal, wire the connections to the second terminal block as follows:

Gas Flow Signal

- TB-2, Terminal 12: +, 4–20 mA
- TB-2, Terminal 13: -, 4–20 mA

Tank Level

- TB-2, Terminal 14: +, 4–20 mA
- TB-2, Terminal 13: -, 4–20 mA

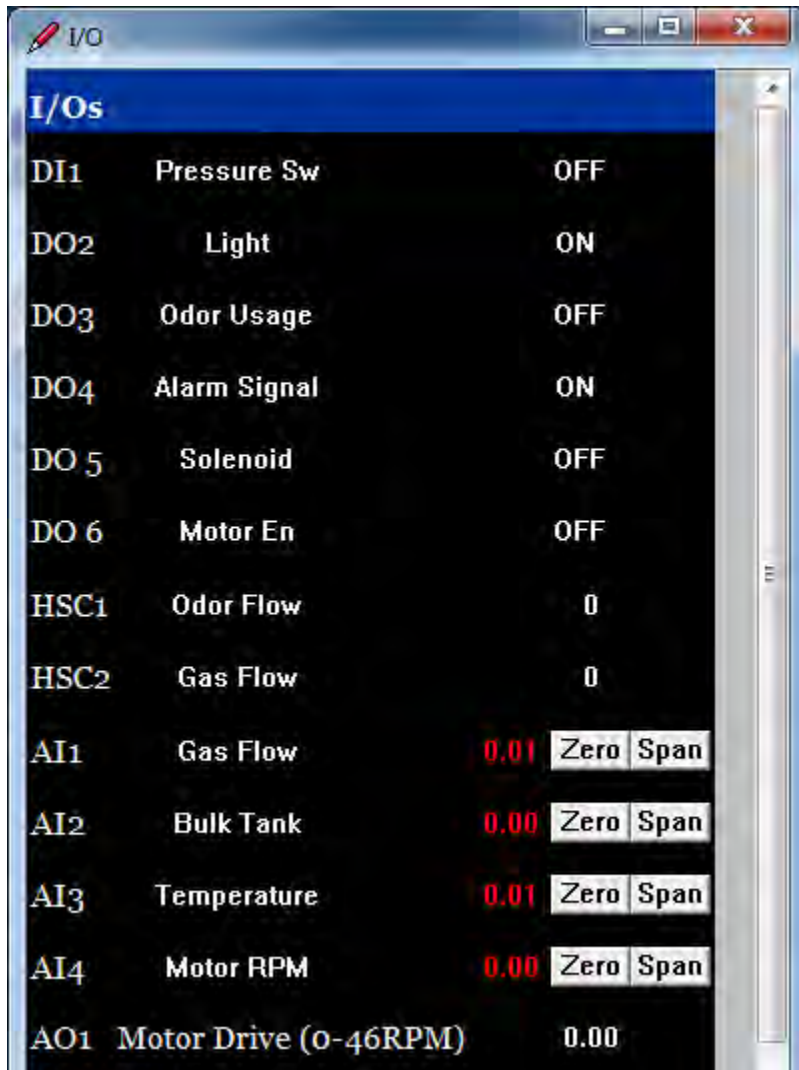
3.4.4 Modbus RS-485 Wiring

Modbus RS-485 protocol is used to monitor the real-time status of the GPL Z10000 natural gas odorizer. Wire the connections to the third terminal block as follows:

- TB-3, Terminal 5: +, RS-485
- TB-3, Terminal 4: -, RS-485

3.4.5 I/O Signal Verification

The TechView I/O page allows verification of I/O signals to the GPL Z10000. The status of DI and DO pins can be seen and verified. See the image below for an example of the I/O screen.



Analog inputs are calibrated using the zero and span buttons.

1. Apply 4 mA. Click zero.
2. Apply 20 mA. Click span.

The only signals that are available to the customer are Odor Usage (DO3), Alarm (DO4), Gas Flow (HSC2 or AI1), and in some cases Bulk Tanks (AI2). Others are verified in the factory and should not be modified in the field except under advice from technical support.

3.4.6 External HMI (optional)

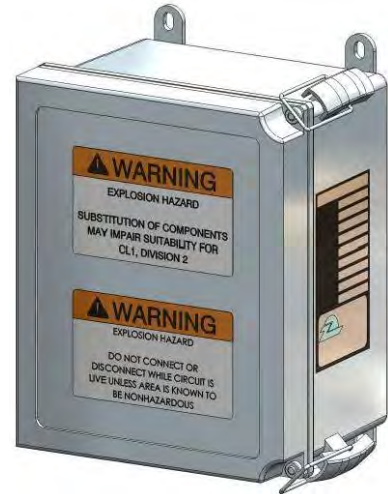
1. With power off, open the external HMI enclosure.
2. Connect +24 VDC to TB-1, Terminal 1.
3. Connect -24 VDC to TB-1, Terminal 2.
4. Connect proper ground to TB-1, Terminal 3.
5. The customer must provide an Ethernet cable to establish proper communication between

Note:

Field wiring used for 24VDC input must be suitably rated.

the external HMI and GPL Z10000 odorizer.

6. Open external HMI enclosure and connect one end of the Ethernet cable to port labeled MJ2 located on the right side of the HMI controller.
7. Run the Ethernet cable through code applicable conduit from the external HMI to the GPL Z10000 enclosure and connect the other end to the RJ45 patch panel located inside the enclosure.
8. Close external HMI access door.



3.5 Leak Testing

After installing the tubing and wiring, all the tubing and fittings connected to the system need to be leak tested. During leak testing, pipeline pressure is slowly brought back to the bulk tank.

1. Apply nitrogen (or pipeline gas or instrument air) to the odorant supply line. Check for leaks on line leading from the bulk storage tank to the odorizer.
2. Open isolation valve through the software override in TechView.
3. Check for leaks within the odorizer enclosure.
4. Open the valve at pipeline to check for leaks from the Pipeline back to the odorizer enclosure.
5. Check for leaks back to the enclosure.
6. Place isolation valve back in normal service through the proper screen in TechView.

Note:

Before beginning leak/pressure testing, be sure that all valves are closed.

3.6 Unit Configuration

There are three different options available for configuring the GPL Z10000:

- Remote configuration by a GPL Odorizers Technician (requires a modem)
- Configuration on a computer connected to the odorizer (TechView)
- Configuration using the external HMI

3.6.1 Remote Configuration

To have the GPL Z10000 configured remotely by a GPL Odorizers technician, please contact GPL Odorizers a minimum of one week prior to startup. The following information is required for remote configuration:

- Planned startup date
- IP address for Wireless modem
- Desired configuration settings (see the GPL Z10000 User’s Manual for details)

3.6.2 TechView

Please see the GPL Z10000 User’s Manual for instructions on configuring the odorizer using TechView.

3.6.3 External HMI

Please see the GPL Z10000 User’s Manual for instructions on configuring the odorizer using the external HMI.

3.7 Warm Start / Hydraulic Bleed

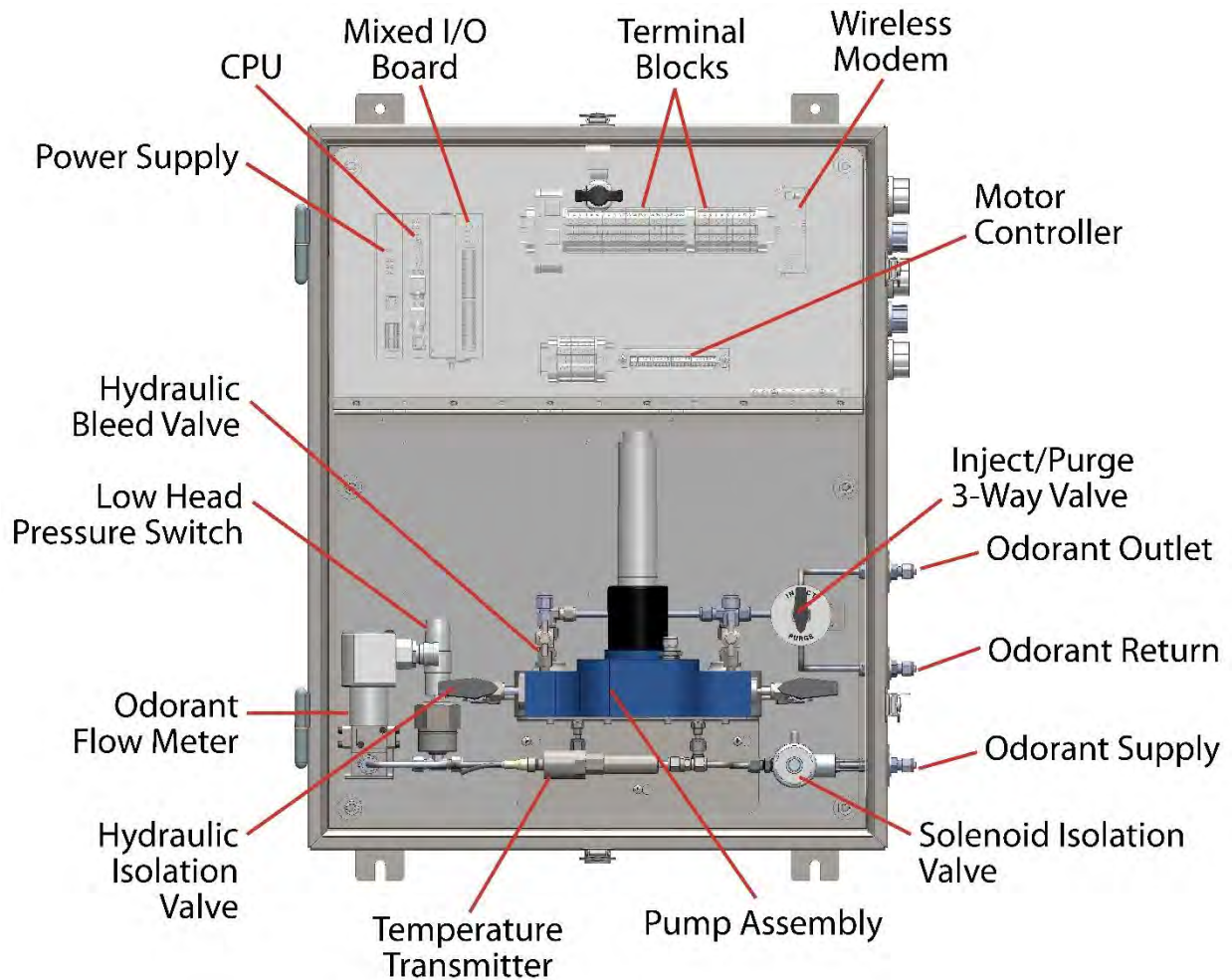
After the tubes and fittings have been leak/pressure tested and the unit has been configured, the odorizer is ready to be started.

1. Ensure the main odorant valve on the storage tank is open, as well as the valve for the odorant prime/purge return circuit.
2. Move the Inject/Purge valve (KK) to the “Purge” position.
3. On a local display or TechView, go to the Startup Screen and set the motor speed to 5 RPM, then enable the motor.
4. Using the attached compression fittings on the hydraulic bleed tool, secure the tubing of the bleed tool to each end of the bleed valves (CC). Open each bleed valve. Gently pull back on the syringe to create a slight vacuum on each side of the pump. Allow the pump to run with the vacuum, and wait until no bubbles are seen in the bleed tubing for several minutes.
5. Close each bleed valve when the fluid level on the respective side reaches its lowest point.
6. Increase Prime motor speed to 25 RPM. Allow pump to run again for several minutes, observing the pump efficiency.
7. Continue to run, or repeat steps 4–7 until efficiency is consistently over 85% (0.85), and then disable pump prime.
8. Move the Inject/Purge valve (KK) to the “Inject” position.
9. Verify solenoid override is in auto (from leak testing).
10. Turn Unit on.

Note:

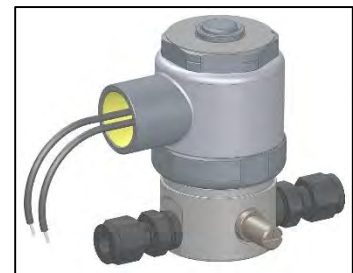
Refer to drawing 10-05072H.

4. Mechanical Overview



4.1 Solenoid Isolation Valve

The solenoid isolation valve on the GPL Z10000 is an electric solenoid valve. When the solenoid is electrically charged, it opens and allows the odorant to flow.



SIV

4.2 Positive Displacement Flow Meter

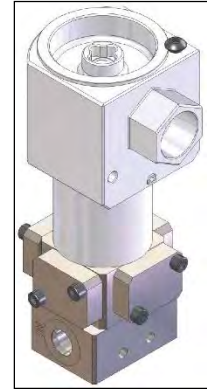
The positive displacement flow meter is what provides feedback to the controller to ensure the proper amount of odorant is being injected.



4.3 Hydraulic Pump Assembly

A brushless DC servo actuates the pump. Its speed varies according to odorization requirements.

The pump actuates bellows hydraulically. The odorant and the hydraulic system are separated by the bellows, thereby allowing the entire pump assembly to be serviced without contacting odorant.



OFM

4.4 Bellows Capsules

The bellows capsules allow complete isolation of wear parts from the odorant. Inside each capsule there are ceramic check valves and the hermetically welded stainless steel bellows.



Pressure Switch

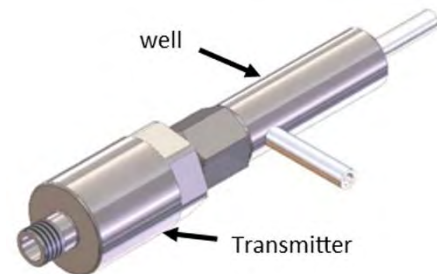
Diaphragm Assembly

4.5 Pressure Switch

The pressure switch ensures that the pump does not run without adequate head pressure. If the head pressure falls below 10 psig, the pressure switch closes. This triggers the motor controller to shut off the motor. The motor resumes pumping once the head pressure of 10 psig is restored, opening the pressure switch.

4.6 Temperature Transmitter

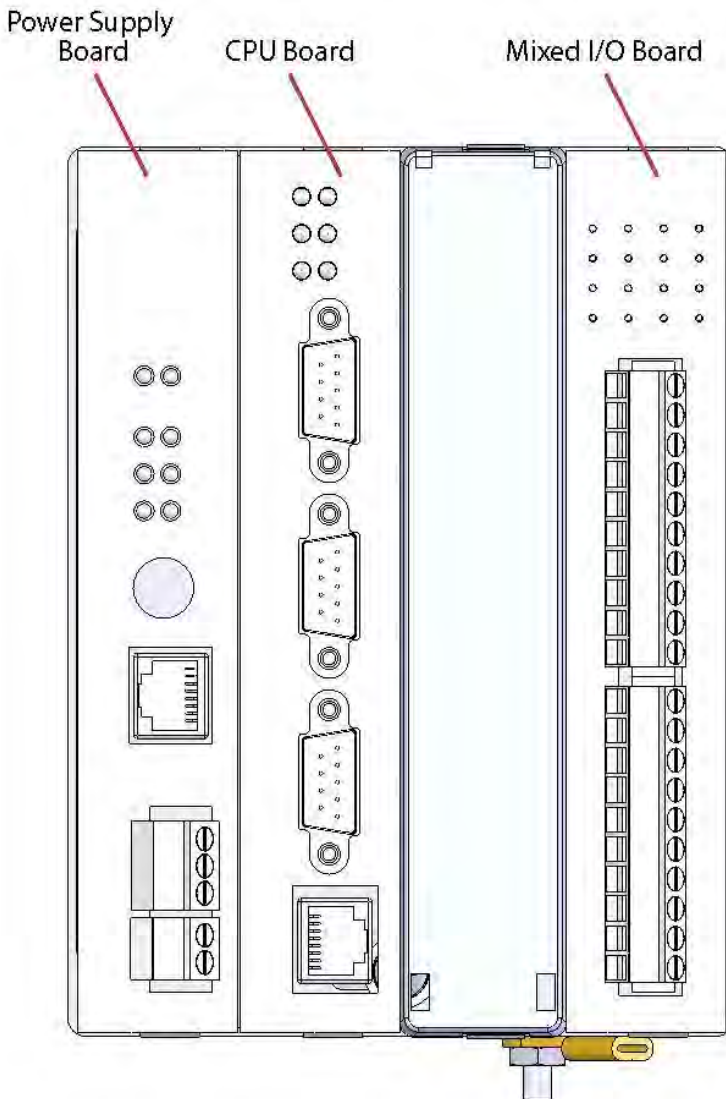
The Temperature transmitter measures the temperature of the incoming odorant, providing compensation for temperature induced density changes.



well

Transmitter

4.7 Control Boards



DANGER When changing any electrical or electronic parts, the power must be turned off, or the warranty is null and void.

5. Hydraulic Pump Maintenance



Do not damage seals or sealing surfaces. Seal failure can result in inadequate pump volume or odorization failure. To prevent damage to these surfaces, use soft vice jaws to hold components.

When assembling or disassembling the hydraulic pump, be careful to avoid damage to the seals and the sealing surfaces. If significant damage is incurred, seal failure can result in inadequate pump volume or odorization failure. Use soft vice jaws whenever a component needs

Note:

Refer to drawing 10-05072H.

to be held, and clean and degrease all sealing surfaces before reassembly.

Unless otherwise noted, lubricate all threads with a copper grease, such as Loctite C5-A, to prevent seizure.

Use a calcium based grease, such as JetLube 35050, on all O-rings, seals, and sealing surfaces when assembling.

When performing maintenance, the pump should be removed from the mechatronic enclosure and moved to a clean area.

5.1 Maintenance cycle

The hydraulic pump assembly, which includes the motor and gearbox, is designed to go without maintenance for 3 million cycles, or 1 year, whichever comes first.

5.1.1 Pump Removal

To remove the pump from the mechatronic enclosure:

1. Ensure that the unit is turned off.
2. Open the electronic assembly door, and disconnect the wires leading from the motor/gear box (F) to the motor controller (MM). Remove the ground wire.
3. Close the electronic assembly door and also close the two hydraulic isolation valves on either side of the pump (AA).
4. Using an 11/16th or adjustable wrench, loosen the nuts connecting the isolation valves (AA) to Piston chamber outlet fittings (T).
5. Loosen and remove the two #10-32 Socket Head cap screws from the bottom of the pump (RR).
6. The pump body can now be pulled out of the mechatronic enclosure. Note that hydraulic fluid can leak out of the pump body at this point; take care to minimize spills and drops of the fluid.

5.1.2 Piston Seal Service

To replace the piston seals within the pump housing:

1. Using a ¼" Allen wrench, loosen and remove the 4 socket head cap screws (S) from the pump housing lid (U).
2. The lid (U), which is bolted to the Drive shaft housing (V) and motor/gearbox (F), can now be pulled up from the pump body. Note that the inner hydraulic chamber is filled with hydraulic fluid and the Cam roller bearing (K) and crankshaft (X) are covered in oil. Take care to avoid drips and spills.
3. The hydraulic fluid in the pump body can now be poured into a large bowl or container. Dispose of the fluid in the proper manner.
4. Remove the Scotch Yoke bearing housing (J) by pulling the part straight upwards from the body. Inspect and clean the bearing housing, and look for signs of excessive wear.

5. Remove each of the pistons (H) by pulling straight back from the cavity they are inserted in. Take care that the pistons are not scratched or damaged during disassembly. Inspect and clean the pistons, and look for signs of excessive wear.
6. Using a 1- 1/16" or adjustable wrench, loosen and remove the Piston Chamber outlet fittings (T) on either side of the pump.
7. Using a 5/16" Allen wrench, loosen and remove the Hydraulic seal cartridge housings (M) from each side of the pump body. Ensure that the O-rings that are at the end of each housing are removed with the seal cartridges. Dispose of the used cartridges.
8. Unpackage the new Hydraulic seal cartridges and using Loctite 222, install and torque the new housings to 5 ft. - lbs. (6.8 N-m) in each end of the pump body.
9. Reinstall the pistons (H) into each cavity, making sure to lubricate the pistons before insertion.
10. Reinstall the Scotch Yoke bearing housing (J), making sure that each piston is reattached to the housing.
11. Using a 1- 1/16" or adjustable wrench, install the Piston Chamber outlet fittings (T) on either side of the pump, and torque to 1 ft-lb (1.4 N-m).
12. Fill the pump body with Hydraulic fluid #41 (6-05488R), moving the piston back and forth, priming each chamber. This results in some hydraulic fluid being pumped out of each Piston Chamber outlet fitting (T).
13. Reinstall the pump lid (U), which contains the crankshaft (X), cam bearing (K), and motor/gearbox (F). Ensure the cam bearing is inside the scotch yoke bearing housing (J).
14. Align the pump lid (U), with the four holes for the ¼"-20 Socket head cap screws(S).
15. Install with Loctite 222 the 4 socket head cap screws(S), and torque to 6 ft.-lbs.
16. Move the pump assembly back into the main mechatronic enclosure.
17. Reinstall the wire leads from the motor (F) to the motor controller (MM).
18. Reinstall and tighten the two nuts from the piston chamber outlet fittings (T) to the hydraulic isolation valves (AA).
19. Open the hydraulic isolation valves (AA).
20. Follow instructions in section 3.7 for bleeding of the hydraulics.

5.2 Pump Odorant Purge

In some cases, it may be necessary to drain and purge all odorant from the GPL Z10000 assembly and back into the bulk tank.

NOTICE

Do not send high-pressure purge gas (either nitrogen or pipeline gas) through the GPL Z10000. The positive displacement flow meter can be damaged if higher pressures are used.

1. Ensure the GPL Z10000 is in standby mode and that the startup page with isolation valve override is open.
2. Turn the purge/injection 3-way valve (KK) to the purge position.
3. Close the odorant supply valve on the bulk storage tank.

4. Shut the blanket gas valve on the bulk storage tank.
5. Open the odorant prime/purge return valve on the bulk storage tank.
6. Change the blanket gas regulator to 5–10 psig over the current tank pressure, if blanket gas is used to purge. (If an external source is used, make sure it is regulated to 5–10 psig over the current blanket pressure, and tube the source after the odorant supply valve on the bulk tank.)
7. Open the odorant line purge valve.
8. Override the solenoid valve on the startup page. This allows the gas in the odorant line purge valve to force all odorant in the GPL Z10000 out and back into the bulk storage tank.
9. Wait several minutes to ensure all odorant has been purged into the storage tank.
10. Close the odorant line purge valve.
11. Close the odorant prime/purge return valve on the bulk storage tank.

6. Recommended Spare Parts



Refer to drawing 10-05072H at the end of this manual for the spare parts list.

7. Accessories

Item	Part Number
Heater *	6-05568E 6-05568D
Wireless Modem	6-05568C
Odorant Visual Indicator	7-04733A
External HMI	7-04578K

* Note: For heater accessory customer to provide fused disconnect sized in accordance with local code.

8. Standard Warranty

GPL Odorizers (“Seller”) warrants products manufactured by it and supplied hereunder to be free from defects in workmanship and, to the extent materials are selected by Seller, to be free from defects in materials, in each case for a period as defined in the table below:

Product Line	Warranty Period
GPL Odorizers	Eighteen months from date of shipment or twelve months from startup (whichever occurs first)
Odorizer Bellows Pump Module	Eighteen months from date of shipment

If within such period any such products shall be proved to Seller’s satisfaction to be defective, such products shall be repaired or replaced at Seller’s option. Seller’s sole obligation and Buyer’s exclusive

remedy hereunder shall be such repair and replacement and shall be conditioned upon Seller's receiving written notice of any alleged defect within 10 days after its discovery and, at Seller's option, return of such product to Seller, FOB GPL Odorizers' factory or provision of evidence (e.g., photographs) of such defect satisfactory to Seller.

Warranty Conditions & Limitations

This Warranty shall not apply to any GPL Odorizers entry product which, in the opinion of GPL Odorizers, has been (a) altered or repaired in a manner affecting the efficiency or performance of the unit or (b) incorrectly installed or operated or (c) damaged in shipment or (d) damaged by flood or fire or (e) if the serial number is missing, altered or defaced.

Any materials required to be used by Seller as provided in customer specifications or instructions are excluded from the foregoing warranty and customer assumes sole responsibility for the selection of such materials. Customer further acknowledges and agrees that, to the extent Customer requests that GPL Odorizers make any recommendations with respect to materials to be used in connection with products, Seller may rely on published reference literature, that any references based on third-party studies may not correlate directly with the end user's intended usage or process (i.e., chemical composition, concentrations, temperatures, etc.), and that Customer is solely responsible for the final determination with respect to which materials are to be used in connection with the products.

EXCEPT FOR THE LIMITED WARRANTIES SET FORTH HEREIN, SELLER HEREBY DISCLAIMS ANY AND ALL WARRANTIES AND REPRESENTATIONS (EXPRESS OR IMPLIED, ORAL OR WRITTEN), INCLUDING ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE WHETHER OR NOT SELLER KNOWS, OR HAS REASON TO KNOW, HAS BEEN ADVISED, OR IS OTHERWISE IN FACT AWARE OF ANY SUCH PURPOSE, WHETHER ALLEGED TO ARISE BY LAW, BY REASON OF CUSTOM OR USAGE IN THE TRADE, OR BY COURSE OF DEALING OR PERFORMANCE. Without limiting the generality of the foregoing, Seller makes no warranty regarding ability of products sold hereunder to withstand erosion or corrosion, or regarding material compatibility of elastomers in specific services, and no warranty made hereunder shall apply to products which have been subjected to adverse storage.

The owner shall be responsible for maintenance of his equipment. Wear or damage caused by lack of normal maintenance or misuse of equipment shall not be considered as defective workmanship and material.

If a part requires replacement during the warranty period, the part must be returned to GPL Odorizers for credit or the customer will be responsible for paying for the replacement part(s).

GPL Odorizers and its subsidiaries reserve the right to make product design changes or improvements without notice and without imposing any obligation upon itself to install these changes or improvements on its products previously manufactured.

This warranty is for the sole benefit of the original purchaser and is not transferable unless agreed to in writing by GPL Odorizers.

Receiving Shipments (including loss or damage by transportation)

It is the customer's responsibility to check for missing cartons and/or sign of damage to cartons. If found, the customer should note missing and/or damaged boxes on the delivery receipt and have a delivery receipt signed by the representative of the transportation company. If unpacking discloses concealed damage from rough handling, the customer should request a concealed damage inspection from the transportation company.

The GPL Odorizers Customer Service Department will aid your organization in any claim proceeding for shortages or damages in shipment, but it is the receiver's responsibility to file a claim with the carrier for damage or loss.

Liability Limitation

IN NO EVENT, WHETHER FOR BREACH OF WARRANTY OR OTHER CONTRACT BREACH, NEGLIGENCE OR OTHER TORT, OR ON ANY STRICT LIABILITY THEORY, SHALL GPL ODORIZERS., ITS SUBSIDIARIES OR ITS SUPPLIERS BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING BUT NOT LIMITED TO DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION, OR OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF, OR INABILITY TO USE, THE PRODUCTS, EVEN IF GPL ODORIZERS. OR ANY OF ITS SUBSIDIARIES, HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Customer Actions for Claims on Products during the Warranty Period

1. Contact the Customer Service Department, GPL Odorizers, Wheat Ridge, CO, Telephone: 303-927-7683, to obtain a Return Material Authorization (RMA) number.
2. You will be sent an "RMA" and a "Decontamination Statement" that is required to be filled out and returned with the equipment.
3. The following information must appear on the outside of the package:
 - RMA number is marked on the outside of the box.
 - Decontamination Statement filled out and attached to the outside of the box.
4. Return defective equipment FREIGHT PREPAID. Collect shipments will be refused.
5. The factory will not process warranty claims until the customer has properly accomplished the above items.
6. The GPL Odorizers factory may accept the entire claim, a part of the claim or none of the claim if our inspection of returned parts proves the failure was for reasons other than defective material or factory workmanship.

Important Notes:

1. *GPL Odorizers will not be responsible for damage incurred during the return shipment.*
2. *All returns subject to inspection and a minimum \$100.00 evaluation fee for any products found not to be defective.*
3. *This RMA is not authorization for credit. Credits and/or replacements will be issued upon*

evaluation of returned goods.

- 4. RMA is valid for thirty (30) days from issue date.*

9. Factory Assistance

GPL Odorizers manufactures environmentally-friendly odorant injection systems for natural gas and other gases.

Please do not return any equipment before discussing your application problem with a GPL Odorizers representative and obtaining a Return Authorization.

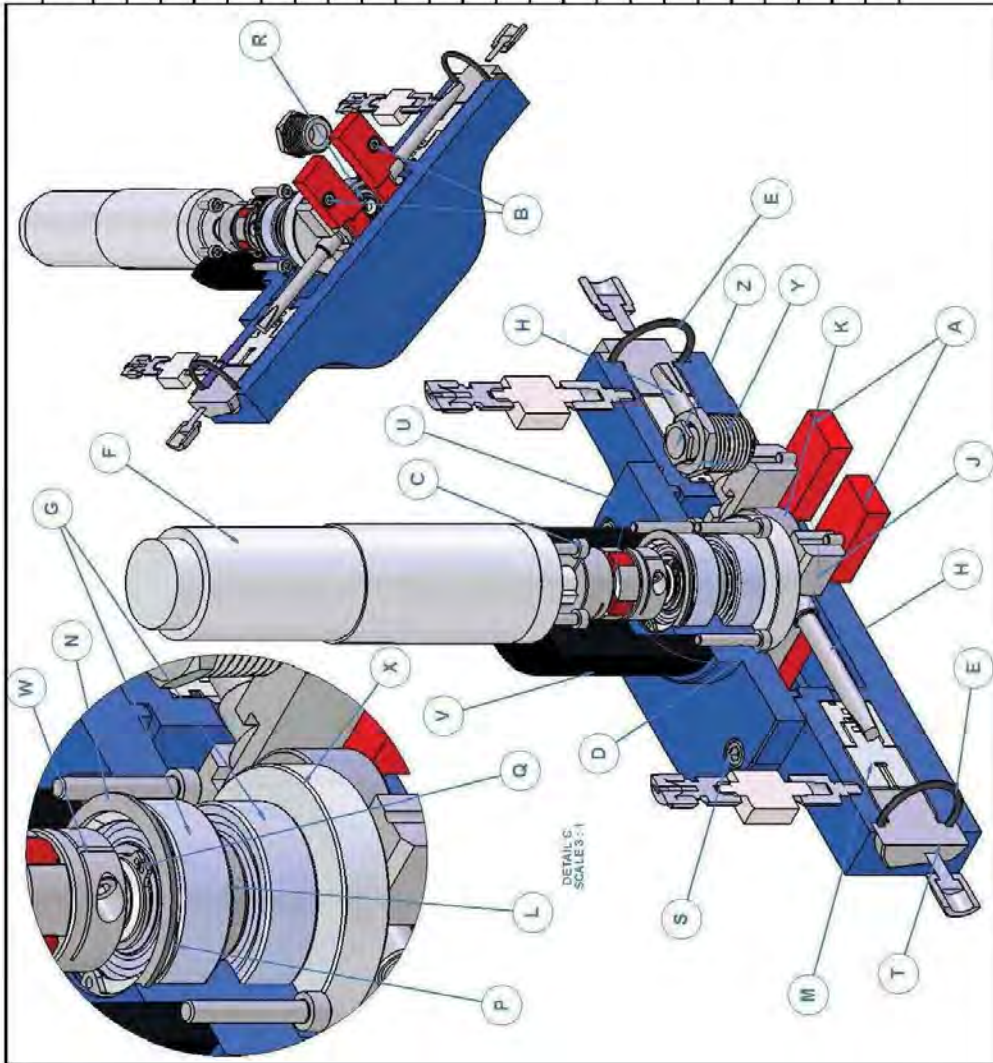
GPL Odorizers has a dedicated staff of trained Service Department associates to assist customers with any problems. Please call GPL Odorizers at 303.927.7683 and request a service representative.

For other sampling applications, your GPL Odorizers representative is eager to help you. Please feel free to call your representative or contact GPL Odorizers to discuss your application.

GPL Odorizers LLC
11919 W. I-70 Frontage Rd. North Unit #119
Wheat Ridge, Colorado 80033
Phone: 303.927.7683
E-mail: info@gasodorizer.com

10. Drawings

See the following two pages.



ITEM	DESCRIPTION	PART NUMBER	QTY
A	LINEAR GUIDE	2-07492J	2
B	SOCKET HEAD CAP SCREW, M4 x 12	-	4
C	SOCKET HEAD CAP SCREW, M4 x 16	-	4
D	SOCKET HEAD CAPSCREW, M4 x 25	-	4
E	O-RING, OUTLET FITTING	4-06330M	2
F	MOTOR / GEARBOX	4-06152M	1
G	CRANKSHAFT BEARING	4-06330A	2
H	PISTON	2-07492F	2
J	BEARING HOUSING, SCOTCH YOKE	2-07492D	1
K	BEARING, CAM ROLLER	4-06330E	1
L	HYDRAULIC WIPER SEAL	4-05330L	1
M	HYDRAULIC SEAL CARTRIDGE	6-0526H	2
N	1-3/8" INTERNAL RETAINING RING	4-06154G	1
P	BEARING PRELOAD WAVE SPRING	4-06154H	1
Q	RETAINING SPRING - 15MM	4-06254N	1
R	RETAINING SPRING - 10MM	4-06330D	1
S	SOCKET HEAD CAP SCREW, 20 x 1	-	4
T	PISTON CHAMBER OUTLET FITTING	6-0526A	2
U	PUMP HOUSING LID	2-07492B	1
V	DRIVE SHAFT HOUSING	2-07492C	1
W	FLEXIBLE SHAFT COUPLING	4-06330G	1
X	CRANKSHAFT	2-07492E	1
Y	REDUCING ADAPTER TO 1/2" NPT	4-06330J	1
Z	BREATHER VENT TO 1/2" NPT	4-06330Z	1

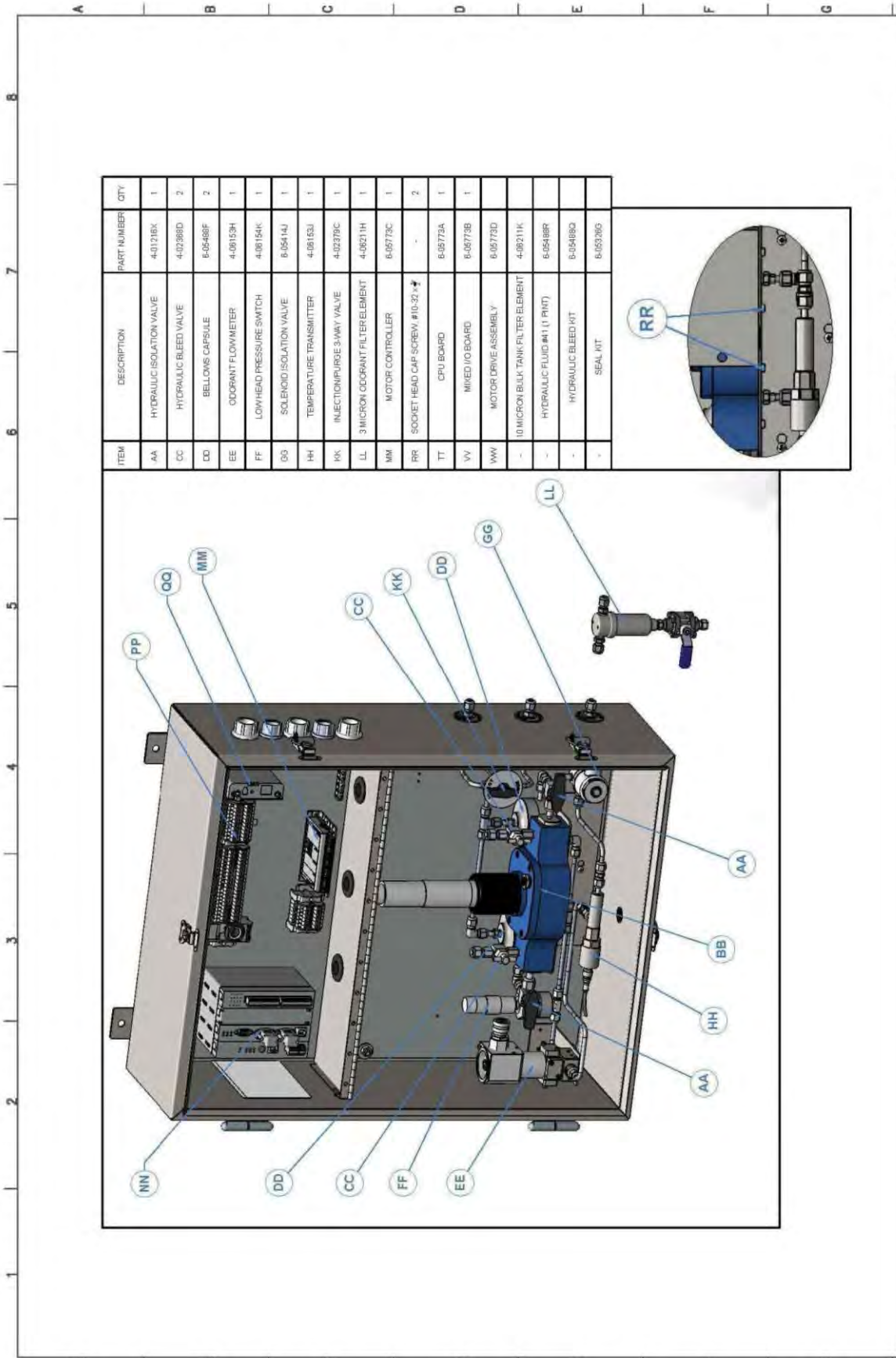
NOTE: DO NOT SCALE DIMS. THIS DRAWING IS FOR IDENTIFICATION PURPOSES ONLY. IT IS NOT TO BE USED FOR MANUFACTURING OR REPAIR. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE DIMENSIONS OF ALL PARTS AND ASSEMBLIES.

GPL ODORIZERS
WHEAT RIDGE, CO 80033 USA

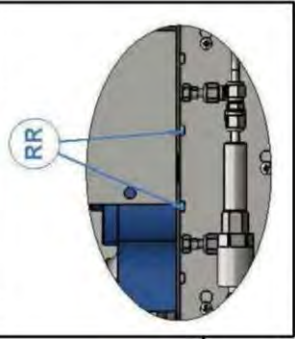
SHEET 1 OF 2

REVISIONS

NO.	DATE	DESCRIPTION
1		



ITEM	DESCRIPTION	PART NUMBER	QTY
AA	HYDRAULIC ISOLATION VALVE	4-012BK	1
CC	HYDRAULIC BLEED VALVE	4-0228BD	2
DD	BELLOWS CAPSULE	6-0548BF	2
EE	ODORANT FLOWMETER	4-06153H	1
FF	LOW HEAD PRESSURE SWITCH	4-06154K	1
GG	SOLENOID ISOLATION VALVE	6-05414J	1
HH	TEMPERATURE TRANSMITTER	4-06153J	1
KK	INJECTION/PURGE 3-WAY VALVE	4-02379C	1
LL	3 MICRON COAGULANT FILTER ELEMENT	4-06211H	1
MM	MOTOR CONTROLLER	6-0573C	1
RR	SOCKET HEAD CAP SCREW #10-32 x 1/2	-	2
TT	CPU BOARD	6-05773A	1
VV	MIXED I/O BOARD	6-05773B	1
WW	MOTOR DRIVE ASSEMBLY	6-05773D	1
-	10 MICRON BULK TANK FILTER ELEMENT	4-06211K	
-	HYDRAULIC FLUID #1 (1 PINT)	6-05488P	
-	HYDRAULIC BLEED KIT	6-05488Q	
-	SEAL KIT	6-05328G	



REVISIONS

NO.	DATE	DESCRIPTION
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NOTE: DO NOT SCALE DWG.

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 WHEAT RIDGE, CO. 80033 USA

SHEET 2 OF 2