DynaPak Gas Sampler

SYSTEM SUPPORT MANUAL

DP-2100

With Z-100 Controller

Options: N, L, D, F, K, R, X, J, H

YZ SYSTEMS

An Ingersoll Rand Business

DP-2100
Instruction & Operating Manual

Version: 10-2025

DP-2100 Table of Contents

DP-2100 Table of Contents

Section 1: First Things To Know About The DynaPak

How to Use this Manual

The DP-2100 Operations Manual is a step-by-step guide containing the procedures needed to work with the DP-2100 System.

The DynaPak System Series of samplers implement the most advanced technology available in the industry. It is recommended that the technicians working with the DynaPak Systems study the manual prior to initiating work on the system for the first time.

Typographic Conventions

To aide in readability, this manual uses several typographic conventions. References to illustrations, photographs, and other related content will appear in italicized text along with the location of where to find the item in the manual. Digital versions of the manual, available in Adobe Acrobat™ PDF format, will be highlighted further in blue italic text indicating the copy retains a hyperlink to the referenced item.

Measurement units are listed in italic parenthesis text following their US standard equivalent. As an example, for defining a distance, 15′ (4.5 meters), is how the text will appear throughout the manual.

Items that require action, for example the pressing of a key for programming the controller, will feature the action item in sentence case Bold Text followed in normal text by the item such as, the Up Arrow key or Main Power switch.

Getting Help

This manual provides solutions to typical questions about the DP-2100 system. If the answer can not be found within this manual, contact YZ Systems at:

For Technical Support: 1-281-362-6500
1-800-NJEX-HELP
(1-800-653-9435)
Email: techsupport@yzsystems.com

When calling, have this manual close at hand. Whether calling or writing, please include in your communique the following information:

- The serial number of the DynaPak System and the version number of this manual. The serial number is located on the inside of the enclosure door. The version number of this manuals located at the bottom of each page.
- A description of the problem and, if applicable the actions of the technical personnel when the problem occurred.

Section 1: First Things To Know About The DynaPak

Operation Specifications

Maximum Output:	5,760 cc/day* (5.76 liters/day)
Maximum Operating Pressure:	1,500 psig (103 Bar (g))
Pump Displacement:	.2 - .4 cc/Stroke
Operating Temp Range:	0˚ to 140˚F. (-17˚C to 60˚C)
Power Supply:	Internal Battery Pack*
Flow Signal:	Pulse (Dry Contact or Voltage Pulse)
	Analog (4-20mA)

*The **External Power Option** can be used in lieu of the internal battery pack. The External Power Option (model#EPO-120) consists of an AC to DC converter and intrinsically safe barrier to convert 120 VAC power to 28 VDC to operate the controller without the use of the internal battery pack.

Theory of Operation

The DynaPak 2100 Sampler is a pipeline mounted system which uses the pneumatically operated, positive displacement DynaPak 2000 pump, the Z-100 timer/controller, the YZ filter/regulator and a low power solenoid valve to obtain gas samples. The 2100 provides three modes of operation:
The off time interval is entered in menu screens as shown in page 13.

Time-based Sampling:

- In this mode of operation, the 2100 extracts a gas sample from the pipeline at regular time intervals. The volume of the sample is set by the operator using the volume adjustment feature of the DP-2000 pump. The Z-100 controller operates as a recycling timer, periodically energizing a low power solenoid valve. Energizing the solenoid valve allows actuation gas to stroke the DP-2000 pump. The rate at which this occurs is a function of operator input. The modes are used to set the off time interval. The number of times the solenoid output is activated is recorded by the onboard LCD stroke indicator.

Proportion-to-Flow 4-20mA Analog Sampling:

- In Analog mode, the Z-100 controller monitors a 4-20mA signal and operates the pump at a rate proportional to the 4-20mA signal as configured in the proportional to flow settings. See Section 5, Analog mode.

Proportion-to-Flow Pulse Counter Sampling:

- In this mode of operation, the Z-100 counter operates as a dividing counter. The Z-100 counter periodically energizes a low power solenoid valve. As in the other two modes of operation, this allows actuation gas to stroke the DP-2000 pump. The rate at which this occurs is a function of operator input as well as the host computer or other device that inputs pulses per volume metered. The modes on the Z-100 are used to set the number of pulses the counter will count before activating the solenoid output. The number of times the solenoid output is activated is recorded by the onboard LCD stroke indicator. Sample volume is again controlled using the DP-2000 volume adjustment knob.
- In all three modes of operation, the Z-100 timer/counter operates using a replaceable internal battery pack. The battery pack condition is monitored by way of two indicator LEDs. When the battery pack needs replacement, the red LED will illuminate when the solenoid output is activated. If the battery pack is good, the green LED will illuminate when the solenoid is activated.

Section 1: First Things To Know About The Dynapak

System Accessories

1. **The External Power Option** can be used in lieu of the internal battery pack. The External Power Option (model # EPOZ) consists of an AC to DC convertor and intrinsically safe barrier to convert 120 VAC power to 24 VDC to operate the controller without the use of the internal battery pack.
2. **The Solar Power Option** would be used in lieu of the internal battery pack. The Solar Power Option (model #SPO-12) consists of a 5 watt solar panel with RM-12 charger regulator module and internal 12V, 5 Amp hour battery pack.
3. **DuraSite,** portable DOT approved constant pressure sample vessels. Available in 150, 300, 500, 800, and 1000 cc sizes.
4. **SC-Spun Vessel,** portable DOT approved (1800 psi maximum working pressure), sample vessels. Available in 300, 500, and 1000 cc sizes.
5. **KK-1, KK-2, & KK-3,** carrying cases for DuraSites that meet DOT requirements for transporting portable sample vessels.
6. **1/4″ stainless steel tubing Dielectric Isolator Union,** these should be installed in every tubing line that attaches the sampler to the pipeline in any manner. For example the supply gas, product connection to the system, and differential pressure switch connections. (P/N A1-0182).
7. **LinkPlus** provides a direct link between the DynaPak, and your sample vessel, providing a gauge, vessel isolation valve, and excess pressure protection.
8. **YZ BackRack vessel trays** are available for direct support mounting of a sample vessel tray to the back of the DynaPak. Limited to SC-300 & SC-500 Vessels.

NOTE: A complete line of sampling accessories ranging from sample probes to sample vessels is available through YZ. Please contact your local representative:

Technical Support (T): 1-281-362-6500
1-800-NJEX-HELP
(1-800-653-9435)
Email: techsupport@yzsystems.com

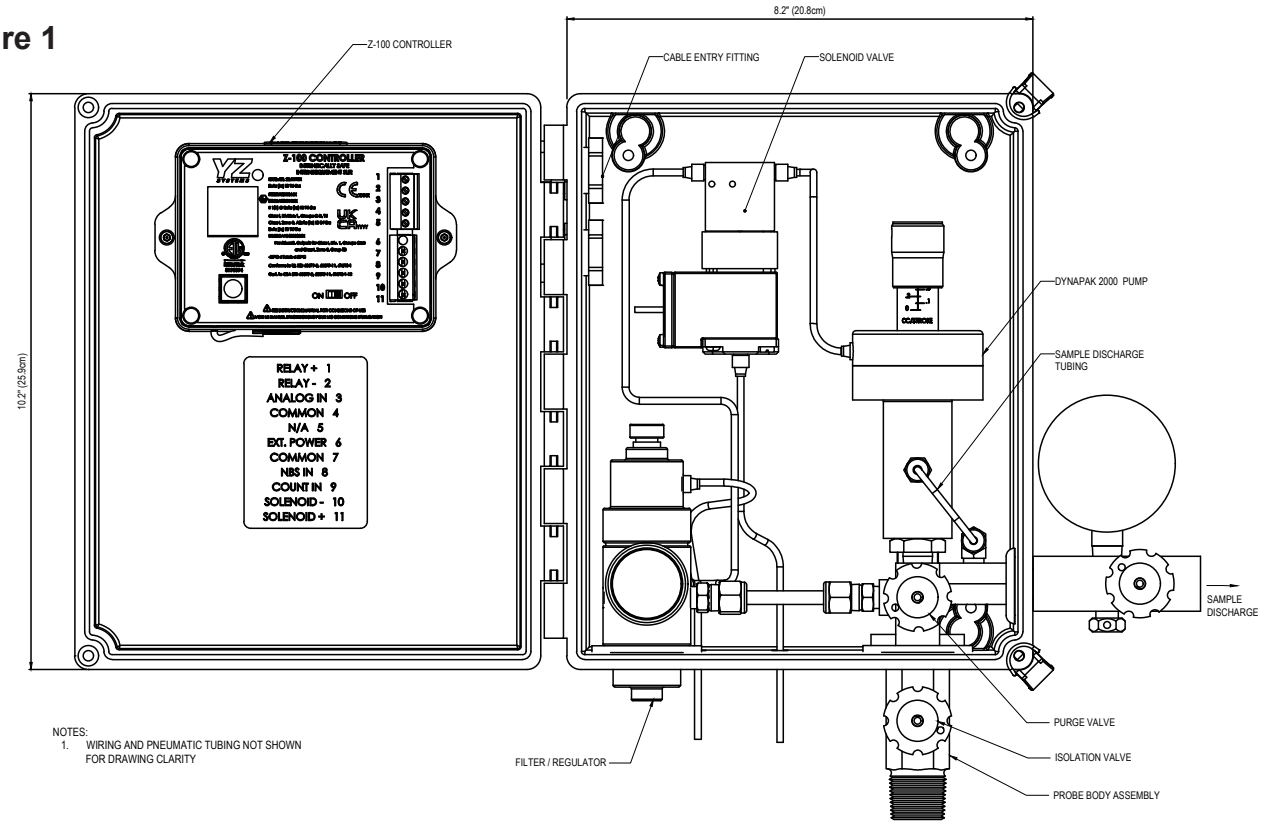
Section 2: System Installation

Standard System Components

Standard primary components of the DynaPak 2100 include the following:

- **System Enclosure:** Houses the Sample Pump, Filter Regulator, Solenoid, and Controller.
- **Sample Pump:** Probe mounted, pneumatically actuated DP-2000 Sample Pump.
- **Filter Regulator:** Stainless Steel regulator capable of reducing pressure from line pressure of up to 1500 psi down to system supply pressures in one step.
- **Low Power Solenoid:** Provides interface between the Z-100 Electronic Controller, and the Pump Pneumatic actuation.
- **Controller:** Provides control functions for the DynaPak Sampler in Proportional-To-flow, or Proportional-To-Time Modes.
- **Probe Body Assembly:** Provides direct mount connection to the pipeline.

Figure 1



CLASS I, DIVISION 1, GROUPS C-D, T4
PROVIDES INTRINSICALLY SAFE OUTPUTS FOR CLASS I, DIVISION 1, GROUPS C-D AND CLASS I, ZONE 0, GROUP IIB
CLASS I, ZONE 0, AEx ia [ia] IIB T4 Ga

Ex h ia [ia] IIB T4 Ga
II 1(1) G Ex h ia [ia] IIB T4 Ga
-20°C ≤ Ta ≤ +60°C
IP54

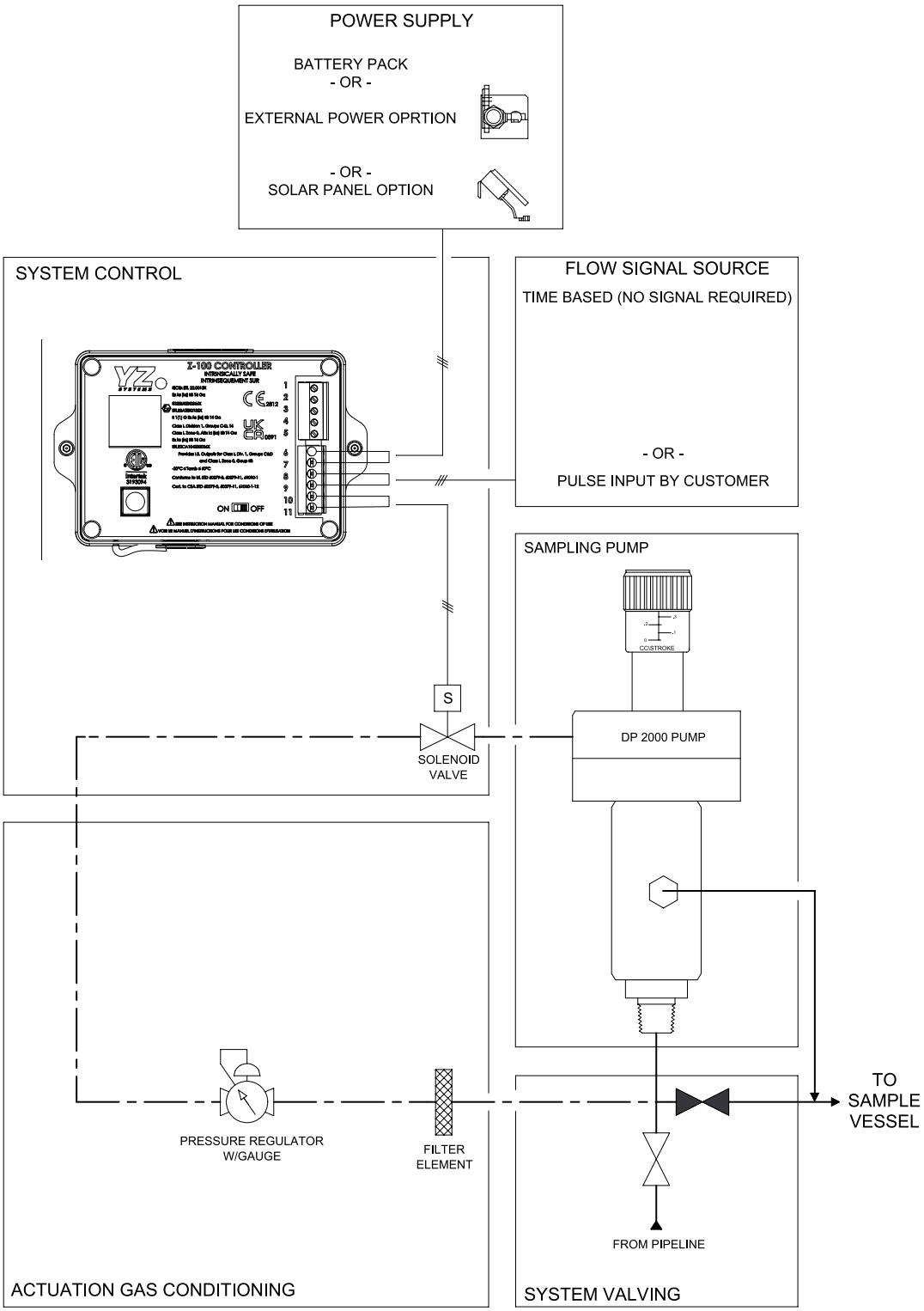
ETL23CA104230006X
IECEx ETL 23.0013X
ETL24ATEX0290X
ITS24UKEX0707X

Conforms to UL STD 60079-0, 60079-11, 61010-1, 80079-36, 80079-37
Certified to CSA STD C22.2 NO. 60079-0, 60079-11, 61010-1-12, 80079-36, 80079-37

Section 2: System Installation

System Flow Schematic

Figure 2



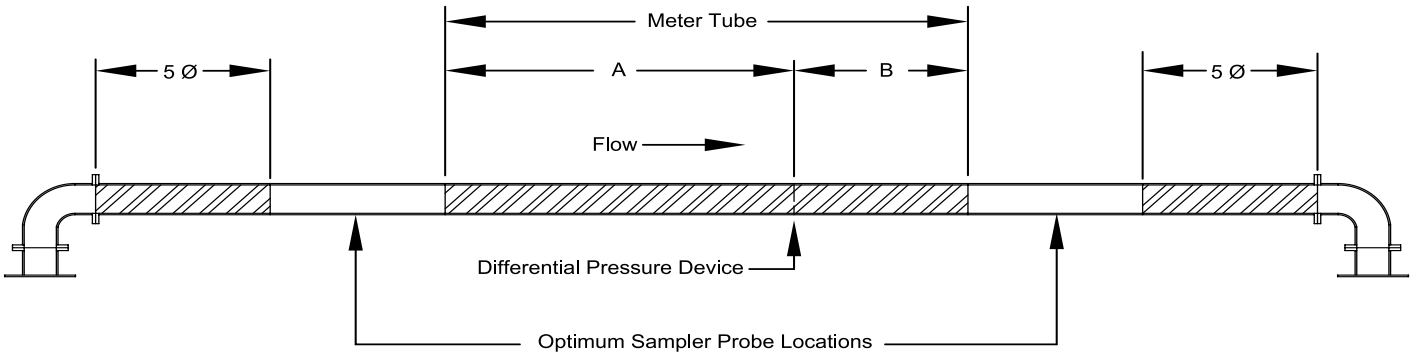
Section 2: System Installation

Standard Mounting Location

The sampler should be a minimum of five pipe diameters from any device which could cause aerosols or significant pressure drops.

The sampler should not be located within the defined meter tube region (AGA 3 manual). A= The number of unobstructed, straight pipe diameters upstream (see AGA – 3 manual). B= the number of unobstructed, straight pipe diameters downstream (see AGA - manual).

Figure 3



A= The number of unobstructed, straight pipe diameters upstream (see AGA – 3 manual). B= The number of unobstructed, straight pipe diameters downstream (see AGA – 3 manual).

Section 2: System Installation

Standard System Connections

- The DynaPak 2100 requires a 3/4” FNPT pipeline connection.
- The DynaPak 2100 sampler should be mounted vertically in a horizontal run of the pipeline.
- The end of the sampler probe should penetrate the center 1/3rd of the pipeline.
- The end of the sample probe should be cut parallel to the pipeline.
- Before applying pipeline pressure to the DynaPak 2100, ensure that the isolation valve and purge valve are good.
- After pipeline pressure has been applied to the sampler, check the probe body/pipeline connection using a liquid leak detector.

CAUTION: Overtightening of valves can result in damage to the valve components which might result in the valve stem being screwed out of the probe body. This, of course, results in product at pipeline pressure being vented continually through this port until this section of the pipeline is shut in. DynaPak valves are of soft seat design and should only be closed or opened with fingers. Wrenches should never be used. If a valve will not seal off with finger tight operation the valve should have maintenance performed to allow proper operation of the valve.

NOTE: At temperatures below 32˚ F (0˚C), conditioning of the actuation gas supply may be required. Where the actuation gas supply has a high water content and/or a low hydrocarbon dew point, additional actuation gas filtration or heating of the actuation gas supply may be necessary. Bottled nitrogen gas can also be used during cold operating conditions to avoid condensation in the actuation gas supply line. In addition, operation at extreme temperatures will affect seal and diaphragm performance. To prolong the service of seals and diaphragm, adequate heat should be provided to maintain an operating environment above 32˚ F (0˚C).

Figure 4

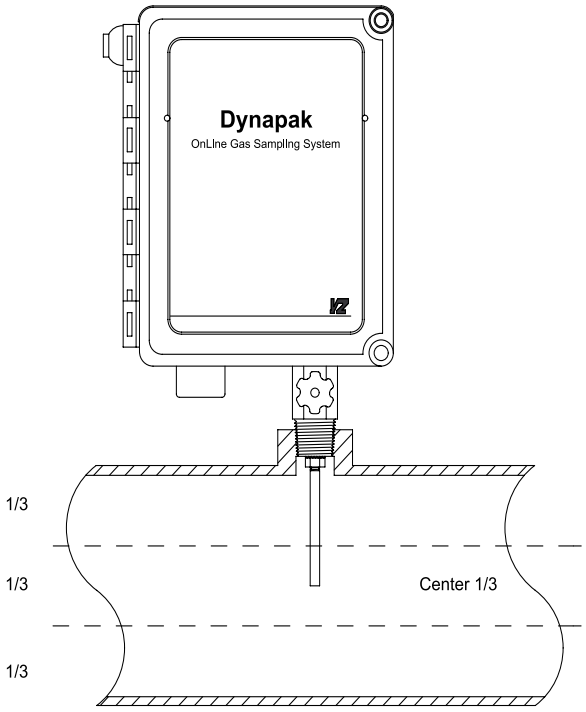
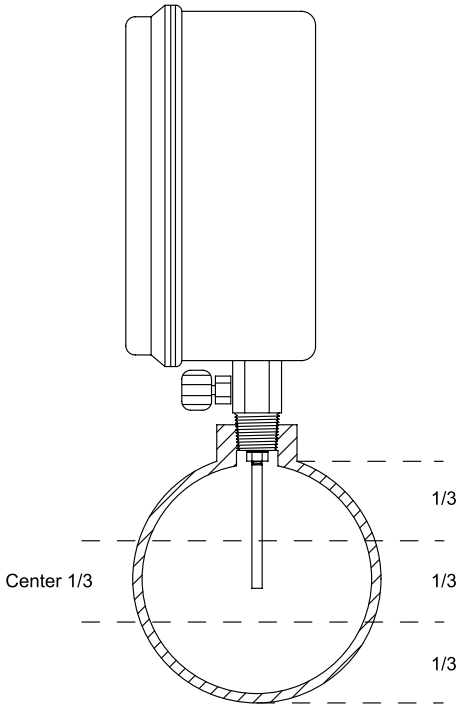


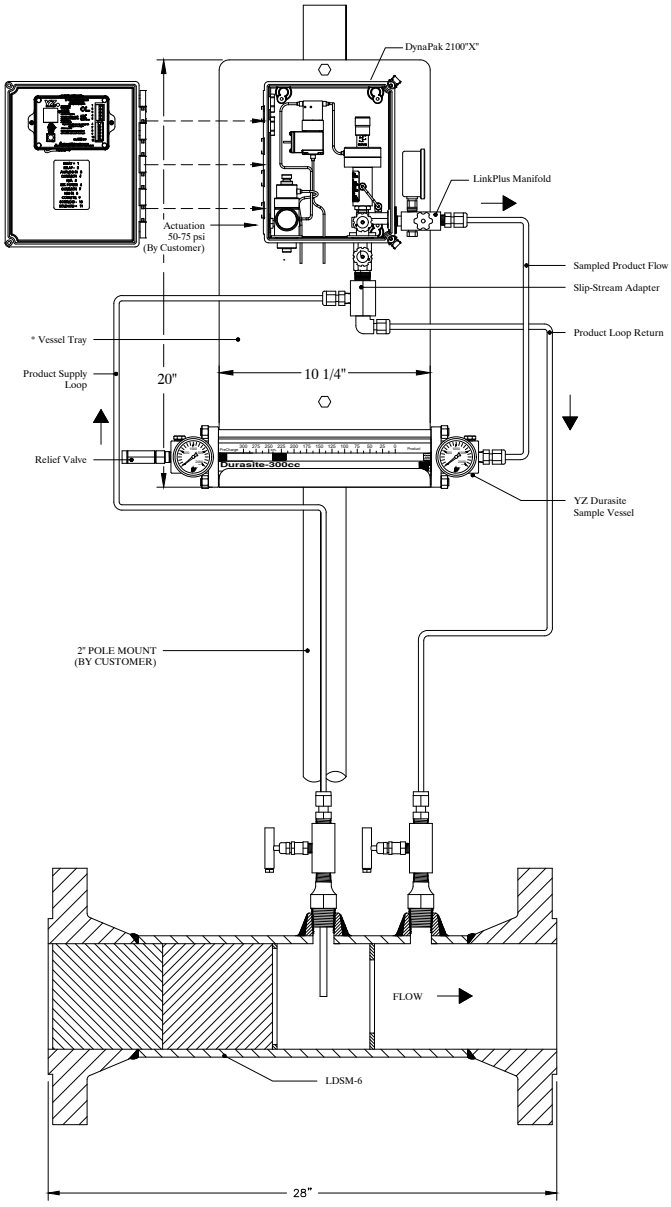
Figure 5



Section 2: System Installation

Standard System Connections - with Optional Slipstream kit

- Mount the DP-2100 with slipstream kit on a vertical 2” pole.
- Connect the slipstream adapter to the pipeline product supply and product return connections as shown in the diagram.
- Connect the actuation gas supply (50-75 psi) to the actuation gas connection located on the left side of the sampler.
- Connect the sample out connection to the sample vessel.
- Wire the customer connection to the flow inputs.
- Before applying pipeline pressure to the DynaPak 2000, ensure that the product supply valve is closed.
- After pipeline pressure has been applied to the sampler, check the probe body/pipeline connection using a liquid leak detector.



CAUTION: Overtightening of valves can result in damage to the valve components which might result in the valve stem being screwed out of the probe body. This, of course, results in product at pipeline pressure being vented continually through this port until this section of the pipeline is shut in. DynaPak valves are of soft seat design and should only be closed or opened with fingers. Wrenches should never be used. If a valve will not seal off with finger tight operation the valve should have maintenance performed to allow proper operation of the valve.

Section 3: Sample Vessel Installation

Variable Pressure / Constant Volume Cylinders

Spun cylinders may be installed in a horizontal position on the DynaPak BackRack vessel rack. Avoiding traps in the line, install stainless steel tubing and fittings from the sample discharge port of the sampler to the product end of the sample cylinder.

300cc and 500cc spun cylinders may also be installed in a vertical position. Piping from the sampler discharge port to the sample vessel should be arranged so that liquid traps are not created.

Variable Volume / Constant Pressure cylinder

The free floating piston cylinder (DuraSite), figure 18 on page 52, may be installed in a horizontal position on an optional vessel rack. Free floating piston cylinders should NOT be installed on the DynaPak BackRack vessel rack.

Install 1/8″ tubing from the sample discharge port of the manifold to the product end of the vessel. Avoid traps in this line.

LinkPlus: Install the optional LinkPlus directly into the sample discharge port of the sampler. Use stainless steel tubing and fittings to connect the LinkPlus outlet to the product end of the sampler cylinder.

Section 4: System Control & Electronics

Overview

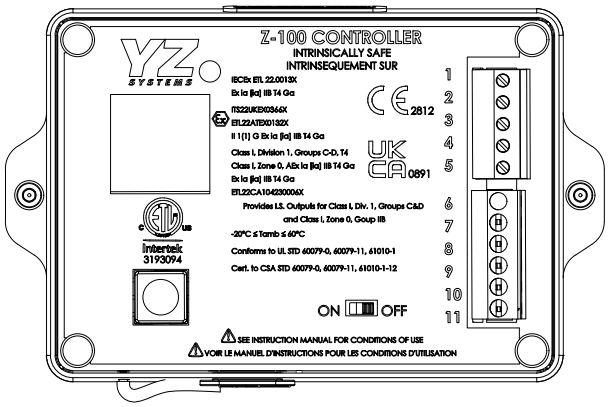
The electronic control package provided with your Dynapak 2100 sampling system consists of Z-100 controller powered by an internal battery or external power supply and a low power solenoid. The Z-100 Controller will control the timing of the Dynapak 2000 Pump based on the controller settings and mode of operation, either Prop to flow or time. When odorant is required, the controller will energize the solenoid, allowing the actuation gas to activate the Dynapak 2000 Pump.

SAFETY NOTES: Always take the necessary measures to verify whether the area has an explosive atmosphere and obtain necessary work permits are obtained and safety protocols followed. as required by the areas of installation. Use the wiring label in the door of the Dynapak 2100, also shown to the right, to make your connections to the Z-100 controller. Please note some connections may share a common Ground connection. All wiring connected to the Z-100 controller must be done in accordance with the Wiring Control Document, see Page 57. The Z-100 rated for use in Class I, Division 1, Groups C&D and IECEx/ ATEX Zone 1 hazardous locations.

WARNING:

- Electrostatic Discharge Hazard – Wipe with a damp cloth only.
- System is top-heavy. Lift cabinet with rigging to support weight and prevent it from tipping.
- The Z-100 controller is in a housing with more than 10% aluminum. Non-sparking tools must be used while servicing the Z-100 controller to avoid an ignition hazard due to impact or friction.
- Customer to ensure inlet actuation supply pressure does not exceed 90 psi (6.2 bar).

Figure 6



Z-100 Controller Approvals:

IECEx ETL 22.0013X
Ex ia [ia] IIB T4 Ga
ITS22UKEX0366X
ETL22ATEX0132X
II 1(1) G Ex ia [ia] IIB T4 Ga
Class I, Division 1, Groups C-D, T4
Class I, Zone 0, AEx ia [ia] IIB T4 Ga
Ex ia [ia] IIB T4 Ga
ETL22CA104230006X
Provides I.S. Outputs for Class I, Div. 1, Groups C&D and Class I, Zone 0, Goup IIB
-20°C ≤ Tamb ≤ 60°C
Conforms to UL STD 60079-0, 60079-11, 61010-1
Cert. to CSA STD 60079-0, 60079-11, 61010-1-12

RELAY +	1
RELAY -	2
ANALOG IN	3
COMMON	4
N/A	5
EXT. POWER	6
COMMON	7
NBS IN	8
COUNT IN	9
SOLENOID -	10
SOLENOID +	11

Relay out	Term. 1(+), Term. 2(-)	Voltage free contact, solid state Recommended operating load 2ma max
Analog in	Term. 3(+) Term. 4/7(-)	Passive 4-20ma nominal 250ohm load
Flow switch	Term. 5(+) Term. 4/7(-)	Voltage free contact
NBS in / Inhibit in	Term. 8(+) to Term 4/7(-)	Voltage free contact or DC voltage 3.2v-24v
Count In	Term. 9(+) to Term. 4/7(-)	Voltage free contact (recommended), DC voltage pulse 5-24VDC 20ms minimum pulse width

Section 5: Programming the Z-100 Controller

Controller Overview

To begin initial setup of the Z-100 Controller, move the Power switch, located on the front panel, to the ON position. The YZ logo will be shown while the controller is initializing then the Home Screen will be displayed when ready to operate.

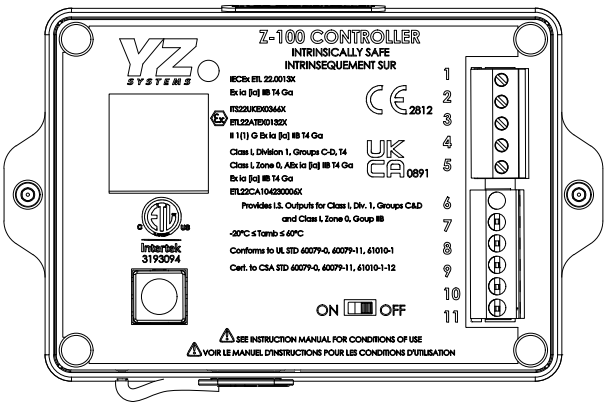
The navigation switch has 5 functions: UP, DOWN, RIGHT, LEFT, and ENTER (center press). Pressing the switch in the appropriate direction to move between menus, and a center key to select sub menus or to modify, select, and save settings.

To open sub-menus, enter parameters, etc. you will use the navigation like a push button and push by pressing in the center of the switch.

When moving between screens arrows will be shown on the display indicating what keys are active and their functions. Example illustration: the small down arrow indicates pressing the down key will allow you to scroll to additional Home Screen information. The right arrow next to “Menu” indicates pressing the right arrow will take you to the “Menu” Screen. See detailed navigation switch functionality in Section 05, menu screens.

When viewing a screen, note if there is an arrow at the top or bottom of the screen. If a small arrow is shown, it indicates you can scroll down or navigate in that direction. On some screens, additional instructions may be shown in the bottom corners.

Figure 7



Section 5: Programming the Z-100 Controller

Z-100 operating modes

Time based: In timer mode, the controller actuates the pump at a set time interval. The time interval can be set to 0.1 min to 180.00 min in 0.01min increments.

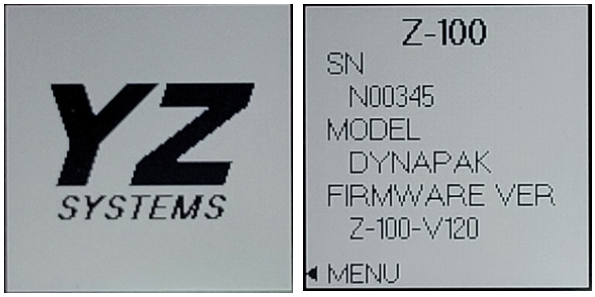
Proportion-to-Flow Pulse Counter: In counter mode, the Z-100 controller functions as a pulse divider. The controller monitors and counts incoming pulses at the count input. When the number of pulses equals the pulse divider setting the controller operates the pump The pulse divider can be set from 1 to 10,000 in increments of 1.

Proportion-to-Flow 4-20mA Analog: In Analog mode, the Z-100 controller monitors a 4-20mA signal and operates the pump at a rate proportional to the 4-20mA signal as configured in the proportional to flow settings. See Section 5, Analog mode.

Home Screen:
Total signaled count is displayed on the main Home Screen. This screen resets at midnight each day. Where the display shows DAILY TOTALS, this line will alternate between showing DAILY TOTALS and the running mode. It will display TIMER or COUNTER or ANALOG followed by OFF or ON.

Signaled:
Signaled is the count of how many times the controller sent a signal to the solenoid to stroke the pump.

Totalizer
From the Home Screen, you can navigate to the Totalizer by pressing down on the navigation button. The totalizer is a running total of how many strokes have been pumped. The date the totalizer was started will be displayed at the top, along with the current date and time. The totalizer can be reset by pressing the navigation button in and holding until the value and date resets.



Section 5: Programming the Z-100 Controller

Using The Z-100 Controller

The Z-100 user interface has been designed for easy navigation and setting of parameters.

The following sections outline the various screens and the steps needed to change and save settings.

Menu Screens

To navigate to a Menu or Sub Menu screen, use the navigation switch and push up or down to highlight the desired option. The selected option will be highlighted with an asterisk to the left. To open that menu item and press the navigation switch. Note the instructions on the bottom row of the screen for additional information or how to navigate back to the previous screen.

Modifying Controller Settings: Z-100 Controller settings will either be a value that must be changed, an item selected from a list, or a multiple-choice parameter option.

For items requiring a number to be edited, like the INITIAL % FLOW below, each digit will need to be changed individually. Note the arrow underneath the digit that is currently being edited. Press the left or right arrow to change which digit is updated. To change the value, press the navigation switch up or down. Move to the next digit as needed. To cancel the change, navigate to the back button and Press enter on the navigation switch to go back to the previous screen. To save the change, navigate to the Save option and Press enter on the navigation switch to save.

For an item that must be selected from a menu such as the MODE, the option that is currently selected will be shown with a dash next to it on the left. To change the selection, use the navigation switch and move up and down to the desired option. The possible selection will be shown with an asterisk to the left. Press the navigation switch to confirm the selected option.

Lastly, for the alarm sources, you can select multiple options to turn on or off each alarm source. The alarms will be shown with a dash next to it to indicate the alarm is active. The activate or deactivate an alarm, press the navigation switch up or down to the desired alarm source, the elected alarm will have an asterisk to the left. Press the navigation switch to enable or disable the alarm, if disabled the dash will be removed.

Section 5: Programming the Z-100 Controller

System ON/OFF

This menu, is used to start and stop the system. Select ON to start odorizing as per the settings on the controller. Actuate the pump once immediately after turning the system ON and then begin odorizing as per the current operating mode and settings. Settings cannot be modified while the system is ON, If a settings change is attempted while the system is ON, the controller will display a popup notification prompting to STOP the system. Selecting Yes will turn the OFF and display the setting to be modified. Selecting No will leave the system ON and return to the previous menu.

The system must be re-started once settings changes are completed.

Section 5: Programming the Z-100 Controller

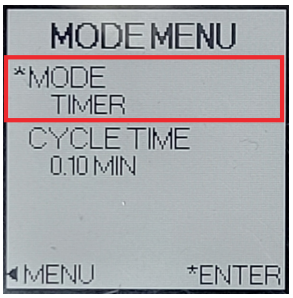
Selecting the Z-100 Operational Mode

The Z-100 controller can operate your Dynapak system in timer mode, counter mode, or analog mode. To select the Z-100 mode of operation, navigate to the Main Menu and select Mode. The Mode Menu will open showing the currently selected operating mode and mode specific settings.

Select Mode to access the list of modes available an * indicates the currently selected mode.
Once a mode has been selected, press the left key to exit back to the Mode Menu

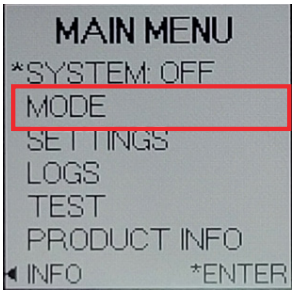
Time Based

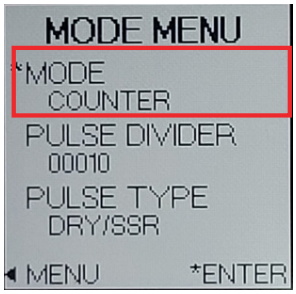
In timer mode, the controller actuates the 2000 pump at a set time interval as per the CYCLE TIME setting. The CYCLE TIME range is 0.1 minutes to 180.00 minutes in 0.01 minute increments. To modify the CYCLE TIME, move the * to CYCLE TIME and press enter to select. Use the navigation switch to modify the value then navigate to SAVE and press enter.

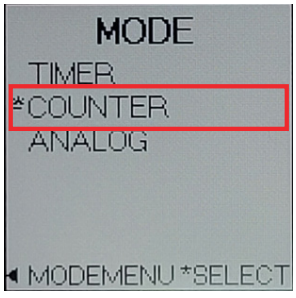


Proportion-to-Flow Pulse Counter

In counter mode, the Z-100 controller functions as a pulse divider. The controller monitors and counts a customer provided pulse signal at the COUNT input. When the number of pulses counted equals the PULSE DIVIDER setting the controller actuates the 2000 pump. The PULSE DIVIDER can be set from 1 to 10,000 in increments of 1. When the counter mode is selected, the PULSE DIVIDER setting will determine the pumps injection rate in response to the incoming pulses. For example, a pulse divider of 10 will cause the pump to actuate once each time 10 pulses are counted. The minimum pulse width is 20ms with a maximum input frequency of 25Hz. The pulse types available are Voltage or Dry Contact/SSR. Navigate to the Pulse Type option submenu. Select the pulse type and navigate to the select button and press enter to save.



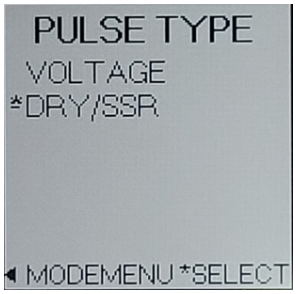




Section 5: Programming the Z-100 Controller

Pulse Types

Voltage: Positive voltage pulse (5-24VDC).
Dry/SSR: Voltage free contact closures.

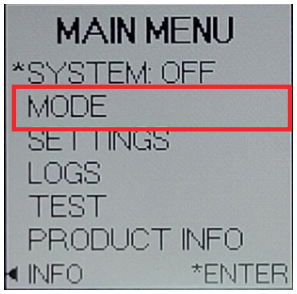


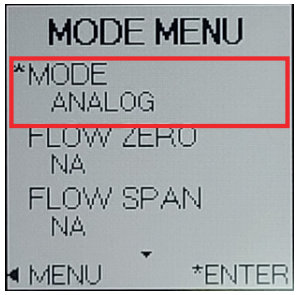
Proportion-to-Flow 4-20mA Analog

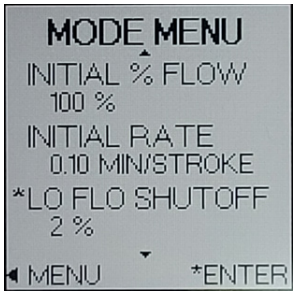
In Analog Mode the Z-100 controller monitors a 4-20mA flow signal provided by the customer. In this mode, the Z-100 controller monitors the incoming flow signal and with the INITIAL RATE and INITIAL % FLOW settings calculates and varies the pump cycle time as needed to maintain a consistent odorization rate.

Analog mode settings include: INITIAL RATE, INITIAL % FLOW. The Z-100 has a default calibration for the Analog Input. To obtain the best performance and accuracy perform the ZERO and SPAN calibration procedures below using the actual flow signal is recommended.

NOTE: The 4-20mA current signal is converted to a voltage prior to being displayed on the calibration screen.

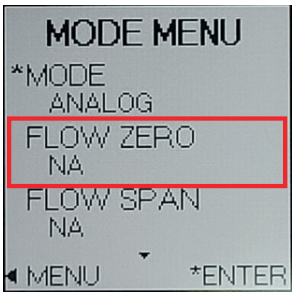


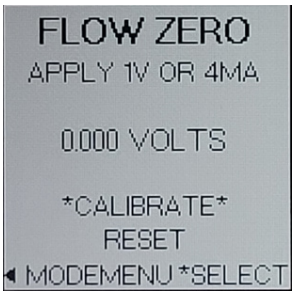




Calibration - Flow Zero

To begin setting parameters for Analog Mode, navigate to Main Menu->Mode->Flow Zero. Apply 4.0mA to the flow signal in TB(3) and TB(4) and press enter on the navigation switch to save the calibration. If successful, the voltage will read very close to 1.000V and the Flow Zero Screen will show CALIBRATED, indicating that a user calibration value is being used. If the flow signal is too far out of range, a RANGE ERROR message will be shown and there will be no change to the calibration state. The RESET function will clear the user calibration and return the unit to the factory calibrated values. Press the navigation switch to the left to return to the Mode Menu or navigate to Reset and press enter on the navigation switch in to cancel the calibration.

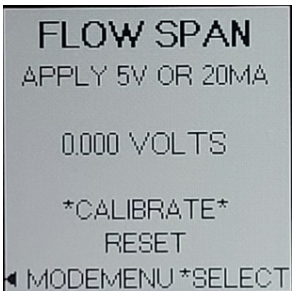




Section 5: Programming the Z-100 Controller

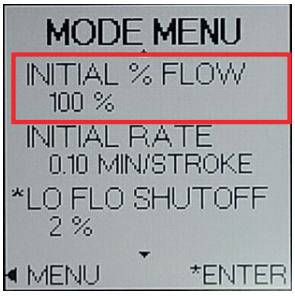
Calibration - Flow Span

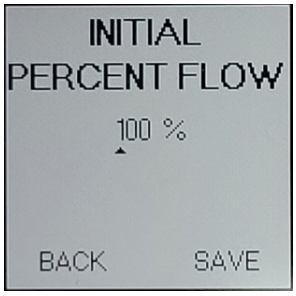
Apply 20.0mA to the flow signal in TB(3) and TB(4) and press enter on the navigation switch to start calibration. If successful, the voltage will read very close to 5.00V and the Flow Zero Screen will show CALIBRATED, indicating that a user calibration value is being used. If the flow signal is too far out of range, a RANGE ERROR message will be shown and there will be no change to the calibration state. The RESET function will clear the user calibration and return the unit to the factory calibrated values. Press the navigation switch to the left to return to the Mode Menu or navigate to Reset and press enter on the navigation switch to cancel the calibration.



Initial Percent Flow

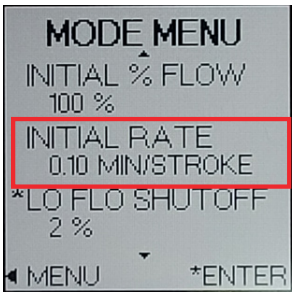
After calibrating the incoming flow signal, navigate to the Initial percent flow setting within the Mode menu. The INITIAL FLOW should be set by the operator to the typical or average % of metered flow that exists in the pipeline. This should be based on historical flow measurement records from the metering device being used. If the history is not known, use an anticipated value. Press the navigation switch in to enter the Initial percent flow menu. Note the arrow located under the active digit. Press the navigation switch up or down to change the digit and press the navigation switch to the right to move to the next digit and repeat. Press the navigation switch to the right to navigate to the Save button and press the navigation switch in to save the update. To cancel the flow rate change, navigate to the back button by pressing the navigation switch to the left or the right and press the switch in to enter.





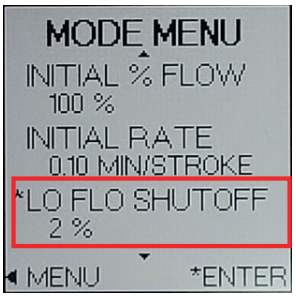
Initial Stroke Rate

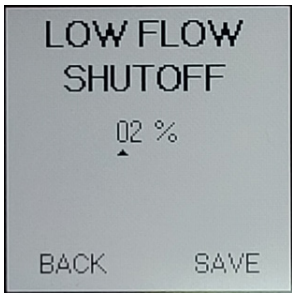
To run the Dynapak 2100 system proportional to the flow signal, you must enter an initial stroke rate. The INITIAL RATE is set by the operator to the desired time between strokes if the flow measured in the pipeline was equal to the INITIAL FLOW that was just set in the previous step. Open the initial rate option from the Mode Menu. Note the arrow located under the active digit. Press the navigation switch up or down to change the digit and press the navigation switch to the right to move to the next digit and repeat. Press the navigation switch to the right to navigate to the Save button and press the navigation switch in to save the update. To cancel the flow rate change, navigate to the back button by pressing the navigation switch to the left or the right and press the switch in to enter.



Section 5: Programming the Z-100 Controller

Low Flow Shut Off





The low flow shutoff setting determines the percentage of the max gas flow the Dynapak system will enter standby in low flow conditions. While in standby the pump will not be actuated but the Z-100 will continue to monitor the inputs and report system status.

Loss of Flow Signal

The Loss of flow signal option allows you to set a time per stroke pat in the case of loss of flow signal. To set this option, open the Flow No Signal option from the Mode Menu. Note the arrow located under the active digit. Press the navigation switch up or down to change the value. A flow signal below 0.10 min/stroke is considered a loss of flow signal.

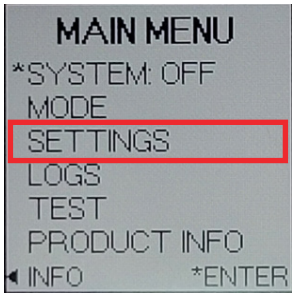
Press the navigation switch to the right to navigate to the Save button and press the navigation switch in to save the update. To cancel the flow rate change, navigate to the back button by pressing the navigation switch to the left or the right and press the switch in to enter.

Section 5: Programming the Z-100 Controller

Change Z-100 Settings

Go back to Main menu and scroll down to Settings tab and press Enter.

In order to run the pump system to the proper sampling rate, the settings must be set within the settings menu. From the Home Screen, open the Main Menu and navigate to the Settings parameter and press the navigation button in to open. To modify each setting, navigate to the setting and press the navigation button in to open. The active setting will be indicated with an asterisk (*) on the left side. Press the left arrow to return to the Main Menu. The small arrow at the bottom or top of the screen indicates there are additional parameters to scroll through.



Remote Inhibit

The Remote Inhibit setting determines the functionality of the Remote inhibit. To use this feature, set the REMOTE INHIBIT setting to ON. If the signal drops from this connection, the Dynapak system will run to the set parameters.

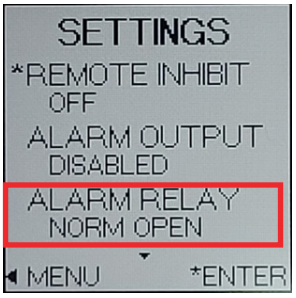
Alarm Output

The Alarm Output screen allows you to test the alarm output is being sent properly to the customer monitoring system. To test, ensure that the alarm output option has been enabled from the settings menu and the relay type selected as normally open or normally closed. Open the Test Alarm Output option by pressing the navigation button in to enter. The Test Alarm Output screen will display whether the alarm output is normally open or normally closed. Press the navigation button in to toggle the alarm. While the alarm is toggled, check your monitoring system to ensure the alarm is being monitored and enables when toggled.

Section 5: Programming the Z-100 Controller

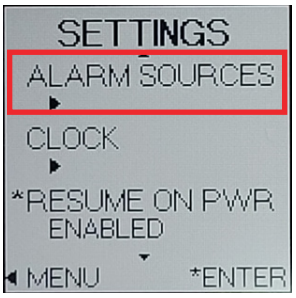
Alarm Relay

For the alarm output, the user has the option of selecting the relay to be normally open or normally closed. Select which option best suits the monitoring needs. In the Settings menu, scroll down to get more choices. Press the navigation switch left to exit the sub-menu.



Alarm Sources

Selecting Alarm Sources will open a sub-menu to select the alarm sources in which to be notified. The two alarm options are Battery Low, Solenoid. The selected alarm will be highlighted with an asterisk (*). Navigate to each alarm in the list and press the navigation button in to select or deselect each option. If an alarm source is activated, it will have a single line dash (-) next to the alarm.
Press the navigation switch left to exit the sub-menu.



Battery Low

The Battery Low alarm is an indication the battery voltage is low and should be replaced. If enabled, the Relay Output will be activated. The remaining battery capacity is dependent on the settings and ambient temperature the system is installed. The more often the pump is actuated with ambient temperatures approaching minimum or maximums of the operating range will result in considerably shorter battery capacity.

Solenoid

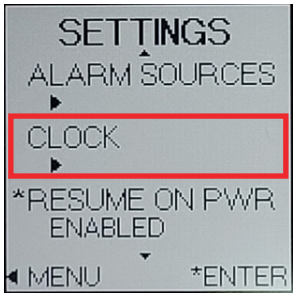
The solenoid alarm is an indication the solenoid fuse (F1), needs to be replaced. A low supply voltage could also cause a solenoid alarm. If replacing fuse (F1) does not remove the solenoid alarm, verify supply voltage is within the required operating range using the Battery Test function.

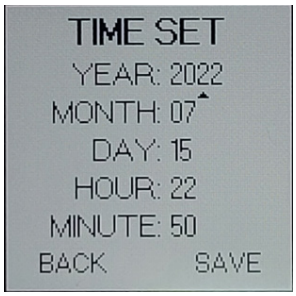
NOTE: The battery test function can also be used to verify external supply voltage. If these steps do not remove the solenoid alarm, please contact YZ System Tech Support for help.

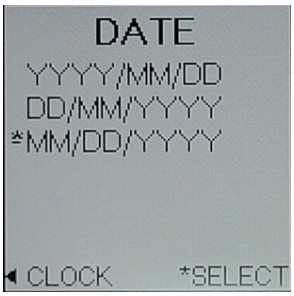
Section 5: Programming the Z-100 Controller

Clock Menu

Use the Clock Menu to configure the date and time settings. Having the correct time and date is important for the accuracy of Z-100 event logs and daily odorant usage estimates (DOU). The time can be formatted as a 12- or 24-hour clock. The date can be formatted three ways (YYYY/MM/DD, DD/MM/YYYY, or MM/DD/YYYY). To set the CLOCK, move * to SET TIME and press enter on the navigation switch. The TIME SET will open. Press RIGHT and LEFT on the navigation switch to move to each editable setting, and UP and DOWN to modify each setting. Press RIGHT to move to the next setting or to move to BACK or SAVE. To change the date formatting, move * to DATE FMT and press enter. Select the desired formatting and press enter to select.
When changes are complete press the left key to exit to the CLOCK menu.

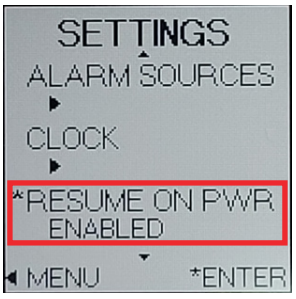


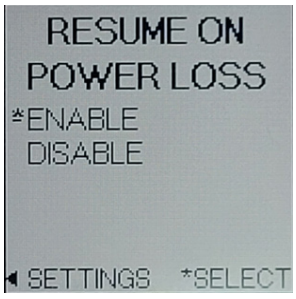




Resume on Power Loss

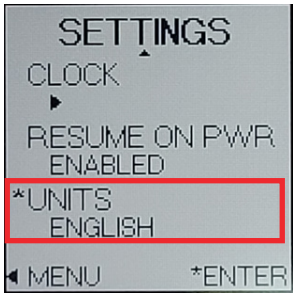
If the Dynapak system loses power during normal operation, the Resume on Power loss function can be enabled to allow the system to resume sampling when power is restored. system is OFF when power is lost, it will remain OFF when power is restored. To enable, open the Resume on Power Loss submenu. Press navigation switch up or down and press enter to select an option.
Press navigation switch left to exit the sub-menu.





Units

The Z-100 can be assigned either English or Metric units. Navigate to the Units sub-menu and press navigation switch up or down for available options and enter to *SELECT.
Press navigation switch left to exit the sub-menu.



Section 5: Programming the Z-100 Controller

Go back to Main menu and scroll down to Logs tab and press Enter.

Logs

The Z-100 logs the Sampler usage, parameter changes, alarms, and other events to the Dynapak locally. To view the logged data, open the Main Menu and scroll to the Logs option and press the navigation button in to open.

MM-100 Memory module is available as needed to download the data.

DOU

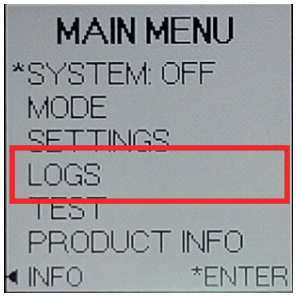
The DOU logs are the daily sample volume logs. Select the DOU option by pressing the navigation button in. This will open the latest DOU log. Note the small arrows displayed on the bottom and/or top of each DOU screen. Scroll up or down to view logs from other days.

Config

The Config logs are logs of changes to the system configuration. Changes that are saved include settings that affect the system performance such as a stroke rate change, changing of the operational mode, input signal type change, and alarm changes.

Event Logs

Event logs are saved when an event happens in the Z-100 controller. The events that are recorded are totalizer resets, DOU reset, alarm count reset, device powered on, alarms turning on or clearing of alarms, alarm output turned on or off, and time changes.



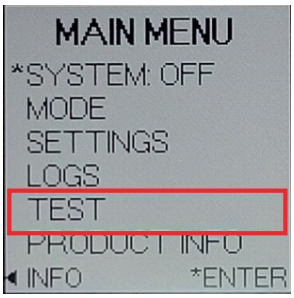
Section 5: Programming the Z-100 Controller

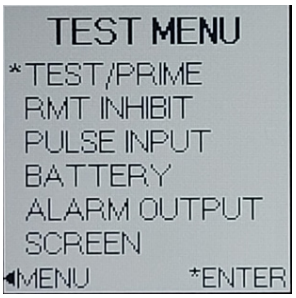
MM100

When ready to download the MM-100 Memory Module data, connect the memory module in the opening in the bottom of the enclosure. A rubber plug is provided to protect the opening when not in use. If the MM-100 is not plugged in or not recognized, the MM100 screen will display “Not Found”. If MM-100 is plugged in and recognized, you can download the module from the MM-100 screen.
Go back to Main menu and scroll down to Tests tab and press Enter.

Test Menu

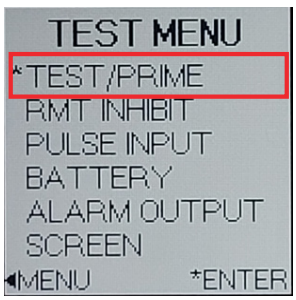
The test screen allows you to test the system functionality after installation or maintenance to ensure it is running as expected. To open the test screen, navigate to the Test option from the Main Menu and select the Test option by pressing the navigation button in to enter.

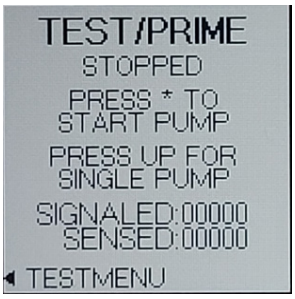




Test/Prime

The Test/Prime screen provides access to two functions.
Function 1, press enter on the navigation switch the UP direction for 1 to 2 seconds will actuate the solenoid a single time to stroke the 2000 pump.
Function 2, pressing the center button will initiate a prime cycle. The Prime cycle actuates the pump at a 2.5 second cycle time for 60 cycles, or until stopped by pressing the center button. The pump actuations signaled will increment each time the pump is stroked. For Dynapak systems “SENSED” will always show N/A. This allows the system to be primed during installation and maintenance.
When running the system in the Test/Prime mode in a Dynapak model, the “SENSED” value should increment when the discharge line is fully liquid packed, and equals the discharge or pipeline pressure.





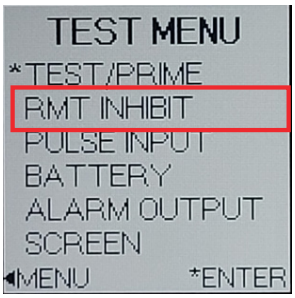
Section 5: Programming the Z-100 Controller

RMT Inhibit

The INHIBIT TEST can be used to verify the incoming remote inhibit signal is being properly read by the Z-100 controller at the DBS IN (Remote Inhibit) input terminal.

If the REMOTE INHIBIT input setting is OFF, the test function will be disabled and TEST status NA displayed. Go to the SETTINGS MENU to change the REMOTE INHIBIT input setting.

If the REMOTE INHIBIT input setting is ON or DBS, upon entry, the INHIBIT TEST screen will show the INHIBIT test type (INHIBIT ON, or INHIBIT DBS) with NOT TESTING status. Press enter on the navigation switch to start the test and begin monitoring the DBS IN input.



If an active input signal is not sensed, the red LED will flash and the test status will indicate INPUT INACTIVE. If an active input signal is sensed the GREEN LED flash and the test status will indicate INPUT ACTIVE.

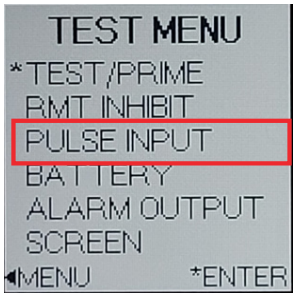
The difference between INHIBIT input types INHIBIT ON and NBS is the “active” voltage level of the incoming signal.

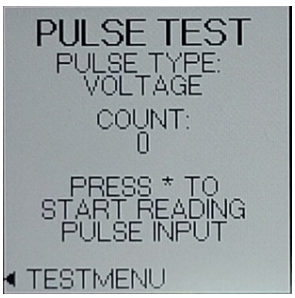
To stop the INHIBIT INPUT test press enter on the navigation switch.

Section 5: Programming the Z-100 Controller

Pulse Test

The PULSE TEST can be used to verify the incoming pulsed flow signal is being properly read by the Z-100 controller at the COUNT input. The PULSE TEST signal will be interpreted based on the PULSE TYPE setting for COUNTER mode. To test the pulse signal, ensure the type of pulse is selected from the Mode Menu when the Counter mode is selected. The pulse types are voltage, or dry contact/SSR.

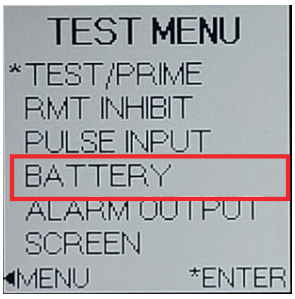


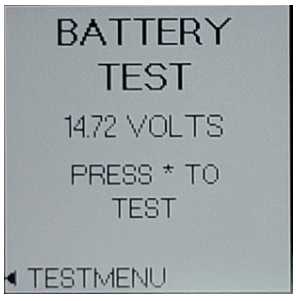


Navigate to the Pulse Input option from the Test Menu screen and press enter on the navigation switch to select. The Pulse Test screen will display what pulse type is selected. Press enter on the navigation switch to enter and start reading the pulse input. Send the pulse signal from the signal generator and confirm the counts on the Z-100 controller. The count will increase and the green LED will flash on every successful pulse reading.

Battery Test

The BATTERY TEST is used to verify the system power supply voltage read by the controller. The test is primarily used when to verify the voltage when the system is powered from the internal battery pack. The test can also be used to verify the voltage reading when the system is supplied by and external power source.





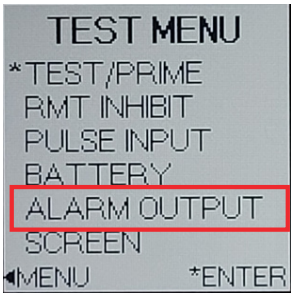
Select BATTERY TEST from the Test Menu and press enter on the navigation switch. The BATTERY TEST screen will open. The value shown initially will be from the previously run test and not a current reading. In order to get a valid test result, a solenoid must be connected to the system. Press enter to start the test, the solenoid will be actuated one time, the LED will flash and the battery voltage reading will be updated. A new battery will read approximately 11.5V during this test and the LED will flash GREEN.
If the battery voltage is found to be low during the test, the LED will flash RED.
A fully charged new battery pack will measure approximately 14.4V if measured with a DMM or voltmeter at the battery leads.

Section 5: Programming the Z-100 Controller

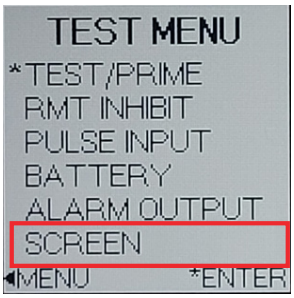
Alarm Output Screen

The RELAY OUTPUT test is used to the RELAY OUTPUT is being properly sensed by the users external SCADA or other control system.

If the RELAY OUTPUT setting is DISABLE, the test screen will indicate RELAY OUTPUT NOT CONFIGURED, CHECK SETUP. Change the RELAY OUTPUT setting to enable the output and test. If RELAY OUTPUT setting is ALARM OUT, the test display will show the relay config as ALARM OUT, the normal contact state, and ALARM OFF. Press enter to toggle the alarm ON or OFF and OPEN or CLOSE the output relay.



If RELAY OUTPUT setting is SAMPLING RATE, the test display will show the relay config as SAMPLING RATE, and normal output state. Press enter to initiate a single 40mS output pulse. The LED will flash GREEN to indicate the pulse was generated.

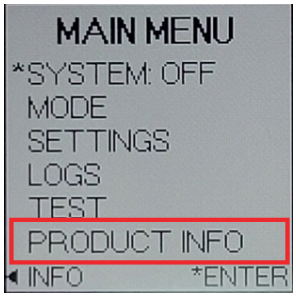


Screen Test

The Screen Test will cycle all pixels on the display on (black), then all off (blank), then back to the Test Screen. This test can help determine if any pixels are malfunctioning on the display.

Z-100 Product Info

Go back to Main menu and scroll down to product info tab and press Enter to show the product information.

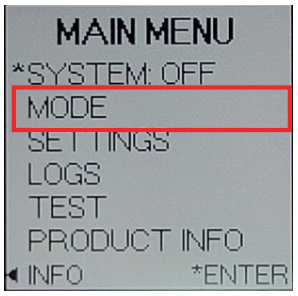


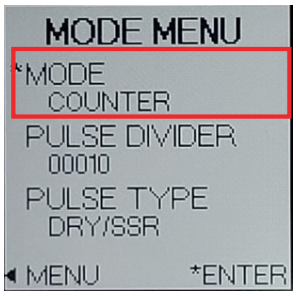
Section 6: Programming For Proportional To Flow Operation

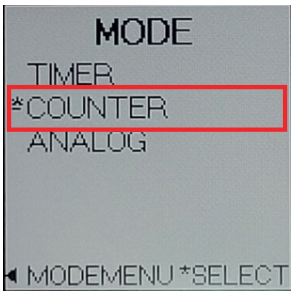
Setting Operator Input Values

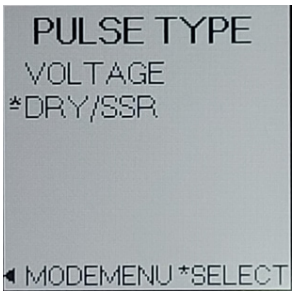
In this mode of operation, the Z-100 controller is used as a dividing counter to control the rate at which the pump is actuated. The desired time between pump strokes is controlled by the host computer or output device that will give an input pulse to the Z-100 controller.

- Determine if the incoming input is either a dry contact or voltage pulse.
- **If the input is a dry contact:** Set Pulse Type to DRY/SSR.
- **If the input is a voltage pulse:** Set Pulse Type to VOLTAGE.









Section 6: Programming For Proportional To Flow Operation

4. Calculate the counter setting using the following chart:

1. Your pump displacement (from .1 to .4cc's)	=	a.	_____
2. Your sample cylinder volume in cc's (300cc, 500cc, etc.)	=	b.	_____
3. Average flow rate (MMCF per day or MCM per day)	=	c.	_____
4. Sample period in days	=	d.	_____
5. Pulses/volume metered (pulses/MMCF or pulses/MCM)	=	e.	_____
6. Counter setting	=		a x c x d x e / (b)

			Example #1: English Gas Flow Units	Example #2 Metric Gas Flow Units
Pump displacement	(a.)	=	.2cc	.2cc
Sample cylinder size	(b.)	=	300cc	300cc
Average flow rate	(c.)	=	10 MMCF per day	10MCM/day
Sample period	(d.)	=	30 days	30 days
Pulses per volume metered	(c.)	=	100 pulses/MMcf	100 pulses/MCM

Example #1
counter setting = $\frac{\text{.2cc x 10 MMcf per day x 30 days x 100 pulses per MMcf}}{\text{300 cc}}$ = 20 pulses

Example #2
counter setting = $\frac{\text{.2cc x 10 MCM per day x 30 days x 100 pulses per MCM}}{\text{300 cc}}$ = 20 pulses

5. Adjust the pump volume adjustment knob to the value used in the calculation in step 4.

Sample pump displacement per stroke	Number of turns open on the pump volume knob
.1cc	3
.2cc	6
.4cc	12

6. Program the counts using the menus to the appropriate number of pulses you want to count before the sample pump strokes.

IMPORTANT NOTE:
If the calculated counter setting is less than 10 or greater than 9900, the pulses per volume metered will need to be adjusted. This can be programmed in most flow meters to the desired rate. If the calculated counter setting is less than 10, increase the pulses per volume metered. If the calculated counter setting is greater than 9900, decrease the pulses per volume metered.

See Section 10, for Trouble shooting.

Section 6: Programming For Proportional To Flow Operation

Go back to Mode menu and under Mode menu scroll down and select Timer tab and press enter.

Time Based

The Z-100 controller sends a signal to the solenoid to actuate the pump at a set time interval. The cycle time must be selected. The cycle time is 0.10 hr.

1. Calculate the sampling rate using the following 30 day chart:

Number of turns open on pump stroke knob	Sample pump displacement per stroke	Sample cylinder volumes		
		1000 cc	500 cc	300 cc
3	**.100**	**4**	**9**	**15**
6	**.200**	**9**	**18**	**30**
9	**.300**	**13**	**27**	**45**
12	**.400**	**18**	**36**	**60**

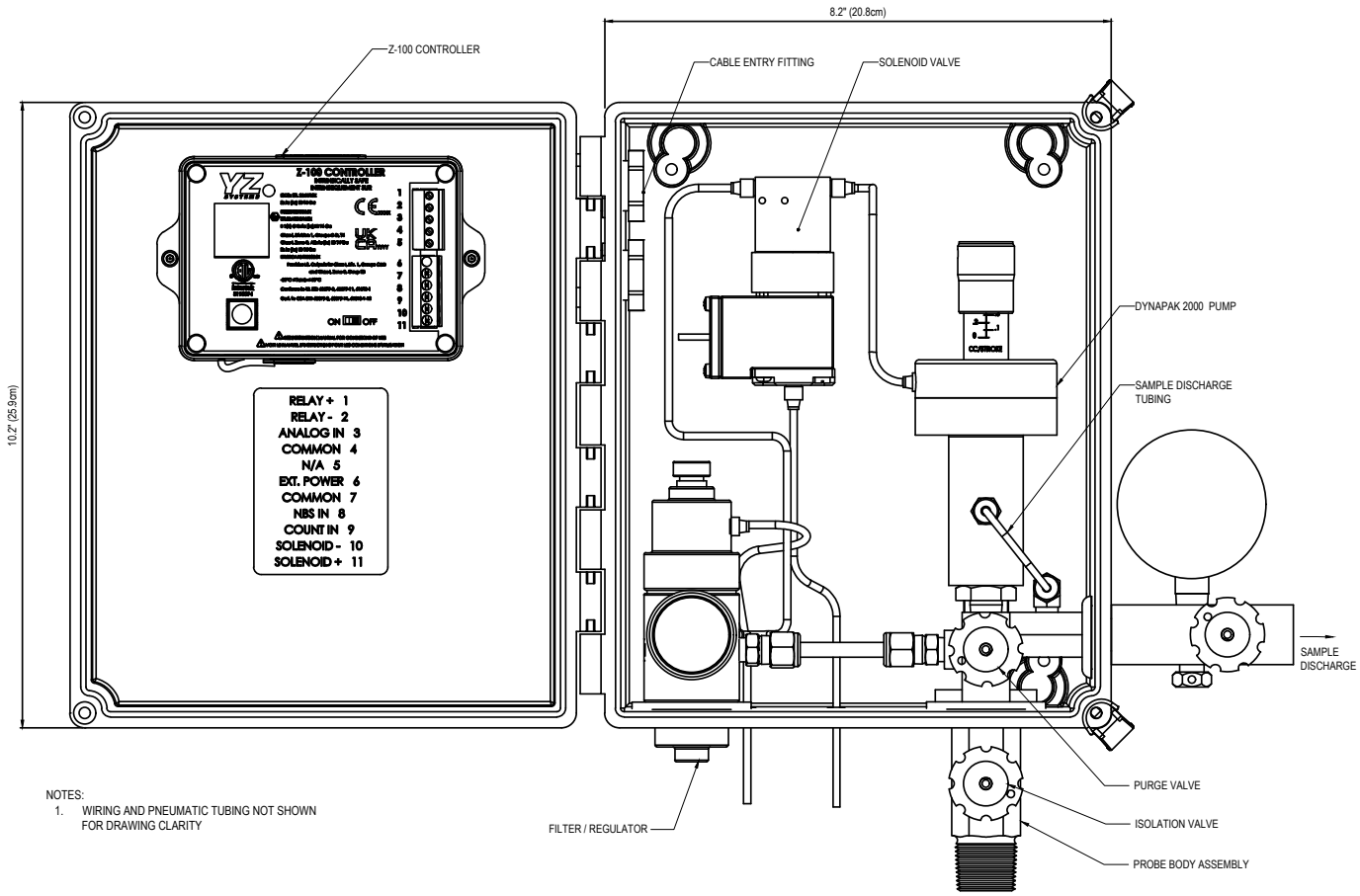
Sample rate (minutes)

Section 7: Mechanical System

Overview

The DynaPak mechanical system as shown below is composed of the sample pump, and filter regulator. These components of the system are shown here and described in the following pages.

Figure 8



Section 7: Mechanical System

DP-2000 Sample Pump

DP-2000 Sample Pump, refer to Appendix, page 43, is a positive displacement plunger pump. It's robust design provides for dependable sampling service, while also providing a simple to maintain pump, with few internal components. The pump has an adjustable displacement of .1 to .4 cc per stroke. The set displacement may be viewed at the volume adjustment knob, refer to Appendix, page 43, located on the top of the DP-2000 pump. Adjustment is simple. Turn the volume adjustment knob clockwise to increase the pump volume displacement per stroke, or turn the volume adjustment knob counter clockwise to decrease the pump volume displacement per stroke. Final control of the volume of sample to be gathered during the sample cycle period, is achieved by the controller.

This pump has internal pressure balancing capabilities that allows the pump to function properly when the pipeline pressure is greater than the sample vessel pressure, or when the sample vessel pressure is greater than the pipeline pressure.

Each time the pump strokes, product previously captured in the pump chamber is forced towards the sample cylinder. As the pump plunger returns to a resting state a new fresh sample is captured in the pump. Once the pump completes its stroke, the cycle is ready to begin again.

Filter Regulator

The DynaPak Filter Regulator, refer to Appendix , page 50, is a stainless steel filtered regulator to supply the supply gas required to actuate the sample pump. It is capable of providing actuation pressure from pipeline pressures to required actuation pressures in a single dependable step.

Maintenance is minimal, but is certainly dependant on gas quality. Should the gas supplied to the filter regulator require significant filtration, replacement of the filter may be more frequent than normal, refer to System Maintenance, page 33.

Section 8: System Operation

Preparing for System Operation

1 When all of the tubing connections have been completed, close the purge valve on the front of the sampler probe body. Open the sample probe supply valve to allow pipeline pressure into the sampler, refer to Section 7, page 30. Check all connections using a liquid leak detector.

2 Adjust the filter/regulator from the following ranges, refer to Section 7, page 31.

Pipeline Pressure	Actuation Pressure
25 psig (1.72 Bar) to 50 psig (3.5 Bar)	Available Pipeline Pressure
50 psig (3.5 Bar) to 700 psig (48 Bar)	50 psig (3.5 Bar)
Over 700 psig (48 Bar)	65 psig (4.5 Bar)

3 Turn the stroke adjustment knob on the top of the pump counterclockwise to set the pump displacement at .4 cc/stroke, refer to Section 7, page 30.

4 Move all of the mode buttons on the Z-100 to their OFF positions as shown and make sure the system button is OFF.

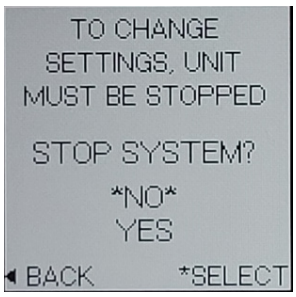
5 Push both timer/counter buttons to OFF position.

6 Push the mode buttons to select the timer mode. The pump will begin stroking once every 0.10 min.

7 Allow the sampler to operate until the pipeline pressure plus 100 psi (6.9 Bar) is achieved at the sample discharge.

8 Push the system to OFF position as shown.

9 Check all connections from the sampler discharge to the connection on the sample.



Section 9: System Maintenance

Preventative Maintenance Schedule

A preventative maintenance program serves to anticipate maintenance issues prior to waiting until the system requires service. Like changing the oil & filters in an automobile, by choosing to service the various parts and operation in the Sampling System at regular intervals, the technician can perform the maintenance service when desired, rather than when required, such as in the middle of night.

The key is to perform maintenance before it is required. The preventative maintenance schedule implemented should consider the application of the sampler. Many of these considerations include: the weather environment; the condition of, the actuation gas, the product condition and quality, and the pump stroke frequency. All of these issues must be considered when establishing a preventative maintenance schedule.

Recommended Maintenance Schedule
Monthly Inspection

- Verify system pressure
- Check for leaks
- Test the battery.
- Test the system for leaks each time a fitting or connection has been made.

Semi-Annual Inspection

- Clean and lubricate the sample pump
- Check the filter element, and replacing as necessary.

Annual Inspection

- Rebuild pump
- Test the Sampler System performance and service, as needed
- Replace Z-100 Battery Assembly.

Recommended Spare Parts List

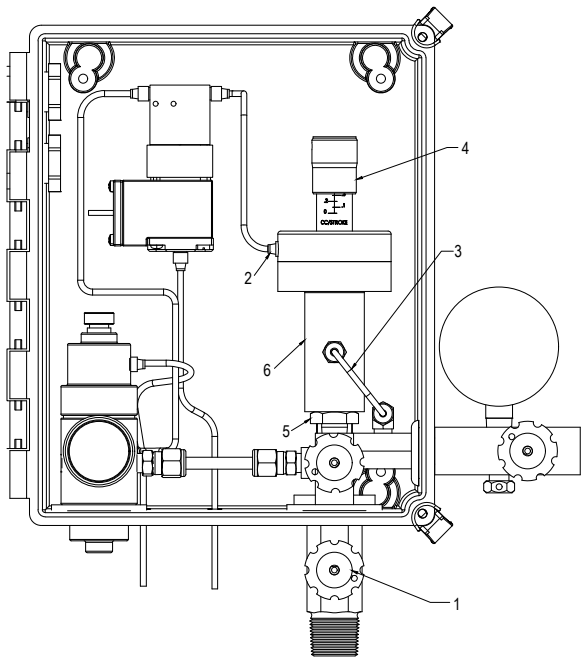
Part #	Description	Recommended Quantity
D3-0002	DP-2000 pump seal Replacement kit	1
D3-0003	Filter Regulator repair kit	1
A4-0036	Solenoid	1
E3-2005	Battery Pack	1
D3-0284	Z-100 fuse replacement kit	1
	3mm Tubing	as req'd

Section 9: System Maintenance

Cleaning and Lubricating the DP 2000 Pump

- Close the isolation valve.
- Disconnect the plastic tubing from the solenoid valve to the pump diaphragm housing by depressing the tubing release sleeve on the diaphragm housing fitting while pulling out the tubing. It is not necessary to remove the fitting from the diaphragm housing.
- Remove the sample discharge (1/8″ stainless steel tubing) from the pump body.
- Screw the stroke adjustment knob all the way down to the 0 cc/stroke setting.
- *Unscrew the pump body by hand from the inlet check valve assembly. Separation at this point is recommended to maintain proper tubing location and alignment between the pump body and the probe body. Do not remove the inlet check valve body from the manifold unless cleaning is necessary. To replace the inlet check valve O-ring, carefully cut the O-ring off the head of the dart and stretch the new O-ring over the head of the dart using a light coat of the assembly grease.
- Remove the diaphragm housing from the pump body by unscrewing the diaphragm housing and carefully pulling the plunger out of the pump body. Inspect the plunger shaft for damage or wear. The diaphragm chamber houses the diaphragm, return spring, stroke adjustment screw and plunger assembly. The diaphragm chamber should not be disassembled unless one of these items needs replacing.

Figure 9



*Screw the stroke adjustment screw all the way down

Section 9: System Maintenance

- Remove the internal bushings and O-rings from the pump body by inserting a nonmetallic rod (larger than 1/4″, smaller than 1/2″) into the top of the pump body. Gently tap to remove all bushing and O-rings out the bottom of the pump body as shown.
- Clean and inspect all components. Replace if necessary.

IMPORTANT NOTE: Normal service generally requires only the replacement of the O-rings and seal. A seal repair kit (part number D3-0002) is available from YZ.

- Apply a light coat of non-soluble assembly grease on all O-rings, bushings, and the plunger shaft to prevent damage.
- Install the body bushing into the bottom of the pump body as shown.
- Insert all other bushings, springs, and O-rings in their respective sequence on the plunger shaft as shown.
- Carefully install assembly into the top of the pump body, and screw the actuator assembly onto the pump body. (Tighten firmly by Hand ONLY)
- Install the pump assembly on the inlet valve assembly. (Tighten firmly by Hand ONLY)
- Connect the 1/8″ stainless steel tubing to the pump body and 1/8″ plastic tubing to the diaphragm housing.
- Open the isolation valve.
- Adjust the stroke adjustment knob to its original setting.
- Pressure test the pump as previously described for proper operation.

Figure 10

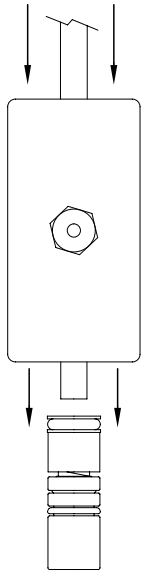
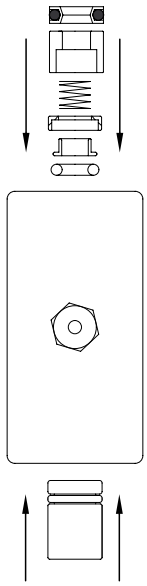


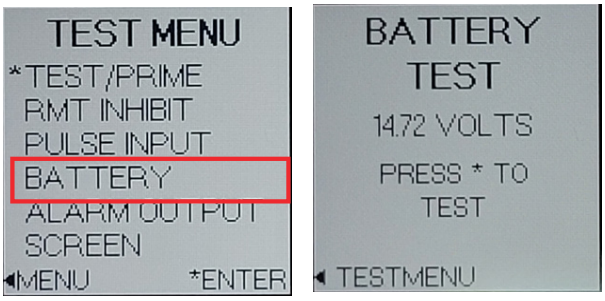
Figure 11



Section 9: System Maintenance

Battery Test

The BATTERY TEST is used to verify the system power supply voltage read by the controller. The test is primarily used when to verify the voltage when the system is powered from the internal battery pack. The test can also be used to verify the voltage reading when the system is supplied by and external power source.



Select BATTERY TEST from the Test Menu and press enter on the navigation switch. The BATTERY TEST screen will open. The value shown initially will be from the previously run test and not a current reading. In order to get a valid test result, a solenoid must be connected to the system. Press enter to start the test, the solenoid will be actuated one time, the LED will flash and the battery voltage reading will be updated. A new battery will read approximately 11.5V during this test and the LED will flash GREEN.

If the battery voltage is found to be low during the test, the LED will flash RED. A fully charged new battery pack will measure approximately 14.4V if measured with a DMM or voltmeter at the battery leads.

Section 9: System Maintenance

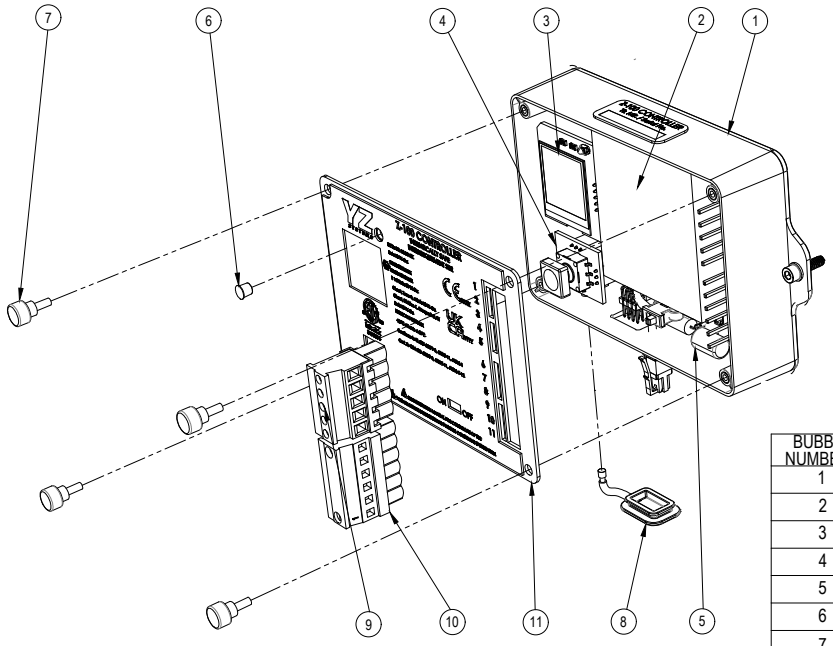
Replacing a depleted battery

- Remove the four thumb screws, cover plate and terminal connector.
- The battery is located in the upper right hand corner of the Z-100 controller assembly.
- Un-clip the battery plug from the battery receptacle.
- Replace the depleted battery with a fresh battery pack (part No. E3-2005).

IMPORTANT NOTE: Follow the illustration along with steps 1-5 to assure proper battery replacement in the Z-100 enclosure

- Restart the Z-100 controller.
- For Technical Support: 1-281-362-6500
  1-800-NJEX-HELP
  (1-800-653-9435)
  Email: techsupport@yzsystems.com

Figure 12



BUBBLE NUMBERS	PART NO.	DESCRIPTION
1	F2-0615	Z-100 Controller Assy
2	E3-2005	Battery Pack
3	G0-0096	Z-100 Display Board
4	G0-0097	Z-100 Navigation Switch
5	D3-0284	Z-100 Fuse Replacement Kit (2 Fuses per kit)
6	C0-1026	Stand Pipe
7	A9-1001	Thumb Screws
8	D5-0322	Z-100 MM Plug Cover
9	H1-0201	Z-100 5 Pin Terminal Block
10	H1-0202	Z-100 6 Pin Terminal Block
11	A9-3141	Z-100 Face Plate

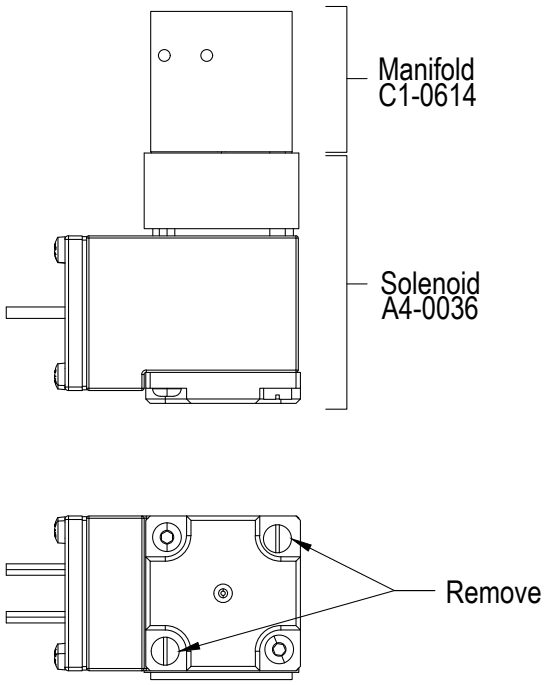
Section 9: System Maintenance

Solenoid Maintenance

- The solenoid assembly A4-0038 is made up of the solenoid A4-0036 and the manifold C1-0614. To replace the solenoid, remove only the two slotted head bolts as shown in figure. Removing any other screws to disassemble the solenoid voids the certification of the solenoid.

- For Technical Support: 1-281-362-6500
  1-800-NJEX-HELP
  (1-800-653-9435)
  Email: techsupport@yzsystems.com

Figure 13



Section 10: System Trouble Shooting

How to Use This Section

The recommendations contained in this section should be used as a preliminary information resource to remedy operational issues with the DynaPak Sampling System. It is important to read all of the definitions and notes prior to initiating work.

Each subsection contains a description of the indicators followed by a step-by-step trouble shooting procedure.

For Additional Help

Any issue that can not be resolved through the use of this reference, please contact YZ:

For Technical Support: 1-281-362-6500
1-800-NJEX-HELP
(1-800-653-9435)
Email: techsupport@yzsystems.com

SAFETY NOTES

- Always use extreme care when performing maintenance on Sampling Systems. Always take necessary measures to assure that electrical classification in the area is considered, before, and during all repairs, and that necessary steps are taken to maintain proper electrical procedures for the classification of the area.

- Take special care when disconnecting any fitting, to assure that product and/or pressure will not be released when the connection is broken. This system may contain liquid and/or gas high pressures.

Step-by-Step Resolution

Using a step-by-step method to resolve issues on the Sampling System will reduce maintenance time and assist in returning the system to service quicker.

The following represent the recommended chronology to resolve issues:

Resolve issues to the following order:

a. Battery Power, page 40
b. Timer Mode, page 41
c. Counter Mode, page 42

Section 10: System Trouble Shooting

Battery Power

The Z-100 controller and the low powered solenoid are normally powered by the Z-100 Battery assembly. The battery assembly is not a rechargeable type battery. Under normal conditions this battery may last two years. The Z-100 controller has an alarm that will advise when the battery needs replaced.

Battery Power Troubleshooting Steps

- The battery voltage can be tested with the battery test option under the test menu. Navigate to the battery test menu and press enter on the navigation switch.
- While in the battery test menu, press the navigation switch in to test the battery.

NOTE: The battery test will send a signal to the solenoid to stroke the pump - the pump will stroke odorant into the discharge line if open. This provides the most accurate load on the battery pack to be representative of the available battery life.

- The battery voltage will be displayed on the screen and the LED will flash green or red, depending if the battery voltage is acceptable or low. It is recommended to replace the battery when it reaches 11.5 volts as shown on the controller in the battery test screen with the solenoid connected.

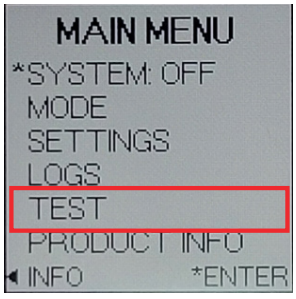
Section 10: System Trouble Shooting

Trouble Shooting: Timer Mode

Go back to Mode menu and under Mode menu scroll down and select Timer tab and press enter.

Mechanical Operation Test

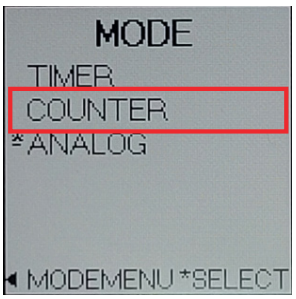
1. Set the mode to Timer.
2. This mode enables the user to increase the solenoid output rate at a set time interval.
3. Go to Main Menu, scroll down to TEST and push to choose TEST.
4. Scroll down to SCREEN. Push to choose that.
5. Press once and the screen should go to all black, then all white. It's fast - you can repeat it to double check. Push left to return to test.

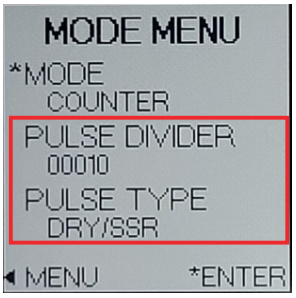


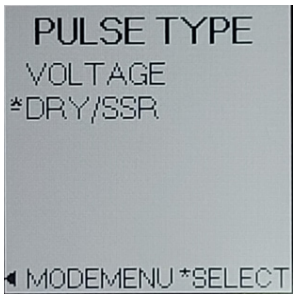
Section 10: System Trouble Shooting

Trouble Shooting: Counter Mode

Go back to Mode menu and under Mode menu scroll down and select Counter tab and press enter.







The Z-100 controller monitors a pulse input signal provided by the customer. In this mode, the Z-100 controller is used as a dividing counter to control the rate at which the solenoid output is activated to stroke to the pump. When the counter mode is selected, the pulse divider must be input to determine how often the pump will stroke in response to the incoming pulses. Navigate to the Pulse Divider option and press the navigation button in to enter the Pulse Divider screen. The arrow at the bottom of the number will indicate which digit is being modified. Press the navigation button up or down to adjust the digit and then press the right arrow to move to the next digit. Use the right arrow to navigate to the back button and press the button in to cancel, or navigate to save and enter to save. The pulse types that can be selected are Voltage or Dry Contact/SSR. Navigation to the Pulse Type option from the Mode Menu to open the Pulse Type submenu. Select the pulse type and navigate to the select button and press enter to save, or press the navigation button to the left to discard the change.

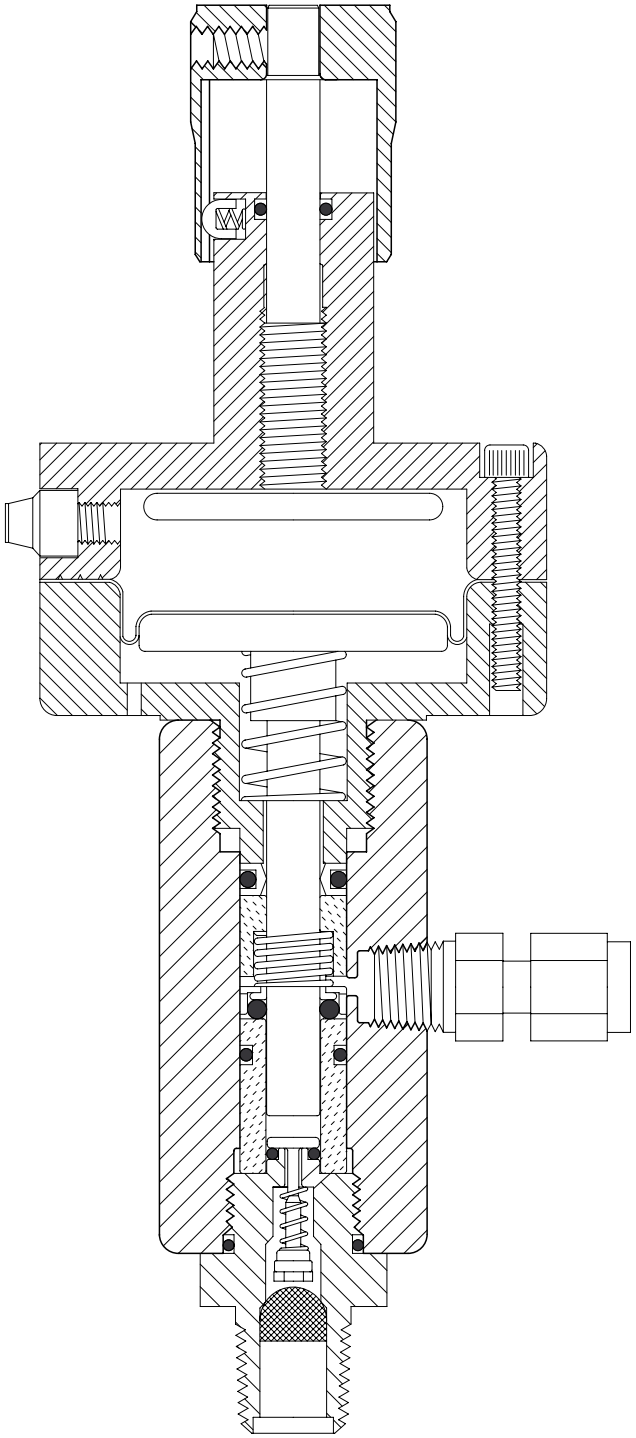
Fuse Replacement

- If the Z-100 display will not power-up, from battery or external power supply, replace F2.
- If the Z-100 powers up, but the solenoid does not activate, replace F1.

Appendix:

DynaPak 2000 Pump, Assembled

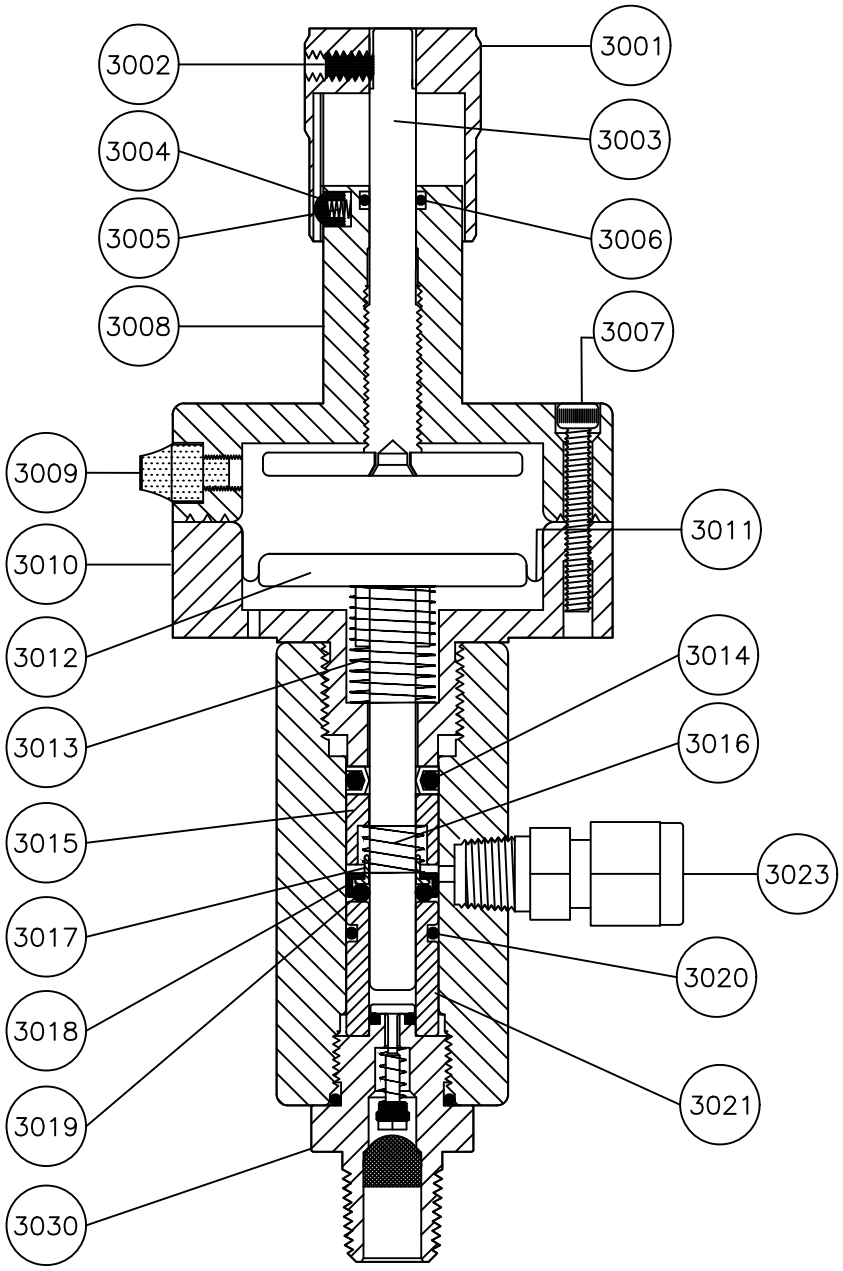
Figure 14



Appendix:

DynaPak 2000 Pump, Exploded View

Figure 15



* - DP-2000 Pump Seal Kit - P/N D3-0002

Appendix:

DynaPak 2000 Pump Parts List

Item Number	Description	Quantity	Bubble Seq No
B1-0002	VOLUME ADJUSTMENT KNOB BLACK	1	3001
C0-0096	10-24 X 1/4 SET SCREW SS	1	3002
B1-0004	DP STROKE ADJ SCREW ASSY	1	3003
B1-0030	DP VOLUME ADJUST DETENT	1	3004
C3-0005	DP VOL ADJ SPRING	1	3005
V-010	O-RING/VITON	1	3006
C0-0014	6-32 X 1 SHCS SS	6	3007
B1-0003	DP UPPER DIAPHRAGM HSG ANODIZE	1	3008
A1-0113	MCONN 3MM X M5 SS	1	3009
B1-0070	DP PUMP BODY/LOWER DIA HOU ASSY	1	3010
A6-0010	DP ACTUATION DIAPHRAGM	1	3011
B1-0007	DP PLUNGER ASSY	1	3012
C3-0006	NJEX CARTRIDGE SPRING / DP	1	3013
A6-0018	LUBRITHANE W/ VITON SKF P9068	1	3014
B1-0011	DP SPRING RETAIN BUSHING	1	3015
C3-0007	DP DISCHARGE CV SPRING	1	3016
B1-0013	DP DISCHARGE CV BUSHING	1	3017
B1-0014	DP DISCH CV BUSHING SLV	1	3018
A5-1108	O-RING -108 VITON, 75 DUROMETR	1	3019
A5-1012	OR -012 VITON,V75	1	3020
B1-0016	DP BODY BUSHING	1	3021
40061	TUBE CONN 1/8TUBE X 1/8NPT 316	1	3023
B1-0017+	DP 2000 INLET CV ASSY (STD)	1	3030

Appendix:

DynaPak Pump Options

High Pressure – Option N

- Larger diaphragm housing on sample pump (gold anodized appearance). MAWP 2350 PSIG.

- Unique replacement parts for this option are listed below:

Bubble No.	Part No.
3001	B1-0059
3008	B1-0054
3010	B1-0071
3011	A6-0106
3012	B1-0012

Pipeline Pressure	Actuation Pressure
Under 700 psig (48 Bar)	50 psig (3.5 Bar)
700 psig (48 Bar) to 1500 psig (103 Bar)	65 psig (4.5 Bar)
1500 psig (103 Bar) to 2160 psig (149 Bar)*	75 psig (5.2 Bar)

* Note: Only available with High Pressure N option. 2400 PSI rupture disk.

- Use the standard D3-0002 seal kit.

Low Pressure – Option L

- Modified inlet check assembly (lighter return spring) appropriate for line pressures of 10psig (0.69 Bar).

- Unique replacement parts for this option listed below:

Bubble No.	Part No.
3001	B1-0059

90 Durometer – Option D

- The option D uses 90 durometer O-rings in two key positions to provide enhanced durability and higher pressures.

- Use the D3-0115 seal kit.

Stainless Steel Body Bushing – Option F

- Option F replaces bushing material of construction from Delrin (standard) to stainless steel. This option is often ordered with Option D for 90 durometer O-rings.

- To order a replacement bushing:

Bubble No.	Part No.
3021	B1-0047

- F only, use the standard D3-0002 seal kit. FD use D3-0115 seal kit.

Severe Service – Option K

- Choosing option K changes the wetted seals to Chemraz and Teflon for superior material compatibility. This option also uses the stainless steel bushing.

- Use the D3-0002K seal kit.

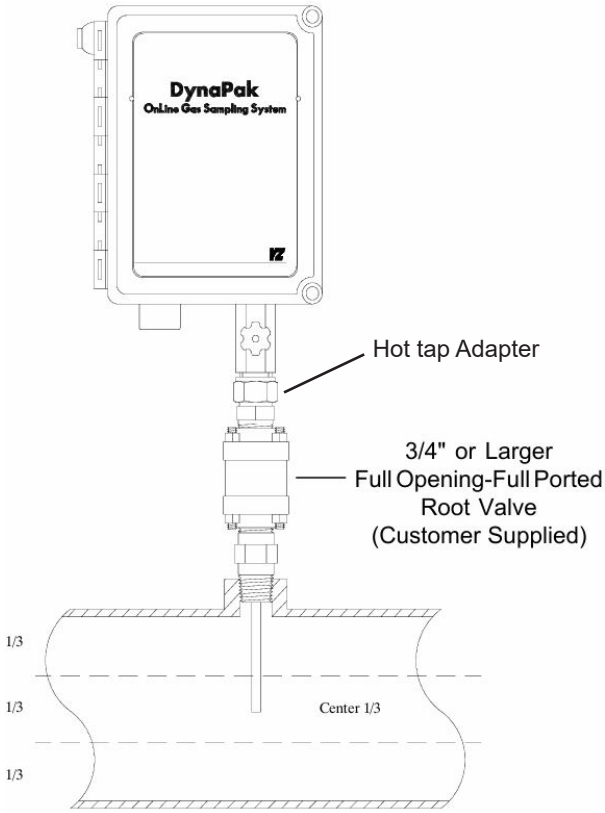
1/2” NPT Probe – Option J

- Choosing Option J simply replaces the standard ¾” NPT probe connection with a ½” NPT probe connection body.

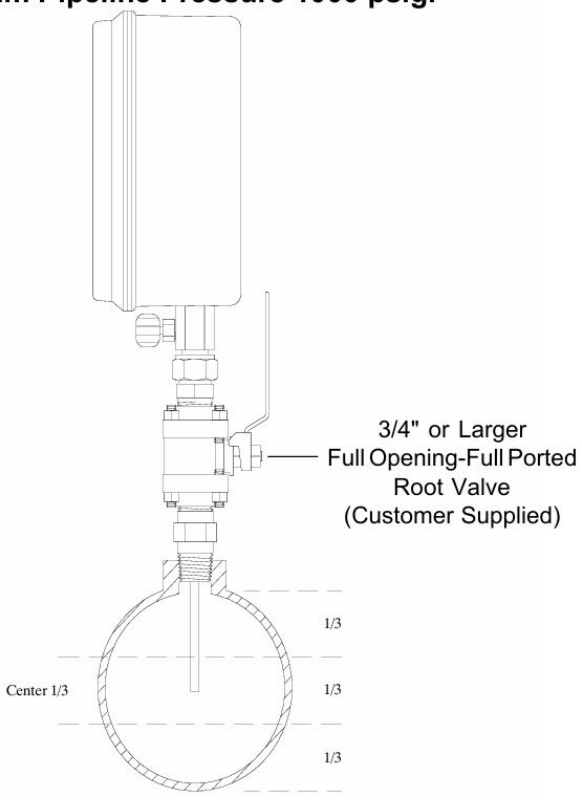
Appendix:

Hot Tap Configuration – Option “H”

- Choosing Option H attaches the Hot Tap Adapter Assembly to the Isolation valve as shown in Page 48.
- The Dynapak with Option H mounts directly to a (customer supplied) root valve on the pipeline. (The root valve connection facing the sampler must be 3/4” FNPT, and the valve must be 3/4” or larger full ported full opening valve.

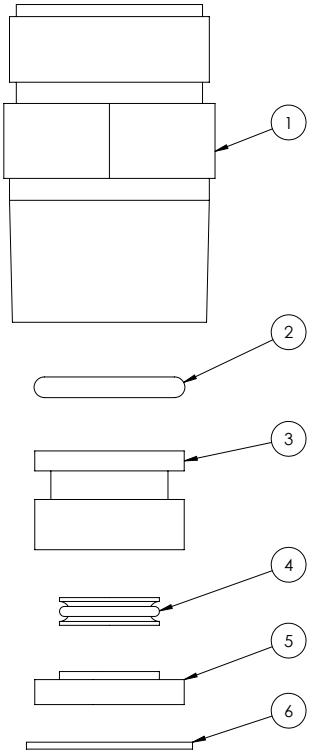


Maximum Pipeline Pressure 1000 psig.

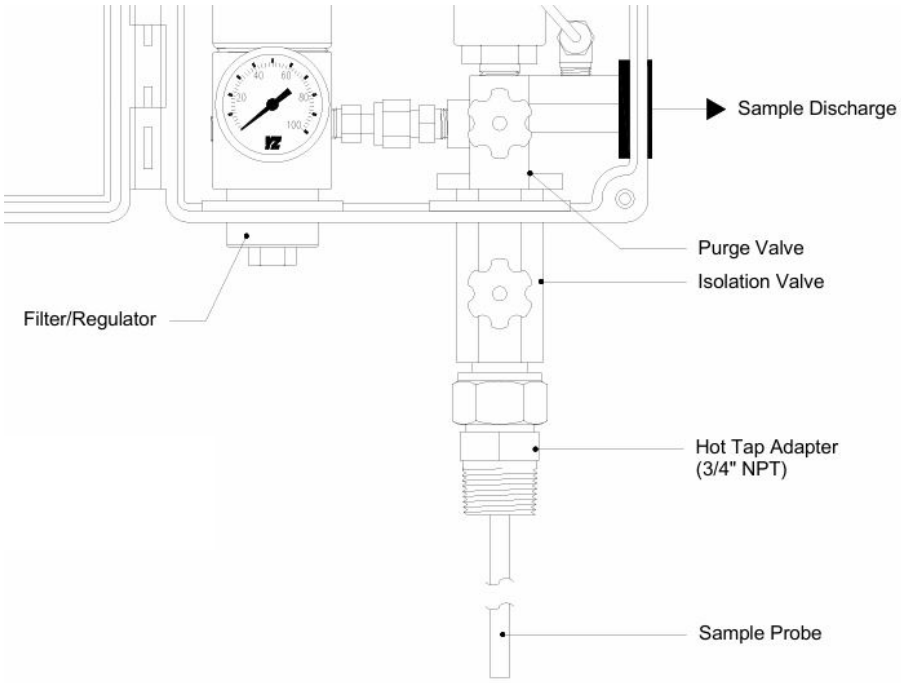


Appendix:

Hot Tap Configuration – Option “H”



BILL OF MATERIALS			
BUBBLE NUMBER	PART NO.	DESCRIPTION	QTY
1	B1-0031	DP HOT TAP FITTING	1
2	A5-1113	O-RING - 113	1
3	A7-0009	DP HOT TAP UPPER BUSHING	1
4	A6-0018	SEAL - 202	1
5	A7-0010	DP HOT TAP LOWER BUSHING	1
6	C3-0802	SNAP RING, 3/4" INT.	1

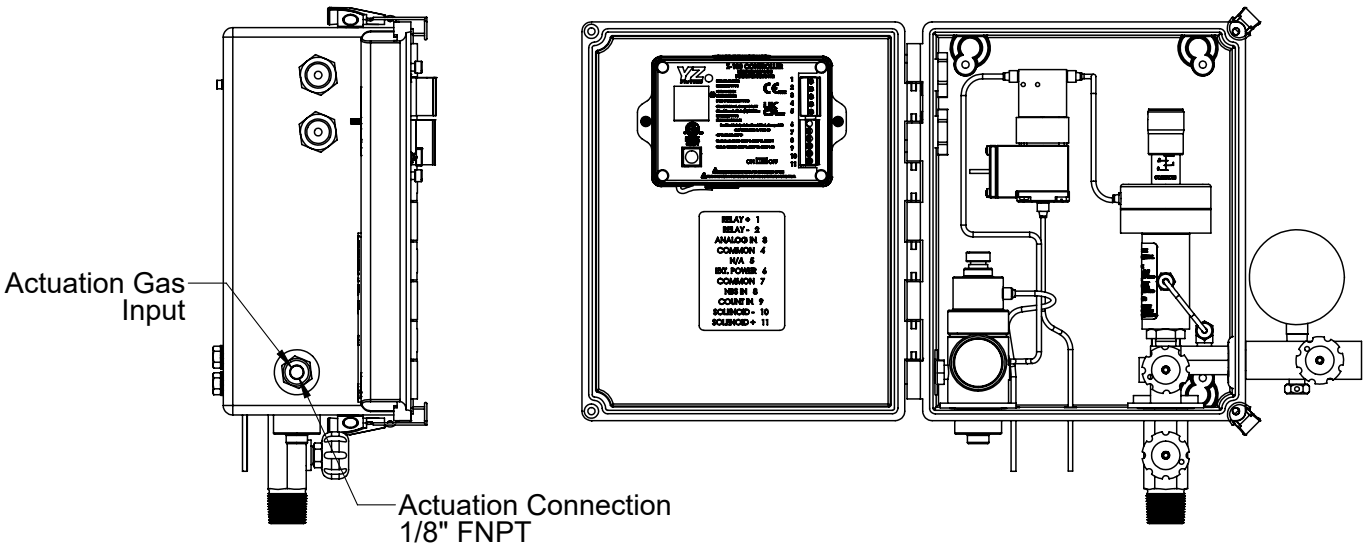


Appendix:

External Actuation – Option “X”

- The standard Dynapak system uses the line pressure coming into the pump to also actuate the pump. The external actuation option eliminates the connection from the pipeline pressure and instead provides a port for the customer to connect a separate clean gas supply to the actuation gas.

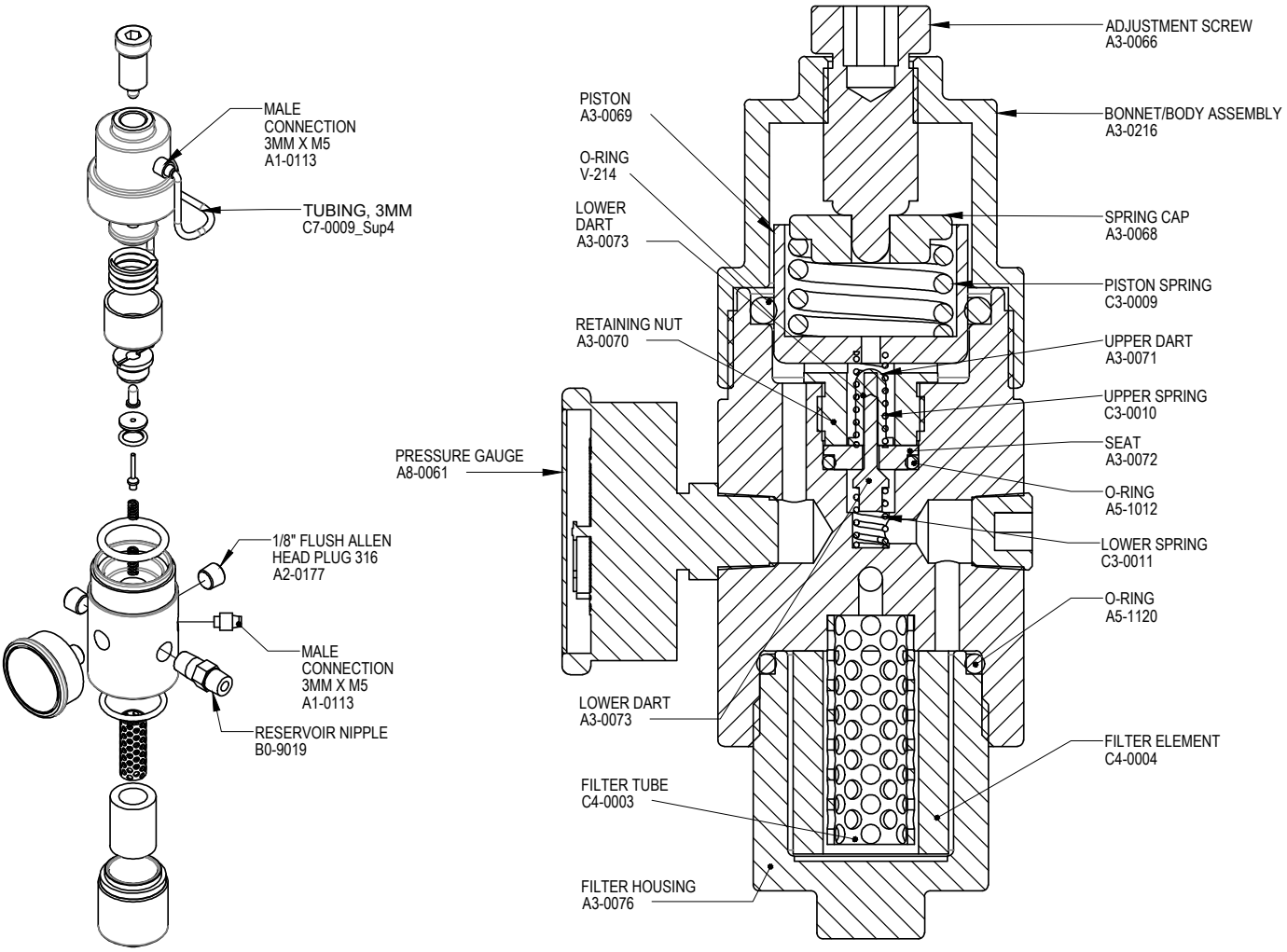
- The external actuation gas may be bottled nitrogen or pressured clean, dry air. This option is common if the pipeline material is detrimental to the system, such as sour gas or has a high level of particulates. The external actuation also eliminates the exhaust of the pipeline product as part of the pump stroke process. The external actuation connection is 1/8” FNPT. See the diagram below.



Appendix:

YZ Filter/Regulator Assembled

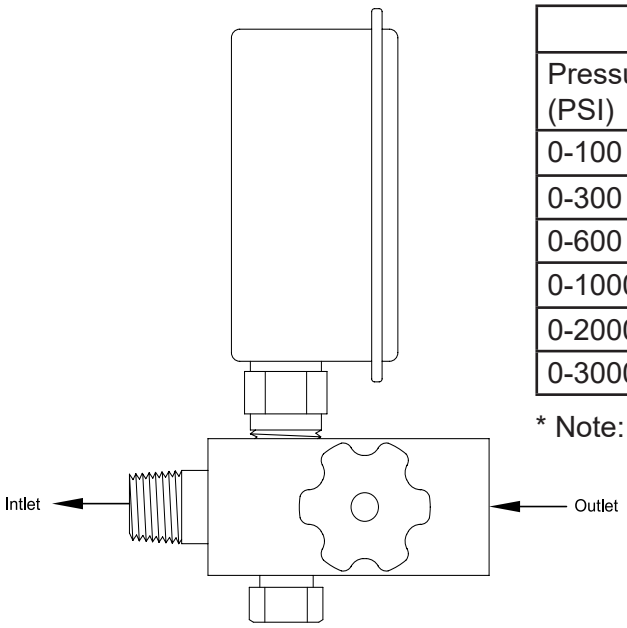
Figure 16



Appendix:

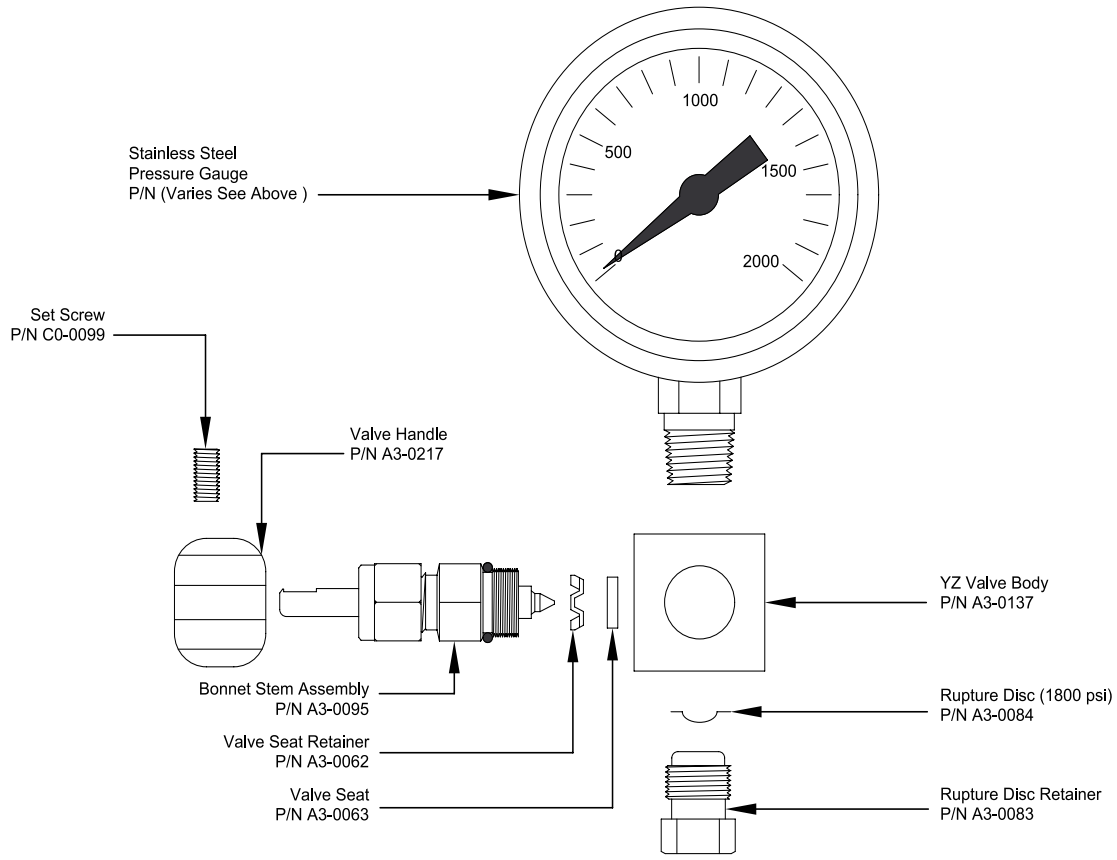
Link Plus

Figure 17



Link Plus		Pressure Gauge	
Pressure (PSI)	Model	Standard	Dual Scale PSI/KPA
0-100 psi	C1-0002	A8-0010	A8-0067
0-300 psi	C1-0003	A8-0008	A8-0060
0-600 psi	C1-0004	A8-0011	A8-0048
0-1000 psi	C1-0005	A8-0007	A8-0058
0-2000 psi	C1-0006	A8-0012	-
0-3000 psi*	C1-0120	A8-0033	-

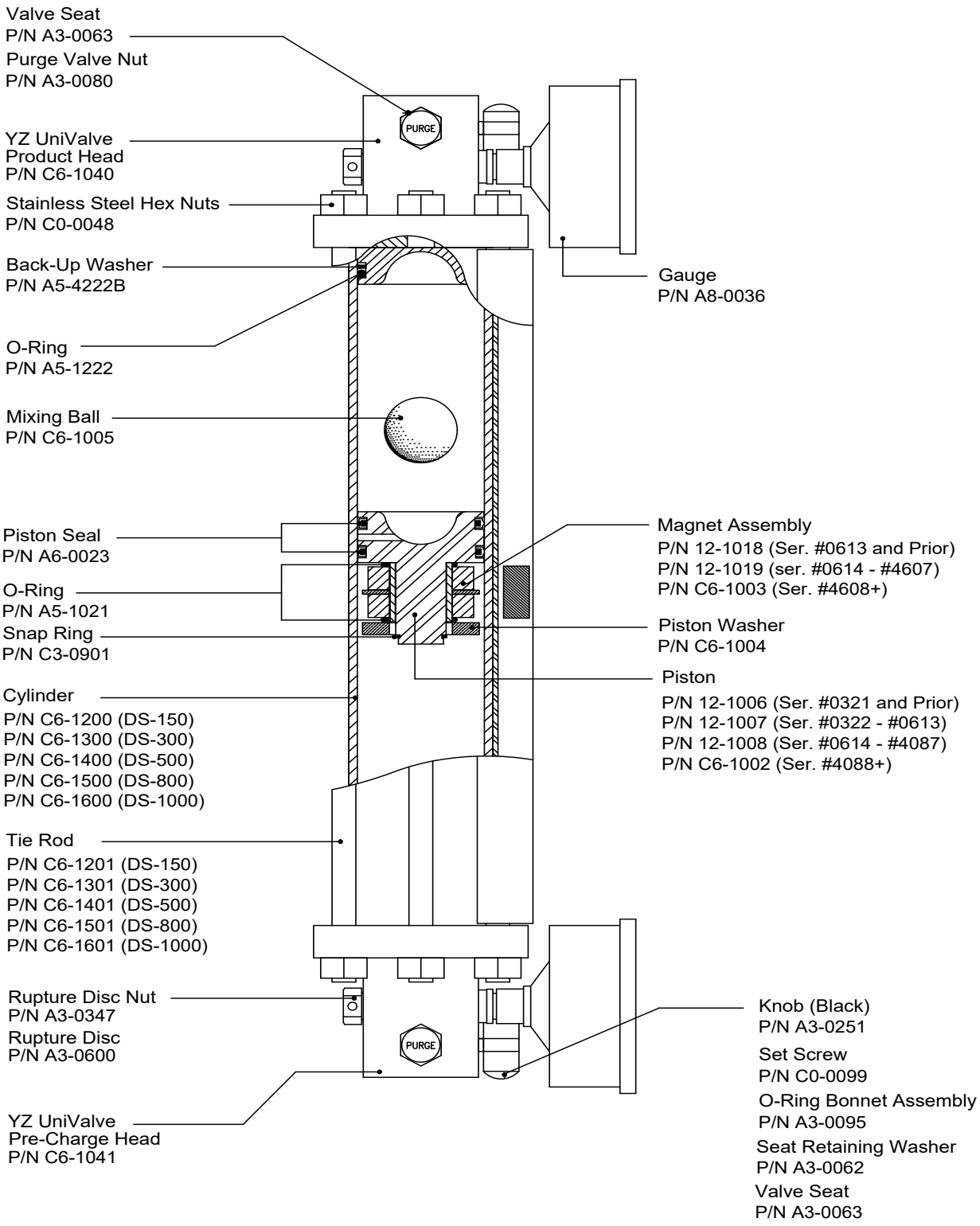
* Note: Only available with High Pressure N option.
2400 PSI rupture disk



Appendix:

Durasite Sample Vessel

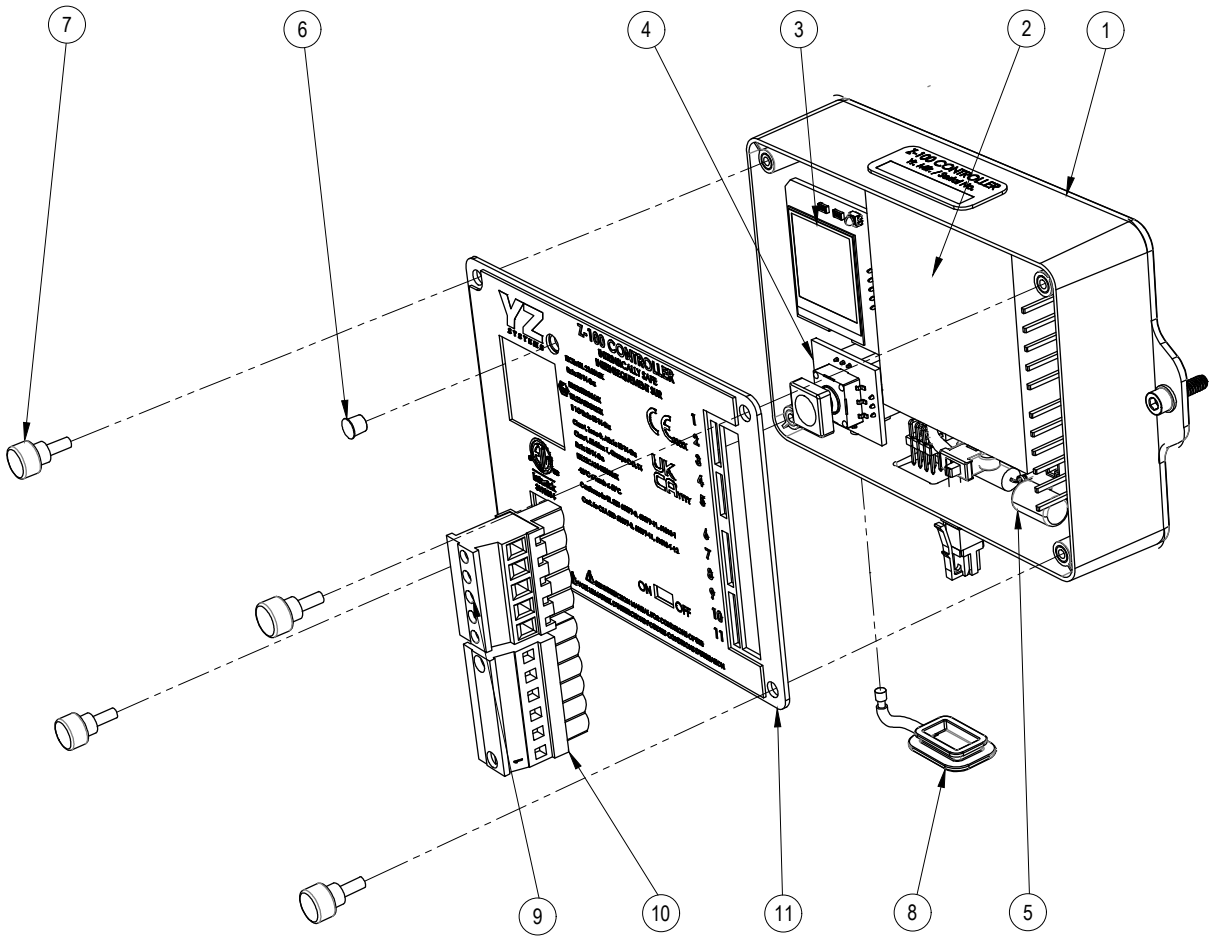
Figure 18



Appendix:

Z-100 Controller

Figure 19



BUBBLE NUMBERS	PART NO.	DESCRIPTION
1	F2-0615	Z-100 Controller Assy
2	E3-2005	Battery Pack
3	G0-0096	Z-100 Display Board
4	G0-0097	Z-100 Navigation Switch
5	D3-0284	Z-100 Fuse Replacement Kit (2 Fuses per kit)
6	C0-1026	Stand Pipe
7	A9-1001	Thumb Screws
8	D5-0322	Z-100 MM Plug Cover
9	H1-0201	Z-100 5 Pin Terminal Block
10	H1-0202	Z-100 6 Pin Terminal Block
11	A9-3141	Z-100 Face Plate

APPENDIX:

Z-100 Installation Drawing

Z-100 ELECTRONIC CONTROLLER
HAZARDOUS AREA INSTALLATION INSTRUCTIONS AND DRAWINGS

The following instructions apply to equipment covered by the following certificate numbers:

IECEx:	IECEx ETL 22.0013X
ATEX:	ETL22ATEX0132X
UKEX:	ITS22UKEX0366X
NORTH AMERICA:	ETL22CA104230006X

APPLICABLE STANDARDS:
Class I, II, and III, Division 1, Hazardous (Classified) Locations
UL 913:2013 Ed.8+R:06 Dec2019
UL 60079-0:2019 ED.7 + R:15 APR 2020, UL 60079-11:2013 ED.6 + R:14 SEP2018
CSA C22.2#60079-0 : 2019 ED.4, CSA C22.2#60079-11 : 2014 ED.2)(R2018)
IEC 60079-0 : 2017 ED.7, IEC 60079-11 : 2011 ED.6
EN 60079-0 : 2018, EN 60079-11 : 2012

The Z-100 controller assembly (F2-0615) is an intrinsically safe electronic controller that can reside in a hazardous area and is used to control and monitor chemical injection or sampling applications. The Z-100 also provides several entity rated intrinsically safe customer inputs and outputs. These include 2 digital inputs, 1 digital output, and 1 analog input for interfacing to suitably certified equipment located inside or outside the hazardous area.

The Z-100 Controller may be used in hazardous area locations with flammable gas and vapors of Class I group IIB Zone 0 or Division 1 Group C-D with a temperature class rating of T4 with an ambient temperature range of -20C to +60C.

Z-100 Intrinsically Safe Controller Assembly F2-0615, shall be housed in a general purpose enclosure with or without factory interconnect wiring and mechanical components. The minimum IP rating of the system enclosure shall be IP54.

For safe operation and installation the information in this document, and the end applications system level instruction and operating manual shall be observed.

The Z-100 Controller shall only be installed and maintained by qualified personnel in accordance with all local laws, national laws, directives, and standards applicable to the country and area of installation.
Factory wiring shall not be modified.

DATE	ECN	DESCRIPTION	UPD BY	APR BY	REV
02/16/2023	28238	PRODUCTION RELEASE	GSS	YZT	00
12/14/2022	26682	PRELIM: UPDATED ENTITIES, ADDED WARNING,	GSS	YZT	C

REVISION HISTORY

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE INCH[mm]
INTERPRET DIM AND TOL PER ASME Y14.5-2009
TOLERANCES:

.X	± .050[1.27]
.XX	± .010[.254]
.XXX	± .005[.127]
∠	± .5°
FRACTIONS	± 1/64[.397]
FINISH:	125 √RMS

THIRD ANGLE PROJECTION

MILTON ROY
www.miltonroy-americas.com MILTON ROY, LLC

TITLE
INSTALLATION DRAWING
YZ SYSTEMS
Z-100 CONTROLLER

DO NOT SCALE DRAWING | SIZE A | DRAWING NO 2E-0042 | REV 00 | SCALE 1 : 1 | SHEET 1 of 4

APPENDIX:

Z-100 Installation Drawing

Z-100 ELECTRONIC CONTROLLER
HAZARDOUS AREA INSTALLATION INSTRUCTIONS AND DRAWINGS

WARNING: Substitution of components may impair intrinsic safety.
AVETISSEMENT: La substitution de composants peut compromettre la sécurité intrinsèque.

WARNING: Explosion Hazard - To prevent ignition of an explosion atmosphere remove power before disconnecting any equipment or wiring unless the area is known to be non-hazardous.
AVERTISSEMENT: **Risque d'explosion -** Pour éviter l'inflammation d'une atmosphère d'explosion, coupez l'alimentation avant de déconnecter tout équipement ou câblage, à moins que la zone ne soit connue pour être non dangereuse.

WARNING: Replace removable fuses with the same type and rating to provide protection against the risk of fire and shock.
AVERTISSEMENT: Remplacez les fusibles amovibles avec le même type et les mêmes caractéristiques pour vous protéger contre les risques d'incendie et de choc.

WARNING: If battery powered, use only YZ Systems replaceable battery pack assembly, Part Number: E3-2005
AVERTISSEMENT: Si alimenté par batterie, utilisez uniquement l'ensemble de batterie remplaçable YZ Systems, numéro de pièce : E3-2005.

WARNING: F2-0615 Z-100 Controller contains lithium primary battery (VBAT1) under encapsulation. Unit may explode if mistreated. Do Not Recharge, Disassemble or Dispose of in fire.
AVERTISSEMENT: Le contrôleur F2-0615 Z-100 contient une batterie primaire au lithium (VBAT1) sous encapsulation. L'appareil peut exploser s'il est maltraité. Ne pas recharger, démonter ou jeter au feu.

WARNING: POTENTIAL STATIC CHARGING HAZARD - To avoid static buildup, use a damp cloth to clean all painted or other non-metallic surfaces.
AVERTISSEMENT: RISQUE DE CHARGE STATIQUE POTENTIEL - Pour éviter l'accumulation d'électricité statique, utilisez un chiffon humide pour nettoyer toutes les surfaces peintes ou non métalliques.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE INCH[mm]
INTERPRET DIM AND TOL PER ASME Y14.5-2009
TOLERANCES:

.X	± .050[1.27]
.XX	± .010[.254]
.XXX	± .005[.127]
∠	± .5°
FRACTIONS	± 1/64[.397]

FINISH: 125 √RMS

THIRD ANGLE PROJECTION

MILTON ROY
www.miltonroy-americas.com MILTON ROY, LLC

TITLE
INSTALLATION DRAWING
YZ SYSTEMS
Z-100 CONTROLLER

DO NOT SCALE DRAWING	SIZE	DRAWING NO	REV
	A	2E-0042	00
		SCALE 1 : 1	SHEET 2 of 4

APPENDIX:

Z-100 Installation Drawing

HAZARDOUS AREA INSTALLATION INSTRUCTIONS AND DRAWINGS

Conditions for safe use:

The system shall not be connected to any associated apparatus which uses or generates more than 250VRMS.

Installations:

USA- Installations shall be in accordance with the National Electric Code (NEC), NFPA-70, and ANSI/ISA-RPI206.1
Canada - Installation shall be in accordance with Canadian Electrical Code (CEC) Part 1 (CSA22.1).
ATEX/IECEx - Installations shall be in accordance with all applicable local and national electrical codes, EN60079-14, IEC60079-25, and all Essential Health and Safety Regulations of Directive 2014/34/EU.

Z-100 Controller Assembly F2-0615 is rated and shall be marked as follows:

Z-100 Controller
Ex ia IIB T4 Ga
Ex II 1 G Ex ia IIB T4 Ga
Class I, Zone 0, AEx ia IIB T4 Ga
Class I Division 1, Groups C-D, T4

NOTES:

1. INTRINSICALLY SAFE INTERCONNECT WIRING BETWEEN DEVICES SHOWN MAY BE FACTORY INSTALLED.
2. SUBSTITUTION OF COMPONENTS COULD IMPAIR INTRINSIC SAFETY.
3. CABLE(S) X SHALL BE SHIELDED TWISTED PAIR TYPE. CABLE SHIELDS SHALL BE EARTHED PER 60079-14 IN NON-HAZARDOUS AREA.
4. WHEN USING MULTI-CORE TYPE CABLE(S) FOR CABLE X THE CABLE SHALL BE TYPE A OR B PER 60079-25 CLAUSE 9.
5. IF USING DIODE SAFETY BARRIERS, FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS FOR PROPER SAFETY GROUNDING TO PROTECTIVE EARTH.
6. ANALOG FLOW INPUT (TB2) AND COUNT INPUT (TB2) SHALL NOT BE CONNECTED AT THE SAME TIME.
7. INTRINSIC SAFETY BARRIERS OR ISOLATORS SHALL BE COMPLIANT WITH THE SAFETY PARAMETERS LISTED FOR EACH INPUT OR OUTPUT.
8. THE AMBIENT TEMPERATURE RANGE FOR F2-0615 IS -20C TO +60C.
9. F2-0615 INTRINSIC SAFETY PROTECTION LEVEL IS: "ia".
10. EXTERNAL I.S. SUPPLY AND BATTERY PACK E3-2005 SHALL NOT BE CONNECTED AT THE SAME TIME.
11. REPLACEABLE INTRINSICALLY SAFE BATTERY PACK ASSEMBLY, E3-2005, CONTAINS LITHIUM PRIMARY CELLS. DO NOT STORE OR USE IN TEMPERATURES EXCEEDING 85C. DO NOT CHARGE, DISASSEMBLE, OR INCINERATE. DEPLETED BATTERY PACKS SHOULD BE DISPOSED OF PER LOCAL REGULATIONS.
12. ALTHOUGH RECOMMENDED TO VERIFY THE AREA IS SAFE, THE E3-2005 BATTERY PACK MAY BE REPLACED SAFELY IN A HAZARDOUS AREA. REPLACE **ONLY** WITH YZ PN: E3-2005 INTRINSICALLY SAFE BATTERY PACK ONLY, **SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.**
13. MM-100 MEMORY MODULE ASSEMBLY F2-0268 IS NOT NORMALLY CONNECTED TO THE CONTROLLER. TO PREVENT POTENTIAL DAMAGE OR SYSTEM RESETS WHEN MEMORY MODULE IS NOT IN USE, COVER THE CONTROLLER CONNECTOR WITH PROVIDED SEAL. SHORT CIRCUITS OR ESD DISCHARGE TO TO THESE CONNECTIONS COULD RESET OR DAMAGE THE CONTROLLER.
14. Z-100 CONTROLLER IS INTENDED FOR FIXED INSTALLATION.
15. Z-100 CONTROLLER F2-0615 SHALL BE MOUNTED IN AN ENCLOSURE WITH A MINIMUM IP54 RATING IN SYSTEM LEVEL OR FINAL INSTALLATION.
16. MATERIAL USED IN Z-100 COVER PLATE IS ALUMINUM WHICH EXCEEDS 10% IN TOTAL. PLEASE SEE APPLICABLE SYSTEM LEVEL USER MANUAL FOR INSTRUCTIONS TO AVOID IGNITION HAZARD DUE TO IMPACT OR FRICTION.
17. **SCHEDULE DRAWING - DO NOT MODIFY WITHOUT AGENCY APPROVAL.** EX

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE INCH[mm]
INTERPRET DIM AND TOL PER ASME Y14.5-2009
TOLERANCES:

.X	± .050[1.27]
.XX	± .010[.254]
.XXX	± .005[.127]
∠	± .5°
FRACTIONS	± 1/64[.397]
FINISH:	125 √RMS

THIRD ANGLE PROJECTION

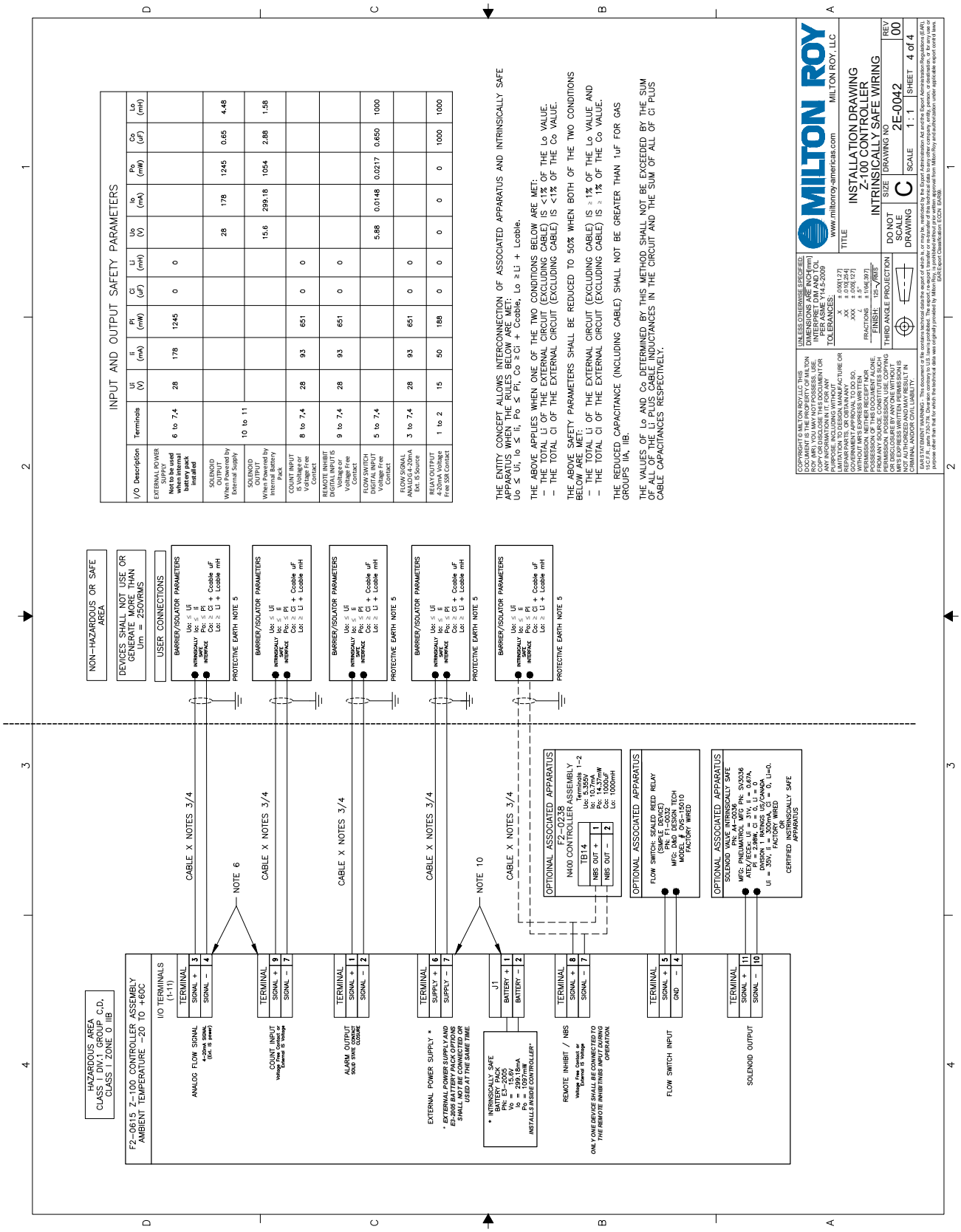
MILTON ROY
www.miltonroy-americas.com MILTON ROY, LLC

TITLE
INSTALLATION DRAWING
YZ SYSTEMS
Z-100 CONTROLLER

DO NOT SCALE DRAWING | SIZE A | DRAWING NO 2E-0042 | REV 00 | SCALE 1 : 1 | SHEET 3 of 4

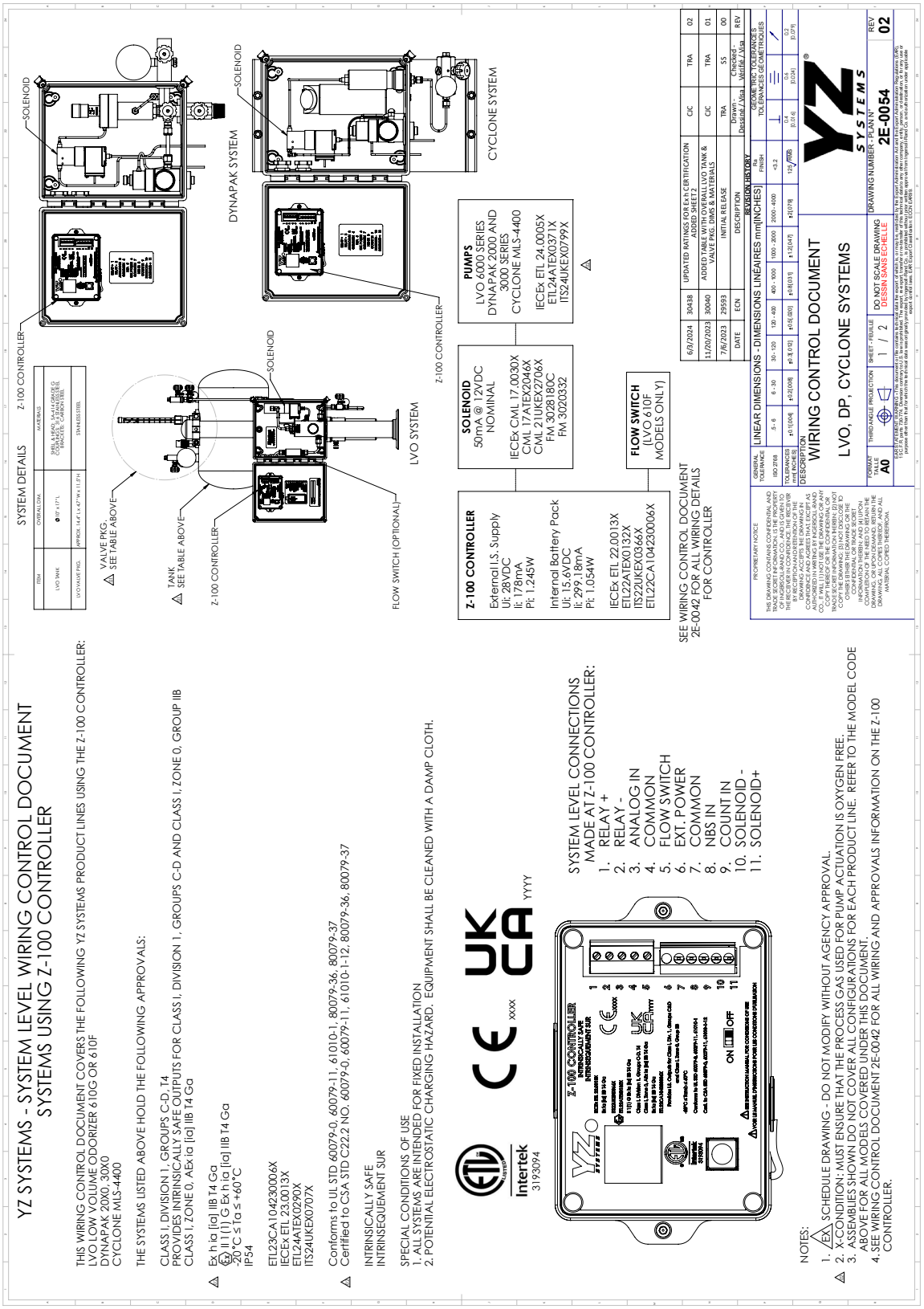
APPENDIX:

Z-100 Installation Drawing



APPENDIX:

Wiring Control Document



Wiring Control Document

LVO LOW VOLUME ODORIZER 610G OR 610F SYSTEM NOTES:

1. FLOODED SUCTION REQUIRED FOR PRIMING
2. SHALL NOT BE USED WITHOUT A PROCESS MEDIUM
3. COMPATIBLE FLUIDS: GROUP IIC GASES AND NATURAL GAS ODORANTS (VARIOUS BLENDS)
4. INLET ACTUATION PRESSURE: 30 - 60 psi
5. MAXIMUM PROCESS PRESSURE: 1440 psi
6. OPERATING SYSTEM TEMPERATURE: -4°F to +140°F (-20°C to +60°C)
7. INSTALLATION INSTRUCTIONS:
   1. SYSTEM SHOULD BE MOUNTED IN A VERTICAL POSITION
   2. ATTACH SYSTEM TO A SECTION OF 2" PIPE USING PROVIDED MOUNTING CLAMPS
   3. CONNECT A GROUND WIRE FROM THE 2" PIPE TO A PROPERLY INSTALLED GROUND ROD
   4. CONNECT THE PUMP DISCHARGE VALVE FITTING TO THE PIPELINE CONNECTION
   5. PRESSURE TEST SYSTEM PRIOR TO TURNING ON
8. MAINTENANCE:
   1. SEE TABLE BELOW
   2. SEE FULL SYSTEM LEVEL MANUAL FOR TROUBLESHOOTING STEPS
9. REPAIR
   1. SYSTEM SHALL BE PURGED AND VENTED PRIOR TO SERVICING
   2. SYSTEM SHALL HAVE POWER DISCONNECTED PRIOR TO SERVICING
   3. PRESSURE TEST SYSTEM AFTER SERVICING

DYNAPAK 20X0, 30X0 SYSTEM NOTES:

1. FLOODED SUCTION REQUIRED FOR PRIMING
2. SHALL NOT BE USED WITHOUT A PROCESS MEDIUM
3. COMPATIBLE FLUIDS: GROUP IIC GASES, ODORIZED OR UNODORIZED
4. INLET ACTUATION PRESSURE: 50 - 65 psig
5. MAXIMUM PROCESS PRESSURE: 1500 psig
6. OPERATING SYSTEM TEMPERATURE: -4°F to +140°F (-20°C to +60°C)
7. INSTALLATION INSTRUCTIONS:
   1. SAMPLER SHOULD BE A MINIMUM OF FIVE PIPE DIAMETERS FROM ANY DEVICE
   2. SYSTEM SHOULD BE MOUNTED VERTICALLY IN A HORIZONTAL RUN OF THE PIPELINE
   3. SUCTION: REQUIRES 1/2" OR 3/4" FNPT PIPELINE CONNECTION DEPENDING ON MODEL
   4. END OF SAMPLER PROBE SHOULD PENETRATE THE CENTER 1/3RD OF THE PIPELINE
   5. BEFORE APPLYING PIPELINE PRESSURE, ENSURE THE ISOLATION & PURGE VALVES ARE GOOD
   6. AFTER APPLYING PIPELINE PRESSURE, CHECK ALL CONNECTIONS USING LIQUID LEAK DETECTOR
8. MAINTENANCE:
   1. SEE TABLE BELOW
   2. SEE FULL SYSTEM LEVEL MANUAL FOR TROUBLESHOOTING STEPS
9. REPAIR
   1. SYSTEM SHALL BE PURGED AND VENTED PRIOR TO SERVICING
   2. SYSTEM SHALL HAVE POWER DISCONNECTED PRIOR TO SERVICING
   3. PRESSURE TEST SYSTEM AFTER SERVICING

CYCLONE MLS-4400 SYSTEM NOTES:

1. FLOODED SUCTION REQUIRED FOR PRIMING
2. SHALL NOT BE USED WITHOUT A PROCESS MEDIUM
3. COMPATIBLE FLUIDS: GROUP IIC GASES, CHEMLUBE, ANDEROL, 5w OR EQUIVALENT
4. INLET ACTUATION PRESSURE: 15 - 55 psi
5. MAXIMUM PROCESS PRESSURE: 1500 psi
6. OPERATING SYSTEM TEMPERATURE: -4°F to +140°F (-20°C to +60°C)
7. INSTALLATION INSTRUCTIONS:
   1. SYSTEM SHOULD BE MOUNTED IN A VERTICAL POSITION
   2. SUCTION: 1/4" NPT PIPELINE GAS CONNECTION REQUIRED
   3. DISCHARGE: 1/8" TUBING TO INJECTION PORT ALONG WITH A CHECK VALVE
   4. PRESSURE TEST SYSTEM PRIOR TO TURNING ON
8. MAINTENANCE:
   1. SEE TABLE BELOW
   2. SEE FULL SYSTEM LEVEL MANUAL FOR TROUBLESHOOTING STEPS
9. REPAIR
   1. SYSTEM SHALL BE PURGED AND VENTED PRIOR TO SERVICING
   2. SYSTEM SHALL HAVE POWER DISCONNECTED PRIOR TO SERVICING
   3. PRESSURE TEST SYSTEM AFTER SERVICING

LVO 610G OR 610F MAINTENANCE SCHEDULE

ITEM	INTERVAL
VERIFY GAS PRESSURES	EVERY WEEK
CHECK FOR GAS & ODORANT LEAKS	EVERY WEEK
VISUALLY INSPECT FOR OBVIOUS EXTERNAL PROBLEMS	EVERY WEEK
INSPECT OVERFLOW PROTECTOR & SERVICE AS NEEDED	EVERY 6-MONTHS
INSPECT TUBE FITTINGS AND VALVE PACKINGS FOR LEAKS	EVERY 6-MONTHS
CHANGE FILTERS	EVERY 12-MONTHS
REBUILD PUMP	EVERY 12-MONTHS
REPLACE SOLENOIDS	EVERY 12-MONTHS
TEST REGULATORS & SERVICE AS NEEDED	EVERY 12-MONTHS
CONDITION ODORANT AS NEEDED	EVERY 12-MONTHS
TEST SYSTEM PERFORMANCE	EVERY 12-MONTHS
REPLACE BATTERY	* EVERY 12-MONTHS

* MORE FREQUENT REPLACEMENT MAY BE REQUIRED IF SYSTEM STROKES MORE THAN 5X PER HOUR

DYNAPAK 20X0, 30X0 MAINTENANCE SCHEDULE

ITEM	INTERVAL
VERIFY SYSTEM PRESSURE	EVERY MONTH
CHECK FOR LEAKS	EVERY MONTH
TEST BATTERY	EVERY MONTH
CLEAN & LUBRICATE PUMP	EVERY 6-MONTHS
CHECK FILTER ELEMENT & REPLACE IF NEEDED	EVERY 6-MONTHS
REBUILD PUMP	EVERY 12-MONTHS
TEST SYSTEM PERFORMANCE & SERVICE AS NEEDED	EVERY 12-MONTHS
REPLACE BATTERY	EVERY 12-MONTHS

CYCLONE MLS-4400 MAINTENANCE SCHEDULE

ITEM	INTERVAL
CLEAN & INSPECT INJECTOR PUMP	EVERY 6-MONTHS
CHECK FILTER ELEMENT	EVERY 6-MONTHS
TEST BATTERY	EVERY MONTH

ENCLOSURE DETAILS

ITEM	OVERALL DIM.	MATERIALS
ENCLOSURE WITH QUICK-RELEASE LATCHES (COMMON)	10.5" L x 8.5" W x 6.3" D	ENCLOSURE: FIBERGLASS ENCLOSURE HARDWARE 316 STAINLESS STEEL
LIQUID TIGHT FITTING PLUGS (COMMON) - QTY 2	7/16" OD	RUBBER
MANIFOLD GASKET (LVO)	1.35" W x 2.85" L x .06" T	NITRILE
PUMP GASKET (LVO)	2.53" OD x 1.49" ID x .06" T	NITRILE
TUBING GROMMET (LVO) - QTY 1 (610G), QTY 2 (610F)	1/4" ID x 1/2 GRV DIA x 1/8" GRV W	RUBBER
PIPE GROMMET (DYNAPAK)	3/4" ID x 1-1/16" GRV DIA x 1/8" GRV W	RUBBER
PUMP GASKET (DYNAPAK)	2" OD x 1.125" ID x .125" T	NEOPRENE
FILTER / REGULATOR GASKET (DYNAPAK & CYCLONE)	2" OD x 1.25" ID x .125" T	NEOPRENE
TUBING GROMMET (DYNAPAK & CYCLONE) - QTY 2	1/8" ID x 5/16" GRV DIA x 1/8" GRV W	BUNA-N
PUMP GASKET (CYCLONE)	1.5" OD x .75" ID x .125 T	RUBBER
RESERVOIR GASKET (CYCLONE)	2" x .125" T	RUBBER

GENERAL TOLERANCE	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							Ra FINISH	GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES		
ISO 2768	.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	<3.2	⊥	≡	↗
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	125 √RMS	0.4 [0.016]	0.6 [0.024]	0.2 [0.079]

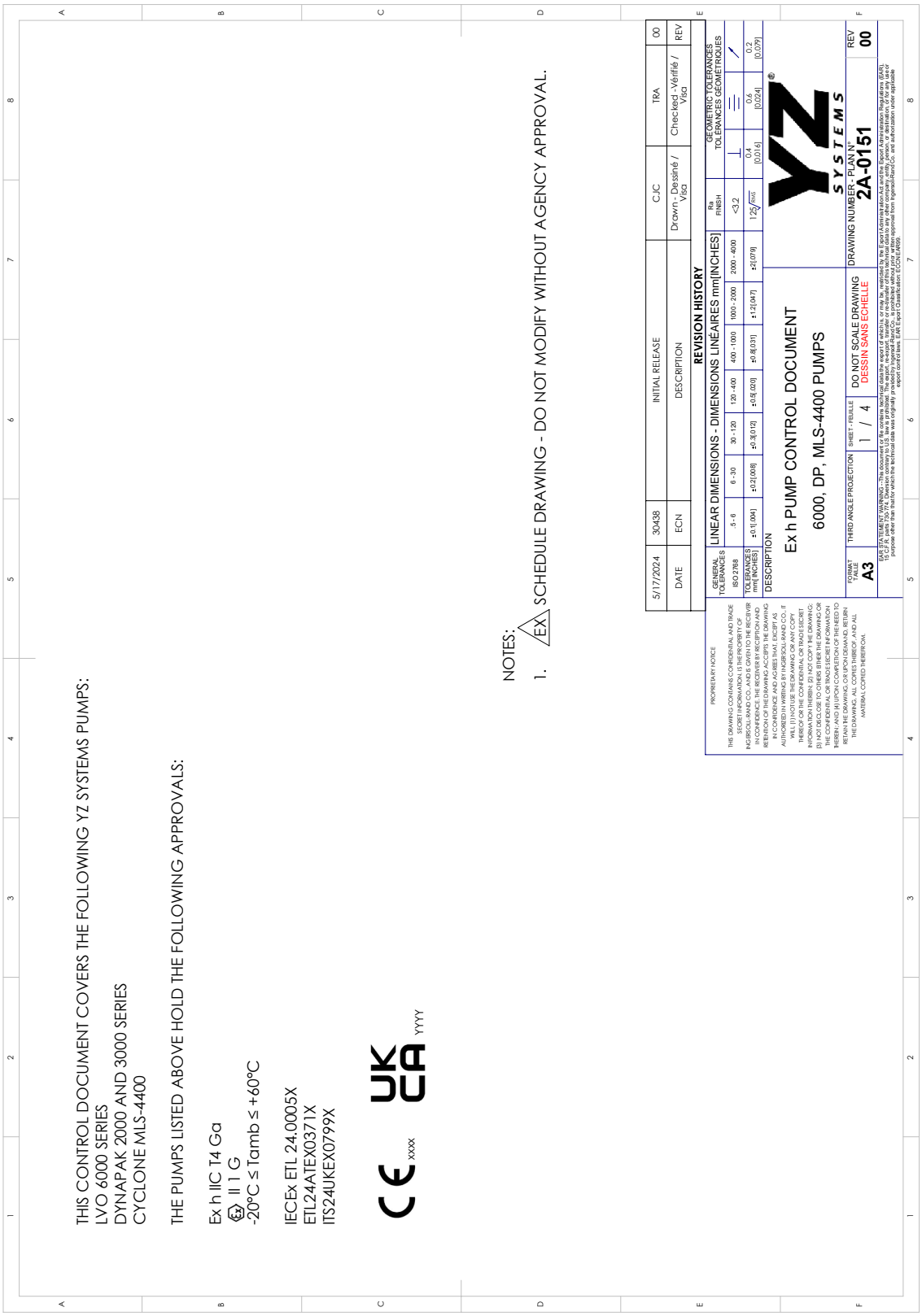
DESCRIPTION
WIRING CONTROL DOCUMENT
LVO, DP, CYCLONE SYSTEMS

YZ SYSTEMS®

FORMAT TAILLE	THIRD ANGLE PROJECTION	SHEET - FEUILLE		DRAWING NUMBER - PLAN N°	REV
A0		2 / 2	DO NOT SCALE DRAWING DESSIN SANS ECHELLE	2E-0054	02

Appendix:

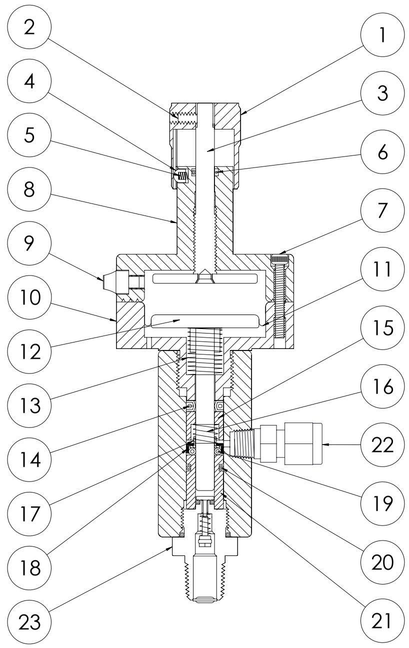
Pump Control Document

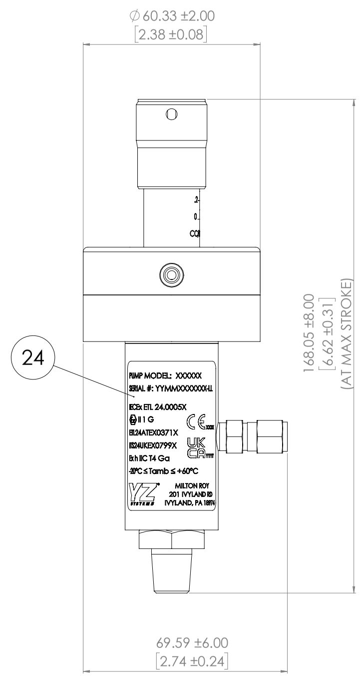


APPENDIX:

Pump Control Document

DYNAPAK SERIES PUMP





BILL OF MATERIAL - DYNAPAK SERIES PUMPS		
ITEM NO.	DESCRIPTION	MATERIAL
1	VOLUME ADJUSTMENT KNOB	6061-T6 ALUMINIUM
2	SET SCREW	18-8 STAINLESS STEEL
3	STROKE ADJ SCREW ASSY	316 STAINLESS STEEL
4	DETENT	DELRIN
5	VOL ADJ SPRING	302/304 STAINLESS STEEL
6	O-RING	VITON
7	SHCS	18-8 STAINLESS STEEL
8	UPPER DIAPHRAGM HSG	6061-T6 ALUMINIUM
9	TUBE CONNECTOR	BRASS, NICKEL-PLATED
10	PUMP BODY LOWER DIA HOUSING ASSY	316 STAINLESS STEEL 6061-T6 ALUMINIUM
11	ACTUATION DIAPHRAGM	POLYESTER/NITRILE
12	PLUNGER ASSY	PLUNGER - 17-4 SS PISTON - 316 SS
13	PLUNGER RETURN SPRING	302/304 STAINLESS STEEL
14	PLUNGER SEAL	LUBRITHANE W/ VITON
15	SPRING RETAIN BUSHING	DELRIN
16	DISCHARGE CV SPRING	302/304 STAINLESS STEEL
17	DISCHARGE CV BUSHING	DELRIN
18	DISCH CV BUSHING SLEEVE	316 STAINLESS STEEL
19	O-RING	VITON
20	O-RING	VITON
21	BODY BUSHING	17-4 STAINLESS STEEL
22	TUBE CONNECTOR	316 STAINLESS STEEL
23	INLET CV ASSY	316 STAINLESS STEEL
24	CERTIFICATION LABEL	POLYESTER

PUMP NOTES:

1. PUMP CALCULATIONS:

   SOLENOID STROKE TIME = 600 ms, MAX PUMP STROKE = 0.6 in
   PUMP SPEED = 0.6 in / 600 ms = 0.001 in/ms
   MAIN SPRING CONSTANT = 0.963198 N/mm, MAX DISPLACEMENT = 15.24 mm
   MAIN SPRING ENERGY = (1/2) * 0.963198 N/mm * 15.24^2 = 111.855 N
   MASS OF PLUNGER: 53 g
   MASS OF SPRING: 0.1 g

2. PUMP MAINTENANCE:
   RELUBRICATION INTERVAL: SEMI-ANNUAL
   LUBRICANT TYPE: NON-SOLUABLE ASSEMBLY GREASE
   ALL LUBRICANTS UTILIZED SHALL HAVE A MINIMUM FLASH POINT OF 120C
   RELUBRICATION INSTRUCTIONS:
   1. DISASSEMBLE PUMP
   2. APPLY LIGHT COAT OF LUBRICANT ON ALL O-RINGS, BUSHINGS, AND PLUNGER SHAFT
   3. RE-ASSEMBLE PUMP

3. FLOODED SUCTION REQUIRED FOR PRIMING PUMP
4. PUMP SHALL NOT BE USED WITHOUT A PROCESS MEDIUM
5. PUMP COMPATABLE FLUIDS: GROUP IIC GASES, ODORIZED OR UNODORIZED
6. MAXIMUM OVERALL MASS: 2.40 lbs
7. INLET ACTUATION PRESSURE: 50 - 65 psig
8. MAXIMUM PROCESS PRESSURE: 1500 psig

The Dynapak pump has a controlled aluminum content exceeding the limitations defined by IEC 60079-0. When installed in an EPL Ga environment, the end user shall conduct a risk assessment, and only install the equipment where the risk of impact is considered negligible.

GENERAL TOLERANCE	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							Ra FINISH	GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES		
ISO 2768	.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	<3.2	⊥	≡	↗
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	125 √RMS	0.4 [0.016]	0.6 [0.024]	0.2 [0.079]

DESCRIPTION

Ex h PUMP CONTROL DOCUMENT

6000, DP, MLS-4400 PUMPS

YZ® SYSTEMS

FORMAT TAILLE	THIRD ANGLE PROJECTION	SHEET - FEUILLE		DRAWING NUMBER - PLAN N°	REV
A1		3 / 4	DO NOT SCALE DRAWING DESSIN SANS ECHELLE	2A-0151	00

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