DynaPak Gas Sampler

SYSTEM SUPPORT MANUAL

DP-2010

Versions: D, F, J, K, L, STD

YZ SYSTEMS
MILTON ROY

DP-2010

Instruction & Operating Manual

Version: 05-2018

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Section 1: First Things To Know About The DynaPak

How to Use this Manual

The DP-2010 Operations Manual is a step-by-step guide containing the procedures needed to work with the DP-2010 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 aid 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-2010 system. If the answer can not be found within this manual, contact YZ Systems at:

T: 1.281.362.6500
T: 1.800.653.9435
E: techsupport@yzhq.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 manual is 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 *(124 Bar (g))*
Pump Displacement:	.2 - .4 cc/Stroke
Operating Temp Range:	0 to 140 degrees F. *(17˚C to 60˚C)*
Power Supply:	Internal Battery Pack
Flow Signal:	Dry Contact or Voltage Pulse

Theory of Operation

The DynaPak 2010 Sampler is a pipeline mounted system which uses the pneumatically operated, positive displacement DynaPak 2000 pump, the Z-65 timer/controller, the YZ filter/regulator and a low power solenoid valve to obtain gas samples. **The 2010 provides two modes of operation:**

A. Time-based sampling:

In this mode of operation, the 2010 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-65 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. Two 10 position switches 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.

B. Proportional-to-Flow sampling:

In this mode of operation, the Z-65 counter operates as a dividing counter. The Z-65 counter periodically energizes a low power solenoid valve. As in the time-based mode 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 two 10-position switches on the Z-65 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 both modes of operation, the Z-65 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

• **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 convertor and intrinsically safe barrier to convert 120 VAC power to 28 VDC to operate the controller without the use of the internal battery pack.

• **The Solar Power Option** would be used in lieu of the internal battery pack. The Solar Power Option (model #SPO-120) consists of a 5 watt solar panel with RM-12 charger regulator module and internal 12V, 5 Amp hour battery pack.

• **DuraSite**, portable DOT approved constant pressure sample vessels. Available in 150, 300, 500, 800, and 1000 cc sizes.

• **SC-Spun Vessel**, portable DOT approved (1800 psi maximum working pressure), sample vessels. Available in 300, 500, and 1000 cc sizes.

• **KK-1, KK-2, & KK-3:** carrying cases for DuraSites that meet DOT requirements for transporting portable sample vessels.

• 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).

• **LinkPlus** provides a direct link between the DynaPak, and your sample vessel, providing a gauge, vessel isolation valve, and excess pressure protection.

• **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 or YZ toll free at 800.344.5399. For technical support call 800.653.9435.

SECTION 2: SYSTEM INSTALLATION

Standard System Components

Standard primary components of the DynaPak 2010 include the following:

• **System Enclosure**: Houses the Sample Pump, Filter Regulator, Solenoid, and Controller.

• **Sample Pump**: Probe mounted, pneumatically actuated DP-2000 Sample Pump.

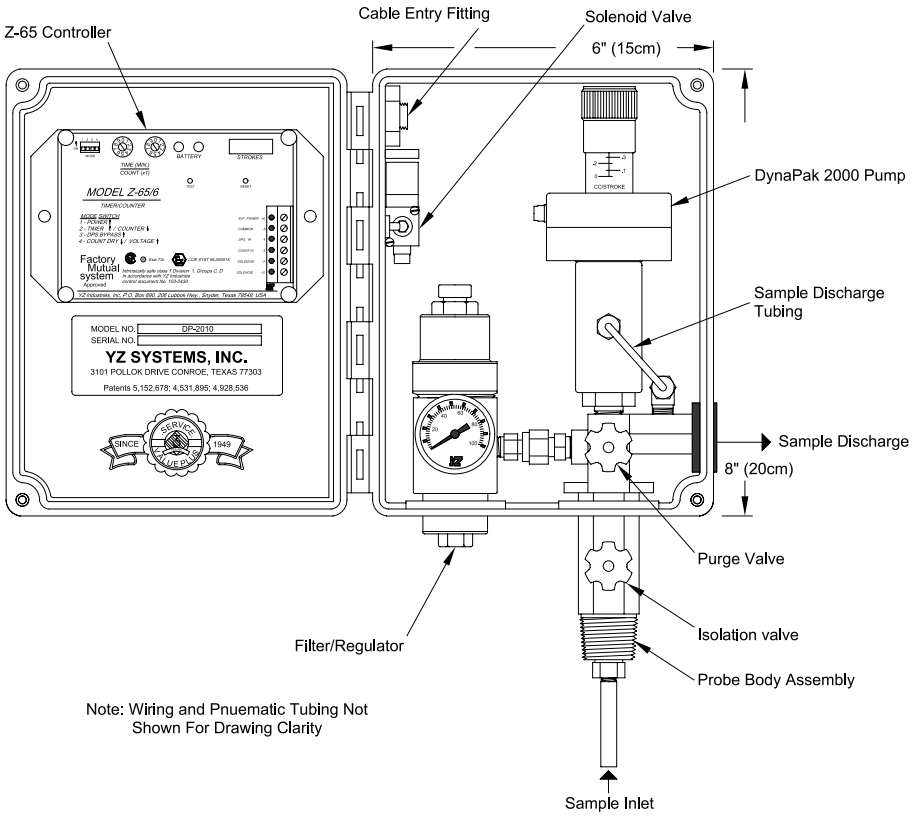
• **Filter Regulator**: Stainless Steel regulator capable of reducing pressure from line pressure of up to 1500 psi down to system supply pressures in one step.

• **Low Power Solenoid**: Provides interface between the Z-65 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.

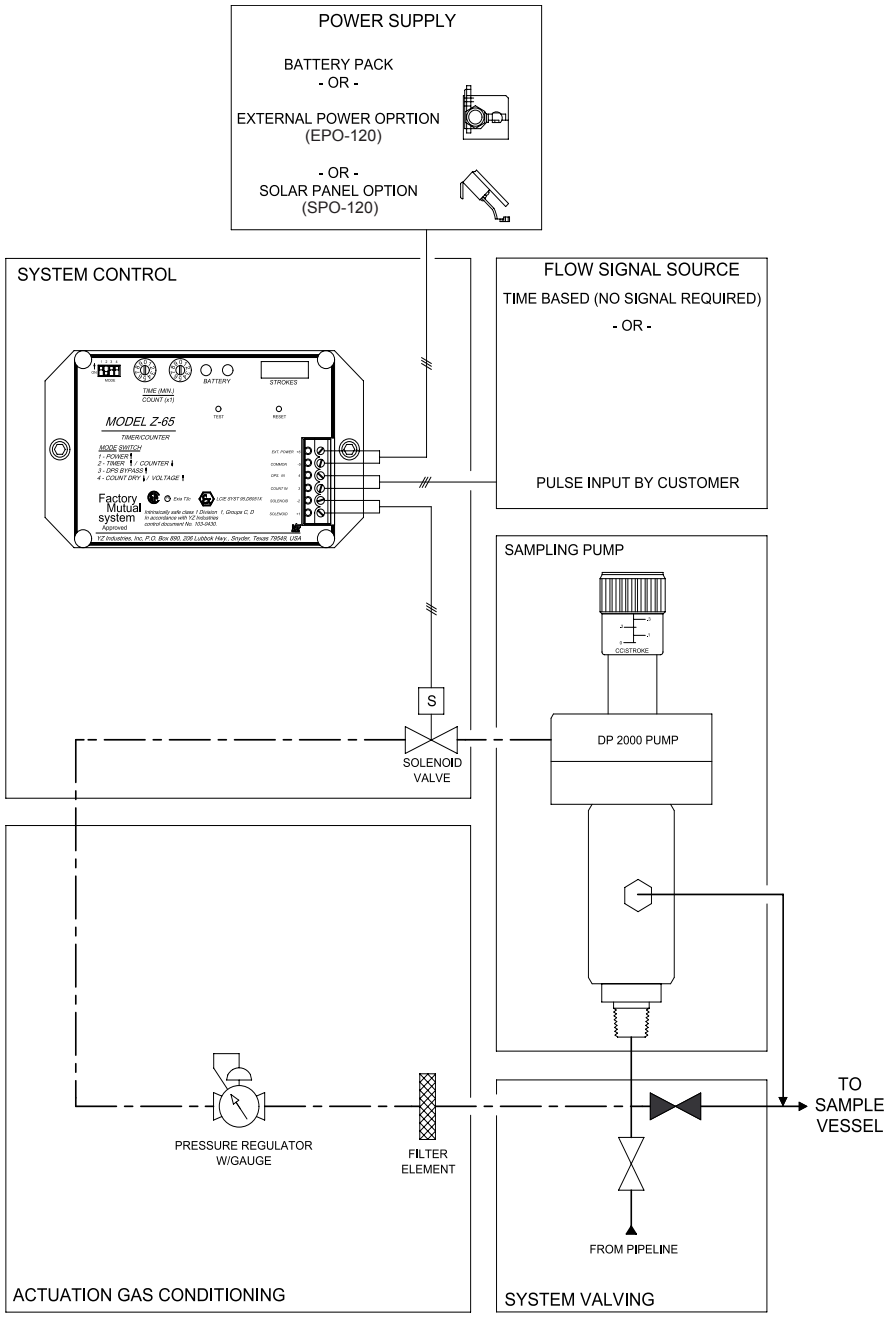
figure 1



SECTION 2: SYSTEM INSTALLATION

System Flow Schematic

figure 2



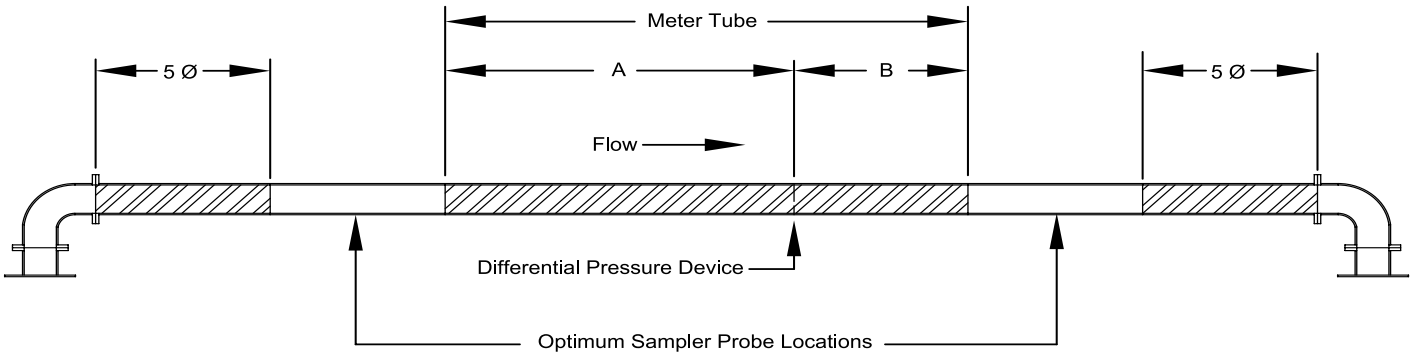
SECTION 2: SYSTEM INSTALLATION

Standard Mounting Location

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

2. 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

a. The DynaPak 2010 requires a 3/4” FNPT pipeline connection (1/2” for J version).

b. The DynaPak 2010 sampler should be mounted vertically in a horizontal run of the pipeline.

c. The end of the sampler probe should penetrate the center 1/3rd of the pipeline.

d. The end of the sample probe should be cut parallel to the pipeline.

e. Before applying pipeline pressure to the DynaPak 2010, ensure that the isolation valve and purge valve are good.

f. 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

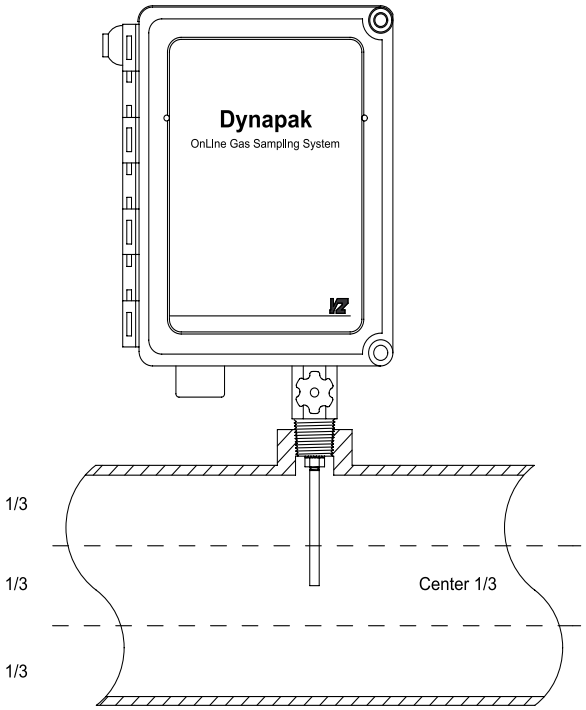
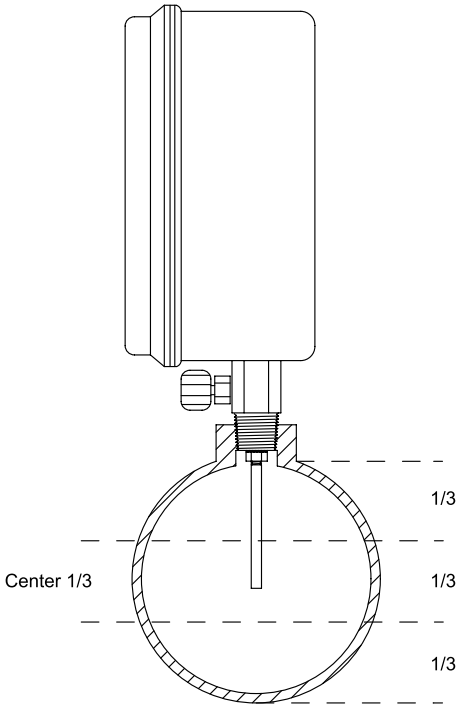


figure 5



Section 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 35 on page 31, 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 sampling system consists of a solid state Controller, and a Low Powered Solenoid. The controller energizes the solenoid which in turn sends a pneumatic actuation signal to the Sample Pump, every time sample is required either Proportional-To-Flow, or Time.

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.

The control package requires you to configure the Z-65 controller to operate in a Proportional-To-Flow mode, refer Section 5, to page 10, a Proportional-To-Time mode, refer to Section 6, page 12. All wiring connected to the controller must be done in accordance with the Wiring Control Document, refer to Appendix A, Figure 37, page 33. DynaPak electronics are rated for use in Class I, Division 1, Groups C and D hazardous locations.

SECTION 5: PROGRAMMING FOR PROPORTIONAL-TO-FLOW OPERATION

Setting Operator Input Values

In this mode of operation, the Z-65 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-65 controller.

1. Determine if the incoming input is either a, dry contact or voltage pulse.

2. If the input is a dry contact:

a. Terminate the incoming connections to the Z-65 terminal strip (see illustration).

b. Turn mode switches 1, 3 to ON and 2, 4 to OFF.

OR

3. If the input is a voltage pulse:

a. Terminate the incoming connections to the Z-65 terminal strip (see illustration).

b. Turn mode switches 1, 3, 4 to ON and switch 2 to OFF.

figure 6

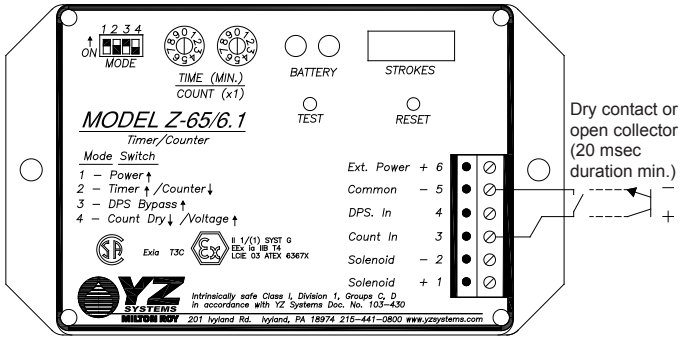
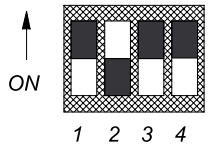
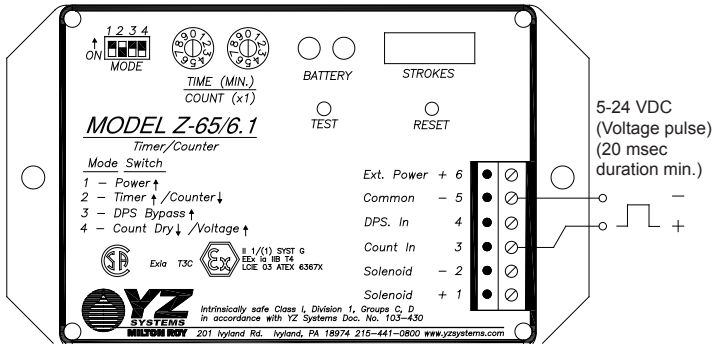


figure 7





Section 5: 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		=	$\frac{a \times c \times d \times e}{(b)}$

			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

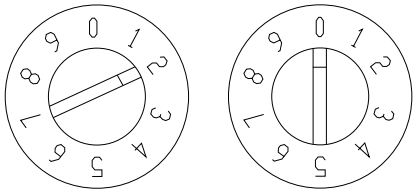
6. Turn the counter dials to the appropriate number of pulses you want to count before the sample pump strokes.

NOTE: If the calculated counter setting is less than 1 or greater than 99, 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 1, increase the pulses per volume metered. If the calculated counter setting is greater than 99, decrease the pulses per volume metered.

7. ***Press*** the test button once to load the value into the memory.

figure 8

Example
20 pulses



COUNT (x1)

Section 6: Programming For Proportional-To-Time Operation

1. Calculate the sampling rate to fill a cylinder in 30 days:

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**	Sample rate (minutes)
6	**.200**	**9**	**18**	**30**	
9	**.300**	**13**	**27**	**45**	
12	**.400**	**18**	**36**	**60**	

2. Set the timer dials on the Z-65 to the sample rate from step 1.

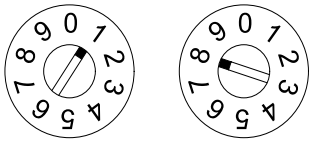
NOTE: To obtain maximum battery life, choose the longest time interval and the largest pump displacement setting possible.

NOTE: The time (18 minutes), in the chart above, corresponds to the dial setting shown for the Z-65 model with the timer range setting in the factory position (jumper on the two left pins). See section 10 Timer Range Setting, Page 24.

figure 9

Example

18 minutes



TIME (MIN.)

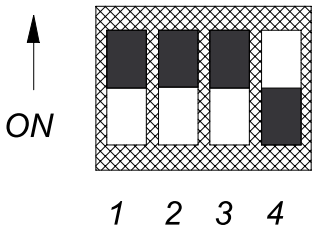
COUNT (x1)

3. Adjust the pump volume adjustment knob to the value used in the calculations in step 1.

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

4. Turn mode switches 1, 2, 3 to ON and 4 to OFF.
5. Press the test button once to initiate the timer sequence.

figure 10

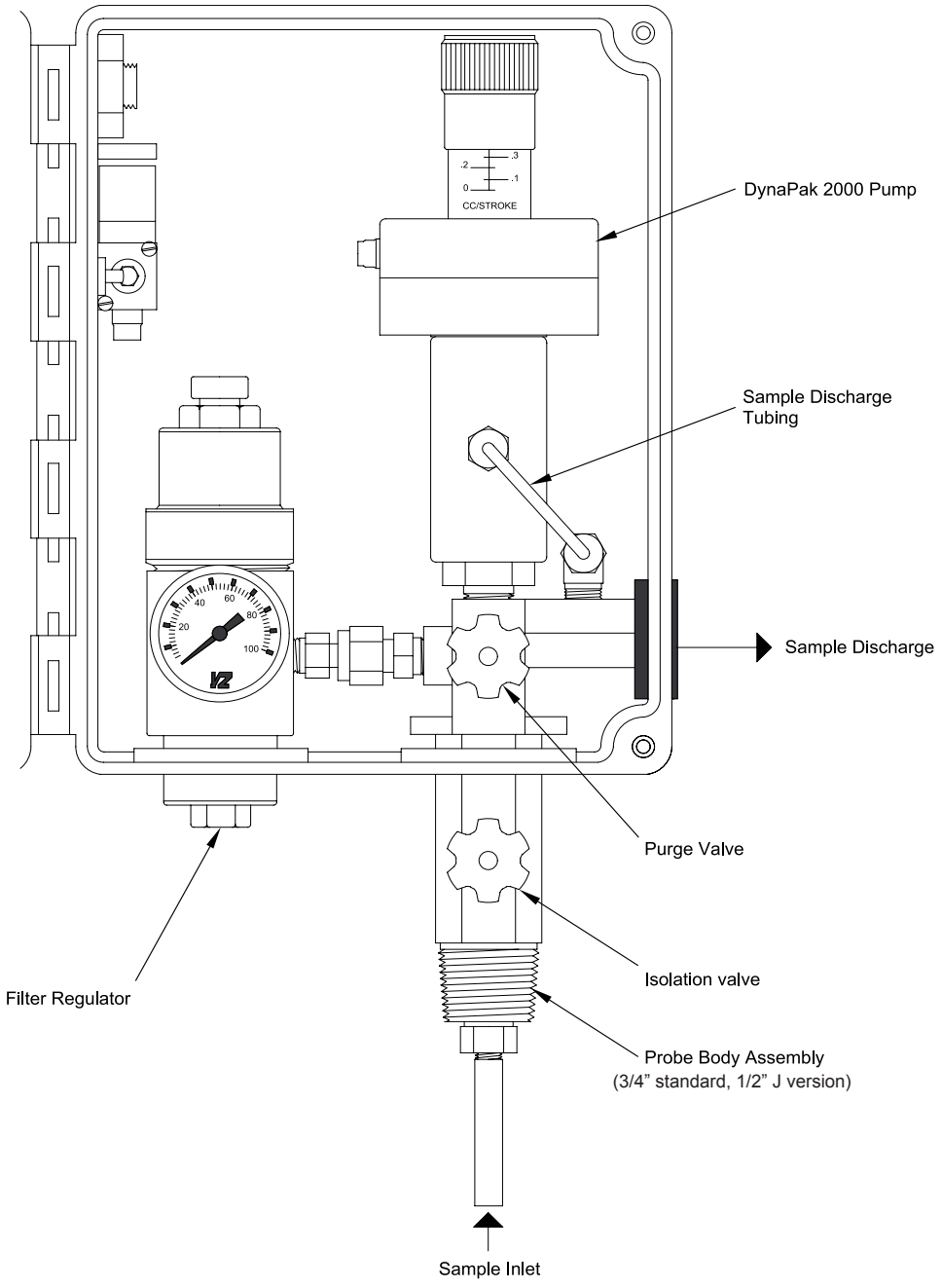


SECTION 7: MECHANICAL SYSTEM

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 11



Section 7: Mechanical System

DP-2000 Sample Pump

DP-2000 Sample Pump, refer to Appendix A, page 25, 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 A, page 26, 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 A, page 29, 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 16.

SECTION 8: SYSTEM OPERATION

Preparing The System for 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 isolation valve to allow pipeline pressure into the sampler, refer to Section 7, page 13. Check all connections using a liquid leak detector.
2. Adjust the filter/regulator from the following ranges, refer to Section 7, page 14:

Pipeline Pressure	Actuation Pressure
Under 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 14.
4. Move all of the mode switches on the Z-65 to their OFF positions as shown.
5. Move both timer/counter dials to the 0 position (00 minutes) as shown.
6. Move mode switches 1, 2 and 3 to ON position. The pump will begin stroking once every 2 seconds in a diagnostic test mode as shown.
7. Allow the sampler to operate until the pipeline pressure **plus** 100 psi (6.9 Bar) is achieved at the sample discharge.
8. Return the mode switches to their OFF positions as shown.
9. Check all connections from the sampler discharge to the connection on the sample.

figure 12

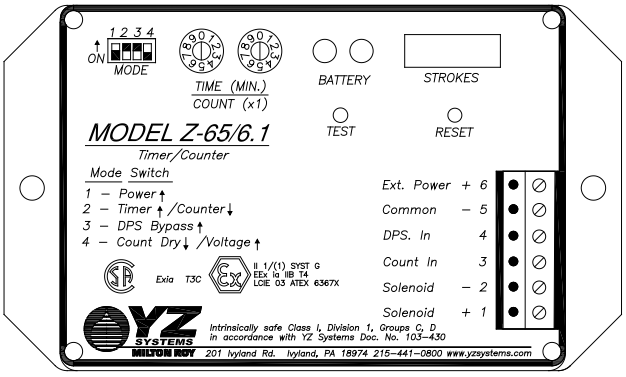
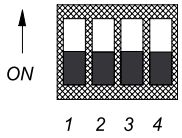


figure 13



NOTE: Black indicates the switch position

figure 14

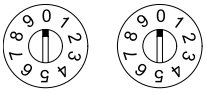


figure 15

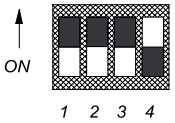
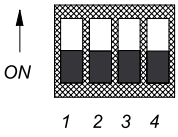


figure 16



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

1. Verify system pressure
2. Check for leaks
3. Test the battery.
4. Test the system for leaks each time a fitting or connection has been made.

Semi-Annual Inspection

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

Annual Inspection

1. Rebuild pump
2. Test the Sampler System performance and service, as needed
3. Replace Z-65 Battery Assembly.

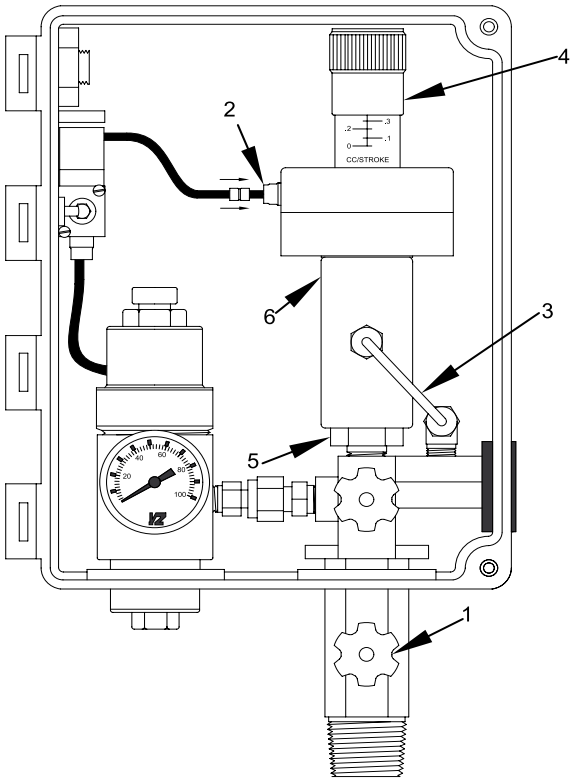
Recommended Spare Parts List

Part #	Description	Recommended Quantity
D3-0002	DP-2000 pump seal replacement kit	1
D3-0003	Filter Regulator repair kit	1
A4-0001	Solenoid	1
E3-2001	Z-65 Battery Assembly	1

Section 9: System Maintenance

Cleaning and lubricating the DP-2000 pump:

figure 17



1. Close the isolation valve.
2. 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.
3. Remove the sample discharge (1/8″ stainless steel tubing) from the pump body.
4. Screw the stroke adjustment knob all the way down to the 0 cc/stroke setting.
5. 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.
6. 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.

Section 9: System Maintenance

7. 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.

8. Clean and inspect all components. Replace if necessary.

   NOTE: Normal service generally requires only the replacement of the o-rings and seal found in repair kit D3-0002.

9. Apply a light coat of non-soluble assembly grease on all o-rings, bushings, and the plunger shaft to prevent damage.

10. Install the body bushing into the bottom of the pump body as shown.

11. Insert all other bushings, springs, and o-rings in their respective sequence on the plunger shaft as shown.

12. Carefully install assembly into the top of the pump body, and screw the actuator assembly onto the pump body. (Tighten firmly by Hand ONLY)

13. Install the pump assembly on the inlet valve assembly. (Tighten firmly by Hand ONLY)

14. Connect the 1/8″ stainless steel tubing to the pump body and 1/8″ plastic tubing to the diaphragm housing.

15. Open the isolation valve.

16. Adjust the stroke adjustment knob to its original setting.

17. Pressure test the pump as previously described for proper operation.

figure 18

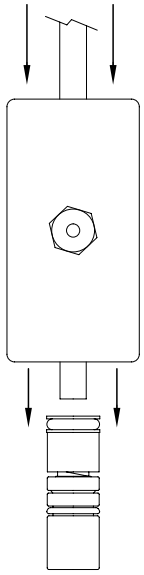
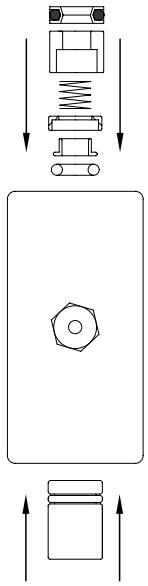


figure 19

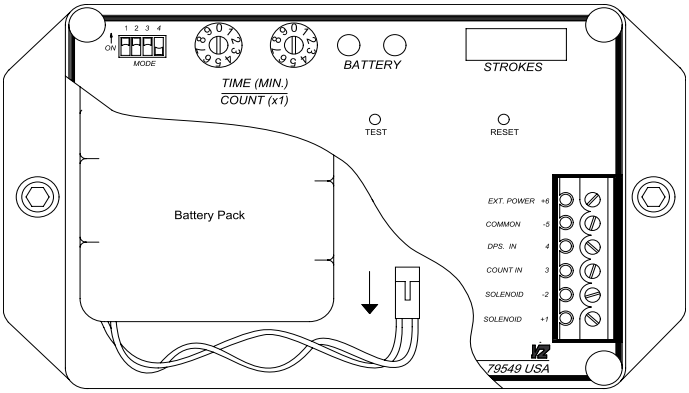


SECTION 9: SYSTEM MAINTENANCE

Replacing a Depleted Battery:

1. Remove the four thumb screws, over plate and orange terminal connector.
2. The battery is located in the lower left hand corner of the Z-65 controller assembly.
3. Unclip the battery plug from the battery receptacle.
4. Replace the depleted battery with a fresh battery pack (part No. E3-2001). Refer to figure 20 to assure proper battery wire placement in the Z-65 enclosure.
5. Return the mode switches to their original positions.

figure 20



SECTION 10: SYSTEM TROUBLESHOOTING

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 Technical Service at:

T: 1.800.653.9435
T: 1.281.362.6500, International Calls
E: techsupport@yzhq.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 21
b. Z-65 Controller, page 22

SECTION 10: SYSTEM TROUBLESHOOTING

Battery Power

The Z-65 controller and the low powered solenoid are normally powered by the Z-65 Battery Assembly. The battery assembly is not a rechargeable type battery. Under normal sampling conditions this battery may last 2 years. A built in warning LED is provided to advise the operator when the Battery needs changing.

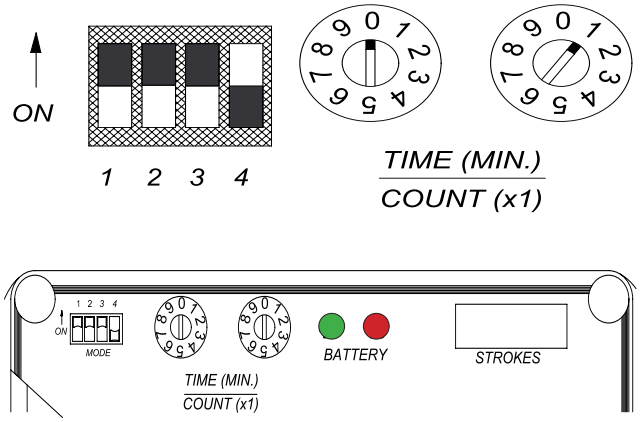
Battery Power Troubleshooting Steps

1. **Set** the mode switches 1, 2 and 3 to ON position as shown.

2. **Set** the **time switches** to the 01 position. This will set the solenoid output rate to one actuation every one minute (based on the factory set time range for the Z-65 model, refer to figure 28, page 24)

3. Depress the **test switch** to test the battery. A green LED will illuminate if the battery is good and a red LED will illuminate if the battery is low.

figure 21



NOTE: Time switches must not be in 00 position to test the battery.

NOTE: The solenoid must be connected to test the battery condition. Battery condition cannot be tested with a volt meter.

SECTION 10: SYSTEM TROUBLESHOOTING

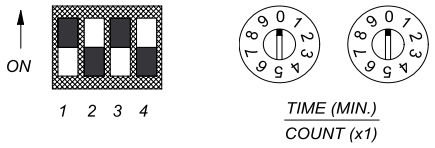
Proportional-to-Flow Mode

If the Z-65 controller is to be operated in the counter mode, an input pulse from some other flow monitoring device must be received by the Z-65. These pulses are then totalized, and the low powered solenoid is energized when a sample is needed.

Proportional-to-Flow Mode Troubleshooting Steps

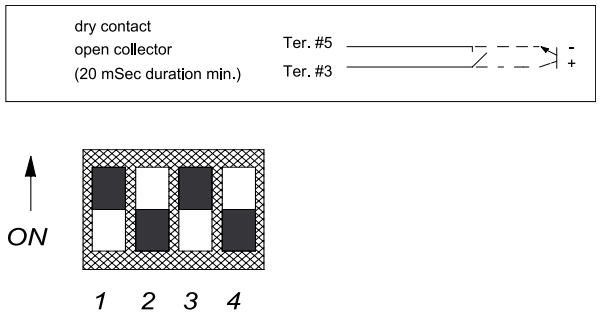
1. **Set** the mode switches 1, 3 to ON and 2, 4 to OFF position as shown.
2. **Set** the count switches to 00 to enter the diagnostic mode as shown. This mode enables the user to determine if the proper input pulses are being received at the count input (ter. #3).

figure 22



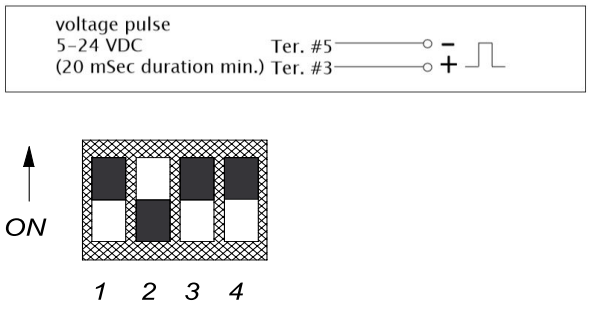
A. Dry Contact Input: Mode switch 4 should be in the off position as shown. **Depress** the test switch and **hold**. A red LED should illuminate. When the dry contact input is received at the counter input (ter, #3) the green LED will turn on and off and the red LED will illuminate again. This will normally occur very quickly and give the appearance that the green LED blinks on when the pulse input is received and removed.

figure 23



B. Voltage Pulse Input: Move mode switch 4 to the on position. **Depress** the test switch and **hold**. A green LED should illuminate. When the voltage pulse input is received at the count input (ter. #3) the red LED will turn on and off and the green LED will illuminate again. This will normally occur very quickly and give the appearance that the red LED blinks on when the pulse input is received and removed.

figure 24



SECTION 10 : SYSTEM TROUBLESHOOTING

Proportional-to-Time Mode

If the Z-65 controller is to be operated in the timer mode, it acts a simple recycling timer. Set up is detailed in Section 6, page 12. If a sample is not taken when expected in this mode the following should assist in restoring the sampler to proper operation.

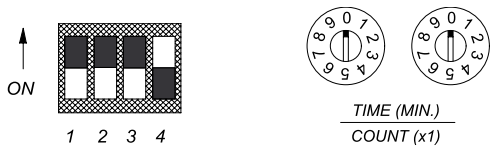
Proportional-to-Time Mode Troubleshooting Steps

Mechanical Operation Test:

1. **Set** the mode switches 1, 2 and 3 to ON position and 4 to OFF.

2. **Set** the time switches to 00 to enter the diagnostic mode. This mode enables the user to increase the solenoid output rate to one pulse every two seconds.

Figure 25



LCD Stroke Indicator Test Mode:

1. **Set** the mode switches 1, 2 and 3 to ON position and 4 to OFF.

2. **Set** the time switches to 00.

3. **Unscrew** the thumbscrews and **remove** the six position terminal strip and cover. This will expose the battery pack and the three position configuration jumper (located in the lower right corner of the Z-65 controller assembly).

4. **Set** the configuration jumper to the far right position marked stroke indicator test as shown.

5. This will cause all six digits to become active on the stroke counter. **Depress** the reset. The stroke counter should increment 000000, 111111, etc., up to 999999 each time the solenoid fires. When the counter display reads 999999, the test is complete.

NOTE: When the test is complete, move the jumper back to the factory position (far left position).

Figure 26

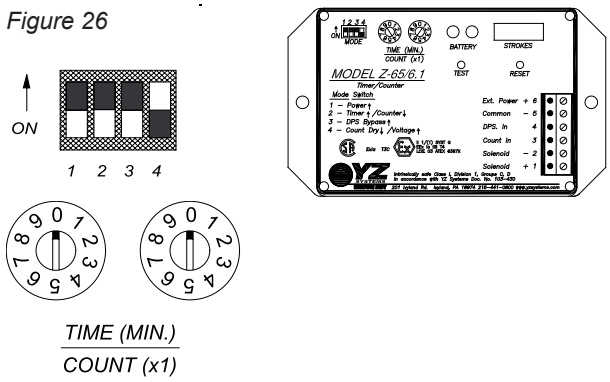
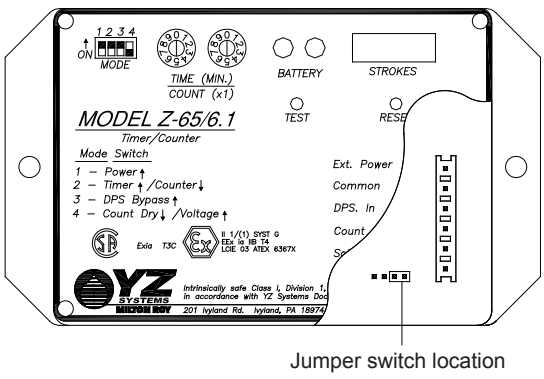


Figure 27



SECTION 10: SYSTEM TROUBLESHOOTING

Timer Range Setting

The Z-65 timer mode has two ranges for the timer setting dials.

1. Range Setting xx minutes: Set the configuration jumper to the far left position (factory setting), as shown.

2. Range Setting x.x minutes: Set the configuration jumper to the center position, as shown.

NOTE: To obtain maximum battery life, choose the longest solenoid stroke rate possible.

Figure 28

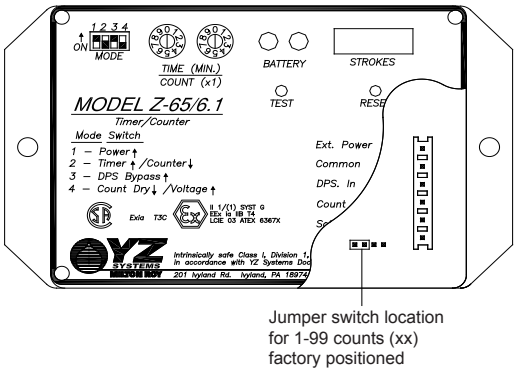
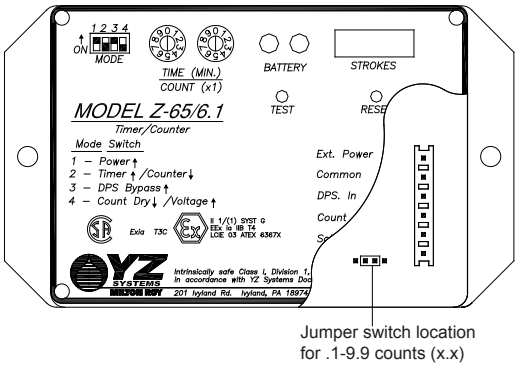


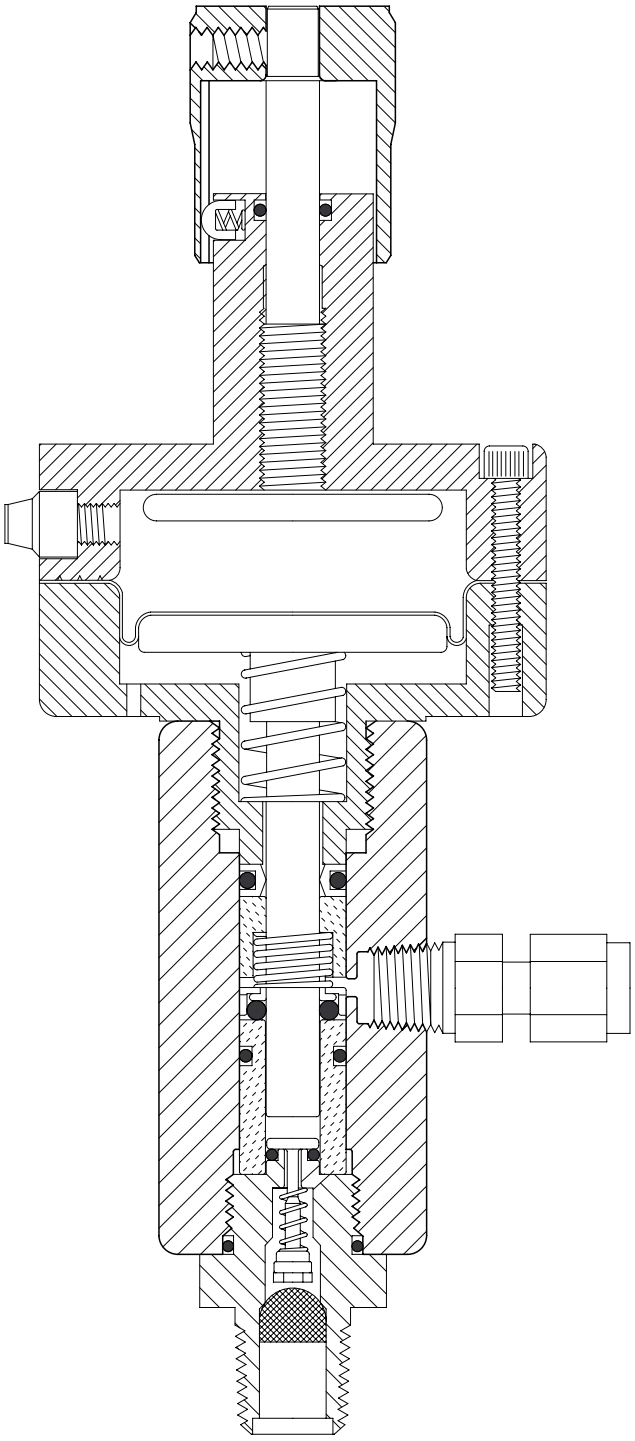
Figure 29



Appendix A: Illustrations

DynaPak 2000 Pump, Assembled

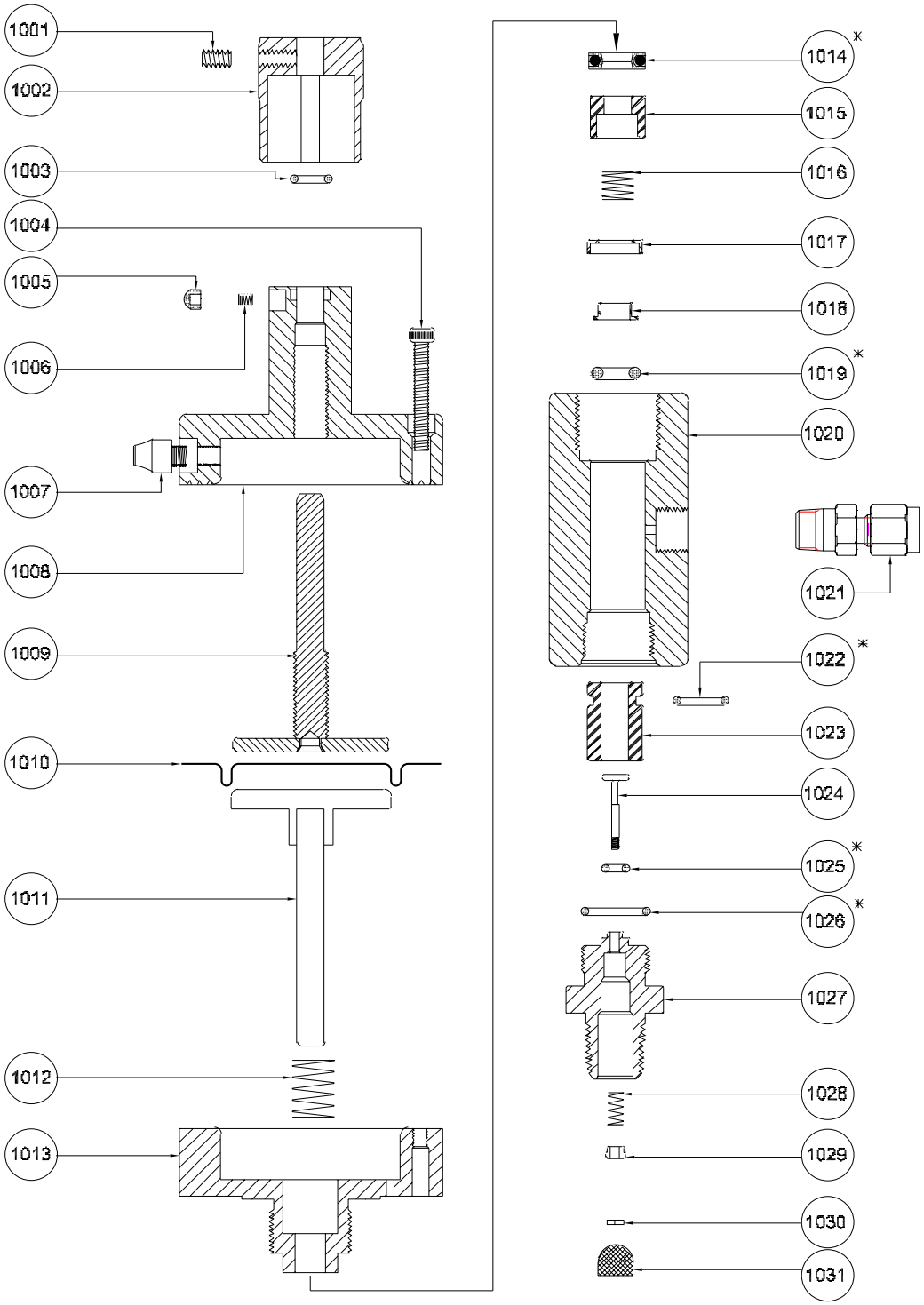
Figure 30



Appendix A: Illustrations

DynaPak 2000 Pump, Exploded View

Figure 31



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

Appendix A: Illustrations

DynaPak 2000 Pump Parts List

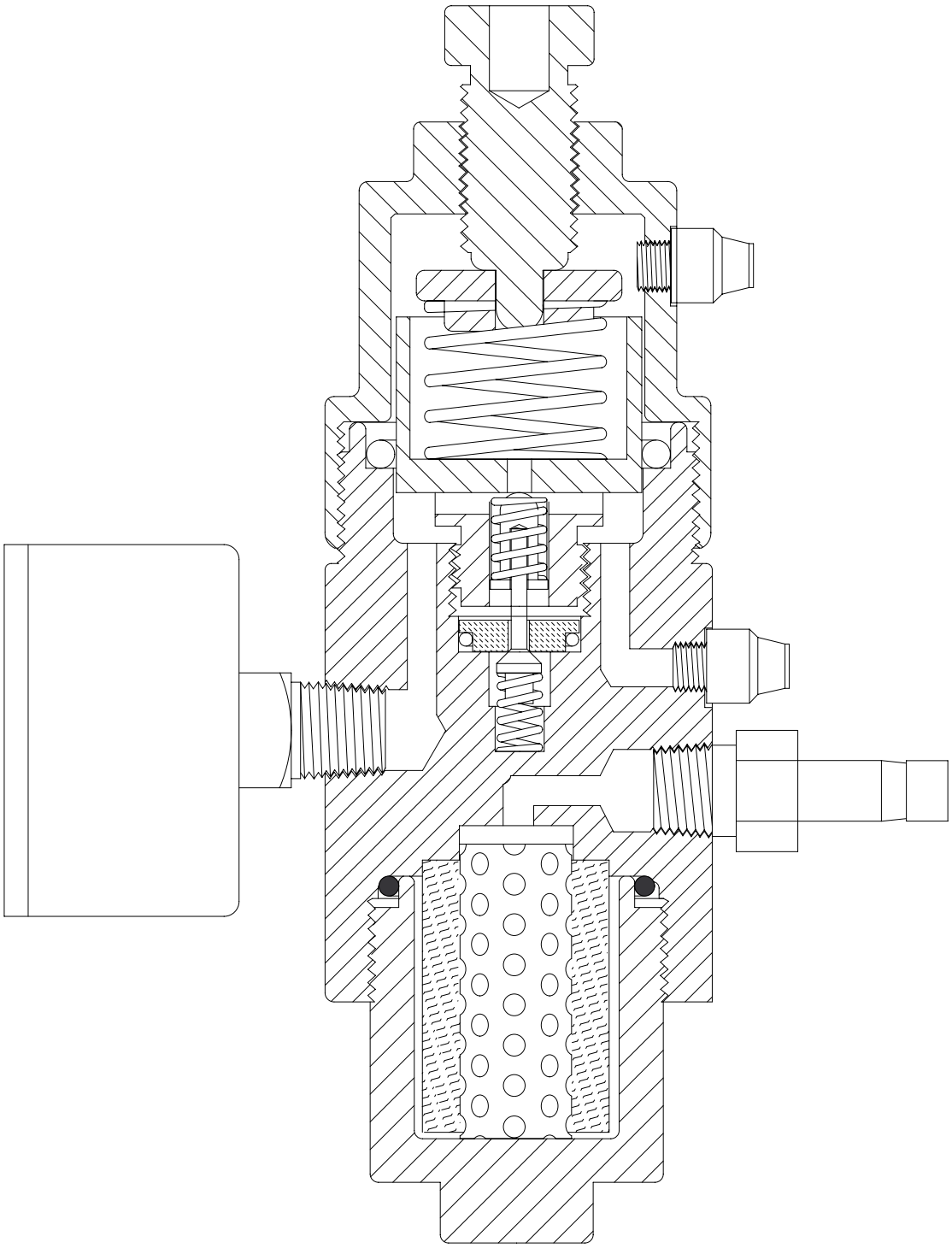
Number	Description	Part Number	D	F	K	L
1001	Set Screw	C0-0096				
1002	Volume Adjustment Knob	B1-0002				
1003	O-Ring	V-010				
1004	Cap Screw	C0-0014				
1005	Volume Adjustment Detent	B1-0030				
1006	Volume Adjustment Spring	C3-0005				
1007	Pneumatic Fitting	A1-0113				
1008	Upper Diaphragm Housing	B1-0003				
1009	Stroke Adjustment Screw Assembly	B1-0004				
1010	Diaphragm	A6-0010				
1011	Plunger Assembly	B1-0007				
1012	Plunger Return Spring	C3-0006				
1013	Lower Diaphragm Housing	B1-0010				
1014	Seal	A6-0018			A6-0028	
1015	Spring Retainer Bushing	B1-0011				
1016	Discharge Check Valve Spring	C3-0007				
1017	Discharge Check Valve Sleeve	B1-0014				
1018	Discharge Check Valve Bushing	B1-0013				
1019	O-Ring	A5-1108	A5-1108-90D		A5-3108	
1020	Pump Body	B1-0015				
1021	Male Connector	40061				
1022	O-Ring	A5-1012			A5-3012	
1023	Body Bushing	B1-0016		B1-0047	B1-0047	
1024	Inlet Check Valve Dart	B1-0018				
1025	O-Ring	A5-1006	A5-1006-90D		A5-3006	
1026	O-Ring	V-014			A5-3014	
1027	Inlet Check Valve Body	B1-0019				
1028	Inlet Check Valve Spring	C3-0008				C3-0013
1029	Inlet Check Valve Spring Guide	B1-0020				
1030	Nut	C0-0026				
1031	Inlet Screen	C4-0006				

NOTE: The part number column indicates parts for the standard DP-2010. The listings in the columns for other versions are the only parts that are different for that version. For example, a DP-2010FL has a B1-0047 body bushing and a C3-0013 inlet spring along with all the other standard parts.

Appendix A: Illustrations

YZ Filter Regulator Assembly,

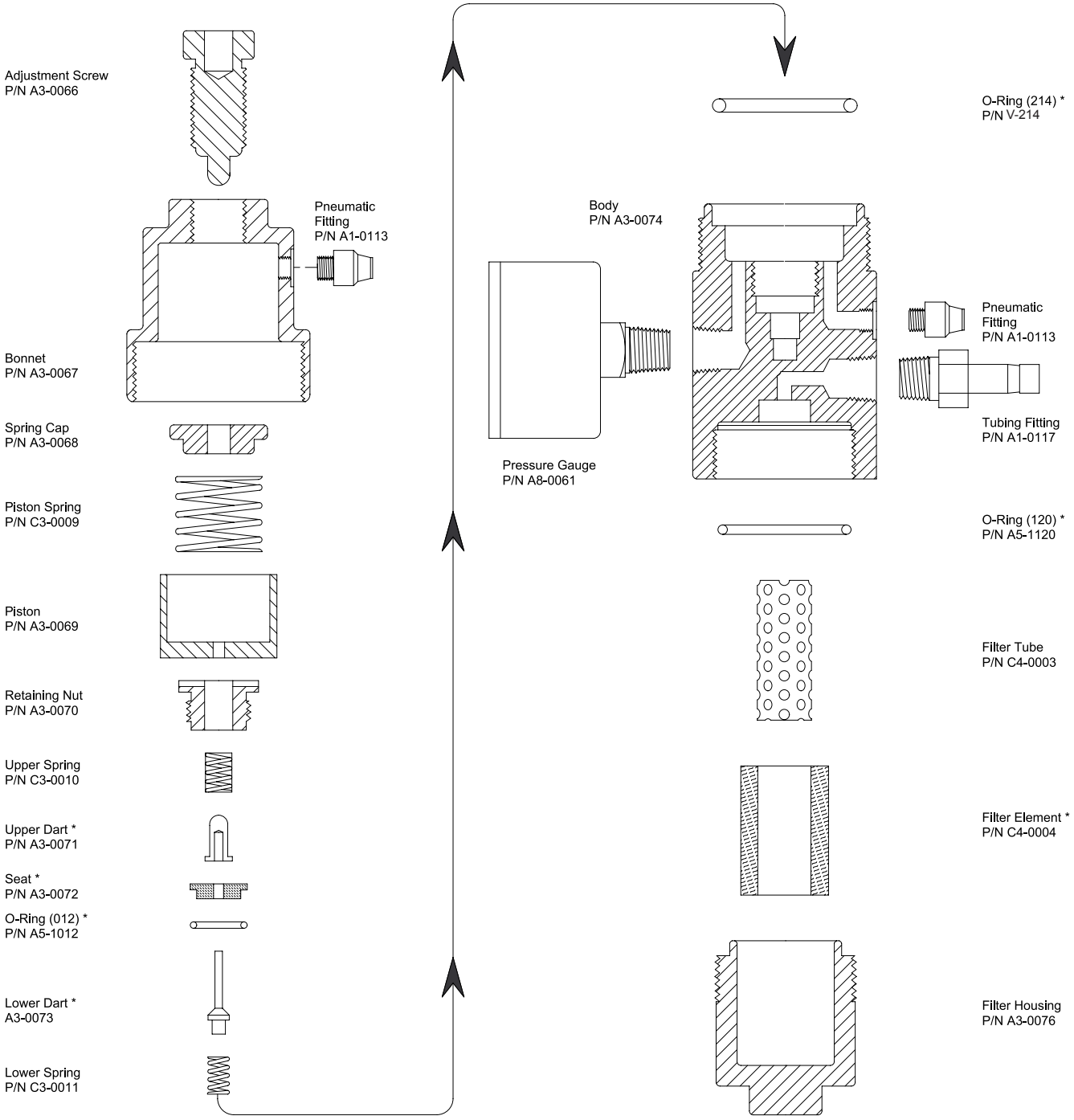
Figure 32



APPENDIX A: ILLUSTRATIONS

YZ Filter Regulator, Exploded View

Figure 33

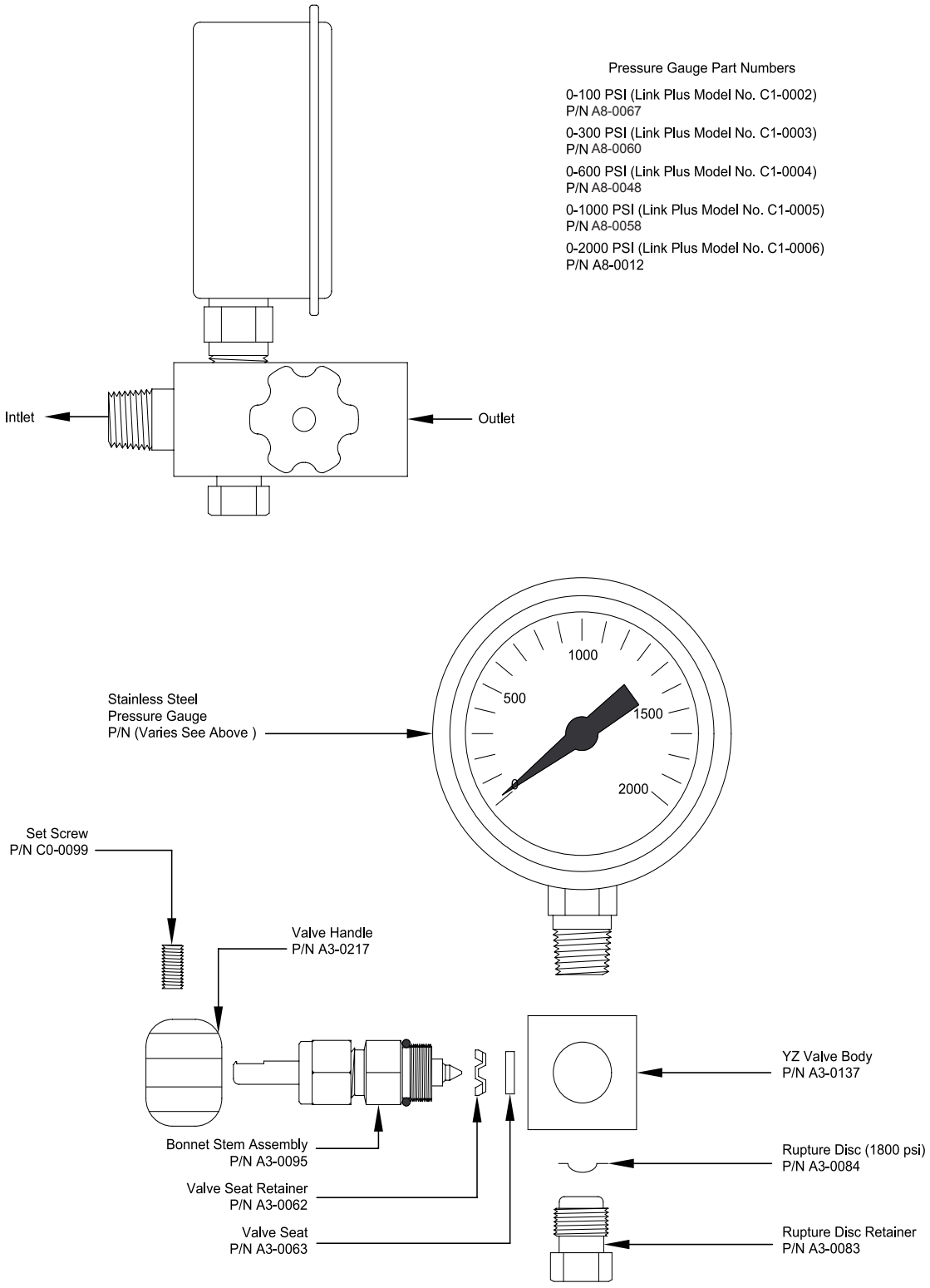


* Filter / Regulator Repair Kit P/N D3-0003

Appendix A: Illustrations

Link Plus,

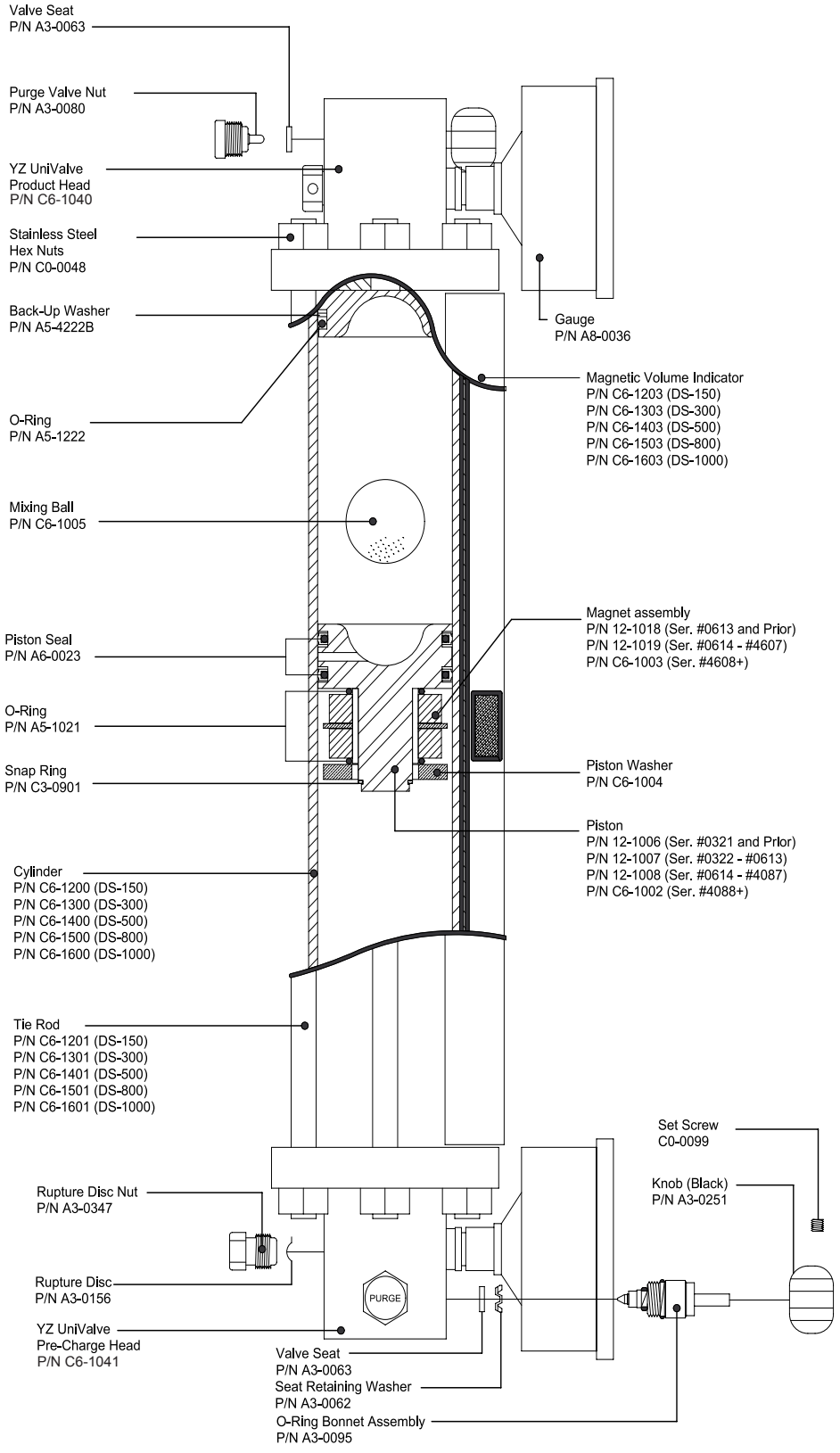
Figure 34



APPENDIX A: ILLUSTRATIONS

DuraSite Sample Vessel,

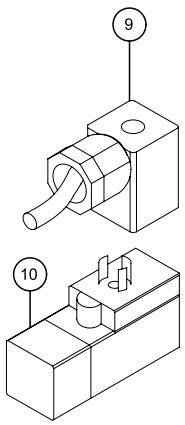
Figure 35



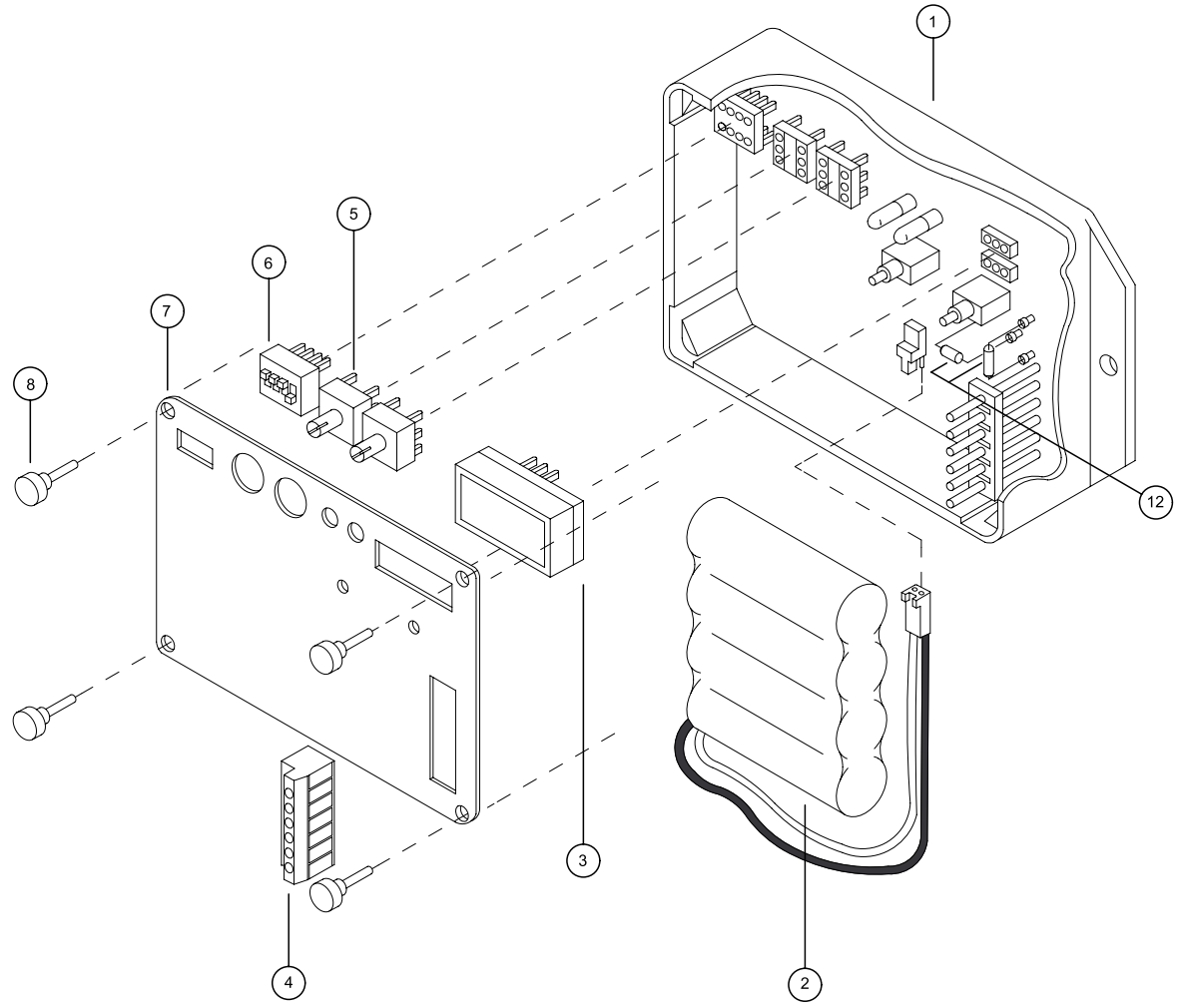
APPENDIX A: ILLUSTRATIONS

Z-65 and Solenoid,

Figure 36



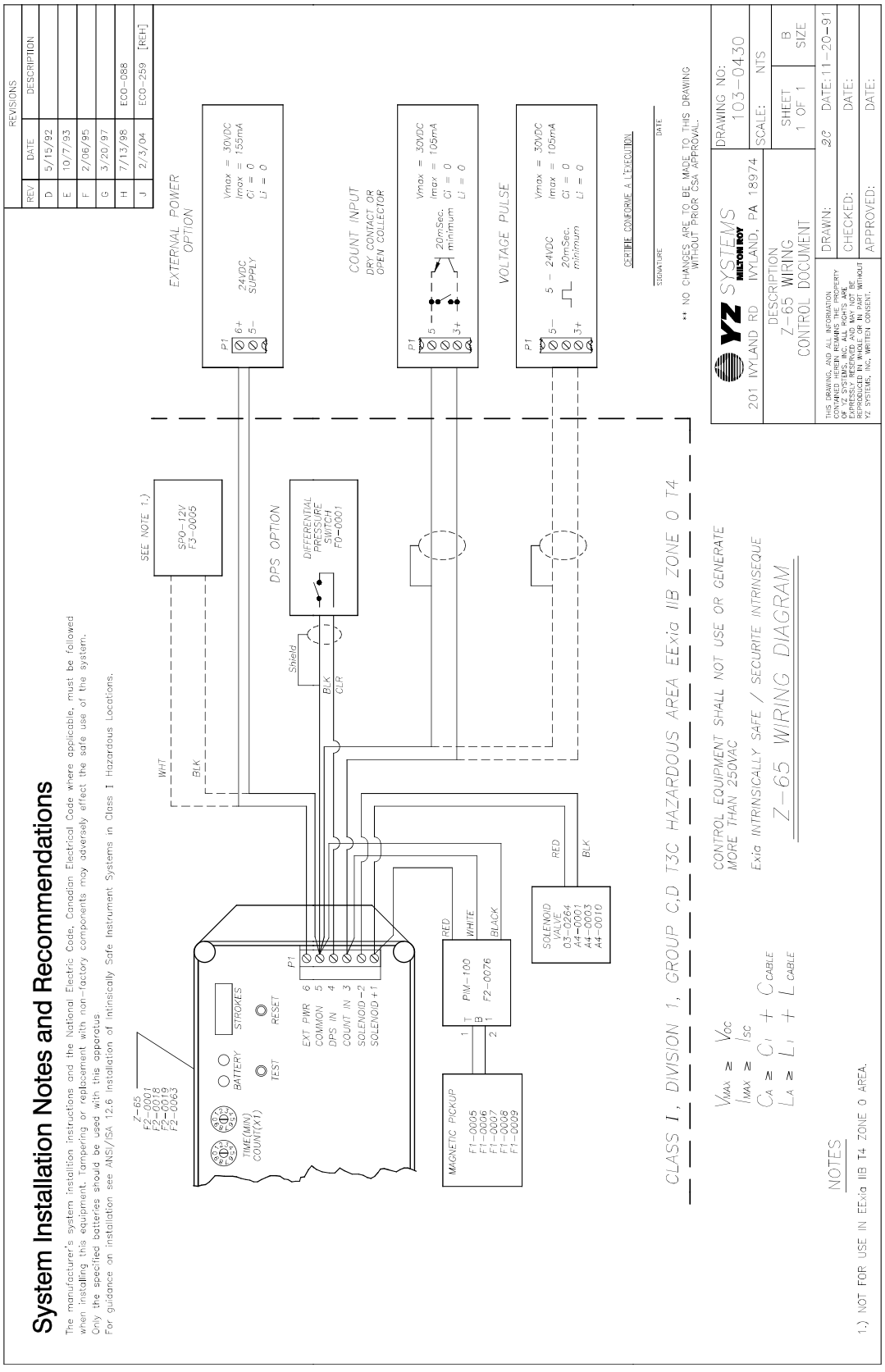
Ref. No.	Description	Part No.	Qty.
1	Z-65/6 Controller Assembly		1
	Model Z-65/6.1	F2-0001	
	Model Z-65/6.03	F2-0018	
2	Battery Pack	E3-2001	1
3*	Stroke Counter Assembly	G1-0001	1
4*	Terminal Strip, 6 Position	H1-0001	1
5*	BCD Switch	E1-0001	2
6*	Mode Switch	E1-0002	1
7	Face Plate		1
	Model Z-65/6.1	A9-3001	
	Model Z-65/6.03	A9-3029	
8	Thumb Screw	A9-1001	4
9	Cable Assembly	G2-0001	1
10	Solenoid Valve	A4-0001	1
11	Repair Kit*	D3-0005	1
12	Z-65/200 Fuse Replacement Kit (2 Fuses Per Kit)	D3-0142	1



APPENDIX A: ILLUSTRATIONS

Z-65 Wiring Control Document

Figure 37



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