DynaPak 3010RNM Liquid Sampling System Support Manual

Version 01102001 ATEX Rev.

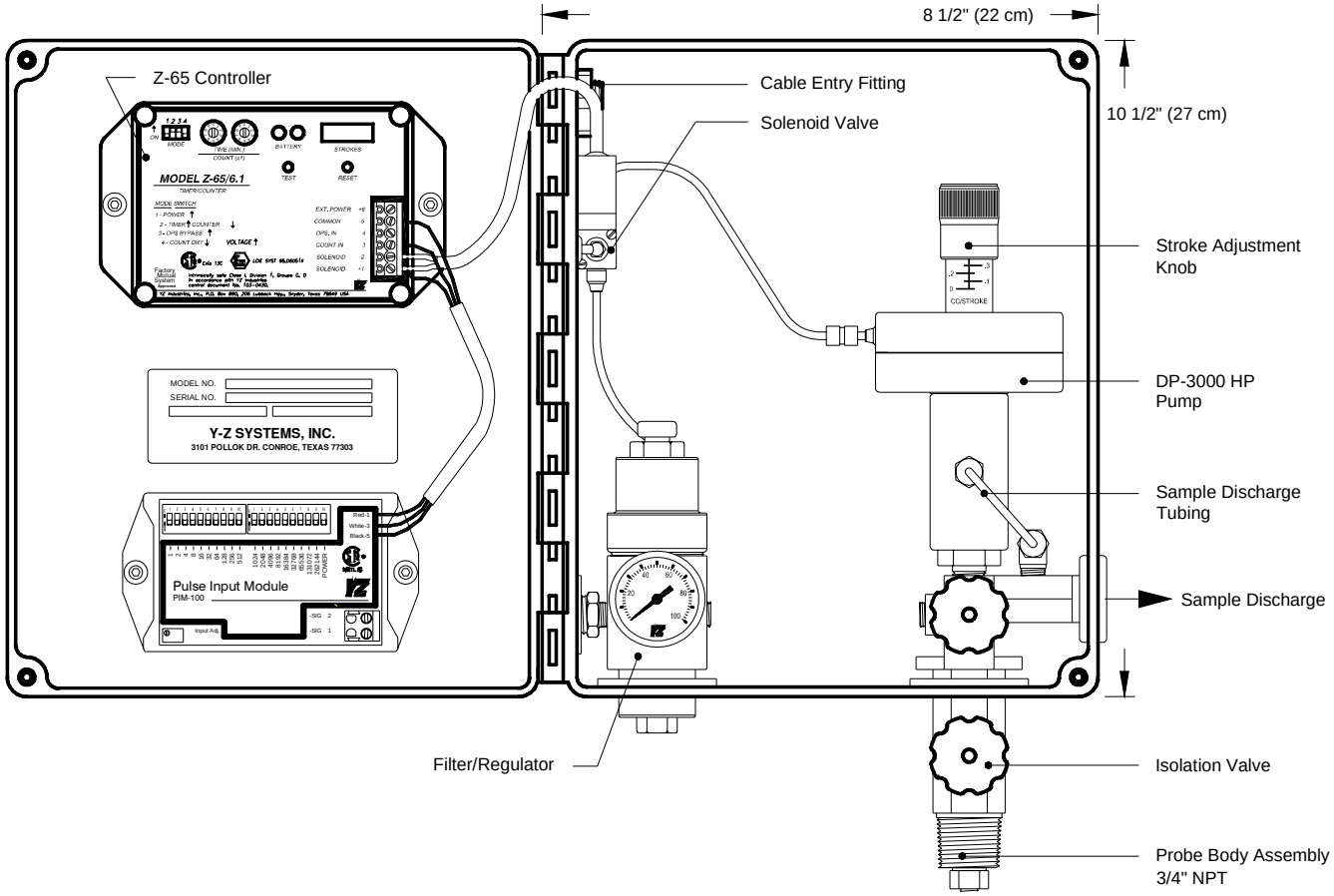
Table of Contents

1. Introduction

Congratulations on your purchase of the DynaPak 3010RNM Series Sampler. Before installation, insure that all of the components are present. You may or may not have ordered a sample cylinder(s) with your DynaPak System. Regardless, you will need a cylinder during installation. If you have questions about installation/operation, contact your YZ representative or YZ Customer Service at 936.788.5526.

2. System Components:

The primary components of the DynaPak 3010RNM Sampling System are illustrated here.



3. Theory of Operation:

The DynaPak 3010RNM Sampler is a liquid sampling system which uses the pneumatically operated, positive displacement DynaPak 3000 HP pump, the Z-65/6.1 timer/controller, the PIM-100 interface module, the YZ filter/ regulator and a low power solenoid valve to obtain liquid samples. **The 3010RNM has two modes of operation:**

A. Time-based sampling: in this mode of operation, the 3010RNM extracts a liquid 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-3000 HP pump. The Z-65/6.1 controller operates as a recycling timer, periodically energizing a low power solenoid valve. Energizing the solenoid valve allows externally provided actuation gas to stroke the DP-3000 HP 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. This allows a stroke time interval of 1 - 99 minutes. 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-65/6.1 counter operates as a dividing counter. The PIM-100 Pulse Input Module is a low power device designed to interface between a DynaPak Z-65 controller and a magnetic pickup input. The PIM-100 provides fixed width logic level output pulses used to drive the count input of a Z-65 controller at a rate determined by a user configurable divisor. The switch settable divisor, ranging from 1 to 524,287, divides the input pulses from a turbine flow meter by the cumulative number represented by the “ON” divisor switches. An input adjustment potentiometer is provided to allow adjusting the input sensitivity. Power is derived from the Z-65 battery pack.

The Z-65/6.1 counter periodically energizes a low power solenoid valve. As in the time based sampling mode of operation, this allows actuation gas to stroke the DP-3000 HP pump. The rate at which this occurs is a function of operator input as well as the turbine flow meter or other device that inputs pulses per volume metered. The two 10 position switches on the Z-65/6.1 are used to set the number of input 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-3000 HP volume adjustment knob.

In both modes of operation, the Z-65/6.1 timer/ counter operates using a replaceable internal battery pack. The battery pack condition is monitored by way of two indicator LEDs. Under normal conditions, the green indicator LED will illuminate when the solenoid output is actuated. 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.

The **External Power Option** may be used in lieu of the internal battery pack. The External Power Option (model No. EPO-120) consists of a 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-12) consists of a 5 watt solar panel with RM-12 charger regulator module and internal 12V, 5 Amp hour battery pack.

4. System Installation:

CAUTION:

Incorrect operation of valves (over tightening) can result in damage to the valve components (isolation valve bonnet assembly) 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. Be aware of the following procedures and information.

· DynaPak valves are of soft seat design and should only be closed or opened with fingers. No wrenches should ever 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.

4.1 DynaPak-3010RNM With Slipstream Kit

a. Mount the DP-3010RNM with slipstream kit on a vertical 2" pole.

b. Connect the slipstream adapter to the pipe-line product supply and product return connections as shown in the diagram.

c. Connect the actuation gas supply (75 psi) to the actuation gas connection located on the left hand side of the sampler.

d. Connect the sample out connection to the sample vessel.

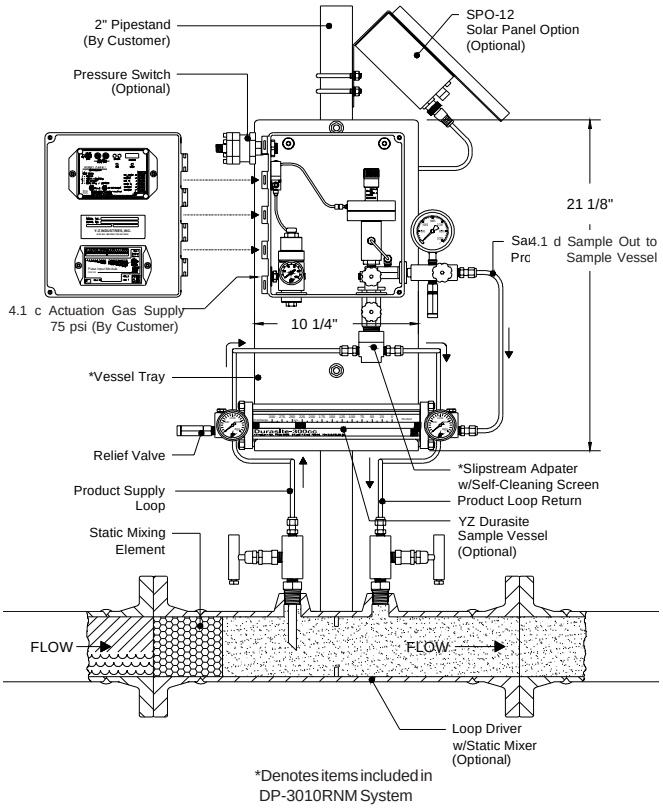
e. Wire the PIM-100 to the flow input device (Turbine Meter) to be used. *(Refer to diagram #7, Wiring Control Document)*

f. Before applying pipeline pressure to the DP-3010RNM, ensure that the product supply valve is closed.**

g. After pipeline pressure has been applied to the sampler, check the slipstream tubing connections for leaks.

h. Open the product supply valve.

i. Follow the "Operational Check and Leak Testing Procedures" detailed in Section 6.



4. System Installation:

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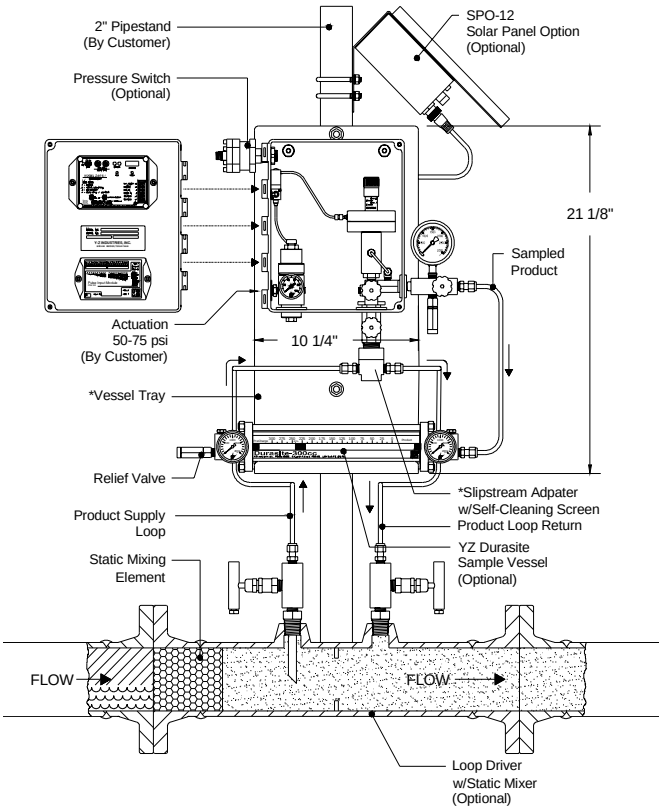
· DynaPak valves are of soft seat design and should only be closed or opened with fingers. No wrenches should ever be used.

·If a valve will not seal off with finger tight operation the valve should have maintenance performed to allow proper operation of the valve.

4.2 Pulse Input

In the counter mode, the Z-65/6.1 is designed to energize the sample pump solenoid once the preset number of pulses are received. The rate at which this occurs is a function of operator input as well as the turbine flow meter or other device that inputs pulses per volume metered. The two 10 position switches on the Z-65/6.1 are used to set the number of input 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. In this mode of operation, the Z-65/6.1 counter operates as a dividing counter. The PIM-100 Pulse Input Module is a low power device designed to interface between a DynaPak Z-65 controller and a magnetic pickup input. The PIM-100 provides fixed width logic level output pulses used to drive the count input of a Z-65 controller at a rate determined by a user configurable divisor. The switch settable divisor, ranging from 1 to 524,287, divides the input pulses from a turbine flow meter by the cumulative number represented by the "ON" divisor switches. Actual programming of these values will be discussed in section 8. An input adjustment potentiometer is provided on the PIM-100 to allow adjusting the input sensitivity. *(Refer to diagram #7, Wiring Control Document)*



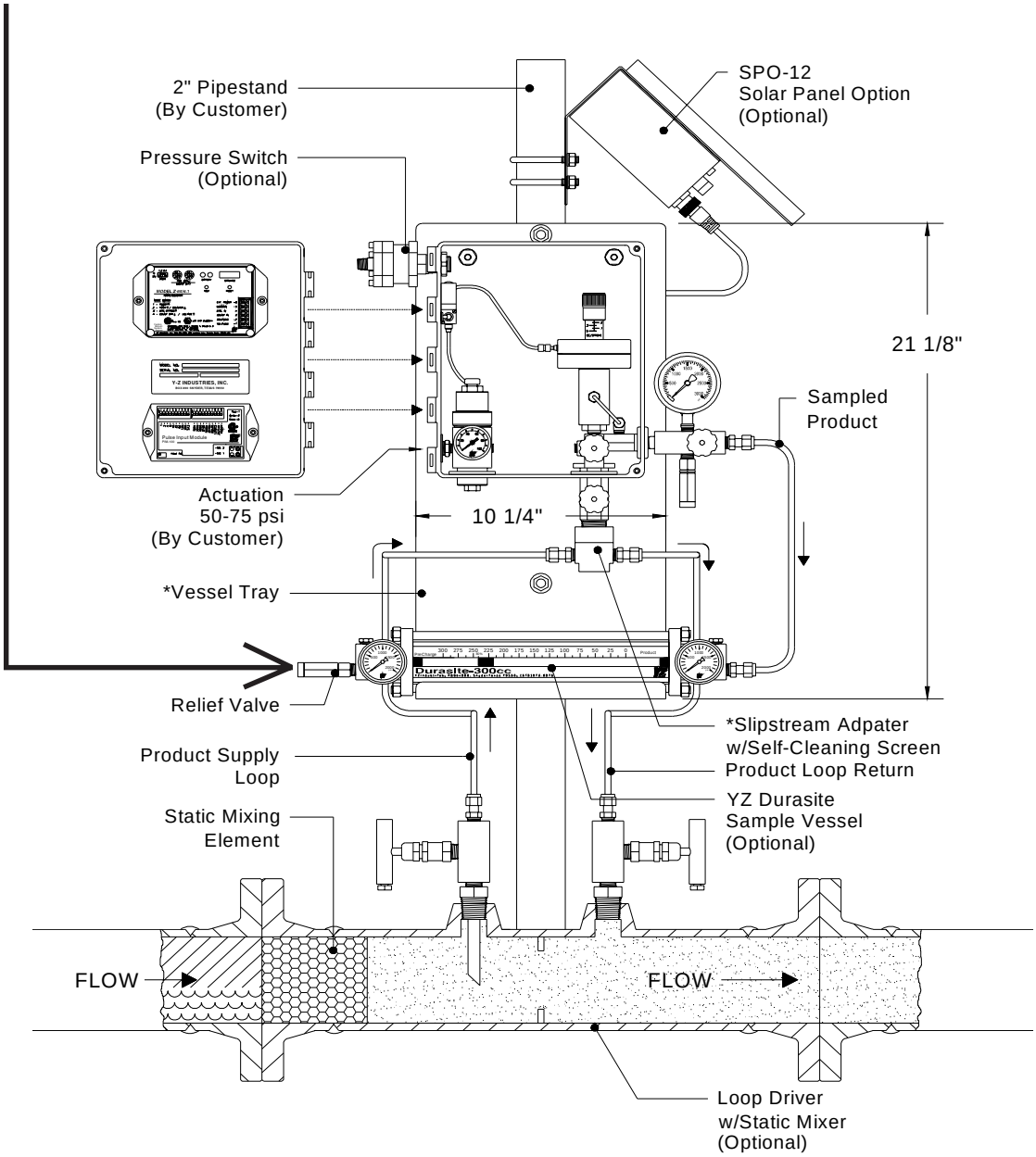
*Denotes items included in DP-3010RNM System

5. Sample Vessel Installation:

The free-floating piston cylinder (DuraSite) should be installed in a horizontal position on the 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.

The vessel may be pre-charged by using bottled inert gas such as nitrogen or helium (consult the factory for proper procedure).



*Denotes Items Included in
DP-3010 HP Slipstream Adapter Kit

6. Operational Check & Leak Testing:

6.1 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 establish product supply pressure to the probe body. Check all connections for leaks.

6.2 Adjust the filter/regulator from the following ranges:

Pipeline Pressure	Actuation Pressure
Under 700 psig (48.3 Bar)	45 psig (3.1 Bar)
700-1500 psig (48.3-103.4 Bar)	60 psig (4.1 Bar)
1500-2250 psig (103.4-155.1 Bar)	75 psig (5.2 Bar)

6.3 Turn the stroke adjustment knob on the top of the pump counterclockwise to set the pump displacement at .4cc/stroke.

6.4 Move all of the mode switches on the Z-65 to their off positions.

6.5 Move both timer/counter dials to the 0 position (00 minutes).

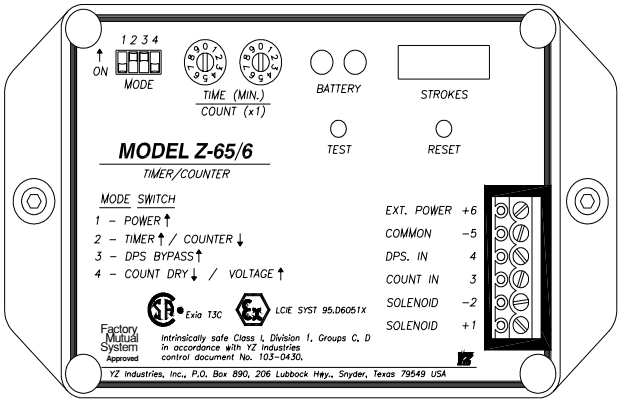
6.6 Move mode switches 1, 2 and 3 to the on position. The pump will begin stroking once every 2 seconds in a diagnostic test mode.

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

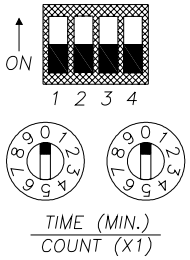
6.8 Return the mode switches to their off positions.

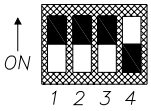
6.9 Check all connections from the sampler discharge to the connection on the sample cylinder using a liquid leak detector.

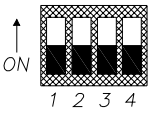
6.10 If no leaks are found, the pump and tubing should be considered tested and functional.



NOTE: black illustrates position of switches.







7. Sampler Set-Up:

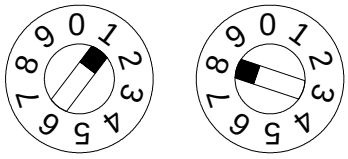
Continuous time-based sampling

7.1 Calculate the sampling rate using the following 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)

Example 18 minutes



TIME (MIN.)

COUNT (x1)

7.2 Set the timer dials on the Z-65/6.1 to the sample rate from step 7.1.

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

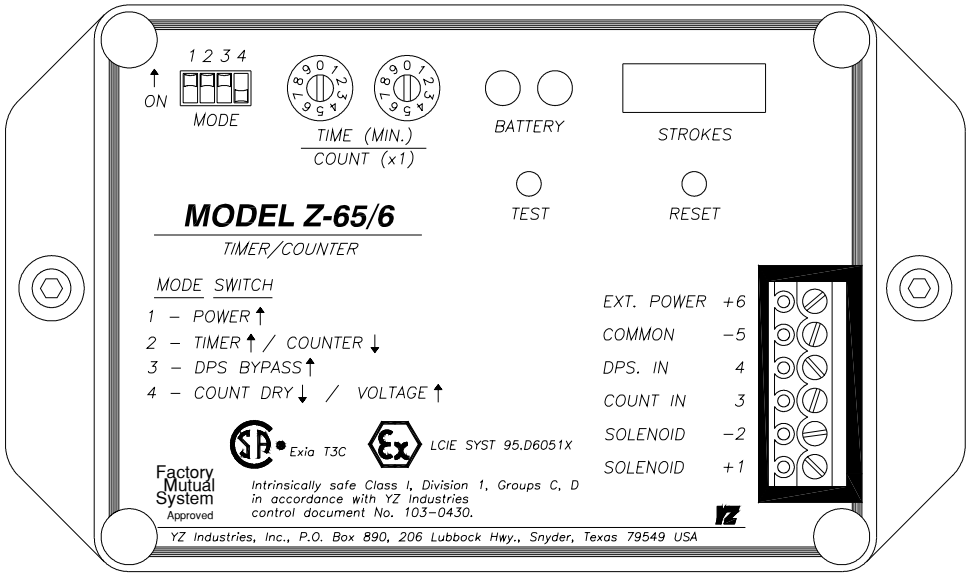
NOTE: The time (18 minutes) above corresponds to the dial setting shown for the Z-65/6.1 model with the timer range setting in the factory position (jumper on the two left pins). See Section 10.4 Timer Range Setting.

7. Sampler Set-Up:

Continuous time-based sampling

7.3 Adjust the pump volume adjustment knob to the value used in the calculations in step 7.1.

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

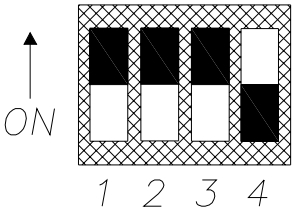


7.4 Turn mode switch 1 to on.

7.5 Turn mode switch 2 to on.

7.6 Turn mode switch 3 to on.

7.7 Turn mode switch 4 to off.



7.8 Press the test button once to initiate the timer sequence.

8. Sampler set-up:

Continuous proportional-to-flow sampling

In this mode of operation, the Z-65/6.1 controller and the PIM-100 module work together as a dividing counter to control the rate at which the pump is actuated. The desired time between pump strokes is controlled by the turbine meter pulses or another output device that will give an input pulse to the PIM-100 module.

8.1 **PIM-100 Set Up:**

Determining the Divisor: The Divisor is determined by taking the nominal flow meter output pulse rate and calculating how many output pulses you want for that number or input pulses.

For example:

If your flow meter is calibrated for 2300 pulses per metered volume (meter k-factor), and you want one output pulse per metered volume from the PIM-100, your divisor would be 2300. In Table 1, lookup the largest switch value that is less than or equal to the divisor. Subtract that switch value from the divisor. Next locate the largest switch value that will go into the remainder of the divisor. Repeat this process until the remainder is zero.

Table1

Switch S1		Switch S2	
Position	Divisor Value	Position	Divisor Value
1	1	1	1024
2	2	2	2048
3	4	3	4096
4	8	4	8192
5	16	5	16384
6	32	6	32768
7	64	7	65536
8	128	8	121072
9	264	9	262144
10	512	10	POWER

* Your meter will provide pulses per Metered Volume. The Metered Volume may be in gallons, barrels, liters, etc. Verify this value from your meter information.

8. Sampler set-up:

Continuous proportional-to-flow sampling

To set this value turn on switch positions
S2-2, S1-8, S1-7, S1-6, S1-5, S1-4, and S1-3.
Turning a switch "ON" enables the divisor value.
Switch divisor values are cumulative.
2300

-2048 **S2-2 “ON”**
252

- 128 **S1-8 “ON”**
124

- 64 **S1-7 “ON”**
60

- 32 **S1-6 “ON”**
28

- 16 **S1-5 “ON”**
12

- 8 **S1-4 “ON”**
4

- 4 **S1-3 “ON”**
0

The input signal threshold level is set from the factory to work with most applications. However, due to varying cable lengths and wire types, the threshold level may need to be adjusted for certain applications. The threshold level can be adjusted using the “Input Adj.” potentiometer. If pulses occur too often, not at all, and/or erratically, you may need to change the threshold setting. Turning the Input Adj. Potentiometer clockwise will decrease the input sensitivity, and counterclockwise will increase the input sensitivity.

8. Sampler set-up:

Continuous proportional-to-flow sampling

8.2 **Z-65/6.1 Set Up:**

Calculate the Z65/6.1 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 (Metered Volume per day)	=	c._____
4. sample period in days	=	d._____
5. pulses per volume metered (pulses per Metered Volume)	=	e._____
6. counter setting	=	a x c x d x e / (b)

EXAMPLE:

pump displacement	(a.)	=	.2cc
sample cylinder size	(b.)	=	300cc
average flow rate	(c.)	=	100 Metered Volumes per day
sample period	(d.)	=	30 days
pulses per volume metered	(e.)	=	10 pulses per Bbl

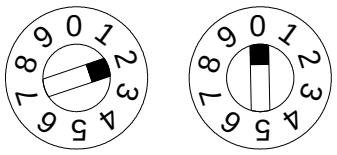
counter setting = .2cc x 100 Bbl/day x 30 days x 10 pulses/Bbl = 20 pulses
300 cc

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

Example: 20 pulses; turn dials to 20.

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

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.



COUNT (x1)

8. Sampler set-up:

Continuous proportional-to-flow sampling

8.3 Adjust the pump volume adjustment knob to the value used in the calculation in step 8.1.

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

8.4 Input from the PIM-100 is a dry contact:

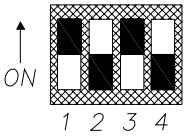
a.interface between the PIM-100 and the Z-65/6.1 terminal strip will be pre-wired.

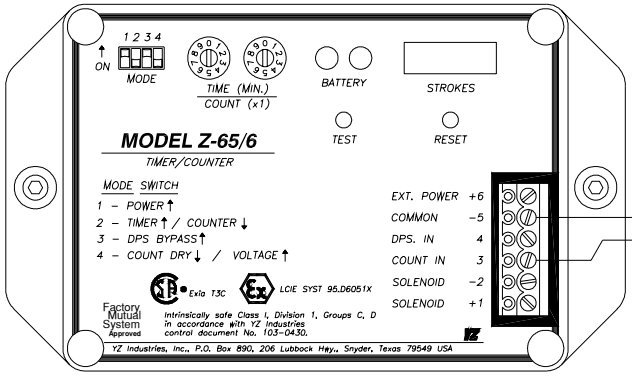
b.Turn mode switch 1 to on.

c.Turn mode switch 2 to off.

d.Turn mode switch 3 to on.

e.Turn mode switch 4 to off.





Dry contact or open collector (20 mSec duration min.)

9. Sampler maintenance:

9.1 Recommended preventative maintenance schedule

Every sampling situation is unique. Below are our recommendations for average conditions. A higher BTU content will necessitate more frequent pump/filter maintenance.

A. Clean and lubricate the sample pump every four months.*

B. Check the filter element every six months, replacing as necessary.

C. Test the battery every month.

D. Test the system for leaks each time a fitting or connection has been made.

9.2 Cleaning and lubricating the High Pressure DP pump:

A. Close the isolation valve.

B. 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.

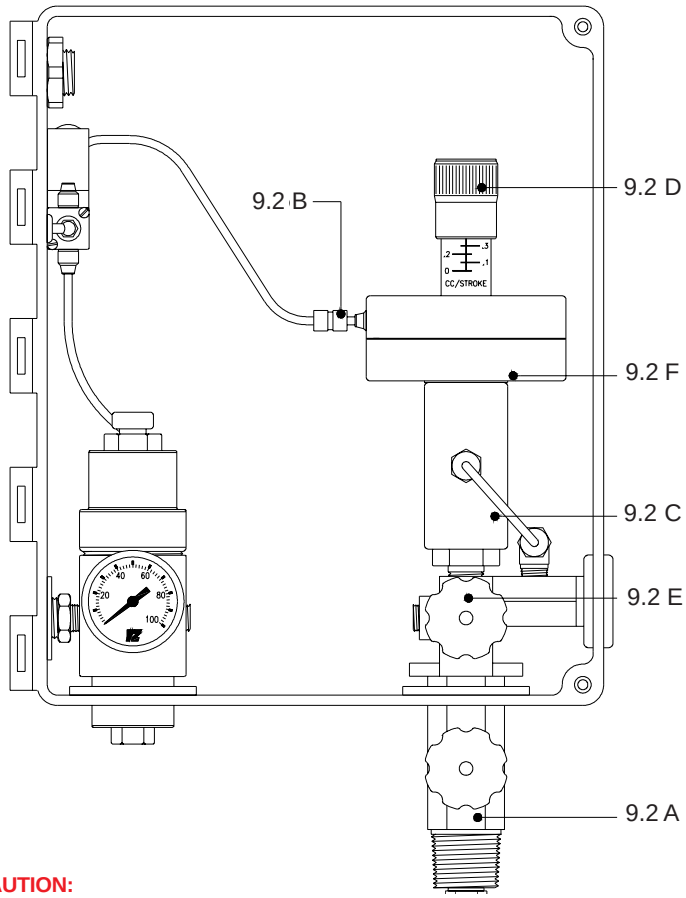
C. Remove the sample discharge (1/8" stainless steel tubing) from the pump body.

D. Screw the stroke adjustment knob all the way down to the 0 cc/stroke setting.

E. 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, 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 assembly grease.

F. 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.

NOTE: Normal service generally requires only the replacement of the o-rings and seal. A seal repair kit (part number D3-0115) is available from YZ.



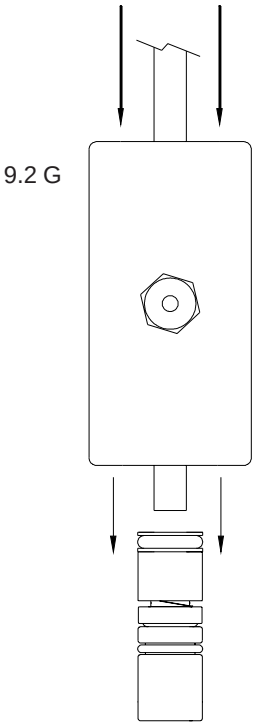
CAUTION:

Incorrect operation of valves (over tightening) can result in damage to the valve components (isolation valve bonnet assembly) 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. Be aware of the following procedures and information.

· DynaPak valves are of soft seat design and should only be closed or opened with fingers. No wrenches should ever be used.

9. Sampler maintenance:

G. 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 bushings and o-rings out the bottom of the pump body.



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

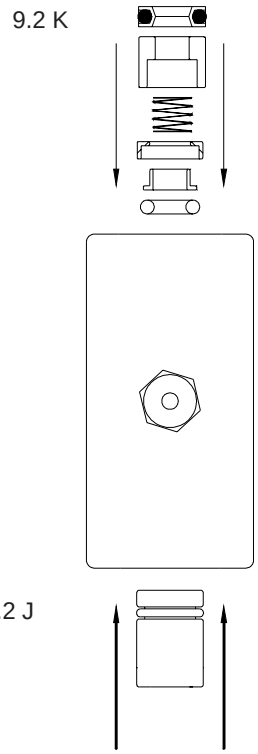
I. Apply a light coat of non-soluble assembly grease on all o-rings and bushings to prevent damage.

J. Install the body bushing into the bottom of the pump body.

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

L. Carefully install assembly into the top of the pump body.

NOTE: Apply a light coat of assembly grease on the plunger shaft prior to installation.



M. Install the pump assembly on the inlet valve assembly. Tighten firmly by hand.

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

O. Open the isolation valve.

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

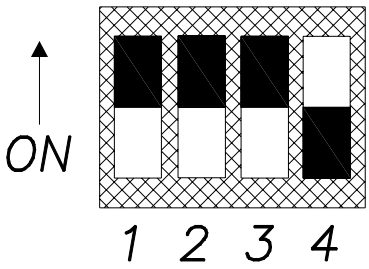
Q. Pressure test the pump as previously described for proper operation.

9. Sampler maintenance:

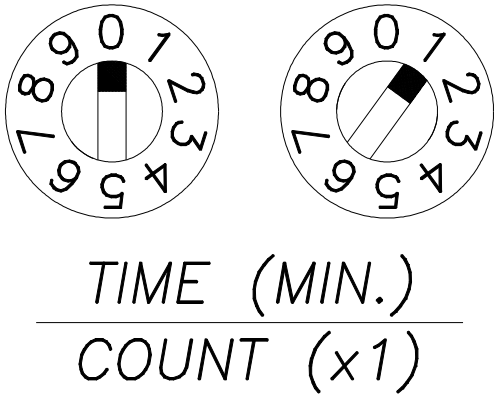
9.3 Battery Test:

1. Set the mode switches as follows:
   a. Position 1, 2 and 3 on
   b. Position 4 off.
   c. Set the time switches to the 01 position.

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



This will set the solenoid output rate to one actuation every one minute (based on the factory set time range for the Z-65/6.1 model).



2.. 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.

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

Replacing a Depleted Battery:

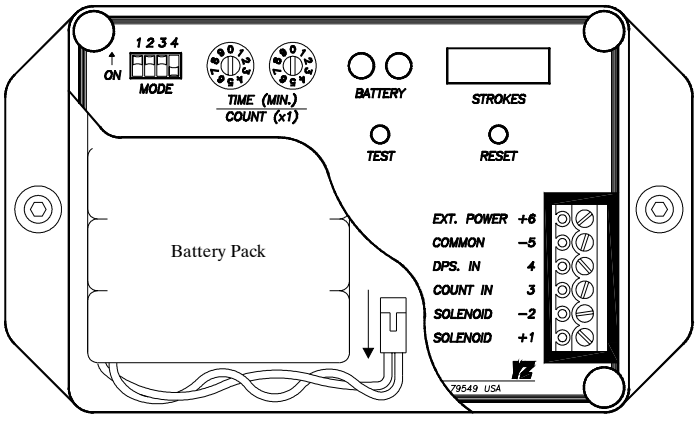
1. Remove the four thumb screws, cover plate and orange terminal connector.

2. The battery is located in the lower left hand corner of the Z-65/6.1 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).

NOTE: follow the illustration to assure proper battery wire placement in the Z-65/6.1 enclosure.



5. Return the mode switches to their original positions.

6. Send your depleted battery to:
   YZ Systems Inc.
   206 Lubbock Hwy.
   Snyder, TX 79549 USA

9. Sampler maintenance:

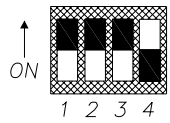
9.4 Recommended spare parts for the DynaPak 3000RNM Series gas samplers.

Part Number	Description	Qty.	Location
C4-0004	filter element	1	see diagrams #3 and #4
D3-0115	DP-3000 HP pump seal kit	1	see diagrams #1 and #2
D3-0116	YZ filter regulator repair kit	1	see diagrams #3 and #4
D3-0142	Z-65/200 fuse replacement kit	1	see diagram #5
E3-2001	battery pack	1	see diagram #5

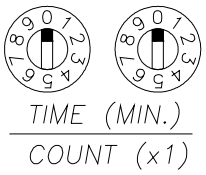
10. Troubleshooting: Timer Mode

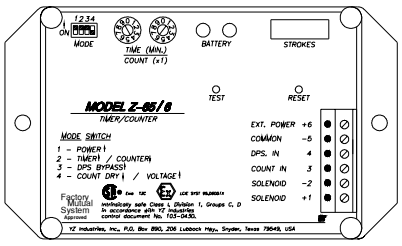
10.1 Mechanical Operation Test:

A. Set the mode switches as follows:
1. Positions 1, 2 and 3 on.



B. 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.



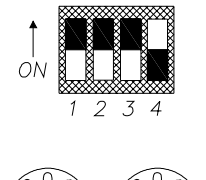


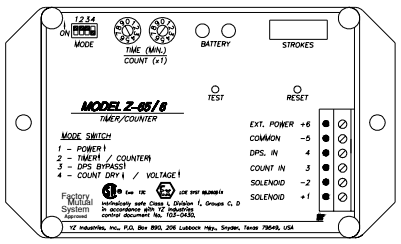
Mechanical Operation Test

10.3 LCD Stroke Indicator Test Mode:

A. To test the stroke counter, set the mode switches as follows:
1. Positions 1, 2 and 3 on.

B. Set the time switches to 00.



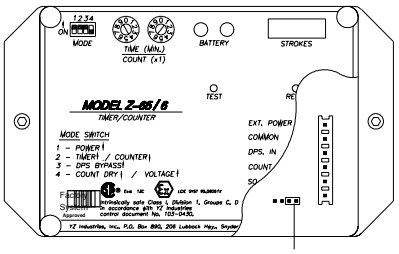


C. Unscrew the thumbscrews and remove the six position terminal strip and cover. This will expose the battery pack and the three position configuration jumper (located in the lower right corner of the Z-65/6.1 controller assembly).

D. Set the configuration jumper to the far right position marked stroke indicator test.

E. 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).



10.3d Jumper Switch Location

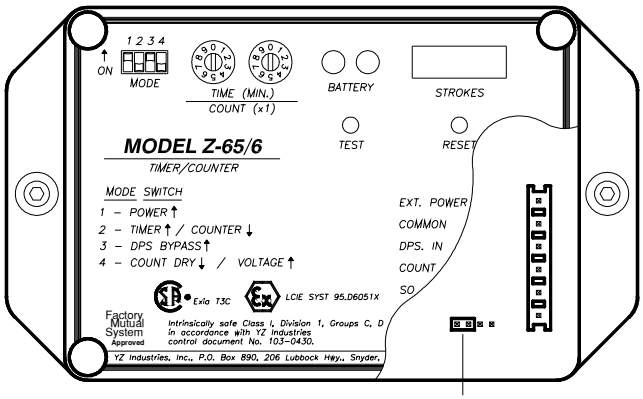
10. Troubleshooting:

10.4 Timer Range Setting

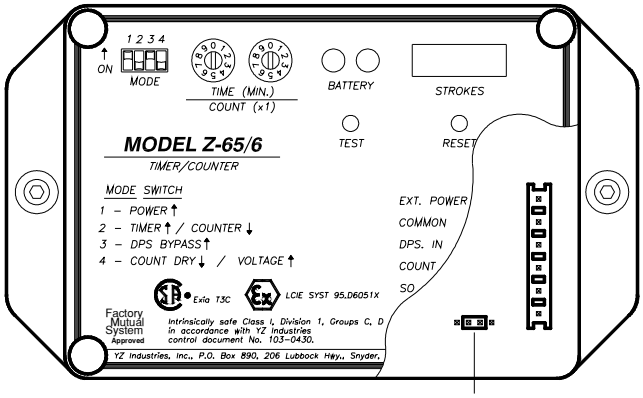
A. the Z-65/6.1 timer has two ranges for the timer setting dials.

1. Z-65/6.1 Range Setting:
a. xx minutes: set the configuration jumper to the far left position (factory setting).
b. x.x minutes: set the configuration jumper to the center position.

Note: to obtain maximum battery life, choose the longest solenoid stroke rate possible.



Jumper switch location
for 1 - 99 counts (xx)
factory positioned



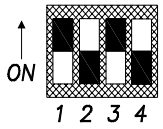
Jumper switch location
for .1 - 9.9 counts (x.x)

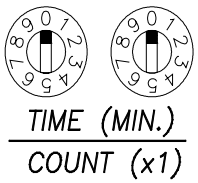
10. Troubleshooting: Counter Mode

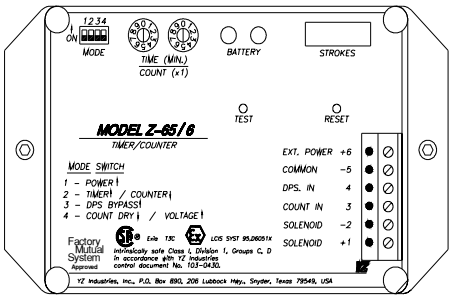
10.5 Input Pulse Test

A. Set the mode switches as follows:
1. Position 1 and 3 on, 2 and 4 off.

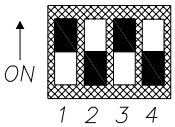
B. Set the count switches to 00 to enter the diagnostic mode. This mode enables the user to determine if the proper input pulses are being received at the count input (ter. #3).





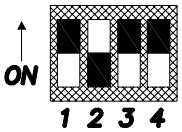


1. Dry Contact Input: mode switch 4 should be in the off position. Depress the test switch and hold. A red LED should illuminate. When the dry contact input is received at the counter input (ter. #3) the green LED will turn on and off and the red LED will illuminate again. This will normally occur very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



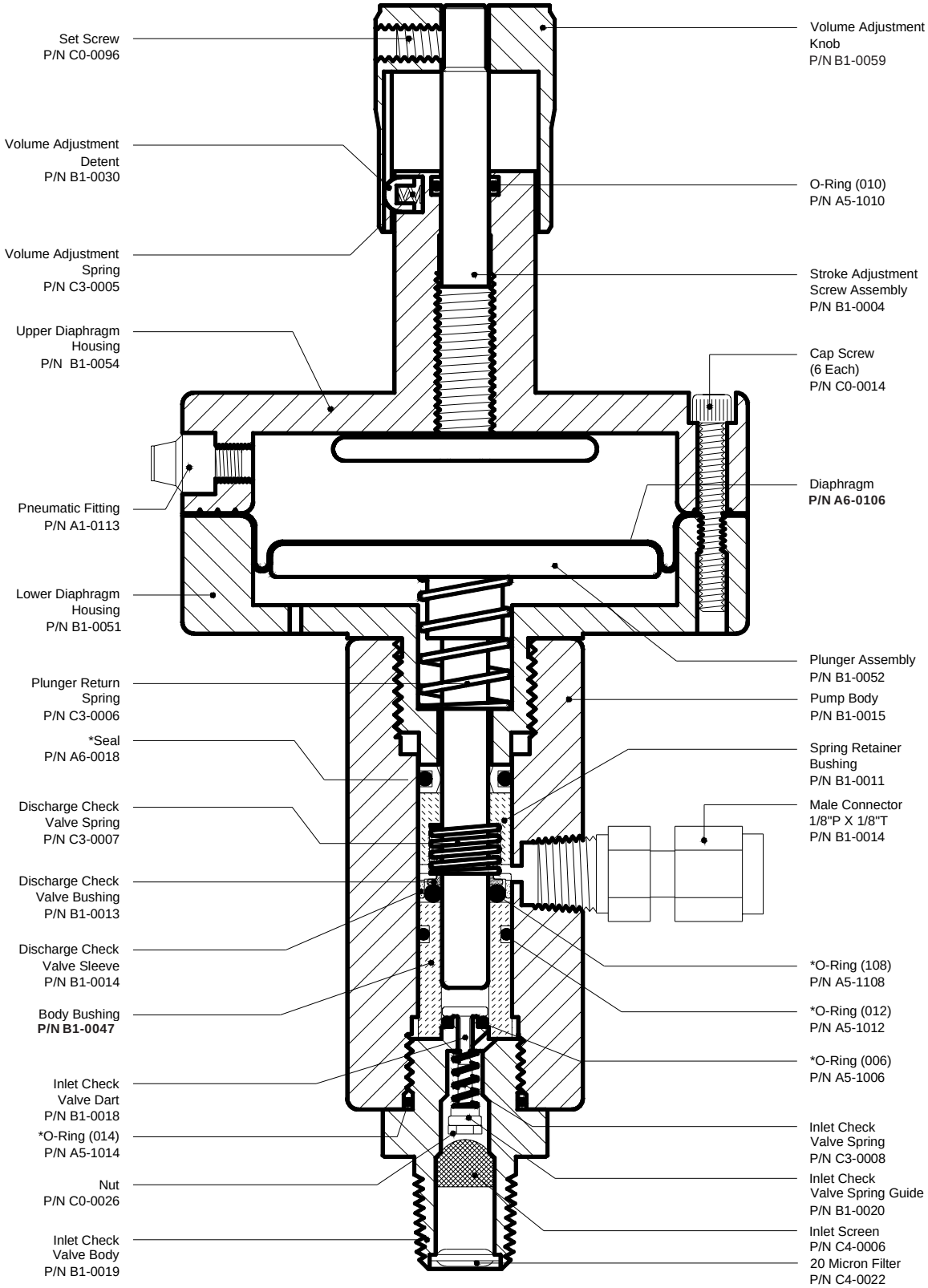
dry contact
open collector
(20 mSec duration min.)

2. 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.



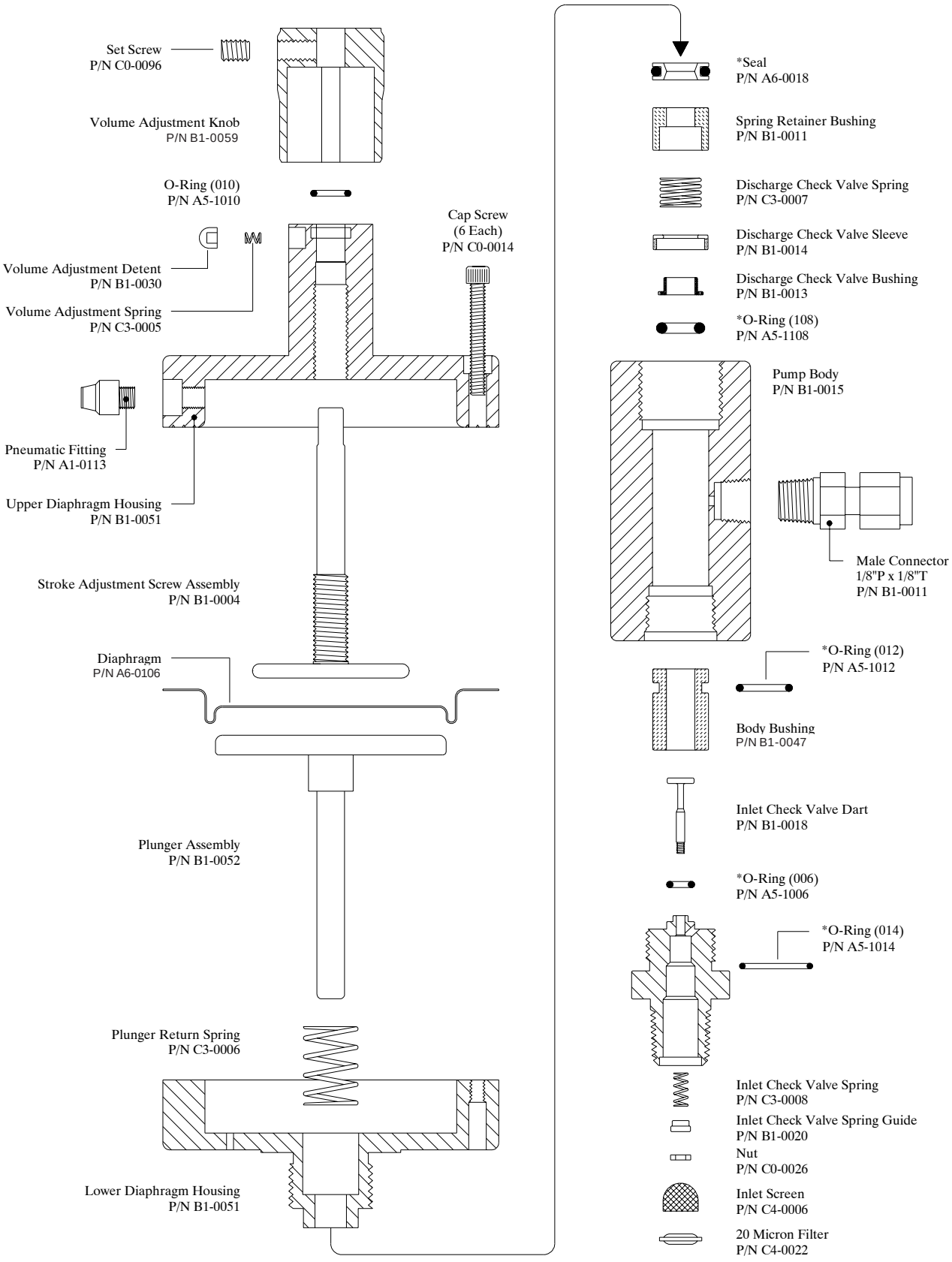
voltage pulse
5-24 VDC
(20 mSec duration min.)

Diagram #1:
DP 3000 HP pump (assembled)



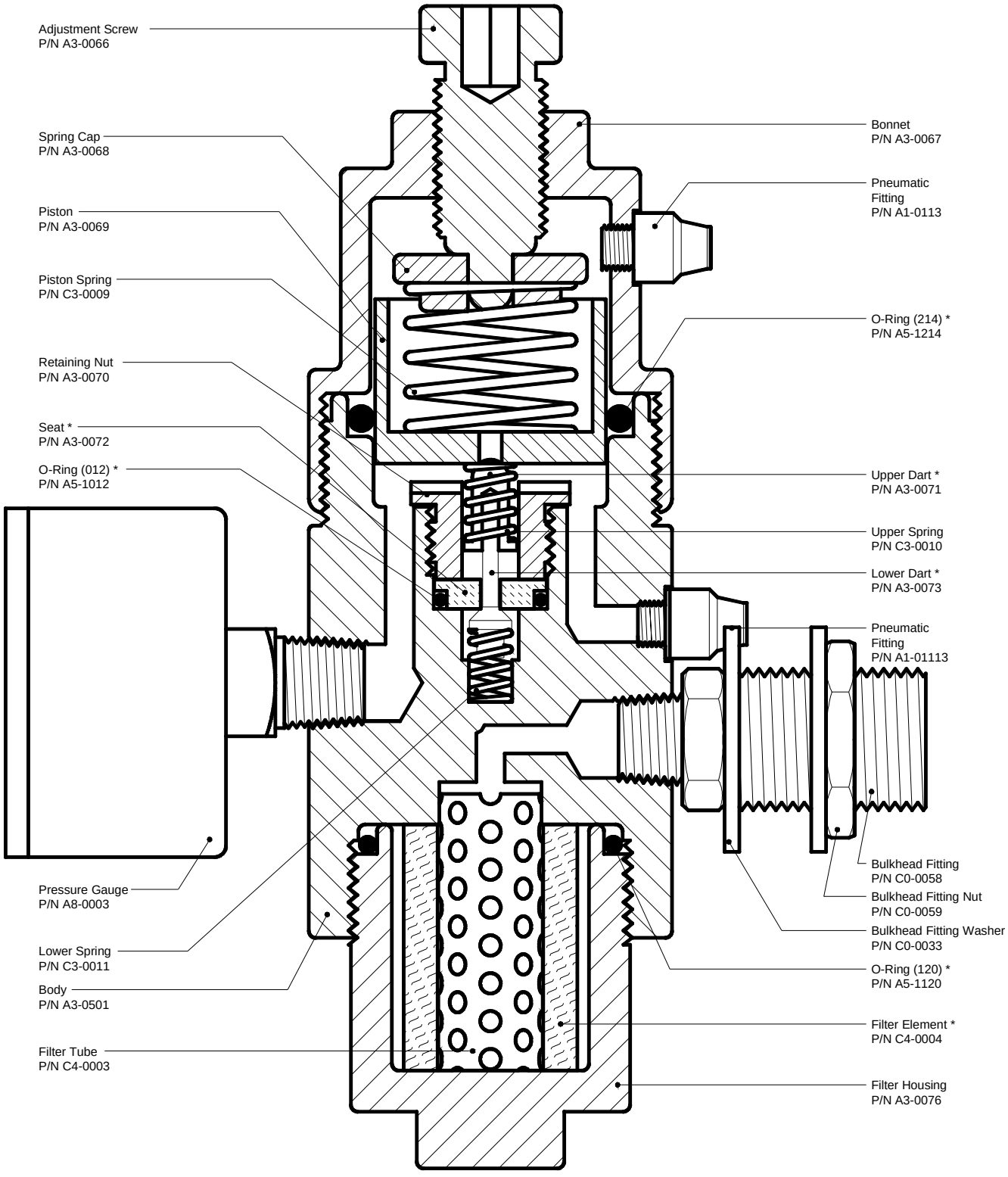
*DP-3000 HP Pump Seal Kit - P/N D3-0115

Diagram #2:
DP 3000 HP pump (exploded)



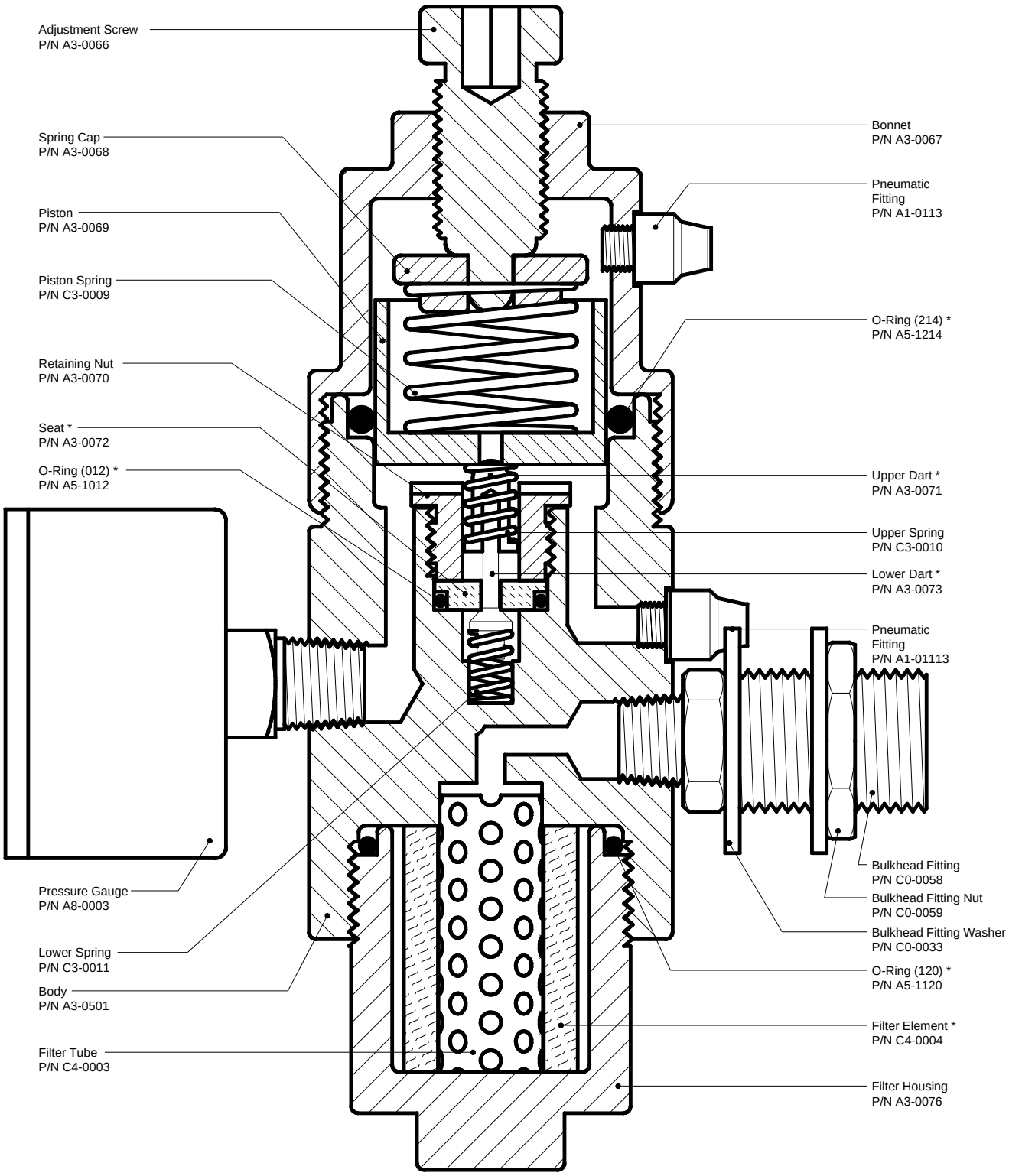
*DP-3000 HP Pump Seal Kit - P/N D3-0115

Diagram #3:
YZ external actuation filter/regulator (assembled)



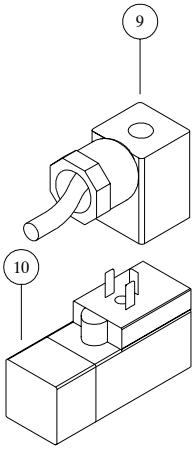
* Filter/Regulator Repair Kit P/N D3-0116

Diagram #4:
YZ external actuation filter/regulator (exploded)



* Filter/Regulator Repair Kit P/N D3-0116

Diagram #5:
Z-65/6.1 Controller



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

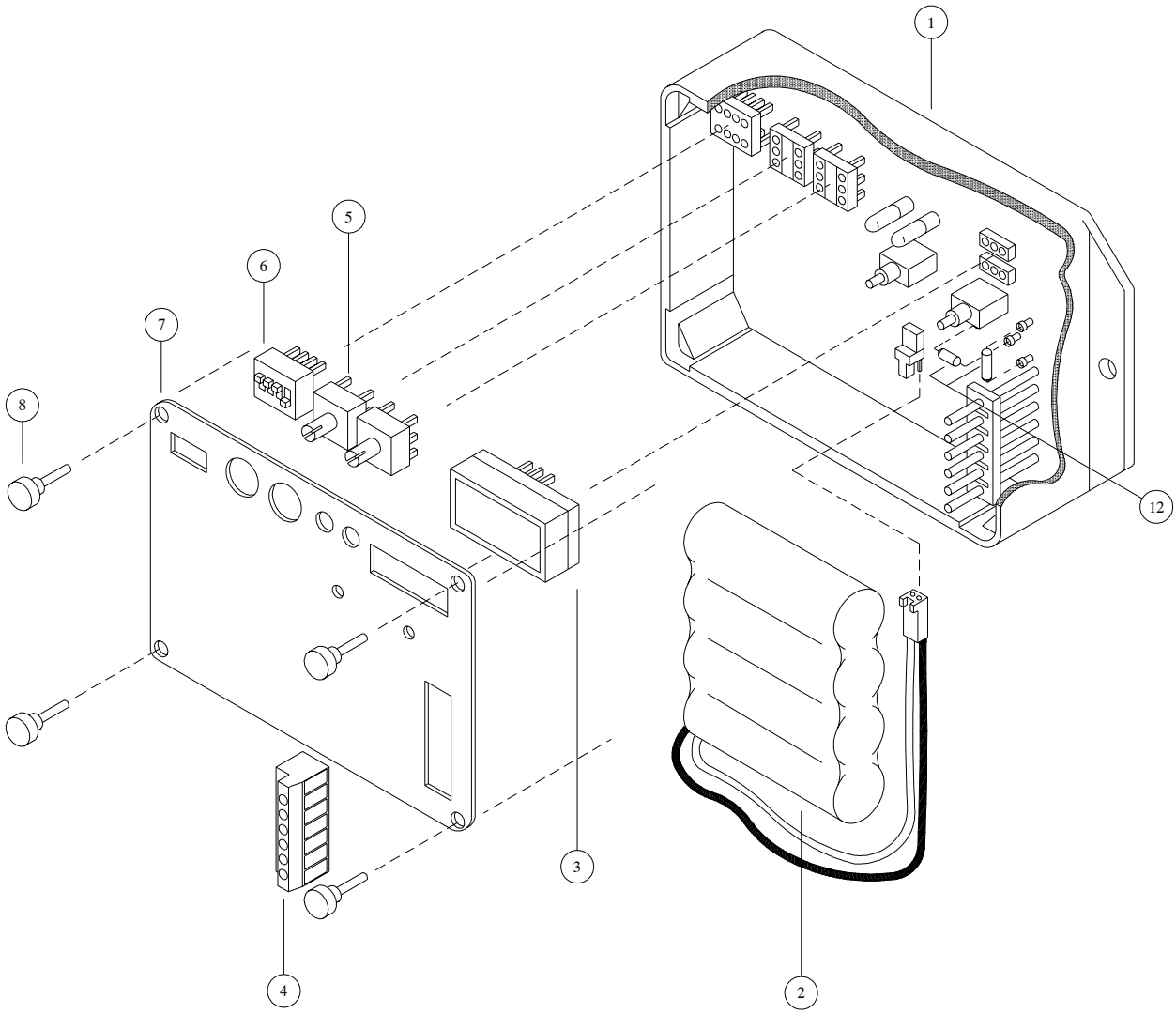
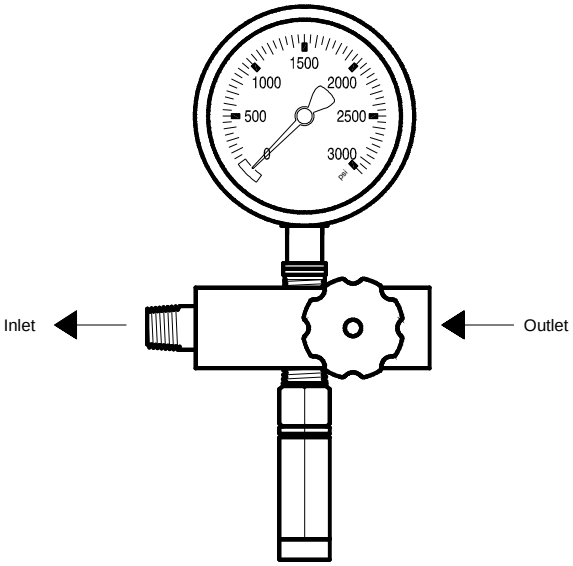


Diagram #6: LinkPlus



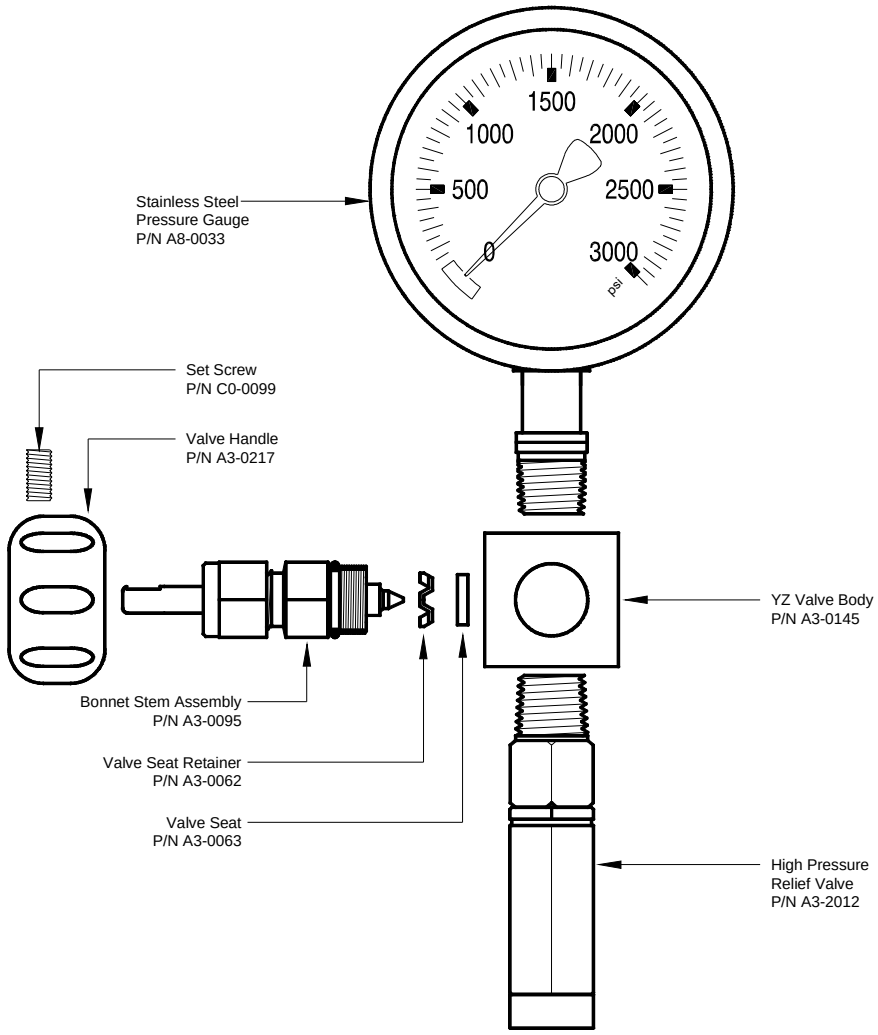


Diagram #7: Z-65 Installation Notes/Wiring Control Documentation

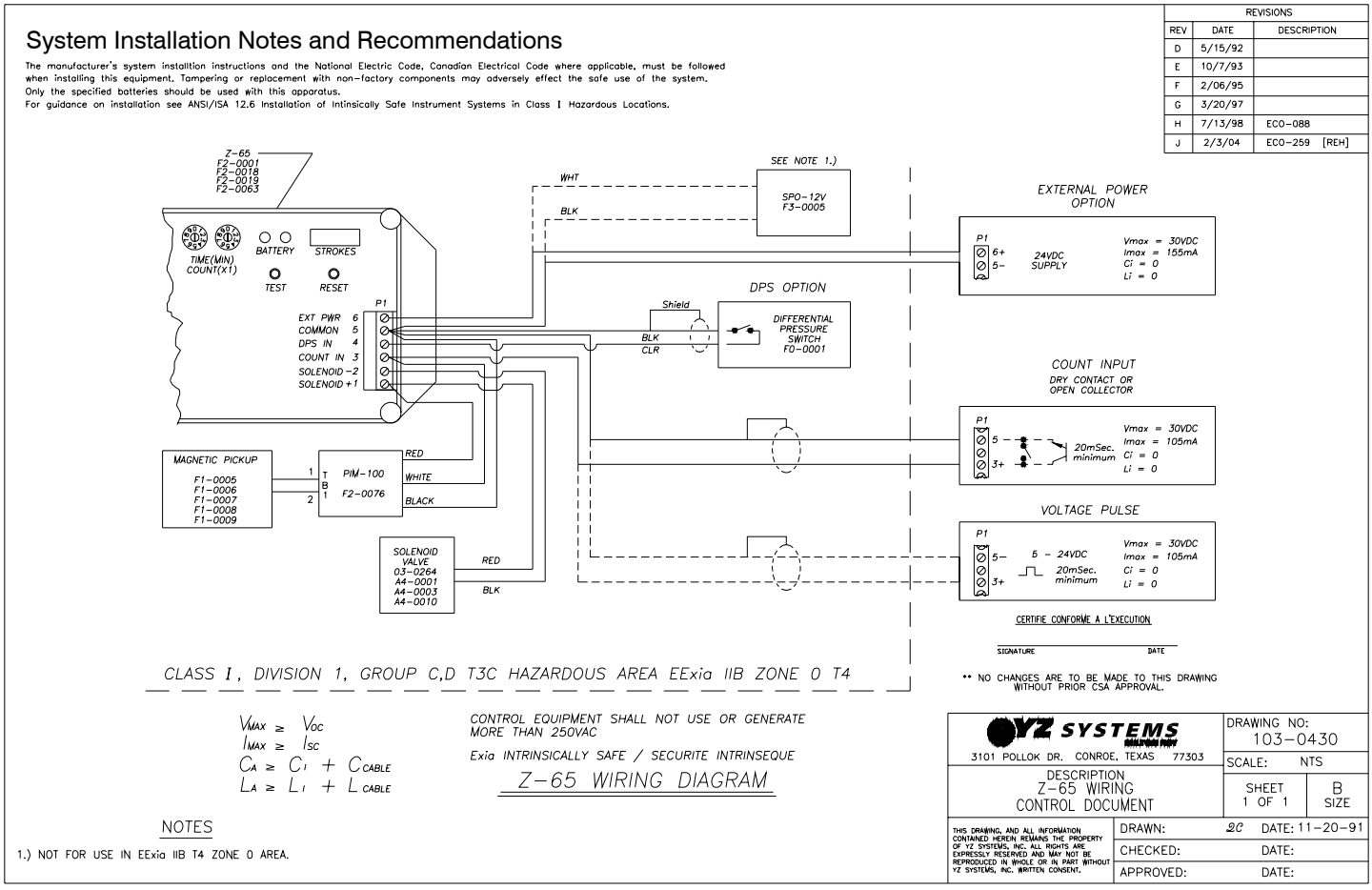


Diagram #8: DuraSite Portable Sample Vessel Instructions

Purpose: The DuraSite Portable Sample Vessel permits the user to remove a liquid or gas hydrocarbon sample from a pipeline or a sampling device. This is accomplished without changing the pressure of the product or exposing it to a contaminant fluid. If properly used and maintained the DuraSite will provide many years of safe, accurate and clean sampling.

Use: The DuraSite is a very safe device to use. As with any equipment dealing with flammable products, it is mandatory that a good, thorough operator training procedure be established prior to use.

Typical use of the cylinder would be as follows:

Step 1: (In The Lab) Connect a regulated inert gas supply to the pre-charge valve. The product valve should be open. By carefully controlling the pre-charge valve and the regulator, the cylinder can be slowly charged with pre-charge gas (NOTE: This should be done slowly to prevent slamming the piston down to the opposite end). The pressure on the pre-charge pressure gauge should be brought to a reading of 10-50 psi above the expected pressure of the product in the field. Close the pre-charge valve and disconnect the gas supply. Check the pre-charge valve, relief device, and the pre-charge pressure gauge for leaks. Any leaks should be stopped before continuing. The vessel should be placed in a padded carrying case and made ready for field use.

USE STEP 2 FOR COLLECTION OF SAMPLE VIA SPOT SAMPLE OR FROM COMPOSITE ACCUMULATOR VESSEL.

Step 2a: Connect the pre-charged sample vessel to the product supply (NOTE: the pre-charge pressure gauge reading should be greater than the product supply pressure reading. If not, repeat Step 1 above).

Step 2b: Once the vessel is connected to the product supply, it is necessary to vent a small amount of product prior to filling the vessel. This assures fresh product and removes any air or gas when dealing with liquids. This can be done by loosening the product purge valve a very small amount until the product is purged. After thorough purging, the product purge valve should be tightened.

Step 2c: The product pressure gauge reading should be 10-50 psi below the pre-charge pressure gauge reading. By carefully opening the pre-charge valve, the pressure becomes equalized. The pre-charge valve should be carefully controlled so as to not vent the pre-charge gas too fast. The pre-charge port should then be connected to a pipeline connection or relief valve, which will allow movement of the piston while maintaining pre-charge on the cylinder.

Step 2d: When the cylinder becomes a maximum of 80% full (see volume indicator), all valves should be closed. The product connection is slowly broken in order to vent any trapped product. After vessel removal, all connections should be checked for leaks and the pre-charge and product valve ports capped to prevent leakage.

Step 2e: The vessel should be labeled and placed back into the padded case and made ready for shipment.

USE STEP 3 FOR DIRECT CONNECTION TO SAMPLER.

Step 3a: Connect the sample discharge port to the sampler to the product inlet port to the DuraSite using 1/8" stainless steel tubing.

Step 3b: (Gas sampling) Connect the pre-charge port to the DuraSite to the pipeline for pre-charge pressure, or configured like the liquid sample application below. (Proceed to step 3d)

Step 3c: (Light sampling) Pre-charge the DuraSite as indicated in Step 1, then install a pressure relief valve to the pre-charge port and open the pre-charge valve on the DuraSite. (The pressure relief valve should have a relief pressure setting of approximately 100 psi above line pressure.)

Step 3d: Open the product inlet valve of the DuraSite and the purge valve on the sampler. Next open the purge valve on the product end of the DuraSite and allow product to purge all lines and connections out.

Step 3e: Close purge valve and begin sample cycle.

Step 3f: At the end of sample cycle, close product inlet valve on the DuraSite and remove the DuraSite. Pack the DuraSite in appropriate carrying case to meet D.O.T. guideline, with D.O.T. paperwork and transport to lab for analysis.

Step 4: (In The Lab) Prior to analysis, the product should be mixed. This is accomplished simply and efficiently by inverting the cylinder end-over-end, causing the mixing ball to fall through the product. Approximately 10-12 trips of the mixing ball through the product assures a homogenous solution.

Step 5: The regulated pre-charge gas should be reconnected to the pre-charge side of the cylinder. The pre-charge gas supply should remain open during analysis.

Step 6: Purging a small amount of product from the vessel removes unmixed product from the tee, relief device, gauge, etc. The unit can now be connected to a chromatograph and the product analyzed.

Step 7: After analyzing, the remainder of the product should be dumped and the vessel properly cleaned. Normal cleaning can be accomplished by rinsing the product end with a petroleum solvent and flushing with acetone. If a more thorough cleaning is required, the vessel should be disassembled.

WARNING: A portable sample vessel should never be filled to more than 80%. This allows a 20% pre-charge cushion to absorb thermal expansion of the product.

Shipping: Extreme care should be taken when preparing a vessel for shipment. Both valves should be capped to prevent possible leakage. The vessel should be placed in a snug-fitting, well-padded and durable case. All applicable DOT regulations should be adhered to.

DuraSite-9 Sample Vessel,

(3600 psi maximum working pressure)

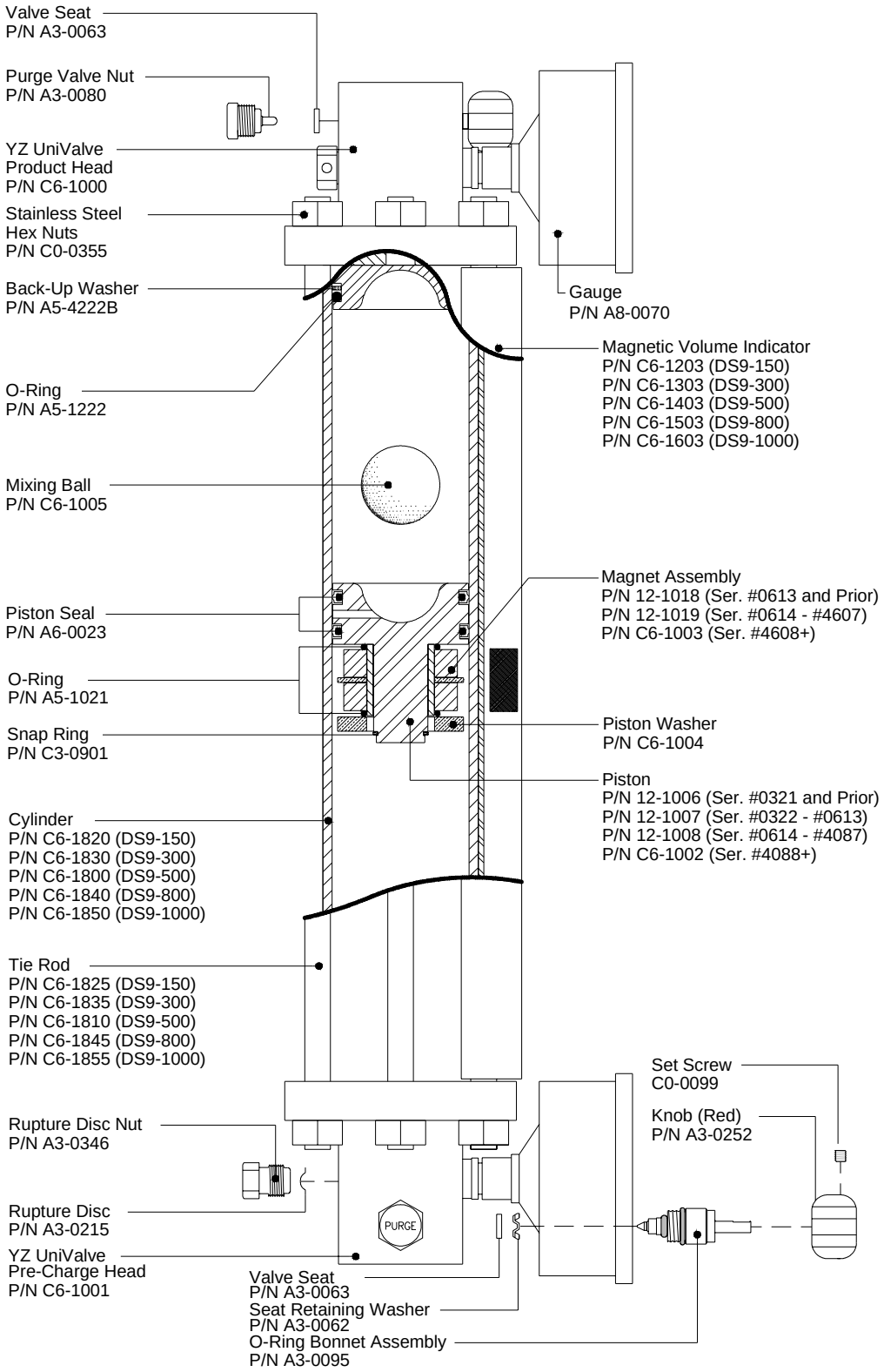


Diagram #9: About The PIM-100...

Introduction:

The PIM-100 User's Guide provides all of the information you will need to work with the Pulse Input Module.

For solutions to questions about the PIM-100, first look in this guide.

If you can't find the answer in your documentation, contact YZ Industries. For technical support call 800.344.5399.

If you call, you should also have this guide close at hand. Whether you call or write, please provide the following information:

• version number of this guide. For the version number of the guide, look at the first page of the guide.
• a description of what has happened and what you were doing when the problem occurred.

Operation Specifications:

Power Requirements:	14.5V from Z-65 battery pack 85 microamperes quiescent 110 microamperes Max.
Minimum Input Signal:	20mV peak to peak 300mH ≤ Inductance
Operating Temperature Range:	-40° to 140° F (-40° to 60° C)
Divider Capability:	1 to 524,287
Maximum Input Frequency:	3khz

Theory Of Operation:

The PIM-100 Pulse Input Module is a low power device designed to interface between a DynaPak Z-65 controller and a magnetic pickup input. The PIM-100 provides fixed width logic level output pulses used to drive the count input of a Z-65 controller at a rate determined by a user configurable divisor. The switch settable divisor, ranging from 1 to 524,287, divides the input pulses from a turbine flow meter by the cumulative number represented by the "ON" divisor switches. An input adjustment potentiometer is provided to allow adjusting the input sensitivity. Power is derived from the Z-65 battery pack.

Notes: