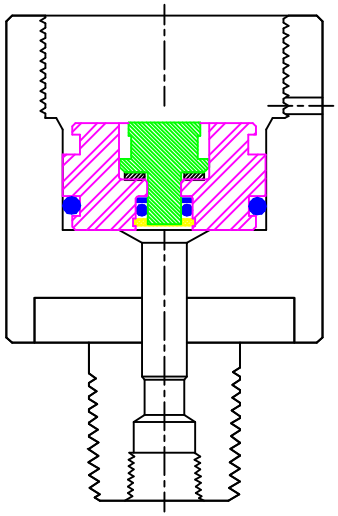
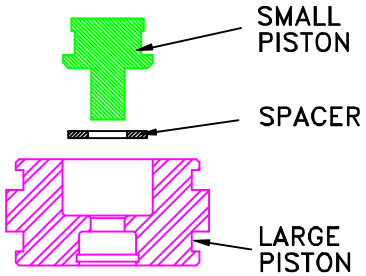
HLR PRESSURE SENSOR – PISTON ARRANGEMENT DETAIL

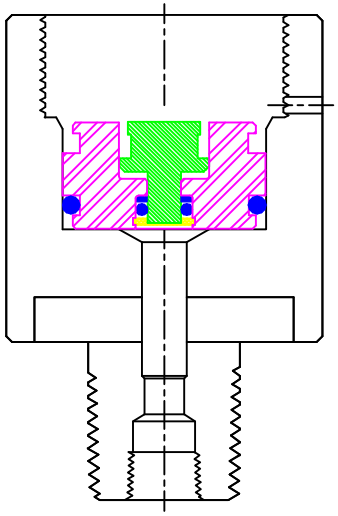
NOTE: ALL COMPONENTS SHOWN ARE PROVIDED IN EACH PRESSURE SENSOR ASSEMBLY



1 1/8" PISTON ARRANGEMENT DETAILS

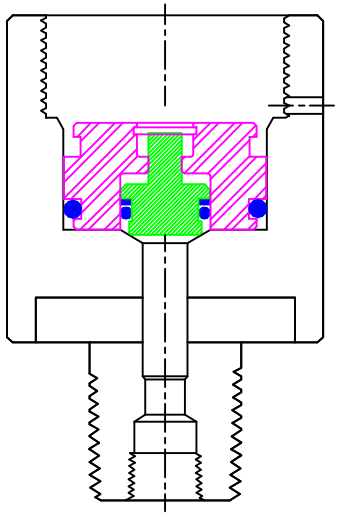
ADJUSTMENT RANGE: 10 TO 290 PSI





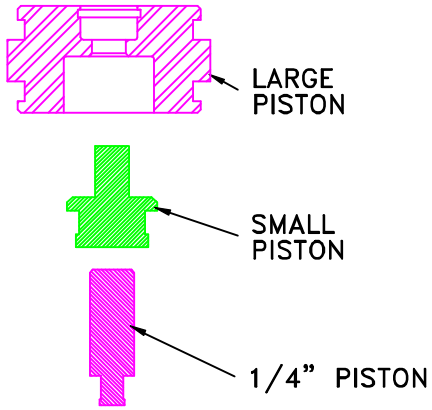
3/16" PISTON ARRANGEMENT DETAILS

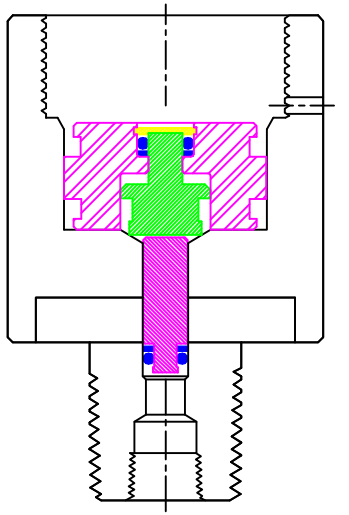
ADJUSTMENT RANGE: 5,900 TO 10,000 PSI



1/2" PISTON ARRANGEMENT DETAILS

ADJUSTMENT RANGE: 290 TO 1,440 PSI





1/4" PISTON ARRANGEMENT DETAILS

ADJUSTMENT RANGE: 1,440 TO 5,900 PSI

File: 23-92MSG 10-14-97

Typical Four (4) Piston Arrangement Detail

Assembly Drawings & Feature Descriptions

Each Pressure Sensor **has** a full compliment of **four (4) different piston** assemblies housed **within each unit**. **Our Pressure Sensor's patented Piston assemblies provide an excellent mechanical advantage.** ***No purchase or inventory storage of additional Pistons, Piston Housings and specific "matched set" Springs are required, to change from one Piston size (Arrangement) to another.*** **All of the components necessary (Pistons & Seals) to make the changes, are already located within the Pressure Sensor.**

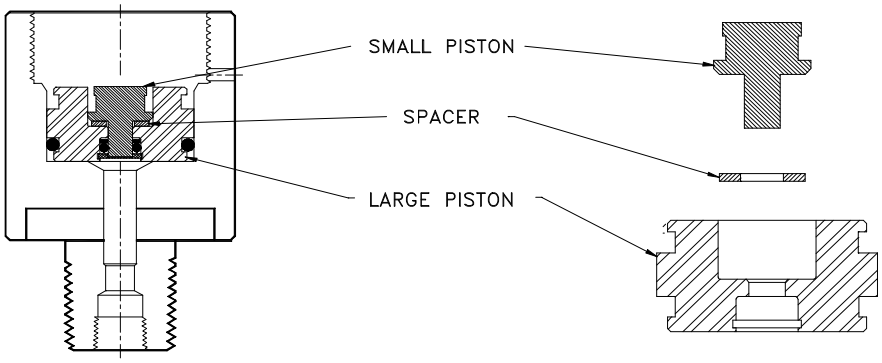
Each Piston Arrangement is identifiable by a specific size and pressure Adjustment Range. Detailed Piston Arrangement assembly drawings, corresponding Adjustment Range capabilities and feature descriptions are provided for each individual Piston Arrangement.

Note: A Storage Tube is located within the Spring's hollow center. This Tube provides an excellent place for safe keeping of the O-Rings and the Piston components which are not being utilized in the current (preassembled) Piston Arrangement.

1-1/8" PISTON ARRANGEMENT

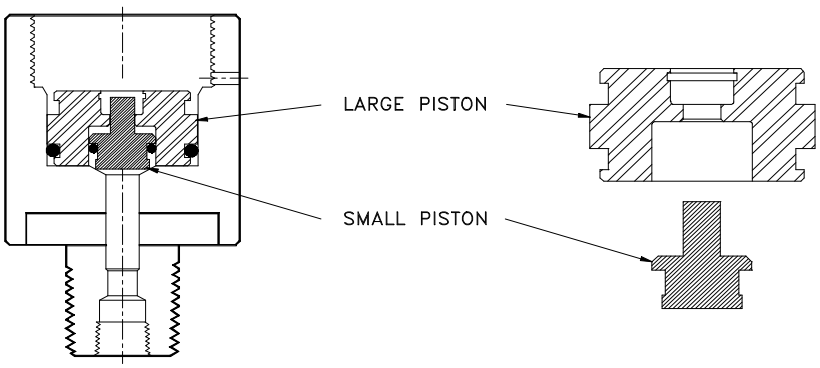
Pressure Adjustment Range: 10-290 PSI (.69-20 BAR).

The Piston's surface area (of this Piston Arrangement that is subjected to movement by the monitored pressure) is 1-1/8" in **diameter**. **Three basic components comprise the 1-1/8" Piston Arrangement.** These are the **Large Piston** (79702A), the **Small Piston** (79703A) and the **Spacer** (79705). The Spacer essentially "locks" the Small Piston and Large Piston together. This assembly will rise and fall in unison or function as single unit, as it is affected by monitored pressure. O-Ring seals are installed on both the Large and Small Piston's O-Ring grooves. The seals also engage the Piston Housing wall to prevent passage of monitored pressure beyond the inlet surface area of the Piston assembly.



1/2" PISTON ARRANGEMENT

Pressure Adjustment Range: 290-1440 PSI (20-99 Bar)

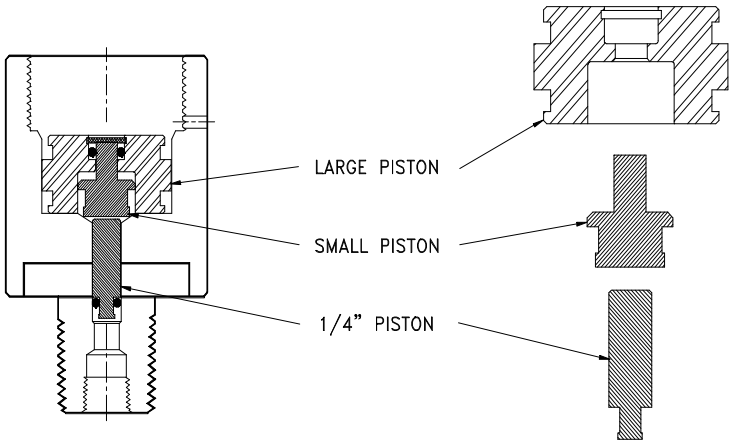


The Piston's surface area that is subjected to movement by the monitored pressure, is 1/2" in diameter. **Two basic components comprise the 1/2" Piston Arrangement.** These are the **Large Piston** (79702A) and the **Small Piston** (79703A).

The Small Piston's 1/2" diameter is oriented toward the Piston Housing's inlet connection. Monitored pressure will exert its force to affect or lift, only the Small Piston. The Large Piston (79702A) remains stationary. It functions as a guide within which, the Small Piston slides (moves). O-Ring seals are installed on both the Large and Small Pistons. The O-Ring seals also engage the Piston Housing wall to prevent passage of monitored pressure beyond the desired control area.

1/4" PISTON ARRANGEMENT

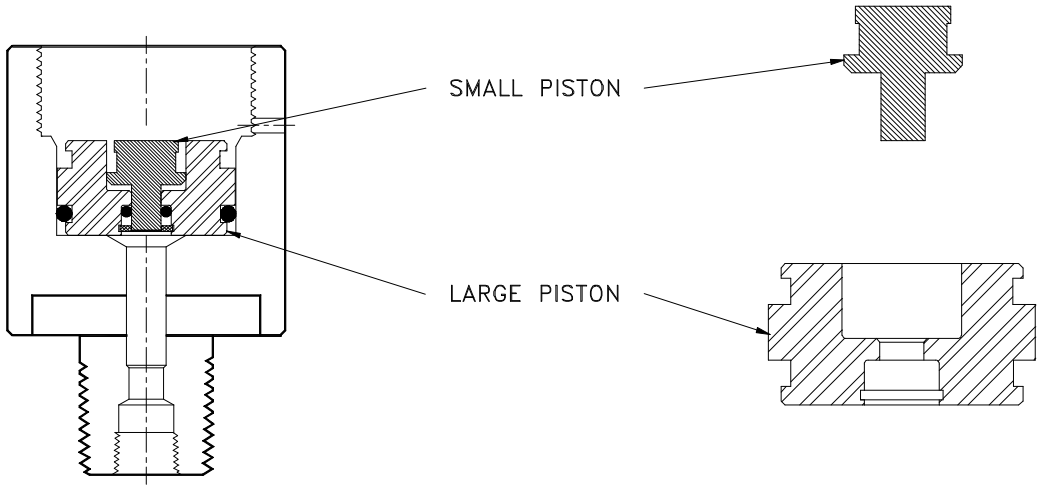
Pressure Adjustment Range: 1440-5900 PSI (99-407 Bar)



The surface area of the piston assembly subjected to incoming media pressure, is a 1/4" in diameter. A special bore is machined within the Piston Housing to accommodate the 1/4" Piston (79713). O-Ring seals on the 1/4" Piston engage the Piston Housing wall, thereby providing the necessary monitored pressure isolation. As monitored pressure is introduced at the inlet of the Piston Housing, it lifts both the 1/4" Piston and Small Piston together in unison. The Large Piston (79702) remains stationary, as the Small Piston moves within its' bore.

3/16" PISTON ARRANGEMENT

Pressure Adjustment Range: 5,900 - 10,000 PSI (406-690 BAR)



The Piston's surface area that is subjected to movement by the monitored pressure, is 3/16" in diameter. Two basic components comprise the 3/16" Piston Arrangement. These are the **Large Piston** (79702A) and the **Small Piston** (79703A).

The Small Piston's 3/16" diameter is oriented toward the Piston Housing's inlet connection. Monitored pressure will exert its force to affect only the Small Piston's 3/16" surface area. The Large Piston (79702A) remains stationary. It functions as a guide, within which monitored pressure will move the Small Piston only. O-Ring seals are installed on both the Large and Small Pistons. The O-Ring seals also engage the Piston Housing wall to prevent passage of monitored pressure beyond the desired control surface area.

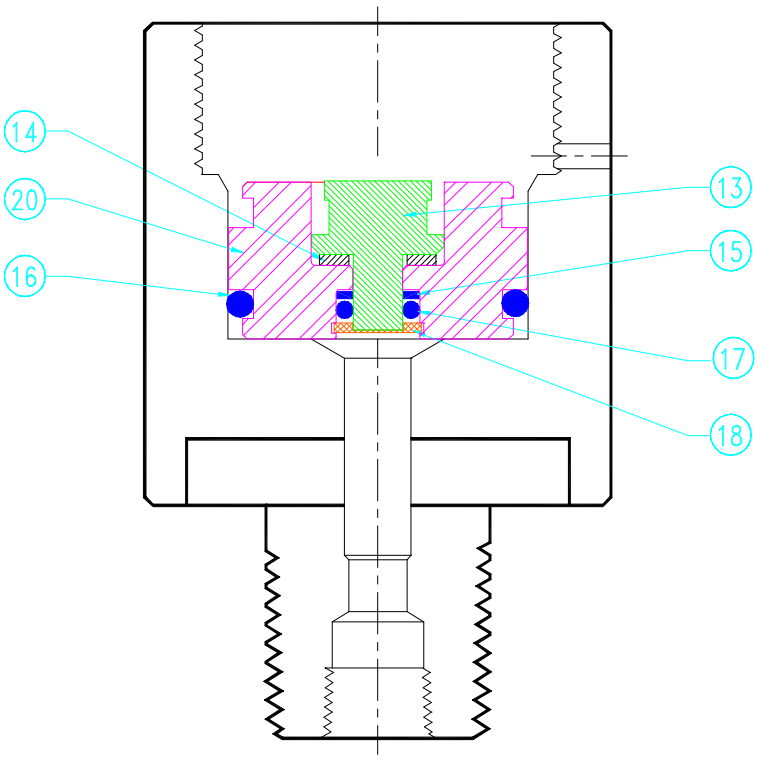
Note: *The 3/16" Piston Arrangement is similar to the 1-1/8" Piston Arrangement previously described. Its' exception is that the Spacer (79705) is placed within the Storage Tube. Removal of the Spacer allows free movement of the Small Piston only, as it is affected by the monitored pressure's exerted force.*

1-1/8" PISTON ARRANGEMENT

ENLARGED DETAIL DRAWING

HIGH/LOW PRESSURE SENSOR - HLR 7970 Series

For pressures from 10 to 290 PSI(.689 - 20 Bar)
with 79702MSG Piston and Viton Teflon Coated Seals



BILL OF MATERIAL

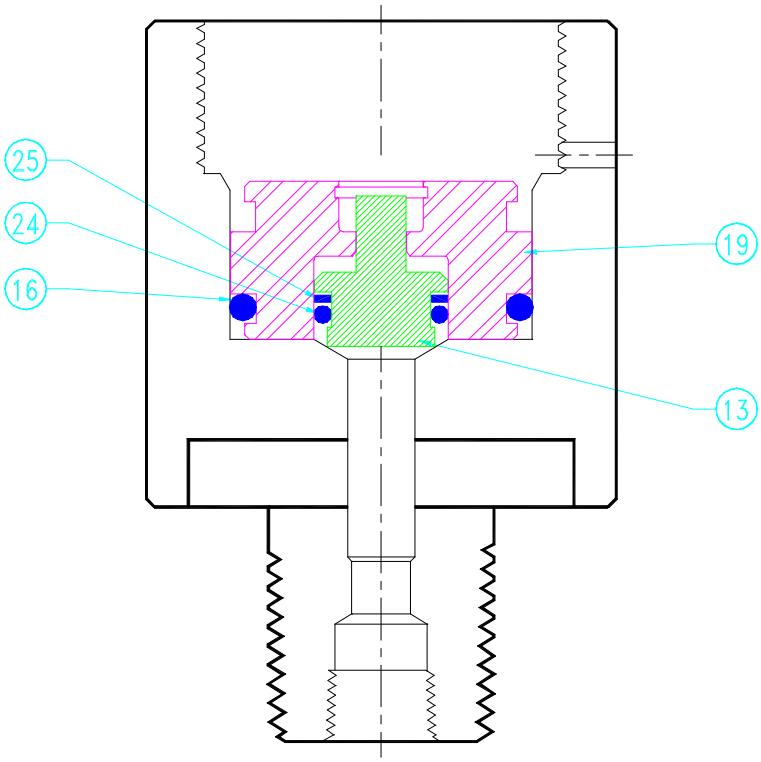
ITEM	PART NAME	PART NUMBER	MATERIAL
13.	Small Piston	79703A	316SS
14.	Spacer	79705	316SS
15.	Back Up Ring	AS-008VBU	Viton
16.	O-Ring	AS-119V75	Viton
17.	O-Ring	AS-008VTC95	Viton Teflon Coated
18.	Retainer Ring	.312IRR	316SS
19.	Large Piston	79702MSG	316SS

1/2" PISTON ARRANGEMENT

ENLARGED DETAIL DRAWING

HIGH/LOW PRESSURE SENSOR - HLR 7970 Series

For pressures from 290 to 1440 PSI (20 - 99.28 Bar)
with 79702MSG Piston and Viton Teflon Coated Seals



BILL OF MATERIAL

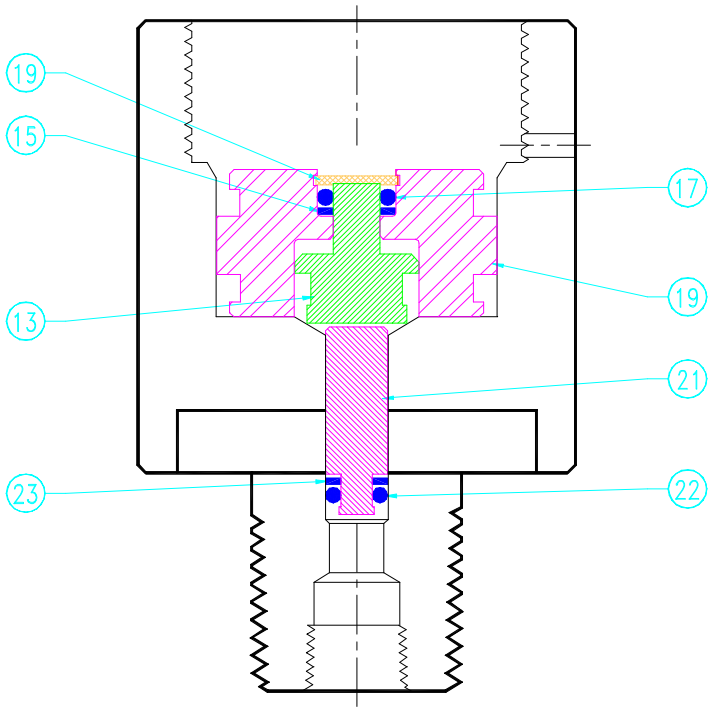
ITEM	PART NAME	PART NUMBER	MATERIAL
13.	Small Piston	79703A	316SS
16.	O-Ring	AS-119V75	Viton
19.	Large Piston	79702MSG	316SS
24.	O-Ring	AS-012VTC75	Viton Teflon Coated
25.	Back Up Ring	AS-012VBU	Viton

1/4" PISTON ARRANGEMENT

ENLARGED DETAIL DRAWING

HIGH/LOW PRESSURE SENSOR - HLR 7970 Series

For pressures from 1440 to 5900 PSI (99.28 - 406.8 Bar)
with 79702MSG Piston and Viton Teflon Coated Seals



BILL OF MATERIAL

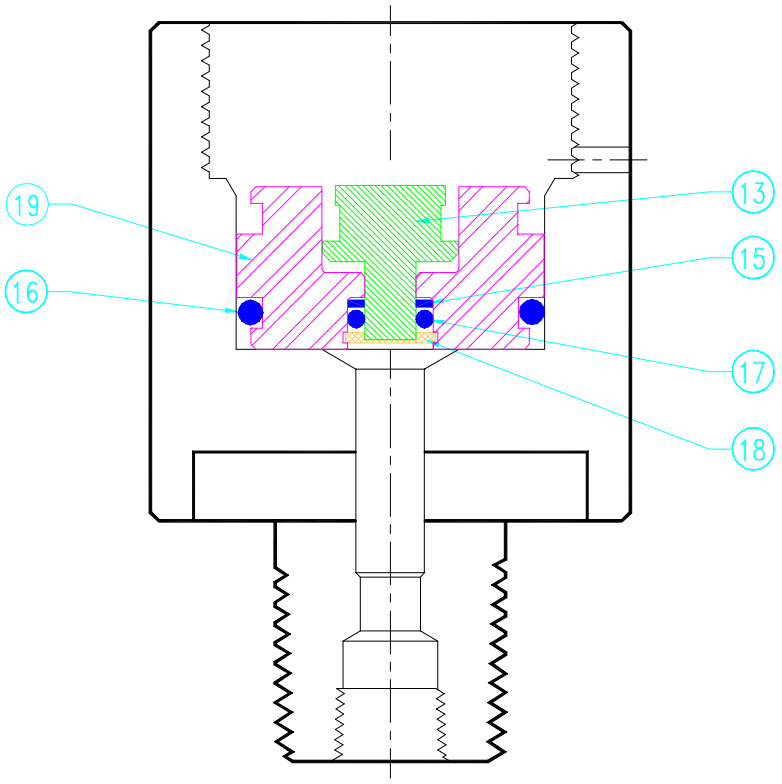
ITEM	PART NAME	PART NUMBER	MATERIAL
13.	Small Piston	79703A	316SS
15.	Back Up Ring	AS-008VBU	Viton
17.	O-Ring	AS-008VTC95	Viton Teflon Coated
18.	Retainer Ring	.312IRR	316SS
19.	Large Piston	79702MSG	316SS
21.	1/4" Piston	79713A	316SS
22.	O-Ring	AS-006VTC95	Viton Teflon Coated
23.	Back Up Ring	AS-006VBU	Viton

3/16" PISTON ARRANGEMENT

ENLARGED DETAIL DRAWING

HIGH/LOW PRESSURE SENSOR - HLR 7970 Series

For pressures from 5900 to 10,000 PSI (406.8 - 689.5 Bar)
with 7970MSG Piston and Viton Teflon Coated Seals



BILL OF MATERIAL

ITEM	PART NAME	PART NUMBER	MATERIAL
13.	Small Piston	79703A	316SS
15.	Back Up Ring	AS-008VBU	Viton
16.	O-Ring	AS-119V75	Viton
17.	O-Ring	AS-008VTC95	Viton Teflon Coated
18.	Retainer Ring	.312IRR	316SS
19.	Large Piston	79702MSG	316SS

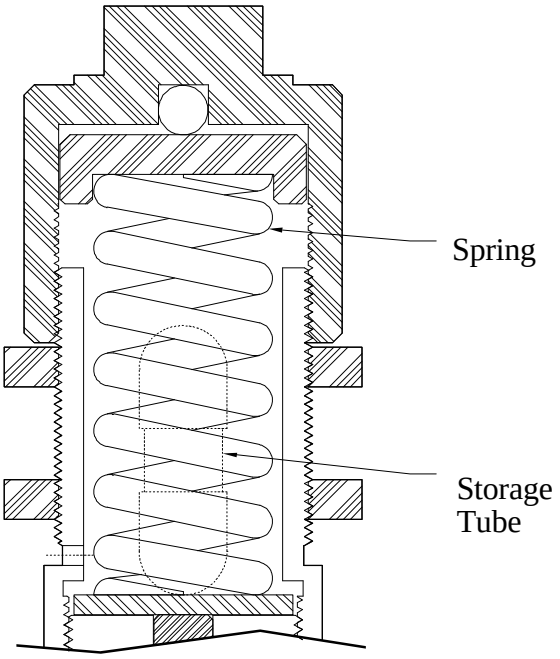
Pressure Sensor Storage Tube

Enclosed Items for all Standard Pressure Sensors

*HLR 7970 Models, Viton Seals & 79702MSG Piston

The Storage Tube is housed within the Spring's center and depicted below. It contains all of the components required to change from the original (HLR shop installed) Piston Arrangement to another as required by a new Pressure Setting. Enlarged Piston Arrangement detail drawings are essential to complete the conversion and installation of the new assembly. A listing of all the different Piston Arrangement components, provides the facility technicians with item and specific part numbers to aid with the conversion.

NOTE: The Storage Tube components should be replaced with a new set of items once the original parts are utilized.



Spring Housing Assembly

1-1/8" Piston Arrangement Storage Tube Items:

ITEM	PART NAME	PART NUMBER
21.	1/4" Piston	79713A
22.	O-Ring	AS-006V95
23.	Back Up Ring	AS-006VBU
24.	O-Ring	AS-012V75
25.	Back Up Ring	AS-012VBU

1/2" Piston Arrangement Storage Tube Items:

ITEM	PART NAME	PART NUMBER
14.	Spacer	79705
15.	Back Up Ring	AS-008VBU
17.	O-Ring	AS-008V95
18.	Retainer Ring	.312IRR
21.	1/4" Piston	79713A
22.	O-Ring	AS-006V95
23.	Back Up Ring	AS-006VBU

1/4" Piston Arrangement Storage Tube Items:

ITEM	PART NAME	PART NUMBER
14.	Spacer	79705
16.	O-Ring	AS-119V75
24.	O-Ring	AS-012V75
25.	Back Up Ring	AS-012VBU

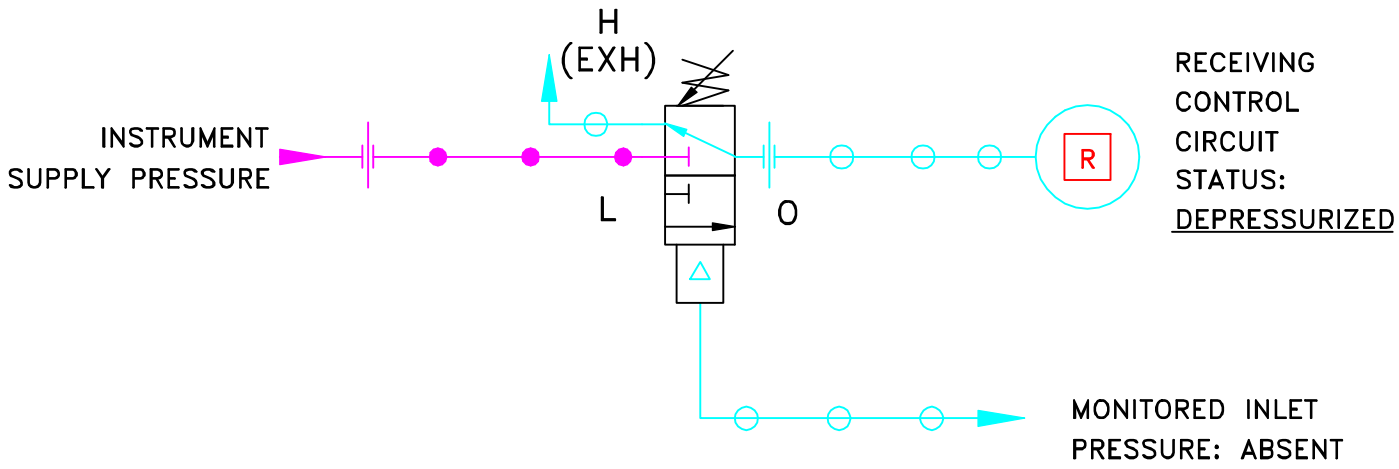
3/16" Piston Arrangement Storage Tube Items:

ITEM	PART NAME	PART NUMBER
14.	Spacer	79705
21.	1/4" Piston	79713A
22.	O-Ring	AS-006V95
23.	Back Up Ring	AS-006VBU
24.	O-Ring	AS-012V75
25.	Back Up Ring	AS-012VBU

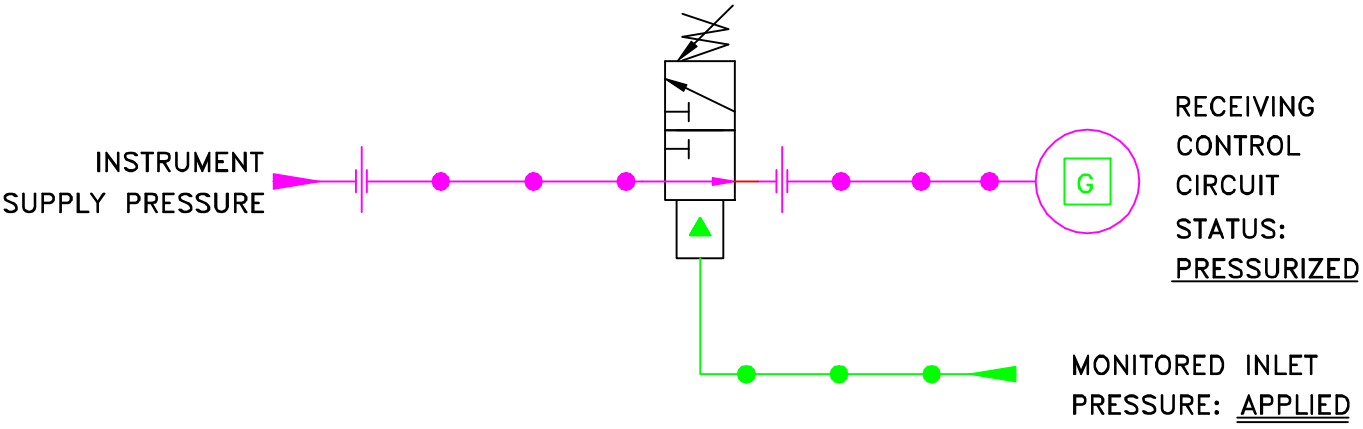
***NOTE:** Pressure Sensors (with all four Standard Piston Arrangements) manufactured after October 10, 1997, have a 79702MSG Piston.

INSTRUCTIONAL SCHEMATIC

ANSI Symbols
for
APPLICATION: PSL (DECREASING)
NORMALLY CLOSED 3 WAY "BLOCK & BLEED"
LOSS OF OUTPUT (INSTRUMENT PRESSURE) WHENEVER MONITORED
(SENSED) INLET PRESSURE DECREASES BELOW LOW PRESSURE SETTING.



STATUS: UNACTUATED (SHELF POSITION)
MONITORED PRESSURE HAS DECREASED
BELOW (OR IS ABSENT)
THE "LOW" PRESSURE SETTING.



STATUS: IN-SERVICE (ACTUATED), MONITORED PRESSURE IS
ABOVE THE LOW PRESSURE SETTING.
(NORMAL OPERATION)

File 7970PSL
PNEU

6-17-97