

CVS Controls Ltd is dedicated to providing you with the right Emergency Shut Down System to best suit your applications needs.

A wide array of individual products to add to your current configurations, or a complete package, is available.

Contact a CVS Controls representative to assist you in finding the best ESD Solution for your application.



## CVS Controls Ltd. Self Contained Hydraulic Pump

The CVS Self Contained Pump provides reliable emergency shutdown when an external power source or fuel gas is not available or not reliable. The unit uses clean hydraulic fluid. Used in conjunction with a linear or rotary spring return hydraulic operator, the CVS Self Contained Pump is a fail-safe system which is suitable for ball, plug or other quarter-turn valves as well as reverse-acting gate valves or other linear operated valves.

This pump has been proven reliable under the most demanding operating and environmental conditions. It is designed to be the foundation for a flexible sensing and control system, and has built-in temperature compensation and pressure relief.



Available in pressure configurations from 100-2250 psi.

## CVS Controls Ltd.

### Series D Scotch Yoke Actuator

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The CVS Series D Hydraulic Actuator uses a scotch yoke mechanism to convert linear piston motion to a 90 degree rotation. The CVS D Series actuator incorporates key materials for construction, such as aluminum drive case, fiber wound cylinders, and does not use brass or bronze components, which allow for use in sour gas applications.

The CVS D Series actuator is well suited for operating plug, ball, butterfly, dampers and other devices requiring 90° turn rotation. ( $\pm 4^\circ$  of additional angle adjustment)



CVS Series 35-SRM100



## CVS Controls Ltd

### Rack and Pinion Actuators

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Rack and Pinion Actuators are used to open or close ball or butterfly valves with 90° rotation. The actuators are activated by pneumatic or hydraulic fluid. The supply pressure pushes pistons together or apart causing the pinion shaft to rotate opening or closing the valve. The actuators can be double acting or spring return. Double acting requires supply pressure to open and close the actuator.

Single acting actuators require supply pressure to open the actuator. When the supply pressure is removed the springs push the pistons back to the original position. Single acting actuators can be fail open or fail closed. CVS actuators are available in sizes 52 to 700 with torques 50 in/lbs to 1089970 in/lbs.



CVS actuators are temperature rated from -50oC (-58oF) to 80oC (176oF) with standard seals made of low temperature nitrile. The actuators adhere to ISO 9001: ISO5211, DIN3337, and VDI/VDE 3845NAMUR standards. Each actuator has position indication with NAMUR drive slot for positioners and pneumatic connections. The output shaft and valve mounts meet NAMUR standards. Each actuator has stroke adjustment 0° to 90°, +/-4degrees. Direction of shaft rotation can be done easily by inverting the pistons.



## CVS Controls Ltd

### 7970 Pressure Pilot

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The CVS 7970 is a versatile sensor that can be programmed to detect and react to either increasing pressure or decreasing pressure with an adjustable range of 2 to 10,000 PSI (.138 to 689.5 bar). Temperature rating to -40°C .

When used within standard safety systems, a pressure sensor monitors a specific media or process pressure source for changes to the normal operating range. Loss of pressure within the control circuit will begin a shutdown sequence or trigger an alarm, and pressure sensors can also indirectly operate on/off flow control valves or pneumatic driven pumps.

The CVS 7970 is a two position, three-way pilot with universal ports (H, O, L), automatic reset (spring return) and pressure balance spool.



High Pressure Pilot



Low Pressure Pilot



High/Low Pilot Arrangement

## CVS Controls Ltd

### Limit Switches

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#### CVS-500

The CVS 500 Limit Switch is designed for valves and actuators in hazardous locations. The limit switch is CSA approved and is rated for EXdIIBT6 explosion proof, zone 1, class 1, division 1. Temperature rating -40°C.

This unit is equipped with standard NAMUR shaft and bracket for easy mounting to NAMUR actuators, as well as a secure waterproof case with multi angle top and side visual indicators.

Available switch configurations are 2 single pole single throw, through 4 single pole double throw. Optional proximity sensors are also available.

Standard CVS 500 Limit Switch is 2 Single Pole Double Throw(0.6A 125Vdc, 0.3A 250VDC, 16A 125/250VAC) and optional proximity sensors (P16AM-D3N: 8~30VDC, <=150mA or P&F sensors NJ2-V3-N: 8VDC, detected<=1mA, not detected>=3mA)



#### CVS 410-3W

The CVS 410-3W is designed for valves and actuators in hazardous locations.

The pneumatic solenoid valve is a two position three way valve and electrically actuated with a spring return spool.

The limit switch with pneumatic solenoid valve is CSA approved and is rated EXdIIBT6 explosion proof zone 1, class 1, division 1.

Temperature rating -40°C.

Includes a standard NAMUR shaft and bracket for easy mounting to NAMUR actuators, and a secure waterproof case with multi angle top and side visual indicator.

Uses two single pole, double throw mechanical switches rated (0.6A 125VDC, 0.3A 250VDC, 16A 125/250VAC).

Optional two proximity sensors for sensing switch location (8-30VDC, <=150mA or 8VDC, detected<=1mA, not detected>=3mA).

The solenoid coil is 24VDC (1.2W) or optional 48,220, 380VAC.

Solenoid valve is available as a 3/2 or 5/2 valve.



## CVS Controls Ltd

### 2000 Pressure Pilot

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The CVS 2000 Pressure Pilot is a High and Low Pressure sensing unit, used to monitor process or pipeline pressure in high/low pressure shut down installation. Operated by either hydraulic or pneumatic signal. By utilizing a spring loaded piston, the CVS 2000 Pressure Pilot is able to sense the pre-set pressure settings and activate a pilot valve.

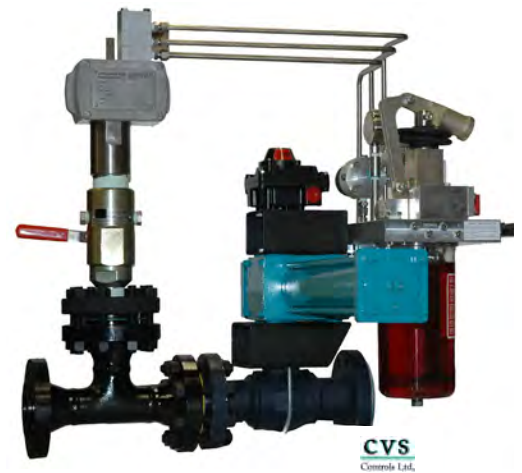
- Adjustable pressure range from 10 psi to 6000 psi (0.7 bar to 413 bar)
- Easy field adjustable set points
- Operating temperature range from -46°C to 100°C (-50°F to 212°F)
- Available in both manual and automatic reset configurations
- Ideal for use as a part of a complete CVS Shutdown System (ESD)
- Signal/Supply pressure up to 150 psig
- Standard 2" NPT threaded input connection (additional options available upon request)



### Spools

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CVS Controls Ltd. has a dedicated welding and fabrication shop located in Edmonton, Alberta. Custom designed valve spools can be provided to mount your ESD application to your specifications as required.



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### CVS Self Contained Hydraulic Pump

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#### Introduction

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This CVS Controls product manual includes instructions for the installation, adjustment, maintenance and parts ordering of the CVS Self Contained Pump.

All CVS Controls equipment should be installed, operated and maintained by qualified personnel. If you have any questions regarding this equipment, contact your CVS Controls representative.

#### Description

The CVS Self Contained Pump provides reliable emergency shutdown when an external power source or fuel gas is not available or not reliable. The unit uses clean hydraulic fluid.

Used in conjunction with a linear or rotary spring return hydraulic operator, the CVS Self Contained Pump is a fail-safe system which is suitable for ball, plug or other quarter-turn valves as well as reverse-acting gate valves or other linear operated valves.

This pump has been proven reliable under the most demanding operating and environmental conditions. It is designed to be the foundation for a flexible sensing and control system, and has built-in temperature compensation and pressure relief.



*Figure 1: CVS Self Contained Hydraulic Pump*

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#### Installation

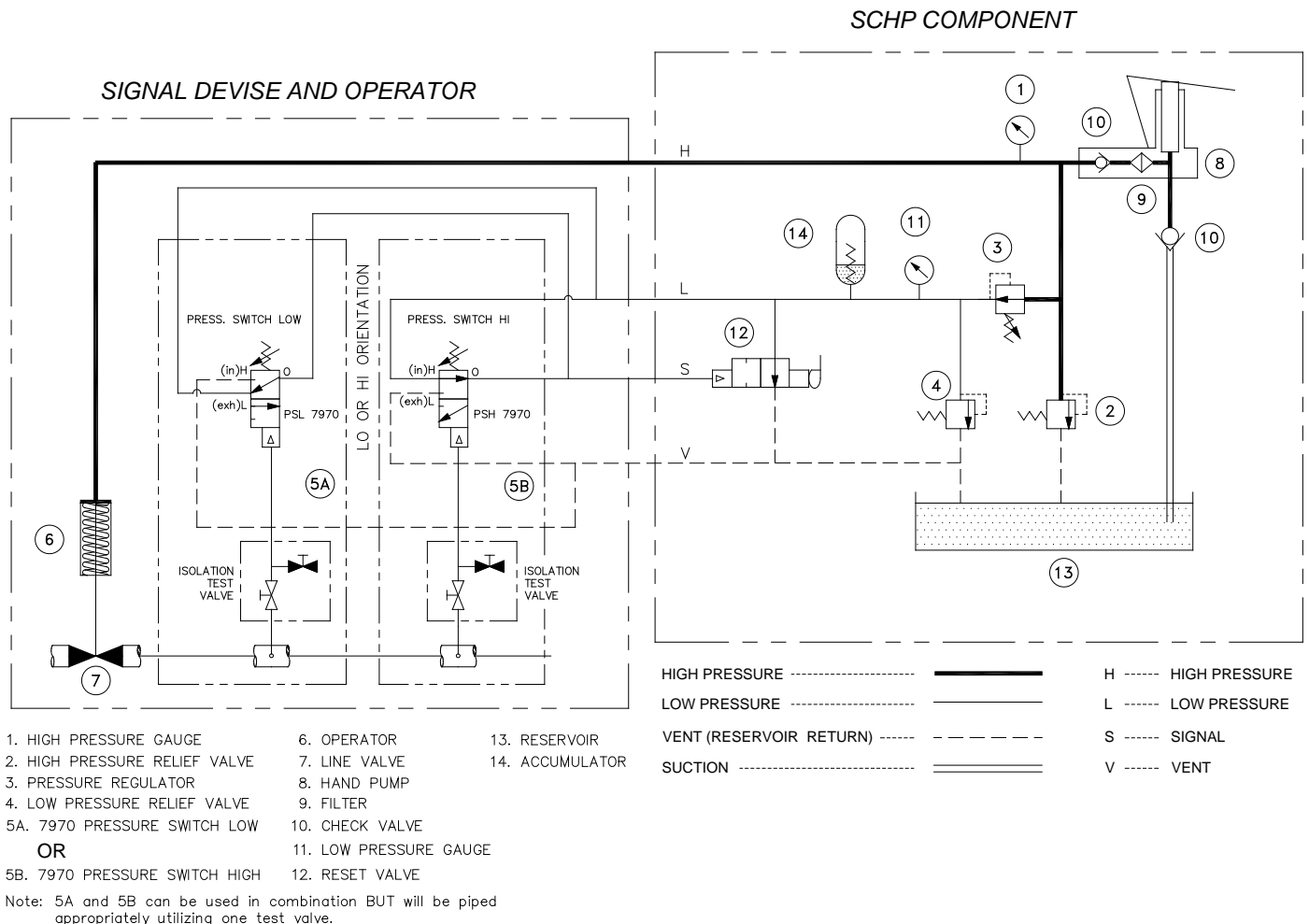
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Generally the module is installed on the operator by CVS Controls at the manufacturing facility, but can also be field installed by the user.

The module can be ordered in pressure configurations from 100 psi to 1500 psi.

The following connections are marked on the manifold assembly:

- H: High pressure hydraulic supply to operator
- L: Low pressure hydraulic supply for monitoring devices
- S: Low pressure hydraulic signal for RESET VALVE from monitoring or ESD devices
- V: Vent or return line to allow off-panel devices to return oil to the reservoir



**Figure 2: Module Schematic**

This example illustrates the operating method and options for sensing and control.

The module is shown with the line valve closed and reset valve unlatched.

To operate in this configuration:

1. Latch the reset valve (Key 12), then open the line valve (Key 7) by operating the hand pump (Key 8)
1. When the pilot (Key 5a or 5b) senses that pressure is within the set points the system enters automatic mode
1. The line valve (Key 7) will close if:
  1. the reset valve (Key 12) is switched manually, or
  2. the pilot (Key 5a or 5b) senses that the pressure is out of range

## Specifications

Components	High-pressure SCH Module	<ul style="list-style-type: none"><li>▪ HP-2-SC or BHP 3 Handpump</li><li>▪ 0-3000 PSI HP Gauge</li><li>▪ 0-200 PSI LP Gauge</li></ul>
	Low-pressure SCH Module	<ul style="list-style-type: none"><li>▪ HP-2-SC Handpump</li><li>▪ 0-200 PSI LP Gauge</li></ul>
Pressure Settings	High-pressure SCH Module	<ul style="list-style-type: none"><li>▪ HP Relief set at 2250 psi</li><li>▪ LP Relief set at 135 psi</li><li>▪ CVS SCR Regulator set at 80-100 psi<sup>1</sup></li></ul>
	Low-pressure SCH Module	LP Relief set at 135 psi
Valves	<ul style="list-style-type: none"><li>▪ Pilot to close valve</li><li>▪ Reset valve</li><li>▪ Toggle valve</li><li>▪ Manual pilot valve (requires 40-60 psi on signal port to sustain auto mode)</li></ul>	
Optional Solenoid Valve	Voltage as specified by user <ul style="list-style-type: none"><li>▪ 24 VDC</li><li>▪ 125 VDC</li><li>▪ 120VAC with MAWP 150 psi</li></ul>	
Valve Operator	Refer to appropriate manual for specifications	
Reservoir	Low temperature, high impact resin standard (Lexan) Cast aluminum optional.	
Other Components	High/low pressure pilot upper block is connected to the self contained hydraulic module with an operating pressure of 60 to 130 psi. Process sensing pressure MAWP depends on the manufacturer.	
1. Set to 90 psi at point of manufacturing		

## Installation continued

Refer to Figure 2 for connections, which are also tagged at the factory. If requested, an optional Solenoid valve may have been installed and tubed at the factory and is ready for electrical connection. A metal or plastic plug may have been installed in the breather/fill port of the reservoir. If that is the case, remove the plug and replace with the breather provided in the bag attached to the unit.

Hydraulic fluid used is Esso Univas J13 unless an alternate is specifically requested.

## Operation

### Manual Mode (Start Up or Reset)

- Lift the toggle on the manual pilot valve and latch in the "Up" position. See Figure 3 for "Manual Reset" position.
- Operate hand pump to open/close line until system is pressurized.
- Stop pumping when high pressure gauge reading is 10% above the minimum value required to hold the valve in position.

#### Note

**System will automatically reset at set pressure.**

#### Note

**To start up when the system is not completely connected, plug "L" Low Pressure to prevent fluid flow off the panel. Refer to operation instructions above.**

### Automatic Mode (To Run)

- Lower the toggle on the manual pilot valve. See Figure 3 for "Auto/Run" position. The toggle should automatically go to "Run".
- When the signal device(s) is satisfied, the unit will be in automatic mode. The optional Solenoid valve is returned to normal operating condition (either energized or de-energized).

## Shutdown

If the pilot detects pressures outside of the set points, (or if there is an applied or removed electrical signal to the optional Solenoid valve), the pilot removes the signal to the manual pilot valve. The manual pilot valve then switches which allows the spring in the operator to stroke the line valve to the failsafe position.

The pilot can also be shutdown manually by pushing the toggle.

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## Maintenance

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### Note:

**Regular maintenance should be performed each fall, or as required. CVS Controls recommends the use of protective clothing, gloves and eyewear when performing any installation or maintenance.**

1. Empty fluid reservoir of any accumulated moisture.
2. Check filter element(s) and clean and/or replace as necessary.
3. Check set points on pressure relief valve(s) and reset values if required.
4. If possible, check operation and calibration of pressure pilot or optional Solenoid.
5. Top up hydraulic fluid. Be sure to use compatible fluid.

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## Troubleshooting

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### Note

**As shown in Figure 2, the high-pressure side of the system supplies the low-pressure regulated side, therefore any leakage on the low side will cause significant changes in high-pressure gauge values.**

Without cycling the actuator, but with the pressurized removal of the reservoir and off panel device, vent/return lines will assist in tracing leakage. To trace leakage:

1. Disconnect the vent line from the pilot/solenoid vent port. This isolates it from the SCH module and allows for checking oil leakage throughout the device.

### Note

**This procedure also checks o-ring seals of poppet/spool and spool/sleeve in operating positions.**

2. Remove reservoir from the module and check for oil leakage of reliefs and reset valve under operating conditions.

3. Remove the filter plug, spring and filter in hand pump sub-plate to observe backside of HP discharge. Check for leakage across and around it while applying high pressure.
4. Remove fitting and tubing or plug from the second vent port of the module. Check for oil leakage that may be caused by manifold porosity between low-pressure (LP) channel and vent (V) channel.
5. Remove operator inspection cover or plate, and/or tubing from the cylinder plate to check for oil leakage across the piston seal and the piston centre o-ring.

In the case of pumping problems, access the pump suction valve by removing the pump assembly from the sub-plate. Pumping difficulties are usually caused by a dirty filter element, contaminated oil (with water or methanol), or using incorrect fluid in the unit.

When the unit fails to regulate it is noticeable by a low pressure gauge reading of 130 psi after two strokes. Service the regulator according to the appropriate maintenance manual.

### Note

**Before removing or disassembling any components on the manifold, depressurize the system.**

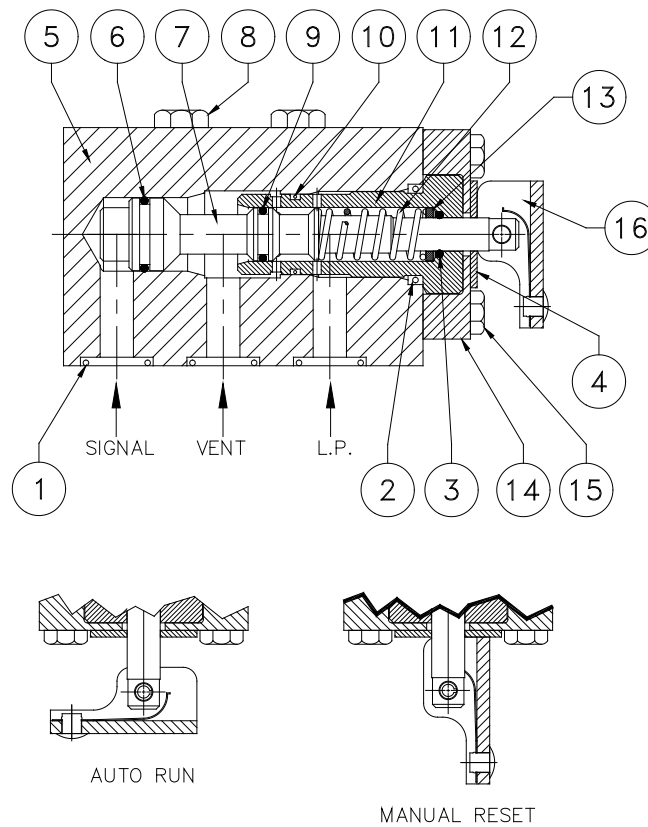
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## Parts Ordering

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All pertinent information regarding the CVS Self Contained Pump is stamped on the manifold assembly. Please refer to this information when corresponding with CVS Controls regarding parts or service.





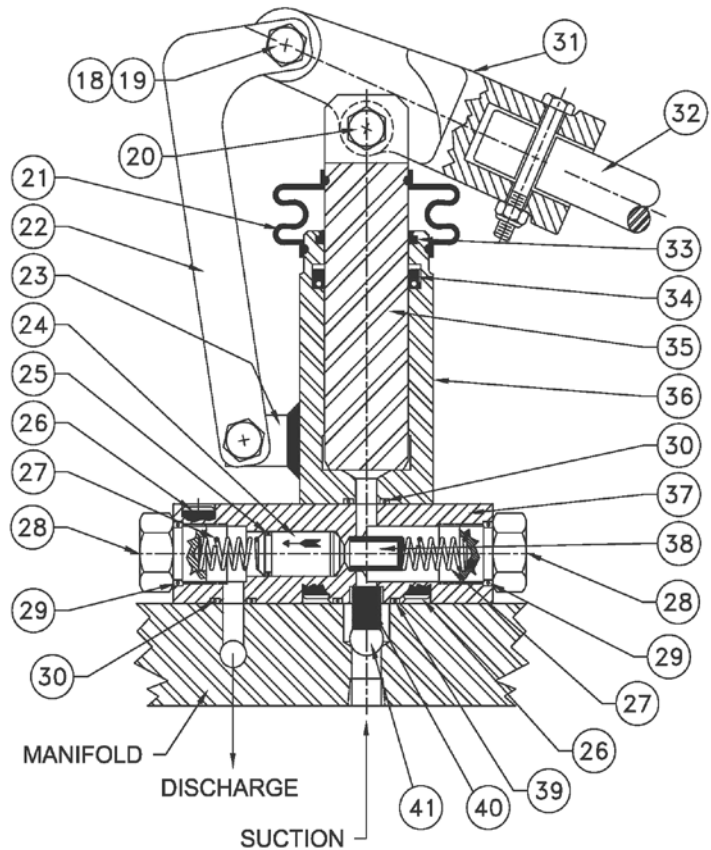
**Figure 3: Reset Valve**

## Parts List

Key No.	Description	Material	Part Number	Qty
1	O-Ring, Reset Valve	Nitrile	Seal Kit	3*
2	O-Ring, Sleeve Head	Nitrile	Seal Kit	1*
3	O-Ring, Sleeve Stem	Nitrile	Seal Kit	1*
4	Washer Toggle	Nylon	Seal Kit	1*
5	Body, Reset Valve	AL 6061-T6	CVSSCHARV001	1
6	O-Ring, Spool Piston	Nitrile	Seal Kit	1*
7	Spool, Reset Valve	AL 6061-T6	CVSSCHARV003	1
8	Capscrew, Reset Valve	SS 304	Bolt Kit	3
9	O-Ring, Spool	Nitrile	Seal Kit	1*
10	O-Ring, Sleeve	Nitrile	Seal Kit	1*
11	Sleeve, Reset Valve	Teflon	CVSSCHARV007	1
12	Spring, Reset Valve	SS 302	CVSSCHARV005	1
13	Washer, Spring	AL 6061-T6	CVSSCHARV006	1
14	Sleeve Retainer	AL 6061-T6	CVSSCHARV002	1
15	Capscrew, Sleeve Retainer	SS	Bolt Kit	2
16	Toggle Assembly	AL 6061-T6 / SS 3001	CVSSCHARV008	1

1. \* Recommended Spare Part. Included in Seal Kit (CVS SCHA Seal Kit)

**Figure 4. Hand Pump**



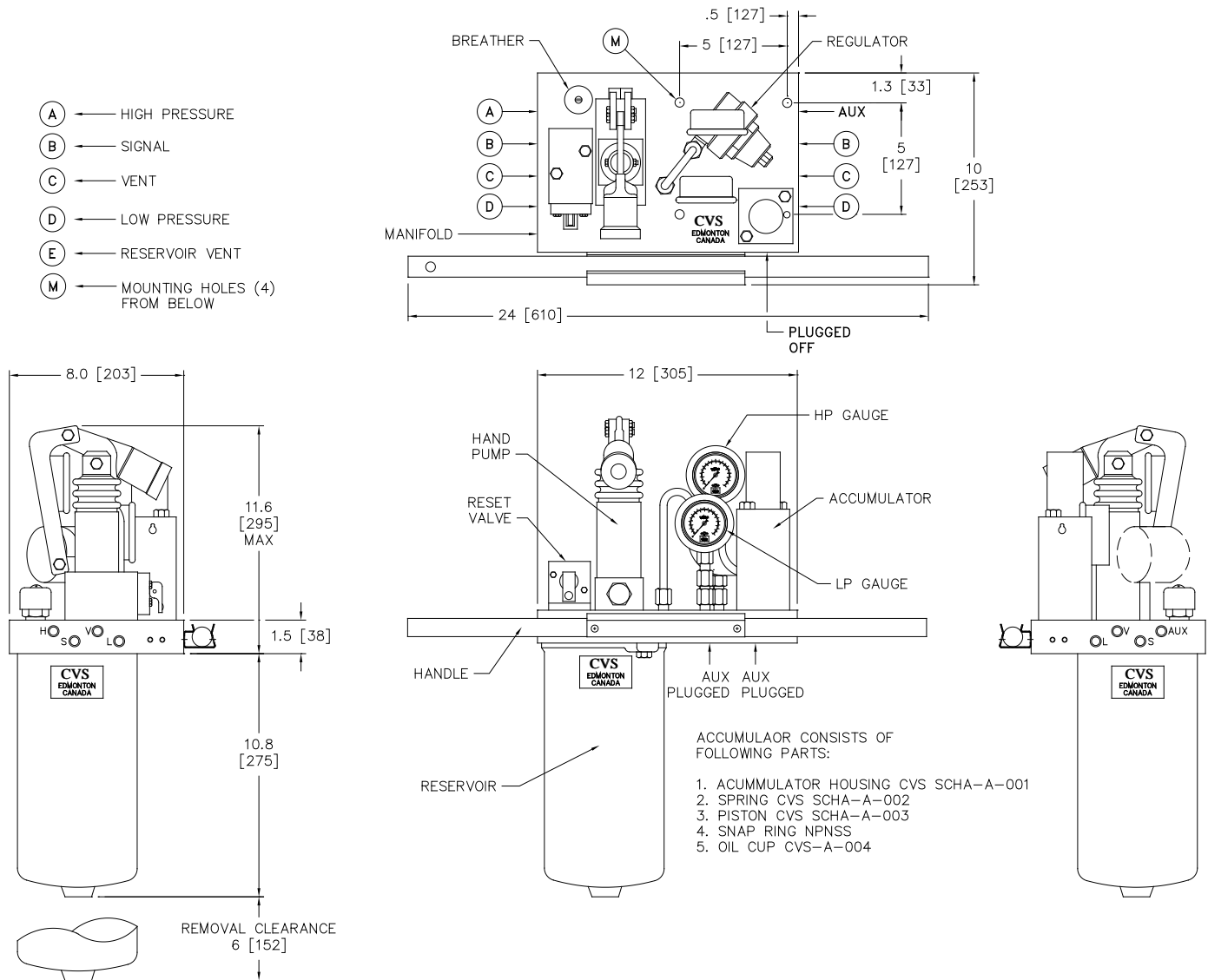
## Parts List

Key No.	Description	Material	Part Number	Qty
18	Locknut	HEXN ZN PL	Bolt Kit	3
19	Pin, Connecting Link	HXHC GR 5 ZN PL	Bolt Kit	2
20	Pin, Ram	HXHC GR 5 ZN PL	Bolt Kit	1
21	Boot		CVS SCHA-PA-007	1
22	Connecting Link - SCHA	AISI C1020 ZN PL	CVSSCHAPA003	2
23	Pivot - Series SCHA	AISI C1020 ZN PL	CVSSCHAPA001A	1
24	Cartridge Insert Check Valve	CS/Nitrile	CVSSCHA908029	1
25	O-Ring, Check Valve	Nitrile	Seal Kit	1*
26	Socket Head Screw	HXSC GR 8 ZN PL	Bolt Kit	4
27	SCHA Spring	SS 302	CVSSCHA908026	2
28	Plug - Series SCHA	AL 7075-T651	CVSSCHAPA004	2
29	O-Ring, End Plug	Nitrile	Seal Kit	2*
30	O-Ring, Body	Nitrile	Seal Kit	2*
31	Lever - CVS SCHA	D.I. 65-45-12 PL	CVSSCHAPA005	1
32	Lever Handle	ASTM A53-B ZN PL	CVSSCHA003	1
33	Wiper	Urethane	Seal Kit	1*
34	Rod Polypak	Urethane/Nitrile	Seal Kit	1*
35	Ram - Series SCHA	AISI C1045 CH PL	CVSSCHAPA002	1
36	Body - Series SCHA	AISI C1020 ZN PL	CVSSCHAPA001	1
37	Base - Series SCHA	AL 6061-T6	CVSSCHAPA006	1
38	90 Micron Sintered Filter Element	SS 316	CVS908025	1
39	O-Ring, Suction Port	Nitrile	Seal Kit	1*
40	SCHA Suction Port Spring	AL 7075-T651	CVSSCHA908023	1
41	½" SST Ball, Suction Port	SS 302	CVSA0053	1
	Seal Kit (O-Ring Kit) (Includes Keys 1,2,3,4,6,9,10,24, 27, 29, 32, 33, 38)		CVSSCHA Seal Kit	
	Bolt Kit (Includes Keys 8,15,18, 19, 20, 26)		CVSSCHA-B/N	

\* Recommended Spare Part, Included in Seal Kit (CVS SCHA Seal Kit)

**Figure 5: Self Contained Hydraulic Pump Assembly**

CVS-BF68.5



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