

# ***HALE***

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09/01/95

## ***Model SPV***

### ***Semi-Automatic Priming Valve***

#### **INSTALLATION AND MAINTENANCE MANUAL**

All Hale products are quality components: ruggedly designed, accurately machined, precision inspected, carefully assembled and thoroughly tested. In order to maintain the high quality of your unit, and to keep it in a ready condition, it is important to follow the instructions on care and operation. Proper use and good preventive maintenance will lengthen the life of your unit. ALWAYS INCLUDE THE UNIT SERIAL NUMBER IN CORRESPONDENCE.

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### NOTE TO SYSTEM INSTALLER

**IMPORTANT:** Please provide two copies of the Hale SPV manual to the end user of the equipment. For additional manuals, contact Hale Products, Inc at (610) 825-6300. Ask for Manual P/N 029-0020-33-0.



# 1 SAFETY

**IMPORTANT NOTICE:** Before attempting installation and maintenance of the Hale SPV read and follow all safety precautions listed below. The warnings and cautions listed are necessary for the safe installation or maintenance of the Hale SPV. When developing departmental apparatus maintenance procedures make sure the warnings and cautions are incorporated as written.

**WARNING:** Parts under spring tension can become projectiles and cause serious injury. When removing or installing these parts make sure they are restrained and spring tension is released slowly.

**WARNING:** Disconnect or turn-off master battery switch prior to service of the Hale SPV electrical components. Make sure there is no power at the primer solenoid before starting service procedures.

**WARNING:** Any electrical system has the potential to cause sparks during installation, service or repair. Take care to eliminate explosive or hazardous environments during installation, service or repair.

**WARNING:** Check all hoses for weak or worn conditions after each use. Ensure that all connections and fittings are tight and secure.

**WARNING:** Use only pipe, hose, and fittings from the priming pump vacuum connection to the Hale SPV vacuum connection rated for 29 in (737 mm) Hg vacuum.

**CAUTION:** Make sure the Hale SPV is located higher than the pump body allowing water to drain from the vacuum hose.

## 2 DESCRIPTION

The Hale Semi-Automatic Priming Valve (Hale SPV) (shown in figure 1) is a diaphragm operated type valve that opens using the vacuum generated by the priming pump. The Hale SPV mounts directly to the priming connection of a Hale midship pump. Additionally, a universal adapter that bolts to an installer supplied bracket is available to permit use of the Hale SPV on booster and volute type pumps. The installer must also supply hose connections from the adapter to the pump priming connection. The Hale SPV operates from the vacuum generated by the priming pump when the momentary contact push-button located on the pump operator panel is depressed. The Hale SPV conforms to NFPA requirements for priming time and hydrostatic test when bolted to Hale midship type pumps. Each valve is factory tested to 24 in (610 mm) hg vacuum and 600 PSIG (41 BAR).

When used on a midship fire pump, the valve mounts to the pump body with two studs and nuts, standard strainer and seal ring. Mounted on the midship fire pump, in close proximity to the priming pump, only a short length of  $\frac{3}{4}$  inch

(19 mm) ID vacuum hose connects the Hale SPV to the priming pump, eliminating potential leak points in the priming hose. The short length of hose also reduces the volume that the priming pump must evacuate allowing faster priming time and longer primer life. The priming pump motor operates by a sealed momentary contact push-button located on the pump operator panel of the apparatus. There are NO hose connections at the pump operator panel thus saving valuable space.

Depressing and holding the PRIME push-button will energize the priming pump motor creating a vacuum in the  $\frac{3}{4}$  inch (19 mm) ID hose. As sufficient vacuum is created the diaphragm will depress the spring allowing the priming valve to open. Once the Hale SPV opens, the priming pump creates a vacuum in the main pump body, priming the main pump. Once primed, as indicated by water discharging to the ground from the priming pump outlet, the push-button is released. Once push-button is released, the priming pump stops running allowing the Hale SPV to close for normal pump operation.

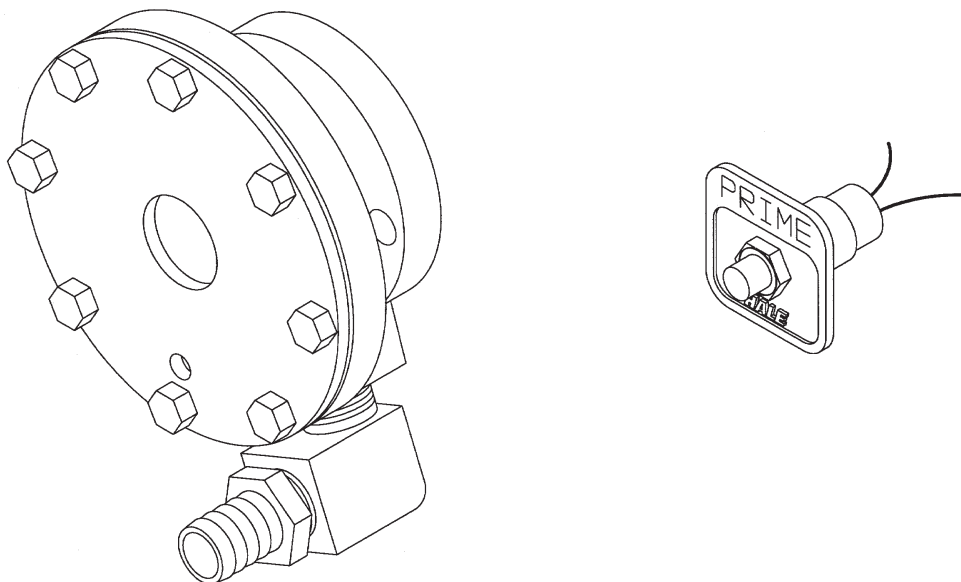


Figure 1. Hale SPV Valve and Push-Button Switch Assembly

The Hale SPV is available from the factory in four different configurations. A description of the different configurations follows.

**Hale SPV Retrofit kit:** Kit contains the components necessary for installing the Hale SPV on a midship fire pump with Hale PVG installed. The kit contains a Hale SPV Valve assembly, Panel Placard, Push-button Switch and Installation Manual.

**Hale SPV Universal Mount Installation Kit:** Kit contains the components necessary for installing the Hale SPV on a volute type or booster pump. The kit contains a Hale SPV Valve assembly, Universal Mounting Adapter, Panel Placard, Push-button Switch and Installation Manual.

**Hale SPV Mounted on Midship Pump:** This available option on new midship fire pumps has the Hale SPV mounted to the priming flange connection on the midship pump body. Components that are included with this option and shipped with the midship pump are the Push-button Switch, Panel Placard and Installation Manual. When completing the apparatus installation of the Hale SPV with this option the priming pump must be mounted on the apparatus and vacuum hose connected in addition to the push-button switch and panel placard being installed on the operator panel.

**Hale SPV and Primer Mounted on Midship Pump:** This available option on new midship fire pumps has the Hale SPV mounted to the priming flange connection on the midship pump body and the priming pump mounted to the pump gearbox. When this option is ordered the vacuum hose is connected from the Hale SPV to the priming pump. Components that are included with this option and shipped with the midship pump are the Push-button Switch, Panel Placard and Installation Manual. When completing the apparatus installation of the Hale SPV with this option the push-button switch and panel placard must be installed on the operator panel.

# 3 INSTALLATION

When ordered as an option on a new midship fire pump the Hale SPV valve assembly is already attached to the pump body with the vacuum hose connected to the priming pump when the primer is ordered mounted to the gearbox. All that remains after the midship pump is mounted on the apparatus frame is to install the panel placard and push-button on the pump operator panel and make the electrical connections from the switch to the battery and priming pump solenoid. If the midship pump was ordered with the primer shipped loose then the primer must be attached to the apparatus and priming hose must be attached to the Hale SPV hose connection. Figure 2 shows the relative location of components of the Hale SPV.

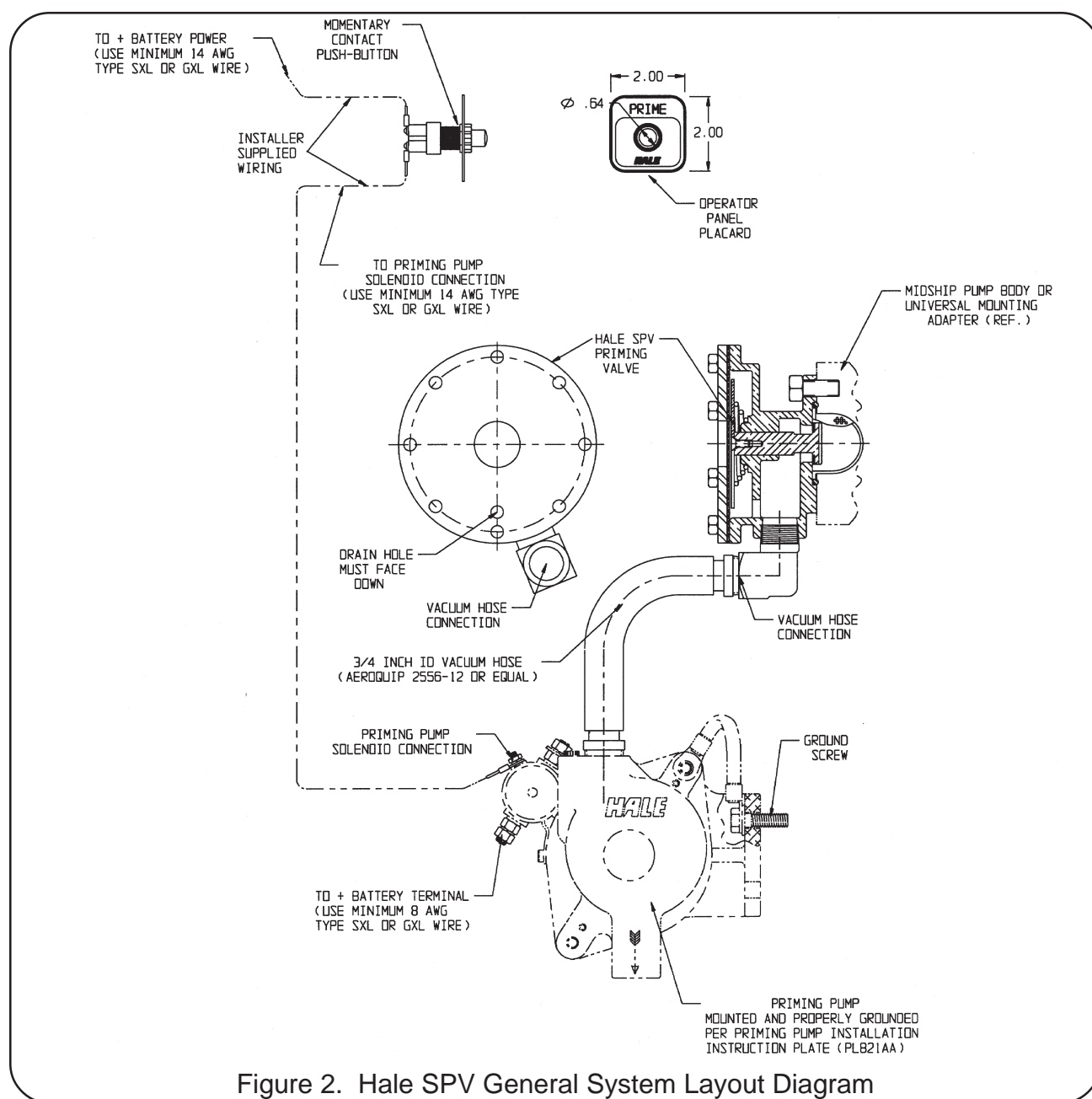


Figure 2. Hale SPV General System Layout Diagram



### Panel Placard and Push-Button Switch Installation:

The following procedures shall be used to install the panel placard and push-button switch.

**WARNING:** Disconnect or turn-off master battery switch prior to service of the Hale SPV electrical components. Make sure there is no power at the primer solenoid before starting service procedures.

**WARNING:** Any electrical system has the potential to cause sparks during installation, service or repair. Take care to eliminate explosive or hazardous environments during installation, service or repair.

1. Carefully locate the position of the push-button switch on the operator panel.
2. Drill or punch a 0.64 inch (16 mm) diameter hole in the panel.
3. Remove the push-button switch from the packaging and install the locknut on the mounting neck.
4. Referring to figure 3, Insert the push-button switch through the 0.64 inch (16 mm) diameter hole from the back of the operator panel.
5. Place PRIME placard over exposed end of push-button switch on outside of operator panel.
6. Install face nut on push-button switch to hold switch and placard in place. Tighten locknut and face nut.
7. Using #10 ring terminals on the wire ends, install minimum 14 AWG type SXL or GXL wire (SAE J1128) from one switch terminal to the priming pump solenoid connection. Secure the ring terminal to the push-button switch using the screws provided.
8. Using #10 ring terminals on the wire ends, install minimum 14 AWG type SXL or GXL wire (SAE J1128) from the other switch terminal to the positive battery power. Secure the ring terminal to the push-button switch using the screws provided with the switch.
9. Test operation of the Hale SPV and priming pump. Conduct vacuum and hydrostatic tests in accordance with department procedures, NFPA1901 or NFPA 1911.

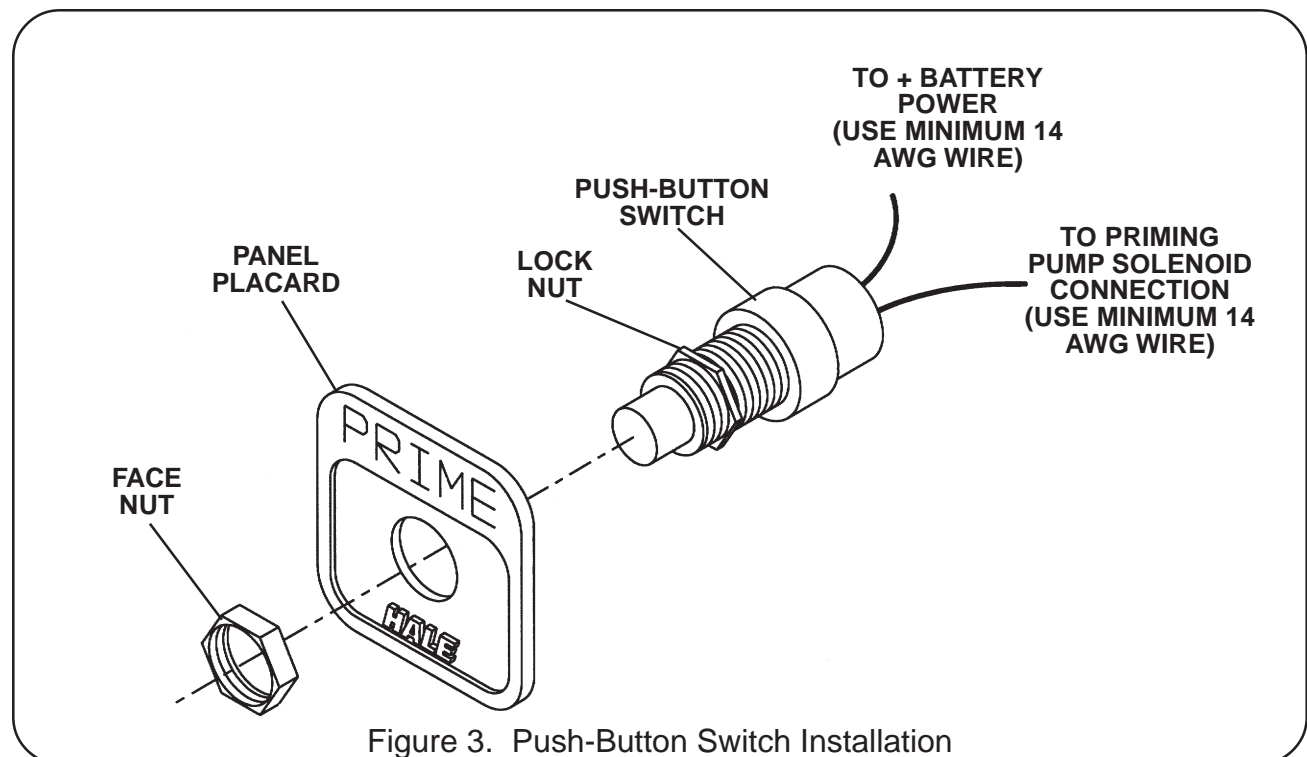


Figure 3. Push-Button Switch Installation

## Retrofit Installation:

When installing the Hale SPV as a retrofit on a midship fire pump the following procedures shall be followed. (Refer to figure 5)

1. Place the apparatus out of service in accordance with departmental procedures. Drain all water from pump body.

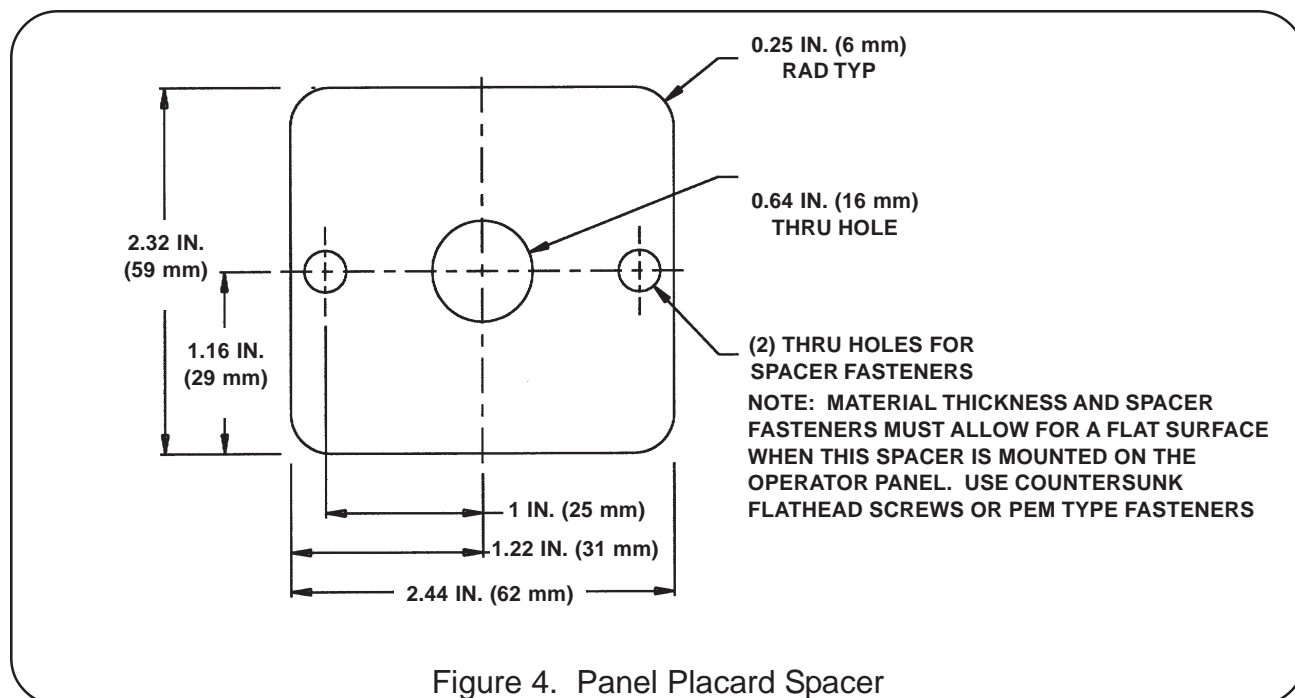
**WARNING:** Disconnect or turn-off master battery switch prior to service of the Hale SPV electrical components. Make sure there is no power at the primer solenoid before starting service procedures.

2. Open the pump operator panel and gain access to the existing Hale PVG.
3. Disconnect the electrical leads and vacuum hoses to the Hale PVG.
4. If the Hale PVG is mounted at the operator panel, remove the Hale PVG and placard.
5. Install the panel placard and momentary contact push-button provided with the Hale SPV on the operator panel.

NOTE: A spacer is required where the Hale PVG was removed to allow mounting of the push-button switch. Manufacture a spacer using the template in figure 4 as a guide.

The outer surface of the spacer must be flat to allow proper installation of the panel placard push-button switch. Use material thickness and fastening devices that leave a flat surface.

6. Connect electrical leads to the momentary contact push-button.
7. Locate the priming valve flange on the midship pump. (Refer to figure 5) The priming valve flange is located next to the gearbox on the midship pump.
8. Remove the  $\frac{7}{16}$ -14 x 1- $\frac{1}{4}$  inch long cap screws that hold the priming flange, hose and fittings on the midship pump body. Remove the flange assembly from the pump body.
9. Remove the strainer and seal ring from the pump body. Clean the strainer of all debris. DO NOT discard the strainer as it must be used with the Hale SPV.
10. Apply a light coat of thread locking compound (Loctite #290 or equal) to one end of the  $\frac{7}{16}$ -14 x 1- $\frac{3}{4}$  inch long studs. Insert studs into the pump body where the cap screws were removed then tighten studs.
11. Insert strainer and seal ring in pump body then install Hale SPV on the pump body.



Make sure the vacuum hose connection is facing in the down direction when the Hale SPV is installed.

12. Apply a light coating of thread locking compound (Loctite #290 or equal) to the exposed stud threads. Secure Hale SPV in place using  $\frac{7}{16}$ -14 nuts.

**WARNING:** Use only pipe, hose, and fittings from the priming pump vacuum connection to the Hale SPV vacuum connection rated for 29 in (737 mm) Hg vacuum.

13. Attach  $\frac{3}{4}$  inch (19 mm) ID vacuum hose from the hose connection on the Hale SPV to the priming pump connection. Use hose with  $\frac{3}{4}$  inch (19 mm) inside diameter that is rated for 29 in (737 mm) Hg vacuum (Aeroquip 2556-12 or equal). Make sure the hose is routed and properly secured in place to prevent chaffing and abraision.
14. Test operation of the Hale SPV and priming pump. Conduct vacuum and hydrostatic tests in accordance with department procedures, NFPA1901 or NFPA 1911.

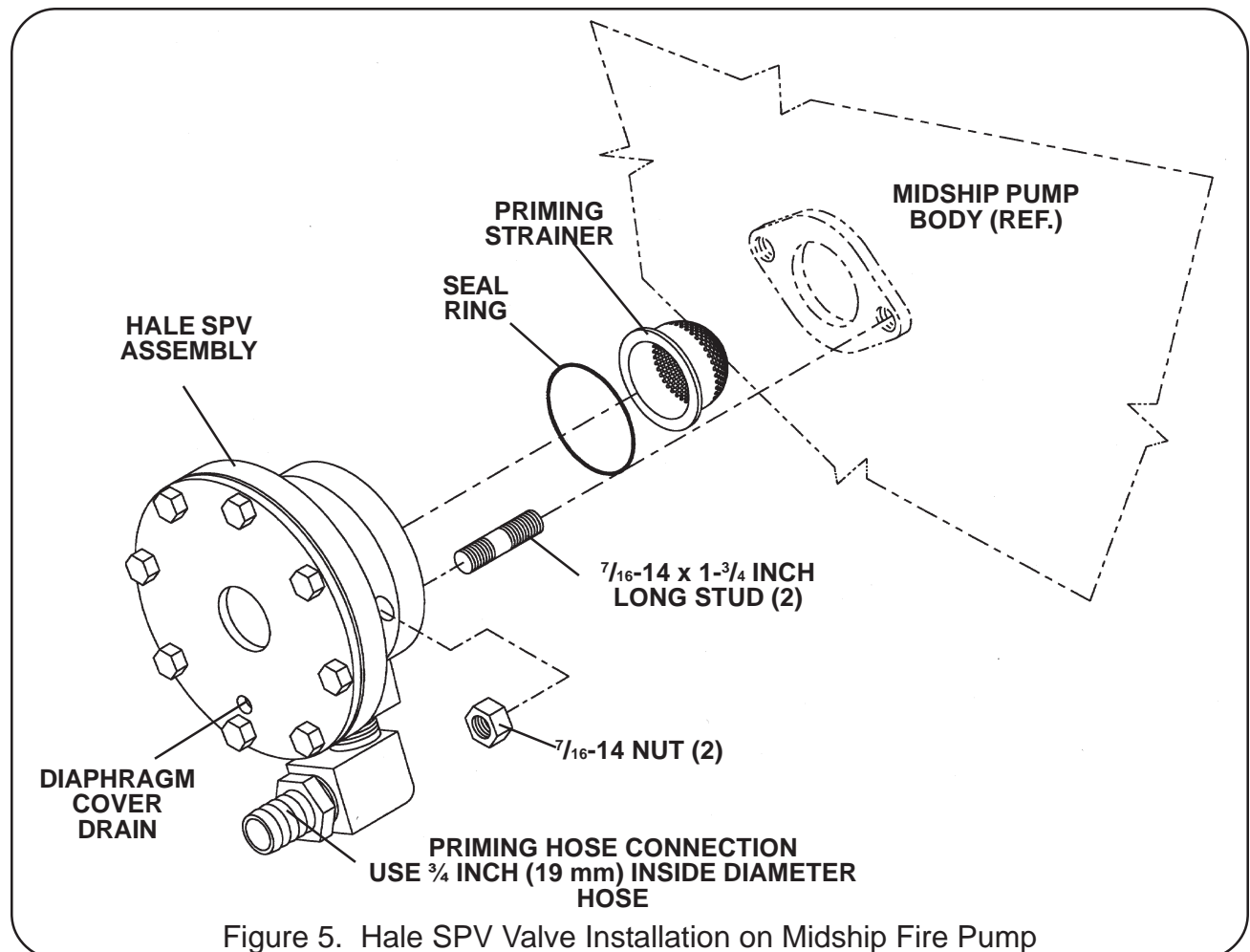


Figure 5. Hale SPV Valve Installation on Midship Fire Pump

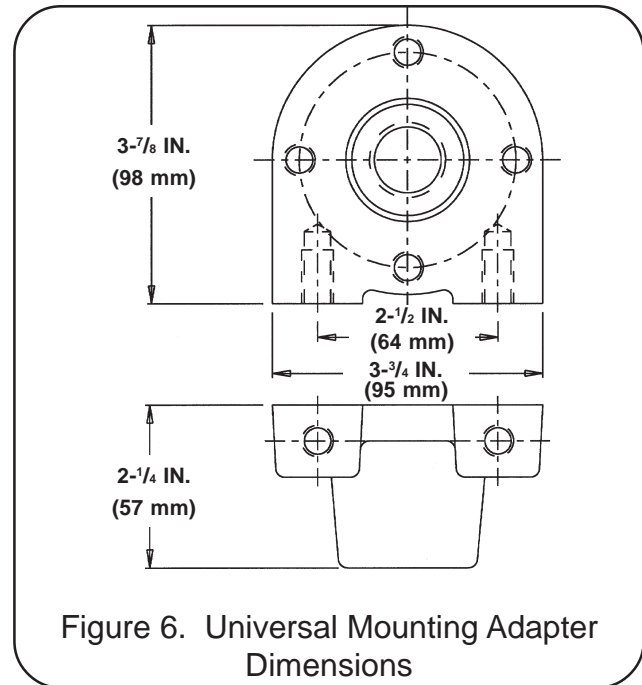
## Hale SPV Installation with Universal Mounting Adapter:

When installing the Hale SPV assembly with a universal mounting adapter use the following procedures.

1. Place the apparatus out of service in accordance with departmental procedures.

**CAUTION:** Make sure the Hale SPV is located higher than the pump body allowing water to drain from the vacuum hose.

2. Determine location of Hale SPV Universal Mounting adapter on the apparatus. When choosing location of universal mounting adapter make sure there is minimum of 5 inches (127 mm) clearance for hose connections.
3. Referring to the dimensions in figure 6, drill two  $\frac{29}{64}$  inch (12 mm) holes  $2\frac{1}{2}$  inches (64 mm) apart to attach the universal mounting adapter to a secure point on the apparatus.
4. Select the proper mounting adapter orientation (refer to figure 6 and 7) and using  $\frac{7}{16}$ -14 x 1 inch long cap screws attach the universal mounting adapter to the apparatus.
5. Apply a light coat of thread locking compound (Loctite #290 or equal) to one

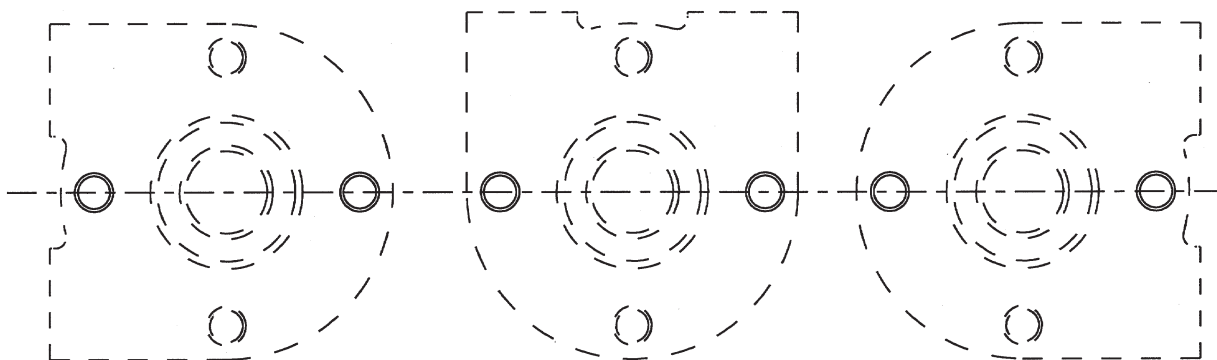


end of the  $\frac{7}{16}$ -14 x  $1\frac{3}{4}$  inch long studs.

Install the studs in horizontal holes on the universal adapter. Refer to figure 8.

6. Insert strainer and seal ring in universal adapter then install Hale SPV on the universal adapter over the studs. Make sure the vacuum hose connection is facing in the down direction when the Hale SPV is installed. Additionally, the small drain hole on the diaphragm cover will be in the down

The Universal Mounting Adapter can be mounted to a secure point on the apparatus with the attaching holes (flat portion) located in the down position or as shown below.



**NOTE: STUDS MUST BE INSTALLED IN HOLES THAT LIE ON THE HORIZONTAL CENTERLINE OF THE UNIVERSAL ADAPTER.**

Figure 7. Universal Mounting Adapter Mounting Positions

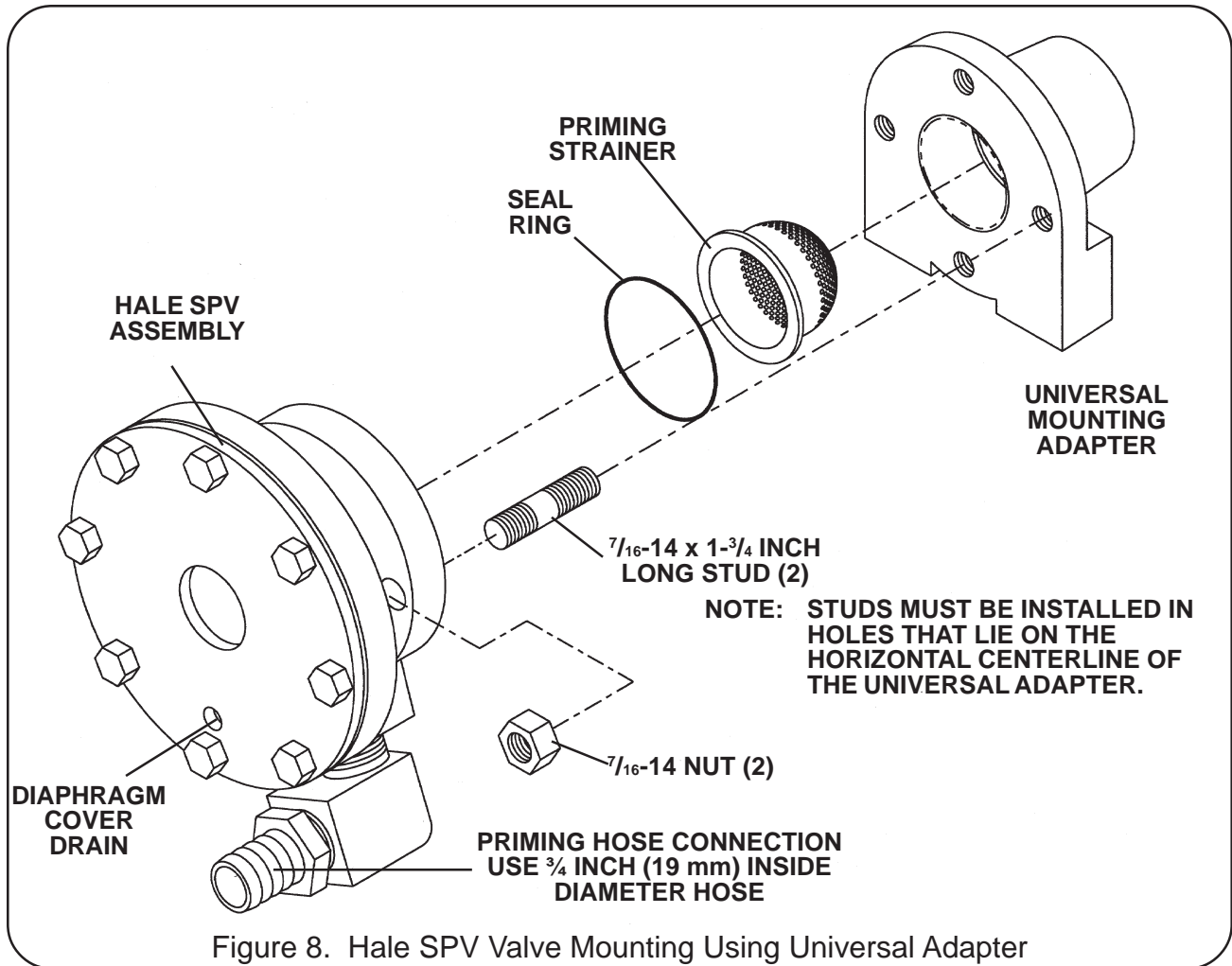


Figure 8. Hale SPV Valve Mounting Using Universal Adapter

- position.
7. Apply a light coating of thread locking compound (Loctite #290 or equal) to the exposed stud threads. Secure the Hale SPV valve in place on the universal mounting adapter using  $\frac{7}{16}$ -14 nuts.
- WARNING:** Use only pipe, hose, and fittings from the priming pump vacuum connection to the Hale SPV vacuum connection rated for 29 in (737 mm) Hg vacuum.
8. Attach  $\frac{3}{4}$  inch (19 mm) ID vacuum hose from the hose connection on the Hale SPV to the priming pump connection. Use hose with  $\frac{3}{4}$  inch (19 mm) inside diameter that is rated for 29 in (737 mm) Hg vacuum (Aeroquip 2556-12 or equal). Make sure the hose is routed and properly secured in place to prevent chaffing and abrasion.
9. Install a fitting on the side opposite the Hale SPV on the universal adapter. Connect a  $\frac{3}{4}$  inch (19 mm) inside diameter hose rated for 29 in (737 mm) Hg vacuum (Aeroquip 2556-12 or equal) from the priming tap on the pump body to the hose fitting on the universal mounting adapter.
10. Test operation of the Hale SPV and priming pump. Conduct vacuum and hydrostatic tests in accordance with department procedures, NFPA1901 or NFPA 1911.

# 4 MAINTENANCE

The Hale SPV is designed to provide trouble free service with a minimum of preventive maintenance. Performance degradation can result from a ruptured diaphragm or worn seat on the valve. A Hale SPV repair kit that contains a manual, seal ring, valve and diaphragm is available from Hale Products, Inc. The repair kit part number is 546-1680-00-0

## Hale SPV Test Procedures:

Performance of the Hale SPV shall be tested monthly. The following procedures shall be used to test the Hale SPV. If proper performance as indicated below cannot be achieved then the valve must be repaired.

1. Close all valves and drains on the pump. Cap all suction openings and outlet of suction side relief valve (if so equipped).
2. Connect a test vacuum gauge to the intake test gauge connection on the pump panel.
3. Depress and hold the prime push-button to energize the priming pump motor. Observe the diaphragm on the Hale SPV while the priming pump is running. The diaphragm should draw in when sufficient vacuum is generated in the vacuum hose.
4. Continue operation of the priming pump while observing the vacuum test gauge. When the vacuum gauge stops dropping at approximately 22 in (559 mm) Hg. release the push-button. Observe the vacuum gauge. If the vacuum falls more than 10 inches (254 mm) in 5 minutes it is certain there is a leak in the system. Check for leakage of the system.
5. Hydrostatic test the Hale SPV to 250 PSIG (17 BAR) in accordance with departmental procedures.

## Repair Procedures:

The following procedures are provided for repair of the Hale SPV. Refer to the exploded view in section 5 of this manual to determine the relative location of parts as the Hale SPV is being disassembled.

1. Disconnect the vacuum hose from the hose

connection on the valve body.

2. Remove the  $\frac{7}{16}$ -14 nuts that hold the valve assembly to the pump body or universal adapter.
3. Remove the valve assembly, strainer and seal ring from the pump.
4. Matchmark the diaphragm cover and valve body to permit proper alignment of the drain hole during re-assembly of the valve.
5. Remove the  $\frac{5}{16}$ -18 x  $\frac{3}{4}$  inch long cap screws that hold the diaphragm cover and diaphragm to the valve body.
6. Carefully pry the cover and diaphragm from the valve body being careful to not damage the diaphragm. Separate the cover and diaphragm.

**WARNING:** Parts under spring tension can become projectiles and cause serious injury. When removing or installing these parts make sure they are restrained and spring tension is released slowly.

7. Support the valve on a stable work surface to prevent accidental release of spring tension. While pressing in on the diaphragm plate unscrew the #10-24 x  $\frac{1}{2}$  inch long screw. Once the screw is removed slowly release the spring tension and remove the diaphragm plate.
8. Remove valve spring from valve body.
9. Remove the valve from the valve body.
10. Remove vacuum hose connection fitting and service elbow from the valve body.
11. Carefully inspect all components of the valve for damage and wear. The Hale SPV repair kit (Hale P/N 546-1680-00-0) contains a new diaphragm, valve and seal ring. Always



replace these components when the valve is disassembled. If the brass seat on the valve body is damaged the Hale SPV must be replaced.

12. During re-assembly of the valve use thread locking compound (Loctite #290 or equal) to lock threads in place.
13. Apply a light coating of thread sealing compound and install the service elbow and vacuum hose connection fitting into the valve body.
14. Insert the new valve into the valve body from the side that attaches to the pump or universal adapter.
15. Place the small end of the compression spring over the boss in the valve body around the valve.

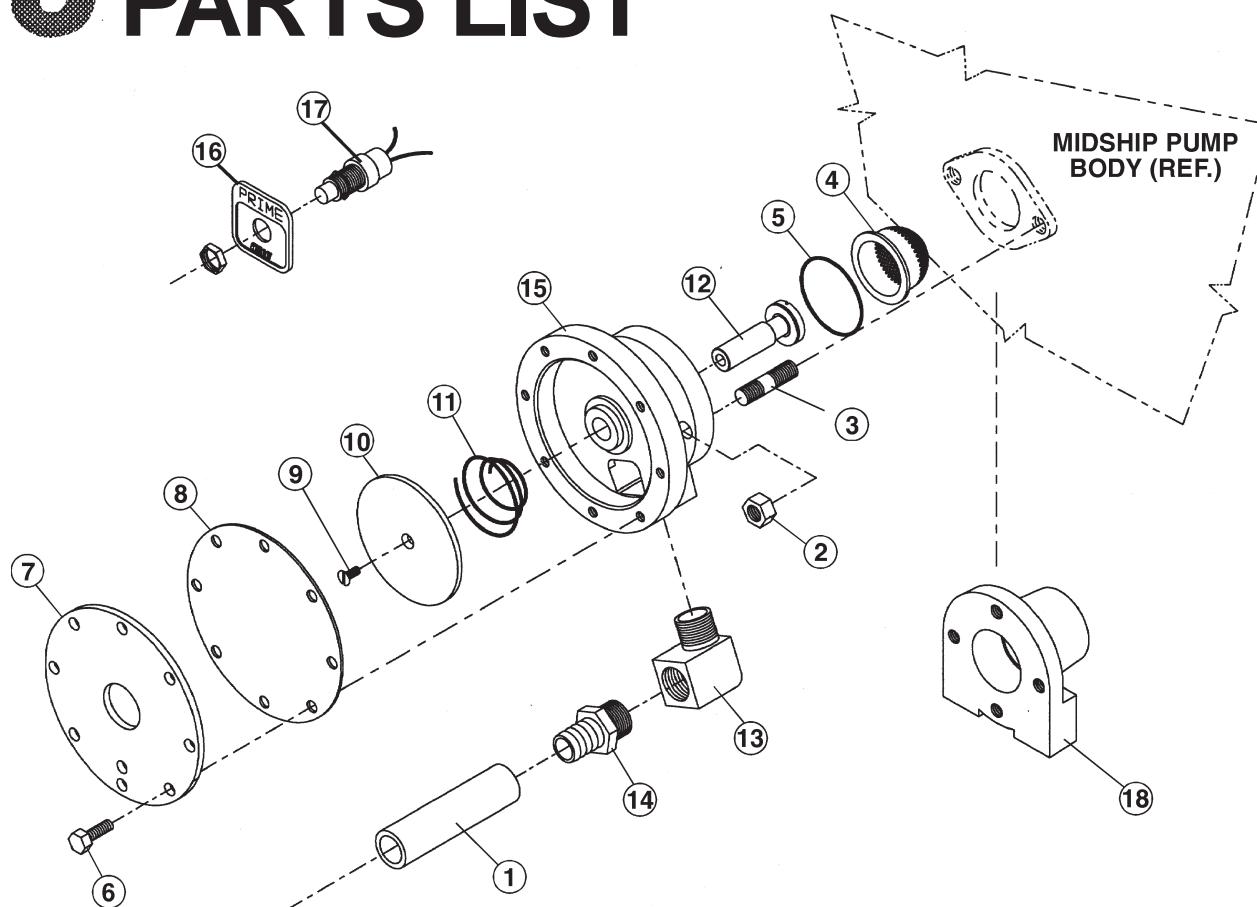
**WARNING:** Parts under spring tension can become projectiles and cause serious injury. When removing or installing these parts make sure they are restrained and spring tension is released slowly.

16. With the Hale SPV on a stable surface, place the diaphragm plate over the spring and press down to compress spring. While holding diaphragm plate down with spring compressed, install #10-24 x  $\frac{1}{2}$  inch long screw into the valve.
17. Place a new diaphragm on the valve body and align screw holes.
18. Place the diaphragm cover over diaphragm

aligning matchmarks ensuring the cover drain hole will be in the correct position when the valve is installed on the pump.

19. Install the 5/16-18 x  $\frac{3}{4}$  inch long cap screws to hold the cover in place.
20. Apply a light coating of grease to the seal ring then place strainer and new seal ring into valve body. Install seal ring, strainer and valve assembly on pump (or universal adapter) over studs. Secure in place using  $\frac{7}{16}$ -14 nuts. Tighten nuts.
21. Connect the  $\frac{3}{4}$  inch (19 mm) ID vacuum hose from the priming pump to the hose connection fitting on the Hale SPV assembly.
22. Test operation of the Hale SPV. Conduct vacuum and hydrostatic tests in accordance with department procedures.

# 5 PARTS LIST



ITEM	PART NUMBER	DESCRIPTION	QTY	UM
1	340-0640-00-1	3/4 ID HOSE (AEROQUIP 2556-12 or EQUAL)	14	IN
2	110-1800-02-0	NUT, 7/16-14 ZINC PLATED	2	EA
3	018-8040-00-0	STUD, 7/16-14 X 1-3/4 IN. LG. ZINC PLATED	2	EA
4	010-0040-00-0	ZMQ-329H PRM VALVE STRAINER	1	EA
5	040-2260-00-0	40-4N200 RING-SEAL	1	EA
6	018-1406-07-0	SCREW, 5/16-18 X 3/4 IN. LG.	8	EA
7	044-0231-00-0	DIAPHRAGM COVER (PAINTED)	1	EA
8	046-0121-00-0	DIAPHRAGM, 5-3/8 IN. DIA.	1	EA
9	018-1004-32-0	SCREW, #10-24 X 1/2 IN. LG.	1	EA
10	005-0021-00-0	SPV DIAPHRAGM PLATE	1	EA
11	042-0081-00-0	VALVE RETURN SPRING, STAINLESS	1	EA
12	038-0151-00-0	SPV PRIMING VALVE VALVE	1	EA
13	082-4027-00-0	STREET ELBOW, 3/4 MALE NPT X 3/4 FEMALE NPT	1	EA
14	082-4027-01-0	CONNECTION, 3/4 MALE NPT X 3/4 HOSE BARB	1	EA
15	038-0141-00-0	SPV PRIMING VALVE BODY	1	EA
16	101-0050-01-0	SPV PRIME PLACARD	1	EA
17	200-0120-04-0	STARTER SWITCH, MOMENTARY PUSH	1	EA
18	007-3370-00-0	SPV UNIVERSAL MOUNTING ADAPTER	1	EA



**Hale SPV Repair Kit**

A repair kit is available from Hale Products, Inc. The repair kit contains components that require replacement when the Hale SPV is removed from the pump and disassembled.

REPAIR KIT PART NUMBER: 546-1680-00-0

The repair kit contains the following components. Refer to the exploded view on the previous page for parts identification.

ITEM	PART NUMBER	DESCRIPTION	QTY	UM
5	040-2260-00-0	40-4N200 RING-SEAL	1	EA
8	046-0121-00-0	DIAPHRAGM, 5-3/8 IN. DIA.	1	EA
12	038-0151-00-0	SPV PRIMING VALVE VALVE	1	EA
	029-0020-33-0	INSTALLATION MANUAL (NOT SHOWN)	1	EA

# 6 WARRANTY

## LIMITED WARRANTY

**EXPRESS WARRANTY.** Hale Products Inc. ("Hale") hereby warrants to the original buyer that products manufactured by it are free of defects in material and workmanship for two (2) years or 2000 hours usage, whichever shall first occur. The "Warranty Period" commences on the date the original buyer takes delivery of the product from the manufacturer.

**LIMITATIONS.** HALE'S obligation is expressly conditioned on the Product being.

- Subjected to nominal use and service;
- Properly maintained in accordance with HALE'S Instruction Manual as to recommended services and procedures;
- Not damaged due to abuse, misuse, negligence or accidental causes;
- Not altered, modified, serviced (non-routine) or repaired other than by an Authorized Service Facility;
- Manufactured per design and specifications submitted by the original Buyer.

THE ABOVE EXPRESS LIMITED WARRANTY IS EXCLUSIVE. NO OTHER EXPRESS WARRANTIES ARE MADE. SPECIFICALLY EXCLUDED ARE ANY IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATIONS, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE; QUALITY; COURSE OF DEALING; USAGE OF TRADE; OR PATENT INFRINGEMENT FOR A PRODUCT MANUFACTURED TO ORIGINAL BUYER'S DESIGN AND SPECIFICATIONS.

**EXCLUSIVE REMEDIES.** If Buyer promptly notifies HALE upon discovery of any such defect (within the Warranty Period), the following terms shall apply:

- Any notice to HALE must be in writing, identifying the Product (or component) claimed defective and circumstances surrounding its failure;
- HALE reserves the right to physically inspect the Product and require Buyer to return same to HALE'S plant or other Authorized Service Facility;
- In such event, Buyer must notify HALE for a Returned Goods Authorization number and Buyer must return the Product F.O.B. within (30) days thereof;
- If determined defective, HALE shall, at its option, repair or replace the Product, or refund the purchase price (less allowance for depreciation),
- Absent proper notice *within* the Warranty Period, HALE shall have no further liability or obligation to Buyer therefore.

THE REMEDIES PROVIDED ARE THE SOLE AND EXCLUSIVE REMEDIES AVAILABLE. IN NO EVENT SHALL HALE BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOSS OF LIFE; PERSONAL INJURY; DAMAGE TO REAL OR PERSONAL PROPERTY DUE TO WATER OR FIRE; TRADE OR OTHER COMMERCIAL LOSSES ARISING, DIRECTLY OR INDIRECTLY, OUT OF PRODUCT FAILURE.