

## Installation & Service Instructions



# HEAD PRESSURE CONTROL VALVES

## LAC-4 and LAC-4-DS

### INSTALLATION INSTRUCTIONS

To insure proper performance, head pressure control valves must be selected and applied correctly. This is covered thoroughly in Bulletin 90-30. However, proper installation procedures are equally important.

**Valve Location/Piping Suggestions** - LAC-4 valves can be installed in horizontal or vertical lines, whichever best suits the application and permits easy accessibility of the valves. However, consideration should be given to locating these valves so they don't act as oil traps or that solder cannot run into the internal parts during brazing. Care should also be taken to install the valves with the flow in the proper direction.

Figure 3 is a piping schematic only to illustrate the general location of the LAC-4 valve. In most cases the valve is located at the condensing unit. When the condenser is remote from the compressor, the usual location is near the compressor. Sporlan recommends that recognized piping references be consulted for assistance in piping procedures. Sporlan is not responsible for system design, any damage arising from faulty system design, or for misapplication of its products. If these valves are applied in any manner other than as described in this bulletin, the Sporlan warranty is void.

**Inlet Strainer** - The need for an inlet strainer is a function of system cleanliness. Inlet strainers are available for the LAC-4 and LAC-4-DS (3/8" ODF fittings must have a rolled stop to support the strainer). Keep in mind that the LAC model actually has two inlet fittings (condenser and discharge) and it may be desirable to use an inlet strainer in both fittings.

FITTING SIZE	INLET STRAINER PART NUMBER
3/8"	825-003
1/2"	825-004

**Brazing Procedures** - Any of the commonly used brazing alloys for high side usage are satisfactory. However, when soldering or brazing, it is very important that the internal parts be protected by wrapping the valve with a *wet* cloth to keep the body temperature below 250°F. Also, when using high temperature solders, the torch tip should be large enough to avoid prolonged heating of the copper connections. And, always direct the flame away from the valve body.

**Test and Operating Pressures** - Inert dry gases such as nitrogen, CO<sub>2</sub> or helium are often used for leak detection. Excessive leak testing or operating pressures may damage these valves or reduce the life of the diaphragm or bellows.

**CAUTION:** *Inert gases must be added to the system carefully through a pressure regulator. Unregulated gas pressure can seriously damage the system and endanger human life. Never use oxygen or explosive gases.*

The maximum pressure that this valve can withstand without damage is 500 psig. Care must be taken to keep test or operating pressures below this maximum rated pressure.

## VALVE SETTINGS

### LAC-4

The LAC-4 is available with 4 standard settings for various refrigerants as shown in Table 1. Some manufacturers' systems use other settings which are critical to system operation e.g. harvest cycle on ice makers. These non-standard settings are available for replacement but delivery time may be extended. (See Figure 1.)

### LAC-4-DS

The LAC-4-DS provides the choice of two settings, 100 psig or 180 psig (other combinations of high and low settings have been produced). The higher setting is obtained by a combination spring force and air charge in the upper dome assembly. (See Figure 2) The valve supplied with the higher of the two settings stamped on the hex flats of the condenser connection. When the valve is used on systems with:

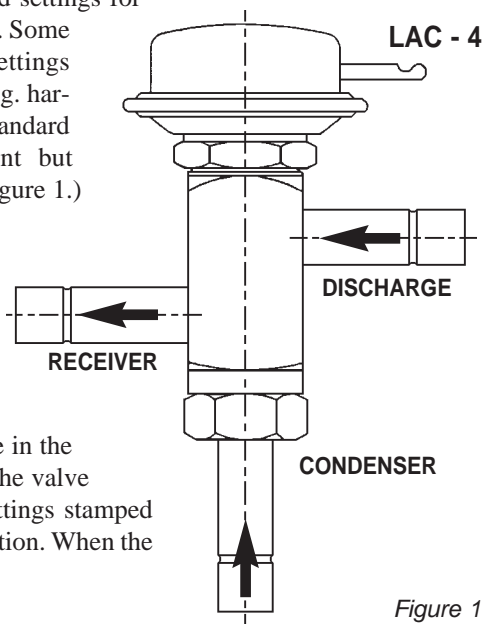


Figure 1

### Refrigerant 22 and 502

1. Remove low setting stamp from hex flat with a file.
2. Install valve. It is set to maintain 180 psig during low ambient conditions.

### Refrigerant 12 and 134a

1. Clip 3/4" off dome capillary tube to relieve air charge.
2. Remove paint from end of capillary tube.
3. Fuse tip to prevent moisture from entering dome.
4. Remove high setting stamp from hex flat with a file.
5. Install valve. It is now set to maintain 100 psig during low ambient conditions.

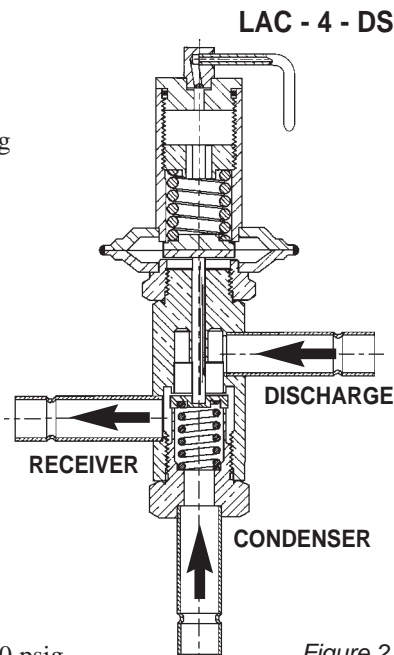


Figure 2

REFRIGERANT	RECOMMENDED SETTINGS
12,134a	100
401A	120
22, 502	180
404A, 507, 402A	210

Table 1

## LOW AMBIENT (Winter) CAPACITIES - Tons

Capacities are based on 40°F Evaporator Temperatures, 65°F Return Gas Temperature Valve Setting of 100 psig for R-12 and R-134a and 180 psig for R-22 and R-502.

PRESSURE DROP ACROSS VALVE PSI	REFRIGERANT											
	12			134a			22			502		
	MINIMUM AMBIENT DESIGN TEMPERATURE °F											
	- 20	0	20	- 20	0	20	- 20	0	20	- 20	0	20
5	2.8	3.1	3.4	3.4	3.7	4.2	4.0	4.3	4.7	2.7	3.0	3.2
10	4.0	4.3	4.9	4.8	5.3	6.0	5.8	6.2	6.9	4.0	4.3	4.8
20	5.9	6.5	7.3	7.1	7.8	8.9	8.0	8.7	9.6	5.8	6.3	7.0

The LAC-4 Liquid Flow capacities are equal to the above hot gas flow capacities (at 5 psi ΔP) at less than two psi pressure drop.

**WARNING:** Serious injury could result from an explosion caused by the rapid expansion of trapped liquid refrigerant subjected to high temperature. **Always open or vent the system before applying heat to remove system components.** Break the element charging cap tube on valve dome by hand or with a clean cut tool. **Do not** use side cutters which may seal the opening.

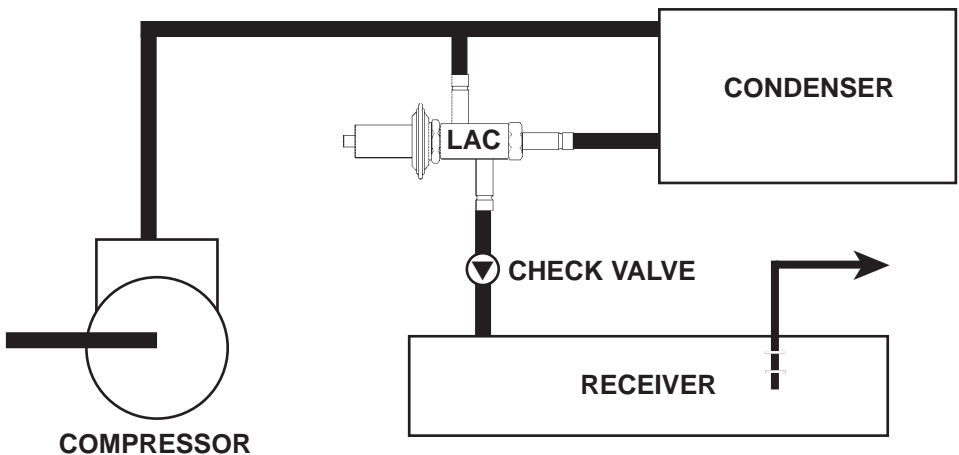


Figure 3

## SERVICE INSTRUCTIONS

There are several possible causes for system malfunction with "refrigerant side" head pressure control and these may be difficult to isolate from each other. As with any form of system trouble-shooting, it is necessary to know the existing operating temperatures and pressures before system problems can be determined. Once the actual malfunction is established, it is easier to pinpoint the cause and then take suitable corrective action. The following chart lists the most common malfunctions, the possible causes, and the remedies.

## MALFUNCTION - LOW HEAD PRESSURE

POSSIBLE CAUSE	REMEDY
<ol style="list-style-type: none"><li>1. Insufficient refrigerant charge to adequately flood condenser.</li><li>2. LAC fails to close due to:<ol style="list-style-type: none"><li>a. Foreign material in valve.</li><li>b. Loss of air charge in element.</li></ol></li><li>3. Wrong setting on LAC (e.g. 100 psig on Refrigerant 22 or 502 system)</li><li>4. Discharge line to LAC restricted.</li></ol>	<ol style="list-style-type: none"><li>1. Charge system according to Manufacturers Specifications or if unavailable use Bulletin 90-30-1.</li><li>2. See Below:<ol style="list-style-type: none"><li>a. Cause LAC to open by raising condensing/receiver pressure above valve setting by cycling condenser fan. If foreign material does not pass through valve, replace LAC.</li><li>b. Replace LAC.</li></ol></li><li>3. Replace LAC with valve with correct setting.</li><li>4. Remove restriction in fitting(s) or line.</li></ol>

## MALFUNCTION - HIGH HEAD PRESSURE

POSSIBLE CAUSE	REMEDY
<ol style="list-style-type: none"><li>1. Dirty condenser coil.</li><li>2. Air on condenser blocked off.</li><li>3. Too much refrigerant charge.</li><li>4. Undersized receiver.</li><li>5. Non-condensable (air) in system.</li><li>6. Liquid port or liquid line plugged.</li><li>7. Wrong setting on LAC (e.g. 180 psig on Refrigerant 12 systems).</li><li>8. Spring overheated during installation, increasing the LAC setting.</li><li>9. Condenser fans not running.</li></ol>	<ol style="list-style-type: none"><li>1. Clean coil.</li><li>2. Clear area around unit.</li><li>3. Remove charge until proper head pressure is maintained.</li><li>4. Check receiver capacity against refrigerant required to maintain desired head pressure.</li><li>5. Purge from system.</li><li>6. Remove blockage in port or liquid line.</li><li>7. Replace LAC with valve with correct setting.</li><li>8. Replace LAC.</li><li>9. Repair or replace fan motor.</li></ol>

FOR USE ON REFRIGERATION and/or AIR CONDITIONING SYSTEMS ONLY

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