

# Step Motor Expansion Valves

Types SER-AA, -A, -B, -C, -D, & -E

Installation and Servicing Instructions  
SD-348



The Sporlan SER valves are stepper motor driven Electric Expansion Valves (EEV), featuring:

- High resolution actuators
- High linear force output
- Tight seating
- Unmatched corrosion resistance
- Removable IP-67 M12 cables (A-coded)
- No mounting orientation restrictions
- Ability to mount in the conditioned space
- Optional spring-loaded internal check valve (unipolar valves only)
- Bi-flow with no reduction in reverse flow MOPD

## Installation

1. Braze or solder the inlet and outlet connections using standard practices and materials. See Figure 1. It is not necessary to remove the cable during valve installation, but it should be routed to avoid direct or indirect damage from overheating.

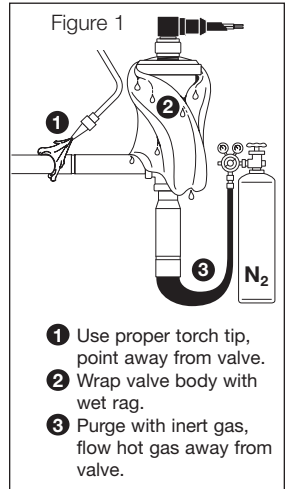
**NOTE:** If the cable is removed, the electrical connection should be protected to prevent introduction of moisture.

**NOTE:** Care must be taken to ensure that the valve internal temperature does not reach 250°F (60°C).

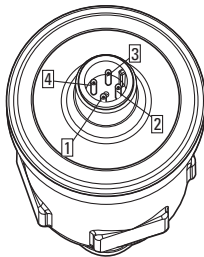
2. If a cable is not already attached to the valve, attach an M12 A-coded cable and hand-tighten the nut, using care to avoid twisting the cable itself. A torque of 10-14 in-lb will ensure compliance with the IP67 rating.

**NOTE:** Orientation of the cable is not relevant to valve performance. If the plastic insert with the keyway is removed, it can be reinstalled in any of four orientations without affecting performance.

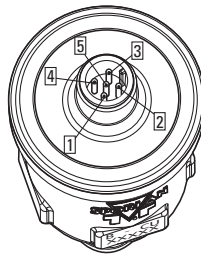
3. Wire the valve cable to the controller according to the controller specifications. The required valve drive sequence is shown here for reference.



## BIPOLAR STEPPER MOTOR



## UNIPOLAR STEPPER MOTOR



**Bipolar M12 Terminal #**

	1	2	3	4	
Close ↓	1	HI	HI	0	0
	2	0	HI	HI	0
	3	0	0	HI	HI
	4	HI	0	0	HI
	1	HI	HI	0	0

↑ Open

**Unipolar M12 Terminal #**

	1	2	3	4	
Close ↓	1	0	HI	HI	HI
	2	0	0	HI	HI
	3	HI	0	HI	HI
	4	HI	0	0	HI
	5	HI	HI	0	HI
	6	HI	HI	0	0
	7	HI	HI	HI	0
	8	0	HI	HI	0
	1	0	HI	HI	HI

↑ Open

Terminal #5 is always connected to HI

## Field Service Instructions

1. If the valve fails to operate properly, disconnect the line voltage from the valve controller. Disconnect the valve leads from the controller.
2. Check the resistance of each motor phase. On a unipolar valve, resistance between any outer pin (1, 2, 3 or 4) and the center pin (5) should be approximately 100 Ω at 72°F (22°C). On a bipolar valve, resistance between opposite pins (locations 1-3 and 2-4) should be approximately 100 Ω at 72°F (22°C). Differences of more than 10% between phases may indicate a defective motor, and the valve should be replaced.
3. Check to ensure that resistance between any pin or lead and the valve body is greater than 1 MΩ. Lower resistance readings may indicate a short, and the valve should be replaced.
4. If you have access to a Sporlan SMA-12 test instrument, functionality of the valve can be determined before removal from the system by monitoring downstream pressure. If normal function can be verified by manually positioning the valve, control functionality should be investigated.

**NOTE:** Care should be taken to assure that floodback and compressor damage does not occur during the test.

5. Prior to removing an installed valve, make sure the refrigerant has been properly recovered and pressure has been reduced to a safe level (0 psig).
6. The valve can be unbrazed or cut out of the piping. If cut out, a tubing or pipe cutter should be used to avoid introducing copper contamination into the system.
7. A replacement EEV can be installed according to the preceding installation instructions. Ensure that the new valve is an exact replacement, or meets all requirements of the control and system.
8. Pressurize the system, and check for leaks.
9. Reapply power to the valve controller. The controller will initialize the valve, and a light clicking may be heard during this time. The valve should be ready to resume normal operation at this time.

### ⚠ WARNING – USER RESPONSIBILITY

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