

Step Motor Pressure Regulating Valve

Types CDS(T)-2, -4, -7, -9, -16, -17

INSTALLATION AND SERVICING INSTRUCTIONS
SD-218/62016



The Sporian CDS valves are stepper motor driven Pressure Regulating Valves, featuring:

- High resolution actuators
- High linear force output
- Tight seating
- Field proven reliability
- Excellent corrosion resistance
- Minimal full stroke pressure drop
- Application flexibility

INSTALLATION

1. Braze or solder the inlet and outlet connections using standard practices and materials. It is recommended to purge with inert gas, and to wrap the valve body and motor assembly with a wet rag to prevent damage from overheating during installation.

NOTE: Valve internal temperature must not reach 250°F (60°C) during installation.

NOTE: Care must be taken to prevent damaging the motor cable from excessive heat, either directly from the torch, or indirectly from contact with a hot surface. If the cable is removed during installation (CDS-2, -4 and -7 only), water should be prevented from entering the electrical connections.

2. If the cable was removed during valve installation (CDS-2, -4 and -7 only), reinstall the cable at this time, ensuring proper alignment of the pins and engagement of the alignment key.

NOTE: The cable connector can be installed in any of the four directions. Pins should be aligned with the connector when installing the cable. When tightening the cable nut, the cable connector should not be twisted or rotated. Do not force the connector onto the valve to avoid damage to the valve and cable.

3. Pressurize the system and check for leaks.

4. The valve will only operate when connected to a properly designed and configured controller. Wire the valve cable to the controller according to the controller specifications. The required valve drive sequence is shown here for reference.

		BIPOLAR DRIVE SEQUENCE				
	STEP	BLACK	WHITE	RED	GREEN	
OPEN ↓	1	12 volts	0 volts	12 volts	0 volts	↑ CLOSE
	2	0 volts	12 volts	12 volts	0 volts	
	3	0 volts	12 volts	0 volts	12 volts	
	4	12 volts	0 volts	0 volts	12 volts	
	1	12 volts	0 volts	12 volts	0 volts	

5. Apply power to the valve controller. The valve is shipped at approximately half stroke, so the



controller will overdrive the valve closed to establish the zero position. A light clicking may be heard during this time. Upon completion of the initialization, the valve should be ready to begin controlling.

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 the CDS-2, -4 and -7, resistance between either the black and white or red and green leads should be approximately 100 Ω at 72°F (22°C). On the CDS-9, -16 and -17, resistance between either the black and white or red and green leads should be approximately 75 Ω at 72°F (22°C). Differences of more than 10% between phases may indicate a defective motor, and the motor assembly should be replaced.
3. Check to ensure that resistance between any lead and the valve body is greater than 1 MΩ. Lower resistance readings may indicate a short, and the motor assembly 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 changes in system conditions as valve position is changed. If normal function can be verified by manually positioning the valve, proper controller functionality should be investigated.

NOTE: Care should be taken to assure that damage to the system does not occur during the manual positioning test due to an improperly positioned valve.

5. Prior to removing a valve or motor assembly, make sure the refrigerant has been properly recovered and pressure has been reduced to a safe level (0 psig).
6. Using an SMA-12 or the manual positioning capability of the valve controller, retract the piston (open the valve).
NOTE: Removing the motor assembly with the piston fully extended (valve closed) may cause permanent damage to the piston assembly.
7. Refer to the exploded view of the valves prior to disassembly. Using appropriate wrenches or a vise to support the valve body, remove the motor and adaptor assembly from the valve body by loosening the locknut.

NOTE: The locknut is very tight on the valve body. Use properly sized tools, and make sure to support the valve body well to avoid damaging the valve or surrounding piping.

8. If you have access to a Sporlan SMA-12 test instrument, functionality of the valve can be visually confirmed by watching the piston extend and retract into the adaptor housing.
NOTE: Be careful when extending the valve piston to avoid accidentally driving the piston out of the adaptor housing. If removed, extreme care should be taken to ensure that the white seal is not damaged or folded during reinstallation of the piston.
9. The original or a replacement motor assembly can be reinstalled into the existing valve body. Lightly oil the wolverine gasket (CDS-2, -4, -17), knife edge joint (CDS-7, and -9), or o-ring (CDS-16), and thread the motor assembly into the valve body. Tighten the locknut to the following specification:

CDS-2, -4	Wolverine Gasket	30-35 ft-lb
CDS-7, -9	Knife Edge Joint	1/8 Turn Past Hand Tight
CDS-16, -17	Wolverine Gasket / O-Ring	65 ft-lb

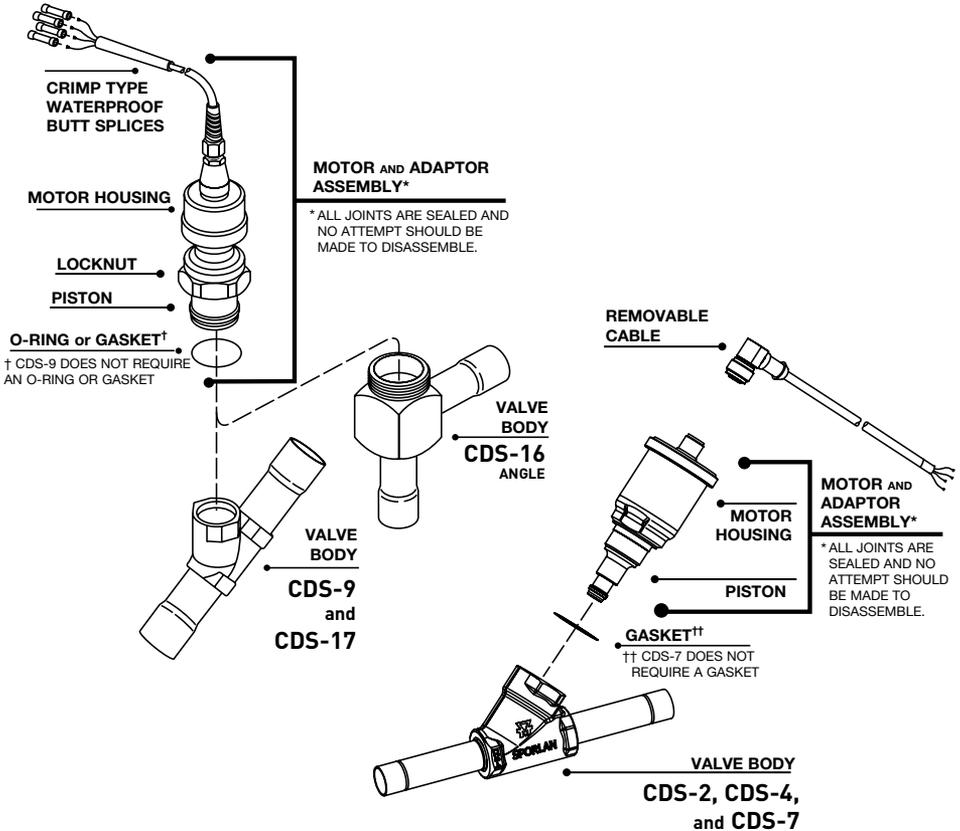
10. For the CDS-2, -4 and -7, the existing valve cable can be reused or replaced. For the CDS-9, -16 and -17, waterproof butt splices should be used to tie into the existing cable.
NOTE: Cable splices must be protected from moisture to ensure the quality of the signal from the controller to the valve.
11. Complete installation starting with step 2 of the installation instructions above.

COMPLETE VALVE REPLACEMENT

1. The entire valve may be replaced if desired by unbrazing or cutting out the existing fittings. If cut out, a tubing or pipe cutter should be used to minimize copper contamination in the system.
2. For the CDS-2, -4 and -7, the existing cable can be reused or replaced. For the CDS-9, -16 and -17, waterproof butt splices should be used to tie into the existing cable.

NOTE: Cable splices must be protected from moisture to ensure the quality of the signal from the controller to the valve.

3. Install the replacement valve according to the preceding installation instructions. Ensure that the new valve is an exact replacement, or meets all requirements of the control and system.



Valve Model	Motor and Adaptor Assembly	Cable Kit	Gasket or O-ring	Motor Phase Resistance (Ω)	Number of Steps
CDS(T)-2	805577	805194 (10 ft. / 3 m)	908079	100	2500
CDS(T)-4	805578	805195 (20 ft. / 6 m)			
CDS(T)-7	805579	805343 (30 ft. / 9 m)			
CDS(T)-9	958177	N/A	N/A	75	6386
CDS(T)-16	958111		908077		
CDS(T)-17	958179		908078		

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