Gas Cooler & Flash Gas Bypass Pressure Regulating Valves
Type GC and FGB

INSTALLATION AND SERVICING INSTRUCTIONS
SD-398

The Sporlan GC and FGB valve families are stepper motor driven pressure regulating valves engineered specifically for transcritical CO₂ (R-744) refrigeration systems. The GC family is designed for application as a Gas Cooler valve, but can also be applied as a Flash Gas Bypass valve. The FGB family is designed to extend the capacity range of the GC valves when applied as Flash Gas Bypass valves. Both families are rated for 140 barg (2030 psig) maximum working pressure. Offered with a PSD4BX3XXXVP Valve Positioner and PSS4B Backup Power Module, the GC/FGB valves are easy to implement, and feature:

- High resolution actuators with 2500 steps and 7.25 second full stroke actuation
- Uniquely characterized pin and port combinations for excellent full range flow control
- Cartridge valve designs with interchangeable bodies
- Tight seating capability
- Replaceable / serviceable screens (GC only)

For more information on these Sporlan Transcritical CO₂ valves, please refer to Bulletin 100-80.

INSTALLATION

Valves are shipped fully assembled, but must be disassembled prior to installation.

1. Supporting the valve body on the provided flats, loosen and remove the motor adapter assembly using the 1-1/2” (38.1mm) hex flats.

NOTE: The motor adapter assemblies are extremely tight, so proper tools are required to support and loosen the components. Be careful not to warp the body by clamping too tightly.

NOTE (FGB ONLY): If the valve has been energized at any time, the piston must be retracted prior to disassembly. Failure to do so can permanently damage the valve. The valve pistons are shipped at approximately half stroke, so if the valve has not been energized, retracting the piston is not necessary.
2. **FGB ONLY** – Remove the port using a standard 1-1/8” deep well socket. The gasket will now be loose, and should be removed from the body as well.

3. Butt or socket weld the GC valve body into the system piping (1/2”, 3/4” or 1” connection). The FGB body can be installed with a butt weld (1”), or brazed with the ODF (1-1/8”) or ODM (1-3/8”) connection.

**NOTE:** The body should be oriented to position the motor within 45° of vertical.

**NOTE:** Ensure proper flow direction with respect to the flow arrow on the valve body.

4. Lubricate all gaskets and o-rings using suitable refrigeration oil.

5. **FGB ONLY** – Insert the gasket into the valve body. Install the port and tighten using a standard 1-1/8” deep well socket.
6. Insert the motor adapter assembly into the valve body, and tighten using the 1-1/2" (38.1mm) hex flats.

NOTE (FGB ONLY): If the valve has been energized at any time, the piston must be retracted prior to assembly. Failure to do so can permanently damage the valve. The valve pistons are shipped at approximately half stroke, so if the valve has not been energized, retracting the piston is not necessary.

7. Attach the 4-conductor M12 cable and tighten the nut, using care to avoid twisting the cable itself. The cable is not position dependent, and can be installed in any of four orientations (90° apart).

8. Wire the valve cable to the controller according to the controller specifications. If using the PSD4BX3XXXVP and PSS4B controllers, refer to Bulletin 100-80 for a wiring schematic.

9. Pressurize the system, and check for leaks.

10. Apply power to the controller. The valve will perform an initialization routine and should then begin controlling.

FIELD SERVICE INSTRUCTIONS

1. If the valve is not responding properly, disconnect line voltage and any backup power supply from the valve controller.

2. Disconnect the valve leads from the controller.

3. Check the resistance of each motor phase. On a Sporlan cable, resistance between the black and white leads, and between the red and green leads, should be approximately 12.8Ω ± 10% (at valve internal temperature of 72°F / 22°C). Differences of more than 10% between phases may indicate a defective motor, and the valve should be replaced.
4. Check to ensure that the resistance between any valve lead and the valve body is greater than 1MΩ. Lower resistance readings may indicate a short, and the valve should be replaced.

**NOTE:** Prior to removing the motor adapter assembly, make sure the refrigerant has been properly recovered or contained, and the pressure has been reduced to a safe level.

5. Follow Installation Step 1 to remove the motor adapter assembly, and Installation Step 2 (FGB only) to remove the port (if necessary).

**NOTE:** The FGB piston is not replaceable, and no attempt should be made to remove it. None of the GC or FGB valves have removable pins.

6. GC ONLY – Carefully remove the bottom o-ring in order to remove the port screen.

**NOTE:** Screen and o-ring must be carefully reinstalled or replaced prior to installation of the motor adapter assembly. Failure to install the bottom o-ring will degrade valve performance.

7. Inspect the screen, pin and port area or valve body for damage or debris. If no obstruction or other correctable issue is identified, and the valve is still not responding properly, controller functionality should be investigated.

8. Follow Installation Steps 4-9 to install the original or a replacement motor adapter assembly.

9. Reapply power to the controller. The valve will perform an initialization routine, and should then resume normal operation.

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**WARNING – USER RESPONSIBILITY**

Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.

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**FOR USE ON REFRIGERATION and/or AIR CONDITIONING SYSTEMS ONLY**

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