CLARK SOLUTIONS

Technical Bulletin, General Industry Solenoid Valves

Installation and Troubleshooting

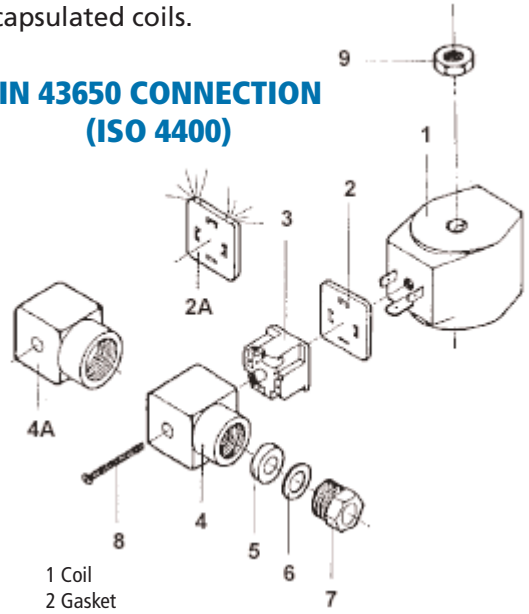
MODELS COVERED IN THIS BULLETIN 1314, 1323, 1325, 1327, 1335, 1342, 1365,1390, 1393, 2026, 2036

ELECTRICAL INSTALLATION

All the coils are for continuous use - permanent or high frequency operation.

Check that the coil supplied with the valve has the correct voltage and current required. If not, replace it with the adequate coil without changing the valve. The allowed voltage variation that does not affect the performance of the valve is -15% to +10% of the nominal voltage for AC and -10% to +10% for DC. Except for valve series 1314, the models are generally supplied with DIN 43650 Connection (ISO 4400) and encapsulated coils.

DIN 43650 CONNECTION (ISO 4400)



1 Coil
2 Gasket
2a Optional gasket with energized coil indicator light.
3 Electric terminals block. Maximum wire size AWG14 (1.6 mm.)
4 Cover with opening for armored cable. Strain relief "PG9", for cable O.D. from 6 to 8 mm. Cover with indicator light upon request.
4a Cover with opening for conduit. ½ NPT Connection. (Part No 3189-2). Cover with indicator light upon request.
5 Strain relief gasket.
6 Washer.
7 Strain relief.
8 Fixing screw.
9 Coil fixing nut.

MECHANICAL INSTALLATION

- Verify that the working conditions are within the range of differential pressure and temperature indicated on the nameplate of the valve.
- Place a strainer with adequate capacity and a mesh smaller than 100 µ immediately upstream from the valve.
- The most favorable mounting position is on a horizontal pipeline with the coil upright.
- Pipelines upstream from the valve must be carefully and exhaustively cleaned even before the strainer, by means of purges with compressed air or any other system that guarantees the disposal of solid elements as well as welding bits, mud, dirt, etc., especially with new pipelines.
- Follow the arrow that indicates the flow direction in the valve's body. The input pressure must always be equal or greater than the output pressure.

INSTRUCTIONS FOR THE ELECTRICAL CONNECTION WITH STRAIN RELIEF

1.Unscrew the screw (8) to reach the block (3), where the terminals are. The system is designed to use armored cables with 3 "PG9" conductors. Carry out Neutral - Live - Ground connections.
2.Insert the terminal block into the cover (4) according to the desired entrance angle, in any of the four possible positions: Left, Right, Above, Below.
3.Insert the coil blades into the connector. Fasten it with the screw (8).
4.Finally but very important, tighten the strain relief (7) to make sure that it is hermetic. Otherwise, moisture may enter and cause a short-circuit between the terminals.

INSTRUCTIONS FOR THE COVER WITH AN OPENING FOR ½ NPT CONDUIT.

1.Follow instructions 1, 2 and 3 for strain relief connector.
2.It is important to be sure that the interconnection is hermetic, so we recommend the use of a sealant or gasketing tape over the threads.

COIL FIXING

The nut (9) that fixes the coil to the core-tube must be 5 Nm / 0.5 kpm / 3.75 lbf, to prevent the coil from turning round. Avoid unnecessary tension that may damage the core-tube due to excess of torsion.

TROUBLE SHOOTING PROBLEMS

Most of the failures that occur when starting a new installation are the result of lack of cleanness in the pipelines between the filter and the valve, due to left-overs of packaging, Teflon, welding residue, dirt, etc.. However, in spite of having made a good choice, a good installation and the adequate maintenance, some contingent factors may occur after the installation and disturb a suitable operation. The following page shows the most common failures with their possible causes and solution.

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
1.Valves do not open when energized (NC) or when de-energized (NO).	**For direct acting valves** 1. Voltage less than 15% of the nominal voltage. 2. Too high a differential pressure for that model. 3. Burnt coil (with the circuit open). 4. Plunger jammed with solids. 5. Damaged plunger. **For pilot operated valves** The same as above plus: 6. Differential pressure too low. 7. Jammed pilot piston. 8. Damaged pilot piston, pilot piston rings or diaphragm. 9. Pilot orifice blocked. 10. Pilot gasket damaged or mis-aligned. 11. Excessive viscosity.	1. Check the coil voltage, which must not be less than 85% of the indicated nominal voltage. If this is the case, adjust the source to the adequate value. 2. Reduce pressure to the maximum shown on the valve nameplate or change it for a more adequate one. 3. See Burnt Coils (Problem 3). 4. Clean the plunger's core tube and the valve. If the system lacks an adequate strainer before the valve, the problem will persist. 5. Replace the damaged part. Damage may be caused by fluid abrasive elements or high operation frequency over a long period of time and exceeding the part's life. 6. This factor should be considered when choosing a valve. It may occur due to over-sizing or reduction of differential pressure. If differential pressure cannot be increased by increasing the flow, the valve must be changed for an adequate one. 7. Check that solids have not affected the piston's movement. After cleaning, check that it is not damaged. A strainer must be placed upstream from the valve to eliminate the problem. 8. Change damaged parts. Check that the cause is not dirt. Also see solution #1. 9. Clean the orifice, if the orifice is damaged consult Clark. Also see solution #1. 10. This is caused by poor assembly. Change the damaged part and assemble the valve correctly. The O-ring must be correctly fitted. 11. Fluids with vicosities exceeding 60 cSt cannot be used with pilot operated valves.
2.The valve remains open	**For direct acting valves** 1. The coil was not de-energized (NC valve) or energized (NO valve). 2. Plunger jammed with solids. **For pilot assisted valves** The same as above plus: 3. The pilot orifice does not close. 4. Compensation orifice blocked. 5. Jammed pilot piston. 6. Pilot piston, Pilot piston rings or diaphragm damaged. 7. Excessive viscosity.	1. Check the control circuits. 2. Clean the plunger's core tube and the valve. If the system lacks an adequate strainer before the valve, the problem will persist. 3. Check that the plunger is not jammed or the seats damaged. In the first case, clean it, in the second case, change it. If the orifice seat is damaged, consult Jefferson. 4. Clean the orifice, if the orifice is damaged consult Clark. 5. Check that solids have not affected the piston's movement. After cleaning, check that it is not damaged. A strainer must be placed upstream from the valve to eliminate the problem. 6. Change the damaged parts. Check that the cause is not dirt. 7. Fluids with vicosities exceeding 60 cSt cannot be used with pilot operated valves.
3. The coil gives off a burning smell after working for a short period or it burns up frequently.	1. Excessive voltage. 2. Only for AC: Too high a pressure that does not allow the pilot to open, therefore, only inrush current is present, which doubles the holding current. 3. The coil's nominal voltage is less than the source's or does not correspond to its cycling. 4. Excessive fluid or ambient temperature. 5. Moisture entering the interior of the coil. 6. Lack of part of the electromagnetic package when it is not integrated to the coil. 7. It is energized outside the valve (AC only).	1. The voltage must not exceed 10% of the nominal voltage, and only for brief periods. Correct the voltage. 2. Adjust the maximum working pressure to the maximum shown on the nameplate. If pressure is within the parameters, check that voltage is not less than 85% of the nominal voltage. 3. Check that the voltage and current type is as indicated on the coil. 4. The fluid, atmosphere and power of the coil determine the internal temperature. As a general rule, the fluid temperature + ambient temperature must not exceed 210ºC. The fluid temperature cannot be above 180ºC. When handling hot fluids and the ambient exceeds 30ºC, it is advisable to fit the valve in the most ventilated area. 5. Check that DIN coils' strain relief is tight and the armored cable corresponds to the connector PG size. For series 1314, check that the housing and connection are closed. See mounting recommendations. 6. Replace the missing parts because they are part of the magnetic circuits and their absence results in an increase of the intensity which reduces the force of the magnetic attraction. 7. Do not energize the coil if it is not fitted to the valve.
4.The coil vibrates when energized.	1. Insufficient voltage. 2. Dirty fixed core and plunger surfaces, they have scales.	1. Adjust the voltage within the permitted parameters. 2. Clean the surfaces. If scales remain there, change the components.
5-Fluid leakage when closed.	1. Main or pilot seat damaged or dirty.	1. Clean or change seats. If the orifice seats are damaged, consult Clark.
6-It operates slowly or fails.	1. Compensation or pilot orifice partially blocked. 2. Excessive fluid viscosity. 3. Temporary excess or lack of differential pressure.	1. In case of dirt, clean the orifices. In case of damage, consult Clark. 2. The fluid's viscosity must not exceed 60 cSt. 3. Check that both differential and opening pressure differential are within the limits indicated in the valve nameplate.