

## 1. Pilot operated diaphragm and piston valves

<i>Problem</i>	<i>Probable cause</i>	<i>How to correct</i>
Valve does not open when coil is energised.	No voltage supply. Voltage may be too low or incorrect.	Check voltage; voltage must be within declared limits (AC $\pm 10\%$ ; DC $\pm 5\%$ ).
	Pilot orifice is blocked.	Disassemble valve and clean pilot orifice.
	Diaphragm or piston ring is ruptured.	Replace damaged part.
	Dirt or calcium deposits within solenoid base is blocking solenoid core.	Disassemble valve and clean thoroughly; install strainer on the inlet side of valve. (40 $\mu\text{m}$ mesh recommended).
	Inlet pressure is too high.	Reduce pressure if possible; consult our staff over valve's suitability.
	Pressure difference is insufficient.	Valve may be oversized for your application; increase inlet pressure if valve permits or replace valve with smaller one,
	Solenoid base is damaged.	Replace damaged part.
Valve does not close when coil is de-energised.	Coil is still energised.	Check electric circuit.
	Flow direction is incorrect.	Check valve orientation; arrow mark on valve body indicates flow direction.
	Pilot orifice is blocked.	Disassemble valve and clean pilot orifice.
	Dirt or calcium deposits within solenoid base is blocking solenoid core.	Disassemble valve and clean thoroughly; install strainer on the inlet side of valve. (40 $\mu\text{m}$ mesh recommended).
	Solenoid base is damaged.	Replace damaged part.
Valve does not shut tightly or it leaks.	Damaged sealing disc / diaphragm / valve seat / solenoid core spring.	Replace damaged part; never stretch or shorten core spring!
	Pressure difference is insufficient.	Valve may be oversized for your application; increase inlet pressure if valve permits or replace valve with smaller one.

## 2. Direct acting valves

<i>Problem</i>	<i>Probable cause</i>	<i>How to correct</i>
Valve does not open when coil is energised.	No voltage supply. Voltage may be too low or incorrect.	Check voltage; voltage must be within declared limits (AC $\pm 10\%$ ; DC $\pm 5\%$ ).
	Inlet pressure is too high.	Reduce pressure if possible; consult our staff over valve's suitability.
	Dirt or calcium deposits within solenoid base is blocking solenoid core; solenoid base may be damaged.	Disassemble valve and clean thoroughly; replace damaged parts; install strainer on the inlet side of valve. (max 40 $\mu\text{m}$ mesh).
	Coil is burned.	Replace coil. Refer to section 3 for probable causes of coil burning.
Valve does not close when coil is de-energised.	Coil is still energised.	Check electric circuit.
	Flow direction is incorrect.	Check valve orientation; arrow mark on valve body indicates flow direction.
	Dirt or calcium deposits within solenoid base is blocking solenoid core.	Disassemble valve and clean thoroughly; install strainer on the inlet side of valve. (40 $\mu\text{m}$ mesh recommended).
	Solenoid base is damaged.	Replace damaged part.
Valve does not shut tightly or it leaks.	Damaged sealing disc / valve seat / solenoid core spring.	Replace damaged part; never stretch or shorten core spring!

## 3. Coils

<i>Problem</i>	<i>Probable cause</i>	<i>Prevention</i>
Coil is burned.	Dirt or calcium deposits within solenoid base blocking solenoid core.	Disassemble valve and clean thoroughly; install strainer on the inlet side of valve. (40 $\mu\text{m}$ mesh recommended).
	There is moisture inside coil.	Seal and tighten cable gland; make sure that plug seals are in place; use sealing set or TM35k coil in humid environment (see page 37).
	Solenoid core does not move due to excessive fluid pressure.	Reduce pressure or install suitable valve; consult our staff over valve's suitability.
	Solenoid core is blocked due to damaged solenoid base or core spring.	Disassemble valve and clean thoroughly; replace damaged parts.
	Valve is missing parts or is not properly assembled.	Check valve assembly; replace missing parts if necessary.
	Supply voltage is too high or incorrect.	Check voltage; voltage must be within declared limits (AC $\pm 10\%$ ; DC $\pm 5\%$ ).
	Fluid and/or ambient temperature is too high.	Consult our staff over suitability of chosen valve/coil.

## Pressure conversion table

bar	Mpa	PSI
0	0	0
0.001	0.0001	0.015
0.002	0.0002	0.029
0.003	0.0003	0.044
0.004	0.0004	0.058
0.005	0.0005	0.073
0.006	0.0006	0.087
0.007	0.0007	0.102
0.008	0.0008	0.116
0.009	0.0009	0.131
0.01	0.001	0.145
0.02	0.002	0.290
0.03	0.003	0.435
0.04	0.004	0.580
0.05	0.005	0.725
0.06	0.006	0.870
0.07	0.007	1.015
0.08	0.008	1.160
0.09	0.009	1.305
0.1	0.01	1.45
0.2	0.02	2.90
0.3	0.03	4.35
0.4	0.04	5.80
0.5	0.05	7.25
0.6	0.06	8.70
0.7	0.07	10.15
0.8	0.08	11.60
0.9	0.09	13.05
1	0.1	14.50
1.5	0.15	21.75
2	0.2	29.01
2.5	0.25	36.26
3	0.3	43.51
3.5	0.35	50.76
4	0.4	58.01
4.5	0.45	65.26
5	0.5	72.52

bar	Mpa	PSI
6	0.6	87.02
6.5	0.65	94.27
7	0.7	101.52
7.5	0.75	108.77
8	0.8	116.03
8.5	0.85	123.28
9	0.9	130.53
9.5	0.95	137.78
10	1	145.03
11	1.1	159.54
12	1.2	174.04
13	1.3	188.54
14	1.4	203.05
15	1.5	217.55
16	1.6	232.05
17	1.7	246.56
18	1.8	261.06
19	1.9	275.56
20	2	290.07
21	2.1	304.57
22	2.2	319.07
23	2.3	333.57
24	2.4	348.08
25	2.5	362.58
26	2.6	377.08
27	2.7	391.59
28	2.8	406.09
29	2.9	420.59
30	3	435.10
35	3.5	507.61
40	4	580.13
45	4.5	652.65
50	5	725.16
55	5.5	797.68
60	6	870.20
65	6.5	942.71
70	7	1015.23

bar	Mpa	PSI
80	8	1160.26
85	8.5	1232.78
90	9	1305.29
95	9.5	1377.81
100	10	1450.33
105	10.5	1522.84
110	11	1595.36
115	11.5	1667.87
120	12	1740.39
125	12.5	1812.91
130	13	1885.42
135	13.5	1957.94
140	14	2030.46
145	14.5	2102.97
150	15	2175.49
155	15.5	2248.01
160	16	2320.52
165	16.5	2393.04
170	17	2465.55
175	17.5	2538.07
180	18	2610.59
185	18.5	2683.10
190	19	2755.62
195	19.5	2828.14
200	20	2900.65
210	21	3045.79
220	22	3190.83
230	23	3335.87
240	24	3480.91
250	25	3625.94
260	26	3770.98
270	27	3916.02
280	28	4061.06
290	29	4206.09
300	30	4351.13
400	40	5801.51
500	50	7251.89

## Orifice sizes with approximate inch equivalents

mm	in.
1	5/128"
1.2	3/64"
1.4	7/128"
1.5	7/128"
1.6	1/16"
1.8	9/128"
2	5/64"
2.3	3/32"
2.5	13/128"
3	7/64"
4	5/32"
4.5	23/128"
5	25/128"
5.5	7/32"

mm	in.
6	15/64"
7	35/128"
7.3	37/128"
8	5/16"
10	25/64"
11	7/16"
12	61/128"
15	19/32"
18	91/128"
20	25/32"
23	29/32"
25	1"
40	1 1/2"
50	2"

## BASIC UNIT CONVERSIONS

### Pressure

1 bar = 14.50326 PSI  
 1 bar = 10 N/cm<sup>2</sup>  
 1 bar = 0.1 MPa  
 1 PSI = 0.06895 bar  
 1 kg/cm<sup>2</sup> = 0.981 bar

### Temperature

°F = (°C x 9/5) + 32  
 °C = (°F - 32) x 5/9  
 K = °C + 273

### Flow rate

1 l/min = 16.667 m<sup>3</sup>/h  
 1 l/min = 1.412579 x 10<sup>-3</sup> cu ft/min (CFM)  
 1 m<sup>3</sup>/h = 0.06 l/min

### Mass

1 kg = 35.27399 oz.  
 1 kg = 2.2 lb  
 1 lb = 0.455 kg