Leer

Nominal capacity Q_N (kW)

Type	Kv-value m³/h		Liquid				Hot Gas				Suction Gas			
			R134a	R22	R407C	R404A R507	R134a	R22	R407C	R404A R507	R134a	R22	R407C	R404a
MD 062	0.17	direct operated.	5.1	5.5	5	3.8	1.12	1.46	1.39	1.29				
MA 062	0.17	no min. pressure	5.1	5.5	5	3.8	1.12	1.46	1.39	1.29				
M(G)D 102	0.22	difference	6.7	7.2	7	4.9	1.44	1.89	1.80	1.66				
M(G)D 103	0.23	required	7.0	7.5	7	5.2	1.51	1.98	1.88	1.74				
M(G)S 103	0.9		27	29	29	20	5.93	7.33	7.37	6.77	1.5	2.1	1.92	1.8
M(G)S 104	0.9	pilot operated	27	29	29	20	5.93	7.33	7.37	6,77	1.5	2.1	1.92	1.8
M(G)S 124	1.6	min. pressure	48	52	51	35.9	10.5	13.7	13.10	12.1	2.7	3.6	3.42	3.16
M(G)S 125	1.6	difference	48	52	51	35.9	10.5	13.7	13.10	12.1	2.7	3.6	3.42	3.16
M(G)S 165	2	to open valve:	61	65	63	45	13.2	17.2	16.38	15.1	3.4	4.55	4.27	3.95
M(G)S 167	2	0.05 bar	61	65	63	45	13.2	17.2	16.38	15.1	3.4	4.55	4.27	3.95
M(G)S 227	4		122	130	127	90	26.3	34.4	32.76	30.3	6.8	9.1	8.5	7.9

The nominal capacity Q_N is based on the following conditions:

Medium	Condensing temperature °C	Evaporating temperature °C	Pressure loss across valve Δp (bar)
Liquid	25	–10	0. 4
Hot gas	25	–10	1
Suction gas	25	–10	0.15

Valve selection for other operating conditions. see the following tables:

Valve calculation for the liquid line $Q_N = Q_o \times f_{TF} \times f_{\Delta PF}$

– Q_N = Nominal capacity (according to data sheet)
– Q_o = Refrigeration capacity
– f_{TF} = Correcting factor for evaporating and liquid temperature
– $f_{\Delta}PF$ = Correcting factor for pressure loss across the valve

Correcting factor f_{TF} – for the change of capacity according to the operating temperatures

	R 134a						R 22						R 407C					R 404A / R 507					
	V E R D A M P F U N G S T E M P E R A T U R ° C																						
°C	+10	0	-10	-20	-30	-40	+10	0	-10	-20	-30	-40	+10	0	-10	-20	-30	+10	0	-10	-20	-30	-40
0	-	-	0.80	0.83	0.85	0.88	-	-	0.82	0.83	0.85	0.88	-	-	0.8	0.8	0.8	-	-	0.73	0.76	0.79	0.83
+5	-	-	0.83	0.86	0.89	0.93	-	-	0.85	0.87	0.89	0.91	-	0.8	0.8	0.8	0.9	-	-	0.77	0.8	0.84	0.88
+10	-	0.84	0.87	0.91	0.94	0.97	-	0.86	0.88	0.90	0.92	0.95	-	0.8	0.9	0.9	0.9	-	0.79	0.82	0.85	0.89	0.94
+15	-	0.88	0.91	0.94	0.98	1.02	-	0.90	0.92	0.94	0.96	0.99	0.9	0.9	0.9	0.9	1.0	-	0.84	0.87	0.91	0.95	1
+20	0.89	0.92	0.95	0.99	1.03	1.08	0.92	0.94	0.96	0.98	1.00	1.03	0.9	0.9	0.9	1.0	1.0	0.86	0.89	0.93	0.97	1.02	1.08
+25	0.94	0.96	1.00	1.05	1.09	1.14	0.96	0.98	1.00	1.03	1.05	1.09	0.9	1.0	1.0	1.0	1.1	0.92	0.96	1.05	1.05	1.11	1.18
+30	0.99	1.02	1.06	1.12	1.16	1.22	1.01	1.02	1.05	1.08	1.10	1.14	1.0	1.0	1.0	1.1	1.2	0.99	1.03	1.08	1.14	1.21	1.29
+35	1.04	1.08	1.12	1.18	1.24	1.30	1.05	1.07	1.10	1.13	1.16	1.20	1.1	1.1	1.1	1.2	1.2	1.08	1.13	1.19	1.26	1.34	1.44
+40	1.10	1.14	1.19	1.26	1.32	1.39	1.10	1.12	1.15	1.19	1.22	1.26	1.1	1.2	1.2	1.3	1.3	1.18	1.24	1.32	1.4	1.5	1.63
+45	1.18	1.22	1.28	1.35	1.42	1.50	1.17	1.19	1.22	1.26	1.29	1.34	1.2	1.3	1.3	1.4	1.4	1.32	1.39	1.48	1.59	1.72	1.88
+50	1.25	1.24	1.37	1.45	1.53	1.62	1.23	1.26	1.29	1.33	1.37	1.42	1,.3	1.4	1.4	1.5	1.6	1.5	1.59	1.7	1.85	2.02	2.23
+55	1.35	1.41	1.48	1.58	1.67	1.78	1.30	1.33	1.37	1.42	1.46	1.52	1.4	1.5	1.6	1.7	1.8	1.74	1.87	2.02	2.22	2.47	2.79
+60	1.46	1.55	1.61	1.73	1.84	1.97	1.38	1.41	1.46	1.51	1.56	1.63	-	-	-	-	-	-	-	-	-	-	-

Correcting factor $f_{\Delta PF}$ – for the change of capacity according to the chosen pressure loss across the valve

Pressure loss across valve $_{\Delta p}$ (bar)	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70
Correcting factor $f_{\Delta PF}$	2.83	2	1.63	1.41	1.26	1.15	1.07	1	0.94	0.89	0.85	0.82	0.78	0.76

Valve capacity for the hot gas line (kW)

Type	Press loss across valve	evaporating temperature t_o = –10 °C, hot gas temperature t_H = +25 °C, t_u = 1 K																	
		R 134a condensing temperature					R 22 condensing temperature					R 407C condensing temperature				R 404A / R 507 condensing temperature			
	Δp	+25	+30	+40	+50	+60	+25	+30	+40	+50	+60	+25	+30	+40	+50	+25	+30	+40	+50
MA 062 MD 062	0.2	0.54	0.55	0.57	0.58	0.57	0.68	0.7	0.74	0.76	0.78	0.62	0.65	0.68	0.7	0.6	0.6	0.58	0.53
	0.5	0.83	0.86	0.89	0.90	0.89	1.06	1.1	1.15	1.19	1.22	0.98	1.02	1.08	1.11	0.93	0.93	0.9	0.83
	1.0	1.12	1.17	1.23	1.25	1.24	1.46	1.51	1.6	1.67	1.7	1.39	1.44	1.52	1.57	1.29	1.29	1.26	1.16
	1.5	1.31	1.38	1.47	1.5	1.5	1.74	1.81	1.93	2.01	2.06	1.71	1.77	1.87	1.93	1.54	1.55	1.52	1.41
	2.0	1.44	1.52	1.64	1.70	1.70	1.94	2.04	2.19	2.29	2.34	1.96	2.04	2.15	2.22				
MD 102 MGD 102	0.2	0.69	0.72	0.75	0.75	0.73	0.77	0.91	0.96	0.99	1.00	0.81	0.83	0.88	0.91	0.77	0.77	0.74	0.68
	0.5	1.07	1.11	1.15	1.17	1.16	1.37	1.42	1.49	1.55	1.58	1.27	1.32	1.39	1.44	1.2	1.2	1.17	1.07
	1.0	1.44	1.51	1.60	1.62	1.61	1.89	1.96	2.08	2.15	2.2	1.80	1.87	1.97	2.04	1.66	1.67	1.63	1.5
	1.5	1.69	1.78	1.89	1.94	1.93	2.25	2.34	2.50	2.60	2.66	2.21	2.29	2.41	2.49	1.99	2	1.96	1.82
	2.0	1.86	1.97	2.12	2.2	2.2	2.52	2.64	2.83	2.97	3.03	2.55	2.64	2.79	2.88				
MD 103 MGD 103	0.2	0.72	0.75	0.78	0.78	0.77	0.8	0.95	1	1.03	1.05	0.84	0.87	0.92	0.95	0.8	0.8	0.78	0.71
	0.5	1.12	1.16	1.21	1.22	1.21	1.43	1.48	1.56	1.62	1.65	1.33	1.38	1.46	1.50	1.26	1.26	1.22	1.12
	1.0	1.51	1.58	1.67	1.69	1.68	1.98	2.05	2.17	2.25	2.3	1.88	1.95	2.06	2.13	1.74	1.74	1.7	1.57
	1.5	1.77	1.86	1.98	2.03	2.02	2.35	2.45	2.61	2.72	2.78	2.31	2.39	2.52	2.61	2.08	2.09	2.05	1.9
	2.0	1.94	2.06	2.22	2.3	2.3	2.64	2.76	2.96	3.1	3.17	2.66	2.76	2.91	3.01				
MS 103 MS 104 MGS 103 MGS 104	0.2	2.83	2.93	3.04	3.06	3.02	4.2	4.33	4.55	4.7	4.79	3.60	3.71	3.90	4.03	3.09	3.09	3.00	2.74
	0.5	4.37	4.53	4.73	4.78	4.72	6.55	6.76	7.13	7.38	7.52	5.61	5.79	6.11	6.33	4.89	4.89	4.80	4.37
	1.0	5.93	6.19	6.52	6.63	6.57	9.02	9.35	9.91	10.3	10.5	7.73	8.01	8.49	8.83	6.77	6.86	6.69	6.09
	1.5	6.93	7.29	7.77	7.95	7.92	10.8	11.2	11.9	12.4	12.7	9.26	9.60	10.20	10.62	8.14	8.14	8.06	7.37
	2.0	7.60	8.07	8.66	9.00	9.00	12.1	12.6	13.5	14.2	14.5	10.37	10.80	11.57	12.17				
MS 124 MS 125 MGS 124 MGS 125	0.2	5.04	5.21	5.4	5.44	5.36	6.4	6.6	6.94	7.17	7.3	5.86	6.07	6.41	6.62	5.6	5.6	5.44	4.96
	0.5	7.77	8.07	8.4	8.5	8.39	9.97	10.3	10.9	11.2	11.5	9.27	9.6	10.14	10.47	8.76	8.76	8.52	7.8
	1.0	10.5	11	11.6	11.8	11.7	13.7	14.3	15.1	15.7	16	13.10	13.57	14.33	14.81	12.1	12.1	11.8	10.9
	1.5	12.3	13	13.8	14.1	14.1	16.4	17.1	18.2	19	19.4	16.05	16.63	17.56	18.13	14.5	14.6	14.3	13.2
	2.0	13.5	14.3	15.5	16	16	18,4	19,2	20,6	21,6	22,1	18.53	19.20	20.27	20.94				
MS 165 MS 167 MGS 165 MGS 167	0.2	6.29	6.51	6.76	6.8	6.7	8	8.25	8.68	8.96	9.12	7.33	7.59	8.01	8.28	7	7	6.8	6.2
	0.5	9.72	10.1	10.5	10.6	10.5	12.5	12.9	13.6	14.1	14.3	11.58	12.0	12.67	13.09	10.9	10.9	1.6	9.7
	1.0	13.2	13.7	14.5	14.7	14.6	17.2	17.8	18.9	19.6	20	16.38	16.97	17.92	18.51	15.1	15.2	14.8	13.6
	1.5	15.4	16.2	17.2	17.7	17.6	20.5	21.3	22.7	23.7	24.2	20.06	20.78	21.95	22.67	18.1	18.2	17.9	16.5
	2.0	16.9	17.9	19.3	20	20	23	24	25,7	27	27,6	23.16	24.0	25.34	26.17				
MS 227 MGS 227	0.2	12.6	13	13.5	13.6	13,4	16	16,5	17,4	17,9	18,2	14.65	15.18	16.03	16.55	14	14	13.6	12.4
	0.5	19.4	20.1	21	21.2	21	24,9	25,8	27,1	28,1	28,6	23.16	24.00	25.34	26.17	21.9	21.9	21.3	19.5
	1.0	26.3	27.5	29	29.5	29.2	34.4	35.6	37.8	39.2	40	32.76	33.94	35.84	37.01	30.3	30.4	29.7	27.3
	1.5	30.8	32.4	34.5	35.3	35.2	41	42.6	45.4	47.4	48.4	40.12	41.56	43.89	45.33	36.3	36.5	35.8	33.1
	2.0	33.8	35.9	38.7	39.9	40	45.9	48	51.5	53.9	55.2	46.33	47.99	50.68	52,.35				

If the hot gas temperature is changed by ± 10 °C the valve capacity changes (inversely proportional) by ± 2,5 %.
With other evaporating temperatures t_o the above capacities should be multiplied by the following correcting factors:

t_o °C	–50	–40	–30	–20	–10	±0	+10
R 134a	–	0.85	0.90	0.95	1	1.05	1.09
R 22	0.88	0.91	0.95	0.97	1	1.03	1.05
R 407C	0.83	0.88	0.92	0.95	1	1.01	1.06
R 404A / R 507	0.75	0.81	0.88	0.13	1	1.05	–

Valve calculation for the suction line $Q_N = Q_o \times f_{TS} \times f_{\Delta PS}$

- Q_N = Nominal capacity (according to data sheet)
- Q_o = Refrigeration capacity
- f_{TS} = Correcting factor for evaporating and liquid temperature
- $f_{\Delta PS}$ = Correcting factor for pressure loss across the valve

Correcting factor f_{TS} for the change of capacity according to the operating temperatures

Evaporating temperature t_o (°C)	Condensating temperatur t_k (°C)				
	+60	**+50**	**+40**	**+30**	**+20**
VALID FOR REFRIGERANT R 134a, R 22, R 407C					
+10	0.98	0.86	0.78	0.71	0.66
±0	1.19	1.05	0.95	0.86	0.79
–10	1.48	1.29	1.16	1.05	0.96
–20	1.88	1.62	1.44	1.31	1.19
–30	2.42	2.08	1.83	1.65	1.59
–40	3.20	2.71	2.37	2.13	1.92
VALID FOR REFRIGERANT R 404A, R 507					
+10	–	1.14	0.82	0.71	0.63
±0	–	1.24	1.01	0.87	0.77
–10	–	1.57	1.26	1.07	0.94
–20	–	2.02	1.60	1.35	1.17
–30	–	2.67	2.07	1.72	1.49
–40	–	3.62	2.74	2.25	1.93

Correcting factors $f_{\Delta PS}$ for the change of capacity according to the chosen pressure loss across the valve

Pressure loss across valve Δp (bar)	0.05	0.075	0.1	0.15	0.2	0.3	0.4	0.5	0.6
Correcting factor $f_{\Delta PS}$	1.73	1.41	1.22	1	0.87	0.71	0.61	0.55	0.5

Valve nomenclature / Order instructions

1. Complete valve incl. coil

M S 16 5 230 V AC

Series:

Operation:
(S) = pilot operated
(D) = direct operated
(A) = direct operated, angle

Valve size:

Tube diameter in 1/8" SAE:

Voltage:

2. Solenoid Coils as Spare Parts

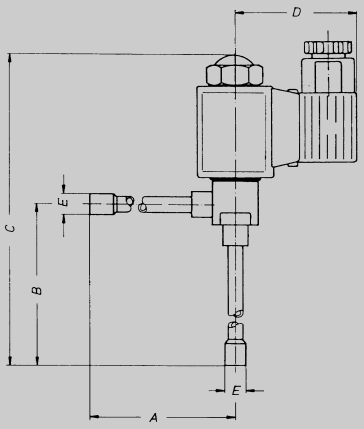
International protection rating IP65, coil incl. e.l.c.b.-protected plug to DIN 43650 with cable gland; conduit thread PG11(PG 9 on request)

Solenoid Valve	Type of coil	Voltage AC 50 – 60 Hz	Capacity	Voltage DC	Capacity
MD 102(S)(MMS) MD 103(S)(MMS) MS 103-227(S)(MMS)	**M C 102-227**	230 V 110 V 24 V tolerance: ± 10 %	13 W	24 V 110 V 230 V ~ incl. rectifier in plug	20 W
MGD 102(S)(MMS) MGD 103(S)(MMS) MGS 103-227(S)(MMS)	**M C 102-227**	–	–		
MD 062(S)(MMS) MA 062(S)(MMS)	**M C 1062**	230 V / 110 V 24 V	8 W	–	–

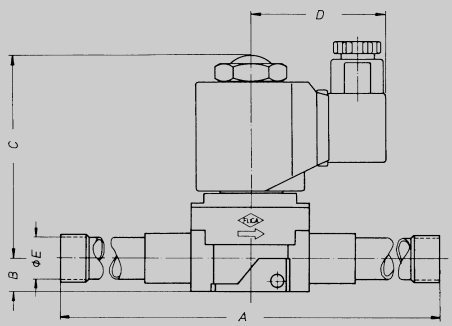
Dimensions and weights

Type	Dimensions in mm					Weight in kgs		Tube diameter
	A	B	C	D	E	AC	DC	
Direct operated								
MA 062	88	88	142	47	6 mm	0.25		6 mm
MA 062S	88	88	142	47	1/4”	0.25		1/4”
MD 062	65	17	57	47	UNF 7/16”	0.25		6 mm / 1/4”
MD 062MMS	111	17	57	47	6 mm	0.25		6 mm
MD 062S	111	17	57	47	1/4”	0.25		1/4”
MD 102	68	19	64	54	UNF 7/16”	0.43	0.83	6 mm / 1/4”
MD 102MMS	116	19	64	54	6 mm	0.41	0.81	6 mm
MD 102S	116	19	64	54	1/4”	0.41	0.81	1/4”
MD 103	71	19	64	54	UNF 5/8”	0.45	0.85	10 mm / 3/8”
MD 103MMS	116	19	64	54	10 mm	0.44	0.84	10 mm
MD 103S	116	19	64	54	3/8”	0.44	0.84	3/8”
Pilot operated								
MS 103	84	12	79	54	UNF 5/8”	0.74	1.14	10 mm / 3/8”
MS 103MMS	159	12	79	54	10 mm	0.70	1.10	10 mm
MS 103S	159	12	79	54	3/8”	0.70	1.10	3/8”
MS 104MMS	159	12	79	54	13 mm	0.70	1.10	12 mm
MS 104S	159	12	79	54	1/2”	0.70	1.10	1/2”
MS 124	91	12	79	54	UNF 3/4”“	0.81	1.31	12 mm / 1/2”
MS 124MMS	159	12	79	54	12 mm	0.71	1.11	12 mm
MS 124S	159	12	79	54	1/2"	0.71	1.11	1/2”
MS 125S	159	12	79	54	15-16 mm 5/8”	0.71	1.11	15-16 mm 5/8”
MS 165	97	12	79	54	UNF 7/8”	0.87	1.27	15-16 mm 5/8”
MS 165S	159	12	79	54	15-16 mm 5/8”	0.74	1.14	15-16 mm 5/8”
MS 167S	159	12	79	54	22 mm 7/8”	0.74	1.14	22 mm / 7/8”
MS 227S	260	22	88	54	22 mm 7/8”	1.5	1.9	22mm / 7/8”

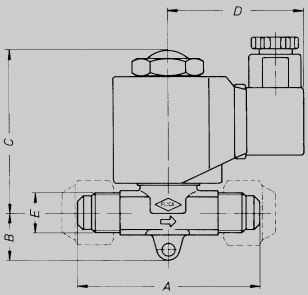
*Nominal capacity



MA



MS



MD

Installation

Respect the mounting instruction of the solenoid valves!

- Arrow on valve body must correspond with flow direction.
- Keep 45 mm distance clear above the valve for assembly/disassembly of coil.
- Position of plunger tube should be from upright to horizontal position.
- Solder valves:
  - Remove cap nut, solenoid coil and gaskets before soldering
  - Max. temperature of valve body: 120 °C.
  - When soldering, always point flame away from valve (keep housing cool, eg. using a wet cloth).
  - When assembling after soldering, fit the coil's top and bottom seal rings.
  - Max. torque of the cap nut 1.5 Nm.
- Flare valves:
  - When tightening flare nuts grip at wrench flats on the valve body provided for this purposes; do not use coil and plunger tube as lever (thin-walled plunger tube).
  - When installing direct operated valves with 20 W DC coils the flare nut must be tightened that way that one flatof the nut is in parallel with the lower surface of the coil.
- Fit solenoid valve so that it is drip proof.

Connection to network

- Voltage of coil and network must correspond.
- The flat spade terminals is the earth connection. The protective conductor must also be connected at the plant.
- Plug unit can be turned by 4 x 90°.
- Mount gasket between plug and coil.
- All seals and the cable gland must be fitted carefully in order to achieve protection to IP65.
- Tighten fixing screw of connector.

Honeywell

Honeywell
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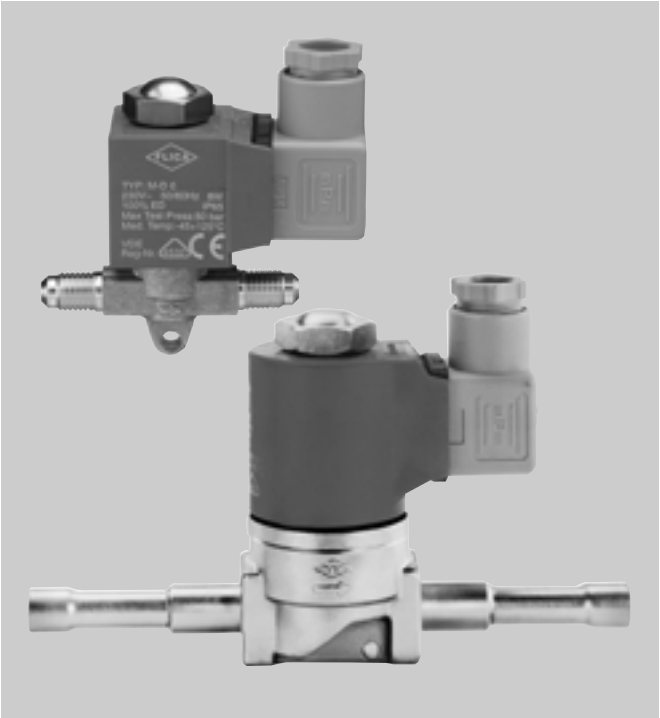
Atelier Klöpfer 02.2000

Series M

Solenoid valves suitable for all fluorinated refrigerants

Specification Data



Specification / Technical data

- Normally closed
- Solenoid coil encapsulated, including safety connector to DIN 43650, protected to IP65
- Plug unit rotatable by 4 x 90°
- Hermetically sealed valves thanks to teflon seal
- Efficient sealing prevents the coil burning out
- Built in accordance with EN 60335-1
- Extremely low leakage rate at the valve seat
- Series M: standard version
- Series MG: noise reduced version
- Noise reduced version to damp the opening noise. The damping effect depends on the medium. The best noise damping is achieved in the liquid line with medium temperatures between –20 °C and +80 °C. Noise reduced valves MGD, MGS operate with DC coils only.
  When using noise reduced valves with AC 230 V the coil MC 102-227 230 V AC
  (⊣◀ Part-No. MC-00011) is to be used.
  The AC will be rectified in the pertaining connector.

Application

- Suitable for all gaseous and liquid refrigerants and oils dissolved and carried therein, not for NH_3
- Fracture-resistant plunger tube guarantees no refrigerant loss even when operated frequently

- **M(G)D direct operated,**
  no minimum pressure differential required to open the valve
- **M(G)S pilot operated,**
  minimum pressure differential to open the valve 0.05 bar
- Medium temperature:
  version M: –45°C to +125°C
  version MG: –30°C to +80°C
  in the liquid, suction and hot gas line
- Ambient temperature: –40° C to +80° C
- Standard voltage:
  AC: 230 V ~ 50/60 Hz, 24 V ~ 50/60 Hz, 110 V ~ 50/60 Hz
  DC: 12 V, 24 V, 110 V
  230 V ~ with rectifier in connector
  Other voltages on request
- Nominal capacity:
  MA 062 + MD 062: 8 W AC,
  MD 102 – MD 103: 13 W AC, 20 W DC
  MS 103 – MS 227: 13 W AC, 20 W DC
- Max. permissible operating pressure: 35 bar
  Max. opening pressure differential: MOPD
  AC coil: 30 bar
  DC coil 20 W: 21 bar
- Max. admissible pressure drop: with pilot operated valves, the max. pressure loss must not be higher than $\Delta p = 2$ bar when the valve is open. This applies specifically when operating solenoid valves in hot gas lines within compound systems.
- Materials:
  Valve body: brass
  Plunger: stainless steel
  Seal material: PTFE / Neoprene

Cooling Solutions