ON/OFF solenoid for hydraulic application

4
Product group

F MM E + F HT S

Function

- Armature space pressure tight, nominal operating pressure up to 250 bar
- Magnetic force vs. stroke characteristic increasing
- Quick response times
- Push type

Fig. 1: Solenoid body type F MM E with complete tube F HT S

Construction

- Electrical connection via robust terminal made of metal
- Construction size: 35mm, 45mm, 60mm
- Protection class according to DIN VDE 0470/DIN EN 60529 when properly installed: IP 65
- Integrated circuit with TVS diode
- Explosion protection: Ⓔx II 2G Ex eb mb IIC T6 / T4 Gb
  Ⓔx II 2D Ex tb IIIC T80°C / T130°C Db
- Mounting via central thread
- Simple exchange of the solenoid body without opening the hydraulic circuit
- Manual override

Application examples

- Hydraulic applications in explosive atmospheres (Gas: Zone 1 resp. EPL Gb, Dust: Zone 21 resp. EPL Db) e.g. in chemical companies, refineries and refueling facilities

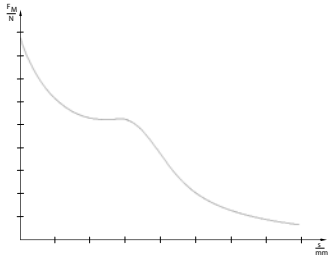


Fig. 2: Magnetic force-stroke-characteristic

Options and accessories on request

- Protection class IP 67
- AC version with bridge rectifier
- Other ambient temperatures
- In the framework of our platform for valve solenoids there is a variety of variation possibilities for customer specific requirements. We are pleased to work out your individual solution in a personal meeting.

Standards and approvals

- Design and testing according to DIN VDE 0580
- Quality management to ISO 9001, DIN EN ISO/IEC 80079-34
- ATEX, IECEx

Technical data

Size			**035**	**045**	**060**
Operating mode			S1 (100 %)		
Reference temperature ϑ_{11} [1]		(°C)	50		
Ambient temperature T_a [1]		(°C)	-30 ... +50		
Rated voltage U_N		(V DC)	24±10%		
Temperature class			T4		
Total stroke s		(mm)	**Magnetic force F_M (N)**		
		0	90	189	363
		0,5	61	145	298
		1	53	112	253
		1,5	52	95	213
		2	37	67	185
		2,5	20	43	166
		3	12	29	154
		3,5	8	21	146
		4	6	17	125
		5		11	74
		6		8	49
		7			34
		8			25
Working stroke s_W		(mm)	1,5	1,5	3,5
Nominal operating pressure (dynamic)		(bar)	250	210	
Rated work W_N with working stroke s_W		(Ncm)	7,8	14,3	51,1
Rated power P_{20}		(W)	17,5	22,5	41,4
Operating frequency		(1/h)	3.600		
Armature weight m_A		(kg)	0,044	0,061	0,18
Solenoid weight m_M		(kg)	0,42	0,71	1,84
The heating test is based on the assembly on a hydraulic valve with base plate and the minimum dimensions	hydraulic valve	(mm)	46 x 76 x 66		67 x 67 x 82 + 105x32x116
	material		iron or material with the same or better heat conduction		

[1] The reference temperature resp. ambient temperature may also not been exceeded by a heat input via an operating medium (e.g. oil).

Table 1

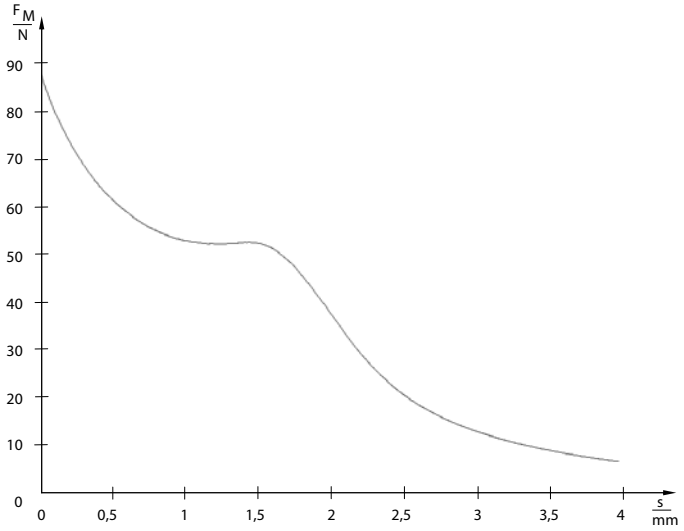


Fig. 2: Magnetic force vs. stroke characteristic size 035

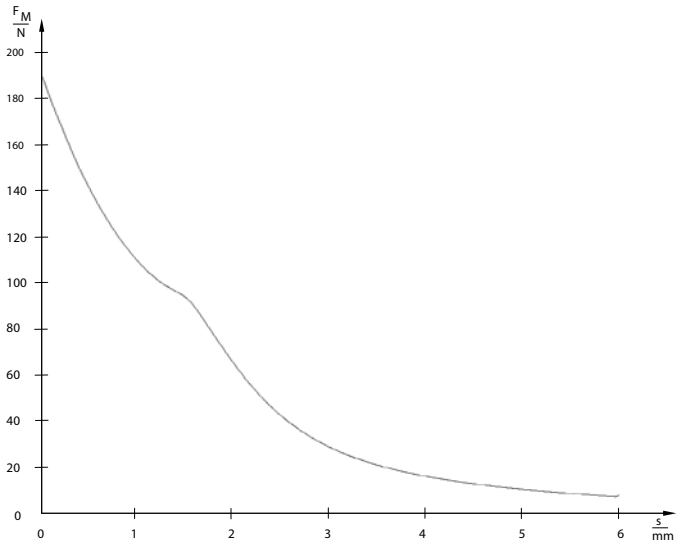


Fig. 3: Magnetic force vs. stroke characteristic size 045

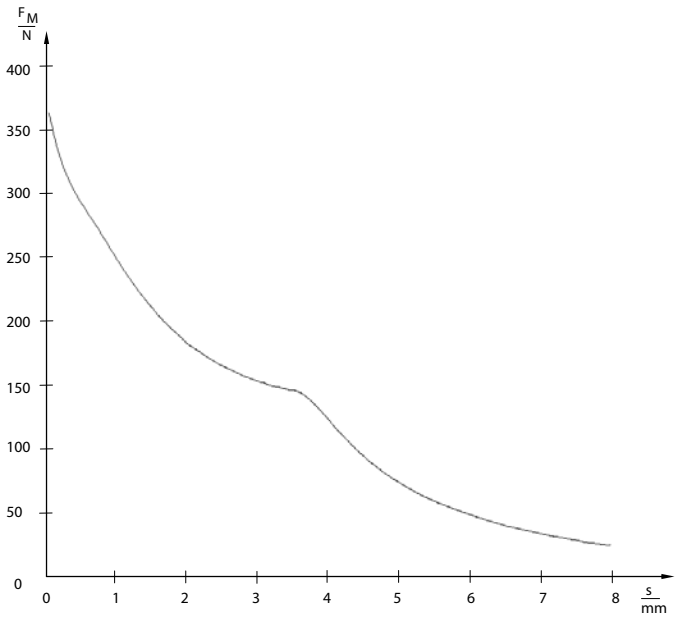


Fig. 4: Magnetic force vs. stroke characteristic size 060

Standard values for voltage and operating mode: 24V, S1 (100%).

The indicated technical data refer to a power supply of the AC network via bridge rectifiers.

An adaptation of the exciter coil to other current and resistance values is possible on request.

Further temperature classes and ambient temperature ranges see part list F MM E.

The force values shown in the diagram refer to 90% of the rated voltage (Un = ⎓24 V) and to the normal operating temperature according to DIN VDE EN 0580. For other voltages deviations of the magnetic force may occur.

Due to natural dispersion the magnetic force values may deviate by about ± 10 % from the table values.

The interior of the solenoid and the armature bearing are resistant against all neutral liquids normally used in hydraulics. Please contact us when using other operating media.

Protection class, protective conductor connection

The devices correspond to protection class I.

Due to their construction devies with renewable solenoid body do not have a continuous proper protective conductor connection between the protective conductor connector of the solenoid body and the tube.

A proper protective conductor connection of the tube resp. of the connected valve is to be ensured by the user.

Information and remarks concerning European directives can be taken from the correspondent information sheet which is available under *Produktinfo.Magnet-Schultz.com*.

Please note the respective operating manual delivered with each device. An EC conformity declaration of the manufacturer is attached to every delivery one time.

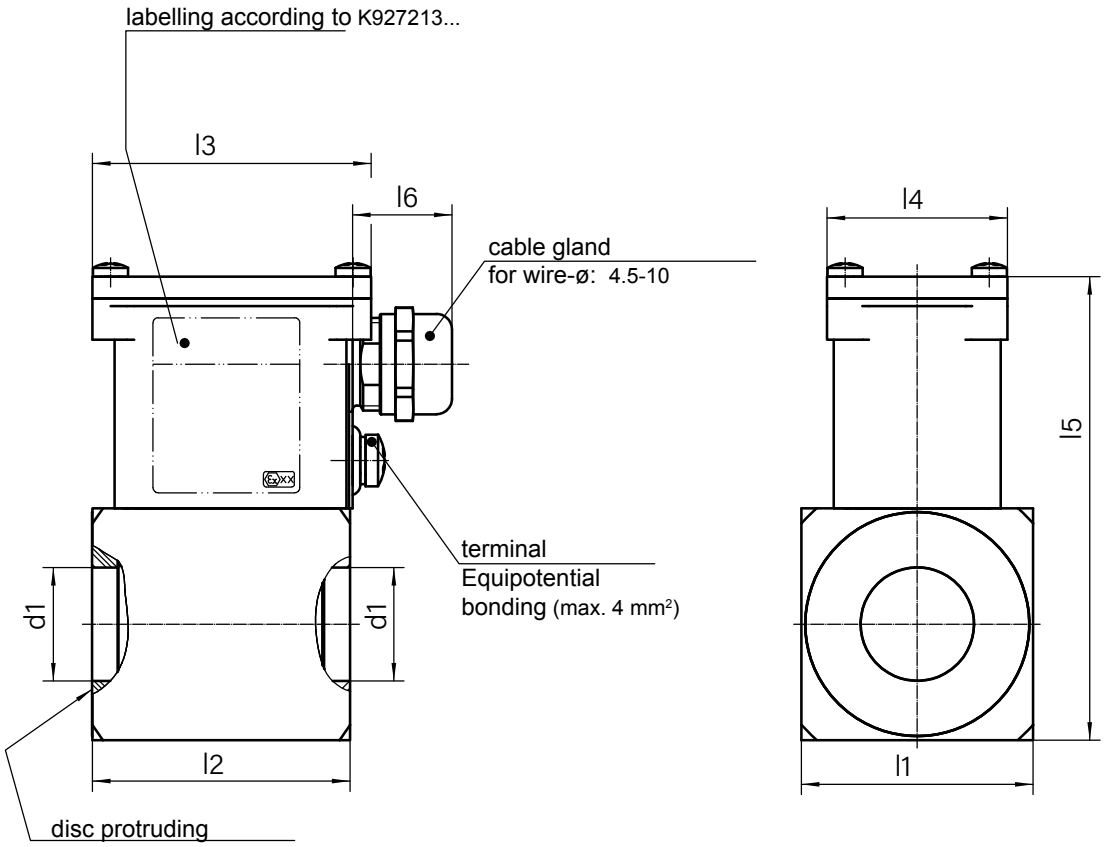
Please make sure that the described devices are suitable for your application. Our offers for these devices are based on the assumption of maximal 8 in an FMEA severity table, i. e. in case of malfunction of the device model as offered, there is, amongst others, no jeopardy of life or limb.

For this application please note DIN EN 60079-14.

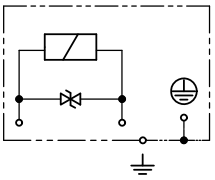
This part list is a document for technically qualified personnel.

The present publication is for informational purposes only and shall not be construed as mandatory illustration of the products unless otherwise confirmed expressively.

Solenoid body



Circuit diagram

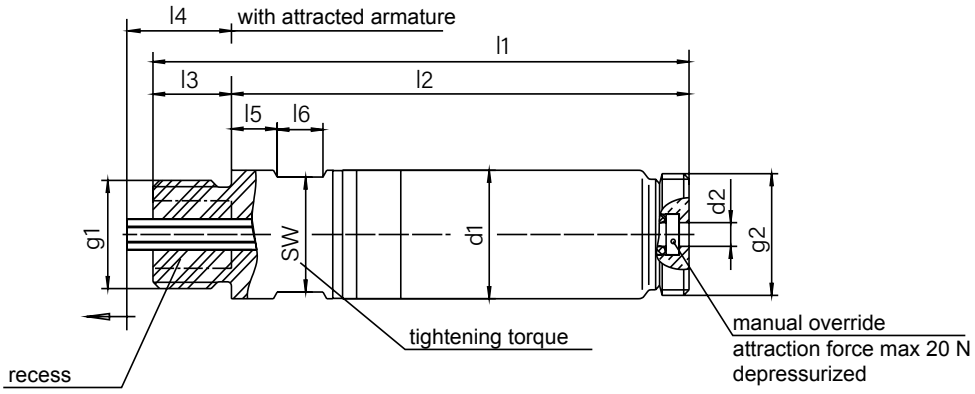


Size	035	045	060
Material no.	927213	927214	927215
	Dimensions in mm / electrical data see table 1		
d1	Ø 19	Ø 22 *	Ø 31
l1	□35	□45	□60
l2	50	50	72
l3	54	54	54
l4	35	35	35
l5	80	90	105
l6	max.22.5	max.22.5	max.22.5

* Variants with ø19 mm and ø23 mm on reques

Table 2

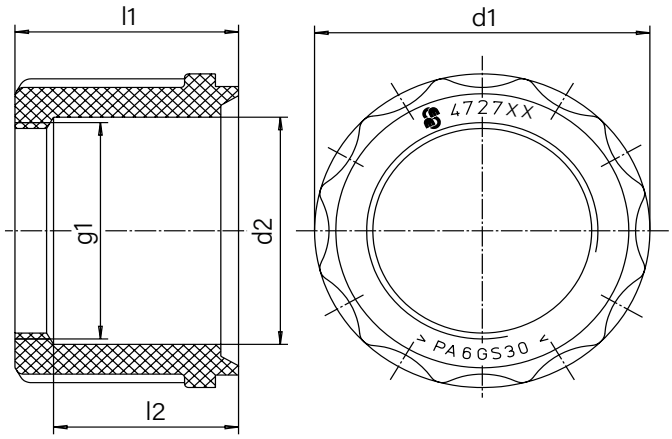
Tube ON/OFF solenoid



Size	035 / 037	045	060 / 063
Material no.	926099	923690	923685
d1	Ø 19	Ø 22	Ø 31
d2	Ø 3.5	Ø 3.5	Ø 4.5
l1	82	83	113
l2	70	71	101
l3	12 ±0.1	12 ±0.1	12 ±0.1
l4	20 ±0.15	20 ±0.15	25 ±0.15
l5	7	7	8
l6	7	7	10,5
Stroke	4 +0,5	6 +1	8 +1
SW	SW17	SW19	SW27
Tightening torque (Nm)	12 bis 14	22 bis 24	50 bis 55
g1	M16x1.5	M18x1.5	M27x1.5
g2	M18x1.5	M22x1.5	M30x1.5
Admissible recess	max. ø 10 - 12 deep	max. ø 11 - 12 deep	max. ø 18 - 12 deep

Tabelle 3

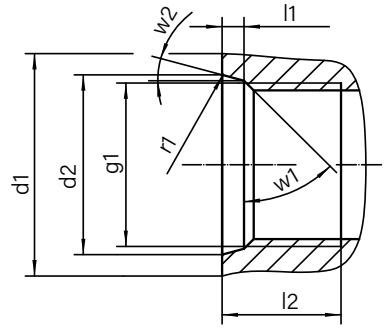
Fastening nut



Size	035 / 037	045	060 / 063
Material no.	472793	472778	472794
	Dimensions in mm		
d1	Ø 30 ±0.3	Ø 35	Ø 43.5
d2	Ø 19.5 ±0.2	Ø 23.3 ±0.1	Ø 31.5
l1	20	21	29
l2	15	15	24
g1	M18x1.5	M22x1.5	M30x1.5

Table 4

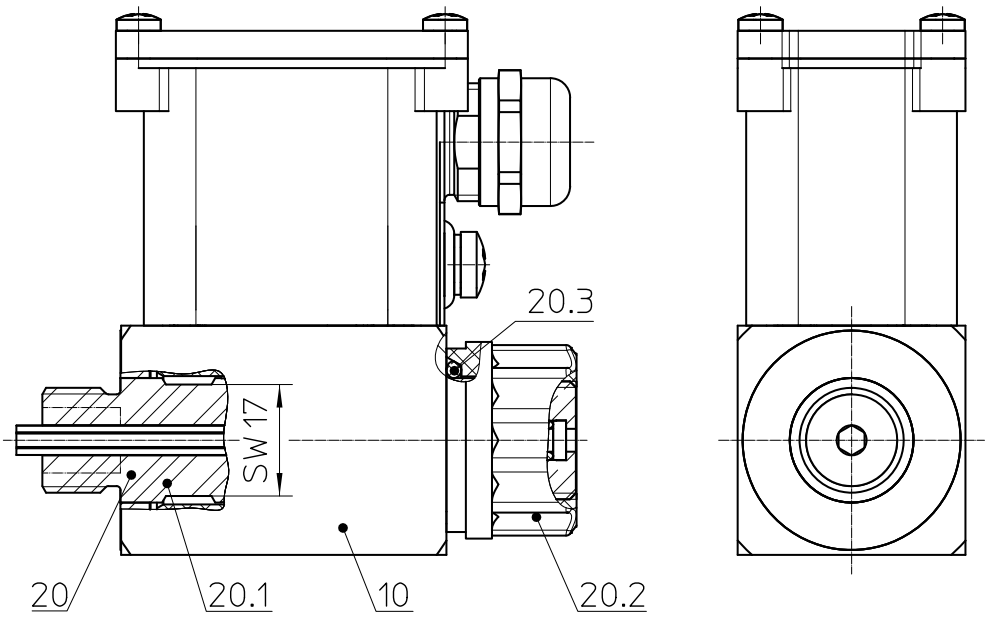
Connection geometry



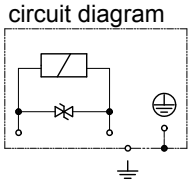
Size	035 / 037	045	060 / 063
	Dimensions in mm		
d1	Ø 22.5	Ø 24.5	Ø 33.5
d2	Ø 17.8 +0.1	Ø 19.8 +0.1	Ø 28.8 +0.1
l1	2.4 +0.4	2.4 +0.4	2.4 +0.4
l2	min.13	min.13	min.13
r1	R0.2 ±0.1	R0.2 ±0.1	R0.2 ±0.1
w1	45° ±5°	45° ±5°	45° ±5°
w2	15° ±1°	15° ±1°	15° ±1°
g1	M16x1.5	M18x1.5	M27x1.5
Suitable o-ring	13.3x2.2	15.3x2.2	23.3x2.4

Table 5

ON/OFF solenoid complete



circuit diagram



Size	Pos.	Designation	Material no.	Designation 2	Remark
035	**10**	**Solenoid body F MM E 035 K01 A01**	**927213 002**	**24VDC, T4, -30°C ... +50°C assembly on valve body**	**Order description** for complete unit please order pos. 10 + 20
	20	**Tube complete**	**902312**	**bagged**	
	20.1	Tube FHTS037	926099		Supplied as tube compl. (included in Pos. 20)
	20.2	Fastening nut	472793	Suitable socket wrench SW26 (12 kt DIN 3124) Tightening torque 5+1 Nm	
	20.3	O-ring	781754	19x2,5 70 Sh-A NBR	
045	**10**	**Solenoid body F MM E 045 K01 A01**	**927214 002**	**24VDC, T4, -30°C ... +50°C assembly on valve body**	**Order description** for complete unit please order pos. 10 + 20
	20	**Tube complete**	**902314**	**bagged**	
	20.1	Tube FHTS045	923690		Supplied as tube compl. (included in Pos. 20)
	20.2	Fastening nut	472778	Suitable socket wrench SW30 (12 kt DIN 3124) Tightening torque 6^{+1} Nm	
	20.3	O-ring	781744	22x2,5 70 Sh-A NBR	
060	**10**	**Solenoid body F MM E 060 K01 A01**	**927215 002**	**24VDC, T4, -30°C ... +50°C assembly on valve body**	**Order description** for complete unit please order pos. 10 + 20
	20	**Tube complete**	**902316**	**bagged**	
	20.1	Tube FHTS063	923685		Supplied as tube compl. (included in Pos. 20)
	20.2	Fastening nut	472794	Suitable socket wrench SW38 (12 kt DIN 3124) Tightening torque 6^{+1} Nm	
	20.3	O-ring	781755	31x2,5 70 Sh-A NBR	

Tabelle 6

Example

Please note that for a functional unit always a combination of solenoid body and tube must be ordered.

Solenoid body	Designation:	Solenoid body F MM E 035 K01 A01
	Material no.:	927213 002
	Rated voltage:	24VDC
	Ambient temperature range:	-30°C ….. + 50°C
	Temperature class:	T4
Tube	Designation:	Tube F HT S 037
	Material no.:	902312

Specials designs

Please do not hesitate to ask for our assistance with the solution of your application-oriented task. In order to find rapidly a reliable solution we need complete details about your application conditions. The details should be specified as precisely as possible in accordance with the relevant -Technical Explanations.

If necessary, please request the support of our corresponding technical office.