Proportional rotary solenoid

6
Product group

G DR

Function Proportional Rotary Solenoid
- Linear torque vs. rotation angle characteristic
- Constant torque in the operating range
- Proportional behaviour between torque and current
- Short correcting times through pre-magnetized system
- Clockwise and anti-clockwise by reversing the polarity

Construction Proportional Rotary Solenoid
- Armature guided in ball bearings
- Fastening via thread bores at the end faces
- Insulation materials of the excitation winding correspond to thermal class B
- Electrical connection via free flexible lead ends
- Protection class according to DIN VDE/DIN EN 60529 when properly installed: IP 20

Function and construction rotation angle position sensor
- Measuring principle: Hall sensor
- Stable aluminium sensor housing
- Flange mounted directly to the rotary solenoid
- Electrical connection via free flexible lead ends
- Protection class according to DIN VDE/DIN EN 60529 when properly installed: IP 20

Application examples
- Drive for industrial actuators, measuring and control technology
- Rotary slide and flap valves in fluid technology
- The type with rotation angle-position-sensor can be operated in the closed rotation angle loop

Options and accessories
- Flange option of a return spring
- Execution with programmable hall sensor on request
- Please contact us for application related solutions

Standards
- Design and testing according to DIN VDE 0580
- Production according to ISO 9001

Fig. 1: Type G DR X 050 X20 A01
Without rotation position sensor

Fig. 2: Type G DR X 050 X20 A61
With rotation position sensor

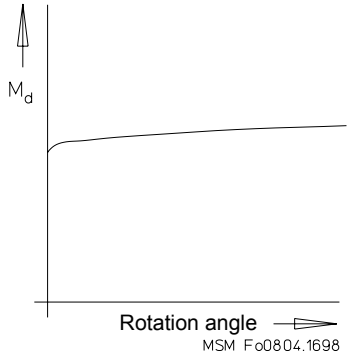

Fig. 3: Torque characteristic

Technical data proportional rotary solenoids of the series G DR

G DR X		035					050					075				
Rated voltage U_N	(V)	⎓ 24					⎓ 24					⎓ 24				
Operating mode ED		S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %
Rated power P_{20}	(W)	6,6	15,6	24,6	37	80	11	21	40	65	144	25	50	82	146	331
Torque M_d	(Ncm)	2,1	3,3	4,1	5,1	7,2	6	8,6	11,6	16	23	24	35	48	61	85
Reference temperature ϑ_{11}	(°C)	35					35					35				
Rotation angle	(°)	110					110					110				
Mass m	(kg)	0,156					0,425					1,42				
Moment of inertia of the armature J	(kgm²)	$1,9 \times 10^{-6}$					$1,1 \times 10^{-5}$					$1,1 \times 10^{-4}$				
RoHS conforming		yes					yes					yes				

Technical date **Rotation angle position sensor** **on proportional rotary solenoids**)		**G DR X 035 X 20 A 61** **G DR X 050 X 20 A 61** **G DR X 075 X 20 A 61**	
Measuring range	(<°)	±55	
Supply voltage	(V)	4,5 ... 6	
Current consumption	(mA)	<14	
Output voltage	(V)	1,8 ... 3,1	e.g. at U_{Supply} = 5 V
In central position	(V)	2,5±0,25	
Sensitivity	(mV/1°)	typically 11±1	
Linearty tolerance	(%)	±3	
Limit frequency (-3 dB)	(kHz)	typically 23	
Reference temperature range	(°C)	0 ... 50	
Temperature drift	(%/°C)	typically 0,05	
Output resistance	(Ω)	50	
RoHS conforming		no	

Sensitivity
The sensytivity is the change output signal referring to the measurement path (indicated in mV/1°).

Linearity fault
Lineartiy fault indicates the deviation (in per cent) of the output signal from the ideal straight line

Temperature drift
Temperature drift indicates the deviation (in per cent) of the output signal per degree of the temperature change (indicated in %/°C).

Limit frequency
In reference to the Hall sensor

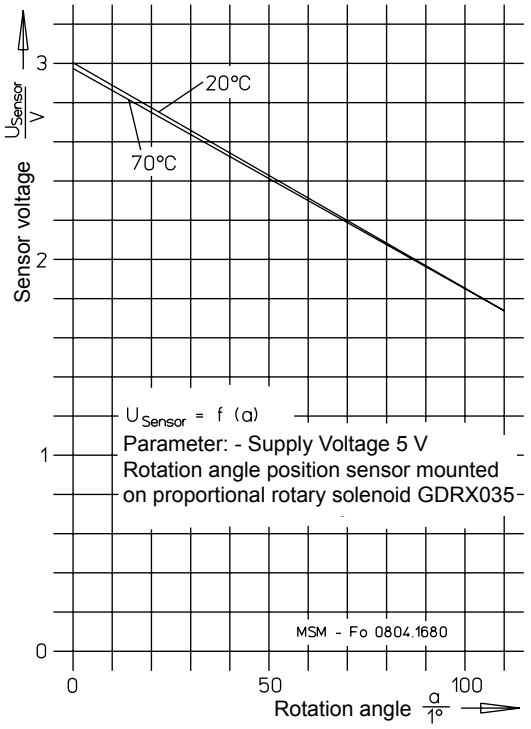

Fig. 4: Voltage vs. rotation angle characteristic of rotation angle position sensor

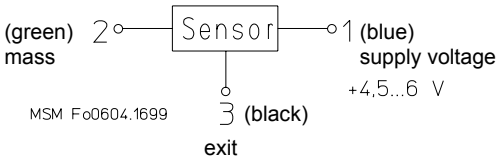

Fig 5: Block diagram

Notes on the tables

The torques indicated in the tables refer to 90% of the rated voltage ⎓ 24 V and normal operating temperature. For other rated voltages deviations of the torque may occur. The torque values may deviate by approx. ±10% due to natural dispersion.

The normal operating temperature is based on

a) Mounting on heat-insulating base
b) Rated voltage ⎓ 24 V
c) Operating mode S3 5% - S1 according to part list G XX section 4
d) Reference temperature 35°C

Rated voltage

Rated voltage ⎓ 24V, other voltages on request.

The devices correspond to protection class III. Electrical equipment of protection class III may be only connected to low voltage systems (PELV, SELV)(IEC 60364-4-4-41).

Type G DR X 035

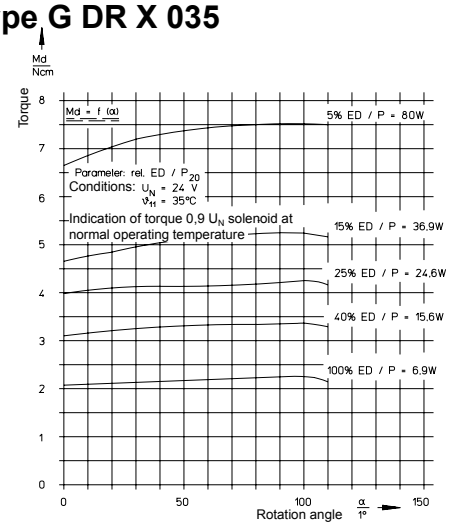

Fig. 6: MSM-Fo 0804.1692
Characteristics Md = f (α)
Type G DR X 035

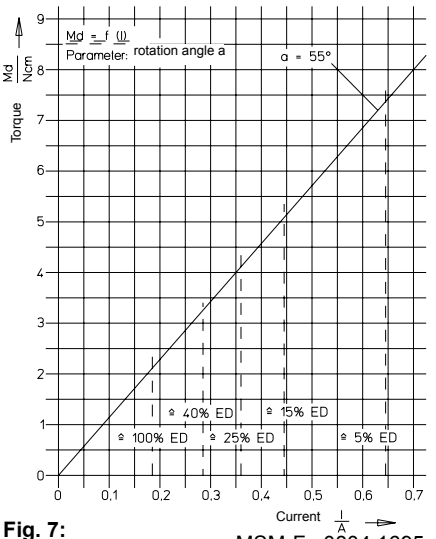

Fig. 7: MSM-Fo 0804.1695
Characteristics Md = f (I)
Type G DR X 035

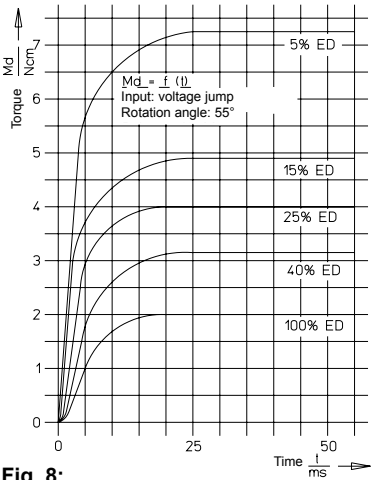

Fig. 8: MSM-Fo 0804.1675
Characteristics Md = f (t)
Typ G DR X 035

Type G DR X 050

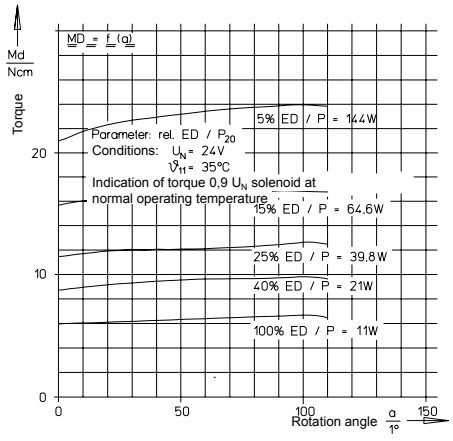

Fig. 9: MSM-Fo 0804.1693
Characteristics Md = f (d)
Type G DR X 050

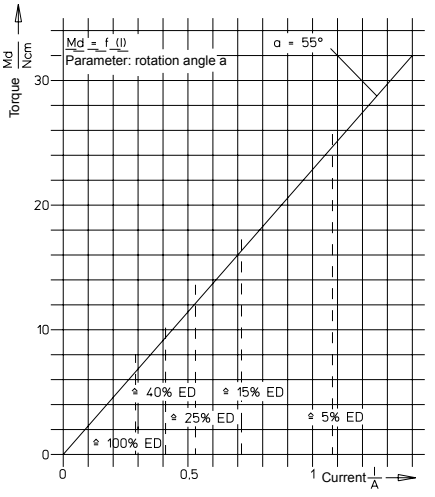

Fig. 10: MSM-Fo 0804.1696
Characteristics Md = f (I)
Type G DR X 050

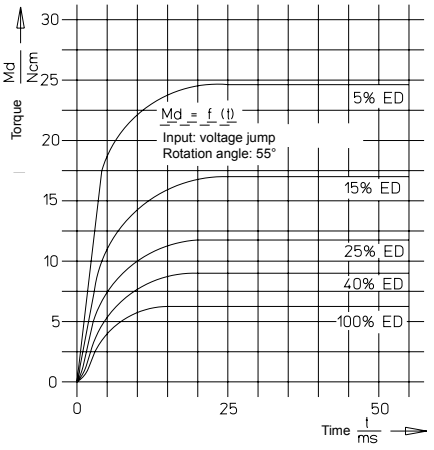

Fig. 11: MSM-Fo 0804.1676
Characteristics Md = f (t)
Type G DR X 050

Type G DR X 075

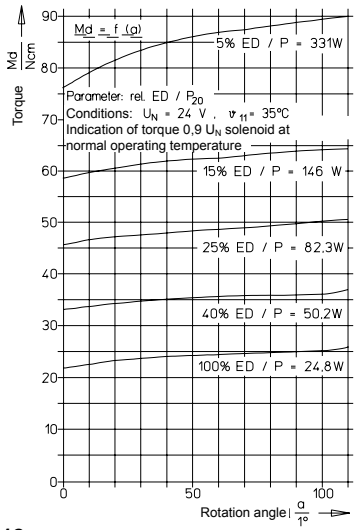

Fig. 12: MSM-Fo 0804.1694
Characteristics Md = f (d)
Type G DR X 075

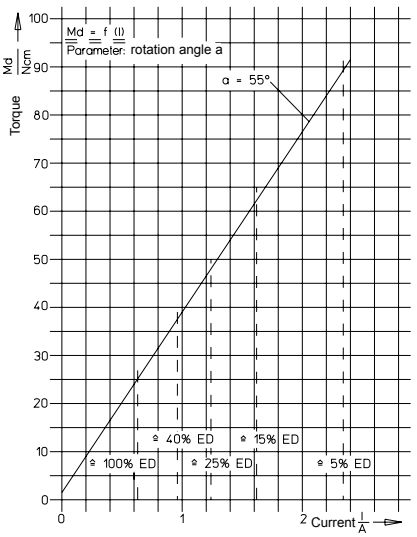

Fig. 13: MSM-Fo 0804.1697
Characteristics Md = f (I)
Type G DR X 075

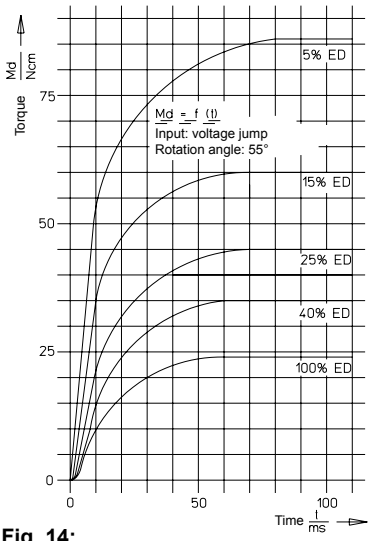

Fig. 14: MSM-Fo 0804.1677
Characteristics Md = f (t)
Type G DR X 075

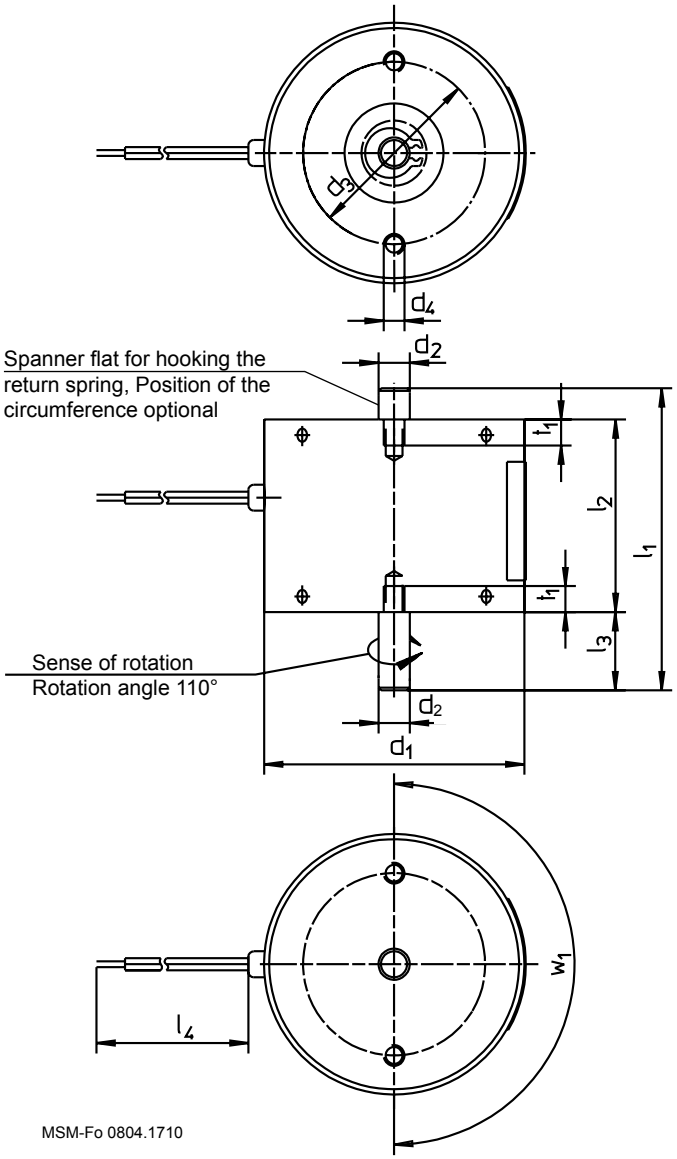

Fig. 15:
Dimensions
Type G DR X 035 X 20 A01
G DR X 050 X 20 A01
G DR X 075 X 20 A01 (hole pattern see fig 16)

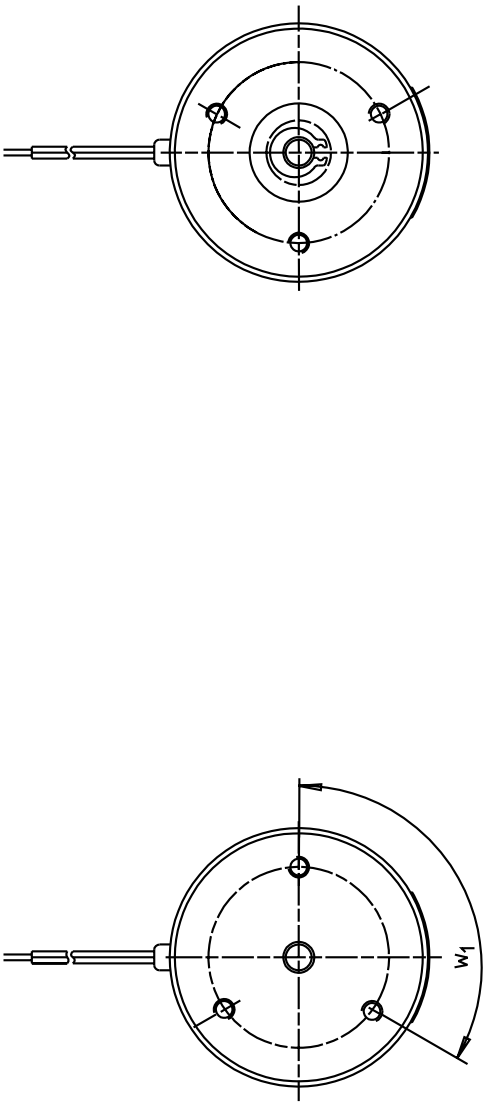

Fig. 16:
hole pattern
Type G DR X 075 X 20 A01

G DR ... A01			
Size	**035**	**050**	**075**
Dim.	Dimensions in mm		
d_1	35	50	75
d_2	4_{h8}	6_{h8}	10_{h8}
d_3	25	35	50
d_4	M3	M4	M5
d_5	35	35	35
l_1	46	58	86
l_2	30	37	56
l_3	10	15	20
l_4	100	150	200
[1)] t_1	3,5	5	8
w_1	2x180°	2x180°	3x180°

[1)] We ask you to please do not exceed the screw depth t1, because this could lead to damage of the coil.

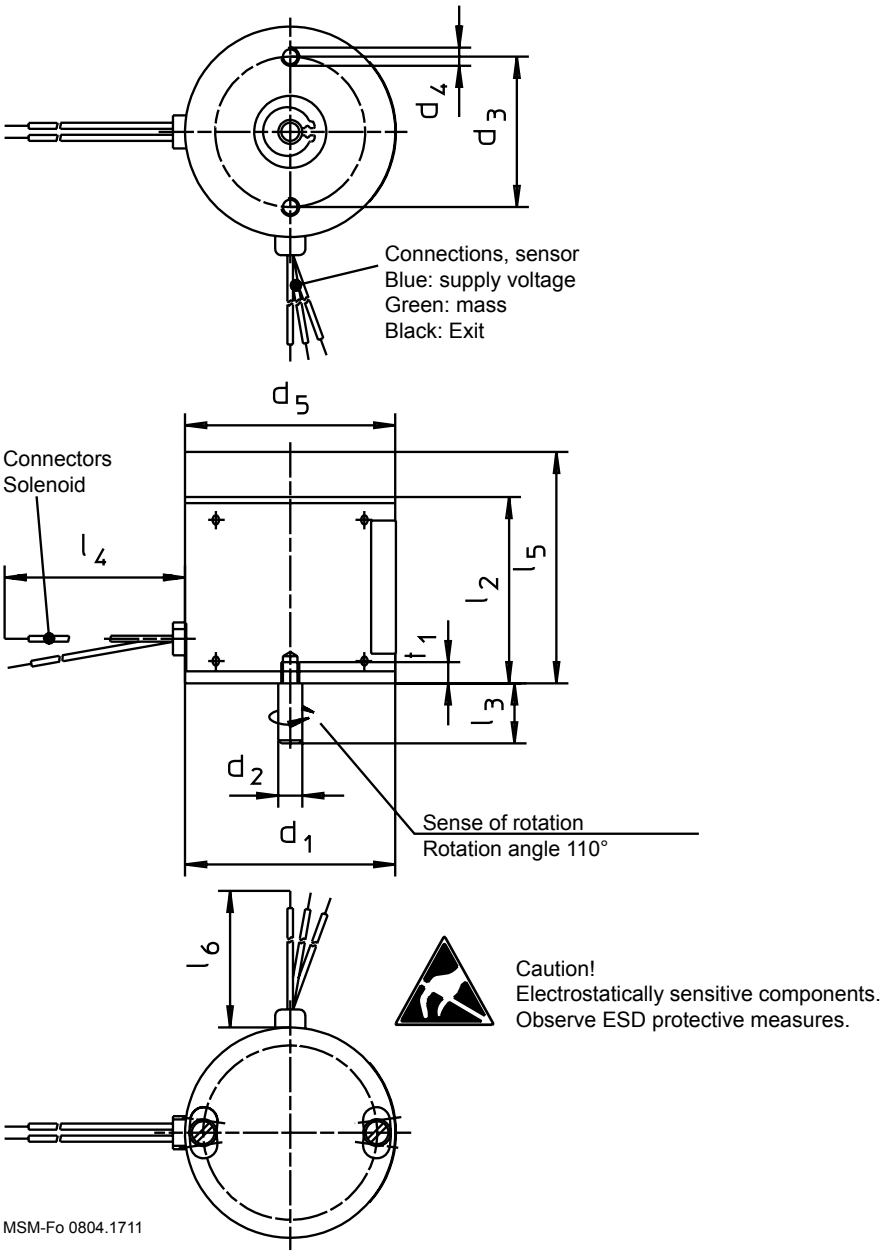

Fig. 17:
Dimensions
Type G DR X 035 X 20 A61
to type G DR X 075 X 20 A61
With rotation angle position sensor

G DR ... A61			
Size	**035**	**050**	**075**
Dim.	Dimensions in mm		
d_1	35	50	75
d_2	4_{h8}	6_{h8}	10_{h8}
d_3	25	35	50
d_4	M3	M4	M5
d_5	35	35	35
l_2	30	37	56
l_3	10	15	20
l_4	100	150	200
l_5	38,5	45,5	64,5
l_6	200	200	200
[1)] t_1	3,5	5	8

[1)] We ask you to please do not exceed the screw depth t1, because this could lead to damage of the coil.

Missing dimensions see fig. 15

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

Please make sure that the described devices are suitable for your application. Supplementary information concerning its proper installation can be taken also from the –Technical Explanation, the effective DIN VDE0580 as well as the relevant specifications.

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.

Installation instructions

The rotary solenoids may be inserted in any mounting position. In the interest of the service life and function of the bearing, please make sure that impacts and bigger pressures on the rotation axis in axial direction are avoided.

It is advisable to do not intercept bigger, with the axis connected masses with the stops inside the solenoid but by external stops or damping elements installed by the customer.

The device may not show any mechanical or electrical damages.

For applications with dynamic loads we recommend to perform switching life time tests.

Type code

Designation	Execution	Size (ø)
G DR X 035 X20 A01		35 mm
G DR X 050 X20 A01		50 mm
G DR X 075 X20 A01		75 mm
G DR X 035 X20 A61	With rotation angle sensor	35 mm
G DR X 050 X20 A61		50 mm
G DR X 075 X20 A61		75 mm

Order example

Type	G DR X 035 X20 A01
Voltage	⎓ 24 V DC
Operating mode	S1 (100 %)

Specials designs

Please do not hesitate to ask us for application-oriented problem solutions. 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.