

## DC rotary solenoid

# 6

Product group

## G DA

### Function

- Rotary movement without axial wave movement
- Rotation angle 35°, 65° and 95°
- Increasing torque characteristic (for smaller duty cycles almost linear torque characteristic)
- With and without return spring
- Clockwise and anti-clockwise

### Construction

- Shaft protruding on both sides
- Spring return force infinitely adjustable
- 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

### Application examples

- Tooling machines, office machines, packing machines, textile machines
- Shutter for laser and optical devices
- Measuring and control technology

### Options

- Proportional rotary solenoids, double-acting with high torque type GDR
- Reverse and polarized rotary solenoids on request
- Please contact us for application related solutions or functional units

### Standards

- Design and testing according to DIN VDE 0580
- Quality management to ISO 9001



Fig. 1: G DA with return spring

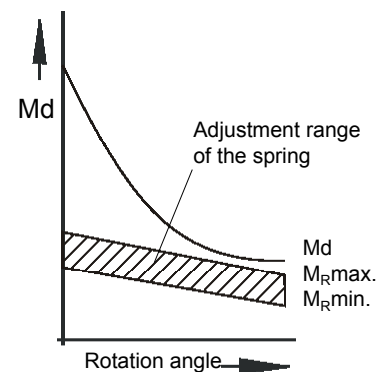


Fig. 2: torque characteristic and return spring characteristic

## Technical data G DA X and G DA Y without spring return

G DA X ... X20 B01		035					050				
Rotation angle (°)		95 <sup>+3</sup>					95 <sup>+3</sup>				
Operating mode rel. Einschaltdauer		S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %
Torque M <sub>d</sub> (Ncm) at Δ	0°	1,68	2,00	2,15	2,20	2,00	9,00	10,00	10,20	10,00	8,40
	30°	0,73	1,45	1,75	2,00	2,45	3,90	6,55	8,10	9,50	11,00
	60°	0,34	0,80	1,20	1,45	2,00	1,50	3,25	4,80	6,60	8,90
	95°	0,22	0,58	0,90	1,30	2,25	0,77	1,70	2,55	4,10	7,40
Rated power P <sub>20</sub> (W)		7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168
Moment of inertia (kgm <sup>2</sup> )		0,314 x 10 <sup>-6</sup>					1,903 x 10 <sup>-6</sup>				
Time constant τ (ms)		6,5					9,2				
Solenoid weight m <sub>M</sub> (kg)		0,16					0,42				

G DA Y ... X20 B01		025					035					050				
Rotation angle (°)		65 <sup>+3</sup>					65 <sup>+3</sup>					65 <sup>+3</sup>				
Operating mode rel. Einschaltdauer		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 %
Torque M <sub>d</sub> (Ncm) at Δ	0°	0,98	1,50	1,65	1,80	1,80	2,40	2,90	3,00	3,00	3,00	13,90	15,30	15,70	15,70	14,30
	20°	0,46	1,00	1,30	1,55	1,85	1,50	2,35	2,75	3,10	3,60	8,80	12,90	14,60	15,80	17,10
	40°	0,25	0,60	0,85	1,15	1,60	0,85	1,70	2,10	2,50	3,25	4,30	7,90	10,50	12,90	15,60
	65°	0,16	0,40	0,60	0,85	1,50	0,57	1,26	1,80	2,50	3,60	2,40	5,00	7,20	10,00	14,40
Rated power P <sub>20</sub> (W)		4,2	10,9	16,6	24,3	57,6	7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168
Moment of inertia (kgm <sup>2</sup> )		1,15 x 10 <sup>-6</sup>					0,366 x 10 <sup>-6</sup>					2,04 x 10 <sup>-6</sup>				
Time constant τ (ms)		9					8					15,5				
Solenoid weight m <sub>M</sub> (kg)		0,07					0,16					0,42				

G DA Y... X20 B03		025					035					050				
Rotation angle (°)		35 <sup>+3</sup>					35 <sup>+3</sup>					35 <sup>+3</sup>				
Operating mode rel. Einschaltdauer		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 %
Torque M <sub>d</sub> (Ncm) at Δ	0°	1,05	1,60	1,90	2,00	2,10	2,50	3,30	3,60	3,90	4,30	14,40	17,70	19,20	20,00	20,40
	10°	0,84	1,55	1,90	2,15	2,55	2,10	3,10	3,50	3,95	4,60	12,30	16,20	18,00	19,80	21,80
	20°	0,66	1,35	1,80	2,20	2,90	1,80	2,90	3,50	4,10	5,20	10,00	15,40	18,00	20,70	24,30
	35°	0,38	0,90	1,30	1,70	2,60	1,20	2,40	3,00	3,70	5,10	5,90	10,60	13,60	16,90	21,70
Rated power P <sub>20</sub> (W)		4,2	10,9	16,6	24,3	57,6	7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168
Moment of inertia (kgm <sup>2</sup> )		1,40 x 10 <sup>-6</sup>					0,358 x 10 <sup>-6</sup>					2,11 x 10 <sup>-6</sup>				
Time constant τ (ms)		9					12					20				
Solenoid weight m <sub>M</sub> (kg)		0,07					0,16					0,42				

### Notes on the tables

Due to natural dispersion torque data may deviate by approx. ± 10 % from the table values and base on:

- Rated voltage 24 V / 5 %-100 % duty cycle
- 90 % of the rated voltage
- Normal operating temperature at 35° ambient temperature
- Mounting on heat-insulating base

Duty cycle (%)	100	40	25	15	5
Operating time (s)	dauernd	120	75	45	15

Rated power P20 applies for a coil temperature of 20 °C

0° is the end position in energized condition.

The torque data M<sub>d</sub> (Ncm) do not consider any return spring. For types with return spring, self-aligning torques according to table „**Technical Data with return spring**“ are to be considered.

### Rated voltage

Rated voltage is == 24 V. An adaptation of the exciter coil to a rated voltage less than == 120 V is possible on request.

Standard values for voltage and operating mode: 24 V, S1 (100%) / S3 (40%).

The devices correspond to protection class III. Electrical equipment of protection class III may be only connected to low voltage systems (PELV, SELV)(IEC 60364-4-41). The design limit of the equipment is a rated voltage not higher than 120 V (EN 61140:2002) with DC. On request we are pleased to check to what extent the delivery of higher rated voltages is possible as special solutions by agreement.

### Technical data G DA X and G DA Y without return spring

G DA X ... X20 B01	060					075					
Rotation angle (°)	95 <sup>+3</sup>					95 <sup>+3</sup>					
Operating mode rel. Einschaltdauer	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque $M_d$ (Ncm) at $\Delta$	0°	19,5	22,3	22,6	22,3	17,9	34,0	33,0	31,0	28,5	19,0
	30°	7,5	14,2	17,0	19,6	23,4	19,4	30,0	33,5	35,5	39,0
	60°	3,0	6,4	9,7	13,0	18,9	8,1	17,5	22,5	27,5	33,0
	95°	1,3	3,4	5,0	7,6	14,0	4,4	11,1	16,2	20,5	35,0
Rated power $P_{20}$ (W)	16,8	40	61	96	262	23,5	55	82	124	303	
Moment of inertia (kgm <sup>2</sup> )	4,88 x 10 <sup>-6</sup>					14,45 x 10 <sup>-6</sup>					
Time constant $\tau$ (ms)	18					25					
Solenoid weight $m_M$ (kg)	0,74					1,48					

G DA Y ... X20 B01	060					075					
Rotation angle (°)	65 <sup>+3</sup>					65 <sup>+3</sup>					
Operating mode rel. Einschaltdauer	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque $M_d$ (Ncm) at $\Delta$	0°	28,5	33,0	34,0	34,0	31,0	48,0	50,0	49,0	47,0	39,0
	20°	15,0	25,4	29,1	31,9	35,7	37,0	48,0	53,0	55,0	58,0
	40°	7,9	16,8	21,6	26,0	34,6	19,0	37,0	44,0	48,0	57,0
	65°	3,9	9,3	13,4	18,4	29,3	11,0	25,0	35,0	42,0	59,0
Rated power $P_{20}$ (W)	16,8	40	61	96	262	23,5	55	82	124	303	
Moment of inertia (kgm <sup>2</sup> )	5,14 x 10 <sup>-6</sup>					15,25 x 10 <sup>-6</sup>					
Time constant $\tau$ (ms)	22,5					30					
Solenoid weight $m_M$ (kg)	0,74					1,48					

G DA Y... X20 B03	060					075					
Rotation angle (°)	35 <sup>+3</sup>					35 <sup>+3</sup>					
Operating mode rel. Einschaltdauer	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque $M_d$ (Ncm) at $\Delta$	0°	31,0	38,0	41,0	43,0	46,0	60,0	67,0	68,0	69,0	64,0
	10°	25,0	35,5	39,5	43,0	49,0	54,0	66,0	71,0	73,0	75,0
	20°	18,5	32,0	38,0	43,0	53,0	47,0	65,0	73,0	79,0	88,0
	35°	10,8	21,5	28,0	34,5	46,0	30,0	51,0	63,0	70,0	87,0
Rated power $P_{20}$ (W)	16,8	40	61	96	262	23,5	55	82	124	303	
Moment of inertia (kgm <sup>2</sup> )	5,39 x 10 <sup>-6</sup>					15,92 x 10 <sup>-6</sup>					
Time constant $\tau$ (ms)	30					42,5					
Solenoid weight $m_M$ (kg)	0,74					1,48					

#### Return spring - Adjustment

The above table indicates the adjustment range of the spring return torque depending on the operating mode. (Diagram fig. 3)

The spring return torque is to be modified within the adjustment range by changing the tooth spaces and by turning the spring housing. For turning the spring housing, the fastening screws are to be loosened and tightened again.

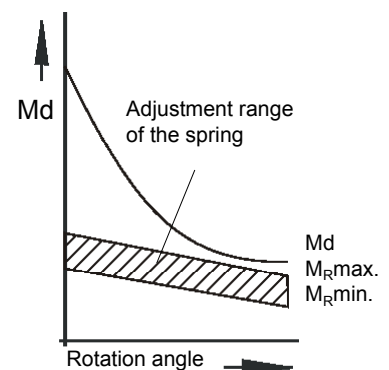
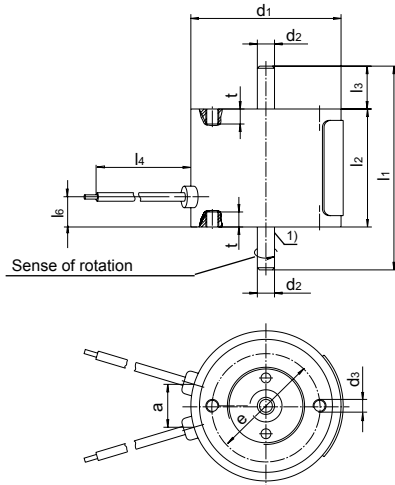


Fig. 3: torque characteristic and return spring characteristic

### Technical data G DA X and G DA Y with return spring

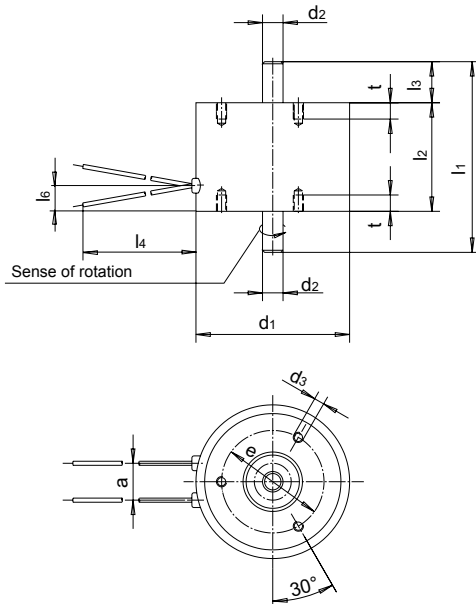
<b>G DA X ... X20 B21</b> <b>B25</b>	(clockwise) (anti-clockwise)						<b>035</b>					<b>050</b>				
Rotation angle	(°)						95 <sup>+3</sup>					95 <sup>+3</sup>				
Operating mode							S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.						-	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
Spring constant	(Ncm/°)						0,0065					0,016				
<b>G DA Y ... X20 B21</b> <b>B25</b>	(clockwise) (anti-clockwise)	<b>025</b>					<b>035</b>					<b>050</b>				
Rotation angle	(°)	65 <sup>+3</sup>					65 <sup>+3</sup>					65 <sup>+3</sup>				
Operating mode		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 %
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.	0,1	0,1	0,1	0,1	0,1	0,14	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
Spring constant	(Ncm/°)	0,00206					0,0065					0,016				
<b>G DA Y ... X20 B23</b> <b>B27</b>	(clockwise) (anti-clockwise)	<b>025</b>					<b>035</b>					<b>050</b>				
Rotation angle	(°)	35 <sup>+3</sup>					35 <sup>+3</sup>					35 <sup>+3</sup>				
Operating mode		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 %
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.	0,1	0,1	0,1	0,1	0,1	0,14	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
Spring constant	(Ncm/°)	0,00206					0,0065					0,016				
<b>G DA X ... X20 B21</b> <b>B25</b>	(clockwise) (anti-clockwise)	<b>060</b>					<b>075</b>									
Rotation angle	(°)	95 <sup>+3</sup>					95 <sup>+3</sup>									
Operating mode		S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %					
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.	0,56	0,56	0,56	0,56	0,56	1,1	1,1	1,1	1,1	1,1					
Spring constant	(Ncm/°)	0,026					0,05									
<b>G DA Y ... X20 B21</b> <b>B25</b>	(clockwise) (anti-clockwise)	<b>060</b>					<b>075</b>									
Rotation angle	(°)	65 <sup>+3</sup>					65 <sup>+3</sup>									
Operating mode		S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %					
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.	0,56	0,56	0,56	0,56	0,56	1,1	1,1	1,1	1,1	1,1					
Spring constant	(Ncm/°)	0,026					0,05									
<b>G DA Y ... X20 B23</b> <b>B27</b>	(clockwise) (anti-clockwise)	<b>060</b>					<b>075</b>									
Rotation angle	(°)	35 <sup>+3</sup>					35 <sup>+3</sup>									
Operating mode		S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1 100 %	S3 40 %	S3 25 %	S3 15 %	S3 5 %					
Self-aligning torque of the spring M <sub>R</sub>	(Ncm) min. max.	0,56	0,56	0,56	0,56	0,56	1,1	1,1	1,1	1,1	1,1					
Spring constant	(Ncm/°)	0,026					0,05									



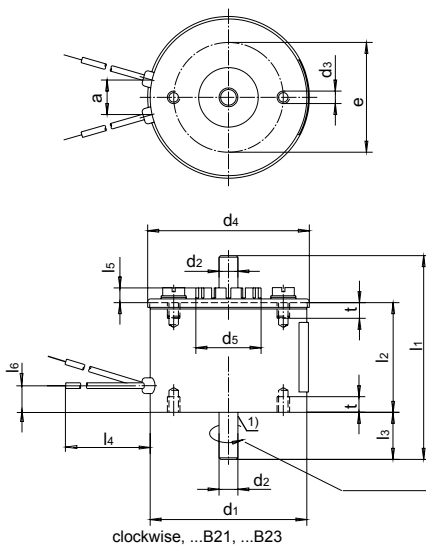
**Fig. 4:** Type G DA X 035 to 050 and G DA Y 025 to 050 (fastening holes: 2 x 180°)

G DA X and G DA Y					
Size	025	035	050	060	075
Dim.	Dimensions in mm				
a	---	10	11	11	18
d <sub>1</sub>	25	35	50	60	75
d <sub>2</sub>	3	4	6	8	10
d <sub>3</sub>	M3	M3	M4	M4	M5
d <sub>4</sub>	26,2	36,4	51,6	61,6	76,2
d <sub>5</sub>	11,4	14,6	20,8	24	29,5
e	18	25	35	40	50
l <sub>1</sub>	55	47,5	65	78	93
l <sub>2</sub>	25	27,5	35	42	53
l <sub>3</sub>	15	10	15	18	20
l <sub>4</sub>	100	100	150	150	200
l <sub>5</sub>	3,2	4,5	4,7	6	8,5
l <sub>6</sub>	5,5	7	8,5	10	12,5
t	3	3,5	5	6	8

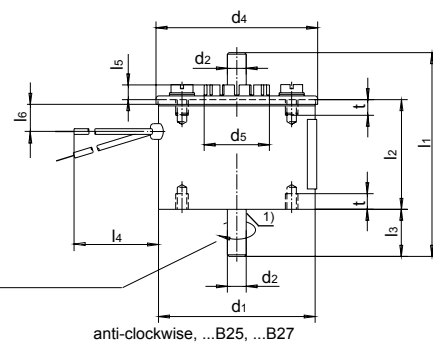
We ask you to please do not exceed the screw depth, this could lead to damage of the coil. The position of the shaft flattening (support of the return spring) to the fastening threads is variable.



**Fig. 5:** Type G DA X 060 to 075 and G DA Y 060 to 075 (fastening holes: 3 x 120°)



<sup>1)</sup> Spanner flat for hooking the return spring with reversal of rotation direction  
Angular position to the fixing holes optional



**Fig. 6:** Type G DA X 035 to 075 and G DA Y 025 to 075 (with return spring)

### Safety

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 Explanations, the effective DIN VDE0580 as well as the relevant specifications.

### Installation instructions

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


In case of vertical installation, the support of installed masses should take place outside the solenoid. Furthermore 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 application with reduced rotation angle the range from end position 0° (energized condition) should be used in order to achieve the max. possible torque.

Standard devices will be delivered with free lead ends. Types with clamps or connector on request.

For connection via plug connector Z KB X resp. Z KB G please pay attention to max. continuous current of the connector.

**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. 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. 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.

### Type code

Example	G DA X	050	X20	B21
Type	G DA X: 95° G DA Y: 65°, 35°			
Size		025 035 050 060 075		
Code for execution & protection class			X20	
Numbering				Rotation angle 95° (GDAX size 035, 050, 060, 075) <b>B01</b> without spring <b>B21*</b> with return spring clockwise <b>B25*</b> with return spring anti-clockwise Rotation angle 65° (GDAX all sizes) <b>B01</b> without spring <b>B21</b> with return spring clockwise <b>B25</b> with return spring anti-clockwise Rotation angle 35° (GDAX all sizes) <b>B03</b> without spring <b>B23</b> with return spring clockwise <b>B27</b> with return spring anti-clockwise


<sup>2)</sup> only G DA Y available

<sup>3)</sup> G DA X size 035 in operating mode S1/100% ED not available

### Example

Type G DA X 060 X20 B01  
 Voltage  $\equiv$  24 V DC  
 Operating mode S1 (100 %)

### 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.