

## D.C. Rotary Solenoid

# 6

Product group

# G DA

Pamphlet

- to VDE 0580
- Increasing torque graph  
(almost horizontal for short duty ratings)
- Design:
  - Shaft exiting on both sides
  - Clockwise and anti-clockwise operation
  - Rotation angles of 35°, 65° and 95°
  - Optional spring return
  - Adjustable return force of the spring
- Armature guided in ball bearings
- Coil to insulation rating B
- Electrical connection and protection rating if mounted properly:
  - Flexible flying leads  
Protection rating to VDE 0470/EN 60529 - IP 20
- Mounting through tapped holes  
on solenoid faces for
  - size 035 and 050: 2 x 180°
  - size 060 to 100: 3 x 120°
- Modifications and special designs on request
- Reversing-stroke rotaries and polarised rotaries on request
- Application examples:  
Machine tools, office machines, textile machinery,  
control technology

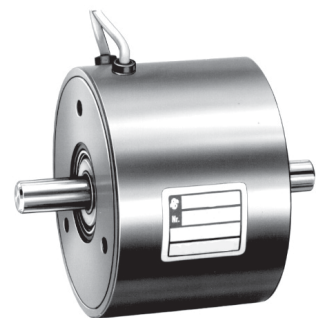


Fig. 1: Type G DA X 075 X20 B01



Fig. 2: Type G DA X 050 X20 B21  
(with return spring)

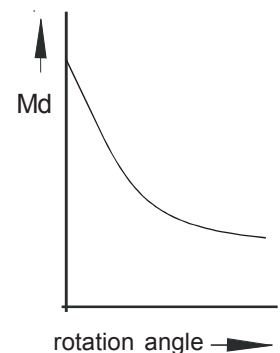


Fig. 3: torque graph



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

G DA X ... X20 B01	035					050					060					
Angle of rotation* (°)	95 <sup>+3</sup>					95 <sup>+3</sup>					95 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	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	19,5	22,3	22,6	22,3	17,9
	30°	0,73	1,45	1,75	2,00	2,45	3,90	6,55	8,10	9,50	11,00	7,5	14,2	17,0	19,6	23,4
	60°	0,34	0,80	1,20	1,45	2,00	1,50	3,25	4,80	6,60	8,90	3,0	6,4	9,7	13,0	18,9
	95°	0,22	0,58	0,90	1,30	2,25	0,77	1,70	2,55	4,10	7,40	1,3	3,4	5,0	7,6	14,0
Rated Power P <sub>20</sub> (W)	7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168	16,8	40	61	96	262	
Mass inertia (kgm <sup>2</sup> )	0,314 x 10 <sup>-6</sup>					1,903 x 10 <sup>-6</sup>					4,88 x 10 <sup>-6</sup>					
Time constant τ (ms)	6,5					9,2					18					
Solenoid weight m <sub>M</sub> (kg)	0,16					0,42					0,74					

G DA Y ... X20 B01	035					050					060					
Angle of rotation* (°)	65 <sup>+3</sup>					65 <sup>+3</sup>					65 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque M <sub>d</sub> (Ncm) at Δ	0°	2,40	2,90	3,00	3,00	3,00	13,9	15,3	15,7	15,7	14,3	28,5	33,0	34,0	34,0	31,0
	20°	1,50	2,35	2,75	3,10	3,60	8,8	12,9	14,6	15,8	17,1	15,0	25,4	29,1	31,9	35,7
	40°	0,85	1,70	2,10	2,50	3,25	4,3	7,9	10,5	12,9	15,6	7,9	16,8	21,6	26,0	34,6
	65°	0,57	1,26	1,80	2,50	3,60	2,4	5,0	7,2	10,0	14,4	3,9	9,3	13,4	18,4	29,3
Rated Power P <sub>20</sub> (W)	7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168	16,8	40	61	96	262	
Mass inertia (kgm <sup>2</sup> )	0,366 x 10 <sup>-6</sup>					2,04 x 10 <sup>-6</sup>					5,14 x 10 <sup>-6</sup>					
Time constant τ (ms)	8,0					15,5					22,5					
Solenoid weight m <sub>M</sub> (kg)	0,16					0,42					0,74					

G DA Y ... X20 B03	035					050					060					
Angle of rotation* (°)	35 <sup>+3</sup>					35 <sup>+3</sup>					35 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque M <sub>d</sub> (Ncm) at Δ	0°	2,50	3,30	3,60	3,90	4,30	14,4	17,7	19,2	20,0	20,4	31,0	38,0	41,0	43,0	46,0
	10°	2,10	3,10	3,50	3,95	4,60	12,3	16,2	18,0	19,8	21,8	25,0	35,5	39,5	43,0	49,0
	20°	1,80	2,90	3,50	4,10	5,20	10,0	15,4	18,0	20,7	24,3	18,5	32,0	38,0	43,0	53,0
	35°	1,20	2,40	3,00	3,70	5,10	5,9	10,6	13,6	16,9	21,7	10,8	21,5	28,0	34,5	46,0
Rated Power P <sub>20</sub> (W)	7,0	16,2	24,2	38	105	13,3	27,2	41,5	75	168	16,8	40	61	96	262	
Mass inertia (kgm <sup>2</sup> )	0,358 x 10 <sup>-6</sup>					2,11 x 10 <sup>-6</sup>					5,39 x 10 <sup>-6</sup>					
Time constant τ (ms)	12					20					30					
Solenoid weight m <sub>M</sub> (kg)	0,16					0,42					0,74					

\* Further angles of rotation on request

M<sub>d</sub> = Torque

$M_R \text{ min.}$   
 $M_R \text{ max.}$ 
} controlling torque of spring, de-energised

The spring return force may be varied by location of spring in the castellations for coarse setting and rotation of spring housing for fine adjustment.

Rated voltage ≐ 24 VDC, on request the coil winding can be adjusted to a rated voltage of ≐ 220 VDC maximum.

The torque values mentioned in the tables refer to 90 % of the rated voltage, (UN = ≐ 24 VDC, for other voltages the torque may differ) and to hot condition.

Owing to natural dispersion, the torque values may deviate by 10 % from the values indicated in the tables.

Hot condition is based on:

- mounting on heat-insulating base
- rated voltage ≐ 24 VDC
- operating mode S1 (100 %) - S2 5%  
(according to pamphlet GXX)
- reference temperature 35° C

Please find further details and definitions in our -Technical Explanation or, in VDE 0580 respectively.

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

G DA X ... X20 B01	075					100					
Angle of rotation* (°)	95 <sup>+3</sup>					95 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque M <sub>d</sub> (Ncm) at Δ	0° 30° 60° 95°	34,0 19,4 8,1 4,4	33,0 30,0 17,5 11,1	31,0 33,5 22,5 16,2	28,5 35,5 27,5 20,5	19,0 39,0 33,0 35,0	68,0 51,0 28,0 16,0	68,0 66,0 47,0 38,0	65,0 72,0 57,0 52,0	59,0 77,0 65,0 66,0	37,0 83,0 78,0 89,0
Rated Power P <sub>20</sub> (W)	23,5	55,0	82,0	124,0	303,0	32,0	78,0	123,0	195,0	514,0	
Mass inertia (kgm <sup>2</sup> )	14,45 x 10 <sup>-6</sup>					51,2 x 10 <sup>-6</sup>					
Time constant τ (ms)	25					50					
Solenoid weight m <sub>M</sub> (kg)	1,48					3,4					

G DA Y ... X20 B01	075					100					
Angle of rotation* (°)	65 <sup>+3</sup>					65 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque M <sub>d</sub> (Ncm) at Δ	0° 20° 40° 65°	48 37 19 11	50 48 37 25	49 53 44 35	47 55 48 42	39 58 57 59	93 82 56 37	97 102 86 73	97 109 99 97	91 113 108 113	67 117 119 136
Rated Power P <sub>20</sub> (W)	23,5	55	82	124	303	32	78	123	195	514	
Mass inertia (kgm <sup>2</sup> )	15,25 x 10 <sup>-6</sup>					54,6 x 10 <sup>-6</sup>					
Time constant τ (ms)	30					75					
Solenoid weight m <sub>M</sub> (kg)	1,48					3,4					

G DA Y ... X20 B03	075					100					
Angle of rotation* (°)	35 <sup>+3</sup>					35 <sup>+3</sup>					
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S3 5 %	
Torque M <sub>d</sub> (Ncm) at Δ	0° 10° 20° 35°	60 54 47 30	67 66 65 51	68 71 73 63	69 73 79 70	64 75 88 87	127 119 118 81	136 140 152 136	137 147 165 156	135 150 176 172	121 149 191 195
Rated Power P <sub>20</sub> (W)	23,5	55	82	124	303	32	78	123	195	514	
Mass inertia (kgm <sup>2</sup> )	15,92 x 10 <sup>-6</sup>					57,9 x 10 <sup>-6</sup>					
Time constant τ (ms)	42,5					100					
Solenoid weight m <sub>M</sub> (kg)	1,48					3,4					

\* Further angles of rotation on request

### Mounting Instructions

The rotaries can be used in any mounting position. To secure long life of the bearings and to maintain their proper function, please make sure that shocks and higher pressure on the rotation axis in axial direction are avoided.

In case of vertical mounting, support of annexed masses should be arranged outside the solenoid. It is also advisable to support bigger masses, which are connected to the shaft, outside the solenoid and not with the stops inside the solenoid.

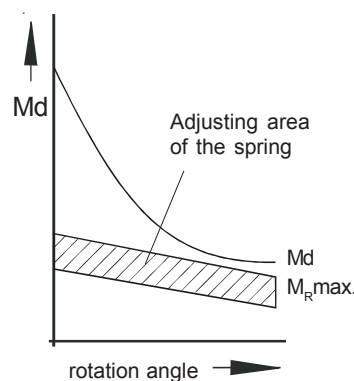
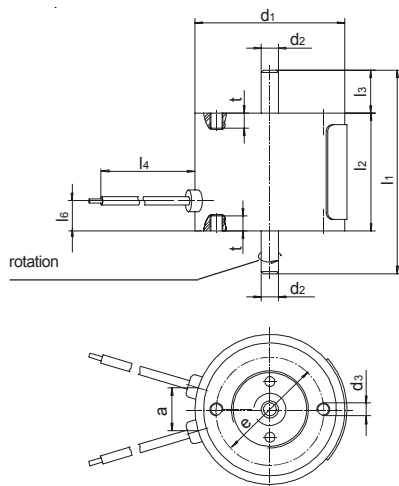
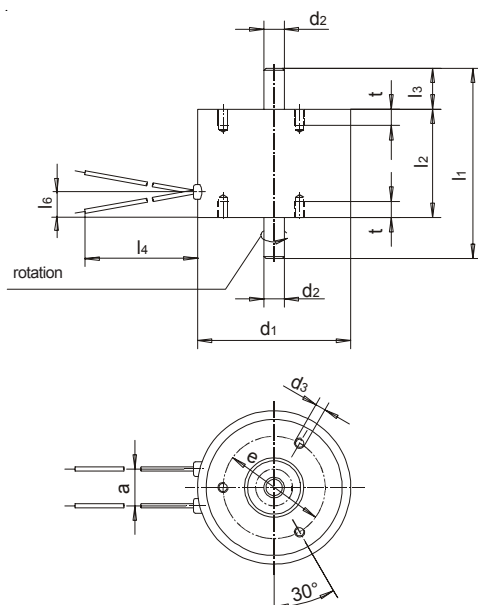


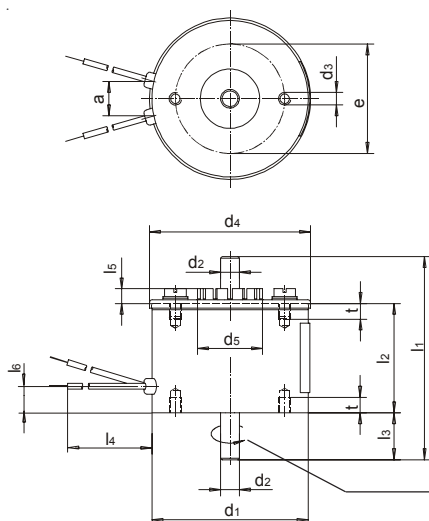
Fig. 4: torque graph and spring return graph



**Fig. 5:** Type G DA X 035 to 050 and G DA Y 035 to 050  
(mounting holes: 2 x 180°)



**Fig. 6:** Type G DA X 060 to 100 and G DA Y 060 to 100  
(mounting holes: 3 x 120°)



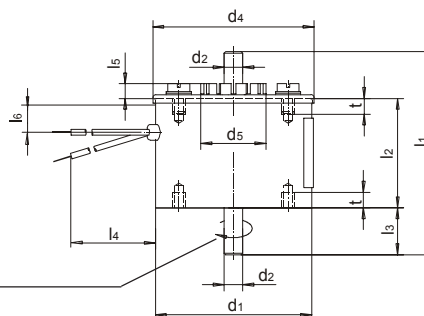
**Fig. 7:** Type G DA X 035 to 100 and G DA Y 035 to 100  
(with return spring)

G DA X and G DA Y					
size	035	050	060	075	100
in mm					
a	10	11	11	18	17
d <sub>1</sub>	35	50	60	75	100
d <sub>2</sub>	4	6	8	10	12
d <sub>3</sub>	M3	M4	M4	M5	M6
d <sub>4</sub>	36,4	51,6	61,6	76,2	102
d <sub>5</sub>	14,6	20,8	24	29,5	32
e	25	35	40	50	70
l <sub>1</sub>	47,5	65	78	93	118
l <sub>2</sub>	27,5	35	42	53	68
l <sub>3</sub>	10	15	18	20	25
l <sub>4</sub>	100	150	150	200	260
l <sub>5</sub>	4,5	4,7	6	8,5	10
l <sub>6</sub>	7	8,5	10	12,5	16
t	3,5	5	6	8	9

To avoid damage to the coil, do not exceed thread reach t.

Optional position of the shaft flattenings (seat of the return spring) to the mounting threads.

The solenoid shown is not a ready-to-use device in the sense of DIN VDE 0580. The general requirements and protective measures to be taken by the user, are included in DIN VDE 0580.



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

Please note: With operating mode S1 size 035 is not available with return spring.

G DA X ... X20 B21 (clockwise operation) B25 (anti-clockwise operation)	035					050				
	Angle of rotation* (°)	95 <sup>+3</sup>					95 <sup>+3</sup>			
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. ---	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
	max. ---	0,18	0,34	0,74	0,74	0,3	0,6	1,25	2,4	3,0
Spring rating (Ncm/°)	0,0065					0,016				

G DA Y ... X20 B21 (clockwise operation) B25 (anti-clockwise operation)	035					050				
	Angle of rotation * (°)	65 <sup>+3</sup>					65 <sup>+3</sup>			
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. 0,14	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
	max. 0,27	0,72	1,0	1,4	1,6	0,75	2,16	3,4	3,5	3,5
Spring rating (Ncm/°)	0,0065					0,016				

G DA Y ... X20 B23 (clockwise operation) B27 (anti-clockwise operation)	035					050				
	Angle of rotation * (°)	65 <sup>+3</sup>					65 <sup>+3</sup>			
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. 0,14	0,14	0,14	0,14	0,14	0,3	0,3	0,3	0,3	0,3
	max. 0,68	1,6	1,8	1,8	1,8	2,4	4	4	4	4
Spring rating (Ncm/°)	0,0065					0,016				

\* Further angles of rotation on request

### Note on the technical harmonisation guidelines within the EU

Electromagnetic solenoids of this product range are subject to the low-voltage guideline 73 / 23 EWG.

To guarantee the targets of this regulation, products are manufactured and inspected to the valid edition of DIN VDE 0580. This also equals a declaration of conformity by the manufacturer.

### Note on the EMC (electromagnetic compatibility) guideline 89/336 EWG

Electromagnetic solenoids are not affected by this guideline because neither do they cause electromagnetic disturbances, nor can they be disturbed through electromagnetic disturbances. Therefore, the adherence to the EMC guideline has to be guaranteed by the user through appropriate circuitry wiring. Examples for protection circuits can be taken from the corresponding technical documents.



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

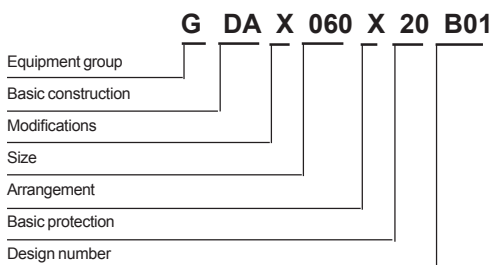
<b>G DA X ... X20 B21</b> (clockwise operation) <b>B25</b> (anti-clockwise oper.)	<b>060</b>					<b>075</b>					<b>100</b>				
Angle of rotation * (°)	95 <sup>+3</sup>					95 <sup>+3</sup>					95 <sup>+3</sup>				
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. 0,56 max. 0,6	0,56 1,0	0,56 2,0	0,56 4,0	0,56 5,6	1,1 1,8	1,1 5,0	1,1 8,4	1,1 11	1,1 11	2 12,5	2 20	2 20	2 20	2 20
Spring rating (Ncm/°)	0,026					0,05					0,1				

<b>G DA Y ... X20 B21</b> (clockwise operation) <b>B25</b> (anti-clockwise oper.)	<b>060</b>					<b>075</b>					<b>100</b>				
Angle of rotation * (°)	65 <sup>+3</sup>					65 <sup>+3</sup>					65 <sup>+3</sup>				
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. 0,56 max. 1,5	0,56 4,0	0,56 6,2	0,56 6,5	0,56 6,5	1,1 4,65	1,1 11,7	1,1 12,5	1,1 12,5	1,1 12,5	2 22,5	2 22,5	2 22,5	2 22,5	2 22,5
Spring rating (Ncm/°)	0,026					0,05					0,1				

<b>G DA Y ... X20 B23</b> (clockwise operation) <b>B27</b> (anti-clockwise oper.)	<b>060</b>					<b>075</b>					<b>100</b>				
Angle of rotation * (°)	65 <sup>+3</sup>					65 <sup>+3</sup>					65 <sup>+3</sup>				
Operating mode	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %	S1	S3 40 %	S3 25 %	S3 15 %	S2 5 %
Spring return force M <sub>R</sub> (Ncm)	min. 0,56 max. 4,8	0,56 7	0,56 7	0,56 7	0,56 7	1,1 14	1,1 14	1,1 14	1,1 14	1,1 14	2 25	2 25	2 25	2 25	2 25
Spring rating (Ncm/°)	0,026					0,05					0,1				

\* Further angles of rotation on request

### Type code



### Order Example

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

### Specials

Special designs with horizontal graph on request.

Special designs and modifications are available on request for which full application conditions should be specified in accordance with our -Technical Explanations.

In case of connection via plug connector ZKBX or ZKBG, allow for the max. constant current of the connector.