

D.C. Rotary Solenoid Square Form

Spring Return
Range up to 95° and 114 Ncm
Rectifier for A.C. supply

6

Product group

Type **G DC**

- According to DIN VDE 0580 and ISO 9001 (conform with article 10 of directions 73/23/EEC - according to CENELEC memorandum no. 3 of March 1987)
- Increasing torque characteristic (fig. 3)
Proportional, high torque, double acting type - list G DR
- Pure rotary operation, angles up to max. 95° (no axial linear shaft movement, shaft supported in encased ball races)
- With or without adjustable spring return interchangeable for left or right hand operation
- Free leads are standard
Plug connectors can be provided (list Z KB / Z KC) with built-in rectifier for A.C. supply (list Z KB G) or for over-voltage (list OVDC)
- Class B coil insulation and protection classification IP 20 - DIN VDE 0470/EN 60529
- Mounting provided by tapped holes in solenoid faces (also used for attaching spring return)
- Square form - 4 sizes (product group G DA for round form type)
- For principle of operation see G DA pamphlet
- Ratchet arm for guard door locks, etc.
- Modifications and special designs on request
- General purpose solenoid with high endurance for arduous service in the fields of:

Machine tools	Automation
Office machines	Remote control
Reject mechanisms	Optical equipment
Hopper flap operation	
Packaging and textile machinery	

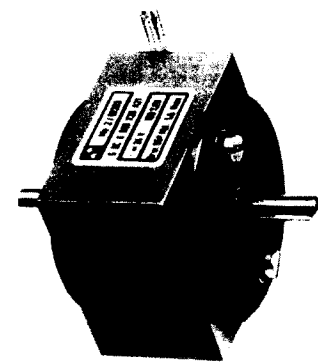


Fig. 1
Type G DC with spring return, r.h. rotation flying leads.

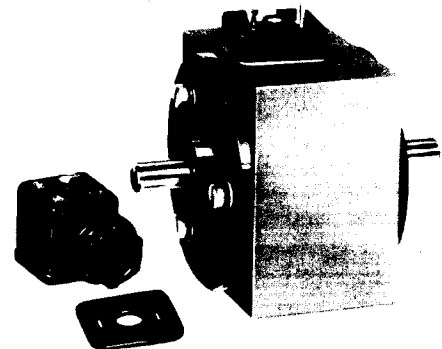


Fig. 2
Type G DC with spring return, l.h. rotation plug connector

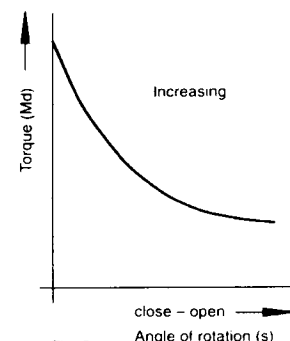


Fig. 3
Force characteristic

Performance tables for type G DC X (Square-Form)

Type 95°	G DC X 035 X 20 A01					G DC X 050 X 20 A01					G DC X 075 X 20 A01					G DC X 100 X 20 A01					
Angle of rotation max. (°)	95 ⁺³					95 ⁺³					95 ⁺³					95 ⁺³					
Duty rating ED %	100	40	25	15	5	100	40	25	15	5	100	40	25	15	5	100	40	25	15	5	
Torque Md (Ncm)	0°	2,20	3,40	3,50	3,65	3,40	12,2	13,0	13,0	13,0	10,0	44,0	43,0	40	36	26	76	66	59	42	34
	30°	1,00	2,25	3,00	3,50	3,25	6,5	10,0	11,5	13,1	10,2	29,0	40,0	43	46	35	74	85	93	93	65
	60°	0,50	1,20	1,85	2,55	3,25	2,5	5,3	7,4	9,3	10,4	12,0	25,0	29	35	40	49	70	78	85	89
	95°	0,38	0,94	1,55	2,40	3,75	1,6	3,4	5,0	7,0	15,4	6,7	15,5	21	29	44	32	64	79	89	114
Mass-inertia (kg m ²)	7,6 · 10 ⁻⁷					4,28 · 10 ⁻⁶					2,62 · 10 ⁻⁵					1,074 · 10 ⁻⁴					
Power consumption P ₂₀ (W)	9,7	22,2	35,1	55	103	13,7	28,4	44,7	75	202	31	73	102	152	414	50,5	122	188	290	774	
Inductance time constant (ms)	9					18					60					90					
Solenoid weight m _M (kg)	0,22					0,55					2,0					4,5					

Note: - 0° is completion of energized rotation.

Performance tables for Spring Return mechanism

Type	right hand	G DC X 035 X 20 A 21		G DC X 050 X 20 A 21		G DC X 075 X 20 A 21		G DC X 100 X 20 A 21	
	left hand	G DC X 035 X 20 A 25		G DC X 050 X 20 A 25		G DC X 075 X 20 A 25		G DC X 100 X 20 A 25	
Angle of rotation max. (°)		0	95	0	95	0	95	0	95
Spring torque (adjustable) M _R (Ncm)	min.	0,76	0,14	1,87	0,3	5,8	1,1	11,5	2
	¹⁾ max.	2,0	1,38	4,5	3,0	15,8	11,0	29,5	20
Spring rate (Ncm/°) ≈		0,0065		0,016		0,05		0,1	

1) The values indicated do not consider the duty rating

SPRING RETURN

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

The spring return performance table details the maximum and minimum torques obtainable by spring adjustment. The spring rate enables intermediate settings to be calculated for relation to requirements and solenoid performance at various duty ratings and with over-voltage.

PERFORMANCE TABLES

Terms are explained in Technical Bulletin G XX & VDE 0580/35.

TABLE BASIS

24 V/5 - 100% duty Ambient temperature 35° C
Heat insulated base Free air mounted
Horizontal working Tolerance ± 10% (inherent & manufacture).

MAGNETIC TORQUE

is listed in HOT condition at 90% of rated voltage (increase approx. 20% at rated voltage).

POWER CONSUMPTION (P₂₀)

is listed with a 20° C coil temperature (decrease/HOT).

DUTY RATING (ED%)

% of energized time per operation cycle: $\frac{t_{on}}{t_{on} + t_{off}} \times 100$.

Max. energized time/cycle:

100% continuous: 40% - 120 secs., 25% - 75 secs., 15% - 45 secs., 5% - 15 secs.

SUPPLY VOLTAGES:

The standard supply voltages are: 12 V, 24 V, 97 V, 205 V, D.C. (for rectified 110 V, 230 V, 50/60 Hz A.C.).

OVER-VOLTAGE

Torque and/or speed of stroke may be increased by application of over-voltage: D.C. Pulse width modulator, list OV/DC

ARRANGEMENT

The range comprises 4 sizes. The standard solenoids are provided with a maximum angle of rotation of 95°. The solenoids may be stalled at any angle without electrical or mechanical harm. External stops are desirable for high inertia applications.

Reduced angle should be used from completion of the energized stroke (0°) to obtain maximum torque.

The standard solenoids are provided with free leads. Alternative arrangements with terminal block or plug are available.

There is no linear movement of the output shafts, which are supported in two enclosed ball-race assemblies.

The load forces should be applied radially and not axially to obtain maximum life of the bearings and protection of the internal components, which are position fitted to the splined shaft for correct torque performance.

Two solenoids may be coupled together to provide a double-acting unit.

Plain stainless steel output shafts are provided, but are available on special order with key ways or other arrangements as required.

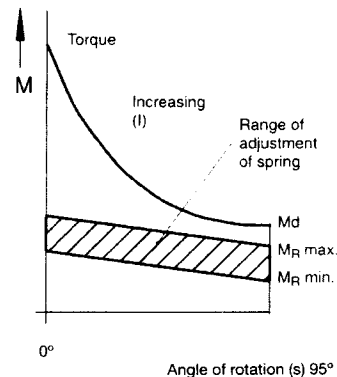


Fig. 4
Rotary solenoid characteristic with spring return mechanism

Conversion Factors	
1 N	= 0.102 kp = 0.1 kg
1 Ncm	= 0.102 kpcm = 0.1 kpcm
1 kp	= 1 kg = 2.2 lb
1 mm	= 0.039 in.
1 Ncm	= 1,373 oz. in.
	0.086 lb. in.
	0.0071 lb. ft.

Dimensions table for type G DC X (Square-Form)

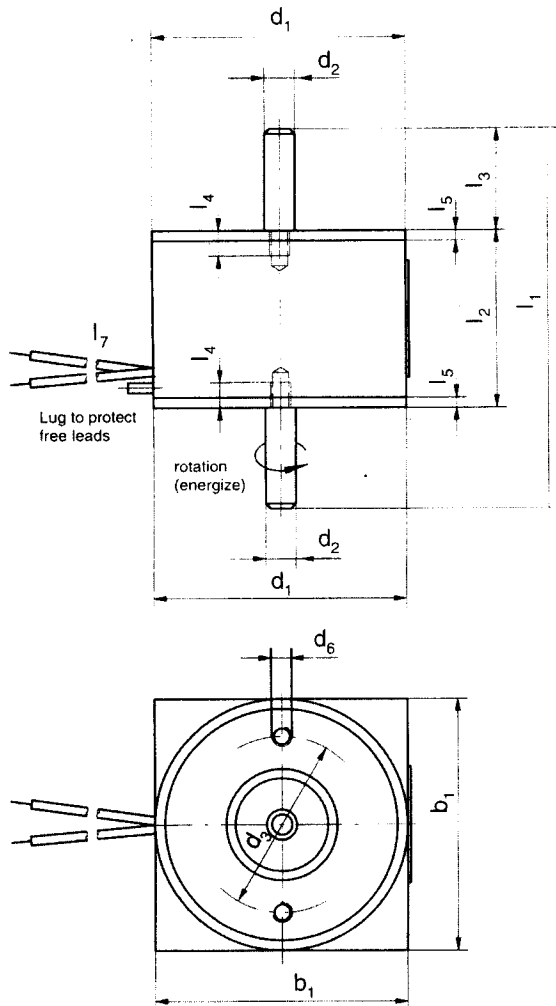


Fig. 5
Type G DC X 035 X 20 A01 and
G DC X 050 X 20 A01
(2 mounting holes)

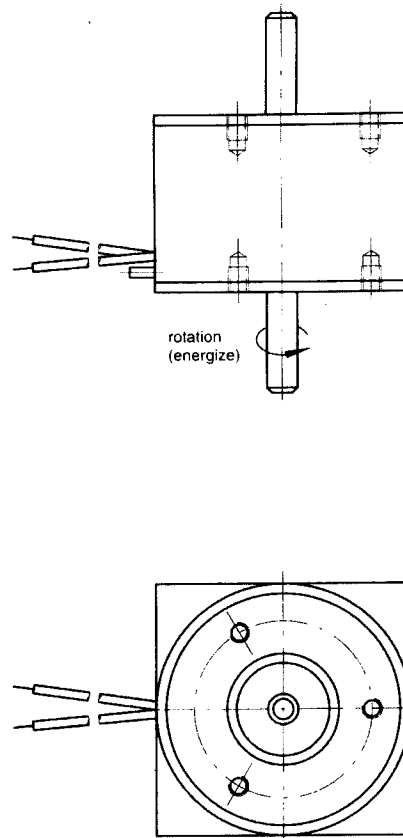


Fig. 6
Type G DC X 075 X 20 A01 and
G DC X 100 X 20 A01
(3 mounting holes)
(other dimensions see fig. 5)

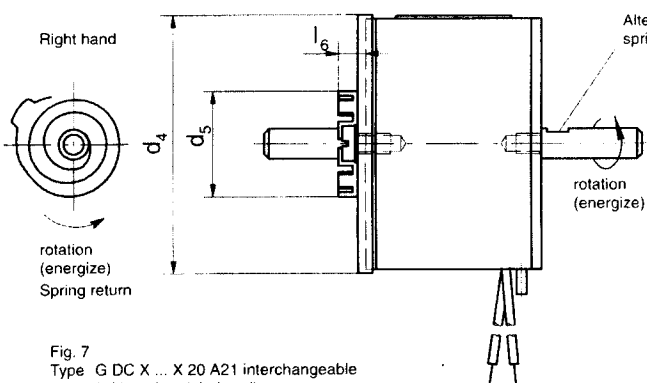


Fig. 7
Type G DC X ... X 20 A21 interchangeable
(with spring right hand)
(all other dimensions see fig. 5)

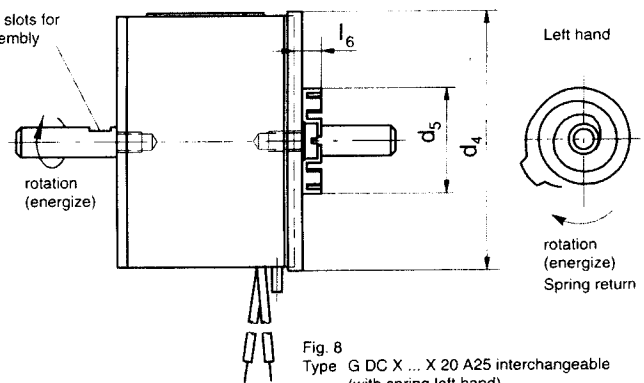


Fig. 8
Type G DC X ... X 20 A25 interchangeable
(with spring left hand)
(all other dimensions see fig. 5)

Type	dim. (mm)													
	b1	∅d ₁	∅d ₂	∅d ₃	∅d ₄	∅d ₅	d ₆	l ₁	l ₂	l ₃	l ₄ *	l ₅ *	l ₆	l ₇
G DC X 035	35	35 _{h11}	4 _{h8}	25	36,4	14,6	M3	57,5	27,5	15	3,5	1,8 _{-0,1}	4,5	100
G DC X 050	50	50 _{h11}	6 _{h8}	35	51,6	20,8	M4	75	35	20	5	2 _{-0,1}	4,7	150
G DC X 075	75	75 _{h11}	10 _{h8}	50	76,2	29,5	M5	103	53	25	8	2,5 _{-0,1}	8,5	200
G DC X 100	100	100 _{h11}	12 _{h8}	70	102	32	M6	128	68	30	9	2,5 _{-0,1}	10	260

*Do NOT use over-length screws
Dimensions with plug connector on request

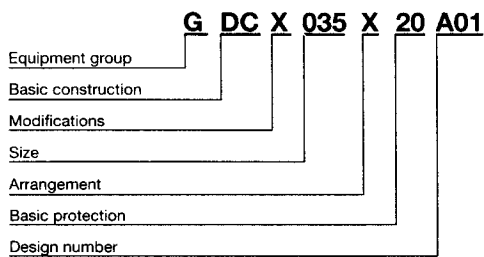
SPRING RETURN - ADJUSTMENT AND HANDING

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. The mechanism is interchangeable to either left or right hand - both shafts are provided with slots for assembly of spring return, which may be changed by:

- Removing screws, lifting spring from castellation,
- removing plastic housing, disengaging spring from shaft flat with knife, sliding spring up and off shaft.
- Refitting plastic housing, screws and spring at opposite end reversing spring direction (Fig. 7).
- Sliding spring down shaft engaging in shaft flat.
- Rotating and engaging spring in castellation for torque required, finally adjusting by screws and slots.

Classification of rotary solenoid type G DC X (Square-Form)

Type code



Order Example

- | | | |
|-------------------------------------------|-------------------------------------------------|----------------------|
| 1. D.C. Classification | | - G |
| Basic Construction | | - DC |
| Standard design: - | | |
| Angle of rotation | - 95° - X | - X |
| Size - Select from tables | | - 035 |
| Arrangement - Standard X | | - X |
| Protection - Standard IP 20 | | - 20 |
| Design number | Without | Spring return |
| Angle of rotation | spring return | right hand left hand |
| - 95° - | ... A01 | ... A21 ... A25 |
| | | - A01 |
| 2. State - Voltage (V) - Standards page 3 | | - 24 V |
| Duty rating (ED%) - from tables | | - 100% |
| (5, 15, 25, 40, 100%) | | |
| Additional requirements: | | |
| 1) Special protection, if required - | | |
| Tropical or special tropical | | |
| 2) Special shaft if required | | |
| 3) Plug connector (if required) | Z KB X 211 - For D.C. supply | |
| | Z KB G 211 - Built-in Rectifier for A.C. supply | |

Special

Special solenoids are available to meet the requirements of specific applications, such as short duty rating, high ambient temperature, special voltages, double acting etc., for which full operating, application and working conditions as well as environment should be specified in accordance with Technical Bulletin - GXX.