

DC Single-Acting High Performance Solenoids

1

Product group

G TC A

Function

- Increasing magnetic force vs. stroke characteristic
- Push and pull type

Construction

- Robust closed cylindrical design
- Fastening with flange or through three tapped holes
- 7 sizes \varnothing (mm) 40, 50, 60, 70, 80, 90
- Armature guided in maintenance free bearings. High service life
- Insulation materials of the exciter coil correspond to thermal class F
- Electrical connection via free flexible lead ends or connector plug Z KB according to DIN EN 175301-803
- Protection class according to DIN VDE / EN 60529, when properly installed
 - Free flexible lead ends IP 00
 - Receptacles according to DIN 46247 IP 00
 - Plug connection via connector plug Z KB IP 54

Application examples

- Tooling machines, packing machines, textile machines
- Measuring and control technology

Options and accessories

- Delivery with and without flange
- Horizontal characteristic on request
- Double acting execution (Type GTUW)
- Plug connectors
 - without rectifier type Type Z KB X 211 B01
 - with rectifier type Type Z KB G 211 A02
- Fork joint (Type Z GA)
- Please contact us for application related problem solutions

Standards

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



Fig. 1: Type G TC A 090 X43 A02

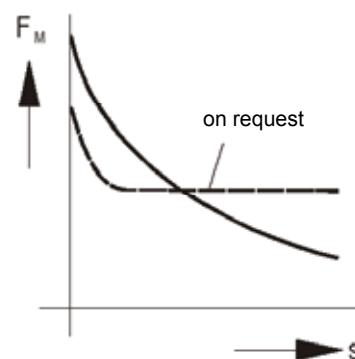


Fig. 2: Force vs. stroke characteristic

Technical data

G T C A	40					50					
	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	
Operating mode	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	
Stroke s (mm)	Magnetic force F_M (N)					Magnetic force F_M (N)					
	0	38	60	70	82	124	100	144	180	207	278
	2	12,6	21	27,5	34	58	28	46	63	77	121
	3	11,2	19,6	24,5	30	55	23	39	54	67	107
	4	10	18	22,5	28,5	53	21	36	50	63	102
	5	9	16,5	21	26,5	51	20	33	47	59	97
	6	7,7	15,5	19,5	25,5	48	18	31	44	56	94
	8	6	13	17,5	22	44	16	27	39	49	86
	10						14	24	36	46	82
Rated work A_N (Ncm)	4,8	10,4	14	17,6	35,2	14	24	36	46	82	
Rated power P_{20} (W)	12,9	28	41	53	156	16,5	34	60	100	270	
Operating frequency S_h (1/h)	19000	15000	10000	6500	2400	15000	12000	8000	5300	2000	
Actuation time t_1 (ms)	102	94	90	82	73	128	117	112	101	90	
Fall time t_2 (ms)	85	70	63	56	51	101	83	75	66	60	
Time constant t (ms)											
* Armature in stroke start position	7					15					
* Armature in stroke end position	18					18					
Inductance $L = \tau * R$ ($\tau * 10^{-3}$)											
Armature weight m_A (kg)	0,08					0,12					
Solenoid weight m_M (kg)	0,38					0,74					

G T C A	60					70					
	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%*	
Operating mode	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%*	
Stroke s (mm)	Magnetic force F_M (N)					Magnetic force F_M (N)					
	0	150	200	228	257	378	196	264	320	355	480
	2	54	89	107	126	200	85	130	164	183	264
	3	48	78	95	114	186	73	109	138	159	245
	4	43	71	87	105	178	68	102	132	154	236
	5	40	67	81	99	175	66	100	130	151	233
	6	38	62	76	93	172	59	94	125	147	229
	8	32	55	69	85	167	52	86	117	137	220
	10	29	51	64	79	156	45	75	105	126	214
	12	26	46	58	73	150	38	68	95	116	207
	15						28	54	81	101	193
Rated work A_N (Ncm)	31,2	55,2	69,6	87,6	180	42	81	121	151	290	
Rated power P_{20} (W)	26	54	77	107	377	33	66	118	142	384	
Operating frequency S_h (1/h)	12000	9700	6400	4200	1600	10000	7900	5200	3500	1400	
Actuation time t_1 (ms)	163	148	140	126	112	203	181	171	152	122	
Fall time t_2 (ms)	138	112	101	79	82	148	119	107	95	87	
Time constant t (ms)											
* Armature in stroke start position	23					31					
* Armature in stroke end position	33					35					
Inductance $L = \tau * R$ ($\tau * 10^{-3}$)											
Armature weight m_A (kg)	0,23					0,34					
Solenoid weight m_M (kg)	1,26					2					

G T C A	80					90				
	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%*	S1 100%	S3 40%	S3 25%	S3 15%	S3 5%*
Operating mode										
Stroke s (mm)	Magnetic force F_M (N)					Magnetic force F_M (N)				
0	185	268	315	366	505	223	300	344	433	630
5	72	109	134	164	263	116	166	193	230	360
10	59	96	120	147	236	102	160	182	215	335
15	42	78	104	134	224	87	148	175	212	324
20	29	60	83	113	220	64	130	162	206	330
25						46	102	134	188	330
Rated work A_N (Ncm)	58	120	166	226	440	115	255	335	470	810
Rated power P_{20} (W)	31	71	119	185	588	51	131	202	318	823
Operating frequency S_h (1/h)	9000	7100	4700	3200	1200	6800	4700	3200	2200	800
Actuation time t_1 (ms)	230	202	189	166	145	350	302	280	243	208
Fall time t_2 (ms)	166	132	118	105	95	182	142	127	113	101
Time constant t (ms)										
* Armature in stroke start position	35					38				
* Armature in stroke end position	30					38				
Inductance $L = \tau * R$ ($\tau * 10^{-3}$)										
Armature weight m_A (kg)	0,46					0,8				
Solenoid weight m_M (kg)	2,85					4,5				

G T C A	100				
	S1 100%	S3 40%	S3 25%	S3 15%*	S3 5%*
Operating mode					
Stroke s (mm)	Magnetic force F_M (N)				
0	353	490	610	800	1060
5	138	190	240	315	480
10	129	180	230	295	440
15	118	175	224	288	432
20	107	163	215	288	440
25	93	156	212	288	460
30	74	138	200	286	470
Rated work A_N (Ncm)	222	414	600	858	1296
Rated power P_{20} (W)	69	125	198	403	855
Operating frequency S_h (1/h)	5700	4200	2900	2000	800
Actuation time t_1 (ms)	400	337	306	262	226
Fall time t_2 (ms)	230	175	156	139	121
Time constant t (ms)					
* Armature in stroke start position	52				
* Armature in stroke end position	45				
Inductance $L = \tau * R$ ($\tau * 10^{-3}$)					
Armature weight m_A (kg)	1,15				
Solenoid weight m_M (kg)	6,4				

* For versions with connector plug, **not** available in rated voltage 24 V due to max. current load of 16 A

Note on the application of series G TC A via rectifier

A connection to the AC network is possible when using a rectifier installed in

cable plug Z KB G (part list Z KB X / Z KB G / Z KC X / Z KC G)

It is necessary to ensure that the AC networks are largely free of voltage peaks. If bigger inductances and capacities are switches very close to the devices, it must be ensured that these voltage peaks are rendered ineffective by suitable switching means (throttle resp. bond-pass filters).

Note on the tables

The magnetic force values stated in the tables refer to series G TC A ... X 43 A01 with 90 % rated voltage and the normal operation condition. This was determined according to VDE 0580 § 35 on a poor heat conducting base.

For versions without flange the indicated magnetic force values are understood for assembly on heat conducting base.

For other rated voltages deviations of the magnetic force may occur. The magnetic force values may deviate by approx. ± 10 % due to natural dispersion.

For versions with connector plug (G TC A ...X43 A01/A02) it has to be ensured that the max. admissible rated current is 16 A.

The rated current is calculated from the rated voltage and the rated power P₂₀ indicated on page 2 in the tables:

Example :

Rated voltage: 12V
Rated power GTCA 100 5%ED: 855W
Calculation of the rated current:

$$I_{20} = \frac{U_N}{P_{20}} = \frac{855W}{12V} = 71,25 A$$

In this case the current admissible for the mating connector is exceeded, it must be switched to a version with free lead ends.

The normal operating condition is based on:

- a) Rated voltage = 24 V
- b) Operating mode S1 (100 %)
- c) Reference temperature 35° C

Rated voltage

Rated voltage is = 24 V. For versions with connector, the exciter coil can be adjusted to a rated voltage of max. = 250 V on request.

The devices with free lead ends GTCA ... (fig. 5/6) comply with 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.

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

Note on the RoHS Directive

The devices presented in this document do not fall into the scope of RoHS Directive and to our knowledge they do not become part of products which fall into this scope. In case of surfaces zinc coating with yellow chromating and zinc iron with black chromating separate agreements are necessary for applications within the scope of RoHS.

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.

Dimensional drawings

G T C A							
Size	40	50	60	70	80	90	100
Dimensions in mm							
a1	50	60	70	80	90	100	110
a2	7	11,5	12	14	14	16	20
d1	40	50	60	70	80	90	100
d2	22	25	32	38	42	52	58
d3	24	27	34	40	44	54	60
d4	M5	M5	M6	M8	M10	M12	M12
d5	4,8	5,8	5,8	7	9,5	9,5	11,5
d6	M3	M4	M5	M5	M6	M6	M8
d7	20	23	28	32	35	42	48
d8	24	28	34	38	45	52	56
d9	25	28	35,5	40	44	54	58
e	38	46	54	62	72	80	88
f	3	3	2,5	5	5	5	5
h1	51,5	61,5	71,5 ^{±1,5}	81,5 ^{±1,5}	91,5 ^{±1,5}	101,5 ^{±1,5}	111,5 ^{±1,5}
k	30	34	45	52	62	68	76
l1	45	55	65	74	79	93	110
l2	50	64,5	74,5	85	90	105	125
l4	60,5	80	92	104,5	115	135	159
l5	29	30	33	39	50	60	61
l6	37	40	45	54	70	85	91
l7	32	30,5	35,5	43	59	73	76
l9	15	16	16,4	23,5	32	37,5	37,5
l10	15	15	18	20	30	40	40
l11	111	125	143	167	199	238	262
l12	7	10,5	12,5	15,5	21	26	31
l13	4,5	10	10	12	13	15	19
l14	4	4	4	5	5	5	6
l15	150	150	200	200	200	200	250
l16	0,5	0,5	0,5	1	2	3	4
l17	121,5	140,5	160,5	186,5	224	268	296
s	8	10	12	15	20	25	30
sw	4,5	4,5	3	7	9	10	10
¹⁾ t1	4	5	6	6	8	8	11
¹⁾ t2	9	9	8	10	13	15	13
Fork end Z GA K*	50	50	60	80	100	120	120
Screw Tightening moment (Nm)	M3	M4	M5	M5	M6	M6	M8
	1,6	2,3	4,4	4,4	7,7	7,7	18,5

* see part list Z GA

¹⁾ Please do not exceed the thread depth t_1 and t_2 as this may cause a damage of the coil.

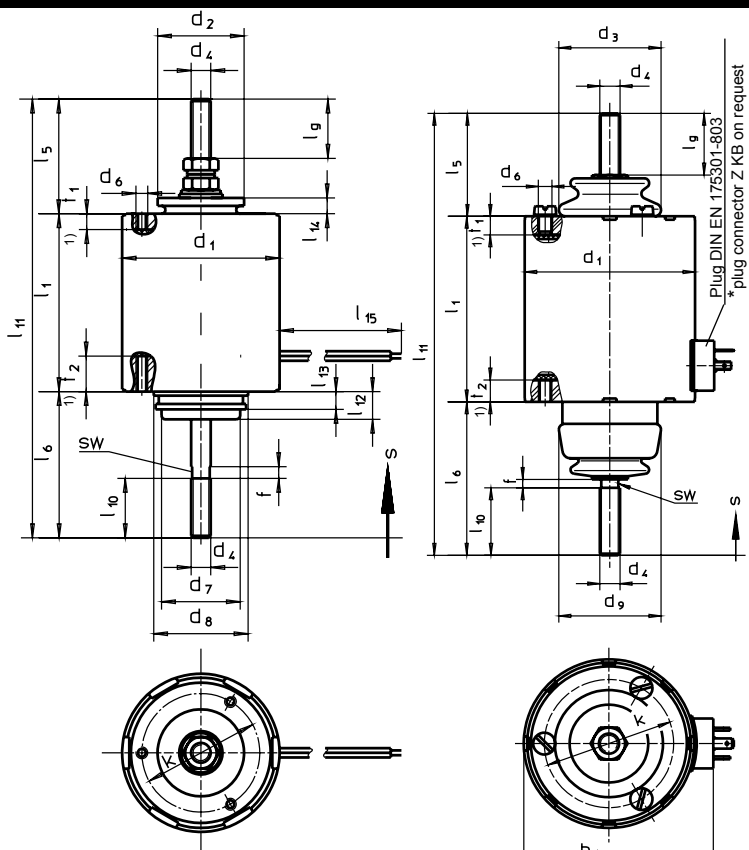


Fig. 5: G T C A 040 X20 A01 to G T C A 100 X20 A01

Fig. 7: G T C A 040 X43 A01 to G T C A 100 X43 A01
* see part list Z KB

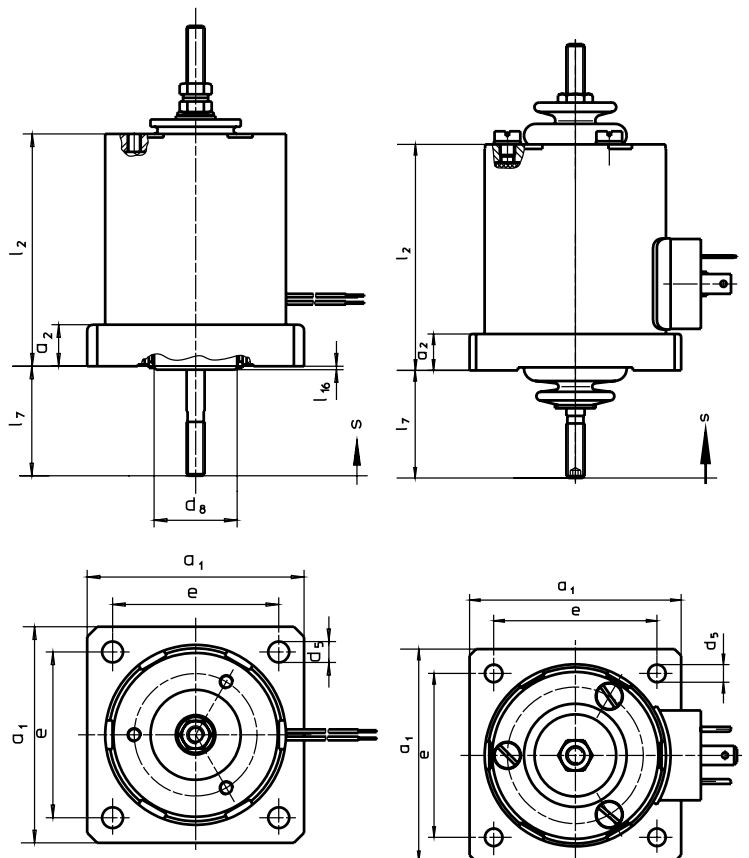


Fig. 6: G T C A 040 X20 A02 to G T C A 100 X20 A02
(missing dimensions see fig. 5)

Fig. 8: G T C A 040 X43 A02 to G T C A 100 X43 A02
(missing dimensions see fig. 7)


Key for type designation

Exam- ple	GTCA	090	X43 A01	Designation	Voltage admissible duty cycle for rated voltage 24V				
					100%	40%	25%	15%	5%
Type	GTCA								
Construction size = main diameter (mm)		040			X	X	X	X	X
		050			X	X	X	X	X
		060			X	X	X	X	X
		070			X	X	X	X	
		080			X	X	X	X	
		090			X	X	X	X	
		100			X	X	X		
Indicator for version & protection class			X20 A01	Free lead ends, without flange	24V DC (max. 120V) without protective conductor connection, protection class III				
			X20 A02	Free lead ends, pull side					
			X43 A01	Connector plug, without flange, bellow	24V DC, 205V DC (max. 250V) protection class I				
			X43 A02	Connector plug, flange pull side, bellow					

Order example

Type G TC A 090 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.