

A.C. Solenoid

Range to
50 mm and 745 Ncm

2

Product group

Type **W BA**

- 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).
- Linear or increasing force characteristic (Fig. 3) according to size
- Pushing or pulling arrangements
- Armature in brass guides
- Class F coil insulation for voltages up to 415/500 V
- Protection classification – DIN VDE 0470/EN 60529
Electrical connection – IP 00
...A01 Terminal block (Fig. 2)
...A04 Spade connections (Fig. 1)
A 6,3 x 0,8 DIN 46244
- Special version with free leads or plug connector can be provided (list Z KB/Z KC)
- Protective sheetmetal covers may be fitted to coils on all sizes (...A 02)
- Tropical protection comprising special coil and paint finish can be provided
- Suitable for mounting and operation at any attitude
- Fork ends for attachment to push rods – see list Z GA K
- 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
Packaging and textile machinery

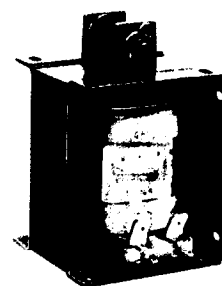


Fig. 1
Type W BA X 030 A00 A04
Spade connectors
Universal mounting

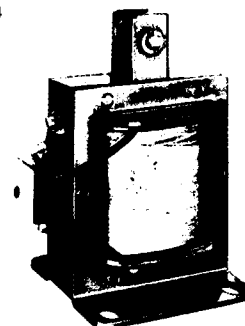


Fig. 2
Type W BA X 070 C 00 A01
Terminal block
Flange mounting

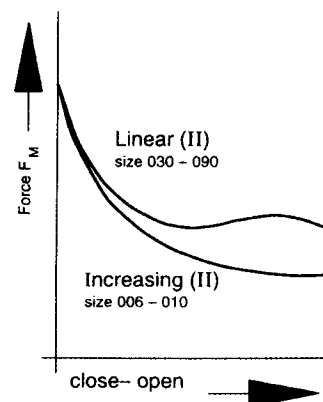


Fig. 3
Force characteristics

Performance tables sizes 006 – 080 type W BA X solenoid

max. rated voltage U_N : size 006 up to 070 = 415 V A. C. - size 080 = 500 V A. C.

W BA X ... A, B ...	006*								010								
	100		40		25		15		100		40		25		15		
Duty rating ED (%)	N		-		N		-		N		-		N		-		
Force F_M	-		VA		-		VA		-		kVA		-		kVA		
Power consumption P_{20}	-		VA		-		VA		-		kVA		-		kVA		
Stroke s (mm)	0	12	26	20	55	22	72	23	104	17	0.04	34	0.08	37	0.11	41	0.15
	3	6.9	57	9.0	86	10	103	12	135	15.6	0.10	20	0.15	24	0.18	28	0.23
	5	5.3	68	7.1	98	8.1	116	9.9	145	11.6	0.12	12	0.17	14	0.21	17	0.26
	8	4.4	78	6.3	110	7.1	130	8.7	160	9.7	0.15	11	0.20	13	0.24	15	0.29
	10	4.1	85	5.8	118	6.7	136	8.0	166	9.7	0.17	11	0.22	13	0.27	15	0.32
	15	3.4	100	5.8	136	6.7	157	8.1	179	7.9	0.20	11	0.27	13	0.32	15	0.37
Rated stroke	20	2.4	110	4.4	150	5.6	171	6.9	210	5.8	0.23	10.2	0.30	12	0.34	14	0.40
Work rating A_N (Ncm)	4.8		8.8		11.2		13.8		11.6		20.4		24		28		
Closing time t_1 (ms)	89								98								
Opening time t_2 (ms)	85								97								
Armature weight m_A (kg)	0.047								0.065								
Solenoid weight m_M (kg)	0.227								0.315								
W BA X ... A, B ...	030								050								
	100		40		25		15		100		40		25		15		
Duty rating ED (%)	N		-		N		-		N		-		N		-		
Force F_M	-		kVA		-		kVA		-		kVA		-		kVA		
Power consumption P_{20}	-		kVA		-		kVA		-		kVA		-		kVA		
Stroke s (mm)	0	74	0.06	95	0.12	103	0.18	109	0.24	108	0.08	130	0.17	140	0.25	147	0.37
	3	24	0.13	41	0.25	51	0.34	60	0.42	29	0.17	54	0.33	66	0.46	77	0.63
	5	19	0.18	32	0.32	40	0.44	46	0.51	23	0.20	43	0.40	52	0.54	61	0.75
	8	17	0.23	29	0.41	36	0.53	41	0.63	19	0.26	36	0.51	44	0.70	52	0.92
	10	17	0.26	28	0.46	35	0.58	40	0.70	19	0.31	35	0.60	43	0.80	50	1.04
	15	18	0.34	29	0.58	36	0.73	41	0.85	21	0.40	37	0.79	45	1.03	53	1.32
	20	18	0.45	30	0.70	37	0.86	43	0.99	22	0.54	40	1.01	48	1.29	56	1.60
	25	19	0.50	31	0.81	38	0.97	43	1.11	22	0.66	42	1.18	52	1.49	59	1.84
	30	16	0.57	28	0.93	34	1.11	40	1.26	25	0.80	46	1.38	55	1.71	64	2.10
	35									24	0.90	43	1.57	52	1.94	60	2.35
Rated stroke (heavy type)	40								20	1.03	36	1.78	44	2.18	56	2.61	
Work rating A_N (Ncm)	48		84		102		120		80		144		176		224		
Closing time t_1 (ms)	112								117								
Opening time t_2 (ms)	115								124								
Armature weight m_A (kg)	0.15								0.19								
Solenoid weight m_M (kg)	0.65								1.10								
W BA X ...C, D, E ...	070								080								
	100		40		25		15		100		40		25		15		
Duty rating ED (%)	N		-		N		-		N		-		N		-		
Force F_M	-		kVA		-		kVA		-		kVA		-		kVA		
Power consumption P_{20}	-		kVA		-		kVA		-		kVA		-		kVA		
Stroke s (mm)	0	84	0.12	112	0.30	123	0.46	129	0.62	105	0.14	160	0.29	184	0.42	209	0.67
	3	46	0.27	73	0.52	91	0.73	102	0.91	61	0.35	98	0.62	124	0.81	166	1.12
	5	34	0.33	56	0.61	70	0.85	79	1.04	49	0.43	82	0.77	100	1.00	124	1.38
	8	29	0.40	48	0.77	60	1.06	69	1.27	44	0.55	71	0.95	90	1.20	109	1.62
	10	28	0.46	47	0.88	59	1.20	66	1.42	42	0.60	69	1.03	85	1.32	105	1.80
	15	28	0.59	47	1.10	59	1.49	66	1.73	41	0.80	66	1.39	81	1.73	100	2.30
	20	30	0.76	50	1.39	62	1.80	69	2.10	43	1.02	70	1.79	85	2.26	105	2.95
	25	32	0.91	53	1.64	65	2.12	74	2.42	45	1.25	73	2.10	90	2.63	109	3.35
	30	34	1.12	56	1.95	69	2.45	77	2.79	48	1.50	78	2.48	95	3.08	116	3.90
	35	37	1.31	60	2.22	72	2.79	81	3.13	53	1.79	84	2.95	101	3.60	122	4.50
	40	41	1.52	65	2.51	77	3.10	86	3.48	56	2.18	86	3.48	105	4.20	126	5.16
Rated stroke (heavy type)	45	41	1.79	65	2.84	77	3.47	86	3.88	53	2.39	83	3.85	100	4.62	121	5.62
Work rating A_N (Ncm)	184		292		347		387		260		370		470		590		
Closing time t_1 (ms)	126								130								
Opening time t_2 (ms)	143								150								
Armature weight m_A (kg)	0.26								0.40								
Solenoid weight m_M (kg)	1.70								2.40								

Note: - 0 mm is completion of energized stroke.

* The magnetic force for size 006 arrangement B 100 % will be reduced by approx. 30 %.

Performance table size 090 type W BA X solenoid

max. rated voltage U_N : 500 V A. G.

W BA X...C, D, E...		090							
		100		40		25		15	
Duty rating ED (%)		N		-		N		-	
Force F_M		N		-		N		-	
Power consumption P_{20}		kVA		-		kVA		-	
Stroke s (mm)	0	125	0.16	208	0.31	235	0.41	275	0.66
	5	69	0.54	107	0.85	129	1.03	167	1.45
	10	53	0.77	83	1.22	100	1.48	129	2.00
	15	53	1.00	83	1.60	100	1.90	128	2.60
	20	55	1.30	85	2.05	104	2.50	133	3.35
	25	59	1.64	91	2.47	110	3.05	140	4.02
	30	64	1.97	98	3.05	117	3.70	149	4.75
	35	70	2.38	106	3.58	125	4.32	158	5.53
	40	72	2.85	110	4.35	129	5.10	162	6.45
	45	71	3.14	108	4.63	126	5.63	160	7.00
Rated stroke	50	63	3.45	97	5.20	117	6.20	149	7.60
Work rating A_N (Ncm)		315		485		585		745	
Closing time t_1 (ms)		132							
Opening time t_2 (ms)		160							
Armature weight m_A (kg)		0.55							
Solenoid weight m_M (kg)		3.0							

PERFORMANCE TABLES terms are explained in Bulletin W XX & VDE 0580/35.

TABLE BASIS

- 230 V/50 Hz/15 - 100% duty.
- Ambient temperature 35° C.
- Horizontal - Pull arrgt.
- Tolerance ± 10% (inherent & manufacture)
- 120 rated strokes/hr.
- Heat insulated mounted.
- in free air.

Conversion factors

1 N = 0.102 kp = 0.1 kg
1 kg = 2.2 lb
1 mm = 0.039 in
1 Ncm = 0.086 in lb

MAGNETIC FORCE (F_M) is listed for HOT condition at 90% of rated voltage and will increase by approx. 20% at rated voltage.

Force should be adjusted for armature weight.

PUSHING force will DECREASE by aprox. 10% (size 006 - 30%).

POWER CONSUMPTION (P_{20}) is listed for coil temperature of 20° C at rated voltage.

OPERATING TIMES (t_1/t_2) are averaged relative to supply phase cycle variation at switch time (± 15%). Times are listed for HOT condition at rated voltage with „weight“ load of 70% of force (F_M) at and over rated stroke.

DUTY RATING (ED %) - % of energized time per operation cycle: $\frac{t_{on}}{t_{on} + t_{off}} \times 100$.

Maximum energized time per cycle of: -

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

RATE OF OPERATION (S/hr.) is limited to 120 strokes (cycles)/hour at rated stroke and force.

Increase by reduction of stroke (fig 4 a), **duty rating** (fig 4 b), **force** (special coil winding) (fig. 4 c), or any combination together with heat sink and cooling within the maximum coil temperature limit of 150° C.

SUPPLY VOLTAGE - Standard voltages are: -

24 V and 230 V (+ 6% / - 10%) at 50 Hz.

Maximum voltage - sizes 006/070 - 415 V; 080/090 - 500 V,

60 Hz/50 Hz coil - force/temperature - reduced, 50 Hz/60 Hz increased - Beware!

60 Hz coil available with listed Magnetic force (F_M).

NOISE - A.C. solenoids may develop unacceptable noise (HUM) especially if resonantly mounted.

Consider D.C. solenoid/rectifier or A.C./D.C. Economiser.

LOAD must allow armature to limit travel with FREE coupling for movement within guides, and

should NOT be too large or less than 60% to obviate „burn-out“ or „hammer“ damage.

PROTECTION - solenoids may be provided with metal protective coil covers (... A02) or Tropical protection, comprising special coil and paint finish.

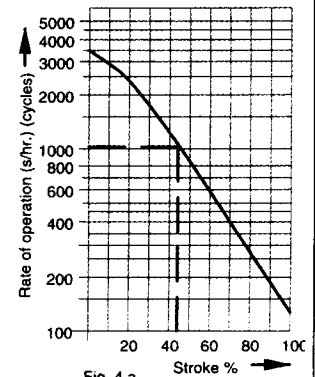


Fig. 4 a
Operation rate/Stroke

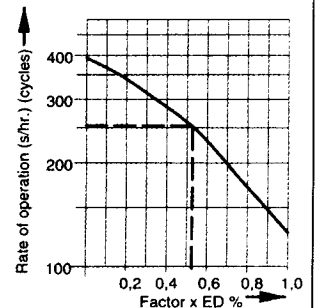


Fig. 4 b
Operation rate/Duty rating

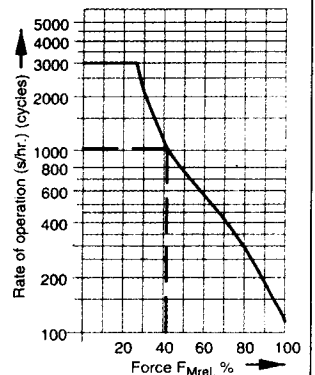


Fig. 4 c
Operation rate/Force

Dimension table type W BA X 006 to W BA X 090 solenoid Mounting A, B and C

A Pulling Universal mounting

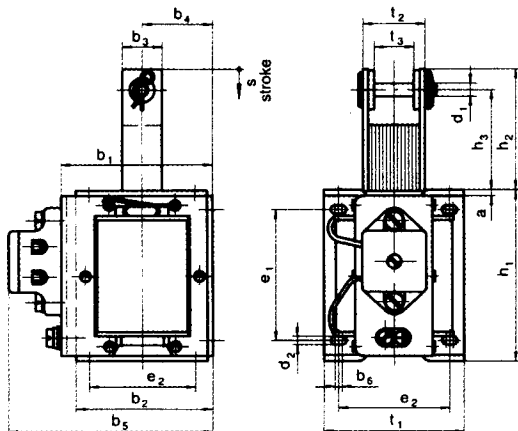


Fig. 5
Type W BA X 006 up to 050 A 00 A01
Pulling – universal mtg.

... A 01
Terminal block

B Pushing

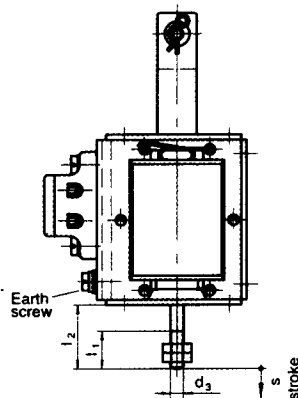


Fig. 6
Type W BA X 006 up to 050 B 00 A01
Pushing – universal mtg.
(other details Fig. 5)

Type	W BA X mtg. A and B			
Size	006	010	030	050
Dim.	Dimensions (mm)			
a	1.5	1.5	2	2.5
b ₁	47	47	57	67
b ₂	43	43	51.5	61
b ₃	10.8	10.8	14.6	13.6
b ₄	21.75	21.75	26.5	31.5
b ₅	63	63	77	87
b ₆	2.8	2.8	2.7	3.7
d ₁	4	4	5	5
d ₂	3.2	3.2	3.2	4.3
d ₃	M4	M4	M5	M5
e ₁	42	42	48	60
e ₂	24	32.5	42	48
e ₃	34	34	40	45
e ₄	13	13	13	13
h ₁	52	52	65	74
h ₂	34	34	46.5	58
h ₃	27	27	38.5	51
l ₁	15	15	15	15
l ₂	20	20	17	17
s	20	20	30	40
t ₁	32	40.5	53	61
t ₂	12.6	21	23.5	29.5
t ₃	6.6	15	14.3	20.3
t ₄	40.5	49	61	69.5
Fork End Z GA K	040		050	

A Pulling Universal mounting

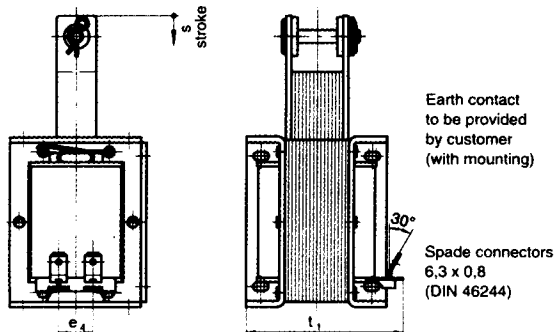


Fig. 7
Type W BA X 006 up to 050 A 00 A04
Pulling – universal mtg.
(other details Fig. 5)

... A 04
Spade connectors

B Pushing

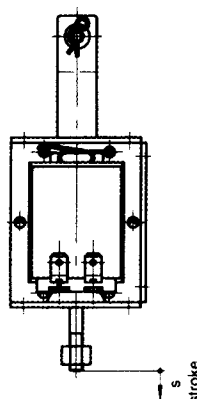


Fig. 8
Type W BA X 006 up to 050 B 00 A04
Pushing – universal mtg.
(other details Fig. 6)

Type	W BA X mtg. C		
Size	070	080	090
Dim.	Dimensions (mm)		
a	2.5	2.5	2.5
b ₁	75	90	90
b ₂	95	110	110
b ₃	17.5	20.5	20.5
b ₄	6	4.5	4.5
d ₁	6	8	8
d ₂	8.4	8.5	8.5
e ₁	66	71	82.2
e ₂	57	65	65
h ₁	92	92	92
h ₂	75	80	80
h ₃	63	68	68
s	45	50	50
t ₁	87	93.5	104.7
t ₂	23.5	31	42
t ₃	12	19.4	30.4

C Pulling Base mounting

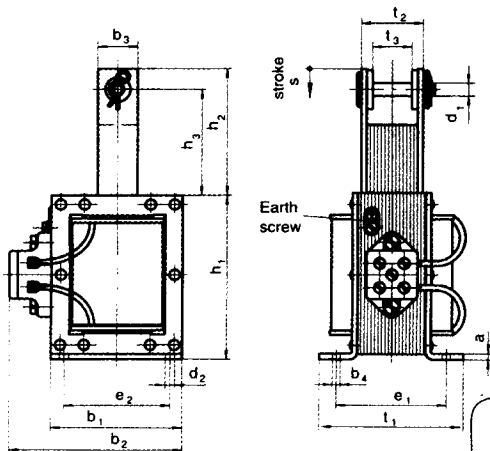


Fig. 9
Type W BA X 070 up to 090 C 00 A01
Pulling – base mtg.

Conversion factors
1 N = 0.102 kp = 0.1 kg
1 kg = 2.2 lb
1 mm = 0.039 in
1 Ncm = 0.086 in lb

Dimension table type W BA X 070 to W BA X 090 solenoid Mounting D and E

D Pulling Neck mounting

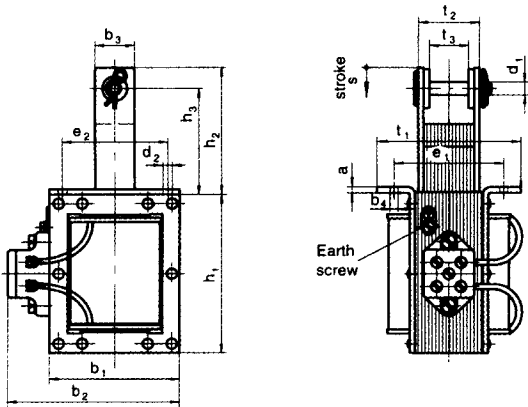


Fig. 10
Type W BA X 070 up to 090 D 00 A01
Pulling - neck mtg.

Type	W BA X mtg. D		
Size	070	080	090
Dim.	Dimensions (mm)		
a	2.5	2.5	2.5
b ₁	75	90	90
b ₂	95	110	110
b ₃	17.5	20.5	20.5
b ₄	6	4.5	4.5
d ₁	6	8	8
d ₂	8.4	8.5	8.5
e ₁	66	71	82.2
e ₂	57	65	65
h ₁	92	92	92
h ₂	73	78	78
h ₃	61	66	66
s	45	50	50
t ₁	87	93.5	104.7
t ₂	23.5	31	42
t ₃	12	19.4	30.4

E Pulling Side mounting

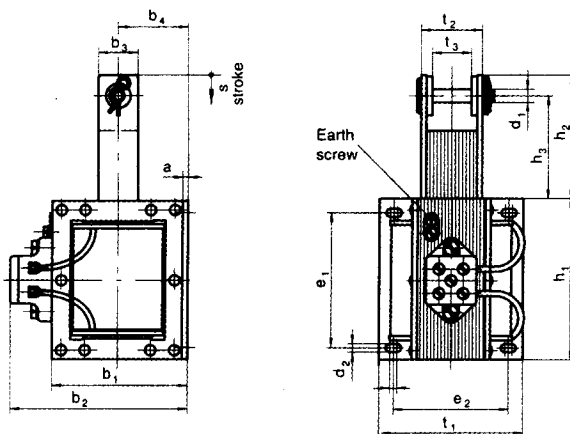


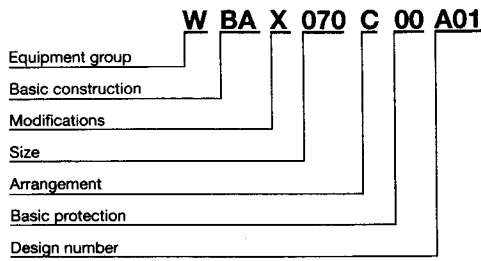
Fig. 11
Type W BA X 070 up to 090 E 00 A01
Pulling - side mtg.

Type	W BA X mtg. E		
Size	070	080	090
Dim.	Dimensions (mm)		
a	2.5	2.5	2.5
b ₁	80	92	92
b ₂	100	112	112
b ₃	17.5	20.5	20.5
b ₄	42.5	47	47
b ₅	6	4.5	4.5
d ₁	6	8	8
d ₂	8.4	8.5	8.5
e ₁	76	65	65
e ₂	67	71	82.2
h ₁	90	90	90
h ₂	75	80	80
h ₃	63	68	68
s	45	50	50
t ₁	88	93.5	104.7
t ₂	23.5	31	42
t ₃	12	19.4	30.4

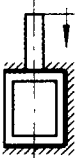
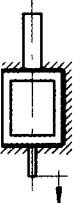
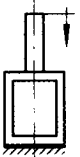
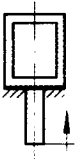
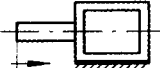
Conversion factors
1 N = 0.102 kp = 0.1 kg
1 kg = 2.2 lb
1 mm = 0.039 in
1 Ncm = 0.086 in lb

Classification of solenoid type WB A

Type code



Order Example

- | | | | | |
|----------------------------|---|----------|-------------------------|-----|
| 1. Equipment group | - Group 2: W | - W | | |
| Basic construction | - Type | - BA | | |
| Modifications | - Standard | - X | | |
| Size | - Select from tables | - 070 | | |
| Arrangement | - Select mounting | | | |
| | | | | |
| A |  | B | - Pulling - Universal | - A |
| |  | | - Pushing - Universal | - B |
| | | | (sizes 006 to 050) | |
| | | | | |
| C |  | | - Pulling - base flange | - C |
| | | | (sizes 070 to 090) | - C |
| | | | | |
| D |  | | - Pulling - neck flange | - D |
| | | | (sizes 070 to 090) | |
| | | | | |
| E |  | | - Pulling side flange | - E |
| | | | (sizes 070 to 090) | |
| | | | | |
| Basic protection | - Standard | - 00 | - 00 | |
| Design number | - Terminal block | - A01 | - A01 | |
| | - Spade connectors | - A04 | | |
| | (sizes 006 to 050) | | | |
| | - Protective Coil covers | - A02 | | |
| | | | | |
| 2. Voltage | - Standards page 3 | - 230 V | | |
| Frequency | - Standards page 3 | - 50 Hz | | |
| Duty rating | - Select from tables | - 100 % | | |
| | | | | |
| 3. Additional requirements | - Fork end for push shaft | | | |
| | - Tropical protection | | | |
| | - Flying leads | | | |
| | - Plug connector | | | |

SPECIAL

Special solenoids are available to meet the requirements of specific applications, such as Short Duty Rating, High Ambient Temperature, Special Voltages and Long Strokes etc., for which full operating, application and working conditions and environmental conditions should be specified in accordance with Technical Bulletin WXX.

Subject to our standard conditions.