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airtec

Pneumatic cylinders



Pneumatic cylinders



Series XL

Double acting, ISO 15552, G1/8 to G1/2, piston ϕ 32 to 125 mm, (1 $\frac{1}{4}$ to 5 in) with sensor grooves

Technical data	9.010
Dimensions	9.012
Accessories	9.015

Series XG

Double acting with sensor grooves, ISO 15552, G3/4 and G1, piston ϕ 160 to 320 mm (6 $\frac{1}{4}$ to 12 $\frac{1}{2}$ in)

Technical data	9.030
Dimensions	9.031
Accessories	9.032



Series XLVK

Valve/cylinder combination to ISO 15552, G1/8 and G1/4, piston ϕ 32 to 100 mm (1 $\frac{1}{4}$ to 4 in)

Technical data	9.040
Dimensions	9.042
Accessories	9.044

Series HE

Single acting cylinders, ISO 6432, M5 and G1/8, piston ϕ 8 to 25 mm (5/16 to 1 in)

Technical data and dimensions	9.060
Accessories	9.082



Series HM

Double acting with sensor grooves, ISO 6432, M5 to G3/8, piston ϕ 8 to 25 mm (5/16 to 1 in)

Technical data	9.081
Dimensions	9.082
Accessories	9.084



Series CM

Double acting, stainless steel,
ISO 15552, M5 and G1/8,
piston ϕ 16 to 25 mm
(5/8 to 1 in)

Technical data	9.170
Dimensions	9.171
Accessories	9.172

Series CX

Double acting, stainless steel,
ISO 15552, G1/8 to G1/2,
piston ϕ 32 to 100 mm
(1 1/4 to 4 in)

Technical data	9.180
Dimensions	9.181
Accessories	9.182



Proximity switches

9.220

Selection guide

Air consumption tables
and critical load diagram
9.240

Explosion protection

ATEX 9.250

Technical information

9.261

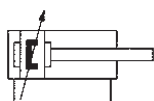
**Terms and Conditions
of sale** 9.265

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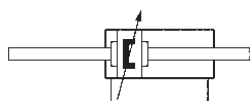
Pneumatic cylinders series XL

Double acting with magnetic piston, ISO 15552

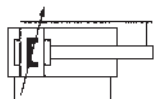
G1/8 to G1/2 • piston Ø 32 to 125 mm



000, 050



400, 450



070



Order code

XL-032-0250-050

<p>Series</p> <p>XL = Standard type, following pages.</p> <p>XLC = low temperature version up to -40 °C (-40 °F)</p> <p>XLD = with metal scraper</p> <p>XLCD = low temperature version from -40 °C (-40 °F) with metal ice-scraper</p> <p>XLH = high temperature version, without magnetic piston up to +150 °C (+302 °F), with FKM seals</p> <p>XLL = low friction version (on request)</p>	<p>Piston Ø</p>	<p>Stroke length (mm)</p>	<p>Type for order code</p> <p>000 – piston rod stainless steel</p> <p>050 – standard (steel piston rod, chromium plated)</p> <p>070 – twin piston rod ø 32 – 63 mm (only for series XL) (piston rod material see page 9.013)</p> <p>400 – double-ended piston rod, stainless steel</p> <p>450 – double-ended piston rod, standard (steel piston rod, hard chrome plated)</p> <p>Series XLH (High temperature/FKM)</p> <p>102 – without magnetic piston, piston rod stainless steel</p> <p>152 – without magnetic piston, piston rod steel hard chromium plated</p>
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Design and function

Double acting Al-profile cylinder with integrated sensor grooves, adjustable cushions and permanent magnet for proximity sensors. The sensors can be installed directly into the sensor grooves of the Al-profile.

Standard stroke lengths in table below, additional lengths on request.

Cylinders of this series are available in explosion proof design in accordance with 94/9/EG (ATEX). For further details see page 9.250.

Order number Please complete according to order code.	XL-032-...	XL-040-...	XL-050-...	XL-063-...	XL-080-...	XL-100-...	XL-125-...
Piston Ø (mm)	32	40	50	63	80	100	125
Connection	G1/8	G1/4	G1/4	G3/8	G3/8	G1/2	G1/2
Piston rod thread	M10 x 1.25	M12 x 1.25	M16 x 1.5	M16 x 1.5	M20 x 1.5	M20 x 1.5	M27 x 2
Cushioning length (mm)¹⁾	27	29	32	32	32	32	42
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)						
Temperature range	XL, XLD, XLL – 20 °C ... + 80 °C (-4 °F ... + 176 °F) XLH – 10 °C ... + 150 °C (+14 °F ... 302 °F) XLC, XLCD – 40 °C ... + 80 °C (-40 °F ... + 176 °F)						
Medium	Compressed air in accordance with ISO 8573-1: 2001, Class 7 4 – and free of aggressive additives						
Standard stroke lengths (mm)²⁾	25, 40, 50, 80, 100, 125, 160, 200, 250, 320, 400, max. 2800 (type 070 max. 500 mm)						
Materials	Cylinder tube: Al-profile (anodized) End caps: Al-die-cast (painted) Piston rod: steel hard chrome plated (standard) – stainless steel (see order code) Seals: PU/NBR						

¹⁾ = cylinder type 070: front cushion length at ø 32 is 21 mm, at ø 40 is 20 mm, at ø 50 and 63 is 27 mm.

²⁾ = refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

Pneumatic cylinders series XL

Double acting with magnetic piston, ISO 15552

G1/8 to G1/2 • piston Ø 32 to 125 mm

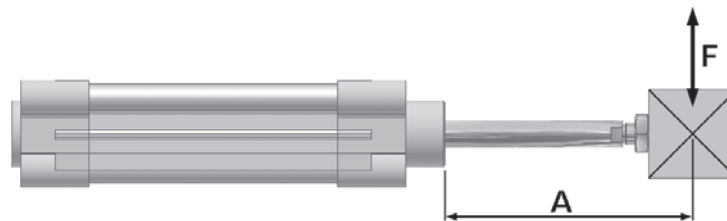


Force chart for series XL

Piston Ø (mm)	Extension		Retraction	
32	434 N	(97.6 lbf.)	373 N	(83.8 lbf.)
40	678 N	(152.4 lbf.)	570 N	(128.1 lbf.)
50	1060 N	(238.3 lbf.)	890 N	(200.1 lbf.)
63	1682 N	(378.1 lbf.)	1513 N	(340.1 lbf.)
80	2713 N	(609.9 lbf.)	2448 N	(550.4 lbf.)
100	4239 N	(953.0 lbf.)	3974 N	(893.4 lbf.)
125	6623 N	(1489.0 lbf.)	6189 N	(1391.4 lbf.)

Pressure 6 bar. The internal friction is considered.

Permissible side load for series XL (N)



Piston Ø	Distance A (mm)											
	25	40	50	80	100	125	160	200	250	320	400	500
32	75 N (16.9 lbf.)	55 N (12.4 lbf.)	50 N (11.2 lbf.)	40 N (9.0 lbf.)	34 N (7.6 lbf.)	28 N (6.3 lbf.)	23 N (5.2 lbf.)	20 N (4.5 lbf.)	16 N (3.6 lbf.)	12 N (2.7 lbf.)	9 N (2.0 lbf.)	7 N (1.6 lbf.)
40	175 N (39.3 lbf.)	150 N (33.7 lbf.)	130 N (29.2 lbf.)	105 N (23.6 lbf.)	91 N (20.4 lbf.)	78 N (17.5 lbf.)	62 N (13.9 lbf.)	55 N (12.4 lbf.)	45 N (10.1 lbf.)	35 N (7.9 lbf.)	28 N (6.3 lbf.)	21 N (4.7 lbf.)
50 + 63	220 N (49.4 lbf.)	180 N (40.5 lbf.)	170 N (38.2 lbf.)	130 N (29.2 lbf.)	120 N (27.0 lbf.)	105 N (23.6 lbf.)	90 N (20.2 lbf.)	80 N (18.0 lbf.)	65 N (14.6 lbf.)	52 N (11.7 lbf.)	43 N (9.7 lbf.)	33 N (7.4 lbf.)
80 + 100	500 N (112.4 lbf.)	450 N (101.2 lbf.)	400 N (89.9 lbf.)	350 N (78.7 lbf.)	310 N (69.7 lbf.)	270 N (60.7 lbf.)	230 N (51.7 lbf.)	205 N (46.1 lbf.)	180 N (40.5 lbf.)	150 N (33.7 lbf.)	125 N (28.1 lbf.)	100 N (22.5 lbf.)
125	810 N (182.1 lbf.)	710 N (159.6 lbf.)	680 N (152.9 lbf.)	590 N (132.6 lbf.)	520 N (116.9 lbf.)	470 N (105.7 lbf.)	420 N (94.4 lbf.)	390 N (87.7 lbf.)	330 N (74.2 lbf.)	270 N (60.7 lbf.)	230 N (51.7 lbf.)	200 N (45.0 lbf.)

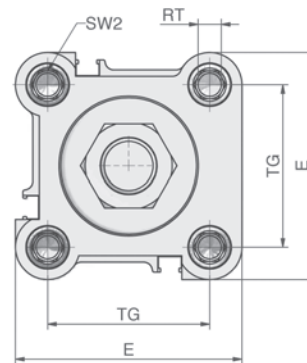
Pneumatic cylinders series XL

Double acting with magnetic piston, ISO 15552

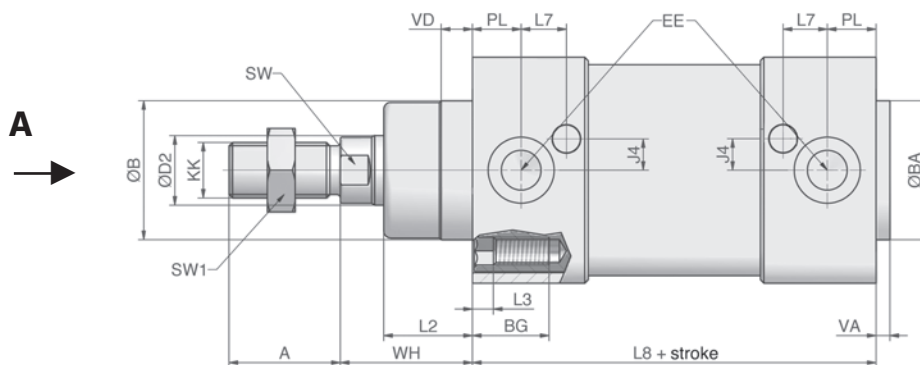
G1/8 to G1/2 • piston Ø 32 to 125 mm



XL (Type for order code: -000 and -050)



view A



Piston Ø	A	Ø B	Ø BA	BG	Ø D2	E	EE	J4	KK	L2	L3
32	22	30	30	16.5	12	47	G1/8	6	M10 x 1.25	18	5
40	24	35	35	16.5	16	54	G1/4	9	M12 x 1.25	22	5
50	32	40	40	17.5	20	63	G1/4	8	M16 x 1.5	25.5	5
63	32	45	45	17.5	20	74	G3/8	9.5	M16 x 1.5	25	5
80	40	45	45	17.5	25	93.5	G3/8	14	M20 x 1.5	35	0
100	40	55	55	17.5	25	110	G1/2	15	M20 x 1.5	38	0
125	54	60	60	20.5	32	137.5	G1/2	15	M27 x 2	46	0
	-2	d11	d11		f 7						

Piston Ø	L7	L8	PL	RT	SW	SW1	SW2	TG	VA	VD	WH
32	11.5	94	12.5	M6	10	17	6	32.5	4	9.5	26
40	13	105	14	M6	13	19	6	38	4	9.5	30
50	12.75	106	14	M8	17	24	8	46.5	4	9.5	37
63	14.5	121	16.5	M8	17	24	8	56.5	4	9.5	37
80	13.75	128	17	M10	22	30	6	72	4	10	46
100	15.5	138	18	M10	22	30	6	89	4	10	51
125	20	160	18	M12	27	41	8	110	6	11	65

Piston Ø	32	40	50	63	80	100	125
Mass at 0 mm stroke in kg	0.617 (1.360 lbs.)	0.925 (2.039 lbs.)	1.421 (3.133 lbs.)	1.950 (4.299 lbs.)	3.250 (7.165 lbs.)	4.396 (9.691 lbs.)	6.391 (14.089 lbs.)
add-on per 100 mm stroke	0.286 (0.630 lb.)	0.403 (0.888 lb.)	0.528 (1.164 lbs.)	0.597 (1.316 lbs.)	0.861 (1.898 lbs.)	0.946 (2.085 lbs.)	1.517 (3.344 lbs.)

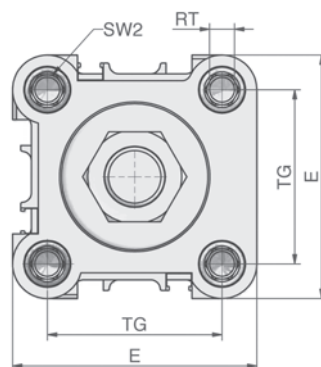
Pneumatic cylinders series XL

with double-ended piston rod, ISO 15552

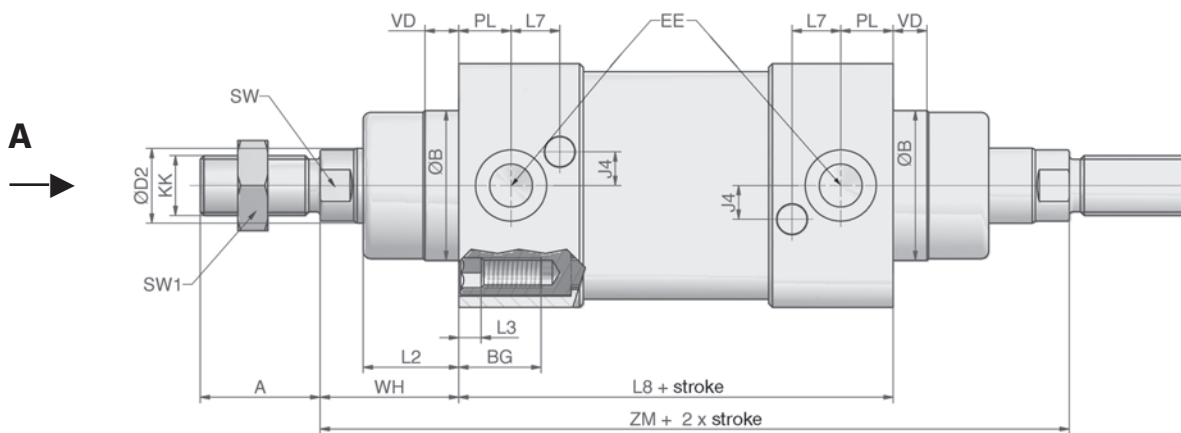
G1/8 to G1/2 • piston Ø 32 to 125 mm



XL (Type for order code: -400 and -450)



view A



Piston Ø	A	Ø B	BG	Ø D2	E	EE	J4	KK	L2	L3
32	22	30	16.5	12	47	G1/8	6	M10 x 1.25	18	5
40	24	35	16.5	16	54	G1/4	9	M12 x 1.25	22	5
50	32	40	17.5	20	63	G1/4	8	M16 x 1.5	25.5	5
63	32	45	17.5	20	74	G3/8	9.5	M16 x 1.5	25	5
80	40	45	17.5	25	93.5	G3/8	14	M20 x 1.5	35	0
100	40	55	17.5	25	110	G1/2	15	M20 x 1.5	38	0
125	54	60	20.5	32	137.5	G1/2	15	M27 x 2	46	0
	-2	d11		f 7						

Piston Ø	L7	L8	PL	RT	SW	SW1	SW2	TG	VD	WH	ZM
32	11.5	94	12.5	M6	10	17	6	32.5	9.5	26	146
40	13	105	14	M6	13	19	6	38	9.5	30	165
50	12.75	106	14	M8	17	24	8	46.5	9.5	37	180
63	14.5	121	16.5	M8	17	24	8	56.5	9.5	37	195
80	13.75	128	17	M10	22	30	6	72	10	46	220
100	15.5	138	18	M10	22	30	6	89	10	51	240
125	20	160	18	M12	27	41	8	110	11	65	290

Piston Ø	32	40	50	63	80	100	125
Mass at 0 mm stroke in kg	0.702 (1.548 lbs.)	1.065 (2.348 lbs.)	1.713 (3.776 lbs.)	2.208 (4.868 lbs.)	3.780 (8.333 lbs.)	5.057 (11.149 lbs.)	9.387 (20.694 lbs.)
add-on per 100 mm stroke	0.374 (0.824 lb.)	0.559 (1.232 lbs.)	0.768 (1.693 lbs.)	0.837 (1.845 lbs.)	1.243 (2.740 lbs.)	1.328 (2.928 lbs.)	2.143 (4.724 lbs.)

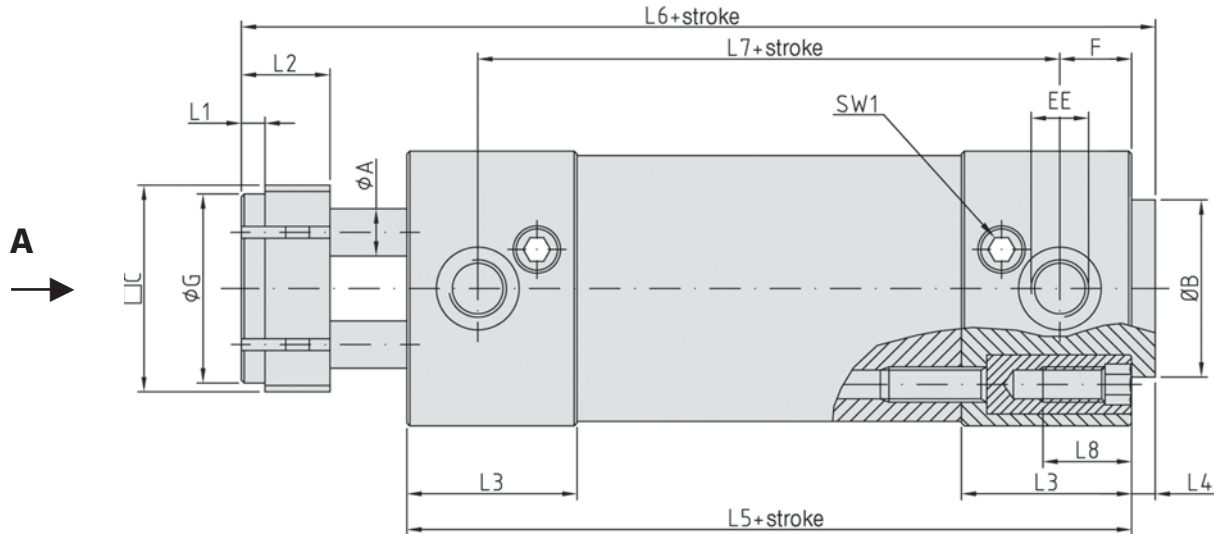
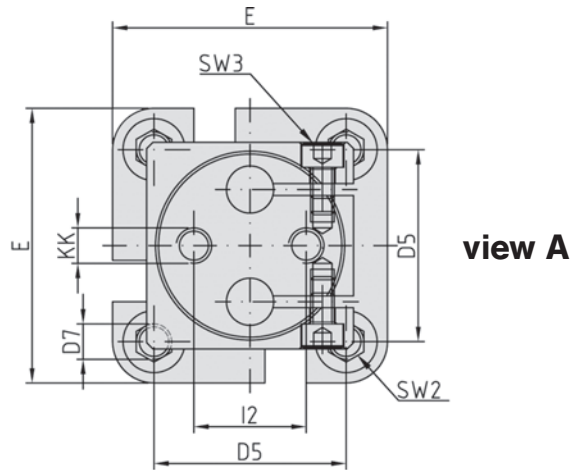
Pneumatic cylinders series XL

with double piston rod, ISO 15552

G1/8 to G1/2 • piston Ø 32 to 125 mm



XL (Type for order code: -070)



Piston Ø	Ø A	Ø B	□ C	D5	D7	E	EE	F	Ø G	I2	KK
32	8	30	35	32,5	M6	46.5	G1/8	12	32	19	M6
40	10	35	45	38	M6	53	G1/4	13	40	22.5	M8
50	12	40	55	46.5	M8	65	G1/4	14	50	30	M8
63	16	45	65	56.5	M8	75	G3/8	14	63	38	M10

Piston Ø	L1	L2	L3	L4	L5	L6	L7	L8	SW 1	SW 2	SW 3
32	4	15	28.8	4	100	128	76	16.5	3	6	3
40	4	15	33	4	114	142	88	16.5	3	6	3
50	5	18	34	4	116	151	88	17.5	3	8	4
63	5	22	35.2	4	124	161	96	17.5	3	8	5

Piston Ø	32	40	50	63
Mass at 0 mm stroke in kg	0.744 (1.640 lbs.)	1.121 (2.471 lbs.)	1.641 (3.618 lbs.)	2.678 (5.904 lbs.)
add-on per 100 mm stroke	0.277 (0.610 lb.)	0.370 (0.815 lb.)	0.464 (1.023 lbs.)	0.669 (1.475 lbs.)

Materials: Piston rod for Ø 32 and 40 mm = stainless steel
 Piston rod for Ø 50 and 63 mm = steel (hard chrome plated)

Piston rod accessories



Flexible coupling
FK
Page 9.212



Rod eye
FO + RO
Page 9.212



Rod clevis with pin
FD + RD
Page 9.211



Piston rod nut
FE + RL
Page 9.212

Mounting accessories



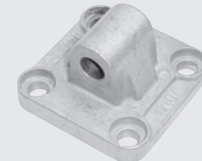
Foot mount
XLB-Ø-01
Page 9.016



Flange mount
XLB-Ø-02
Page 9.016



Clevis mount with bushing
XLB-Ø-04
Page 9.016



Swivel mount
XLB-Ø-05
Page 9.017



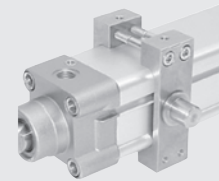
Swivel mount 90°
XLB-Ø-06
Page 9.017



Clevis pin
XLB-Ø-08
Page 9.017



Bearing block
XLB-Ø-09
Page 9.018



Trunnion mount
XLB-Ø-10
Page 9.018



Trunnion flange mount
XLB-Ø-11
Page 9.018

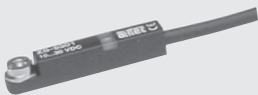


Swivel mount with spherical bearing
XLB-Ø-12
Page 9.019



Small clevis mount with non rotating pin
XLB-Ø-14
Page 9.019

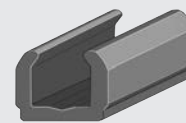
Proximity sensors



Sensors
ZS-
Page 9.220



Connecting cable
KA-
Page 9.221



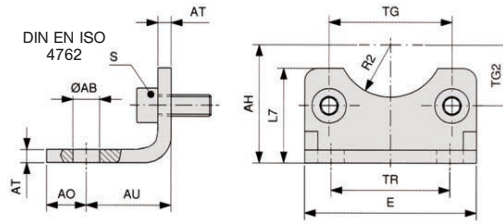
Cover for sensor groove
XLB-011 0,5m

Seal kits see page 9.045.

Mounting accessories for series XL



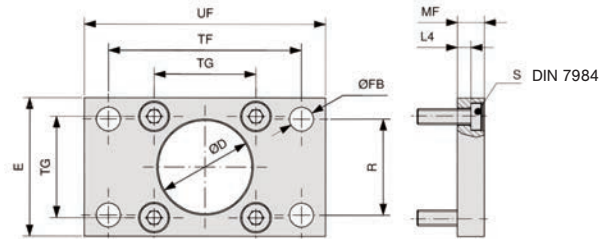
Foot mount 1 pair



Material: steel (zinc-plated)

Order number	Ø AB	AH	AO	AU	AT	E	L7	R2	S	TG	TG2	TR
XLB-032-01	7	32	11	24	4	45	30	15	M6 x 20	32.5	16.25	32
XLB-040-01	10	36	8	28	4	52	30	17.5	M6 x 20	38	19	36
XLB-050-01	10	45	15	32	5	65	36	20	M8 x 20	46.5	23.25	45
XLB-063-01	10	50	13	32	5	75	35	22.5	M8 x 20	56.5	28.25	50
XLB-080-01	12	63	14	41	6	95	47	22.5	M10 x 20	72	36	63
XLB-100-01	14.5	71	16	41	6	115	53	27.5	M10 x 20	89	44.5	75
XLB-125-01	16.5	90	25	45	8	140	70	30	M12 x 25	110*	55	90
	H14	JS16		± 0,2				H15		± 0.2 *± 0.3		JS14

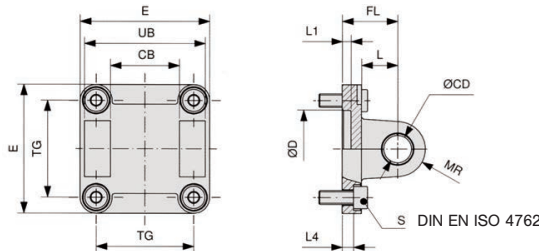
Flange mount



Material: steel (zinc-plated)

Order number	Ø D	E	Ø FB	L4	MF	R	S	TF	TG	UF
XLB-032-02	30	45	7	5	10	32	M6 x 20	64	32.5	80
XLB-040-02	35	52	9	5	10	36	M6 x 20	72	38	90
XLB-050-02	40	65	9	6.5	12	45	M8 x 20	90	46.5	110
XLB-063-02	45	75	9	6.5	12	50	M8 x 20	100	56.5	120
XLB-080-02	45	95	12	9	16	63	M10 x 25	126	72	150
XLB-100-02	55	115	14	9	16	75	M10 x 25	150	89	170
XLB-125-02	60	140	16	10.5	20	90	M12 x 25	180	110*	205
	H11		H13	- 0,5	JS14	JS14		JS14	± 0.2 *± 0.3	

Clevis mount with bushing



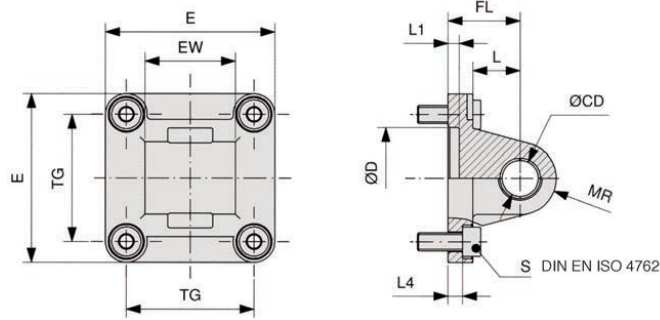
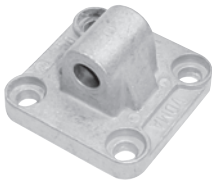
Order number XLB-xxx-48
includes the mounting pin.

Material: Al

Order number	CB	Ø CD	Ø D	E	FL	L	L1	L4	MR	S	TG	UB
XLB-032-04	26	10	30	45	22	13	5	5.5	10	M6 x 20	32.5	45
XLB-040-04	28	12	35	52	25	16	5	5.5	12	M6 x 20	38	52
XLB-050-04	32	12	40	65	27	16	5	6.5	12	M8 x 20	46.5	60
XLB-063-04	40	16	45	75	32	21	5	6.5	16	M8 x 20	56.5	70
XLB-080-04	50	16	45	95	36	22	5	10	16	M10 x 25	72	90
XLB-100-04	60	20	55	115	41	27	5	10	20	M10 x 25	89	110
XLB-125-04	70	25	60	140	50	30	7	10	25	M12 x 25	110*	130
	H14	H9	H11		± 0.2			± 0.5			± 0.2 *± 0.3	h13

Mounting accessories for series XL

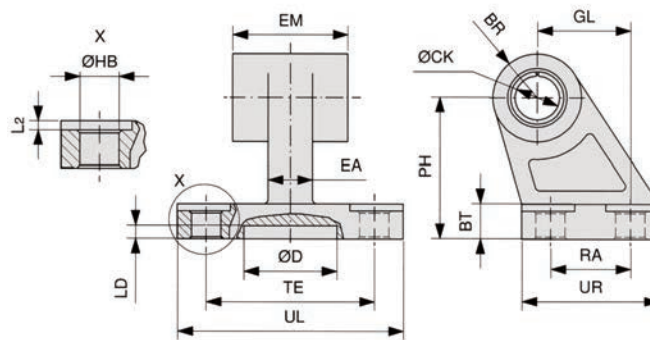
Swivel mount



Material: Al

Order number	Ø CD	Ø D	E	EW	FL	L	L1	L4	MR	S	TG
XLB-032-05	10	30	45	26	22	13	5	5.5	10	M6 x 20	32.5
XLB-040-05	12	35	52	28	25	16	5	5.5	12	M6 x 20	38
XLB-050-05	12	40	65	32	27	16	5	6.5	12	M8 x 20	46.5
XLB-063-05	16	45	75	40	32	21	5	6.5	16	M8 x 20	56.5
XLB-080-05	16	45	95	50	36	22	5	10	16	M10 x 25	72
XLB-100-05	20	55	115	60	41	27	5	10	20	M10 x 25	89
XLB-125-05	25	60	140	70	50	30	7	10	25	M12 x 25	110*
	H9	H11			± 0.2			± 0.5			± 0.2 * ± 0.3

Swivel mount 90°



Material: Al

Order number	BR	BT	Ø CK	Ø D	EA	EM	GL	Ø HB	L2	LD	PH	RA	TE	UL	UR
XLB-032-06	10	8	10	21	10	26	21	6.6	1.6	3	32	18	38	51	31
XLB-040-06	11	10	12	21	15	28	24	6.6	1.6	3	36	22	41	54	35
XLB-050-06	13	12	12	21	16	32	33	9	1.6	3	45	30	50	65	45
XLB-063-06	15	14	16	21	16	40	37	9	1.6	3	50	35	52	67	50
XLB-080-06	15	14	16	21	20	50	47	11	2.5	3	63	40	66	86	60
XLB-100-06	19	17	20	11	20	60	55	11	2.5	3	71	50	76	96	70
XLB-125-06	22.5	20	25	21	30	70	70	14	3.2	3	90	60	94	124	90
			H9				JS14	H13			JS15	JS14	JS14		

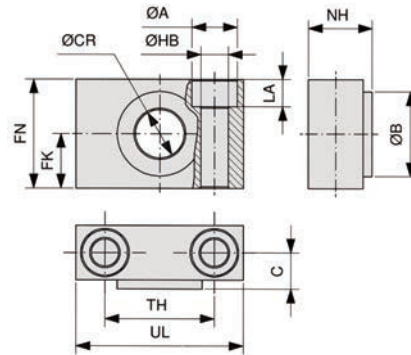
Clevis pin

Order number	A	Ø B	Ø EK	EL	LB
XLB-032-08	53	9.6	10	46	1.1
XLB-040-08	60	11.5	12	53	1.1
XLB-050-08	68	11.5	12	61	1.1
XLB-063-08	78	15.2	16	71	1.1
XLB-080-08	98	15.2	16	91	1.1
XLB-100-08	118	19	20	111	1.3
XLB-125-08	139	23.9	25	132*	1.3
		e8		+ 2 * + 3	



Material: steel (zinc-plated)
Snap rings are included.

Bearing block (1 pair)

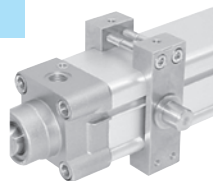


Order number = 1 pair
Material: steel (zinc-plated), bronze

Order number	Ø A	Ø B	C	Ø CR	FK	FN	Ø HB	LA	NH	TH	UL
XLB-032-09	11	22	10.5	12	15	30	6.6	7	18	32	46
XLB-040-09	15	28	12	16	18	36	9	9	21	36	55
XLB-063-09	18	32	13	20	20	40	11	11	23	42	65
XLB-100-09	20	39	16	25	25	50	14	13	28.5	50	75
				H9	± 0.1		H13			± 0.2	

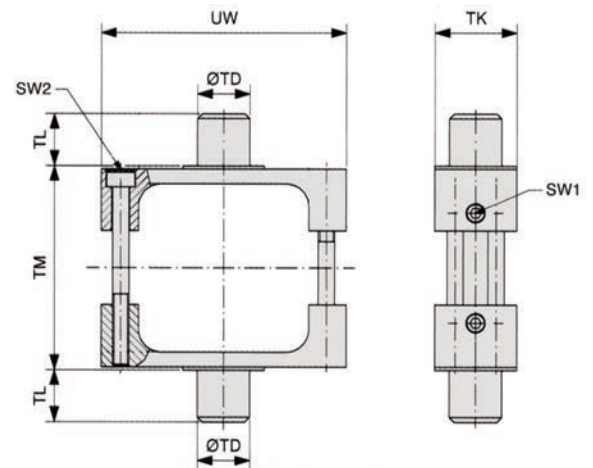
Trunnion mount

Mounting position arbitrary.

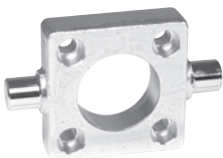


Material: steel (zinc-plated)

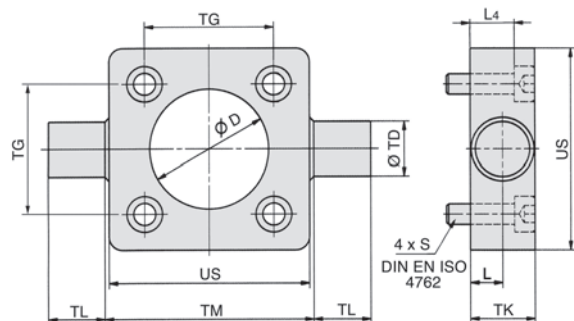
Order number	SW1 DIN 914	SW2 DIN 7984	Ø TD	TK	TL	TM	UW
XLB-032-10	3	2.5	12	25	12	50	65
XLB-040-10	3	3	16	25	16	63	75
XLB-050-10	3	4	16	30	16	75	95
XLB-063-10	3	4	20	30	20	90	105
XLB-080-10	3	4	20	30	20	110	130
XLB-100-10	4	5	25	40	25	132	145
XLB-125-10	4	6	25	40	25	160	175
		EN ISO 4762	e9		h14	h14	



Trunnion flange mount

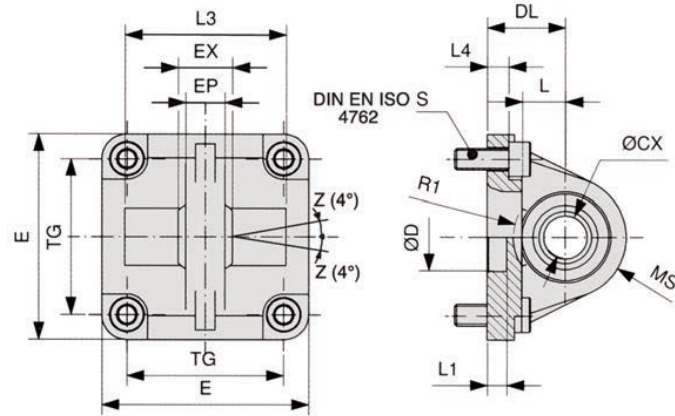
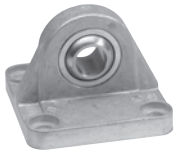


Material: steel (zinc-plated)



Order number	D	L	L4	S	TD	TG	TK	TL	Ø TM	US
XLB-032-11	30	6.5	8	M6 x 20	12	32.5	14	12	50	46
XLB-040-11	35	9	13	M6 x 25	16	38	19	16	63	59
XLB-050-11	40	9	11	M8 x 25	16	46.5	19	16	75	69
XLB-063-11	45	11.5	16	M8 x 30	20	56.5	24	20	90	84
XLB-080-11	45	11.5	14	M10 x 30	20	72	24	20	110	102
XLB-100-11	55	14	19	M10 x 35	25	89	29	25	132	125
	H11	+ 0.2			e9	± 0.2		h14	h14	

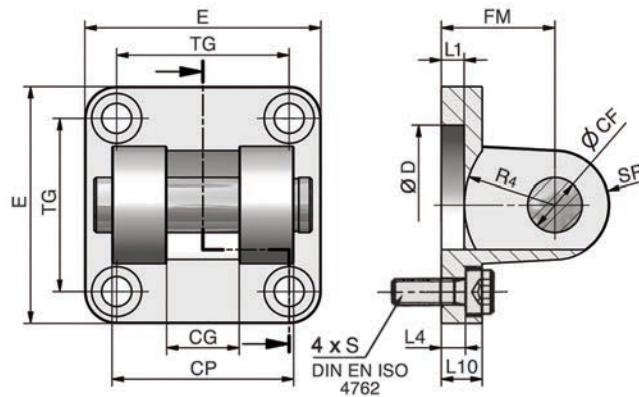
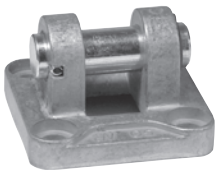
Swivel mount with spherical bearing



Material: Al

Order number	ØCX	ØD	DL	E	EP	EX	L	L1	L3	L4	MS	R1	S	TG
XLB-032-12	10	30	22	45	10.5	14	12	7	-	5.5	16	-	M6 x 20	32.5
XLB-040-12	12	35	25	52	12	16	15	7	-	5.5	18	-	M6 x 20	38
XLB-050-12	16	40	27	65	15	21	15	7	51	6.5	21	19	M8 x 20	46.5
XLB-063-12	16	45	32	75	15	21	20	7	-	6.5	23	-	M8 x 20	56.5
XLB-080-12	20	45	36	95	18	25	20	9	74	10	28	24	M10 x 25	72
XLB-100-12	20	55	41	115	18	25	25	9	-	10	30	-	M10 x 25	89
XLB-125-12	30	60	50	140	25	37	30	9	-	10	40	-	M12 x 25	110*
	H7	H11	± 0.2			± 0.1				± 0.5				± 0.2 *± 0.3

Small clevis mount with non rotating pin

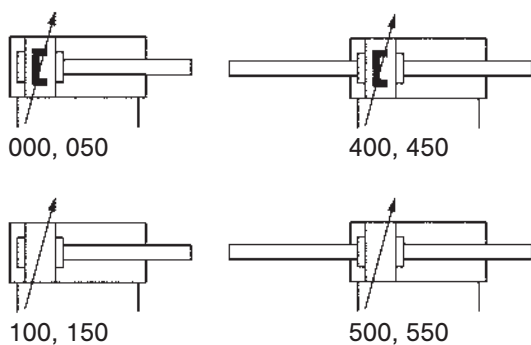


Material of clevis: Al
of pin: steel (zinc-plated)

Order number	CF	CG	CP	D	E	FM	L1	L4	L10	R4	S	SR	TG
XLB-032-14	10	14	34	30	45	22	5	5.5	9	17	M6 x 20	10	32.5
XLB-040-14	12	16	40	35	52	25	5	5.5	9	20	M6 x 20	12	38
XLB-050-14	16	21	45	40	65	27	5	6.5	11	22	M8 x 20	14	46.5
XLB-063-14	16	21	51	45	75	32	5	6.5	11	25	M8 x 20	18	56.5
XLB-080-14	20	25	65	45	95	36	5	10	14	30	M10 x 25	20	72
XLB-100-14	20	25	75	55	115	41	5	10	14	32	M10 x 25	22	89
XLB-125-14	30	37	97	60	140	50	7	10	20	42	M12 x 25	25	110*
	F7	D10	d 12	H11		± 0.2		± 0.5					± 0.2 *± 0.3

Pneumatic cylinders series XG

Double acting with adjustable cushions, ISO 15552
G3/4 and G1 • piston Ø 160, 200, 250 and 320 mm



Order code

XG-160-0250-050

Series

Piston Ø

Stroke length
(mm)

Type of cylinder

Standard (steel piston rod, chromium plated)

- 050 – with magnetic piston
- 150 – no magnetic piston
- 450 – with magnetic piston, double-ended piston rod
- 550 – no magnetic piston, with double-ended piston rod

Piston rod stainless steel

- 000 – with magnetic piston
- 100 – no magnetic piston
- 400 – with magnetic piston, double-ended piston rod
- 500 – no magnetic piston, with double-ended piston rod

XGS = Cylinder with intermediate trunnion, see page 9.035.

Design and function

Double acting cylinder with adjustable cushions.

Standard stroke lengths in table below, additional lengths on request.

Cylinders of this series are available in explosion proof design in accordance with 94/9/EG (ATEX). For further details see page 9.250.

Order number Please complete according to order code.	XG-160-...	XG-200-...	XG-250-...	XG-320-...
Piston Ø (mm)	160	200	250	320
Force at Extension	10852 (2439.7 lbf.)	16956 (3812.0 lbf.)	26494 (5956.4 lbf.)	43407 (9758.8 lbf.)
6 bar in N** Retraction	10174 (2287.3 lbf.)	16278 (3659.6 lbf.)	25434 (5718.1 lbf.)	41725 (9380.6 lbf.)
Cushioning length (mm)	50		60	65
Connection	G3/4		G1	
Piston rod thread	M36 x 2		M42 x 2	M48 x 2
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)			
Temperature range	- 20 °C ... + 80 °C (- 4 °F ... + 176 °F)			
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives. If speeds exceed 1 m/s (3.3 ft/s) lubricated air is recommended.			
Standard stroke lengths (mm)*	25, 50, 80, 100, 125, 160, 200, 250, 320, 350, 400, 500, 600, 700, 800, 900, 1000, max. 2500			
Materials	Cylinder tube: Al (anodized) End caps: Al-die-cast (painted) Piston rod: hard chrome plated (standard) – stainless steel (see order code) Seals: PU/NBR			

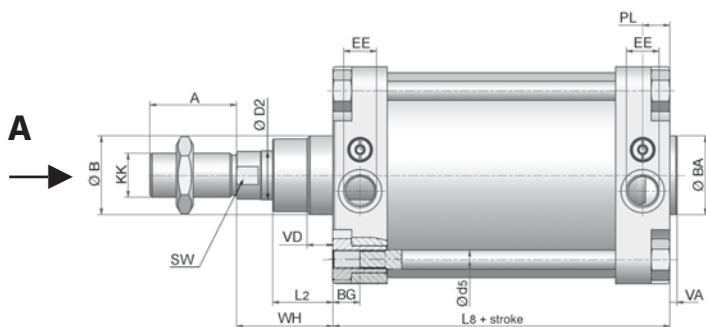
* Refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

** The internal friction is considered.

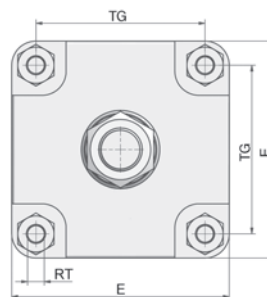
Pneumatic cylinders series XG
 Double acting with adjustable cushions, ISO 15552
 G3/4 and G1 • piston Ø 160, 200, 250 and 320 mm



(Type for order code: -000, -050, -100 and -150)



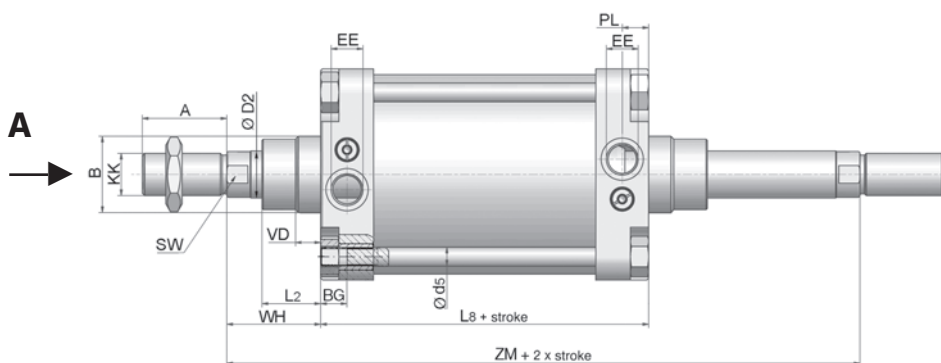
view A



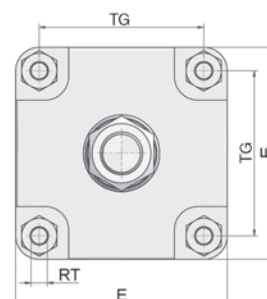
Piston Ø	A	Ø B	Ø BA	BG	Ø D2	Ø d5	E	EE	KK	L2	L8	PL	RT	SW	TG	VA	VD	WH
160	72	65	65	22.5	40	16	180	G3/4	M36 x 2	50	179.5	22.5	M16	36	140	6	21.5	80
200	72	75	75	22.5	40	16	220	G3/4	M36 x 2	55	180	22.5	M16	36	175	6	26.5	95
250	84	90	90	25	50	20	268	G1	M42 x 2	67	200	31	M20	46	220	10	20	105
320	96	110	110	28	63	25	340	G1	M48 x 2	82	220	31	M24	55	270	10	20	120
	- 2	d11	d11															

Piston Ø	160	200	250	320
Weight at 0 mm stroke in kg	15.0 (33.06 lbs.)	20.0 (44.09 lbs.)	28.5 (62.83 lbs.)	48.4 (106.70 lbs.)
Weight per 100 mm stroke	2.0 (4.41 lbs.)	2.5 (5.51 lbs.)	3.8 (8.38 lbs.)	6.2 (13.67 lbs.)

(Type for order code: -400, -450, -500 and -550)



view A



Piston Ø	A	Ø B	BG	Ø D2	Ø d5	E	EE	KK	L2	L8	PL	RT	SW	TG	VD	WH	ZM
160	72	65	22.5	40	16	180	G3/4	M36 x 2	50	179.5	22.5	M16	36	140	21.5	80	340
200	72	75	22.5	40	16	220	G3/4	M36 x 2	55	180	22.5	M16	36	175	26.5	95	370
250	84	90	25	50	20	268	G1	M42 x 2	67	200	31	M20	46	220	20	105	410
320	96	110	28	63	25	340	G1	M48 x 2	82	220	31	M24	55	270	20	120	460
	- 2	d11															

Piston Ø	160	200	250	320
Weight at 0 mm stroke in kg	16.9 (37.25 lbs.)	22.5 (49.60 lbs.)	32.3 (71.21 lbs.)	54.8 (120.81 lbs.)
Weight per 100 mm stroke	3.3 (7.27 lbs.)	3.5 (7.71 lbs.)	4.0 (8.82 lbs.)	6.4 (14.11 lbs.)

Accessories for pneumatic cylinders series XG

ISO 15552

G3/4 and G1 • piston Ø 160, 200, 250 and 320 mm



Piston rod accessories



Flexible coupling
FK
Page 9.212



Rod eye
FO
Page 9.212



Rod clevis with pin
FD
Page 9.211



Piston rod nut
FE
Page 9.212

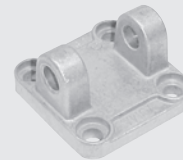
Mounting accessories



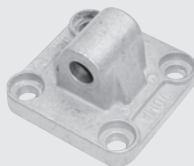
Foot mount
VLB-Ø-01
Page 9.033



Flange mount
VLB-Ø-02
Page 9.033



Clevis mount with bushing
VLB-Ø-04
Page 9.033



Lasche
VLB-Ø-05
Page 9.034



Swivel mount 90°
VLB-Ø-06
Page 9.034



Swivel mount with spherical bearing
VLB-Ø-12
Page 9.035



Clevis pin
VLB-Ø-08
Page 9.034



Bearing block
VLB-Ø-09
Page 9.034



Trunnion mount
XGS-Ø-...
Page 9.035

Proximity sensors



Sensors
ZS-
Page 9.220

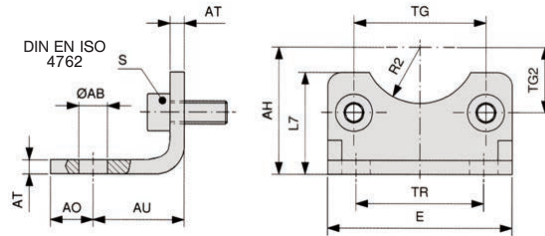


Connecting cable
KA-
Page 9.221



Cover for sensor groove
For use on tie rods.
NT-250
Page 9.221

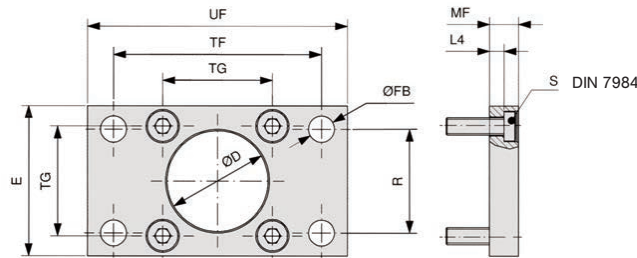
Foot mount (1 pair)



Material: steel (zinc-plated)

Order number	Ø AB	AH	AO	AU	AT	E	L7	R2	S	TG	TG2	TR	Weight
VLB-160-01	18	115	15	60	9	180	100	32.5	M16 x 30	140	70	115	2.68 kg (5.91 lbs.)
VLB-200-01	22	135	30	70	12	220	100	37.5	M16 x 30	175	87.5	135	7.20 kg (15.87 lbs.)
VLB-250-01	26	165	25	75	14	270	150	45	M20 x 40	220	110	165	13.80 kg (30.42 lbs.)
	H14	JS16		± 0.2	± 1			H15		± 0.3		JS14	

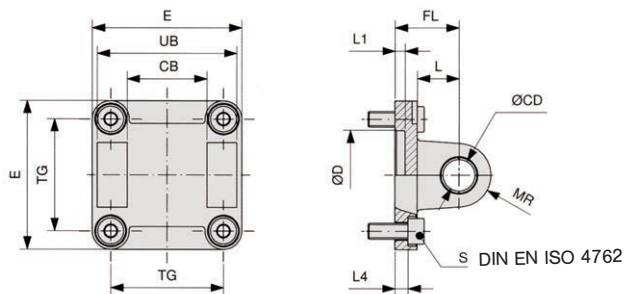
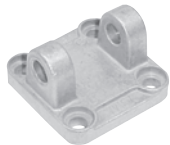
Flange mount



Material: steel (zinc-plated)

Order number	Ø D	E	Ø FB	L4	MF	R	S	TF	TG	UF	Weight
VLB-160-02	65	180	18	9.5	20	115	M16 x 30	230	140	260	6.65 kg (14.66 lbs.)
VLB-200-02	75	220	22	12.5	25	135	M16 x 30	270	175	300	11.65 kg (3.15 lbs.)
VLB-250-02	90	285	26	10.5	25	165	M20 x 30	330	220	400	20.65 kg (45.52 lbs.)
VLB-320-02	110	350	33	15	30	200	M24 x 40	400	270	470	-
	H11		H13	0 - 0.5	JS14	JS14		JS14	± 0.3		

Clevis mount with bushing



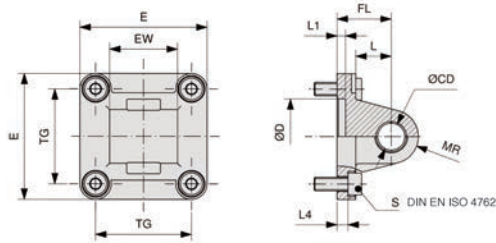
Order number **XLB-xxx-48** includes the mounting pin.

Material: Al

Order number	CB	Ø CD	Ø D	E	FL	L	L1	L4	MR	S	TG	UB	Weight
VLB-160-04	90	30	65	180	55	35	7	10	25	M 16 x 30	140	170	2.27 kg (5.00 lbs.)
VLB-200-04	90	30	75	220	60	35	7	11	25	M 16 x 30	175	170	3.62 kg (7.98 lbs.)
VLB-250-04	110	40	90	268	70	59	11	11	41	M 20 x 35	220	200	10.85 kg (23.92 lbs.)
VLB-320-04	120	45	110	340	80	65	15	15	45	M 24 x 40	270	220	19.94 kg (43.96 lbs.)
	H14	H9	H11		± 0.2			± 0.5			± 0.3	h14	

Mounting accessories for series XG

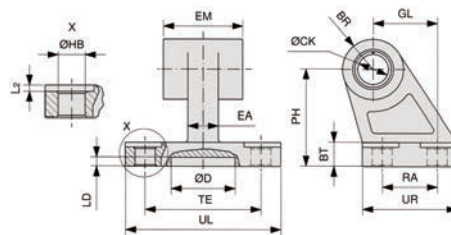
Swivel mount



Material: Al

Order number	Ø CD	Ø D	E	EW	FL	L	L1	L4	MR	S	TG	Weight
VLB-160-05	30	65	180	90	55	35	7	10	25	M16 x 30	140	2.38 kg (5.25 lbs.)
VLB-200-05	30	75	220	90	60	35	7	11	25	M16 x 30	175	3.75 kg (8.27 lbs.)
VLB-250-05	40	90	268	110	70	47	11.5	11	41	M20 x 35	220	14.67 kg (32.34 lbs.)
VLB-320-05	45	110	340	120	80	52	11.5	15	45	M24 x 40	270	26.13 kg (57.61 lbs.)
	H9	H11		- 0.5 - 1.2	± 0.2			± 0.5			± 0.3	

Swivel mount 90°



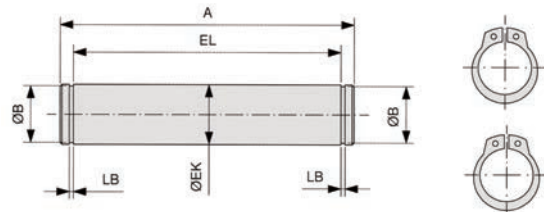
Material: Al

Order number	BR	BT	Ø CK	Ø D	EA	EM	GL	Ø HB	L2	LD	PH	RA	TE	UL	UR	Weight
VLB-160-06	31.5	25	30	31	36	90	97	14	4	5	115	88	118	156	126	2.39 kg (5.27 lbs.)
VLB-200-06	31.5	30	30	31	40	90	105	18	4	5	135	90	122	162	130	2.95 kg (6.50 lbs.)
			H9			- 0.5 - 1.5	JS14	H13			JS15	JS14	JS14			

Clevis pin



Order number	A	Ø B	Ø EK	EL	LB	Weight
VLB-200-08	178	28.6	30	171.5	1.60	0.98 kg (2.16 lbs.)
VLB-250-08	211	37.5	40	202	1.85	2.10 kg (4.63 lbs.)
VLB-320-08	234	42.5	45	222	1.85	2.95 kg (6.50 lbs.)
			e8	+ 3 0		



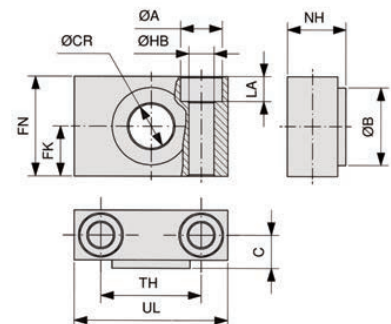
Material: steel (zinc-plated)
Snap rings are included.

Bearing block



Order number = 1 pair
Material: steel (zinc-plated), bronze

Order number	Ø A	C	Ø CR	FK	FN	Ø HB	LA	NH	TH	UL	Weight (pair)
VLB-200-09	26	22.5	32	30	60	18	17	40	60	92	1.95 kg (4.30 lbs.)
VLB-250-09	33	31	40	35	70	22	20	56	90	140	5.5 kg (12.12 lbs.)
			H9	± 0.2		H13				± 0.3	



Trunnion mount

Order code

XGS-160-0250-050-215

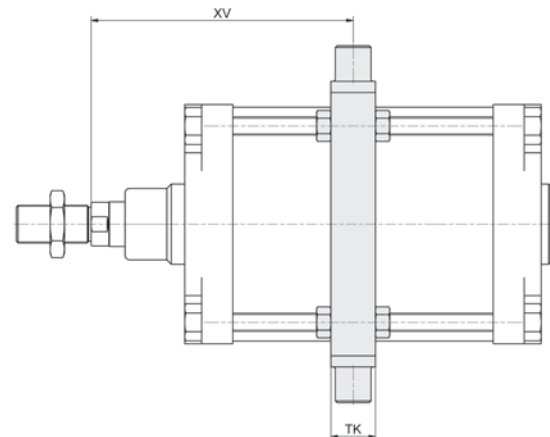
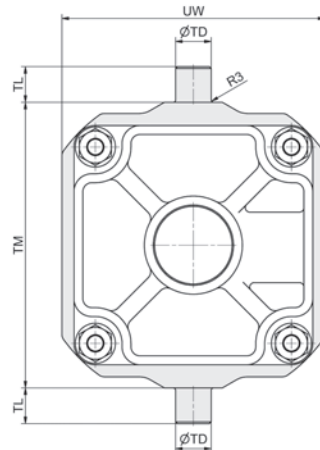
Series

Piston Ø

Stroke length
(mm)

Type for
order code
see page 9.030

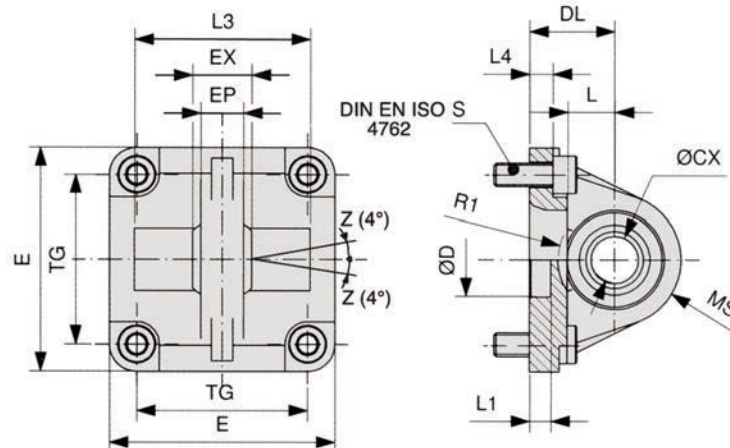
Distance XV



Order number Please complete according to order code.	R3	Ø TD	TK	TL	TM	UW	Weight
XGS-160-...	2.5	32	40	32	200	190	4.15 kg (9.15 lbs.)
XGS-200-...	2.5	32	40	32	250	240	7.30 kg (16.10 lbs.)
XGS-250-...	2.5	40	50	40	320	295	12.45 kg (27.45 lbs.)
XGS-320-...	2.5	50	70	50	400	370	24.20 kg (53.35 lbs.)
		e9			h14		

Included in the scope of delivery of the intermediate trunnion are 8 fastening nuts.
Tie rods are threaded.

Swivel mount with spherical bearing



Material: Al

Order number	Ø CX	Ø D	DL	E	EP	EX	L	L1	L3	L4	MS	R1	S	TG	Weight
VLB-160-12	35	65	55	195	30	43	35	7	-	10	44	-	M16 x 30	140	2.72 kg (6.00 lbs.)
VLB-200-12	35	75	60	238	30	43	35	7	-	11	47	-	M16 x 30	175	4.14 kg (9.13 lbs.)
	H7	H11	±0.2			±0.1				±0.5				±0.3	

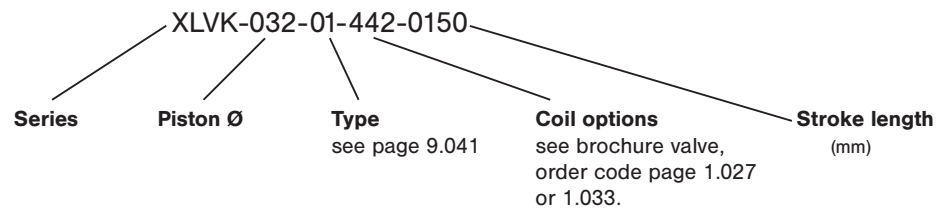
Cylinder/valve combination series XLVK

Cylinder ISO 15552

G1/8 and G1/4 • piston Ø 32 to 125 mm



Order code



Design and function

Double acting Al-profile cylinder with integrated sensor grooves, adjustable cushions and permanent magnet for proximity sensors. The sensors can be installed directly into the sensor grooves of the Al-profile. The cylinder includes a 5/2- or 5/3-way valve with a high flow rate and compact dimensions.

Alternatively the fittings can include a flow control valve for infinite speed adjustment.

Please specify the required voltage when ordering. The valve includes the standard socket 28-ST-01 if not specified. Other coils and socket types are available, see accessories on page 9.044.

Standard stroke lengths in table below, additional lengths on request.

Order number Please complete according to order code.	XLVK-032-...	XLVK-040-...	XLVK-050-...	XLVK-063-...	XLVK-080-...	XLVK-100-...	XLVK-125-...	
Piston Ø (mm)	32	40	50	63	80	100	125	
Force at 6 bar in N**	Extension	434 (97.6 lbf.)	678 (152.4 lbf.)	1060 (238.3 lbf.)	1682 (378.1 lbf.)	2713 (609.9 lbf.)	4239 (953.0 lbf.)	6623 (1489.0 lb.)
	Retraction	373 (83.8 lbf.)	570 (128.1 lbf.)	890 (200.1 lbf.)	1513 (340.1 lbf.)	2448 (550.3 lbf.)	3974 (893.4 lbf.)	6189 (1391.4 lb.)
Valve type	KM 09				KM 10			
Connection	G1/8				G1/4			
Nominal size	6 mm (0.2362 in)				9 mm (0.3543 in)			
Piston rod thread	M10 x 1.25	M12 x 1.25	M16 x 1.5	M16 x 1.5	M20 x 1.5	M20 x 1.5	M27 x 2	
Cushioning length mm	27	29	32	32	32	32	42	
Operating pressure	3 ... 10 bar (max. 8 bar at 2.2 W) 43.5 ... 145 psi (max. 116 psi at 2.2 W)				2.5 ... 10 bar (max. 8 bar at 2.2 W) 36 ... 145 psi (max. 116 psi at 2.2 W)			
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives							
Temperature range	– 10 °C ... + 70 °C (+ 14 °F ... + 158 °F)							
Standard stroke lengths (mm)*	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, max. 2800							
Standard voltage	DC: 12 V, 24 V AC: 24 V, 115 V, 230 V / 50/60 Hz							
Power consumption	DC: 4.2 W, AC: 7.0/4.0 VA special DC 12 V, 24 V with 2.2 W							
Degree of protection	IP 65 according to EN 60529							

* = The internal friction is considered.

** = refer to “Critical Load Diagram” on page 9.240 to determine critical values on the piston rod.

Cylinder/valve combination series XLVK

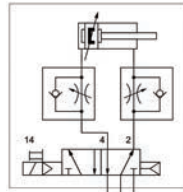
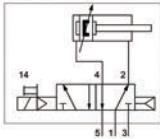
Cylinder ISO 15552

G1/8 and G1/4 • piston Ø 32 to 125 mm



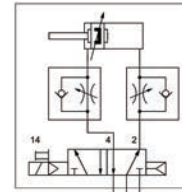
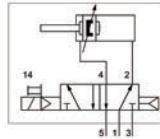
Types of series XLVK

Cylinder with 5/2-way valve, normally retracted



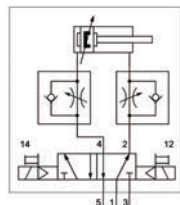
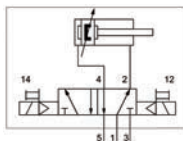
- 01 – standard cylinder with valve (air spring return)
- 02 – valve with spring return
- 03 – piston rod in stainless steel
- 04 – valve with spring return, piston rod in stainless steel
- 05 – standard cylinder with flow controls
- 06 – valve with spring return and flow controls
- 07 – piston rod in stainless steel and flow controls
- 08 – valve with spring return, piston rod in stainless steel and flow controls

Cylinder with 5/2-way valve, piston rod normally extended



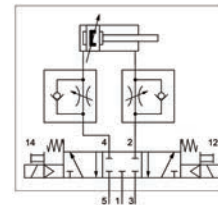
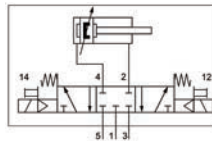
- 10 – standard cylinder with valve (air spring return)
- 11 – valve with spring return
- 12 – piston rod in stainless steel
- 13 – valve with spring return, piston rod in stainless steel
- 15 – standard cylinder with flow controls
- 16 – valve with spring return and flow controls
- 17 – piston rod in stainless steel and flow controls
- 18 – valve with spring return, piston rod in stainless steel and flow controls

Cylinder with 5/2-way valve, double solenoid



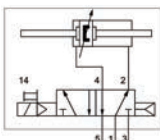
- 20 – standard cylinder
- 21 – piston rod in stainless steel
- 22 – standard cylinder with flow controls
- 23 – piston rod in stainless steel and flow controls

Cylinder with 5/3-way valve, center position closed

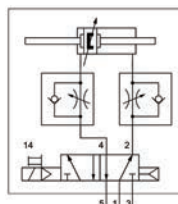


- 25 – standard cylinder
- 26 – piston rod in stainless steel
- 27 – standard cylinder with flow controls
- 28 – piston rod in stainless steel and flow controls

Cylinder with double-ended piston rod, 5/2-way valve

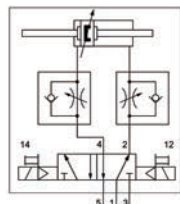
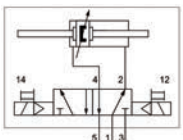


- 30 – standard cylinder with valve (air spring return)
- 31 – valve with spring return
- 32 – piston rod in stainless steel
- 33 – valve with spring return, piston rod in stainless steel



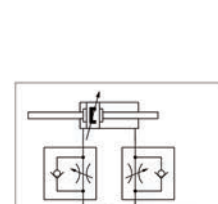
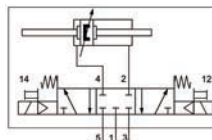
- 35 – standard cylinder with flow controls
- 36 – valve with spring return and flow controls
- 37 – piston rod in stainless steel and flow controls
- 38 – valve with spring return, piston rod in stainless steel and flow controls

Cylinder with double-ended piston rod 5/2-way valve, double solenoid



- 40 – standard cylinder
- 41 – piston rod in stainless steel
- 42 – standard cylinder with flow controls
- 43 – piston rod in stainless steel and flow controls

Cylinder with double-ended piston rod 5/3-way valve, center position closed



- 45 – standard cylinder
- 46 – piston rod in stainless steel
- 47 – standard cylinder with flow controls
- 48 – piston rod in stainless steel and flow controls

Further cylinder/valve combinations on request.

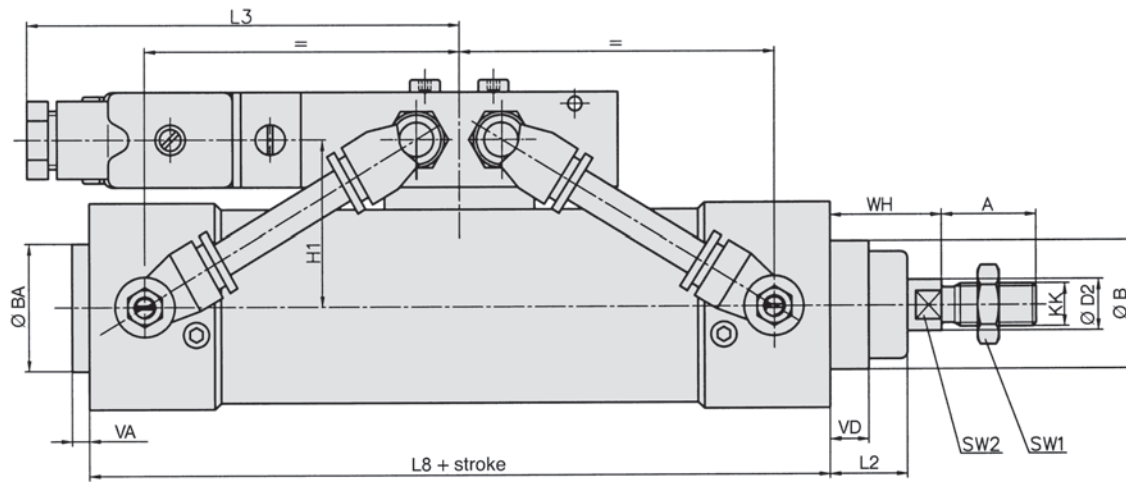
Cylinder/valve combination series XLVK

Cylinder ISO 15552

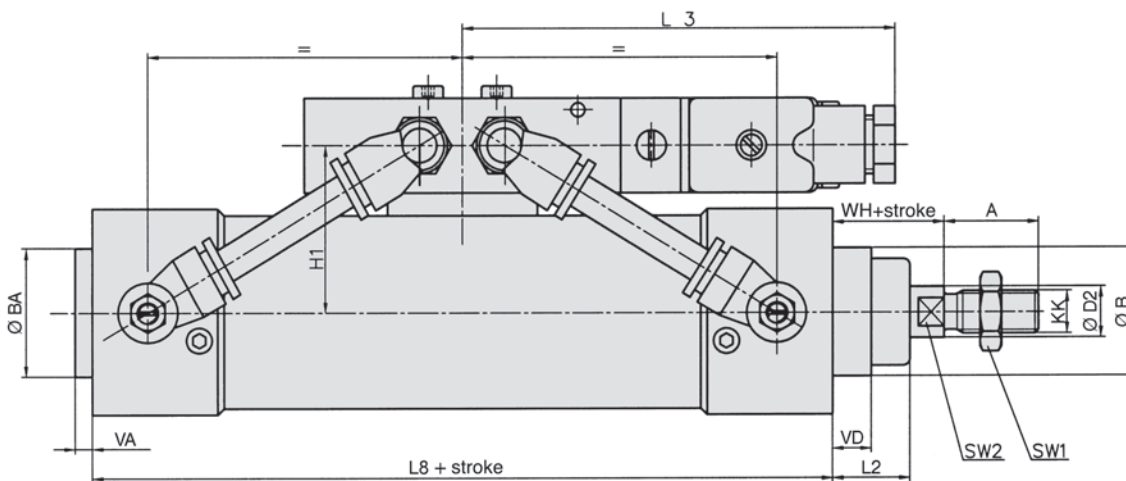
G1/8 and G1/4 • piston \varnothing 32 to 125 mm



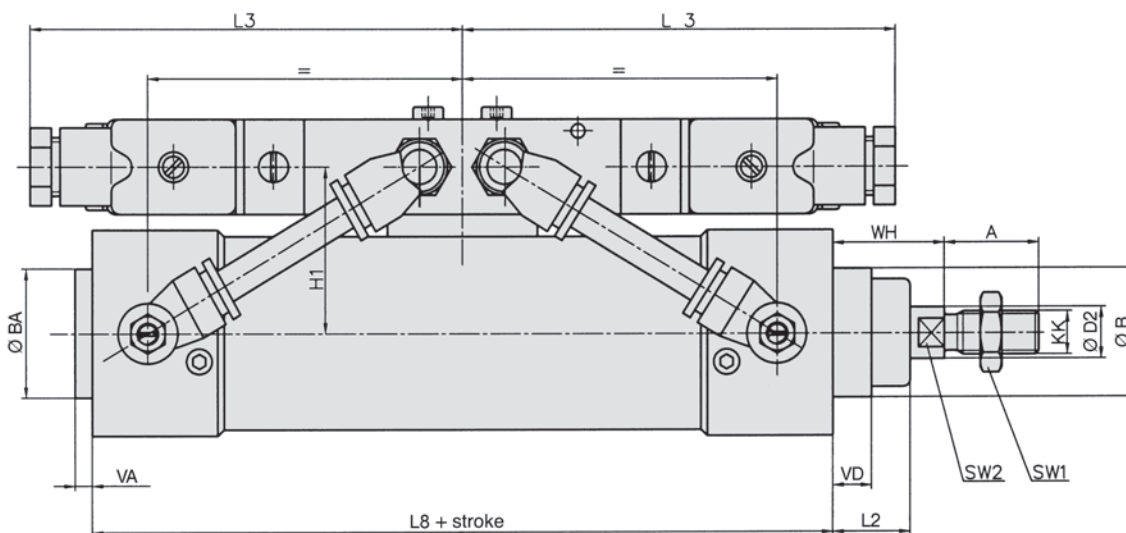
Types with single solenoid valve, normally retracted



Types with single solenoid valve, piston rod normally extended



Types with double solenoid or 5/3-way valves



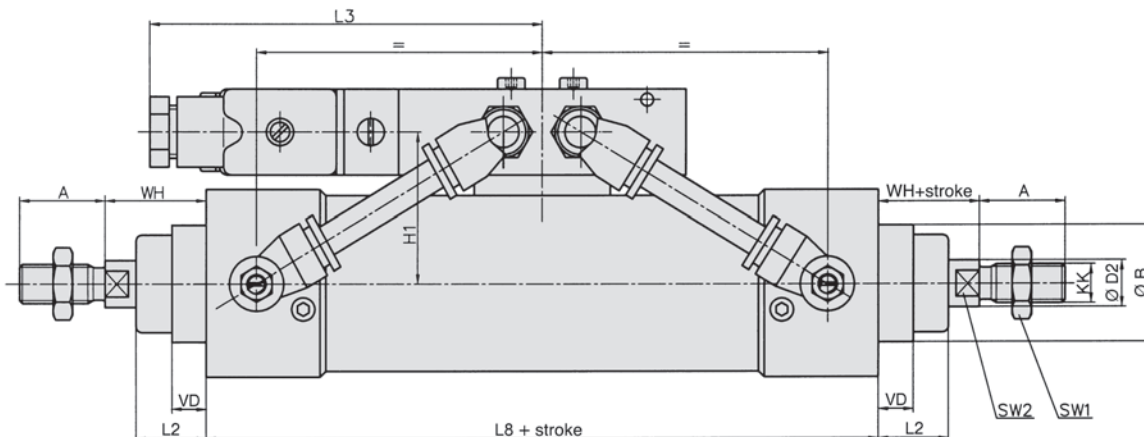
Cylinder/valve combination series XLVK

Cylinder ISO 15552

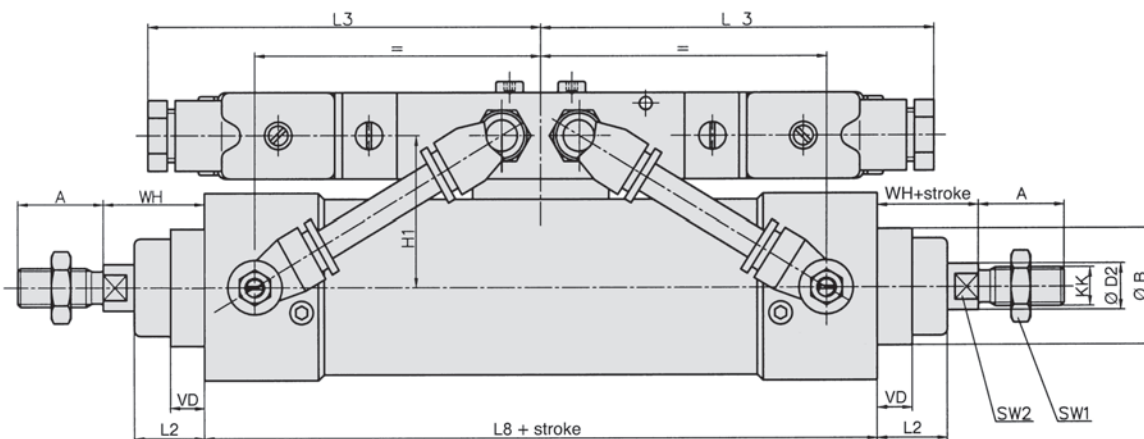
G1/8 and G1/4 • piston Ø 32 to 125 mm



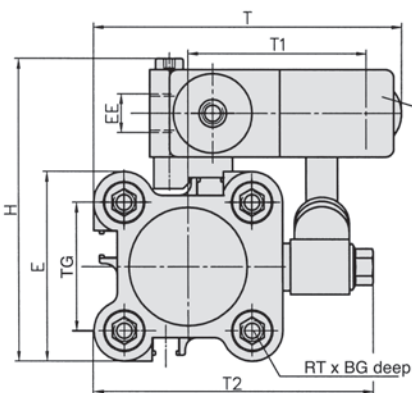
Types with single solenoid valve, double-ended piston rod



Types with double solenoid or 5/3-way valves, double-ended piston rod



Side view for all types



Coil can be repositioned by 3 x 90°. Socket can be repositioned by 180°.

All dimensions are for types with adjustable flow controls. For cylinders without throttles, T, T1 and T2 are smaller.

Cyl.-Ø	A	Ø B Ø BA	BG	Ø D2	□ E	EE	H
32	22	30	16	12	47	G1/8	76
40	24	35	16	16	54	G1/8	83.3
50	32	40	21.5	20	63	G1/8	92
63	32	45	21.5	20	74	G1/4	107
80	40	45	17.5	25	93.5	G1/4	132
100	40	55	17.5	25	110	G1/4	150
125	54	60	20.5	31	138	G1/2	178
	-2	d 11		f 7			

Cyl.-Ø	H 1	KK	L 2	L 3	L 8	RT	SW 1	SW 2	T	T 1	T 2	□ TG	VA	VD	WH
32	38.7	M10 x 125	18	101	94	M6	17	10	78	46	72	32.5	4	9.0	26
40	42.5	M12 x 125	22	101	105	M6	19	13	83	47	81	38	4	9.0	30
50	46.5	M16 x 1.5	25.5	101	106	M8	24	16	94	53	91	46.5	4	9.0	37
63	55	M16 x 1.5	25	101	121	M8	24	16	111	65	107	56.5	4	9.0	37
80	66.4	M20 x 1.5	35	109	128	M10	30	21	120	64	131	72	4	9.5	46
100	76.8	M20 x 1.5	38	109	138	M10	30	21	142	78	155	89	4	7.5	51
125	90.5	M27 x 2	46	109	160	M12	41	27	153	73.5	163.5	110	6	11	65

-1

Accessories for Cylinder/valve combination series XLVK

Cylinder ISO 15552

G1/8 and G1/4 • piston Ø 32 to 125 mm



Piston rod accessories



Flexible coupling
FK
Page 9.212



Rod eye
FO + RO
Page 9.212



Rod clevis with pin
FD + RD
Page 9.211



Piston rod nut
FE + RL
Page 9.212

Mounting accessories



Foot mount
XLB-Ø-01
Page 9.016



Flange mount
XLB-Ø-02
Page 9.016



Clevis mount with bushing
XLB-Ø-04
Page 9.016



Swivel mount
XLB-Ø-05
Page 9.017



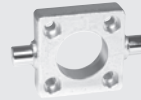
Swivel mount 90°
XLB-Ø-06
Page 9.017



Swivel mount with spherical bearing
XLB-Ø-12
Page 9.019



Clevis pin
XLB-Ø-08
Page 9.017



Trunnion flange mount
XLB-Ø-11
Page 9.018



Small clevis mount with non rotating pin
XLB-Ø-14
Page 9.019

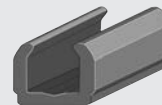
Proximity sensors



Sensors
ZS-
Page 9.220



Connecting cable
KA-
Page 9.221



Cover for sensor groove
XLB-011 0,5 m

Seal kits see page 9.045.

Solenoid coils, actuators

Solenoid coils	23-SP-011-...	Standard coil	see main catalog page 4.280
	23-SP-012-...	Coil with 2,2 W power consumption	see main catalog page 4.280
	23-SP-011-5-O12	Coil with M12 plug connection, 4,8 W, LED and circuit protection	see main catalog page 4.282
	23-SP-012-5-O32	Coil with M12 plug connection, 2,5 W, LED and circuit protection	see main catalog page 4.282
Actuators	23-R-011	Standard actuator	
	23-R-012	Low power actuator	
Plug sockets	28-ST-01	Standard plug socket	see main catalog page 4.283
	28-ST-04-...	Plug socket with LED	see main catalog page 4.283
	28-ST-06-...	Plug socket with LED and circuit protection	see main catalog page 4.283
	28-ST-06-K3-...	Plug socket with LED, circuit protection and cable	see main catalog page 4.283

User information

Low power consumption coils (2.2 W or 2.5 W) are for pressures up to 8 bar (116 psi) only. Valve actuator 23-R-012 is required. The actuator 23-R-012 is nickel plated. Make sure that the coils with the right power consumption are used.

For outdoor applications or in areas with high humidity use coil 23-SP-011-1-... or 23-SP-012-1-... (see main catalog page 4.280).

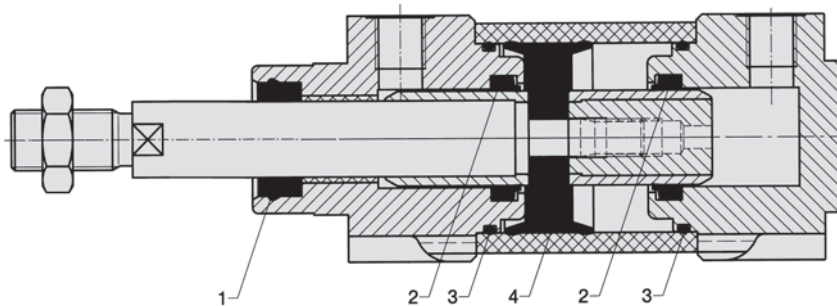
The following types are available on request

Coils and sockets with contacts according to DIN EN 175301-803 type B (U-form).

Plug sockets with molded cable.

Seal kits for series XL, XG, CX*

For cylinders with piston rod on one side



Seal kits – standard

Order number	Ø
VS-XL-032-01	32 mm
VS-XL-040-01	40 mm
VS-XL-050-01	50 mm
VS-XL-063-01	63 mm
VS-XL-080-01	80 mm
VS-XL-100-01	100 mm
VS-XL-125-01	125 mm
VS-XG-160-01	160 mm
VS-XG-200-01	200 mm
VS-XG-250-01	250 mm
VS-XG-320-01	320 mm

Seal kits – Viton

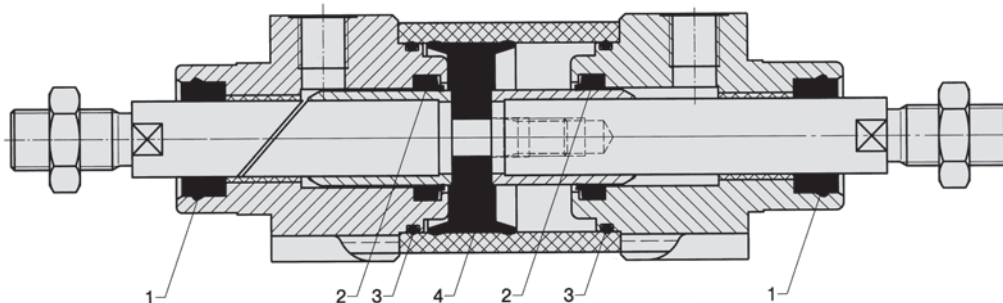
Order number	Ø
VS-XL-032-02	32 mm
VS-XL-040-02	40 mm
VS-XL-050-02	50 mm
VS-XL-063-02	63 mm
VS-XL-080-02	80 mm
VS-XL-100-02	100 mm
VS-XL-125-02	125 mm
VS-XG-160-02	160 mm
VS-XG-200-02	200 mm
VS-XG-250-02	250 mm
VS-XG-320-02	320 mm

Content

Pos.	Part	Quantity
1	Wiper and seal element	1
2	Cushion seal	2
3	O-ring	2
4	Piston	1
	Grease	1

* Repair kits for CX from Ø 32 to Ø 100 are identical with XL.

For cylinders with piston rod on both sides



Seal kits – standard

Order number	Ø
VS-XL-032-03	32 mm
VS-XL-040-03	40 mm
VS-XL-050-03	50 mm
VS-XL-063-03	63 mm
VS-XL-080-03	80 mm
VS-XL-100-03	100 mm
VS-XL-125-03	125 mm
VS-XG-160-03	160 mm
VS-XG-200-03	200 mm
VS-XG-250-03	250 mm
VS-XG-320-03	320 mm

Seal kits – Viton

Order number	Ø
VS-XL-032-04	32 mm
VS-XL-040-04	40 mm
VS-XL-050-04	50 mm
VS-XL-063-04	63 mm
VS-XL-080-04	80 mm
VS-XL-100-04	100 mm
VS-XL-125-04	125 mm
VS-XG-160-04	160 mm
VS-XG-200-04	200 mm
VS-XG-250-04	250 mm
VS-XG-320-04	320 mm

Content

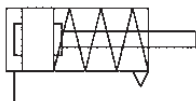
Pos.	Part	Quantity
1	Wiper and seal element	2
2	Cushion seal	2
3	O-ring	2
4	Piston	1
	Grease	1

* Repair kits for CX from Ø 32 to Ø 100 are identical with XL.

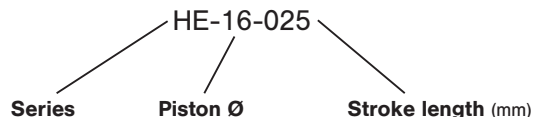
Pneumatic cylinders series HE

Single acting, ISO 6432

M5 and G1/8 • piston Ø 8 to 25 mm



Order code

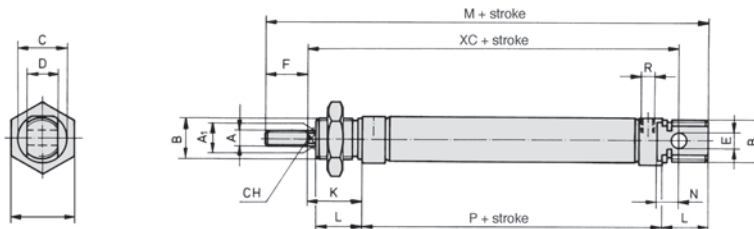


Design and function

Single acting pneumatic cylinder with built-in cushioning rings

Order number <small>Please complete according to order code.</small>	HE-08-...	HE-10-...	HE-12-...	HE-16-...	HE-20-...	HE-25-...
Piston Ø (mm)	8	10	12	16	20	25
Connection	M5 (10/32 UNF)	M5 (10/32 UNF)	M5 (10/32 UNF)	M5	G1/8	G1/8
Piston rod thread	M4	M4	M6	M6	M8	M10 x 1.25
Operating pressure	2 ... 10 bar (29 ... 145 psi)					
Temperature range	- 30 °C ... + 80 °C (- 22 °F ... + 176 °F)					
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives					
Standard stroke lengths (mm)¹⁾	10, 25, 50, max. 50					
Materials	Cylinder tube: stainless steel; End caps: Al (anodized); Piston rod: stainless steel; Seals: PU					

¹⁾ = refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.



Ø	A ¹	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC
8	4	12	M12 x 1.25	16	4	–	M5	8	M4	6	86	12	46	19	16	64
10	4	12	M12 x 1.25	16	4	–	M5	8	M4	6	86	12	46	19	16	64
12	6	16	M16 x 1.5	19	6	5	M5	12	M6	9	104	18	48	22	22	75
16	6	16	M16 x 1.5	19	6	5	M5	12	M6	9	109	18	53	22	22	82
20	8	20	M22 x 1.5	27	8	7	G1/8	16	M8	12	131	20	67	27	24	95
25	10	22	M22 x 1.5	30	8	9	G1/8	16	M10 x 1.25	12	140	22	68	27	28	104
						H 9										d 13

Force chart for series HE

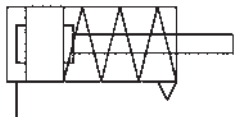
Piston Ø		stroke 10		stroke 25		stroke 50	
		min.	max.	min.	max.	min.	max.
Ø 8	Extension	19.0	19.7	19.0	20.3	19.0	21.7
	Retraction	4.5	5.2	3.9	5.2	2.5	5.2
Ø 10	Extension	36.0	36.7	36.0	37.3	36.0	38.7
	Retraction	4.5	5.2	3.9	5.2	2.5	5.2
Ø 12	Extension	51.7	52.0	51.7	52.6	51.7	53.6
	Retraction	5.7	6.0	5.1	6.0	4.1	6.0
Ø 16	Extension	87.5	90.0	87.5	93.5	87.5	99.7
	Retraction	15.0	17.5	11.5	17.5	5.3	17.5
Ø 20	Extension	142.8	145.0	142.8	148.3	142.8	153.8
	Retraction	21.3	23.5	18.0	23.5	12.5	23.5
Ø 25	Extension	243.7	245.0	243.7	247.0	243.7	250.3
	Retraction	18.2	19.5	16.2	19.5	12.9	19.5

Pressure 6 bar. The internal friction is considered.

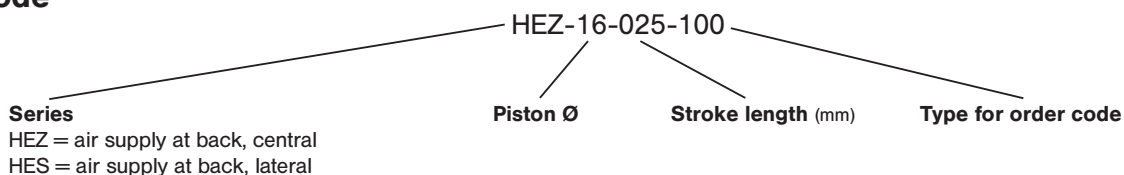
Pneumatic cylinders series HEZ and HES

Single acting, basis according to ISO 6432

M5 and G1/8 • piston Ø 16 to 25 mm



Order code



Design and function

Single acting pneumatic cylinder with built-in cushioning rings.

Order number	HEZ-16-...	HEZ-20-...	HEZ-25-...
Please complete according to order code.	HES-16-...	HES-20-...	HES-25-...
Piston Ø (mm)	16	20	25
Connection	M5	G1/8	G1/8
Piston rod thread	M6	M8	M10 x 1,25
Operating pressure	2 ... 10 bar (29 ... 145 psi)		
Temperature range	- 30 °C ... + 80 °C (- 22 °F ... + 176 °F)		
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 -; free of aggressive additives		
Standard stroke lengths (mm) ¹⁾	10, 25, 50, max. 50		
Materials	Cylinder tube: stainless steel End caps: Al (anodized) Piston rod: stainless steel Seals: PU		

¹⁾ = refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

Pneumatic cylinders series HEZ and HES

Single acting, basis according to ISO 6432

M5 and G1/8 • piston Ø 16 to 25 mm

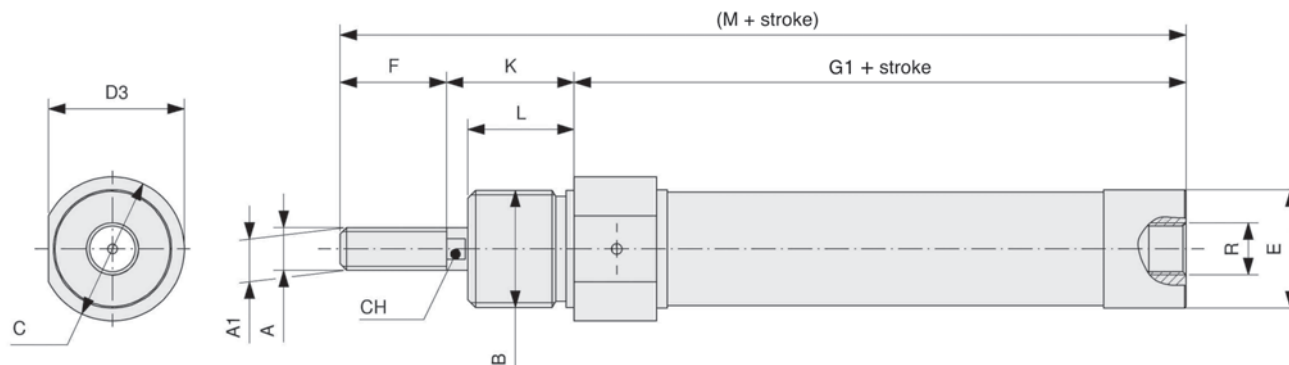


Force chart for series HEZ, HES

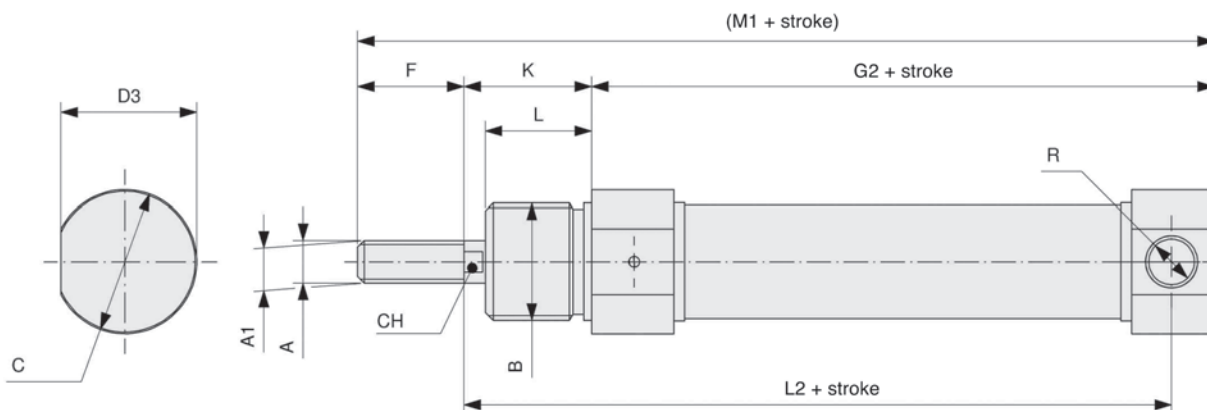
Diameter		stroke 10		stroke 25		stroke 50	
		min.	max.	min.	max.	min.	max.
Ø 16	Extension	87.5	90.0	87.5	93.5	87.5	99.7
	Retraction	15.0	17.5	11.5	17.5	5.3	17.5
Ø 20	Extension	142.8	145.0	142.8	148.3	142.8	153.8
	Retraction	21.3	23.5	18.0	23.5	12.5	23.5
Ø 25	Extension	243.7	245.0	243.7	247.0	243.7	250.3
	Retraction	18.2	19.5	16.2	19.5	12.9	19.5

Pressure 6 bar. The internal friction is considered.

Dimensions for series HEZ



Dimensions for series HES

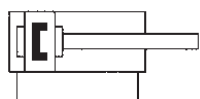


Ø	A	A1	B	C	D3	E	F	G1	G2	K	L	L2	R	M	M1	CH
16	M6	6	M16 x 1.5	19	18	17.2	16	52	52.5	22	18	70	M5	90	90.5	5
20	M8	8	M22 x 1.5	27	25.5	22.2	20	65	67	24	20	83	G1/8	109	111	7
25	M10 x 1.25	10	M22 x 1.5	30	28.5	27	22	66	68	28	22	88	G1/8	116	118	9

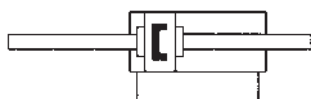
Pneumatic cylinders series HM

Double acting with magnetic piston, ISO 6432

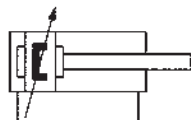
M5 to G1/8 • piston Ø 8 to 25 mm



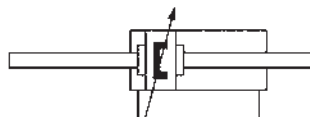
HM



HMDE



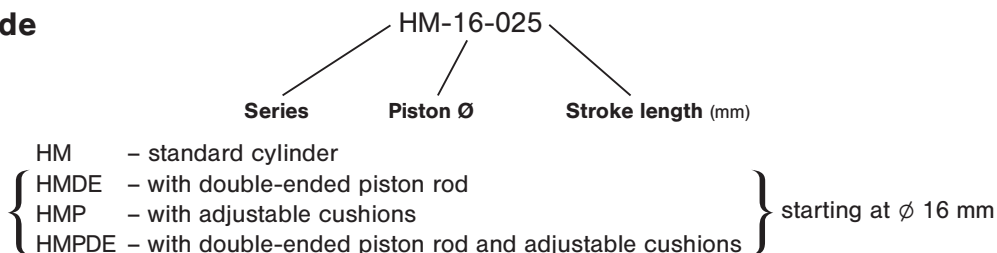
HMP



HMPDE



Order code



Design and function

Double acting pneumatic cylinder with permanent magnet and built-in cushioning rings or adjustable cushions. Standard stroke lengths in table below, additional lengths on request.

For piston Ø 8, 10 and 12 mm only electronic switches (ZS-6700, ZS-6701, ZS-7300 or ZS-7302) can be used.

Order number <small>Please complete according to order code.</small>	HM-08-...	HM-10-...	HM-12-...	HM-16-...	HM-20-...	HM-25-...	
Piston Ø (mm) *	8	10	12	16	20	25	
Force at 6 bar in N**	Extension	27	42	61	109	170	265
	Retraction	20	36	46	93	142	223
Connection	M5 (10/32 UNF)	M5 (10/32 UNF)	M5 (10/32 UNF)	M5 (10/32 UNF)	G1/8	G1/8	
Piston rod thread	M4	M4	M6	M6	M8	M10 x 1,25	
Cushioning length (mm)***	–	–	–	15,5	17	19,5	
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)						
Temperature range	– 30 °C ... + 80 °C (– 22 °F ... + 176 °F)						
Medium	Compressed air in accordance with ISO 8573-1: 2001, Class 7 4 – and free of aggressive additives						
Standard stroke lengths (mm)****	Ø 8 ... 10	10, 25, 40, 50, 80, 100, max. 100					
	Ø 12 ... 16	10, 25, 40, 50, 80, 100, 125, 160, 200, max. 200					
	Ø 20	10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 320, max. 320					
	Ø 25	10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, max. 500					
Materials	Cylinder tube: stainless steel End caps: Al (anodized) Piston rod: stainless steel Seals: PU						

* The series HMP, HMDE and HMPDE are not available for dia 8 to 12.

** The internal friction is considered.

*** For series HMP and HMPDE only.

**** Refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

Pneumatic cylinders series HM and HMP

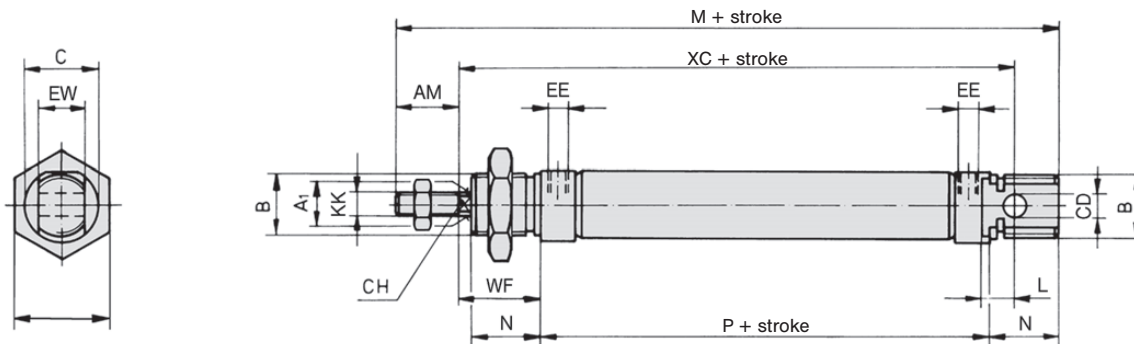
Double acting with magnetic piston, ISO 6432

M5 to G1/8 • piston Ø 8 to 25 mm



Dimensions for series HM, piston Ø 8 – 25 mm

Cyl.-Ø	A ¹	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC
8	4	12	M12 x 1.25	16	4	–	M5 (10/32 UNF)	8	M4	6	86	12	46	19	16	64
10	4	12	M12 x 1.25	16	4	–	M5 (10/32 UNF)	8	M4	6	86	12	46	19	16	64
12	6	16	M16 x 1.5	19	6	5	M5 (10/32 UNF)	12	M6	9	104	18	48	22	22	75
16	6	16	M16 x 1.5	19	6	5	M5 (10/32 UNF)	12	M6	9	109	18	53	22	22	82
20	8	20	M22 x 1.5	27	8	7	G1/8	16	M8	12	131	20	67	27	24	95
25	10	22	M22 x 1.5	30	8	9	G1/8	16	M10 x 1.25	12	140	22	68	27	28	104



Dimensions for series HMP, piston Ø 16 – 25 mm

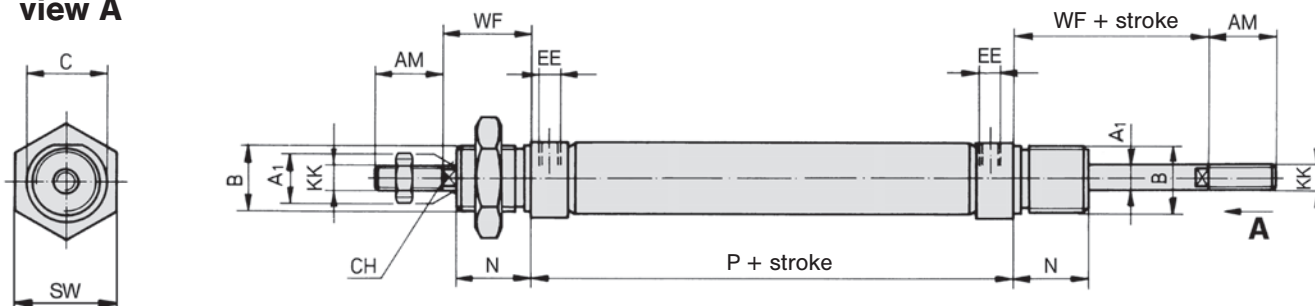
Cyl.-Ø	A ¹	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC
16	6	16	M16 x 1.5	21	6	5	M5 (10/32 UNF)	12	M6	9	109	17	53	22	22	82
20	8	20	M22 x 1.5	27	8	7	G1/8	16	M8	12	131	20	67	27	24	95
25	10	22	M22 x 1.5	30	8	9	G1/8	16	M10 x 1.25	12	140	22	68	27	28	104

Series HMDE, HMPDE Double acting with double-ended piston rod, with magnetic piston ISO 6432

M5 and G1/8 • piston Ø 16 to 25 mm

Ø	A ¹	AM	B	C	CH	EE	KK	N	P	SW	WF
16	6	16	M16 x 1.5	19	5	M5 (10/32 UNF)	M6	18	53	22	22
20	8	20	M22 x 1.5	27	7	G1/8	M8	20	67	27	24
25	10	22	M22 x 1.5	30	9	G1/8	M10 x 1.25	22	68	27	28

view A



Dimensions for series HMPDE

Ø	A ¹	AM	B	C	CH	EE	KK	N	P	SW	WF
16	6	16	M16 x 1.5	21	5	M5 (10/32 UNF)	M6	17	53	22	22
20	8	20	M22 x 1.5	27	7	G1/8	M8	20	67	27	24
25	10	22	M22 x 1.5	30	9	G1/8	M10 x 1.25	22	68	27	28

Accessories for Pneumatic cylinders series HE and HM

M5 to G1/8 • piston Ø 8 to 25 mm



Piston rod accessories



Rod eye
RO-
Page 9.212



Flexible coupling
FK-
Page 9.212



Rod clevis with pin
RD-
Page 9.211



Piston rod nut
RL-
Page 9.212

Mounting accessories



Foot mount
Ø 8–25
RA-
Page 9.084



Clevis mount
Ø 8–25
RC-
Page 9.084



Clevis mount Ø 10–25
RH-
Page 9.084



Flange mount
Ø 8–25
RB-
Page 9.084



Mounting nut
Ø 8–25
RM-

Accessories only for series HM

Proximity sensors for series HM



Sensors
ZS-
Page 9.220

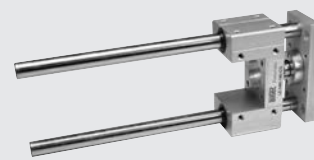


Mounting bracket
NT-250
Page 9.221



Connecting cable
KA-
Page 9.221

Linear guides for series HM



Linear guides
LE-
Page 9.201

Piston Ø	Foot mount	Clevis mount	Threaded bolts	Flange mount	Sensors	Mounting bracket	Rod clevis	Flexible coupling	Rod eye	Mounting nut	Piston rod nut
8	RA-10	RC-10	–	RB-10	ZS-5600	NT-250	RD-10	–	–	RM-10	RL-10
10	RA-10	RC-10	–	RB-10	ZS-5601 ZS-5700		RD-10	–	–	RM-10	RL-10
12	RA-16	RC-16	–	RB-16	ZS-5700-10		NT-250	RD-16	FK-16	RO-16	RM-16
16	RA-16	RC-16	–	RB-16	ZS-5701 ZS-6700	RD-16		FK-16	RO-16	RM-16	RL-16
20	RA-25	RC-30	–	RB-25	ZS-6701 ZS-7300	NT-250	RD-20	FK-20	RO-20	RM-25	RL-20
25	RA-25	RC-30	–	RB-25	ZS-7302		RD-25	FK-32	RO-25	RM-25	RL-25

* For piston Ø 8, 10 and 12 mm only electronic switches (ZS-6700, ZS-6701, ZS-7300 or ZS-7302) can be used.

Mounting accessories for series HE and HM

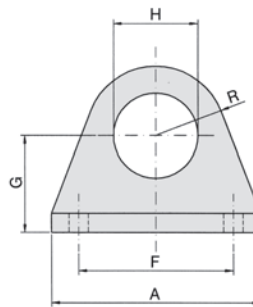
Accessories for pneumatic cylinders

M5 to G1/8 • piston Ø 8 to 25 mm

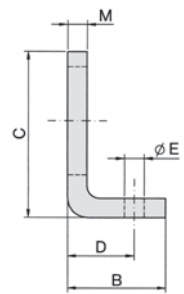


Foot mount

For Ø 8 – 25



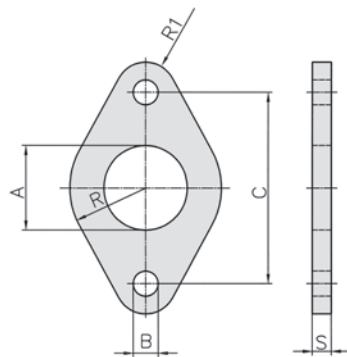
For Ø 8 – 25



Material: steel (zinc-plated)

Order number	A	B	C	D	E	F	G	H	I	J	K	L	M	R
RA-10	35	16	26	11	4.5	25	16	12	-	-	-	-	3	10
RA-16	42	20	32.5	14	5.5	32	20	16	-	-	-	-	4	12.5
RA-25	54	25	45	17	6.6	40	25	22	-	-	-	-	5	20

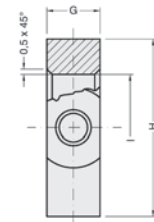
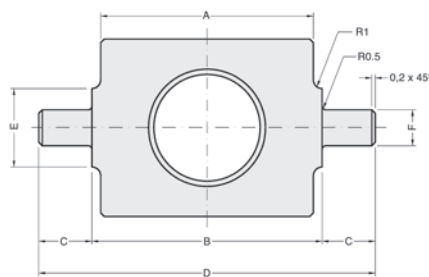
Flange mount



Material: steel (zinc-plated)

Order number	A	B	C	R	R ₁	S
RB-10	12	4.5	30	11	5	3
RB-16	16	5.5	40	15	6	4
RB-25	22	6.6	50	20	8	5

Clevis mount

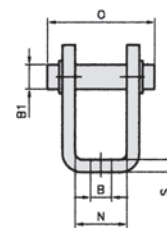
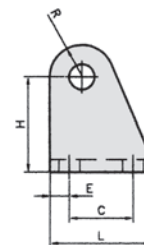


Material: steel (zinc-plated)

Order number	A	B	C	D	E	F	G	H	I
RH-10	24	26	6	38	9	4	6	20	12
RH-16	36	38	10	58	13	6	8	25	16
RH-25	44	46	10	66	13	6	8	30	22
		0 -0.2				e9			+1.5 +0.5

Clevis mount

For Ø 8 – 25



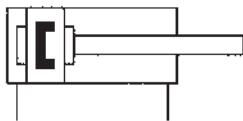
Material: steel (zinc-plated)

Order number	for Cyl.-Ø	B	B ₁	C	H	L	N	O	R	S	E
RC-10	8 + 10	4.5	4	12.5	24	20	8.1	17	5	2.5	5
RC-16	12 + 16	5.5	6	15	27	25	12.1	23	7	3	5
RC-30	20 + 25	6.6	8	20	30	32	16.1	30	10	4	6

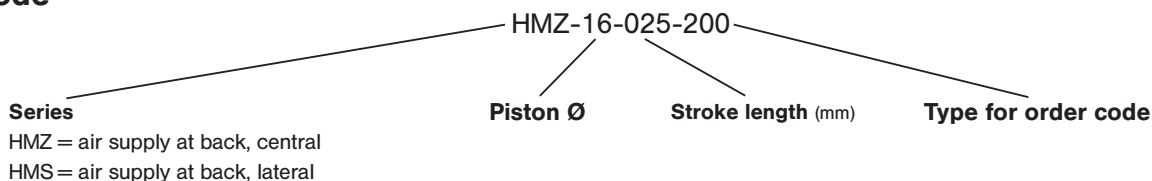
Pneumatic cylinders series HMZ and HMS

Double acting, basis according to ISO 6432

M5 and G1/8 • piston Ø 16 to 25 mm



Order code



Design and function

Single acting pneumatic cylinder with built-in cushioning rings.

Standard stroke lengths in table below, additional lengths on request

Order number <small>Please complete according to order code.</small>	HMZ-16-... HMS-16-...	HMZ-20-... HMS-20-...	HMZ-25-... HMS-25-...
Piston Ø (mm)	16	20	25
Connection	M5	G1/8	G1/8
Piston rod thread	M6	M8	M10 x 1.25
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)		
Temperature range	- 30 °C ... + 80 °C (- 22 °F ... + 176 °F)		
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 -; free of aggressive additives		
Standard stroke lengths (mm) ¹⁾	Ø 16 = 10, 25, 40, 50, 80, 100, 125, 160, 200 Ø 20 = 10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 300, 320 Ø 25 = 10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 300, 320, 400, 500		
Materials	Cylinder tube: stainless steel End caps: Al (anodized) Piston rod: stainless steel Seals: PU		

¹⁾ = refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

Pneumatic cylinders series HMZ and HMS

Double acting, Basis according to ISO 6432

M5 and G1/8 • piston Ø 16 to 25 mm

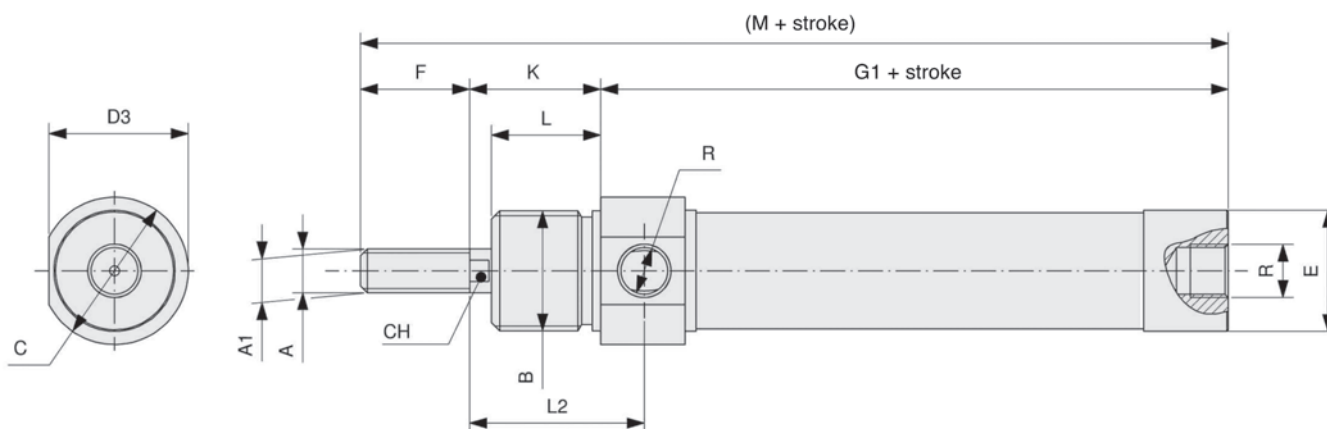


Force chart for series HMZ, HMS

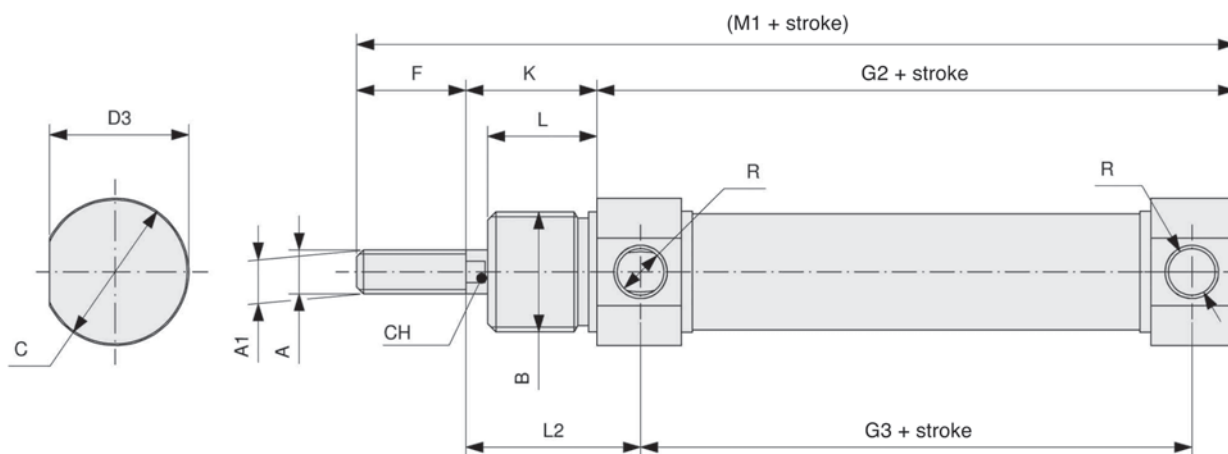
Diameter	Extension	Retraction
Ø 16	109	93
Ø 20	170	142
Ø 25	265	223

Pressure 6 bar. The internal friction is considered.

HMZ



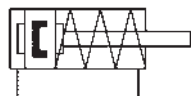
HMS



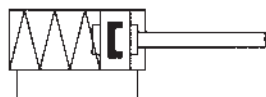
Cyl.-Ø	A	A1	B	C	D3	E	F	G1	G2	G3	K	L	L2	R	M	M1	CH
16	M6	6	M16 x 1.5	19	18	17.2	16	52	52.5	43.5	22	18	26.5	M5	90	90.5	5
20	M8	8	M22 x 1.5	27	25.5	22.2	20	65	67	51	24	20	32	G1/8	109	111	7
25	M10 x 1.25	10	M22 x 1.5	30	28.5	27	22	66	68	52	28	22	36	G1/8	116	118	9

Compact cylinders series NYE

Single acting with permanent magnet, ISO 21287
M5 to G1/8 • piston Ø 20 to 100 mm



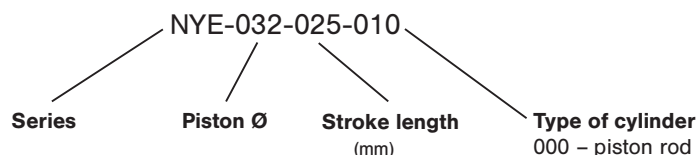
000, 010



200, 210

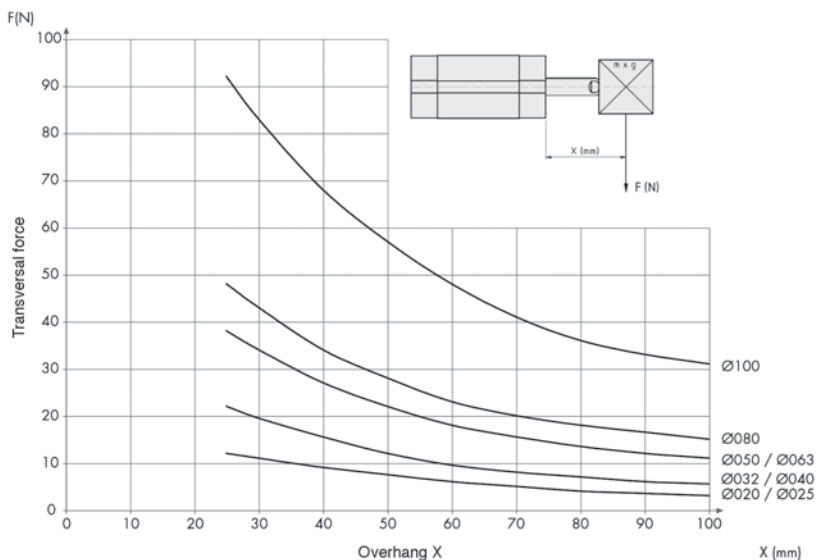


Order code



- Type of cylinder**
- 000 – piston rod with male thread, normally retracted
 - 010 – piston rod with female thread, normally retracted
 - 200 – piston rod with male thread, normally extended (force on retraction)
 - 210 – piston rod with female thread, normally extended (force on retraction)

Loading diagram



Design and function

Single acting cylinder with permanent magnet for proximity sensors and built-in cushioning rings. Cylinder end caps are connected to the Al-profile by mounting screws.

Order number Please complete according to order code.	NYE-020-...	NYE-025-...	NYE-032-...	NYE-040-...	NYE-050-...	NYE-063-...	NYE-080-...	NYE-100-...
Piston Ø (mm)	20	25	32	40	50	63	80	100
Connection	M5		G1/8	G1/8	G1/8	G1/8	G1/8	G1/8
Female thread	M6	M6	M8	M8	M10	M10	M12	M12
Male thread	M8	M8	M10 x 1.25	M10 x 1.25	M12 x 1.25	M12 x 1.25	M16 x 1.5	M16 x 1.5
Operating pressure	2 ... 10 bar							
Temperature range	- 20 °C ... + 80 °C (- 4 °F ... + 176 °F); - 10 °C ... + 150 °C on request (+ 14 °F ... + 302 °F)							
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives							
Standard stroke lengths (mm)	5, 10, 15, 20, 25, special stroke length up to 60 mm on request							
Materials	Cylinder tube: Al (anodized); End caps: Al (anodized); Piston rod: stainless steel; Seals: PU/NBR							

Extension force at 6 bar, type 000 and 010 (in N)

Piston Ø	stroke 5		stroke 10		stroke 15		stroke 20		stroke 25		stroke 30		stroke 35		stroke 40		stroke 50		stroke 60	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
20	132	137	132	141	132	146	132	151	132	155	132	160	93	132	93	138	93	149	93	160
25	223	227	223	232	223	236	223	241	223	245	223	250	185	223	185	228	185	239	185	250
32	381	386	381	392	381	397	381	403	381	408	381	414	326	381	326	389	326	404	326	420
40	609	616	609	623	609	630	609	637	609	644	609	651	550	609	550	617	550	634	550	651
50	985	993	985	1001	985	1008	985	1016	985	1024	985	1032	914	985	914	995	914	1016	914	1036
63	1586	1594	1586	1602	1586	1610	1586	1619	1586	1627	1586	1635	1502	1586	1502	1598	1502	1622	1502	1646
80	2564	2573	2564	2581	2564	2590	2564	2599	2564	2607	2564	2616	2491	2564	2491	2574	2491	2595	2491	2616
100	4027	4039	4027	4052	4027	4064	4027	4076	4027	4089	4027	4101	3923	4027	3923	4042	3923	4071	3923	4101

Retraction force at 6 bar, type 200 and 210 (in N)

Piston Ø	stroke 5		stroke 10		stroke 15		stroke 20		stroke 25		stroke 30		stroke 35		stroke 40		stroke 50		stroke 60	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
20	89	94	89	98	89	103	89	108	89	112	89	117	7	71	7	87	7	100	7	117
25	181	185	181	190	181	194	181	199	181	203	181	208	130	176	130	176	130	195	130	209
32	320	325	320	331	320	336	320	342	320	347	320	353	171	268	171	282	171	309	171	337
40	548	555	548	562	548	569	548	576	548	583	548	590	416	513	416	527	416	554	416	582
50	877	885	877	893	877	900	877	908	877	916	877	924	676	802	676	820	676	856	676	892
63	1478	1486	1478	1494	1478	1502	1478	1511	1478	1519	1478	1527	1299	1425	1299	1443	1299	1479	1299	1515
80	2395	2404	2395	2412	2395	2421	2395	2430	2395	2438	2395	2447	2143	2331	2143	2358	2143	2411	2143	2465
100	3762	3774	3762	3787	3762	3799	3762	3811	3762	3824	3762	3836	3316	3596	3316	3636	3316	3716	3316	3796

Spring force for retraction, type 000 and 010 (in N)

Piston Ø	stroke 5		stroke 10		stroke 15		stroke 20		stroke 25		stroke 30		stroke 35		stroke 40		stroke 50		stroke 60	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
20	33	38	29	38	24	38	19	38	15	38	10	38	38	77	32	77	21	77	10	77
25	38	42	33	42	29	42	24	42	20	42	15	42	42	80	37	80	26	80	15	80
32	48	53	42	53	37	53	31	53	26	53	20	53	53	108	45	108	30	108	14	108
40	63	70	56	70	49	70	42	70	35	70	28	70	70	129	62	129	45	129	28	129
50	67	75	59	75	52	75	44	75	36	75	28	75	75	146	65	146	44	146	24	146
63	89	97	81	97	73	97	64	97	56	97	48	97	97	181	85	181	61	181	37	181
80	141	150	133	150	124	150	115	150	107	150	98	150	150	223	140	223	119	223	98	223
100	202	214	189	214	177	214	165	214	152	214	140	214	214	318	199	318	170	318	140	318

Spring force for extension, type 200 and 210 (in N)

Piston Ø	stroke 5		stroke 10		stroke 15		stroke 20		stroke 25		stroke 30		stroke 35		stroke 40		stroke 50		stroke 60	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
20	33	38	29	38	24	38	19	38	15	38	10	38	56	120	40	120	27	120	10	120
25	38	42	33	42	29	42	24	42	20	42	15	42	47	93	47	93	28	93	14	93
32	48	53	42	53	37	53	31	53	26	53	20	53	105	202	91	202	64	202	36	202
40	63	70	56	70	49	70	42	70	35	70	28	70	105	202	91	202	64	202	36	202
50	67	75	59	75	52	75	44	75	36	75	28	75	150	276	132	276	96	276	60	276
63	89	97	81	97	73	97	64	97	56	97	48	97	150	276	132	276	96	276	60	276
80	141	150	133	150	124	150	115	150	107	150	98	150	214	402	187	402	134	402	80	402
100	202	214	189	214	177	214	165	214	152	214	140	214	380	660	340	660	260	660	180	660

Pressure 6 bar. The internal friction is considered.

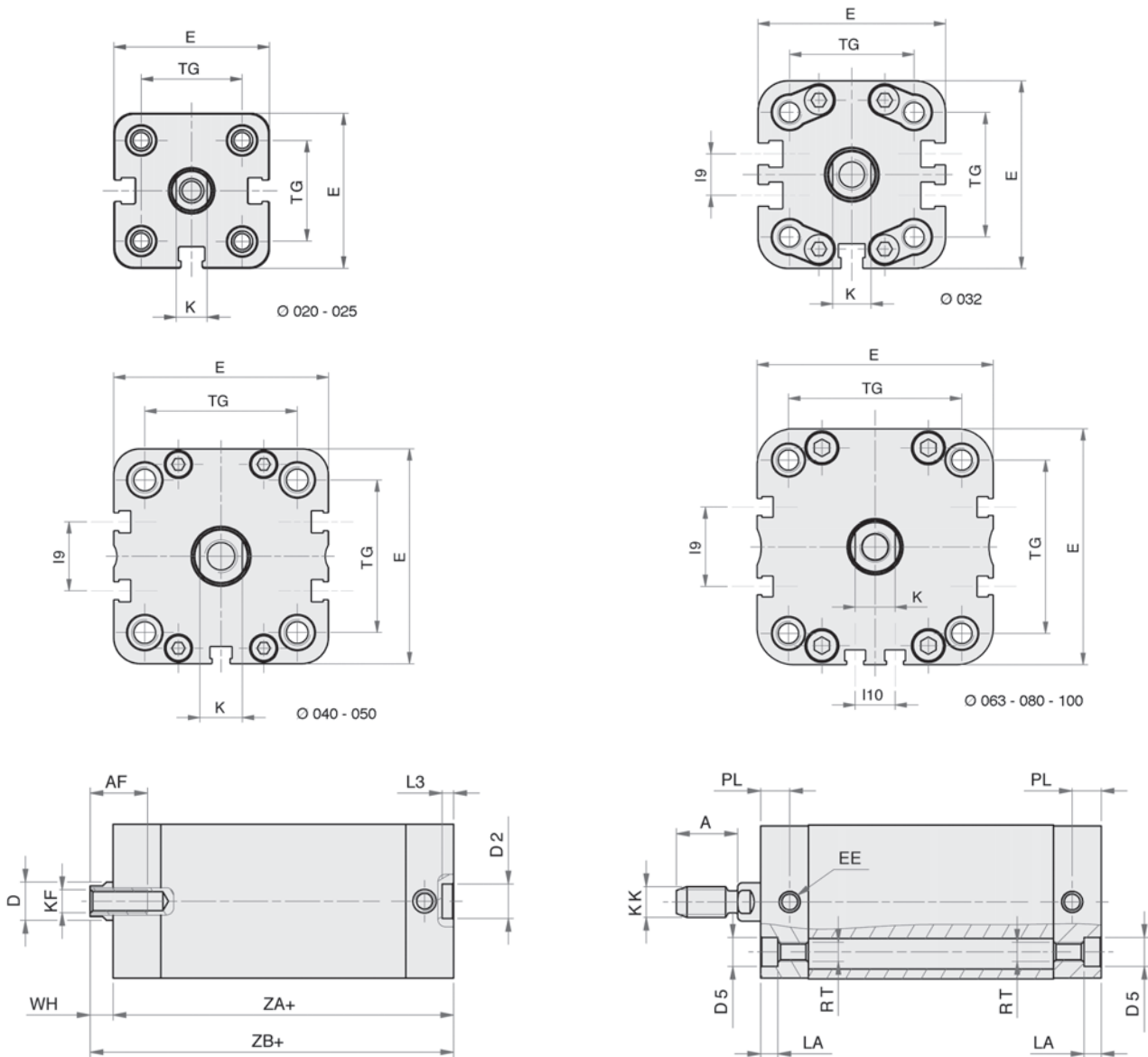
Compact cylinders series NYE

Single acting, normally retracted, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYE (Type for order code: -000 = male thread, -010 = female thread)



Ø	A	AF	Ø D	Ø D2	Ø D5	E	EE	I9	I10	K	KF	KK	LA	L3	PL	RT	TG	WH	ZA+	ZB+
20	16	15	10	9	7.5	36	M5	-	-	8	M6	M8	4.5	3	7.5	M5	22	6.5	37*	43.5*
25	16	15	10	9	7.5	40	M5	-	-	8	M6	M8	4.5	3	7.5	M5	26	6	39*	45*
32	19	16	12	9	9	49	G1/8	10.8	-	10	M8	M10 x 1.25	5	3	7.5	M6	32.5	6.5	44*	50.5*
40	19	16	12	9	9	54.5	G1/8	12.8	-	10	M8	M10 x 1.25	5	3	8	M6	38	7	45*	52*
50	22	17	16	12	10.5	65.5	G1/8	21	-	13	M10	M12 x 1.25	5	4	8	M8	46.5	8	45*	53*
63	22	17	16	12	10.5	77	G1/8	25.8	13	13	M10	M12 x 1.25	5	4	7.5	M8	56.5	8	49*	57*
80	28	20	20	12	13.5	95.5	G1/8	30	18	17	M12	M16 x 1.5	3	4	8	M10	72	9	54*	63*
100	28	20	25	12	13.5	113.5	G1/8	50	35	22	M12	M16 x 1.5	3	4	10.5	M10	89	10	67*	77*

+ stroke length

* for the strokes 35, 40, 50 + 60 mm the 0-stroke length is changing as follows: Ø 20 + 10 mm
 Ø 25 - 63 + 20 mm
 Ø 80 - 100 + 30 mm

Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-010) in kg (only up to a stroke 30 mm)	0.131	0.166	0.217	0.278	0.435	0.625	0.996	1.722
Mass at 0 mm stroke (-000) in kg (only up to a stroke 30 mm)	0.143	0.178	0.240	0.301	0.471	0.661	1.066	1.793
add-on per 10 mm stroke	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

Weight in lbs. = x 2.2046

Subject to change

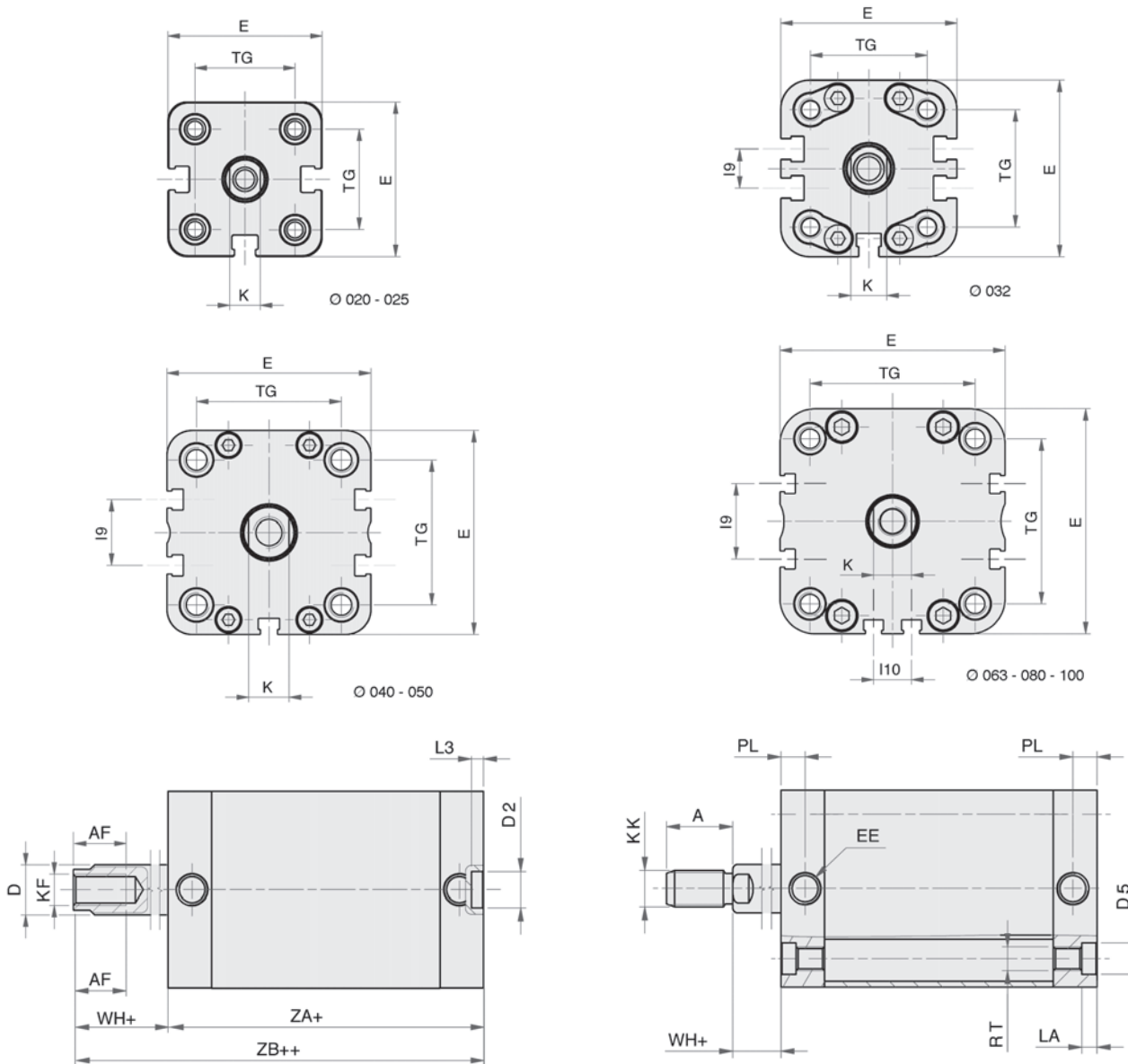
Compact cylinders series NYE

Single acting, normally extended, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYE (Type for order code: -200 = male thread, -210 = female thread)



Ø	A	AF	Ø D	Ø D2	Ø D5	E	EE	I9	I10	K	KF	KK	LA	L3	PL	RT	TG	WH+	ZA+	ZB++
20	16	15	10	9	7.5	36	M5	-	-	8	M6	M8	4.5	3	7.5	M5	22	6.5	37*	43.5*
25	16	15	10	9	7.5	40	M5	-	-	8	M6	M8	4.5	3	7.5	M5	26	6	39*	45*
32	19	16	12	9	9	49	G1/8	10.8	-	10	M8	M10 x 1.25	5	3	7.5	M6	32.5	6.5	44*	50.5*
40	19	16	12	9	9	54.5	G1/8	12.8	-	10	M8	M10 x 1.25	5	3	8	M6	38	7	45*	52*
50	22	17	16	12	10.5	65.5	G1/8	21	-	13	M10	M12 x 1.25	5	4	8	M8	46.5	8	45*	53*
63	22	17	16	12	10.5	77	G1/8	25.8	13	13	M10	M12 x 1.25	5	4	7.5	M8	56.5	8	49*	57*
80	28	20	20	12	13.5	95.5	G1/8	30	18	17	M12	M16 x 1.5	3	4	8	M10	72	9	54*	63*
100	28	20	25	12	13.5	113.5	G1/8	50	35	22	M12	M16 x 1.5	3	4	10.5	M10	89	10	67*	77*

+ stroke length

* for the strokes 35, 40, 50 + 60 mm the 0-stroke length is changing as follows: Ø 20 - 63 + 10 mm
Ø 80 - 100 + 20 mm

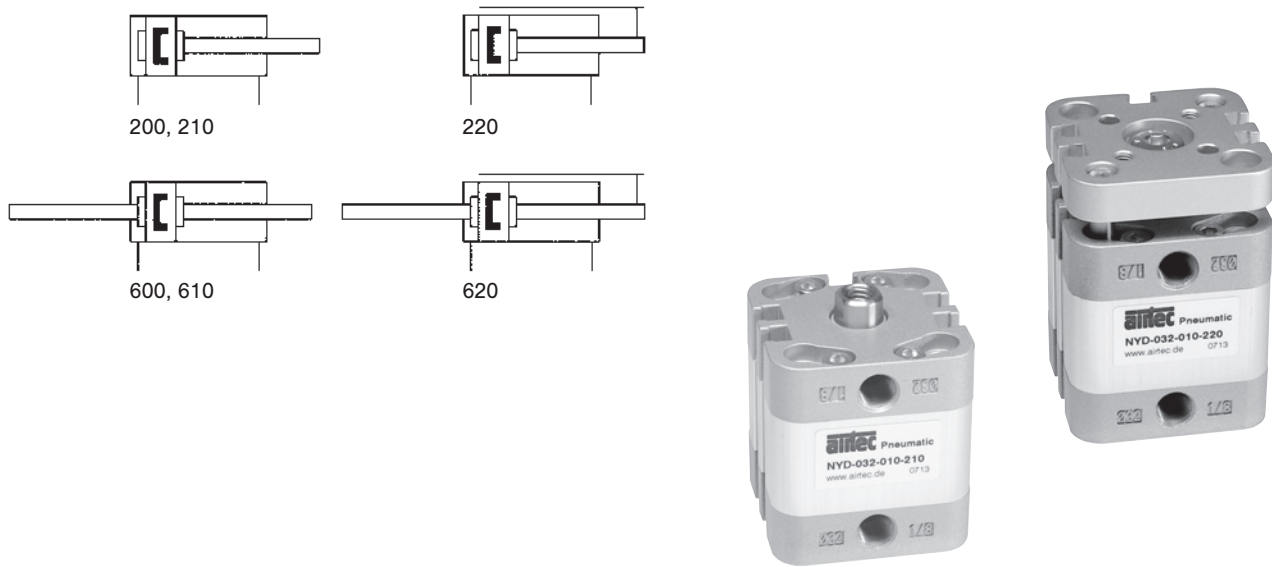
Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-210) in kg (only up to a stroke 30 mm)	0.131	0.166	0.217	0.278	0.435	0.625	0.996	1.722
Mass at 0 mm stroke (-200) in kg (only up to a stroke 30 mm)	0.143	0.178	0.240	0.301	0.471	0.661	1.066	1.793
add-on per 10 mm stroke	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

Weight in lbs. = x 2.2046

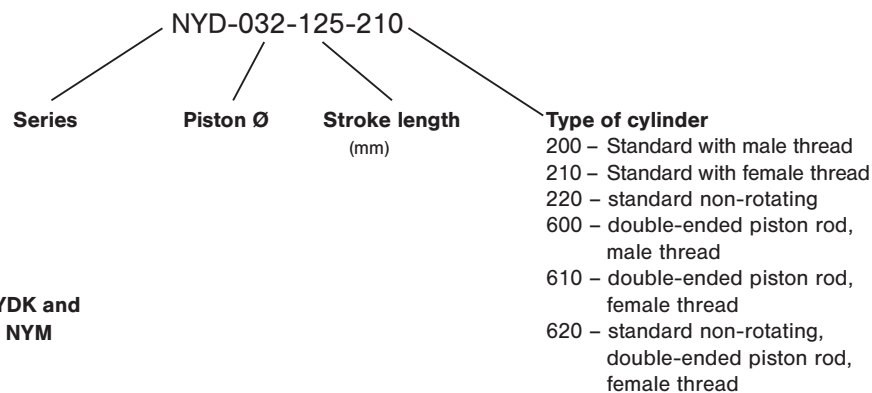
Compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Order code



High force cylinder series NYDK and multiple positioning cylinder NYM

see pages 9.158 and 9.159.

Design and function

Double acting pneumatic cylinder with permanent magnet for proximity sensors and built-in cushioning rings. Cylinder end caps are connected with the Al-profile tube by mounting screws.

Order number Please complete according to order code.	NYD-020-...	NYD-025-...	NYD-032-...	NYD-040-...	NYD-050-...	NYD-063-...	NYD-080-...	NYD-100-...
Piston Ø (mm)	20	25	32	40	50	63	80	100
Connection	M5		G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8
Female thread	M6	M6	M8	M8	M10	M10	M12	M12
Male thread	M8 x 1,25	M8 x 1,25	M10 x 1,25	M10 x 1,25	M12 x 1,25	M12 x 1,25	M16 x 1,5	M16 x 1,5
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)							
Temperature range	– 20 °C ... + 80 °C (– 4 °F ... + 176 °F)							
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives							
Standard stroke lengths (mm)	Ø 20 + 25: 5, 10, 15, 20, 25, 30, 40, 50, 60, special stroke length on request. Ø 32 – 100: 5, 10, 15, 20, 25, 30, 40, 50, 60, 80, special stroke length up to 250 mm on request							
Materials	Cylinder tube: Al (anodized) End caps: Al (anodized) Piston rod: stainless steel Seals: PU + NBR							

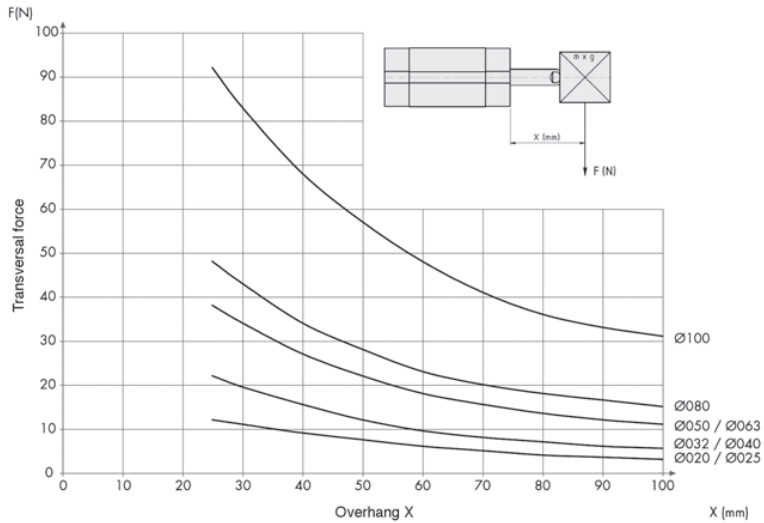
Loading diagram for compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

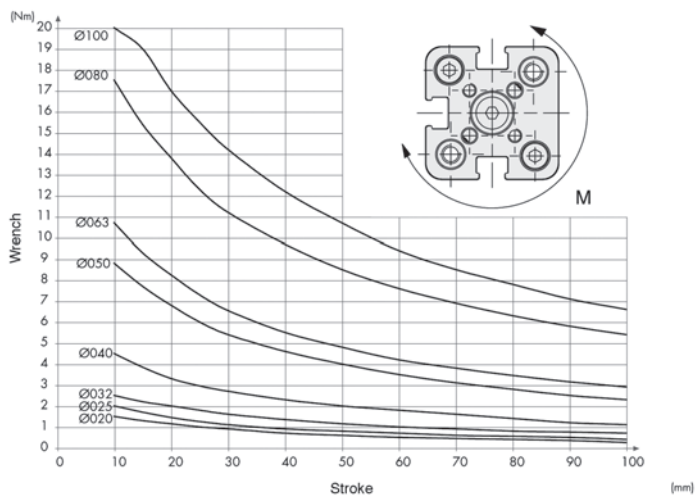
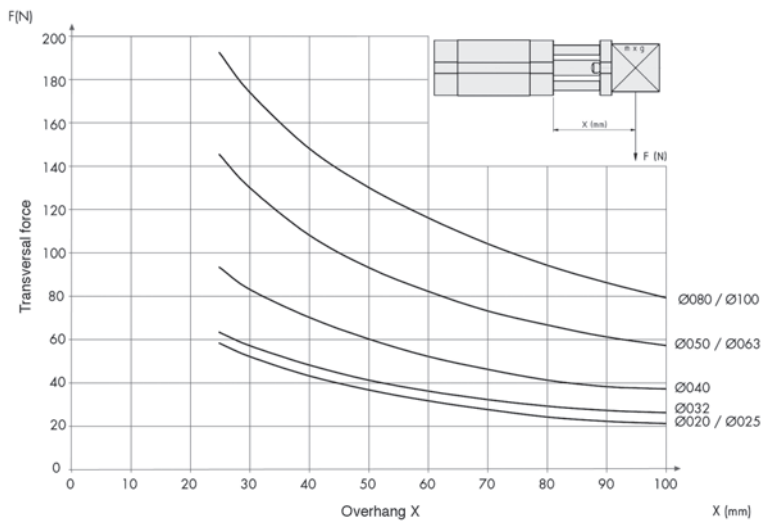
M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -200 = male thread, -210 = female thread)



Series NYD (Type for order code: -220 = non-rotating)



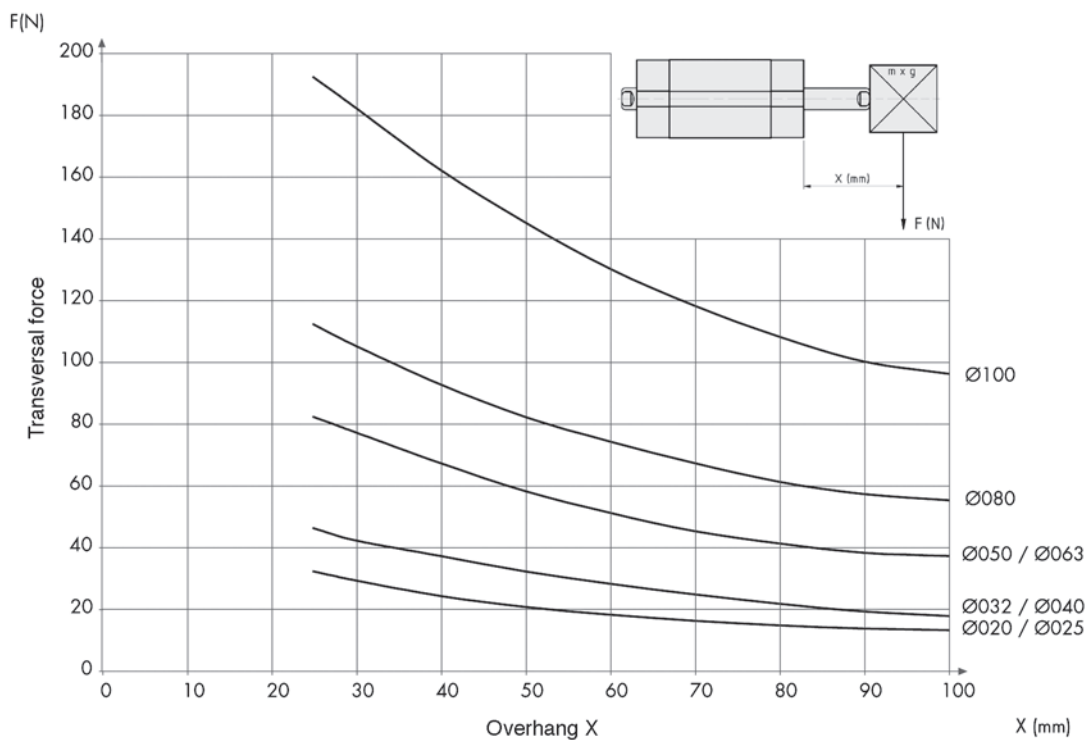
Loading diagram for compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

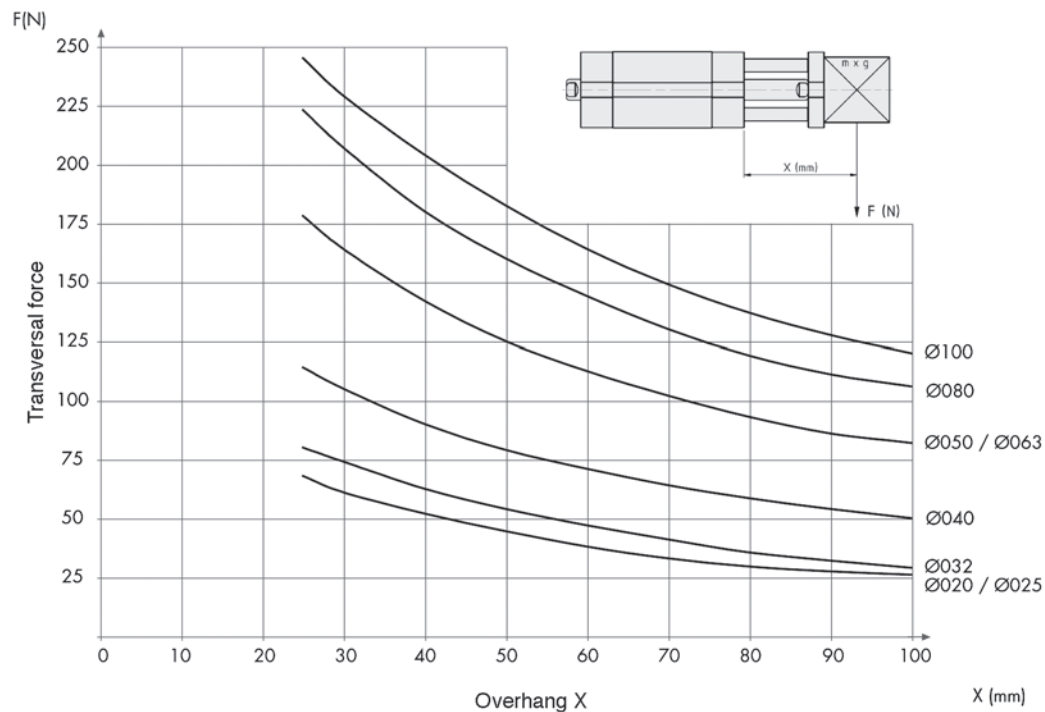
M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -600 = male thread, -610 = female thread)



Series NYD (Type for order code: -620 = non-rotating)



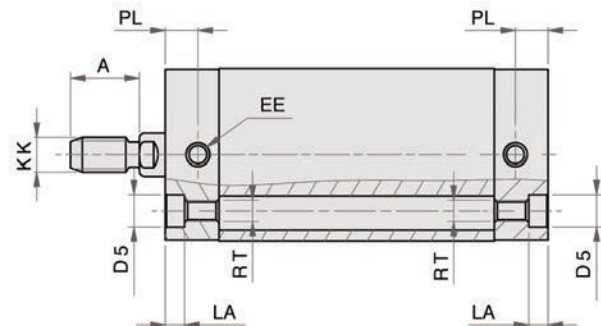
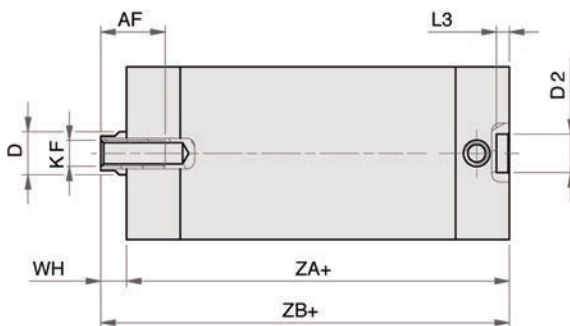
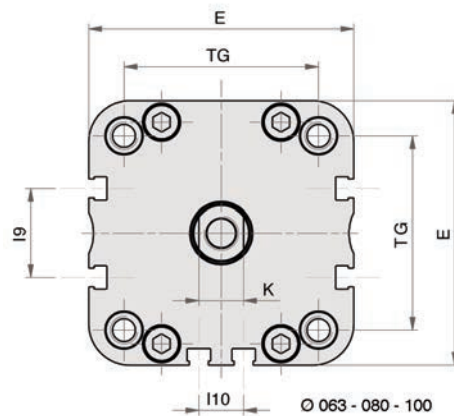
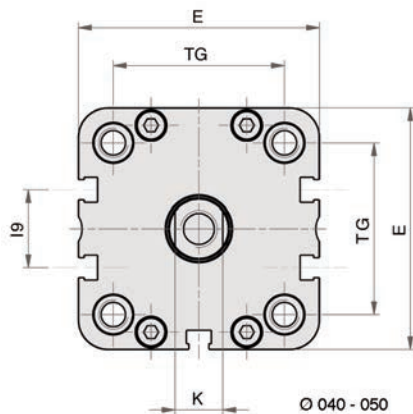
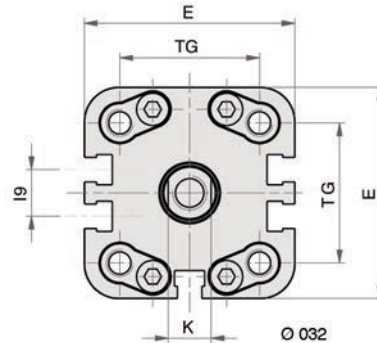
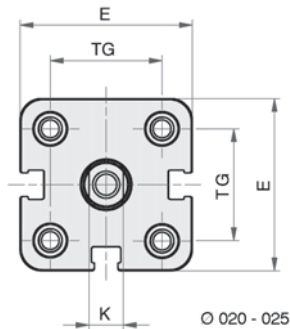
Compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -200 = male thread, -210 = female thread)



Ø	A	AF	Ø D	Ø D2	Ø D5	E	EE	I9	I10	K	KF	KK	LA	L3	PL	RT	TG	WH	ZA+	ZB+
20	16	15	10	9	7.5	36	M5	-	-	8	M6	M8	4.5	3	7.5	M5	22	6.5	37	43.5
25	16	15	10	9	7.5	40	M5	-	-	8	M6	M8	4.5	3	7.5	M5	26	6	39	45
32	19	16	12	9	9	49	G1/8	10.8	-	10	M8	M10 x 1.25	5	3	7.5	M6	32.5	6.5	44	50.5
40	19	16	12	9	9	54.5	G1/8	12.8	-	10	M8	M10 x 1.25	5	3	8	M6	38	7	45	52
50	22	17	16	12	10.5	65.5	G1/8	21	-	13	M10	M12 x 1.25	5	4	8	M8	46.5	8	45	53
63	22	17	16	12	10.5	77	G1/8	25.8	13	13	M10	M12 x 1.25	5	4	7.5	M8	56.5	8	49	57
80	28	20	20	12	13.5	95.5	G1/8	30	18	17	M12	M16 x 1.5	3	4	8	M10	72	9	54	63
100	28	20	25	12	13.5	113.5	G1/8	50	35	22	M12	M16 x 1.5	3	4	10.5	M10	89	10	67	77

+ stroke length

Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-210) in kg	0.131	0.166	0.217	0.278	0.435	0.625	0.996	1.722
Mass at 0 mm stroke (-200) in kg	0.143	0.178	0.240	0.301	0.471	0.661	1.066	1.793
add-on per 10 mm stroke	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

Weight in lbs. = x 2.2046

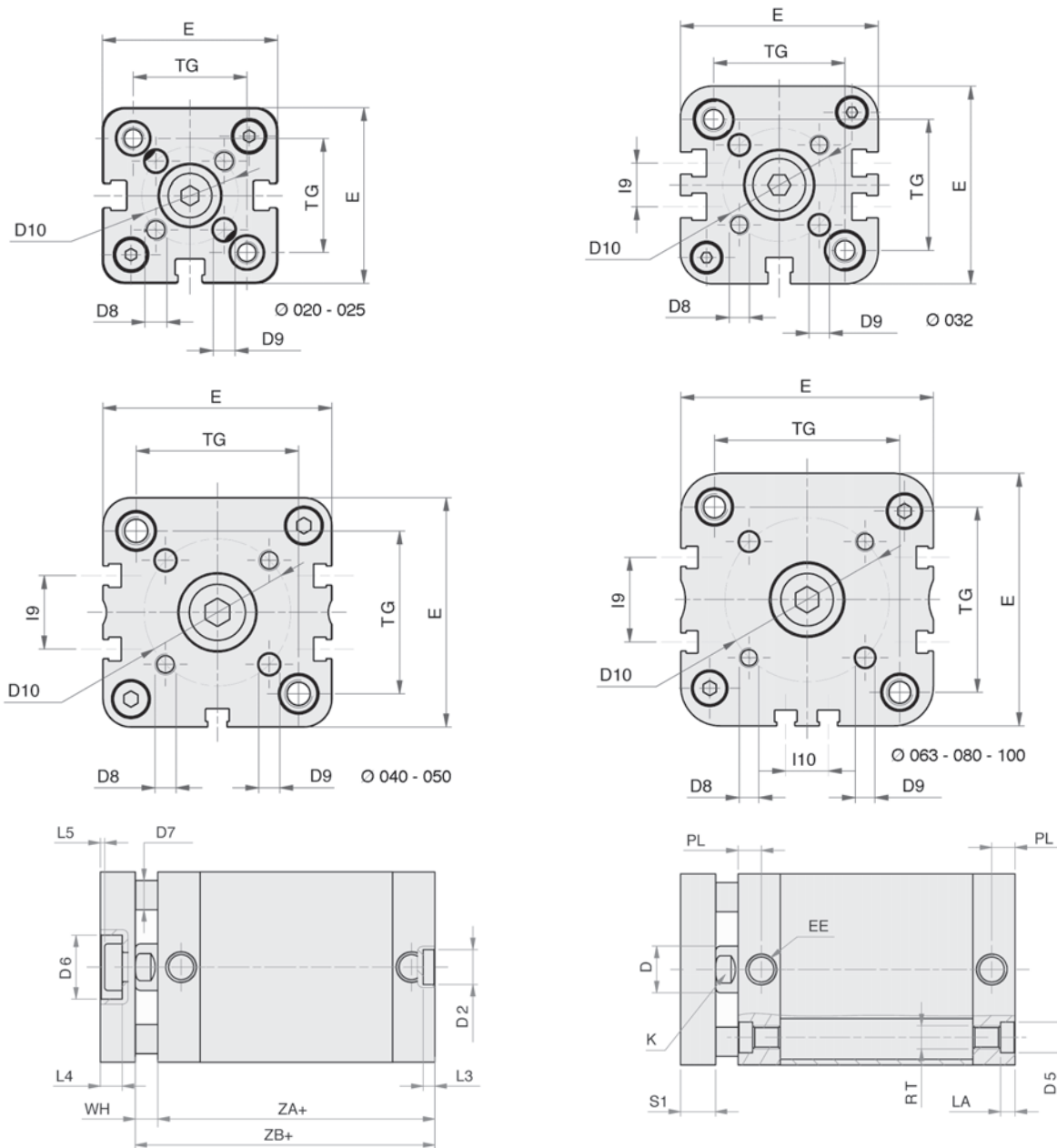
Compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -220 = non-rotating)



Ø	Ø D	Ø D2	Ø D5	Ø D6	Ø D7	D8	Ø D9	Ø D10	E	EE	I9	I10	K	LA	L3	L4	L5	PL	RT	S1	TG	WH	ZA+	ZB+
20	10	9	7.5	11	5	M4	4	17	36	M5	-	-	8	4.5	3	5	1	7.5	M5	8	22	6.5	37	43.5
25	10	9	7.5	14	6	M5	5	22	40	M5	-	-	8	4.5	3	5	1	7.5	M5	8	26	6	39	45
32	12	9	9	17	6	M5	5	28	49	G1/8	10.8	-	10	5	3	6.5	1.5	7.5	M6	10	32.5	6.5	44	50.5
40	12	9	9	17	8	M5	5	33	54.5	G1/8	12.8	-	10	5	3	6.5	1.5	8	M6	10	38	7	45	52
50	16	12	10.5	22	10	M6	6	42	65.5	G1/8	21	-	13	5	4	7.5	1.5	8	M8	12	46.5	8	45	53
63	16	12	10.5	22	10	M6	6	50	77	G1/8	25.8	13	13	5	4	7.5	1.5	7.5	M8	12	56.5	8	49	57
80	20	12	13.5	28	14	M8	8	65	95.5	G1/8	30	18	17	3	4	9	2	8	M10	14	72	9	54	63
100	25	12	13.5	30	14	M10	10	80	113.5	G1/8	50	35	22	3	4	10	3	10.5	M10	14	89	10	67	77

+ stroke length

Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-220) in kg	0.163	0.204	0.287	0.373	0.590	0.833	1.398	2.261
add-on per 10 mm stroke	0.028	0.034	0.035	0.038	0.062	0.071	0.114	0.139

Weight in lbs. = x 2.2046

Subject to change

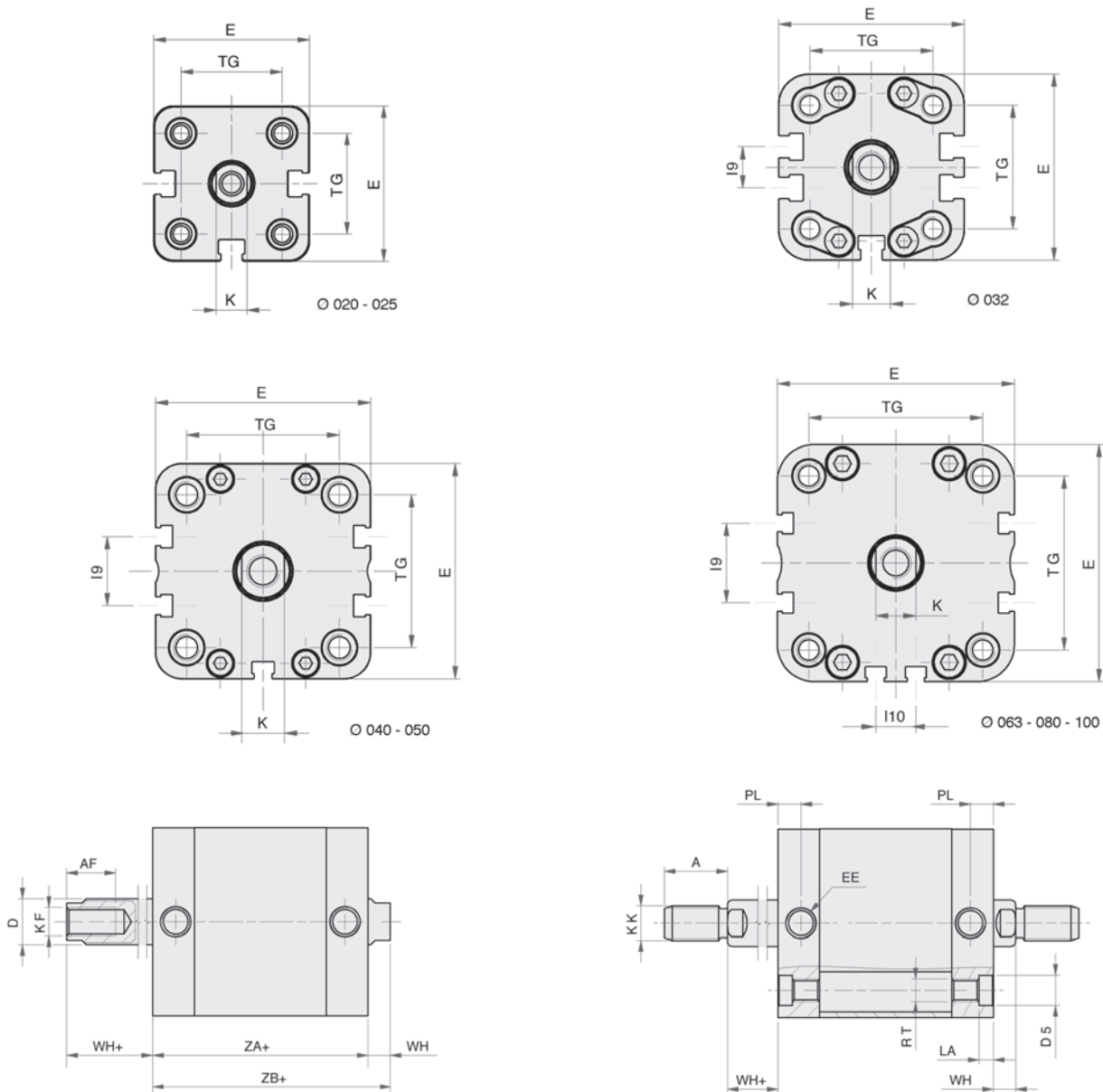
Compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -600 = male thread, -610 = female thread)



Ø	A	AF	Ø D	Ø D5	E	EE	I9	I10	K	KF	KK	LA	PL	RT	TG	WH	WH+	ZA+	ZB+
20	16	15	10	7.5	36	M5	-	-	8	M6	M8	4.5	7.5	M5	22	6.5	6.5	37	43.5
25	16	15	10	7.5	40	M5	-	-	8	M6	M8	4.5	7.5	M5	26	6	6	39	45
32	19	16	12	9	49	G1/8	10.8	-	10	M8	M10 x 1.25	5	7.5	M6	32.5	6.5	6.5	44	50.5
40	19	16	12	9	54.5	G1/8	12.8	-	10	M8	M10 x 1.25	5	8	M6	38	7	7	45	52
50	22	17	16	10.5	65.5	G1/8	21	-	13	M10	M12 x 1.25	5	8	M8	46.5	8	8	45	53
63	22	17	16	10.5	77	G1/8	25.8	13	13	M10	M12 x 1.25	5	7.5	M8	56.5	8	8	49	57
80	28	20	20	13.5	95.5	G1/8	30	18	17	M12	M16 x 1.5	3	8	M10	72	9	9	54	63
100	28	20	25	13.5	113.5	G1/8	50	35	22	M12	M16 x 1.5	3	10.5	M10	89	10	10	67	77

+ stroke length

Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-610) in kg	0.140	0.175	0.232	0.293	0.463	0.653	1.050	1.833
Mass at 0 mm stroke (-600) in kg	0.164	0.199	0.278	0.339	0.535	0.725	1.190	1.975
add-on per 10 mm stroke	0.030	0.034	0.037	0.038	0.064	0.073	0.114	0.149

Weight in lbs. = x 2.2046

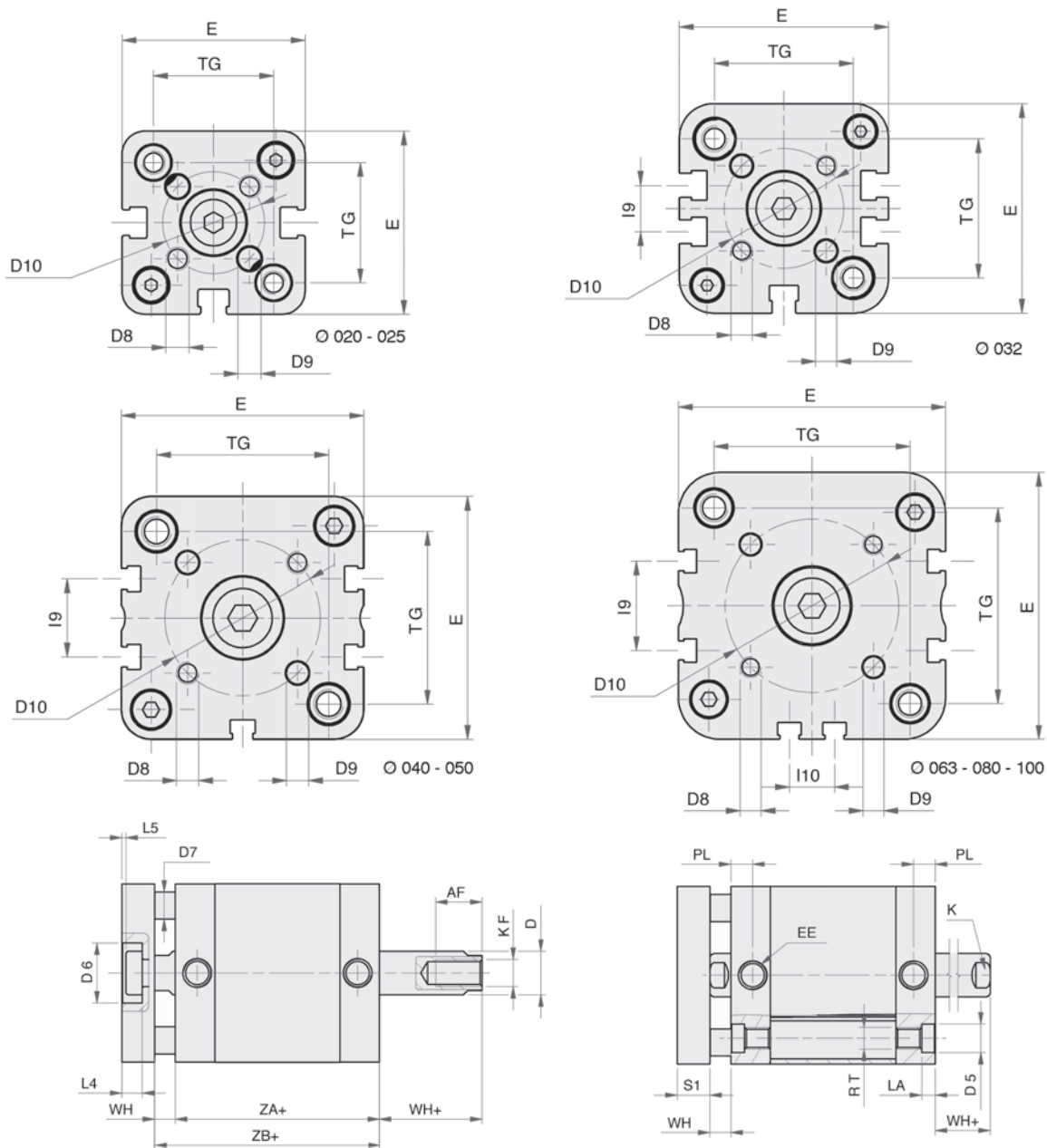
Compact cylinders series NYD

Double acting with magnetic piston, ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Series NYD (Type for order code: -620 = non-rotating)



Ø	A	AF	Ø D	Ø D5	Ø D6	Ø D7	D8	Ø D9	Ø D10	E	EE	I9	I10	K	KF	KK	LA	L4	L5	PL	RT	S1	TG	WH	WH+	ZA+	ZB+
20	16	15	10	7.5	11	5	M4	4	17	36	M5	-	-	8	M6	M8	4.5	5	1	7.5	M5	8	22	6.5	6.5	37	43.5
25	16	15	10	7.5	14	6	M5	5	22	40	M5	-	-	8	M6	M8	4.5	5	1	7.5	M5	8	26	6	6	39	45
32	19	16	12	9	17	6	M5	5	28	49	G1/8	10.8	-	10	M8	M10x1.25	5	6.5	1.5	7.5	M6	10	32.5	6.5	6.5	44	50.5
40	19	16	12	9	17	8	M5	5	33	54.5	G1/8	12.8	-	10	M8	M10x1.25	5	6.5	1.5	8	M6	10	38	7	7	45	52
50	22	17	16	10.5	22	10	M6	6	42	65.5	G1/8	21	-	13	M10	M12x1.25	5	7.5	1.5	8	M8	12	46.5	8	8	45	53
63	22	17	16	10.5	22	10	M6	6	50	77	G1/8	25.8	13	13	M10	M12x1.25	5	7.5	1.5	7.5	M8	12	56.5	8	8	49	57
80	28	20	20	13.5	28	14	M8	8	65	95.5	G1/8	30	18	17	M12	M16x1.5	3	9	2	8	M10	14	72	9	9	54	63
100	28	20	25	13.5	30	14	M10	10	80	113.5	G1/8	50	35	22	M12	M16x1.5	3	10	3	10.5	M10	14	89	10	10	67	77

+ stroke length

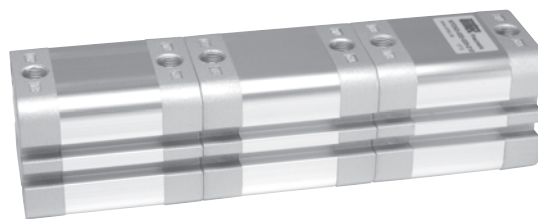
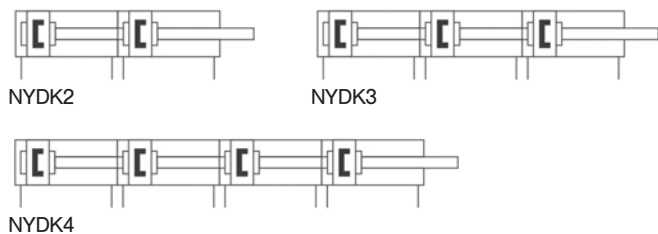
Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-620) in kg	0.172	0.213	0.302	0.388	0.618	0.861	1.452	2.372
add-on per 10 mm stroke	0.034	0.040	0.043	0.046	0.078	0.087	0.140	0.173

Weight in lbs. = x 2.2046

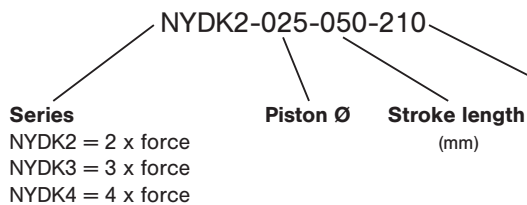
Subject to change

High force cylinder series NYDK

Double acting with magnetic piston, similar to ISO 21287
M5 to G1/8 • Piston Ø 20 to 100 mm

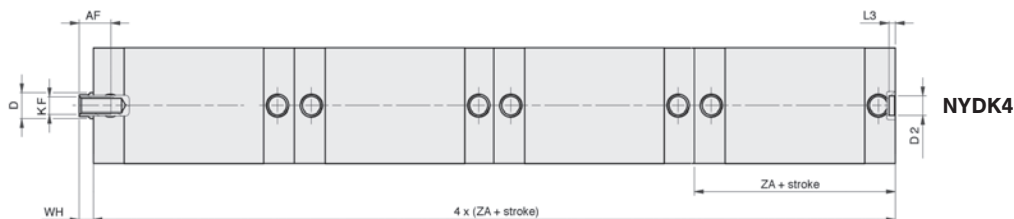
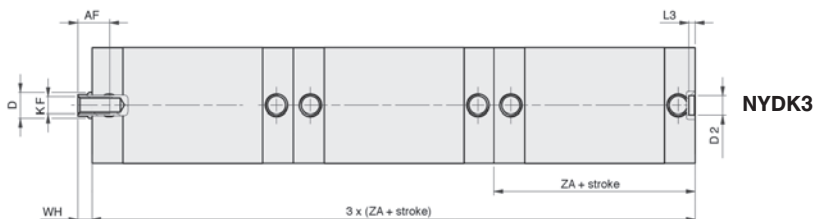
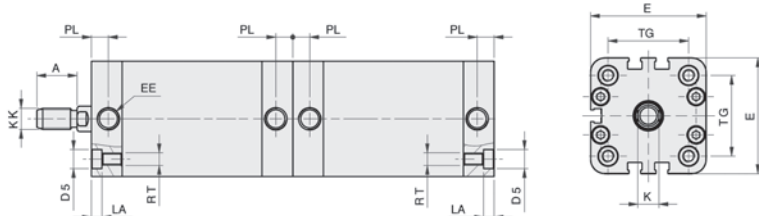
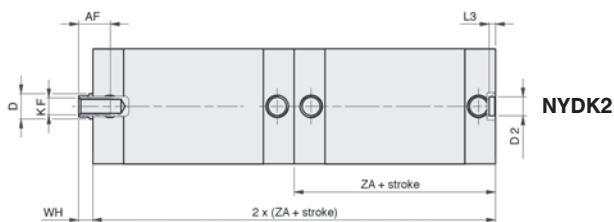


Order code



Type for order code
200 – Standard with male thread
210 – Standard with female thread

For cylinder applications for NYDK3 and NYDK4 please check mounting advises with our technical department.



Series and function
Multiplying the force will be achieved by adding several cylinders with same diameter and same stroke length.

Ø	A	AF	Ø D	Ø D2	Ø D5	E	EE	K	KF	KK	L3	LA	PL	RT	TG	WH	ZA+
20	16	15	10	9	7.5	36	M5	8	M6	M8	3	4.5	7.5	M5	22	6.5	37
25	16	15	10	9	7.5	40	M5	8	M6	M8	3	4.5	7.5	M5	26	6	39
32	19	16	12	9	9	49	G1/8	10	M8	M10 x 1.25	3	5	7.5	M6	32.5	6.5	44
40	19	16	12	9	9	54.5	G1/8	10	M8	M10 x 1.25	3	5	8	M6	38	7	45
50	22	17	16	12	10.5	65.5	G1/8	13	M10	M12 x 1.25	4	5	8	M8	46.5	8	45
63	22	17	16	12	10.5	77	G1/8	13	M10	M12 x 1.25	4	5	7.5	M8	56.5	8	49
80	28	20	20	12	13.5	95.5	G1/8	17	M12	M16 x 1.5	4	3	8	M10	72	9	54
100	28	20	25	12	13.5	113.5	G1/8	22	M12	M16 x 1.5	4	3	10.5	M10	89	10	67

+ stroke length

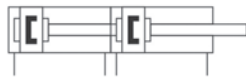
Piston Ø	20	25	32	40	50	63	80	100
NYDK2 Mass at 0 mm stroke (-210) in kg	0.274	0.339	0.457	0.574	0.852	1.242	2.066	3.534
NYDK2 Mass at 0 mm stroke (-200) in kg	0.286	0.351	0.480	0.597	0.888	1.278	2.136	3.605
add on for 1 x NYDK3 and 2 x NYDK4	0.143	0.173	0.240	0.296	0.417	0.617	1.070	1.812
add-on for each 10 mm stroke (total of all cyl. elements)	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

Weight in lbs. = x 2.2046

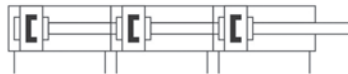
Multiple positioning cylinder series NYM

Double acting with magnetic piston, similar to ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



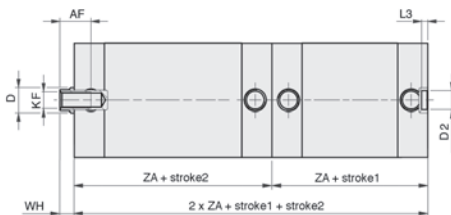
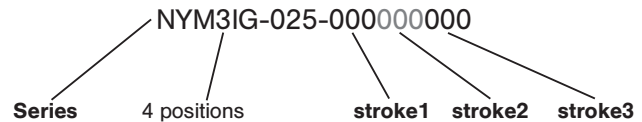
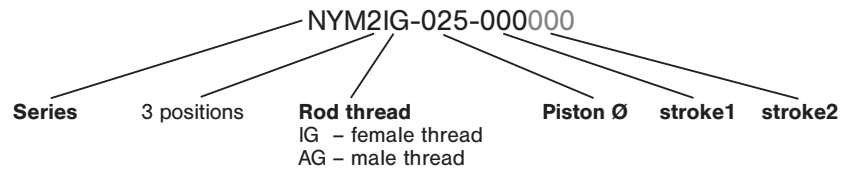
NYM2



NYM3

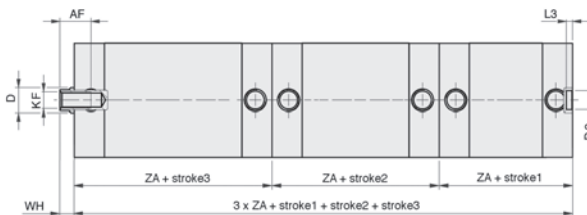
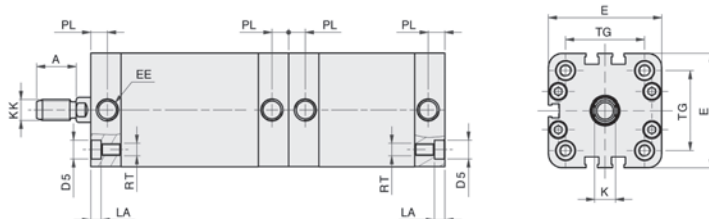


Order code



NYM2

stroke 1 < stroke 2 < stroke 3 ...
The max. single stroke is equal to the max. total stroke.



NYM3

Series and function

Combining 2 to 3 cylinders with same piston diameter but different stroke lengths provides a max. of 4* positions.

* More positions on request.

Ø	A	AF	Ø D	Ø D2	Ø D5	E	EE	K	KF	KK	L3	LA	PL	RT	TG	WH	ZA+
20	16	15	10	9	7.5	36	M5	8	M6	M8	3	4.5	7.5	M5	22	6.5	37
25	16	15	10	9	7.5	40	M5	8	M6	M8	3	4.5	7.5	M5	26	6	39
32	19	16	12	9	9	49	G1/8	10	M8	M10 x 1.25	3	5	7.5	M6	32.5	6.5	44
40	19	16	12	9	9	54.5	G1/8	10	M8	M10 x 1.25	3	5	8	M6	38	7	45
50	22	17	16	12	10.5	65.5	G1/8	13	M10	M12 x 1.25	4	5	8	M8	46.5	8	45
63	22	17	16	12	10.5	77	G1/8	13	M10	M12 x 1.25	4	5	7.5	M8	56.5	8	49
80	28	20	20	12	13.5	95.5	G1/8	17	M12	M16 x 1.5	4	3	8	M10	72	9	54
100	28	20	25	12	13.5	113.5	G1/8	22	M12	M16 x 1.5	4	3	10.5	M10	89	10	67

+ stroke length

Piston Ø	20	25	32	40	50	63	80	100
NYM2IG Mass at 0 mm stroke in kg	0.274	0.339	0.457	0.574	0.852	1.242	2.066	3.534
NYM2AG Mass at 0 mm stroke in kg	0.286	0.351	0.480	0.597	0.888	1.278	2.136	3.605
add-on for each element (NYM3)	0.143	0.173	0.240	0.296	0.417	0.617	1.070	1.812
add-on for each 10 mm stroke (total of all cyl. elements)	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

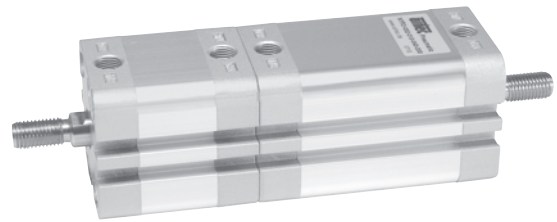
Weight in lbs. = x 2.2046

Subject to change

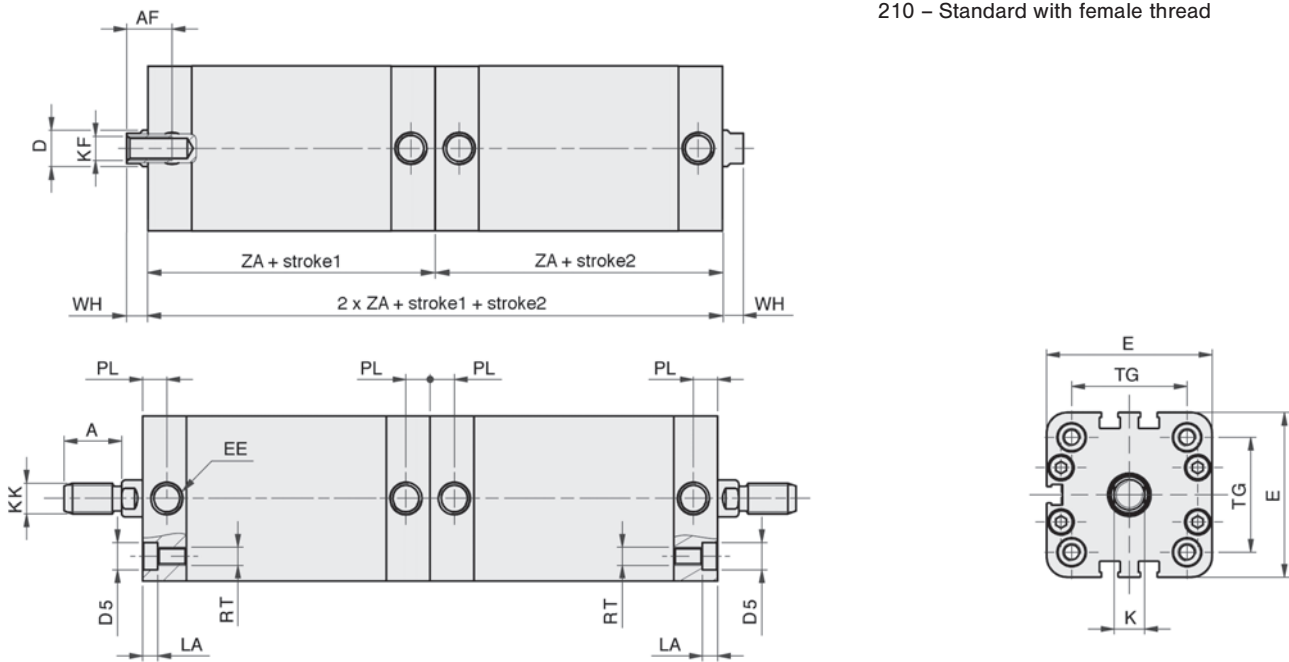
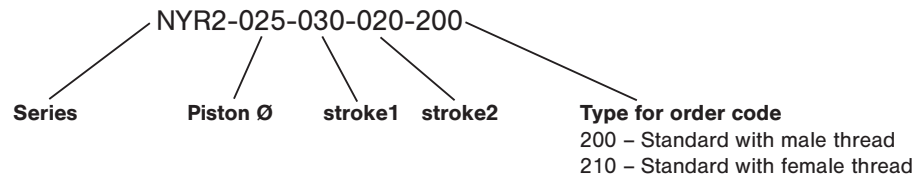
Multiple positioning cylinder series NYR

Double acting with magnetic piston, similar to ISO 21287

M5 to G1/8 • Piston Ø 20 to 100 mm



Order code



Series and function

A back to back mounting of cylinders with same piston diameter and equal or different stroke lengths provides up to 4 positions.

Ø	A	AF	Ø D	Ø D5	E	EE	K	KF	KK	L3	LA	PL	RT	TG	WH	ZA+
20	16	15	10	7.5	36	M5	8	M6	M8	3	4.5	7.5	M5	22	6.5	37
25	16	15	10	7.5	40	M5	8	M6	M8	3	4.5	7.5	M5	26	6	39
32	19	16	12	9	49	G1/8	10	M8	M10 x 1.25	3	5	7.5	M6	32.5	6.5	44
40	19	16	12	9	54.5	G1/8	10	M8	M10 x 1.25	3	5	8	M6	38	7	45
50	22	17	16	10.5	65.5	G1/8	13	M10	M12 x 1.25	4	5	8	M8	46.5	8	45
63	22	17	16	10.5	77	G1/8	13	M10	M12 x 1.25	4	5	7.5	M8	56.5	8	49
80	28	20	20	13.5	95.5	G1/8	17	M12	M16 x 1.5	4	3	8	M10	72	9	54
100	28	20	25	13.5	113.5	G1/8	22	M12	M16 x 1.5	4	3	10.5	M10	89	10	67

+ stroke length

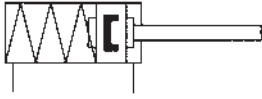
Piston Ø	20	25	32	40	50	63	80	100
Mass at 0 mm stroke (-210) in kg	0.274	0.339	0.457	0.574	0.852	1.242	2.066	3.534
Mass at 0 mm stroke (-200) in kg	0.286	0.351	0.480	0.597	0.888	1.278	2.136	3.605
add-on for each 10 mm stroke (total of all cyl. elements)	0.024	0.028	0.029	0.030	0.048	0.057	0.088	0.115

Weight in lbs. = x 2.2046

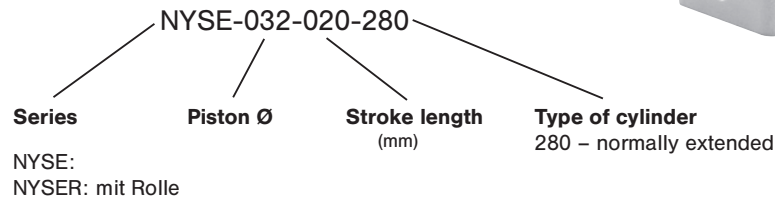
Stopper cylinders series NYSE

Single acting

M5 and G1/8 • piston Ø 20, 32, 50 and 80 mm



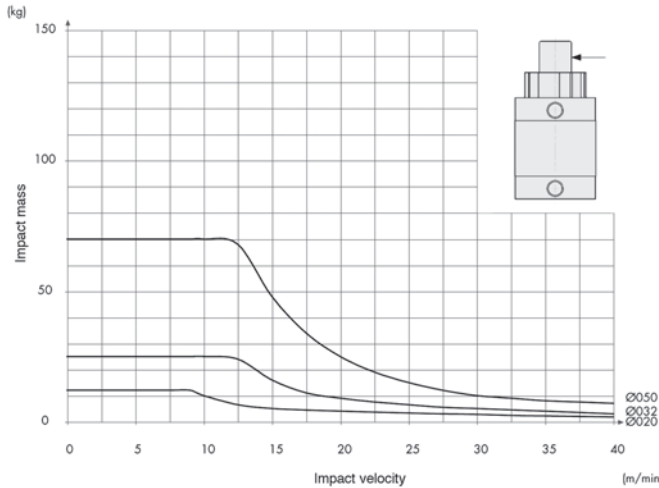
Order code



Design and function

Single acting compact cylinders with permanent magnet, built-in cushioning rings and return spring. Cylinder end caps are connected to the Al-profile by mounting screws. The cylinder profil has integrated sensor grooves.

Loading diagram



Mass (in kg) and spring force (theoretical)

Order number	kg	min. Load (N)	max. Load (N)
NYSE-020-015-280	0.20	28	36
NYSER-020-015-280	0.24		
NYSE-032-020-280	0.40	36	51
NYSER-032-020-280	0.46		
NYSE-050-030-280	1.04	49	78
NYSER-050-030-280	1.30		
NYSE-080-030-280	3.20	133	187
NYSER-080-030-280	4.50		

Weight in lbs. = x 2.2046

Order number	NYSE-020-015-280 NYSER-020-015-280	NYSE-032-020-280 NYSER-032-020-280	NYSE-050-030-280 NYSER-050-030-280	NYSE-080-030-280 NYSER-080-030-280
Piston Ø (mm)	20	32	50	80
Connection	M5	G1/8	G1/8	G1/8
Stroke lengths	15	20	30	30
Mounting position	any			
Operating pressure	2 ... 10 bar (29 ... 145 psi)			
Temperature range	- 20 °C ... + 80 °C (- 4 °F ... + 176 °F); - 10 °C ... + 150 °C on request (+ 14 °F ... + 302 °F)			
Medium	Compressed air in accordance with ISO 8573-1: 2001, Class 7 4 – and free of aggressive additives			
Materials	Cylinder tube: Al (anodized) End caps: Al (anodized) Piston rod: stainless steel Seals: PU/NBR			

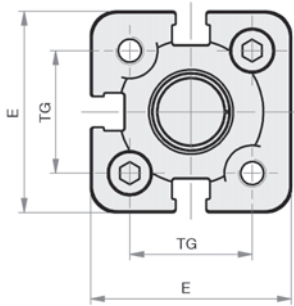
Stopper cylinders series NYSE

Single acting

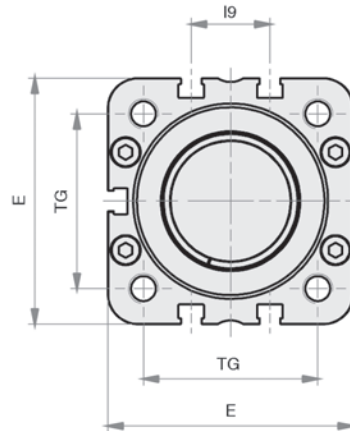
M5 and G1/8 • piston Ø 20, 32, 50 and 80 mm



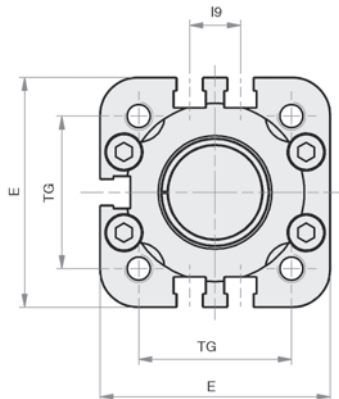
Ø 20



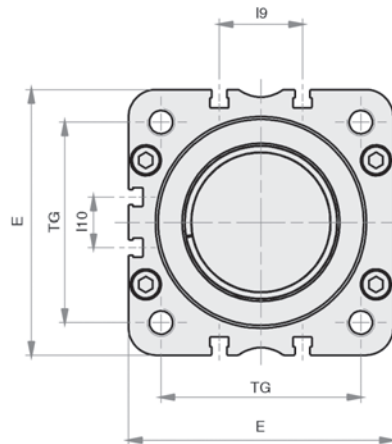
Ø 50



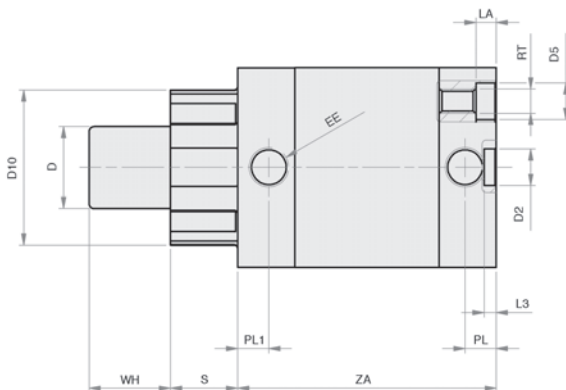
Ø 32



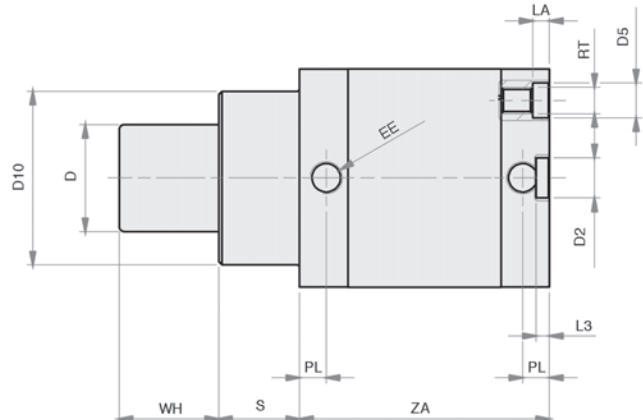
Ø 80



Ø 20 + Ø 32



Ø 50 + Ø 80



* The cylinder of Ø 20 have three sensor grooves. The cylinders of Ø 32 and Ø 50 mm have five sensor grooves. The cylinder of Ø 80 mm have six sensor grooves.

Ø	Ø D	Ø D2	Ø D5	Ø D10	E	EE	I9	I10	LA	L3	PL	PL1	RT	S	TG	WH	ZA
020	12	9	7.5	26	36	M5	-	-	4.5	3	7.5	9	M5	11.5	22	15	53
032	20	9	9	38	49	G1/8	10.8	-	5	3	8	8	M6	16.5	32.5	20	64
050	32	12	10.5	52	65.5	G1/8	21	-	5	4	8	-	M8	24.5	46.5	30	75
080	50	12	13.5	76	95.5	G1/8	30	18	3	4	8	-	M10	15	72	30	126

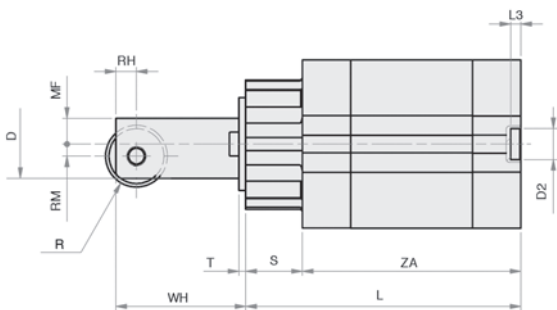
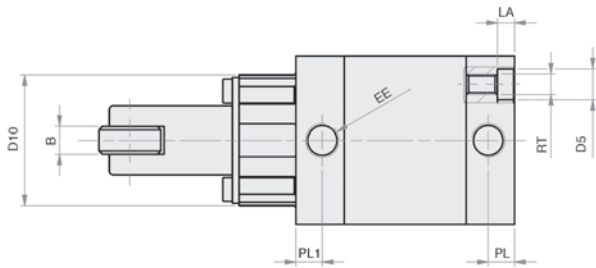
Stopper cylinders series NYSE

Single acting

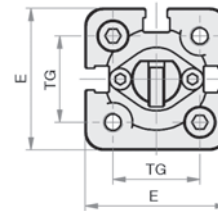
M5 and G1/8 • piston Ø 20, 32, 50 and 80 mm



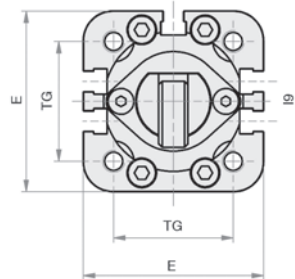
Ø 20 + Ø 32



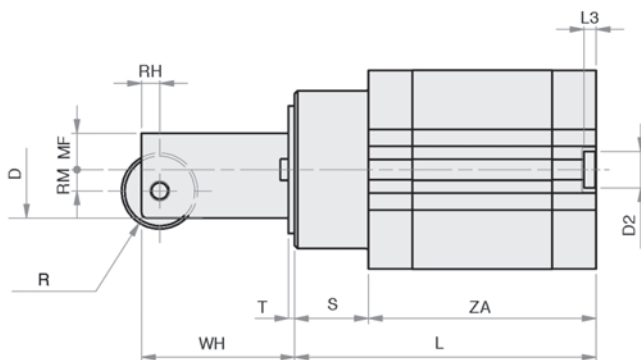
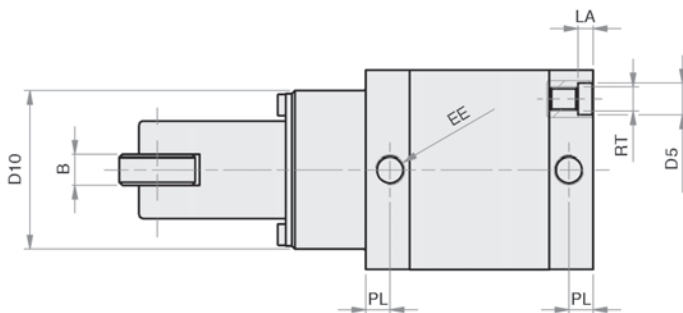
Ø 20



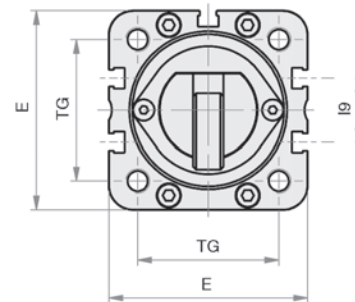
Ø 32



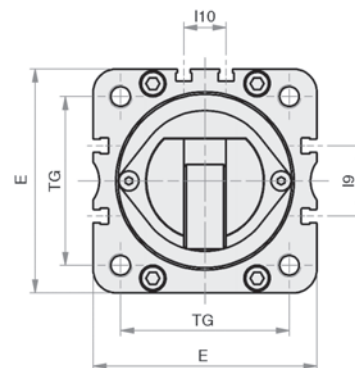
Ø 50 + Ø 80



Ø 50



Ø 80



* The cylinder of Ø 20 have three sensor grooves. The cylinders of Ø 32 and Ø 50 mm have five sensor grooves. The cylinder of Ø 80 mm have six sensor grooves.

Ø	B	Ø D	Ø D2	Ø D5	Ø D10	E	EE	I9	I10	L	LA	L3	MF	PL	PL1	R	RH	RM	RT	S	T	TG	WH	ZA
020	4	12	9	7.5	26	36	M5	-	-	64.5	4.5	3	4.5	7.5	9	5	3	2	M5	11.5	2	22	24	53
032	8	20	9	9	38	49	G1/8	10.8	-	80.5	5	3	7.5	8	8	9	6	3.5	M6	16.5	2	32.5	38	64
050	10	32	12	10.5	52	65.5	G1/8	21	-	99.5	5	4	12	8	-	12.5	6	7	M8	24.5	2	46.5	50.5	75
080	18	50	12	13.5	76	95.5	G1/8	30	18	141	3	4	18	8	-	18	10	11	M10	15	3	72	63	126

Piston rod accessories



Rod clevis with pin
FD + RD
Page 9.211



Piston rod nut
FE + RL
Page 9.212



Flexible coupling
FK
Page 9.212



Rod eye
FO + RO
Page 9.212

Mounting accessories



Foot mount
XLB-Ø-01 (Ø 32 – 100)
Page 9.165



Flange mount
NXB-Ø-02 (Ø 20 + 25)
Page 9.165
XLB-Ø-02 (Ø 32 – 100)
Page 9.165



Swivel mount
NXB-Ø-04 (Ø 20 + 25)
Page 9.166
XLB-Ø-05 (Ø 32 – 100)
Page 9.166



Clevis mount with bushing
XLB-Ø-04 (Ø 32 – 100)
Page 9.166



Swivel mount 90°
XLB-Ø-06 (Ø 32 – 100)
Page 9.167



Clevis pin
XLB-Ø-08 (Ø 32 – 100)
Page 9.167



Bearing block
XLB-Ø-09 (Ø 32 – 100)
Page 9.168



Trunnion flange mount
XLB-Ø-11 (Ø 32 – 100)
Page 9.168



Small clevis mount with non rotating pin
XLB-Ø-14 (Ø 32 – 100)
Page 9.169



Swivel mount with spherical bearing
XLB-Ø-12 (Ø 32 – 100)
Page 9.169



Clevis mount
RC-30 (Ø 20 + 25)
Page 9.169

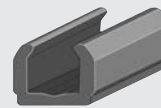
Proximity sensors



Sensors
ZS-
Page 9.220



Connecting cable
KA-
Page 9.221

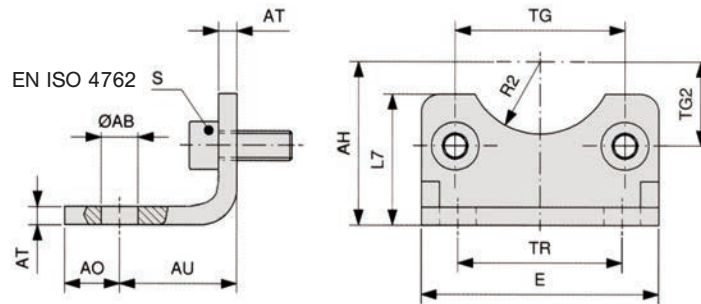


Cover for sensor groove
XLB-011 0,5m

Mounting accessories for series NYE und NYD

M5 and G1/8 • piston Ø 20 to 100 mm

Foot mount (1 pair)



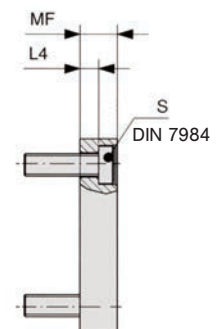
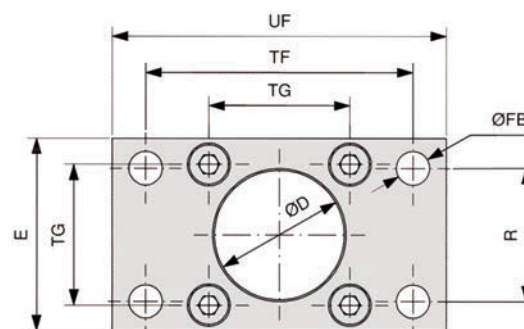
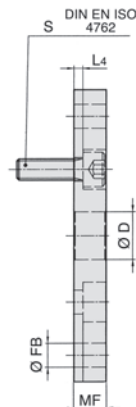
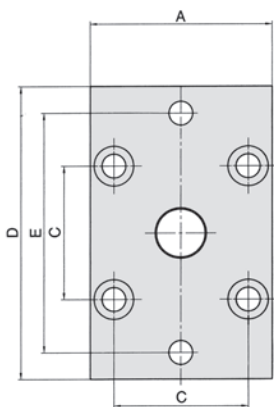
Material: steel (zinc-plated)

Order number	Ø AB	AH	AO	AU	AT	E	L7	R2	S	TG	TG2	TR
XLB-032-01	7	32	11	24	4	45	30	15	M6 x 20	32.5	16.25	32
XLB-040-01	10	36	8	28	4	52	30	17.5	M6 x 20	38	19	36
XLB-050-01	10	45	15	32	5	65	36	20	M8 x 20	46.5	23.25	45
XLB-063-01	10	50	13	32	5	75	35	22.5	M8 x 20	56.5	28.25	50
XLB-080-01	12	63	14	41	6	95	47	22.5	M10 x 20	72	36	63
XLB-100-01	14.5	71	16	41	6	115	53	27.5	M10 x 20	89	44.5	75
	H14	JS16		± 0.2				H15		± 0.2		JS14

Flange mount

Ø 20 – 25 = NXB-...

Ø 32 – 100 = XLB-...



Material: steel (zinc-plated)

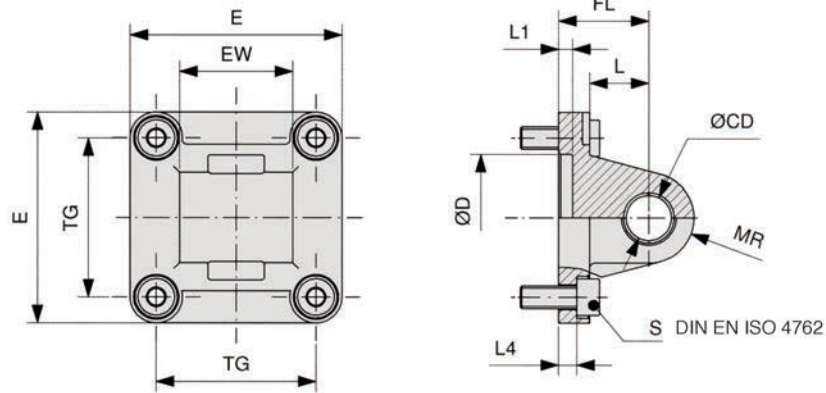
Order number	Ø D	E	Ø FB	L4	MF	R	S	TF	TG	UF
NXB-020-02	12	36	6.6	4.6	10	-	M5 x 20	*55	22	70
NXB-025-02	12	40	6.6	4.6	10	-	M5 x 20	*60	26	76
XLB-032-02	30	45	7	5	10	32	M6 x 20	64	32.5	80
XLB-040-02	35	52	9	5	10	36	M6 x 20	72	38	90
XLB-050-02	40	65	9	6.5	12	45	M8 x 20	90	46.5	110
XLB-063-02	45	75	9	6.5	12	50	M8 x 20	100	56.5	120
XLB-080-02	45	95	12	9	16	63	M10 x 25	126	72	150
XLB-100-02	55	115	14	9	16	75	M10 x 25	150	89	170
	H11		H13	- 0.5	JS14	JS14		*JS13 JS14	± 0.2	

Mounting accessories for series NYE und NYD

M5 and G1/8 • piston Ø 20 to 100 mm



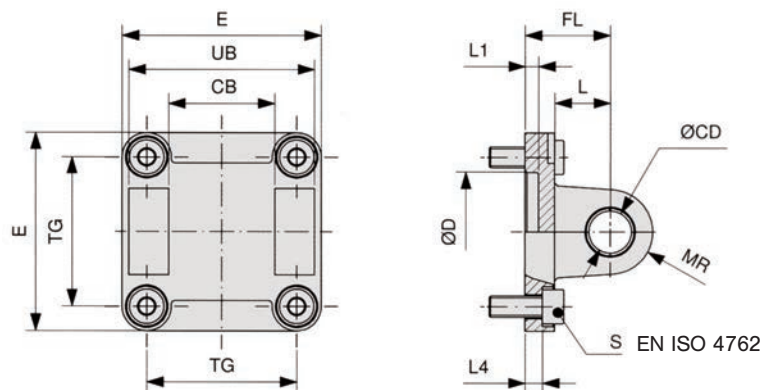
Swivel mount



Material: Al

Order number	Ø CD	Ø D	E	EW	FL	L	L1	L4	MR	S	TG
NXB-020-04	8	12	34	16	20	14	3	2.6	8	M5 x 16	22
NXB-025-04	8	12	38	16	20	14	3	2.6	8	M5 x 16	26
XLB-032-05	10	30	45	26	22	13	5	5.5	10	M6 x 20	32.5
XLB-040-05	12	35	52	28	25	16	5	5.5	12	M6 x 20	38
XLB-050-05	12	40	65	32	27	16	5	6.5	12	M8 x 20	46.5
XLB-063-05	16	45	75	40	32	21	5	6.5	16	M8 x 20	56.5
XLB-080-05	16	45	95	50	36	22	5	10	16	M10 x 25	72
XLB-100-05	20	55	115	60	41	27	5	10	20	M10 x 25	89
	H9	H11		- 0.2 - 0.6	± 0.2			± 0.5			± 0.2

Clevis mount with bushing



Order number **XLB-xxx-48** includes the mounting pin.

Material: Al

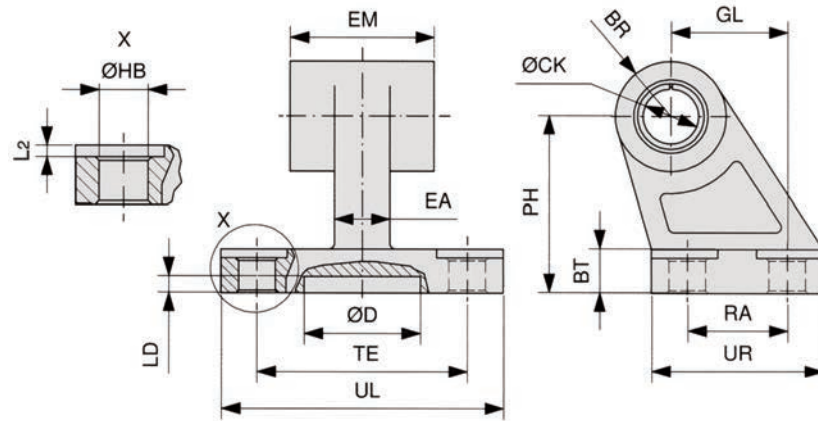
Order number	CB	Ø CD	Ø D	E	FL	L	L1	L4	MR	S	TG	UB
XLB-032-04	26	10	30	45	22	13	5	5.5	10	M6 x 20	32.5	45
XLB-040-04	28	12	35	52	25	16	5	5.5	12	M6 x 20	38	52
XLB-050-04	32	12	40	65	27	16	5	6.5	12	M8 x 20	46.5	60
XLB-063-04	40	16	45	75	32	21	5	6.5	16	M8 x 20	56.5	70
XLB-080-04	50	16	45	95	36	22	5	10	16	M10 x 25	72	90
XLB-100-04	60	20	55	115	41	27	5	10	20	M10 x 25	89	110
	H14	H9	H11		± 0.2			± 0.5			± 0.2	h13

Mounting accessories for series NYE und NYD

M5 and G1/8 • piston Ø 20 to 100 mm



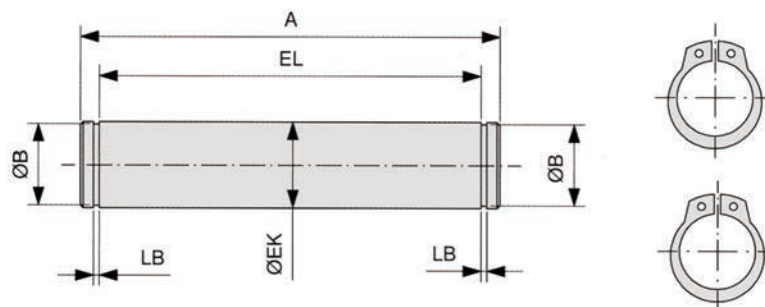
Swivel mount 90°



Material: Al

Order number	BR	BT	ØCK	ØD	EA	EM	GL	ØHB	L2	LD	PH	RA	TE	UL	UR
XLB-032-06	10	8	10	21	10	26	21	6.6	1.6	3	32	18	38	51	31
XLB-040-06	11	10	12	21	15	28	24	6.6	1.6	3	36	22	41	54	35
XLB-050-06	13	12	12	21	16	32	33	9	1.6	3	45	30	50	65	45
XLB-063-06	15	14	16	21	16	40	37	9	1.6	3	50	35	52	67	50
XLB-080-06	15	14	16	21	20	50	47	11	2.5	3	63	40	66	86	60
XLB-100-06	19	17	20	11	20	60	55	11	2.5	3	71	50	76	96	70
			H9				JS14	H13			JS15	JS14	JS14		

Clevis pin



Material: steel (zinc-plated)
Snap rings are included.

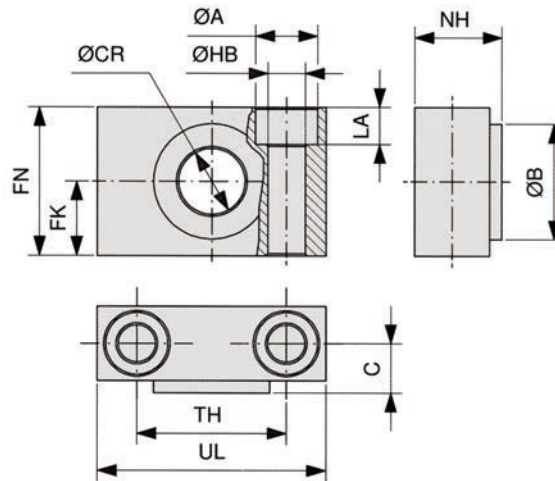
Order number	A	Ø B	Ø EK	EL	LB
XLB-032-08	53	9.6	10	46	1.1
XLB-040-08	60	11.5	12	53	1.1
XLB-050-08	68	11.5	12	61	1.1
XLB-063-08	78	15.2	16	71	1.1
XLB-080-08	98	15.2	16	91	1.1
XLB-100-08	118	19	20	111	1.3
			e8	+2	

Mounting accessories for series NYE und NYD

M5 and G1/8 • piston Ø 20 to 100 mm



Bearing block

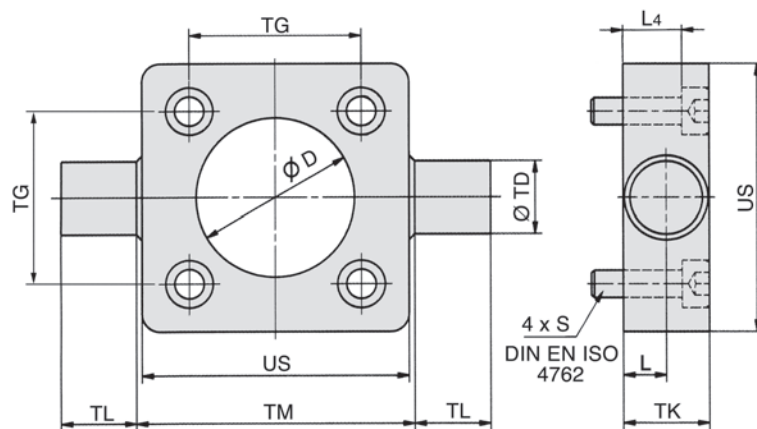
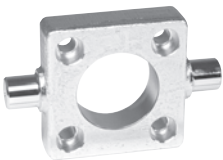


Order number = 1 pair

Material: steel (zinc-plated), bronze

Order number	Ø A	Ø B	C	Ø CR	FK	FN	Ø HB	LA	NH	TH	UL
XLB-032-09	11	22	10.5	12	15	30	6.6	7	18	32	46
XLB-040-09	15	28	12	16	18	36	9	9	21	36	55
XLB-063-09	18	32	13	20	20	40	11	11	23	42	65
XLB-100-09	20	39	16	25	25	50	14	13	28.5	50	75
				H9	± 0.1		H13			± 0.2	

Trunnion flange mount



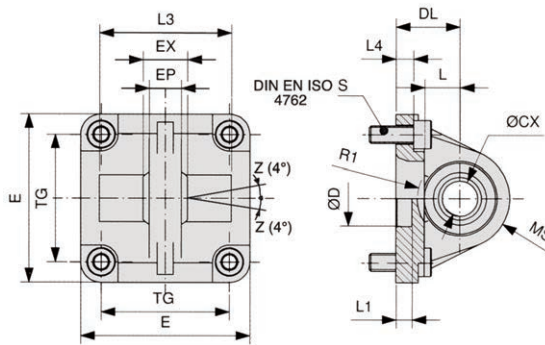
Material: steel (zinc-plated)

Order number	D	L	L4	S	TD	TG	TK	TL	Ø TM	US
XLB-032-11	30	6.5	8	M6 x 20	12	32.5	14	12	50	46
XLB-040-11	35	9	13	M6 x 25	16	38	19	16	63	59
XLB-050-11	40	9	11	M8 x 25	16	46.5	19	16	75	69
XLB-063-11	45	11.5	16	M8 x 30	20	56.5	24	20	90	84
XLB-080-11	45	11.5	14	M10 x 30	20	72	24	20	110	102
XLB-100-11	55	14	19	M10 x 35	25	89	29	25	132	125
	H11	+ 0.2			e9	± 0.2		h14	h14	

Mounting accessories for series NYE und NYD

M5 and G1/8 • piston Ø 20 to 100 mm

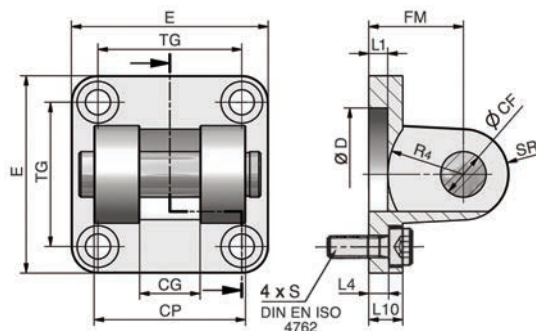
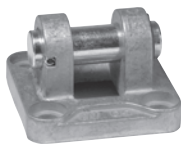
Swivel mount with spherical bearing



Material: Al

Order number	Ø CX	Ø D	DL	E	EP	EX	L	L1	L3	L4	MS	R1	S	TG
XLB-032-12	10	30	22	45	10.5	14	12	7	-	5.5	16	-	M6 x 20	32.5
XLB-040-12	12	35	25	52	12	16	15	7	-	5.5	18	-	M6 x 20	38
XLB-050-12	16	40	27	65	15	21	15	7	51	6.5	21	19	M8 x 20	46.5
XLB-063-12	16	45	32	75	15	21	20	7	-	6.5	23	-	M8 x 20	56.5
XLB-080-12	20	45	36	95	18	25	20	9	74	10	28	24	M10 x 25	72
XLB-100-12	20	55	41	115	18	25	25	9	-	10	30	-	M10 x 25	89
	H7	H11	± 0.2			± 0.1				± 0.5				± 0.2

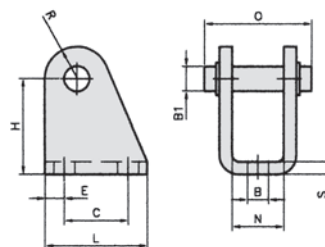
Small clevis mount with non rotating pin



Material: Al, Clevis pin steel (zinc-plated)

Order number	CF	CG	CP	D	E	FM	L1	L4	L10	R4	S	SR	TG
XLB-032-14	10	14	34	30	45	22	5	5.5	9	17	M6 x 20	10	32.5
XLB-040-14	12	16	40	35	52	25	5	5.5	9	20	M6 x 20	12	38
XLB-050-14	16	21	45	40	65	27	5	6.5	11	22	M8 x 20	14	46.5
XLB-063-14	16	21	51	45	75	32	5	6.5	11	25	M8 x 20	18	56.5
XLB-080-14	20	25	65	45	95	36	5	10	14	30	M10 x 25	20	72
XLB-100-14	20	25	75	55	115	41	5	10	14	32	M10 x 25	22	89
	F7	D10	d 12	H11		± 0.2		± 0.5					± 0.2

Clevis mount for Ø 20 + 25

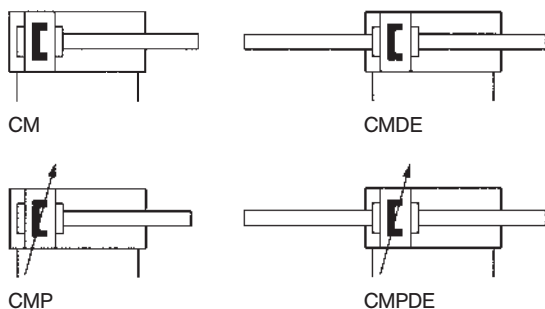


Material: steel (zinc-plated)

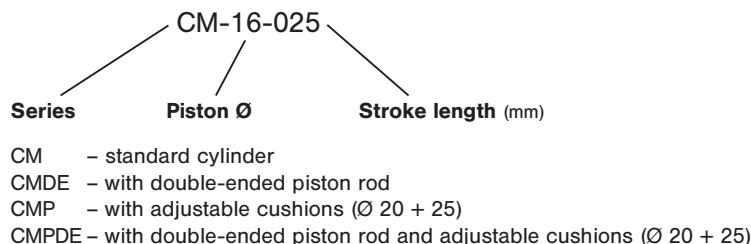
Order number	B	B ₁	C	H	L	N	O	R	S	E
RC-30	6.6	8	20	30	32	16.1	30	10	4	6

Pneumatic cylinders series CM

Double acting with permanent magnet, ISO 6432, stainless steel
M5 and G1/8 • piston Ø 16 to 25 mm



Order code



Design and function

Double acting pneumatic cylinder with permanent magnet and built-in cushioning rings. Standard stroke lengths in table below, additional lengths on request.

Order number Please complete according to order code.	CM-16-...	CM-20-...	CM-25-...
Piston Ø (mm)	16	20	25
Force at 6 bar in N*			
Extension	109	170	265
Retraction	90	142	223
Connection	M5 (10/32 UNF)	G1/8	G1/8
Piston rod thread	M6	M8	M 10 x 1.25
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)		
Temperature range	- 30 °C ... + 80 °C (- 22 °F ... + 176 °F)		
Medium	Compressed air in accordance with ISO 8573-1:2001, Class 7 4 – and free of aggressive additives		
Standard stroke lengths (mm)**	10, 25, 40, 50, 80, 100, 125, 160, 200, 250, max. 250	10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, max. 600	
Materials***	Cylinder tube: AISI 304 (1.4301) End caps: AISI 304 (1.4301) Piston rod: AISI 316 (1.4401) Seals: PU		

* The internal friction is considered.

** Refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

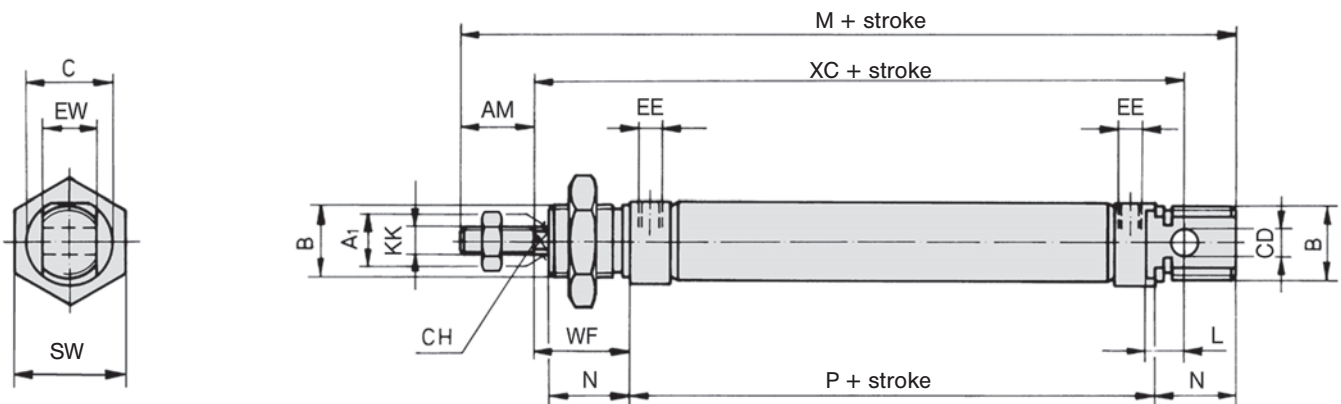
*** Other materials on request.

Pneumatic cylinders series CM

Double acting with permanent magnet, ISO 6432, stainless steel
M5 and G1/8 • piston Ø 16 to 25 mm



Dimensions for series CM + CMP (Ø 20 + 25)



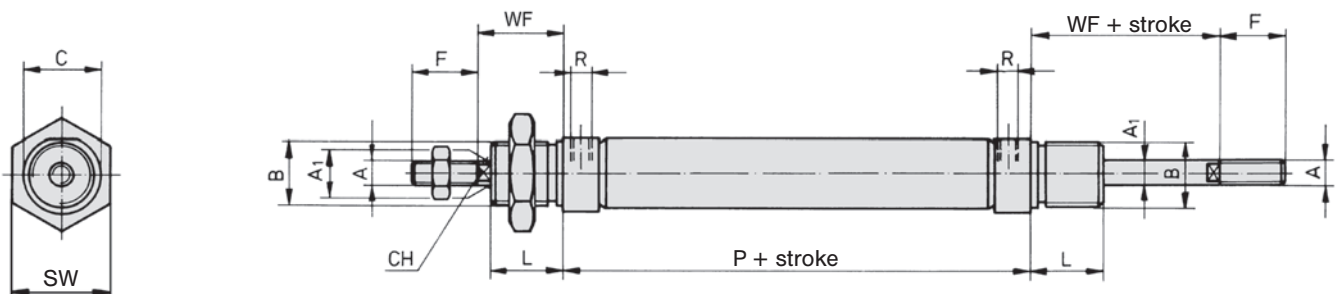
Ø	A ¹	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC
16	6	16	M16 x 1.5	19	6	5	M5	12	M6	9	109	18	53	22	22	82
20	8	20	M22 x 1.5	27	8	7	G1/8	16	M8	12	131	20	67	27	24	95
25	10	22	M22 x 1.5	30	8	9	G1/8	16	M10 x 1.25	12	140	22	68	27	28	104
					H 9			d 13								

Pneumatic cylinders series CMDE + CMPDE

Piston Ø 16 – 25 mm

Double acting with double-ended piston rod
according to ISO 6432, stainless steel

Dimensions for series CMDE + CMPDE (Ø 20 + 25)



Ø	A	A ¹	B	C	F	L	P	R	CH	SW	WF
16	M6	6	M16 x 1.5	19	16	18	53	M5	5	22	22
20	M8	8	M22 x 1.5	27	20	20	67	G1/8	7	27	24
25	M10 x 1.25	10	M22 x 1.5	30	22	22	68	G1/8	9	27	28

Accessories for pneumatic cylinders series CM

ISO 6432, stainless steel

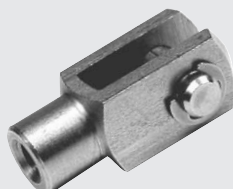
M5 and G1/8 • piston Ø 16 to 25 mm



Piston rod accessories



Rod eye
PO-...
Page 9.213



Rod clevis with pin
PD-...
Page 9.213



Piston rod nut
PL-...
Page 9.213

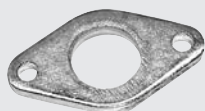
Mounting accessories



Foot mount
Ø 16 – 25
PA-...
Page 9.173



Clevis mount
Ø 16 – 25
PC-...
Page 9.173



Flange mount
Ø 16 – 25
PB-...
Page 9.173



Mounting nut
Ø 16 – 25
PM-...

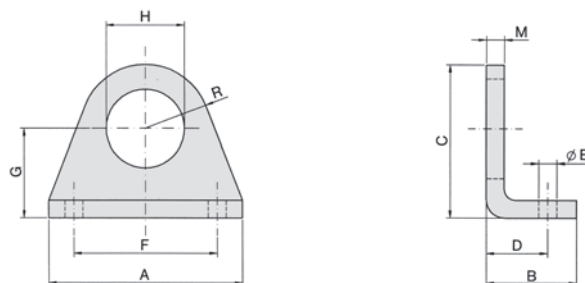
Accessories for pneumatic cylinders series CM

ISO 6432, stainless steel

M5 and G1/8 • piston Ø 16 to 25 mm



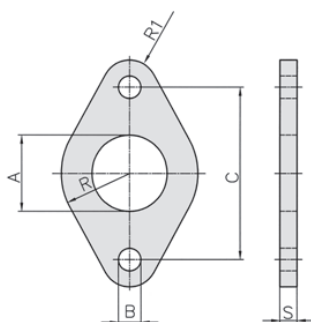
Foot mount



Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	M	R
PA-16	42	20	33	14	5.5	32	20	16.1	4	13
PA-25	54	25	45	17	6.6	40	25	22.1	5	20

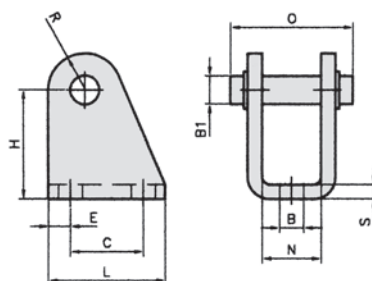
Flange mount



Material: AISI 304 (1.4301)

Order number	A	B	C	R	R ₁	S
PB-16	16.1	5.5	40	15	6	4
PB-25	22.1	6.6	50	20	8	5

Clevis mount

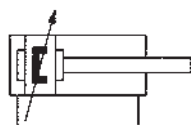


Material: AISI 304 (1.4301)

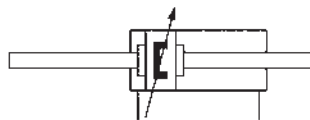
Order number	B	B ₁	C	H	L	N	O	R	S	E
PC-16	5.5	6	15	27	25	12.1	24	7	3	5
PC-25	6.6	8	20	30	32	16.1	30	10	4	6

Pneumatic cylinders series CX

Double acting with magnetic piston, ISO 15552, stainless steel
G1/8 to G1/2 • piston Ø 32 to 100 mm



000



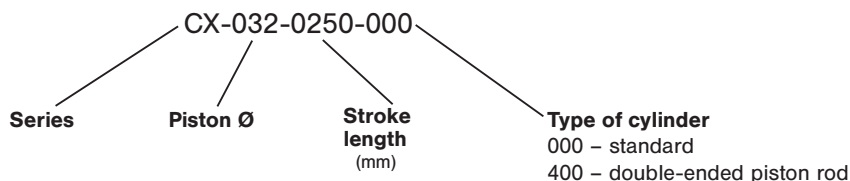
400



Note:

Piston Ø 125, 160 and 200 on request.

Order code



Design and function

Double acting pneumatic cylinder with adjustable cushions and permanent magnet for proximity sensors. Standard stroke lengths in table below, additional lengths on request.

Order number Please complete according to order code.	CX-032-...	CX-040-...	CX-050-...	CX-063-...	CX-080-...	CX-100-...
Piston Ø (mm)	32	40	50	63	80	100
Force at 6 bar in N**						
Extension	434	678	1060	1682	2713	4239
Retraction	373	570	890	1513	2448	3974
Connection	G1/8	G1/4	G1/4	G3/8	G3/8	G1/2
Piston rod thread	M 10 x 1,25	M 12 x 1,25	M 16 x 1,5	M 16 x 1,5	M 20 x 1,5	M 20 x 1,5
Cushioning length (mm)	27	29	32	32	32	32
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)					
Temperature range	- 20 °C ... + 80 °C (- 10 °C ... + 150 °C on request)					
Medium	Compressed air in accordance with ISO 8573-1: 2001, Class 7 4 – and free of aggressive additives					
Standard stroke lengths (mm)*	25, 40, 50, 80, 100, 125, 160, 200, 250, 320, 400, max. 1000					
Materials***	Cylinder tube: AISI 304 (1.4301) End caps: AISI 304 (1.4301) Piston rod: AISI 316 (1.4401) Seals: PU/NBR					

* Refer to "Critical Load Diagram" on page 9.240 to determine critical values on the piston rod.

** The internal friction is considered.

*** Other materials on request.

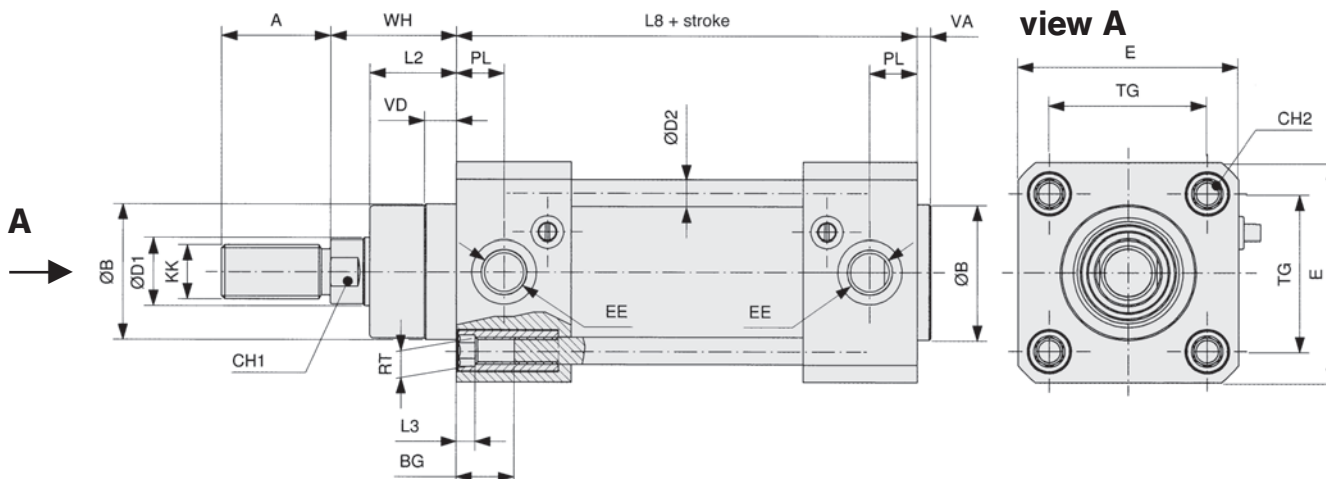
Pneumatic cylinders series CX

Double acting with magnetic piston, ISO 15552, stainless steel

G1/8 to G1/2 • piston Ø 32 to 100 mm



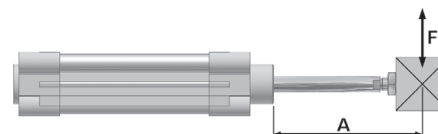
Series CX (Type for order code: -000)



Piston Ø	A	Ø B	BG	CH1	CH2	Ø D1	Ø D2	E	EE	KK
32	22	30	16.5	10	6	12	6	50	G1/8	M10 x 1.25
40	24	35	16.5	13	6	16	6	55	G1/4	M12 x 1.25
50	32	40	17.5	17	8	20	8	65	G1/4	M16 x 1.5
63	32	45	17.5	17	8	20	8	75	G3/8	M16 x 1.5
80	40	45	17.5	22	-	25	10	95	G3/8	M20 x 1.5
100	40	55	17.5	22	-	25	10	110	G1/2	M20 x 1.5

Piston Ø	L2	L3	L8	PL	RT	TG	VA	VD	WH
32	18	5	94	13	M6	32.5	4	9.5	26
40	22	5	105	14	M6	38	4	9.5	30
50	25.5	5	106	14	M8	46.5	4	9.5	37
63	25	5	121	16	M8	56.5	4	9.5	37
80	35	-	128	17	M10	72	4	10	46
100	38	-	138	18	M10	89	4	10	51

Permissible side load (N) for cylinder CX



Piston Ø	Distance A (mm)											
	25	40	50	80	100	125	160	200	250	320	400	500
32	75	55	50	40	34	28	23	20	16	12	9	7
40	175	150	130	105	91	78	62	55	45	35	28	21
50 + 63	220	180	170	130	120	105	90	80	65	52	43	33
80 + 100	500	450	400	350	310	270	230	205	180	150	125	100

Mounting accessories for series CX

ISO 1552, stainless steel

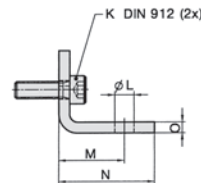
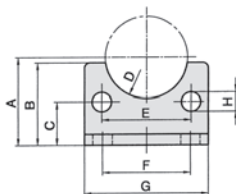
G1/8 to G1/2 • piston Ø 32 to 100 mm



Piston rod accessories	PO-...	Rod eye	Page 9.213	PL-...	Piston rod nut	Page 9.213
	PD-...	Rod clevis with pin	Page 9.213			

Foot mount

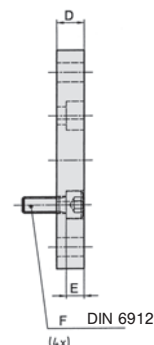
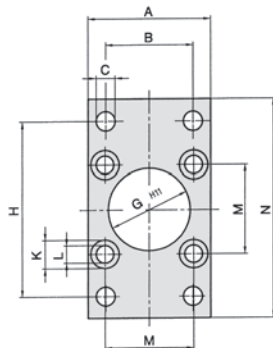
1 pair



Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	K	L	M	N	O
CXB-032-01	32	30	15.75	R 15	32.5	32	45	7	M6 x 20	7	24	35	4
CXB-040-01	36	30	17	R 17.5	38	36	52	7	M6 x 20	9	28	36	4
CXB-050-01	45	36	21.75	R 20	46.5	45	65	9	M8 x 25	9	32	47	5
CXB-063-01	50	35	21.75	R 22.5	56.5	50	75	9	M8 x 25	9	32	45	5
CXB-080-01	63	47	27	R 22.5	72	63	95	11	M10 x 25	12	41	55	6
CXB-100-01	71	53	26.5	R 27.5	89	75	115	11	M10 x 30	14	41	57	6
	JS 15	+2											± 0.5
							-0.2						

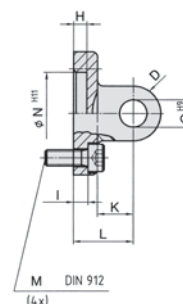
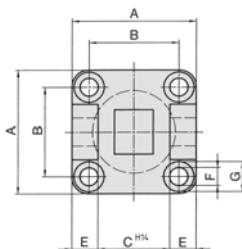
Flange mount



Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	K	L	M	N
CXB-032-02	45	32	7	10	5	M6 x 16	30	64	10.5	6.6	32.5	80
CXB-040-02	52	36	9	10	5	M6 x 16	35	72	11	6.6	38	90
CXB-050-02	65	45	9	12	5.5	M8 x 20	40	90	15	9	46.5	110
CXB-063-02	75	50	9	12	5.5	M8 x 20	45	100	15	9	56.5	120
CXB-080-02	95	63	12	15	8	M10 x 25	45	126	18	11	72	150
CXB-100-02	115	75	14	15	8	M10 x 25	55	150	18	11	89	170

Clevis mount



Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	I	K	L	M	N	O
CXB-032-03	45	32.5	26	10	9.5	6.6	11	5	5.5	12	22	M6 x 16	30	10
CXB-040-03	55	38	28	12	12	6.6	11	5	5.5	15	25	M6 x 16	35	12
CXB-050-03	65	46.5	32	12	14	9	15	5	6.5	17	27	M8 x 20	40	12
CXB-063-03	75	56.5	40	16	15	9	15	5	6.5	20	32	M8 x 20	45	16
CXB-080-03	95	72	50	16	20	11	18	14	10	22	36	M10 x 30	45	16
CXB-100-03	115	89	60	20	25	11	18	14	10	25	41	M10 x 30	55	20

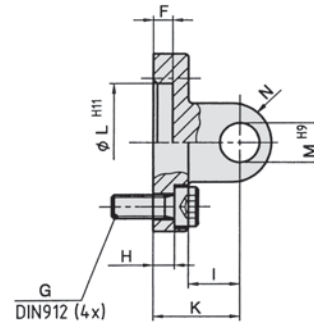
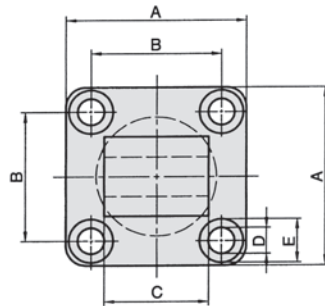
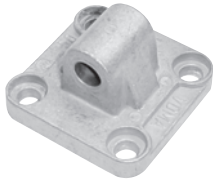
Mounting accessories for series CX

ISO 1552, stainless steel

G1/8 to G1/2 • piston Ø 32 to 100 mm



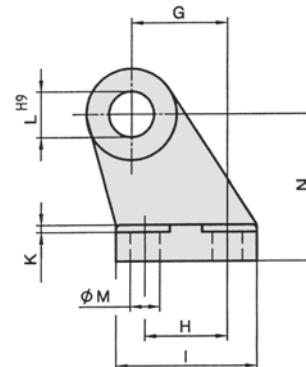
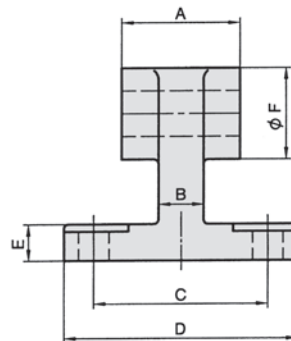
Swivel mount



Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	I	K	L	M	N
CXB-032-05	45	32.5	26	6.6	11	5	M6 x 16	5.5	12	22	30	10	10
CXB-040-05	55	38	28	6.6	11	5	M6 x 16	5.5	15	25	35	12	12
CXB-050-05	65	46.5	32	9	15	5	M8 x 20	6.5	17	27	40	12	12
CXB-063-05	75	56.5	40	9	15	5	M8 x 20	6.5	20	32	45	16	16
CXB-080-05	95	72	50	11	18	5	M10 x 30	10	22	36	45	16	16
CXB-100-05	115	89	60	11	18	5	M10 x 30	10	25	41	55	20	20

Swivel mount 90°

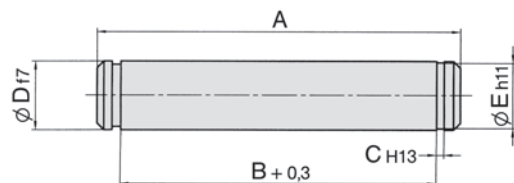


Material: AISI 304 (1.4301)

Order number	A	B	C	D	E	F	G	H	I	K	L	M	N
CXB-032-06	26	10	38	51	8	20	21	18	31	1.5	10	6.6	32
CXB-040-06	28	10	41	54	10	22	24	22	35	1.5	12	6.6	36
CXB-050-06	32	14	50	65	12	26	33	30	45	1.5	12	9	45
CXB-063-06	40	14	52	67	12	30	37	35	50	1.5	16	9	50
CXB-080-06	50	18	66	86	14	30	47	40	60	2.5	16	11	63
CXB-100-06	60	20	76	96	15	36	55	50	70	2.5	20	11	71

- 0.2
 - 0.6

Clevis pin



Order number	A	B	C	D	E
CXB-032-08	53	46	1.1	10	9.6
CXB-040-08	60	53	1.1	12	11.5
CXB-050-08	68	61	1.1	12	11.5
CXB-063-08	78	71	1.1	16	15.2
CXB-080-08	98	91	1.1	16	15.2
CXB-100-08	118	111	1.3	20	19.0

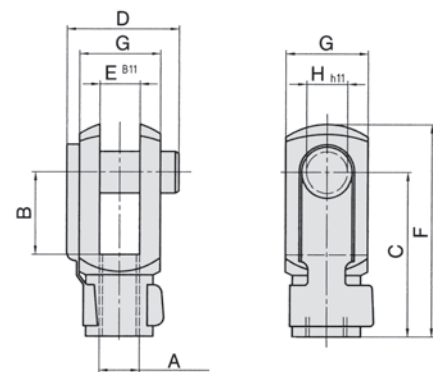
Material: AISI 304 (1.4301)
Snap rings are included.

Assignment to series

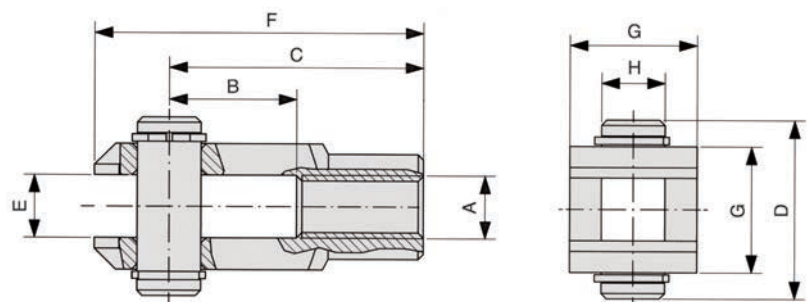
Series	Cylinder Ø	Piston rod thread	Rod clevis	Piston rod nut	Flexible coupling	Rod eye
HE and HM	Ø 8 and 10	M4	RD-10	RL-10	–	–
HE and HM	Ø 12 and 16	M6	RD-16	RL-16	FK-16	RO-16
HE and HM NYD and NYE	Ø 20 Ø 20 and 25	M8	RD-20	RL-20	FK-20	RO-20
HE and HM XL	Ø 25 Ø 32	M 10 x 1.25	RD-25	RL-25	FK-32	RO-25
NYD and NYE	Ø 32 and 40					
XL	Ø 40	M 12 x 1.25	FD-40	FE-40	FK-40	FO-40
NYD and NYE	Ø 50 and 63					
XL	Ø 50 and 63	M 16 x 1.5	FD-63	FE-63	FK-63	FO-63
NYD and NYE	Ø 80 and 100					
XL	Ø 80 and 100	M 20 x 1.5	FD-80	FE-80	FK-80	FO-80
XL	Ø 125	M 27 x 2	FD-125	FE-125	FK-125	FO-125
XG	Ø 160 and 200	M 36 x 2	FD-200	FE-200	FK-200	FO-160/200
XG	Ø 250	M 42 x 2	FD-250	FE-250	–	–
XG	Ø 320	M 48 x 2	FD-320	FE-320	–	–

Rod clevis with pin

Order number	A	B	C	D	E	F	G	H
RD-10	M4	8	16	11.5	4	21	8	4
RD-16	M6	12	24	16	6	31	12	6
RD-20	M8	16	32	22	8	42	16	8
RD-25	M 10 x 1.25	20	40	26	10	52	20	10
RD-32	M 10	20	40	26	10	52	20	10
RD-40	M 12	24	48	32	12	62	24	12
RD-63	M 16	32	64	36	16	83	32	16
FD-40	M 12 x 1.25	24	48	32	12	62	24	12
FD-63	M 16 x 1.5	32	64	40	16	83	32	16
FD-80	M 20 x 1.5	40	80	50	20	105	40	20
FD-125	M 27 x 2	54	110	65	30	148	55	30
FD-200	M 36 x 2	72	144	84	35	188	70	35
FD-250	M 42 x 2	84	168	104.5	40	232	85	40
FD-320	M 48 x 2	96	192	117.5	50	265	96	50



Material: steel (zinc-plated)
spring steel

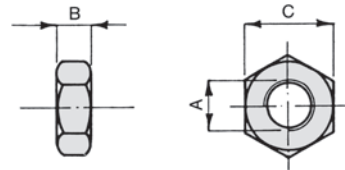


Rod clevis FD-125 to FD-320, pin with snap rings.

Piston rod accessories

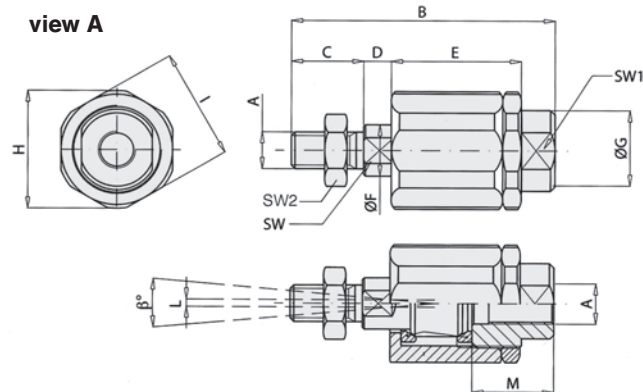
Piston rod nut

Order number	A	B	C
RL-10	M4	3.2	7
RL-16	M6	4	10
RL-20	M8	5	13
RL-25	M10 x 1.25	5	17
RL-32	M10	5	17
RL-40	M12	6	19
RL-50/63	M16	8	24
FE-40	M12 x 1.25	6	19
FE-63	M16 x 1.5	8	24
FE-80	M20 x 1.5	10	30
FE-125	M27 x 2	13.5	41
FE-200	M36 x 2	18	55
FE-250	M42 x 2	21	65
FE-320	M48 x 2	24	75



Material: steel (zinc-plated)

Flexible coupling

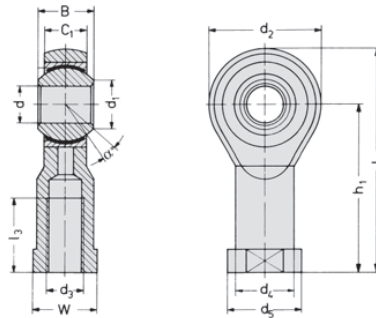


Material: steel (zinc-plated)

Order number	A	B	C	D	E	Ø F	Ø G	Ø H	I	L	M	SW	SW1	SW2	β°
FK-16	M6	35	11	2.5	17.5	6	8.5	14.5	13	1	12.5	5	7	10	6°
FK-20	M8	57	21	5	26	8	12.5	19	17	2	16	7	11	13	8°
FK-32	M10 x 1.25	71.5	20	7.5	35	14	22	32	30	2	22	12	19	17	8°
FK-33	M10	71.5	20	7.5	35	14	22	32	30	2	22	12	19	17	8°
FK-40	M12 x 1.25	75.5	24	7.5	35	14	22	32	30	2	22	12	19	19	8°
FK-41	M12	75.5	24	7.5	35	14	22	32	30	2	22	12	20	19	9°
FK-63	M16 x 1.5	104	32	10	53	22	32	45	41	2	30	20	27	24	6°
FK-80	M20 x 1.5	119	40	10	53	22	32	45	41	2	37	20	27	30	6°
FK-125	M27 x 2	147	54	10	60	32	57	70	65	2	48	24	54	41	8°
FK-200	M36 x 2	190	72	15.5	77	39	57	75	70	2	68	32	54	55	8°

Piston rod accessories

Rod eye



Material: steel (zinc-plated)
stainless steel

Order number	d_3	d	d_1	d_2	d_4	d_5	B	C_1	W	L_3	L_4	h_1	α
RO-16	M 6	6	8.9	20	10	13	9	6.75	11	12	40	30	13
RO-20	M 8	8	10.4	24	12.5	16	12	9	14	16	48	36	14
RO-25	M 10 x 1.25	10	12.9	28	15	19	14	10.5	17	20	57	43	13
RO-32	M 10	10	12.9	28	15	19	14	10.5	17	20	57	43	13
RO-40	M 12	12	15.4	32	17.5	22	16	12	19	22	66	50	13
RO-50	M 16	16	19.3	42	22	27	21	15	22	28	85	64	15
FO-40	M 12 x 1.25	12	15.4	32	17.5	22	16	12	19	22	66	50	13
FO-63	M 16 x 1.5	16	19.3	42	22	27	21	15	22	28	85	64	15
FO-80	M 20 x 1.5	20	24.3	50	27.5	34	25	18	30	33	102	77	14
FO-125	M 27 x 2	30	34.8	70	40	50	37	25	41	51	145	110	17
FO-160/200	M 36 x 2	35	37.7	80	46	58	43	28	50	56	165	125	16
FO-250	M 42 x 2	40	45.1	91	53	65	49	33	55	60	187	142	16
FO-320	M 48 x 2	50	56.6	117	65	75	60	45	65	65	218	162	14

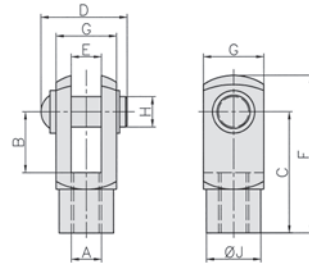
Piston rod accessories stainless steel

Assignment to series

Series	Piston rod thread	Rod clevis	Piston rod nut	Rod eye
CM-16	M 6	PD-16	PL-16	PO-16
CM-20	M 8	PD-20	PL-20	PO-20
CM-25	M 10 x 1.25	PD-25	PL-25	PO-25
CX-32				
CX-40	M 12 x 1.25	PD-40	PL-40	PO-40
CX-50	M 16 x 1.5	PD-63	PL-63	PO-63
CX-63				
CX-80	M 20 x 1.5	PD-80	PL-80	PO-80
CX-100				

Piston rod accessories stainless steel

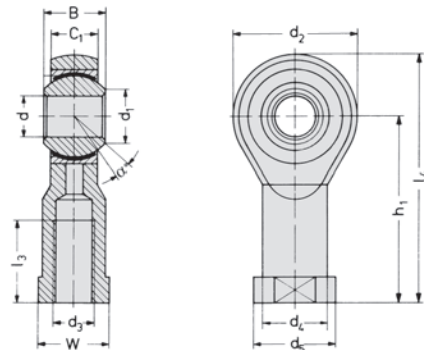
Rod clevis with pin



Material: stainless steel 1.4305

Order number	A	B	C	D	E	F	G	H	J
PD-16	M6	12	24	17	6	31	12	6	10
PD-20	M8	16	32	20	8	42	16	8	14
PD-25	M10 x 1.25	20	40	25	10	52	20	10	18
PD-40	M12 x 1.25	24	48	30	12	62	24	12	20
PD-63	M16 x 1.5	32	64	39	16	83	32	16	26
PD-80	M20 x 1.5	40	80	48	20	105	40	20	34
			± 0,3					h ₁₁	

Rod eye



Material Body: stainless steel 1.4057
 Bearing housing: stainless steel 1.4571 PTFE coated
 Inner ring: stainless steel 1.4034 hardened

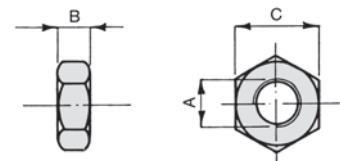
Order number	d ₃	d	d ₁	d ₂	d ₄	d ₅	B	C ₁	W	L ₃	L ₄	h ₁	α
PO-16	M6	6	8.9	20	10	13	9	6.75	11	12	40	30	13
PO-20	M8	8	10.4	24	12.5	16	12	9	13	16	48	36	13
PO-25	M10 x 1.25	10	12.9	28	15	19	14	10.5	17	20	57	43	13
PO-40	M12 x 1.25	12	15.4	32	17.5	22	16	12	19	22	66	50	13
PO-63	M16 x 1.5	16	19.3	42	22	27	21	15	22	28	85	64	15
PO-80	M20 x 1.5	20	24.3	50	27.5	34	25	18	32	33	102	77	15

Piston rod nut

Order number	A	B	C
PL-16	M6	3.2	10
PL-20	M8	4	13
PL-25	M10 x 1.25	5	17
PL-40	M12 x 1.25	6	19
PL-63	M16 x 1.5	8	24
PL-80	M20 x 1.5	10	30

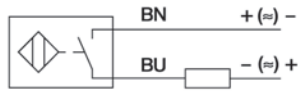


Material: stainless steel 1.4301

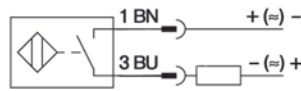


Proximity sensors

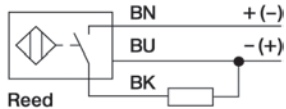
Wiring diagram



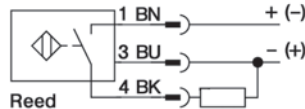
Reed
ZS-5600



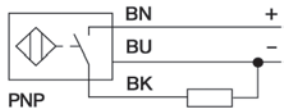
Reed
ZS-5601



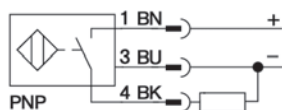
Reed
ZS-5700, ZS-5700-10



Reed
ZS-5701

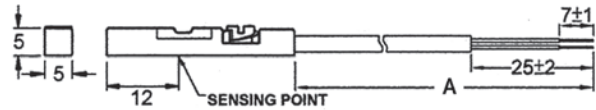


PNP
ZS-6700, ZS-7300



PNP
ZS-6701, ZS-7302 (dimensions for ZS-7302, page 9.221)

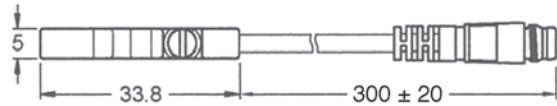
Dimensions



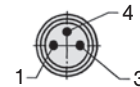
ZS-5600, ZS-6700, ZS-7300; A = 3.000 ± 20

ZS-5700; A = 5.000 ± 20

ZS-5700-10; A = 10.000 ± 20



ZS-5601, ZS-5701, ZS-6701



Function principles

Magnetic field sensors are actuated by magnetic fields and are especially suited for piston position detection in pneumatic cylinders. Based on the fact that magnetic fields can permeate non-magnetizable metals, it is possible to detect a permanent magnet attached to the piston through the aluminum wall of the cylinder.

Mounting tip

The sensor is firmly fixed in the groove by clockwise rotation of the screw.

Proximity sensors Reed contact

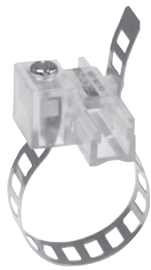


Order number	ZS-5600	ZS-5601	ZS-5700	ZS-5700-10	ZS-5701
Design	2-pole Reed sensor (non-polarized) normally open		3-pole Reed sensor* normally open		
Cable	∅ 2.8, PUR				
Cable cross section	n/a				
Cable length	3 m	0.3 m	5 m	10 m	0.3 m
Cable plug	-	M8	-	-	M8
Overtravel speed	n/a				
Max. absolute hysteresis	n/a				
Temperature drift	n/a				
min. absolute repeat accuracy	n/a				
Operating temperature	- 10 °C ... + 70 °C				
Degree of protection	IP 67				
Housing material	Plastic				
Switching status indication	LED red		LED yellow		
Rated operational voltage	5 ... 240 V AC/DC	5 ... 60 V AC/DC	5 ... 30 V DC		
Rated operational current I_E	DC 3 ... 100 mA	AC 3 ... 100 mA	≤ 500 mA		
Breaking capacity	≤ 10 W				
No-load current	n/a		≤ 10 mA		
Max. OFF-state current	0 mA				
Max. switching frequency	≤ 0.2 kHz				
Rated insulation voltage	n/a				
Short-circuit protection	no				
Max. voltage drop at I_E	≤ 2.5 V		≤ 0.1 V		
Wire breakage	no				
Reverse polarity protection	yes				
Vibration resistance	9 g (1.5 mm, 10 – 55 Hz – 10 Hz)				
Shock resistance	30 g (11 ms)				
Explosion proof	-				

* Useable as 2-wire contact, voltage 0 ... 30 V AC / 0 ... 30 V DC, LED has no function.

Proximity sensors

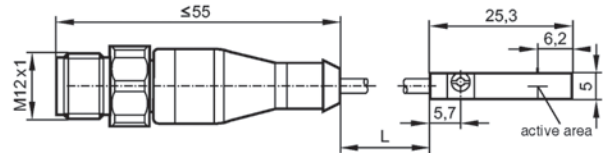
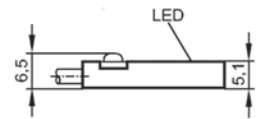
Mounting bracket for round cylinder Ø 8 – 63 mm



Material: metal,
plastic PA GI/6T

Order number	Piston Ø
NT-250	8 to 25 mm
NT-500	32 to 63 mm

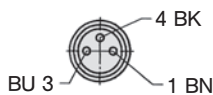
Dimensions for ZS-7302



Connecting cable for ZS-5601, ZS-5701 and ZS-6701



Cable: PUR, black,
3 x 0.25 mm²,
Ø 3.9,
high flexible
Operating voltage
0 ... 48 V AC/DC



Order number	Length of cable	Connection
KA-30	3 m	8 mm sensor snap-in, straight
KA-50	5 m	8 mm sensor snap-in, straight
KA-51	5 m	8 mm sensor snap-in, 90°
KA-100	10 m	8 mm sensor snap-in, straight
KA-101	10 m	8 mm sensor snap-in, 90°

Proximity sensors electronic

Order number	ZS-6700	ZS-6701	ZS-7300	ZS-7302
Design	electronic, magnet-inductive sensor, normally open PNP output			
Cable	Ø 2,8, PUR		n/a	
Cable cross section	n/a		3 x 0,14 mm ²	
Cable lengths	3 m	0,3 m	6 m	0,3 m
Cable plug	-	M8	-	M12
Overtravel speed	n/a		≤ 10 m/s	
Max. absolute hysteresis	n/a		n/a	
Temperatur drift	n/a		≤ 0,1 mm	
Min. absolute repeat accuracy	n/a		≤ 0,2 mm	
Operating temperature	- 10 °C ... + 70 °C		- 25 °C ... + 60 °C	
Degree of protection	IP 67		IP65/IP67	IP 67
Housing material	Plastic		Body: PA; Mounting band: stainless steel	
Switching status indication	LED green		LED yellow	
Rated operational voltage	5 ... 30 V DC		10 ... 30 V DC	
Rated operational current I_E	DC ≤ 200 mA AC -		≤ 100 mA -	
Breaking capacity	6 W		n/a	
No-load current	≤ 10 mA		≤ 10 mA	
Max. OFF-state current	n/a		n/a	
Max. switching frequency	≤ 1 kHz		> 6.000 Hz	> 10.000 Hz
Rated insulation voltage	n/a		n/a	
Short-circuit protection	yes		yes	
Max. voltage drop at I_E	≤ 1,0 V		≤ 2,5 V	
Wire breakage	yes		n/a	
Reverse polarity protection	yes		yes	
Vibration resistance	9 g (1.5 mm, 10 – 55 Hz – 10 Hz)		n/a	
Shock resistance	50 g (11 ms)		n/a	
Explosion proof	-		EX II 3G Ex nA T4 X EX II 3D Ex tD A22 IP67 T125°C X	EX II 3D Ex tc IIIC T125°C Dc X

Force chart

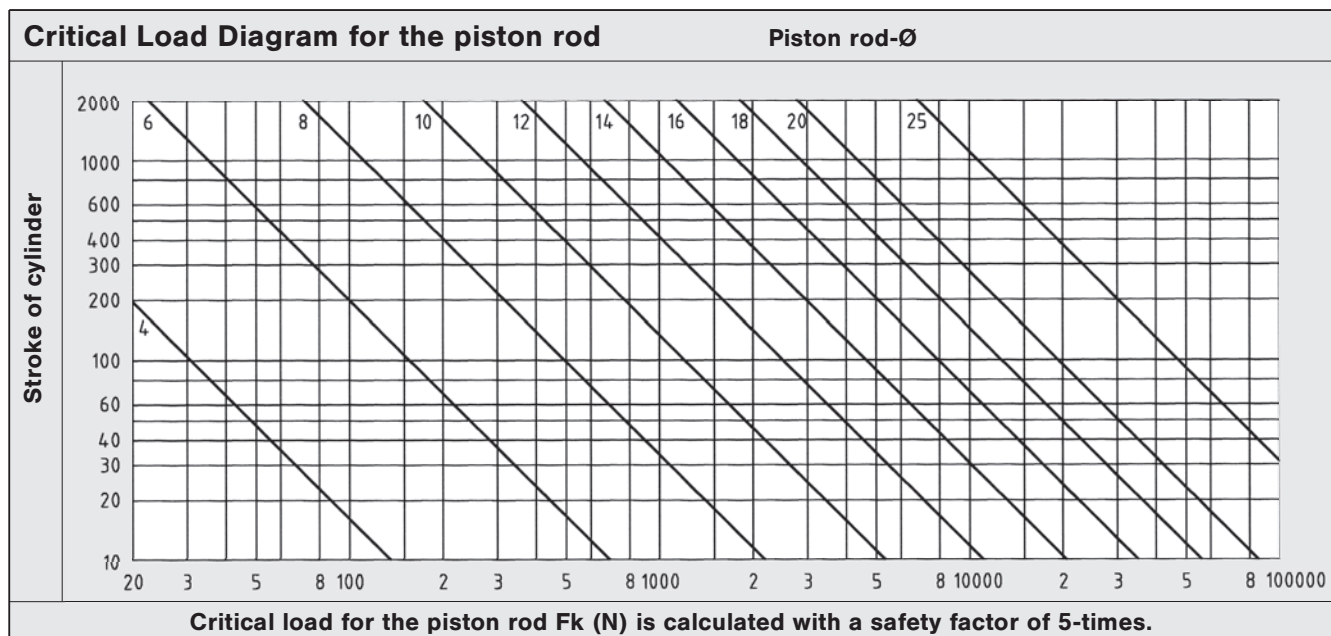
The chart shows extension and retraction forces for double acting cylinders in N. A correction factor of 0,9 for the internal friction is already calculated. Minor influences based on the cushioning bushings are disregarded.

Cylinder Ø	Cylinder series	Rod diameter Ø	Piston area [cm ²]	Pressure in bar							
				2	3	4	5	6	7	8	
8	HM	4	Extension force 0,50	9	14	18	23	27	32	36	
			Retraction force 0,38	7	10	14	17	20	24	27	
10	HM	4	Extension force 0,79	14	21	28	35	42	49	57	
			Retraction force 0,66	12	18	24	30	36	42	47	
12	HM	6	Extension force 1,13	20	31	41	51	61	71	81	
			Retraction force 0,85	15	23	31	38	46	53	61	
16	HM, CM	6	Extension force 2,01	36	54	72	90	109	127	145	
			Retraction force 1,73	31	47	62	78	93	109	124	
20	HM, CM	8	Extension force 3,14	57	85	113	141	170	198	226	
			Retraction force 2,64	47	71	95	119	142	166	190	
	NYD	10	Retraction force 2,36	42	64	85	106	127	148	170	
25	HM, NYD, CM	10	Extension force 4,91	88	132	177	221	265	309	353	
			Retraction force 4,12	74	111	148	185	223	260	297	
32	XL, NYD, CX	12	Extension force 8,04	145	217	289	362	434	506	579	
			Retraction force 6,91	124	187	249	311	373	435	497	
40	NYD	12	Extension force 12,56	226	339	452	565	678	791	904	
			Retraction force 11,43	206	309	411	514	617	720	823	
	XL, CX	16	Retraction force 10,55	190	285	380	475	570	665	760	
50	NYD	16	Extension force 19,63	353	530	707	883	1060	1236	1413	
			Retraction force 17,62	317	476	634	793	951	1110	1268	
	XL, CX	20	Retraction force 16,49	297	445	593	742	890	1039	1187	
63	NYD	16	Extension force 31,16	561	841	1122	1402	1682	1963	2243	
			Retraction force 29,15	525	787	1049	1312	1574	1836	2099	
	XL, CX	20	Retraction force 28,02	504	756	1009	1261	1513	1765	2017	
80	NYD	20	Extension force 50,24	904	1356	1809	2261	2713	3165	3617	
			Retraction force 47,10	848	1272	1696	2120	2543	2967	3391	
	XL, CX	25	Retraction force 45,33	816	1224	1632	2040	2448	2856	3264	
100	XL,	25	Extension force 78,50	1413	2120	2826	3533	4239	4946	5652	
	NYD, CX		Retraction force 73,59	1325	1987	2649	3312	3974	4636	5299	
125	XL	32	Extension force 122,66	2208	3312	4416	5520	6623	7727	8831	
			Retraction force 114,62	2063	3095	4126	5158	6189	7221	8252	
160	XG	40	Extension force 200,96	3617	5426	7235	9043	10852	12660	14469	
			Retraction force 188,40	3391	5087	6782	8478	10174	11869	13565	
200	XG	40	Extension force 314,00	5652	8478	11304	14130	16956	19782	22608	
			Retraction force 301,44	5426	8139	10852	13565	16278	18991	21704	
250	XG	50	Extension force 490,63	8831	13247	17663	22078	26494	30909	35325	
			Retraction force 471,00	8478	12717	16956	21195	25434	29673	33912	
320	XG	63	Extension force 803,84	14469	21704	28938	36173	43407	50642	57876	
			Retraction force 772,68	13908	20862	27817	34771	41725	48679	55633	

Technical charts

This table shows the air consumption for a single stroke of 100 mm. These statements are based upon extension and are in NI.

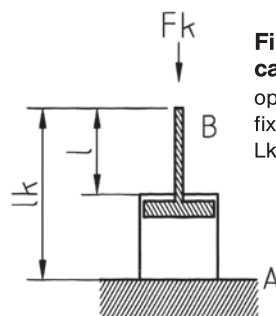
Piston Ø mm	Air pressure in bar/psi						
	2 (29 psi)	3 (43.4 psi)	4 (58 psi)	5 (72.5 psi)	6 (87 psi)	7 (101.5 psi)	8 (116 psi)
8	0.02	0.02	0.03	0.03	0.04	0.04	0.05
10	0.02	0.03	0.04	0.05	0.05	0.06	0.07
12	0.03	0.05	0.06	0.07	0.08	0.09	0.10
16	0.06	0.08	0.10	0.12	0.14	0.16	0.18
20	0.09	0.13	0.16	0.19	0.22	0.25	0.28
25	0.15	0.20	0.25	0.29	0.34	0.39	0.44
32	0.24	0.32	0.40	0.48	0.56	0.64	0.72
40	0.38	0.50	0.63	0.75	0.88	1.01	1.13
50	0.59	0.79	0.98	1.18	1.37	1.57	1.77
63	0.94	1.25	1.56	1.87	2.18	2.49	2.81
80	1.51	2.01	2.51	3.02	3.52	4.02	4.52
100	2.36	3.14	3.93	4.71	5.50	6.28	7.07



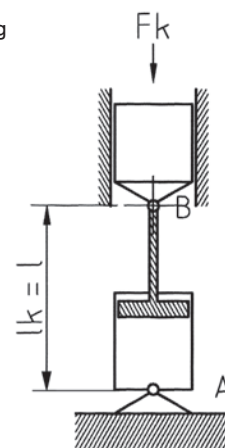
$$F_k = \frac{\pi^2 EI}{L_k^2 S}$$

F_k = permitted critical force (N)
 E = elasticity module (N/mm²)
 I = moment of inertia (mm⁴)
 L_k = effective length of critical load
 S = security

Elastic cases of buckling according to Euler



First elastic case of buckling
 open end at B
 fixed restraint at A
 $L_k = 2 \times L$



Second elastic case of buckling
 joint at B
 joint at A
 $L_k = L$

Pneumatic and explosion protection



The directive 94/9/EC (ATEX)

ATEX derives its name from ATMosphere EXposable and stands for the Directive 94/9/EC of the European Parliament. The Directive concerns electrical and non-electrical equipment and protection systems for use in potential explosive atmospheres.

Since 1st of July 2003, devices and protection systems for use in potentially explosive areas must satisfy the new Directive 94/9/EC.

Compared with the previous directives, it must be noted that the specification refers not only to electrical but also to mechanical equipment.

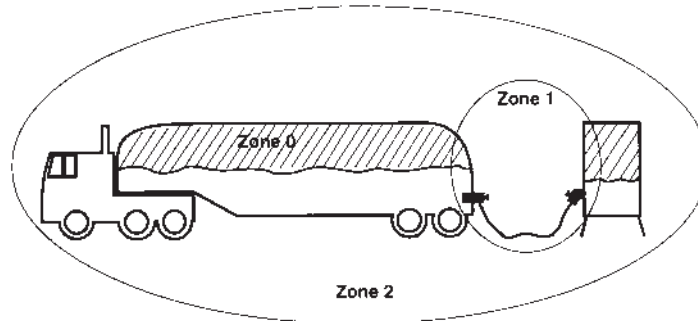
ATEX classifies explosive atmospheres and associates equipment

explosion protection document from plant manufacture	AIRTEC
<p data-bbox="435 1055 735 1117">Plant evaluation acc. to ATEX directive 99/92/EC</p> <div data-bbox="521 1193 686 1342" style="text-align: center;">  </div> <ul style="list-style-type: none"> <li data-bbox="435 1417 699 1444">– Zone classification <li data-bbox="435 1455 683 1483">– Temperature class <li data-bbox="435 1493 659 1521">– Explosion group <li data-bbox="435 1532 711 1559">– Ambient temperature 	<p data-bbox="850 1055 1151 1138">Equipment evaluation according (acc.) to ATEX directive 94/9/EC</p> <div data-bbox="927 1193 1092 1342" style="text-align: center;">  </div> <ul style="list-style-type: none"> <li data-bbox="850 1417 1094 1444">– Equipment group <li data-bbox="850 1455 1094 1483">– Temperature class <li data-bbox="850 1493 1070 1521">– Explosion group <li data-bbox="850 1532 1127 1559">– Ambient temperature

General information

Category

The categories define which zones the devices may be used in. The classification states how frequently and in what concentration the ignitable mixture occurs. Furthermore, differentiation is made as to whether the hazard is due to gases, vapors and mists or due to dust.



Example of zone classification in gas Ex area.

Category 1

For devices, which guarantee a **very high level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected frequently or continuously.
Devices in this category can also be used in Category 2 and 3.

Inflammable gases, vapors or mists

Zone 0 equivalent to Category 1G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists is continuously or frequently present or present for long periods.

Inflammable dusts

Zone 20 equivalent to Category 1D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air is continuously or frequently present or present for long periods.

Category 2

For devices, which guarantee a **high level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected.
Devices in this category can also be used in Category 3.

Inflammable gases, vapors or mists

Zone 1 equivalent to Category 2G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists can form occasionally during normal operation.

Inflammable dusts

Zone 21 equivalent to Category 2D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air can form occasionally during normal operation.

Category 3

For devices, which guarantee a **normal level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected rather infrequently and, if so, for only short periods.

Inflammable gases, vapors or mists

Zone 2 equivalent to Category 3G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists does not normally occur at all or only for short periods during normal operation.

Inflammable dusts

Zone 22 equivalent to Category 3D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air does not normally occur at all or only for short periods during normal operation.

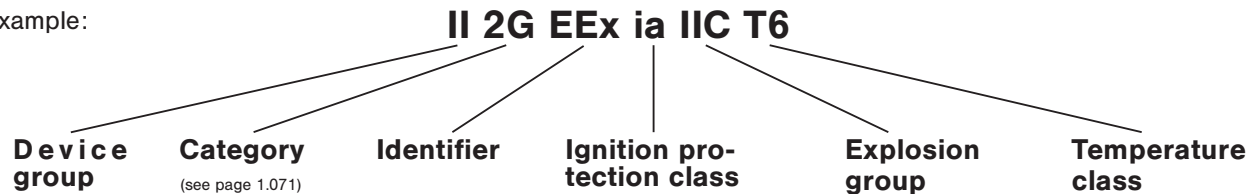
General information

According to 94/9/EC, a device that is to be used in an environment at risk of explosion may only be brought into the market if it satisfies the standards specified in the norm.

Compared with the previous directives, it must be noted that the specification refers not only to electrical but also to mechanical equipment (e.g. cylinders).

Devices are divided into categories and groups to accurately define the conditions of use. This definition is marked on the device and may appear as follows:

Example:



Device group

There are 2 groups of devices.

Devices of Group I, Category M are for use in underground mines and their above ground equipment, which are at risk from firedamp and/or inflammable dusts. (This is not given further coverage in this document).

All other areas at risk of explosion are combined in Device Group II.

Identifier

EEx defines that this is an electrical device.

Ignition protection class

This defines which measures are used to ensure explosion protection.

The following ignition protection classes are used by AIRTEC:

m = Encapsulation, **ia** = Intrinsic safety, **c** = Safe by design

Other ignition protection classes are defined in EN 50014: 1997. The abbreviations are currently under review discussion. It should be noted that devices in ignition protection class ia may only be supplied from circuits that are certified to be intrinsically safe.

Explosion group

Device group II is sub-divided into Explosion Groups A, B or C.

This classification is dependent on the typical material properties of the gases and vapors that occur.

The hazard level of materials increases from Explosion Group IIA to IIC. The requirements for the devices increase accordingly. If a device is approved for IIC, it can be used for all other explosion groups. Alternatively, the chemical formula or the name of the material can be stated here.

Temperature class

It must be ensured that the ignition temperature of an inflammable material is not reached during operation. For this purpose, the maximum surface temperature of a device must be less than the minimum ignition temperature. For this reason, the maximum surface temperature of equipment for use with inflammable gases, vapors or mists is specified in temperature classes. For dusty environments, the maximum surface temperature is specified in °C.

Temperature class	Maximum permissible surface temperature of the equipment (°C)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

The following AIRTEC products are available in explosion-proof design for Device Group II in accordance with 94/9/EC.

The following list is intended to provide an overview. Attention must be paid to the Operating Instructions and Declaration of Conformity before commissioning. These can be provided on request.

Electrically operated valves

Series	Functions	Classification	Special features	Catalogue/ NPTF folder page
MS-18/MS-98	310	II 2GD c T5 T 100° C	Valves are equipped with special actuators. Dimensional changes and technical data can be seen in the following pages. Compressed air in accordance with ISO 8573-1: 2001 Class 74-free of any aggressive particles T _{Medium} – 10° C ... + 50° C T _{amb} – 10° C ... + 50° C	4.040/1.039
M-04	310, 311, 320, 510, 511, 520, 530, 533, 534			4.080
ME-04	311, 511			
M-05/M-95	310, 311, 320, 510, 511, 520, 530, 533, 534			4.110/1.040
ME-05	311, 320, 511, 520			4.110
MO-05	311			4.110
M-07/M-97	310, 311, 320, 510, 511, 520, 530, 533, 534			4.151/1.043
MO-07	311			4.151
ME-07	311, 320, 511, 520, 530			4.151
MG-07	510, 520, 530, 533, 534			–
MN-06	310, 311, 320, 510, 511, 520, 530, 533			5.020
M-22	310, 311, 320, 510, 511, 520, 530, 533, 534			4.181
ME-22	311, 520			
MO-22	310, 311			
KN-05	310, 311, 510, 511, 520, 530, 533, 534			5.040
KNE-05	511			
KM-09/KM-99	510, 511, 520, 530, 533, 534			4.120/1.027
KM-10/KM-90	510, 511, 520, 530, 533, 534			4.161/1.033
KME-10	520, 530, 533			–
MI-01	510, 511, 520, 530, 533			5.061
MI-02	510, 520, 530, 533			5.081
MI-03	510, 511, 520, 530, 533			5.101

Pneumatically operated valves

Series	Functions	Classification	Special features	Example order number	Catalogue page
P-04	311, 511, 530, 533, 534	II 2GD c T5 T 100° C	Compressed air in accordance with ISO 8573-1: 2001 Class 74-free of any aggressive particles T _{Medium} – 10° C ... + 50° C T _{amb} – 10° C ... + 50° C	P-04-311-ATEX	–
P-05	310, 311/2, 320, 510, 511, 520, 530, 533, 534			P-05-310-ATEX	3.060
P-07	310, 311/2, 320, 510, 511, 520, 530, 533, 534			P-07-310-ATEX	3.080
PG-07	510, 520, 530, 533, 534			–	–
P-12	310, 311, 320, 510, 511, 520, 534			P-12-310-ATEX	3.100
L-25	310, 311, 320, 510, 520			L-25-310-ATEX	3.020
L-28	310, 311, 320, 510, 511, 520			L-28-310-ATEX	3.040
PI-01	510, 511, 520			PI-01-510-ATEX	–
PI-02	510, 520, 530, 533, 534			PI-02-510-ATEX	–
PI-03	510, 520, 530, 533, 534			PI-03-510-ATEX	–

Other series can be provided on request.

Manually operated valves

Series	Functions	Classification of the pneumatic valves	Special features	Example order number	Catalogue/NPTF folder page
HF-12	310	II 2GD c T6 T 85° C	Compressed air in accordance with ISO 8573-1:2001 Class 74-free of any aggressive particles $T_{\text{Medium}} - 10^{\circ} \text{C} \dots + 50^{\circ} \text{C}$ $T_{\text{amb}} - 10^{\circ} \text{C} \dots + 60^{\circ} \text{C}$	HF-12-310-ATEX	2.101
HF-14/HF-94	310, 510			HF-14-310-ATEX	2.101/1.002
HF-18/HF-98	310, 533			HF-18-310-ATEX	2.101/1.002
HR-12	on request			HR-12-...-ATEX	2.102
HR-14/HR-94	320, 530			HR-14-320-ATEX	2.102/1.003
HR-18/HR-98	520			HR-18-520-ATEX	2.102/1.003
T-28	311			T-28-311-ATEX	2.123
T-30	310			T-30-310-ATEX	2.125

Quick exhaust valves

Series	Functions	Classification of the pneumatic valves	Special features	Example order number	Catalogue page
SE-12	-	II 2GD c T6 T 85° C	Compressed air in accordance with ISO 8573-1:2001 Class 74-free of any aggressive particles $T_{\text{Medium}} - 10^{\circ} \text{C} \dots + 50^{\circ} \text{C}$ $T_{\text{amb}} - 10^{\circ} \text{C} \dots + 50^{\circ} \text{C}$	SE-12-ATEX	8.160
SE-14	-			SE-14-ATEX	8.160
SE-18	-			SE-18-ATEX	8.160
SE-98	-			SE-98-ATEX	8.160

Speed regulation plates for valves acc. to NAMUR

Series	Classification	Special features	Example order number	Catalogue page
KN-063-DRH KN-063-DRS	II 2GD c T5 T 100° C $- 10^{\circ} \text{C} \leq T_{\text{amb}} \leq 50^{\circ} \text{C}$	Compressed air in accordance with ISO 8573-1:2001 Class 74-free of any aggressive particles	KN-063-DRH-ATEX	5.042
KN-065-DRH KN-065-DRS		$T_{\text{Medium}} - 10^{\circ} \text{C} \dots + 50^{\circ} \text{C}$ $T_{\text{amb}} - 10^{\circ} \text{C} \dots + 50^{\circ} \text{C}$		

The following accessories are approved for the valves:

Manifolds: R-281/n, R-283/n, R-181/n, R-183/n, R-141/n, R-143/n, RF-05, RF-07

Hollow bolt: H-281, H-283, H-183, H-143, HI-143, HI-183

Blind plates: R-281-V, R-283-V, R-181-V, R-183-V, RF-09-V, RF-10-V, R-141-V, RF-04-V, RF-C-07-V, R-143-V, MG-07-V

Brackets: R-281-W, R-181-W, R-141-W

Modular manifolds: RF-09/n, RF-10/n, RF-19-E, RF-09-E1, RF-10-E1, RF-09-E2, RF-10-E2, RF-09-Z1, RF-10-Z1, RF-09-Z4, RF-10-Z4, RF-24, RF-C/n

Seal plate: RF-19-01

Cylinders

Series	Classification	Special features	Example order number	Catalogue page
XL	II 2GD c T5 T 100° C -20° C ≤ T _{amb} ≤ 80° C	Compressed air in accordance with ISO 8573-1:2001 Class 74- At V > 1 m/s Class 744 free of any aggressive particles T _{Medium} - 20° C ... + 50° C T _{amb} - 20° C ... + 80° C Max permissible energy in the end positions: ∅ 32 - 0,1 J, ∅ 40 and 50 - 0,2 J, ∅ 63 - 0,5 J, ∅ 80 - 0,9 J, ∅ 100 - 1,2 J, ∅ 125 - 5 J	XL-040-0320-000-ATEX	9.009
XG	II 2GD c T5 T 100° C -20° C ≤ T _{amb} + 80° C	Compressed air in accordance with ISO 8573-1:2001 Class 74- At V > 1 m/s Class 744 free of any aggressive particles	XG-160-0250-000-ATEX	9.030
CX			CX-032-0250-000-ATEX	9.180
HM			HM-016-025-ATEX	9.081
CM			CM-16-025-ATEX	9.170

The following accessories are approved for the cylinders:

Flexible coupling	FK	Cylinder fixings	XLB-∅-01, XLB-∅-02, XLB-∅-03, XLB-∅-04, XLB-∅-05, XLB-∅-06, XLB-∅-07, XLB-∅-08, XLB-∅-09, XLB-∅-10, XLB-∅-12
Rod eye	FO and RO up to V _{max} 1 m/s		
Rod clevis	FD and RD		
Piston rod nut	FE and RL		

Rodless cylinders

Series	Classification	Special features	Example order number	Catalogue page
ZX	II 2G T6 T 85° C, -20° C ≤ T _{amb} ≤ 60° C	Compressed air in accordance with ISO 8573-1:2001 Class 74- free of any aggressive particles V _{max} 1 m/s T _{Medium} - 10° C ... + 50° C T _{amb} - 10° C ... + 60° C	ZX-25-S-0500-01ATEX	10.140

The following accessories are approved for the cylinders:

Head mount	ZXB-∅-01	Trunnion mount	ZXB-∅-10
Head mount tall	ZXB-∅-02		

Proximity Sensors

Series	Classification	Order number	Catalogue page
ZS	II 3G Ex nA T4 II 3D Ex tD A22 IP67 T 125° C	ZS-7300	9.221
	EX II 3D Ex tc IIIC T125°C Dc X	ZS-7302	

Electrically operated valves

in -proof design

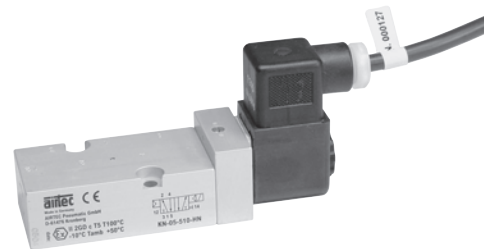


Valves from the (e.g. **MS-98, M-95, others see table page 1.073**) ranges can be provided in explosion proof design in accordance with 94/9/EC (ATEX) for device group II.

For this purpose, special valves are equipped with alternative electrical equipment. The dimensional changes of these components, which are mounted on the valve housing, can be seen on the following pages.

The valves are supplied in an assembled state, complete with valve, as the approval relates both to the electrical and the mechanical components. Individual parts may only be supplied for replacement purposes.

When ordering, the number of the required design must be added to the valve order number, or the required version must be noted in the item text.



Example 1: M-95-510-HN-**Ex037**-24V=

Example 2: M-95-510-HN
Solenoid valve 5/2-way 1/8 NPTF,
explosion proof design **Ex037**
Control voltage 24V=.

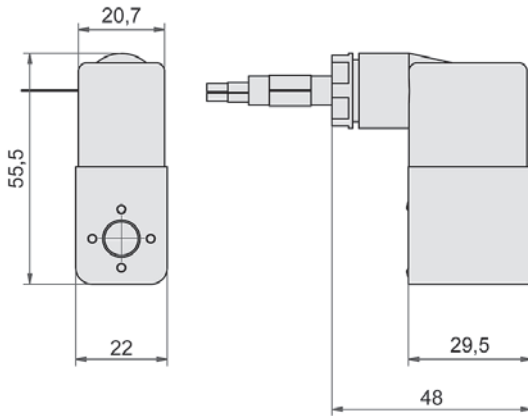
The specified technical boundary conditions are to enable the user to make a selection. The operating instructions for the valve and the electrical equipment must be taken into account before putting into operation. These are included with each valve and we would be pleased to send them to you on request by quoting Order No. 54-ATEX-01.

Version	23-SP-037-012-xx	23-SP-037-025-xx	23-SP-037-027-xx	23-SP-038-01-912	23-SP-040-B12	23-SP-040-B27	23-SP-041-A12
Width	30 mm						22 mm
Ignition protection class	Encapsulated with casting compound mb (gases) mb tb (dust)			Intrinsically safe ia (gases) t (dust)	Non-sparking device nA (gases) tc (dust)		
Classification	II 2G Ex mb IIC T5 II 2D Ex mb tb IIIC T95°C IP65			II 2G Ex ia IIC T6 Ga (≤ 28VDC) II 2G Ex ia IIB T6 Ga (≤ 32VDC) II 2D Ex t IIIC T80°C Db IP65	II 3G Ex nA IIC T5 Gc II 3D Ex tc IIIC T95°C Dc IP65		II 3G Ex nA IIC T5 Gc X II 3D Ex tc IIIC T5 Dc X
Rated voltage	24 VDC	110...120 VAC	230 VAC	$U \leq 28VDC / U \leq 32VDC$	24 VDC	230 VAC	24 VDC
Rated current	136 mA	27 mA	14 mA	$I \leq 115 mA / I \leq 195 mA$	112 mA	15 mA...18 mA	120 mA
Rated power	3,3 W	3 VA	3,1 VA	-	2,7 W	4 VA	3 W
Cable length	xx: 03 = 3 m (standard) xx: 05 = 5 m xx: 10 = 10 m			- incl. connector			- without connector ¹
Medium	Compressed air in accordance with ISO-8573-1 : 2001, Class 7 4 - Free of any aggressive particles						
Temperature range	- 20 °C...+ 50 °C			- 40 °C...+ 50 °C	- 20 °C...+ 50 °C		- 15 °C...+ 50 °C
Ambient Battery fitted	- 20 °C...+ 40 °C			-	-		-
Temperature range Medium	- 10 °C ... + 50 °C (Mounting on manifold -10°C...+40°C)						
Pressure range	depending on armature						

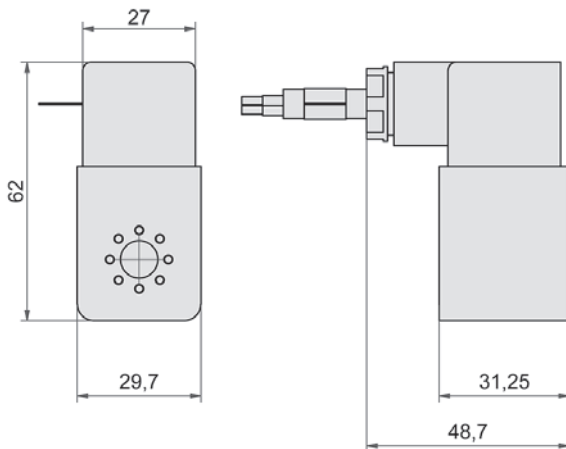
Version	23-SP-036-012-03	23-SP-036-011-03	23-SP-045-B12	23-SP-045-B27
Width	22 mm		36 mm	
Ignition protection class	Encapsulated with casting compound mb (gases) mb tb (dust)		Flame proof enclosures/ Encapsulated with casting compound d mb (gases) tb (dust)	
Classification	II 2G Ex mb IIC T4 II 2D Ex mb tb IIIC T130°C IP65		II 2G Ex d mb IIC T5 Gb II 2D Ex tb IIIC T95°C Db IP66	
Rated voltage	24 VDC	12 VDC	24 VDC	230 VAC
Rated current	207 mA	375 mA	125 mA	14 mA
Rated power	5 W	4,5 W	3 W	3,8 VA
Cable length	3 m		Terminal box	
Medium	Compressed air in accordance with ISO-8573-1 : 2001, Class 7 4 - Free of any aggressive particles			
Temperature range	- 20 °C...+ 50 °C		- 50 °C...+ 50 °C	
Ambient Battery fitted	-		-	
Temperature range Medium	- 10 °C ... + 50 °C (Mounting on manifold -10°C...+40°C)		-	
Pressure range	depending on armature			

*1: suitable connector 28-ST-05-B

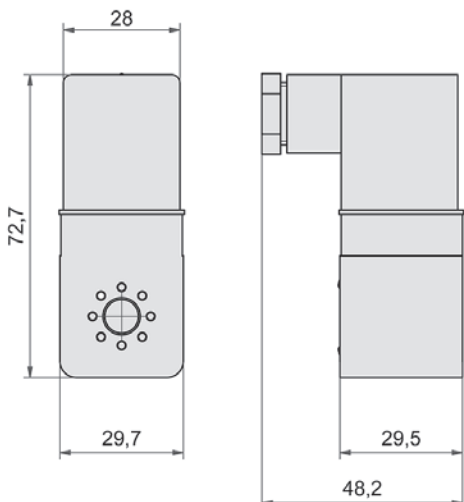
23-SP-036, Dimensions



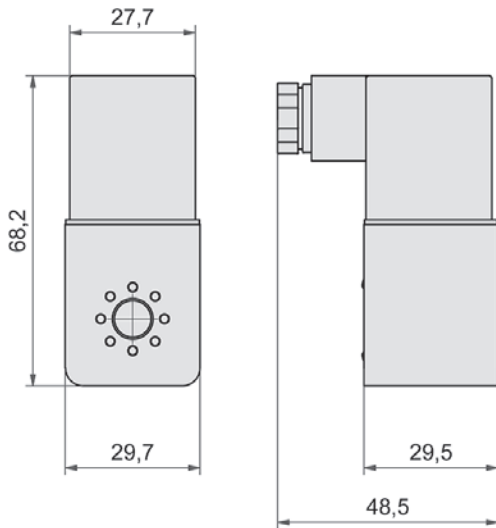
23-SP-037, Dimensions



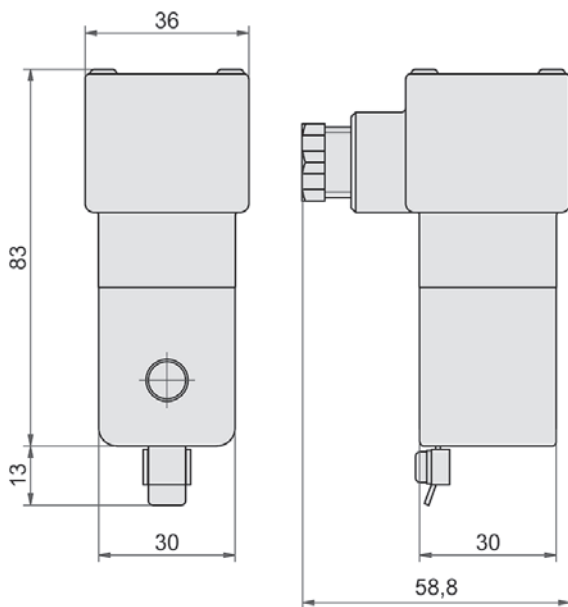
23-SP-038, Dimensions



23-SP-040, Dimensions



23-SP-045, Dimensions



Technical information

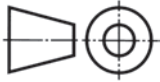
A Drawings

The method of projection within this catalogue is the first angle projection according to DIN ISO 5456-2.



First angle projection (Used in this catalogue)

Is based on the idea that the body is turned to the side. This means that a view from left is on the right hand side of the main view.



Third angle projection

Normally used in USA and english speaking countries. Specify that a view from right has to be on the right hand side of the main view.

All dimensions in the drawings are generally in millimeters (mm) if not stated otherwise. The abbreviations SW, WS, or CH are the short form of wrench size.

B Length

The following table assists in the conversion of the used mm dimension to inches.

For precise calculation please use the following formula:

mm to inch 1 mm = 0.03937 inch

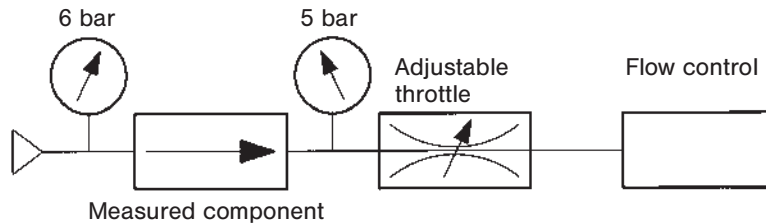
inch to mm 1 inch = 25.4 mm

mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
0.1	0.0039	3.8	0.1496	7.5	0.2953	11.2	0.4409	14.9	0.5866	290	11.417
0.2	0.0079	3.9	0.1535	7.6	0.2992	11.3	0.4449	15.0	0.5906	300	11.811
0.3	0.0118	4.0	0.1575	7.7	0.3031	11.4	0.4488	20.0	0.7874	310	12.205
0.4	0.0157	4.1	0.1614	7.8	0.3071	11.5	0.4528	25.0	0.9843	320	12.598
0.5	0.0197	4.2	0.1654	7.9	0.3110	11.6	0.4567	30.0	1.1811	330	12.992
0.6	0.0236	4.3	0.1693	8.0	0.3150	11.7	0.4606	35.0	1.3780	340	13.386
0.7	0.0276	4.4	0.1732	8.1	0.3189	11.8	0.4646	40.0	1.5748	350	13.780
0.8	0.0315	4.5	0.1772	8.2	0.3228	11.9	0.4685	45.0	1.7717	360	14.173
0.9	0.0354	4.6	0.1811	8.3	0.3268	12.0	0.4724	50.0	1.9685	370	14.567
1.0	0.0394	4.7	0.1850	8.4	0.3307	12.1	0.4764	55.0	2.1654	380	14.961
1.1	0.0433	4.8	0.1890	8.5	0.3346	12.2	0.4803	60.0	2.3622	390	15.354
1.2	0.0472	4.9	0.1929	8.6	0.3386	12.3	0.4843	65.0	2.5591	400	15.748
1.3	0.0512	5.0	0.1969	8.7	0.3425	12.4	0.4882	70.0	2.7559	410	16.142
1.4	0.0551	5.1	0.2008	8.8	0.3465	12.5	0.4921	75.0	2.9528	420	16.535
1.5	0.0591	5.2	0.2047	8.9	0.3504	12.6	0.4961	80.0	3.1496	430	16.930
1.6	0.0630	5.3	0.2087	9.0	0.3543	12.7	0.5000	85.0	3.3465	440	17.323
1.7	0.0669	5.4	0.2126	9.1	0.3583	12.8	0.5039	90.0	3.5433	450	17.717
1.8	0.0709	5.5	0.2165	9.2	0.3622	12.9	0.5079	95.0	3.7402	460	18.110
1.9	0.0748	5.6	0.2205	9.3	0.3661	13.0	0.5118	100	3.937	470	18.504
2.0	0.0787	5.7	0.2244	9.4	0.3701	13.1	0.5157	110	4.331	480	18.898
2.1	0.0827	5.8	0.2283	9.5	0.3740	13.2	0.5197	120	4.724	490	19.291
2.2	0.0866	5.9	0.2323	9.6	0.3780	13.3	0.5236	130	5.119	500	19.685
2.3	0.0906	6.0	0.2362	9.7	0.3819	13.4	0.5276	140	5.512	510	20.079
2.4	0.0945	6.1	0.2402	9.8	0.3858	13.5	0.5315	150	5.906	520	20.472
2.5	0.0984	6.2	0.2441	9.9	0.3898	13.6	0.5354	160	6.230	530	20.866
2.6	0.1024	6.3	0.2480	10.0	0.3937	13.7	0.5394	170	6.693	540	21.260
2.7	0.1063	6.4	0.2520	10.1	0.3976	13.8	0.5433	180	7.087	550	21.654
2.8	0.1102	6.5	0.2559	10.2	0.4016	13.9	0.5472	190	7.480	560	22.047
2.9	0.1142	6.6	0.2598	10.3	0.4055	14.0	0.5512	200	7.874	570	22.441
3.0	0.1181	6.7	0.2638	10.4	0.4094	14.1	0.5551	210	8.268	580	22.835
3.1	0.1220	6.8	0.2677	10.5	0.4134	14.2	0.5591	220	8.661	590	23.228
3.2	0.1260	6.9	0.2717	10.6	0.4173	14.3	0.5630	230	9.056	600	23.622
3.3	0.1299	7.0	0.2756	10.7	0.4213	14.4	0.5669	240	9.449	700	27.559
3.4	0.1339	7.1	0.2795	10.8	0.4252	14.5	0.5709	250	9.843	750	29.528
3.5	0.1378	7.2	0.2835	10.9	0.4291	14.6	0.5748	260	10.236	800	31.496
3.6	0.1417	7.3	0.2874	11.0	0.4331	14.7	0.5787		10.630	900	35.433
3.7	0.1457	7.4	0.2913	11.1	0.4370	14.8	0.5827	280	11.024	1000	39.370

Technical information

C Flow rate

The flow rate values given in the AIRTEC catalogue are in NI/min. and based on a pressure drop from a pressure inlet 6 bar (87 psi) to a pressure outlet of 5 bar (72.5 psi). The flow rates are measured with the following experimental circuit.



The table below simplifies the calculation of Cv and Kv values.

For precise calculation please use the following formula:

$$\text{NI/min to } K_v \quad K_v = \text{NI/min} / 1100$$

$$\text{NI/min to } C_v \quad C_v = \text{NI/min} / 984$$

NI/min.	K _v	C _v
10	0.0091	0.0102
20	0.0182	0.0203
30	0.0273	0.0305
40	0.0364	0.0407
50	0.0455	0.0508
60	0.0545	0.0610
70	0.0636	0.0711
80	0.0727	0.0813
90	0.0818	0.0915
100	0.0900	0.1016
110	0.1000	0.1118
120	0.1091	0.1220
130	0.1182	0.1321
140	0.1273	0.1423
150	0.1364	0.1524
160	0.1455	0.1626
170	0.1545	0.1728
180	0.1636	0.1829
190	0.1727	0.1931
200	0.1818	0.2033
250	0.2273	0.2541
300	0.2727	0.3049
350	0.3182	0.3557
400	0.3636	0.4065
450	0.4091	0.4573
500	0.4545	0.5081
550	0.5000	0.5589
600	0.5455	0.6098
650	0.5909	0.6606
700	0.6364	0.7114
750	0.6818	0.7622
800	0.7273	0.8130
850	0.7727	0.8638
900	0.8182	0.9146
950	0.8636	0.9654
1000	0.9090	1.0163
1050	0.9545	1.0671
1100	1.0000	1.1179
1150	1.0450	1.1687
1200	1.0900	1.2195
1250	1.1364	1.2703
1300	1.1818	1.3211
1350	1.2273	1.3720
1400	1.2727	1.4228
1450	1.3182	1.4736

NI/min.	K _v	C _v
1500	1.3636	1.5244
1550	1.4091	1.5752
1600	1.4545	1.6260
1700	1.5455	1.7276
1800	1.6364	1.8293
1900	1.7273	1.9309
2000	1.8182	2.0325
2100	1.9091	2.1341
2200	2.0000	2.2358
2300	2.0909	2.3374
2400	2.1818	2.4390
2500	2.2727	2.5407
2600	2.3636	2.6423
2700	2.4545	2.7439
2800	2.5455	2.8455
2900	2.6364	2.9472
3000	2.7273	3.0488
3100	2.8182	3.1504
3200	2.9091	3.2520
3300	3.0000	3.3537
3400	3.0909	3.4553
3500	3.1818	3.5569
3750	3.4091	3.8110
4000	3.6364	4.0650
4250	3.8636	4.3191
4500	4.0909	4.5732
4750	4.3182	4.8272
5000	4.5455	5.0813
5250	4.7727	5.3354
5500	5.0000	5.5894
5750	5.2273	5.8435
6000	5.4545	6.0976
6250	5.6818	6.3516
6500	5.9091	6.6057
6750	6.1364	6.8598
7000	6.3636	7.1138
7250	6.5909	7.3679
7500	6.8182	7.6220
7750	7.0455	7.8760
8000	7.2727	8.1301
8250	7.5000	8.3841
8500	7.7273	8.6382
8750	7.9545	8.8923
9000	8.1818	9.1463

Technical information

D Pressure

The data contained in the AIRTEC catalogue for pressures are given in bar.

The table below shows conversion to psi.

1 bar = 100 kPa = 14.5 psi = 10 N/cm²
 1 psi = 0.069 bar = 6896.5 Pa = 1 lb./sq. in.
 1 Pa = 0.00001 bar = 0.000145 psi = 1 N/m²

bar	psi	kPa	bar	psi	kPa	bar	psi	kPa
0.05	0.725	5	0.90	13.050	90	7.00	101.500	700
0.10	1.450	10	1.00	14.500	100	7.50	108.750	750
0.15	2.175	15	1.50	21.750	150	8.00	116.000	800
0.20	2.900	20	2.00	29.000	200	8.50	123.250	850
0.25	3.625	25	2.50	36.250	250	9.00	130.500	900
0.30	4.350	30	3.00	43.500	300	9.50	137.750	950
0.35	5.075	35	3.50	50.750	350	10.00	145.000	1000
0.40	5.800	40	4.00	58.000	400	10.50	152.250	1050
0.45	6.525	45	4.50	65.250	450	11.00	159.500	1100
0.50	7.250	50	5.00	72.500	500	11.50	166.750	1150
0.60	8.700	60	5.50	79.750	550	12.00	174.000	1200
0.70	10.150	70	6.00	87.000	600	14.00	203.000	1400
0.80	11.600	80	6.50	94.250	650	16.00	232.000	1600

E Temperature

The temperature values given in the AIRTEC-catalogue are in °C. The following table assists in the conversion to °F or Kelvin (°K).

Formula °C to °F

$$\frac{C \times 9}{5} + 32 = °F$$

Formula °F to °C

$$(F - 32) \times \frac{5}{9} = °C$$

°C → °F		°C → °F	
-100	-148	75	167
-95	-139	80	176
-90	-130	85	185
-85	-121	90	194
-80	-112	100	212
-75	-103	110	230
-70	-94	120	248
-65	-85	130	266
-60	-76	140	284
-55	-67	150	302
-50	-58	160	320
-45	-49	170	338
-40	-40	180	356
-35	-31	190	374
-30	-22	200	392
-25	-13	210	410
-20	-4	220	428
-15	5	230	446
-10	14	240	464
-5	23	250	482
0	32	260	500
5	41	270	518
10	50	280	536
15	59	290	554
20	68	300	572
25	77	310	590
30	86	320	608
35	95	330	626
40	104	340	644
45	113	350	662
50	122	360	680
55	131	370	698
60	140	380	716
65	149	390	734
70	158	400	752

°F → °C		°F → °C	
-100	-73.3	70	21.1
-95	-70.6	75	23.9
-90	-67.8	80	26.7
-85	-65.0	90	32.2
-80	-62.2	100	37.8
-75	-59.4	110	43.3
-70	-56.7	120	48.9
-65	-53.9	130	54.4
-60	-51.1	140	60.0
-55	-48.3	150	65.6
-50	-45.6	160	71.1
-45	-42.8	170	76.7
-40	-40.0	180	82.2
-35	-37.2	190	87.8
-30	-34.4	200	93.3
-25	-31.7	210	98.9
-20	-28.9	220	104.4
-15	-26.1	230	110.0
-10	-23.3	240	115.6
-5	-20.6	250	121.1
0	-17.8	260	126.7
5	-15.0	270	132.2
10	-12.2	280	137.8
15	-9.4	290	143.3
20	-6.7	300	148.9
25	-3.9	310	154.4
30	-1.1	320	160.0
32	0.0	330	165.6
35	1.7	340	171.1
40	4.4	350	176.7
45	7.2	360	182.2
50	10.0	370	187.8
55	12.8	380	193.3
60	15.6	390	198.9
65	18.3	400	204.4

°C	°F	°K
-20	-4	253.15
-15	5	258.15
-10	14	263.15
-5	23	268.15
0	32	273.15
5	41	278.15
10	50	283.15
15	59	288.15
20	68	293.15
25	77	298.15
30	86	303.15
35	95	308.15
40	104	313.15
45	113	318.15
50	122	323.15
55	131	328.15
60	140	333.15
65	149	338.15
70	158	343.15
75	167	348.15
80	176	353.15
85	185	358.15
90	194	363.15
95	203	368.15
100	212	373.15
105	221	378.15
110	230	383.15
115	239	388.15
120	248	393.15
125	257	398.15
130	266	403.15
135	275	408.15
140	284	413.15
145	293	418.15
150	302	423.15

Technical information

F SI – Basic units

Description	Symbol	SI-unit	SI-name
Area	A	m ²	square meter
Current intensity	I	A	Ampere
Energy (work)	W	J, Nm	Joule, Newton meter
Force	F	N	Newton
Length	l	m	meter
Mass	m	kg	kilogramme
Power	P	W	Watt
Pressure	p	Pa, bar	Pascal, bar
Speed	v	m/s	meter per second
Temperature	T	K	Kelvin
Time	t	s	second
Torque	M _t , T	Nm	Newton meter
Volume	V	m ³	cubic meter
Volume flow	\dot{V}	m ³ /s	cubic meter per second

G Conversion chart (European/USA standards)

Area	1 sq. in.	= 6.452 cm ²	Speed	1 ft./s.	= 0,3048 m/s	
	1 cm ²	= 0.155 sq. in.		1 m/s	= 3,281 ft./s	
	1 sq. ft.	= 0.0929 m ²		Temperature	Δ 1 °C	= 1,7999 °F = 1 K
	1 m ²	= 10.764 sq. ft.			Δ 1 °F	= 0,5556 °C = 0,5556 K
Force	1 lbf.	= 4.44822 N	0 °C	= 32 °F = 273,15 K		
	Length	1 mm	= 0.03937 in	Volume	1 cu. in.	= 16.387 cm ³
1 in		= 25.4 mm	1 cm ³		= 0.0610 cu. in.	
1 ft		= 12 in = 0.3048 m	1 cu. ft.		= 28.317 dm ³	
1 m		= 3.281 ft	1 dm ³		= 0.0353 cu. ft.	
1 yd		= 3 ft = 0.914398 m	1 US-gallon		= 3.785 l	
1 m		= 1.09362 yd	1 l		= 0.2642 US-gallon	
Mass	1 lb	= 0.4536 kg	Pressure	1 bar	= 14.5 psi = 100 kPa	
	1 kg	= 2.2046 lb		1 psi	= 0.069 bar	
	1 oz	= 28.35 g			= 6.8965 kPa	
	1 g	= 0.0353 oz		1 lb/sq. ft.	= 47.88 Pa	
				= 0.0004788 bar		
			1 bar	= 2089 lb/sq. ft.		
			1 Pa	= 0.0209 lb/sq. ft.		

TERMS AND CONDITIONS OF SALE

1. Offer and Contract

Acceptance by Seller of Buyer's order is expressly made conditional on assent to these Terms and Conditions, either by written acknowledgement or by conduct of Buyer that recognizes the existence of the contract with respect to Goods described on this acknowledgement form.

These Terms and Conditions also serve as notice of Seller's objection to and rejection of any Terms and Conditions of purchase or sale included in Buyer's purchase order or other writing that are different from or additional to these Terms and Conditions.

Sales representatives are not authorized to bind Seller.

All written quotations automatically expire thirty (30) days from the date quoted unless otherwise specified.

2. Prices and Taxes

Prices are subject to change without notice at any time prior to acceptance of order on Seller's acknowledgement form. All prices are F.O.B. Chicago, Illinois unless otherwise agreed by Buyer and Seller in writing. Buyer agrees to pay all present and future U.S. federal, state and local tax obligations, including but not limited to sales, use and excise taxes. If Buyer claims that the Goods are exempt from any particular tax, Buyer must provide Seller with a tax exemption certificate acceptable to the tax authorities.

3. Cancellation Charges

No cancellations or changes of any kind in the purchase order shall be effective unless agreed to in writing by Seller. All changes are accepted subject to adjustment in prices and delivery dates. All cancellations are accepted subject to cancellation charges which will be determined by the Seller and will reflect, among other factors, the expenses already incurred and commitments made by the Seller, sales and administrative overhead and profits.

Seller shall have the absolute right to cancel the order upon (i) material breach of any of these Terms and Conditions by Buyer, or (ii) failure by Buyer to make any payment or (iii) insolvency of Buyer, the filing of voluntary petition in bankruptcy by Buyer, the filing of an involuntary petition to have the Buyer declared bankrupt, the appointment of a receiver or trustee for Buyer, the execution by Buyer of an assignment for the benefit of creditors, or (iv) the discontinuance of business by Buyer or the sale by Buyer of the bulk of its assets other than in the usual course of business. Upon cancellation, Seller shall be entitled to a cancellation charge as described above.

4. Shipment and Delivery

All delivery dates are estimates only. Seller's only obligation with respect to delivery dates shall be to use reasonable effort to meet same. All shipments shall be F.O.B. Chicago, Illinois unless otherwise agreed in writing between Buyer and Seller. Title and risk of loss shall pass to Buyer at the F.O.B. point. Unless otherwise agreed in writing, Seller will ship via surface transportation. Seller will not be liable for any delays, breakage, loss or damage after having made delivery in good order to the carrier. Seller reserves the right to insure all shipments at Buyer's expense.

5. Force Majeure, Waiver

Seller shall not be liable for any delay to make delivery or failure to deliver due to any clause or contingency beyond the control of Seller (including but not limited to accidents, breakdowns, strikes, riots, sabotage, insurrections, war, delay or interruptions in or failure of sources of materials, supplies, labor, energy or transportation, acts of God or orders of any court, governmental body, authority or agency). Seller may, at its option, allocate available supplies among its customers, including Buyer, in any manner that Seller decides is fair and reasonable, extend the delivery time or cancel the contract for such Goods, in whole or in part. Such allocation, extension of delivery time or cancellation shall not affect the right of Seller to cover for any unpaid Goods previously delivered. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE OR EXPENSE OF ANY KIND INCLUDING LOSS OF PROFITS ARISING IN CONNECTION WITH SUCH FAILURE OR DELAY IN DELIVERY.

6. Terms of Payment

Unless otherwise expressly agreed between Buyer and Seller in writing, terms of payment are net thirty (30) days after date of shipment. Seller reserves the right to alter or suspend credit terms and require C.O.D. or advance payment, whenever Seller has reasonable doubt as to Buyer's creditworthiness. If Buyer becomes delinquent in payment or refuses to accept C.O.D. shipments, Seller shall have the right, in addition to any other rights it may have, to cancel any order of Buyer's, without further deliveries and declare all unpaid amounts for Goods previously delivered immediately due and payable. Each shipment shall be considered a separate and independent transaction and payment therefore shall be made accordingly. Amounts past due shall be subject to a late charge of 1.5% per month. All costs and expenses incurred by Seller as result of non-payment or delinquent payment by Buyer, including collections costs, interest, and reasonable attorneys fees shall be paid by the Buyer.

7. Claims and Remedies

All claims for loss or damage in transit are to be made by Buyer directly to the carrier. No deduction of any kind from the invoice amount shall be made. Buyer shall inspect all Goods immediately upon their arrival and shall immediately give written notice to Seller of any claim that the Goods do not conform to the terms of the contract. Seller shall have reasonable access to inspect any allegedly non-conforming Goods. Buyer waives any right to assert any claim against Seller arising from any non-conformity of Goods which would have been observable on reasonable inspection or testing within thirty (30) days after delivery.

Written notice of any alleged defect within the warranty period must be presented to Seller immediately upon Buyer's discovery of the defect and Seller must be allowed in the alleged defective condition. Operation of the Goods must be suspended until written clearance is issued by Seller for continued operation provided that Seller, upon receipt of written notice of an alleged defect, proceeds without unreasonable delay to remedy any defects coming within the warranty.

8. Warranty, Disclaimer, Limitation of Liability

General Warranty Terms Applicable To All Goods:

The above warranties by Seller do not extend to any Goods subject to (i) improper installation or storage, (ii) accident, damage, abuse or misuse, (iii) abnormal or unusual operating conditions or applications, (iv) operating conditions or applications above the rated capacity of the Goods, (v) operating conditions or applications not made known to Seller prior to the date of the agreement, or (vi) a purpose or application in any way different from that for which the Goods were designed. Seller's warranty does not extend to any Good or parts thereof that are not manufactured by Seller or that Buyer alters or modifies or that Buyer adds to or incorporates into Seller's Goods (including but not limited to controls, electronics, valves and other parts or equipment and only the warranty, if any, given by the manufacturer thereof, will apply. Seller's obligation under this warranty will not apply to any product which (i) is normally consumed in operations or (ii) has a normal life inherently shorter than the warranty period stated herein.

THE WARRANTY EXPRESSED HEREIN IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND IS IN LIEU OF ANY AND ALL OTHER OBLIGATIONS OR LIABILITY ON THE SELLER'S PART. UNDER NO CIRCUMSTANCES WILL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, ARISING IN CONNECTION WITH THE CONTRACT OR WITH THE USE OR LIABILITY TO USE SELLER'S GOODS FURNISHED UNDER THE CONTRACT. SELLER'S SOLE LIABILITY AND BUYER'S SOLE REMEDY ARE LIMITED TO EITHER (i) REPAIR OR REPLACEMENT OF DEFECTIVE PARTS OR GOODS, OR (ii) AT THE SELLER'S OPTION, RETURN OF THE GOODS TO SELLER AND REFUND OF PURCHASE PRICE. SUCH REMEDY SHALL BE BUYER'S ENTIRE AND EXCLUSIVE REMEDY, IN THE EVENT OF BREACH OF WARRANTY OR NEGLIGENCE OF SELLER.

9. Confidentiality

All drawings, diagrams, specifications, and other materials furnished by Seller relating to the sale, installation, service or repair of Goods furnished hereunder and the information therein are proprietary to Seller. Buyer may not reproduce or distribute such materials without the written consent of Seller except to Buyer's employees who may use the material as part of their duties. All such materials relating to the Goods supplied by Seller (except information as may be established to be in the public domain or disclosed through judicial or government action) shall be received in confidence, and Buyer shall exercise reasonable care to hold all such information in confidence.

In the event Buyer's personnel visit Seller's plant or assembly facility or otherwise receive any proprietary or confidential information from Seller, said information shall be retained as confidential by Buyer and not disclosed to any third party without the written consent of Seller.

10. Limitation of Actions

Any cause of action arising from this agreement or the breach thereof must be commenced within one (1) year after the cause of action accrues.

11. Applicable Law

The law governing the agreement and any further agreement or contractual relation between Seller and Buyer shall be the law of the State of Illinois. The invalidity of any provision of this agreement shall not affect the validity of the remaining provisions.

12. Non-Assignment

Buyer's rights and obligations hereunder may not be assigned without prior written consent of Seller.

AIRTEC Pneumatics, Inc.