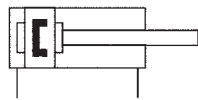


Pneumatic cylinders, piston-Ø 8 – 63 mm
Double acting with magnetic piston
DIN ISO 6432 (up to dia. 25 mm)

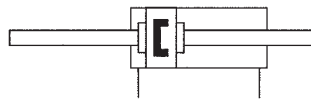


Technical data for series

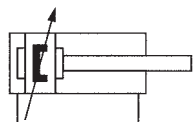
HM



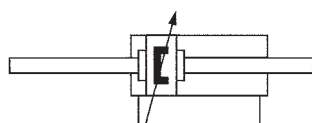
HM



HMDE



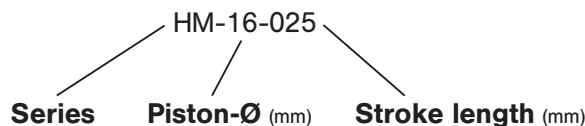
HMP



HMPDE



Order code



- HM – standard cylinder
 - HMDE – with double-ended piston rod
 - HMP – with adjustable cushions
 - HMPDE – with double-ended piston rod and adjustable cushions
- } starting at Ø 16 mm

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-6300, ZS-6301, ZS-7300 or ZS-7301) can be used.

Order number Please complete according to order code.	HM-08...	HM-10...	HM-12...	HM-16...	HM-20...	HM-25...	HM-32...	HM-40...	HM-50...	HM-63...
Piston-Ø mm¹⁾	8	10	12	16	20	25	32	40	50	63
Force at 6 bar in N²⁾										
Extension	25	40	60	105	170	265	430	680	1060	1680
Retraction	20	35	45	90	140	220	370	570	890	1510
Connection	M5 (10/32 UNF)				G 1/8	G 1/8	G 1/8	G 1/4	G 1/4	G 3/8
Piston rod thread	M4	M4	M6	M6	M8	M10 x 1.25	M10	M12	M16	M16
Cushioning length mm³⁾	–	–	–	15.5	17	19.5	22.5	24.5	29.5	29.5
Operating pressure	1 ... 10 bar (14.5 ... 145 psi)									
Temperature range	– 30 °C ... + 80 °C (– 22 °F ... + 176 °F)									
Medium	filtered/lubricated or filtered/non-lubricated air									
Standard stroke lengths mm⁴⁾	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 Ø 32 ... 63 10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 320, max. 900									
Materials	Cylinder tube: stainless steel End caps: Al (anodized) Piston rod: stainless steel Seals: PU									

¹⁾ = The series HMP, HMDE and HMPDE are not available for dia 8 to 12.

²⁾ = The internal friction is considered.

³⁾ = for series HMP and HMPDE only.

⁴⁾ = refer to "Critical Load Diagram" on page 8.240 to determine critical values on the piston rod.

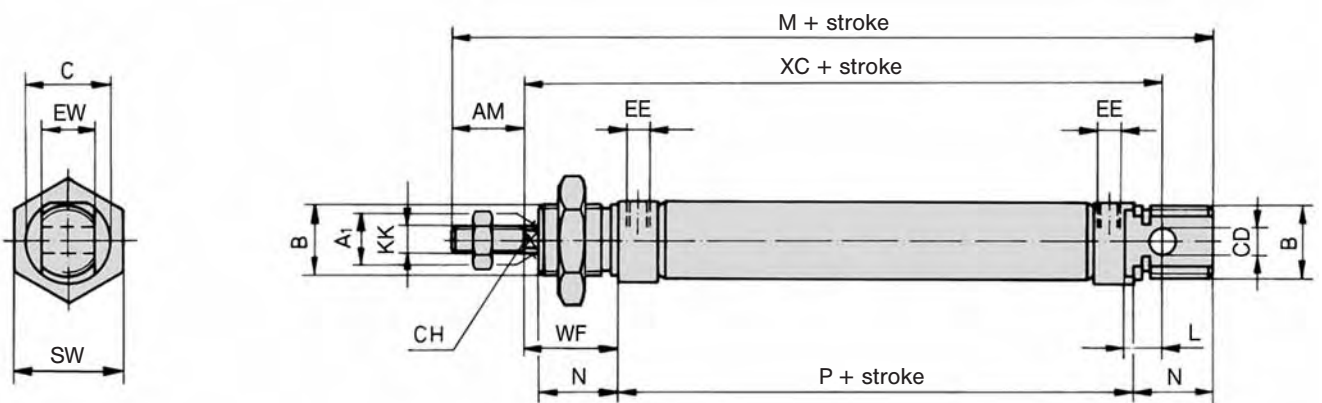
Pneumatic cylinders, piston-Ø 8 – 25 mm
Double acting with magnetic piston
DIN ISO 6432



Dimensions for series

HM

Cyl.-Ø	A'	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC	
8	4	12	M 12 x 1.25	16	4	-	M5 (10/32 UNF)	8	M4	6	86	12	46	19	16	64	
10	4	12	M 12 x 1.25	16	4	-	M5 (10/32 UNF)	8	M4	6	86	12	46	19	16	64	
12	6	16	M 16 x 1.5	19	6	5	M5 (10/32 UNF)	12	M6	9	104	18	48	22	22	75	
16	6	16	M 16 x 1.5	19	6	5	M5 (10/32 UNF)	12	M6	9	109	18	53	22	22	82	
20	8	20	M 22 x 1.5	27	8	7	G 1/8	16	M8	12	131	20	67	27	24	95	
25	10	22	M 22 x 1.5	30	8	9	G 1/8	16	M10 x 1.25	12	140	22	68	27	28	104	
								H 9									d 13



Dimensions for series

HMP

Cyl.-Ø	A'	AM	B	C	CD	CH	EE	EW	KK	L	M	N	P	SW	WF	XC	
16	6	16	M 16 x 1.5	21	6	5	M5 (10/32 UNF)	12	M6	9	109	17	53	22	22	82	
20	8	20	M 22 x 1.5	27	8	7	G 1/8	16	M8	12	131	20	67	27	24	95	
25	10	22	M 22 x 1.5	30	8	9	G 1/8	16	M10 x 1.25	12	140	22	68	27	28	104	
								H 9									d 13

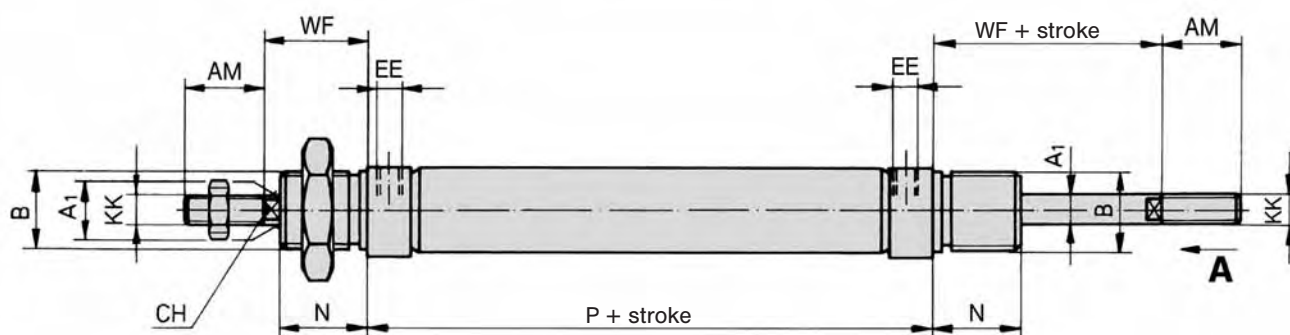
Pneumatic cylinders, piston-Ø 16 – 25 mm
 Double acting with double-ended piston rod,
 with magnetic piston DIN ISO 6432



Dimensions for series

HMDE

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



Dimensions for series

HMPDE

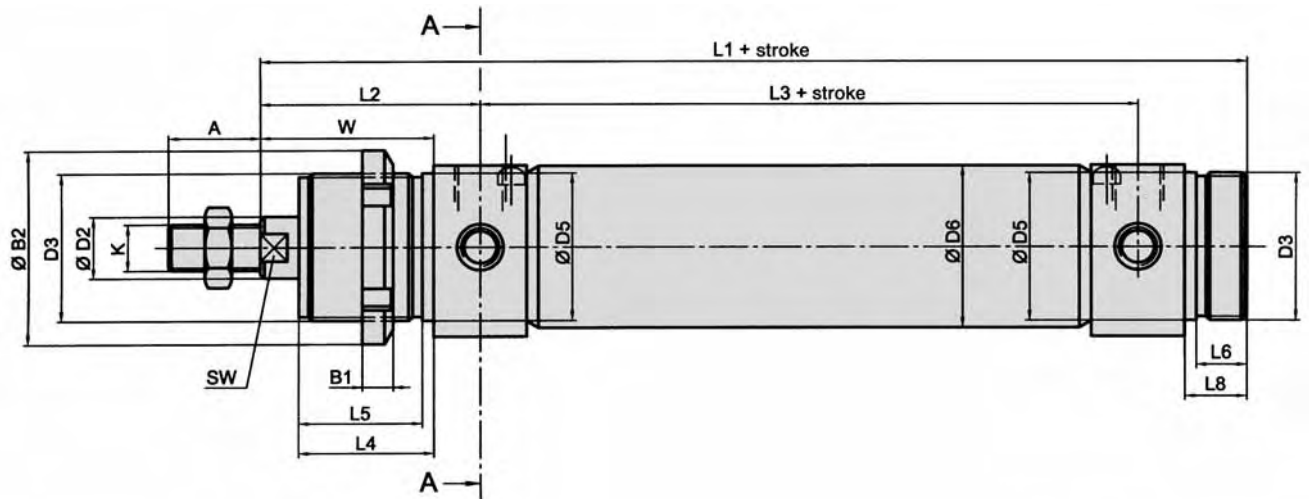
Cyl.-Ø	A ¹	AM	B	C	CH	EE	KK	N	P	SW	WF
16	6	16	M 16 x 1.5	21	5	M5 (10/32 UNF)	M6	17	53	22	22
20	8	20	M 22 x 1.5	27	7	G 1/8	M8	20	67	27	24
25	10	22	M 22 x 1.5	30	9	G 1/8	M10 x 1.25	22	68	27	28

Pneumatic cylinders, piston-Ø 32 – 63 mm
Double acting with magnetic piston

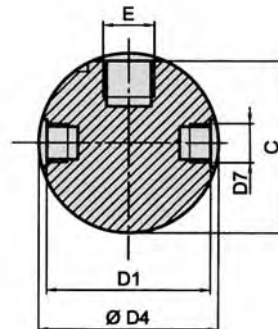


Dimensions for series

HM, HMP



section A-A



Cyl.-Ø	A	B ₁	B ₂	C	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇
32	20	7	45	36.5	35	12	M 30 x 1.5	38	30	33.6	M 8 x 1
40	24	8	50	44	42	16	M 38 x 1.5	46	38	41.6	M 10 x 1
50	32	9	58	55	53	20	M 45 x 1.5	57	45	52.4	M 12 x 1.5
63	32	9	58	67.5	66	20	M 45 x 1.5	70	45	65.4	M 14 x 1.5
						f ₈				h ₉	

Cyl.-Ø	E	K	L ₁	L ₂	L ₃	L ₄	L ₅	L ₆	L ₈	SW	W
32	G 1/8	M 10	148	47	78	30	27	12	14	10	38
40	G 1/4	M 12	174	57	89	35	32	13	16	13	45
50	G 1/4	M 16	188	62	96	38	35	15	18	17	50
63	G 3/8	M 16	192	63	98	38	35	15	18	17	50
			± 1.5	± 1.5	± 1.5						± 2.5

Accessories for series

HE, HM

Piston rod accessories



Rod eye
RO-
Page 8.213



Flexible coupling
FK-
Page 8.213



Rod clevis with pin
RD-
Page 8.212



Piston rod nut
RL-
Page 8.212

Mounting accessories



Foot mount
Ø 8 – 25
RA-
Page 8.086



Foot mount
Ø 32 – 63
RA-
Page 8.086



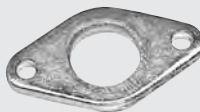
Clevis mount
Ø 8 – 63
RC-
Page 8.087



Threaded bolts
Ø 32 – 63
RG-
Page 8.087



Clevis mount
Ø 10 – 25
RH-
Page 8.086



Flange mount
Ø 8 – 25
RB-
Page 8.086



Mounting nut
Ø 8 – 25
RM-



Mounting nut
Ø 32 – 63
RM-

Accessories for series

HM

Proximity sensors



Sensors
ZS-
Page 8.220



Mounting bracket
NT-
Page 8.221



Connecting cable
KA-
Page 8.221

Linear guides



Linear guides
LE-
Page 8.200

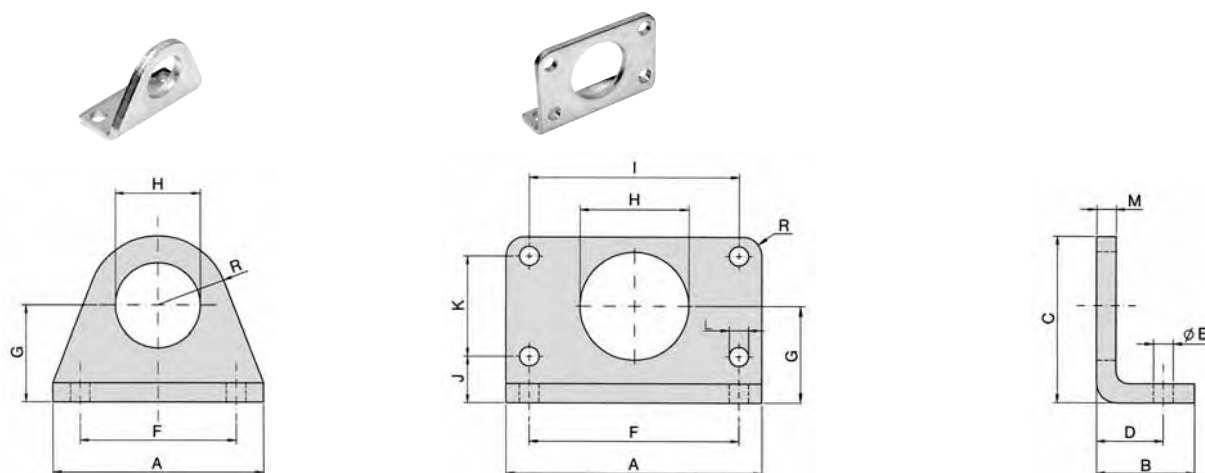
Piston-Ø	Foot mount	Clevis mount	Threaded bolts	Flange mount	Sensors	Mounting bracket	Rod clevis	Flexible coupling	Rod eye	Mounting nut	Piston rod nut
8	RA-10	RC-10	-	RB-10	ZS-5200	NT-0810	RD-10	-	-	RM-10	RL-10
10	RA-10	RC-10	-	RB-10			RD-10	-	-	RM-10	RL-10
12	RA-16	RC-16	-	RB-16	ZS-5201	NT-1216	RD-16	FK-16	RO-16	RM-16	RL-16
16	RA-16	RC-16	-	RB-16	ZS-5300		RD-16	FK-16	RO-16	RM-16	RL-16
20	RA-25	RC-30	-	RB-25	ZS-5300-05	NT-2025	RD-20	FK-20	RO-20	RM-25	RL-20
25	RA-25	RC-30	-	RB-25	ZS-5301		RD-25	FK-32	RO-25	RM-25	RL-25
32	RA-32	RC-32	RG-32	-	ZS-6300	NT-0032	RD-32	FK-33	RO-32	RM-32	RL-32
40	RA-40	RC-40	RG-40	-	ZS-6301	NT-0040	RD-40	FK-41	RO-40	RM-40	RL-40
50	RA-50	RC-50	RG-50	-	ZS-7300	NT-0050	RD-63	-	RO-50	RM-63	RL-63
63	RA-63	RC-63	RG-63	-	ZS-7301	NT-0063	RD-63	-	RO-50	RM-63	RL-63

For piston-Ø 8, 10 and 12 mm only electronic switches (ZS-6300, ZS-6301, ZS-7300 or ZS-7301) can be used.

Mounting accessories for series

HE, HM

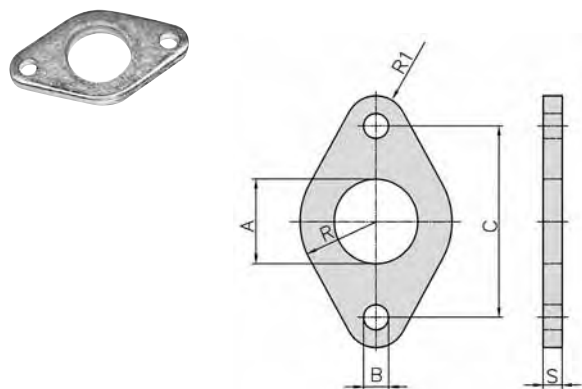
Foot mount



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
RA-32	66	21	49	14	7	52	28	30	52	14	28	7	4	-
RA-40	80	30	58	20	9	60	33	38	60	18	30	9	5	-
RA-50	90	30	70	20	9	70	40	45	70	20	40	9	6	-
RA-63	96	30	80	20	9	76	45	45	76	20	50	9	6	-

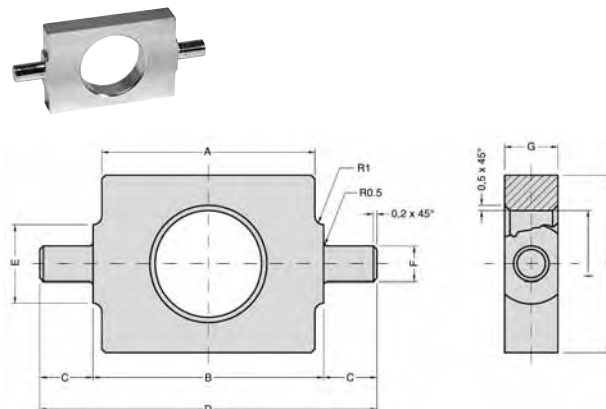
Flange mount



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)

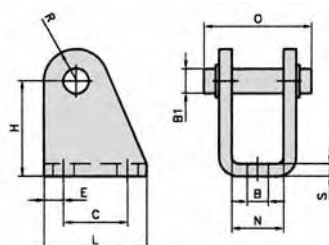
Order-No.	A	B	C	D	E	F	G	H	I
RH-10	24	26	6	38	9	4	6	20	12
RH-16	36	38	10	58	13	6	8	25	16
RH-25	44	46	10	66	13	6	8	30	22
						0 -0.2	e9		+1.5 +0.5

Mounting accessories for series

HE, HM

Clevis mount

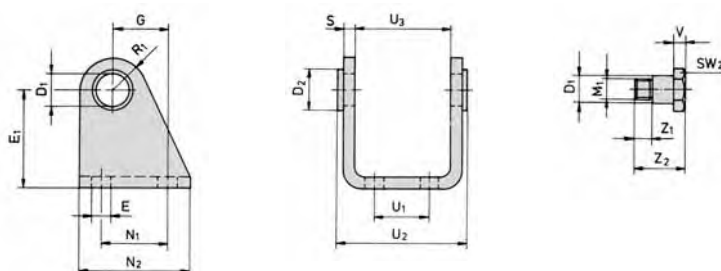
for Ø 8 – 25



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

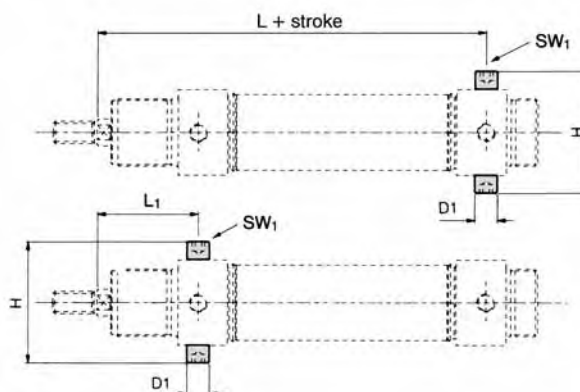
for Ø 32 – 63



Material: steel (zinc-plated)

Order number	D ₁	D ₂	E	E ₁	G	M ₁	N ₁	N ₂	R ₁	S	U ₁	U ₂	U ₃	V	Z ₁	Z ₂	SW ₂
RC-32	10	15	7	35	20	M8 x 1	24	40	12	4	20	50.1	38.1	4	6	18	13
RC-40	12	20	9	40	27	M10 x 1	30	50	13	5	28	60.1	46.1	5	7	21.6	17
RC-50	14	23	9	45	30	M12 x 1.5	34	54	14	6	36	74.1	57.1	6	9	26.4	19
RC-63	16	23	9	50	34	M14 x 1.5	35	65	16	6	42	88.1	70.1	6	16	35	19

Threaded bolts

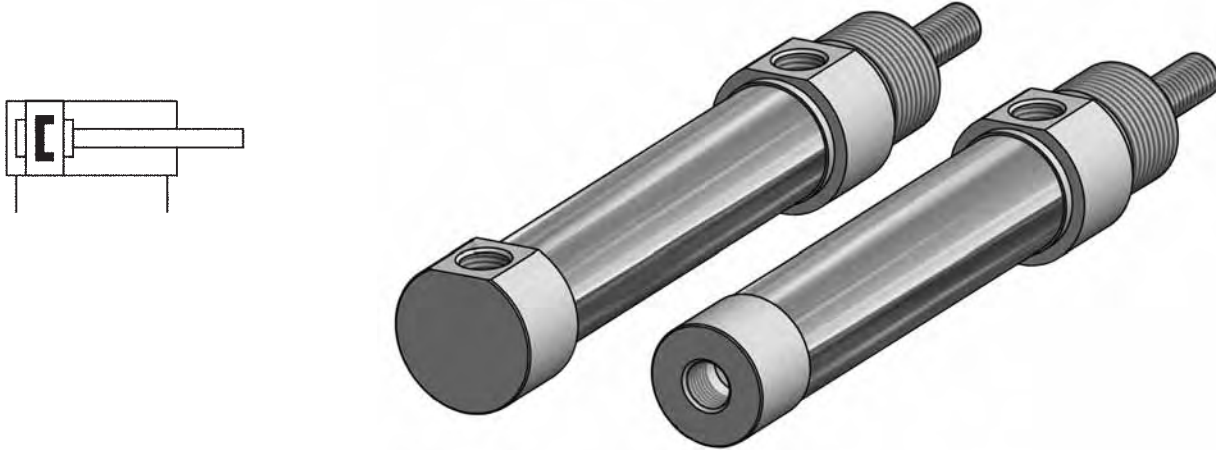


Material: steel (zinc-plated)

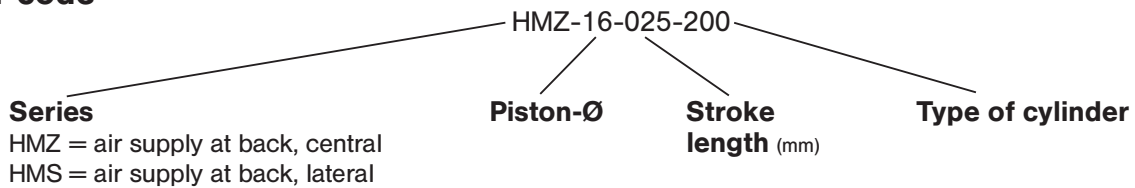
Order number	D ₁	H	L	L ₁	SW ₁
RG-32	10	51	125	47	5
RG-40	12	61	146	57	6
RG-50	14	75	158	62	6
RG-63	16	90	162	64	8

Technical data for series

HMZ, HMS



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 Please complete according to order code.	HMZ-16-... HMS-16-...	HMZ-20-... HMS-20-...	HMZ-25-... HMS-25-...
Piston-Ø (mm)	16	20	25
Connection	M 5	G 1/8	G 1/8
Piston rod thread	M 6	M 8	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	filtered/lubricated or filtered/non-lubricated air		
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 8.240 to determine critical values on the piston rod.

Technical data

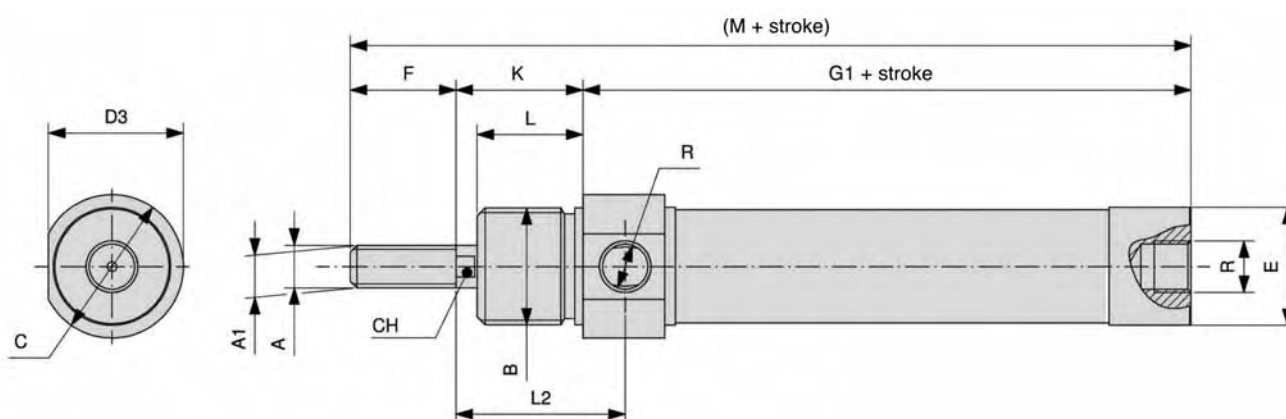
Force chart for series HMZ, HMS

Diameter	Extension	Retraction
Ø 16	105	90
Ø 20	170	140
Ø 25	265	220

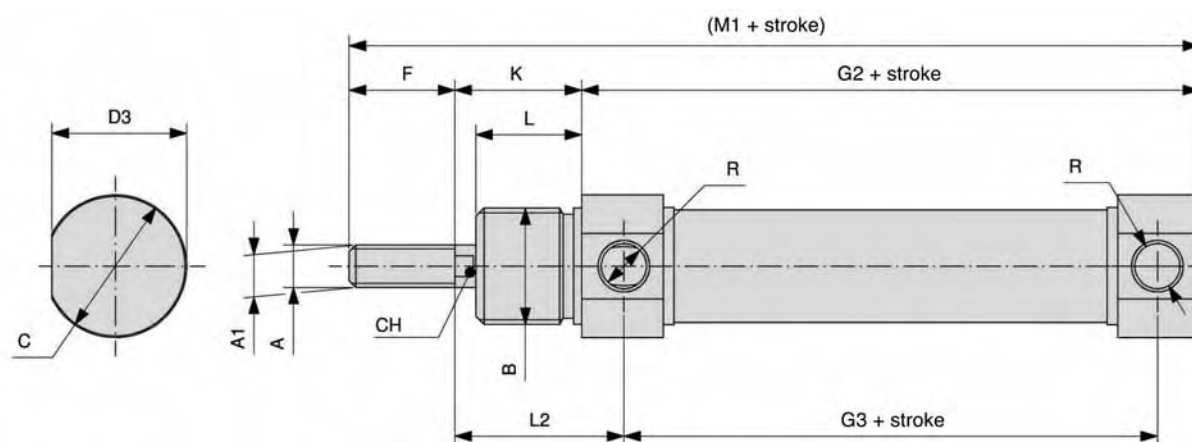
Pressure 6 bar. The internal friction is considered.

Dimensions for series

HMZ



HMS



Ø	A	A1	B	C	D3	E	F	G1	G2	G3	K	L	L2	R	M	M1	CH
16	M6	6	M 16 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	M 22 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	M 22 x 1.5	30	28.5	27	22	66	68	52	28	22	36	G1/8	116	118	9

Overview Piston rod accessories



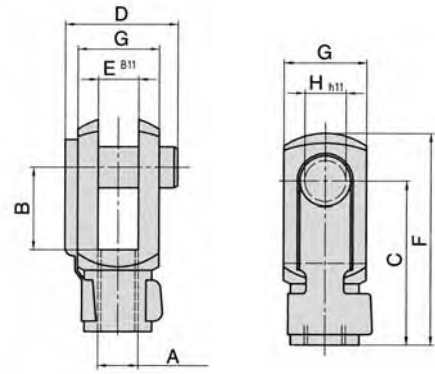
Assignment to series

Series	Cylinder Ø mm	Piston rod thread	Rod clevis	Piston rod nut	Flexible coupling	Rod eye
HM	Ø 8 and 10	M 4	RD-10	RL-10	-	-
NXD	Ø 12	M 6	RD-16	RL-16	FK-16	RO-16
HM	Ø 12 and 16					
NXD	Ø 16	M 8	RD-20	RL-20	FK-20	RO-20
HM	Ø 20					
XV	Ø 20 and 25					
NXD	Ø 20 to 40	M 10 x 1.25	RD-25	RL-25	FK-32	RO-25
HM	Ø 25					
XL	Ø 32					
XV	Ø 32 and 40					
HM	Ø 32	M 10	RD-32	RL-32	FK-33	RO-32
HM	Ø 40	M 12	RD-40	RL-40	FK-41	RO-40
HM	Ø 50 and 63	M 16	RD-63	RL-50/63	-	RO-50
NXD	Ø 50 and 63	M 12 x 1.25	FD-40	FE-40	FK-40	FO-40
XL	Ø 40					
XV	Ø 50 and 63					
NXD	Ø 80	M 16 x 1.5	FD-63	FE-63	FK-63	FO-63
XL	Ø 50 and 63					
NXD	Ø 100	M 20 x 1.5	FD-80	FE-80	FK-80	FO-80
XL	Ø 80 and 100					
XV	Ø 80 and 100					
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	-	-

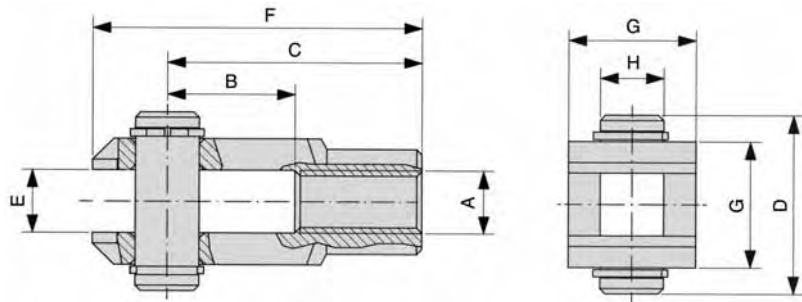
Piston rod accessories

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



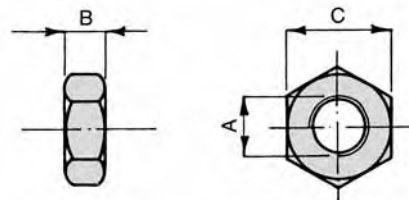
Material: steel (zinc-plated)
spring steel



Rod clevis FD-125 and FD-200, pin with snap rings.

Piston rod nut

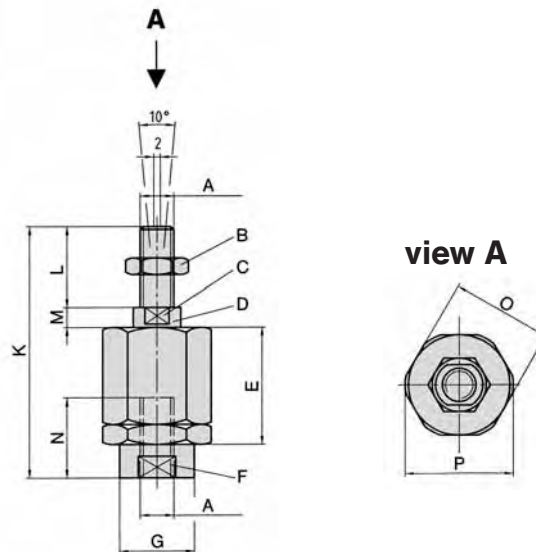
Order number	A	B	C
RL-10	M4	3.2	7
RL-16	M6	5	10
RL-20	M8	6.5	13
RL-25	M 10 x 1.25	6	17
RL-32	M 10	6	17
RL-40	M 12	7	19
RL-50/63	M 16	8	24
FE-40	M 12 x 1.25	7	19
FE-63	M 16 x 1.5	8	24
FE-80	M 20 x 1.5	9	30
FE-125	M 27 x 2	12	41
FE-200	M 36 x 2	14	55
FE-250	M 42 x 2	16	65
FE-320	M 48 x 2	18	75



Material: steel (zinc-plated)

Piston rod accessories

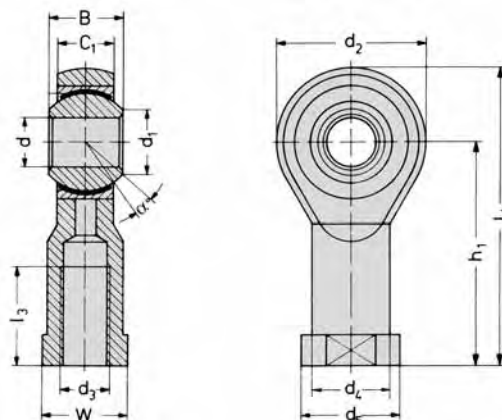
Flexible coupling



Material: steel (zinc-plated)

Order number	A	B	C	D	E	F	G	K	L	M	N	O	P
FK-16	M6	SW 10	SW 5	6	17.5	SW 7	8.5	35	10	3.5	10	13	15
FK-20	M8	SW 13	SW 7	8	28.5	SW 11	12.5	57	20	4	20	17	19
FK-32	M 10 x 1.25	SW 17	SW 12	14	35	SW 19	22	71	20	5	20	30	32
FK-33	M 10	SW 17	SW 12	14	35	SW 19	22	71	20	5	20	30	32
FK-40	M 12 x 1.25	SW 19	SW 12	14	35	SW 19	22	75	24	5	20	30	32
FK-41	M 12	SW 19	SW 12	14	35	SW 19	22	75	24	5	20	30	32
FK-63	M 16 x 1.5	SW 24	SW 20	22	54	SW 30	32	103	32	8	32	41	45
FK-80	M 20 x 1.5	SW 30	SW 20	22	54	SW 30	32	119	40	8	40	41	45
FK-125	M 27 x 2	SW 46	SW 24	32.2	60	SW 54	57	147	49.5	9.5	40	65	70

Rod eye

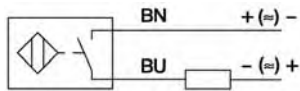


Material: steel (zinc-plated)
stainless steel

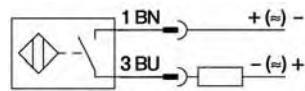
Order number	d ₃	d	d ₁	d ₂	d ₄	d ₅	B	C ₁	W	L ₃	L ₄	h ₁	α
RO-16	M6	6	8.9	20	10	13	9	6.75	11	12	40	30	13
RO-20	M8	8	10.4	24	12.5	16	12	9	13	16	48	36	13
RO-25	M 10 x 1.25	10	12.9	28	15	19	14	10.5	17	20	57	43	13
RO-32	M 10	10	12.9	28	15	19	14	10.5	17	20	57	43	13
RO-40	M 12	12	15.4	32	17.5	22	16	12	19	22	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	32	33	102	77	15
FO-125	M 27 x 2	30	34.8	70	40	51	37	25	41	51	145	110	15
FO-200	M 36 x 2	35	37.7	80	46	56	43	28	50	56	165	125	15

Proximity sensors

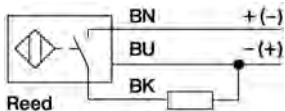
Wiring diagram



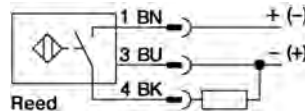
Reed
ZS-5600



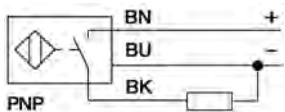
Reed
ZS-5601



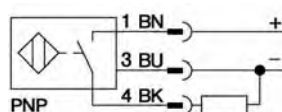
Reed
ZS-5700, ZS-5700-10



Reed
ZS-5701

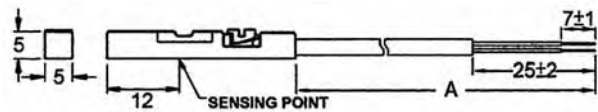


PNP
ZS-6700, ZS-7300



PNP
ZS-6701, ZS-7301

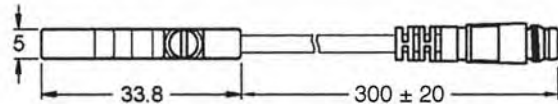
Dimensions



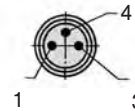
ZS-5600, ZS-6700, ZS-7300; A = 3.000 ± 20

ZS-5700-10; A = 10.000 ± 20

ZS-5700, ZS-7300; A = 5.000 ± 20



ZS-5601, ZS-5701, ZS-6701, ZS-7301



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	ø 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 68				
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 ≤ 100 mA AC ≤ 100 mA		≤ 500 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

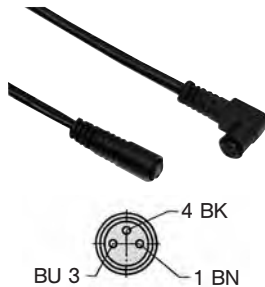
Mounting bracket for round cylinder Ø 8 – 63 mm



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

Material: metal,
plastic PA GI/6T

Connecting cable for ZS-5601, ZS-5701, ZS-6701 and ZS-7301



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°

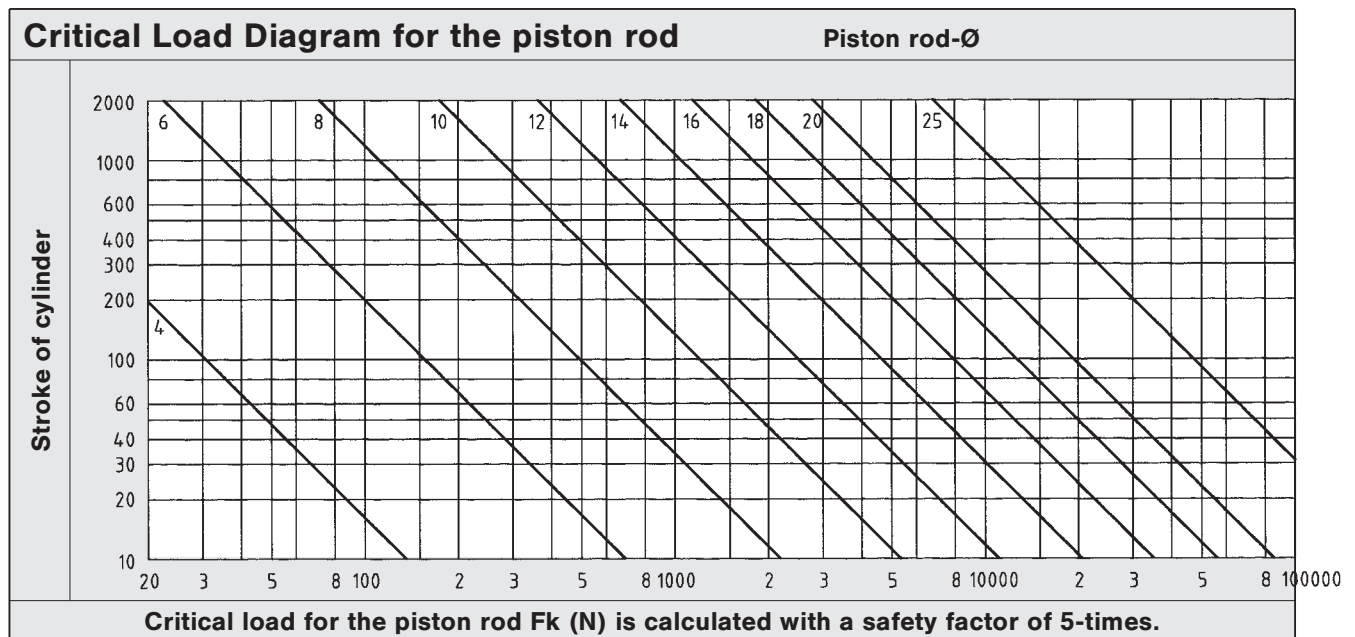
Proximity sensors electronic

Order number	ZS-6700	ZS-6701	ZS-7300	ZS-7301
Design	electronic, magnet-inductive sensor, normally open PNP output			
Cable	Ø 2.8, PUR		Ø 3, LifYY-11Y, PUR	
Cable cross section	n/a		3 x 0.14 mm ²	
Cable lengths	3 m	0.3 m	3 m	0.3 m
Cable plug	-	M8	-	M8
Overtravel speed	n/a		≤ 10 m/s	
Max. absolute hysteresis	n/a		≤ 1 mm	
Temperature drift	n/a		≤ 0.1 mm	
Min. absolute repeat accuracy	n/a		≤ ± 0.1 mm	
Operating temperature	- 10 °C ... + 70 °C		- 25 °C ... + 70 °C	
Degree of protection	IP 68		IP 67	
Housing material	Plastic		Plastic, PA 12	
Switching status indication	LED green		LED yellow	
Rated operational voltage	5 ... 30 V DC		10 ... 30 V DC, max. ripple ≤ 10 % U _{pp}	
Rated operational current I_E	≤ 200 mA		≤ 200 mA	
DC	-		-	
AC	-		-	
Breaking capacity	6 W		6 W	
No-load current	≤ 10 mA		≤ 15 mA	
Max. OFF-state current	n/a		≤ 0.1 mA	
Max. switching frequency	≤ 1 kHz		≤ 1 kHz	
Rated insulation voltage	n/a		≤ 0.5 kV	
Short-circuit protection	yes		yes, cyclic	
Max. voltage drop at I_E	≤ 1.0 V		≤ 1.8 V	
Wire breakage	yes		yes	
Reverse polarity protection	yes		yes / complete	
Vibration resistance	9 g (1.5 mm, 10 – 55 Hz – 10 Hz)		55 Hz (1 mm)	
Shock resistance	50 g (11 ms)		30 g (11 ms)	
Explosion proof	-		II 3 GD EEx nA II T4 X IP 67 T 110 °C	

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“

