

Series HM

Randzylinder ISO 6432, double acting

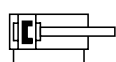
Technical details

Operating pressure	1 ... 10 bar
Temperature range	-20°C ... +80°C for Ø 8 - 12 mm -35°C ... +80°C for Ø 16 - 25 mm 0 ... +150°C for high temperature version
Medium	Filtered, oil-free and dried compressed air according to ISO 8573-1:2010, Class 7:2:4, instrument air, free of aggressive additives. Differing the pressure dew point must be at least 10°C below lowest occurring ambient temperature.
Materials	Cylinder tube: stainless steel End caps: Al (anodized) Piston rod: stainless steel Seals: PU, NBR
	Cylinders in accordance with 2014/34/EU (ATEX) available. (page 17)

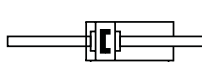


Double acting pneumatic cylinder with magnetic piston and built-in cushioning rings or adjustable cushions. Standard stroke lengths in table below, additional lengths on request.

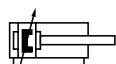
Versions



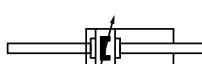
HM, HMS, HMZ
double acting, with magnetic piston



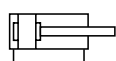
HMDE
double acting, double end piston rod, with magnetic piston



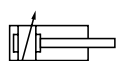
HMP
double acting, adjustable cushioning, with magnetic piston



HMPDE
double acting, double end piston rod, adjustable cushioning, with magnetic piston



HDH
double acting, high temperature version



HDPH
double acting, adjustable cushioning, high temperature version

Order code

Series		Options	
HM	standard	ATEX	cylinders in accordance with 2014/34/EU (ATEX)
HMP*		Stroke (mm)	xxx max. stroke see technical data
HMDE*		Standard#	10, 25, 40, 50, 80, 100, 125, 160, 200, 250, 320, 400 mm
HMPDE*		Piston Ø	08 8 mm
HDH**	high temperature version		10 10 mm
HDPH*	high temperature version		12 12 mm
HMS*	lateral air connection, rear		16 16 mm
HMZ*	central air connection, rear		20 20 mm
			25 25 mm

* only for Ø 16, 20 and 25 mm

** not for Ø 8 mm

only for series HM and HMP in consideration of max. stroke

Series HM

Randzylinder ISO 6432, double acting

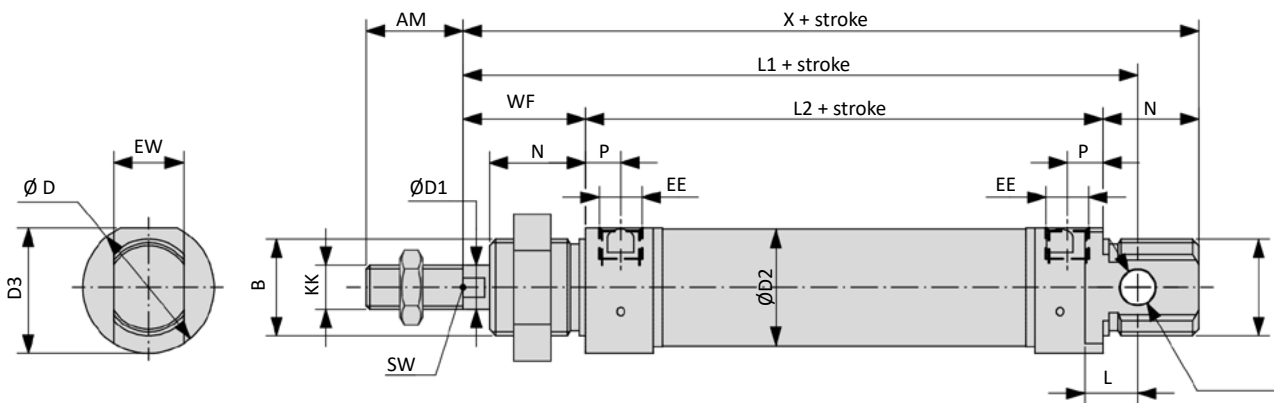


Technical data

Model-no.:	HM-08-...	HM-10-...	HM-12-...	Hxx-16-...	Hxx-20-...	Hxx-25-...
Piston Ø (mm)	8	10	12	16	20	25
Force at 6 bar (N)	27	42	61	109	170	265
Extension						
Retraction						
Connection	M5	M5	M5	M5	G1/8	G1/8
Piston rod thread	M4	M4	M6	M6	M8	M10 x 1.25
Max. stroke (mm)	100	200	500	900	900	900
Cushioning length (mm)*	-	-	-	15.5	17	19.5

* only for series HMP, HMPDE, HDPH

Dimensions series HM, HMP, HDH, HDPH



Piston Ø	AM	B	Ø CD	Ø D	Ø D1	Ø D2	D3	EE
8	12	M12 x 1,25	4	16	4	9,27	15	M5
10	12	M12 x 1,25	4	16	4	11,27	15	M5
12	16	M16 x 1,5	6	19	6	13,27	18	M5
16	16	M16 x 1,5	6	19*	6	17,27	18	M5
20	20	M22 x 1,5	8	27	8	21,27	25,5	G1/8
25	22	M22 x 1,5	8	30	10	26,5	28,5	G1/8

* 21 mm for HMP, HMPDE, HDPH

Piston Ø	EW	KK	L	L1	L2	N	P	SW	WF	X
8	8	M4	6	64	46	12	5	-	16	74
10	8	M4	6	64	46	12	5	-	16	74
12	12	M6	9	75	48	18	5	5	22	88
16	12	M6	9	82	53	18*	4,5	5	22	93
20	16	M8	12	95	67	20	8	7	24	111
25	16	M10 x 1,25	12	104	68	22	8	9	28	118

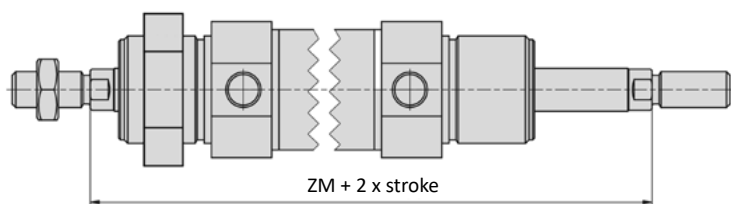
* 17 mm for HMP, HMPDE, HDPH

Series HM

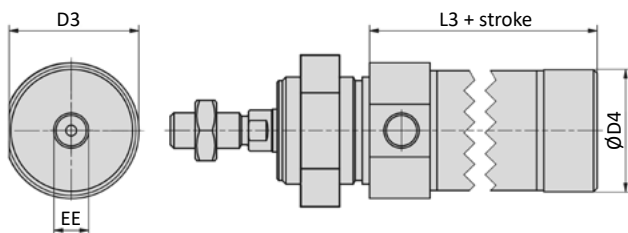
Randzylinder ISO 6432, double acting

Additional dimensions Series HMDE, HMPDE, HMZ, HMS

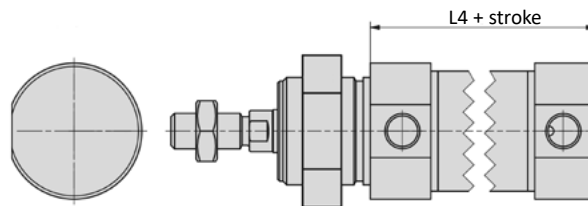
double end piston rod



Series HMZ



Series HMS

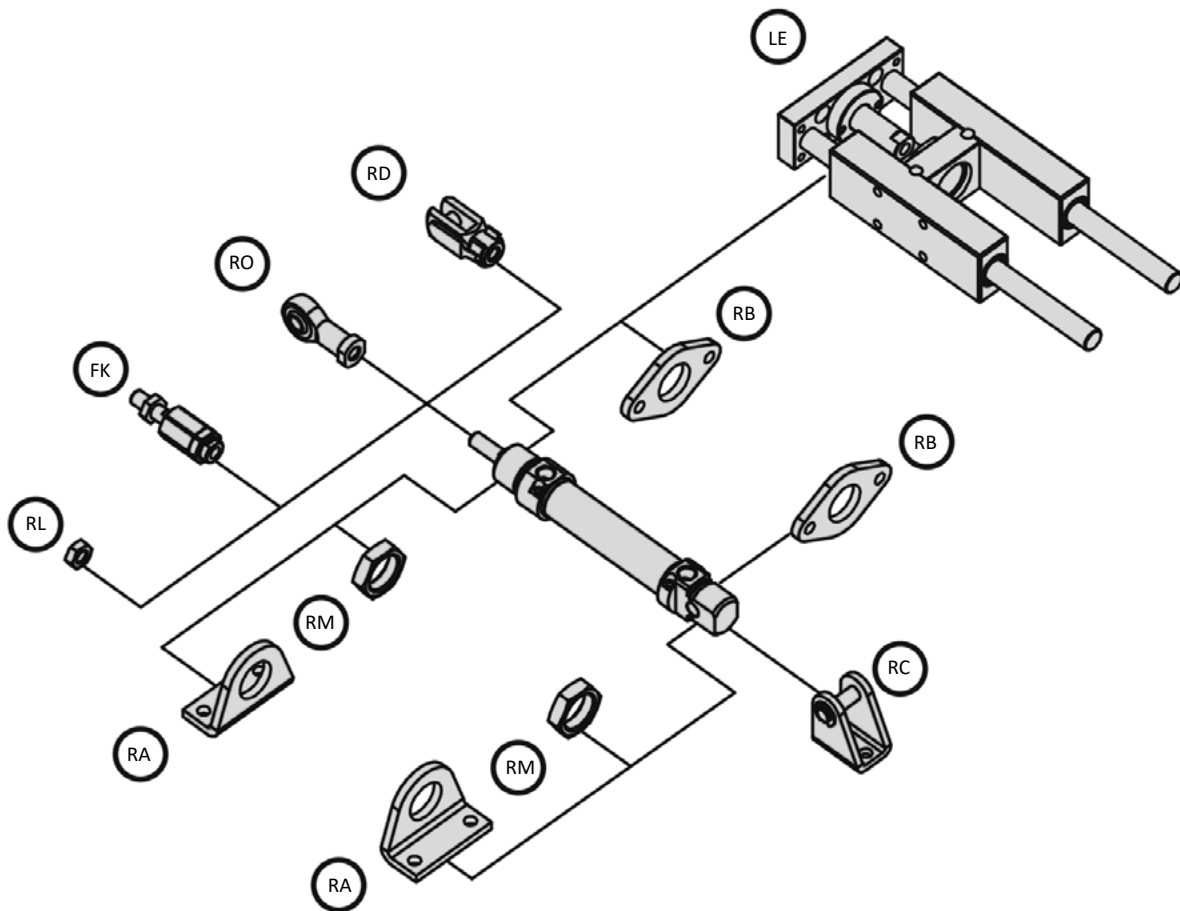


Piston $\varnothing$	ZM	EE	$\varnothing D$	$\varnothing D4$	L3	L4
16	97	M5	19	17.2	52	52.5
20	115	G1/8	27	22.2	65	67
25	124	G1/8	30	27	66	68

Series HM

Mounting accessories

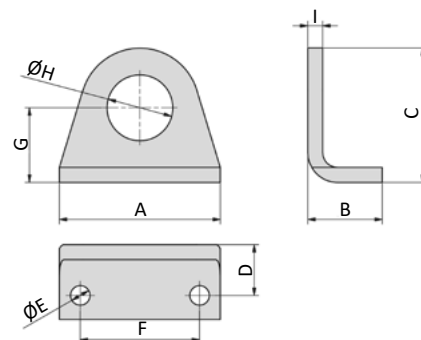
Mounting the add-on parts



Series HM

Mounting accessories

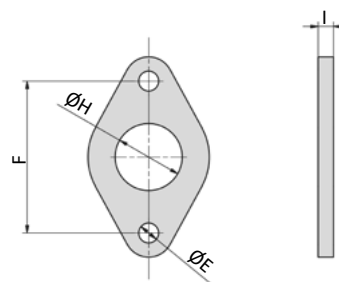
RA-xx Foot mount



Model-no.:	for cylinder Ø	A	B	C	D	Ø E	F	G	Ø H	I
RA-10	8. 10	35	16	26	11	4.5	25	16	12	3
RA-16	12. 16	42	20	32.5	14	5.5	32	20	16	4
RA-25	20. 25	54	25	45	17	6.6	40	25	22	5

Materials: steel, zinc plated

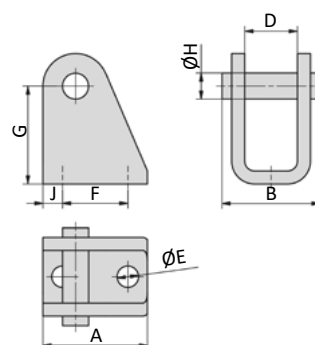
RB-xx Flange mount



Model-no.:	for cylinder Ø	Ø E	F	Ø H	I
RB-10	8. 10	4.5	30	12	3
RB-16	12. 16	5.5	40	16	4
RB-25	20. 25	6.6	50	22	5

Materials: steel, zinc plated

RC-xx Clevis mount



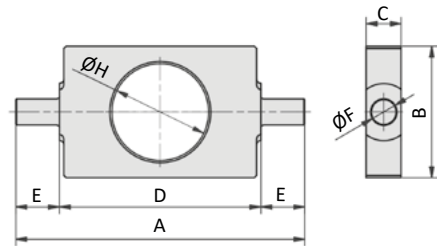
Model-no.:	for cylinder Ø	A	B	D	Ø E	F	G	Ø H	J
RC-10	8. 10	20	17	8.1	4.5	12.5	24	4	5
RC-16	12. 16	25	23	12.1	5.5	15	27	6	5
RC-30	20. 25	32	30	16.1	6.6	20	30	8	6

Materials: steel, zinc plated, 2 snap rings are included.

Series HM

Mounting accessories

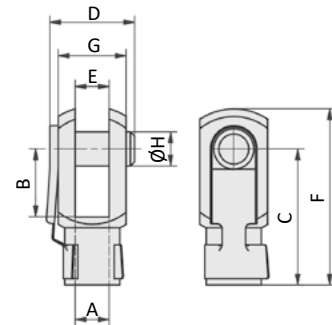
RH-xx Trunnion mount



Model-no.:	for cylinder Ø	A	B	C	D	E	Ø F	Ø H
RH-10	8. 10	38	20	6	26	6	4	12
RH-16	12. 16	58	25	8	38	10	6	16
RH-25	20. 25	66	30	8	46	10	6	22

Materials: steel, zinc plated

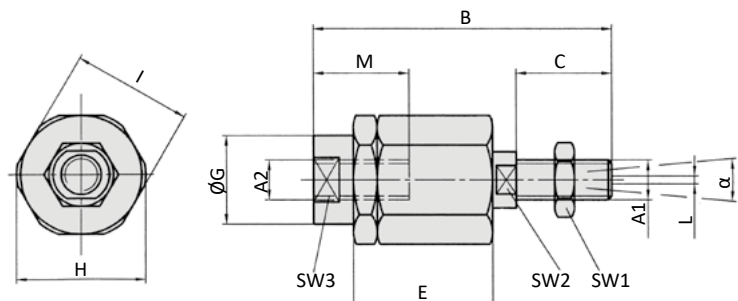
RD-xx Rod clevis



Model-no.:	for cylinder Ø	A	B	C	D	E	F	G	Ø H
RD-10	8. 10	M4	8	16	11.5	4	21	8	4
RD-16	12. 16	M6	12	24	16	6	31	12	6
RD-20	20	M8	16	32	22	8	42	16	8
RD-25	25	M10 x 1.25	20	40	26	10	52	20	10

Materials: steel, zinc plated

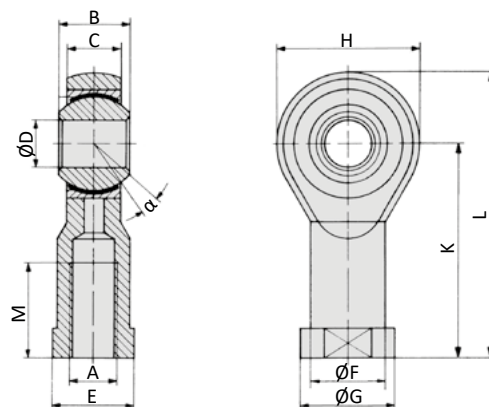
FK-xx Flexible coupling



Model-no.:	for cylinder Ø	A1, A2	B	C	D	E	Ø G	H	I	L	M	SW1	SW2	SW3	α
FK-16	12. 16	M6	35	11	2.5	17.5	8.5	14.5	13	1	12.5	10	5	7	6°
FK-20	20	M8	57	21	5	26	12.5	19	17	2	16	13	7	11	8°
FK-32	25	M10 x 1.25	71.5	20	7.5	35	22	32	30	2	22	17	12	19	8°

Materials: steel, zinc plated

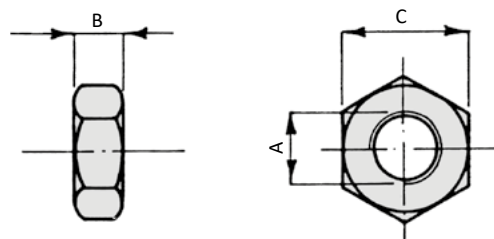
RO-xx Rod eye



Model-no.:	for cylinder Ø	A	B	C	Ø D	E	Ø F	Ø G	H	K	L	M	α
RO-16	12. 16	M6	9	6.75	6	11	10	13	20	30	40	12	13°
RO-20	20	M8	12	9	8	14	12.5	16	24	36	48	16	14°
RO-25	25	M10 x 1.25	14	10.5	10	17	15	19	28	43	57	20	13°

Materials: steel, zinc plated, bearing steel, bronze bushing

RM-xx Mounting nut



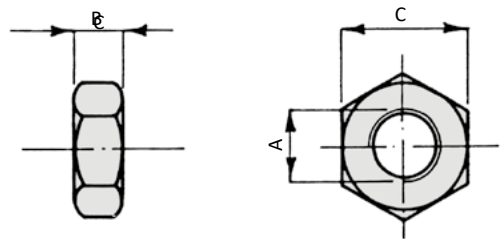
Model-no.:	for cylinder Ø	A	B	C
RM-10	8. 10	M12 x 1.25	7	19
RM-16	12. 16	M16 x 1.5	8	22
RM-25	20. 25	M22 x 1.5	8	27

Materials: steel, zinc plated

Series HM

Mounting accessories

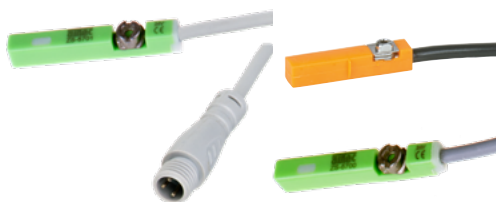
RL-xx Piston rod nut



Model-no.:	for cylinder Ø	A	B	C
RL-10	8. 10	M4	3.2	7
RL-16	12. 16	M6	4	10
RL-20	20	M8	5	13
RL-25	25	M10 x 1.25	5	17

Materials: steel, zinc plated

Proximity sensors



page 12



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

Technical details

Operating pressure	1 ... 10 bar	
Temperature range	-30°C ... +100°C	
Max. stroke	1000 mm	
Materials	Body:	Al (anodized)
	Guide rod:	steel hard chrome plated (bronze bearing) steel, tempered (ball bearings)
	Bearing:	sintered bronze (bronze bearing) steel (ball bearings)
	Seals:	NBR



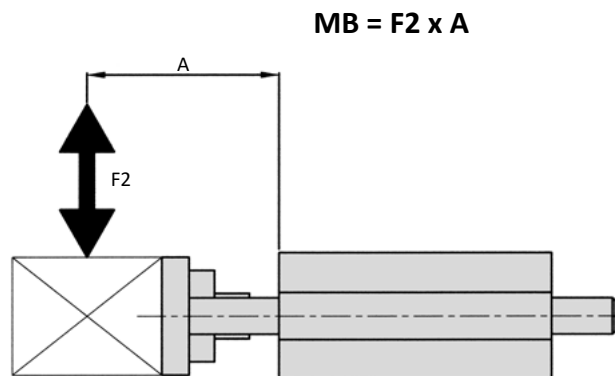
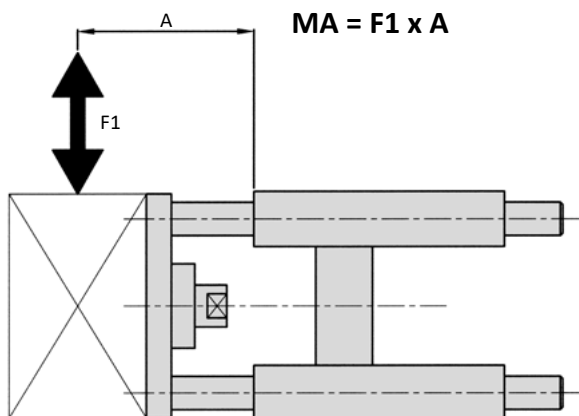
Linear guide for mini cylinder in accordance with ISO 6432.

Order code

Series		Versions	
		HK	type H ball bearings
		HG	type H bronze bearings
		CG	type C bronze bearings
Cylinder-Ø		Stroke (mm)	
16	12, 16 mm	XXXX	max. 1.000 mm
25	20, 25 mm		

Technical information

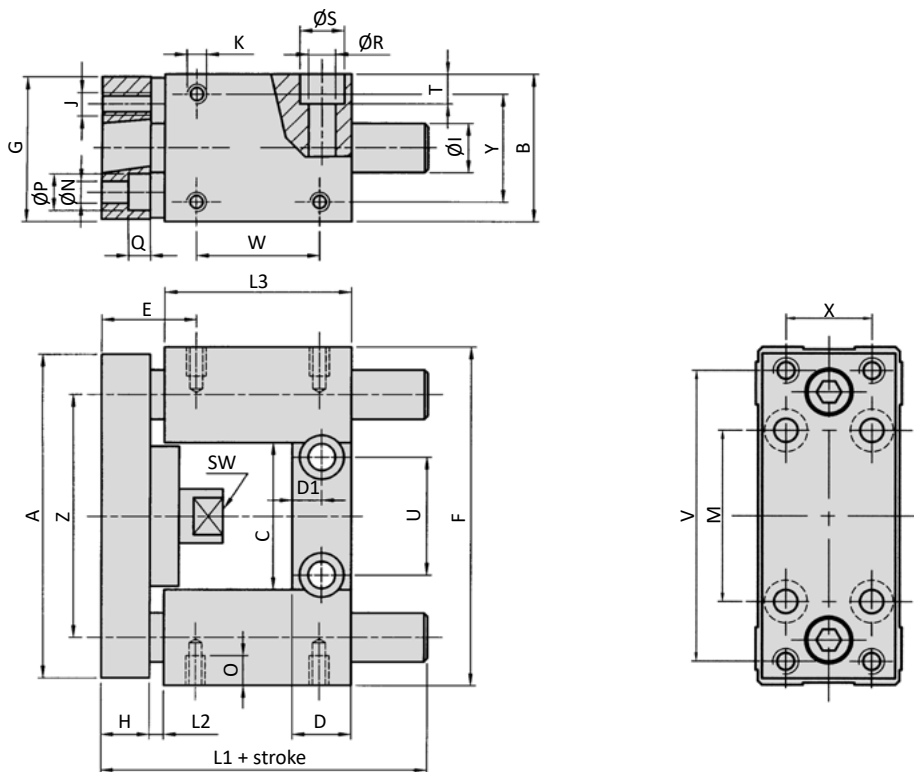
Version	Ø (mm)	16	25
CG	max. load MA (Nm)	6	13
	max. load MB (Nm)	5	12
HG	max. load MA (Nm)	6.5	19
	max. load MB (Nm)	5.8	17
HK	max. load MA (Nm)	9	11
	max. load MB (Nm)	8	10



Series LE

Linear guides

Dimensions types CG

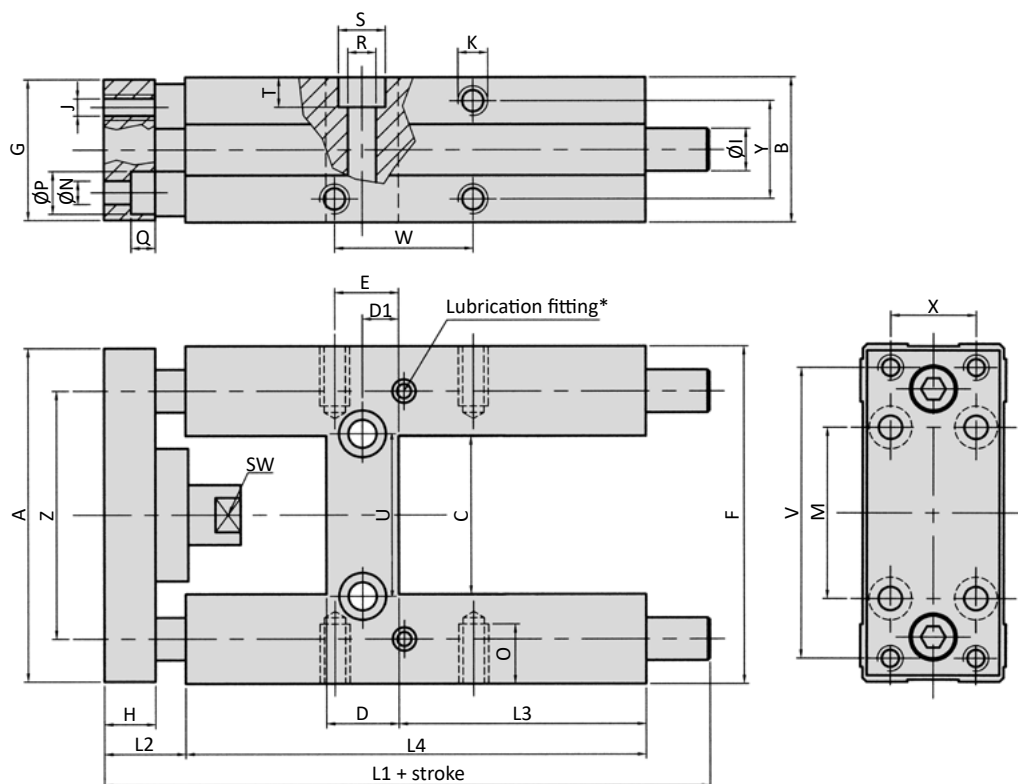


Ø	A	B	C	D	D1	E	F	G	H	ØI	J	K	L1	L2	L3
16	66	30	30	12	6	19.5	69	29	10	10	M4	M4	66.5	3	38
20	78	34	37	17	8.5	21.75	79	32	12	12	M5	M6	83	3	48
25	78	34	37	17	8.5	21.75	79	32	12	12	M5	M6	83	3	48

Ø	M	ØN	O	ØP	Q	ØR	ØS	SW	T	U	V	W	X	Y	Z
16	32	4.5	6	7.5	4.5	5.5	9	8	6	24	58	25	18	22	49.5
20	38	5.5	9	10	7.5	6.5	11	12	7	38	68	32.5	20	23	58
25	38	5.5	9	10	7.5	6.5	11	12	7	38	68	32.5	20	23	58

Piston Ø (mm)		16	20	25
Weight	0 mm stroke	0.30	0.50	0.50
CG (kg)	each 100 mm stroke	0.12	0.18	0.18

Dimensions types HG. HK



*only type HK

$\varnothing$	A	B	C	D	D1	E	F	G	H	$\varnothing I$	$\varnothing I^*$	J	K	L1	L2	L3
16	66	30	30	12	6	8	69	29	10	10	8	M4	M4	123.5	35	46
20	78	34	37	17	8.5	15	79	32	12	12	10	M5	M6	166	15	58
25	78	34	37	17	8.5	15	79	32	12	12	10	M5	M6	166	15	58

* type HK

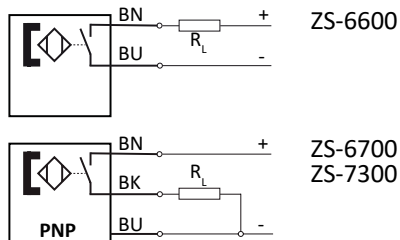
$\varnothing$	L4	M	$\varnothing N$	O	$\varnothing P$	Q	$\varnothing R$	$\varnothing S$	SW	T	U	V	W	X	Y	Z
16	68	32	4.5	6	8	4.5	5.5	9	8	5.5	24	58	18	18	22	49.5
20	108	38	5.5	9	10	7.5	6.5	11	12	6.5	38	68	32.5	20	23	58
25	108	38	5.5	9	10	7.5	6.5	11	12	6.5	38	68	32.5	20	23	58

Piston $\varnothing$ (mm)		16	20	25
Weight	0 mm stroke	0.40	0.90	0.90
Weight	each 100 mm stroke	0.12	0.18	0.18
Weight	0 mm stroke	0.36	0.84	0.84
Weight	each 100 mm stroke	0.08	0.12	0.12

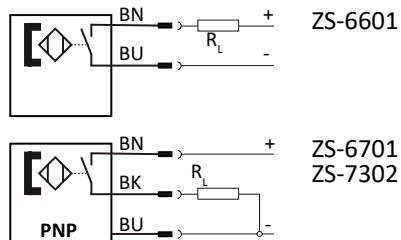
Series ZS

Proximity sensors

Proximity sensors with cable



Proximity sensors with plug



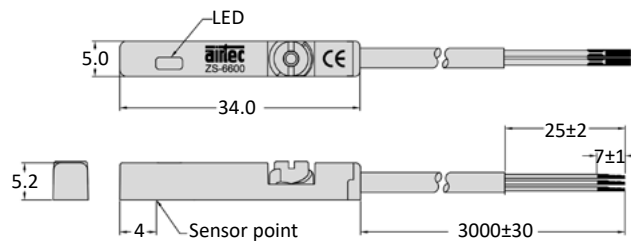
Technical data

Model-no.:	ZS-6600	ZS-6601	ZS-6700	ZS-6701
				
Design	2-pole inductive	2-pole inductive	3-pole inductive	3-pole inductive
Contact function	NO	NO	NO	NO
Output	NO	NO	PNP	PNP
Rated operational voltage	10 ... 30 V DC	10 ... 30 V DC	5 ... 30 V DC	5 ... 30 V DC
Rated operational current I_E	≤ 50 mA	≤ 50 mA	≤ 100 mA	≤ 100 mA
Max. voltage drop at I_E	≤ 2.65	≤ 2.65	≤ 1.0	≤ 1.0
Breaking capacity	1,4 W	1,4 W	3 W	3 W
Sensitivity	40 ~ 800 Gauss	40 ~ 800 Gauss	40 ~ 800 Gauss	40 ~ 800 Gauss
Cable length	3 m	0.3 m with M8 connection	3 m	0.3 m with M8 connection
Reverse polarity protection	nein	nein	ja	ja
Temperature range	-10 ... +70°C	-10 ... +70°C	-10 ... +70°C	-10 ... +70°C
Protection	IP 67	IP 67	IP 67	IP 67
Switching status indication	LED red	LED red	LED red	LED red

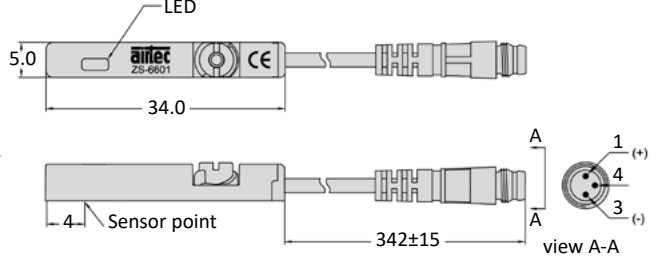
Model-no.:	ZS-7300	ZS-7302
		
Design	3-pole inductive	3-pole inductive
Contact function	NO	NO
Output	PNP	PNP
Rated operational voltage	10 ... 30 V DC	10 ... 30 V DC
Rated operational current I_E	≤ 100 mA	≤ 100 mA
Max. voltage drop at I_E	≤ 2.5	≤ 2.5
Breaking capacity	3 W	3 W
Cable length	6 m	0.3 m with M12 connection
Temperature range	-20 ... +60°C	-20 ... +60°C
Protection	IP 67	IP 67
Switching status indication	LED yellow	LED yellow
	II 3G Ex nA T4 II 3D Ex tD A22 IP67 T 125°C	II 3D Ex tc IIIC T125°C Dc X

Dimensions

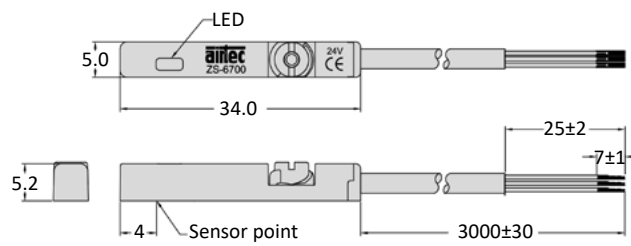
ZS-6600



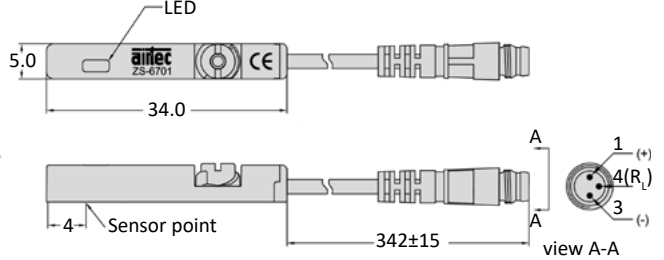
ZS-6601



ZS-6700



ZS-6701



Series ZS

Proximity sensors

Connection cable M8

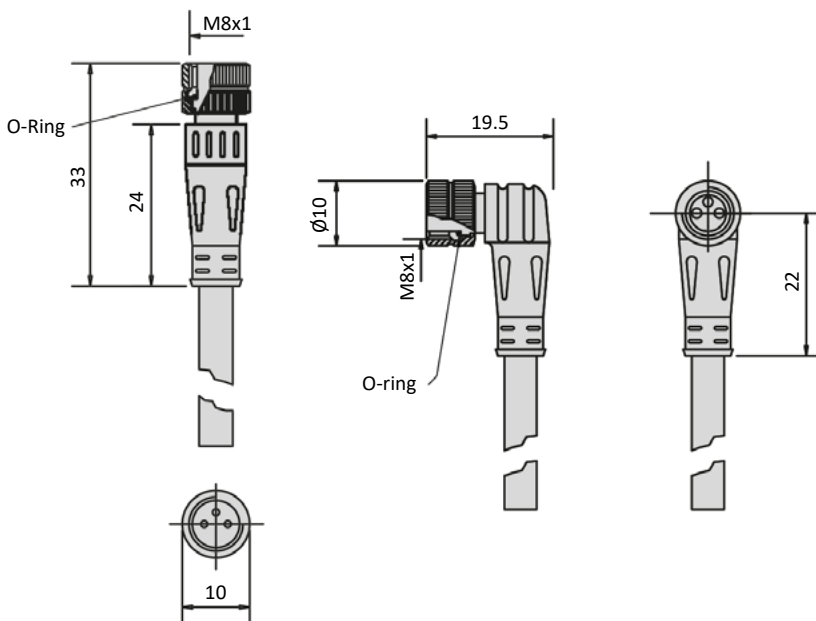
Contacts	M8 Plug socket
Protection	IP 67 according to EN 60529 in conjunction with suitable connection plug
Duty cycle	100 %
Temperature range*	-25°C...+90°C
max. voltage	60 V AC / DC
Use for	Solenoids with M8 plug, cylinder switch with M8 plug



Model-no.:	KA-10-01	KA-30-01	KA-50-01	KA-100-01
Contacts	M8 Socket, straight	M8 Socket, straight	M8 Socket, straight	M8 Socket, straight
Mounting	Coupling nut	Coupling nut	Coupling nut	Coupling nut
Cable	3-pin	3-pin	3-pin	3-pin
Length (L)	1 m	3 m	5 m	10 m

Model-no.:	KA-11-01	KA-31-01	KA-51-01	KA-101-01
Contacts	M8 Socket, elbow 90°	M8 Socket, elbow 90°	M8 Socket, elbow 90°	M8 Socket, elbow 90°
Mounting	Coupling nut	Coupling nut	Coupling nut	Coupling nut
Cable	3-pin	3-pin	3-pin	3-pin
Length (L)	1 m	3 m	5 m	10 m

Dimensions



Pin assignment

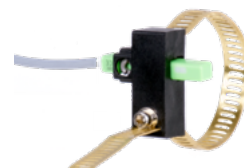


1 = brown
3 = blue
4 = black

Mounting brackets for proximity sensors

Model-no.:

NT-550



Design

sensor mounting

Version code

Cylinder - * * * - xxxx		
Cylinder double acting	Piston rod versions	Seals, Air connection
0 piston rod on one side with magnetic piston adjustable cushioning	0 piston rod stainless steel male thread	0 standard seals (PUR, NBR) air connection G thread
1 piston rod on one side adjustable cushioning	1 piston rod stainless steel female thread	1 standard seals (PUR, NBR) air connection NPT thread
2 piston rod on one side with magnetic piston	2 piston rod stainless steel female thread with guide and non rotating	2 high temperature version (FKM) air connection G thread
3 piston rod on one side	3 piston rod stainless steel male thread non rotating	3 high temperature version (FKM) air connection NPT thread
4 double end piston rod with magnetic piston adjustable cushioning	4 piston rod stainless steel female thread non rotating	4 standard seals (NBR) piston rod seal FKM air connection G thread
5 double end piston rod adjustable cushioning	5 piston rod steel hard chrome plated male thread	5 standard seals (NBR) piston rod seal FKM air connection NPT thread
6 double end piston rod with magnetic piston	6 piston rod steel hard chrome plated female thread	
7 double end piston rod	7 Doppelkolbenstange	
8 double end piston rod through hollow with magnetic piston	8 piston rod stainless steel without thread	
	9 piston rod steel hard chrome plated female thread with guide and non rotating	
	Axxx piston rod stainless steel male thread lengthened by xxx mm [#]	
	Bxxx piston rod stainless steel female thread lengthened by xxx mm	
	Cxxx piston rod steel hard chrome plated male thread lengthened by xxx mm [#]	
	Dxxx piston rod steel hard chrome plated female thread lengthened by xxx mm [#]	
	Exxx piston rod stainless steel without thread lengthened by xxx mm [#]	
	Fxxx piston rod steel hard chrome plated without thread lengthened by xxx mm [#]	
	V piston rod stainless steel AISI 316 (1.4401) male thread	
	xxxx - Additions* ATEX EX X cylinders in accordance with 2014/34/EU (ATEX) E8 piston rod seal E8, two-part, with plastic scraper	
	* Use taking into account the maximum length of 20 characters for an article number	

Cylinder single acting

0	piston rod on one side with magnetic piston normally retracted
1	piston rod on one side normally retracted
2	piston rod on one side with magnetic piston normally extended
3	piston rod on one side normally extended
4	double end piston rod with magnetic piston
5	double end piston rod

Exceptions

Round cylinders are described by the designation of the series.
A design code is only used if there are deviations from the standard described.

If it is not possible to describe the version of the cylinder using the version code, a project number in the form Pxxxx should be used.

Not all options are suitable for all cylinder series

Piston rod cylinders

Device marking

Piston rod cylinders are marked as follows:

II 2G Ex h IIC T5 Gb
 II 2D Ex h IIIC T100°C Db
-20°C T_{amb} +80°C

Marking according to DIN EN ISO 80079-36/ -37.

Piston rod cylinders conform to Equipment category 2 and can be used in Zone 1 respectively Zone 21.

Available cylinders

Series	Versions
HM	HM, HMP, HMDE, HMPDE

Accessories for piston rod cylinders

The cylinders are intended to be used with the following accessories:

Accessories	series
Flexible coupling	FK-Ø
Rod eye	FO-Ø, RO-Ø, PO-Ø (v _{max} 1 m/s)
Rod clevis	FD-Ø, RD-Ø, PD-Ø
Piston rod nut	FE-Ø, RL-Ø, PL-Ø
Mounting accessories XL	XLB-Ø-01, XLB-Ø-02, XLB-Ø-03, XLB-Ø-04, XLB-Ø-05, XLB-Ø-06, XLB-Ø-07, XLB-Ø-08, XLB-Ø-09, XLB-Ø-10, XLB-Ø-11, XLB-Ø-12, XLB-Ø-13, XLB-Ø-14,
Mounting accessories XG	VLB-Ø-01, VLB-Ø-02, VLB-Ø-03, VLB-Ø-04, VLB-Ø-05, VLB-Ø-06, VLB-Ø-08, VLB-Ø-09, VLB-Ø-12
Mounting accessories HM	RA-Ø, RC-Ø, RG-Ø, RH-Ø, RB-Ø, RM-Ø
Mounting accessories CM	PA-Ø, PC-Ø, PB-Ø, PM-Ø

Accessories for rodless cylinders

The cylinders are intended to be used with the following accessories:

Accessories	series
Mounting accessories ZX	ZXB-Ø-01, ZXB-Ø-02, ZXB-Ø-10, ZXB-Ø-20

Proximity switches

Model-No.	Classification / Identification marking
ZS-7300	II 3G Ex nA T4 II 3D Ex tD A22 IP67 T 125°C
ZS-7302	II 3D Ex tc IIIC T125°C Dc X



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 are available at www.airtec.de.

Air consumption cylinder (NI for a single stroke of 100 mm, based upon extension)

Piston-Ø	Pressure in bar						
	2	3	4	5	6	7	8
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

Required flow rate (NI/min at p = 6 bar)

Piston-Ø	speed (m/s)				
	0.25	0.5	1	1.5	2
8	5	11	21	32	42
10	8	16	33	49	66
12	12	24	47	71	95
16	21	42	84	127	169
20	33	66	132	198	264
25	52	103	206	309	412

Force chart cylinders (N)

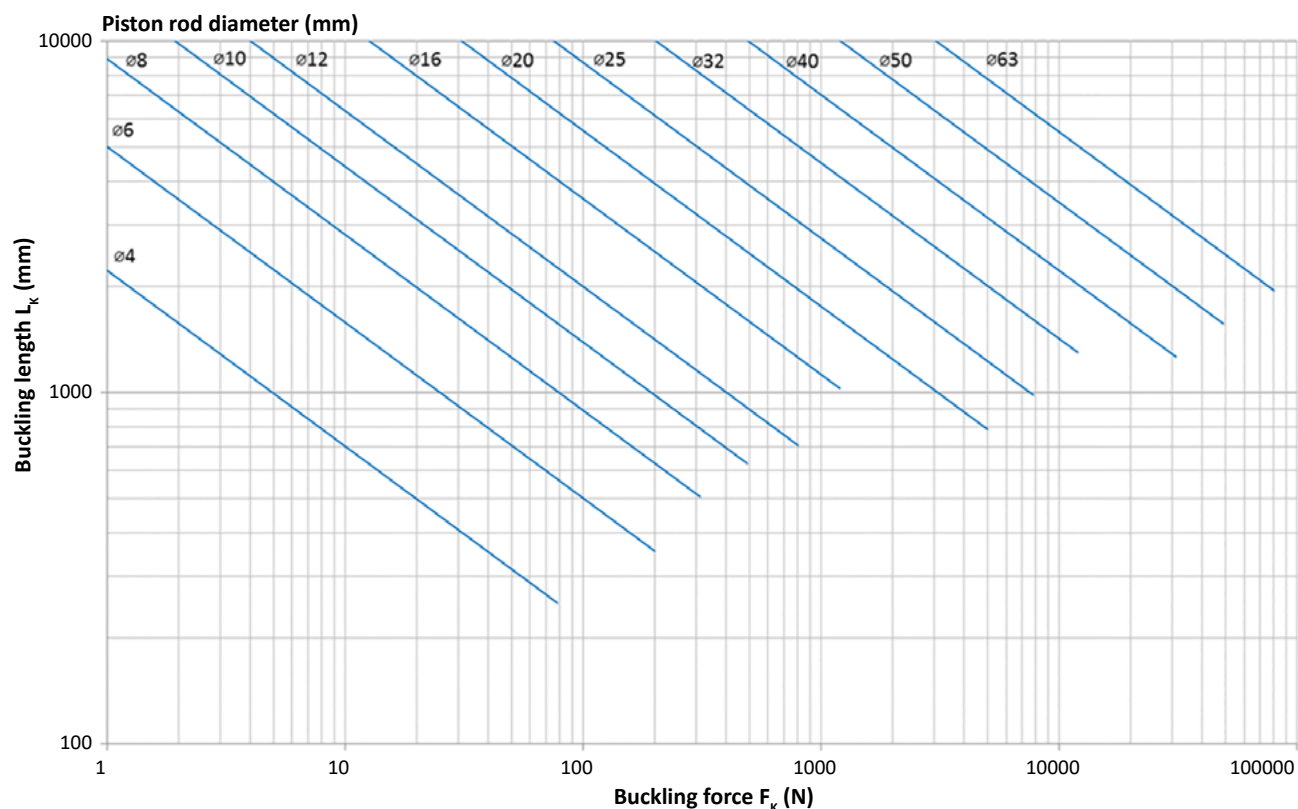
Piston-Ø	Series	Piston rod Ø (mm)	Pressure in bar						
			2	3	4	5	6	7	8
8			9	14	18	23	27	32	36
	HM	4	7	10	14	17	20	24	27
10			14	21	28	35	42	49	57
	HM	4	12	18	24	30	36	42	47
12			20	31	41	51	61	71	81
	HM	6	15	23	31	38	46	53	61
16			36	54	72	90	109	127	145
	HM	6	31	47	62	78	93	109	124
20			57	85	113	141	170	198	226
	HM	8	47	71	95	119	142	166	190
25			88	132	177	221	265	309	353
	HM	10	74	111	148	185	223	260	297

extension force*

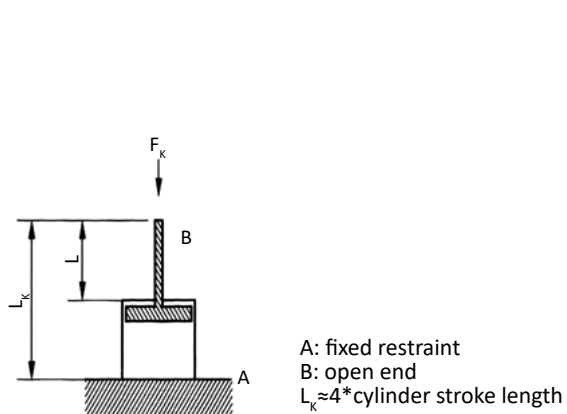
retraction force*

* A correction factor of 0.9 for the internal friction is already calculated.

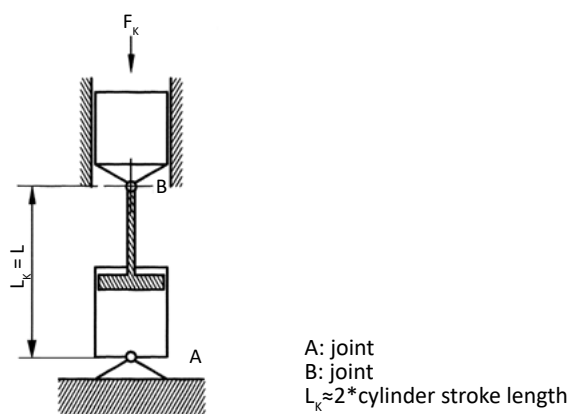
Critical load diagram for the piston rod



First elastic case of buckling



Second elastic case of buckling



Knowing the actual buckling case, either 1 or 2, and knowing the requested stroke length you can calculate the buckling length L_k . If you know the buckling force F_k (compressive force) you determine in the diagram above the intersection of both data. Choose the next graph line above to get the necessary rod diameter.