



BERENDSEN

Berendsen PMC Oy Ab
VDMA cylinders

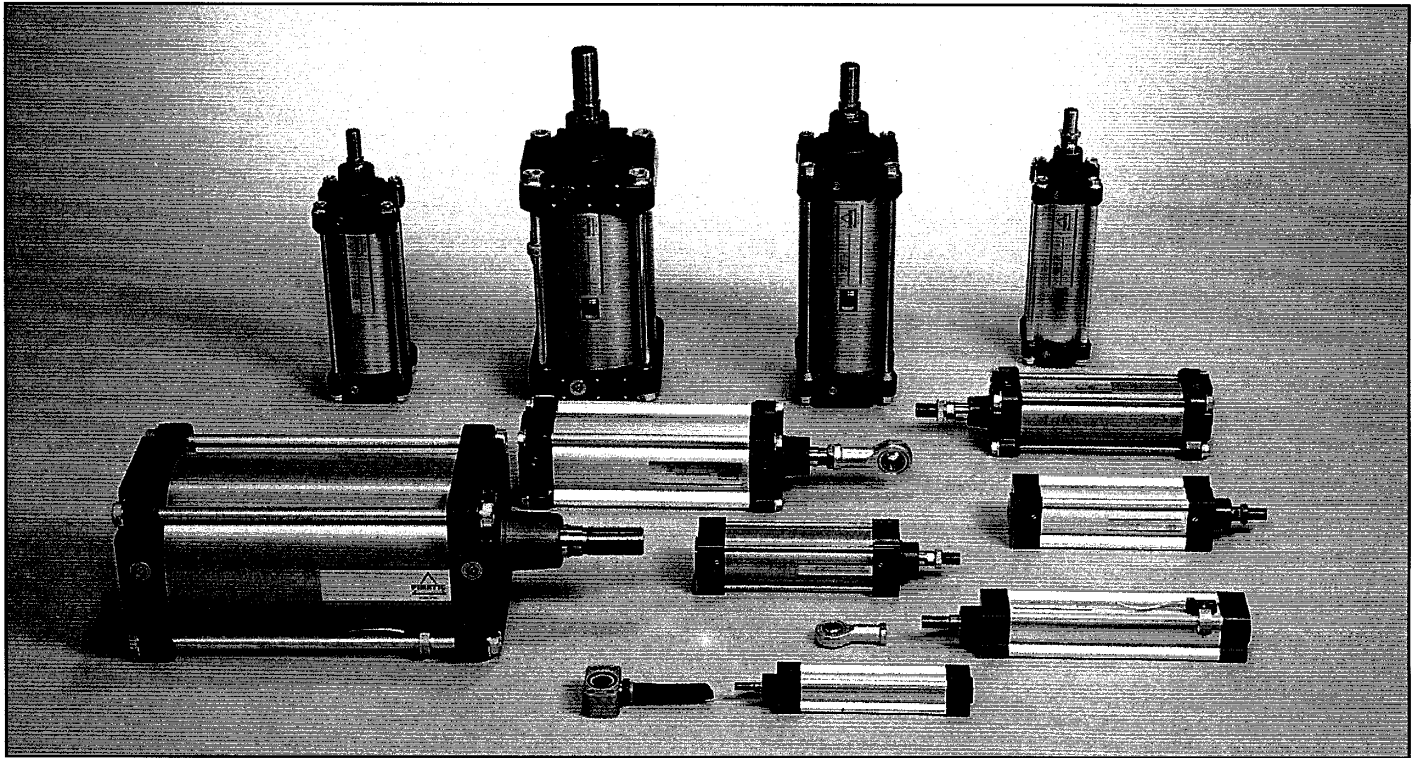


PNEUMATICS

CATALOGUE 1.12.2

CONTENTS:

- | | | |
|--|---|---------------------------|
| 2. Selection | 4. Cylinder thrusts, cushioning
and buckling strength diagrams | 8. Dimensions |
| 3. Technical data, product range,
and ordering references | 5. Options and variants | 13. Mounting combinations |
| | 7. Mountings | 14. Electrical sensors |
| | | 15. Spare parts |

**CHOICE CRITERIA:****1. Standards**

Built to conform to VDMA, ISO and CNOMO standards. International dimensioning ensures compatibility everywhere.

2. Hygienic

Clean-lined profile tube as standard in bore sizes 32 to 125 mm together with smooth end caps provides hygienic and easy to clean surfaces.

3. Seals

Nitrile rubber as standard; viton and other special seal materials available for various conditions.

4. Mountings

A comprehensive selection of mountings for fixed or articulated installation.

5. Robust design

Built-in tie rods construction as standard even in profile tube aluminium body. Lightweight but tough.

6. Options

In addition to standard construction options and special designs are available.

TECHNICAL DATA:

Cylindertype:

Double acting pneumatic cylinder with adjustable cushioning at both ends. Dimensions conform to ISO 6431, VDMA 24562 and CNOMO/NF E 49-003 standards.

Magnetic piston:

Magnetic piston for touch-free position sensing as standard in bore sizes 32 to 125 mm, in larger bore sizes as an option.

Pressure range:

0...1,0 MPa (0...10 bar)

Operating medium:

Filtered air (40 µm) or neutral gases, lubricated or non lubricated. Lubricated air to be recommended in temperatures below +5°C or above + 50°C, or with piston velocity over 1 m/s, or when dew point is below +2°C. We recommend lubricated air also with P2020V seals.

Temperature range:

-20...+80°C standard seals
-15...+150°C viton seals P2020V-
-15...+150°C viton+special grease P2020VE-

Materials:

End caps, cylinder tube and piston: Aluminium, anodized. Round tubes hard anodized.
Piston rod: Hard chromed steel (25 µm)
Wear ring: Acetal plastic or PTFE
Piston rod bearing: Acetal or PTFE coated
Tie rods and nuts: Stainless or zinc coated steel
Standard seals ø 32...63: Oil resistant nitrile rubber,
Other seals: See page 5

Sensors:

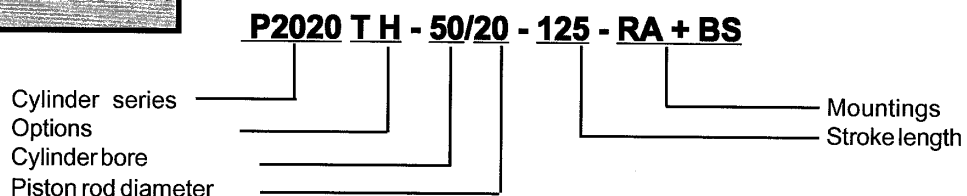
See page 14

PRODUCT RANGE:

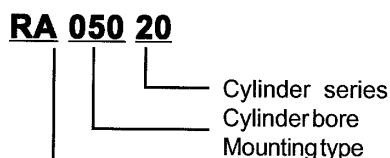
Cylinder bore	Piston rod diameter	Standard stroke length											Weight (kg)		
		25	50	80	100	125	160	200	250	320	400	500	0-stroke	/100 mm	
32	12	X	X	X	X	X	X	X	X	X				0,50	0,30
40	16	X	X	X	X	X	X	X	X	X				0,75	0,39
50	20	X	X	X	X	X	X	X	X	X	X	X	X	1,21	0,60
63	20		X	X	X	X	X	X	X	X	X	X	X	2,10	0,64
80	25		X	X	X	X	X	X	X	X	X	X	X	2,80	0,96
100	25		X	X	X	X	X	X	X	X	X	X	X	3,80	1,10
125	32				X	X	X	X	X	X	X	X	X	6,30	1,60
160	40				X	X	X	X	X	X	X	X	X	11,6	2,20
200	40				X	X	X	X	X	X	X	X	X	16,0	2,50

x = standard strokes, non-standard strokes up to max. 3000 mm

ORDERING REFERENCES:



Separate mountings:



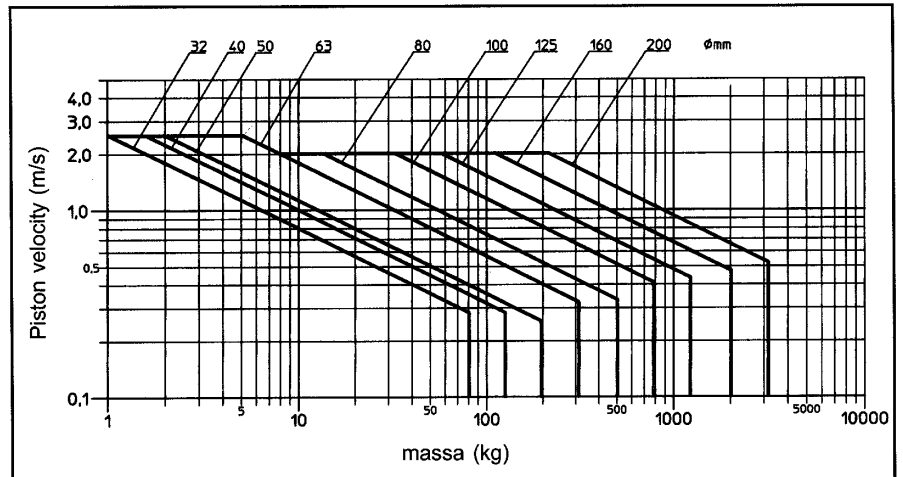
CYLINDER AREAS AND THRUSTS:

Cylinder bore	Piston rod diameter	Port	Area		Thrust * [N]		Cushioning	
			out [cm ²]	in [cm ²]	out	in	length [mm]	area [cm ²]
32	12	G1/8	8,0	6,9	470	410	22	6,0
40	16	G1/4	12,6	10,6	750	630	22	9,4
50	20	G1/4	19,6	16,5	1170	980	23	13,5
63	20	G3/8	31,2	28,1	1860	1650	23	25
80	25	G3/8	50,3	45,4	3000	2650	30	37,7
100	25	G1/2	78,5	73,5	4700	4300	32	66
125	32	G1/2	123	115	7300	6800	36	103
160	40	G3/4	201	188	12000	11100	37	175
200	40	G3/4	314	302	18800	18000	37	288

* Given theoretical cylinder thrusts at 0,6 MPa (6 bar) pressure.

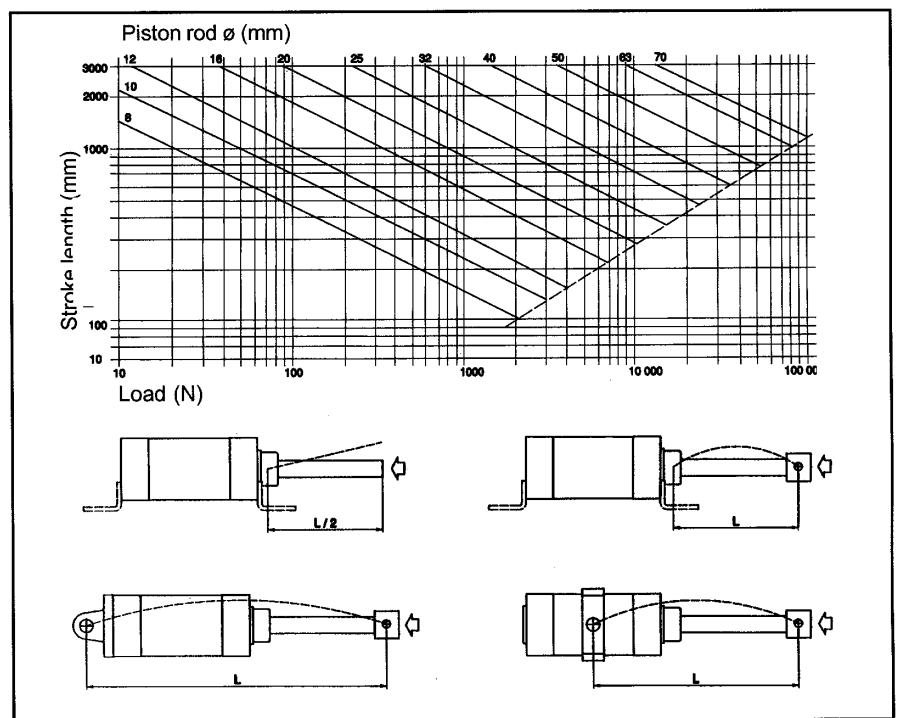
CUSHIONING:

End cushioning protects the cylinder and machine from mechanical stress. The diagram shows maximum value of the mass to be cushioned as a function of piston velocity. Curves are calculated for a horizontal out-stroke at a pressure of 0,63 MPa (6.3 bar).



BUCKLING STRENGTH:

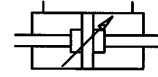
Diagram shows max load of cylinder as function of stroke length, with reliability of $n=5$. To determine maximum stroke length of a particular piston rod, draw a straight line from horizontal axis upwards until it cuts the diagram of piston rod diameter. Max stroke length can be read at vertical axis by the intersectional point. The effect of different mounting styles is described on the diagrams illustrated.



OPTIONS:

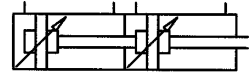
P2021
Cylinder with double piston rod

Equal thrust out and in, better guiding of piston rod.
(e.g. P2021-50/20-100)



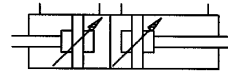
P2022
Tandem cylinder

Cylinders have the same stroke length and a common piston rod, double thrust in and nearly double thrust out.
(e.g. P2022-50/20-100)



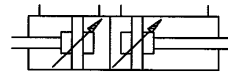
P2023
Three-position cylinder, mounted rear to rear

Both cylinders have the same stroke length, which provides three different positions.
(e.g. P2023-50/20-100)



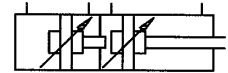
P2023
Four-position cylinder, mounted rear to rear

Cylinders have different stroke lengths, which provides four different positions.
(e.g. P2023-50/20-100-50)



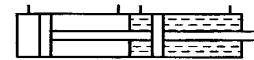
P2028
Multiple position cylinder, mounted front to rear end

Cylinder consists of two or more cylinders joined together to provide more than two defined end positions.
(e.g. P2028-50/20-100-160)



P2007
Cylinder with oil cushioning

Oil cushioning gives even piston velocity regardless of variations of load. The cylinder can be equipped with fluid cistern and one throttle or two restrictor valves.



SEAL OPTIONS:

P2020T
Cylinder with non-lube seals, temperature range -20...+80°C

Standard for \varnothing 80...20, option \varnothing 32...63

Non-lube seals for heavy use and demanding circumstances, including PTFE lip seal and two-lip PTFE scraper for piston rod, and NBR lip seals with permanent lubrication for piston. Cushioning seals of polyurethane, O-rings of NBR.
(e.g. P2020T-50/20-100)

P2020V
Cylinder with seals for high temperatures, -15...+150°C

Viton seals for piston, piston rod and cushioning, and viton O-rings. In \varnothing 80..200 mm piston rod seals like P2020T.
(e.g. P2020V-50/20-100)



P2020VE
Cylinder with non-lube seals for high temperatures, -15...+150°C

P2020V lubricated with special grease. Suitable specially for systems with no lubrication.
(e.g. P2020VE-50/20-100)



P2000N
Cylinder for liquid operating medium

Cylinder with no cushioning seals and with special piston rod seal for oil or water.
(e.g. P2000N-50/20-100)



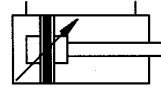
NOTE ! In case of special applications contact our technical sales support.

ACCESSORIES OPTIONS:

P2020M

Cylinder with magnetic piston,
 ø 160 and 200 mm

Cylinder with magnetic piston for touch-free position sensing, standard in bore sizes 32 to 125 mm.
 (e.g. P2020M-160/40-100)



P2020R

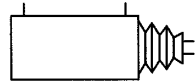
Cylinder with round tube,
 ø 32...125 mm

Cylinders ø 32...125 can be delivered with round tube instead of standard profile tube. Round tube is standard in ø 160...200.
 (e.g. P2020R-50/20-100)

P2020P

Piston rod protected with gaiter

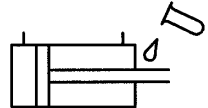
Piston rod protected with rubber gaiter. Note the piston rod extension, ask Pimatic for dimensions.
 (e.g. P2020P-50/20-100)



P2020H

Piston rod of stainless steel

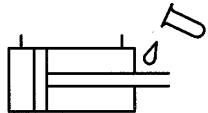
Piston rod of acid proof steel, chromed.
 (e.g. P2020H-50/20-100)



P2020K

Cylinder with outer parts in corrosion resistant material

Outer parts in aluminium or stainless steel.
 (e.g. P2020K-50/20-100)



P2020--drawing no.

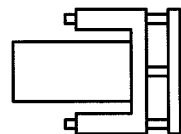
Special design

Special, made to customer design indicated with drawing number.
 (e.g. P2020-50/20-100-32123)

Further accessories available:

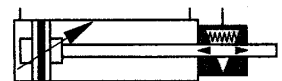
External guides

Cylinder is equipped with external guides for non-rotating piston rod movement. U profile for cylinders ø 32...100 mm, H profile for cylinders ø 32...125 mm.



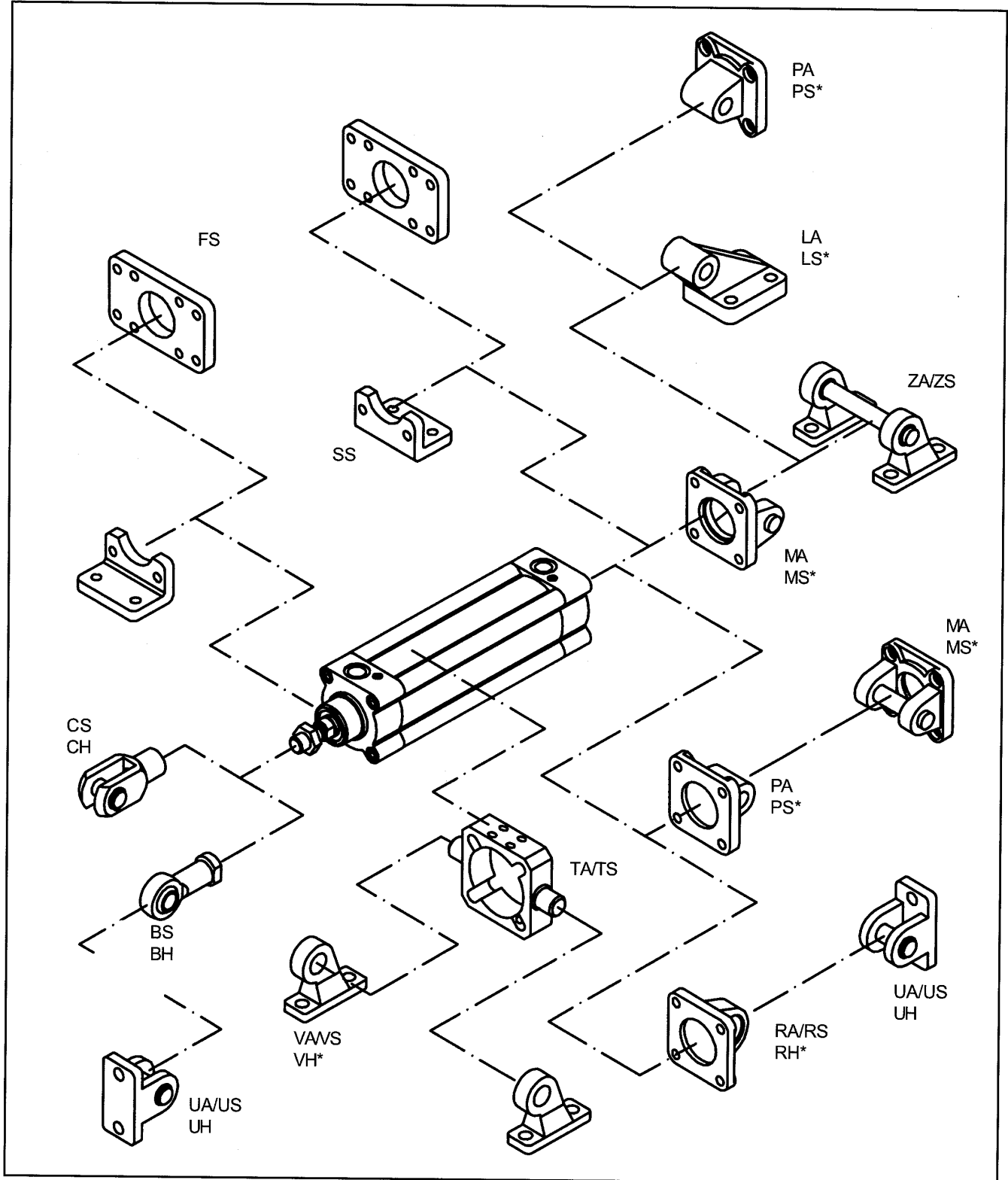
Locking device

Cylinder is equipped with a passive locking cylinder mounted to the front end cap - locked by spring, opened by pressure. Also available an active device locked by pressure, and devices with sensor.



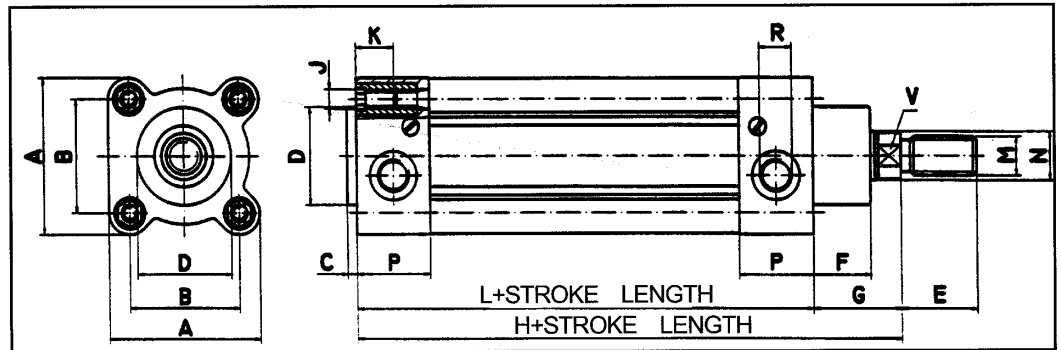
MOUNTINGS:

E.g. FS - first letter = mounting type,
 -second letter = material (A -aluminium, S-steel, H-AISI 316)
 Dimension tables and order references on pages 9...13.



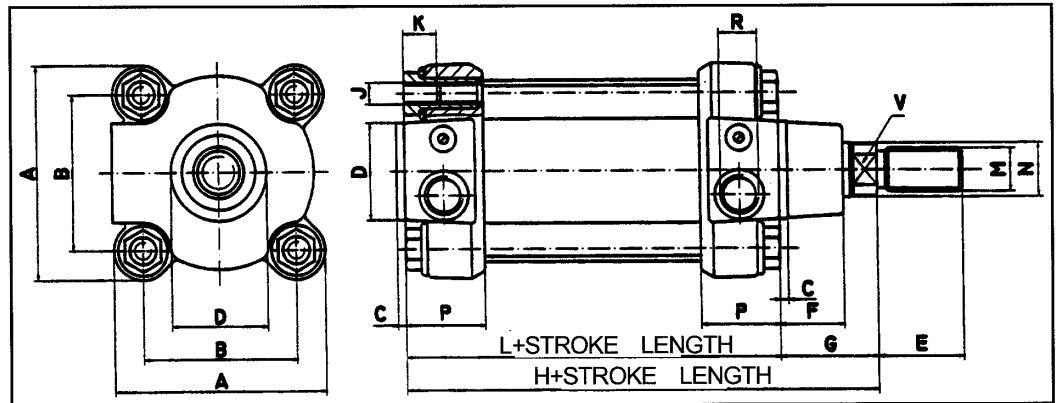
*at special request

Ø 32...63:



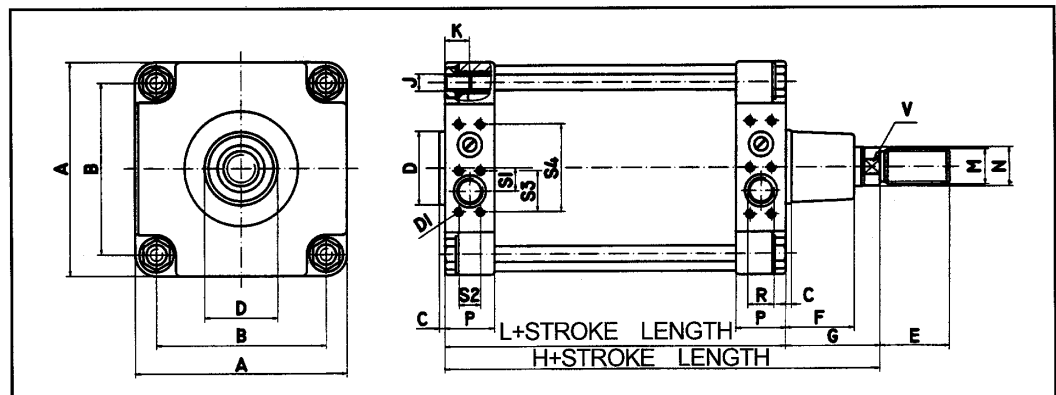
Bore size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	V
32	45,5	32,5	3,5	30	22	17	26	120	M6	16	94	M10x1,25	12	27	G1/8	10
40	52	38	3,5	35	24	20,5	30	135	M6	16	105	M12x1,25	16	27	G1/4	13
50	64	46,5	4	40	32	24	37	143	M8	16	106	M16x1,5	20	31	G1/4	17
63	74	56,5	4	45	32	24	37	158	M8	16	121	M16x1,5	20	32,5	G3/8	17

Ø 80...125:



Bore size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	V
80	99	72	4	45	40	30	46	174	M10	16	128	M20x1,5	25	37	G3/8	21
100	116	89	4	55	40	35	51	189	M10	16	138	M20x1,5	25	42	G1/2	21
125	141	110	6	60	54	50	65	225	M12	20	160	M27x2	32	48,5	G1/2	27

Ø 160...200:



Bore size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	V	D1	S1	S2	S3	S4
160	182	140	6	65	72	55	80	260	M16	24	180	M36x2	40	51	G3/4	36	M6	23,8	28	38	85,6
200	217	175	6	75	72	70	95	275	M16	24	180	M36x2	40	51	G3/4	36	M8	23,8	22	47,6	95,2
250																					
320																					

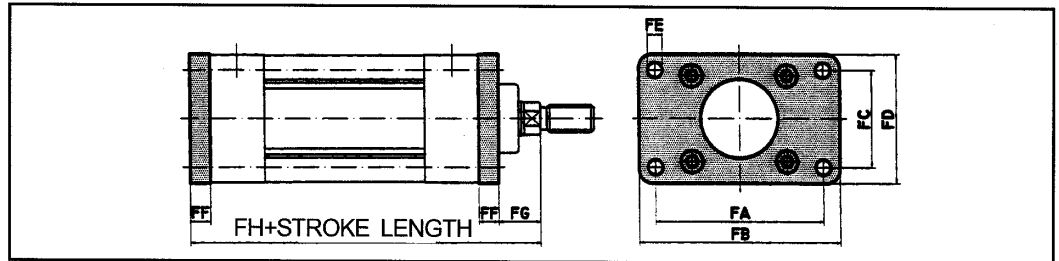
MOUNTINGS:

E.g. FS- first letter = mounting type,
second letter = material (A -aluminium, S -steel)

Flange mounting FS,

Flange at front or rear end;
steel with cataforesis surface
finishing

E.g. FS 050 20

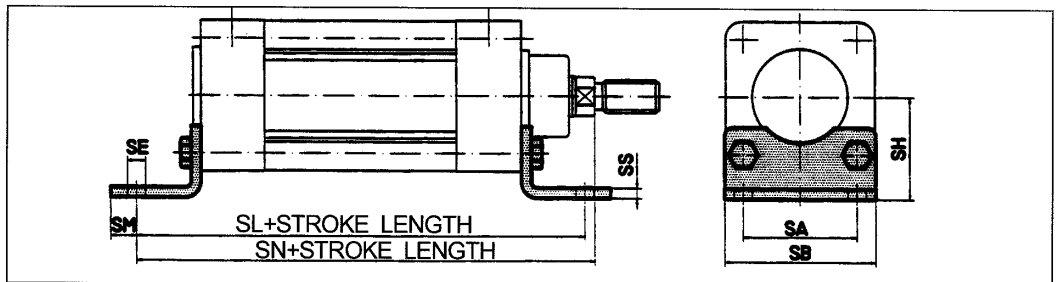


Bore size	32	40	50	63	80	100	125	160	200	250	320
FA	64	72	90	100	126	150	180	230	270		
FB	80	90	110	120	150	170	205	260	300		
FC	32	36	45	50	63	75	90	115	135		
FD	45	52	65	75	95	115	140	180	220		
FE	7	9	9	9	12	14	16	18	22		
FF	10	10	12	12	16	16	20	20	25		
FG	16	20	25	25	30	35	45	60	70		
FH	130	145	155	170	190	205	245	280	300		

Foot mounting SS,

end angles;
steel with cataforesis surface
finishing

E.g. SS 080 20

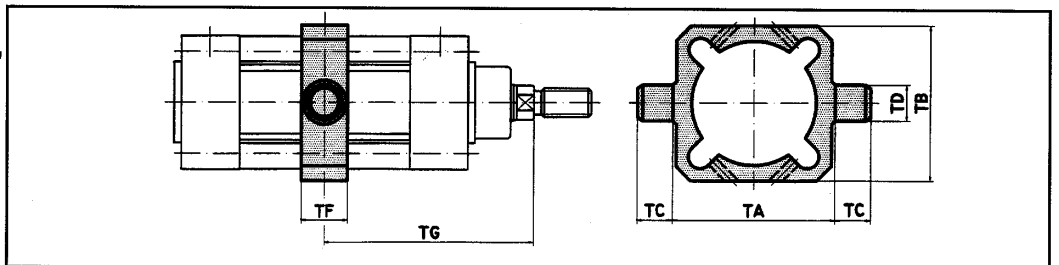


Bore size	32	40	50	63	80	100	125	160	200	250	320
SA	32	36	45	50	63	75	90	115	135		
SB	45	52	65	75	95	115	140	180	220		
SE	7	9	9	9	12	14	16	18	22		
SH	32	36	45	50	63	71	90	115	135		
SL	142	161	170	185	210	220	250	300	320		
SM	11	8	15	13	14	16	25	20	20		
SN	144	163	175	190	215	230	270	320	345		
SS	4	4	5	5	6	6	8	10	12		

Trunnion mounting TATS,

material ø 32...125 aluminium,
ø 125...200 (only for round tube)
zinc plated steel

E.g. TA 100 20



Bore size	32	40	50	63	80	100	125	160	200	250	320
TA (h14)	50	63	75	90	110	132	160	200	250		
TB	57	59	72	86	106	127	155	190	240		
TC (h14)	12	16	16	20	20	25	25	32	32		
TD (e9)	12	16	16	20	20	25	25	32	32		
TF	18	20	20	26	26	32	32	40	40		
TGmin.	62	67	78	83	96	109	130	151	166		

Adjustable in bore sizes 32...100 mm. Fixed in sizes 125...200 mm, dimension TG to be stated if not central.

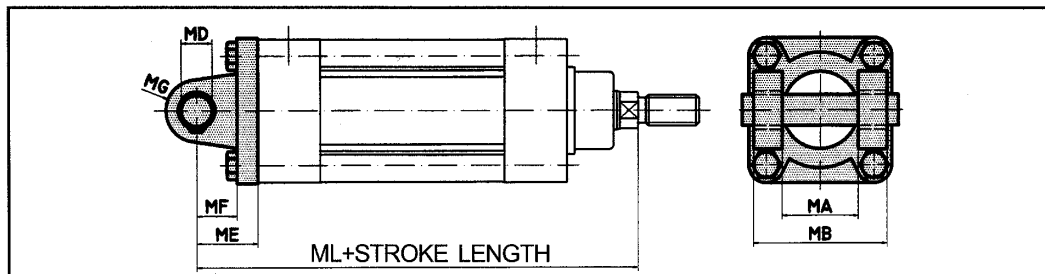
MOUNTINGS:

E.g. MA - first letter = mounting type,
second letter = material (A -aluminium, S -steel)

Mounting MA,

rear clevis mounting;
aluminium with cataforesis
surface finishing and steel axle
E.g. MA 040 20

At request also type **MS**
in steel+cataforesis

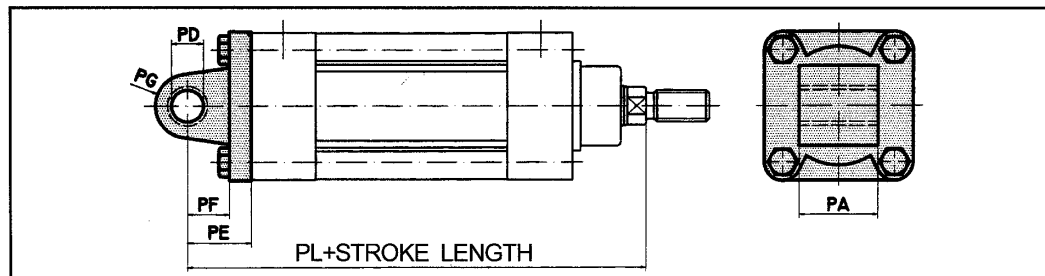


Bore size	32	40	50	63	80	100	125	160	200	250	320
MA	26	28	32	40	50	60	70	90	90		
MB	45	52	60	70	90	110	130	170	170		
MD (H9)	10	12	12	16	16	20	25	30	30		
MG	10	12	12	16	16	20	25	30	30		
ME	22	25	27	32	36	41	50	55	60		
MF	13	16	16	21	22	27	30	35	35		
ML	142	160	170	190	210	230	275	315	335		

Mounting PA,

rear eye mounting;
aluminium with cataforesis
surface finishing
E.g. PA 063 20

At request also type **PS**
in steel+cataforesis

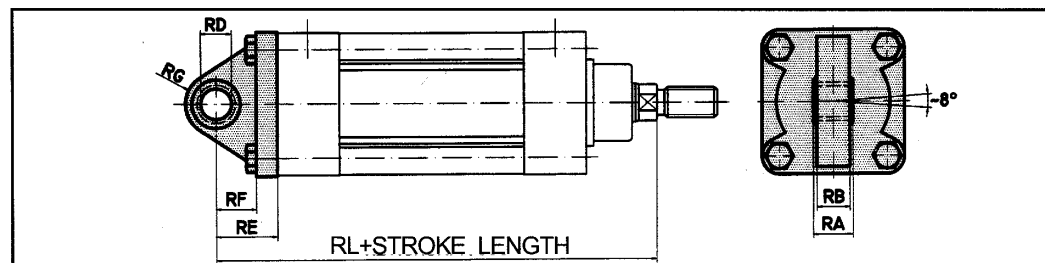


Bore size	32	40	50	63	80	100	125	160	200	250	320
PA	26	28	32	40	50	60	70	90	90		
PD (H9)	10	12	12	16	16	20	25	30	30		
PG	10	12	12	16	16	20	25	30	30		
PE	22	25	27	32	36	41	50	55	60		
PF	13	16	16	21	22	27	30	35	35		
PL	142	160	170	190	210	230	275	315	335		

Mounting RA/RS,

spherical rear bearing;
ø 32...125 in aluminium,
ø 160...200 in zinc plated steel
E.g. RA 100 20

At request type **RS** in
steel+cataforesis, ø 32...125



Bore size	32	40	50	63	80	100	125	160	200	250	320
RA	14	16	16	21	21	25	31	37	37		
RB	12	14	14	17	17	20	25	30	30		
RD (H9)	10	12	12	16	16	20	25	30	30		
RG	15	18	20	22	25	29	35	40	45		
RE	22	25	27	32	36	41	50	55	60		
RF	13	16	16	21	22	27	30	40	40		
RL	142	160	170	190	210	230	275	315	335		

MOUNTINGS for PISTON ROD:

E.g. BS- first letter = mounting type,
second letter = material (A -aluminium, S -steel)

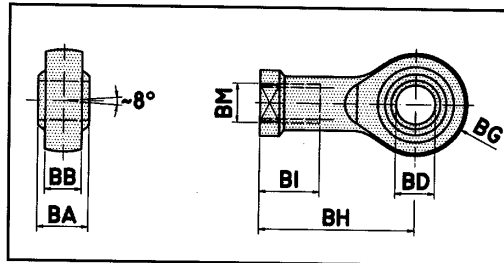
Mounting BS,

piston rod end spherical bearing
(ISO 8139);

zinc plated steel

E.g. BS 032 20

Also available in AISI 316, type BH



Bore size	32	40	50	63	80	100	125	160	200	250	320
BA (h12)	14	16	21	21	25	25	37	43	43		
BB	10,5	12	15	15	18	18	25	30	30		
BD (H9)	10	12	16	16	20	20	30	35	35		
BG max	14	16	21	21	25	25	35	40	40		
BH	43	50	64	64	77	77	110	125	125		
BI	20	23	34	34	40	40	54	56	56		
BM	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2		

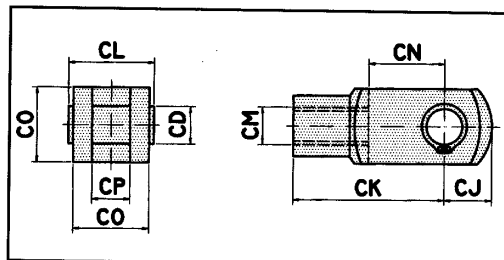
Mounting CS,

Piston rod clevis assembly
(ISO 8140);

zinc plated steel

E.g. CS 040 20

Also available in AISI 316, type CH



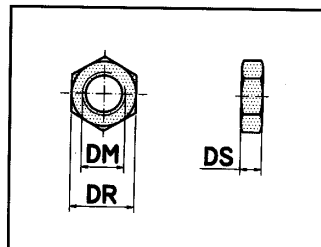
Bore size	32	40	50	63	80	100	125	160	200	250	320
CD (H9)	10	12	16	16	20	20	30	35	35		
CJ max	16	19	25	25	32	32	45	57	57		
CK	40	48	64	64	80	80	110	144	144		
CL	26	31	39	39	48	48	64	80	80		
CM	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2		
CO	20	24	32	32	40	40	55	70	70		
CN	20	24	32	32	40	40	54	72	72		
CP	10	12	16	16	20	20	30	35	35		

Mounting DS,

Piston rod nut;
zinc plated steel

E.g. DS 050 20

Also available in AISI 316, type DH



Piston rod nut DS is included in basic cylinder.

DS is also included in BS and CS, if mountings are ordered separately.

Bore size	32	40	50	63	80	100	125	160	200	250	320
DM	M10x1,25	M12x1,25	M16x1,5	M16x1,5	M20x1,5	M20x1,5	M27x2	M36x2	M36x2		
DR	17	19	24	24	30	30	41	55	55		
DS	5	6	8	8	10	10	12	18	18		

MOUNTINGS:

E.g. LA-

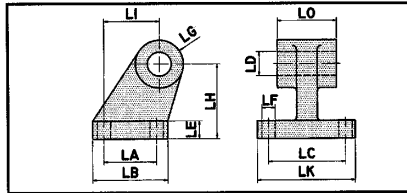
first letter = mounting type,
second letter = material (A -aluminium, S -steel)

Mounting LA,

rear 90° hinge mounting (CETOP RP 107 P);
(mounting for M),
aluminium with cataforesis surface finishing

E.g. L1236

At request also type LS in steel+cataforesis



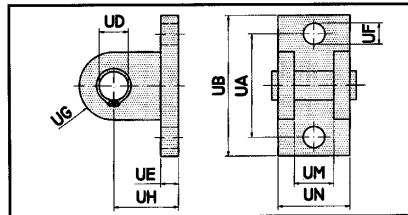
Bore size	32	40	50	63	80	100	125	160	200	250	320
LA	18	22	30	35	40	50					
LB	31	35	45	50	60	70					
LC	38	41	50	52	66	76					
LD (H9)	10	12	12	16	16	20					
LE	8	10	12	12	14	15					
LF	6,5	6,5	8,5	8,5	11	11					
LG	10	11	13	15	15	18					
LH	32	36	45	50	63	71					
LI	21	24	33	37	47	55					
LK	51	54	65	67	86	96					
LO	26	28	32	40	50	60					

Mounting UA/US,

clevis foot (mounting for R and B);
material \varnothing 32...125 aluminium,
 \varnothing 160...200 mm zinc plated steel

E.g. UA 040 20

Available also type UH, AISI 316, for \varnothing 32...125



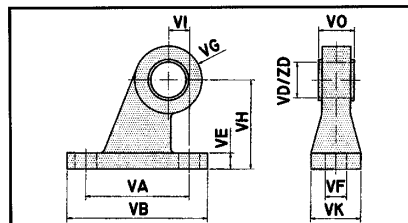
Bore size	32	40	50	63	80	100	125	160	200	250	320
UA	30	38	46	58	70	88	108	138	170		
UB	45	55	64	79	94	118	145	182	215		
UD	10	12	12	16	16	20	25	30	30		
UE	6	7	9	10	12	14	13	14	19		
UF	7	9	9	12	14	18	22	26	26		
UG	11	15	15	19	19	23	28	33	33		
UH	24	27	30	36	40	45	55	65	70		
UM	15	17	22	22	26	32	38	44	44		
UN	26	28	32	40	50	60	70	90	90		

Mounting VA/VS and ZA/ZS,

brackets (V mounting for T)
(Z mounting for M, P and R)
material \varnothing 32...100 aluminium,
 \varnothing 125...200 zinc plated steel

E.g. VA 100 20 or ZS 160 20

Available at request type VH, AISI 316



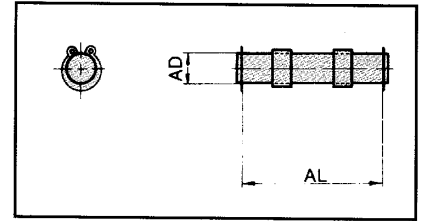
Bore size	32	40	50	63	80	100	125	160	200	250	320
VA	30	38	46	58	70	88	108	138	170		
VB	45	55	64	79	94	118	145	182	215		
VD (H9)	12	16	16	20	20	25	25	32	32		
ZD (H9)	10	12	12	16	16	20	25	30	30		
VE	6	7	7	9	11	11	13	18	18		
VF	7	9	9	12	14	18	22	26	26		
VG	11	15	15	19	19	23	28	33	33		
VH	32	36	45	50	63	71	90	115	135		
VI	7	9	10	12	14	17	21	25	25		
VK	16	18	25	25	34	40	45	60	60		
VO	12	16	16	20	20	25	25	30	30		

Pivot axle AS, dimensions in combinations

Pivot axle is included in mountings M and U, see dimension tables of the mountings.
When bracket Z is combined with M, P, B or R, the pivot axle must be ordered separately.

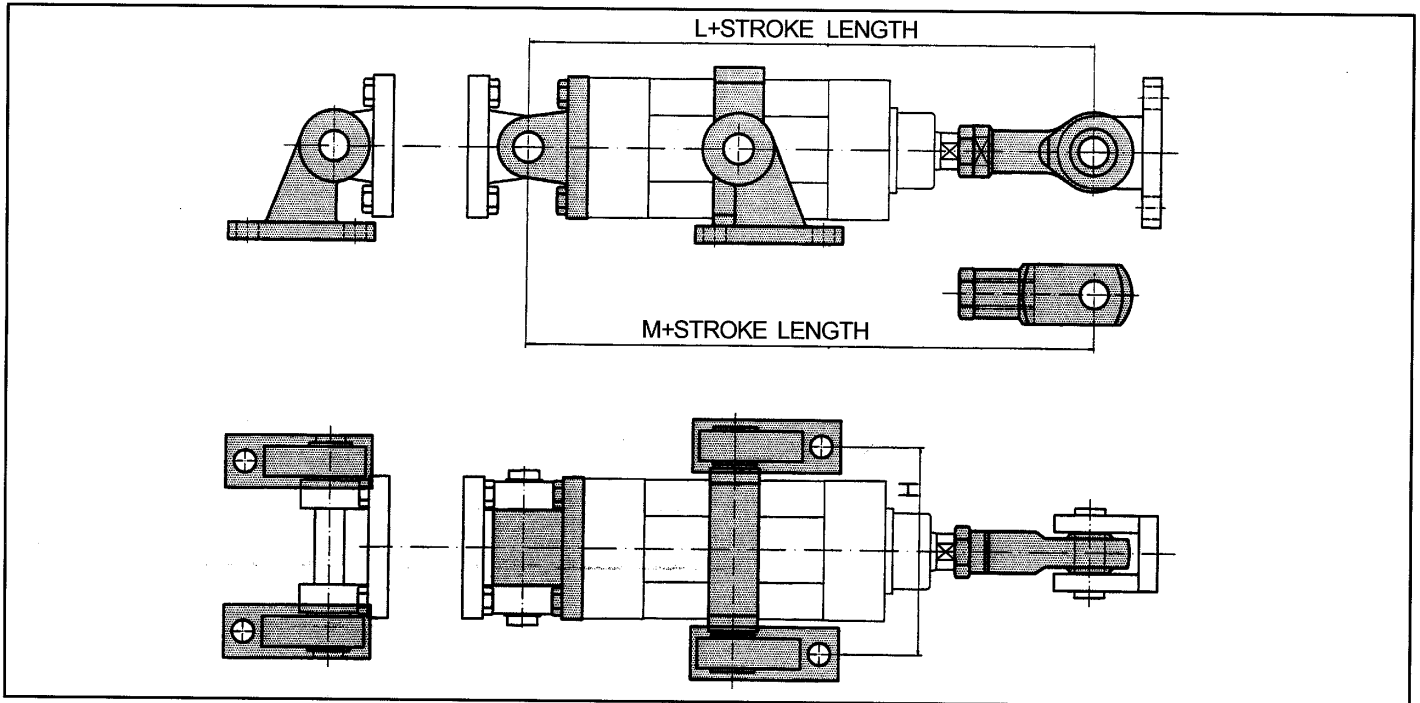
E.g. For combination M+Z, cylinder bore 32, the pivot axle is **AS 032 1066**
(=dimension AD 10, dimension AL 66).

Also available in AISI 316, type **AH**.



Bore size	32	40	50	63	80	100	125	160	200
B/R + Z	1035	1241	1252	1654	1668	2082	2590	30107	30107
P + Z	1046	1253	1263	1673	1693	20115	25122		
M + Z	1066	1277	1291	16104	16133	20165	25182	30234	30234

MOUNTING COMBINATIONS:



Bore size	32	40	50	63	80	100	125	160	200
H	62	80	92	112	132	160	187	232	282
L min.	190	216	242	262	297	317	397	458	478
M min.	187	214	242	262	300	320	397	477	497

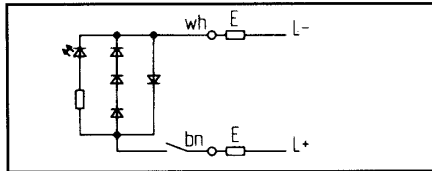
SENSORS w. CABLE OR PLUG:

Reed-switch 102 157

Normally open reed switch with varistor and LED-indication

Voltage AC	10-250 V
Voltage DC	10-250V
Current (25°C)	0,5 A
Power max. (inductive)	30 VA
Power max. (resistive)	20 W
Switch time (ON/OFF)	1,0 / 0,5 ms
Mechanical life time	min. 10 ⁶ cycles
Switching resistance	max. 150 mΩ
Protection degree	IP 67 (DIN 40 050)
Connection system	fixed cable 5 m
Temperature range	-25...+75°C

Connection:
102 157



MOUNTING TYPES

Cylinders ø 32...63
Cylinders ø 80...100
Cylinders ø 125

For profile tubes:	For tie rods:
351 070	351 064
351 071	351 067
351 072	351 067

SENSORS w. PLUG, for tie rods:

Reed-switch 102 247

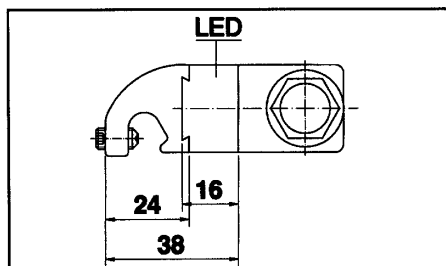
Normally open Reed-switch with varistor and LED-indication

Voltage AC/DC	10-230 V
Current (25°C)	0,5 A
Power max.	20 W / 30 VA
Switch time (ON/OFF)	10 / 0,8 ms
Mechanical life time	10 ⁷ cycles
Protection degree	IP 65
Connection system	plug DIN 43650/B
Operating temperature	-25 to +75°C

Dimensions 102 247 / 351 028

For bore sizes
ø 32...100

Mounting bracket
351 028

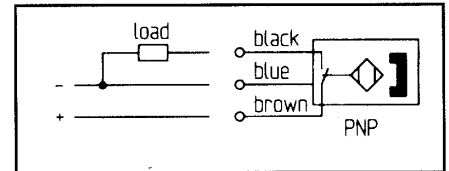


PNP sensor 102 190, or 102 190 PG

Normally open magnetoinductive sensor with PNP-output

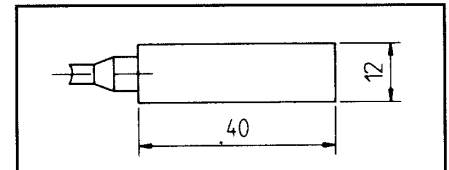
Voltage DC	10...30 V
Current (25°C)	200 mA
Power max.	6 W
Switch time (ON/OFF)	0,05 / 20 ms
Life time	min. 10 ⁷ cycles
Voltage drop	max. 1,05 V
Protection degree	IP 67 (DIN 40 050)
Connection system	fixed cable 5 m (102 190) M8 plug (102 190 PG)
Temperature range	-25...+75°C

Connection:
102 190

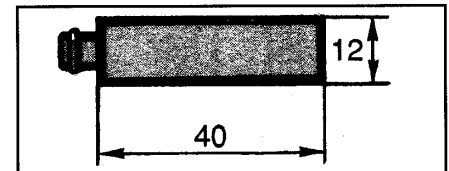


Dimensioning:

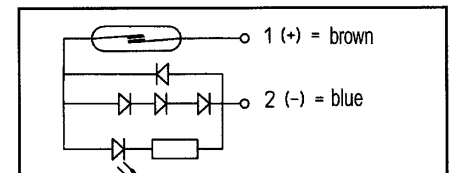
102 157
102 190



102 190 PG



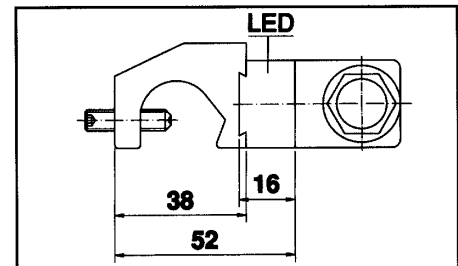
Connection:
102 247



Dimensions 102 247 / 351 019

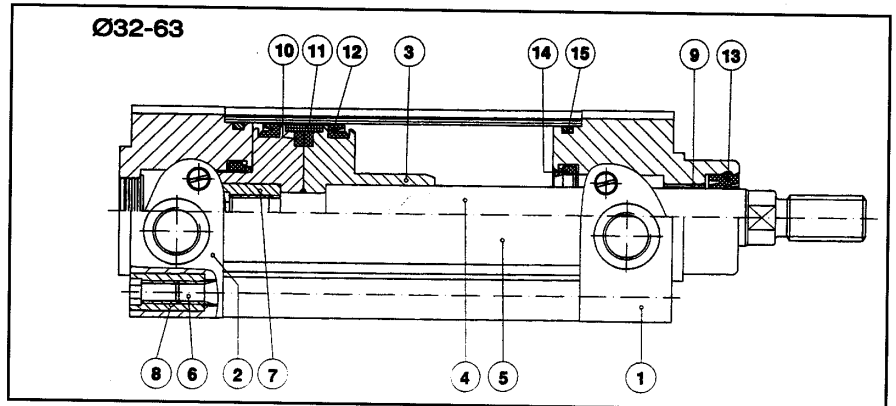
For bore sizes
ø 125...200

Mounting bracket
351 019

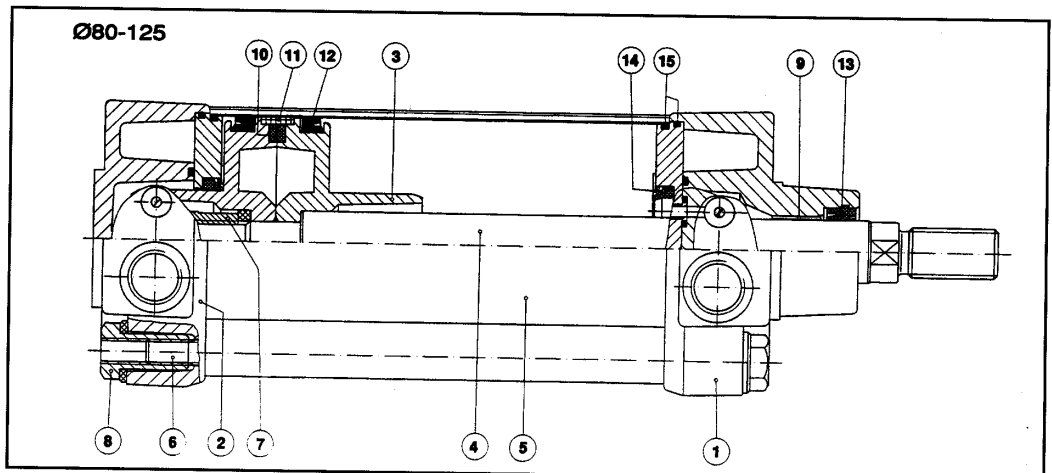


SPARE PARTS for BORE SIZES 32...63 MM:

- 1. Seal kit (parts: 11, 12, 13, 14, 15)
- 2. Cylinder tube (part: 5)
- 3. Piston rod (part: 4)
- 4. Tie rod kit (part: 6, 8)
- 5. Front end cap complete (part: 1)
- 6. Rear end cap complete (part: 2)
- 7. Piston complete (part: 3, 7, 10)



SPARE PARTS for BORE SIZES 80...125 MM:



SPARE PARTS for BORE SIZES 160...200 MM:

