

DOUBLE ACTING CYLINDERS, Ø 32 to 125 mm

conforming to

ISO 6431 - VDMA 24562 STANDARDS

SERIES 450 - TYPE : PES (with profiled barrel)

2



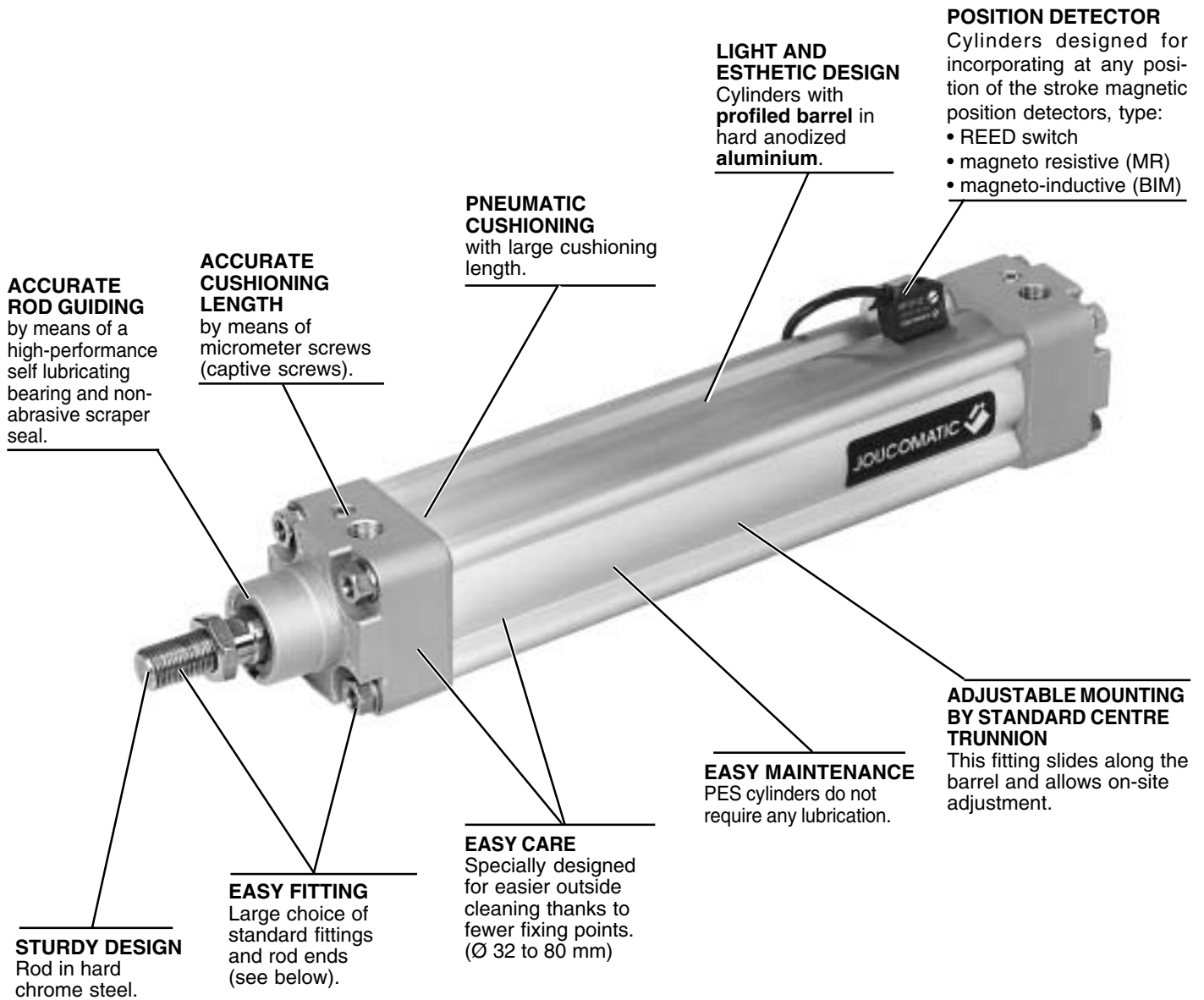
P230-GB.R8

ASCO[®]
JOUCOMATIC 

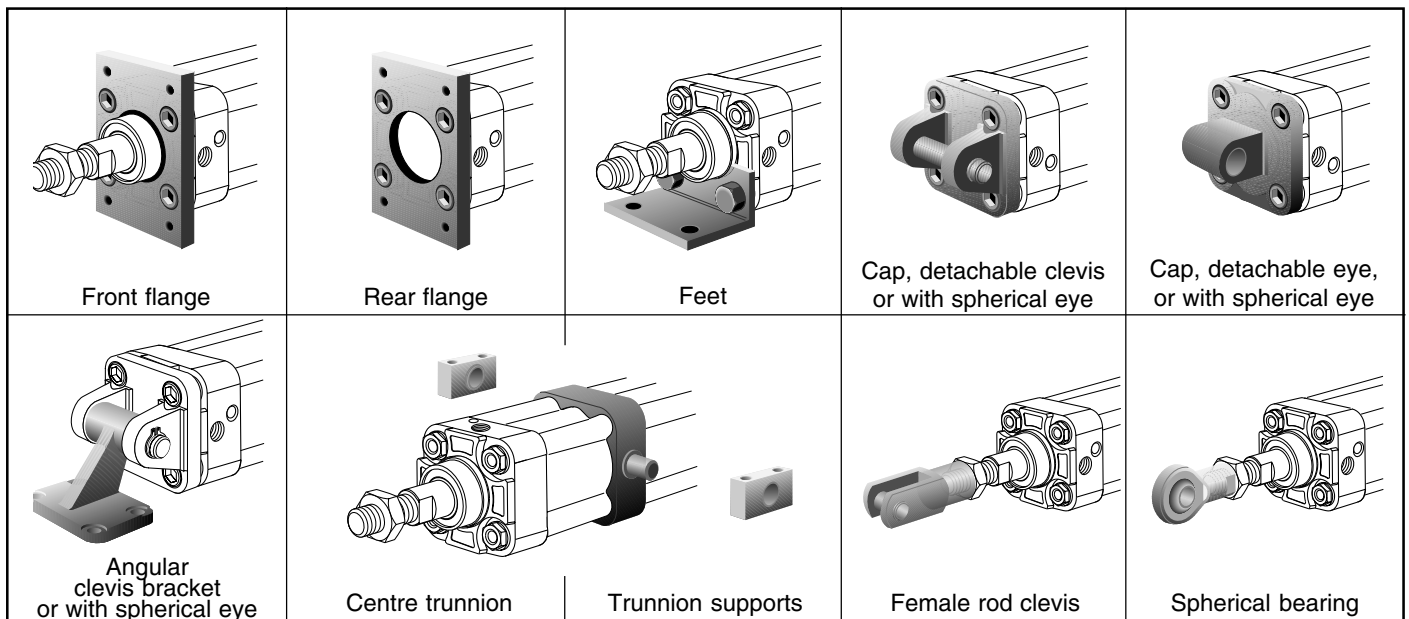
Pneutrol International Limited
UK Office
5 Caulside Drive, Antrim, BT41 2DU
United Kingdom
TEL: +44 (0) 289448 1808
www.valves-direct.com

sales@pneutrol.com
European Office
Unit 6, Saint Anthony's Business Park, Ballymount Road, D22 VW95
Ireland
TEL: +353 (0) 1 4373653
www.valves-direct.com

DOUBLE ACTING PNEUMATIC CYLINDERS - TYPE PES WITH PROFILED BARREL

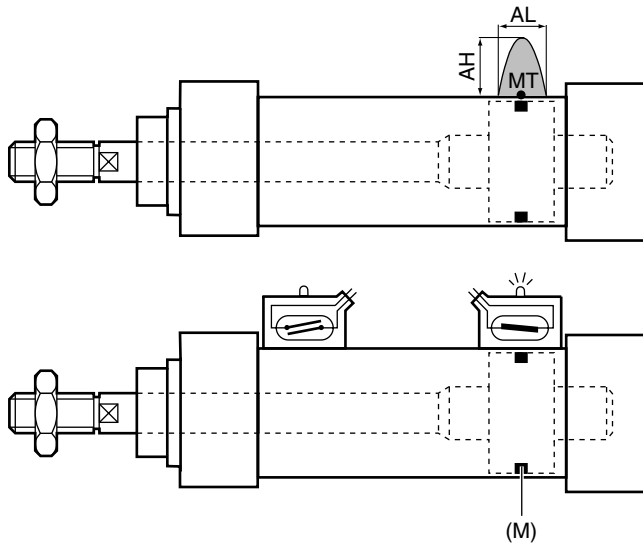


RANGE OF STANDARD FITTINGS



VDMA/ISO AIR CYLINDER Ø 32 to 125 mm

MAGNETIC DETECTION



The cylinder type PES, dia. 32 to 80 mm, onto which detectors can be mounted, has a **force line spectrum according to CNOMO E 530 52 809**. Field values: 7.5 m Tesla at point MT and a maximum of 2 m Tesla at the fringe of the force line spectrum (1 m Tesla = approx. 10 Gauss).

	Ø cylinder				
	32	40	50	63	80
AH	6	6	7	8	9
AL	8	9	10	10	11

mm

Optimal position detection is guaranteed when using our reed switch, magneto-resistive or magneto-inductive type detectors, see summary below.

Air cylinders equipped of a magnet (M) designed to operate in combination with the magnetic position detectors (DM). These air cylinders can be equipped with one or more magnetic position detectors (without contact) attached to the tube. They allow limit positions to be detected, as well as the intermediate piston positions.

DEFINING THE PART NUMBER OF A Ø 32 TO 125 mm VDMA/ISO AIR CYLINDER

PES .. **A/NA** ... - **DM**

VDMA/AFNOR/ISO AIR CYLINDER: prefix PES _____

Air cylinder diameter (mm) _____

End-of-stroke adjustable pneumatic cushioning: suffix **A**

Non-cushioned (elastic cushioning): suffix **NA**

Length of stroke (mm) _____

Air cylinder designed to receive magnetic position detectors = suffix **DM** _____

ORDERING

When ordering, please specify:

AIR CYLINDER

The air cylinder standard code or part number _____

The code or part number of any option(s) _____

450 +

MOUNTINGS

The code or codes and quantity of any mountings _____ : **434**

DETECTORS

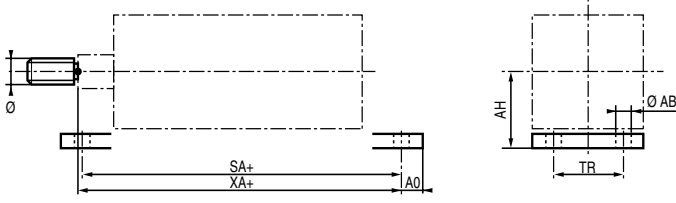
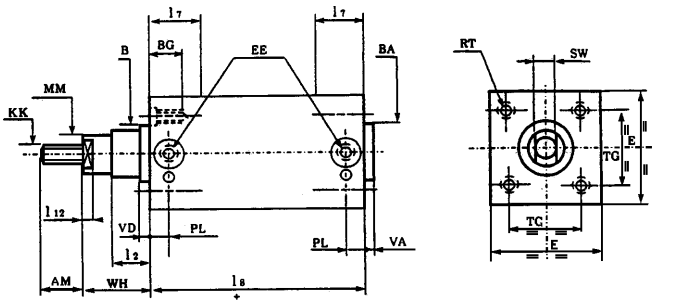
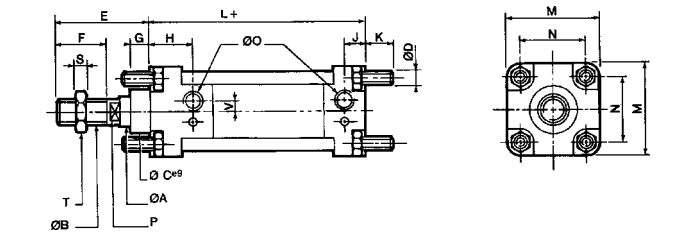
The code and quantity of any magnetic detectors _____ : **881**

The code and quantity of mountings _____ : **881**

CONTENTS

Standardization of dimensions and interchangeability _____	P230-4
Defining the diameter of a cylinder _____	P230-5
Double acting air cylinders Ø 32-125 mm _____	P230-6
Through rod type double acting air cylinders Ø 32-125 mm _____	P230-8
Mountings _____	P230-8
Overall dimensions _____	P230-10
Magnetic position detector, reed switch type _____	see P295
Magnetic position detector, magneto-resistive type (MR) _____	see P295
Magnetic position detector, magneto-inductive type (BIM) _____	see P297
PES specific version and options _____	P230-19

STANDARDIZATION OF DIMENSIONS AND INTERCHANGEABILITY

STANDARDS OF CYLINDERS Ø 32 to 320 mm	INTERCHANGEABILITY	
	within the standard	between standards
<p>ISO 6431 cylinders (year: 1983)</p> <p>The international standards define a cylinder unit equipped with its mountings without any specifications relative to the bare cylinder alone.</p>  <p><i>JOUCOMATIC cylinder, type PES series 450-453, complies with the international standards</i></p>	<p>Interchangeability between manufacturers is achieved by replacing both the cylinder and its mountings.</p>	<p>←</p> <p>For full interchangeability with ISO 6431,VDMA-AFNOR NFE 49003 cylinder must be equipped with its mountings, and reciprocally.</p> <p>(cylinder PES+mountings interchangeable with PIS cylinder).</p> <p>↑</p>
<p>VDMA 24562- CNOMO/AFNOR NFE 49003 cylinders (year: 1992)</p> <p>The new standards define first all the external dimensions of a bare cylinder then the mountings which, when mounted, must comply with the above unit (ISO 6431 cylinder).</p>  <p><i>JOUCOMATIC cylinder, type PES series 450 with profiled barrel or tie rods, complies with the new standards</i></p>	<p>Full interchangeability between the manufacturers is achieved at every level:</p> <ul style="list-style-type: none"> • bare cylinder, • each mounting, • complete unit. 	<p>←</p> <p>↑</p> <p>←</p> <p>↑</p>
<p>CNOMO 06.07.02/AFNOR NFE 49001 cylinders (year: 1968)</p> <p>The French standards define first all the external dimensions of a bare cylinder then the mountings.</p>  <p><i>JOUCOMATIC cylinder, type PCN series 437, complies with the French standards</i></p>	<p>Full interchangeability between the manufacturers is possible at every level:</p> <ul style="list-style-type: none"> • bare cylinder, • each mounting, • complete unit. 	<p>←</p> <p>↑</p> <p>←</p> <p>↑</p>

Note : ISO 6432 and AFNOR NFE 49030 standards apply only to mini-cylinders Ø 8 to 25 mm.

DEFINITION OF THE DIAMETER OF A CYLINDER

• THE DYNAMIC EFFORT DEVELOPED BY A CYLINDER

$$F = \text{Pressure} \times \text{piston area} \times \text{efficiency}$$

The efficiency of a cylinder depends on the diameter of the cylinder, on the pressure and on its mechanical construction. The graph and a chart below show the dynamic effort developed by a cylinder at the piston rod, at various supply pressures.

• LOAD FACTOR

This is the relationship expressed as a percentage between the actual load being moved by the cylinder and the dynamic effort available at the end of the piston rod.

$$\text{Load factor (in \%)} = \frac{\text{actual load}}{\text{dynamic effort}} \times 100$$

For an optimum installation of a cylinder, we recommend a cylinder with a load factor **inferior or equal to 75%**.

EXAMPLE: Calculate a cylinder to lift a load of 130 daN with a pressure of 7 bar (gauge pressure).

$$\text{Theoretical dynamic effort} = \frac{\text{actual load}}{\text{Load factor}} = \frac{130}{0.75} = 175 \text{ daN}$$

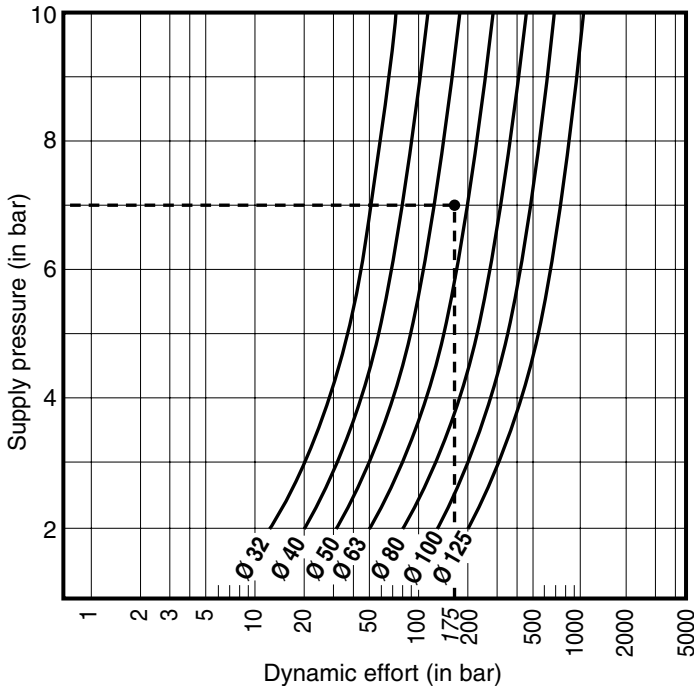
The graph below shows the cross over point between the dynamic effort and the supply pressure. The cylinder diameter required will be that where the curve passes this point or the cylinder giving a force immediately above that required.

In the example above: 175 daN is between Ø 50 and Ø 63. The cylinder recommended is the Ø 63 mm which will develop a force of 200 daN at 7 bar and the actual load factor is:

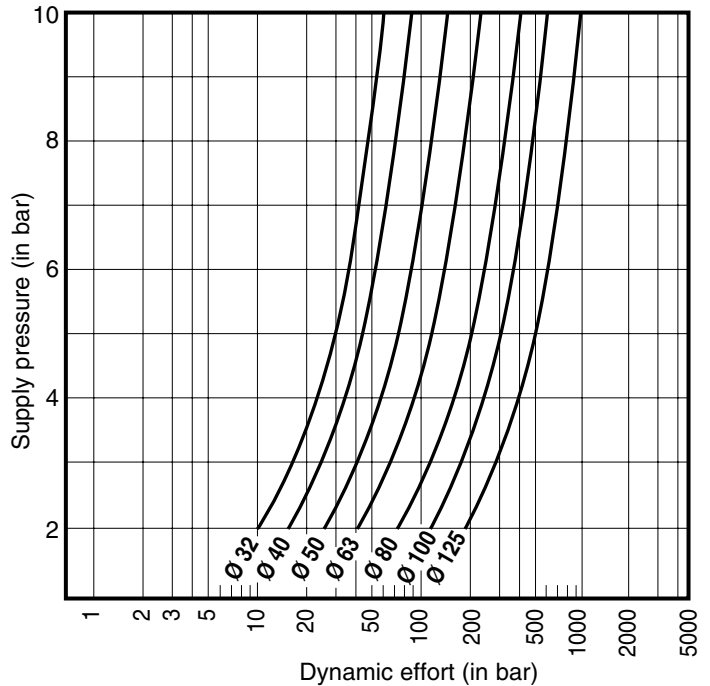
$$\frac{130 \text{ daN}}{200 \text{ daN}} \times 100 = 65\%$$

2

EFFORTS DEVELOPED AT THE END OF THE ROD (ROD OUT)



EFFORTS DEVELOPED AT THE END OF THE ROD (ROD RETURNED)



EFFORTS DEVELOPED BY A CYLINDER (in daN)

Ø Cylinder (mm)	Ø Rod (mm)	Piston cross-section area (cm ²)		Dynamic effort developed (in daN) at various supply pressures (in bar)									
				2		4		6		8		10	
		●	○	●	○	●	○	●	○	●	○	●	○
32	12	8	6,9	13	11	30	25	46	39	62	52	77	65
40	16	12,6	10,6	21	17	46	37	70	58	95	80	122	100
50	20	19,6	16,5	33	27	70	58	110	92	150	124	190	155
63	20	31,2	28,1	53	46	110	98	170	154	230	211	290	264
80	25	50,3	45,4	88	77	185	163	285	255	385	341	480	427
100	25	78,5	73,5	135	125	290	260	440	400	600	550	750	675
125	32	123	115	210	200	460	420	700	650	925	875	1150	1100

● Efforts developed with rod out (bottom side)

○ Efforts developed with rod returned (rod side)

Note: Cylinders with double crossbar develop identical efforts in both working directions. Their values are the ones defined here-above for efforts developed with rod **returned**.

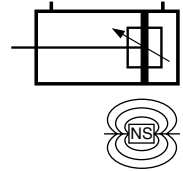
Series 450
Type: PES-DM

DOUBLE ACTING CYLINDERS Ø 32 to 125 mm

equipped for magnetic position detectors
Conforming with VDMA-ISO standards

With or without adjustable pneumatic cushioning

Cylinders with profiled barrel



SPECIFICATION

FLUID : air or neutral gas, filtered, lubricated or not
PRESSURE : 10 bar max.
TEMPERATURE : - 20° C, at + 60° C (for higher temperature, see P239)
OPTIMAL MAX. SPEED : ≤ 1 m/s (for optimal service life)
MAX. SPEED RATE : 2 m/s
STANDARDS : **VDMA 24562 - ISO 6431**

CONSTRUCTION

Barrel : non magnetic hard anodized aluminium alloy
Rod : hard chrome plated steel
Piston : acetal resin (POM), or light alloy
fitted with a permanent annular magnet
Piston seal : polyurethane (PUR)
Cushioning seals : polyurethane (PUR)
Front and rear ends : aluminium alloy
Bearing : metal self lubricating
Rod nut : galvanized steel
Cushioning : pneumatic, adjustable from both sides with captive screws



CHOICE OF EQUIPMENT

Bore Ø (mm)	Strokes (mm)	CODES * * to specify on order		REFERENCES * to specify on order	Connection Ø	Cushioning length (mm)
		CUSHIONED CYLINDER (A)	NON-CUSHIONED CYLINDER (NA)			
32 ***	25	450 00 001	450 00 097	PES 32 (A or NA) 25-DM	G 1/8	18
	50	450 00 002	450 00 098	PES 32 (A or NA) 50-DM		
	80	450 01 003	450 01 010	PES 32 (A or NA) 80-DM		
	100	450 00 003	450 00 099	PES 32 (A or NA) 100-DM		
	125	450 01 017	450 01 024	PES 32 (A or NA) 125-DM		
	160	450 00 004	450 00 100	PES 32 (A or NA) 160-DM		
	200	450 00 005	450 00 101	PES 32 (A or NA) 200-DM		
	250	450 00 006	450 00 102	PES 32 (A or NA) 250-DM		
	X	450 50 193	450 50 202	PES 32 (A or NA) ... -DM		
	40	25	450 00 007	450 00 103		
50		450 00 008	450 00 104	PES 40 (A or NA) 50-DM		
80		450 01 004	450 01 011	PES 40 (A or NA) 80-DM		
100		450 00 009	450 00 105	PES 40 (A or NA) 100-DM		
125		450 01 018	450 01 025	PES 40 (A or NA) 125-DM		
160		450 00 010	450 00 106	PES 40 (A or NA) 160-DM		
200		450 00 011	450 00 107	PES 40 (A or NA) 200-DM		
250		450 00 012	450 00 108	PES 40 (A or NA) 250-DM		
320		450 00 013	450 00 109	PES 40 (A or NA) 320-DM		
400		450 00 014	450 00 110	PES 40 (A or NA) 400-DM		
X		450 50 194	450 50 203	PES 40 (A or NA) ... -DM		
50		25	450 00 015	450 00 111	PES 50 (A or NA) 25-DM	G 1/4
	50	450 00 016	450 00 112	PES 50 (A or NA) 50-DM		
	80	450 01 005	450 01 012	PES 50 (A or NA) 80-DM		
	100	450 00 017	450 00 113	PES 50 (A or NA) 100-DM		
	125	450 01 019	450 01 026	PES 50 (A or NA) 125-DM		
	160	450 00 018	450 00 114	PES 50 (A or NA) 160-DM		
	200	450 00 019	450 00 115	PES 50 (A or NA) 200-DM		
	250	450 00 020	450 00 116	PES 50 (A or NA) 250-DM		
	320	450 00 021	450 00 117	PES 50 (A or NA) 320-DM		
	400	450 00 022	450 00 118	PES 50 (A or NA) 400-DM		
	500	450 00 023	450 00 119	PES 50 (A or NA) 500-DM		
	630	450 00 024	450 00 120	PES 50 (A or NA) 630-DM		
	X	450 50 195	450 50 204	PES 50 (A or NA) ... -DM		
	63	25	450 00 025	450 00 121	PES 63 (A or NA) 25-DM	
50		450 00 026	450 00 122	PES 63 (A or NA) 50-DM		
80		450 01 006	450 01 013	PES 63 (A or NA) 80-DM		
100		450 00 027	450 00 123	PES 63 (A or NA) 100-DM		
125		450 01 020	450 01 027	PES 63 (A or NA) 125-DM		
160		450 00 028	450 00 124	PES 63 (A or NA) 160-DM		
200		450 00 029	450 00 125	PES 63 (A or NA) 200-DM		
250		450 00 030	450 00 126	PES 63 (A or NA) 250-DM		
320		450 00 031	450 00 127	PES 63 (A or NA) 320-DM		
400		450 00 032	450 00 128	PES 63 (A or NA) 400-DM		
500		450 00 033	450 00 129	PES 63 (A or NA) 500-DM		
630		450 00 034	450 00 130	PES 63 (A or NA) 630-DM		
X		450 50 196	450 50 205	PES 63 (A or NA) ... -DM		

X Other strokes on request (to specify on order within the reference)

* A = Cushioned, NA = Non-cushioned

*** **The magnetic position detectors are ordered separately:** UNI model, reed switch or magneto-resistive type (see P295) or BIM model, magneto-inductive (see P297)

***In the case of use of a BIM magnetic detector on PES series 450 Ø 32, it is necessary to add the option code = **995 125**

Bore Ø (mm)	Strokes (mm)	CODES ** to specify on order		REFERENCES * to specify on order	Connection Ø	Cushioning length (mm)
		CUSHIONED CYLINDER (A)	NON-CUSHIONED CYLINDER (NA)			
80	25	450 00 035	450 00 131	PES 80 (A or NA) 25-DM	G 3/8	27
	50	450 00 036	450 00 132	PES 80 (A or NA) 50-DM		
	80	450 01 007	450 01 014	PES 80 (A or NA) 80-DM		
	100	450 00 037	450 00 133	PES 80 (A or NA) 100-DM		
	125	450 01 021	450 01 028	PES 80 (A or NA) 125-DM		
	160	450 00 038	450 00 134	PES 80 (A or NA) 160-DM		
	200	450 00 039	450 00 135	PES 80 (A or NA) 200-DM		
	250	450 00 040	450 00 136	PES 80 (A or NA) 250-DM		
	320	450 00 041	450 00 137	PES 80 (A or NA) 320-DM		
	400	450 00 042	450 00 138	PES 80 (A or NA) 400-DM		
	500	450 00 043	450 00 139	PES 80 (A or NA) 500-DM		
	630	450 00 044	450 00 140	PES 80 (A or NA) 630-DM		
	X	450 50 197	450 50 206	PES 80 (A or NA) ... -DM		
	100	50	450 01 131	450 01 161		
80		450 01 132	450 01 162	PES 100 (A or NA) 80-DM		
100		450 01 133	450 01 163	PES 100 (A or NA) 100-DM		
125		450 01 134	450 01 164	PES 100 (A or NA) 125-DM		
160		450 01 135	450 01 165	PES 100 (A or NA) 160-DM		
200		450 01 136	450 01 166	PES 100 (A or NA) 200-DM		
250		450 01 137	450 01 167	PES 100 (A or NA) 250-DM		
320		450 01 138	450 01 168	PES 100 (A or NA) 320-DM		
400		450 01 139	450 01 169	PES 100 (A or NA) 400-DM		
500		450 01 140	450 01 170	PES 100 (A or NA) 500-DM		
630		450 01 141	450 01 171	PES 100 (A or NA) 630-DM		
700		450 01 142	450 01 172	PES 100 (A or NA) 700-DM		
800		450 01 143	450 01 173	PES 100 (A or NA) 800-DM		
900		450 01 144	450 01 174	PES 100 (A or NA) 900-DM		
1000		450 01 145	450 01 175	PES 100 (A or NA) 1000-DM		
X		450 51 008	450 51 012	PES 100 (A or NA) ... -DM		
125		50	450 01 146	450 01 176	PES 125 (A or NA) 50-DM	G 1/2
	80	450 01 147	450 01 177	PES 125 (A or NA) 80-DM		
	100	450 01 148	450 01 178	PES 125 (A or NA) 100-DM		
	125	450 01 149	450 01 179	PES 125 (A or NA) 125-DM		
	160	450 01 150	450 01 180	PES 125 (A or NA) 160-DM		
	200	450 01 151	450 01 181	PES 125 (A or NA) 200-DM		
	250	450 01 152	450 01 182	PES 125 (A or NA) 250-DM		
	320	450 01 153	450 01 183	PES 125 (A or NA) 320-DM		
	400	450 01 154	450 01 184	PES 125 (A or NA) 400-DM		
	500	450 01 155	450 01 185	PES 125 (A or NA) 500-DM		
	630	450 01 156	450 01 186	PES 125 (A or NA) 630-DM		
	700	450 01 157	450 01 187	PES 125 (A or NA) 700-DM		
	800	450 01 158	450 01 188	PES 125 (A or NA) 800-DM		
	900	450 01 159	450 01 189	PES 125 (A or NA) 900-DM		
	1000	450 01 160	450 01 190	PES 125 (A or NA) 1000-DM		
	X	450 51 009	450 51 013	PES 125 (A or NA) ... -DM		

NOTE: Ø 160 to 250 mm = PES with tie rods (see P232)

X Other strokes on request (to specify on order within the reference)

* A = Cushioned, NA = Non-cushioned

** The magnetic position detectors are ordered separately: UNI model, reed switch or magneto-resistive type (see P295) or BIM model, magneto-inductive (see P297)

MOUNTINGS : see following pages

OPTIONS AND SPECIFIC VERSIONS

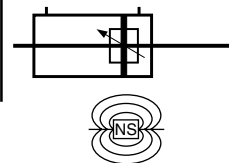
The PES range offers a wide variety of options and versions for specific applications (consult us).

- High temperature version (0° C to 120° C) - see P239

Series 450
Type PES-DM-T2

THROUGH ROD TYPE DOUBLE ACTING CYLINDERS Ø 32 to 125 mm

equipped for magnetic position detectors
Conforming with VDMA-ISO standards
With adjustable pneumatic cushioning



SPECIFICATION

FLUID	: air or neutral gas, filtered, lubricated or not
PRESSURE	: 10 bar max.
TEMPERATURE	: - 20° C, at + 60° C (for higher temperature, see P239)
OPTIMAL MAX. SPEED	: ≤ 1 m/s (for optimal service life)
MAX. SPEED RATE	: 2 m/s
STANDARDS	: VDMA 24562 - ISO 6431

CONSTRUCTION

Barrel	: non magnetic hard anodized aluminium alloy
Rod	: hard chrome plated steel
Piston	: acetal resin (POM), or light alloy fitted with a permanent annular magnet
Piston seal	: polyurethane (PUR)
Cushioning seals	: polyurethane (PUR)
Front and rear ends	: aluminium alloy
Bearing	: metal self lubricating
Rod nut	: galvanized steel
Cushioning	: pneumatic, adjustable from both sides with captive screws



CHOICE OF EQUIPMENT

Bore Ø (mm)	PES CYLINDER WITH PROFILED BARREL THROUGH ROD TYPE		Max. stroke capability (mm)	Connection Ø	Cushioning length (mm)
	CODES	REFERENCES			
32 *	450 50 211 ⁽¹⁾ ...	PES 32 A ⁽¹⁾ DM - T2	300	G1/8	18
40	450 50 212 ⁽¹⁾ ...	PES 40 A ⁽¹⁾ DM - T2	400	G1/4	20
50	450 50 213 ⁽¹⁾ ...	PES 50 A ⁽¹⁾ DM - T2	500	G1/4	26
63	450 50 214 ⁽¹⁾ ...	PES 63 A ⁽¹⁾ DM - T2	500	G3/8	26
80	450 50 215 ⁽¹⁾ ...	PES 80 A ⁽¹⁾ DM - T2	600	G 3/8	27
100	450 51 010 ⁽¹⁾ ...	PES 100 A ⁽¹⁾ DM - T2	600	G 3/8	33
125	450 51 011 ⁽¹⁾ ...	PES 125 A ⁽¹⁾ DM - T2	600	G 3/8	37

(1) Please specify stroke length (in mm) , compatible with the max. stroke capability.

The magnetic position detectors are ordered separately: UNI model, reed switch or magneto-resistive type (see P295) or BIM model, magneto-inductive (see P297)

* In the case of use of a BIM magnetic detector on PES series 450 Ø 32, it is necessary to add the option code = **995 125**

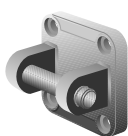
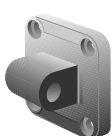
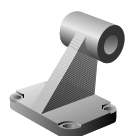
DIMENSIONS (see following pages)




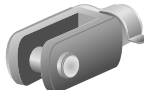

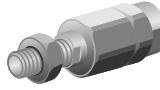
MOUNTINGS

		Low feet (2) MS1	High foot (1) MS3	Rectangular front or rear flange MF1 - MF2	Centre trunnion MT4 (for PES cylinder with profiled barrel) supplied fixed / XV(3) supplied loose (4)	Supports (2) for centre trunnion AT4
Application	Standard duty	●	●	●	●	●
	Heavy duty	●	●	●	●	●
Construction		Stamped sheet steel	Drawn steel	Steel	Cast iron	Cast iron
For cylinder Ø		CODES OF MOUNTINGS				
	32	434 00 163	434 00 307	434 00 119	410 521	410 557
	40	434 00 164	434 00 308	434 00 120	410 522	410 558
	50	434 00 165	434 00 309	434 00 121	410 523	410 559
	63	434 00 166	434 00 310	434 00 122	410 524	410 560
	80	434 00 167	434 00 311	434 00 123	410 525	410 561
	100	434 00 168	-	434 00 124	410 526	410 562
	125	434 00 169	-	434 00 192	410 527	410 563
Dimensions		page 11	page 17	page 11	page 16	page 16

MOUNTINGS

2

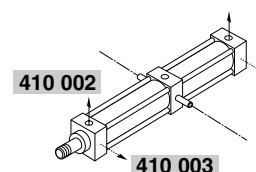
		 Cap, detachable clevis MP2			 Cap, detachable eye (trunnion) MP4			 Angular clevis bracket AB3		
Application	Standard duty	●	●		●	●		●	●	
	Heavy duty		●	●		●	●		●	●
Construction		Light alloy	Cast iron+steel without bush	Cast iron+steel + bush	Light alloy	Cast iron without bush	Cast iron + bush	Light alloy	Cast iron without bush	Cast iron + bush
For cylinder Ø		CODES OF MOUNTINGS								
	32	434 00 130	434 00 257	434 00 185	434 00 125	434 00 266	434 00 171	434 00 383	434 00 145	434 00 110
	40	434 00 131	434 00 258	434 00 186	434 00 126	434 00 267	434 00 172	434 00 384	434 00 146	434 00 111
	50	434 00 132	434 00 259	434 00 187	434 00 127	434 00 268	434 00 173	434 00 385	434 00 147	434 00 112
	63	434 00 133	434 00 260	434 00 188	434 00 128	434 00 269	434 00 174	434 00 386	434 00 148	434 00 113
	80	434 00 134	434 00 261	434 00 189	434 00 129	434 00 270	434 00 175	434 00 387	434 00 149	434 00 114
	100	434 00 135	434 00 262	434 00 190	434 00 161	434 00 271		434 00 388		
	125		434 00 263							
Dimensions		pages 12/13			pages 12/13			page 13		

		 Cap, clevis for spherical eye or clevis bracket		 Cap, eye with spherical bearing (5) MP6		 Angular clevis bracket spherical eye (5) AB5		 Female rod clevis ISO 8140 - RP102P AP2		 Spherical rod end ISO 8139 - RP103P AP6		 Alignment (6) compensator	
Application	Standard duty	●	●	●	●	●	●	●	●				
	Heavy duty	●	●	●	●	●	●	●	●				
Construction		Forged steel	Forged steel	Forged steel	Steel	Steel	Steel	Steel					
For cylinder Ø		CODES OF MOUNTINGS											
	32	434 00 363	434 00 372	434 00 354	434 00 016	434 00 001	434 00 242						
	40	434 00 364	434 00 373	434 00 355	434 00 017	434 00 002	434 00 243						
	50	434 00 365	434 00 374	434 00 356	434 00 018	434 00 003	434 00 244						
	63	434 00 366	434 00 375	434 00 357	434 00 018	434 00 003	434 00 244						
	80	434 00 367	434 00 376	434 00 358	434 00 019	434 00 004	434 00 245						
	100	434 00 368	434 00 377	434 00 359	434 00 019	434 00 004	434 00 245						
	125	434 00 369	434 00 378	434 00 360	434 00 020	434 00 005							
Dimensions		pages 14/15	pages 14/15	page 15	page 18	page 18	page 18						

- (1) High foot sold individually
 - (2) Corresponds to a set of 2 parts.
 - (3) Trunnion supplied **fixed to the barrel** at dimension XV specified when ordered:
The centre trunnion code fixed and the dimension XV along with orientation code of the trunnion with respect to the ports must be added to the cylinder code.
(example: 450 00 020 + options 410 523 / XV = 210 + 410 002)
 - (4) Trunnion supplied **loose** on cylinder barrel for on-site adjustment to required dimension:
The centre trunnion code loose and the dimension XV along with orientation code of the trunnion with respect to the ports must be added to the cylinder code
 - (5) These accessories allows accurate angular compensation adjustment spherical of 4°
 - (6) This accessorie allows accurate angular compensation adjustment spherical of 4° and radial of 0,7 mm
- NOTE: With the exception of the centre trunnion, mountings are delivered separately.

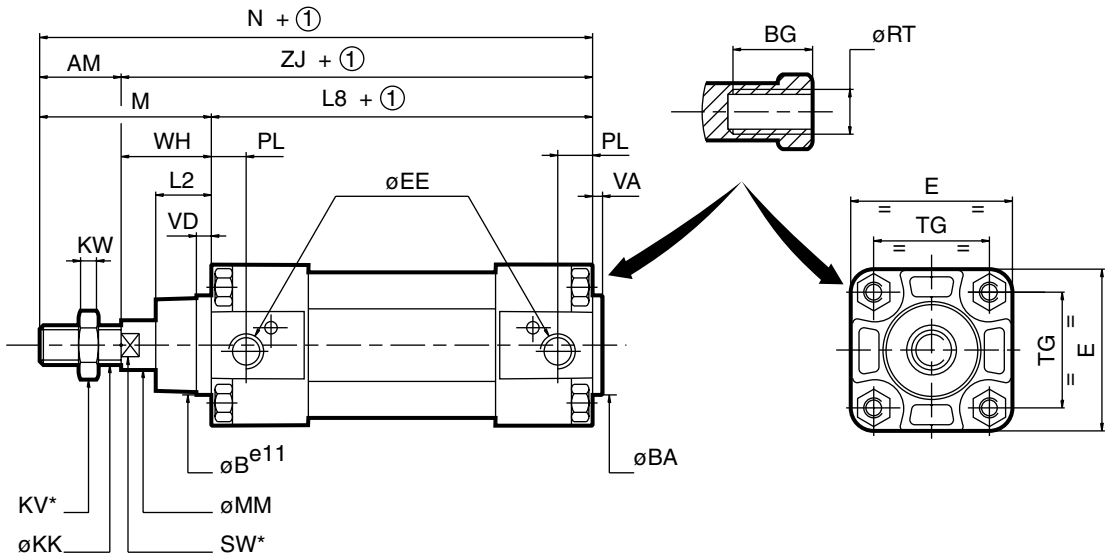
Centre trunnion orientation

- Trunnion axis is perpendicular to supply ports, code: **410 002** (standard orientation)
- other position upon request, code: **410 003**

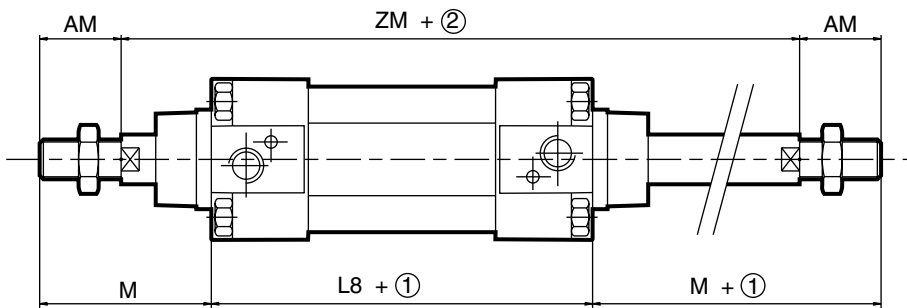


Series 450

DIMENSIONS AND WEIGHTS - BARE CYLINDER



SINGLE
ROD
CYLINDER



THROUGH
ROD TYPE
CYLINDER

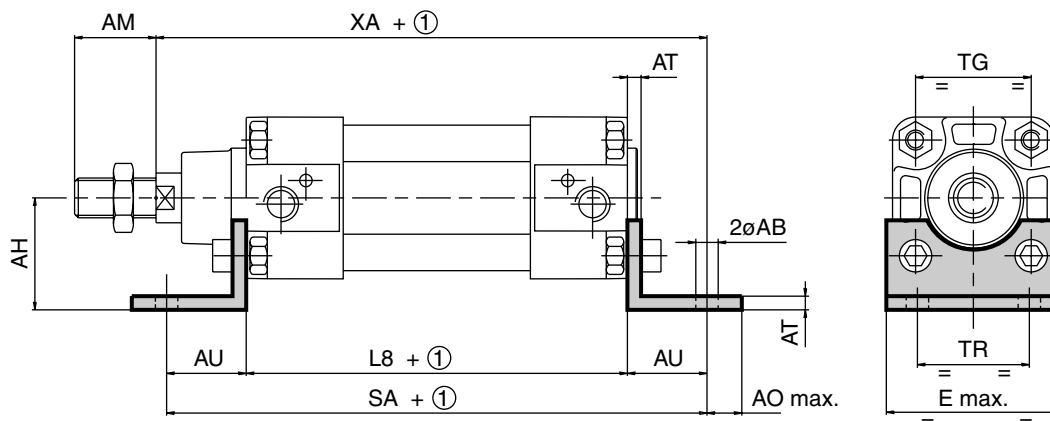
- ① : + Stroke
- ② : + (stroke x 2)
- * : dimensions on flats

Bore Ø (mm)	DIMENSIONS (mm)																			
	AM	ØB	ØBA	BG	E	ØEE	ØKK	KV	KW	L2	L8	M	ØMM	N	PL	ØRT	SW	TG	VA	VD min.
32	22	30	30	16	50	G1/8	M10x1,25	16	5	17	94	48	12	142	14	M6	10	32,5	4	4
40	24	35	35	16	55	G1/4	M12x1,25	18	6	19	105	54	16	159	16	M6	13	38	4	4
50	32	40	40	16	65	G1/4	M16x1,5	24	8	26	106	69	20	175	18	M8	16	46,5	4	4
63	32	45	45	16	75	G3/8	M16x1,5	24	8	26	121	69	20	190	17	M8	16	56,5	4	4
80	40	45	45	17	100	G3/8	M20x1,5	30	10	33	128	86	25	214	16,5	M10	21	72	4	4
100	40	55	55	17	120	G1/2	M20x1,5	30	10	35,5	138	91	25	229	21	M10	21	89	4	4
125	54	60	60	24	145	G1/2	M27x2	41	13,5	40	160	119	32	279	32	M12	27	110	6	6

Bore Ø (mm)	DIMENSIONS (mm)			WEIGHTS (kg)	
	WH	ZJ	ZM	(3)	(4)
32	26	120	146	0,550	0,220
40	30	135	165	0,800	0,315
50	37	143	180	1,120	0,450
63	37	158	195	1,410	0,500
80	46	174	220	2,690	0,750
100	51	189	240	3,560	0,875
125	65	225	290	6,740	1,315

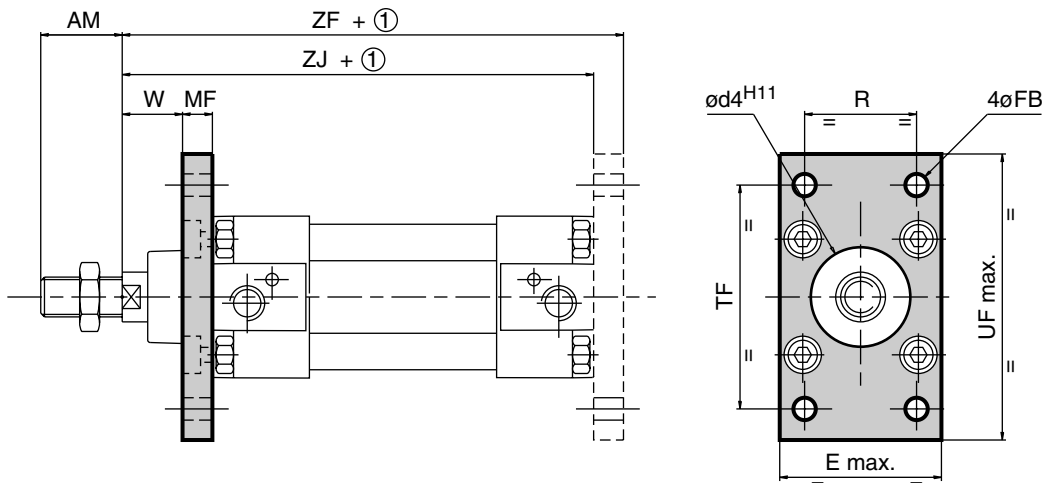
- (3) Cylinder weight with 0 mm stroke.
- (4) Weight to be added per additional 100 mm length.

LOW FEET MOUNTING - MS1



2

RECTANGULAR FRONT OR REAR MOUNTING FLANGE - MF1 - MF2



① : + Stroke

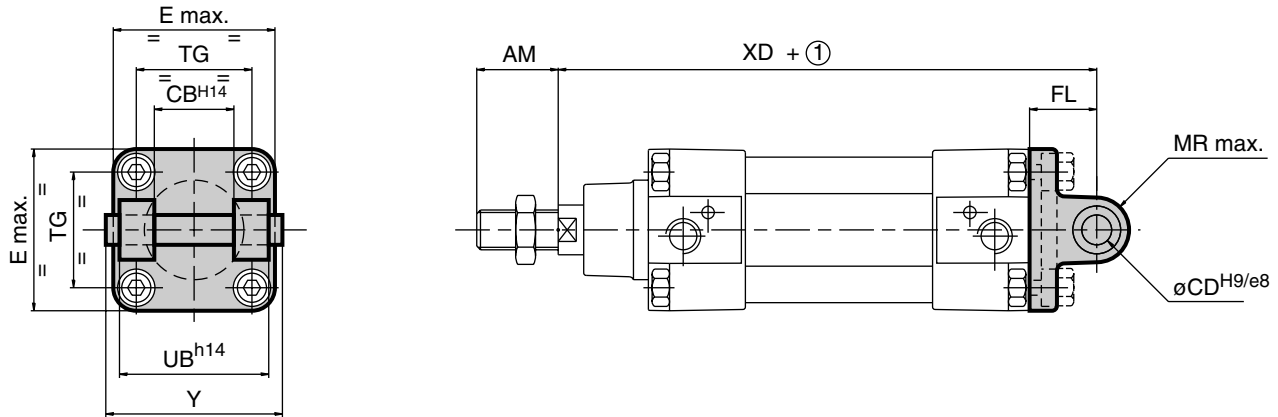
Bore Ø (mm)	DIMENSIONS (mm)																			
	ØAB	AM	AO	AH	AT	AU	Ød4	E	ØFB	L8	MF	R TR	SA	TF	TG	UF	W	XA	ZJ	ZF
32	7	22	11	32	4,5	24	30	50	7	94	10	32	142	64	32,5	86	16	144	120	130
40	10	24	15	36	4,5	28	35	58	9	105	10	36	161	72	38	96	20	163	135	145
50	10	32	15	45	5,5	32	40	70	9	106	12	45	170	90	46,5	115	25	175	143	155
63	10	32	15	50	5,5	32	45	85	9	121	12	50	185	100	56,5	130	25	190	158	170
80	12	40	20	63	6,5	41	45	105	12	128	16	63	210	126	72	165	30	215	174	190
100	14,5	40	25	71	6,5	41	55	130	14	138	16	75	220	150	89	187	35	230	189	205
125	16,5	54	25	90	8	45	60	157	16	160	20	90	250	180	110	224	45	270	225	245

Bore Ø (mm)	Weights (kg)	
	2 feet	Front or rear flange
32	0,150	0,240
40	0,190	0,240
50	0,395	0,500
63	0,445	0,580

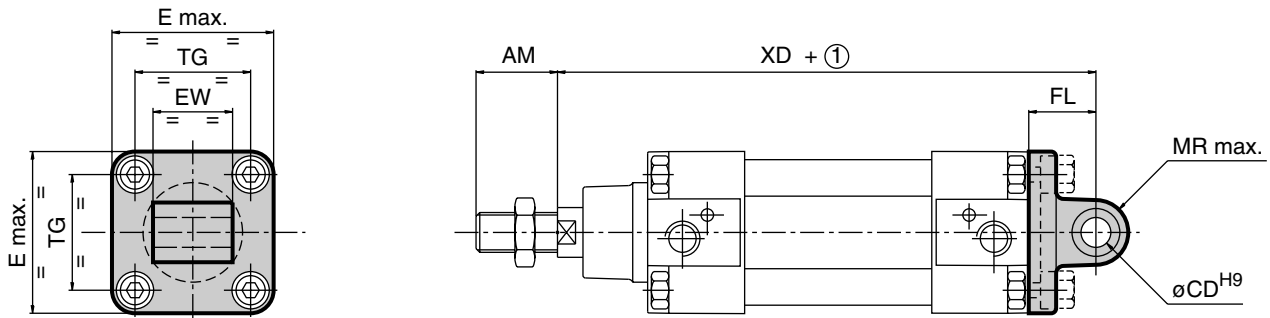
Bore Ø (mm)	Weights (kg)	
	2 feet	Front or rear flange
80	0,790	1,390
100	1,400	1,630
125	2,330	4,270

Series 450

CAP, DETACHABLE CLEVIS MOUNTING - MP2



CAP, DETACHABLE EYE (TRUNNION) MOUNTING - MP4



① : + Stroke

Bore Ø (mm)	DIMENSIONS (mm)										
	AM	CB	ØCD	E	EW	FL	MR	TG	UB	XD	Y
32	22	26	10	50	26	22	11	32,5	45	142	56
40	24	28	12	58	28	25	13	38	52	160	63
50	32	32	12	70	32	27	13	46,5	60	170	71
63	32	40	16	85	40	32	17	56,5	70	190	81
80	40	50	16	105	50	36	17	72	90	210	101
100	40	60	20	130	60	41	21	89	110	230	128
125	54	70	25	157	70	50	26	110	130	275	149

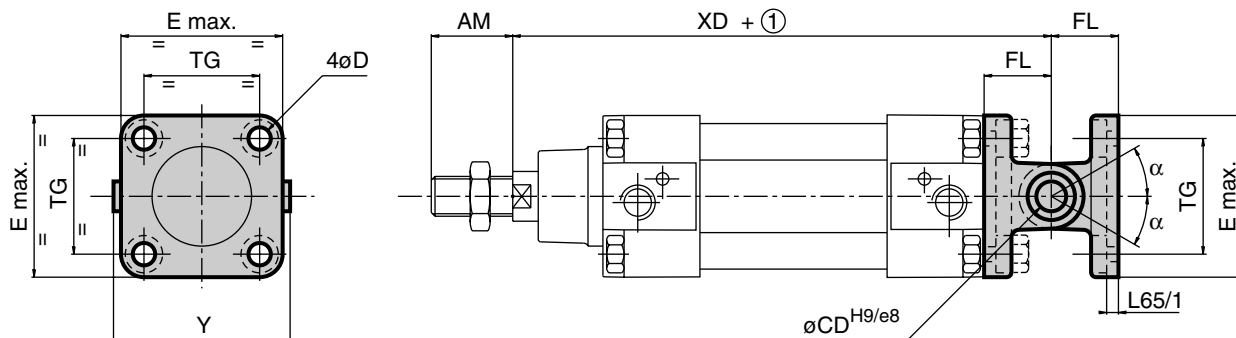
Standard EW tolerances	
Ø 32...100 mm	- 0,2 EW - 0,6
Ø 125 mm	- 0,5 EW - 1,2

Bore Ø (mm)	Weights (kg)			
	Cap, detachable clevis		Cap, detachable eye (trunnion)	
	Light alloy	Cast iron+steel	Light alloy	Cast iron+steel
32	0,105	0,205	0,085	0,210
40	0,150	0,305	0,092	0,230
50	0,240	0,430	0,170	0,430
63	0,370	0,685	0,250	0,620

Bore Ø (mm)	Weights (kg)			
	Cap, detachable clevis		Cap, detachable eye (trunnion)	
	Light alloy	Cast iron+steel	Light alloy	Cast iron+steel
80	0,635	1,375	0,445	1,110
100	0,990	2,100	0,755	1,700
125	-	3,570	-	3,100

STRAIGHT COMPLETE TRUNNION MOUNTING - WITH OR WITHOUT BUSH - MP2 + MP4

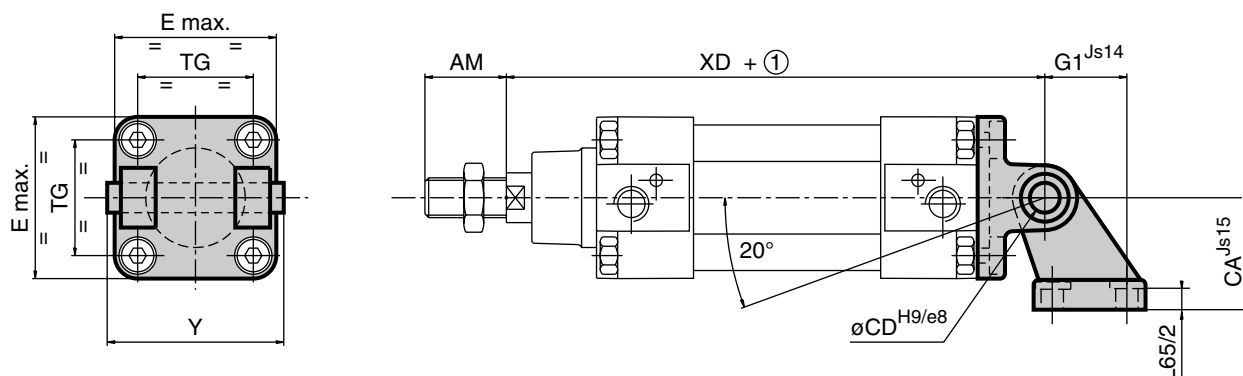
To achieve the complete assembly, items MP2 and MP4 must be ordered **separately**.



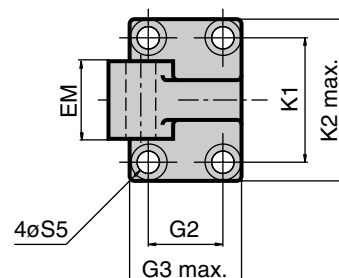
2

COMPLETE TRUNNION MOUNTING WITH ANGULAR CLEVIS BRACKET - WITH OR WITHOUT BUSH - MP2 + AB3

This set includes the cap, detachable clevis MP2 and the angular clevis bracket AB3, with or without bush. These mountings must be ordered **separately**



Standard EM tolerances	
Ø 32...100 mm	- 0,2 EM - 0,6
Ø 125 mm	- 0,5 EM - 1,2



① : + Stroke

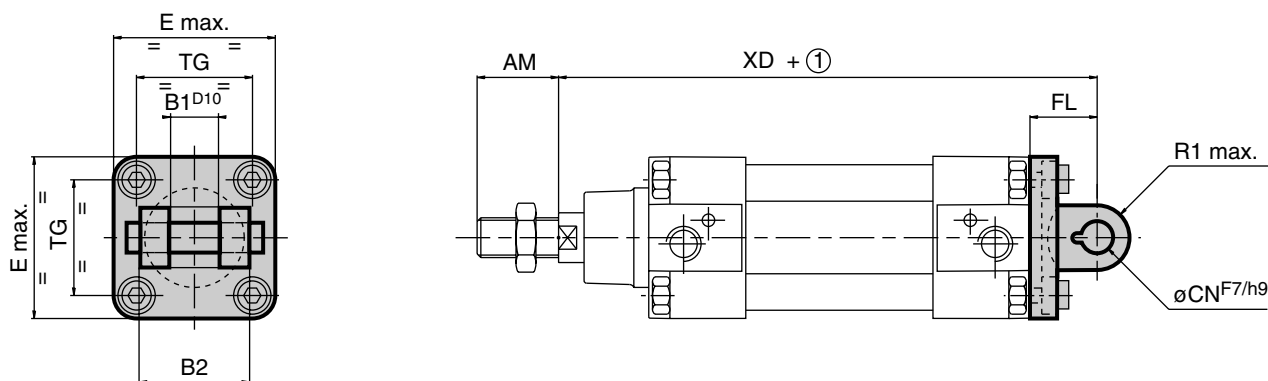
Bore Ø (mm)	DIMENSIONS (mm)																		
	AM	ØCD	ØD	ØS5	E	EM	FL	K1	K2	G1	G2	G3	CA	L65/1	L65/2	TG	XD	Y	α
32	22	10	6,6	6,6	50	26	22	38	51	21	18	31	32	5,5	6,5	32,5	142	56	45°
40	24	12	6,6	6,6	58	28	25	41	54	24	22	35	36	5,5	8,5	38	160	63	50°
50	32	12	9	9	70	32	27	50	65	33	30	45	45	6,5	10,5	46,5	170	71	40°
63	32	16	9	9	85	40	32	52	67	37	35	50	50	6,5	10,5	56,5	190	81	55°
80	40	16	11	11	105	50	36	66	86	47	40	60	63	10	11,5	72	210	101	45°
100	40	20	11	11	130	60	41	76	96	55	50	70	71	10	12,5	89	230	128	35°
125	54	25	13	14	157	70	50	94	124	70	60	90	90	10	16,5	110	275	149	30°

Bore Ø (mm)	Weights (kg)			
	Straight complete trunnion		Complete trunnion with ang. clevis bracket	
	Light alloy	Cast iron+steel	Light alloy	Cast iron+steel
32	0,190	0,415	0,160	0,340
40	0,240	0,535	0,230	0,450
50	0,410	0,860	0,390	0,790
63	0,620	1,305	0,570	1,080

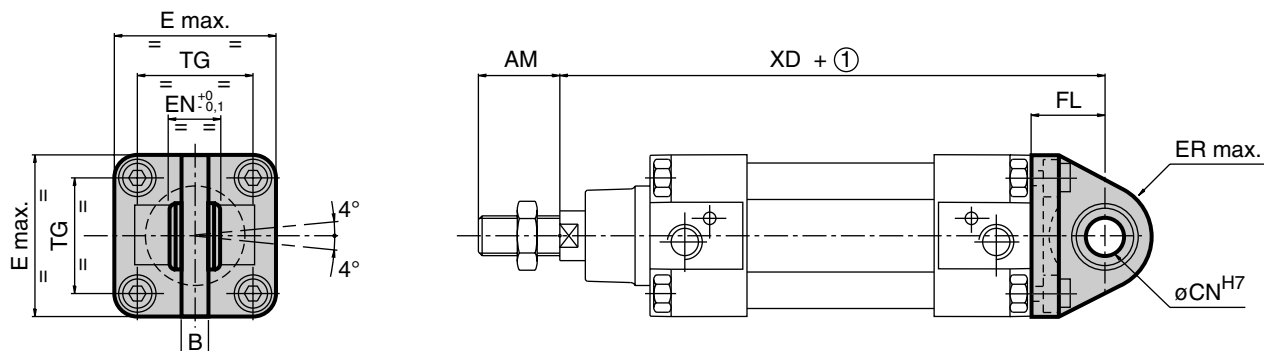
Bore Ø (mm)	Weights (kg)			
	Straight complete trunnion		Complete trunnion with ang. clevis bracket	
	Light alloy	Cast iron+steel	Light alloy	Cast iron+steel
80	1,080	2,485	0,950	2,090
100	1,745	3,800	1,500	2,750
125	-	6,670	-	6,610

Series 450

CAP, DETACHABLE CLEVIS MOUNTING - FOR SPHERICAL EYE (STRAIGHT) OR ANGULAR CLEVIS BRACKET



CAP, DETACHABLE EYE MOUNTING WITH SPHERICAL BEARING - MP6



① : + Stroke

Bore Ø (mm)	DIMENSIONS (mm)											
	AM	B	B1	B2	CN	E	ER	EN	FL	R1	TG	XD
32	22	10,5	14	34	10	50	15	14	22	11	32,5	142
40	24	12	16	40	12	58	18	16	25	13	38	160
50	32	15	21	45	16	70	20	21	27	18	46,5	170
63	32	15	21	51	16	85	23	21	32	18	56,5	190
80	40	18	25	65	20	105	27	25	36	22	72	210
100	40	18	25	75	20	130	30	25	41	22	89	230
125	54	25	37	97	30	157	40	37	50	30	110	275

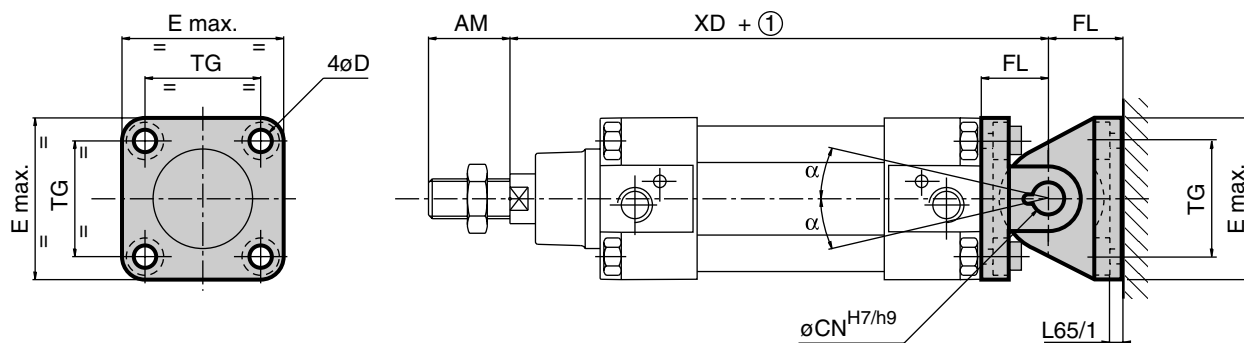
Standard EN tolerances	
Ø 32...125 mm	EN 0 - 0,1

Bore Ø (mm)	Weights (kg)	
	Cap, detachable clevis for spherical eye	Cap, detachable eye with spherical bearing
32	0,190	0,180
40	0,300	0,290
50	0,460	0,420
63	0,680	0,650

Bore Ø (mm)	Weights (kg)	
	Cap, detachable clevis for spherical eye	Cap, detachable eye with spherical bearing
80	1,460	1,210
100	2,130	1,870
125	4,240	3,640

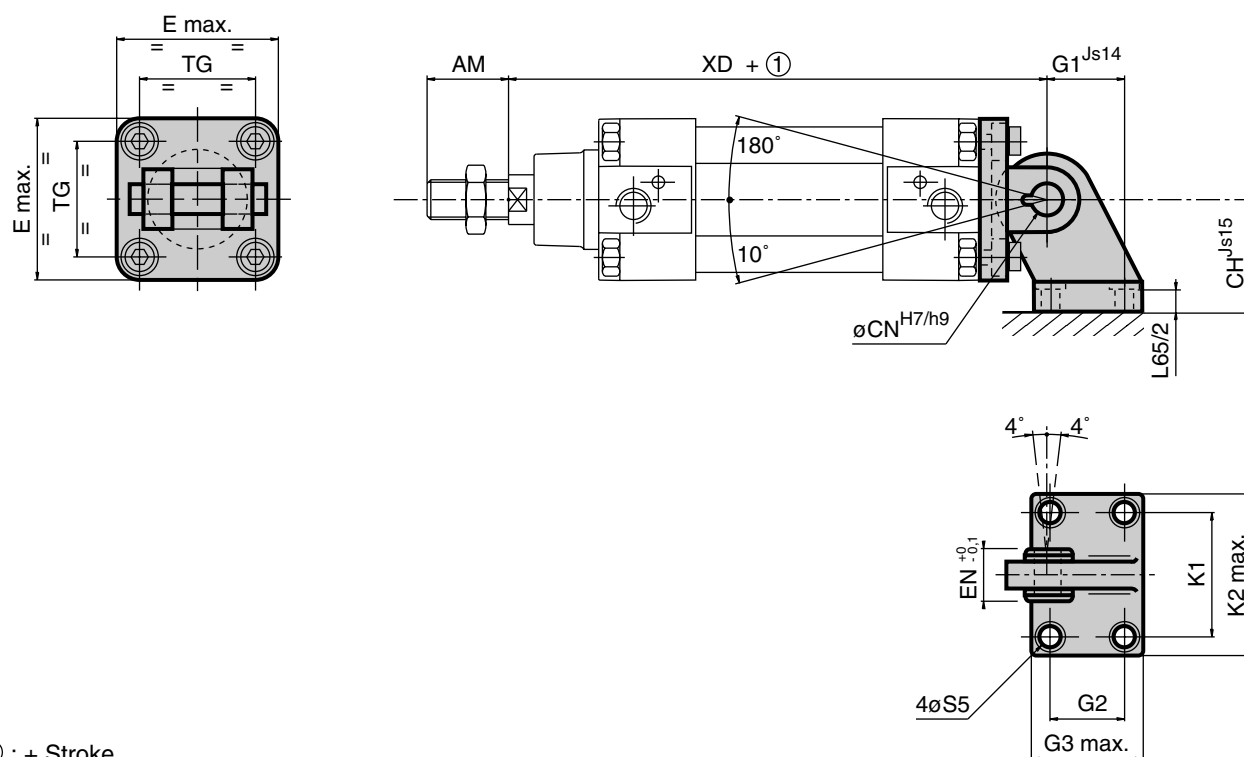
STRAIGHT COMPLETE TRUNNION MOUNTING, SPHERICAL BEARING

This set includes the cap, clevis for spherical eye and the cap, eye with spherical bearing MP6.
 These mountings must be ordered **separately**



COMPLETE TRUNNION MOUNTING WITH ANGULAR CLEVIS BRACKET - SPHERICAL BEARING

This set includes the cap, detachable eye and the angular clevis bracket spherical eye AB5.
 These mountings must be ordered **separately**



① : + Stroke

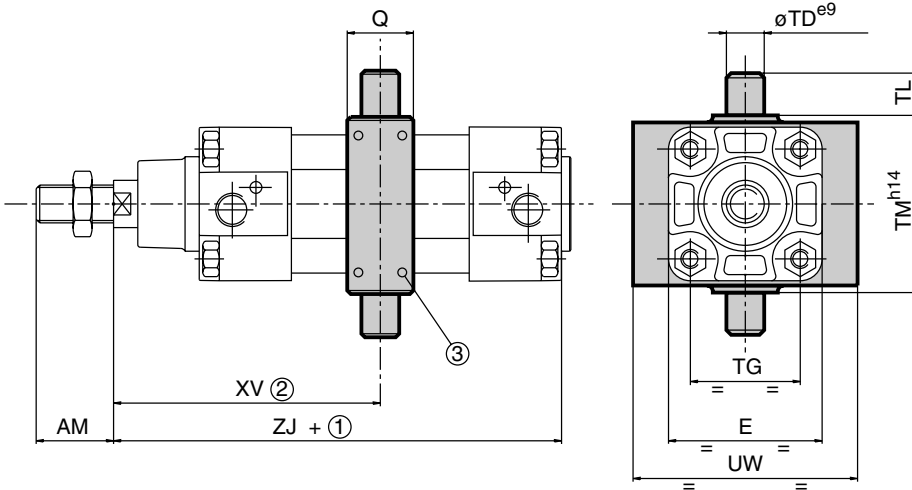
Bore Ø (mm)	DIMENSIONS (mm)																	
	AM	øCN	øD	øS5	E	EN	FL	K1	K2	G1	G2	G3	CH	L65/1	L65/2	TG	XD	α
32	22	10	6,6	6,6	50	14	22	38	51	21	18	31	32	5,5	8,5	32,5	142	40°
40	24	12	6,6	6,6	58	16	25	41	54	24	22	35	36	5,5	8,5	38	160	45°
50	32	16	9	9	70	21	27	50	65	33	30	45	45	6,5	10	46,5	170	35°
63	32	16	9	9	85	21	32	52	67	37	35	50	50	6,5	10	56,5	190	50°
80	40	20	11	11	105	25	36	66	86	47	40	60	63	10	11,5	72	210	40°
100	40	20	11	11	130	25	41	76	96	55	50	70	71	10	12,5	89	230	30°
125	54	30	13,5	14	157	37	50	94	124	70	60	90	90	10	16,5	110	275	25°

Bore Ø (mm)	Weights (kg)	
	Straight complete trunnion,spherical bearing	Complete trunnion with spherical bearing
32	0,370	0,370
40	0,590	0,530
50	0,880	0,910
63	1,330	1,200

Bore Ø (mm)	Weights (kg)	
	Straight complete trunnion,spherical bearing	Complete trunnion with spherical bearing
80	2,670	2,400
100	4	3,200
125	7,880	6,710

Series 450

CENTRE TRUNNION MOUNTING - MT4



Ø	WITHOUT DETECTORS		WITH DETECTORS		①
	XV min.	XV max.	XV min.	XV max.	
32	72	74 + ①	138	138 + ①	130
40	83	83 + ①	149	149 + ①	133
50	90	90 + ①	156	156 + ①	132
63	93,5	101,5 + ①	166	166 + ①	132
80	106,5	113,5 + ①	178	178 + ①	131
100	114	126 + ①	190	190 + ①	135
125	137	155 + ①	220	220 + ①	137

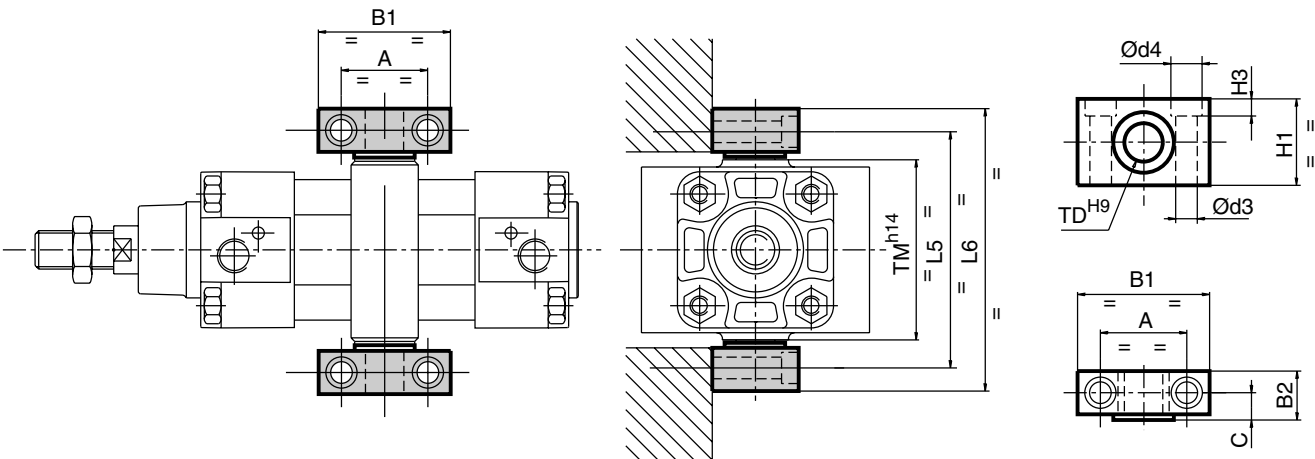
① = + Stroke

① : + Stroke

② : Except when dimension XV is specified on order, the position of the trunnion may be adjusted along the unit. Consequently, the centre trunnion is not screwed on and must be adjusted after delivery.

③ : 8 locking screws

SUPPORTS FOR CENTRE TRUNNION - AT4

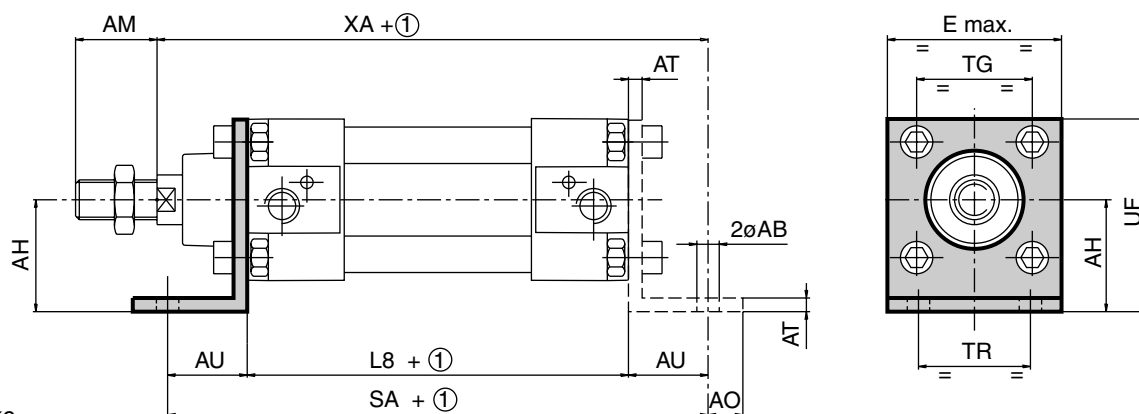


Bore Ø (mm)	DIMENSIONS (mm)																		
	A	AM	B1	B2	C	Ød3	Ød4	E	H1	H3	L5	L6	Q	TD	TG	TL	TM	UW	ZJ
32	32	22	46	18	10,5	6,6	11	50	30	6,8	71	86	22	12	32,5	12	50	55	120
40	36	24	55	21	12	9	15	55	36	9	87	105	28	16	38	16	63	58	135
50	36	32	55	21	12	9	15	65	36	9	99	117	28	16	46,5	16	75	68	143
63	42	32	65	23	13	11	18	75	40	11	116	136	35	20	56,5	20	90	84	158
80	42	40	65	23	13	11	18	100	40	11	136	156	35	20	72	20	110	102	174
100	50	40	75	28,5	16	13,5	20	120	50	13	164	189	40	25	89	25	132	145	189
125	50	54	75	28,5	16	13,5	20	145	50	13	192	217	40	25	110	25	160	175	225

Bore Ø (mm)	Weights (kg)	
	Centre trunnion	Supports for centre trunnion
32	0,200	0,120
40	0,400	0,230
50	0,500	0,230
63	0,900	0,330

Bore Ø (mm)	Weights (kg)	
	Centre trunnion	Supports for centre trunnion
80	1,100	0,330
100	1,860	0,580
125	2,550	0,580

HIGH FOOT MOUNTING - MS3 (sold individually)

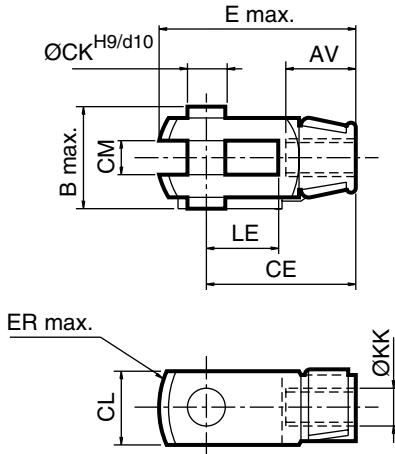


① : + Stroke

Bore Ø (mm)	CODE High foot	DIMENSIONS (mm)													Weights (kg)
		ØAB	AH	AO	AT	AU	AM	E	L8	UF	SA	TG	TR	XA	
32	434 00 307	7	32	11	8	24	22	50	94	54	142	32,5	32	144	0,180
40	434 00 308	10	36	15	8	28	24	58	105	62	161	38	36	163	0,250
50	434 00 309	10	45	15	10	32	32	70	106	77	170	46,5	45	175	0,470
63	434 00 310	10	50	15	10	32	32	85	121	87	185	56,5	50	190	0,595
80	434 00 311	12	63	20	12	41	40	105	128	110	210	72	63	215	1,265

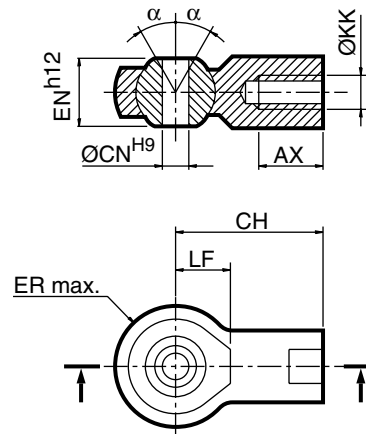
2

FEMALE CLEVIS - AP2
ISO 8140 - RP 102 P



SPHERICAL BEARING ROD END - AP6
ISO 8139 - RP 103 P

α : spherical angular compensation 4°

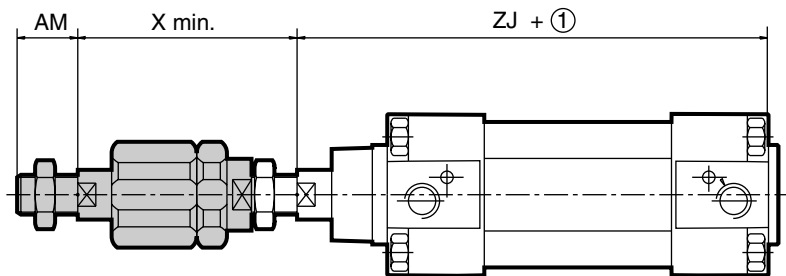
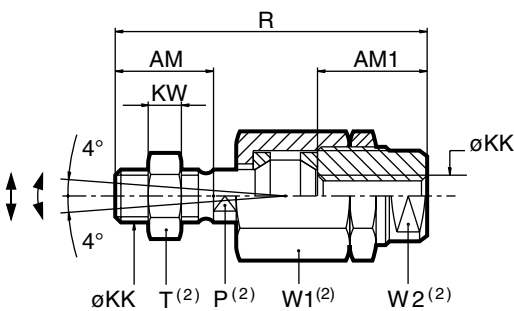


Bore Ø (mm)	DIMENSIONS (mm)													
	AV-AX	B	CE	CH	ØCK	CL	CM	ØCN	E	EN	ER	ØKK	LE	LF
32	20	26	40	43	10	20	10 ^{+0.5} _{+0.15}	10	56	14	14	M10x1,25	20	15
40	22	32	48	50	12	24	12 ^{+0.5} _{+0.15}	12	67	16	16	M12x1,25	24	17
50	28	41	64	64	16	32	16 ^{+0.5} _{+0.15}	16	89	21	21	M16x1,5	32	22
63	28	41	64	64	16	32	16 ^{+0.5} _{+0.15}	16	89	21	21	M16x1,5	32	22
80	33	48	80	77	20	40	20 ^{+0.6} _{+0.15}	20	112	25	25	M20x1,5	40	26
100	33	48	80	77	20	40	20 ^{+0.6} _{+0.15}	20	112	25	25	M20x1,5	40	26
125	51	65	110	110	30	55	30 ^{+0.6} _{+0.15}	30	155	37	35	M27x 2	54	36

Bore Ø (mm)	Weights (kg)	
	Female clevis	Spherical bearing
32	0,100	0,070
40	0,150	0,120
50	0,330	0,220
63	0,330	0,220

Bore Ø (mm)	Weights (kg)	
	Female clevis	Spherical bearing
80	0,670	0,390
100	0,670	0,390
125	1,810	1,600

ALIGNMENT COMPENSATOR

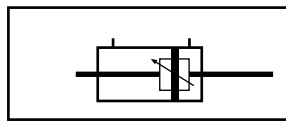


① : + stroke
(2) : dimensions on flats

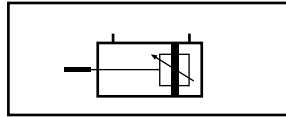
Bore Ø (mm)	DIMENSIONS (mm)										Radiale compensation (mm)	Weights (kg)
	AM	AM1	P(2)	ØKK	KW	R	T(2)	W1(2)	W2(2)	X		
32	22	26	12	M10x1,25	6	73	17	30	19	58	0,7	0,210
40	24	26	12	M12x1,25	7	77	19	30	19	59	0,7	0,210
50	32	34	19	M16x1,5	8	106	24	42	30	82	1	0,650
63	32	34	19	M16x1,5	8	106	24	42	30	82	1	0,650
80	40	42	19	M20x1,5	9	122	30	42	30	92	1	0,680
100	40	42	19	M20x1,5	9	122	30	42	30	92	1	0,680
125	54	40	24	M27x2	13,5	147	41	Ø62	54	107	1	1,700

• Radial compensation 0,7 to 1 mm (see table)
• Spherical angular compensation : 4°
Note: The compensator is preset with an axial clearance of 0,05 to 0,1 - Do not reset.

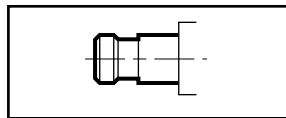
OPTIONS AND SPECIAL VERSIONS OF VDMA-ISO PNEUMATIC CYLINDERS TYPE : PES



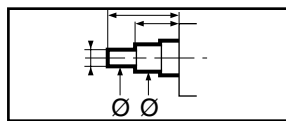
- Through rod, P/N T2



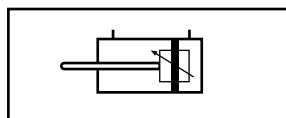
- Extended piston rod



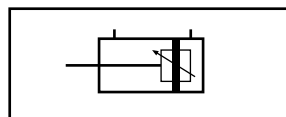
- Tenon piston rod



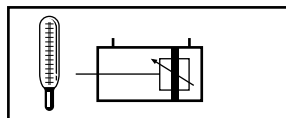
- Special machining of piston rod end



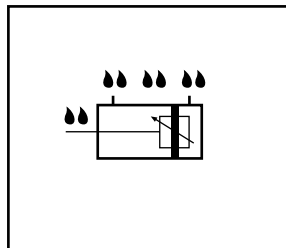
- Oversize piston rod on cylinders Ø 63 to 125 mm



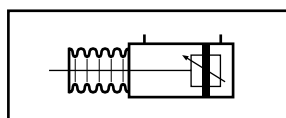
- Cylinder for inductive detector inductif (resin epoxy barrel + FV)



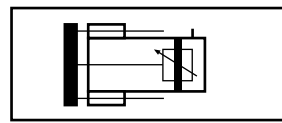
- **High temperature** version 120°C max., FPM seals (see P239) aluminium barrel, tie rods (version non-equipped for magnetic position detector)



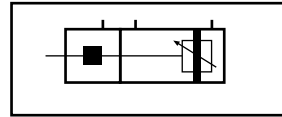
- All FPM seals
- **FPM rod seal**
- Stainless steel barrel
- Stainless steel screws and hardware
- Epoxy resin glass fiber barrel
- Anticorrosive finish on end covers and barrel



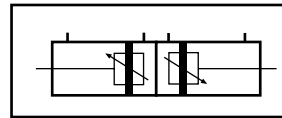
- Cylinder with piston rod gaiter



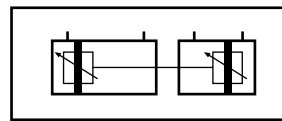
- Cylinder with U or H guiding unit slide or ball bearings (see P237)



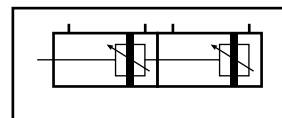
- Piston rod locking on cylinders Ø 40 to 100 mm (see P238)



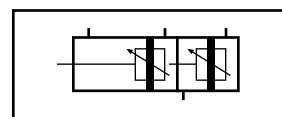
- Back to back assembly of two cylinders



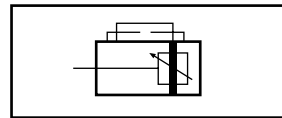
- Nose to nose assembly of two cylinders



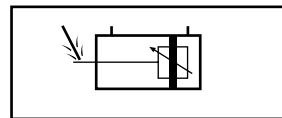
- Tandem cylinders - double acting Ø 40 to 125 mm with a common piston rod



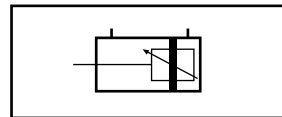
- Three position cylinders, separate piston rods



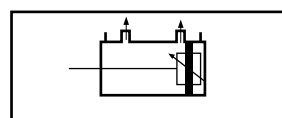
- Mounting of control valve on the cylinder
- With or without flow reducer



- Impact resistant rod



- Extended cushioning

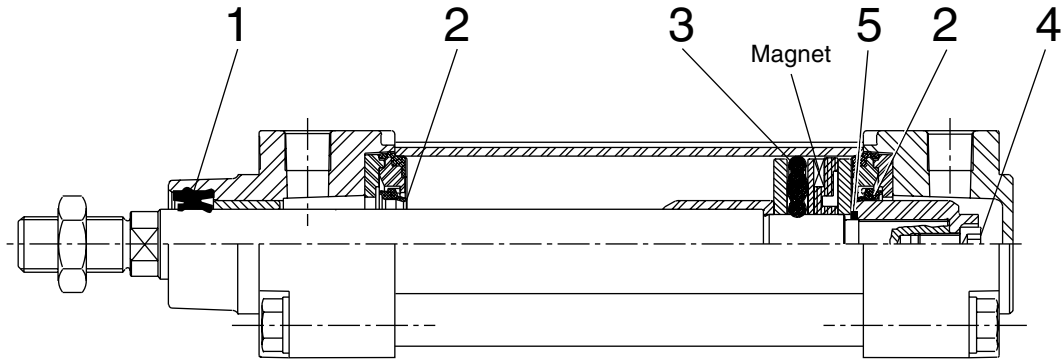


- Cylinders with pressure outlets on barrel (stainless steel version) for exhaust pressure detection

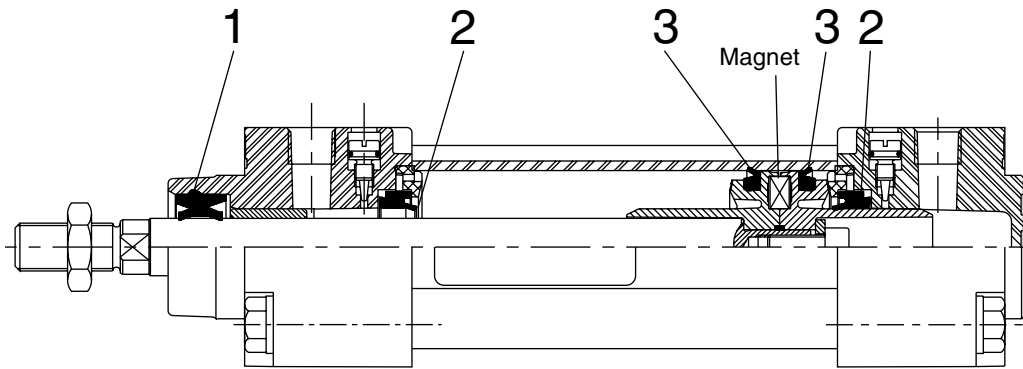
**For all these options and special versions - see P239 or consult our technical staff.
For any special cylinder requirements - consult our technical staff.**

Spare parts kit
PES CYLINDERS WITH PROFILED BARREL

CONSTRUCTION I



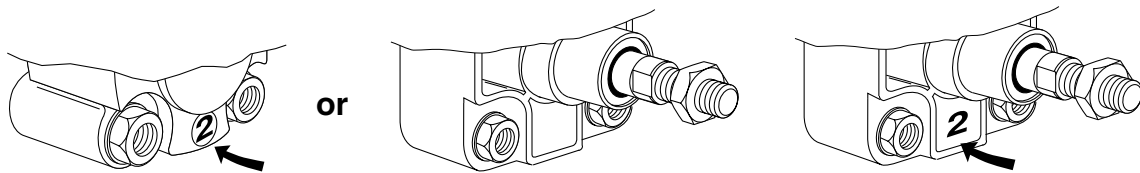
CONSTRUCTION II (PES 2)



Identification of construction type 2

PES Ø 32 ... 80 mm

PES Ø 100 - 125 mm



Ø CYLINDER	Cylinder type	CODES	
		construction I (seals: 1 to 5)	construction II (seals: 1 to 3)
32	Equipped for detector	Consult us	978 02 343
40	Equipped for detector		978 02 344
50	Equipped for detector		978 02 345
63	Equipped for detector		978 02 346
80	Equipped for detector		978 02 347
100	Equipped for detector	978 01 661	978 02 259
125	Equipped for detector	978 01 662	978 02 260

NOTE: For best results, use grease supplied in each kit. Supplementary tube available (11 cm³) on request, code: **978 02 100**