

## M

### Ø 8 ÷ 25 mm - Microcylinders ISO 6432

- Compact, clean, reliable
- Single and double acting
- With or without magnet
- With or without adjustable cushioning

Available ATEX version upon request

CE  $\text{Ex}$  II 2Gc IIC T5 II 2Dc T100°C



### TECHNICAL CHARACTERISTICS

Ambient temperature	-20 ÷ 80 °C
Fluid	filtered air, with or without lubrication
Working pressure	1,5 ÷ 10 bar
Bores	Ø 8 - 10 - 12 - 16 - 20 - 25 mm
Cushionings	adjustable in both sides (Ø16÷25)

### CONSTRUCTIVE CHARACTERISTICS

End-caps	Anodized aluminium (crimped on the barrel)
Barrel	stainless steel AISI 304 (crimped over the end-caps)
Piston	brass (Ø8÷16), aluminium (Ø20-25)
Guide slide	acetalic resin (Ø16÷25)
Piston rod	rolled stainless steel AISI 303
Piston seal	double-lip seal in nitrile rubber (NBR)
Guide bush for piston rod	steel structure, PTFE and sintered bronze sliding
Shock absorber seals	nitrile rubber (NBR) in both sides Ø12÷25
Magnet	neodimio (Ø10), plastroferrite (Ø12÷25)

### CODIFICATION KEY

M	1	0	0	0	2	5	0	0	5	0			
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1	2	3	4	5	6	7	8
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#### 1 Series

M = Ø8÷25 mm - ISO 6432  
Microcylinders

#### 2 Type

- 1 = Stainless steel piston rod (standard version)
- 2 = Chromium-plated steel piston rod (to be used only with locking unit)
- 3 = Reduced version with stainless steel piston rod

#### 3 Version

- 00 = **D.A.** Standard version
- 01 = **D.A.** Through piston rod
- 50 = **D.A.** With adjustable cushionings (Ø16÷25)

- 51 = **D.A.** Through piston rod with adjustable cushionings (Ø16÷25)
- 60 = **S.A.** Retracted piston rod (Ø10÷25), Max stroke 50 mm
- 70 = **S.A.** Extended piston rod (Ø16÷25), Max stroke 25 mm

**D.A.** = Double acting  
**S.A.** = Single acting

#### 4 Bore (mm)

- 008 = Ø8
- 010 = Ø10
- 012 = Ø12
- 016 = Ø16
- 020 = Ø20
- 025 = Ø25

#### 5 Stroke (mm)

- 0010 = 10
- 0020 = 20
- 0025 = 25
- 0030 = 30
- 0040 = 40
- 0050 = 50
- 0075 = 75
- 0080 = 80
- 0100 = 100
- 0125 = 125
- 0150 = 150
- 0160 = 160
- 0175 = 175
- 0200 = 200
- 0250 = 250
- 0300 = 300
- 0320 = 320
- 0400 = 400
- 0500 = 500

#### 6 Option

- F = Preset for locking unit reduced protrusion

#### 7 Magnetic

- M = Magnetic version (Ø10÷25)

#### 8 Atex option

- X = Atex (upon request)

See ATEX Catalogue for types and versions

The version with high temperature seals (Max 120°C) available upon request.  
Nut for piston rod and nut for end-cap standard supplied.

## Stroke tolerances

Ø	stroke ≤ 500
	mm
8	+1,5 - 0
10	+1,5 - 0
12	+1,5 - 0
16	+1,5 - 0
20	+1,5 - 0
25	+1,5 - 0

## Single acting cylinder Theoretical forces (N) for return stroke

Ø	Max force	Min. force	
		retraced piston rod	extended piston rod
	stroke 50 mm	stroke 50 mm	stroke 25 mm
10	7,6	4	-
12	8,7	5,9	-
16	16	7,8	11,9
20	20	13	16,5
25	23,5	15	13,3

## Theoretical forces (N) at different working pressure (bar)

Ø	Surface area		Surface area					Surface area				
	mm <sup>2</sup>		bar					bar				
	Thrust	Traction	Thrust					Traction				
			2	4	6	8	10	2	4	6	8	10
8	50	38	10	20	30	40	50	8	15	23	30	38
10	79	66	16	31	47	63	79	13	26	40	53	66
12	113	85	23	45	68	90	113	17	34	51	68	85
16	201	173	40	80	121	161	201	35	69	104	138	173
20	314	264	63	126	188	251	314	53	106	158	211	264
25	419	412	98	196	295	393	491	82	165	247	330	412

## Cushion

Ø	Length	Max kinetic energy absorption		Standard strokes																		
		mm	Nm		mm																	
		with cushioning	without cushioning	10	20	25	30	40	50	75	80	100	125	150	160	-	-	-	-	-	-	
8	-	-	-	10	20	25	30	40	50	75	80	100	125	150	160	-	-	-	-	-	-	
10	-	-	-	10	20	25	30	40	50	75	80	100	125	150	160	-	-	-	-	-	-	
12	-	-	-	10	20	25	30	40	50	75	80	100	125	150	160	175	200	250	-	-	-	
16	-	-	0,12	10	20	25	30	40	50	75	80	100	125	150	160	175	200	250	-	-	-	
16*	16	0,9	-	-	-	25	30	40	50	75	80	100	125	150	160	175	200	250	300	320	400	500
20	-	-	0,16	10	20	25	30	40	50	75	80	100	125	150	160	175	200	250	300	-	-	-
20*	18	1,3	-	-	-	25	30	40	50	75	80	100	125	150	160	175	200	250	300	320	400	500
25	-	-	0,22	10	20	25	30	40	50	75	80	100	125	150	160	175	200	250	300	320	400	500
25*	22	1,8	-	-	-	25	30	40	50	75	80	100	125	150	160	175	200	250	300	320	400	500

\*= version with adjustable cushionings

## Mass - single acting

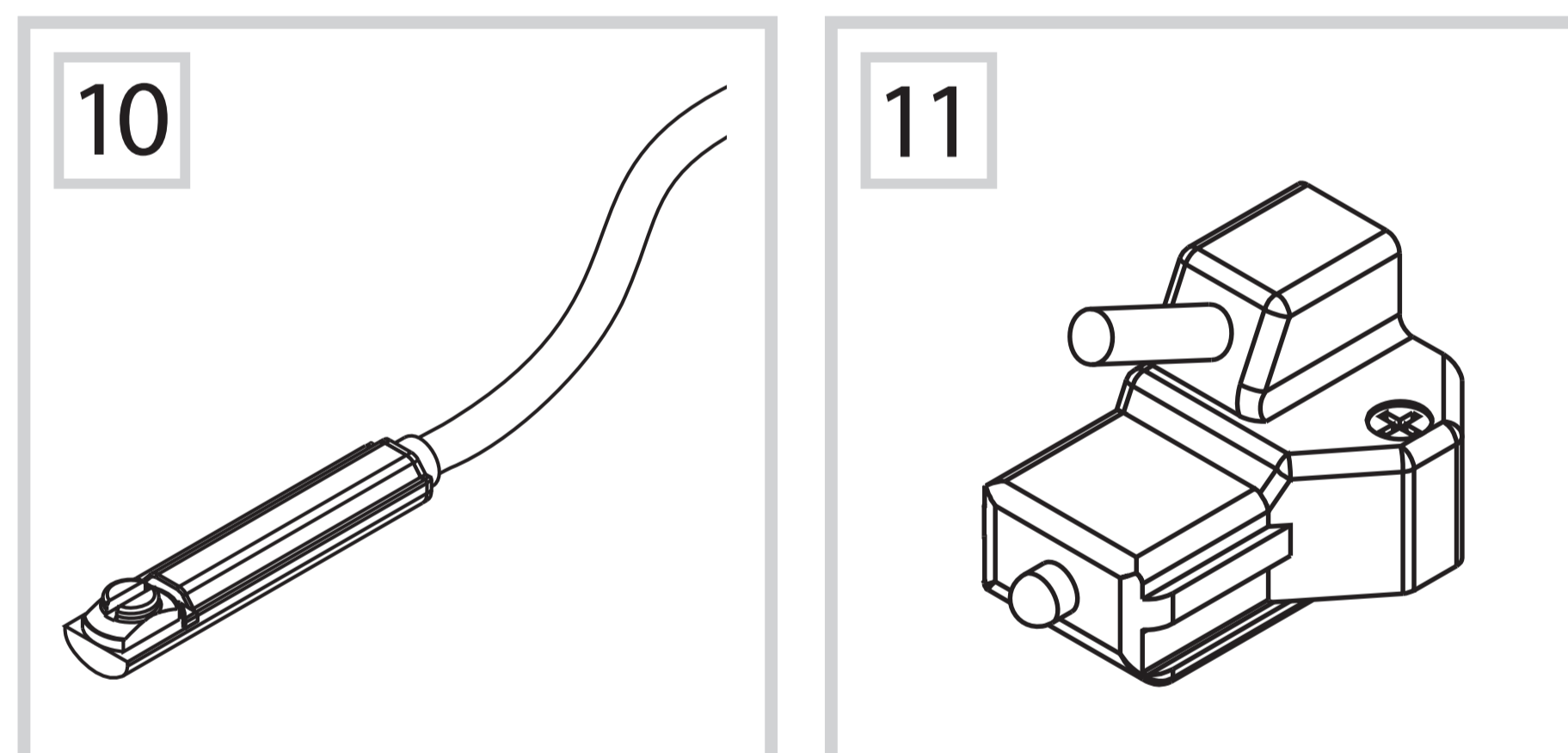
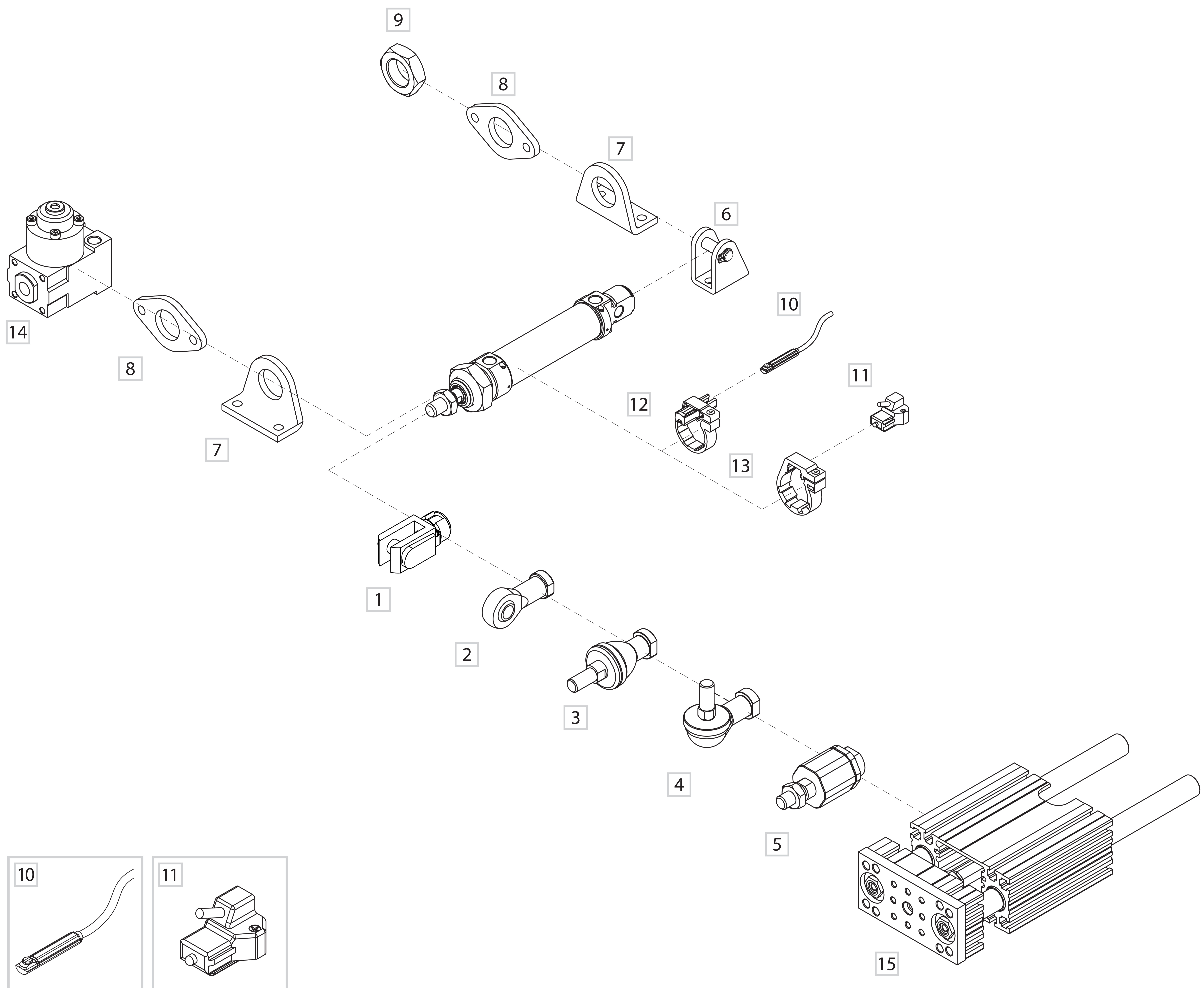
Ø	Cylinder - stroke 0	Increase per mm stroke	Moving element - stroke 0	Increase per mm stroke
	g	g	g	g
10	38	0,23	9	0,1
12	79	0,38	23	0,22
16	85	0,43	26	0,22
20	167	0,66	45	0,4
25	238	0,95	80	0,62

## Massa - double acting

Ø	Cylinder - stroke 0	Increase per mm stroke	Moving element - stroke 0	Increase per mm stroke
	g	g	g	g
8	37	0,21	7	0,1
10	38	0,23	9	0,1
12	78	0,38	23	0,22
16	85	0,43	23	0,22
16*	87	0,43	25	0,22
20	167	0,66	45	0,4
20*	170	0,66	48	0,4
25	237	0,95	80	0,62
25*	245	0,95	88	0,62

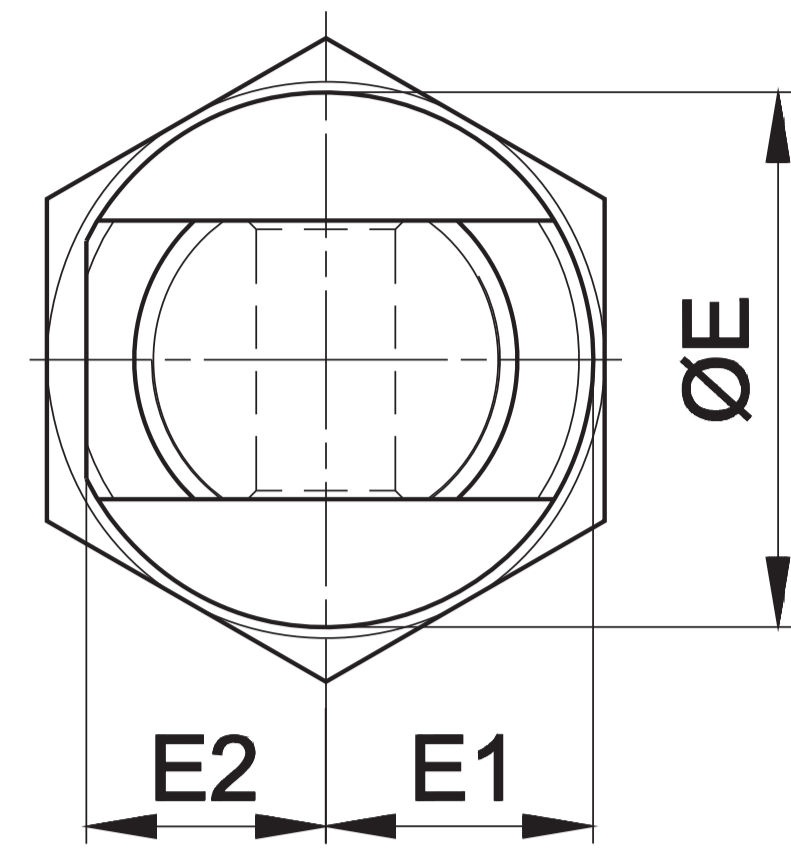
\*= version with adjustable cushionings

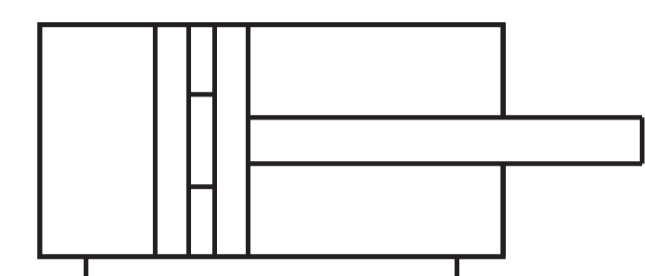
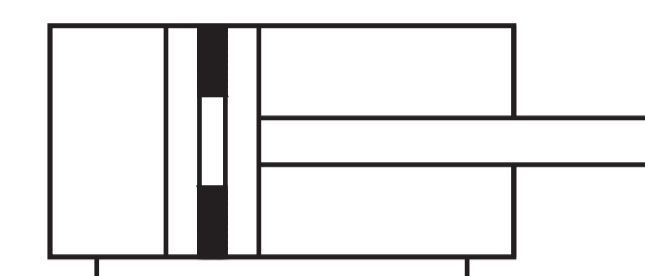
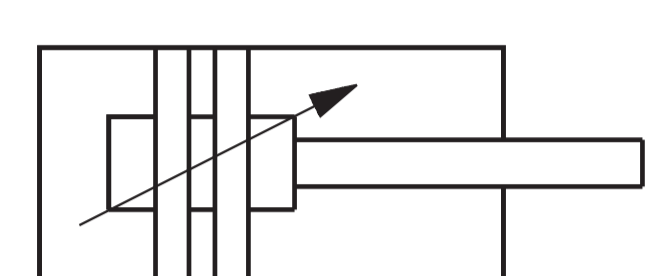
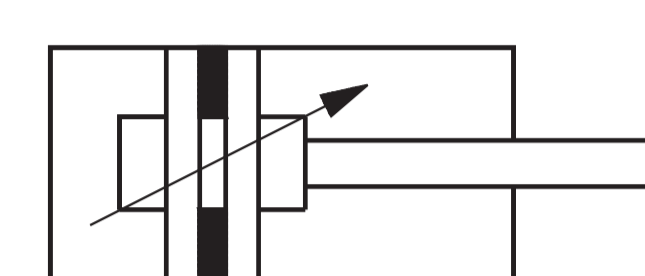




## Fixing elements and accessories



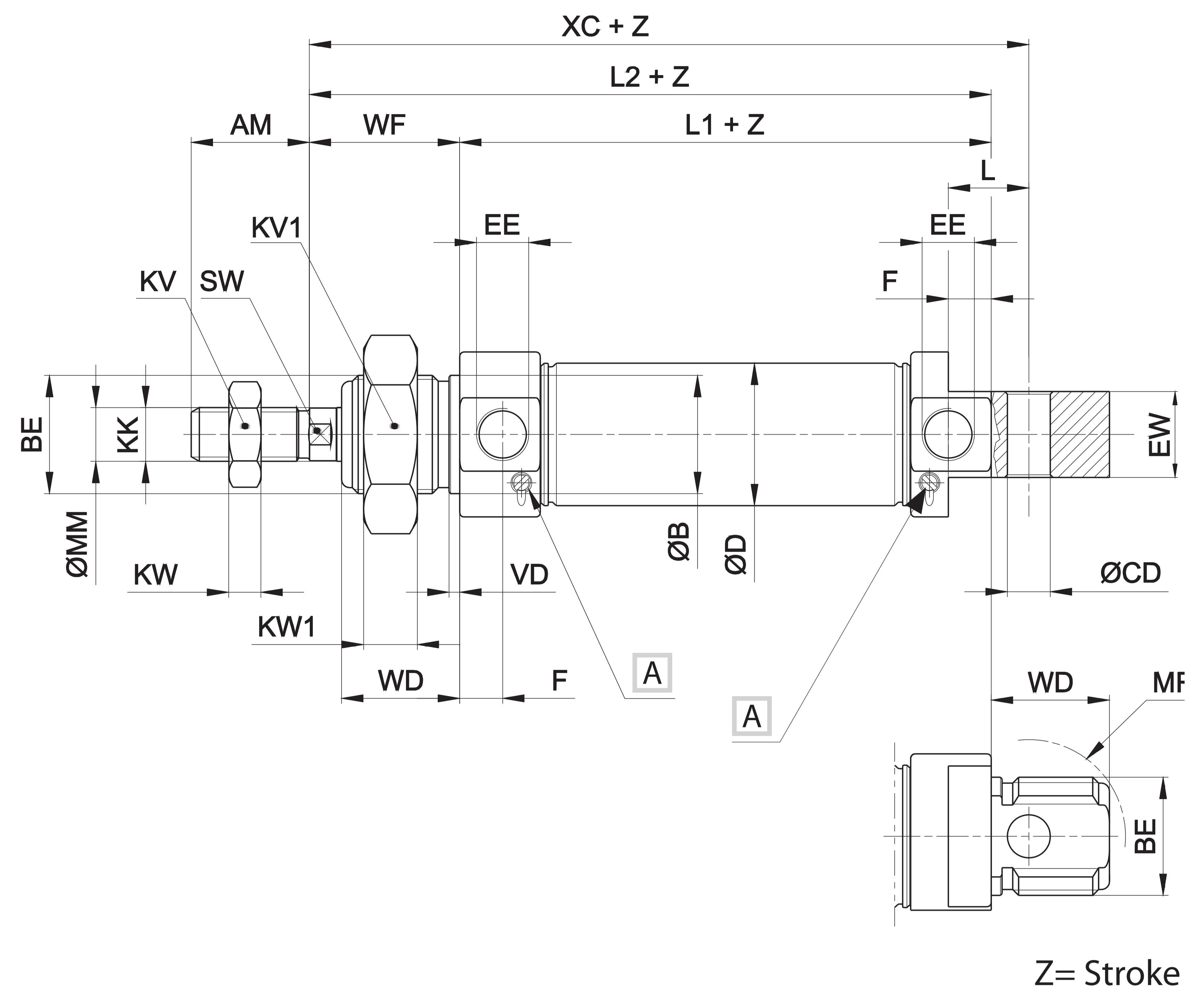
DESCRIPTION	PART NO.
1 Female fork with clips	MF/KF-15_ _ _
2 Articulated self-lubricating fork	MF/KF-17_ _ _
3 Fork with axially mounted articulated pin	MF/KF-22_ _ _
4 Fork with angle mounted articulated pin	MF/KF-23_ _ _
5 Floating joint	MF/KF-24_ _ _
6 Female rear hinge	MF-21_ _ _
7 Angle bracket (MS3)	MF-13_ _ _ _
8 Flange (MF8)	MF-12_ _ _
9 Nut for end-cap	MF-20_ _ _
10 DF Sensor	DF- _ _ _
11 DH Sensor	DH- _ _ _
12 Holder for DF sensor	DH-M_ _ DF
13 Holder for DH sensor	DH-M_ _ _
14 Locking unit	L1-N
15 Slide unit	J12

## Double acting/Single acting

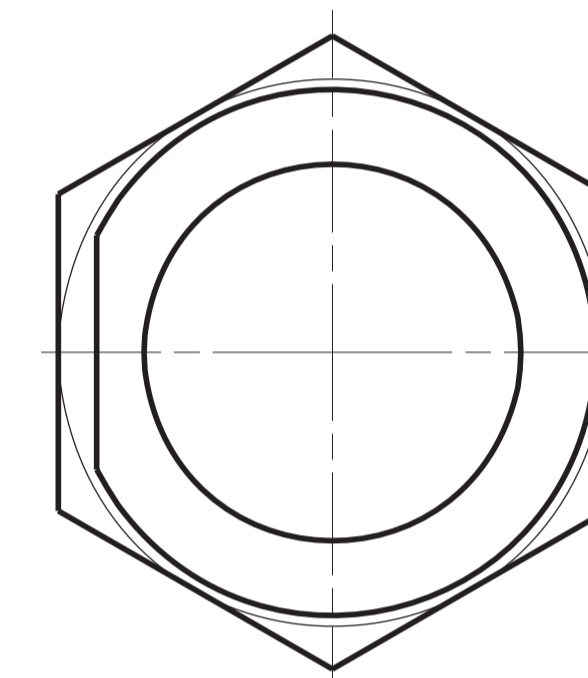


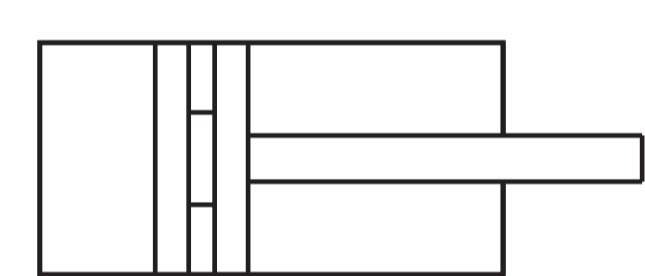
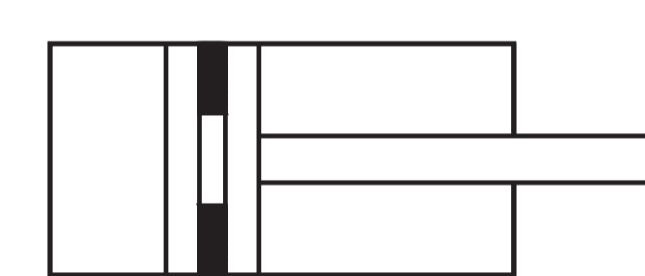
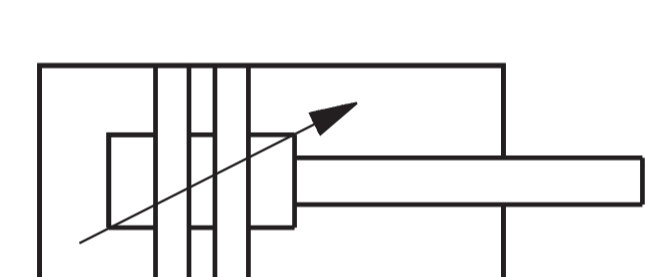
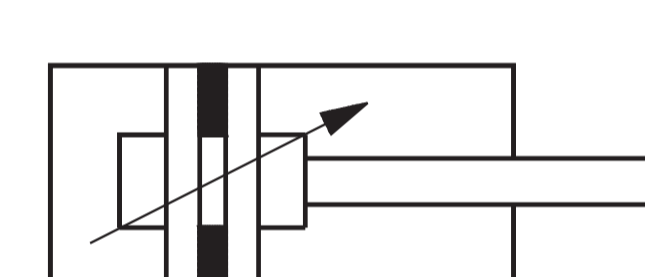
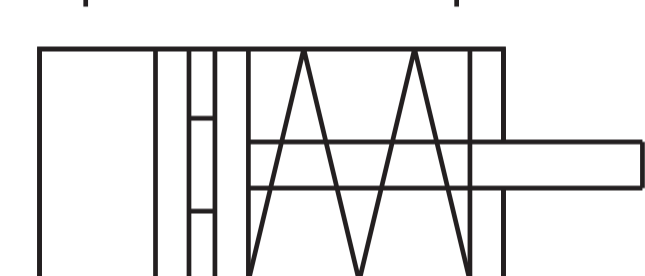



-   **M100**  
D.A. Standard
-   **M150**  
D.A. With adjustable cushionings
-   **M160**  
S.A. Retracted piston rod
-   **M170**  
S.A. Extended piston rod

For extended rod version add **WH+Z**(stroke) dimensions

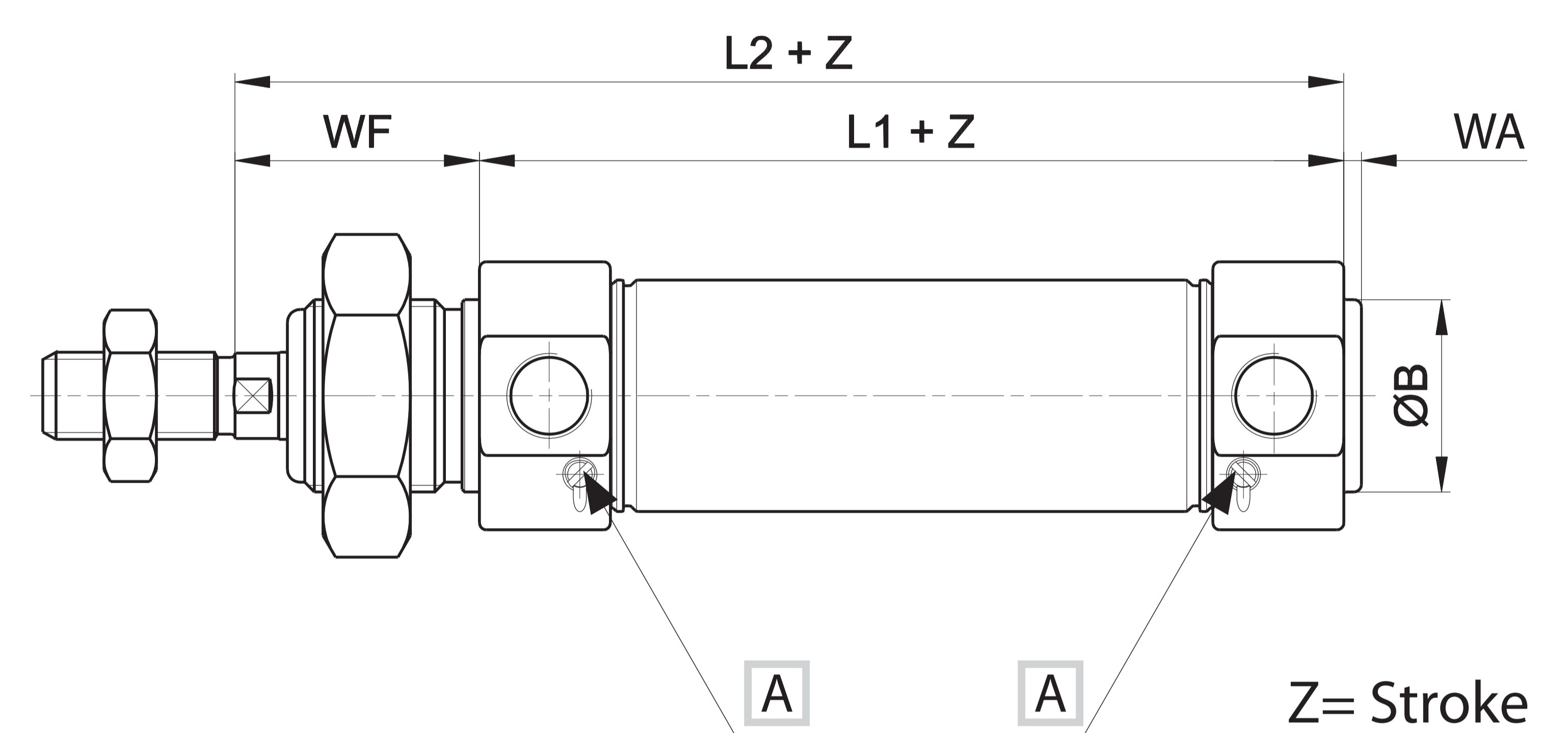


## Double acting reduced version

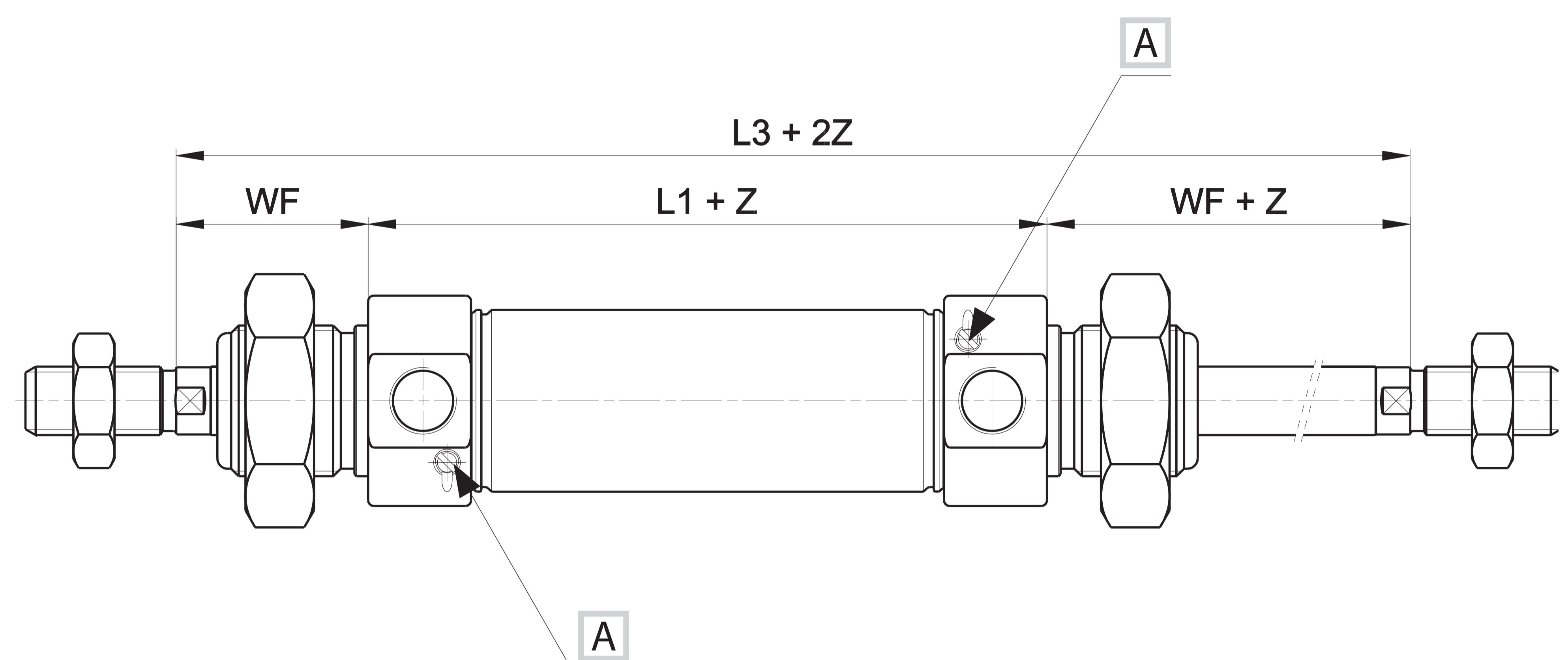


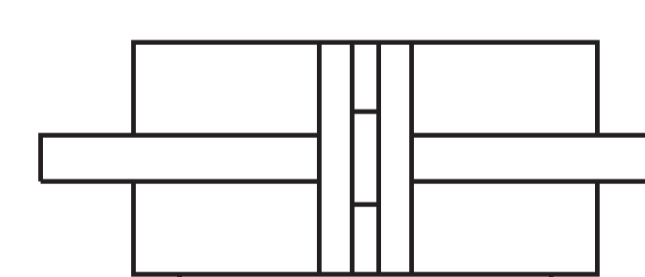
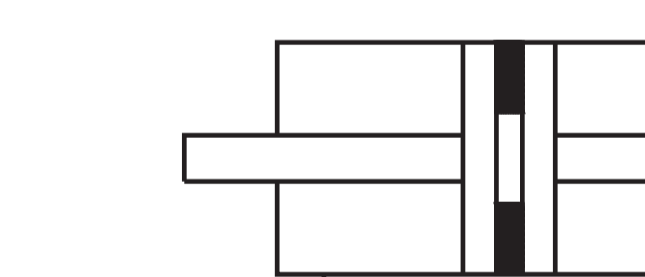
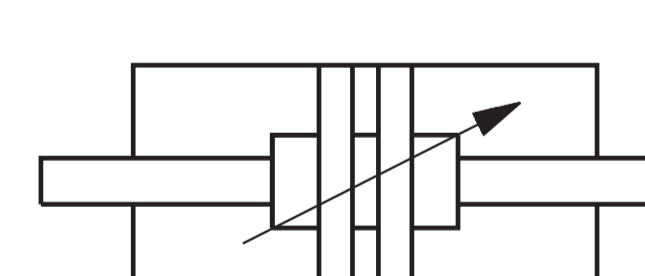
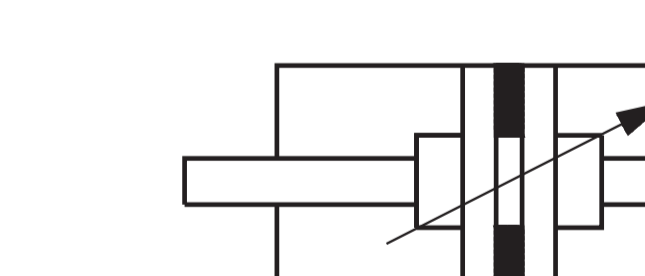
-   **M300**  
D.A. Standard
-   **M350**  
D.A. With adjustable cushionings
-   **M360**  
S.A. Retracted piston rod
-   **M370**  
S.A. Extended piston rod

For extended rod version add **WH+Z**(stroke) dimensions



## Double acting through piston rod



-   **M101**  
D.A. Through piston rod
-   **M151**  
D.A. Through piston rod with adjustable cushionings

Z= Stroke

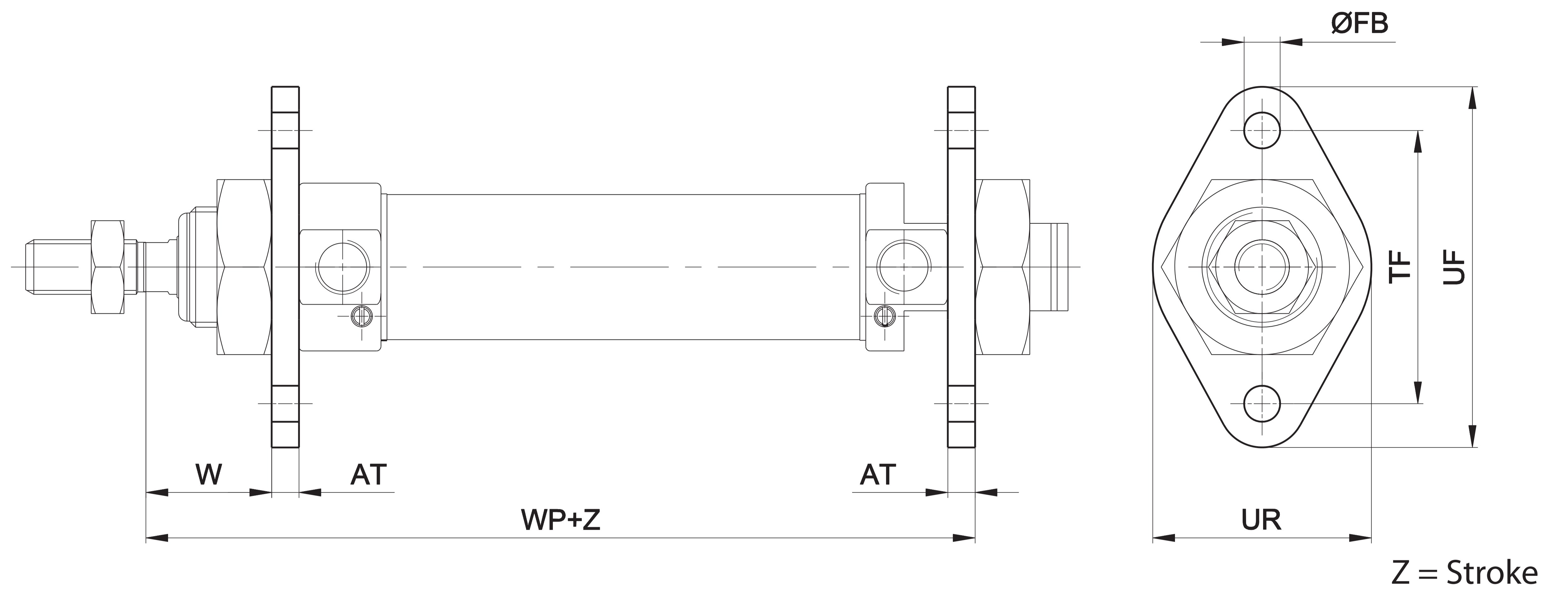
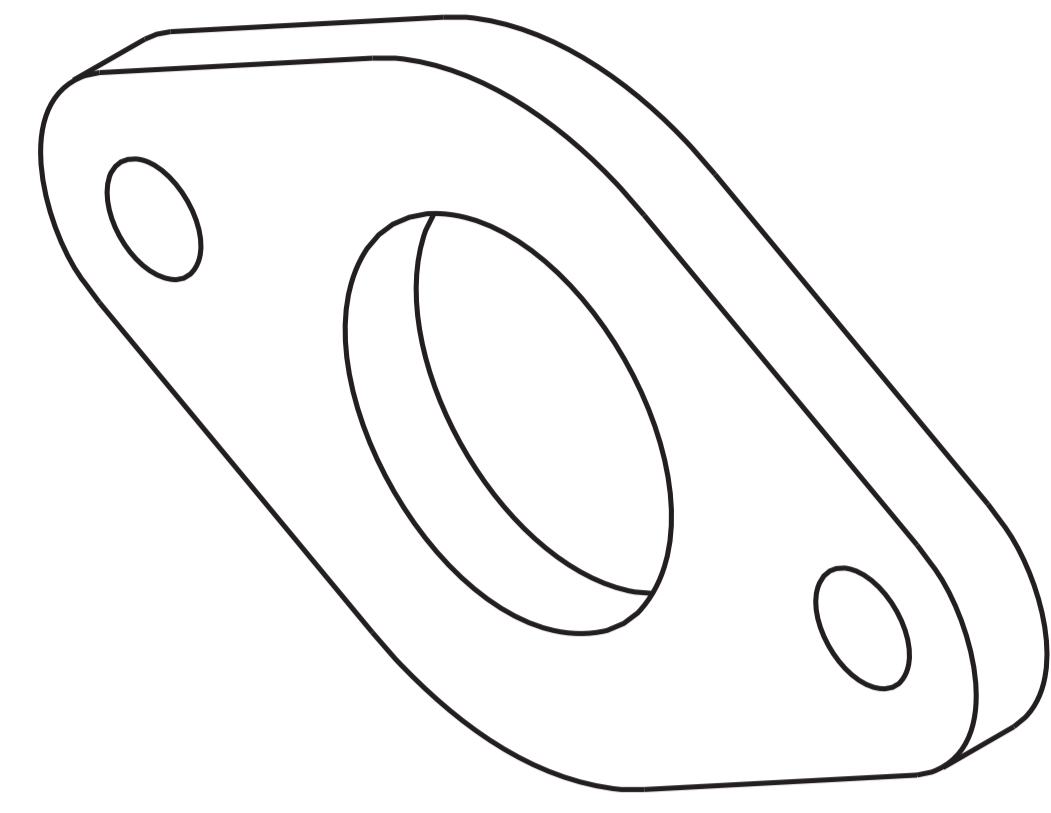
Ø	AM	B	BE	CD	D	E	E1	E2	EE	EW	F	KK	KV	KV1
		h 10	M12x1,25	H 9						d 13				
8	12	12	M12x1,25	4	9,3	14	7,9	7,2	M5x0,8	8	5	M4x0,7	7	19
10	12	12	M12x1,25	4	11,3	14	7,9	7,2	M5x0,8	8	5	M4x0,7	7	19
12	16	16	M16x1,5	6	13,3	17	9,4	8,7	M5x0,8	12	5	M6x1	10	24
16	16	16	M16x1,5	6	17,3	20,8	10,4	9,6	M5x0,8	12	5,5	M6x1	10	24
20	20	22	M22x1,5	8	21,6	27,7	13,85	12	G1/8	16	8	M8x1,25	13	32
25	22	22	M22x1,5	8	26,6	30,7	15,35	13,75	G1/8	16	8	M10x1,25	17	32

Ø	KW	KW1	L	L1	L2	L3	MM	MR	SW	VD	WA	WD	WF	XC
													± 1,2	± 1
8	2,8	7	7	46	62	78	4	12	3	1,5	1,5	12	16	64
10	2,8	7	7	46	62	78	4	12	3	1,5	1,5	12	16	64
12	4	8	9	50	72	94	6	16	5	1,5	1,5	17	22	75
16	4	8	8	56	78	100	6	16	5	1,5	1,5	17	22	82
20	5	10	11	68	92	116	8	18	7	2	2	19	24	95
25	6	10	15	69	97	125	10	18	9	2	2	22	28	104

A Pneumatic cushioning adjusting screw

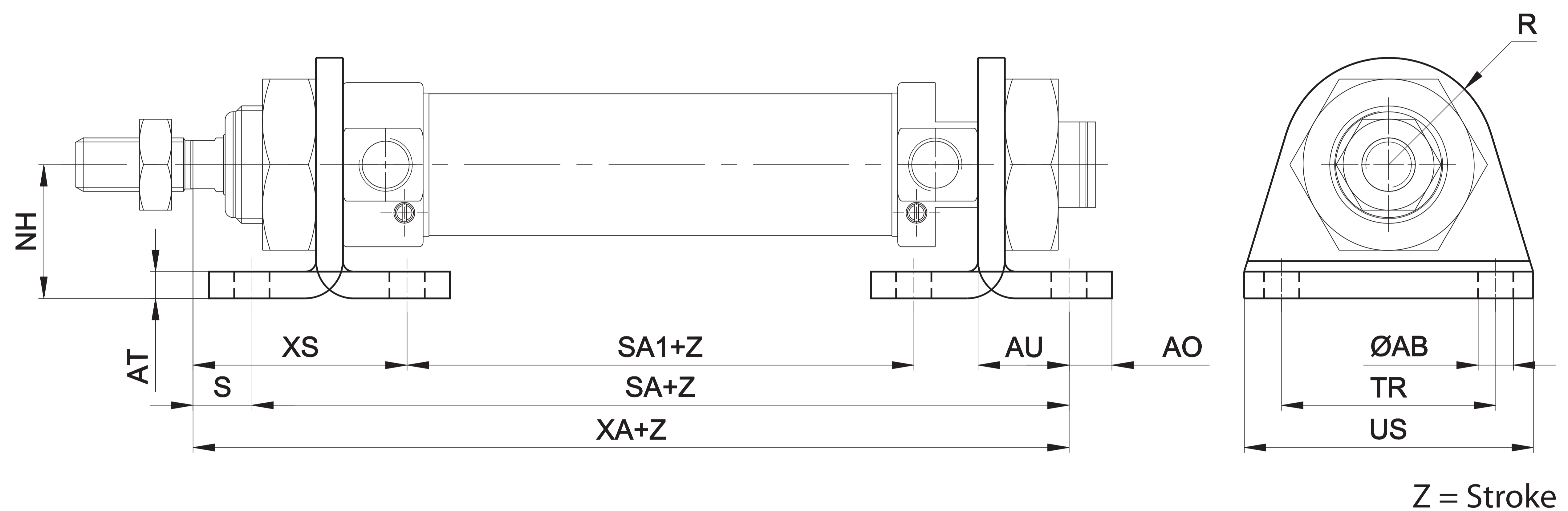
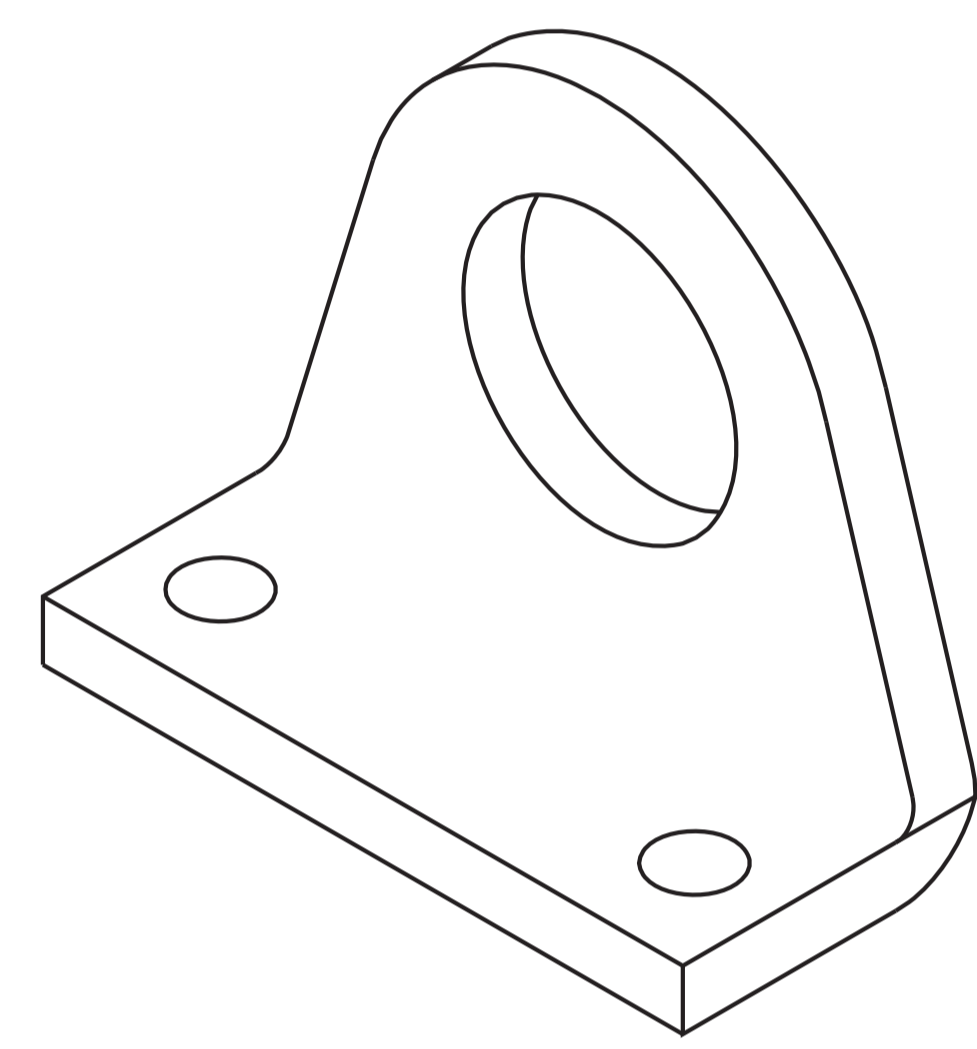
## Flange (MF8)



Material: Zinc-plated steel

Ø	AT	ØFB	TF	UF	UR	W	WP	Mass	Part No.
		H13	Js14			± 1,4		g	
8 - 10	3	4,5	30	40	25	13	65	12	MF-12008
12	4	5,5	40	53	30	18	76	25	MF-12012
16	4	5,5	40	53	30	18	82		
20	5	6,6	50	66	40	19	97	49	MF-12020
25	5	6,6	50	66	40	23	102		

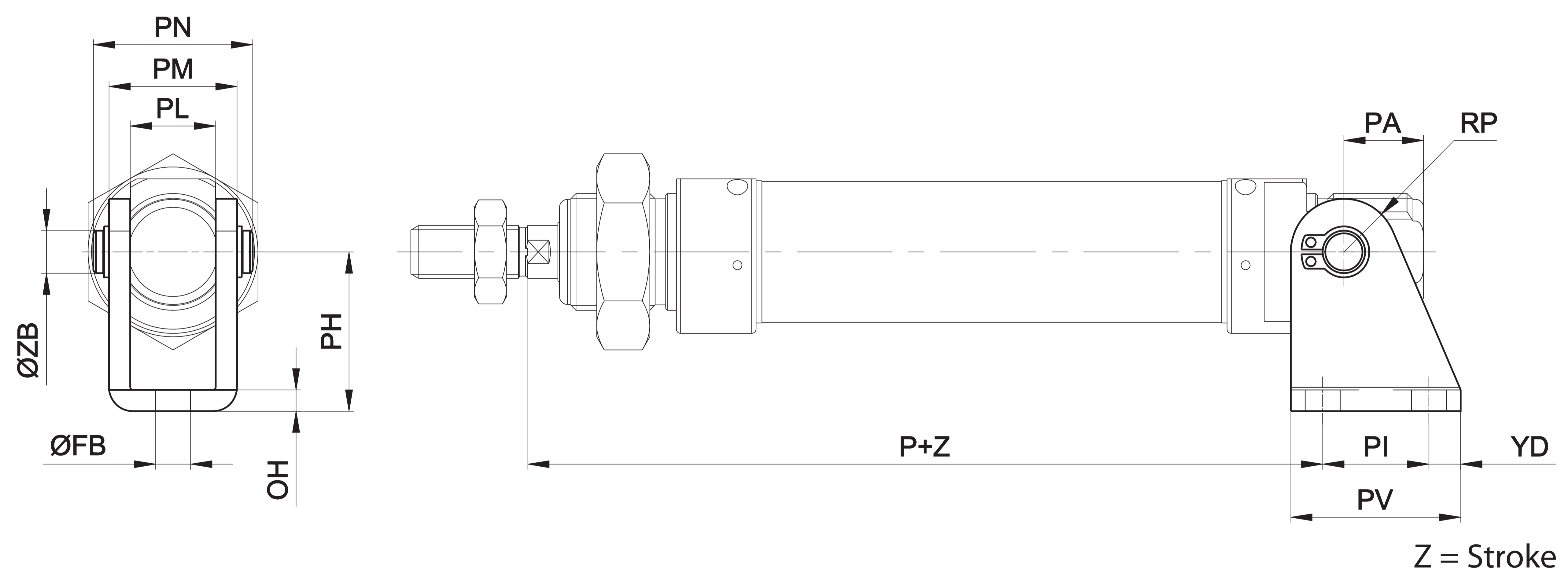
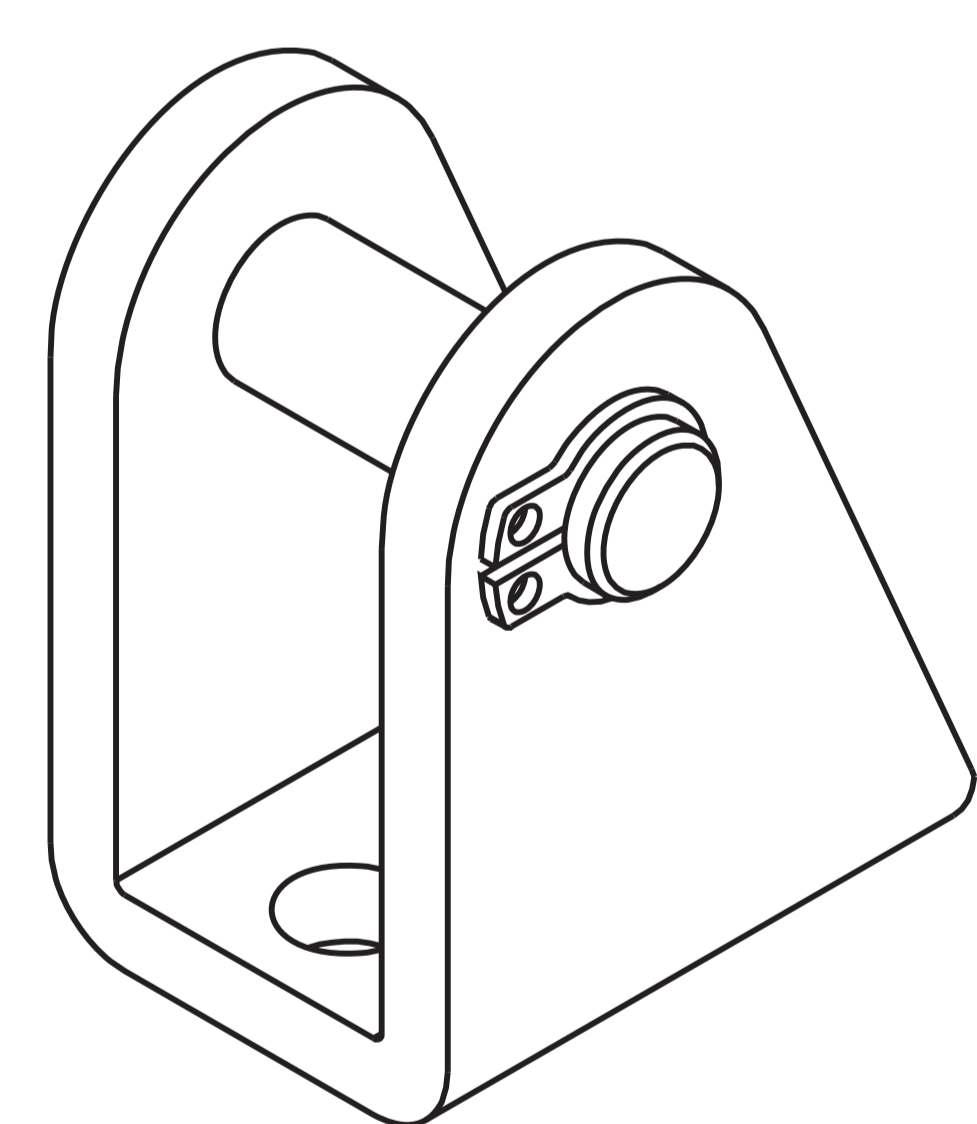
## Angle bracket (MS3)



Material: Zinc-plated steel

Ø	AB	AO	AT	AU	NH	R	S	SA	SA1	TR	US	XA	XS	Mass	Part No.
	H13			$+0,3$ 0	±0,3					Js14			±1,4	g	
8 - 10	4,5	5	3	11	16	10	5	68	30	25	35	73	24	20	MF-13008
12	5,5	6	4	14	20	13	8	78	30	32	42	86	32	40	MF-13012
16	5,5	6	4	14	20	13	8	84	36	32	42	92	32		
20	6,6	8	5	17	25	20	7	102	44	40	54	109	36	90	MF-13020
25	6,6	8	5	17	25	20	11	103	45	40	54	114	40		

## Female rear hinge

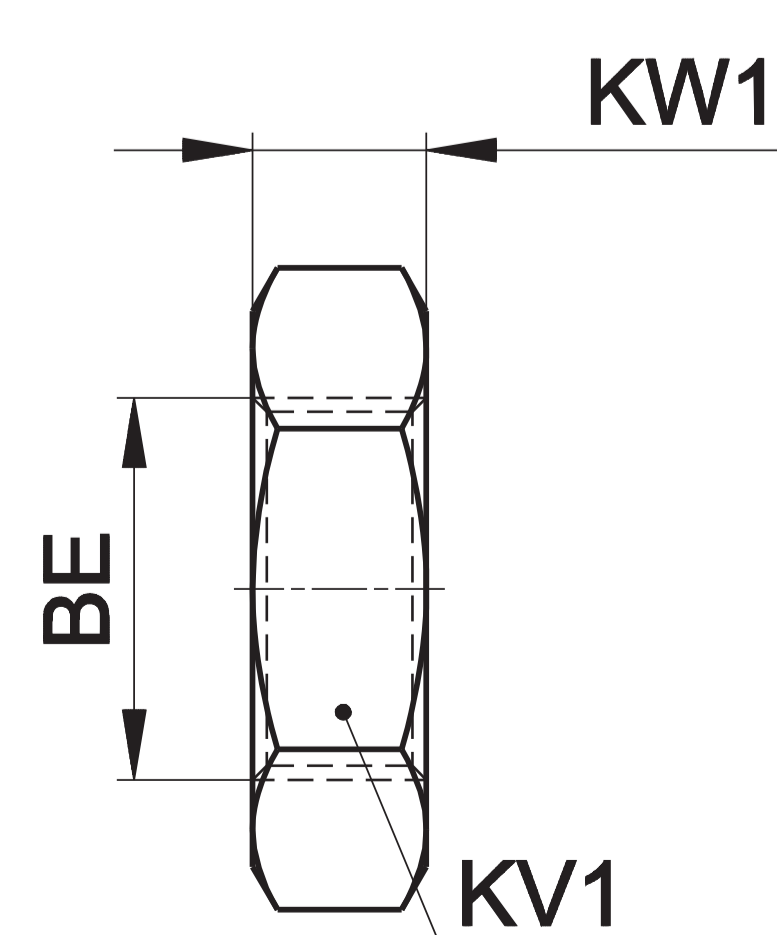
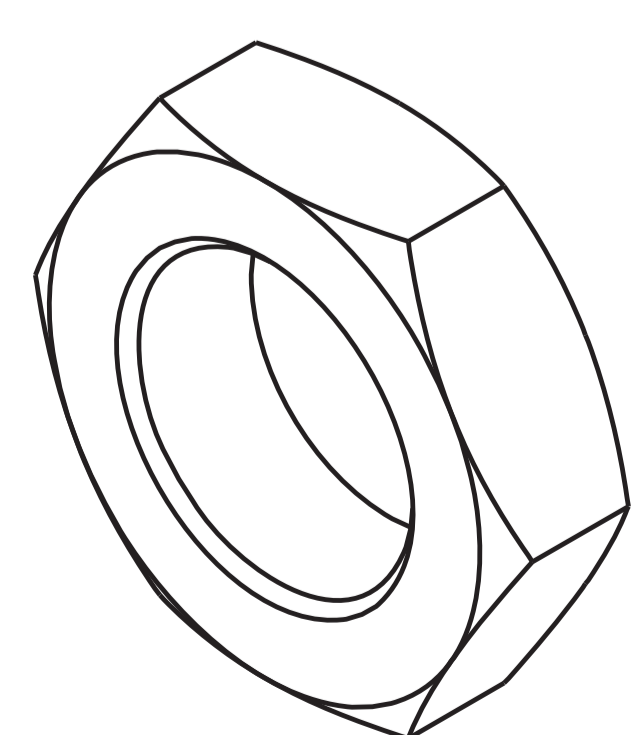


Including bolt and 2 circlips

Material: Zinc-plated steel

Ø	FB	OH	P	PA	PH	PI	PL	PM	PN	PV	RP	YD	ZB	Mass	Part No.
	H13						E9						f8	g	
8 - 10	4,5	2,5	62,5	11	24	12,5	8,1	13,1	17	20	5,3	3,8	4	19	MF-21008
12	5,5	3	73	13	27	15	12,1	18,1	23	25	7	5	6	37	MF-21012
16	5,5	3	80	13	27	15	12,1	18,1	23	25	7	5	6		
20	6,6	4	91	16	30	20	16,1	24,1	30	32	10	6	8	80	MF-21020
25	6,6	4	100	16	30	20	16,1	24,1	30	32	10	6	8		

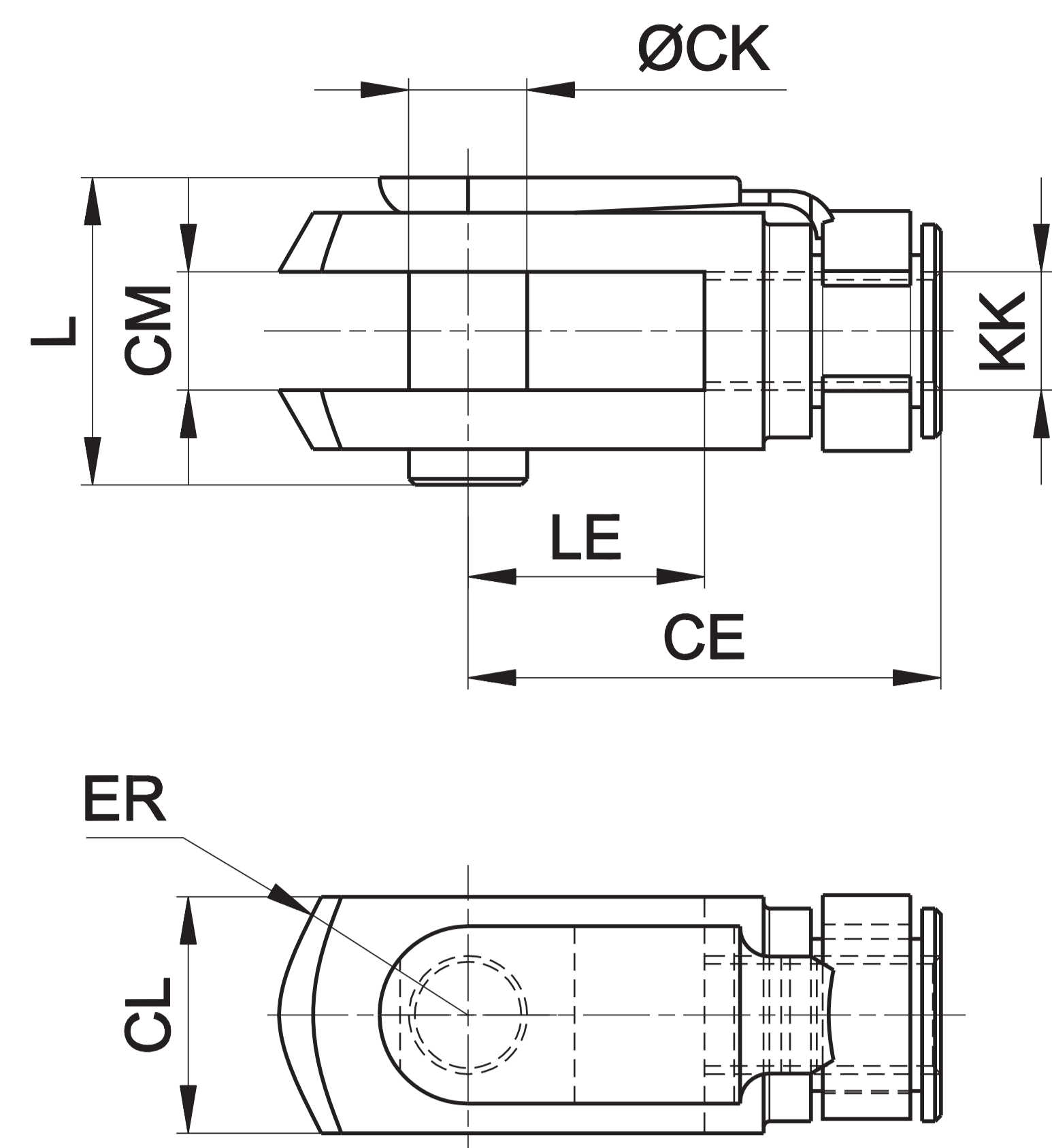
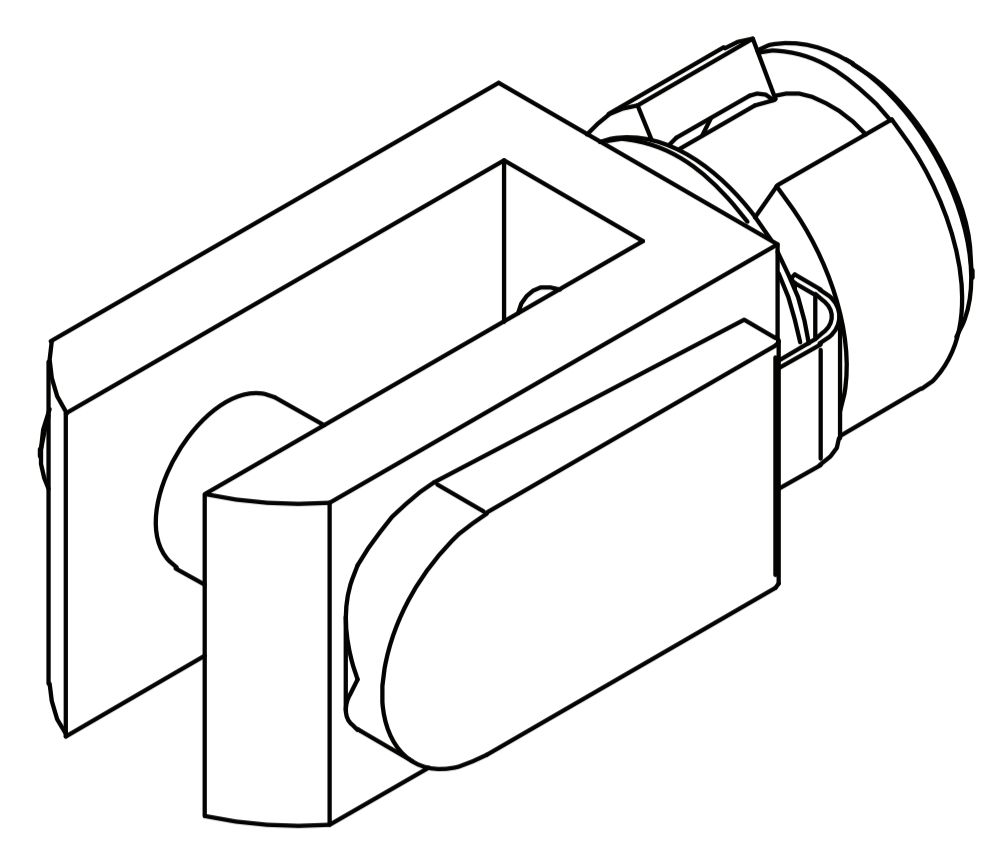
## Nut for end-cap



Ø	BE	KV1	KW1	Mass	Part No.
				g	
8 - 10	M12x1,25	19	7	11	MF-20008
12 - 16	M16x1,5	24	8	18	MF-20012
20 - 25	M22x1,5	32	10	33	MF-20020

Material: Zinc-plated steel

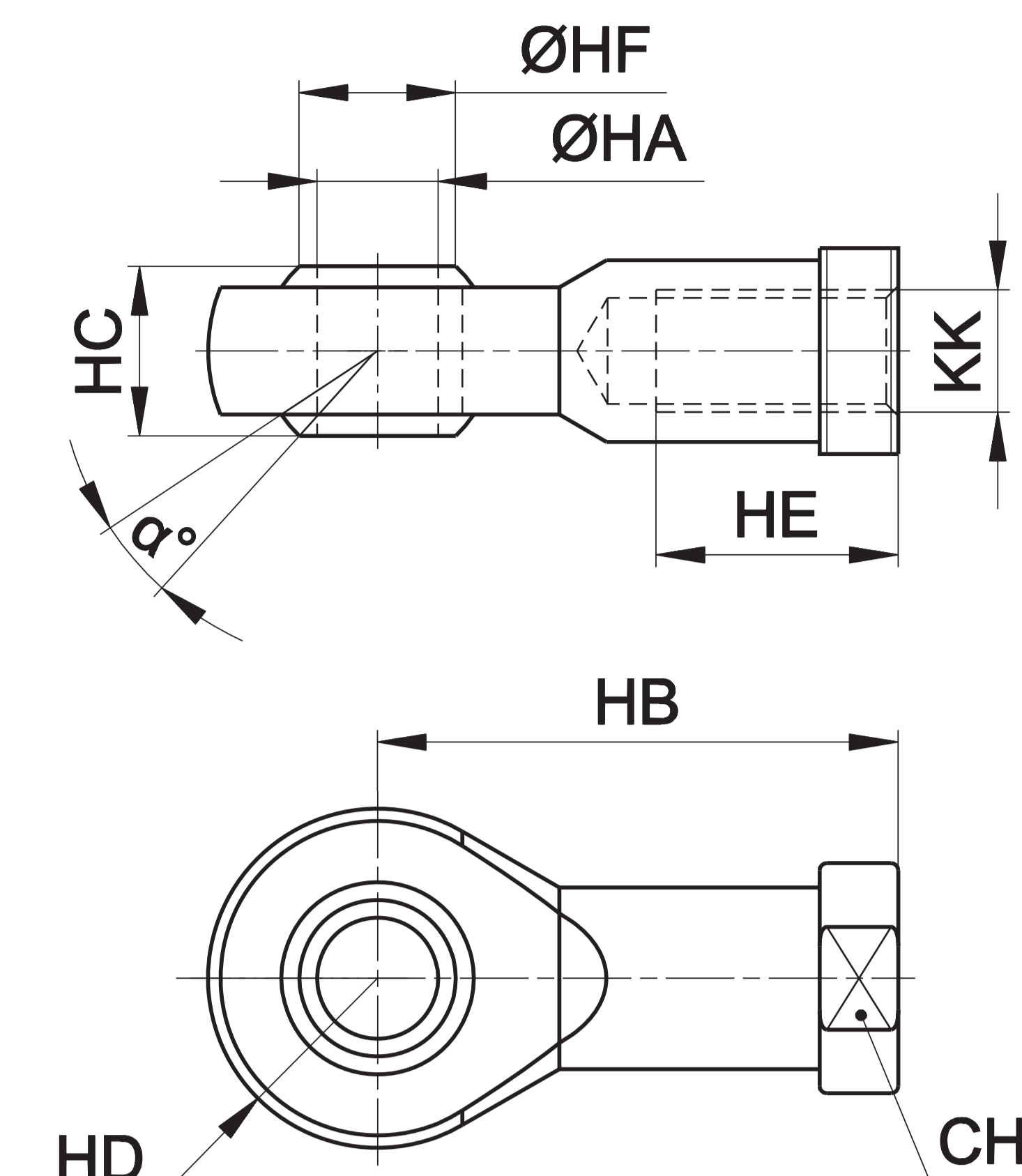
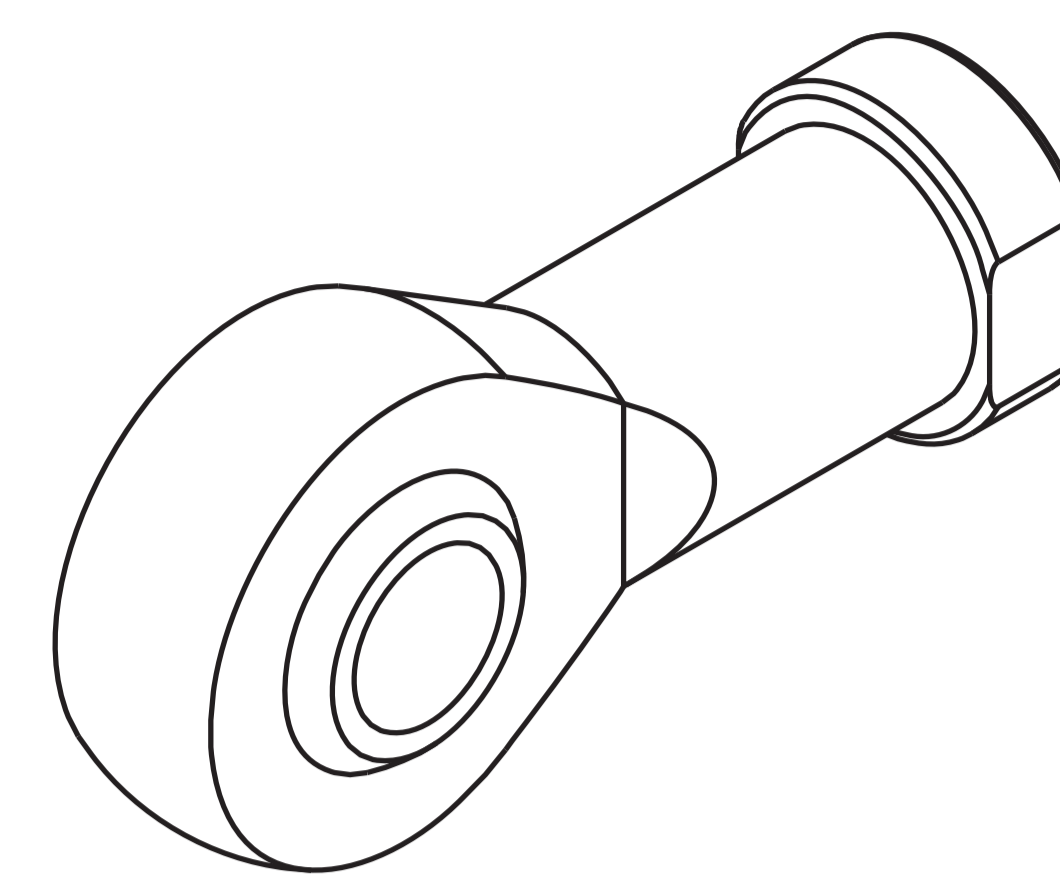
## Female fork with clips



Material: Zinc-plated steel

Ø	CE	CK	CL	CM	ER	KK	L	LE	Mass	Part No.
8 - 10	16	4	8	4	5	M4x0,7	11	8	7	MF-15008
12 - 16	24	6	12	6	7	M6x1	16	12	19	MF-15012
20	32	8	16	8	10	M8x1,25	22	16	46	MF-15020
25	40	10	20	10	16	M10x1,25	26	20	90	KF-15032

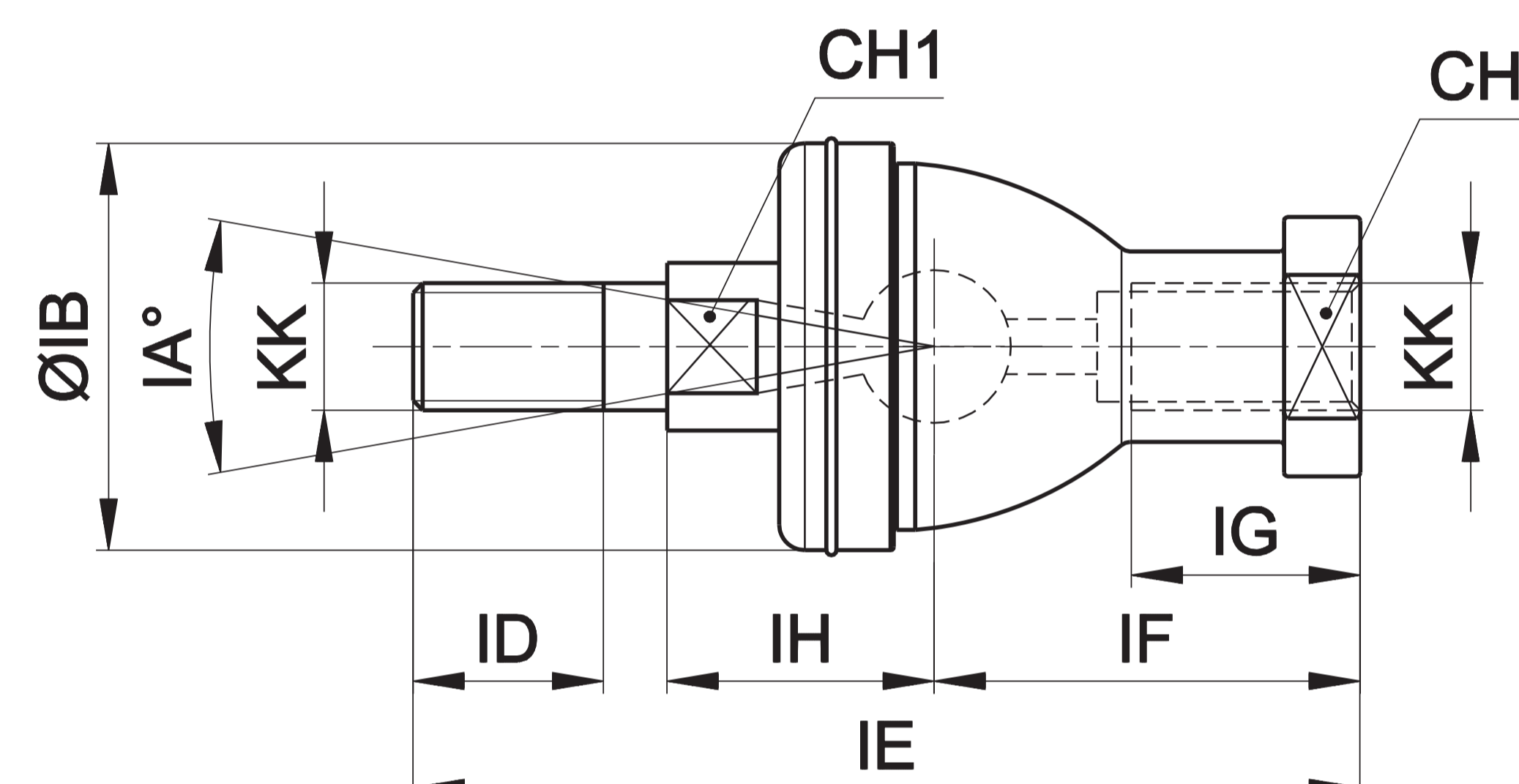
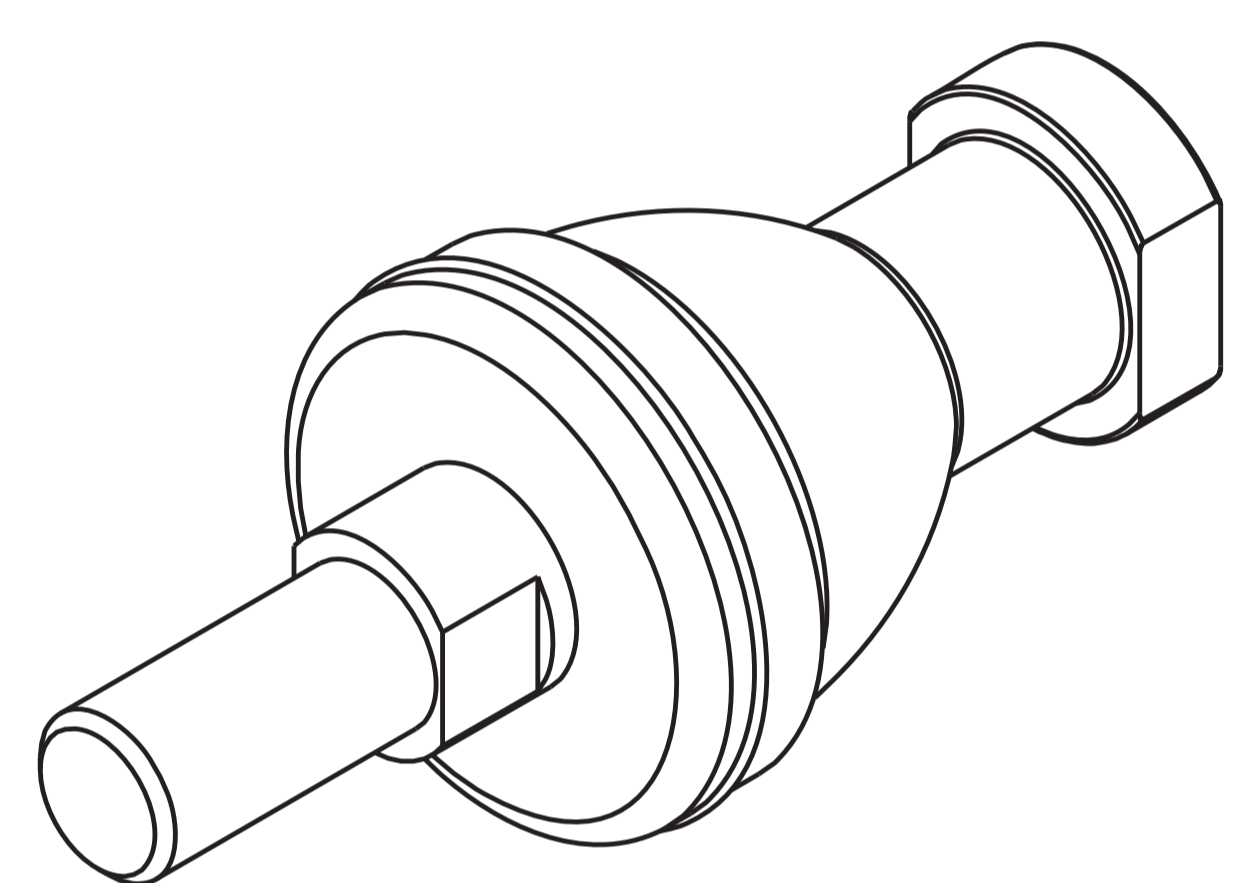
## Articulated self-lubricating fork



Material: Zinc-plated steel

Ø	α°	CH	KK	HA	HB	HC	HD	HE	HF	Mass	Part No.
8 - 10	13°	9	M4x0,7	5	27	8	9	10	7,7	18	MF-17008
12 - 16	13°	11	M6x1	6	30	9	10	12	9	26	MF-17012
20	14°	14	M8x1,25	8	36	12	12	16	10,4	46	MF-17020
25	13°	17	M10x1,25	10	43	14	14	20	12,9	76	KF-17032

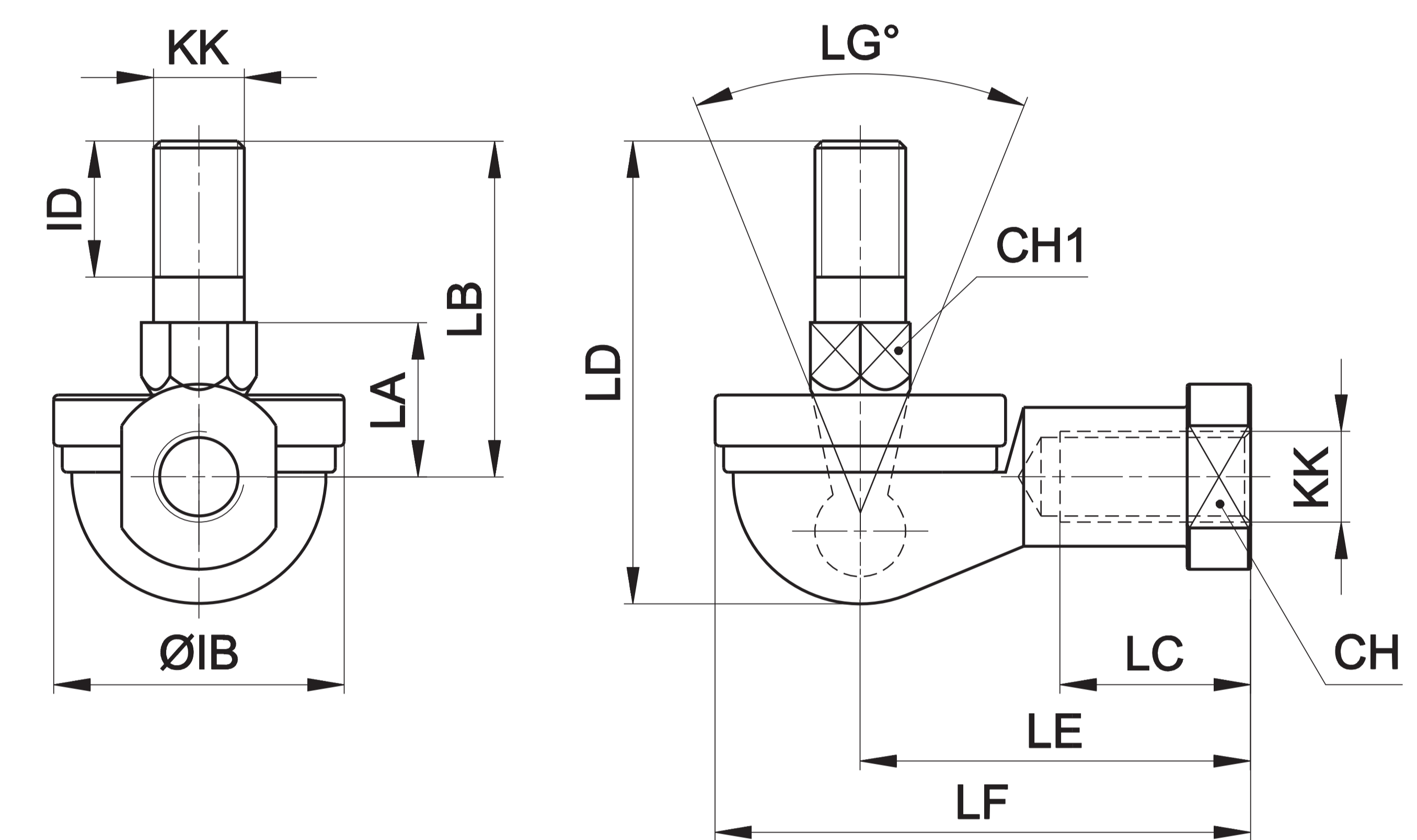
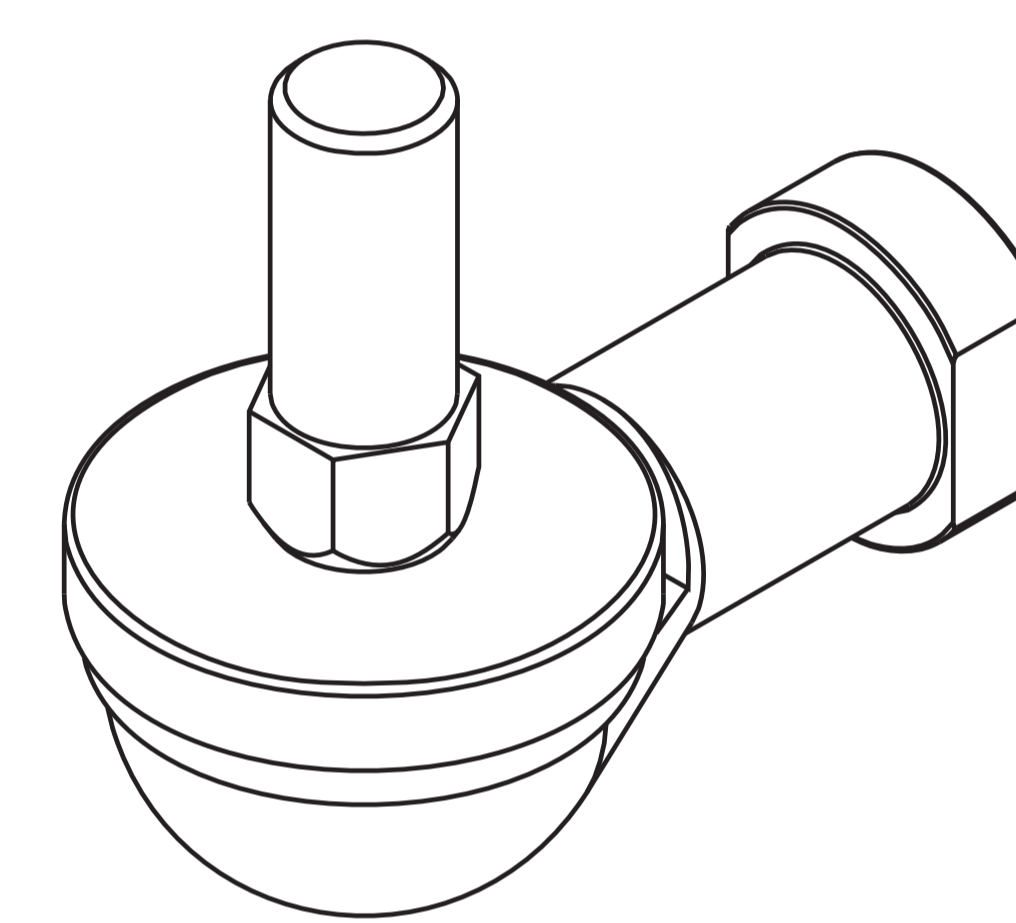
## Fork with axially mounted articulated pin



Material: Zinc-plated steel

Ø	CH	CH1	IA°	KK	IH	IB	ID	IE	IF	IG	Mass	Part No.
8 - 10	-	-	-	-	-	-	-	-	-	-	-	-
12 - 16	11	8	30°	M6x1	12,2	22	11	55,2	28	15	40	MF-22016
20	14	10	30°	M8x1,25	16	28	12	65	32	16	75	MF-22020
25	17	11	30°	M10x1,25	19,5	32	15	74,5	35	18	120	KF-22025

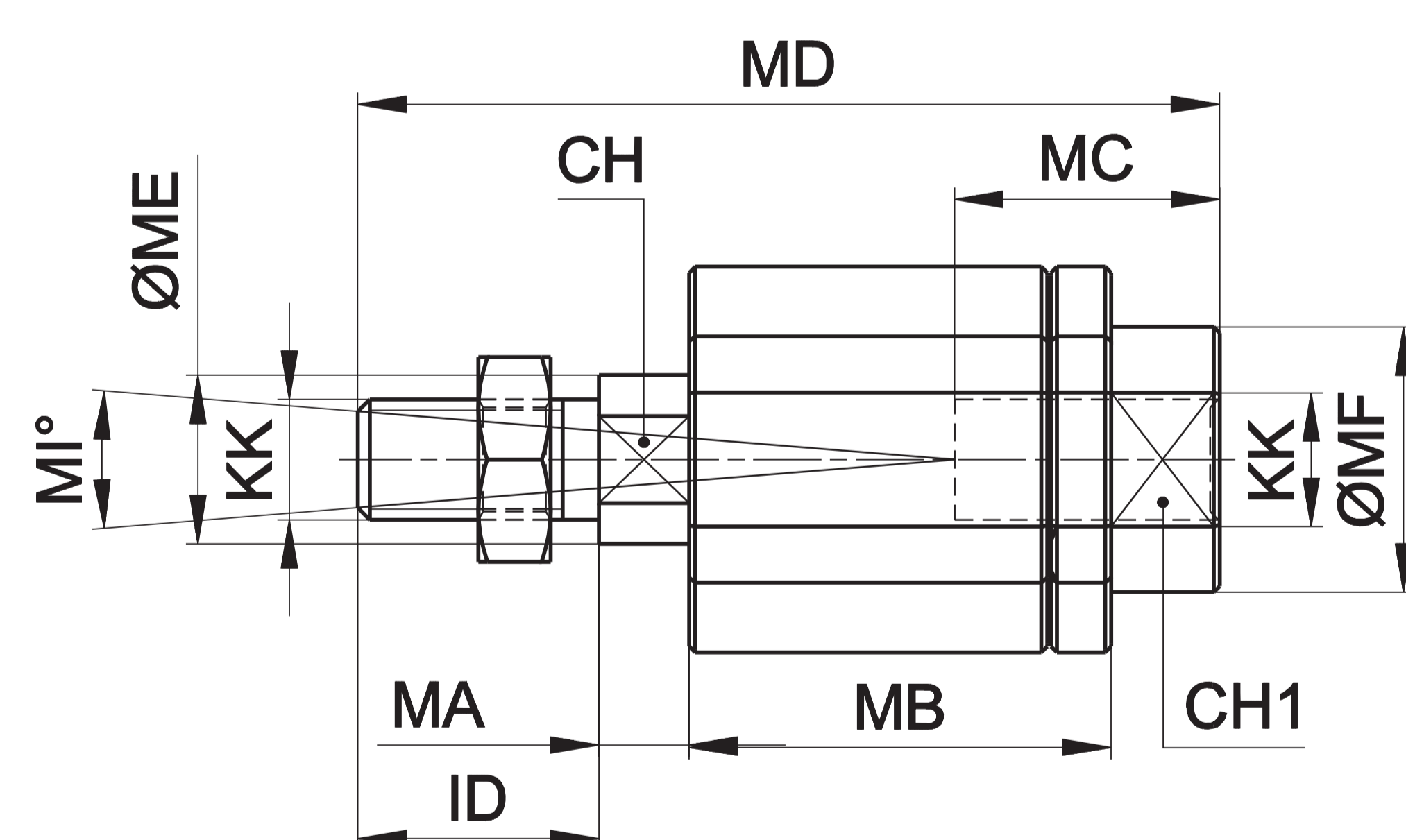
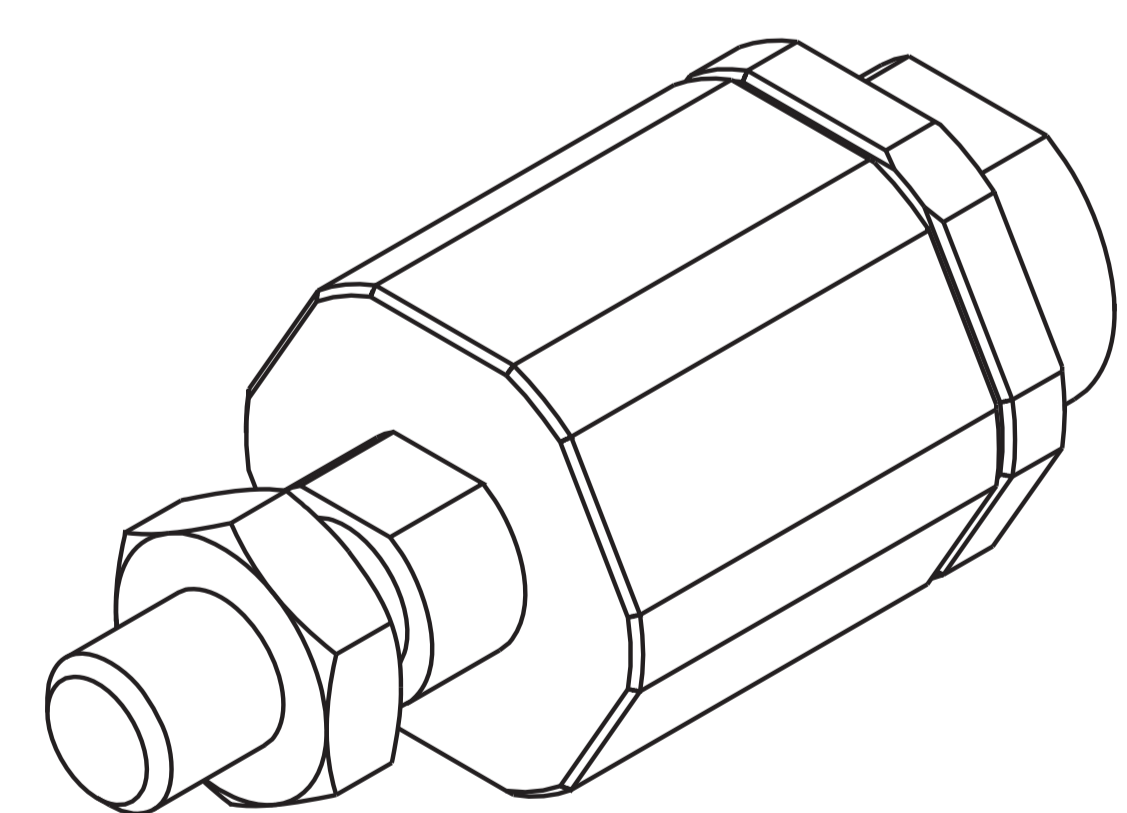
## Fork with angle mounted articulated pin



Material: Zinc-plated steel

Ø	CH	CH1	LG°	KK	IB	ID	LA	LB	LC	LD	LE	LF	Mass	Part No.
8 - 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 - 16	11	8	50°	M6x1	22	11	11	26	14	35,5	30	40	37	MF-23012
20	14	10	50°	M8x1,25	28	12	14	31	17	42,5	36	48	67	MF-23020
25	17	11	50°	M10x1,25	32	15	17	37	21	50,5	43	57	110	KF-23025

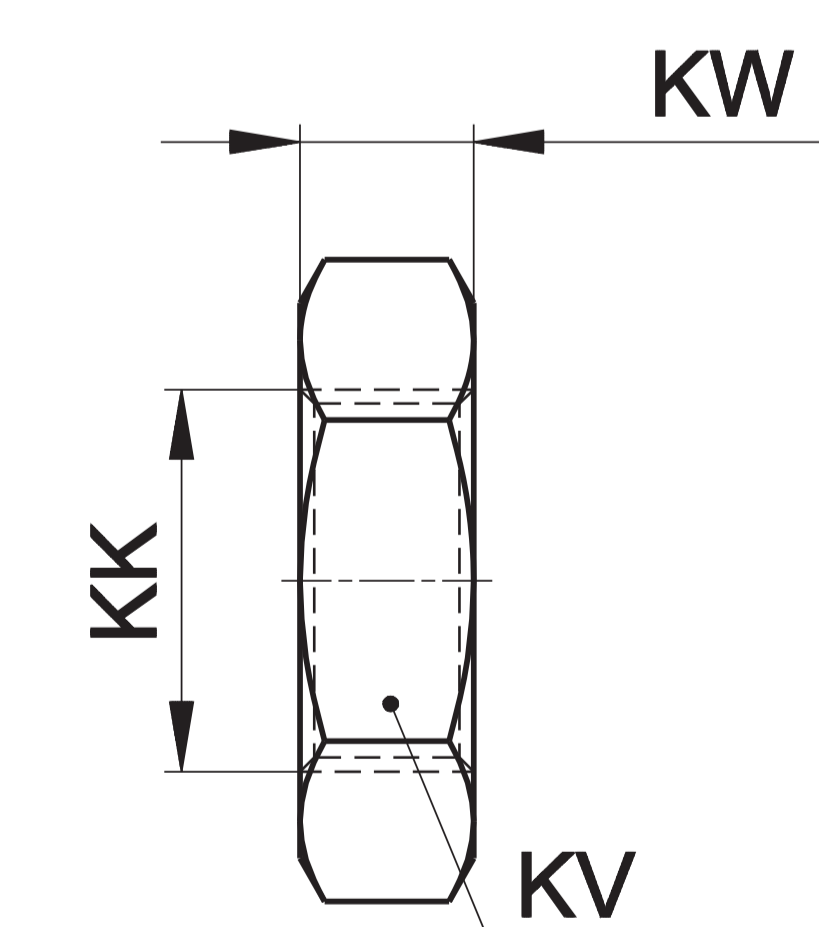
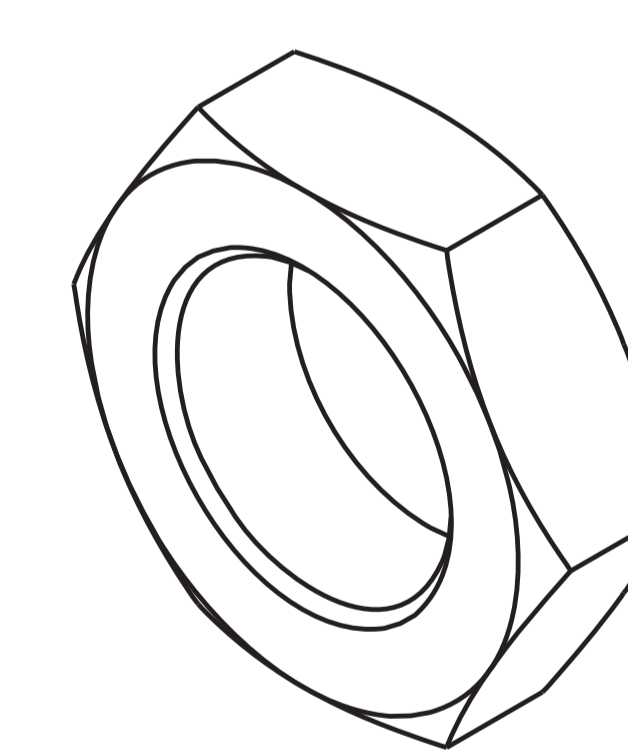
## Floating joint



Material: Zinc-plated steel

Ø	CH	CH1	ID	KK	MA	MB	MC	MD	ME	MF	MG	MH	MI°	Mass	Part No.
8 - 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 - 16	5	7	11	M6x1	2,5	17,5	12,5	35	6	8,5	13	14,5	6°	35	MF-24012
20	7	11	21	M8x1,25	5	26	16	57	8	12,5	17	19	8°	60	MF-24020
25	12	19	20	M10x1,25	7,5	35	22	71,5	14	22	30	32	8°	220	KF-24032

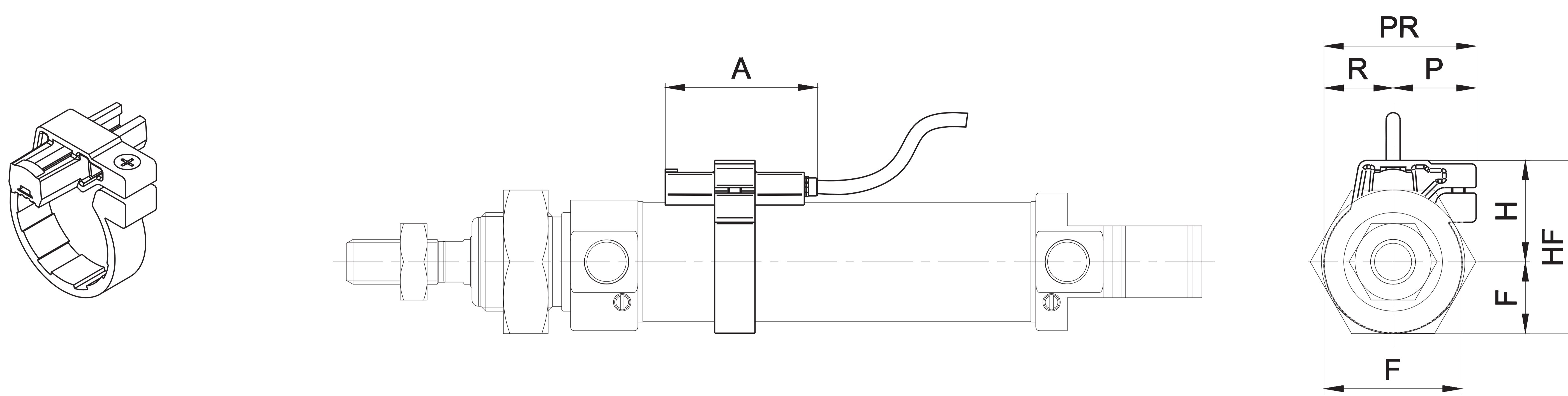
## Nut for piston rod



Material: Zinc-plated steel

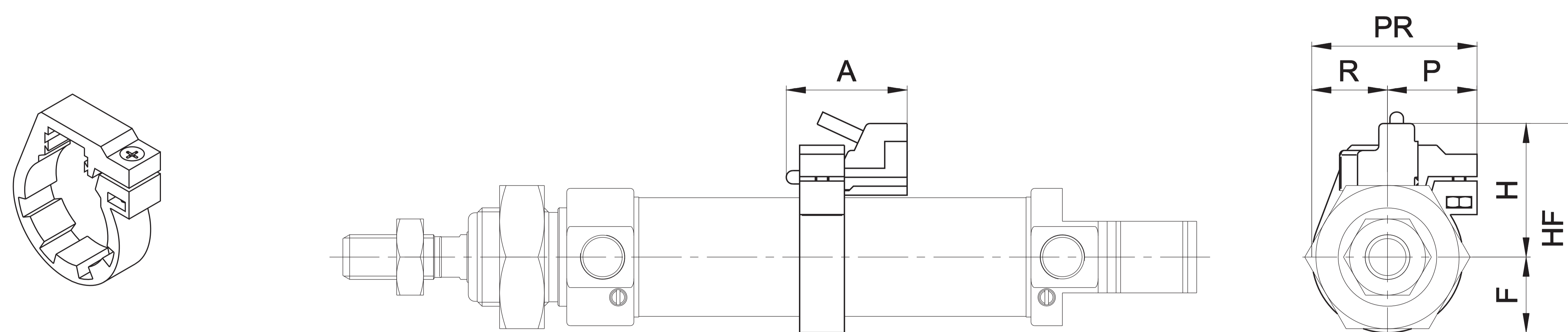
Ø	KK	KV	KW	Mass	Part No.
8 - 10	M4x0,7	7	2,8	0,2	MF-16008
12 - 16	M6x1	10	4	1,6	MF-16012
20	M8x1,25	13	5	3,4	MF-16020
25	M10x1,25	17	6	5	KF-16032

## DF sensor fixing elements



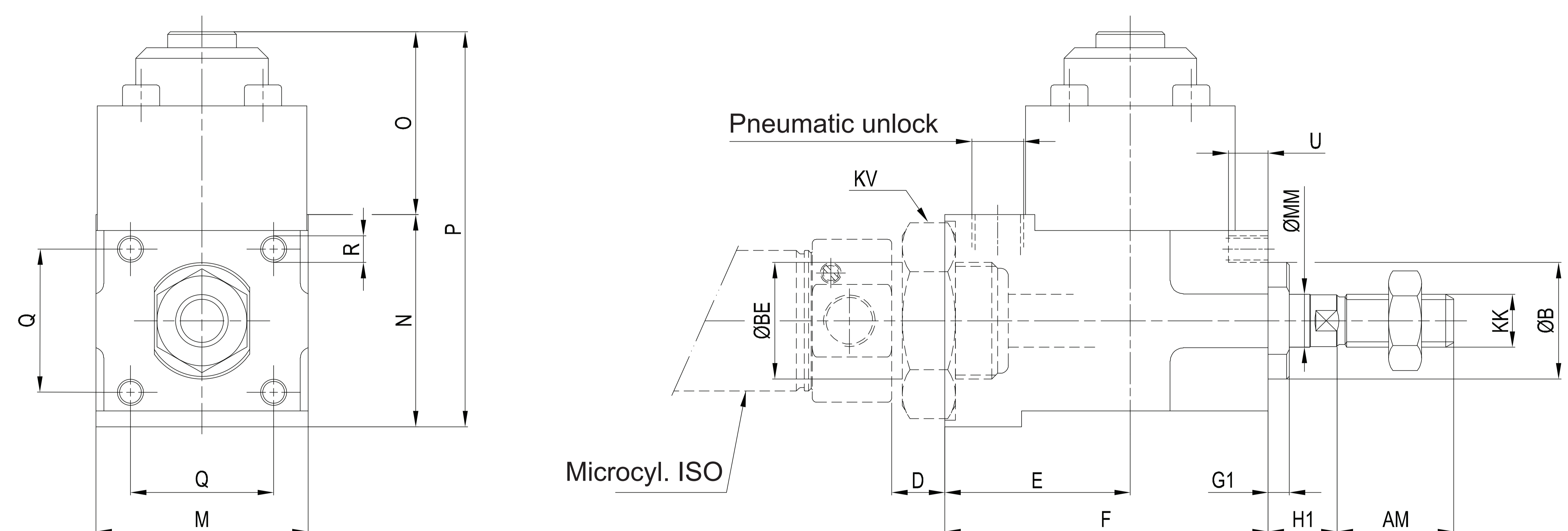
Ø	A	F	H	HF	P	R	PR	Part No.
10	34	8	17	25	15	8	23	DH-M10DF
12	34	8	17	25	15	8	23	DH-M12DF
16	34	11	18	29	17	11	28	DH-M16DF
20	34	12	20	32	17	12	29	DH-M20DF
25	34	16	23	39	19	16	35	DH-M25DF

## DH sensor fixing elements

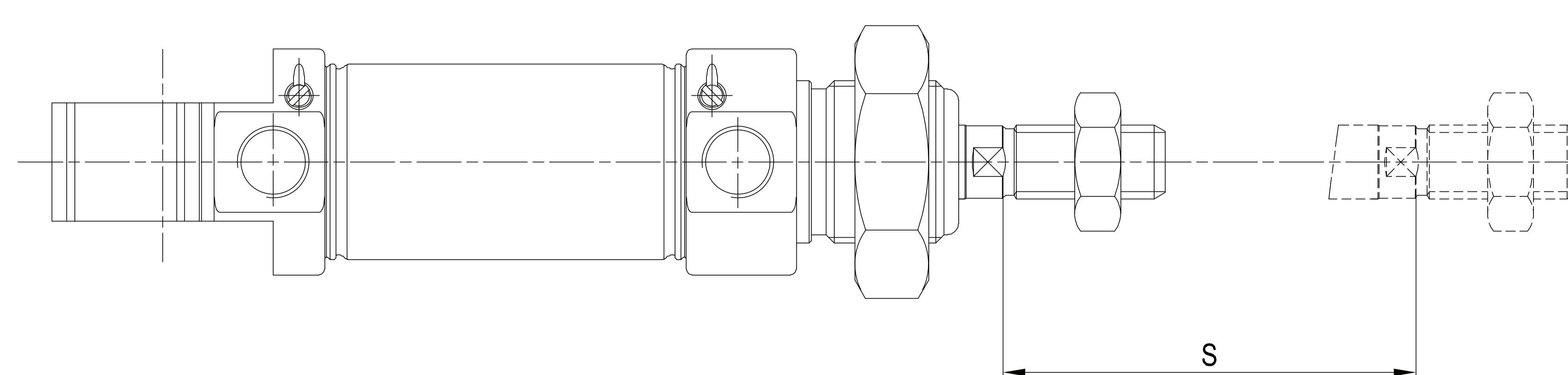


Ø	A	F	H	HF	P	R	PR	Part No.
10	24	12,5	22,5	35	17	10	27	DH-M10
12	24	11,5	23,5	35	17	10	27	DH-M12
16	24	15	25	40	18	13	31	DH-M16
20	24	19	27	46	18	17	29	DH-M20
25	24	18	30	48	20	17	37	DH-M25

## Locking unit for Microcylinders Ø 16 - 20 - 25 mm



> Additional length to standard rod



Ø	AM	B	BE	D	E	F	G1	H1	KK	KV	M	MM	N	O	P	Q	R	S	U
16	16	16	M16 x 1,5	10	35	61	1,5	7	M6 x 1	es. 24	40	6	40	34,5	74,5	27	M5	55	7,5
20	20	22	M22 x 1,5	10	35	61	4	9	M8 x 1,25	es. 32	40	8	40	34,5	74,5	27	M5	55	7,5
25	22	22	M22 x 1,5	10	35	61	4	13	M10 x 1,25	es. 32	40	10	40	34,5	74,5	27	M5	55	7,5