

# TECHNICAL SPECIFICATION

## *ISO Profile Series*



**Product Description**



**Principle of Operation**



**Performance**



**Construction**



**Dimensional Details**



**How to Order**

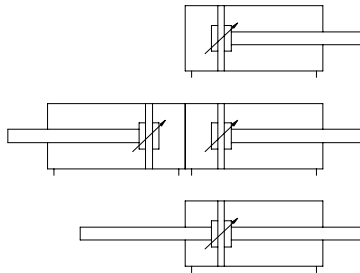


## PRODUCT DESCRIPTION

The ISOP series cylinders are pneumatic cylinders for use in pneumatic systems. They consist of 6 bore sizes ranging from 32 mm to 100 mm diameters.

The ISOP series cylinder is a tie rod type pneumatic cylinder.

The cylinders are available in the following configurations:



- C** A double acting, single rod cylinder with end of stroke cushioning.
- CBB** Two independent double acting, single rod cylinders with cushioning, mounted back-to-back.
- CDE** A double acting, double rod cylinder with end of stroke cushioning.

The cylinders are available in a variety of tube materials and mounting options (see the How To Order section).



## PRINCIPLE OF OPERATION

### Functionality

Pneumatic Cylinders convert compressed air energy into linear motion. The cylinder consists of a tube sealed at each end. A sliding piston divides the tube into 2 chambers. A piston rod is attached to the piston and extends through one end. As compressed air is fed into on end of the tube and air is exhausted out the other end, the piston slides down the tube bore and provides useful linear motion via the connected piston rod.

### Inputs and Outputs

Double acting cylinders have ports at each end to drive the actuator in both directions.



## PERFORMANCE

### Output Force

The useful forces produced by the cylinders are dependent on the cylinder diameter, the system air pressure and friction. The following table shows the forces available at a range of pressures. An allowance of 10% for frictional forces has already been factored in.

#### Available Forces (Newtons) – Double Acting Cylinders

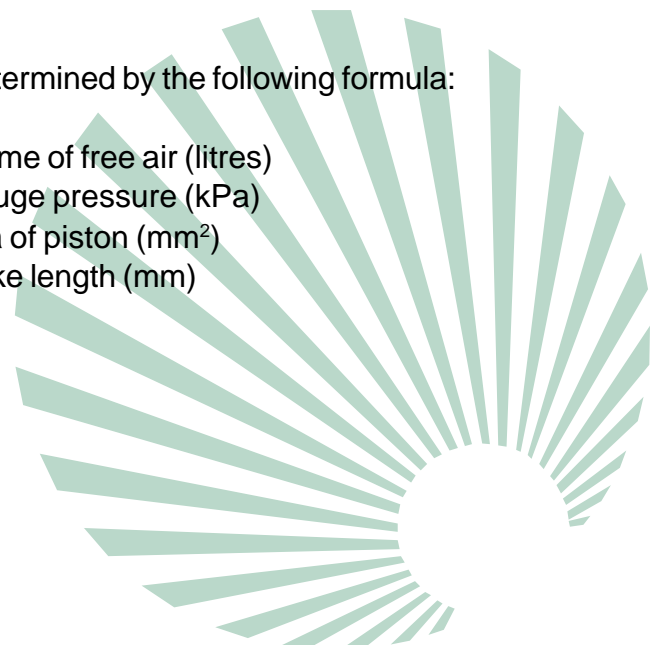
Cylinder ISOP/ISOT	Stroke	Working Pressure (kPa)									
		100	200	300	400	500	600	700	800	900	1000
32	push	72	145	217	290	362	434	507	579	652	724
	pull	62	124	187	249	311	373	436	498	560	622
40	push	113	226	339	453	566	679	792	905	1018	1131
	pull	95	190	285	380	475	570	665	760	855	950
50	push	177	354	530	707	884	1061	1238	1414	1591	1768
	pull	149	297	446	594	743	891	1040	1188	1337	1485
63	push	281	561	842	1123	1403	1684	1965	2245	2526	2807
	pull	252	505	757	1010	1262	1514	1767	2019	2271	2524
80	push	453	905	1358	1810	2263	2715	3168	3621	4073	4526
	pull	408	817	1225	1634	2042	2450	2859	3267	3675	4084
100	push	707	1414	2121	2829	3536	4243	4950	5657	6364	7071
	pull	663	1326	1989	2652	3315	3978	4641	5304	5967	6629

### Air Consumption

The amount of air consumed by a cylinder can be determined by the following formula:

$$V = \frac{P_g + 101.3}{101.3} \times A \times S \times 10^{-6}$$

V = volume of free air (litres)  
 P<sub>g</sub> = gauge pressure (kPa)  
 A = area of piston (mm<sup>2</sup>)  
 S = stroke length (mm)



The following table shows the theoretical air consumption of HD cylinders.

### Free Air Consumption (Litres/mm of stroke)

Cylinder ISOP/ISOT	Stroke	Working Pressure (kPa)									
		100	200	300	400	500	600	700	800	900	1000
32	push	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.008	0.009
	pull	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.006	0.007	0.008
40	push	0.002	0.004	0.005	0.006	0.007	0.009	0.010	0.011	0.012	0.014
	pull	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011
50	push	0.004	0.006	0.008	0.010	0.012	0.014	0.016	0.017	0.019	0.021
	pull	0.003	0.005	0.007	0.008	0.010	0.011	0.013	0.015	0.016	0.018
63	push	0.006	0.009	0.012	0.015	0.019	0.022	0.025	0.028	0.031	0.034
	pull	0.006	0.008	0.011	0.014	0.017	0.019	0.022	0.025	0.028	0.030
80	push	0.010	0.015	0.020	0.025	0.030	0.035	0.040	0.045	0.050	0.055
	pull	0.009	0.013	0.018	0.022	0.027	0.031	0.036	0.040	0.045	0.049
100	push	0.016	0.023	0.031	0.039	0.047	0.054	0.062	0.070	0.078	0.085
	pull	0.015	0.022	0.029	0.036	0.044	0.051	0.058	0.066	0.073	0.080

### Pressure Rating

1000 kPa maximum operating pressure.

### Temperature Rating

-20°C to +80°C for Nitrile seals. -20°C to +150°C for Viton seals.

### Fluid Media

Compressed air that is filtered and lubricated.



## Maximum Stroke

To ensure the piston rod does not buckle during operation, the maximum stroke of a cylinder must be determined. Euler's formula for columns is used:

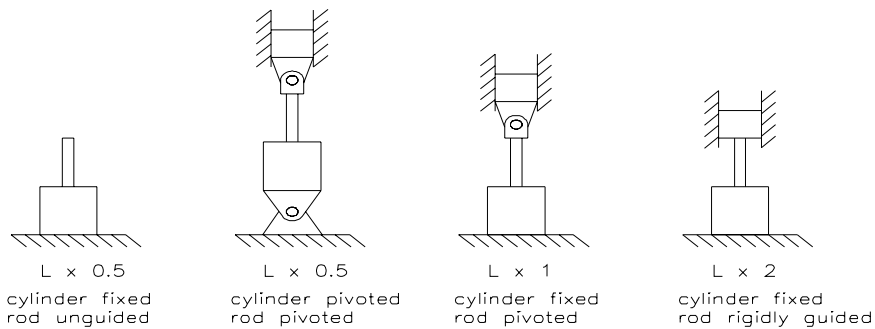
$$L = \sqrt{\frac{\pi^2 E I}{F S}}$$

- L = column length (mm)
- E = modulus of elasticity (N/mm<sup>2</sup>)
- I = moment of inertia (mm<sup>4</sup>)
- F = load (N)
- S = safety factor

For Goyen HD Cylinders, Euler's formula translates to the following:

$$L * K = \sqrt{\frac{d^4 * 18706.474}{F}}$$

- L = maximum stroke (mm)
- K = mounting factor (see options below)
- d = piston rod diameter (mm)
- F = load (N)



The following table shows maximum strokes for cylinders at various pressures (L x 1)

Cylinder	Rod Dia.	Working Pressure (kPa)									
		100	200	300	400	500	600	700	800	900	1000
ISO 32	12	2196	1553	1268	1098	982	897	830	776	732	694
ISO 40	16	3123	2209	1803	1562	1397	1275	1181	1104	1041	988
ISO 50	20	3904	2761	2254	1952	1746	1594	1476	1380	1301	1235
ISO 63	20	3099	2191	1789	1549	1386	1265	1171	1096	1033	980
ISO 80	25	3813	2696	2201	1906	1705	1557	1441	1348	1271	1206
ISO 100	25	3050	2157	1761	1525	1364	1245	1153	1078	1017	965

Note : Due to material limitations, the maximum stroke that can be manufactured is 3000 mm

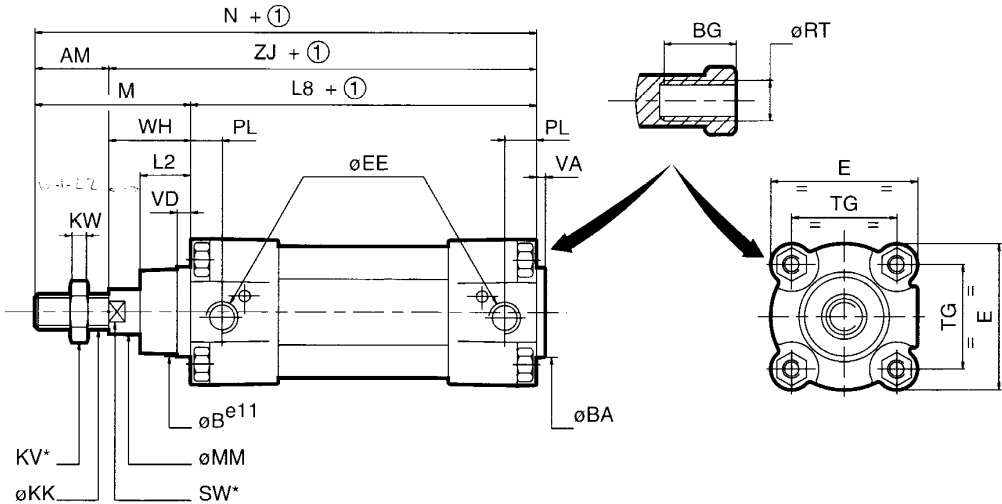
## CONSTRUCTION

Components	Materials
End Caps	Aluminium alloy castings
Barrel	Profile aluminium
Piston Rod	303 stainless steel
Rod bearing	Bronze
Seals	Nitrile or Viton rubber
Trunnion and clevis mountings	Cast iron
Foot mountings	Pressed Steel
Flange mountings	Mild steel

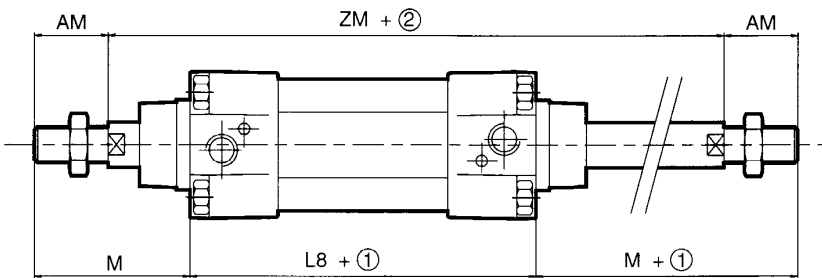


## DIMENSIONAL DETAILS

### Bare Cylinder



SINGLE ROD CYLINDER



THROUGH ROD TYPE CYLINDER

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

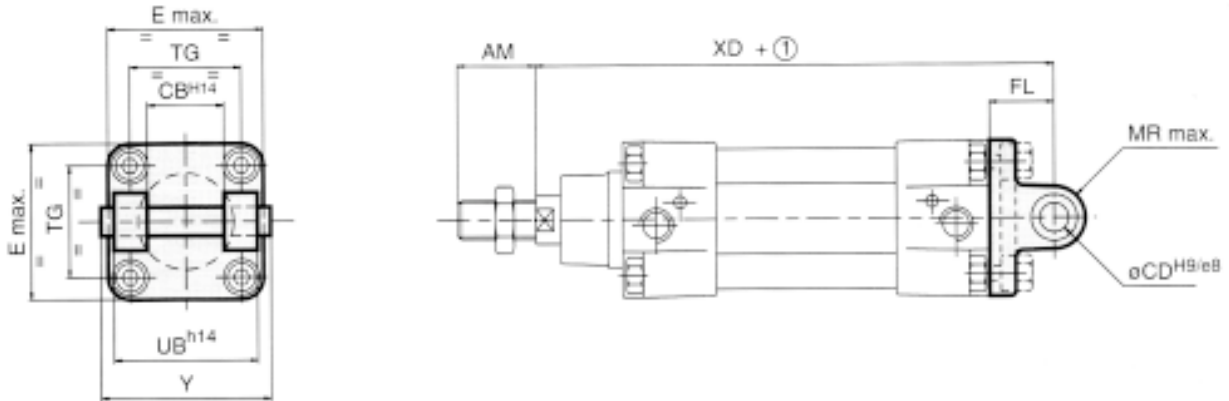
Bore Ø (mm)	DIMENSIONS (mm)																			
	AM	ØB	ØBA	BG	E	ØEE	ØKK	KV	KW	L2	L8	M	ØMM	N	PL	ØRT	SW	TG	VA	VD
32	22	30	30	16	50	G1/8	M10x1,25	16	5	17	94	48	12	142	14	M6	10	32,5	4	6
40	24	35	35	16	55	G1/4	M12x1,25	18	6	19	105	54	16	159	16	M6	13	38	4	6
50	32	40	40	16	65	G1/4	M16x1,5	24	8	26	106	69	20	175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

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

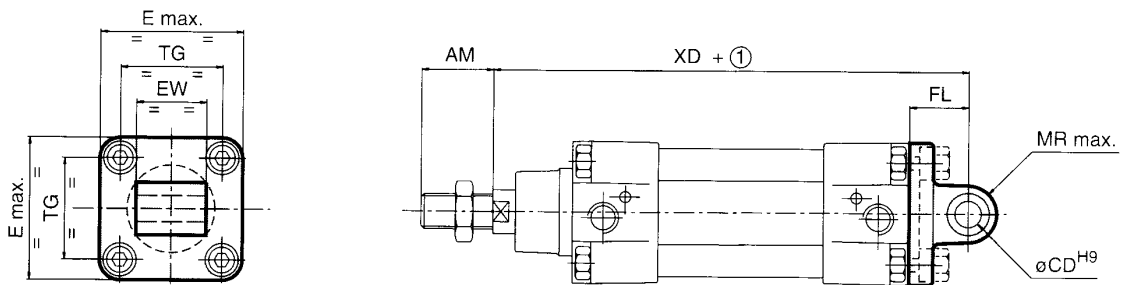
- (3) Cylinder weight with 0 mm stroke.
- (4) Weight to be added per additional 100 mm length.



## Rear Fork Clevis and Pin (RFCP)



## Rear Eye (RE)



① : + Stroke

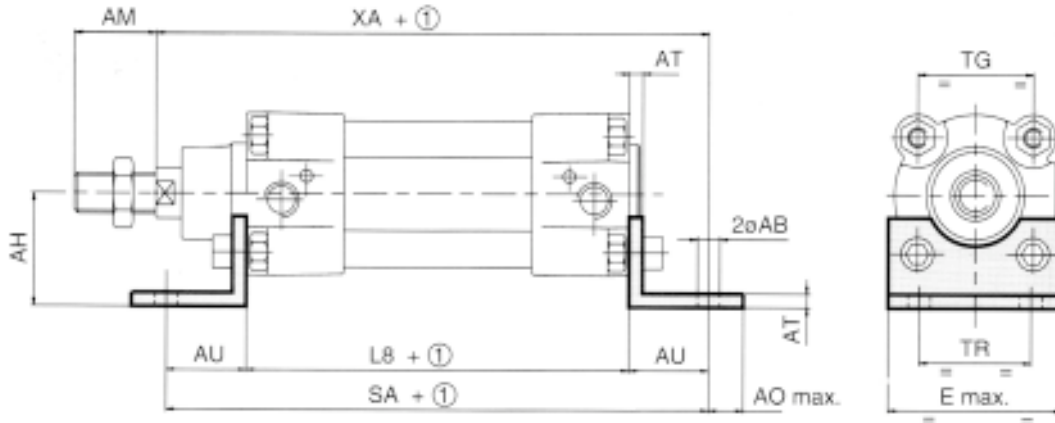
Bore Ø (mm)	DIMENSIONS (mm)										
	AM	CB	ØCD	E	EW	FL	MR	TG	UB	XD	Y
32	22	26	10	50	26	22	11	32,5	45	142	56
40	24	28	12	58	28	25	13	38	52	160	63
50	32	32	12	70	32	27	13	46,5	60	170	71
63	32	40	16	85	40	32	17	56,5	70	190	81
80	40	50	16	105	50	36	17	72	90	210	101
100	40	60	20	130	60	41	21	89	110	230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

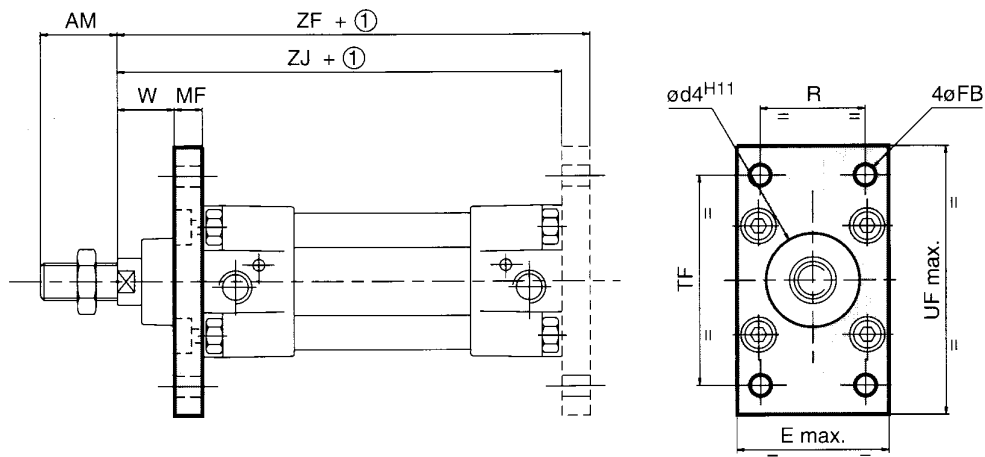
Bore Ø (mm)	Weights (kg)			
	Cap, detachable clevis		Cap, detachable eye (trunnion)	
	Light alloy	Cast iron+steel	Light alloy	Cast iron+steel
32	0,105	0,205	0,085	0,210
40	0,150	0,305	0,092	0,230
50	0,240	0,430	0,170	0,430
63	0,370	0,685	0,250	0,620

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	-	2,100	-	1,700
125	-	3,570	-	3,100

## Foot Mount (FM)



## Flange Mounting (FF) or (RF)



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

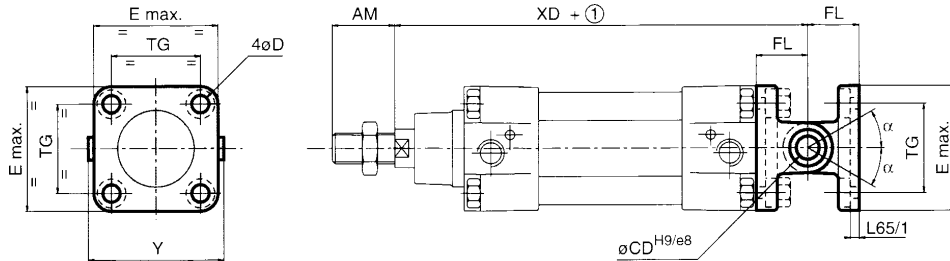
Bore Ø (mm)	Weights (kg)	
	2 feet	Front or rear flange
32	0,150	0,240
40	0,190	0,240
50	0,395	0,500
63	0,445	0,580

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

## Rear Pivot (RP)

### With or without Bush - MP2 + MP4

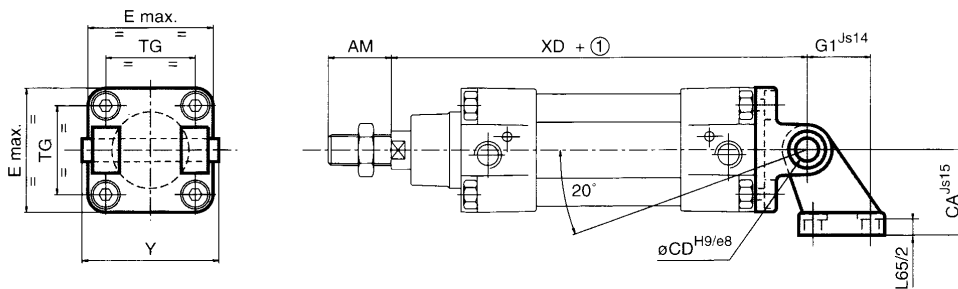
To achieve the complete assembly, items MP2 and MP4 must be ordered **separately**.



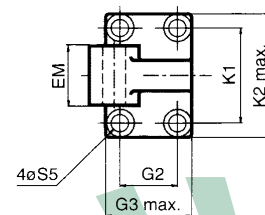
## Rear Hinge (RH)

### 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	EM - 0,2 EM - 0,6
Ø 125 mm	EM - 0,5 EM - 1,2



① : + Stroke

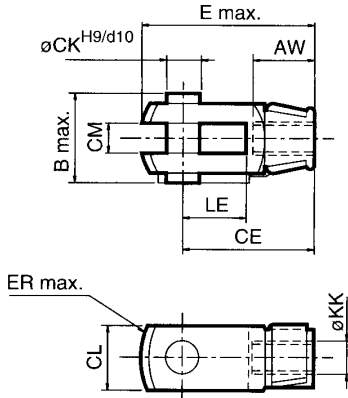
Bore Ø (mm)	DIMENSIONS (mm)																		
	AM	ØCD	ØD	ØS5	E	EM	FL	K1	K2	G1	G2	G3	CA	L65/1	L65/2	TG	XD	Y	α
32	22	10	6,6	6,6	50	26	22	38	51	21	18	31	32	5,5	6,5	32,5	142	56	45°
40	24	12	6,6	6,6	58	28	25	41	54	24	22	35	36	5,5	8,5	38	160	63	50°
50	32	12	9	9	70	32	27	50	65	33	30	45	45	6,5	10,5	46,5	170	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	14	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	0,220	0,340
40	0,240	0,535	0,310	0,450
50	0,410	0,860	0,550	0,790
63	0,620	1,305	0,740	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	1,350	2,090
100	-	3,800	-	2,750
125	-	6,670	-	6,610

## Rod Clevis and Pin (RDCP)

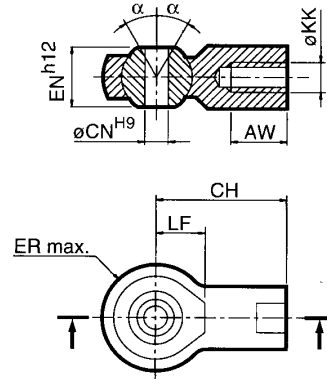
ISO 8140 – RP 102 P



## Spherical Rod Eye (SRE)

ISO 8139 – RP 103 P

$\alpha$ : spherical angular compensation 4°

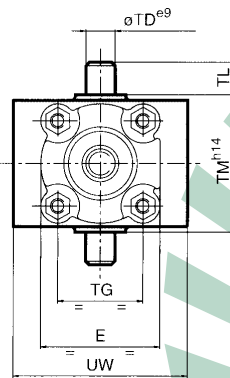
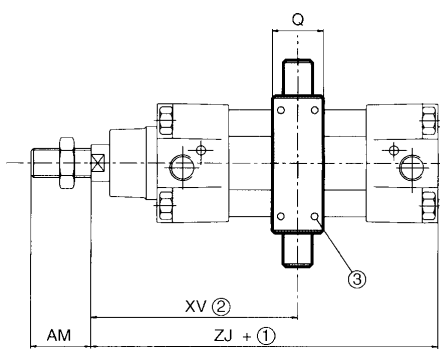


Bore Ø (mm)	DIMENSIONS (mm)													
	AW	B	CE	CH	ØCK	CL	CM	ØCN	E	EN	ER	ØKK	LE	LF
32	20	26	40	43	10	20	10 <sup>+0.5</sup> / <sub>+0.15</sub>	10	56	14	14	M10x1,25	20	15
40	22	32	48	50	12	24	12 <sup>+0.5</sup> / <sub>+0.15</sub>	12	67	16	16	M12x1,25	24	17
50	28	41	64	64	16	32	16 <sup>+0.5</sup> / <sub>+0.15</sub>	16	89	21	21	M16x1,5	32	22
63	28	41	64	64	16	32	16 <sup>+0.5</sup> / <sub>+0.15</sub>	16	89	21	21	M16x1,5	32	22
80	33	48	80	77	20	40	20 <sup>+0.6</sup> / <sub>+0.15</sub>	20	112	25	25	M20x1,5	40	26
100	33	48	80	77	20	40	20 <sup>+0.6</sup> / <sub>+0.15</sub>	20	112	25	25	M20x1,5	40	26
125	51	65	110	110	30	55	30 <sup>+0.6</sup> / <sub>+0.15</sub>	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

## Centre Trunnion (CT)

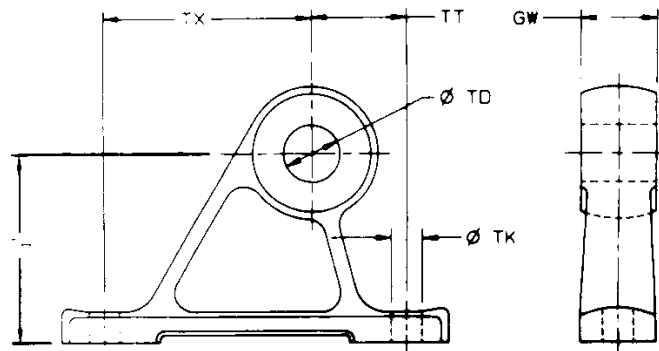


Ø	WITHOUT DETECTORS		WITH DETECTORS		
	XV min.	XV max.	XV min.	XV max.	①
32	72	74 + ①	138	8 + ①	130
40	83	82 + ①	149	16 + ①	133
50	90	90 + ①	156	24 + ①	132
63	93,5	101,5 + ①	166	34 + ①	132
80	106,5	113,5 + ①	178	47 + ①	131
100	114	126 + ①	190	55 + ①	135
125	135	155 + ①	220	83 + ①	137

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

## Trunnion Leg



Bore Dia. mm	Dimensions					
	TD	TK	TT	TX	GW	TH
32	12	9	29	54	17.5	51
40	16	9	29	54	17.5	51
50	16	11	32	70	25.4	64
63	20	11	32	70	25.4	64
80	20	11	37	84	31.9	79
100	25	11	37	84	31.9	79



## HOW TO ORDER

Cylinder ordering codes are constructed by defining the cylinder diameter and stroke in millimeters and the code letters of the variations outlined in Spec 1-7 in the matrix below.

Spec No.	Feature	Description	Code
1	Series/Bore Diameter (mm)	32, 40, 50, 63,80,100	ISOT-32, ISOT-40 etc
2	Barrel Material	Aluminium profile tube	A
3	Internal Operation	Cushioned Double acting	C
		Cushioned Double ended	DE
		Cushioned Back to back	BB
		Cushioned Nose to Nose	NN
		Cushioned Tandem	T
4	Stroke	Specify in millimetres	1 ~ 3000 mm
5	Mounting Options	Front Flange	FF
		Rear Flange	RF
		Foot Mount	FM
		Rear Fork Clevis w/pins & circlips	RFCP
		Rear eye	RE
		Rear Hinge (assembled w/RFCP)	RH
		Centre Trunnion (specify position)	CT
		Trunnion Legs	TL
		Rear Pivot (RFCP + RE)	RP
6	Piston Rod Mountings	Rod Clevis w/pins & circlips	RDCP
		Spherical Rod Eye	SRE
7	Special Features	Dust boot	DB
		Extended Piston Rod	ER
		Viton Seals	V
		Non standard Rod Thread	K
		Reed switches and brackets	RS
		Epoxy Painted	EPOXY

