



Metric All Round Cylinders

*Ø32, 40 and 50mm bore size
Double acting magnetic cylinders*

Catalogue no: 2114a GB-ca



Metric All Round Cylinders

Metric All Round cylinders

Offering a superb range of features, the Metric All Round cylinders are double acting cushioned cylinders with magnetic pistons as standard.

Non-lube operation

All cylinders are pre-lubricated during assembly and in normal applications will operate satisfactorily without air line lubricant. For specific applications consult Technical Sales.

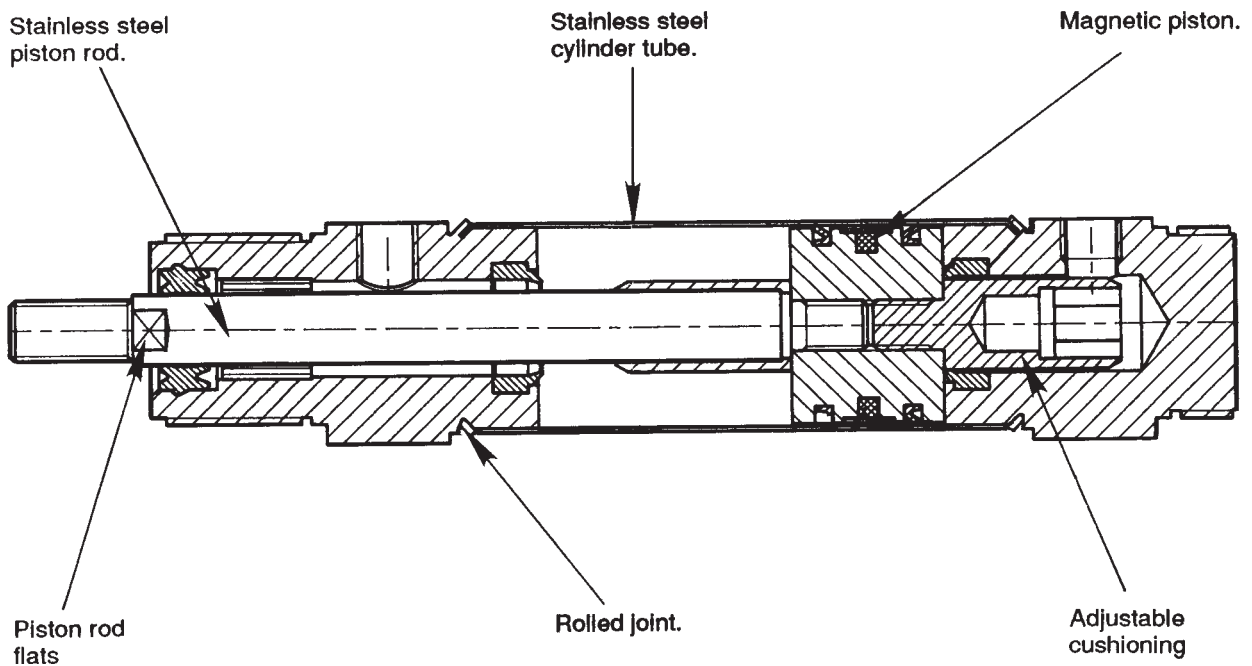
Magnetic cylinders

All cylinders are supplied as standard with magnetic pistons for use with reed switch sensors. For details and dimensions of reed switch kits and solid state sensor kits see page AE27 and AE28.

Standard stroke lengths

Metric all round cylinders are available in 25, 40, 50, 80, 100, 125, 160 and 200mm strokes as standard. 250 and 320mm strokes Ø40mm and Ø50mm only.

Features









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Piston thrust charts

Selection of suitable bore size

- 1 * Establish force required and working pressure available.
- 2 Select working pressure on top of chart.
- 3 Select working pressure required by reading down from selected working pressure.
- 4 If exact force is not established use nearest larger unit.
Read off cylinder bore size on left of chart.
* Determine whether static or dynamic application at this stage.

Double acting cylinders

Bore size		Air pressure (bar)										Effective Area (mm ²)
		1	2	3	4	5	6	7	8	9	10	
32		64.0	129.0	193.0	257.5	321.5	386.0	450.0	515.0	579.0	643.0	804.0
		58	116	174	232	290.5	348.5	406.5	465	523	581	726.0
40		100.5	201	301.5	402	502.5	603	703.5	804	904.5	1005	1256.5
		88	176.5	264.5	353	441	529	617.5	705.5	794	882	1102.5
50		157	314	471	628	785.5	942.5	1099.5	1256.5	1414	1571	1963.5
		137	273.5	410	547	683.5	820	957	1094	1230.5	1367	1709.0

Thrust in Newtons

The above thrust charts show the practical thrust available, an allowance has been made for the internal friction of the seals within the cylinder.
Figures shown are assuming 80% efficiency.

Useful Cylinder Calculations

Thrust

$$T = P \times A \times 10^3$$

T = Thrust (Newtons)
P = Pressure (bar)
A = Effective Piston Area (dm²)

This calculation must be reduced by 20% to allow for internal friction within the cylinder. For dynamic application it is recommended that a thrust of 30% in excess of the required loading be allowed.

Air Flow

$$Q = \frac{A \times L \times (P + 1.013)}{T \times 101.3}$$

Q = Air Flow (dm³/sec)
A = Effective Piston Area (dm²)
L = Stroke (mm)
T = Time to complete single stroke (secs)
P = Pressure (bar)

Air Consumption

$$C = \frac{A \times L \times N \times (P + 1.013)}{101.3}$$

C = Air consumption (dm³/sec)
A = Effective Piston Area (dm²)
L = Stroke (mm)
N = Number of single strokes per sec
P = Pressure (bar)

Useful Conversions

1N = 0.102 kgf
1N = 0.225 lbf
1kgf = 9.81N
1lbf = 0.454 kgf

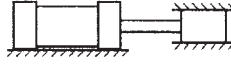
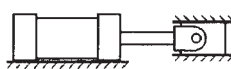
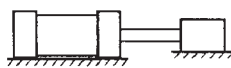



1 scfm = 0.472 dm³/s
1 psi = 0.069 bar
1 kg/cm² = 0.981 bar
14.5 psi = 1 bar
1 bar = 10Pa

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Piston rod buckling information

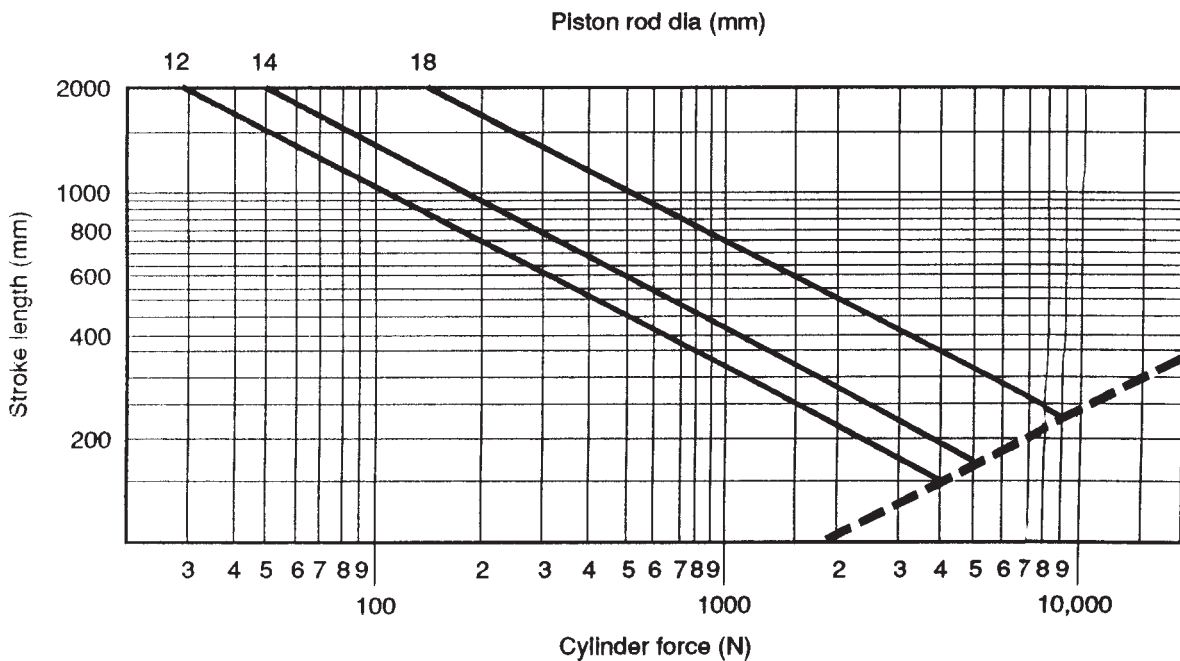
The buckling chart has been calculated using the following formula :- $BL = \frac{11^2 \times E \times I}{L^2 \times F \times S}$

- Where
- BL = Buckling load (N)
 - L = Stroke length (mm)
 - F = Stroke factor (modify according to the application)
 - S = Factor of safety (5 minimum)
 - E = Modulus of elasticity = 206830 Nmm²
 - I = Moment of inertia = moments for standard piston rod -

Stroke factor tabulation		
Rod end connection	Application	Stroke* factor
Fixed and rigidly guided	I 	.50
Pivoted and rigidly guided	II 	.70
Supported but not rigidly guided	III 	2.00
Pivoted and rigidly guided	IV 	1.00
Pivoted and rigidly guided	V 	1.50
Pivoted and rigidly guided	VI 	2.00

* Stroke factor should be modified according to the application

Piston rod buckling graph



Technical information

Pressure range : 1 - 10 bar max.

Temperature range : -20°C + 80°C

Materials : End plates : Aluminium alloy BS1474
6062TFS
Cylinder tube : Stainless steel ASTM304
Piston rod : Stainless steel B3990
303S21
Seals : Nitrile
Rod bearing : Sintered bronze

Cylinder weights

Double acting cylinders

Bore size	Weights (g)	
	Zero stroke	per 5mm stroke
32	416	8
40	742	10
50	1253	17.5

Mounting weights

Foot mounting bracket

Bore size	Weight (g)
32	142
40	232
50	353

Pivot mounting bracket

Bore size	Weight (g)
32	11
40	19
50	33

Hinge bracket

Bore size	Weight (g)
32	146
40	260
50	392

Piston rod and neck nuts

Bore size	Weight neck nut (g)	Weight rod nut (g)
32	43	5
40	47	10
50	72	15

Clevises and lock nuts

Bore size	Weight clevis (g)	Weight lock nut (g)
32	100	5
40	160	10
50	360	15

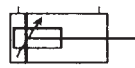
Spherical rod end and lock nuts

Bore size	Weight rod end (g)	Weight lock nut (g)
32	80	5
40	100	10
50	220	15

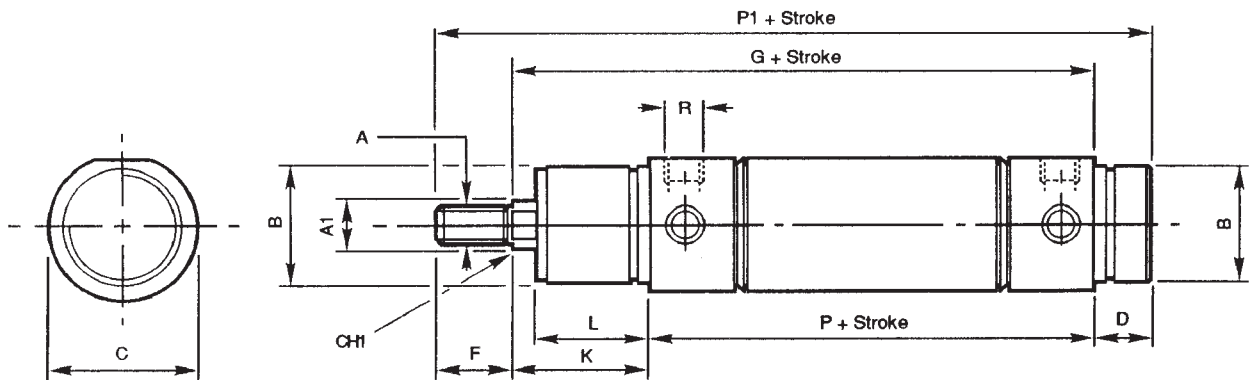
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Part nos. Double acting cushioned cylinders

Bore size	
32	B32-7112B + stroke
40	B40-7112B + stroke
50	B50-7112B + stroke

Standard stroke lengths:
25, 40, 50, 80, 100, 125, 160
and 200 all bores
250 and 320 strokes 40mm
and 50mm bores only



Dimensions (mm)

Bore size	A	A1	B	C	D	F	G	K	L	P	P1	CH1 AF	R(G)
32	M10	12	M30 x 1,5	38	14	20	134	38	30	96	168	10	1/8
40	M12	14	M38 x 1,5	46	16	24	158	45	35	113	198	12	1/4
50	M16	18	M45 x 1,5	57	18	32	170	50	38	120	220	16	1/4

Metric All Round Cylinders

Reed switch types



Part nos

Part no.	Description
846	LED + 3M flying lead
847	LED + cable plug
848	Solid state + LED + 3M flying lead
849	Solid state + LED cable plug

Cable plug for 847 and 849 type switches
(To be ordered separately).

9878010	Mini in-line cable plug + 3M flying lead
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Mounting brackets

Part no.	To suit bore size
32-7800S	Ø 32mm
40-7800S	Ø 40mm
50-7800S	Ø 50mm

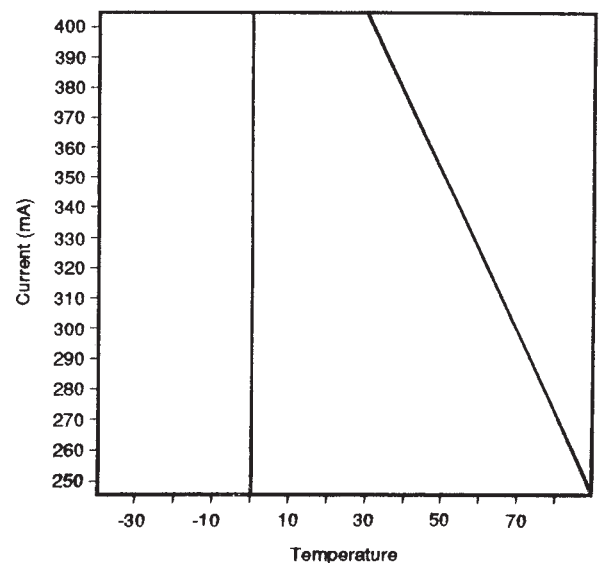
Reed switch characteristics

	846	847	848	849
Switch weight	55g	2g	55g	2g
Cable length	3M	-	3M	-
Working temperature	-30 to +80°C			
Protection number	IP 67	IP65	IP 67	IP 65
Vibration resistance	50 to 1000 Hz			
Switch off time	1 min	1 min	-	-
Switch on time	1 min	1 min	-	-
Electrical life	10 ⁷ OPS		n/a	
Repeatability accuracy	±0.02			
Contact function	n/o	n/o	npn	npn
Maximum current	180 mA	180 mA	*see note below	
Switching capacity	10 W	10W	12W	12W
Voltage range	110 AC	110 AC	-	-
Voltage range	110 DC	110DC	10 to 30 DC	
Maximum voltage drop	2.8 V	2.8 V	1 V	1V
Cable specification	2 core sheathed 7x0.2mm ²	Plug & socket	3 core sheathed 7x0.2mm ²	Plug & socket
Cable diameter	4mm		4mm	
Cable specification	P.V.C. Type artic grade		P.V.C. Type artic grade	
Body material	Nylon 66			
LED indication (red)	Standard			
Additional information	-	-	Reverse polarity protected. Output is Diode protected	

Kit comprises stainless steel clamp ring and screw.

Assembly of reed switches. Select clamp ring to suit cylinder bores release the retained screw and fit to cylinder tube. Assemble switch into clamping lobe with the concave side against the tube and retighten the fixing screw.

848/849 Solid state switch de-rating



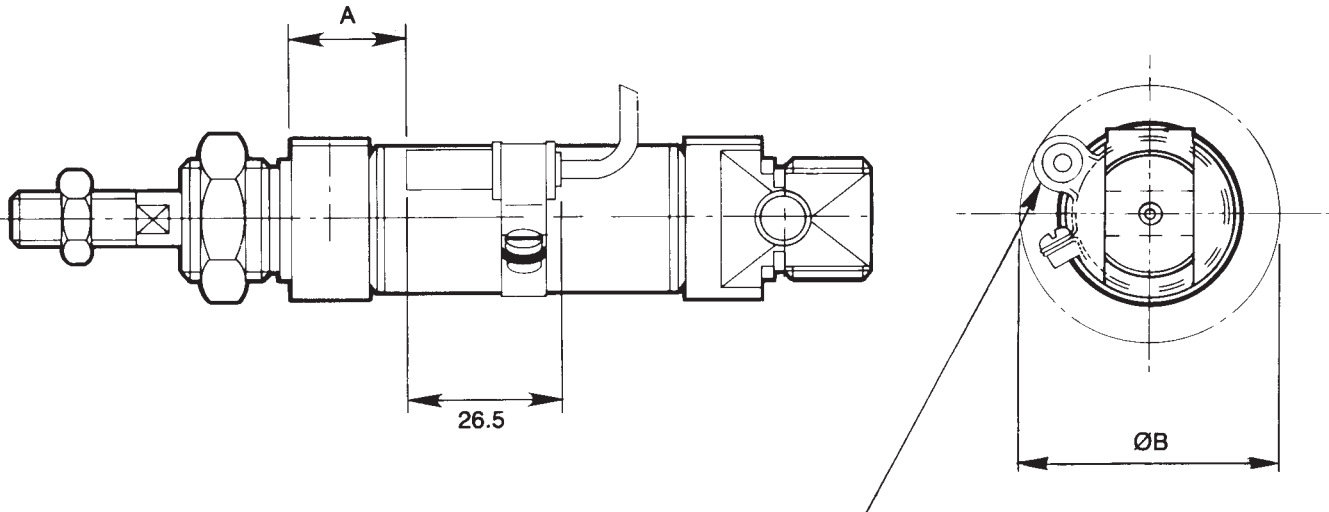
*400mA derated between 25 to 80°C linearly 250mA

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Reed switch sensors

Flying lead type

Approx. setting dimensions
for end of stroke sensing.

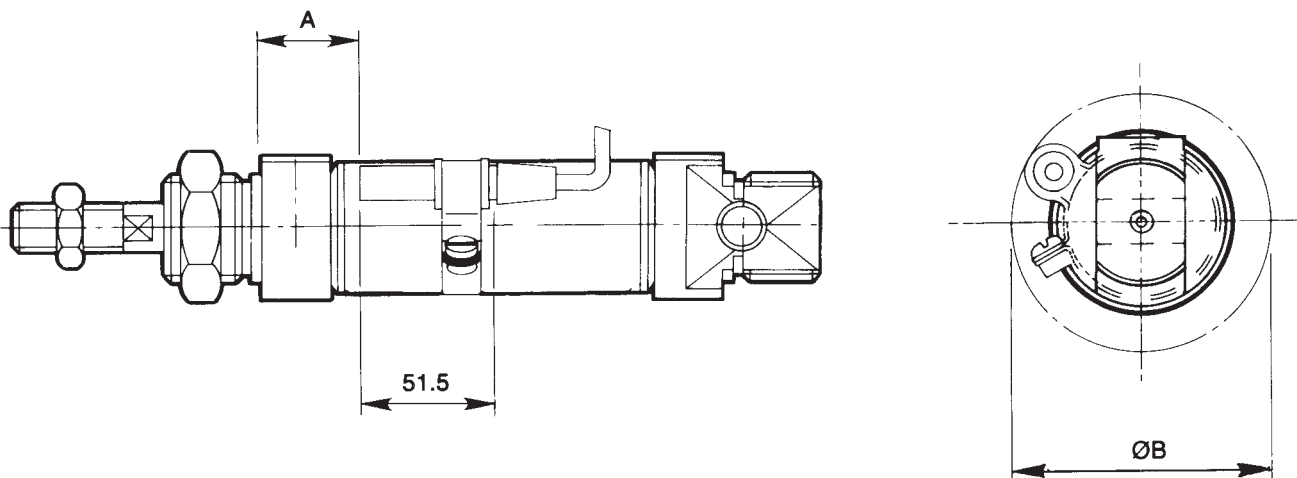


Bore size	Dim. A	Dim. B
32	40	54
40	45	64
50	55	74

The reed switch may be
mounted at any angle
around the cylinder.

The minimum stroke length
with which these reed
switches may be used is
5mm.

Cable plug type



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Foot mounting / Flange mounting

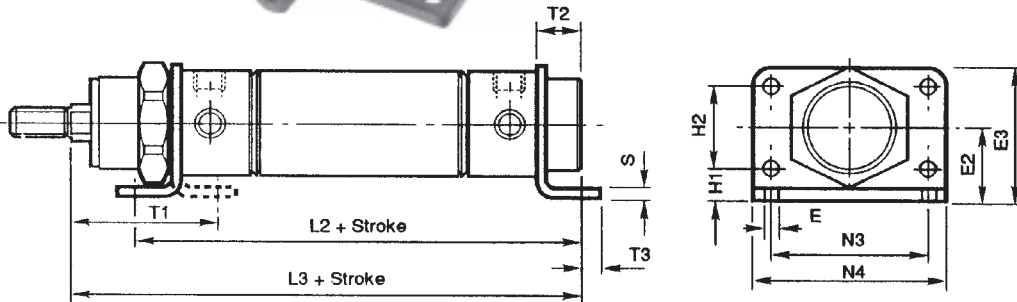


Part nos.

Bore size	Foot bracket
32	32-7800E
40	40-7800E
50	50-7800E

Kit comprises of 1 foot mounting bracket + neck mounting nut.

Materials
Mild steel
Zinc plated



Dimensions (mm)

Bore size	E	E2	E3	H1	H2	L2	L3	N3	N4	S	T1	T2	T3
32	7	28	49	14	28	124	148	52	66	4	48	14	7
40	9	33	58	18	30	153	178	60	88	5	60	20	10
50	9	40	70	20	40	160	190	70	90	6	64	20	10

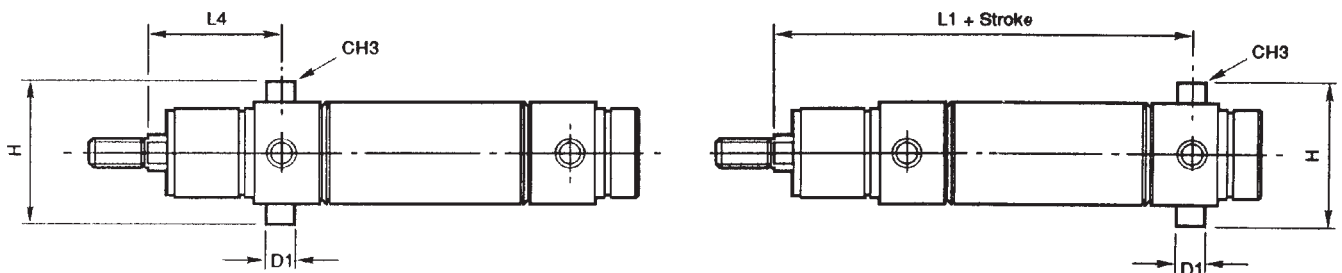
Pivot mounting



Part nos.

Bore size	Pivot mounting
32	32-7800L
40	40-7800L
50	50-7800L

Kit comprises 2 pivots



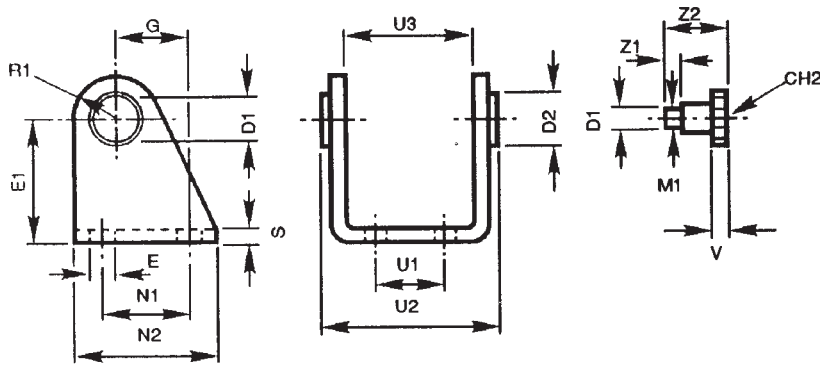
Dimensions (mm)

Bore size	D1	H	L1	L4	CH3 AF
32	10	51	125	47	5
40	12	61	146	57	6
50	14	75	158	62	6

Materials
Mild steel
Zinc plated

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Hinge mounting



Part nos.

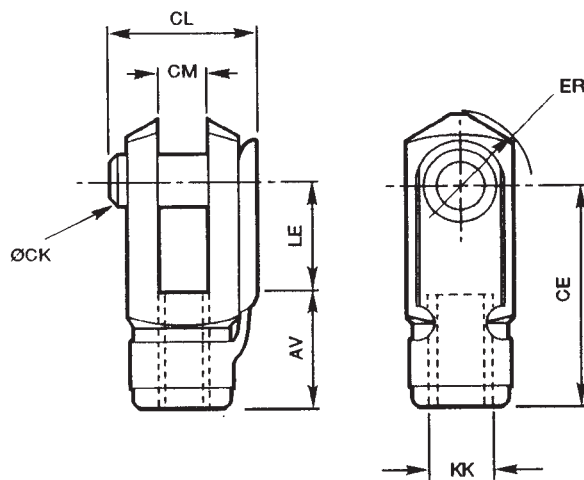
Bore size	Hinge part no.
32	32-7800F
40	40-7800F
50	50-7800F

Material - Hinge bracket material - mild steel, zinc plated with brass bearings.

Dimensions (mm)

Bore size	D1	D2	E	E1	G	M1	N1	N2	R1	S	CH2 AF	U1	U2	U3	V	Z1	Z2
32	10	15	7	35	20	M8 x 1	24	40	12	4	13	20	50,1	38,1	4	6	18
40	12	20	9	40	27	M10 x 1	30	50	13	5	17	28	60,1	46,1	5	7	21,6
50	14	23	9	45	30	M12 x 1,5	34	54	14	6	19	36	74,1	57,1	6	9	26,4

Clevises



Part nos.

Bore size	Clevis part no.
32	4410
40	4311
50	4313

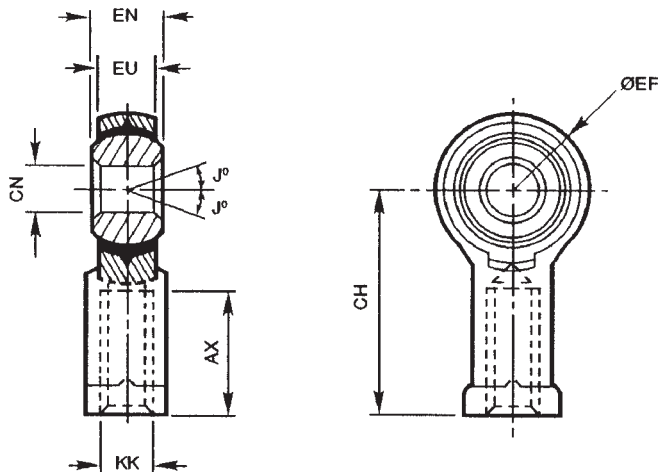
Material - zinc plated steel

Dimensions (mm)

Bore size	KK *	CL	CM *	LE *	CE	AV *	ER *	ØCK *
32	M10x1,5	26,0	+0,13 10,2 -0,05	20,0	40,0	20,0	14,0	+0 10,0 -0,1
40	M12x1,75	31,0	+0,13 12,2 -0,05	24,0	48,0	24,0	15,0	+0 12,0 -0,2
50	M16x2,0	39,0	+0,13 16,2 -0,05	32,0	64,0	32,0	22,0	+0 16,0 -0,2

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Spherical rod end



Part nos.

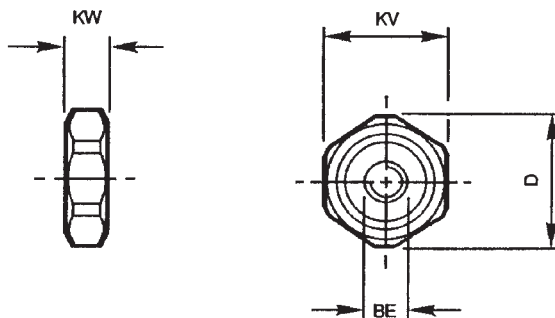
Bore size	Rod end part nos.
32	4078-210
40	4078-212
50	4078-216

Material - zinc plated steel sintered nickel steel eye

Dimensions (mm)

Bore size	ØCN *	EN *	EU	AX *	CH *	ØEF *	KK *	J°	K A/F	L	Static load (kg)
32	10,0	14,0	10,5	20,0	43,0	29,0	M10x1,5	13	17,0	6,0	990
40	12,0	16,0	12,0	22,0	50,0	34,0	M12x1,75	13	19,0	7,0	1320
50	16,0	21,0	15,0	28,0	64,0	42,0	M16x2,0	15	24,0	8,0	2120

Piston rod nuts and neck mounting nuts



Part nos.

Bore size	Neck nut	Rod nut
32	32-77032	536-11
40	40-77032	536-12
50	50-77032	M509-4

Note: 1 off lock nut and 1 off rod nut supplied as standard with each cylinder.

Dimensions (mm) neck nut

Bore size	BE	KW	KV	ØD
32	M30 x 1,5p	8,0	41,0	44,5
40	M38 x 1,5p	8,0	46,0	49,0
50	M45 x 1,5p	10,0	55,0	62,5

Dimensions (mm) piston rod nut

Bore size	BE	KW	KV	ØD
32	M10 x 1,50	6	17	19,5
40	M12 x 1,75	7	19	22,0
50	M16 x 2,00	8	24	28,0