Denley Hydraulic Solutions

Part of the **Kinetic Solutions Group**

High Performance Cylinders

Reference Manual

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DHX

ABOUT DHX

Precision in motion

DHX Denley Hydraulic Solutions is a leading provider of advanced hydraulic solutions, specialising in the design, manufacture, and installation of high-performance hydraulic and electrical systems.

Based in West Yorkshire, DHX combines regional engineering excellence with national reach. As part of the Kinetic Solutions Group (KSG), the business draws on over 60 years of electro-hydraulic expertise to support mission-critical industries including nuclear, defence, offshore, environmental, and heavy industrial applications.

We offer a complete range of electro-hydraulic solutions, from design, testing, and prototyping through to manufacture, installation, and commissioning. Our capabilities cover hydraulic cylinders, standard and bespoke power units, PLC and HMI control systems, and specialist manifolds and valves.

We also deliver advanced expertise in wave and wind power systems, fluid and air engineering, and the development of specialist test rigs. With full support for scoping, validation, and certification, DHX provides both on- and off-site services to meet the demands of complex, mission-critical projects.

COMPANY PROFILE

01 Specialist Engineering Expertise

Delivering imaginative design solutions, prototype engineering, and precision manufacturing for complex, safety-critical projects.

02 Comprehensive Project Delivery

Providing full project management, from concept through to commissioning, maintenance, repair, and system upgrades.

03 Global Application Experience

Supporting internationally distributed projects across a wide range of technically demanding and high-value industries.

04 Trusted Technical Partner

Combining extensive resources, market expertise, and specialist skill sets to meet each customer’s unique engineering requirements.

CORPORATE COMPETENCIES

Denley’s comprehensive range of core competencies is not only the solid foundation upon which the company has developed its expert, technically strong and strategically complete customer service capabilities over the years, but more importantly, the basis upon which they in turn have grown to trust, include and rely on the ‘Denley Brand’ to deliver imaginative, operationally practical and safe, electro-hydraulic solutions.

01

From concept development and detailed systems design to full manufacture, build, and commissioning.

02

Comprehensive project management, including procurement of third-party suppliers and full scoping, certification, and validation

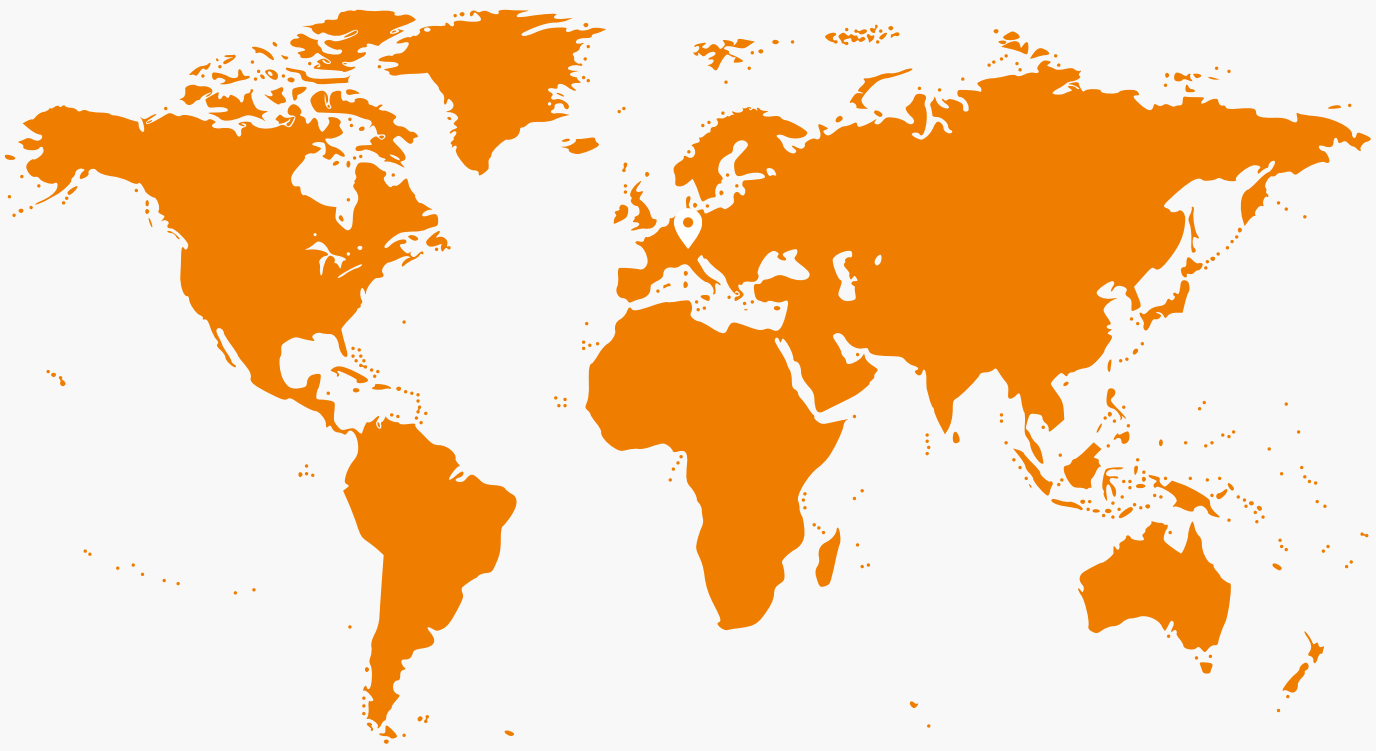
03

Expertise in PLC and HMI process control, ensuring precision, reliability, and efficiency across all system operations.

04

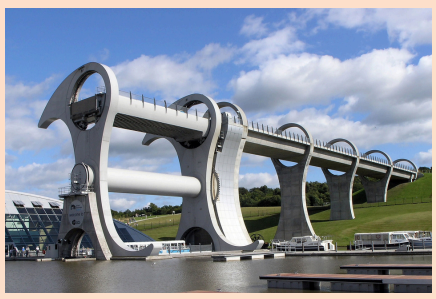
Providing maintenance, repair, overhaul, site labour, spares, and service, while driving next-generation system development.

GLOBAL MARKETS



Denley’s ability to focus its very considerable resources on globally based and industry specific markets, brings a level of commitment and attention to detail few companies can deliver or sustain in the long term, especially important in those operationally sensitive areas of systems safety, hygiene and value.

DHX operates across a diverse range of sectors from aerospace, defence and automotive, through to nuclear, offshore oil and gas, petrochemical, and renewable energy also supporting industries such as construction, food and beverage, pharmaceuticals, government, and public utilities with advanced hydraulic and electro-mechanical engineering solutions.




QUALITY ACCREDITATIONS & PLANT LIST

Denley are internationally recognised and approved by many of the world's leading brand names, whilst also embracing an equally diverse range of industry specific, internationally recognised and individually tailored, associations, quality approvals and accreditations. Denley's design, manufacturing and stocking capabilities are extensive, ensuring that all customer's plant and equipment design, specifications, manufacture and spares, reflect the highest quality levels, in terms of their safety, performance and operational reliability.

CNC horizontal borer	**Fabrication**
CNC lathes	**Grinding**
CNC machining centres	**Honing**
Craneage	**Pressure Testing**
Inspection facilities	**Hydraulics & machine tool fitting**
Painting	**Quality control**

Introduction to DHX standard cylinders

Two ranges of cylinders are available, both conforming to CETOP RP58H recommendations.

1 Cushioned Range (Type M)

Cushioned cylinders provide deceleration at each end of the stroke and should be used where high rod speeds and/or heavy masses are involved, or where the piston head is likely to hammer against the ends of the cylinder.

2 Non-Cushioned Range (Type NCM)

This range of cylinders is less expensive than the cushioned range and for a very high proportion of applications the non cushioned cylinders are ideal

Our technical department would be pleased to advise on the selection of cushioned or non cushioned cylinders on receipt of full details of the application.

Cylinder Bore Selection

Figure 1 shows the bore sizes required to produce a given thrust. (kg./100 bar and lb./1000 psi.) A factor of 10%should be deducted from the theoretical output thrust to allow for seal friction etc. The theoretical pull force available is also shown in figure 1.

For cushioned cylinders, two rod sizes are available for each bore size giving area ratios of 1.4:1 and 2:1.

For non cushioned cylinders the standard rod diameter gives an area ration of 1.4:1.

Figure 1 Theoretical Output Force

Bore Diameter	Rod Diameter	Area Ratio	Bore Area		Push Force		Annulus Area		Pull Force	
mm	mm		cm2	ins2	kg/100 bar	lbs/100 psi	cm2	ins2	kg/100 bar	lbs/100 psi
25	14	1.4	4.91	0.761	501	761	3.37	0.522	344	522
	18	2.0					2.36	0.366	241	366
32	18	1.4	8.04	1.25	820	1250	5.50	0.853	561	853
	22	2.0					4.24	0.657	432	657
40	22	1.4	12.6	1.95	1285	1950	8.77	1.36	895	1360
	28	2.0					6.41	0.994	654	994
50	28	1.4	19.6	3.04	2000	3040	13.5	2.09	1380	2090
	36	2.0					9.46	1.47	965	1470
63	36	1.4	31.2	4.84	3180	4840	21.0	3.26	2140	3260
	45	2.0					15.3	2.37	1560	2370
80	45	1.4	50.3	7.80	5130	7800	34.4	5.33	3510	5330
	56	2.0					25.6	3.97	2610	3970
100	56	1.4	78.5	12.2	8000	12200	54.0	8.37	5510	8370
	70	2.0					40.0	6.20	4080	6200
125	70	1.4	123	19.1	12500	19100	84.2	13.1	8590	13100
	90	2.0					59.1	9.16	6030	9160
160	90	1.4	201	31.2	20500	31200	137	21.2	14000	21200
	110	2.0					106	16.4	10800	16400
200	110	1.4	314	48.7	32000	48700	219	33.9	22300	33900
	140	2.0					160	24.8	16300	24800
250	140	1.4	491	76.1	50000	76100	337	52.2	34400	52200
	180	2.0					236	36.6	24100	36600
320	180	1.4	804	125	82000	125000	550	85.3	56100	85300
	220	2.0					424	65.7	43200	65700
400	220	1.4	1257	195	128000	195000	877	136	89500	136000
	280	2.0					641	99.4	65400	99400

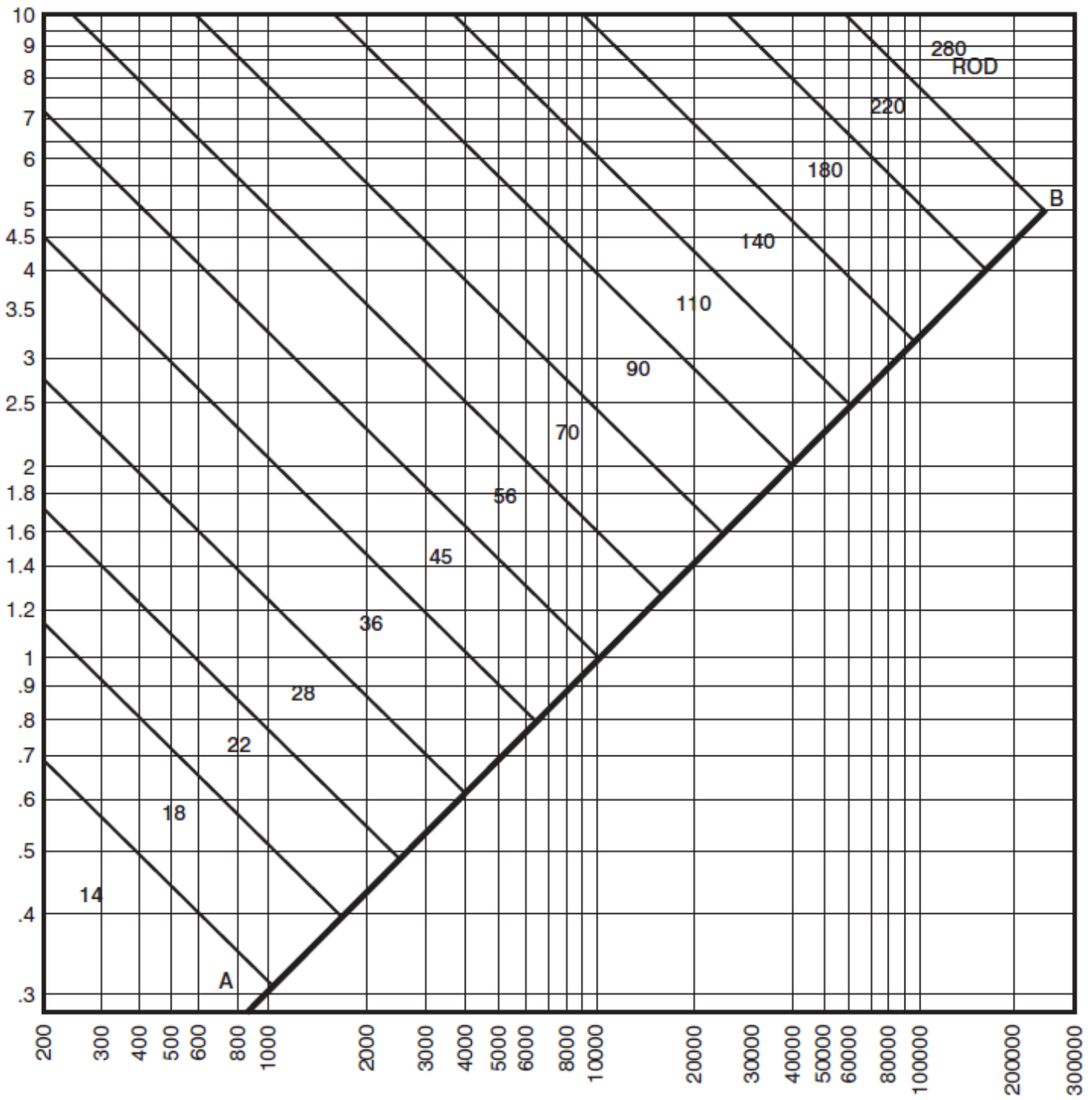
Rod Strut Effect

Before finally selecting the bore and hence the corresponding rod size, it is necessary to check that the rod can withstand the buckling effect imposed, as follows:

1 Determine the corrected strut length, L, for the particular mounting style and stroke, S.
(i) For flange and foot mounted cylinders L = S
(ii) For centre and front trunnion mounted cylinders L = 1.5S
(iii) For clevis, rear trunnion and spherical eye mounted cylinders L = 2S

2 Locate the point of coincidence on the graph, (Figure 2) between the thrust required and the corrected strut length.
3 If this point lies to the right of the line AB, then in general buckling need not be considered.
4 If the point lies to the left of the line AB, then the minimum rod size is indicated by the number in the corresponding box.
5 If the minimum rod size required is larger than the rod size for the bore already selected it will be necessary to use a larger cylinder which has a rod size capable of withstanding the buckling effect.

Figure 2 Rod Strut Effect



Ordering Code

**NCM / 125 / 70 / MM25 / 7a x 1435 + _ _ _ _ _ _ _ _ _ *

CYLINDER TYPE

M – Cushioned
NCM – Non-Cushioned
MTR – Cushioned Through Rod
NCMTR – Non-Cushioned Thro' Rod

BORE DIAMETER

See catalogue page 7 for available Bore / Road combinations

ROD DIAMETER

ROD END

MM – Male metric
FM – Female metric
MM25 – Spherical rod clevis
SP – Special requirement

*FURTHER DETAILS TO BE STATED IN TEXT

ROD EXTENSION

STROKE IN MILLIMETRES

MOUNTING STYLE

7a – Front round flange
7 – Rear round flange
9 – Front rectangular flange
9a – Rear rectangular flange
12 – Rear clevis
16 – Foot
18 – Trunnion
25 – Rear spherical clevis
SP + Special requirement

Section 1

Cushioned Cylinders

Specification

Standard metric hydraulic cylinders to CETOP RP 58H

Cylinder Type

Cushioned — Type M

Specification

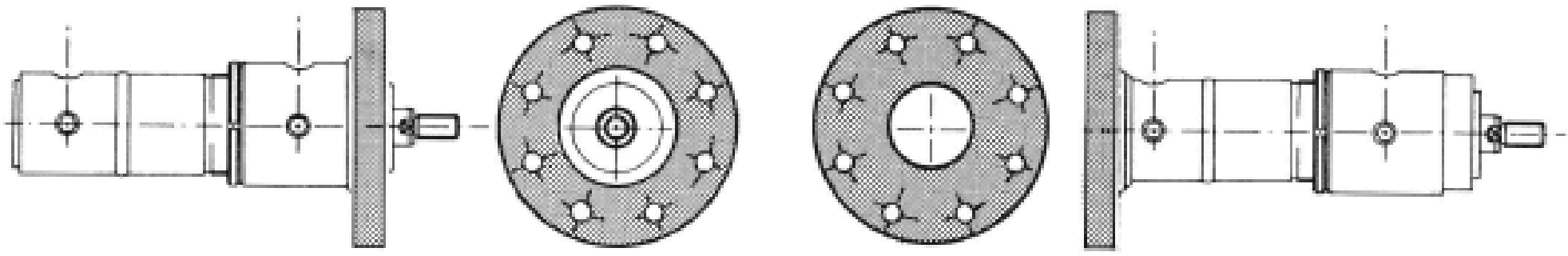
Maximum working pressure:	210 bar (3000 psi)
Temperature range:	–15ºC to 110ºC
Fixed cushioning:	25mm, 32mm and 40mm bore
Adjustable cushioning:	50mm to 160mm bore Adjustment by needle valve with check valve for fast start on return stroke.
Piston rod:	Precision ground BS970 080M40 (EN8) Hard Chromium plated and polished to 0.3µm Ra. surface finish Piston seals & bearings: 'O' Ring energised PTFE double acting seal. PTFE bearing strips.
Cylinders:	Steel tube to BS5242 HP5 honed to 0.4µm Ra. surface finish
Gland:	Steel gland screwed to cylinder with locking ring. High grade cast iron gland bush containing tandem 'O' Ring energised PTFE seals and double acting rod wiper. The gland bush is easily removed for seal replacement without removing the complete gland assembly.
Ordering Details Cylinder Part Numbers are made up as follows:	M/Bore dia./Rod dia./Rod end/Mounting Style x Stroke eg. A 40mm bore cylinder with a 22mm dia. rod with a female tapped end, front round flange mounting and a stroke of 120mm would be: M/40/22/FM/7a x 120

Non-Standard Options

1:	It is necessary to specify when ordering if the Port or Cushion Adjusters are required in positions other than Standard. See page 20.
2:	Piston Rods are available with Imperial Threads: Male thread – Reference MI Female thread – Reference FI

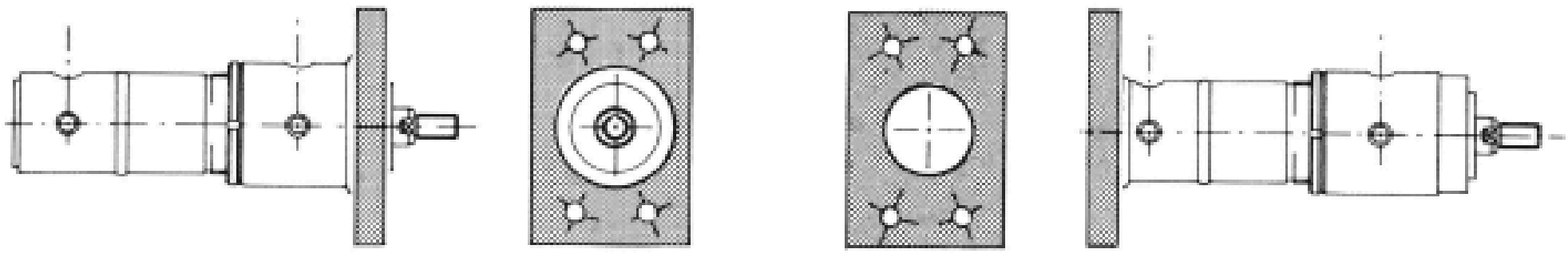
Mounting Styles

Third angle projection (Shown with standard rod ends – ref 'MM')



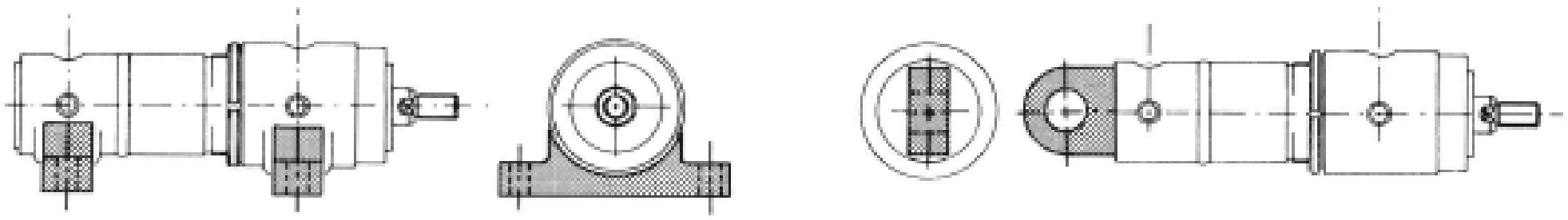
Front Round Flange – Style 7a (page 13)

Rear Round Flange – Style 7 (page 12)



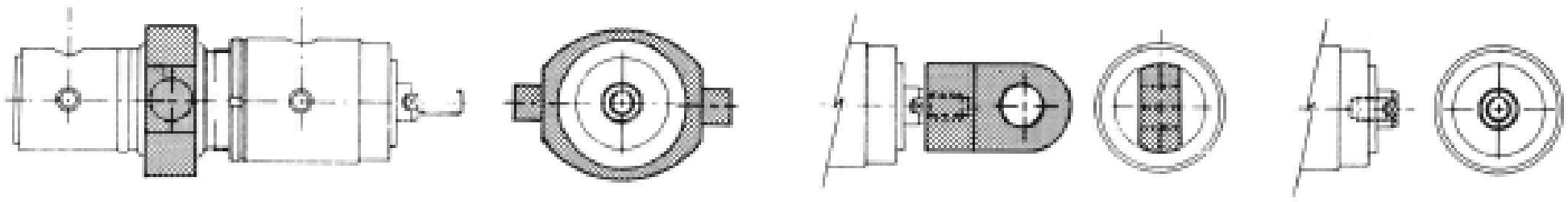
Front Rectangular Flange – Style 9 (page 14)

Rear Rectangular Flange – Style 9a (page 15)



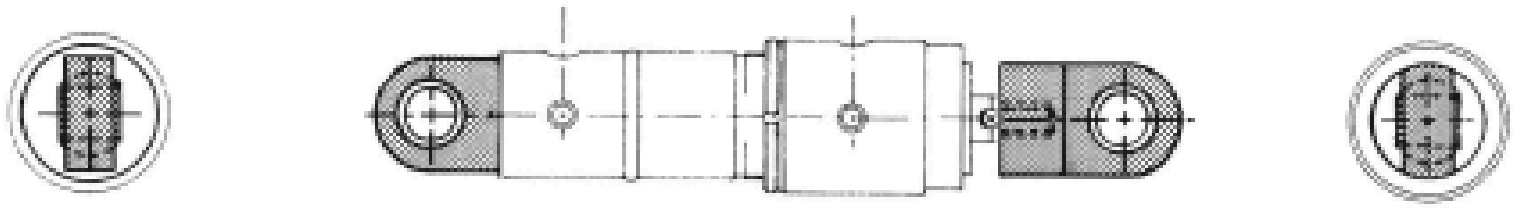
Foot Mounting – Style 16 (page 17)

Rear Clevis Mounting – Style 12 (page 16)



Trunnion Mounting – Style 18 (page 18)

Rod Clevis Plain – Style 27 (page 19)

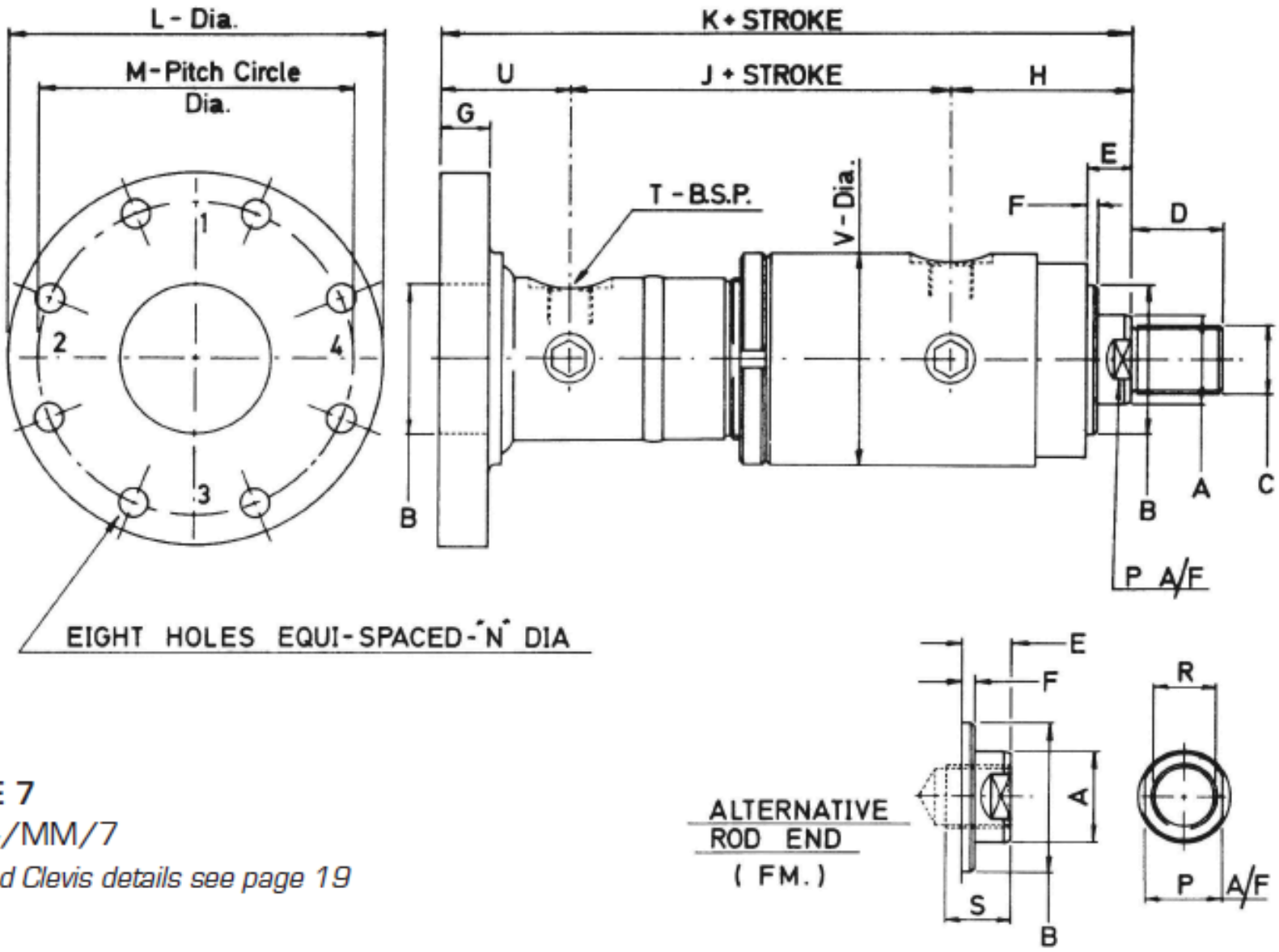


Spherical Eye Mounting – Style 25 (page 19)

See page 20 for full section and parts list

Rear Round

Flange Mounting



STYLE 7

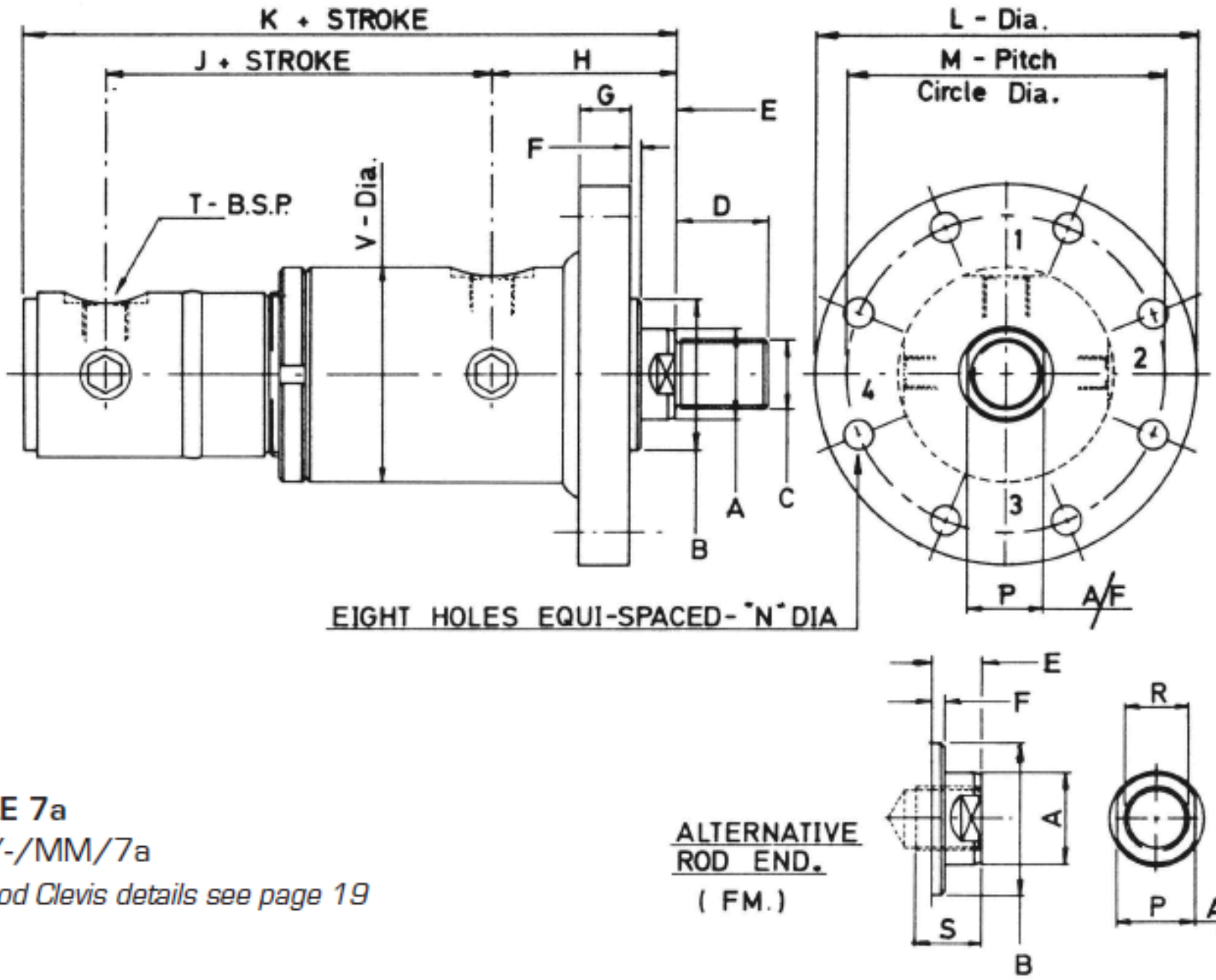
M/-/-/MM/7

For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	15	58	69	162	95	75	6.6	12.5	8x1.0	14	1/4"	35	45
	18	18	32	14x1.5	18	16	3	15	58	69	162	95	75	6.6	14	10x1.25	18	1/4"	35	45
32	18	18	40	14x1.5	18	16	3	15	64	78	186	125	92	9	14	10x1.25	18	3/8"	44	54
	22	22	40	18x1.5	24	16	3	15	64	78	186	125	92	9	18	14x1.5	24	3/8"	44	54
40	22	22	50	18x1.5	24	16	3	20	77	81	206	130	106	9	18	14x1.5	24	1/2"	48	65
	28	28	50	22x1.5	30	16	3	20	77	81	206	130	106	9	25	18x1.5	30	1/2"	48	65
50	28	28	60	22x1.5	30	18	4	20	72	101	225	150	126	11	25	18x1.5	30	1/2"	52	85
	36	36	60	27x2	36	18	4	20	72	101	225	150	126	11	30	22x1.5	30	1/2"	52	85
63	36	36	70	27x2	36	20	4	25	89	103	249	180	145	14	30	22x1.5	30	3/4"	57	100
	45	45	70	33x2	45	20	4	25	89	103	249	180	145	14	40	27x2	45	3/4"	57	100
80	45	45	85	33x2	45	22	4	32	104	115	282	200	165	18	40	27x2	45	3/4"	63	115
	56	56	85	42x2	55	22	4	32	104	115	282	200	165	18	50	33x2	45	3/4"	63	115
100	56	56	106	42x2	55	25	5	32	131	127	332	250	200	22	50	33x2	45	1"	74	140
	70	70	106	52x2	70	25	5	32	131	127	332	250	200	22	60	42x2	55	1"	74	140
125	70	70	132	52x2	70	28	5	32	136	144	357	280	235	22	60	42x2	55	1"	77	180
	90	90	132	68x3	90	28	5	32	136	144	357	280	235	22	80	52x2	70	1"	77	180
160	90	90	160	68x3	90	30	5	40	142	172	406	330	280	22	80	52x2	70	1 1/4"	92	215
	110	110	160	90x3	115	30	5	40	142	172	406	330	280	22	100	52x2	70	1 1/4"	92	215

Front Round

Flange Mounting



STYLE 7a

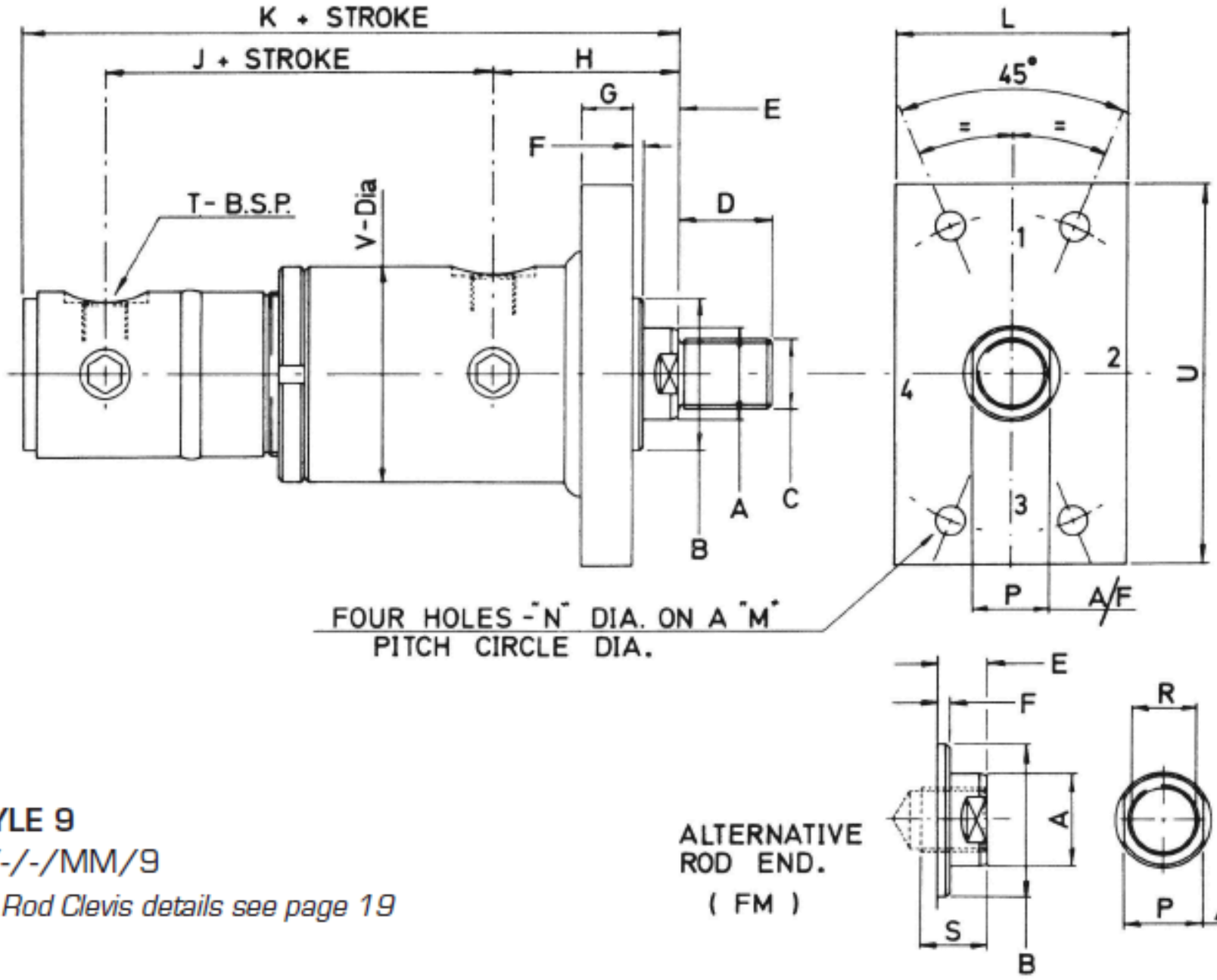
M/-/-/MM/7a

For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V
25	14	14	32	12x1.25	16	16	3	15	58	69	150	95	75	6.6	12.5	8x1.0	14	1/4"	45
	18	18	32	14x1.5	18	16	3	15	58	69	150	95	75	6.6	14	10x1.25	18	1/4"	45
32	18	18	40	14x1.5	18	16	3	15	64	78	170	125	92	9	14	10x1.25	18	3/8"	54
	22	22	40	18x1.5	24	16	3	15	64	78	170	125	92	9	18	14x1.5	24	3/8"	54
40	22	22	50	18x1.5	24	16	3	20	77	81	190	130	106	9	18	14x1.5	24	1/2"	65
	28	28	50	22x1.5	30	16	3	20	77	81	190	130	106	9	25	18x1.5	30	1/2"	65
50	28	28	60	22x1.5	30	18	4	20	72	101	205	150	126	11	25	18x1.5	30	1/2"	85
	36	36	60	27x2	36	18	4	20	72	101	205	150	126	11	30	22x1.5	30	1/2"	85
63	36	36	70	27x2	36	20	4	25	89	103	224	180	145	14	30	22x1.5	30	3/4"	100
	45	45	70	33x2	45	20	4	25	89	103	224	180	145	14	40	27x2	45	3/4"	100
80	45	45	85	33x2	45	22	4	32	104	115	250	200	165	18	40	27x2	45	3/4"	115
	56	56	85	42x2	55	22	4	32	104	115	250	200	165	18	50	33x2	45	3/4"	115
100	56	56	106	42x2	55	25	5	32	131	127	300	250	200	22	50	33x2	45	1"	140
	70	70	106	52x2	70	25	5	32	131	127	300	250	200	22	60	42x2	55	1"	140
125	70	70	132	52x2	70	28	5	32	136	144	325	280	235	22	60	42x2	55	1"	180
	90	90	132	68x3	90	28	5	32	136	144	325	280	235	22	80	52x2	70	1"	180
160	90	90	160	68x3	90	30	5	40	142	172	370	330	280	22	80	52x2	70	1 1/4"	215
	110	110	160	90x3	115	30	5	40	142	172	370	330	280	22	100	52x2	70	1 1/4"	215

Front Rectangular

Flange Mounting



STYLE 9

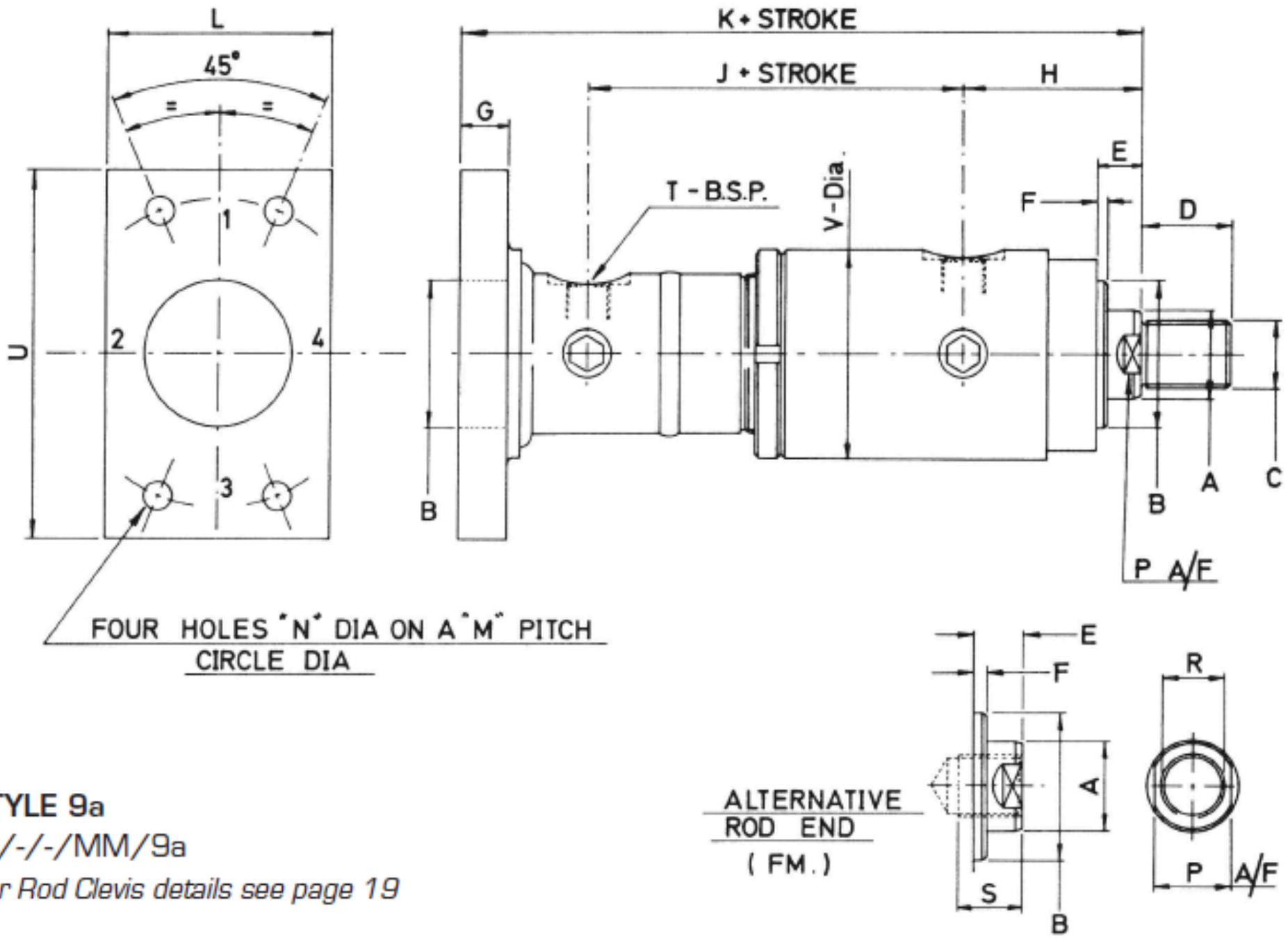
M/-/-/MM/9

For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	15	58	69	150	50	75	6.6	12.5	8x1.0	14	1/4"	90	45
	18	18	32	14x1.5	18	16	3	15	58	69	150	50	75	6.6	14	10x1.25	18	1/4"	90	45
32	18	18	40	14x1.5	18	16	3	15	64	78	170	60	92	9	14	10x1.25	18	3/8"	110	54
	22	22	40	18x1.5	24	16	3	15	64	78	170	60	92	9	18	14x1.5	24	3/8"	110	54
40	22	22	50	18x1.5	24	16	3	20	77	81	190	70	106	9	18	14x1.5	24	1/2"	120	65
	28	28	50	22x1.5	30	16	3	20	77	81	190	70	106	9	25	18x1.5	30	1/2"	120	65
50	28	28	60	22x1.5	30	18	4	20	72	101	205	90	126	11	25	18x1.5	30	1/2"	140	85
	36	36	60	27x2	36	18	4	20	72	101	205	90	126	11	30	22x1.5	30	1/2"	140	85
63	36	36	70	27x2	36	20	4	25	89	103	224	110	145	14	30	22x1.5	30	3/4"	170	100
	45	45	70	33x2	45	20	4	25	89	103	224	110	145	14	40	27x2	45	3/4"	170	100
80	45	45	85	33x2	45	22	4	32	104	115	250	120	165	18	40	27x2	45	3/4"	200	115
	56	56	85	42x2	55	22	4	32	104	115	250	120	165	18	50	33x2	45	3/4"	200	115
100	56	56	106	42x2	55	25	5	32	131	127	300	150	200	22	50	33x2	45	1"	240	140
	70	70	106	52x2	70	25	5	32	131	127	300	150	200	22	60	42x2	55	1"	240	140
125	70	70	132	52x2	70	28	5	32	136	144	325	180	235	22	60	42x2	55	1"	280	180
	90	90	132	68x3	90	28	5	32	136	144	325	180	235	22	80	52x2	70	1"	280	180
160	90	90	160	68x3	90	30	5	40	142	172	370	220	320	40	80	52x2	70	1 1/4"	370	215
	110	110	160	90x3	115	30	5	40	142	172	370	220	320	40	100	52x2	70	1 1/4"	370	215

Rear Rectangular

Flange Mounting



STYLE 9a

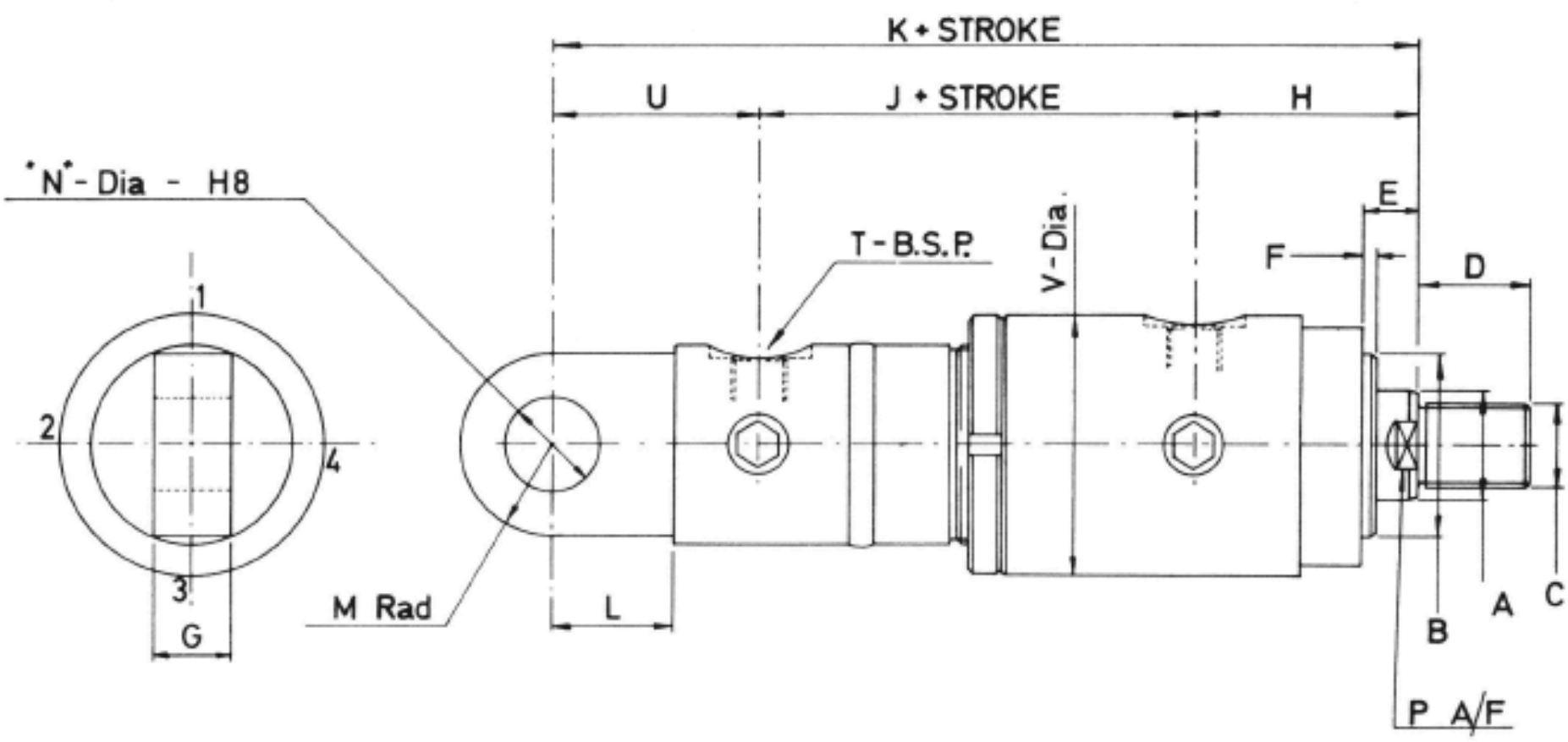
M/-/-/MM/9a

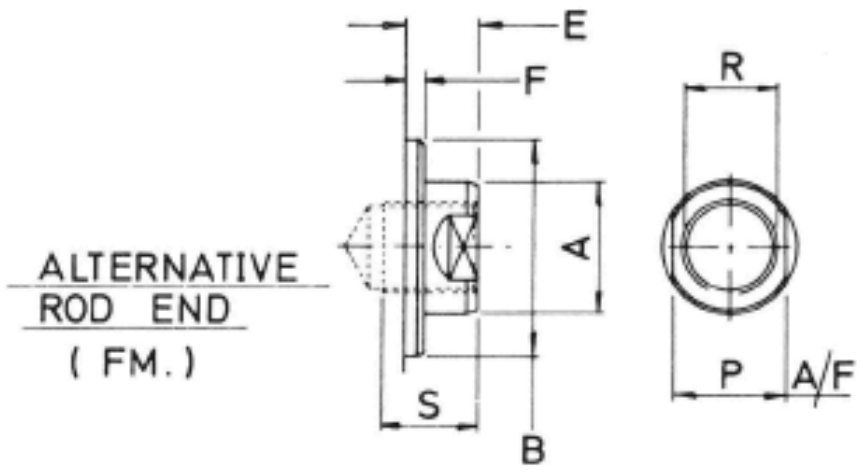
For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	15	58	69	162	50	75	6.6	12.5	8x1.0	14	1/4"	90	45
	18	18	32	14x1.5	18	16	3	15	58	69	162	50	75	6.6	14	10x1.25	18	1/4"	90	45
32	18	18	40	14x1.5	18	16	3	15	64	78	186	60	92	9	14	10x1.25	18	3/8"	110	54
	22	22	40	18x1.5	24	16	3	15	64	78	186	60	92	9	18	14x1.5	24	3/8"	110	54
40	22	22	50	18x1.5	24	16	3	20	77	81	206	70	106	9	18	14x1.5	24	1/2"	120	65
	28	28	50	22x1.5	30	16	3	20	77	81	206	70	106	9	25	18x1.5	30	1/2"	120	65
50	28	28	60	22x1.5	30	18	4	20	72	101	225	90	126	11	25	18x1.5	30	1/2"	140	85
	36	36	60	27x2	36	18	4	20	72	101	225	90	126	11	30	22x1.5	30	1/2"	140	85
63	36	36	70	27x2	36	20	4	25	89	103	249	110	145	14	30	22x1.5	30	3/4"	170	100
	45	45	70	33x2	45	20	4	25	89	103	249	110	145	14	40	27x2	45	3/4"	170	100
80	45	45	85	33x2	45	22	4	32	104	115	282	120	165	18	40	27x2	45	3/4"	200	115
	56	56	85	42x2	55	22	4	32	104	115	282	120	165	18	50	33x2	45	3/4"	200	115
100	56	56	106	42x2	55	25	5	32	131	127	332	150	200	22	50	33x2	45	1"	240	140
	70	70	106	52x2	70	25	5	32	131	127	332	150	200	22	60	42x2	55	1"	240	140
125	70	70	132	52x2	70	28	5	32	136	144	357	180	235	22	60	42x2	55	1"	280	180
	90	90	132	68x3	90	28	5	32	136	144	357	180	235	22	80	52x2	70	1"	280	180
160	90	90	160	68x3	90	30	5	40	142	172	406	220	280	22	80	52x2	70	1 1/4"	370	215
	110	110	160	90x3	115	30	5	40	142	172	406	220	280	22	100	52x2	70	1 1/4"	370	215

Rear Clevis

Mounting





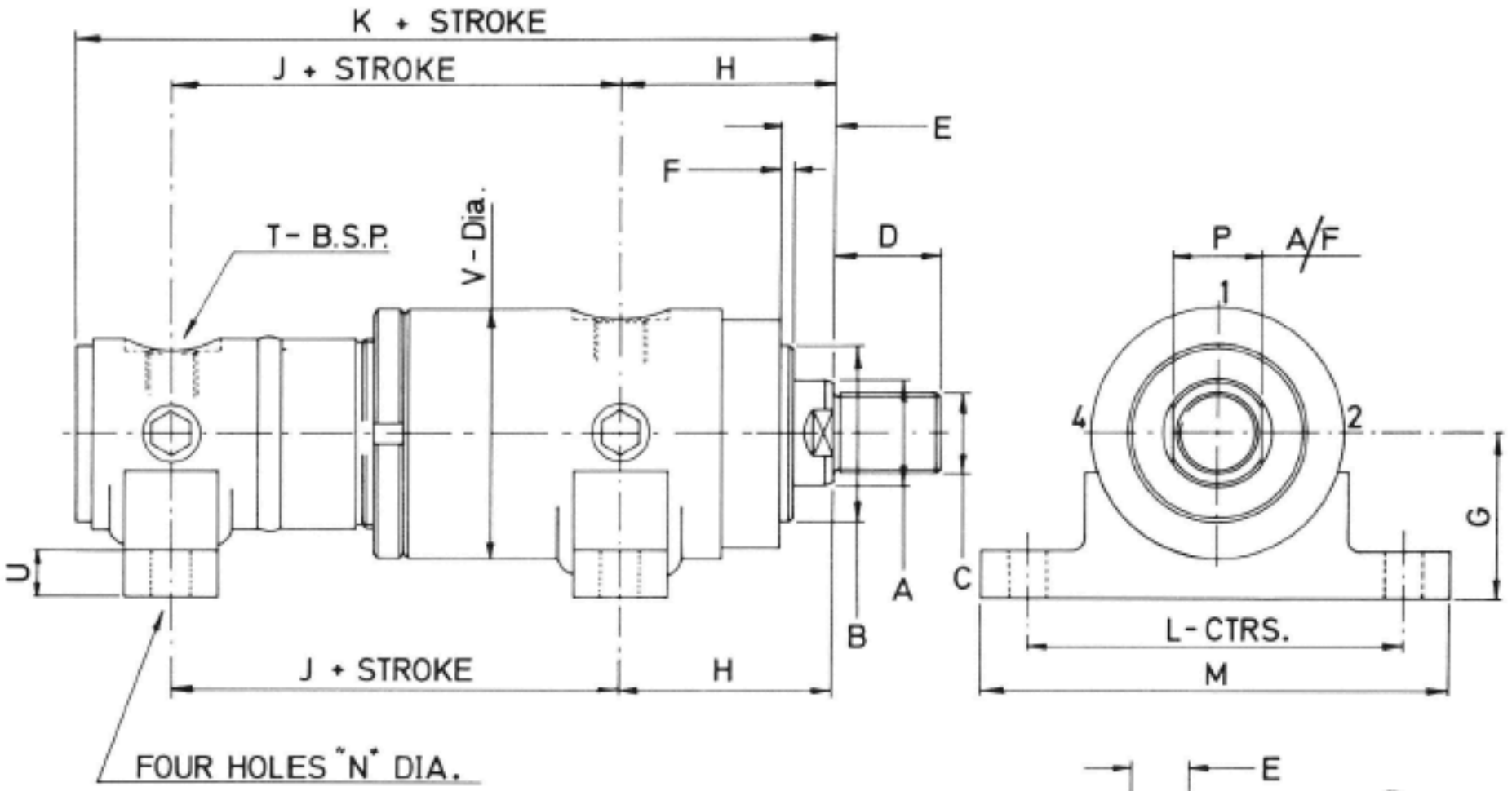
STYLE 12

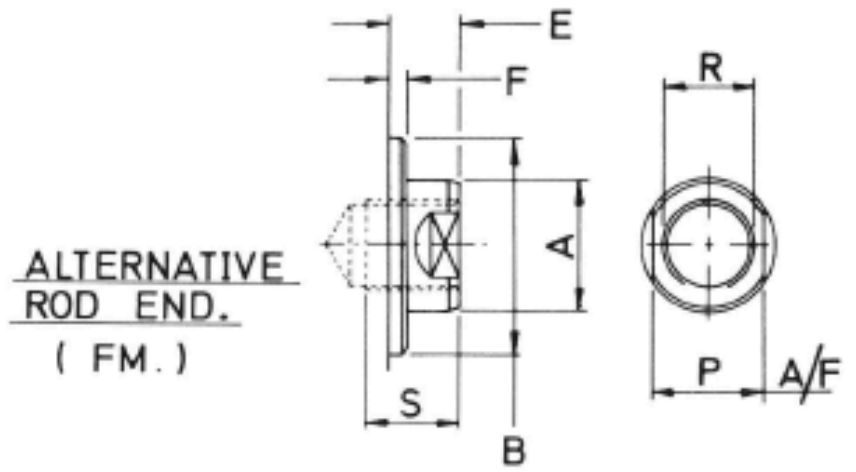
M/-/-/MM/12

For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	12	58	69	178	20	15	12	12.5	8x1.0	14	1/4"	51	45
	18	18	32	14x1.5	18	16	3	12	58	69	178	20	15	12	14	10x1.25	18	1/4"	51	45
32	18	18	40	14x1.5	18	16	3	16	64	78	206	25	20	16	14	10x1.25	18	3/8"	64	54
	22	22	40	18x1.5	24	16	3	16	64	78	206	25	20	16	18	14x1.5	24	3/8"	64	54
40	22	22	50	18x1.5	24	16	3	20	77	81	231	30	22	20	18	14x1.5	24	1/2"	73	65
	28	28	50	22x1.5	30	16	3	20	77	81	231	30	22	20	25	18x1.5	30	1/2"	73	65
50	28	28	60	22x1.5	30	18	4	25	72	101	257	40	27	25	25	18x1.5	30	1/2"	84	85
	36	36	60	27x2	36	18	4	25	72	101	257	40	27	25	30	22x1.5	30	1/2"	84	85
63	36	36	70	27x2	36	20	4	32	89	103	289	50	35	32	30	22x1.5	30	3/4"	97	100
	45	45	70	33x2	45	20	4	32	89	103	289	50	35	32	40	27x2	45	3/4"	97	100
80	45	45	85	33x2	45	22	4	40	104	115	332	60	40	40	40	27x2	45	3/4"	113	115
	56	56	85	42x2	55	22	4	40	104	115	332	60	40	40	50	33x2	45	3/4"	113	115
100	56	56	106	42x2	55	25	5	50	131	127	395	80	50	50	50	33x2	45	1"	137	140
	70	70	106	52x2	70	25	5	50	131	127	395	80	50	50	60	42x2	55	1"	137	140
125	70	70	132	52x2	70	28	5	63	136	144	428	85	65	63	60	42x2	55	1"	148	180
	90	90	132	68x3	90	28	5	63	136	144	428	85	65	63	80	52x2	70	1"	148	180
160	90	90	160	68x3	90	30	5	80	142	172	505	121	80	80	80	52x2	70	1 1/4"	191	215
	110	110	160	90x3	115	30	5	80	142	172	505	121	80	80	100	52x2	70	1 1/4"	191	215

Foot Mounting





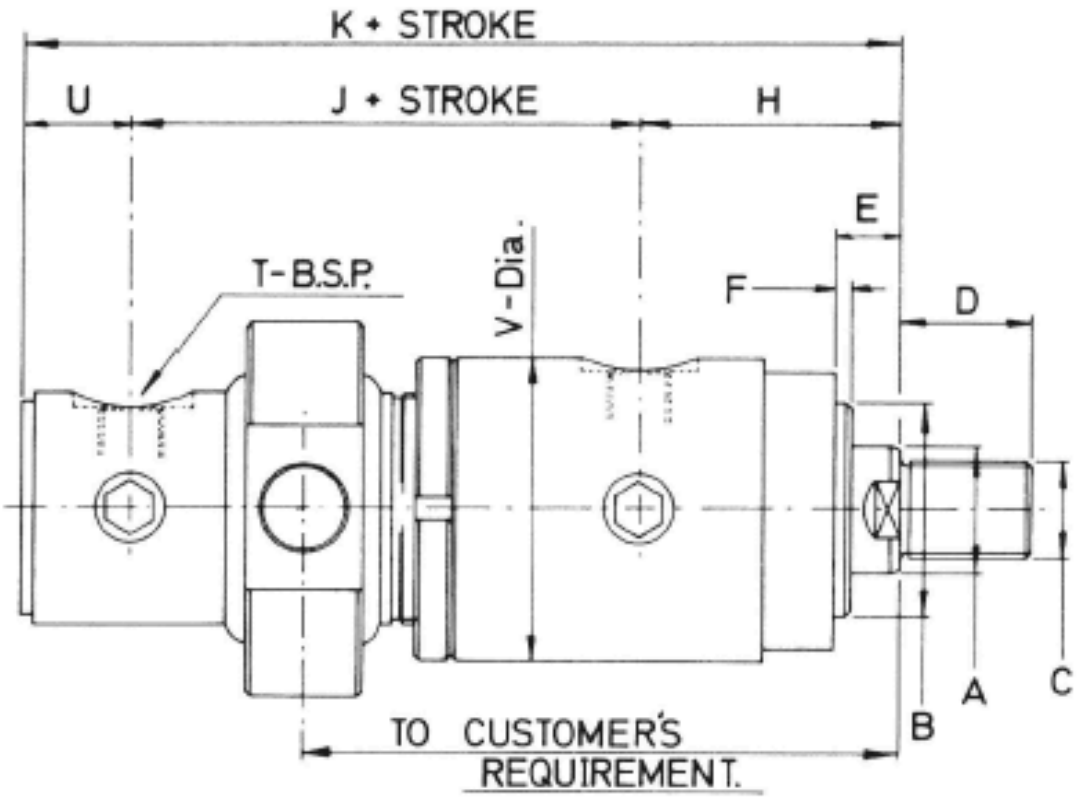
STYLE 16

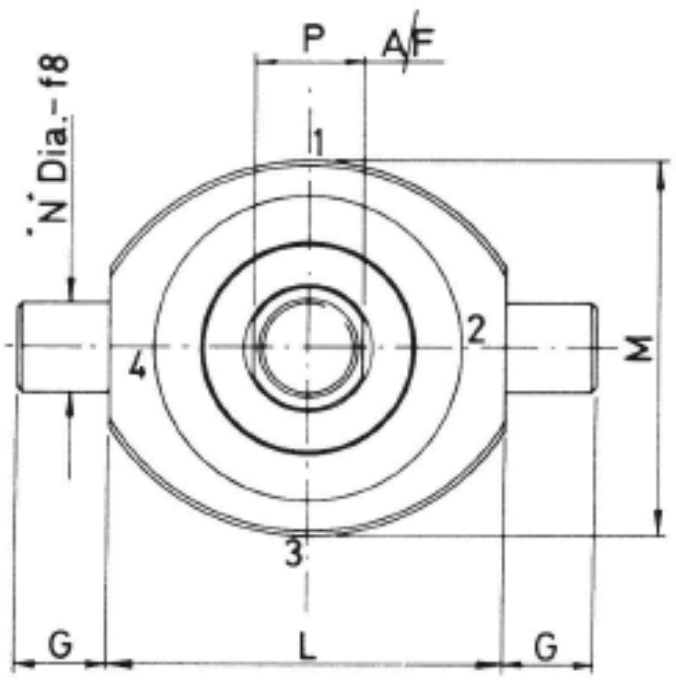
M/-/-/MM/16

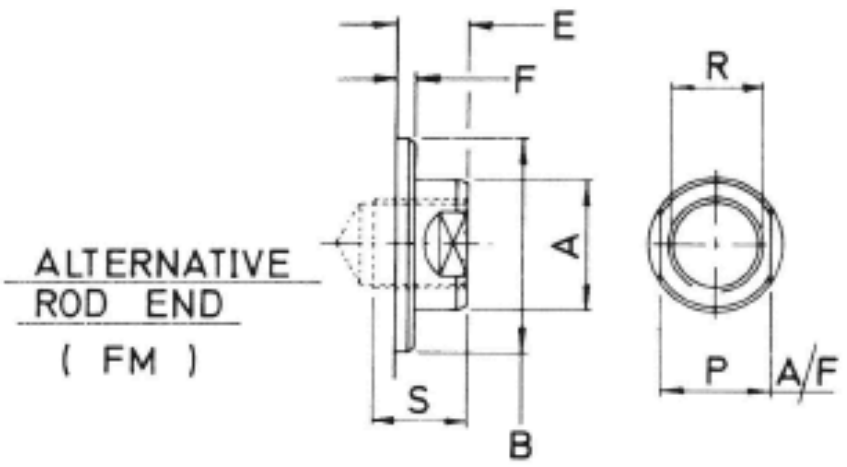
For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	30	58	69	150	80	100	6.6	12.5	8x1.0	14	1/4"	10	45
	18	18	32	14x1.5	18	16	3	30	58	69	150	80	100	6.6	14	10x1.25	18	1/4"	10	45
32	18	18	40	14x1.5	18	16	3	35	64	78	170	95	115	9	14	10x1.25	18	3/8"	12	54
	22	22	40	18x1.5	24	16	3	35	64	78	170	95	115	9	18	14x1.5	24	3/8"	12	54
40	22	22	50	18x1.5	24	16	3	45	77	81	190	120	150	11	18	14x1.5	24	1/2"	15	65
	28	28	50	22x1.5	30	16	3	45	77	81	190	120	150	11	25	18x1.5	30	1/2"	15	65
50	28	28	60	22x1.5	30	18	4	50	72	101	205	130	160	11	25	18x1.5	30	1/2"	20	85
	36	36	60	27x2	36	18	4	50	72	101	205	130	160	11	30	22x1.5	30	1/2"	20	85
63	36	36	70	27x2	36	20	4	60	89	103	224	160	190	14	30	22x1.5	30	3/4"	25	100
	45	45	70	33x2	45	20	4	60	89	103	224	160	190	14	40	27x2	45	3/4"	25	100
80	45	45	85	33x2	45	22	4	70	104	115	250	190	230	18	40	27x2	45	3/4"	25	115
	56	56	85	42x2	55	22	4	70	104	115	250	190	230	18	50	33x2	45	3/4"	25	115
100	56	56	106	42x2	55	25	5	80	131	127	300	210	250	18	50	33x2	45	1"	30	140
	70	70	106	52x2	70	25	5	80	131	127	300	210	250	18	60	42x2	55	1"	30	140
125	70	70	132	52x2	70	28	5	110	136	144	325	260	320	22	60	42x2	55	1"	35	180
	90	90	132	68x3	90	28	5	110	136	144	325	260	320	22	80	52x2	70	1"	35	180
160	90	90	160	68x3	90	30	5	120	142	172	370	315	390	30	80	52x2	70	1 1/4"	40	215
	110	110	160	90x3	115	30	5	120	142	172	370	315	390	40	100	52x2	70	1 1/4"	40	215

Trunnion Mounting







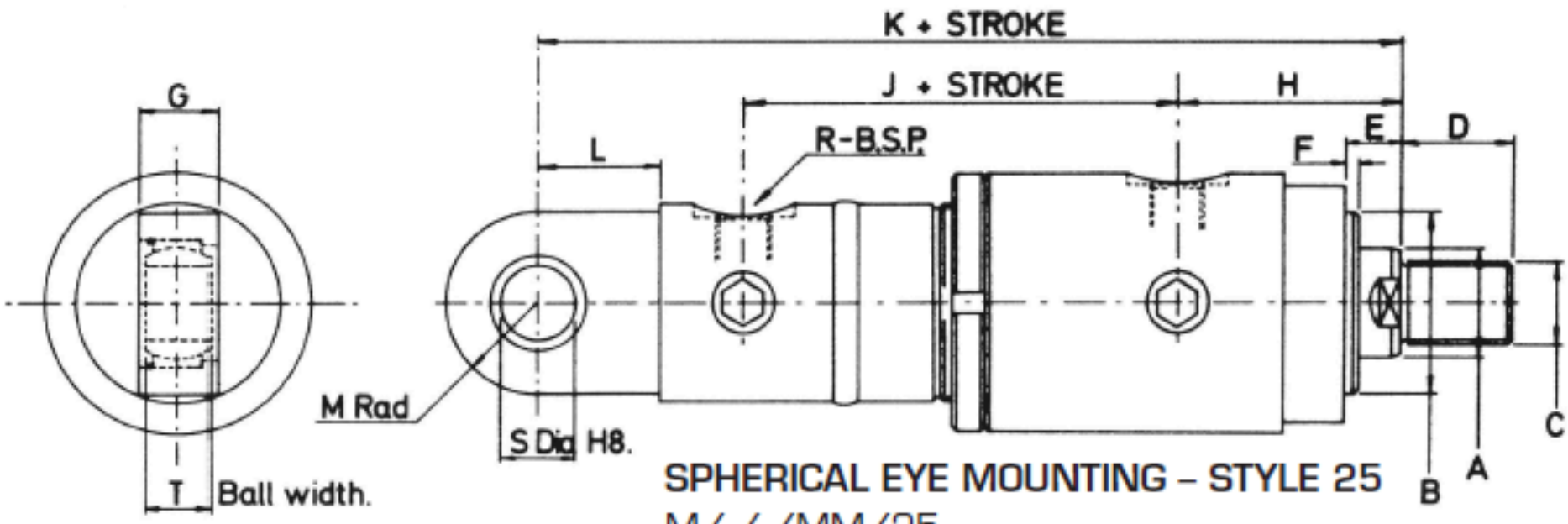
STYLE 18

M/-/-/MM/18

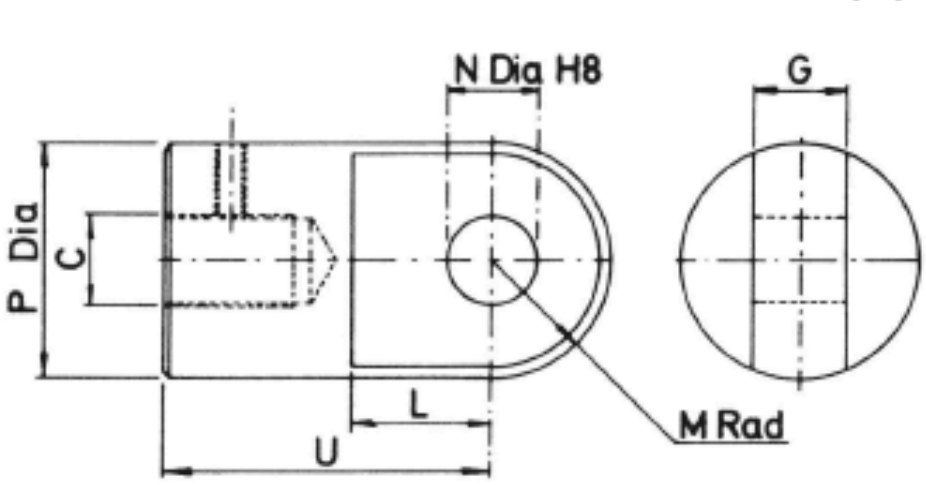
For Rod Clevis details see page 19

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	10	58	69	150	63	66	12	12.5	8x1.0	14	1/4"	23	45
	18	18	32	14x1.5	18	16	3	10	58	69	150	63	66	12	14	10x1.25	18	1/4"	23	45
32	18	18	40	14x1.5	18	16	3	12	64	78	170	75	65	16	14	10x1.25	18	3/8"	28	54
	22	22	40	18x1.5	24	16	3	12	64	78	170	75	65	16	18	14x1.5	24	3/8"	28	54
40	22	22	50	18x1.5	24	16	3	16	77	81	190	90	76	20	18	14x1.5	24	1/2"	31	65
	28	28	50	22x1.5	30	16	3	16	77	81	190	90	76	20	25	18x1.5	30	1/2"	31	65
50	28	28	60	22x1.5	30	18	4	20	72	101	205	105	94	25	25	18x1.5	30	1/2"	32	85
	36	36	60	27x2	36	18	4	20	72	101	205	105	94	25	30	22x1.5	30	1/2"	32	85
63	36	36	70	27x2	36	20	4	25	89	103	224	120	120	32	30	22x1.5	30	3/4"	32	100
	45	45	70	33x2	45	20	4	25	89	103	224	120	120	32	40	27x2	45	3/4"	32	100
80	45	45	85	33x2	45	22	4	32	104	115	250	135	130	40	40	27x2	45	3/4"	31	115
	56	56	85	42x2	55	22	4	32	104	115	250	135	130	40	50	33x2	45	3/4"	31	115
100	56	56	106	42x2	55	25	5	40	131	127	300	160	160	50	50	33x2	45	1"	42	140
	70	70	106	52x2	70	25	5	40	131	127	300	160	160	50	60	42x2	55	1"	42	140
125	70	70	132	52x2	70	28	5	50	136	144	325	195	195	63	60	42x2	55	1"	45	180
	90	90	132	68x3	90	28	5	50	136	144	325	195	195	63	80	52x2	70	1"	45	180
160	90	90	160	68x3	90	30	5	63	142	172	370	240	240	80	80	52x2	70	1 1/4"	56	215
	110	110	160	90x3	115	30	5	63	142	172	370	240	240	80	100	52x2	70	1 1/4"	56	215

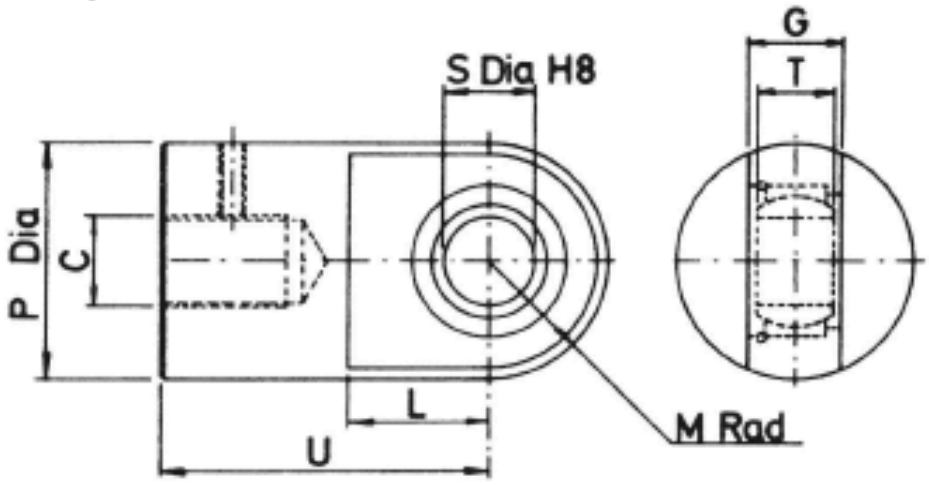
Rear Spherical
and Rod Clevis



SPHERICAL EYE MOUNTING – STYLE 25
M/-/-/MM/25



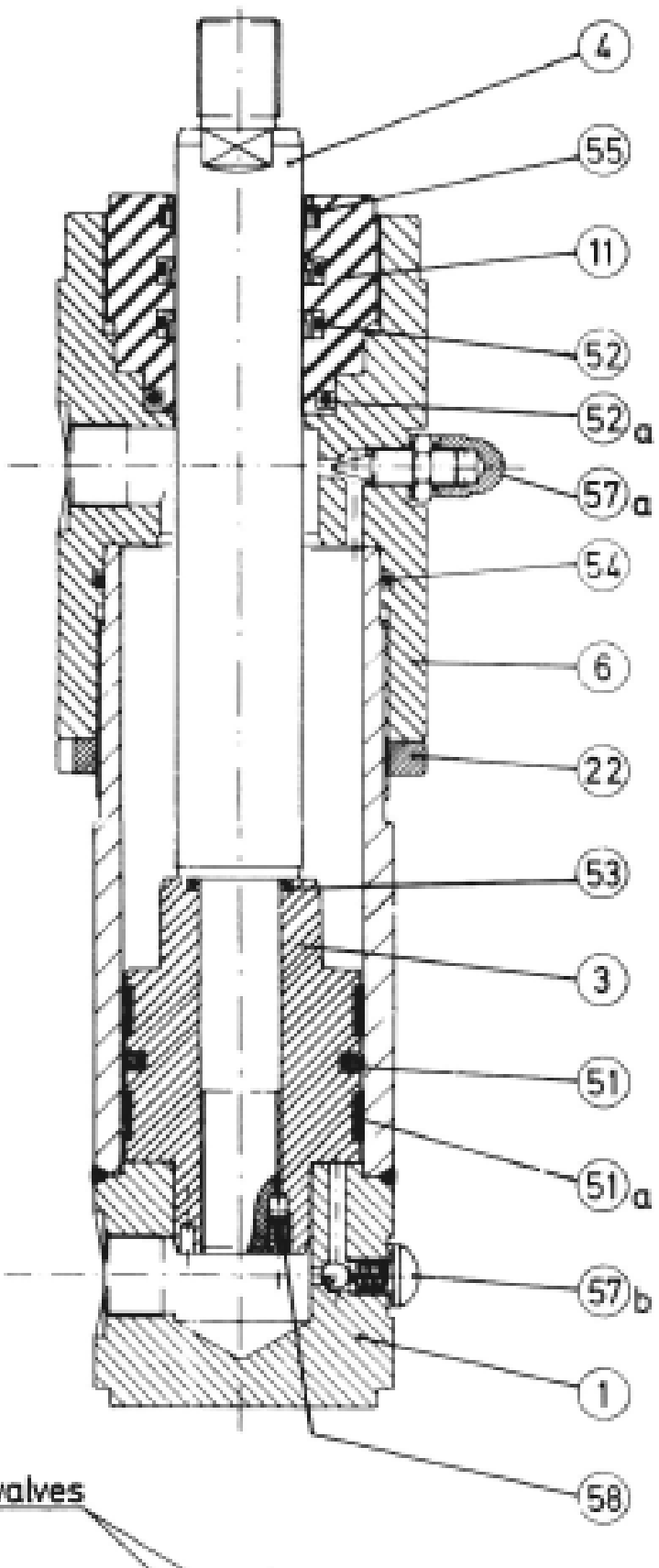
ROD CLEVIS – PLAIN
REF – MM-27



ROD CLEVIS – SPHERICAL
REF – MM-25

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
25	14	14	32	12x1.25	16	16	3	12	58	69	178	20	17.5	12	35	1/4"	12	10	50	45
	18	18	32	14x1.5	18	16	3	12	58	69	178	20	17.5	12	35	1/4"	12	10	50	45
32	18	18	40	14x1.5	18	16	3	16	64	78	206	25	21	16	42	3/8"	16	12.75	54	54
	22	22	40	18x1.5	24	16	3	16	64	78	206	25	21	16	42	3/8"	16	12.75	54	54
40	22	22	50	18x1.5	24	16	3	20	77	81	231	30	25	20	50	1/2"	20	16	75	65
	28	28	50	22x1.5	30	16	3	20	77	81	231	30	25	20	50	1/2"	20	16	75	65
50	28	28	60	22x1.5	30	18	4	25	72	101	257	40	32	25	64	1/2"	25	20	95	85
	36	36	60	27x2	36	18	4	25	72	101	257	40	32	25	64	1/2"	25	20	95	85
63	36	36	70	27x2	36	20	4	32	89	103	289	50	35	32	70	3/4"	32	20.5	115	100
	45	45	70	33x2	45	20	4	32	89	103	289	50	35	32	70	3/4"	32	20.5	115	100
80	45	45	85	33x2	45	22	4	40	104	115	332	60	45	40	90	3/4"	40	28	140	115
	56	56	85	42x2	55	22	4	40	104	115	332	60	45	40	90	3/4"	40	28	140	115
100	56	56	106	42x2	55	25	5	50	131	127	395	80	55	50	110	1"	50	35	175	140
	70	70	106	52x2	70	25	5	50	131	127	395	80	55	50	110	1"	50	35	175	140
125	70	70	132	52x2	70	28	5	63	136	144	428	85	77.5	63	155	1"	63	44	210	180
	90	90	132	68x3	90	28	5	63	136	144	428	85	77.5	63	155	1"	63	44	210	180
160	90	90	160	68x3	90	30	5	80	142	172	505	121	92.5	80	185	1 1/4"	80	55	270	215
	110	110	160	90x3	115	30	5	80	142	172	505	121	92.5	80	185	1 1/4"	80	55	270	215

Spare Parts List



PISTON ROD

PISTON ROD WIPER/SCRAPER

GLAND BUSH

PISTON ROD SEAL

GLAND BUSH 'O' RING

CUSHION ADJUSTMENT ASSEMBLY
(Shown 90º out of position)

GLAND 'O' RING

GLAND / GLAND WELD ASSEMBLY
(Supplied with mounting if applicable)

GLAND LOCK RING

PISTON 'O' RING

PISTON

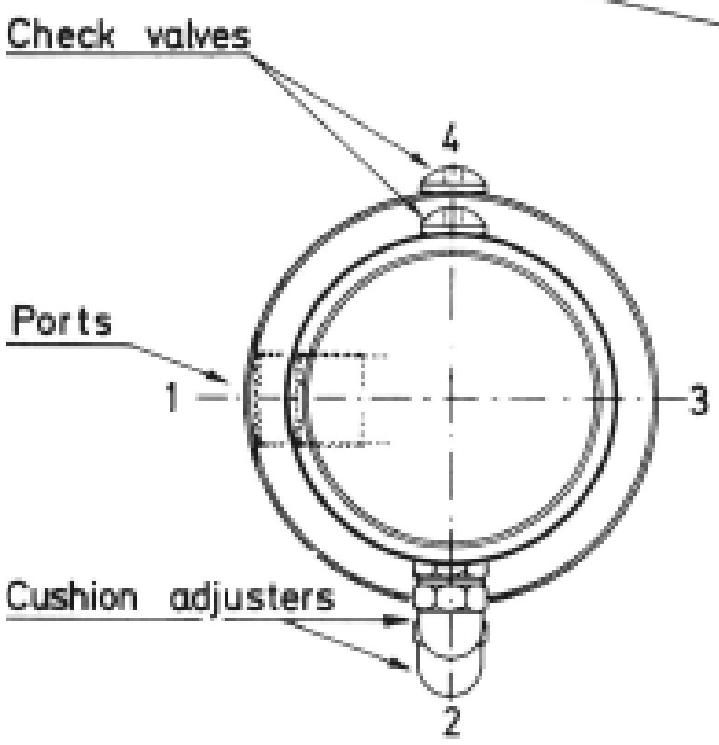
PISTON SEAL

PISTON BEARING STRIP

CUSHION CHECK VALVE ASSEMBLY
(Shown 90º out of position)

CYLINDER WELD ASSEMBLY
(Supplied with mounting if applicable)

PISTON LOCK SCREW



End view of cylinder showing standard position . of check valve and cushion adjusters relative to ports.

ORDERING INFORMATION

When ordering spares quote:

1. Item number and description

2. Cylinder tpe

3. Serial number

(2 & 3 are stamped on label adhered to cylinder)

Example:

1. Item 11 – Gland Bush

2. M/80/45

3. 12051078

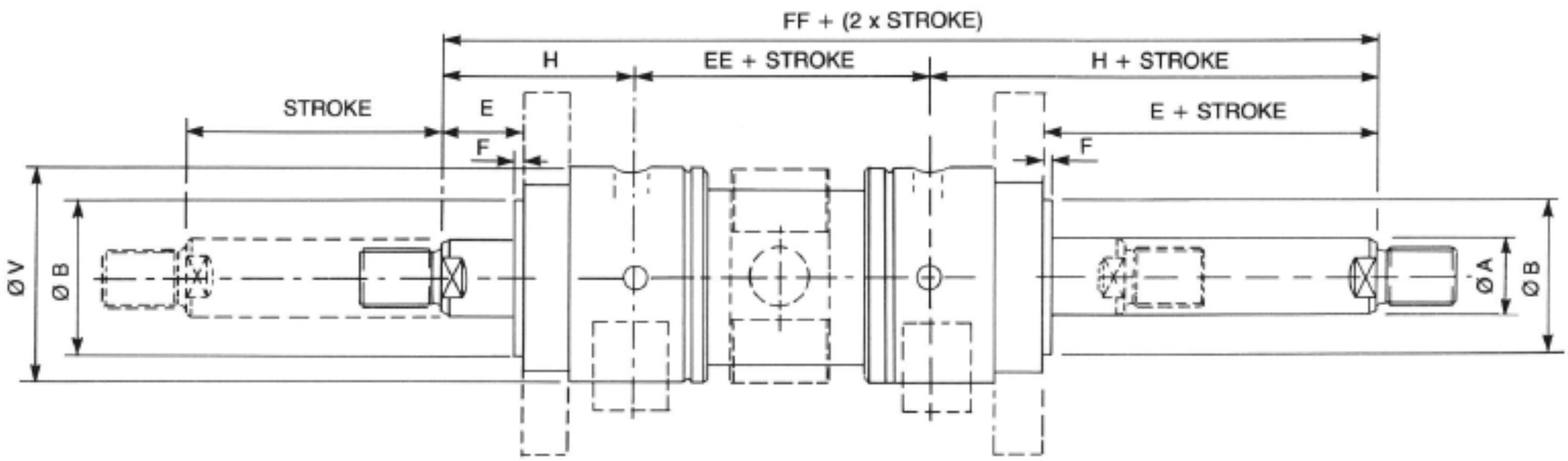
To order SEAL KIT (comprising items 51 to 55) quote item 60.

To order CUSHION ADJUSTMENT / CHECK VALVE KIT

(comprising 2 off

item 57a and 2 off 57b) quote item 57.

Through Rod Cylinders



Through Rod Cylinders can be supplied with any of the mountings offered in the stadard cushioned range. Please refer to the applicable data sheet for dimensions.

CYL BORE	ROD SIZE	A	B	E	F	H	V	EE	FF
25	14	14	32	16	3	58	45	62	178
	18	18	32	16	3	58	45	62	178
32	18	18	40	16	3	64	54	74	202
	22	22	40	16	3	64	54	74	202
40	22	22	50	16	3	77	65	80	234
	28	28	50	16	3	77	65	80	234
50	28	28	60	18	4	72	85	86	230
	36	36	60	18	4	72	85	86	230
63	36	36	70	20	4	89	100	90	268
	45	45	70	20	4	89	100	90	268
80	45	45	85	22	4	104	115	93	301
	56	56	85	22	4	104	115	93	301
100	56	56	106	25	5	131	140	114	376
	70	70	106	25	5	131	140	114	376
125	70	70	132	28	5	136	180	130	402
	90	90	132	28	5	136	180	130	402
160	90	90	160	30	5	142	215	166	450
	110	110	160	30	5	142	215	166	450

Non-Cushioned Cylinders

Specification

Standard metric hydraulic cylinders specification

Cylinder Type

Non-Cushioned	Type NCM

Specification

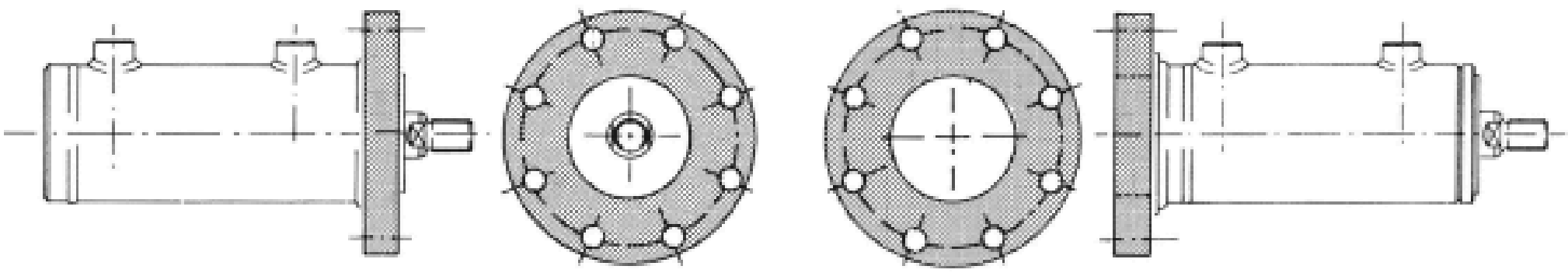
Size range:	40mm to 160mm bore to CETOP RP 58H
Maximum working pressure:	210 bar (3000 psi)
Temperature range:	–15ºC to 100ºC
Piston rod:	Precision ground BS970 – 080M40 (EN8) bar, hard chromium plated and polished to 0.3µm Ra.
Piston seals:	Heavy duty double-acting fluid seals with wear rings
Cylinder barrel:	Steel tube to BS5242 HP5 honed to 0.4µm Ra.
Gland:	High grade cast iron gland screwed into cylnder barrel, housing the rod seal and combined wiper/scraper

Ordering Details

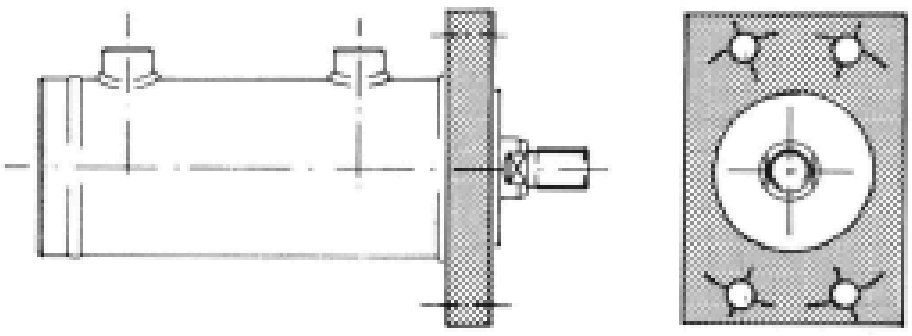
Cylinder Part Numbers are made up as follows:	NCM/Bore dia./Rod dia./Rod end/Mounting Style x Stroke eg. A 40mm bore cylinder with a 22mm dia. rod with a female tapped end, front round flange mounting and a stroke of 120mm would be: NCM/40/22/FM/7a x 120

Mounting Styles

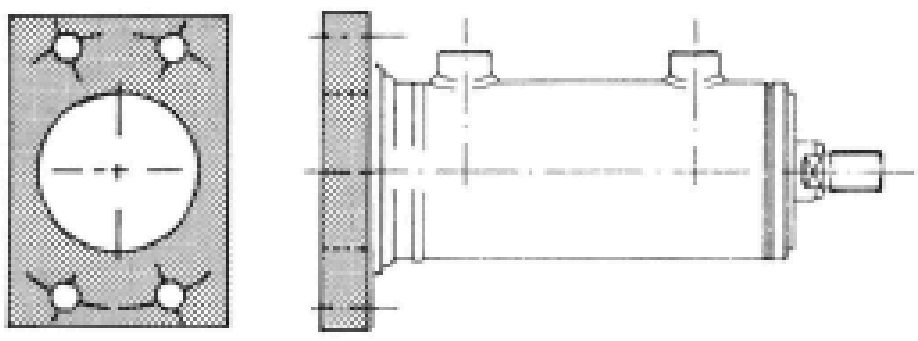
Third angle projection (Shown with standard rod ends – ref 'MM')



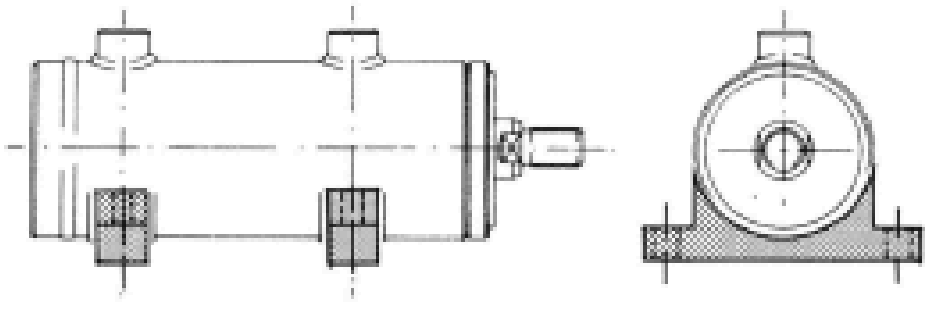
Front Round Flange – Style 7a (page 19)



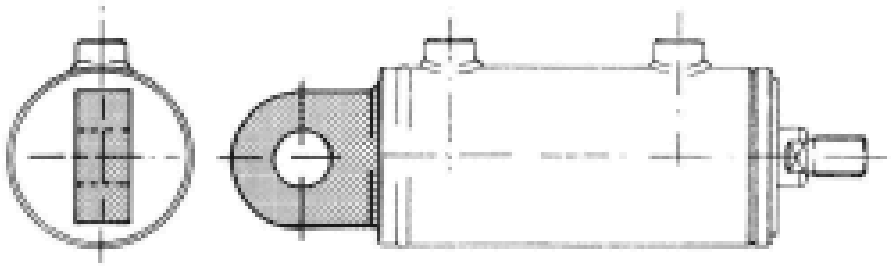
Rear Round Flange – Style 7 (page 18)



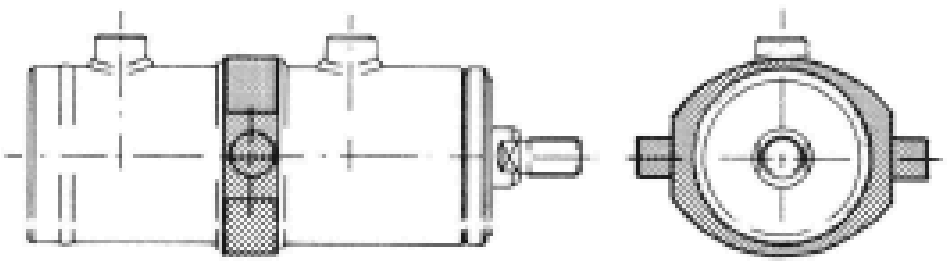
Front Rectangular Flange – Style 9 (page 20)



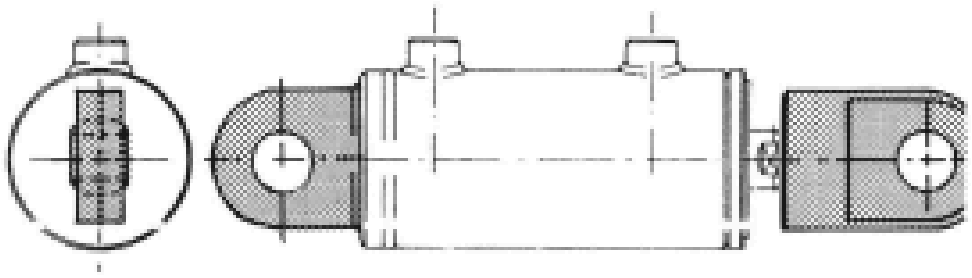
Rear Rectangular Flange – Style 9a (page 21)



Foot Mounting – Style 16 (page 23)



Rear Clevis Mounting – Style 12 (page 22)



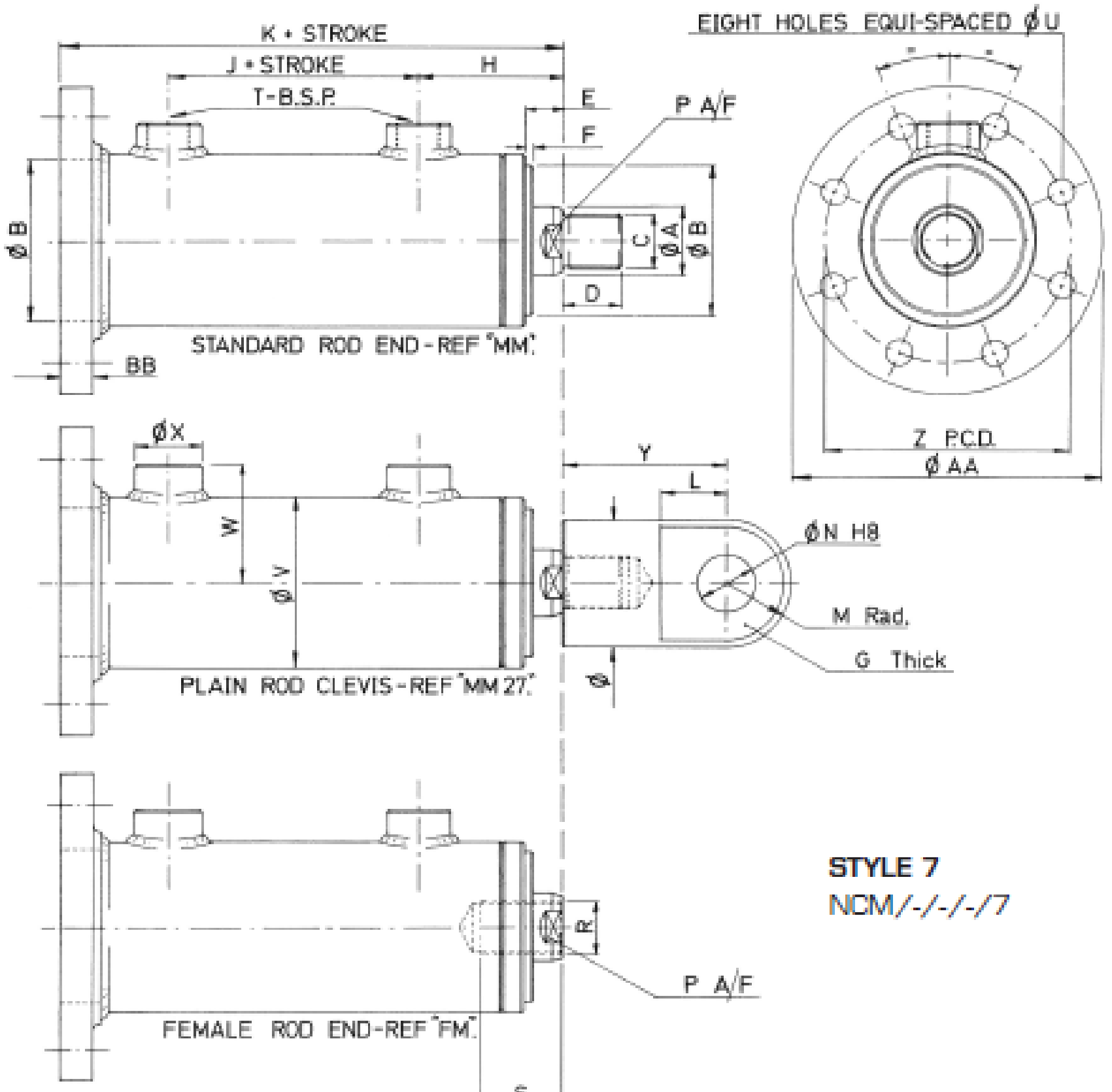
Trunnion Mounting – Style 18 (page 24)

Spherical Eye Mounting – Style 25 (page 25)

See page 26 for full section and parts list

Rear Round

Flange Mounting



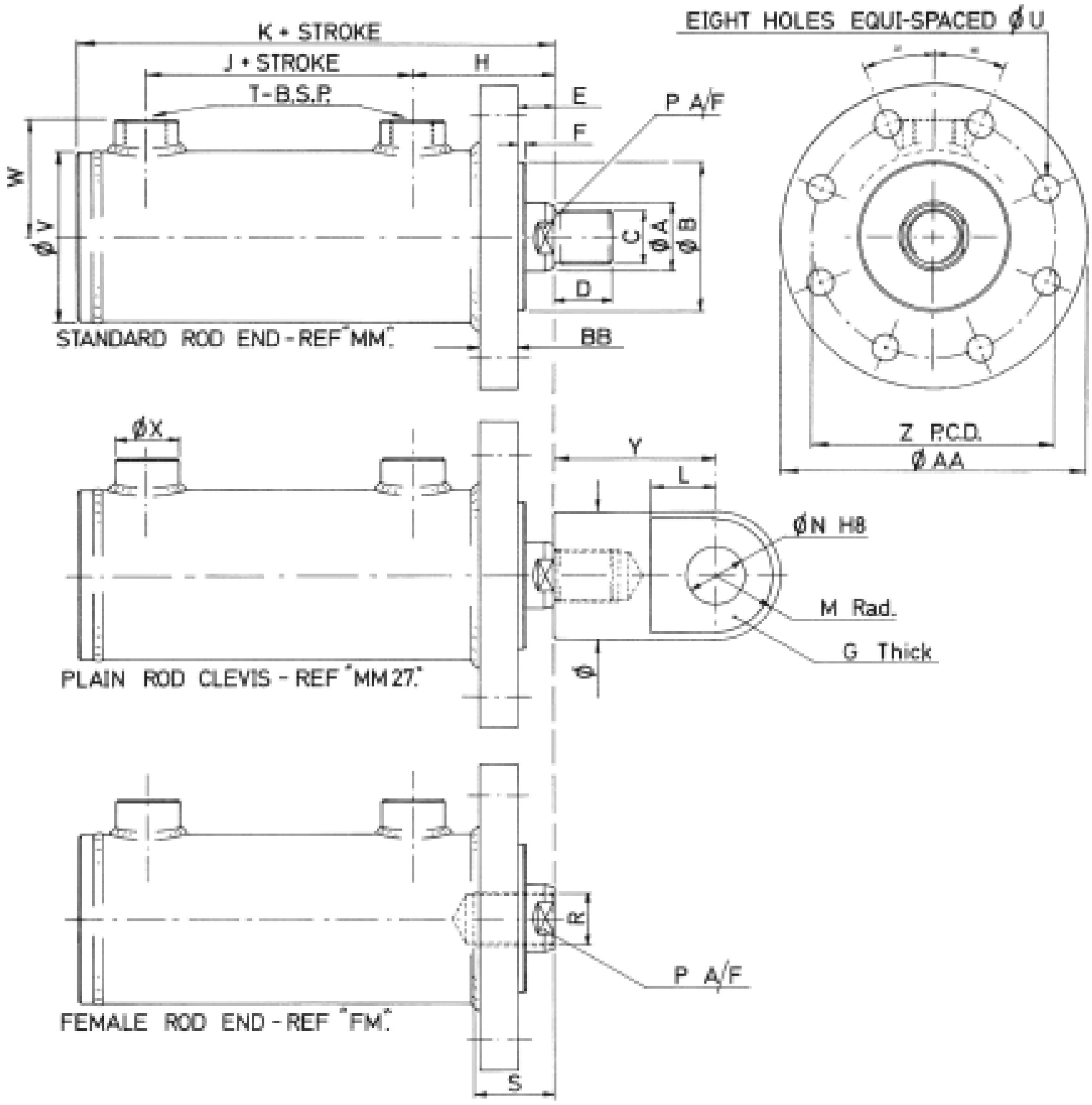
STYLE 7

NCM/-/-/-/7

CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB
40	22	22	50	18x1.5	24	16	3	20	80	77	206	30	25	20	18	14x1.5	24	1½"	9	50	40	30	75	106	130	20
50	28	28	60	22x1.5	30	18	4	25	83	90	225	40	32	25	25	18x1.5	30	1½"	11	60	45	30	95	126	150	20
63	36	36	70	27x2.0	36	20	4	32	96	90	249	50	35	32	30	22x1.5	30	¾"	14	75	58	40	115	145	180	25
80	45	45	85	33x2.0	45	22	4	40	118	87	282	60	45	40	40	27x2.0	45	¾"	18	96	68	40	140	165	200	32
100	56	56	106	42x2.0	55	25	5	50	128	113	332	80	55	50	50	33x2.0	45	1"	22	120	85	55	175	200	250	32
125	70	70	132	52x2.0	70	28	5	63	150	113	357	85	77.5	63	60	42x2.0	55	1"	22	145	98	55	210	235	280	32
160	90	90	160	68x3.0	90	30	5	80	175	125	406	121	92.5	80	80	52x2.0	70	1¼"	22	190	123	60	270	290	330	40

Front Round

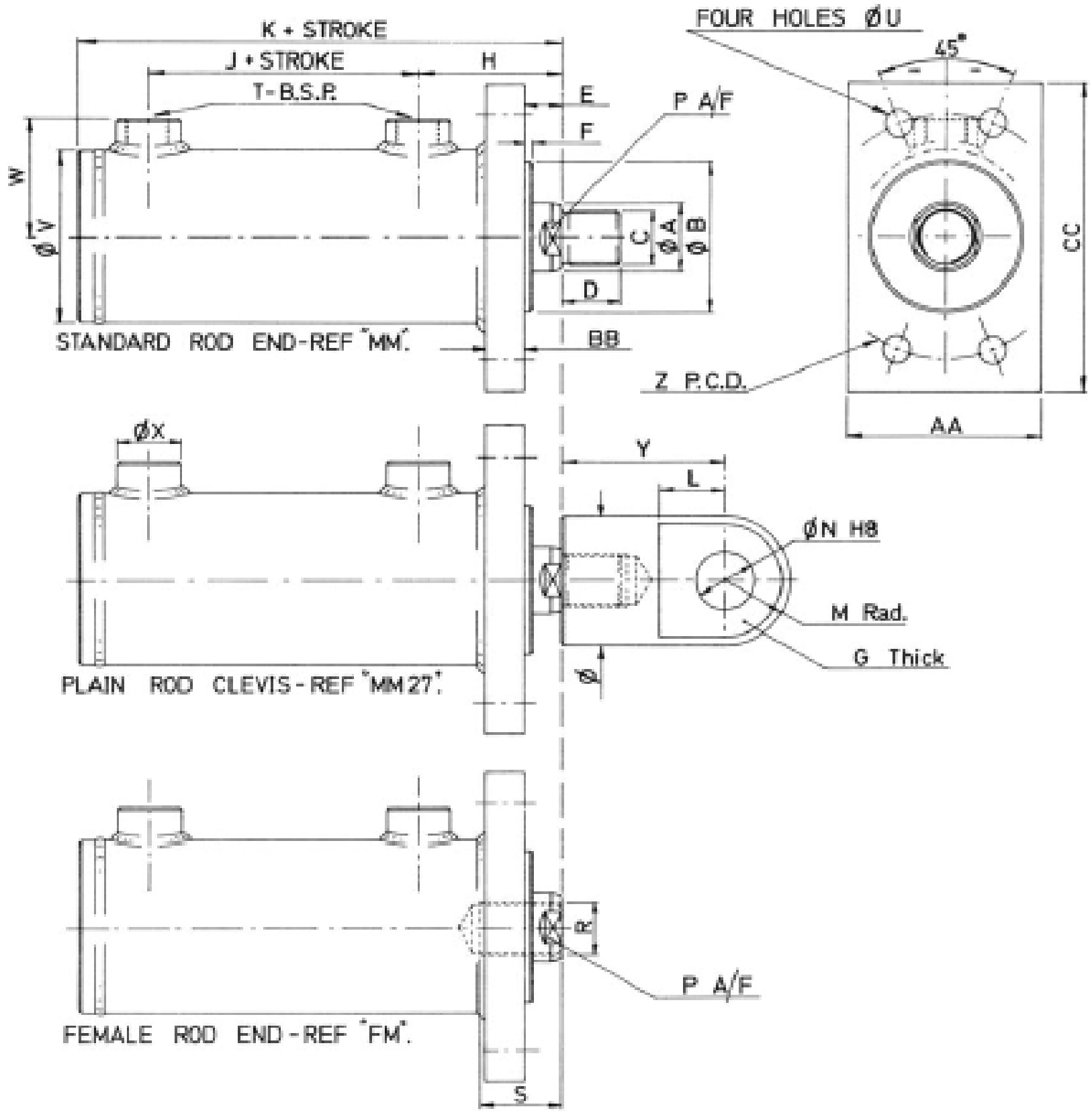
Flange Mounting



CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB
40	22	22	50	18x1.5	24	16	3	20	80	77	190	30	25	20	18	14x1.5	24	½"	9	50	40	30	75	106	130	20
50	28	28	60	22x1.5	30	18	4	25	83	90	205	40	32	25	25	18x1.5	30	½"	11	60	45	30	95	126	150	20
63	36	36	70	27x2.0	36	20	4	32	96	90	224	50	35	32	30	22x1.5	30	¾"	14	75	58	40	115	145	180	25
80	45	45	85	33x2.0	45	22	4	40	118	87	250	60	45	40	40	27x2.0	45	¾"	18	96	68	40	140	165	200	32
100	56	56	106	42x2.0	55	25	5	50	128	113	300	80	55	50	50	33x2.0	45	1"	22	120	85	55	175	200	250	32
125	70	70	132	52x2.0	70	28	5	63	150	113	325	85	77.5	63	60	42x2.0	55	1"	22	145	98	55	210	235	280	32
160	90	90	160	68x3.0	90	30	5	80	175	125	370	121	92.5	80	80	52x2.0	70	1¼"	22	190	123	60	270	280	330	40

Front Rectangular

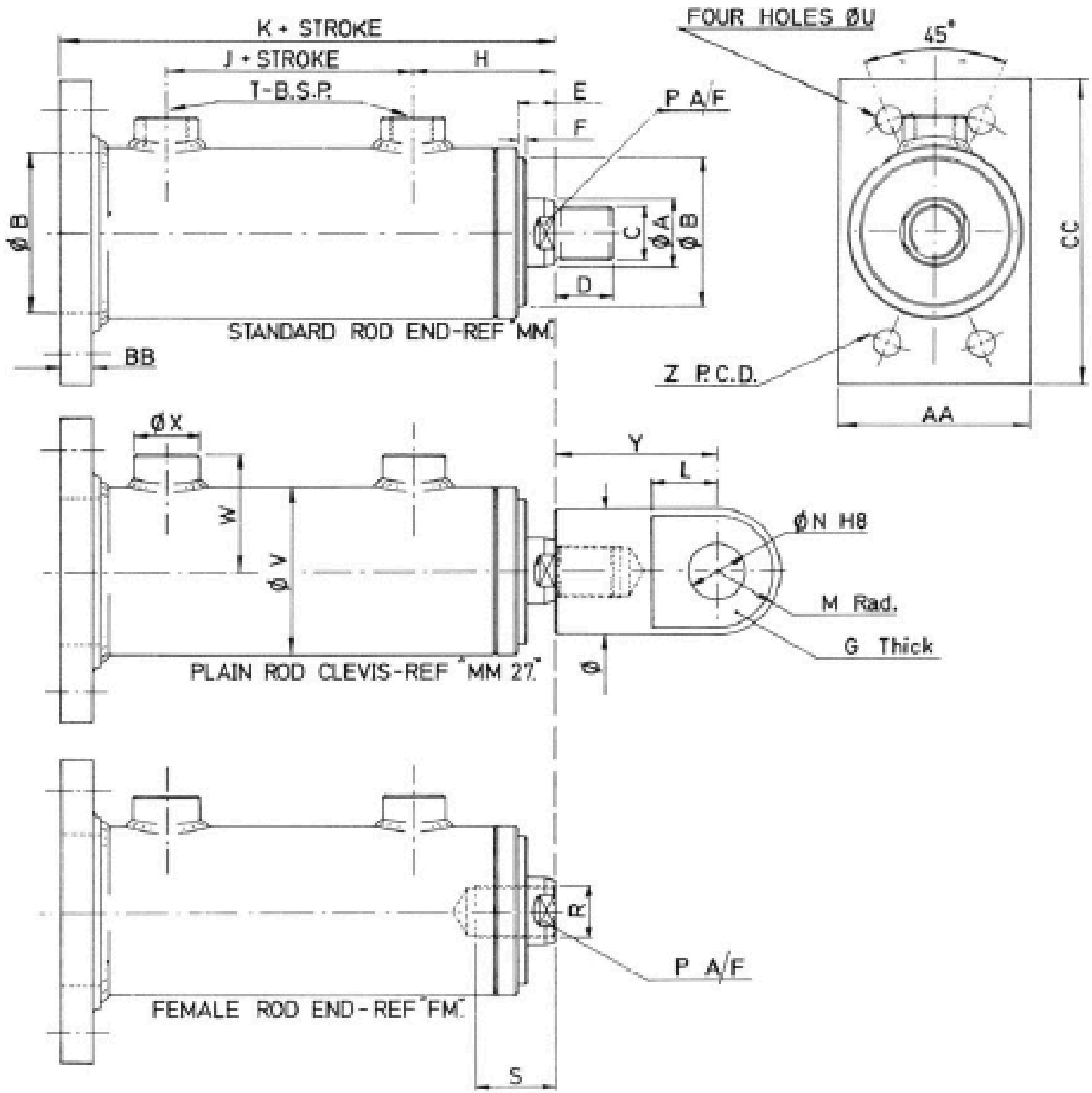
Flange Mounting



CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC
40	22	22	50	18x1.5	24	16	3	20	80	77	190	30	25	20	18	14x1.5	24	1/2"	9	50	40	30	75	106	70	20	120
50	28	28	60	22x1.5	30	18	4	25	83	90	205	40	32	25	25	18x1.5	30	1/2"	11	60	45	30	95	126	90	20	140
63	36	36	70	27x2.0	36	20	4	32	96	90	224	50	35	32	30	22x1.5	30	3/4"	14	75	58	40	115	145	110	25	170
80	45	45	85	33x2.0	45	22	4	40	118	97	250	60	45	40	40	27x2.0	45	3/4"	18	96	68	40	140	165	120	32	200
100	56	56	106	42x2.0	55	25	5	50	128	113	300	80	55	50	50	33x2.0	45	1"	22	120	85	55	175	200	150	32	240
125	70	70	132	52x2.0	70	28	5	63	150	113	325	85	77.5	63	60	42x2.0	55	1"	22	145	98	55	210	235	180	32	280
160	90	90	160	68x2.0	90	30	5	80	175	125	370	121	92.5	80	80	52x2.0	70	1 1/4"	40	190	123	60	270	320	220	40	370

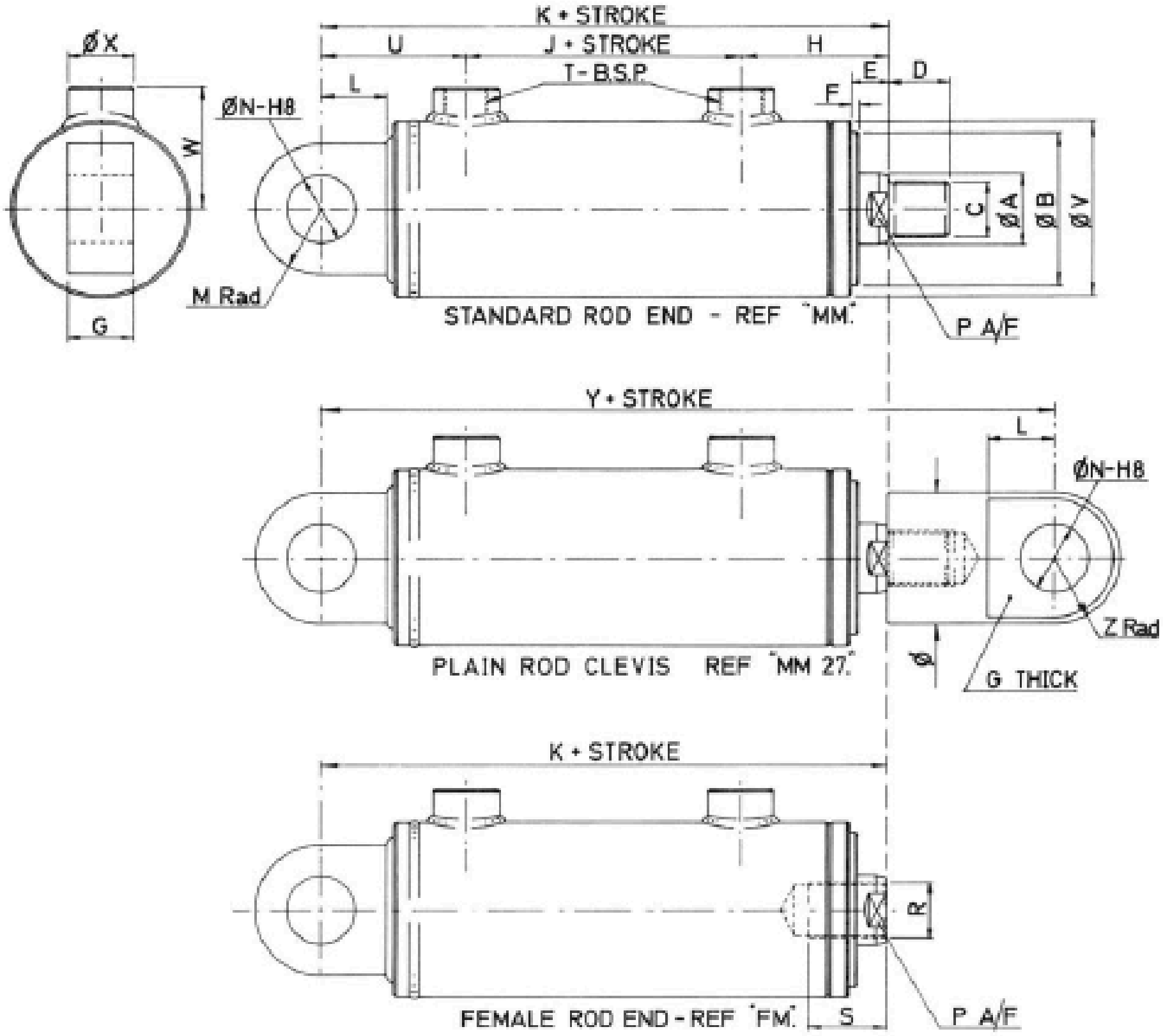
Rear Rectangular

Flange Mounting



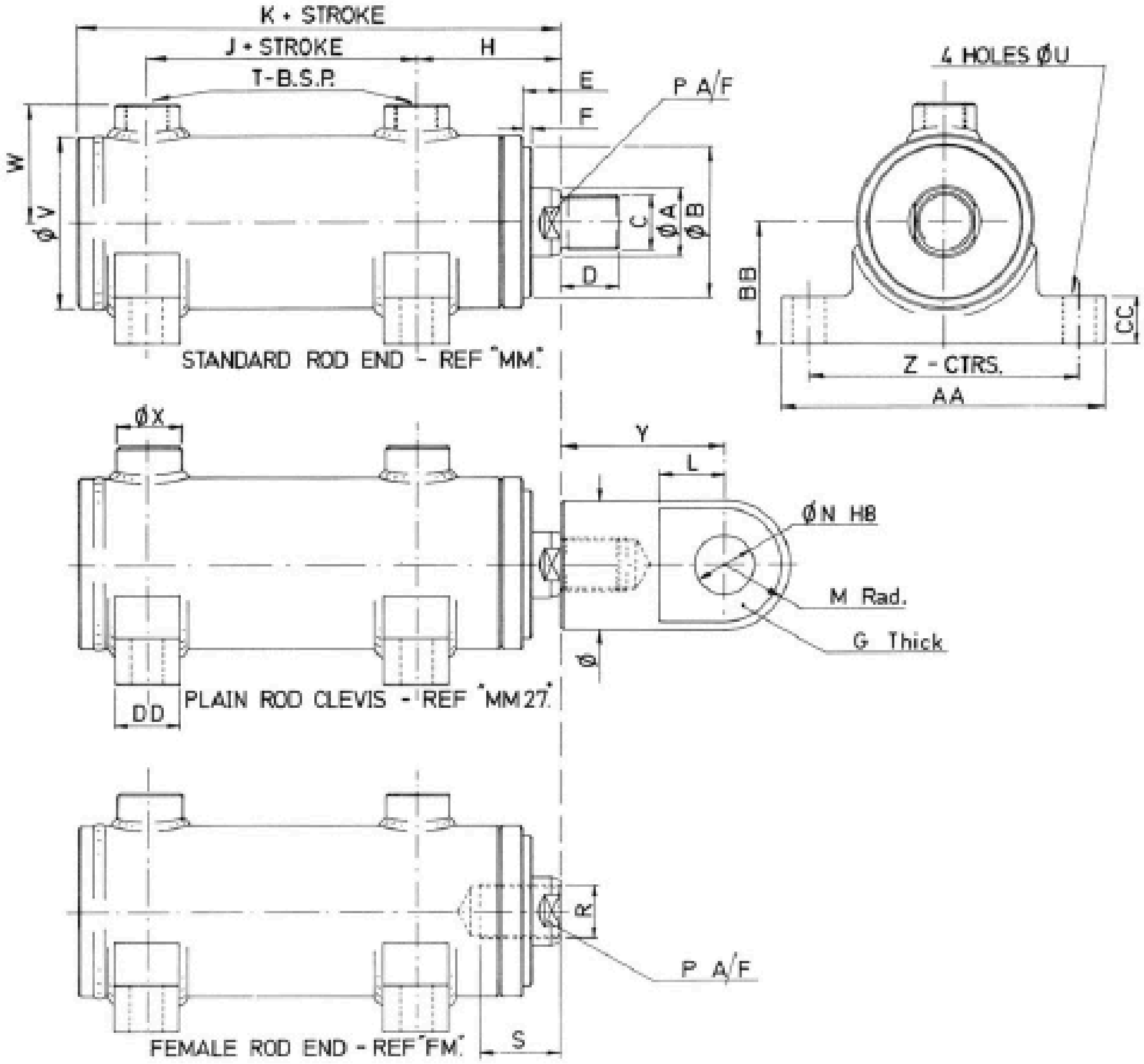
CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC
40	22	22	50	18x1.5	24	16	3	20	80	77	206	30	25	20	18	14x1.5	24	1/2"	9	50	40	30	75	106	70	20	120
50	28	28	60	22x1.5	30	18	4	25	83	90	225	40	32	25	25	18x1.5	30	1/2"	11	60	45	30	95	126	90	20	140
63	36	36	70	27x2.0	36	20	4	32	96	90	249	50	35	32	30	22x1.5	30	3/4"	14	75	58	40	115	145	110	25	170
80	45	45	85	33x2.0	45	22	4	40	118	87	282	60	45	40	40	27x2.0	45	3/4"	18	96	68	40	140	165	120	32	200
100	56	56	106	42x2.0	55	25	5	50	128	113	332	80	55	50	50	33x2.0	45	1"	22	120	85	55	175	200	150	32	240
125	70	70	132	52x2.0	70	28	5	63	150	113	357	85	77.5	63	60	42x2.0	55	1"	22	145	98	55	210	235	180	32	280
160	90	90	160	68x3.0	90	30	5	80	175	125	406	121	92.5	80	80	52x2.0	70	1 1/4"	22	190	123	60	270	320	220	40	370

Rear Clevis Mounting



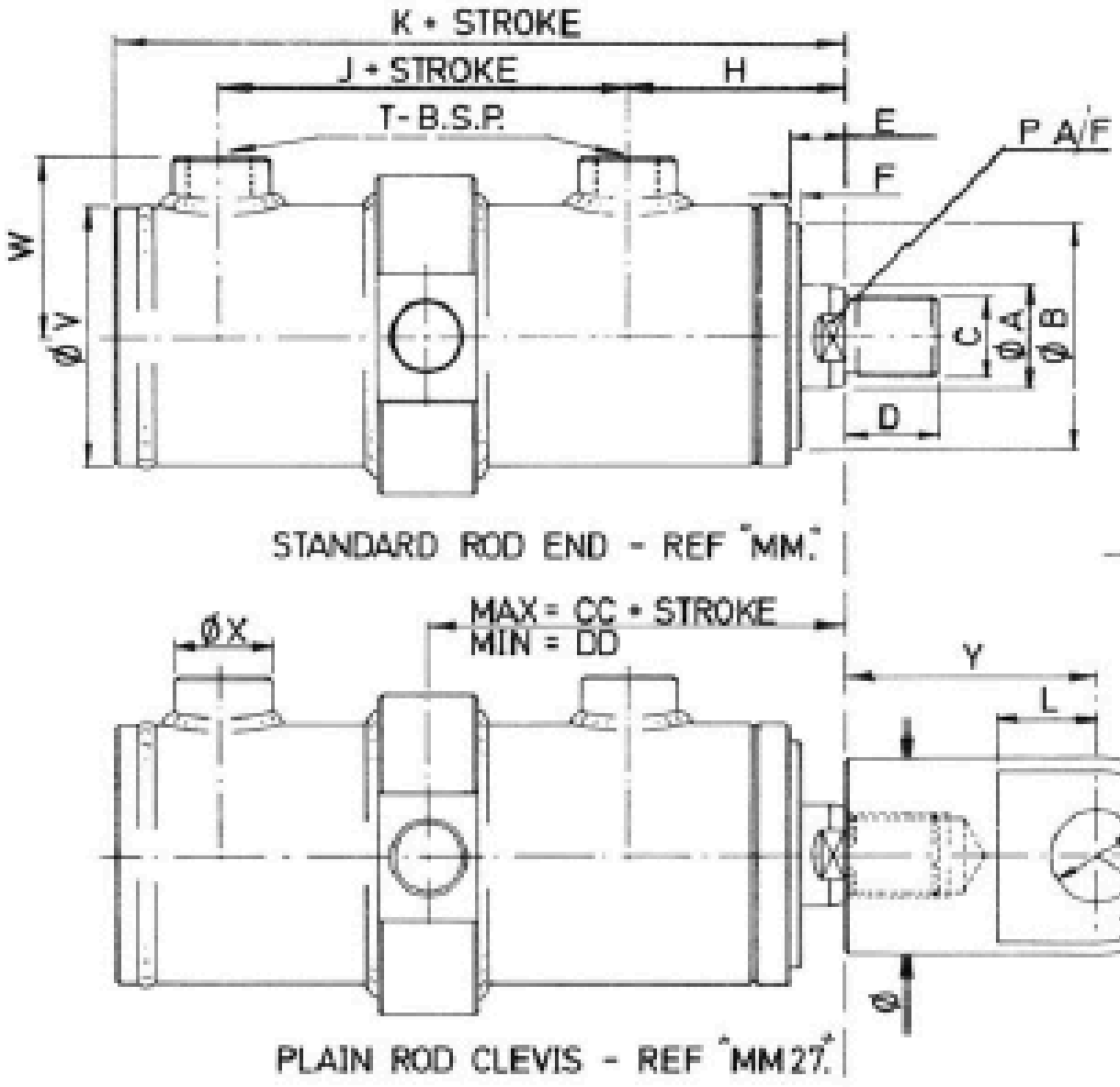
CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z
40	22	22	50	18x1.5	24	16	3	20	80	77	231	30	22	20	18	14x1.5	24	1/2"	74	50	40	30	306	25
50	28	28	60	22x1.5	30	18	4	25	83	90	257	40	27	25	25	18x1.5	30	1/2"	84	60	45	30	352	32
63	36	36	70	27x2.0	36	20	4	32	96	90	289	50	35	32	30	22x1.5	30	3/4"	103	75	58	40	404	35
80	45	45	85	33x2.0	45	22	4	40	118	87	332	60	40	40	40	27x2.0	45	3/4"	127	96	68	40	472	45
100	56	56	106	42x2.0	55	25	5	50	128	113	395	80	50	50	50	33x2.0	45	1"	154	120	85	50	570	55
125	70	70	132	52x2.0	70	28	5	63	150	113	428	85	65	63	60	42x2.0	55	1"	165	145	98	50	638	77.5
160	90	90	160	68x3.0	90	30	5	80	175	125	505	121	80	80	80	52x2.0	70	1 1/4"	205	190	123	60	775	92.5

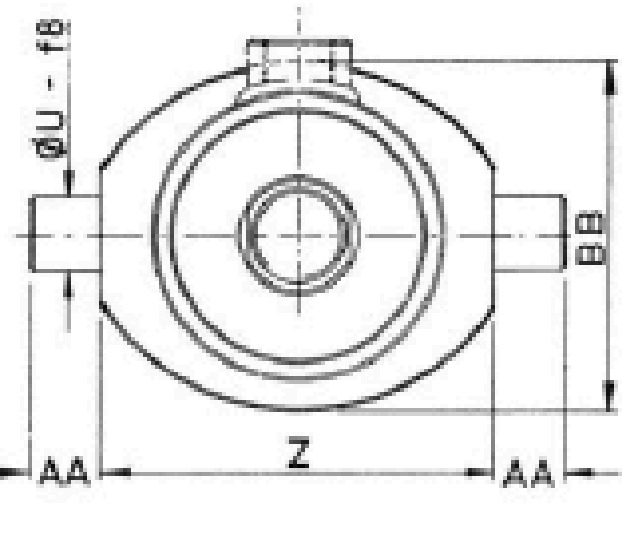
Foot Mounting



CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD
40	22	22	50	18x1.5	24	16	3	20	80	77	190	30	25	20	18	14x1.5	24	1/2"	9	50	40	30	75	120	150	45	15	25
50	28	28	60	22x1.5	30	18	4	25	83	90	205	40	32	25	25	18x1.5	30	1/2"	11	60	45	30	95	130	160	50	20	25
63	36	36	70	27x2.0	36	20	4	32	96	90	224	50	35	32	30	22x1.5	30	3/4"	14	75	58	40	115	160	190	60	25	25
80	45	45	85	33x2.0	45	22	4	40	118	87	250	60	45	40	40	27x2.0	45	3/4"	18	96	68	40	140	190	230	70	25	32
100	56	56	106	42x2.0	55	25	5	50	128	113	300	80	55	50	50	33x2.0	45	1"	18	120	85	55	175	210	250	80	30	32
125	70	70	132	52x2.0	70	28	5	63	150	113	325	85	77.5	63	60	42x2.0	55	1"	22	145	98	55	210	260	320	110	35	40
160	90	90	160	68x3.0	90	30	5	80	175	125	370	121	92.5	80	80	52x2.0	70	1 1/4"	30	190	123	60	270	315	390	120	40	70

Trunnion Mounting

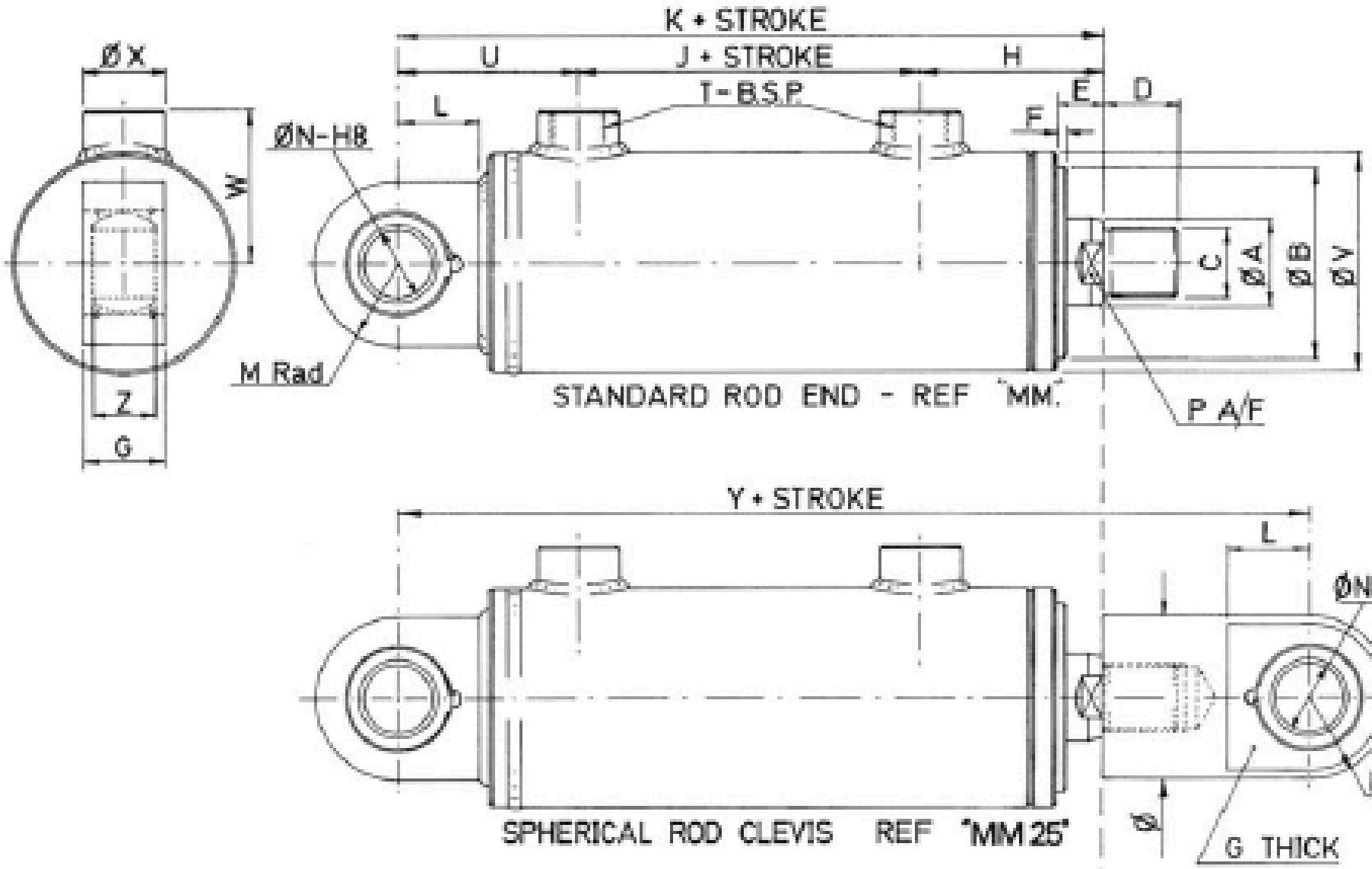




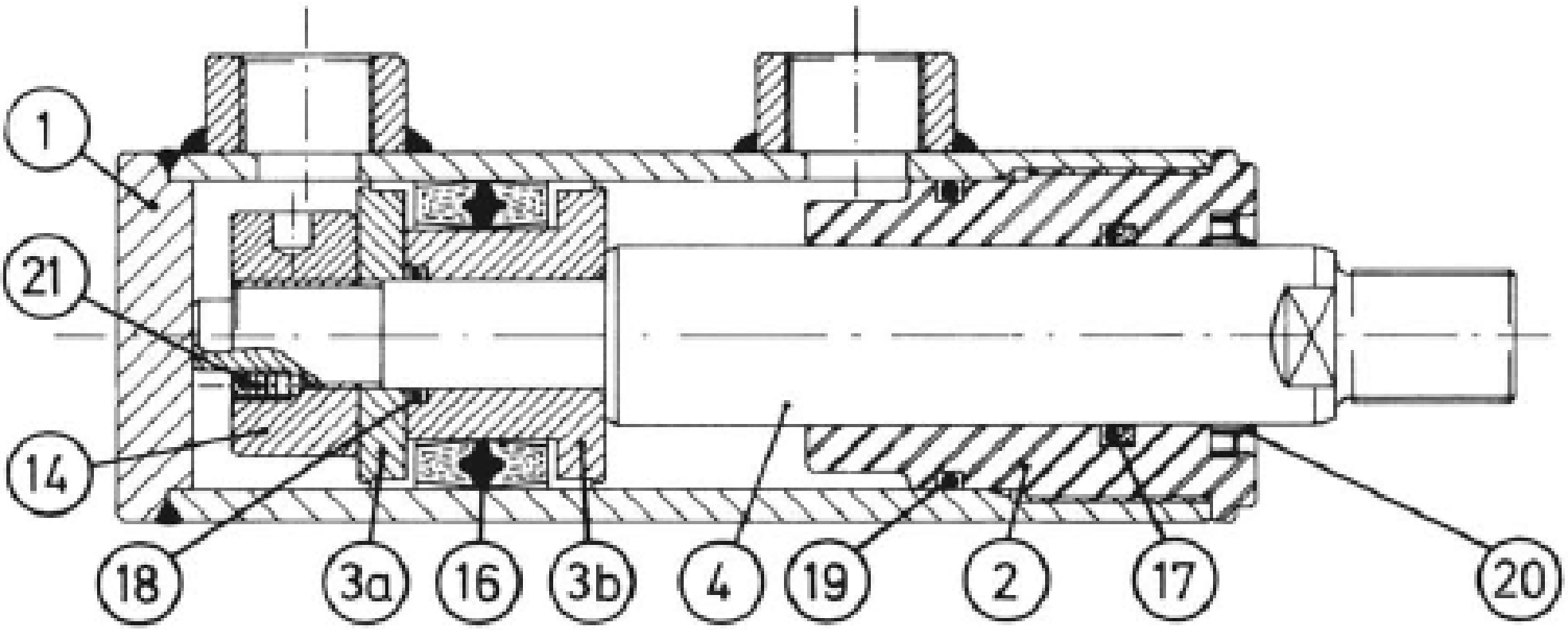
CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD
40	22	22	50	18x1.5	24	16	3	20	80	77	190	30	25	20	18	14x1.5	24	1/2"	20	50	40	30	75	90	16	76	115	122
50	28	28	60	22x1.5	30	18	4	25	83	90	205	40	32	25	25	18x1.5	30	1/2"	25	60	45	30	95	105	20	94	128	128
63	36	36	70	27x2.0	36	20	4	32	96	90	224	50	35	32	30	22x1.5	30	3/4"	32	75	58	40	115	120	25	120	131	151
80	45	45	85	33x2.0	45	22	4	40	118	87	250	60	45	40	40	27x2.0	45	3/4"	40	96	68	40	140	135	32	130	145	178
100	56	56	106	42x2.0	55	25	5	50	128	113	300	80	55	50	50	33x2.0	45	1"	50	120	85	55	175	160	40	160	166	203
125	70	70	132	52x2.0	70	28	5	63	150	113	325	85	77.5	63	60	42x2.0	55	1"	63	145	98	55	210	195	50	195	181	232
160	90	90	160	68x3.0	90	30	5	80	175	125	370	121	92.5	80	80	52x2.0	70	1 1/4"	80	190	123	80	270	240	63	240	205	270

Spherical Eye

– rear and rod



CYL BORE	ROD SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z
40	22	22	50	18x1.5	24	16	3	20	80	77	231	30	22	20	18	14x1.5	24	½"	74	50	40	30	306	16
50	28	28	60	22x1.5	30	18	4	25	83	90	257	40	32	25	25	18x1.5	30	½"	84	60	45	30	352	20
63	36	36	70	27x2.0	36	20	4	32	96	90	289	50	35	32	30	22x1.5	30	¾"	103	75	58	40	404	20.5
80	45	45	85	33x2.0	45	22	4	40	118	87	332	60	45	40	40	27x2.0	45	¾"	127	96	68	40	472	28
100	56	56	106	42x2.0	55	25	5	50	128	113	395	80	55	50	50	33x2.0	45	1"	154	120	85	50	570	35
125	70	70	132	52x2.0	70	28	5	63	150	113	428	85	77.5	63	60	42x2.0	55	1"	165	145	98	50	638	44
160	90	90	160	68x3.0	90	30	5	80	175	125	505	121	92.5	80	80	52x2.0	70	1¼"	205	190	123	60	775	55



1 CYLINDER WELD ASSEMBLY (c/w mounting)

2 GLAND

3a PISTON WASHER

3b PISTON HEAD

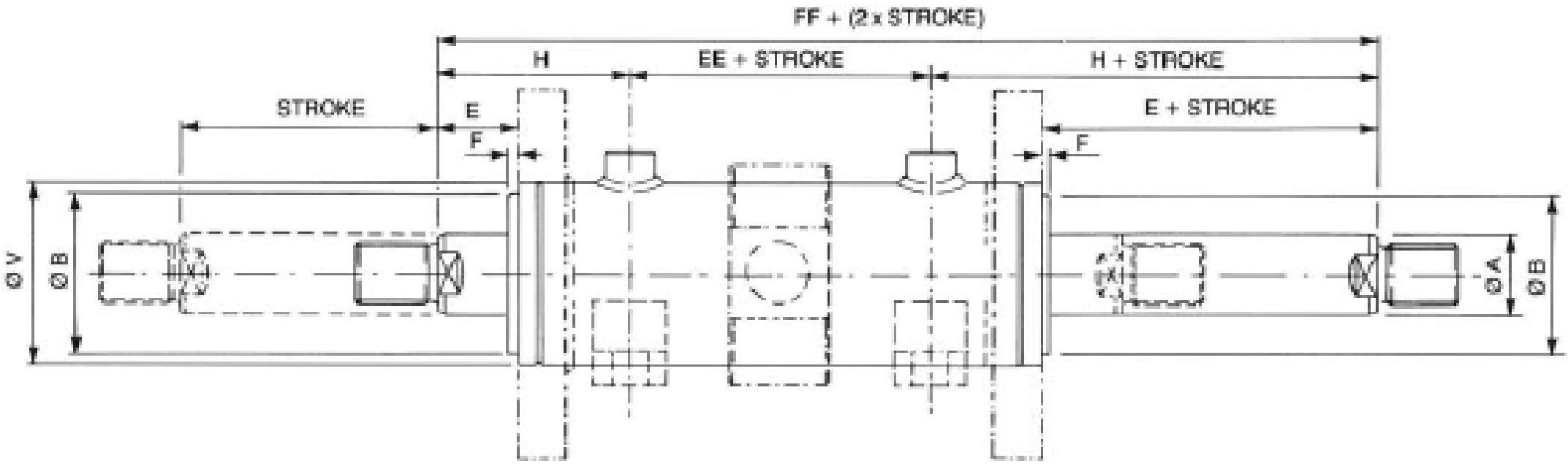
4 PISTON ROD

14 PISTON LOCK RING

21 PISTON LOCK SCREW

S.K. SEAL KIT (Comprises items 16 to 20)

Through Rod Cylinders



Through Rod Cylinders can be supplied with any of the mountings offered in the standard non cushioned range. Please refer to the applicable data sheet for dimensions.

CYL BORE	ROD SIZE	A	B	E	F	H	V	EE	FF
40	22	22	50	16	3	80	50	104	264
50	28	28	60	18	4	83	60	124	290
63	36	36	70	20	4	96	75	110	302
80	45	45	85	22	4	118	96	101	337
100	56	56	106	25	5	128	120	148	404
125	70	70	132	28	5	150	145	130	430
160	90	90	160	30	5	175	190	150	500

Specialised Cylinder Range

In addition to our range of standard cushioned and non cushioned hydraulic cylinders Denley design and manufacture hydraulic cylinders to meet your requirements!
Double acting, single acting, through rod, telescopic and rotary cylnders for oil hydraulics,
water hydraulics, pneumatic and gas operation
Supplying a wide cross section of industry including
offshore,marine, machine tool, nuclear, steel, food
processing, mobile plant and civil engineering
Sizes from 25mm bore to 750mm bore
Strokes up to 7500mm
Pressures up to 700 bar
Construction: Bolted screwed, welded, tie-rod
Integral proximity sensors, transducers, potentionmeters, counterbalance valves,
pilot operated check valve, servo valve mountings
Low fricition seals PTFE – Nitrile, Viton, EPDM
Piston rods: Carbon steel, stainless steel
Plating: Hard chrome,chrome on bronze, chrome on nickel
Wide range of mountings available – Flange, trunnion,
clevis, spherical bearings, full gimbal mounting
Special painting to suit your applicaiton including
shot blasting and epoxy paints