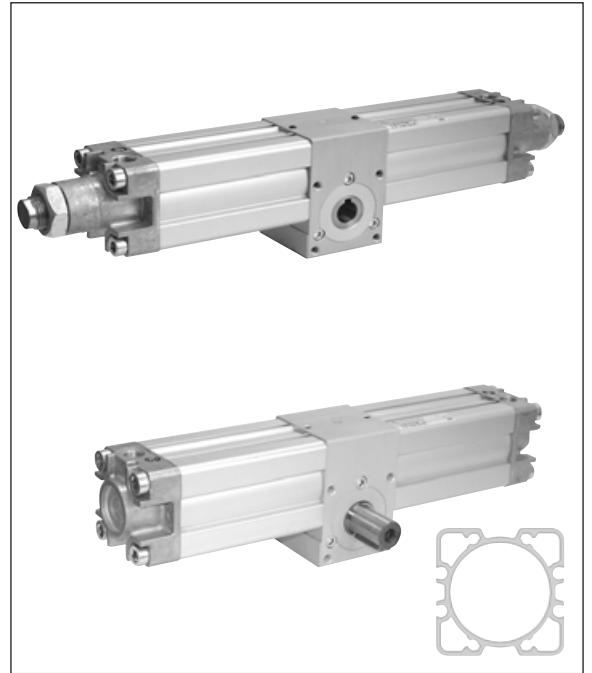


**Rotary Cylinders
Non-magnetic and
Magnetic Piston
Double Acting
Ø 32 to 125 mm**

- Suitable torques from 1,2 to 51,0 Nm/bar
- Rotation angles 90°, 180°, 270°, 360°
- Adjustable cushioning
- Male and female pinion available
- Switches can be mounted flush with the profile
- VDMA 24562 pitch to use standard VDMA mountings


Technical Data

Medium:

Compressed air, filtered, lubricated or non-lubricated

Operation:

M/162000 Double acting, adjustable cushioning
M/162000/M Double acting, magnetic piston,
adjustable cushioning

Operating Pressure:

1,5 to 10 bar

Operating Temperature:

-5°C* to +80°C max.

*Consult our Technical Service for use below +2°C

Cylinder Diameters:

32, 40, 50, 63, 80, 100, 125 mm

Rotation Angles:

90, 180, 270, 360°

Fixed +8°

Adjustable ±5°

Additional angles on request

Materials:

Profile barrel: Anodised aluminium

End covers: Pressure diecast aluminium

Central body: Anodised aluminium

Rack: Normalized steel

Pinion: Surface hardened high strength steel

Pinion bearings: Ball bearings (Ø 32 teflon bronze bearings)

Rack guide shoe: Acetal resin

Piston seals: Polyurethane

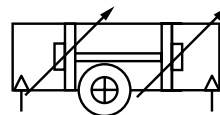
'O'-rings: Nitrile rubber

Ordering Examples

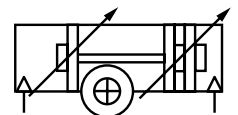
See page N 1.7.011.03

Mountings and Switches

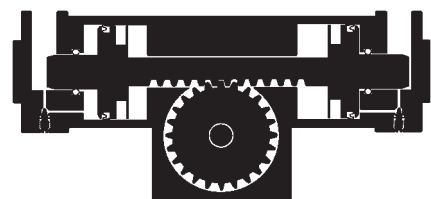
See page N 1.7.011.02 and .03



Non-magnetic piston



Magnetic piston





Cylinder Variants

Symbol	Model Non-magnetic piston	Symbol	Model Magnetic piston	Description	Dimensions Page
	M/162000/II		M/162000/MI	Rotary cylinders with fixed angle and male pinion	4
	M/162000/II X		M/162000/MIX	Rotary cylinders with fixed angle and female pinion	4
	M/162000/IE		M/162000/ME	Rotary cylinders with adjustable angle and male pinion	5
	M/162000/IE X		M/162000/MEX	Rotary cylinders with adjustable angle and female pinion	5

Model Codes

M/162***/***/***

Threads	Substitute
Metric threads, ports: ISO 228 (G 1/8 to G 1/2)	M

Series	Substitute
160000	16

Operation	Substitute
Double acting	2

Cylinder Diameters (mm)	Substitute
32	032
40	040
50	050
63	063
80	080
100	100
125	125

Standard Rotation Angle	Substitute
90°	90
180°	180
270°	270
360°	360

Pinion Variants	Substitute
Male pinion	None
Female pinion	X

Tolerances of Rotation Angle	Substitute
Adjustable ± 5°	E
Fixed +8°	I

Cylinder Variants	Substitute
Non-magnetic piston	I
Magnetic piston	M

Note: If option is not required, disregard option position within part number eg. M/162100/ME/90.

Mountings

Cylinder ∅	Style 'A' Page 6	Style 'G' Page 6	Style 'C' Page 6	Groove Key Page 7
32	QM/8032/35	QA/8032/22	QA/8032/21	M/P72816
40	QM/8032/35	QA/8040/22	QA/8040/21	M/P72816
50	QM/8050/35	QA/8050/22	QA/8050/21	M/P72816
63	QM/8050/35	QA/8063/22	QA/8063/21	M/P72816
80	QM/8080/35	QA/8080/22	QA/8080/21	M/P72816
100	QM/8080/35	QA/8100/22	QA/8100/21	M/P72816
125	QM/8125/35	QM/8125/22	QM/8125/21	M/P72816



Switches

Model	Cable	Plug (M8x1)
Reed		
	M/50/LSU/..	M/50/LSU/CP
	M/50/RAC/5V	—
Solid state	M/50/EAP/..	M/50/EAP/CP
	M/50/EAN/..	M/50/EAN/CP

Model	Solid State	Voltage V a.c.	V d.c.	Current Max.	Temperature °C	LED	Features	Cable/Plug	Cable Type	Plug-in Cable Straight	90°	Catalogue Page
M/50/LSU/*V	—	10 to 240	10 to 170	180 mA	-20° to +80°	●	—	2, 5, 10 m	PVC 2 x 0,25	—	—	N 4.3.005
M/50/LSU/5U	—	10 to 240	10 to 170	180 mA	-20° to +80°	●	—	5 m	PUR 2 x 0,25	—	—	N 4.3.005
M/50/RAC/5V	—	10 to 240	10 to 170	180 mA	-20° to +80°	—	Changeover	5 m	PVC 3 x 0,25	—	—	N 4.3.005
M/50/LSU/CP	—	10 to 60	10 to 75	180 mA	-20° to +80°	●	—	Plug M8x1	—	M/P73001/5	—	N 4.3.005
—	M/50/EAP/*V	—	10 to 30	150 mA	-20° to +80°	●	PNP	2, 5, 10 m	PVC 3 x 0,25	—	—	N 4.3.007
—	M/50/EAP/CP	—	10 to 30	150 mA	-20° to +80°	●	PNP	Plug M8x1	—	M/P73001/5	—	N 4.3.007
—	M/50/EAN/*V	—	10 to 30	150 mA	-20° to +80°	●	NPN	2, 5, 10 m	PVC 3 x 0,25	—	—	N 4.3.007
—	M/50/EAN/CP	—	10 to 30	150 mA	-20° to +80°	●	NPN	Plug M8x1	—	M/P73001/5	—	N 4.3.007

* Insert cable length

Full information on switches (technical data, cable materials, dimensions etc.) please refer to relevant catalogue pages

Ordering Examples

Rotary Cylinders

To order a standard 80 mm bore magnetic piston rotary cylinder with male pinion and a 90° fixed rotation angle (+8°)

quote: **M/162080/M/90**

Switches

To order a reed switch with LED and 2 m cable length

quote: **M/50/LSU/2V**

Mountings

To order a front flange mounting style 'G' for 80 mm bore cylinders quote: **QA/8080/22**

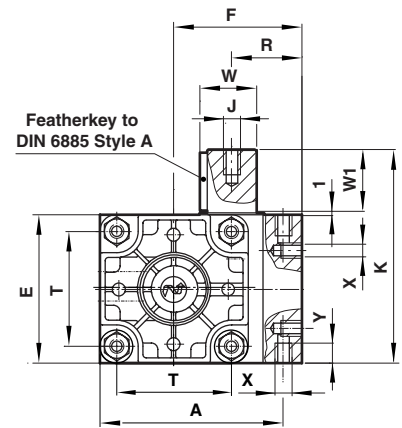
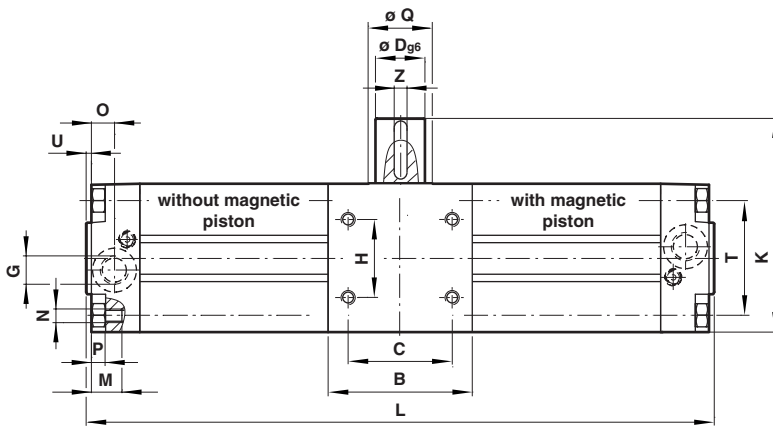
Theoretical Torque ● Cushioning

Cylinder Ø	Theoretical torque (Nm) (Nm) at 1 bar	Cushion length (mm)	Initial cushion volume (cm ³)
32	1,2	19	12,3
40	2,3	22	20,7
50	3,9	24	36
63	7,3	24	64
80	15,7	27	116
100	26,3	34	242
125	51,0	41	451



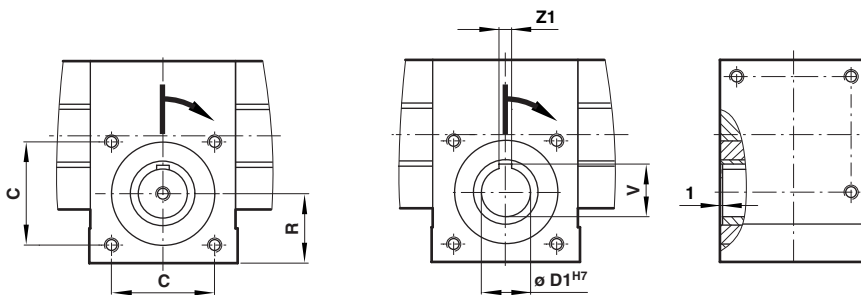
BASIC DIMENSIONS

M/162000/*I*/Angle – Rotary Cylinders with Fixed Angle (+8°)



Rotary Cylinders with Male Pinion

Rotary Cylinders with Female Pinion



Cylinder \varnothing	A	B	C	$\varnothing D$	$\varnothing D1$	E	F	G	H	J	K	M	N
32	71,5	50	33	14	14	50	46,5	G 1/8	18	M 5	81	18	M 6
40	82	60	40	14	14	60	54,5	G 1/4	22	M 5	91	18	M 6
50	94	70	50	19	19	65	60,5	G 1/4	25	M 6	106	18	M 8
63	110	75	60	24	19	75	71	G 3/8	35	M 8	116	17,5	M 8
80	142	99	80	28	24	99	93,5	G 3/8	50	M 8	150	21,5	M 10
100	156,5	115	80	38	28	115	99	G 1/2	60	M 10	166	21,5	M 10
125	188	125	90	38	28	140	118	G 1/2	70	M 10	191	32	M 12

Cylinder \varnothing	O	P	$\varnothing Q$	R	T	U	V	W	W1	X	Y	Z	Z1
32	13	4	25	25	32,5	3	16,3	16	30	M 6	10	5	5
40	15	4	25	30	38	3,5	16,3	16	30	M 6	10	5	5
50	18,5	5	30	32,5	46,5	3,5	21,8	21,5	40	M 8	13	6	6
63	19	5	30	37	56,5	4	21,8	27	40	M 8	13	8	6
80	19	-	45	50	72	4	27,3	31	50	M 10	16	8	8
100	18	-	50	54	89	4	31,3	41	50	M 10	16	10	8
125	20	-	60	60	110	6	31,3	41	50	M 12	20	10	8

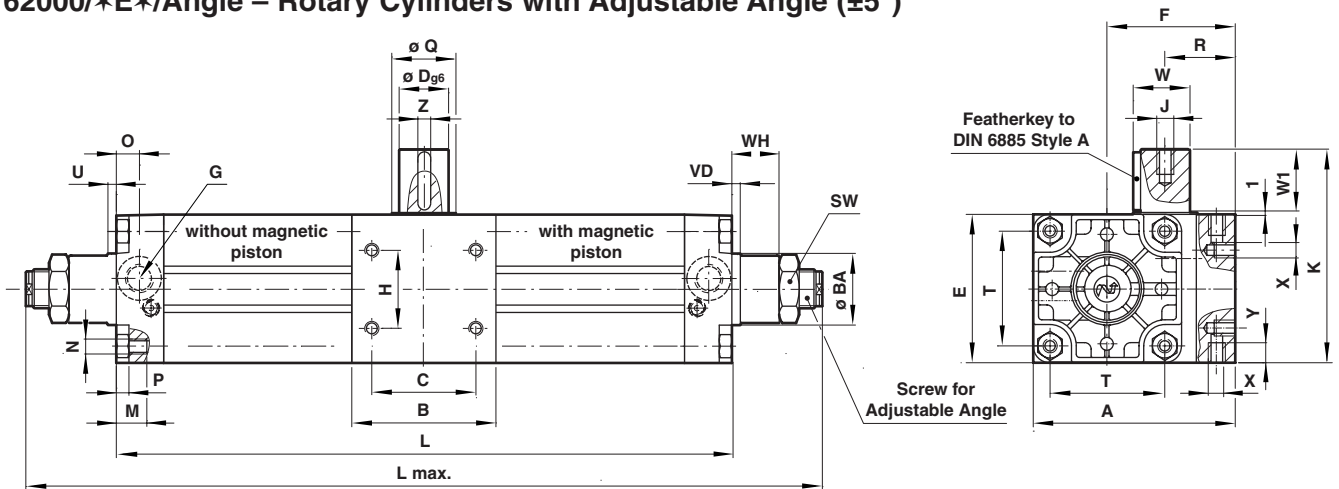
Cylinder \varnothing	32	40	50
Rotation	90°	90°	90°
L	227	266	282
Weight (kg)	1,20	1,80	2,91
Weight (kg)#	1,10	1,67	2,66
Cylinder \varnothing	63	80	100
Rotation	90°	90°	90°
L	331	396	414
Weight (kg)	4,21	8,87	13,26
Weight (kg)#	3,91	8,02	12,26
Cylinder \varnothing	125		
Rotation	90°		
L	483,5		
Weight (kg)	20,14		
Weight (kg)#	18,94		

for actuators with female pinion



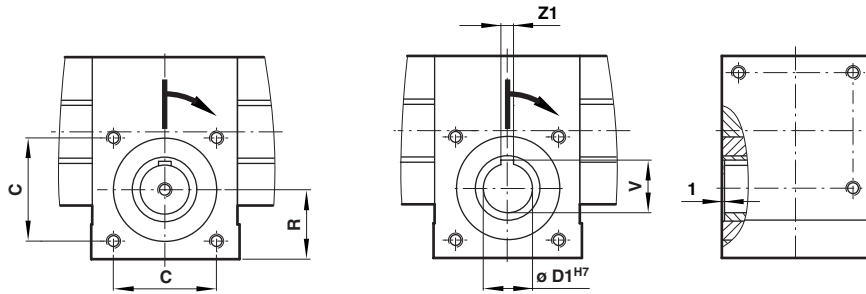
BASIC DIMENSIONS

M/162000/*E*/Angle – Rotary Cylinders with Adjustable Angle ($\pm 5^\circ$)



Rotary Cylinders with Male Pinion

Rotary Cylinders with Female Pinion



Cylinder \varnothing	A	B	\varnothing BA	C	\varnothing D	\varnothing D1	E	F	G	H	J	K	M	N	O
32	71,5	50	30	33	14	14	50	46,5	G 1/8	18	M 5	81	18	M 6	13
40	82	60	35	40	14	14	60	54,5	G 1/4	22	M 5	91	18	M 6	15
50	94	70	40	50	19	19	65	60,5	G 1/4	25	M 6	106	18	M 8	18,5
63	110	75	45	60	24	19	75	71	G 3/8	35	M 8	116	17,5	M 8	19
80	142	99	45	80	28	24	99	93,5	G 3/8	50	M 8	150	21,5	M 10	19
100	156,5	115	55	80	38	28	115	99	G 1/2	60	M 10	166	21,5	M 10	18
125	188	125	60	90	38	28	140	118	G 1/2	70	M 10	191	32	M 12	20

Cylinder \varnothing	P	\varnothing Q	R	SW	SW1	T	V	VD	W	W1	WH	X	Y	Z	Z1
32	4	25	25	30	17	32,5	16,3	6	16	30	20	M 6	10	5	5
40	4	25	30	32	19	38	16,3	6	16	30	22	M 6	10	5	5
50	5	30	32,5	41	24	46,5	21,8	6	21,5	40	27	M 8	13	6	6
63	5	30	37	41	24	56,5	21,8	6	27	40	29	M 8	13	8	6
80	–	45	50	46	27	72	27,3	6	31	50	33	M 10	16	8	8
100	–	50	54	46	27	89	31,3	6	41	50	36	M 10	16	10	8
125	–	60	60	55	32	110	31,3	15,5	41	50	45	M 12	20	10	8

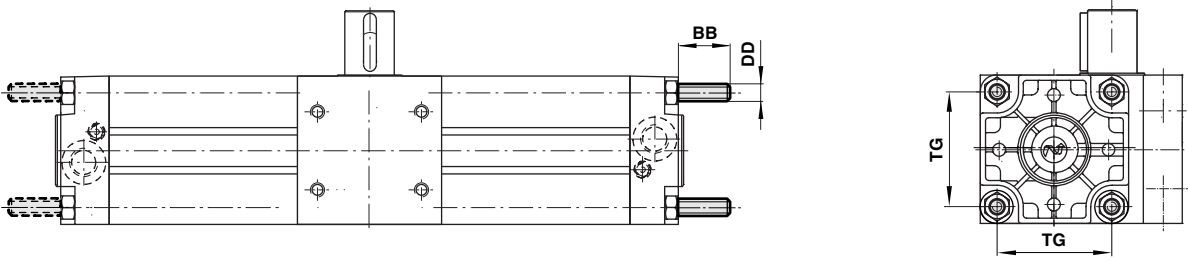
Cylinder \varnothing	32				40				50			
	90°	180°	270°	360°	90°	180°	270°	360°	90°	180°	270°	360°
L	221	268	315	362,5	259	316	372,5	429	275	338	401	464
L max.	303	350	397	444,5	350	407	463,5	519	379	442	505	568
Weight (kg)	1,50	1,64	1,78	1,92	2,20	2,40	2,60	2,80	3,46	3,80	4,14	4,48
Weight (kg)#	1,40	1,54	1,68	1,82	2,07	2,27	2,47	2,67	3,21	3,55	3,89	4,23
Cylinder \varnothing	63				80				100			
	90°	180°	270°	360°	90°	180°	270°	360°	90°	180°	270°	360°
L	323	398	472,5	555	388	487	586	685	406	513	620	727
L max.	431	506	580,5	655	514	613	712	811	540	647	754	861
Weight (kg)	4,76	5,27	5,78	6,29	9,62	10,83	11,92	12,82	14,26	15,51	16,76	17,01
Weight (kg)#	4,47	4,98	5,49	6,00	8,77	9,98	11,07	12,17	13,26	14,51	15,76	16,01
Cylinder \varnothing	125											
	90°	180°	270°	360°								
L	471,5	603,5	735,5	867,5								
L max.	631,5	763,5	895,5	1027,5								
Weight (kg)	22,04	24,29	26,54	28,79								
Weight (kg)#	20,84	23,09	25,34	27,59								

for actuators with female pinion

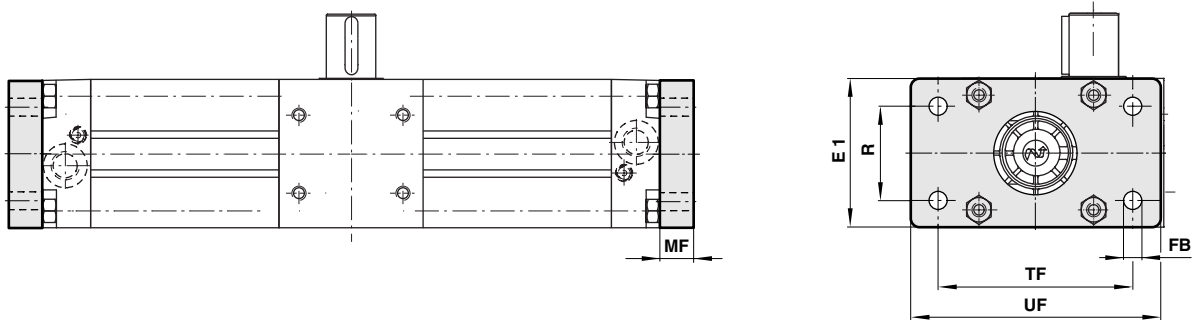


MOUNTINGS

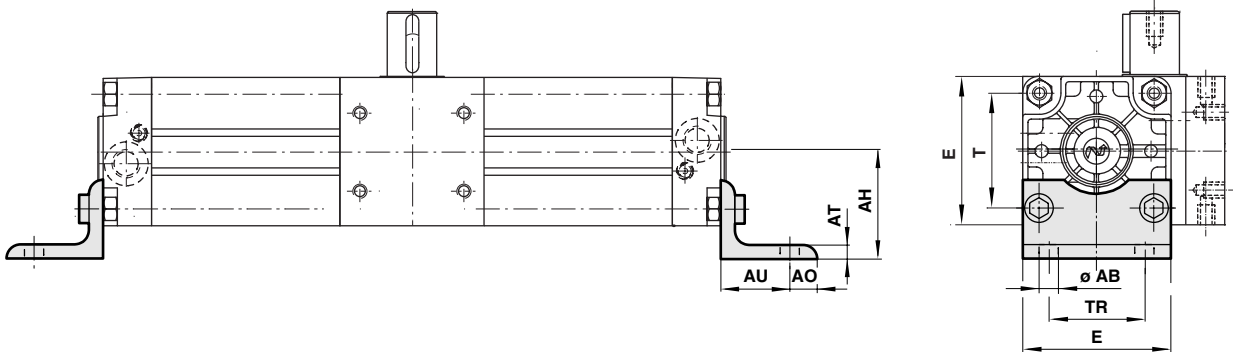
QM/8000/35 – Front or Rear Stud Mounting Style ‘A’ (Corresponds to DIN ISO 6431, Style MX1)



Q./8000/22 – Front Flange Mounting Style ‘G’ (Corresponds to DIN ISO 6431 and VDMA 24562 Part 2, Style MF1)



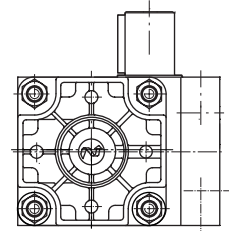
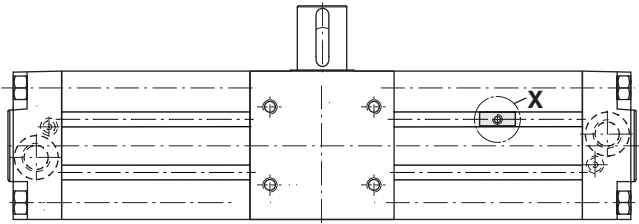
Q./8000/21 – Foot Mounting Style ‘C’ (Corresponds to DIN ISO 6431 and VDMA 24562 Part 2, Style MS1)



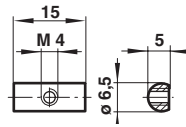
Cylinder \varnothing	\varnothing AB	AH	A0	AT	AU	BB	DD	E	E1	\varnothing FB
32	7	32	8	4	24	17	M 6	48	50	7
40	9	36	9	4	28	17	M 6	53	55	9
50	9	45	10	5	32	23	M 8	64	65	9
63	9	50	12	5	32	23	M 8	74	75	9
80	12	63	19	5	41	28	M 10	98	100	12
100	14	71	19	5	41	28	M 10	115	120	14
125	16	90	20	9	45	34	M 12	140	140	16
Cylinder \varnothing	MF	R	TF	TG	TR	UF	Style ‘A’	Style ‘B’, ‘G’	Style ‘C’	
32	10	32	64	32,5	32	80	0,02 kg	0,25 kg	0,15 kg	
40	10	36	72	38	36	90	0,02 kg	0,35 kg	0,18 kg	
50	12	45	90	46,5	45	110	0,05 kg	0,70 kg	0,30 kg	
63	12	50	100	56,5	50	125	0,05 kg	0,80 kg	0,39 kg	
80	16	63	126	72	63	154	0,08 kg	1,35 kg	0,80 kg	
100	16	75	150	89	75	186	0,08 kg	2,20 kg	0,95 kg	
125	20	90	180	110	90	224	0,14 kg	1,70 kg	2,40 kg	



M/P72816 – Groove Key
Weight: 0,010 kg



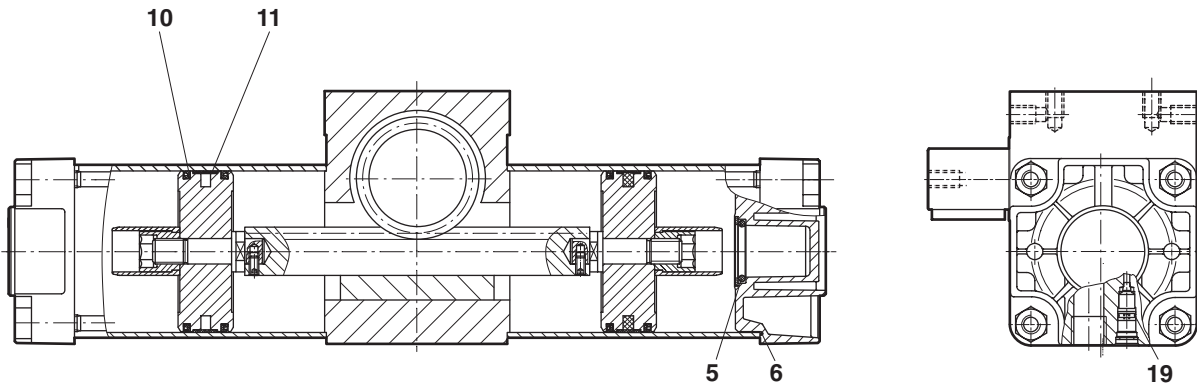
Section X





SPARES

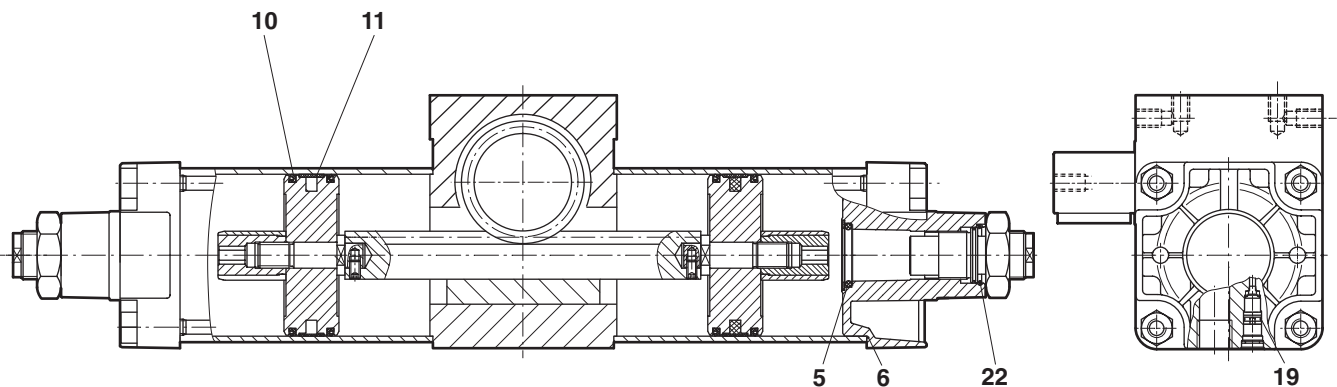
Rotary Cylinders with Fixed Angle (+8°)



Cylinder Ø	Model	Spares kit	Comprising Item	Description	Quantity
32	M/162032/MI•/Angle	M/162032/00	5	Cushion seal	2
40	M/162040/MI•/Angle	M/162040/00	6	Sealing ring	2
50	M/162050/MI•/Angle	M/162050/00	10	Piston seal	4
63	M/162063/MI•/Angle	M/162063/00	11	Wear ring	2
80	M/162080/MI•/Angle	M/162080/00	19	'O'-ring	2
100	M/162100/MI•/Angle	M/162100/00			
125	M/162125/MI•/Angle	M/162125/00			

Note: Please quote the cylinder type number when ordering spares kits.

Rotary Cylinders with Adjustable Angle (±5°)



Cylinder Ø	Model	Spares kit	Comprising Item	Description	Quantity
32	M/162032/ME•/Angle	M/162032/00	5	Cushion seal	2
40	M/162040/ME•/Angle	M/162040/00	6	Sealing ring	2
50	M/162050/ME•/Angle	M/162050/00	10	Piston seal	4
63	M/162063/ME•/Angle	M/162063/00	11	Wear ring	2
80	M/162080/ME•/Angle	M/162080/00	19	'O'-ring	2
100	M/162100/ME•/Angle	M/162100/00	22	'O'-ring	2
125	M/162125/ME•/Angle	M/162125/00			

Note: Please quote the cylinder type number when ordering spares kits

Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under 'Technical Data'.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.