

Rotary vane actuators
Double acting
5,78 to 241,73 Nm
Torque at 6 bar

High torque from compact units

Rotation angles from 90° to 270°

Suitable for torques from 1,23 to 402,46 Nm



Technical data

Medium:

Compressed air, filtered, lubricated or non-lubricated

Wirkungsweise:

Double acting rotary vane with buffer cushioning

M/60285 to M/60288 single vane

M/60285/TI to M/60288/TI double vane

Operating pressure:

2 to 10 bar

Operating temperature:

+5 to +60°C

Rotation angle:

90°, 180°, 270° single vane

90° double vane

Rotation angle tolerance:

0° to +3°

Other features:

Featherkeys supplied as standard parts

Materials:

Housing: cast aluminium

Shaft: steel

Shaft bearings: sintered bronze

Seals: nitrile rubber

Ordering example

See page 2

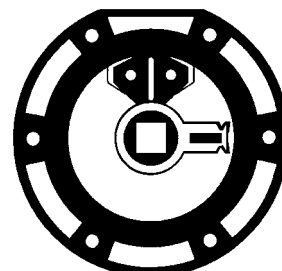
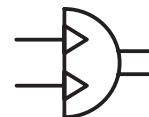
Mountings and switches

See page 3

Accessories

Hydro-cushion

See page 3

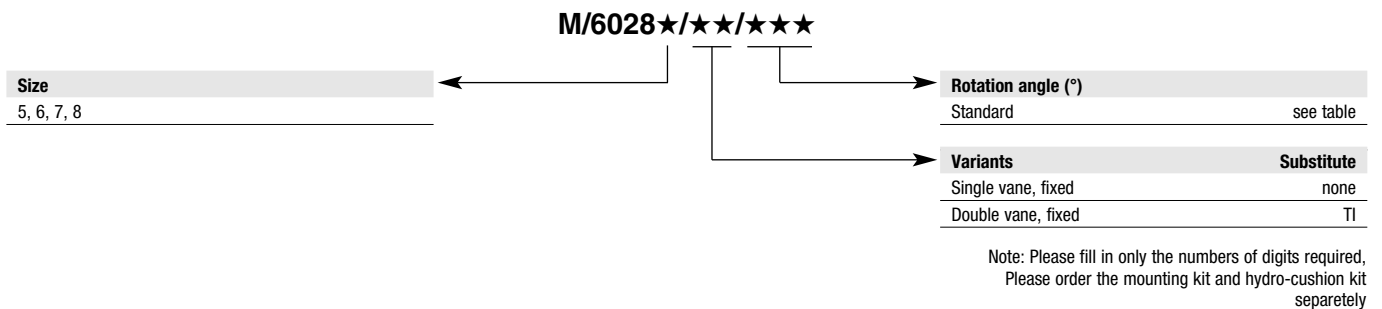


Standard variants

Models with fixed rotation angles

Model	Single vane	Double vane	Rotation angle		
			90°	180°	270°
M/60285	•		•	•	•
M/60285/TI		•	•		
M/60286	•		•	•	•
M/60286/TI		•	•		
M/60287	•		•	•	•
M/60287/TI		•	•		
M/60288	•		•	•	•
M/60288/TI		•	•		

Options selector



Ordering example

To order a rotary vane actuator with torque up to 17 Nm at 6 bar and a 90° rotation quote: **M/60286/90**

To order a rotary vane actuator with torque up to 241 Nm at 6 bar and a 90° rotation quote: **M/60288/TI/90**

Please order switches separately.

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.

Mountings

	B and G	C	Adaptor for Switches
			
Type	see page 6	see page 6	
M/60285, .../TI	QM/60285/22	QM/60285/21	M/P72478
M/60286, .../TI	QM/60286/22	QM/60286/21	M/P72478
M/60287, .../TI	–	QM/60287/21	M/P72478
M/60288, .../TI	–	QM/60288/21	M/P72478

Switches

Type	With cable		With connector		Temperature °C	LED	Features	Cable/ Connector length	Cable type	Cable with Connector	Datasheet
	Reed	Solid state	Voltage V a.c.	V d.c.							
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/UK 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/UK 4.3.005
TM/50/RAU/2S	–	–	10 to 240	10 to 170	180 mA	-20 to +150	– –	2 m	Silicone 2 x 0,25	–	N/UK 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/UK 4.3.005
M/50/LSU/CP	–	–	10 to 60	10 to 75	180 mA	-20 to +80	• Plug M8x1	5 m	PVC 3 x 0,25	M/P73001/5	N/UK 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/UK 4.3.007
–	M/50/EAP/CP	–	–	10 to 30	150 mA	-20 to +80	• PNP, Plug M8x1	5 m	PVC 3 x 0,25	M/P73001/5	N/UK 4.3.007
–	M/50/EAP/CC	–	–	10 to 30	150 mA	-20 to +80	• PNP, Plug M12x1	5 m	PVC 3 x 0,25	M/P34614/5	N/UK 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/UK 4.3.007
–	M/50/EAN/CP	–	–	10 to 30	150 mA	-20 to +80	• NPN, Plug M8x1	5 m	PVC 3 x 0,25	M/P73001/5	N/UK 4.3.007

* Please insert cable length
Further information (technical data, cable material, dimensions) see datasheet.

Theoretical torques, forces, air consumption, weights of actuators

Model	Theoretical torques at 6 bar (Nm)	Permissible forces*1)		Permissible rotation energy*2) (Nm)	Maximum frequency*3)			Air consumption (cm³)			Weight (kg)		
		axial (N)	radial (N)		90°	180°	270°	90°	180°	270°	90°	180°	270°
M/60285	5,8	44,1	588	49 x 10 ⁻³	180	90	60	51	51	61	0,82	0,79	0,73
M/60285/TI	12,8				180			42			0,82		
M/60286	18,0	88,2	1176	225,4 x 10 ⁻³	120	78	48	146	146	179	2,00	1,90	1,70
M/60286/TI	41,5				120			127			2,00		
M/60287	34,5	147	1960	1078 x 10 ⁻³	90	60	42	244	283	352	3,70	3,70	3,70
M/60287/TI	83,0				90			244			4,30		
M/60288	123,0	490	4900	3920 x 10 ⁻³	66	45	30	754	869	1036	12,70	12,20	11,20
M/60288/TI	247,0				66			754			12,70		

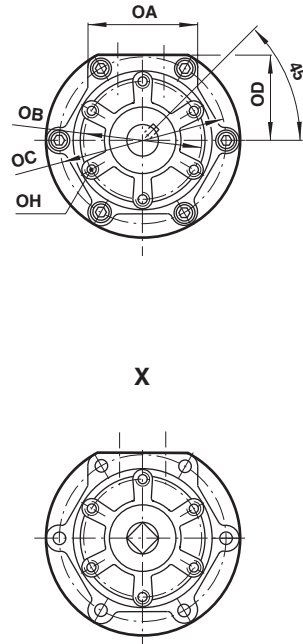
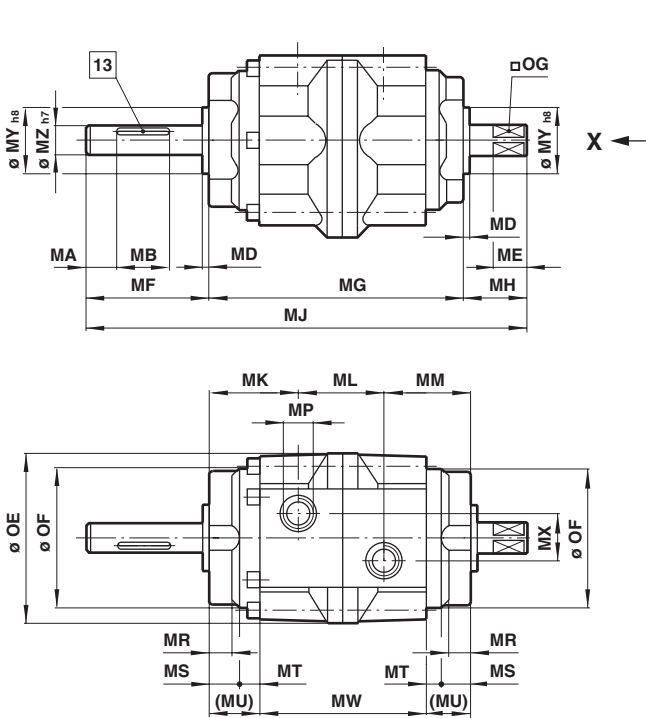
*1) Permissible load on rotary vane shaft
*2) Permissible rotational energy in Nm which may be applied to shaft. It can be calculated as follows: Permissible rotational energy: 1/2 Iw 2, I=Angular moment, w=Mean angular velocity
*3) Maximum frequency at 5 bar pressure, no load

Hydro-cushion

Model	Minimum operating pressure (bar)	Operating temperature (C°)	Load range (kg x cm²)	Maximum absorption energy (Nm)	Maximum absorption energy per minute (Nm/min)	Absorbing angle (°)	Maximum collision angular velocity (°/s)	Weight (kg)
QM/60285/60	3	+5 to +50	981	2,9	20	11	850	0,24
QM/60286/60	3	+5 to +50	2942	9,8	71	12	750	0,42
QM/60287/60	3	+5 to +50	5884	19,6	137	14	650	0,78

Basic dimensions

Rotation start point



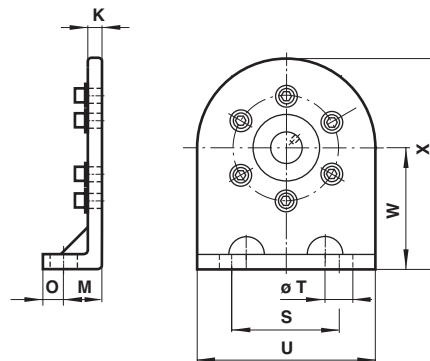
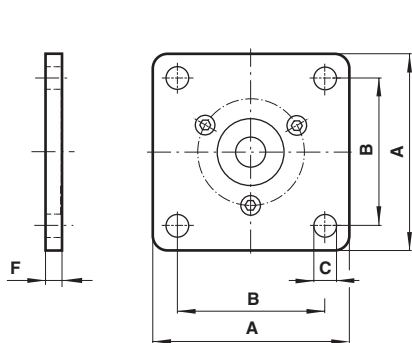
- 3** Rotation angle 90° +3°
- 4** Rotation angle 180° +3°
- 5** Rotation angle 270° +3°
- 7** Rotation start point
- 13** Featherkey

Model	MA	MB	MD	ME	MF	MG	MH	MJ	MK	ML	MM	MP	MR	MS	MT	MU
M/60285/.../TI	5	20	2,5	13	39,5	86	19,5	145	29	28	29	G1/8	11	14	6	20
M/60286/.../TI	5	36	3	16	53,5	103	23,5	180	34,5	34	34,5	G1/4	10,5	15,5	8	23,5
M/60287/.../TI	5	40	3,5	22	65	125	30	220	41,5	4	41,5	G3/8	13	17,5	10	27,5
M/60288/.../TI	10	40	4,5	35	69,5	171	44,5	285	53,5	64	53,5	G1/2	14,5	21	11,5	32,5
Model	MW	MX	Ø MY h8	Ø MZ h7	OA	Ø OB	Ø OC	OD	Ø OE	Ø OF	OG -0,1	OH	Featherkey	kg		
M/60285/.../TI	46	16	25	12	44	45	68	36	79	58	10	M6 x 9*1)	4 -0,03 x 2,5 + 0,1*1)	0,82		
M/60286/.../TI	56	24	30	17	61	70	97	51	110	85,5	13	M8 x 12*1)	5 -0,03 x 3 + 0,1*1)	2,0		
M/60287/.../TI	70	32	45	25	78	80	125	66	141,5	110	19	M10 x 15*1)	7 -0,038 x 4 + 0,2*1)	4,3		
M/60288/.../TI	106	44	70	40	110	120	173	90	196	152	32	M12 x 18*1)	12 -0,043 x 5 + 0,2*1)	12,7		

*1) deep

Rear flange B, front flange G

Foot C



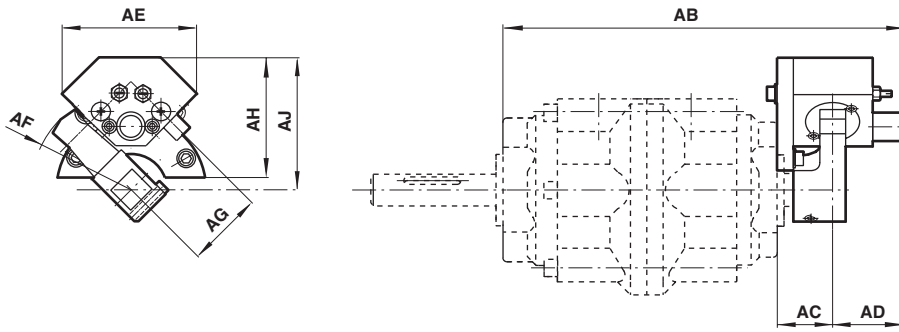
Model	A	B	Ø C	E	Rotation angle *2)	kg
QM/60285/22	80	64	7	4,5	60°	0,20
QM/60286/22	110	88	9	6	60°	0,51

*2) The mountings can be rotated through the angle shown.

Model	K	M	O	S	Ø T	U	W	X	Rotation angl *2)	kg
QM/60285/21	4,5	25	10	55	11	75	45	82,5	60°	0,26
QM/60286/21	10	28	12	80	13	110	65	115	60°	1,14
QM/60287/21	12	32	13	100	15	140	80	135	60°	1,24
QM/60288/21	15	35	15	140	15	200	110	200	60°	4,45

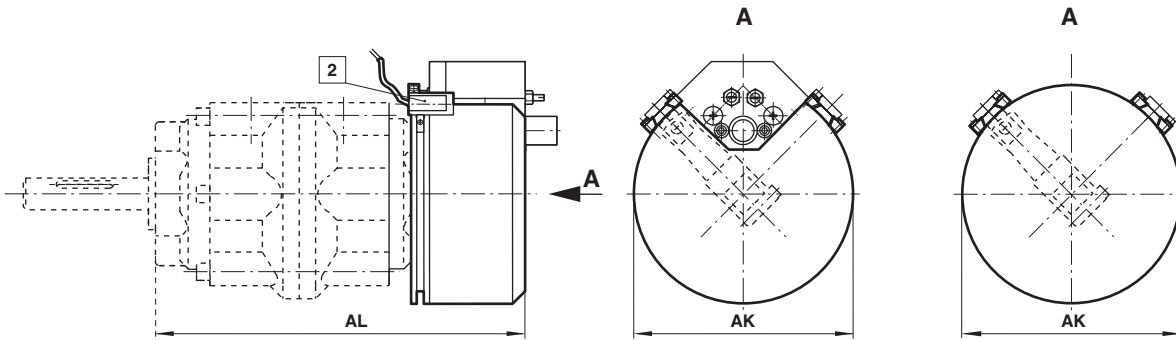
*2) The mountings can be rotated through the angle shown.

Hydro-cushion kit



Model	AB	AC	AD	AE	AF	AG	AH	AJ
QM/60285/60	136,5	20,5	30	56	38	34	50	54
QM/60286/60	159,5	22,5	34	80	51	46	62	71,5
QM/60287/60	187,5	25,5	37	95	68	62	87	96

Brackets for switches M/50



2 Switch

Brackets for 2 switches without hydro-cushion	Brackets for 2 switches with hydro-cushion	Ø AK	AL
QM/60285/22/64	QM/60285/23/64	85	123
QM/60286/22/64	QM/60286/23/64	111	143
QM/60287/22/64	QM/60287/23/64	145	169

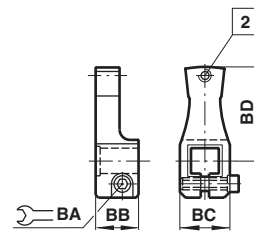
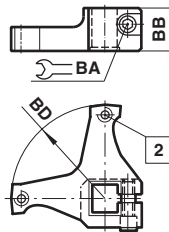
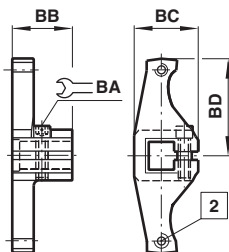
Claw

(for hydro-cushion and magnetic sensing)

Rotation angle 90°

Rotation angle 180°

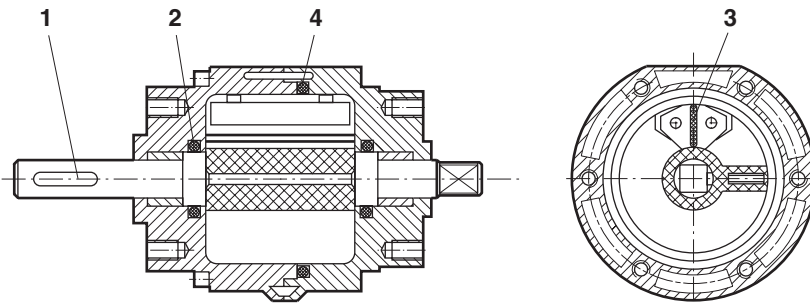
Rotation angle 270°



2 M 4 (6 mm deep)

Model	Actuator	BA	BB	BC	BD
M/P70088 (90°), M/P70089 (180°), M/P70090 (270°)	M/60285	4	18	23	38
M/P70091 (90°), M/P70092 (180°), M/P70093 (270°)	M/60286	5	20	28	51
M/P70094 (90°), M/P70095 (180°), M/P70096 (270°)	M/60287	6	23,5	40	68

Spares



Model	Spares kit	Model	Spares kit
M/60285	QM/60285/00	M/60285/TI	QM/60285/TI/00
M/60286	QM/60286/00	M/60286/TI	QM/60286/TI/00
M/60287	QM/60287/00	M/60287/TI	QM/60287/TI/00
M/60288	QM/60288/00	M/60288/TI	QM/60288/TI/00

() for .../TI

Comprising: Position	Description	Quantity
1	Shaft with rotary vane	1
2	'O'-ring	2
3	Seal	1 (2)
4	'O'-ring	1