Rotary Vane Actuators
Double Acting
5,78 to 241,73 Nm
Torque at 6 bar

- **Suitable for torques from 1,23 to 402,46 Nm**
- **Rotation angles from 90° to 270°**
- **High torque from compact units**

Technical Data

Medium:
Compressed air, filtered, lubricated or non-lubricated

Operation:
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°C 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:
Cast aluminium housing, steel shaft, sintered bronze shaft bearings, nitrile rubber seals.

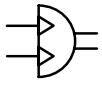
Ordering Information

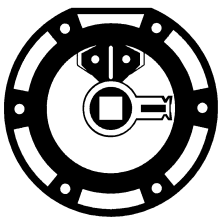
To order a Rotary Vane Actuator with torque up to 17 Nm at 6 bar and a 90° rotation quote: M/60286/90

To order a Rotary Vane Actuator with torque up to 241 Nm at 6 bar and a 90° rotation quote: M/60288/TI/90

To order mounting brackets refer to appropriate actuator mounting table.
Order magnetically operated switches separately.

Accessories	See page
Switches M/40	N **4.3.**041.01
Switches M/41, M/42	N **4.3.**044.01
Hydro-cushion	N **1.7.**035.02





Theoretical Torques • Forces • Air Consumption • Weights of Actuator and Mountings (kg)

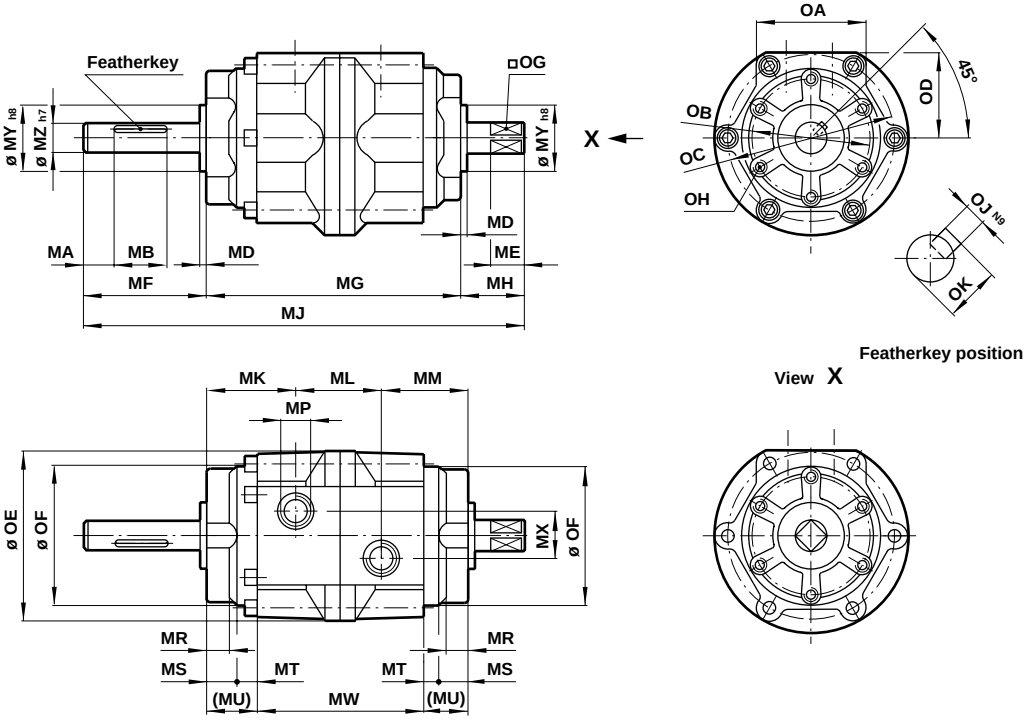
Model	Theoretical torques at 6 bar (Nm)	Permissable forces* radial (N)	axial (N)	Permissable rotation energy** (Nm)	Maximum frequency*** (1/min) 90°	180°	270°	Air consumption (cm^3) 90°	180°	270°	Weight (kg) 90°	180°	270°	Style 'B','G'	Style 'C'
M/60285	5,78	588	44,1	49 x 10^{-3}	180	90	60	51	51	61	0,82	0,79	0,73	0,20	0,26
M/60285/TI	12,55				180			42			0,82				
M/60286	17,65	1176	88,2	225,4 x 10^{-3}	120	80	50	146	146	179	2,00	1,90	1,70	0,51	1,14
M/60286/TI	40,69				120			127			2,00				
M/60287	33,83	1960	147	1078 x 10^{-3}	90	60	40	244	283	352	3,70	3,70	3,70	-	1,24
M/60287/TI	81,39				90			244			4,30				
M/60288	120,91	4900	490	3920 x 10^{-3}	65	45	30	754	869	1036	12,70	12,20	11,20	-	4,45
M/60288/TI	241,73				65			754			12,70				

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

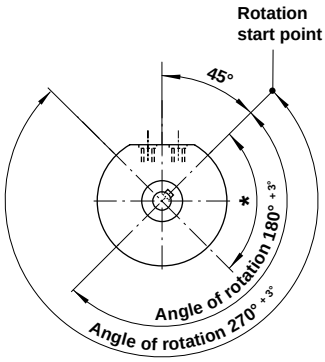
Hydro-cushion

Model	Minimum operating pressure (bar)	Operating temperature (C°)	Load range (kg x cm^2)	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	98,1	2,9	20	11	850	0,24
QM/60286/60	3	+5 to +50	294,2	9,8	71	12	750	0,42
QM/60287/60	3	+5 to +50	588,4	19,6	137	14	650	0,78

Basic Dimensions



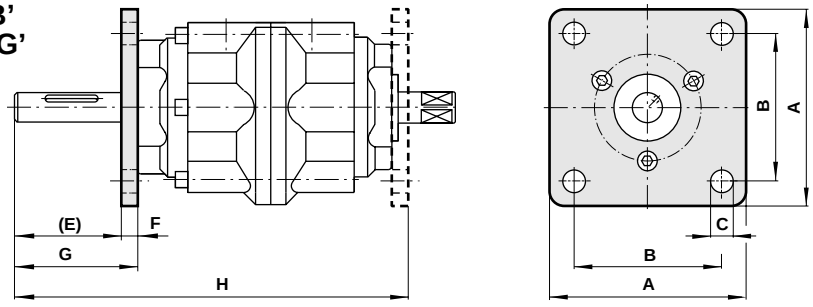
Rotation Start Point



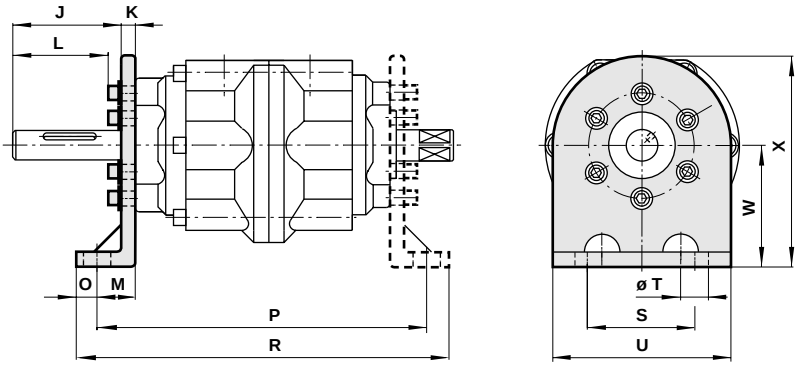
* Angle of rotation 90° +3°

Model	MA	MB	MD	ME	MF	MG	MH	MJ	MK	ML
60285	5	20	2,5	13	39,5	86	19,5	145	29	28
60286	5	36	3	16	53,5	103	23,5	180	34,5	34
60287	5	40	3,5	22	65	125	30	220	41,5	42
60288	10	40	4,5	35	69,5	171	44,5	285	53,5	64
Model	MM	MP	MR	MS	MT	MU	MW	MX	∅ MY h 8	∅ MZ h 7
60285	29	G 1/8	11	14	6	20	46	16	25	12
60286	34,5	G 1/4	10,5	15,5	8	23,5	56	24	30	17
60287	41,5	G 3/8	13	17,5	10	27,5	70	32	45	25
60288	53,5	G 1/2	14,5	21	11,5	32,5	106	44	70	40
Model	OA	∅ OB	∅ OC	OD	∅ OE	∅ OF	❑ OG - 0,1	OH	OJ N 9	OK
60285	44	45	68	36	79	58	10	M 6 - 9 deep	4	13,5
60286	61	70	97	51	110	85,5	13	M 8 - 12 deep	5	19
60287	78	80	125	66	141,5	110	19	M 10 - 15 deep	7	28
60288	110	120	173	90	196	152	32	M 12 - 18 deep	12	43

Rear Flange Mounting Style ‘B’
Front Flange Mounting Style ‘G’



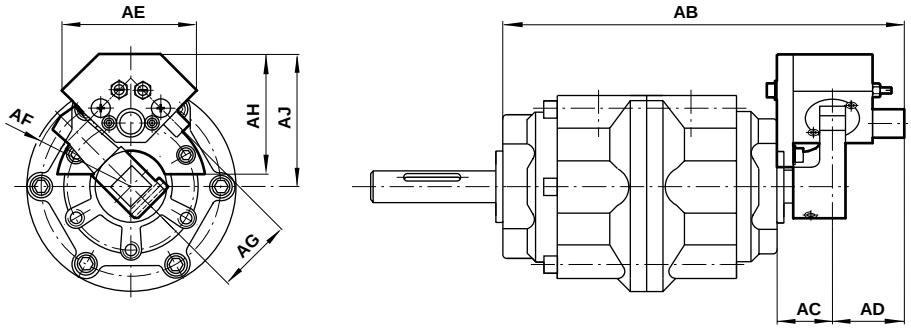
C-Foot Mounting Style ‘C’



Model ‘B’, ‘G’	QM/60285/22	QM/60286/22	Model ‘C’	QM/60285/21	QM/60286/21	QM/60287/21	QM/60288/21
Actuator	60285	60286	Actuator	60285	60286	60287	60288
A	80	110	J	35	43,5	53	54,5
B	64	88	K	4,5	10	12	15
∅ C	7	9	L	27,5	33,5	40,5	39,5
E	35	47,5	M	25	28	32	35
F	4,5	6	O	10	12	13	15
G	39,5	53,5	P	136	159	189	241
H	130	162,5	R	156	183	215	271
Rotation *	60°	60°	S	55	80	100	140
			∅ T	11	13	15	15
			U	75	110	140	200
			W	45	65	80	110
			X	82,5	115	135	185
			Rotation *	60°	60°	60°	60°

* The mountings can be rotated through the angle shown.

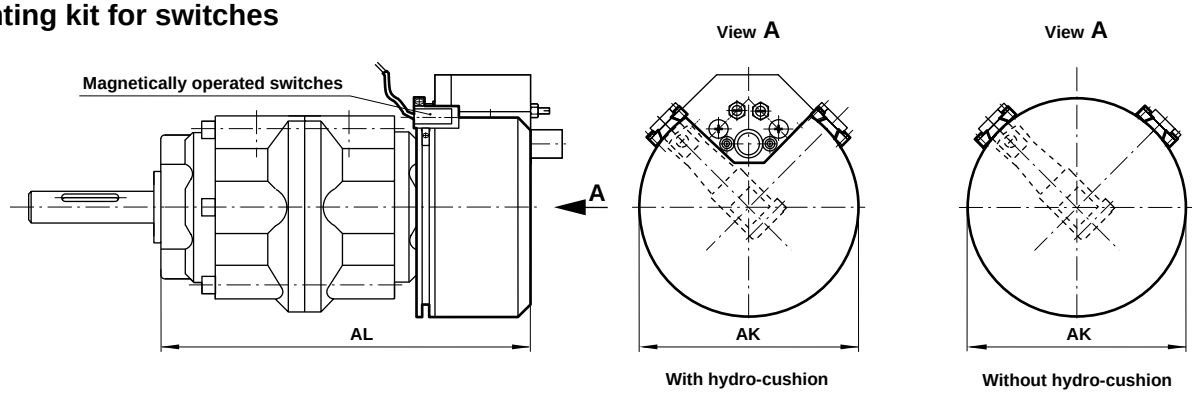
Hydro-cushion kit



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	95

Note: Order claws separately - see following page

Mounting kit for switches



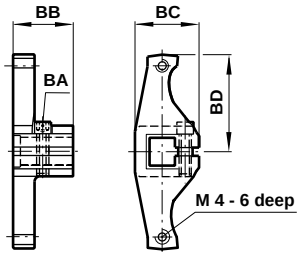
Mounting kit for two switches (**without** hydro-cushion)	Mounting kit for two switches (**with** hydro-cushion)	∅ AK	AL
QM/60285/22/64	QM/60285/23/64	85	123
QM/60286/22/64	QM/60286/23/64	111	143
QM/60287/22/64	QM/60287/23/64	145	169

Note: Order claws and magnetically operated switches separately

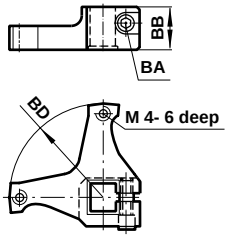
Claw

(for hydro-cushion and magnetic sensing)

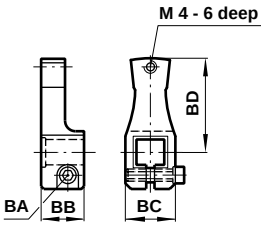
Angle of rotation 90°



Angle of rotation 180°

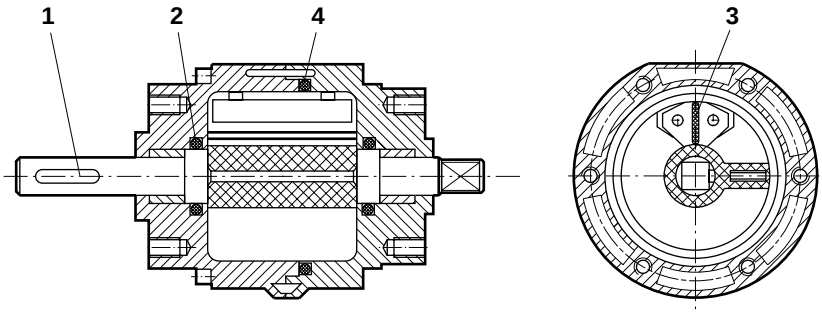


Angle of rotation 270°



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

Spares



Model	Spares kit	Model	Spares kit	Comprising: Item	Description	Quantity
M/60285	QM/60285/00	M/60285/TI	QM/60285/TI/00	1	Shaft with rotary vane	1
M/60286	QM/60286/00	M/60286/TI	QM/60286/TI/00	2	O-ring	2
M/60287	QM/60287/00	M/60287/TI	QM/60287/TI/00	3	Seal	1 (2)
M/60288	QM/60288/00	M/60288/TI	QM/60284/TI/00	4	O-ring	1

( ) for ../TI

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.