

PNEUMATIC VANE MOTOR

MODEC Vane Air Motor



Product characteristics

- Power range from 40 to 3000 W
- Both directions possible (right turn, left turn, reversible)
- Compact design
- Long life expectancy
- Easy maintenance
- Special adaptations on request

Description

MODEC Air Motors have been used for 20 years as an alternative to traditional electrical motors in many applications where specific constraints are apparent such as in the chemical, petrochemical and automotive industries.

The motors are designed to be modular construction, this allows all standard motors to be assembled and supplied to customers within shortened lead times, whilst also providing the possibility of special output shaft and mounting flanges configured to suit the direct replacement of other manufactures

units without the need to re-engineer the motor interface.

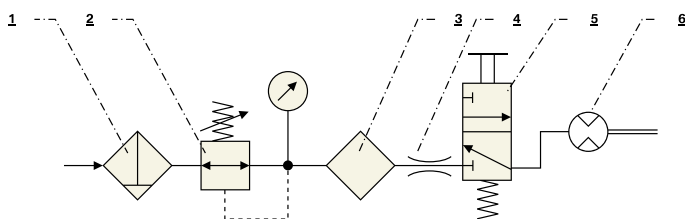
The modular construction continues throughout the motor with the design of planetary reduction gear units allowing for speeds ranging from 95rpm to 5117rpm at maximum power on the latest MT30 3kW motor and stall torques of up to 630Nm.

Standard options include right angled head attachments on the 50W to 1.7kW ranges negating the need to mount a separate gear box to redirect the output shaft.

Piloting of speed and torque

There are two main ways to pilot MODEC Air Motors: flow or pressure regulation. When it is desired to maintain high starting torque and at the same time reduce speed, the flow reduction at intake point is a solution (Impacting more the speed than the torque).

When the control of the stall torque is more important than starting torque, we will use a pressure control system on intake cable of the air motor (Impacting more the torque than the speed).



1. Filter
2. Pressure regulator
3. Lubricating system
4. Flow control system
5. Distributor 3/2
6. Non reversible motor

Mounting the air motors

Mounting the air motor is very flexible. Flange are available to ease the different mounting.

Assembly of air motor using angle head

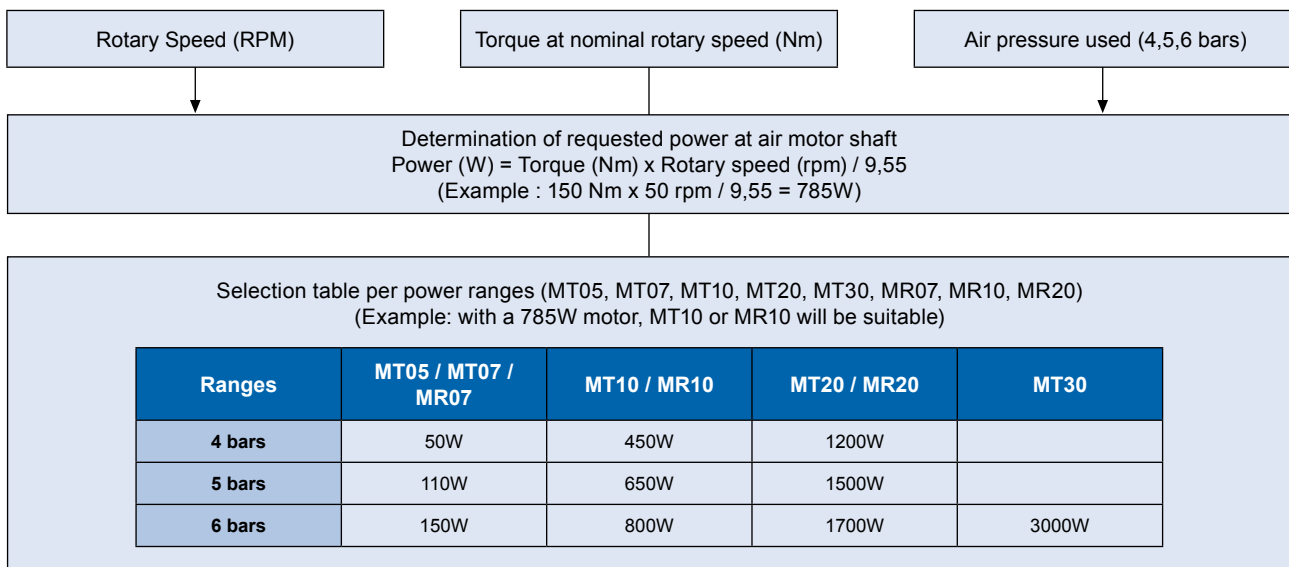
Angle heads are suitable for MR07, MR10, and MR20. They bring a mounting solution where the space is very limited and does not allow the use of classical MODEC Air Motors.

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Selection methodology for MODEC Air Motors

For each planetary geared air motor MODEC, the curves have been measured on real conditions. Power values are those measured on air motor shaft. Torque, rotary speed and power are all linked; with air consumption they are the main characteristics input in an air motor selection.

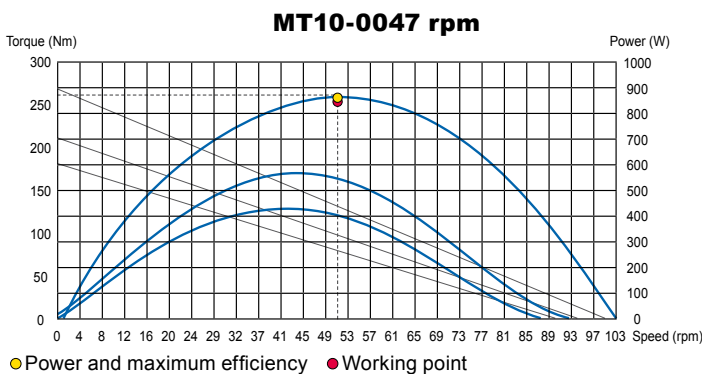
Determination of the conditions of use of the air motor



Air motors have a wide working range. So, frequently more than one air motor will be suitable according to the first selection step. Three main choice criterias will help you to finalize you air motor selection: enegetic efficiency, a power reserve, maximum stall torque.

1. Energy Efficiency

It is more efficient to use an air motor at the rotary speed corresponding to the maximum power. We will select the air motor for which the speed at maximum power is closest to the actual speed in the application.



In this example, the air motor for which the speed at maximum power is the closest to the working point expected is the MT10RT0047 (based on the power efficiency criteria).

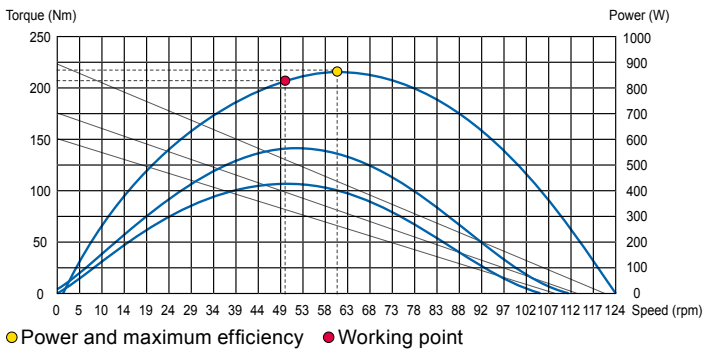
But according to the usage of the air motor, more selection criteria must be taken into account.

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2. A power reserve

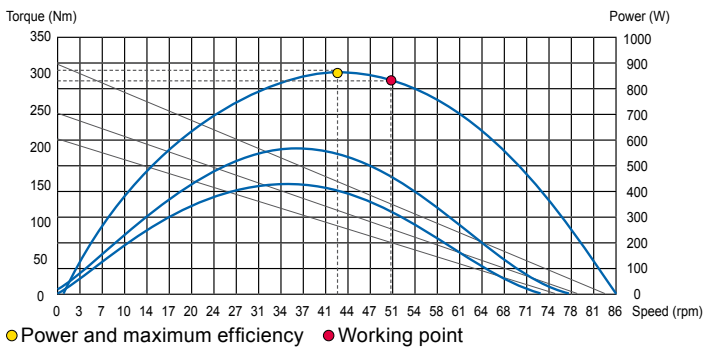
If we want to maintain constant speed in case of torque increase, it is necessary to consider a power reserve. This is obtained by choosing an air motor with speed at working point, higher than the speed at maximum power (When speed is not stable, it may be necessary to consider limiting torque system in order not to reach maximum torque allowed on the air motor shaft).

MT10-0056 rpm



Speed at working point is lower or equal to the speed at maximum power. In that case, there is no power reserve.

MT10-0039 rpm

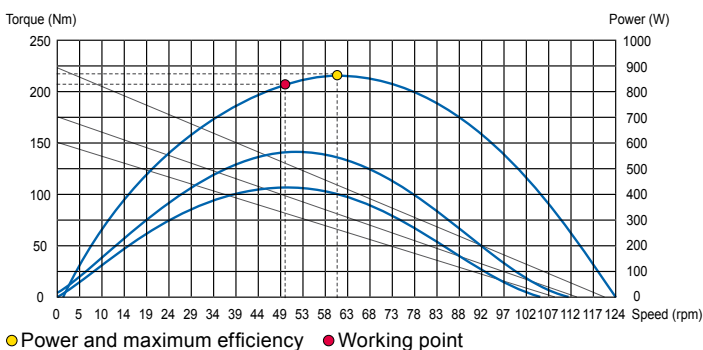


Speed at working point is higher than speed at maximum power. If torque increases, the power of air motor will also increase. This will help to maintain a constant rotary speed.

3. Maximum stall torque

For specific application, it is necessary to guarantee precise stall torque. For example, when using an air motor for safe doors operating system (or a screwing system), maximum torque can be guaranteed by air motor stall torque.

MT10-0056 rpm



The air motor MT10-0056 will guarantee a stall torque of 220 Nm under pressure of 6 bars. So, when torque increases the power drops.

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MT05 Power Range 40-150W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)			Weight (kg)
				F type	B type	P type	
1517 / 1134 ¹	2772 / 2630 ¹	1 / 1 ¹	2 / 2 ¹	113	127	127	0,6
708 / 529 ¹	1294 / 1200 ¹	2 / 2 ¹	4 / 4 ¹	113	127	127	0,6
361 / 270 ¹	660 / 630 ¹	4 / 3 ¹	8 / 7 ¹	113	127	127	0,6
169 / 126 ¹	308 / 290 ¹	9 / 7 ¹	17 / 16 ¹	113	127	127	0,6
86 / 64 ¹	157 / 148 ¹	18 / 14 ¹	34 / 30 ¹	130	144	144	0,7
79 / 59 ¹	144 / 136 ¹	19 / 16 ¹	37 / 35 ¹	113	127	127	0,6
40 / 30 ¹	73 / 70 ¹	38 / 27 ¹	max. 50*	130	144	144	0,7
19 / 14 ¹	34 / 33 ¹	max. 50*	max. 50*	130	144	144	0,7
9 / 7 ¹	16 / 15 ¹	max. 50*	max. 50*	130	144	144	0,7

Pressure of use 6 bar. Air consumption: 350 l/min. ¹Values are for MT05RV (120W).
 * This stall torque is theoretical because the breaking point of air motor shaft is 50 Nm.
 When using these motors, this is necessary to isolate (disengage) accidental load above 50 Nm.

Order Code

M T 0 5 - R T - 1 5 1 7 - B - C L 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	1517	Rotary speed: 1517 rpm	F	Threaded mounting flange (F type)	CL1	Rounded keyed shaft, diam. 10 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above	B	2 holes mounting flange (B type)				
RV	Reversible			P	Flat mounting flange (P type)				

MT07 Power Range 40-150W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)		Weight (kg)
				F and B type		
75 / 56 ¹	138 / 130 ¹	20 / 17 ¹	39 / 35 ¹	206		2,3
63 / 47 ¹	115 / 110 ¹	24 / 20 ¹	47 / 40 ¹	206		2,3
49 / 37 ¹	90 / 85 ¹	30 / 25 ¹	59 / 50 ¹	206		2,3
35 / 26 ¹	64 / 62 ¹	43 / 35 ¹	83 / 70 ¹	206		2,3
29 / 22 ¹	54 / 51 ¹	50 / 42 ¹	100 / 85 ¹	206		2,3
23 / 17 ¹	42 / 40 ¹	65 / 49 ¹	127 / 105 ¹	206		2,3
16 / 12 ¹	30 / 29 ¹	85 / 40 ¹	179 / 160 ¹	206		2,3
14 / 10 ¹	25 / 24 ¹	110 / 95 ¹	214 / 180 ¹	206		2,3
10 / 8 ¹	19 / 18 ¹	150 / 120 ¹	285 / 250 ¹	234		2,3
9 / 6 ¹	16 / 15 ¹	170 / 150 ¹	max. 300* / 290 ¹	234		2,3

Pressure of use 6 bar. Air consumption: 350 l/min. ¹Values are for MT07RV (120W).
 * This stall torque is theoretical because the breaking point of air motor shaft is 300 Nm.
 When using these motors, this is necessary to isolate (disengage) accidental load above 300 Nm.

Order Code

M T 0 7 - R T - 0 0 7 5 - B - C L 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	0075	Rotary speed: 75 rpm	F	Threaded mounting flange (F type)	CL1	Square key, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above	B	3 holes mounting flange (B type)	CL2	Square key, diam. 19.05 mm		
RV	Reversible			CA1	Square drive, diam. 12.70 mm				
						F11	Threaded shaft, diam. 12.70 mm		

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MT10 Power Range 400-800W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)		Weight (kg)
				F and B type		
1300 / 1066 ¹	2798 / 1614 ¹	6 / 4 ¹	10 / 6 ¹	144 / 157 ¹		1,9
1085 / 890 ¹	2336 / 1347 ¹	7 / 5 ¹	12 / 7 ¹	144 / 157 ¹		1,9
851 / 698 ¹	1833 / 1057 ¹	9 / 6 ¹	15 / 9 ¹	144 / 157 ¹		1,9
271 / 222 ¹	583 / 336 ¹	28 / 21 ¹	48 / 27 ¹	171 / 184 ¹		1,9
226 / 185 ¹	487 / 281 ¹	34 / 24 ¹	58 / 34 ¹	171 / 184 ¹		1,9
189 / 155 ¹	406 / 234 ¹	40 / 30 ¹	69 / 40 ¹	171 / 184 ¹		1,9
177 / 145 ¹	382 / 220 ¹	42 / 31 ¹	73 / 42 ¹	171 / 184 ¹		1,9
148 / 121 ¹	319 / 184 ¹	50 / 38 ¹	88 / 50 ¹	171 / 184 ¹		1,9
116 / 95 ¹	250 / 144 ¹	68 / 48 ¹	112 / 65 ¹	171 / 184 ¹		1,9
56 / 46 ¹	121 / 70 ¹	135 / 99 ¹	230 / 130 ¹	199 / 212 ¹		2,3
47 / 39 ¹	101 / 58 ¹	160 / 120 ¹	276 / 160 ¹	200 / 212 ¹		2,3
39 / 32 ¹	85 / 49 ¹	190 / 150 ¹	max. 300* / 190 ¹	201 / 212 ¹		2,3
- / 21 ¹	- / 32 ¹	- / 220 ¹	- / 300 ¹	- / 212 ¹		2,3

Pressure of use 6 bar. Air consumption: 1400 l/min (2200 l/min). ¹Values are for MT10RV (500W).

* This stall torque is theoretical because the breaking point of air motor shaft is 300 Nm.

When using these motors, this is necessary to isolate (disengage) accidental load above 300 Nm.

Order Code

M T 1 0 - R T - 1 3 0 0 - B - C L 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	1300	Rotary speed: 1300 rpm	F	Threaded mounting flange (F type)	CL1	Square key, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above	B	3 holes mounting flange (B type)	CL2	Square key, diam. 19.05 mm	C	Collector
RV	Reversible					CA1	Square drive, diam. 12.70 mm		
						F1	Threaded shaft, diam. 12.70 mm		

MT30 Power Range 1800-3000W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)		Weight (kg)
				H type		
1378 / 1102 ¹	2438 / 2243 ¹	20 / 16 ¹	46 / 41 ¹	274,3		7,4
1066 / 853 ¹	1879 / 1729 ¹	27 / 22 ¹	59 / 53 ¹	274,3		7,4
698 / 558 ¹	1231 / 1132 ¹	40 / 30 ¹	90 / 81 ¹	274,3		7,4
371 / 297 ¹	659 / 606 ¹	80 / 61 ¹	170 / 153 ¹	274,3		7,4
286 / 230 ¹	508 / 467 ¹	95 / 75 ¹	220 / 198 ¹	274,3		7,4
222 / 178 ¹	392 / 360 ¹	130 / 100 ¹	284 / 256 ¹	274,3		7,4
188 / 150 ¹	333 / 306 ¹	150 / 125 ¹	336 / 302 ¹	274,3		7,4
145 / 116 ¹	256 / 236 ¹	200 / 150 ¹	434 / 391 ¹	274,3		7,4
95 / 76 ¹	168 / 154 ¹	300 / 240 ¹	630 / 567 ¹	274,3		7,4

Pressure of use 6 bar. Air consumption: 3100 l/min. ¹Values are for MT30RV (2300W).

Order Code

M T 3 0 - R T - 1 3 7 8 - H - C L 2 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	1378	Rotary speed: 1378 rpm	H	2 holes mounting flange (H type)	CL2	Square key, diam. 25.4 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above			CL4	Square key, diam. 25 mm	C	Collector
RV	Reversible								

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MT20 Power Range 800-1700W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)		Weight (kg)
				F and B type		
1000 / 708 ¹	2331 / 1416 ¹	14 / 12 ¹	22 / 25 ¹	165 / 175 ¹		3,2
835 / 591 ¹	1946 / 1182 ¹	17 / 15 ¹	26 / 30 ¹	165 / 175 ¹		3,2
655 / 464 ¹	1526 / 927 ¹	21 / 19 ¹	34 / 40 ¹	165 / 175 ¹		3,2
208 / 148 ¹	486 / 295 ¹	71 / 60 ¹	106 / 120 ¹	197 / 207 ¹		3,2
174 / 123 ¹	405 / 246 ¹	80 / 79 ¹	127 / 140 ¹	197 / 207 ¹		3,2
145 / 103 ¹	338 / 206 ¹	98 / 90 ¹	152 / 180 ¹	197 / 207 ¹		3,2
136 / 97 ¹	318 / 193 ¹	101 / 95 ¹	161 / 190 ¹	197 / 207 ¹		3,2
114 / 81 ¹	265 / 161 ¹	125 / 107 ¹	193 / 220 ¹	197 / 207 ¹		3,2
89 / 63 ¹	207 / 127 ¹	160 / 145 ¹	246 / 300 ¹	197 / 207 ¹		3,2

Pressure of use 6 bar. Air consumption: 1800 l/min (3000 l/min). ¹Values are for MT20RV (1000W).

Order Code

M T 2 0 - R T - 1 0 0 0 - B - C L 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	1000	Rotary speed: 1000 rpm	F	Threaded mounting flange (F type)	CL1	Square key, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above	B	3 holes mounting flange (B type)	CL2	Square key, diam. 19.05 mm	C	Collector
RV	Reversible			CA1	Square drive, diam. 12.70 mm				
						F11	Threaded shaft, diam. 12.70 mm		

MR07 Power Range 40-150W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)		Weight (kg)
				B type		
57 / 42 ¹	103 / 100 ¹	27 / 21 ¹	52 / 45 ¹	297		2,6
47 / 35 ¹	86 / 81 ¹	31 / 26 ¹	62 / 55 ¹	297		2,6
37 / 28 ¹	68 / 68 ¹	41 / 33 ¹	79 / 72 ¹	297		2,6
26 / 20 ¹	48 / 46 ¹	60 / 49 ¹	111 / 100 ¹	297		2,6
22 / 16 ¹	40 / 39 ¹	70 / 60 ¹	133 / 120 ¹	297		2,6
17 / 13 ¹	32 / 31 ¹	90 / 75 ¹	169 / 145 ¹	297		2,6
12 / 9 ¹	23 / 22 ¹	125 / 100 ¹	238 / 220 ¹	297		2,6
10 / 8 ¹	19 / 18 ¹	150 / 120 ¹	285 / 260 ¹	297		2,6
8 / 6 ¹	14 / 13 ¹	200 / 160 ¹	max. 300*	297 / 325 ¹		2,6

Pressure of use 6 bar. Air consumption: 350 l/min. ¹Values are for MR07RV (120W).

* This stall torque is theoretical because the breaking point of air motor shaft is 300 Nm.

When using these motors, this is necessary to isolate (disengage) accidental load above 300 Nm.

Order Code

M R 0 7 - R T - 0 0 5 7 - B - C A 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	0057	Rotary speed: 57 rpm	B	3 holes mounting flange (B type)	CA1	Square drive, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above			F11	Threaded shaft, diam. 12.70 mm		
RV	Reversible								

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MR10 Power Range 400-800W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)	Weight (kg)
				B type	
640 / 669 ¹	1378 / 1013 ¹	11 / 7 ¹	20 / 9 ¹	236 / 248 ¹	2,6
204 / 525 ¹	438 / 795 ¹	38 / 8 ¹	64 / 12 ¹	263 / 248 ¹	2,6
170 / 167 ¹	366 / 253 ¹	45 / 27 ¹	76 / 37 ¹	263 / 275 ¹	2,6
142 / 138 ¹	305 / 211 ¹	55 / 32 ¹	92 / 45 ¹	263 / 275 ¹	2,6
111 / 116 ¹	240 / 176 ¹	70 / 39 ¹	117 / 53 ¹	263 / 275 ¹	2,6
87 / 109 ¹	188 / 166 ¹	90 / 40 ¹	149 / 59 ¹	263 / 275 ¹	2,6
42 / 91 ¹	91 / 138 ¹	175 / 49 ¹	max. 300* / 69 ¹	291 / 275 ¹	2,6
35 / 72 ¹	76 / 108 ¹	210 / 60 ¹	max. 300* / 85 ¹	291 / 275 ¹	2,6
30 / 35 ¹	64 / 53 ¹	250 / 132 ¹	max. 300* / 175 ¹	291 / 303 ¹	2,6
- / 29 ¹	- / 44 ¹	- / 151 ¹	- / 210 ¹	- / 303 ¹	2,6
- / 19 ¹	- / 29 ¹	- / 240 ¹	- / max.300*	- / 303 ¹	2,6

Pressure of use 6 bar. Air consumption: 1400 l/min (2200 l/min). ¹Values are for MR10RV (500W).

* This stall torque is theoretical because the breaking point of air motor shaft is 300 Nm.

When using these motors, this is necessary to isolate (disengage) accidental load above 300 Nm.

Order Code

M R 1 0 - R T - 0 9 7 7 - B - C A 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	0977	Rotary speed: 977 rpm	B	3 holes mounting flange (B type)	CA1	Square drive, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above			FI1	Threaded shaft, diam. 12.70 mm	C	Collector
RV	Reversible								

MR20 Power Range 800-1700W



Speed at max. power (rpm)	Free speed (rpm)	Pmax torque (Nm)	Stall torque (Nm)	Length (mm)	Weight (kg)
				B type	
492 / 444 ¹	1148 / 889 ¹	29 / 20 ¹	45 / 40 ¹	256 / 266 ¹	3,1
157 / 349 ¹	395 / 697 ¹	90 / 25 ¹	140 / 50 ¹	288 / 266 ¹	3,1
131 / 111 ¹	305 / 222 ¹	110 / 80 ¹	168 / 160 ¹	288	3,1
109 / 93 ¹	254 / 185 ¹	130 / 100 ¹	202 / 195 ¹	288	3,1
103 / 77 ¹	239 / 155 ¹	140 / 110 ¹	214 / 235 ¹	288	3,1
86 / 73 ¹	200 / 145 ¹	160 / 115 ¹	257 / 240 ¹	288	3,1
67 / 61 ¹	157 / 121 ¹	220 / 150 ¹	max. 300* / 300 ¹	288	3,1
- / 48 ¹	- / 95 ¹	- / 190 ¹	- / max. 300*	- / 298 ¹	3,1

Pressure of use 6 bar. Air consumption: 1800 l/min / 3000 l/min. ¹Values are for MR20RV (1000W).

* This stall torque is theoretical because the breaking point of air motor shaft is 300 Nm.

When using these motors, this is necessary to isolate (disengage) accidental load above 300 Nm.

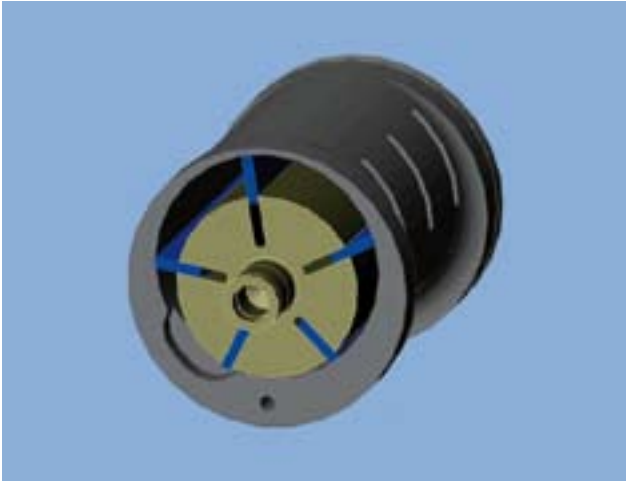
Order Code

M R 2 0 - R T - 0 7 5 2 - B - C A 1 - F

Rotation		Speed at max power		Flange type		Shaft type		Exhaust	
RT	Right turn	0752	Rotary speed: 752 rpm	B	3 holes mounting flange (B type)	CA1	Square drive, diam. 12.70 mm	F	Filter
LT	Left turn	XXXX	choose the desired speed from the table above			FI1	Threaded shaft, diam. 12.70 mm	C	Collector
RV	Reversible								

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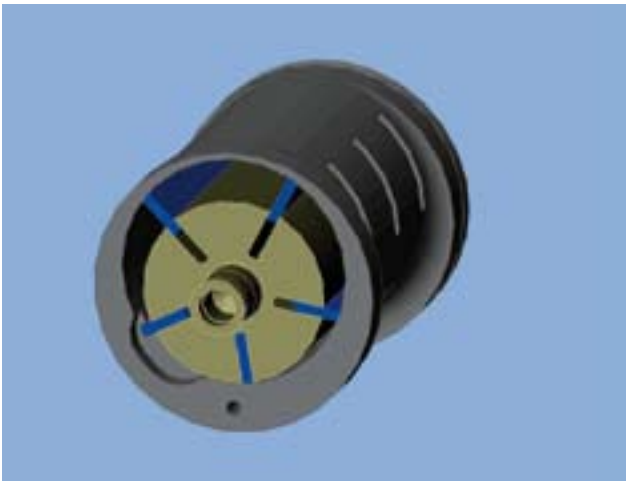
Operation Principle



Pressurized air (4 to 6 bars) is injected in the multi-vane air motor via the injection point (I). It arrives in the first chamber (C1) which is put under pressure. Each of the sides of this compression chamber will receive a proportional force to their respective surface.

The sides delimited by the vanes (P1) and (P2) with different surface area will both receive different forces. The volume of the chamber C1 will increase and the air which is inside will release its pressure.

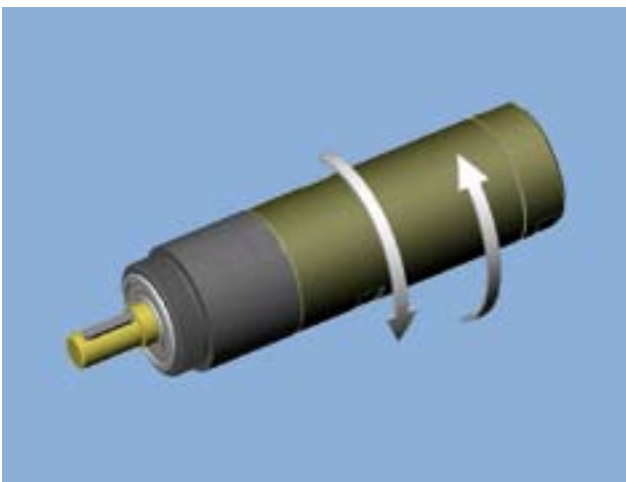
The chamber C2 is now under compression. The same processes are repeated and this allows the constant rotation of the rotor. After the rotation of the rotor, the chamber C1 will be in exhaust position, releasing air outside of the motor.



By positioning differently the injection point of air on the rotor, we can make it turn left or right. The rotational direction of the multi-vane air motor MODEC is defined by viewing it from the back side of the air motor.

Change of the rotation, clockwise or counterclockwise is obtained by switching air injection from one intake to another.

The rotor speed is close to 10,000 rpm under 6 bars pressure. To adjust air motor characteristics to the desired application, we use planetary gear reduction.



Thanks to the different types of gears and different combinations, MODEC multivane air motor can offer a wide range of speed and torque.

It is possible to built air motor with several reduction level, from 1 to 5 depending of air motor range.

For some application, a coupling ring allows small air motor to be mounted with the reduction of higher range. This allows high torque in a very small space. In some applications it is necessary to put in place a torque limitation system in order not to pass the breaking limit of the output shaft.