TSA
TECNOLOGIE
SPECIALI
APPLICATE

MOTORI PNEUMATICI

PNEUMATIC MOTORS WITH RADIAL PISTONS

TSA TECNOLOGIE SPECIALI APPLICATE

INDEX

TSA

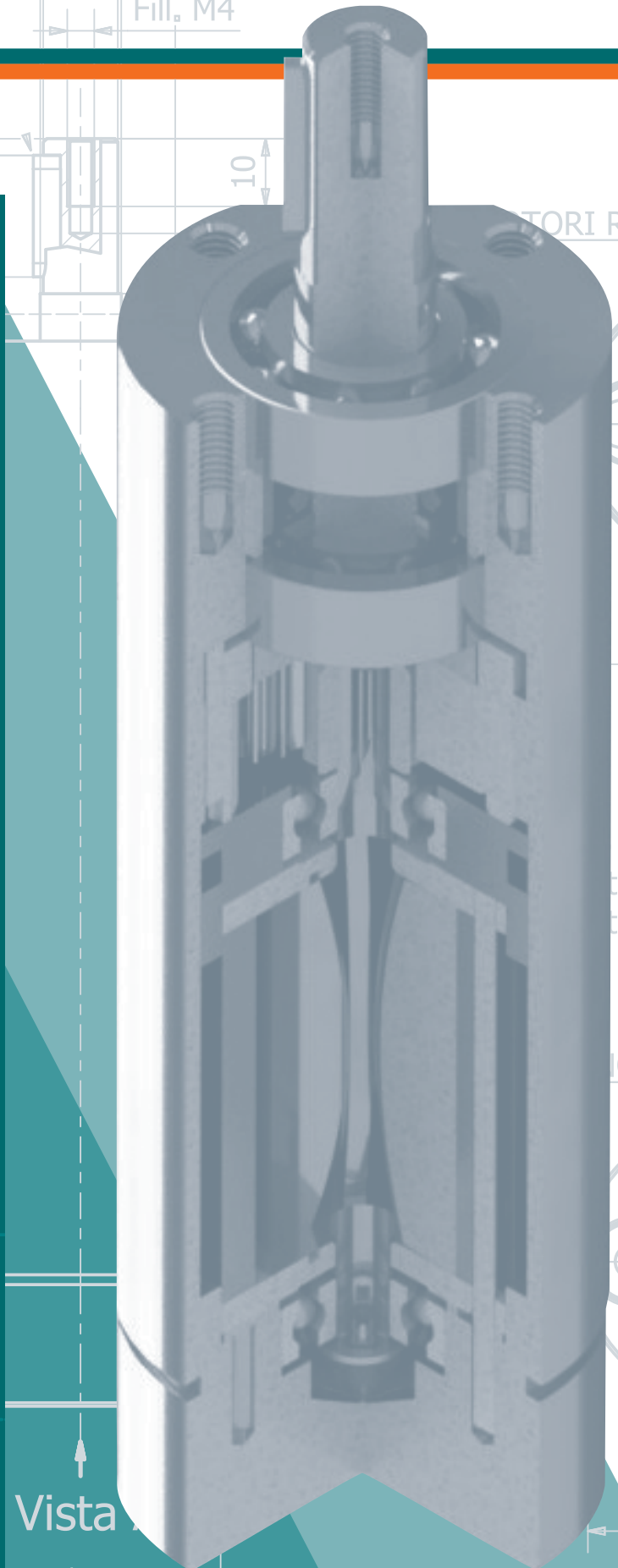
SPECIAL APPLIED TECHNOLOGIES

TSA founded in 1984, for over 30 years has been designing, manufacturing and distributing pneumatic motors, articulated arms for torque reaction, assembling systems and special equipment.

Its technical design office is in charge of studying all of the required characteristics to guarantee maximum reliability and high productivity, according to modern ergonomic principles. Product quality and safety are now a consolidated standard for TSA.

Just-in-time deliveries, a wide, flexible range of products, including diversified motors and arms, an efficient spare parts warehouse and effective before- and after sales: these are the services offered by TSA to its customers. Thanks to its constant commitment and to the professionalism of its technicians,

TSA has gained the trust of major companies on the market. Its aim is to meet customer requirements in all respects: QUALITY, PERFORMANCE AND COST EFFECTIVENESS.



PNEUMATIC MOTORS WITH RADIAL PISTONS

The MP series of radial piston motors offers a wide variety of accessories such as floor fixing, brakes, reductio gears and control valves.
These oil-cooled four- and five-cylinder engines develop more power than others of equivalent size and are often used for heavy and sometimes full-load applications with reductio gears or brakes.

The advantages that can be obtained by using radial piston pneumatic motors are countless:

- Infinite speeds and variable pairs obtainable with simple pressure regulator or tap.
- Own safety against accidents.
- Can be used under load indefinitely without presenting damage.
- Instantaneous power, stops and inversions.
- Resistant to dirt and humidity.
- Designed to last over time.
- Adapt for use with natural gas.
- Designed for the assembly of: floor flanges, brakes and reducctio gears.

CHARACTERISTICS OF PNEUMATIC MOTORS

The outlet power of a pneumatic motor varies depending on its speed and torque. The performance levels of a pneumatic motor depend on the inlet air pressure level measured at the entry point in the motor; this means that it is sufficient to regulate the incoming air to substantially change the torque and speed values in a pneumatic motor.
The choice of a pneumatic motor is based on three fundamental parameters: POWER, SPEED and TORQUE.

POWER

Pneumatic motors produce a characteristic power curve whose maximum value is obtained at approximately 50% of idle speed. The resulting torque is known as maximum power torque.

SPEED

By idle speed in a pneumatic motor reference is made to a moment when there is no load on the outlet shaft, therefore no torque is produced (moment of force). If the load on the shaft is increased, the speed is reduced in a way which is inversely proportional to the torque.

SPEED

The speed at maximum power is reached when the motor reaches its torque at maximum power.

TORQUE AT MAXIMUM SPEED

The maximum speed torque is reached at approximately 50% of the idle speed of the motor, which equals its maximum power.

STARTING TORQUE

The starting torque is the torque provided by a motor to the loaded shaft when it is started with the maximum air inlet.

STALL TORQUE

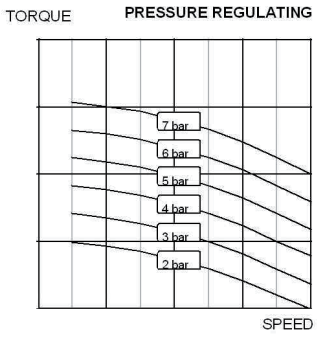
The stall torque is the torque provided by a motor to the shaft during its rotation until it stops completely.

WAYS OF CHANGING THE MOTOR'S PERFORMANCE

The speed and torque in a pneumatic motor can be adjusted by regulating the pressure or throttling the air flow.

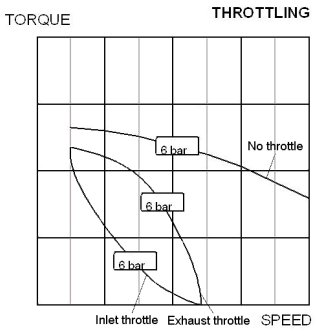
PRESSURE REGULATING

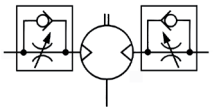
The speed and power can also be reduced by installing a pressure regulator. A pressure regulator, always connected on the entry hole, keeps the inlet air pressure to the motor in check. A pressure regulating system affects the output torque on the shaft, thus making it easier to control the starting torque. If the speed and torque need to be controlled, the best configuration consists in a pressure regulator to the motor inlet and a check valve for the exhaust flow. This means that each point in the speed-torque diagram can be established in a precise way.



FLOW REGULATING

A flow regulator allows adjustment of both the inlet and exhaust flow. It is advisable to work on the exhaust flow in order to achieve a slightly higher starting torque. The diagram shows the difference between these two options.





THROTTLING METHOD
Inlet choking, bi-directional motor

INLET AIR CONDITIONS

CONSUMPTION

The air consumption in a pneumatic motor is proportional to the speed, therefore it reaches its peak at idle speed.
Air consumption is measured in Nl/s, however the conventional unit is l/s.

AIR QUALITY

In order to ensure optimal working conditions for pneumatic motors it is necessary to guarantee the appropriate air inlet and exhaust at all times. In order to ensure its proper operation it is advisable to install an air treatment unit (5-micron filter, regulator and lubricator, unless the motor requires no lubrication), as appropriate for the specific motor.

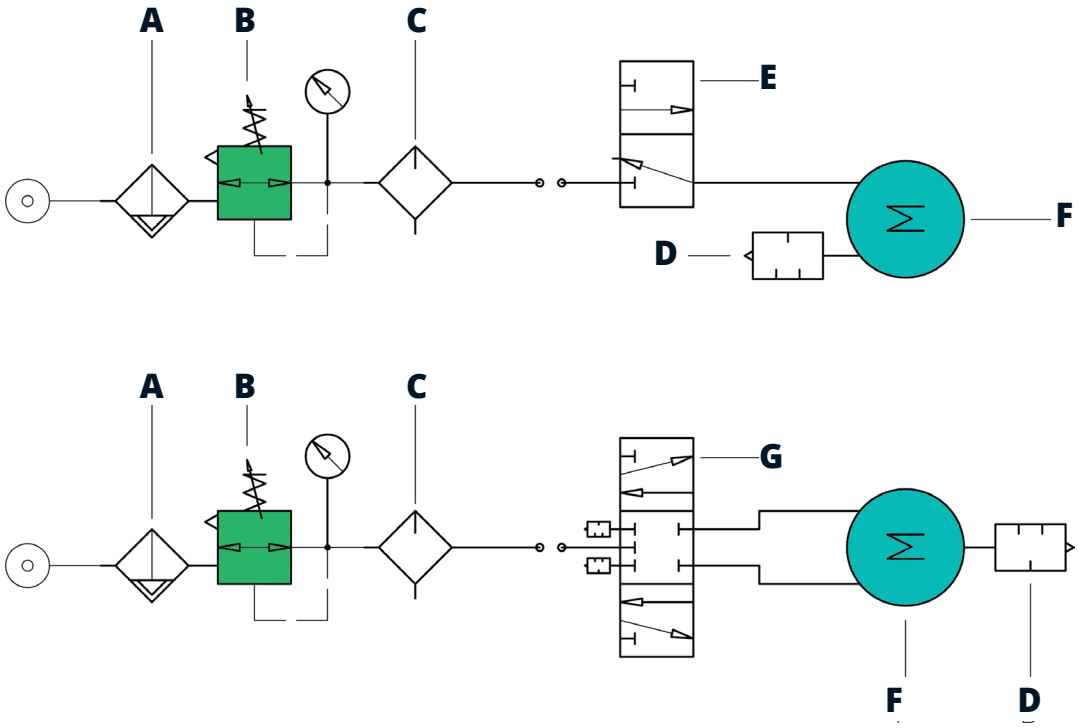
AIR PIPELINE LIMITATIONS

Any limitations in the air inlet line on the motor are bound to reduce its performance levels. Therefore it is especially important to make sure that the required air pressure is available to the motor at all times while it is being operated. Always check the air inlet because if the pipeline is too narrow this might cause a pressure drop. The air exhaust pipe needs to be larger than the inlet pipe. It is advisable to connect the exhaust pipes to a suitable oil separator filter with an incorporated silencer, in order to allow for appropriate lubrication without the room becoming saturated with polluted air.

PNEUMATIC DIAGRAM (POWER – MOTOR CONTROL)

Non-reversible motor operation with 3/2 valve

A = Filter
B = Regulator of pressure
C = Lubricator
D = Silencer
E = 3/2 valve
F = Engine
G = Valve 5/3



Non-reversible motor operation with 5/3 closed-center valve

ORDER CODE

Configuration
F - Flangeded
FV - Flangeded with control
P - On base
PV - On base with control
BR - Motor with brake

Relationship of reduction
XX = no reducer

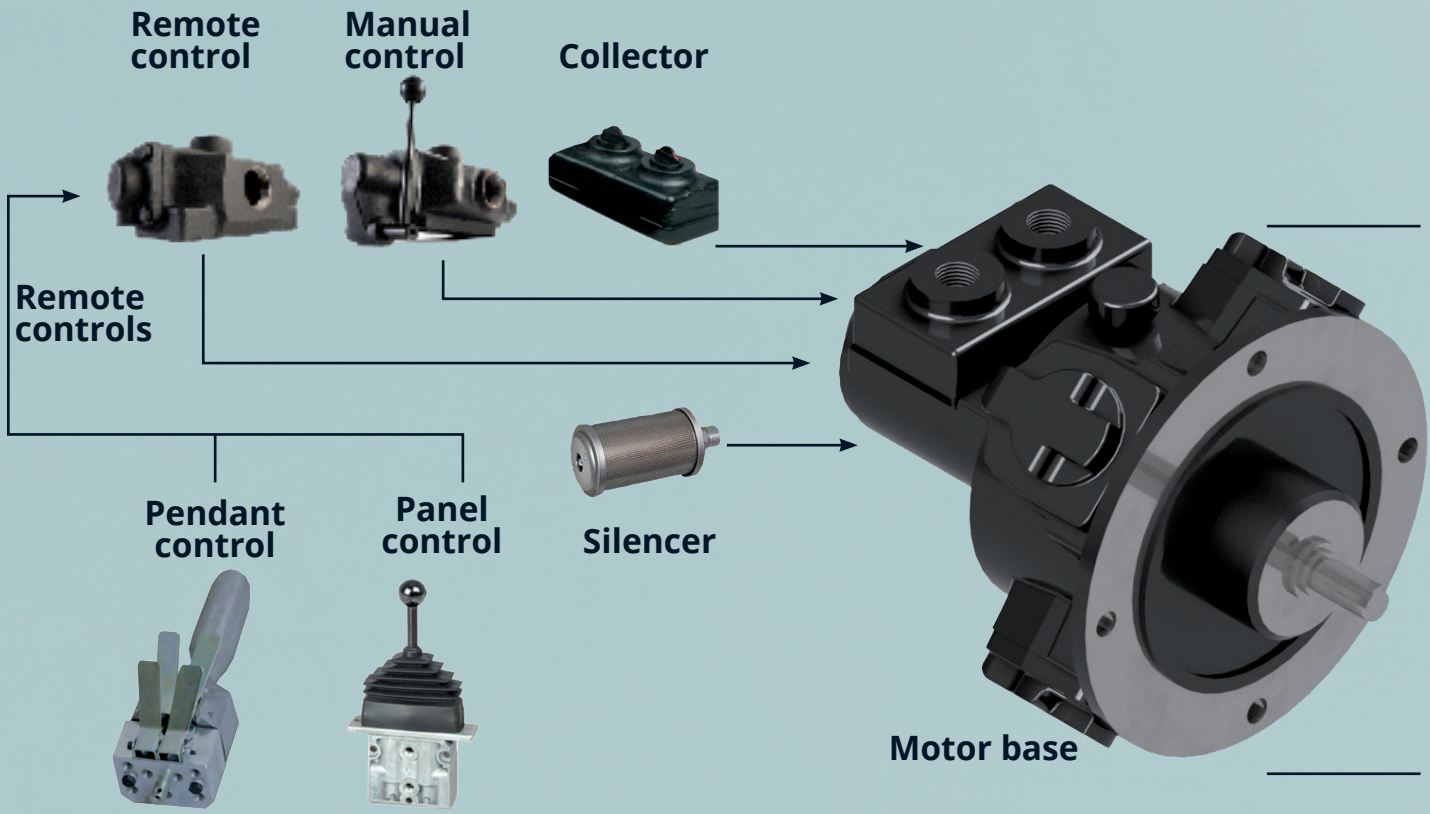
Valve options
A - Collector
H - Manual control valve (HCV)
R - Remote control valve (RCV)
X - No valve No manifold

MP - 165 - F - XX - A - 00

MP
Air Motor
with pistons

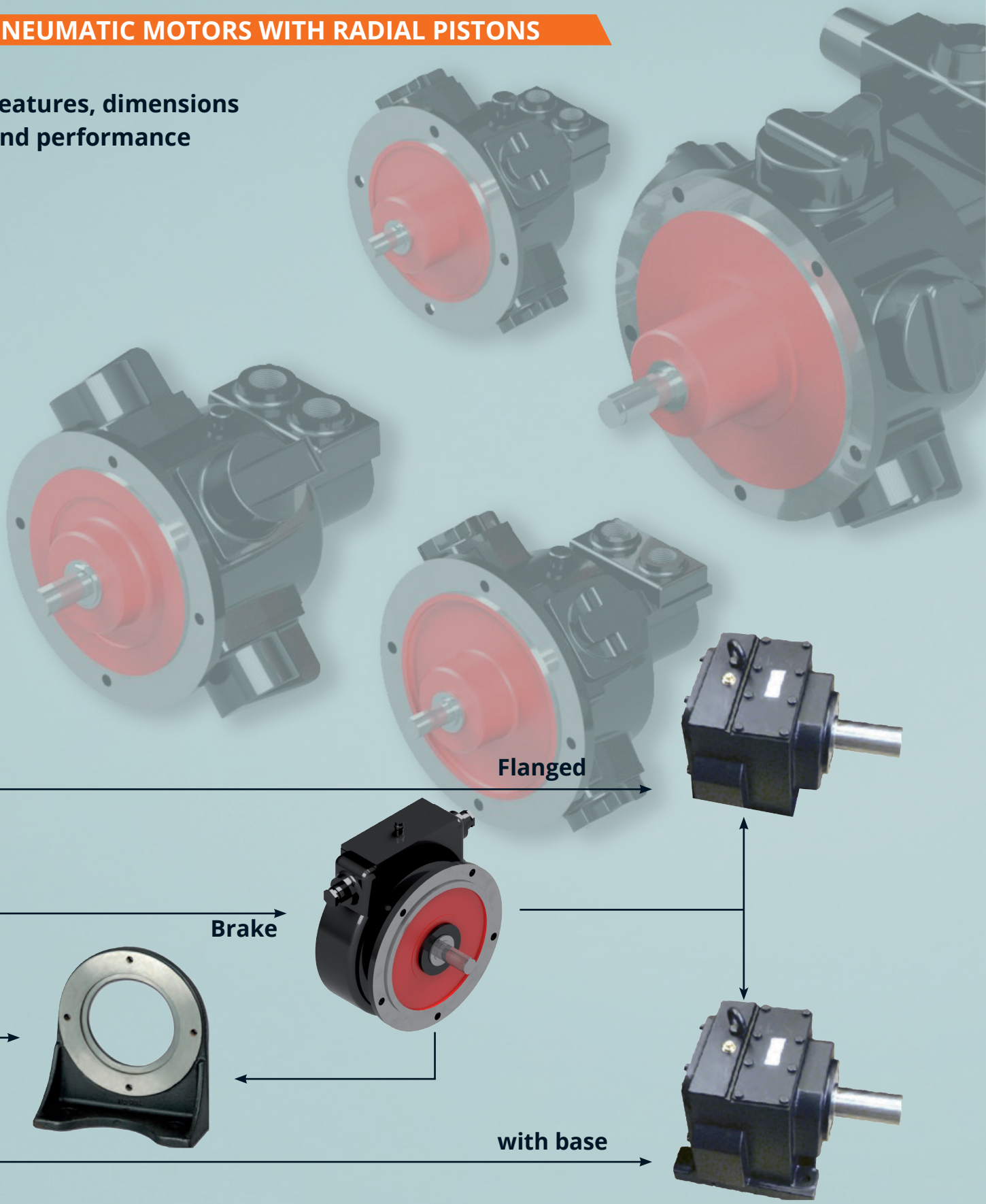
Power
165 – 1,6 KW / 2,3 hp
400 – 3,4 KW / 4,7 hp
850 – 6,1 KW / 8,3 hp
1450 – 12,5 KW / 17,1 hp
2250 – 19,7 KW / 26,8 hp
3000 – 18,3 KW / 24,9 hp

Valve
00 - BSP
10 - NPT
20 - Prevalence:
Clockwise direction (BSP)
30 - Prevalence:
Counterclockwise lowering (BSP)
40 - Prevalence:
Clockwise direction (NPT)
50 - Prevalence:
Counterclockwise lowering (NPT)



PNEUMATIC MOTORS WITH RADIAL PISTONS

Features, dimensions and performance



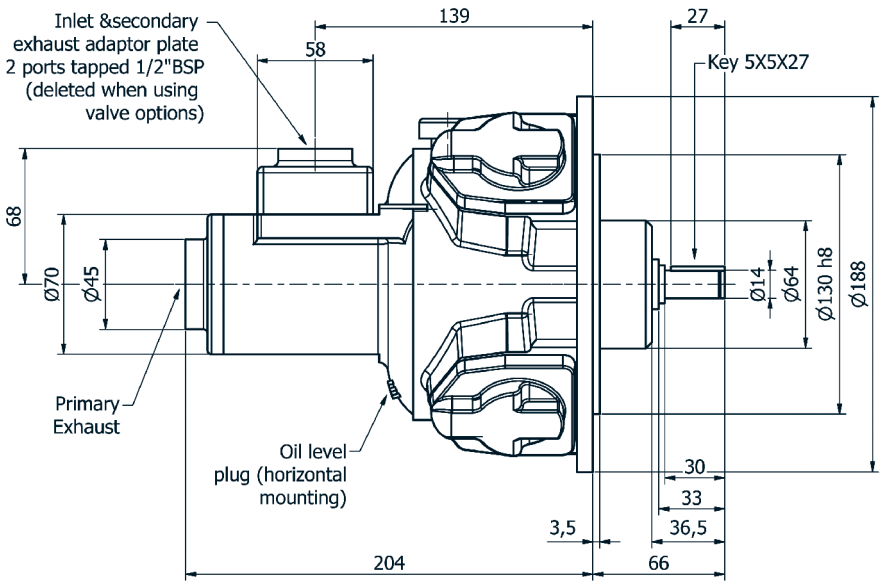
MP165 - HP 2,3 KW 1,6

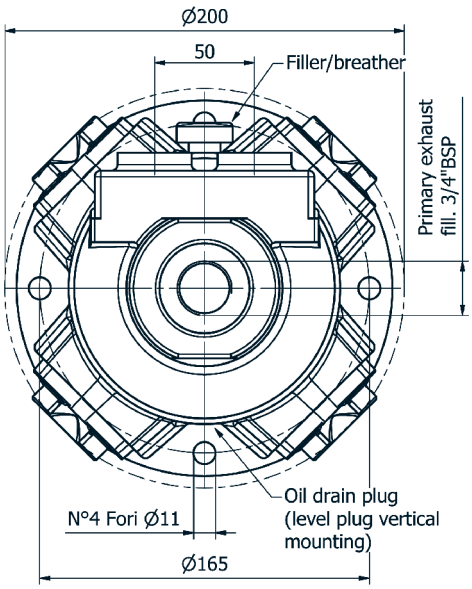
PERFORMANCES AND DIMENSIONS																		
	8 bar			7 bar			6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	8,82	13,72	12,74	7,84	11,76	10,78	5,88	9,80	8,82	4,90	7,84	6,86	3,92	5,88	5,88	2,94	3,92	3,92
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
2400	2,3	6,86	36	1,9	5,88	32	1,5	3,92	27	1,0	2,94	23	0,6	1,96	18	0,2	0,98	14
2200	2,3	6,86	34	1,9	5,88	29	1,5	4,90	25	1,1	2,94	21	0,7	1,96	17	0,3	0,98	13
2000	2,2	7,84	31	1,8	6,86	27	1,5	4,90	23	1,1	3,92	19	0,7	1,96	15	0,3	0,98	12
1800	2,1	7,84	28	1,8	6,86	24	1,4	5,88	21	1,1	3,92	18	0,7	2,94	14	0,3	0,98	11
1600	2,0	8,82	25	1,7	6,86	22	1,3	5,88	19	1,0	4,90	16	0,7	2,94	13	0,4	1,96	10
1400	1,8	8,82	22	1,5	7,84	20	1,3	5,88	17	1,0	4,90	14	0,7	2,94	11	0,4	1,96	9
1200	1,7	9,80	20	1,4	7,84	17	1,1	6,86	15	0,9	4,90	12	0,6	3,92	10	0,4	1,96	8
1000	1,4	9,80	17	1,2	8,82	15	1,0	6,86	13	0,8	5,88	11	0,6	3,92	9	0,3	1,96	6
800	1,2	10,78	14	1,0	8,82	12	0,8	7,84	11	0,7	5,88	9	0,5	3,92	7	0,3	2,94	5
600	0,9	10,78	11	0,8	9,80	10	0,7	7,84	8	0,5	5,88	7	0,4	4,90	6	0,3	2,94	4
400	0,7	11,76	8	0,6	9,80	7	0,5	7,84	6	0,4	6,86	5	0,3	4,90	4	0,2	2,94	3

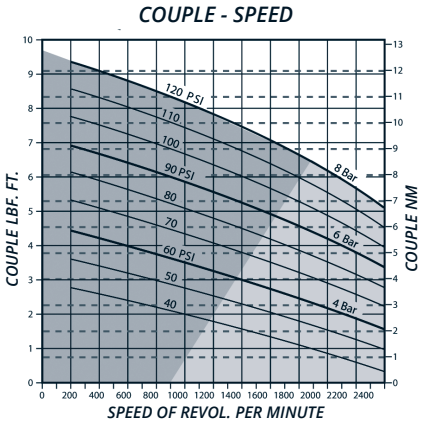
AVAILABLE VERSIONS

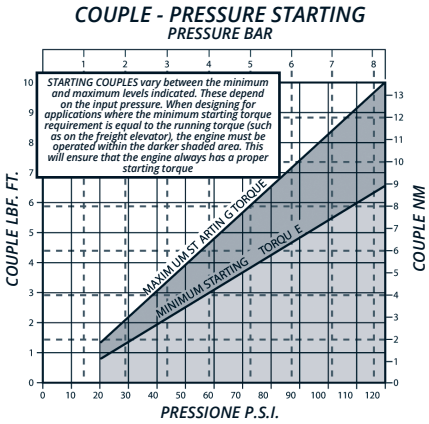
MP165F	flangeded
MP165FV	flangeded with control
MP165P	on base
MP165PV	on base with control
MP165BR	Motor with pneumatic brake BR110

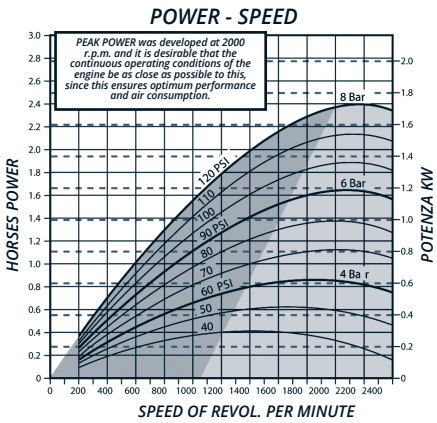
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 75 ml Vertical 150 ml.
Filtration: 64 µ or better
Radial load: 445 N max.
Moment of inertia: 0,01 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.13

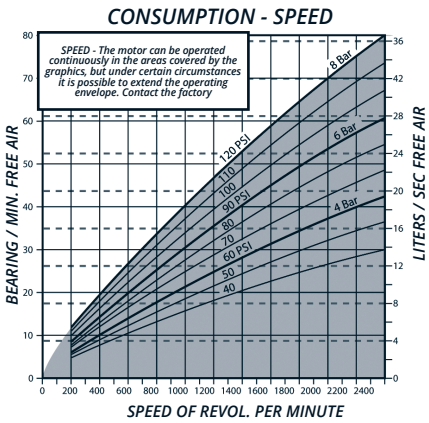


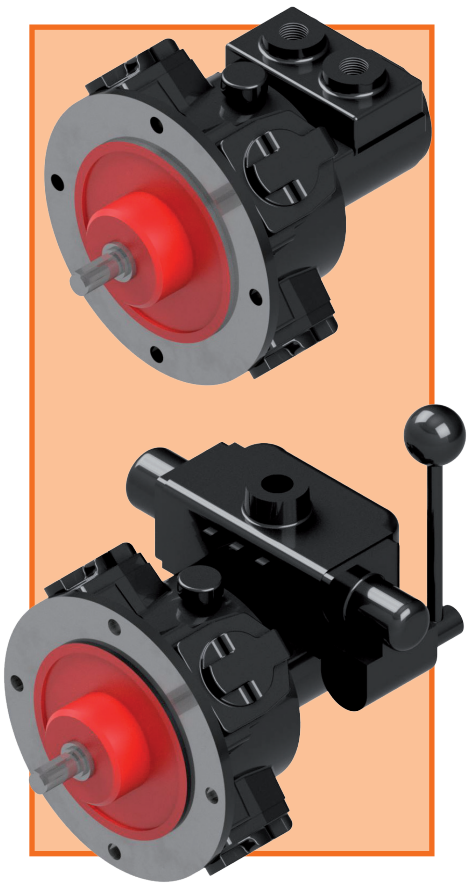












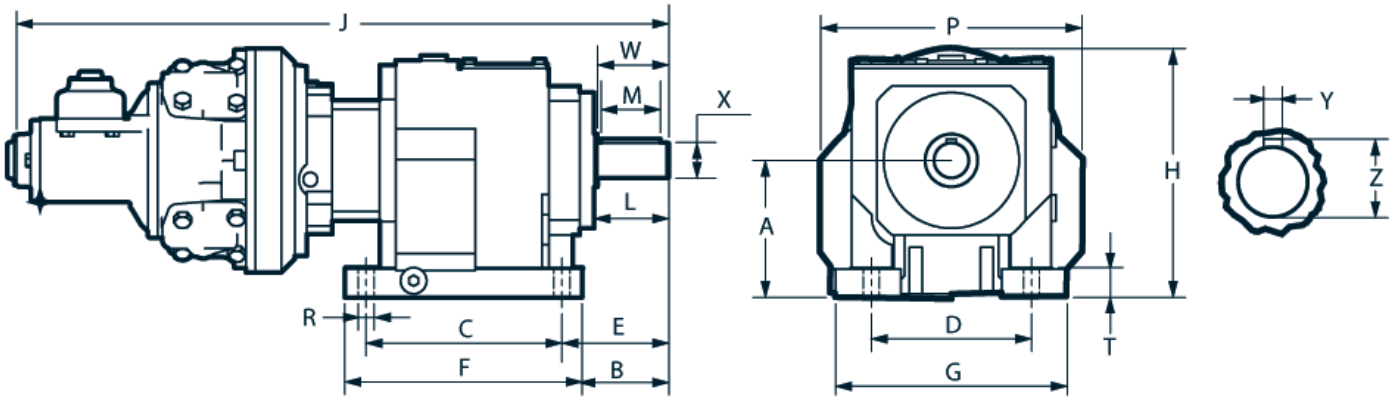
PNEUMATIC RADIAL PISTON GEARED MOTORS

The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
4,77	1,2	1,6	440	23	Nm	15.5	4.5	33
24,50	1,2	1,6	86	122	146	15.5	4.5	33
50	1,2	1,6	42	250	300	26	4.5	43.5
73,30	1,2	1,6	29	366	439	45	4.5	62.5
104,80	1,2	1,6	20	524	629	45	4.5	62.5
129,79	1,2	1,6	16	649	779	79	4.5	96.5
155,46	1,2	1,6	14	777	932	79	4.5	96.5
175,18	1,2	1,6	12	876	1051	79	4.5	96.5
213,64	1,2	1,6	10	1068	1282	79	4.5	96.5
256.86	1,2	1,6	8	1284	1541	129	4.5	146.5

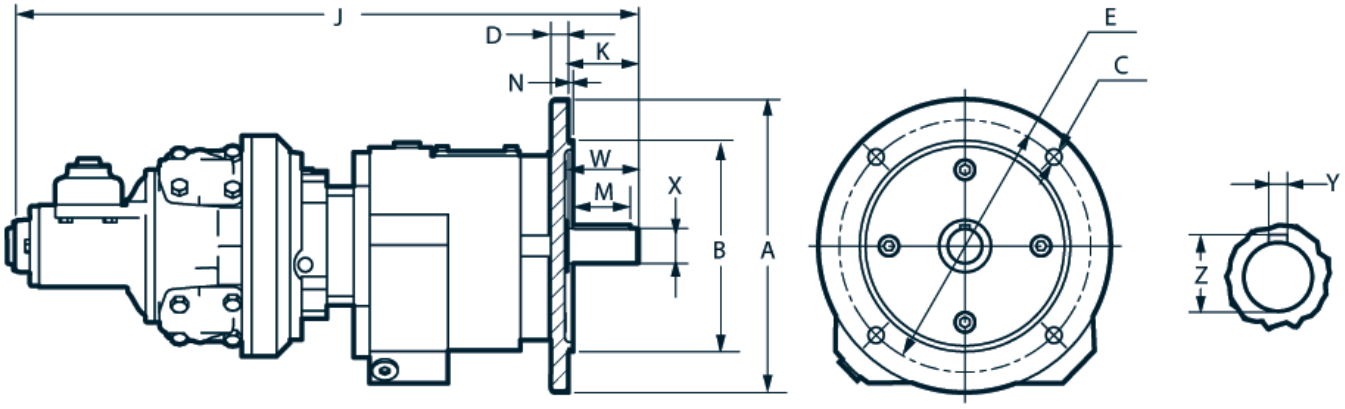
Detailed drawings and CAD models are available on request.

GEAR-MOTOR WITH BASE



Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
4.77-24.5:1	90+4	60	130	110	75	160	145	184+4	495	53	40	188	9.8	20	50	25	8	28	33
27-56:1	115	75	165	135	90	200	195	209	532	63	50	220	13.5	25	60	30	8	33	42
56-61:1	115	75	165	135	90	200	195	209	532	63	50	220	13.5	25	60	30	8	33	43.5
60-88.59:1	140	95	205	170	115	245	235	290	601	84	70	263	17.5	30	80	40	12	43	62.5

GEAR-MOTOR FLANGEDED



Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
4.77-24.5:1	200	130	11	12	165	495	50	40	3.5	50	25	8	28	33
27-56:1	250	180	13.5	15	215	532	60	50	4	60	30	8	33	42
56-61:1	250	180	13.5	15	215	532	60	50	4	60	30	8	33	43.5
60-88.59:1	300	230	13.5	16	265	610	80	70	4	80	40	12	43	62.5

MP400 - HP 4,43 KW 2,9

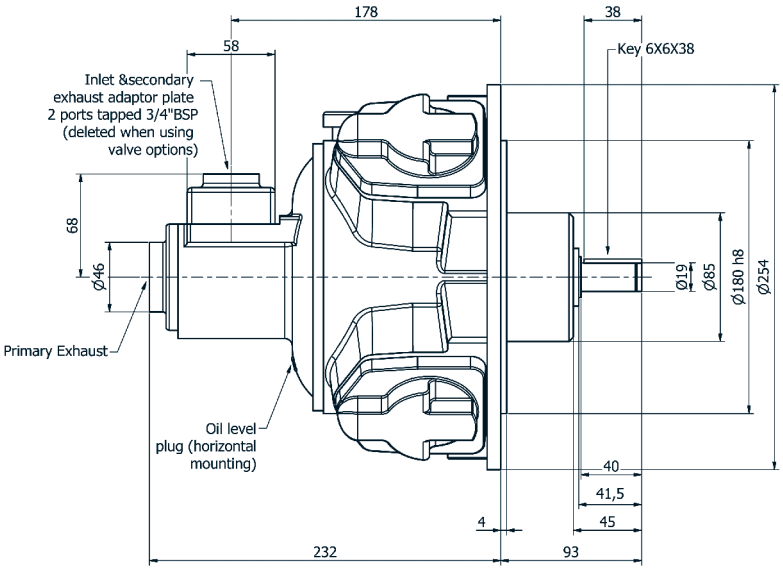
PERFORMANCES AND DIMENSIONS

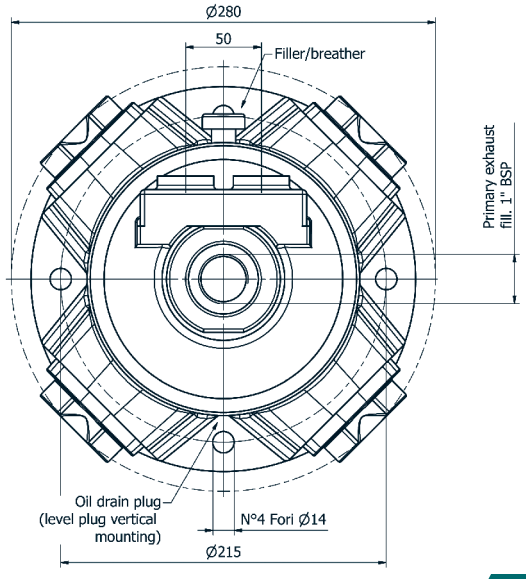
	8 bar			7 bar			6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	26,46	49,98	36,26	23,52	43,12	31,36	19,60	37,24	26,46	15,68	30,38	21,56	12,74	23,52	16,66	8,82	17,64	10,78
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
2400	4,7	13,72	110	4,0	11,76	96	3,2	9,80	83	2,5	6,86	69	1,7	4,90	56	1,0	2,94	42
2200	4,9	15,68	102	4,1	12,74	90	3,4	10,78	77	2,6	8,82	64	1,9	5,88	52	1,1	3,92	39
2000	5,0	17,64	95	4,2	14,70	83	3,5	11,76	71	2,7	9,80	59	2,0	6,86	47	1,2	3,92	36
1800	5,0	19,60	87	4,2	16,66	76	3,5	13,72	65	2,8	10,78	54	2,0	7,84	43	1,3	4,90	33
1600	4,9	21,56	79	4,1	18,62	69	3,4	14,70	59	2,7	11,76	49	2,0	8,82	39	1,3	5,88	29
1400	4,6	23,52	71	4,0	19,60	62	3,3	16,66	53	2,6	12,74	44	1,9	9,80	35	1,3	5,88	26
1200	4,3	25,48	64	3,7	21,56	56	3,1	17,64	47	2,4	14,70	39	1,8	10,78	31	1,2	6,86	23
1000	3,9	27,44	56	3,3	23,52	49	2,8	19,60	41	2,2	15,68	34	1,7	11,76	27	1,1	7,84	20
800	3,3	29,40	48	2,8	24,50	42	2,4	20,58	36	1,9	16,66	29	1,4	12,74	23	1,0	8,82	17
600	2,6	30,38	40	2,3	26,46	35	1,9	22,54	30	1,5	17,64	24	1,1	13,72	19	0,8	8,82	14
400	1,9	32,34	33	1,6	28,42	28	1,3	23,52	24	1,1	18,62	19	0,8	14,70	15	0,6	9,80	10

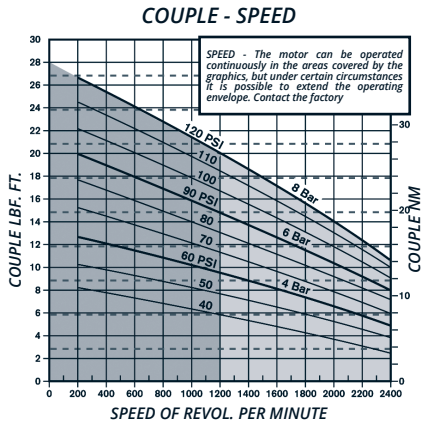
AVAILABLE VERSIONS

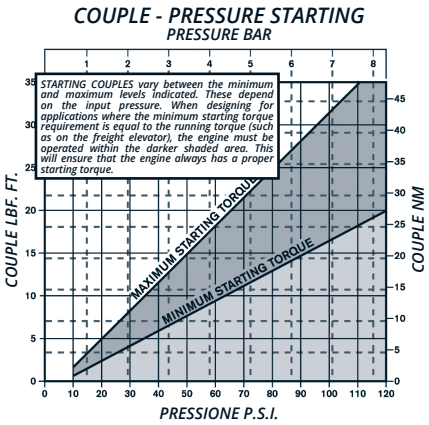
MP400F	flangeded
MP400FV	flangeded with control
MP400P	on base
MP400PV	on base with control
MP400BR	Motor with pneumatic brake BR210

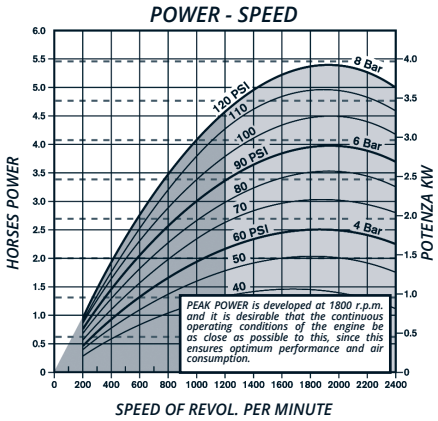
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 330 ml Vertical 450 ml.
Filtration: 64 µ or better
Radial load: 890 N max.
Moment of inertia: 0,56 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.26

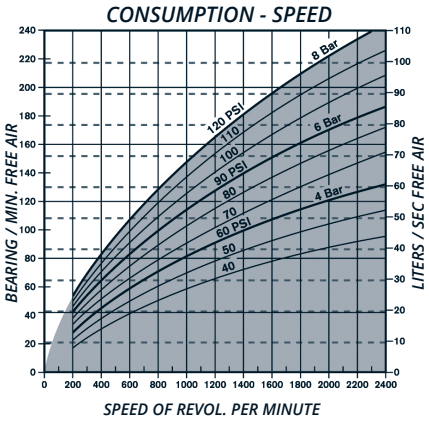


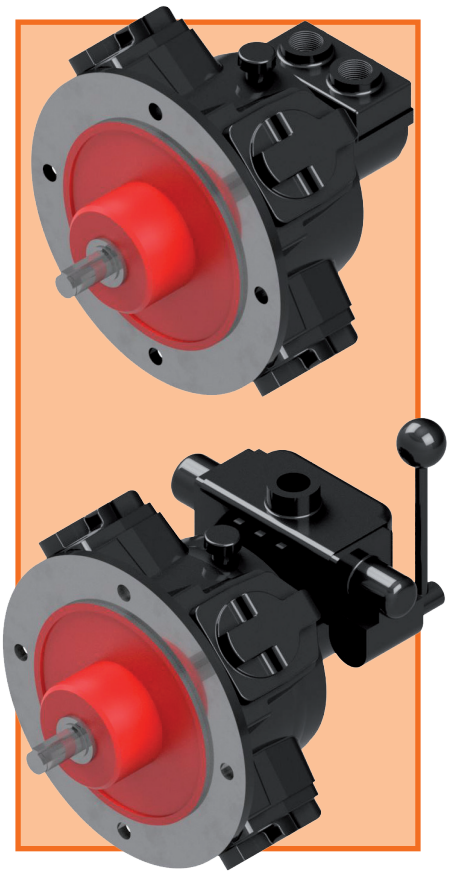












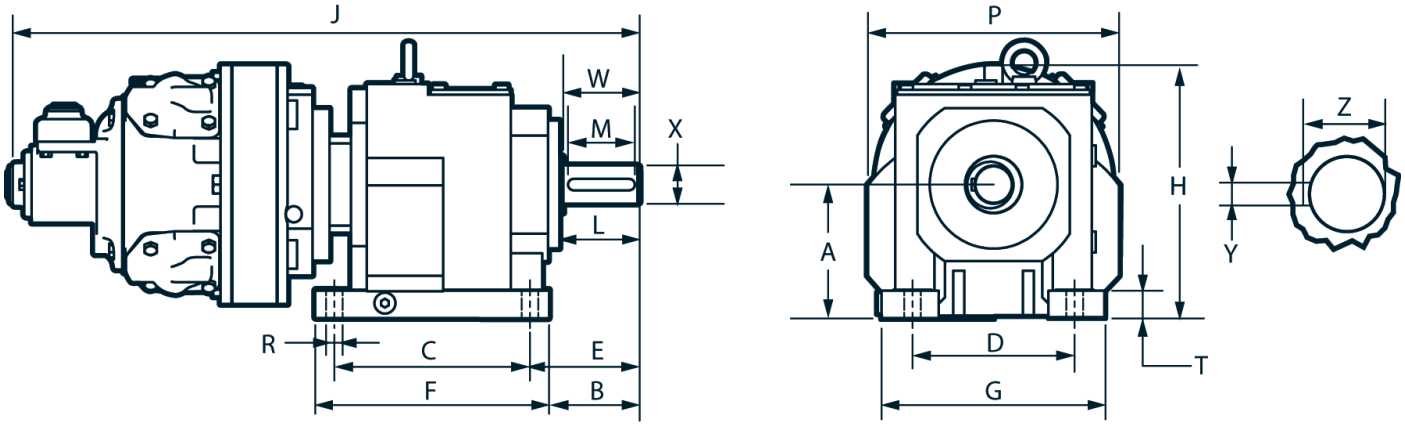
PNEUMATIC RADIAL PISTON GEARED MOTORS

The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
5.15	3	4	369	77	93	30	10	66
25.55	3	4	74	383	460	47	10	83
49.42	3	4	38	741	890	79	10	115
74.88	3	4	25	1123	1348	79	10	115
105.08	3	4	18	1576	1891	129	10	165
126.90	3	4	15	1904	2284	129	10	165
148.99	3	4	13	2235	2682	194	10	230
171.62	3	4	11	2574	3089	194	10	230
201.22	3	4	9	3018	3622	194	10	230
254.70	3	4	7	3821	4585	312	10	348

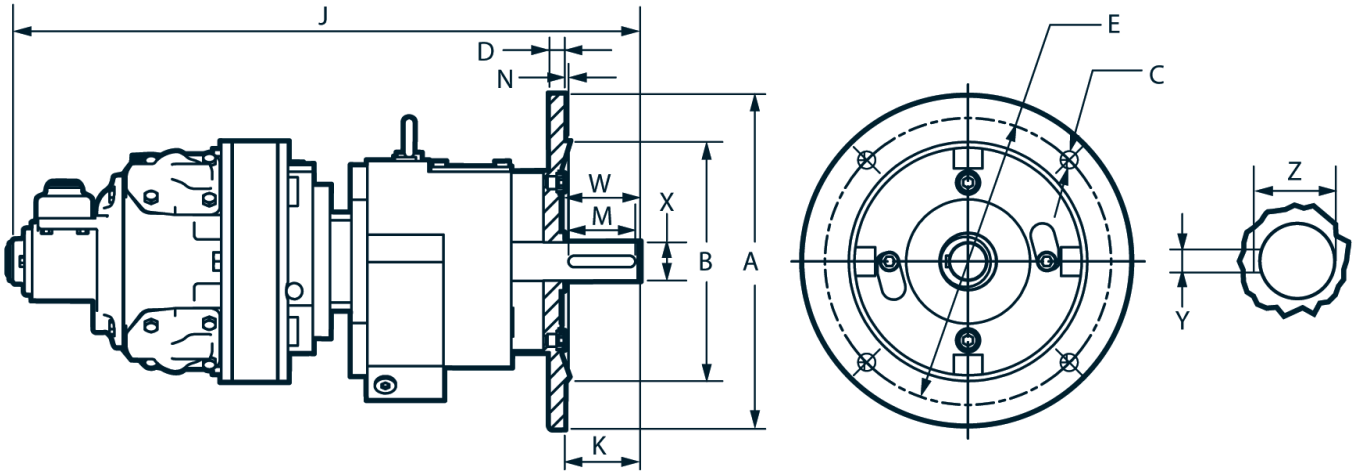
Detailed drawings and CAD models are available on request.

GEAR-MOTOR WITH BASE



Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
4.28-20.95:1	115+10	75	165	135	90	200	195	250	607	63	50	250	13.5	25	60	30	8	33	65.5
21.76-34.49:1	140	96	205	170	115	245	265	290	657	84	70	263	17.5	30	80	40	12	43	82.5
41.19-74.88:1	180	115	260	215	140	310	290	364	764	104	80	332	17.5	45	100	50	14	53.5	115
82.14-126.9:1	225	132	310	250	160	365	340	445	810	125	100	410	22	50	120	60	18	64	165

GEAR-MOTOR FLANGEDED



Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
4.28-20.95:1	250	180	13.5	15	215	607	60	50	4	60	30	8	33	65.5
21.76-34.49:1	350	250	17.5	16	300	658	80	70	4	80	40	12	43	82.5
41.19-74.88:1	350	250	17.5	18	300	743	100	80	5	100	50	14	53.5	114.5
82.14-126.9:1	350	250	17.5	18	300	803	120	100	5	100	60	18	64	164.5

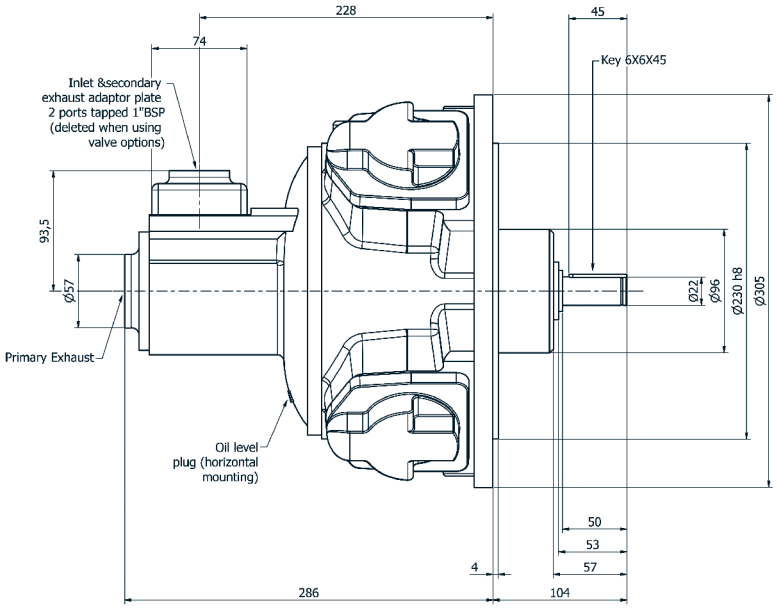
MP850 - HP 8,3 KW 6,1

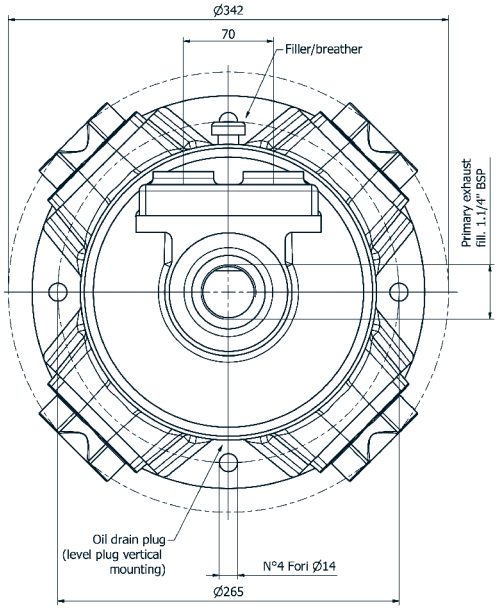
PERFORMANCES AND DIMENSIONS																		
	8 bar			7 bar			6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	47,04	86,24	73,50	40,18	75,46	63,70	34,30	64,68	52,92	28,42	53,90	43,12	22,54	43,12	32,34	16,66	32,34	22,54
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
2400	8,3	24,50	193	7,1	20,58	169	5,9	17,64	144	4,8	13,72	120	3,6	10,78	96	2,5	6,86	71
2200	9,3	29,40	178	8,0	25,48	156	6,7	21,56	133	5,4	17,64	111	4,2	13,72	89	2,9	8,82	66
2000	10,1	35,28	164	8,7	30,38	143	7,4	25,48	122	6,0	21,56	102	4,7	16,66	81	3,4	11,76	60
1800	10,6	41,16	149	9,1	35,28	131	7,7	30,38	111	6,2	24,50	92	4,8	18,62	74	3,4	12,74	55
1600	10,6	46,06	135	9,1	40,18	118	7,7	33,32	100	6,2	27,44	83	4,8	20,58	66	3,4	14,70	49
1400	10,2	50,96	120	8,8	44,10	105	7,4	37,24	89	6,0	30,38	74	4,6	22,54	59	3,1	15,68	43
1200	9,6	55,86	105	8,3	48,02	92	6,9	40,18	78	5,6	32,34	65	4,2	24,50	52	2,9	16,66	38
1000	8,7	60,76	91	7,4	51,94	79	6,2	44,10	67	5,0	35,28	56	3,8	26,46	44	2,6	18,62	32
800	7,4	64,68	76	6,3	55,86	66	5,3	47,04	56	4,3	37,24	47	3,3	28,42	37	2,2	19,60	27
600	5,8	67,62	61	4,9	57,82	54	4,1	48,02	45	3,3	39,20	37	2,5	29,40	29	1,7	20,58	21
400	4,0	69,58	47	3,4	59,78	41	2,9	49,98	34	2,3	40,18	28	1,7	30,38	22	1,2	20,58	16

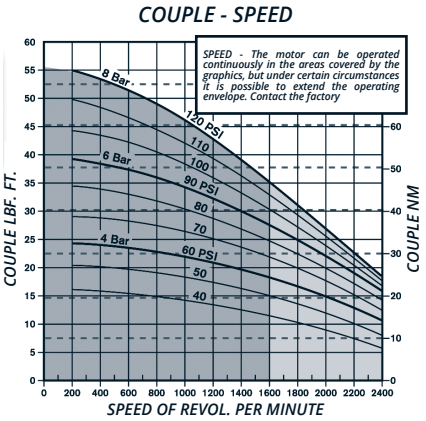
AVAILABLE VERSIONS

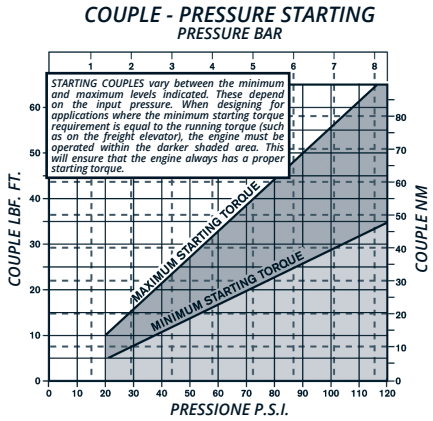
MP850F flangeded
MP850FV flangeded with control
MP850P on base
MP850PV on base with control
MP850BR Motor with pneumatic brake BR310

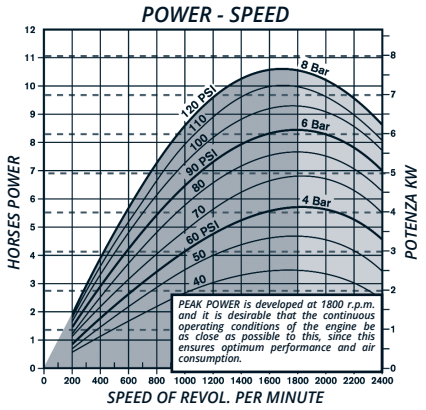
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 350 ml Vertical 600 ml.
Filtration: 64 µ or better
Radial load: 1330 N max.
Moment of inertia: 1,8 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.48

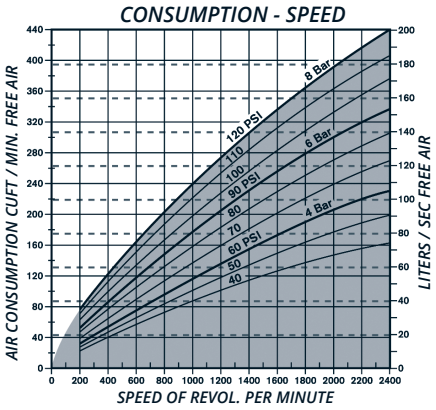


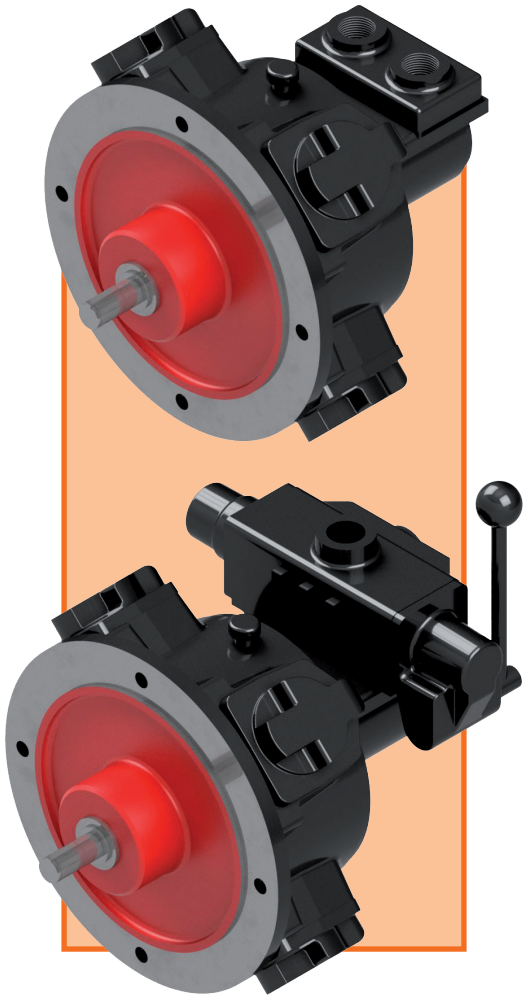












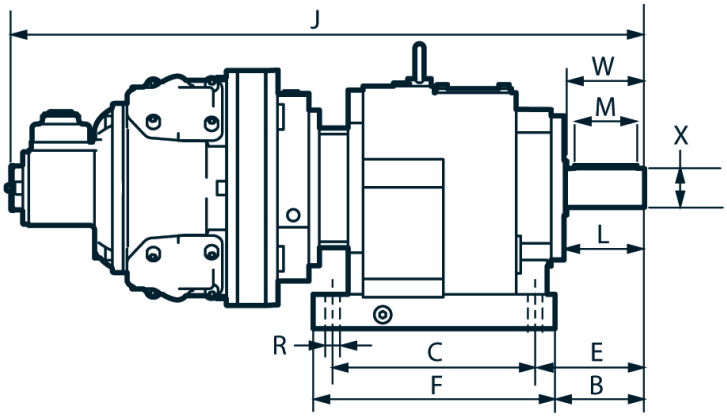
PNEUMATIC RADIAL PISTON GEARED MOTORS

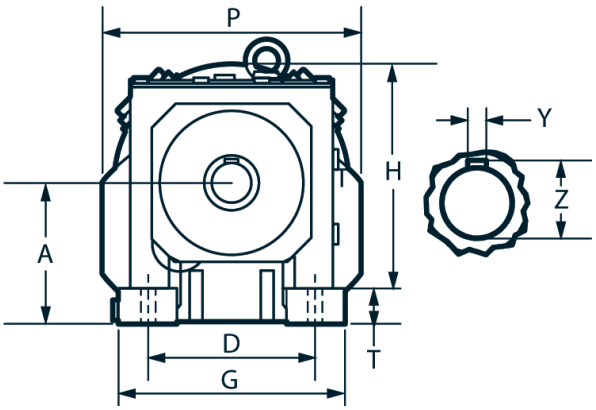
The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
5.15	6.37	8.5	350	165	170	38	14	100
25.01	6.37	8.5	72	800	824	92	14	154
51.97	6.37	8.5	35	1663	1713	130	14	192
78.06	6.37	8.5	23	2498	2573	194	14	256
103.80	6.37	8.5	17	3322	3421	194	14	256
123.37	6.37	8.5	15	3948	4066	312	14	374
156.38	6.37	8.5	12	5004	5154	312	14	374
178.38	6.37	8.5	10	5708	5879	475	14	537
198.71	6.37	8.5	9	6359	6549	475	14	537
253.08	6.37	8.5	7	8099	8342	475	14	537

Detailed drawings and CAD models are available on request.

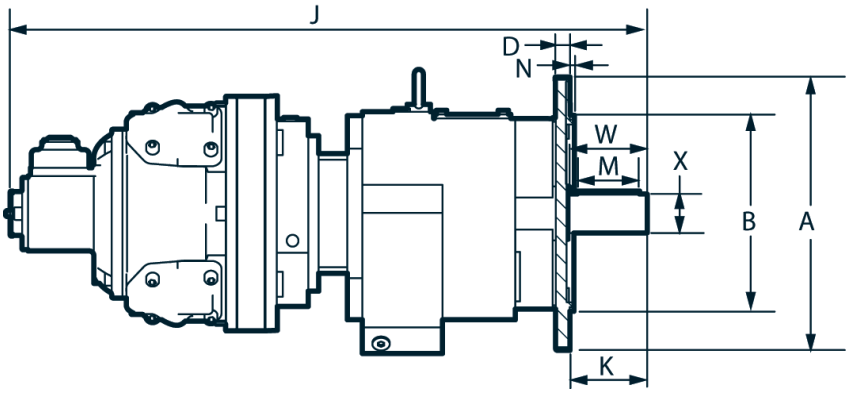
GEAR-MOTOR WITH BASE

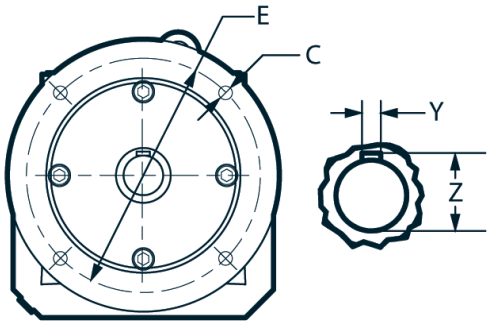




Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
4.28-6.9:1	115+35	92.5	165	135	110	200	195	265+35	722	83	70	300	13.5	25	70	40	12	43	96
8.11-16.45:1	140+10	95	205	170	115	245	235	290+10	748	84	70	290	17.5	30	80	40	12	43	113
20.81-31.32:1	180	115	260	215	140	310	290	364	806	104	80	332	17.5	45	100	50	14	53.5	150
35.14-60.9:1	225	132	310	250	159.5	365	340	445	891	125	100	410	22	50	120	60	18	64	184
78.06-88.46:1	250	150	370	290	185	440	400	507	965	145	110	462	26	55	140	70	20	74.5	252

GEAR-MOTOR FLANGEDED





Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
4.28-6.9:1	300	230	13.5	15	265	721	80	70	4	80	40	12	43	96
8.11-16.45:1	300	230	13.5	16	265	749	80	70	4	80	40	12	43	113
20.81-31.32:1	350	250	17.5	18	300	806	100	80	5	100	50	14	53.5	150
35.14-60.9:1	450	350	17.5	20	400	891	120	100	5	120	60	18	64	188
78.06-88.46:1	550	450	17.5	22	500	969	140	110	5	140	70	20	74.5	252

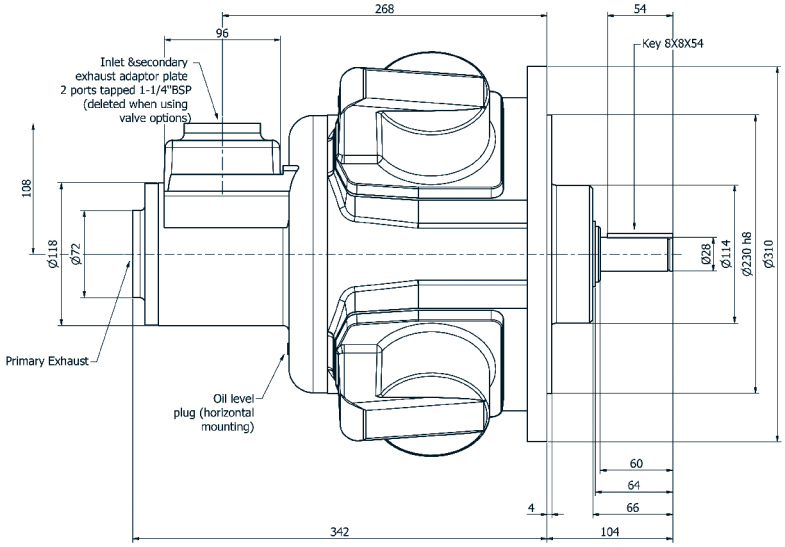
MP1450 - HP 17,1 KW 12,5

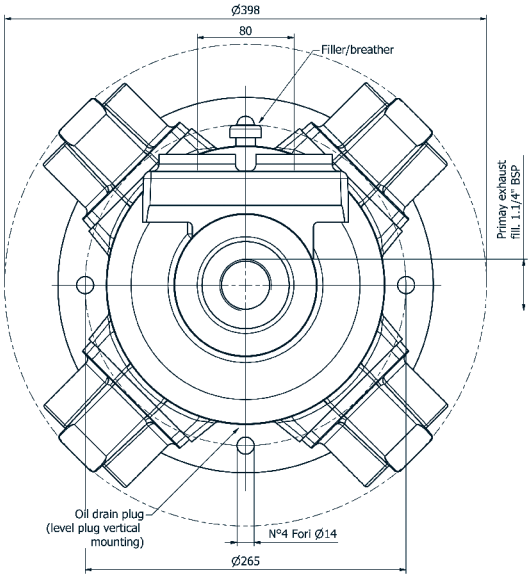
PERFORMANCES AND DIMENSIONS																		
	8 bar			7 bar			6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	96,04	181,30	148,96	83,30	158,76	128,38	72,52	136,22	107,80	59,78	112,70	86,24	48,02	91,14	65,66	36,26	67,62	45,08
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
2000	17,1	59,78	311	14,7	51,94	271	12,2	43,12	231	9,7	34,30	191	7,3	25,48	151	4,8	16,66	111
1800	18,1	70,56	283	15,6	60,76	246	13,1	50,96	210	10,6	41,16	173	8,0	31,36	137	5,5	21,56	100
1600	18,5	81,34	255	15,9	69,58	222	13,4	58,80	189	10,9	48,02	156	8,3	36,26	123	5,8	25,48	90
1400	18,2	91,14	226	15,8	79,38	197	13,3	66,64	168	10,8	53,90	138	8,3	42,14	109	5,9	29,40	79
1200	17,4	101,92	198	15,1	88,20	172	12,7	74,48	146	10,3	60,76	121	7,9	46,06	95	5,6	32,34	69
1000	15,6	109,76	170	13,6	95,06	148	11,6	81,34	125	9,5	66,64	103	7,5	52,92	81	5,4	38,22	58
800	13,5	118,58	142	11,7	102,90	123	9,9	87,22	104	8,1	71,54	85	6,3	54,88	66	4,5	39,20	48
600	10,8	126,42	113	9,4	109,76	98	7,9	92,12	83	6,4	75,46	68	5,0	57,82	52	3,5	41,16	37
400	7,7	134,26	85	6,6	116,62	73	5,6	98,00	62	4,5	79,38	50	3,5	61,74	38	2,5	43,12	27
200	4,0	141,12	57	3,5	121,52	49	2,9	102,90	41	2,4	83,30	32	1,8	63,70	24	1,3	44,10	16

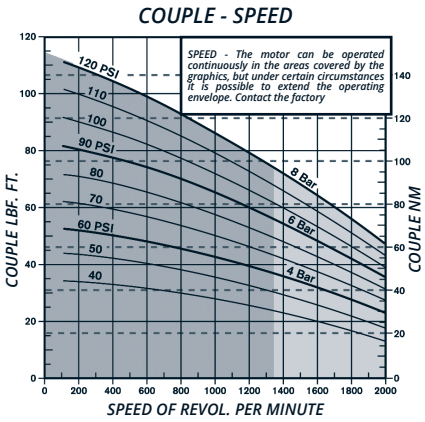
AVAILABLE VERSIONS

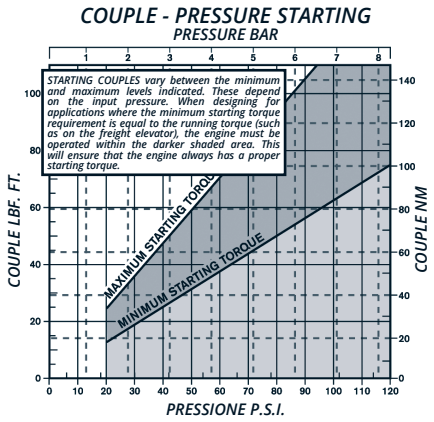
MP1450F flangeded
MP1450FV flangeded with control
MP1450P on base
MP1450PV on base with control
MP1450BR Motor with pneumatic brake BR410

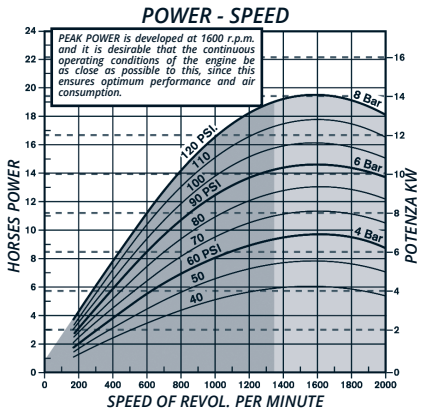
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 500 ml Vertical 940 ml.
Filtration: 64 µ or better
Radial load: 1330 N max.
Moment of inertia: 4,1 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.62

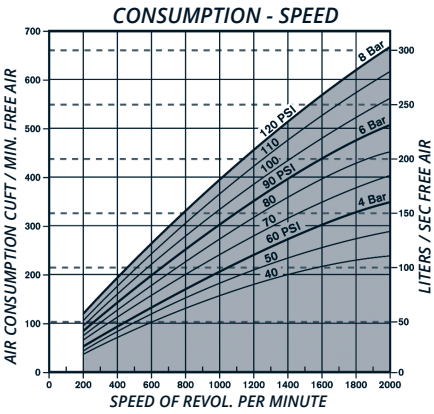


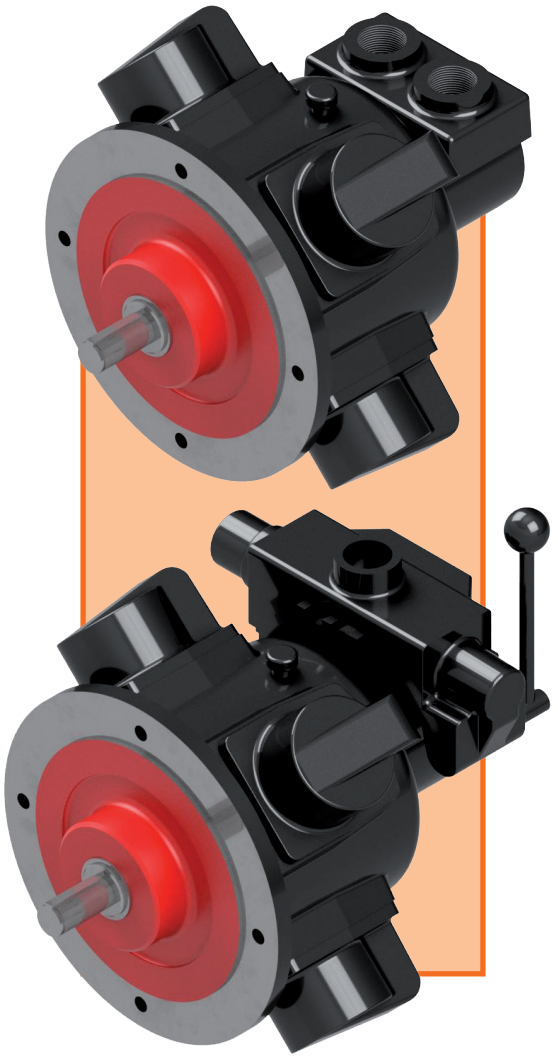












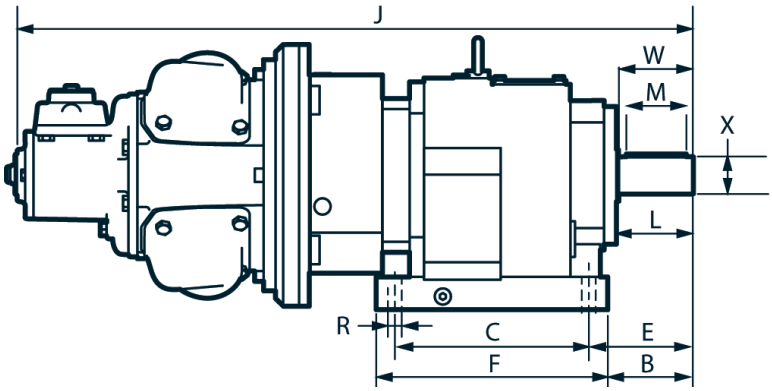
PNEUMATIC RADIAL PISTON GEARED MOTORS

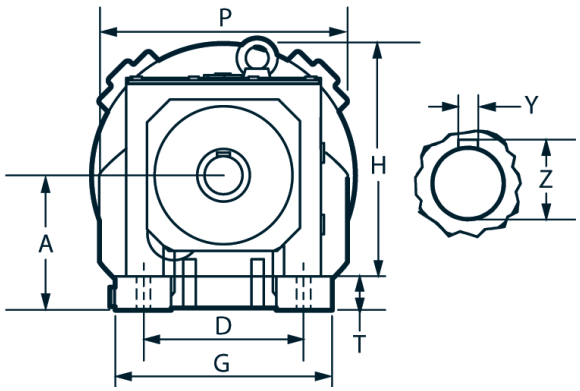
The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
5.06	11.25	15	316	288	317	67	14	143
24.94	11.25	15	64	1422	1564	132	14	208
48.44	11.25	15	33	2761	3037	215	14	291
69.36	11.25	15	23	3954	4349	312	14	388
92.91	11.25	15	17	5296	5825	312	14	388
123.59	11.25	15	13	7045	7749	475	14	551
141.28	11.25	15	11	8053	8858	475	14	551
177.23	11.25	15	9	10102	11112	635	14	711
206.34	11.25	15	8	11761	12938	635	14	711

Detailed drawings and CAD models are available on request.

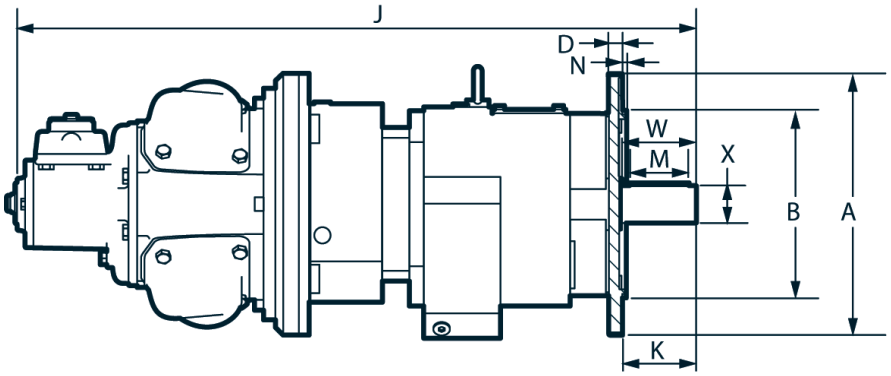
GEAR-MOTOR WITH BASE

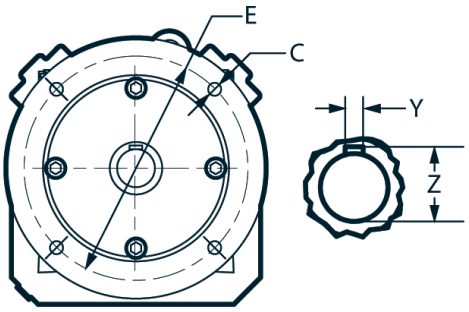




Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
3.49-6.72:1	140+35	115	205	170	135	245	235	315+35	865	104	80	350	17.5	30	100	50	14	53.5	143
7.59-17.27:1	180	115	260	215	140	310	290	364	900	104	80	350	17.5	45	100	50	14	53.5	161
19.48-35.14:1	225	132	310	250	159.5	365	340	445	959	125	100	410	22	50	120	60	18	64	208
37.57-57.66:1	250	150	370	290	185	440	400	507	1063	146	110	462	26	55	140	70	20	75	291
62.12-81.04:1	315	220	410	340	260	490	450	578	1163	210	180	510	33	60	210	100	28	106	388

GEAR-MOTOR FLANGEDED





Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
3.49-6.72:1	350	250	17.5	16	300	865	100	80	4	100	50	14	53.5	143
7.59-17.27:1	350	250	17.5	18	300	906	100	80	5	100	50	14	53.5	161
19.48-35.14:1	450	350	17.5	20	400	959	120	100	5	120	60	18	64	208
37.57-57.66:1	450	350	17.5	22	400	1063	140	110	5	140	70	20	74.5	291

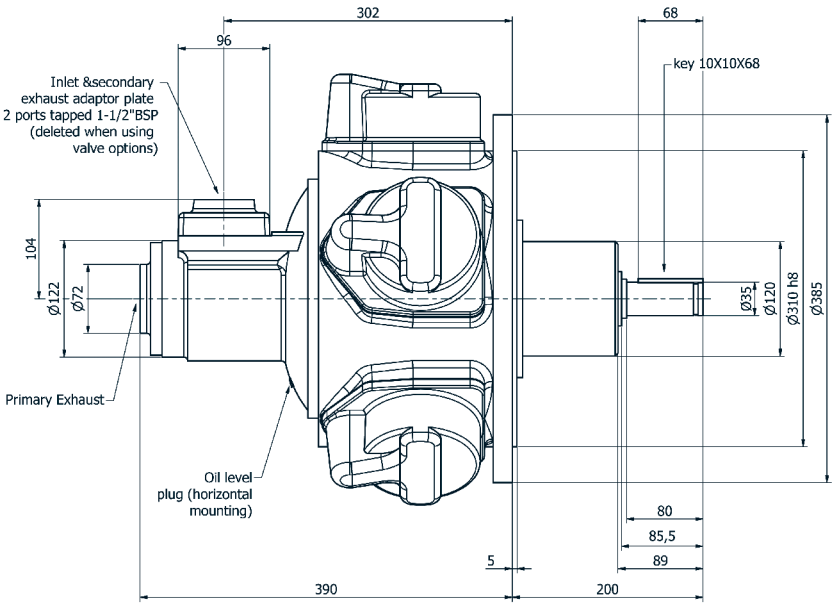
MP2250 - HP 26,8 KW 19,7

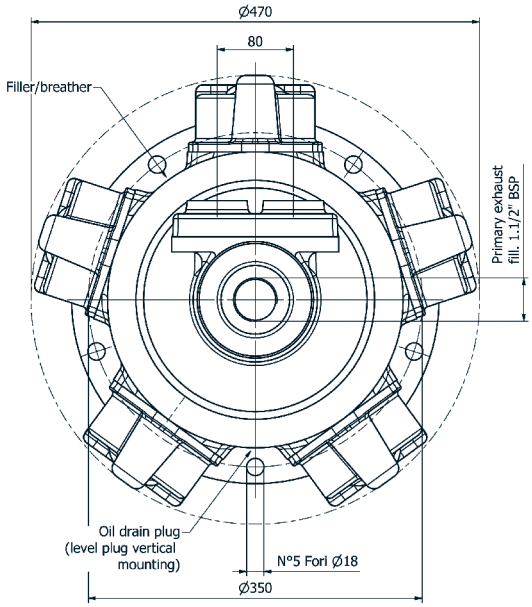
PERFORMANCES AND DIMENSIONS																		
	8 bar			7 bar			6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	223,44	343,98	312,62	195,02	300,86	270,48	166,60	257,74	228,34	138,18	214,62	187,18	109,76	171,50	145,04	81,34	127,40	102,90
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
1500	26,8	125,44	463	22,7	106,82	410	18,7	87,22	358	14,7	68,60	305	10,6	49,98	253	6,5	30,38	200
1300	29,5	159,74	407	25,2	136,22	361	20,9	112,70	315	16,6	89,18	268	12,2	65,66	222	7,9	43,12	176
1100	30,3	193,06	351	25,9	165,62	311	21,6	138,18	271	17,3	110,74	232	13,0	82,32	192	8,6	54,88	152
900	29,1	226,38	295	25,0	195,02	262	20,9	162,68	228	16,8	131,32	195	12,7	98,98	161	8,6	67,62	128
700	25,7	257,74	239	22,1	221,48	212	18,6	186,20	185	15,0	150,92	158	11,5	115,64	131	7,9	79,38	104
500	20,1	282,24	183	17,3	243,04	162	14,6	204,82	142	11,8	165,62	121	9,1	127,40	101	6,3	89,18	80
300	12,8	299,88	127	11,1	258,72	113	9,3	218,54	99	7,6	177,38	84	5,8	136,22	70	4,1	95,06	56
100	4,4	309,68	71	3,8	267,54	63	3,2	225,40	55	2,6	184,24	48	2,0	142,10	40	1,4	100,94	32

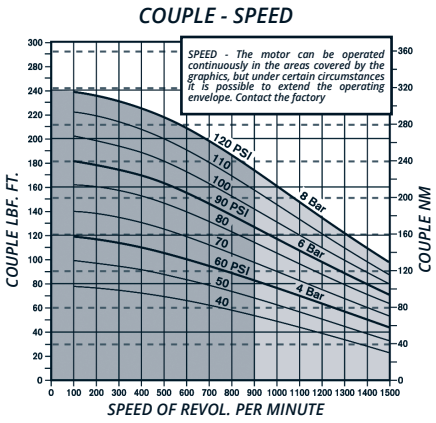
AVAILABLE VERSIONS

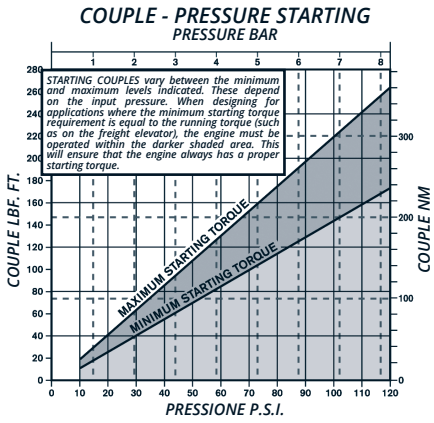
MP2250F	flangeded
MP2250FV	flangeded with control
MP2250P	on base
MP2250PV	on base with control
MP2250BR	Motor with pneumatic brake BR510

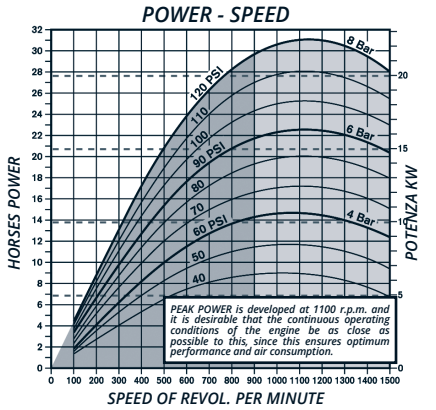
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 1,1 l Vertical 2,1 l.
Filtration: 64 µ or better
Radial load: 6500 N max.
Moment of inertia: 14 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.115

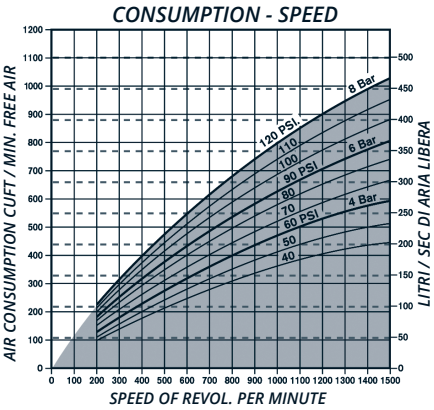


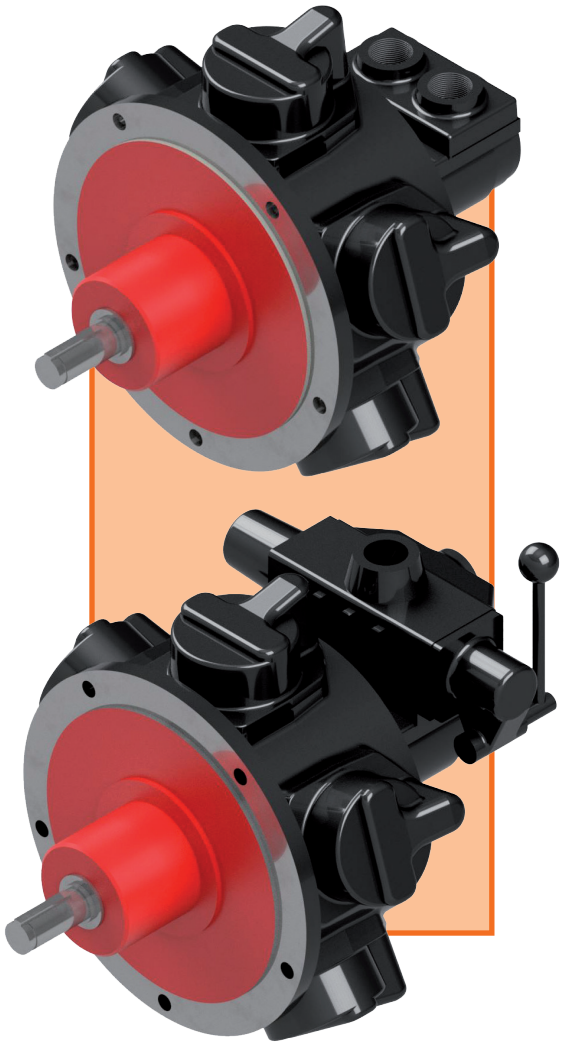












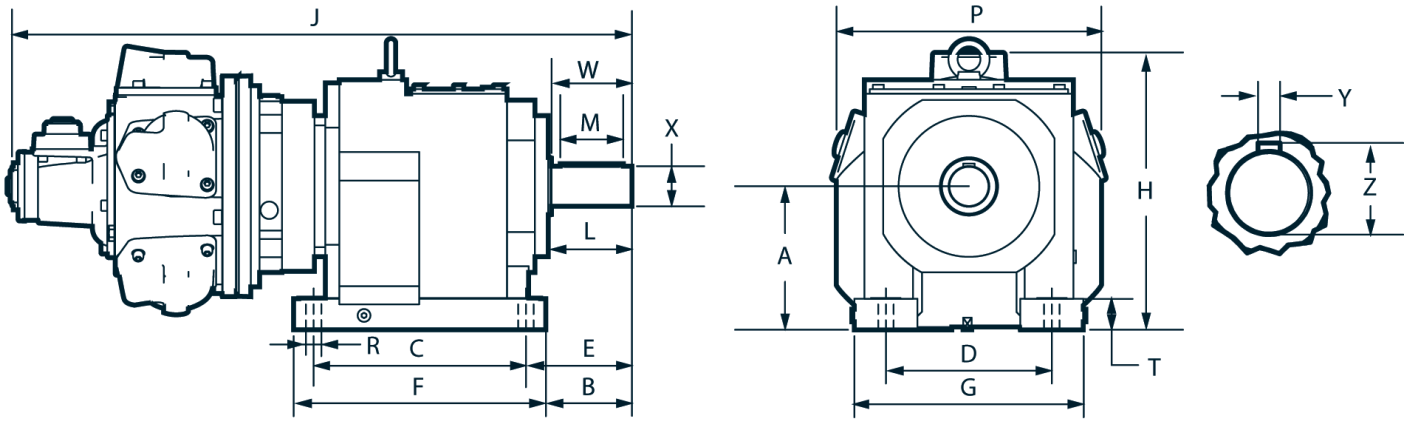
PNEUMATIC RADIAL PISTON GEARED MOTORS

The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
5.24	16	22.5	210	734	807	85	18	218
25.05	16	22.5	44	3507	3858	215	18	348
50.74	16	22.5	22	7104	7814	305	18	438
92.06	16	22.5	12	12888	14177	635	18	768

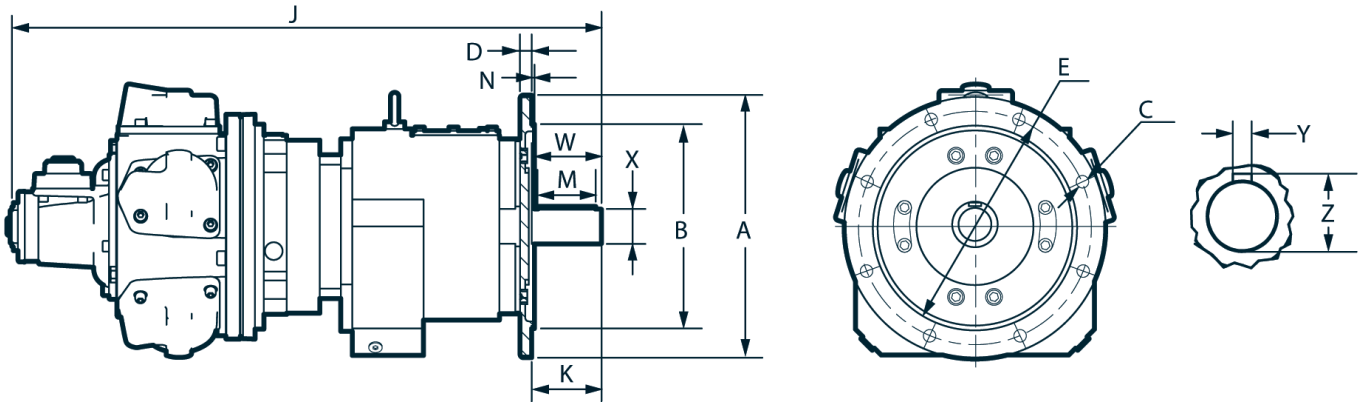
Detailed drawings and CAD models are available on request.

GEAR-MOTOR WITH BASE



Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
3.42-12.68:1	225	132	310	250	159.5	365	340	469	1131	125	100	410	22	50	120	60	18	64	218
14.06-21.41:1	250	150	370	290	185	440	400	507	1092	145	110	462	26	55	140	70	20	74.5	348
23.04-35.09:1	315	220	410	340	260	490	450	578	1199	216	180	510	33	60	210	100	28	106	438
39.45-63.08:1	355	215	500	380	260	590	530	660	1305	216	180	580	39	65	210	100	28	106	608
69.41-92.06:1	425	225	580	500	270	670	630	758	1373	216	180	630	39	100	210	120	32	127	768

GEAR-MOTOR FLANGEDED



Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
3.42-12.68:1	450	350	17.5	20	400	1020	120	100	5	120	60	18	64	218
14.06-21.41:1	450	350	17.5	22	400	1103	140	110	5	140	70	20	74.5	348
23.04-35.09:1	450	350	17.5	22	400	1170	170	140	5	210	90	28	95	438
39.45-63.08:1	550	450	17.5	31	500	1305	210	180	5	210	100	28	106	608
69.41-92.06:1	550	450	18	31	500	1392	210	180	5	210	120	32	127	768

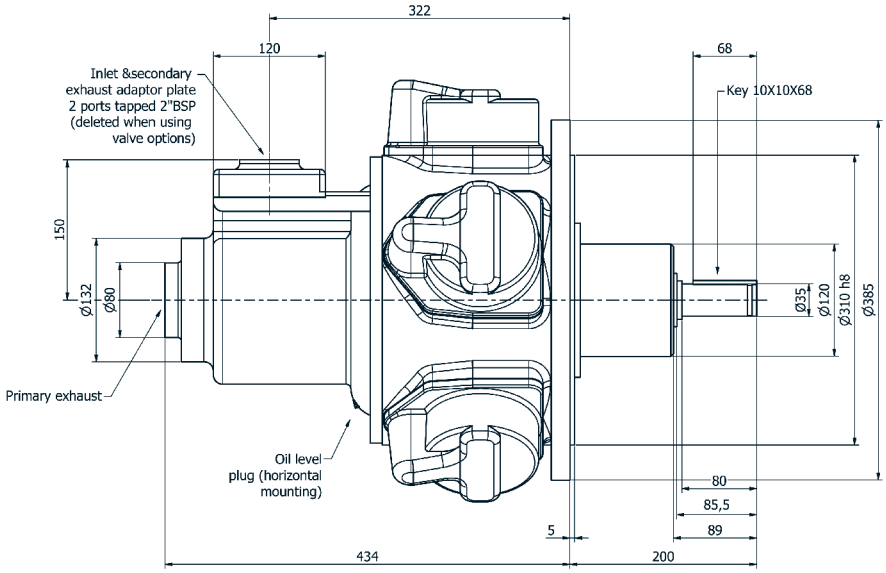
MP3000 - HP 24,9 KW 18,3

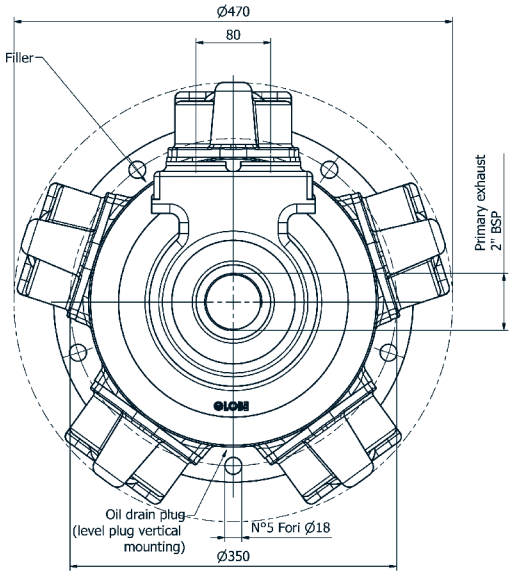
PERFORMANCES AND DIMENSIONS												
	6 bar			5 bar			4 bar			3 bar		
	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm	Couple Min. Of cue Nm	Couple Max. of cue Nm	Couple Stall Nm
	161,70	246,96	235,20	135,24	205,80	192,08	104,86	161,70	147,98	77,42	117,60	104,86
Speed Giri/1'	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec	Power HP	Couple Max Power Nm	Consumption l/sec
2000	24,9	87,22	510	19,5	68,60	430	14,1	49,00	350	8,7	30,38	270
1800	27,9	108,78	467	21,9	85,26	393	16,0	62,72	320	10,1	39,20	247
1600	29,3	128,38	423	23,2	101,92	357	17,1	74,48	290	10,9	48,02	223
1400	29,5	147,98	380	23,5	117,60	320	17,4	87,22	260	11,3	56,84	200
1200	28,3	165,62	337	22,8	133,28	283	17,4	101,92	230	11,9	69,58	176
1000	25,7	180,32	293	20,8	146,02	246	16,0	112,70	199	11,2	78,40	153
800	22,1	194,04	250	18,1	158,76	210	14,0	122,50	169	9,9	87,22	129
600	17,8	208,74	206	14,6	170,52	173	11,3	132,30	139	8,0	94,08	106
400	12,4	217,56	163	10,2	178,36	136	7,9	139,16	109	5,7	99,96	82
200	6,5	226,38	120	5,3	185,22	99	4,1	144,06	79	2,9	102,90	59

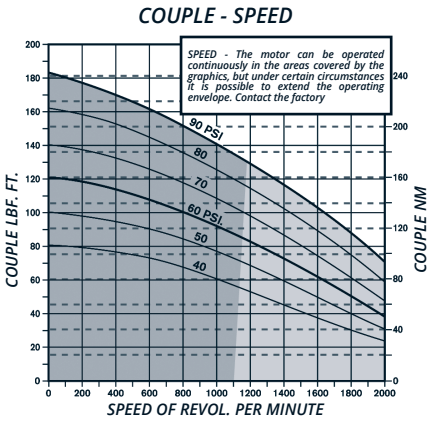
AVAILABLE VERSIONS

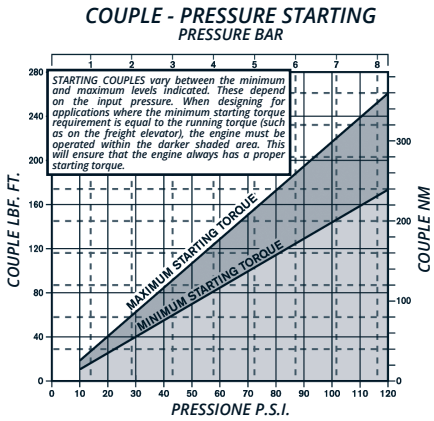
MP3000F flangeded
MP3000FV flangeded with control
MP3000P on base
MP3000PV on base with control
MP3000BR Motor with pneumatic brakeBR610

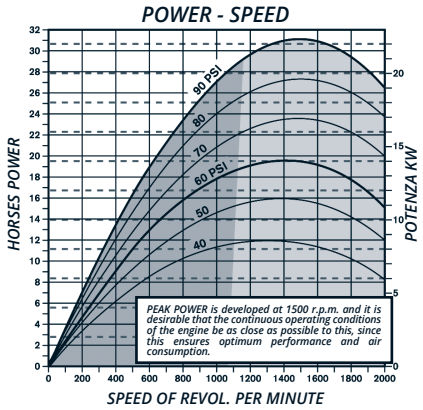
Lubrification: 3-4 drops/1' continuos operation
6-10 drops/1' intermittent operation
Horizontal 1,1 l Vertical 2,1 l.
Filtration: 64 µ or better
Radial load: 6500 N max.
Moment of inertia: 14 g.m
Operative temperature: da –20°C a +80°C
Weight (version MP165): Kg.125

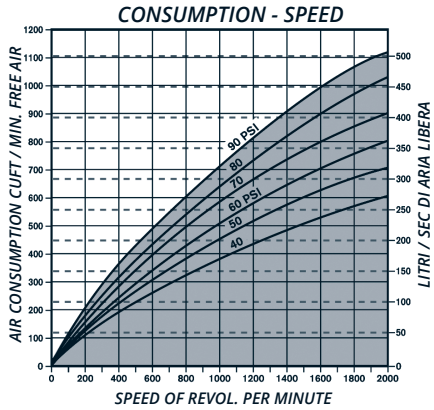


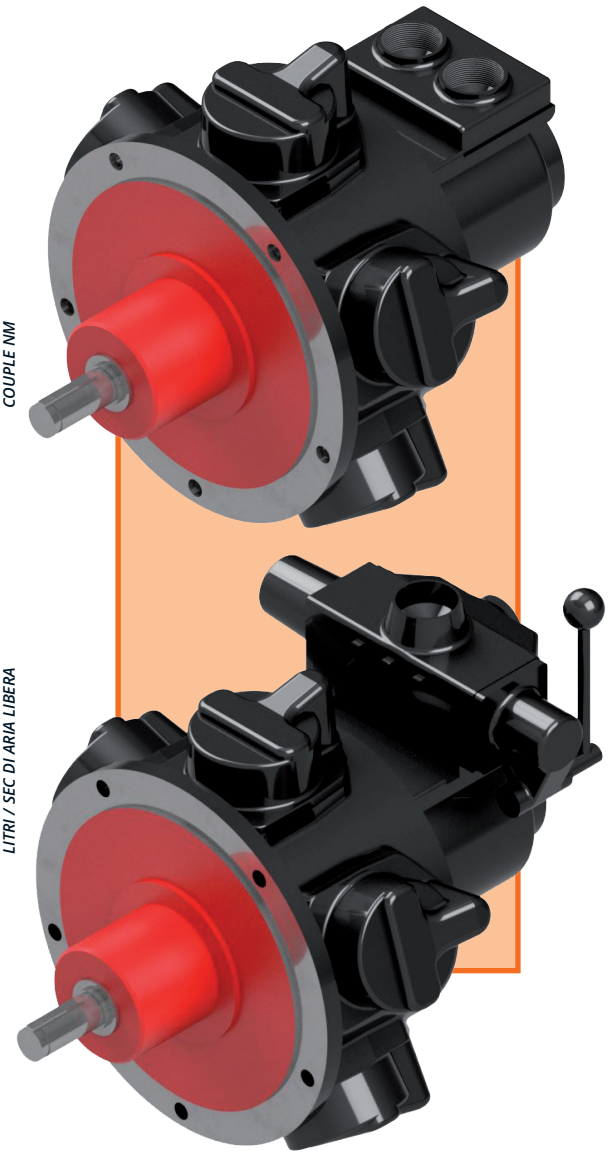












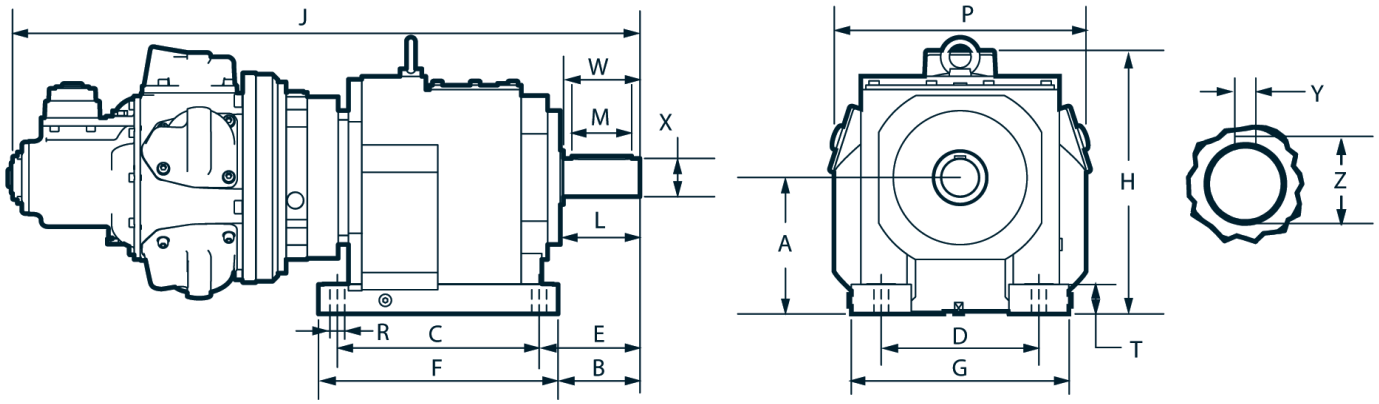
PNEUMATIC RADIAL PISTON GEARED MOTORS

The performance shown below was measured at a pressure of 6 bar. For higher pressures contact TSA. For additional models and reports contact TSA.

Rapport reduction	Conditions at maximum power				Couple min. of cue	Weight Kg		
	kw	hp	Giri/1'	Couple Nm	Nm	Gear	Adapter	Motor & gear
5.24	16	22.5	210	734	807	85	18	218
25.05	16	22.5	44	3507	3858	215	18	348
50.74	16	22.5	22	7104	7814	305	18	438
92.06	16	22.5	12	12888	14177	635	18	768

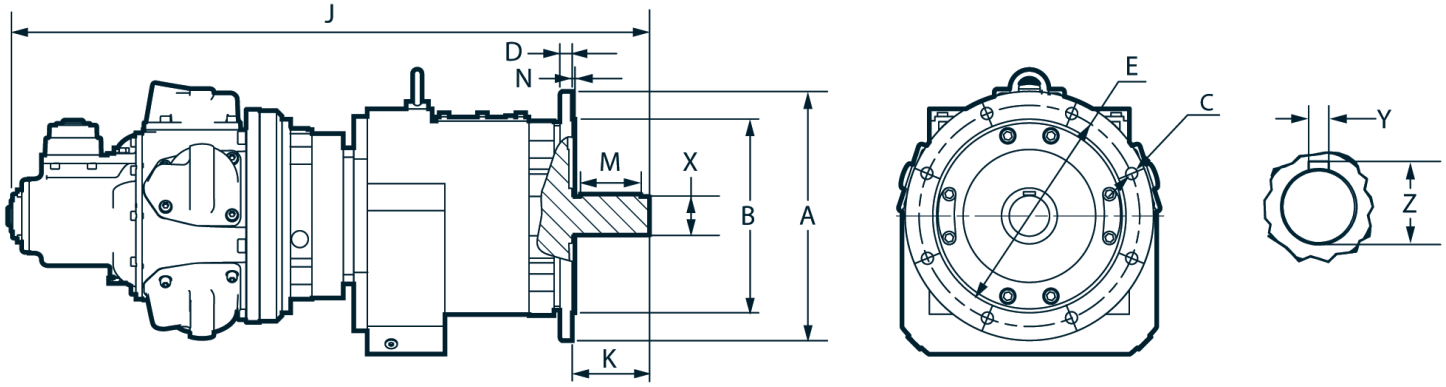
Detailed drawings and CAD models are available on request.

GEAR-MOTOR WITH BASE



Rapport	A	B	C	D	E	F	G	H	J	L	M	P	R	T	W	X	Y	Z	Weight Kg.
3.42-12.68:1	225	132	310	250	159.5	365	340	469	1131	125	100	410	22	50	120	60	18	64	218
14.06-21.41:1	250	150	370	290	185	440	400	507	1092	145	110	462	26	55	140	70	20	74.5	348
23.04-35.09:1	315	220	410	340	260	490	450	578	1199	216	180	510	33	60	210	100	28	106	438
39.45-63.08:1	355	215	500	380	260	590	530	660	1305	216	180	580	39	65	210	100	28	106	608
69.41-92.06:1	425	225	580	500	270	670	630	758	1373	216	180	630	39	100	210	120	32	127	768

GEAR-MOTOR FLANGEDED

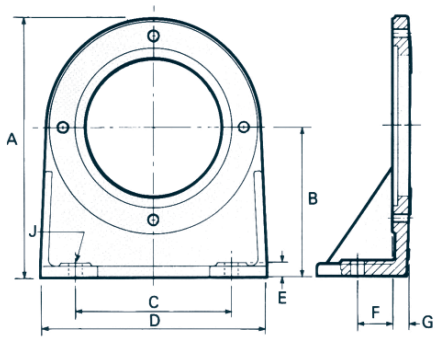


Rapport	A	B	C	D	E	J	K	M	N	W	X	Y	Z	Weight Kg.
3.42-12.68:1	450	350	17.5	20	400	1020	120	100	5	120	60	18	64	218
14.06-21.41:1	450	350	17.5	22	400	1103	140	110	5	140	70	20	74.5	348
23.04-35.09:1	450	350	17.5	22	400	1170	170	140	5	210	90	28	95	438
39.45-63.08:1	550	450	17.5	31	500	1305	210	180	5	210	100	28	106	608
69.41-92.06:1	550	450	18	31	500	1392	210	180	5	210	120	32	127	768

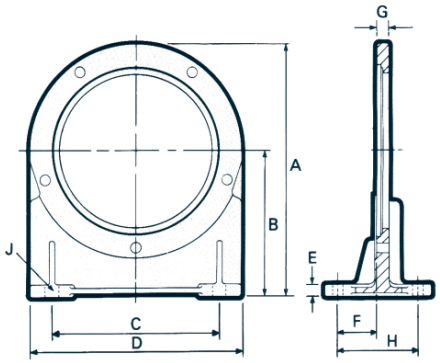
BASE ON FOOT

	MP165	MP400	MP850	MP1450	MP2250	MP3000
A	220	310	370	372	457	457
B	125	180	215	215	264	264
C	140	190	228	228	305	305
D	203	280	330	330	386	386
E	10	20	19	21	22	22
F	32	42	52	52	70	70
G	16	19	22	22	22	22
H	-	-	-	-	146	146
J	2x Ø14	2x Ø18	2x Ø20	2x Ø20	4x Ø22	4x Ø22

BASE
MP165-400-850-1450

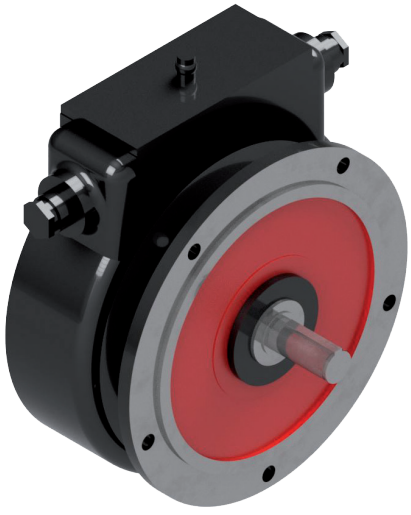


BASE
MP2250-3000



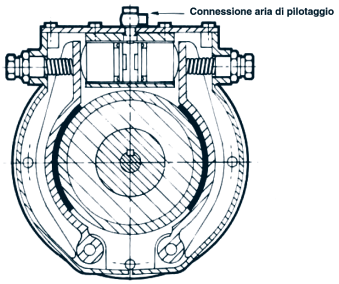
PNEUMATIC BRAKES

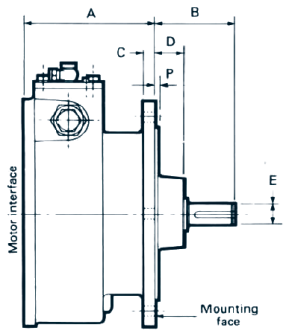
The BR series brakes are designed to be assembled with radial piston air motors. As can be seen from the sectioned drawing, the normally closed brake consists of two springs which press the jaws onto the central hub. These jaws are released by a cylinder with air pressure. The torque of the brake can be varied by means of the two lateral spring regulators, normally it is regulated in such a way that a pilot pressure of 4.1 bar releases it completely. Pressures below 4.1 bar will progressively reduce the braking capacity. Although the brakes are pre-registered it may be necessary to make some adjustments to the place of use for the different individual applications. These types of brakes can not be used for dynamic applications.

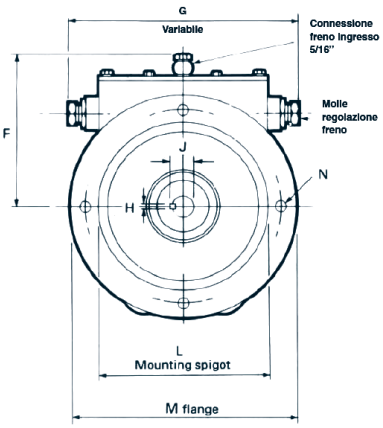


MOD	A	B	C	D	E	F	G	P	H	J	L	M	N-HOLES BY ASSEMBLY			
													No.	Ø	P.C.D.	L-screws MAX
BR110	100	66	8	30	14,01 14,00	126	210	3,6	5,00 4,97	16,00 15,87	130,00 129,94	188	4	11	165	28
BR210	115	93	11	46	19,01 18,99	129	235	4,0	6,00 5,97	21,50 21,27	180,00 179,94	254	4	14	215	25
BR310	140	104	15	46	22,01 21,99	160	270	4,0	6,00 5,97	24,50 24,27	230,00 229,93	305	4	14	265	35
BR410	175	104	16	37	28,01 28,00	206	340	4,0	8,00 7,94	31,01 30,71	230,00 229,93	305	4	14	265	40
BR510	172	96	16	16	35,02 35,00	268	450	5,1	10,00 9,96	38,00 37,71	310,00 309,92	385	5	18	350	35
BR610	172	96	16	16	35,02 35,00	268	450	5,1	10,00 9,96	38,00 37,71	310,00 309,92	385	5	18	350	35

The brake is released by pneumatic pressure. If the pneumatic pressure drops below a predefined air pressure, the brake is enabled.







CIRCUIT (A): INSTALLATION WITHOUT CONTROL VALVE.

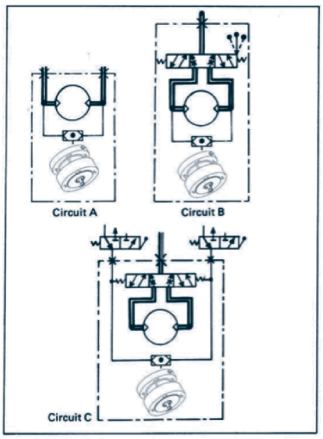
It's applied to engines with brake without control valve. The unit will be equipped with an OR selector valve to allow the brake to operate in both directions of rotation.

CIRCUIT (B): INSTALLATION WITH MANUAL CONTROL VALVE.

The manual valve checks the rotation of the output shaft. This valve allows for brake operation in both rotation directions.

CIRCUIT (C): INSTALLATION WITH REMOTE CONTROL VALVE.

The remote valve allows for checking the output shaft rotation from a distance.
This valve allows for brake operation in both rotation directions.



ACCESSORIES

PROPORTIONAL CONTROL VALVE REMOTE-CONTROLLED (RCV) OR HAND-CONTROLLED (HCV):

These valves have the following advantages:
- Strong and with a molten steel body;
- High flow for low pressures
- Low-attrition spool and operation.
- Accurate proportional control;
- Available with constant spool or differential spool operation

The proportional valves, as standard, can be provided in two versions: with constant spool operation or with differential spool operation; the latter is suitable for lifting operations.
With a differential spool valve the load of the weight being lowered will not move at a speed higher than the set value.

The reduced power direction needs to be indicated when the control is given: clockwise rotation (CW) or counterclockwise rotation (CCW) looking from the motor output shaft.

REMOTE-CONTROLLED VALVE (RCV)

This option is usually operated from a remote position using a PC or an LC2 remote control. A variable pneumatic signal is applied at both ends of the spool on the valve, depending on the motor rotation direction. The pressure field of the signal is included between 1.4 bar (20 psi) and 4.8 bar (70 psi); by increasing the pressure, the speed also goes up. The valve is kept in a central (idle) position by means of springs.

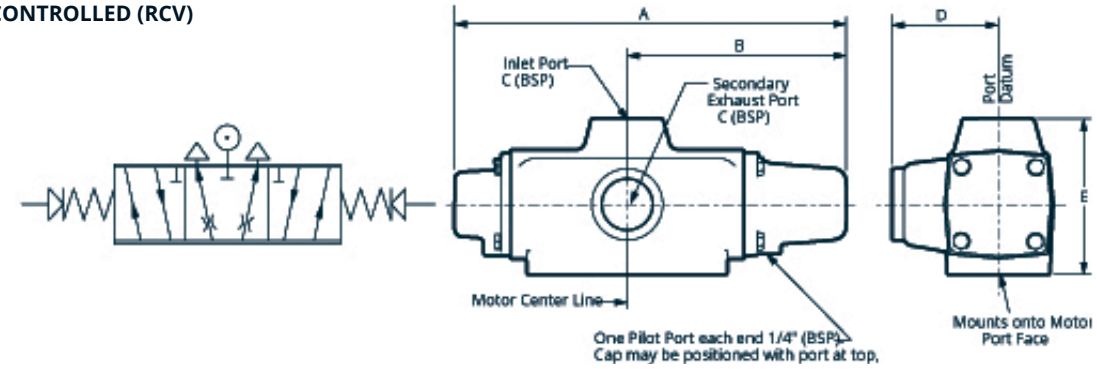
PROPORTIONAL HAND-CONTROLLED VALVE (HCV)

The control valve cursor can be operated directly using a lever mechanism. It is possible to increase the motor speed, depending on how the lever is moved in both directions starting from the central position (idle).

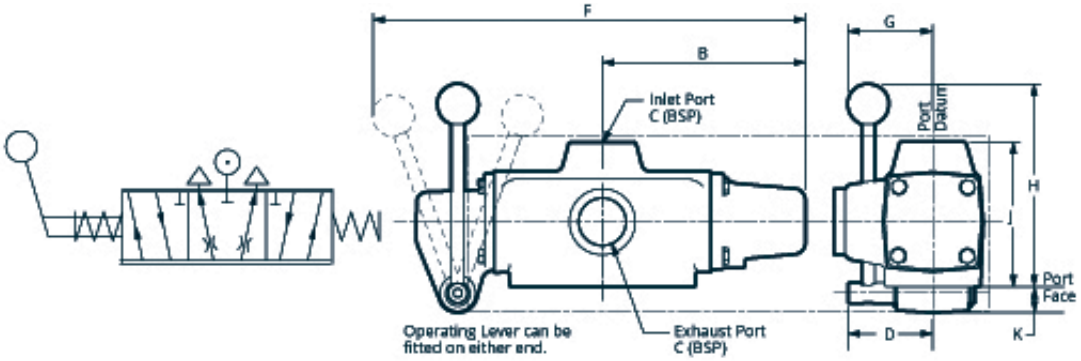
PRESSURE DROP

The slightest pressure drop will be neutralised by the valves; as a result the output torque is maintained and the motor speed reduced by about 10-15% to 6 bar (90 psi) at maximum power. The starting torque remains unchanged.

VALVE REMOTE-CONTROLLED (RCV)



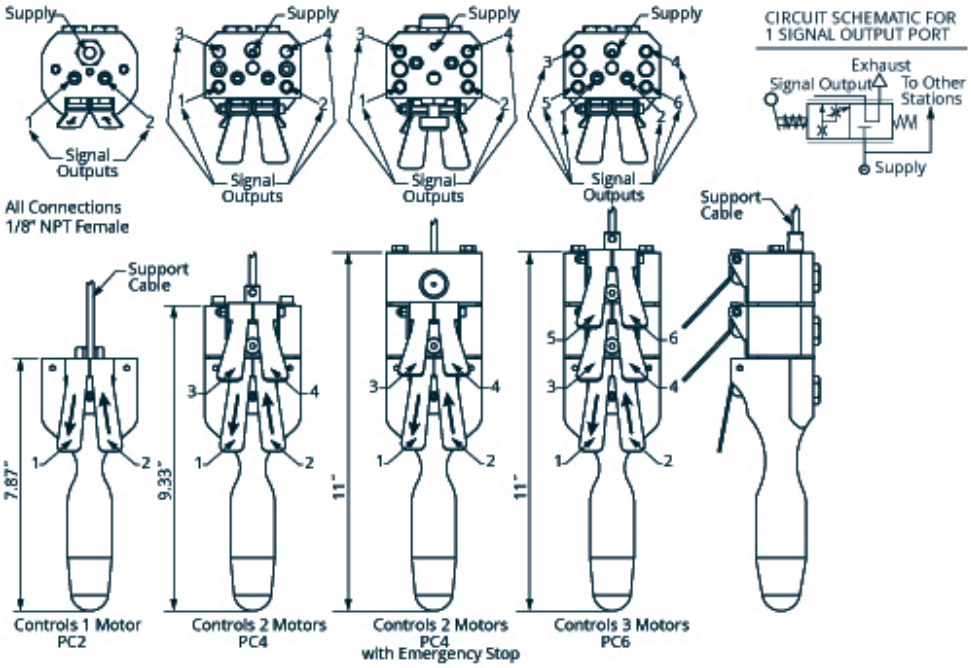
HAND-CONTROLLED (HCV)

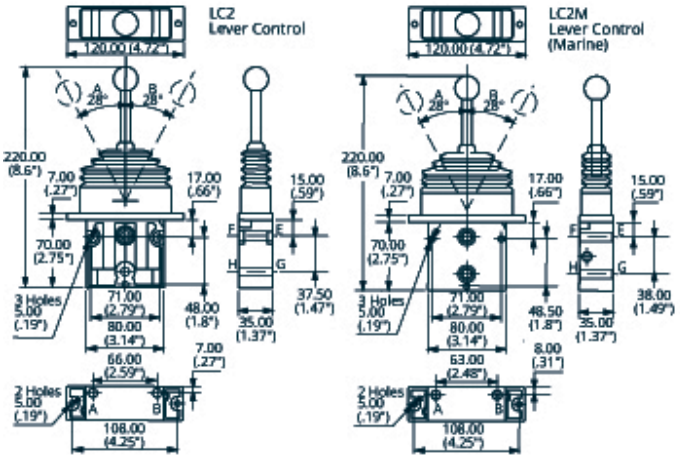


Motor	A	B	C (BSP)	D	E	F	G	H	J	K
MP165	210	118	½"	61	84	270	61	162	84	21
MP400	210	118	¾"	61	84	270	61	162	84	21
MP850	280	160	1"	72	103	365	75	193	103	27
MP1450	280	160	11/4"	72	114	365	75	198	112	22
MP2250	355	197	11/2"	97	137	413	90	190	137	27
MP300	CONSULT THE TECHNICAL OFFICE									

REMOTE CONTROLS

The PC2, 4 and 6 remote controls are specifically designed for RCV modules. They provide the correct driving pressure interval necessary to operate RCV units, as well as ensuring excellent control of the motor speed. The PC2 model can control one motor; PC4 is able to control two motors independently; PC6 can control three motors independently. The same units control differently sized motors. They respond in an excellent way with line lengths up to 36m.





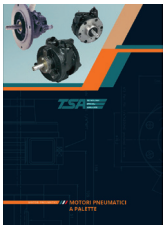
SILENCERS

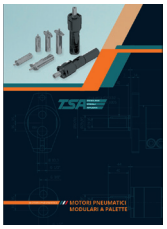
Our silencers are screwed directly onto the secondary outlet gate. Note: The control valves are fitted with secondary outlet gates. These silencers are designed for intermittent use; if continuous operation is required, please refer to TSA. If necessary, move the silencer away from the motor, use suitably sized piping to prevent any counterpressures in the system.

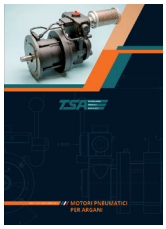
	M95-250	M410	M620	M1100
Size	12.70	19.05	31.75	31.75
L	139.7	171.45	209.55	209.55

Usually delivered as a kit with connections.

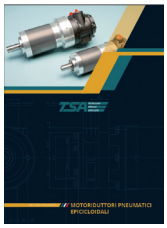
PNEUMATIC MOTORS







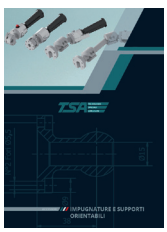
GEAR-MOTORS

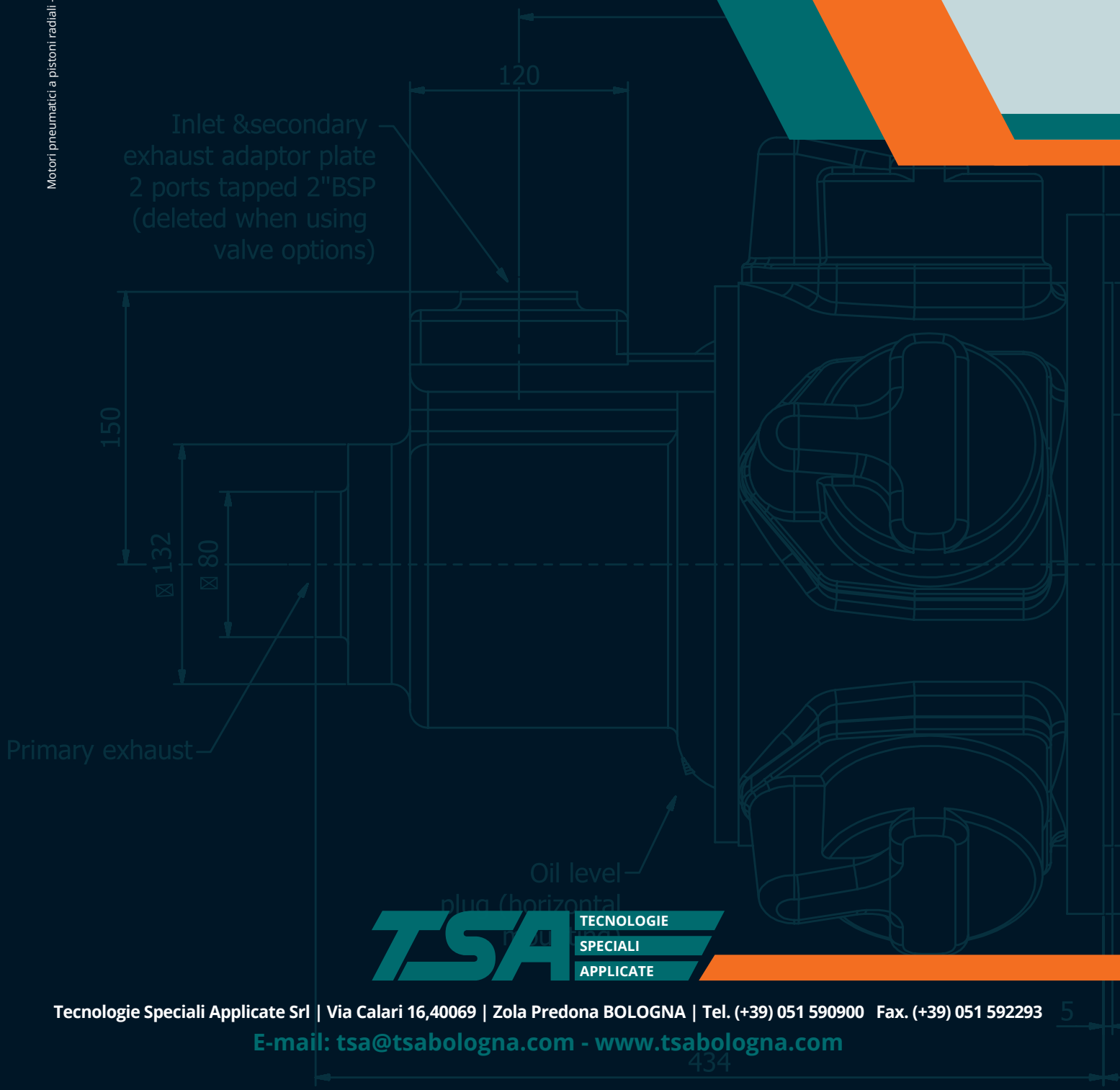


TELESCOPIC BOOMS

ARTICULATED BOOMS

ACCESSORIES





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