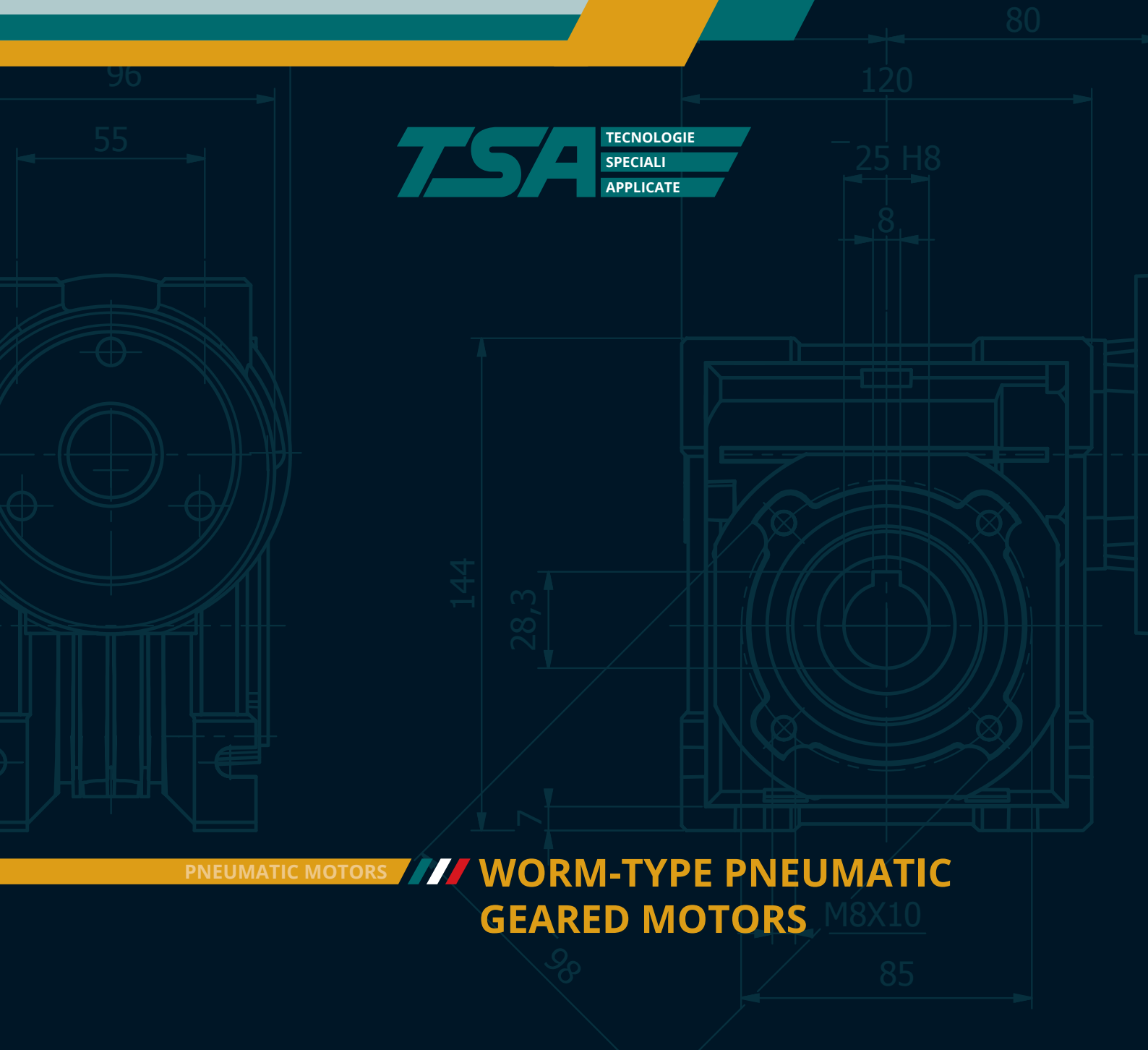


**TSA** **TECNOLOGIE  
SPECIALI  
APPLICATE**



PNEUMATIC MOTORS



**WORM-TYPE PNEUMATIC  
GEARED MOTORS**

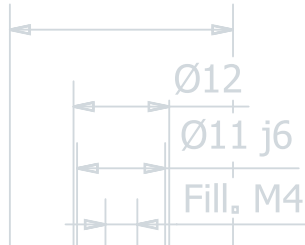
M8X10



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Linguetta 4X4X18



2,5

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## 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.

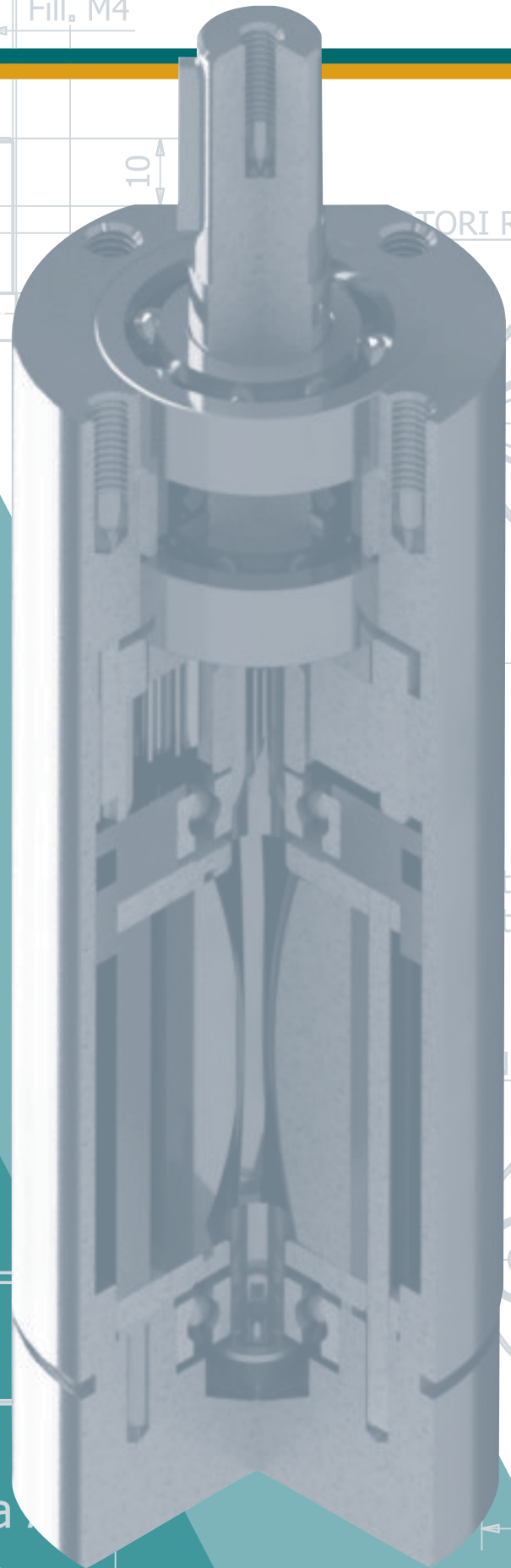
Its technical design office is in charge of studying all of the required characteristics to guarantee maximum reliability and high productivity, according to modern ergonomic principles. Product quality and safety are now a consolidated standard for TSA.

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.**

Vista

$\text{Ø}42$



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tazione p  
tazione p

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## 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

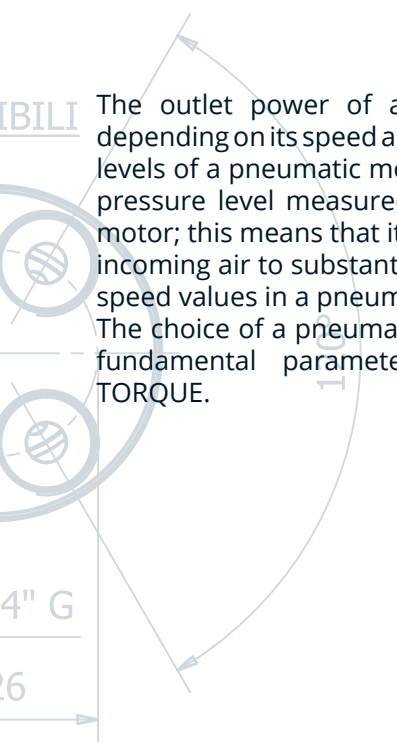
The maximum speed torque is reached at approximately 50% of the idle speed of the motor, which equals its maximum power.

### 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.



per rotazione destrorsa  
per rotazione sinistrorsa

VERSIBILI

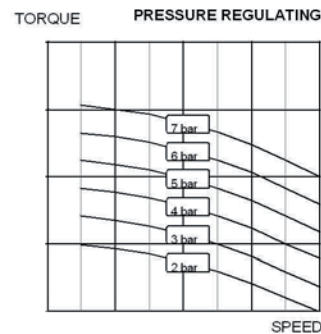


## WAYS OF CHANGING THE MOTOR'S PERFORMANCE

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

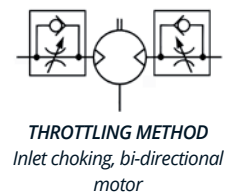
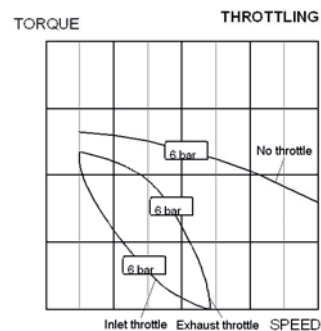
### PRESSURE REGULATING

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.



## 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 NI/s, however the conventional unit is l/s.

### 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

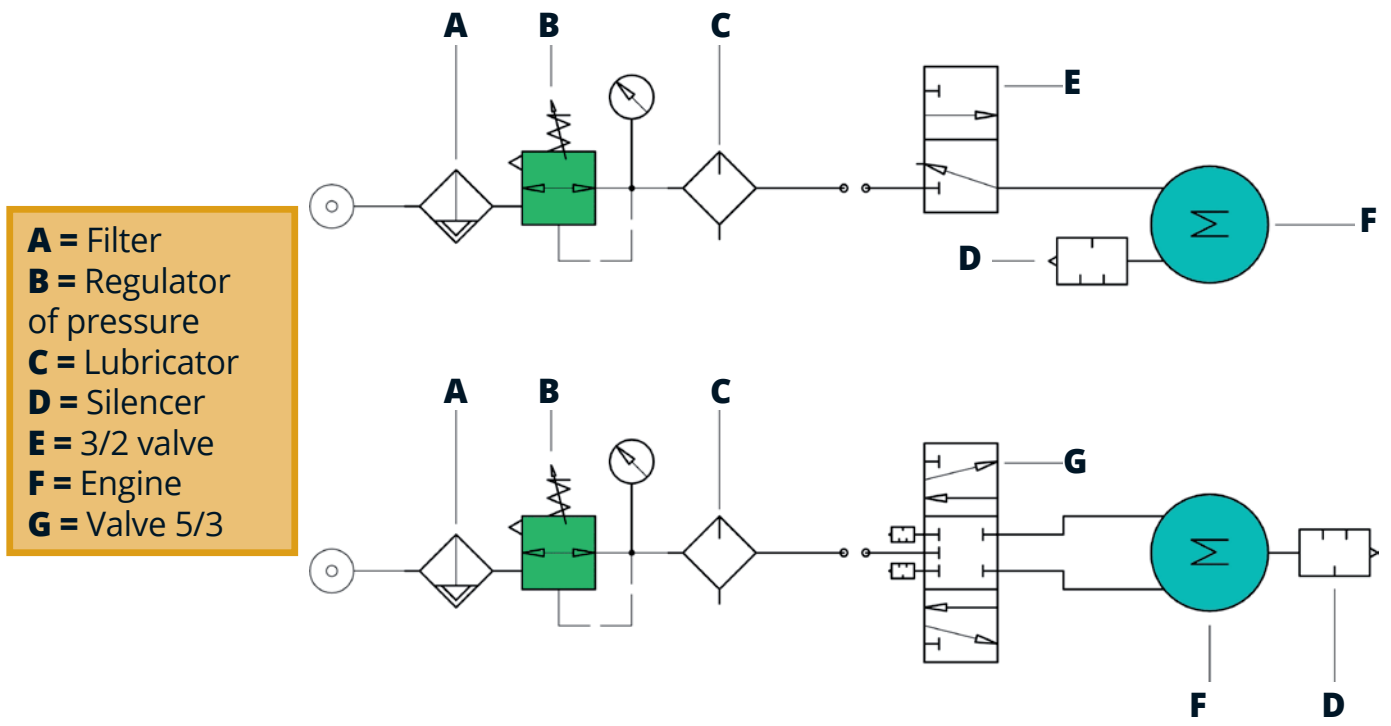
### AIR QUALITY

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.

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**



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

## GEARBOX TECHNICAL CHARACTERISTICS

Our gearboxes are delivered with the following surface finish layer:

### Gearboxes with die-cast aluminium casings

- Elimination of foundry filament using mechanical removal systems (cutting).
- Careful shot peening.
- Painting
- Washing and passivation.

### Painting specifications

Epoxy-polyester Textured Blue RAL 5010. Product used: polyester resin-based thermosetting powder modified with epoxy resin.

### Heat resistance

24 hours at 150° C.

### Corrosion resistance

Saline mist ASTM B 117/97 from 100 to 500 hours depending on the preliminary support treatment.

## PNEUMATIC MOTOR TECHNICAL CHARACTERISTICS

All our pneumatic motors are delivered with the following surface finish layer:

### Cast iron pneumatic motors:

- Elimination of foundry filament using mechanical removal systems.
- Careful shot peening.
- Painting.

### Certification:

- All our pneumatic motors are certified according to European Directive ATEX II cat. 2 G & D T5 and ATEX I M2 explosion protection standards.

### Painting specifications:

- Epoxy-polyester Black RAL9005. Product used: polyester resin-based thermosetting powder modified with epoxy resin.

## SYMBOLS

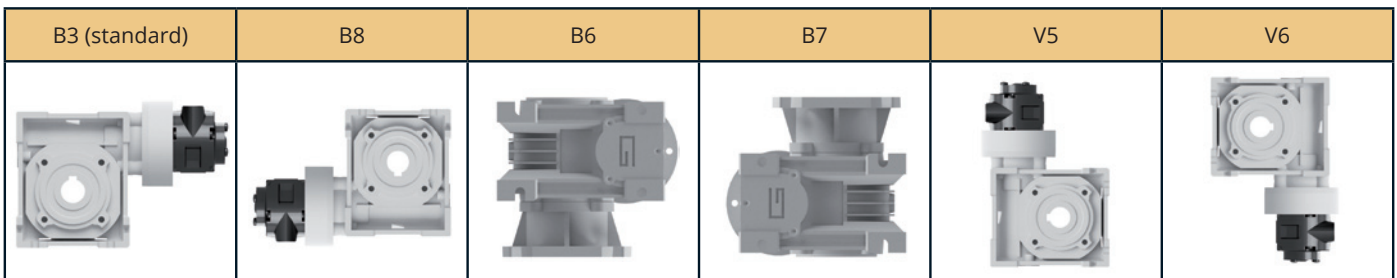
<b>A<sub>2</sub></b>	Allowed output axial load
<b>n<sub>2</sub></b>	[min -1] Output speed
<b>R<sub>2</sub></b>	[N] Allowed output radial load
<b>Rd</b>	Dynamic irreversibility
<b>Rs</b>	Static reversibility

<b>I</b>	Speed reducing ratio
<b>f.s.</b>	Service factor



## ASSEMBLING POSITIONS

The assembling position identified the direction of the gearbox in space. If possible, assembling position B3 is preferable because, from a technical standpoint, it guarantees less sloshing of the oil, better lubrication and prevents overheating.



## PERFORMANCE

### DYNAMIC IRREVERSIBILITY

Dynamic irreversibility occurs when, after the screw stops moving on its axis, the motion on the axis of the slow shaft immediately stops.

This condition is produced with a dynamic performance (dP) < 0.5

### STATIC IRREVERSIBILITY

Static irreversibility occurs when the gearbox is standing still and, if you apply a load to the low speed shaft, the screw axis does not move. This condition is produced with a static performance (sP) < 0.5.

MODELS	I	7,5	15	CM	25	30	40	50	60	80
CM030	Rd	0,85	0,77	0,73	0,68	0,65	0,59	0,55	0,51	0,44
	Rs	0,67	0,55	0,5	0,43	0,39	0,35	0,31	0,27	0,23
CM040	Rd	0,87	0,82	0,78	0,75	0,7	0,65	0,62	0,58	0,52
	Rs	0,71	0,6	0,55	0,51	0,45	0,4	0,36	0,32	0,28
CM050	Rd	0,88	0,82	0,79	0,76	0,72	0,67	0,63	0,59	0,53
	Rs	0,7	0,59	0,55	0,51	0,44	0,39	0,35	0,32	0,27
CM063	Rd	0,88	0,83	0,81	0,78	0,74	0,7	0,66	0,62	0,57
	Rs	0,71	0,6	0,55	0,51	0,45	0,4	0,36	0,33	0,28
CM090	Rd	0,9	0,86	0,84	0,82	0,78	0,75	0,72	0,69	0,63
	Rs	0,73	0,64	0,6	0,56	0,49	0,45	0,41	0,38	0,32
CM110	Rd	0,9	0,86	0,85	0,84	0,79	0,78	0,75	0,72	0,67
	Rs	0,72	0,63	0,62	0,59	0,48	0,48	0,44	0,41	0,36

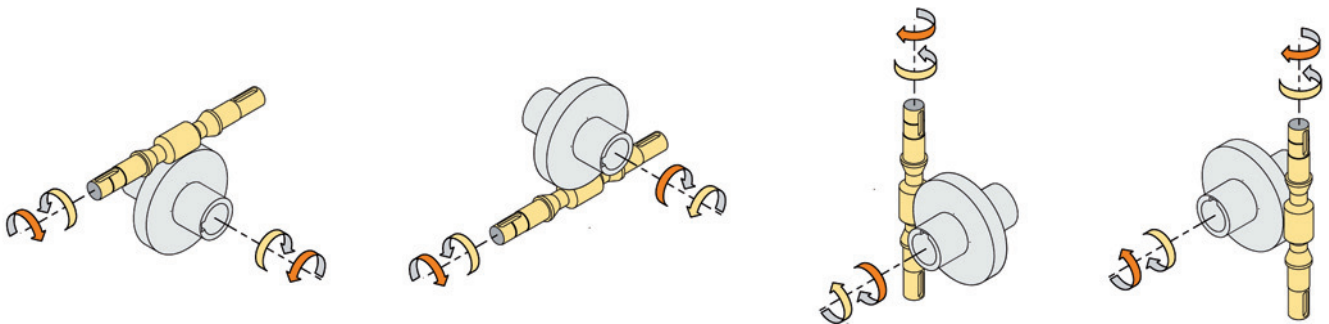
## ANGULAR CLEARANCES

The table shows angular clearance range values on the slow shaft, with the high speed shaft locked. For applications requiring controlled or limited angular clearances, please contact our technical service.

CM030	CM040	CM050	CM063	CM090	CM110
20' ÷ 44'	18' ÷ 34'	18' ÷ 32'	18' ÷ 28'	6' ÷ 18'	6' ÷ 14'

## ROTATION DIRECTIONS

The propeller moves clockwise.

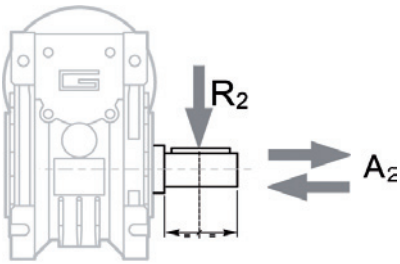


## SLOW SHAFT BEARINGS

MODELS	STANDARD	ON REQUEST
CM030	1	/
CM040	1	2
CM050	1	2
CM063	1	2
CM090	1	2
CM110	1	2

1 - BALL BEARINGS, 2 - TAPERED ROLLER BEARINGS, / NOT AVAILABLE

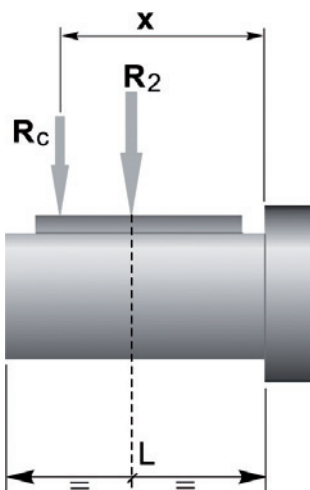
**RADIAL LOADS**



$$A_2 = R_2 \times 0.2$$

$N_2$ [min.]	$R_2$ [N]					
	CM030	CM040	CM050	CM063	CM090	CM110
187	674	1264	1770	2445	3161	5058
140	743	1392	1949	2692	3481	5570
93	851	1596	2234	3085	3990	6384
70	936	1754	2456	3392	4386	7018
56	1008	1890	2646	3654	4725	7560
47	1069	2004	2805	3874	5009	8014
35	1179	2210	3095	4273	5526	8842
28	1270	2381	3334	4603	5953	9524
23	1356	2542	3559	4915	6356	10170
18	1471	2759	3862	5334	6897	11036
14	1600	3000	4200	5800	7500	12000

When no radial load is applied onto the shaft centre line, it is necessary to calculate the actual value using this formula:



	CM030	CM040	CM050	CM063	CM090	CM110
a	65	84	101	120	162	176
b	50	64	76	95	122	136
$R_{2max}$	1830	3490	4840	6270	8180	12000

$$R_c = \frac{R_2 \cdot a}{(b + x)} \leq R_{2max}$$

$$R \leq R_c$$

a, b = values shown in the table

## GEARBOX LUBRICANTS

Our gearboxes are delivered with long-life ENI synthetic lubricant, therefore no maintenance is needed.

Synthetic oil (-25)- (+50) ISO VG320					
SHELL	ENI	KLUBER	MOBIL	CASTROL	BP
OmalaS4 WE320	Telium VSF320	Klubersynth GH 6-320	SHC 632	Alphasyn PG320	Energol SG-XP 320

Oil needs to be changed (non-Atex products) after about 10,000 hours/two years of operation; this length of time is a function of the type of work and of the environment where the gearbox is used. For units delivered without an oil cap, lubrication is permanent, which means that no maintenance is required.

	T an <sup>b</sup> °C	Synthetic oil with polyglycol bases
<b>ENI</b>	(-30) ÷ (+30)	Blasia S 150 (ISO VG150)
	(-20) ÷ (+40)	Blasia S 220 (ISO VG220)
<b>MOBIL</b>	(-45) ÷ (+0)	SCH 624 (ISO VG32)
	(-40) ÷ (+5)	SCH 626 (ISO VG68)
<b>KLUBER</b>	(-40) ÷ (+5)	Klubersynth GH 6-32 (ISO VG32)
	(-35) ÷ (+10)	Klubersynth GH 6-80 (ISO VG80)
	(-30) ÷ (+40)	Klubersynth GH 6-150 (ISO VG150)
	(-25) ÷ (+40)	Klubersynth GH 6-220 (ISO VG220)
	(-15) ÷ (+50)	Klubersynth GH 6-460 (ISO VG460)
	(-10) ÷ (+70)	Klubersynth GH 6-680 (ISO VG680)

	T an <sup>b</sup> °C	Synthetic oil based on polyglycols for the food industry
<b>KLUBER</b>	(-30) ÷ (+15)	Klubersynth UH1-6 100 (ISO VG100)
	(-25) ÷ (+40)	Klubersynth UH1-6 220 (ISO VG220)
	(-15) ÷ (+40)	Klubersynth UH1-6 320 (ISO VG320)
	(-15) ÷ (+50)	Klubersynth UH1-6 460 (ISO VG460)
	(-10) ÷ (+50)	Klubersynth UH1-6 680 (ISO VG680)

For use with special lubricants, please contact our technical service.

### AMOUNTS

- Gearboxes in sizes 030 - 040 - 050 - 063 - 090 - 110 - 130 are delivered with lifetime lubricant, using synthetic-based oil, ENI TELIUM VSF. They can be assembled in any position shown in the catalogue, except for sizes 090 - 110 where you need to specify the intended assembling position.
- For sizes 130 - 150 you always need to specify the assembling positions; if this is not the case, the gearboxes are delivered with the amount of oil required for item B3.
- Only gearboxes in sizes 130 - 150 have caps for oil loading/spill, level and discharge
- The pre-stage modules are delivered with lifetime lubricant, using synthetic-based oil, ENI TELIUM VSF. Lubrication of the pre-stage module is separate from that of the worm gear.

**After installation, it is advisable to replace the closed cap used during transport with the vent cap delivered as standard.**

### AMOUNT IN LITRES

CM	Amount of oil (in litres) Lifetime lubricated					
	B3	B8	B6	B7	V5	V6
030	0.04					
040	0.08					
050	0.15					
063	0.33					
090	1.15					
110	1.6					

### OPERATING TEMPERATURES

The environmental temperature affects the gearbox specifications.

If the specific room temperature is not in the table, please contact our Technical Service. If the temperature is lower than -30° C it is necessary to use seal rings with special compounds.

CM	Standard temperature	Special temperature ranges			
CM		<-15°C	-30°C/-25°C	<-35°C	>+50°C
030	-30°/+50° C				
040					
050				Use silicone oil retainers (VMQ)	Use Viton oil retainers (FPM)
063				Use lubricant for low temperatures	Use lubricant for high temperatures
090					
110					

## ORDER CODE

**VERSION**  
U - Without flange  
FD - Right flange  
FS - Left flange

**OPTIONS**  
VS - Projecting screw  
BN - Pneumatic brake

N - No Lube  
/ - Standard

**Reaction arm**  
BRDX - right  
BRSX - left

**N - M55 - CM030 - U - SZDAX - BRDX - VS**

### MOTOR SIZE

55 - 0,46 KW / 0,6 hp  
95 - 0,73 KW / 1,06 hp  
250 - 1,9 KW / 2,72 hp  
410 - 3,4 KW / 4,6 hp  
620 - 5,1 KW / 6,94 hp  
1100 - 9,2 KW / 12,53 hp

### GEAR MOTORS SIZE

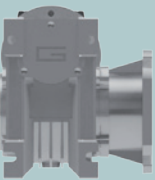
CM030  
CM040  
CM050  
CM063  
CM090  
CM110

### OUTPUT SHAFT

SZDX - simple right slow shaft  
SZSX - simple left slow shaft  
DZ - Double shaft

## VERSION

U



FD



FS



## OUTPUT SHAFT

SZDX



SZSX



DZ



## REACTION ARM

BRDX

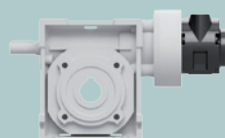


BRSX



## OPTIONS

VS

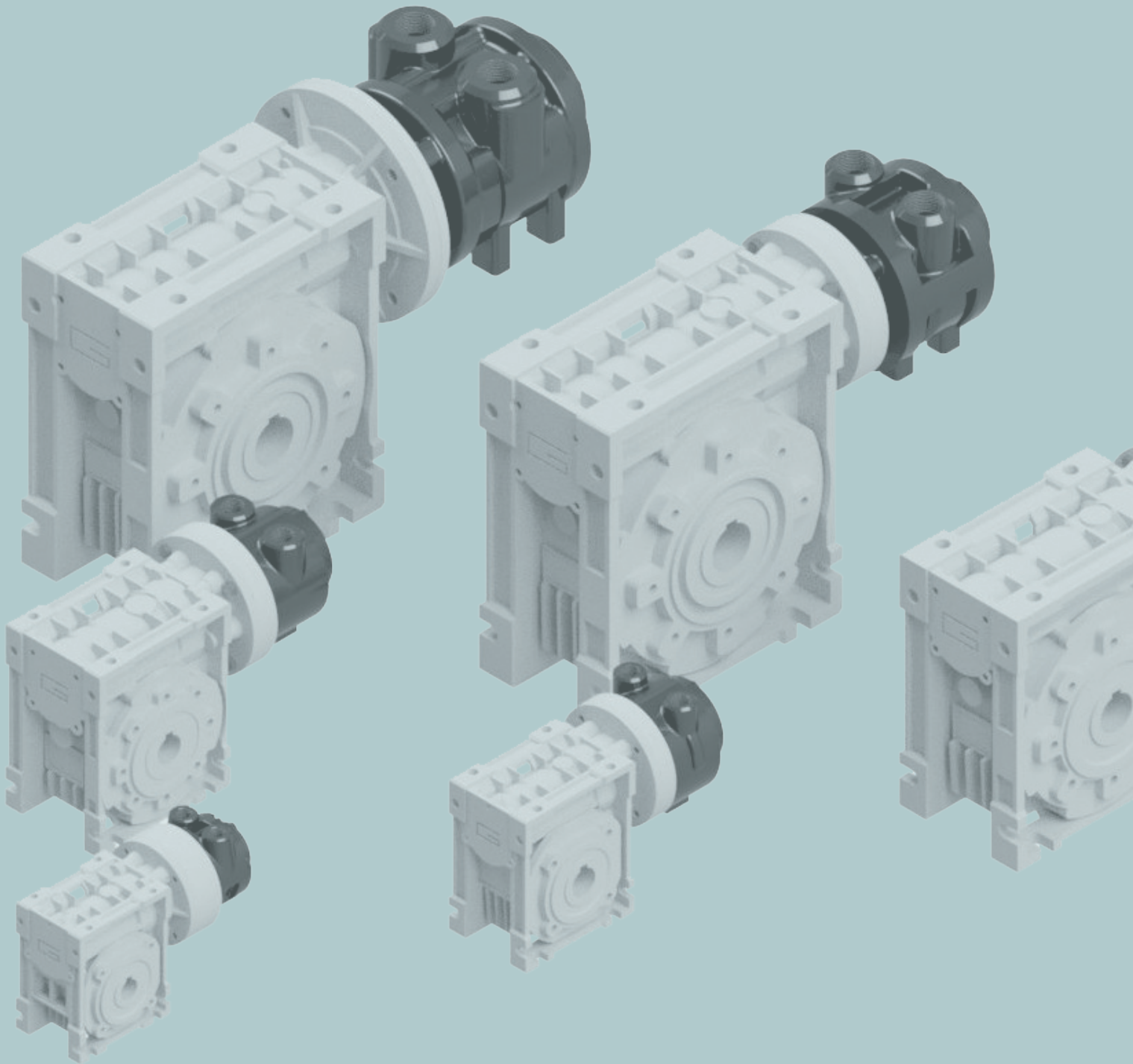


BN



## WORM-TYPE PNEUMATIC GEARED MOTORS

Features, dimensions and performance

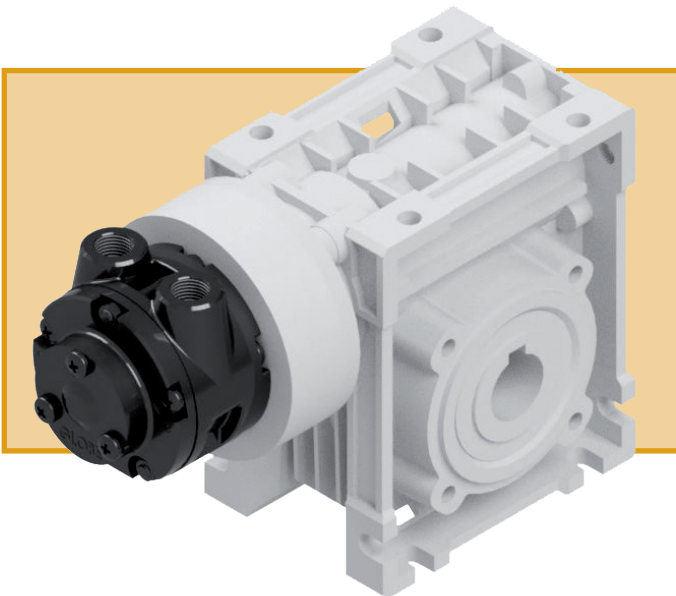


## SERIES M55 - 0,46 KW / 0,6 HP



PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M55CM030i7,5	400	0,32	0,26	0,19	4	3	2	5	4	3	10	8,4	6,8	7,5	1	2,5
M55CM030i15	200	0,32	0,26	0,19	6	5	4	10	8	6				15	1	2,5
M55CM030i30	100	0,27	0,24	0,16	8	7	5	17	15	10				30	1	2,5
M55CM040i40	75	0,27	0,24	0,16	11	9	7	22	20	14				40	1	3,5
M55CM040i50	60	0,25	0,22	0,16	13	10	8	26	23	17				50	1	3,5
M55CM050i60	50	0,25	0,22	0,16	14	11	9	31	25	20				60	1	4,5
M55CM050i80	37	0,23	0,18	0,14	15	13	10	38	31	24				80	1	4,5

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



**Lubrication:** 4-5 gocce/1' in continuous service  
9-12 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 86dB

Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.

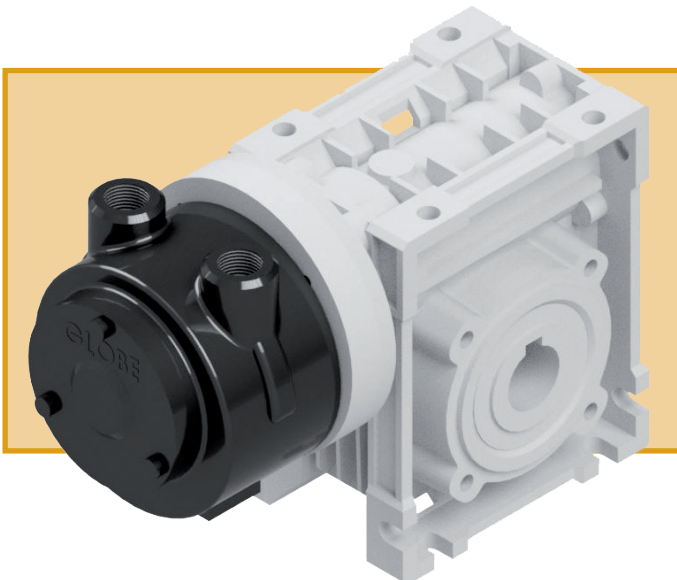




**SERIES M95 - 0,73 KW / 1,06 HP**

PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M95CM040i7,5	400	0,7	0,5	0,3	10	8	7	11	8	5	22,2	19	15,9	7,5	1	6
M95CM040i15	200	0,7	0,5	0,3	17	14	12	21	16	11				15	1	6
M95CM040i30	100	0,6	0,5	0,3	25	21	17	39	29	20				30	1	6
M95CM050i40	75	0,6	0,4	0,3	29	24	20	50	38	26				40	1	7
M95CM050i50	60	0,6	0,4	0,3	33	28	23	61	45	31				50	1	7
M95CM063i60	50	0,6	0,4	0,3	37	31	26	72	54	37				60	1	10
M95CM063i80	37	0,5	0,4	0,3	42	35	29	89	67	45				80	1	10

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



**Lubrication:** 4-5 gocce/1' in continuous service  
9-12 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 83dB

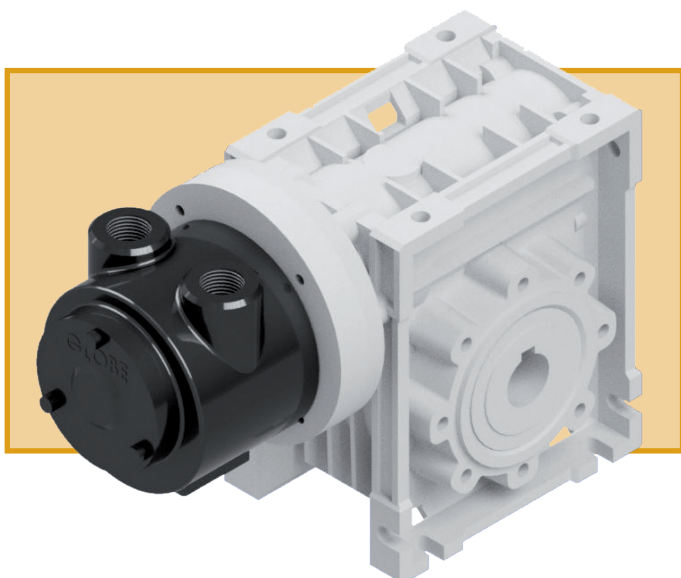
Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.

## SERIES M250 - 1,9 KW / 2,72 HP



PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M250CM063i7,5	400	1,9	1,5	1,2	20	16	13	30	24	19	34,8	8,4 29,6	24,3	7,5	1	10,5
M250CM063i15	200	1,8	1,5	1,1	34	28	22	56	46	36				15	1	10,5
M250CM063i30	100	1,7	1,3	1,1	52	42	33	104	85	67				30	1	10,5
M250CM063i40	75	1,6	1,3	1	61	50	39	133	110	86				40	1	10,5
M250CM063i50	60	1,5	1,3	1	69	57	44	160	132	103				50	1	10,5
M250CM090i60	50	1,5	1,3	1	76	72	56	184	162	127				60	1	17
M250CM090i80	37	1,3	1,2	0,9	86	81	63	228	205	161				80	1	17

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



**Lubrication:** 4-5 gocce/1' in continuous service  
9-12 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 84dB

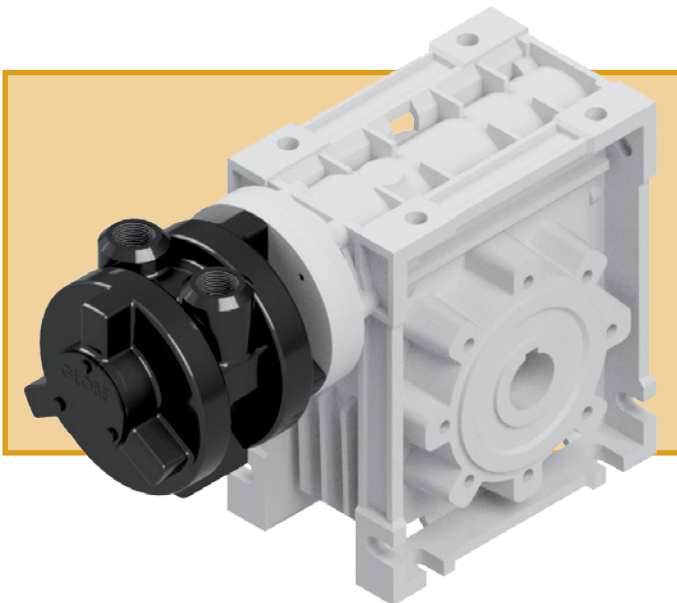
Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.



**SERIES M410 - 3,4 KW / 4,6 HP**

PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M410CM063i7,5	400	3,8	3,1	2,4	38	31	24	59	48	38	62,2	54,1	46,1	7,5	1	14,5
M410CM063i15	200	3,7	3	2,3	64	53	42	113	93	73				15	1	14,5
M410CM090i30	100	3,6	3	2,3	104	86	68	219	184	141				30	1	21
M410CM090i40	75	3,5	2,8	2,2	128	106	84	281	232	182				40	1	21
M410CM090i50	60	3,4	2,7	2,1	146	120	95	343	282	221				50	1	21
M410CM110i60	50	3,3	2,7	2,1	175	145	114	406	334	262				60	1	43
M410CM110i80	37	3,1	2,5	2	205	169	134	513	423	332				80	1	43

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



**Lubrication:** 5-6 gocce/1' in continuous service  
10-12 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 84dB

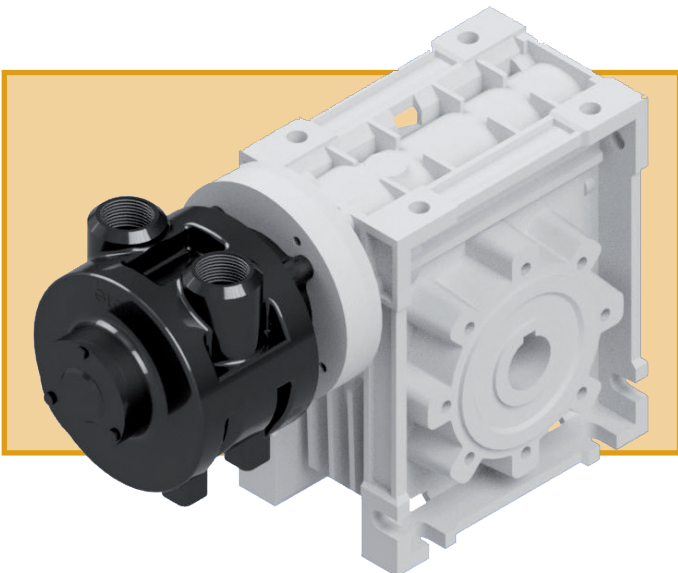
Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.

## SERIES M620 - 5,1 KW / 6,94 HP



PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M620CM090i7,5	400	6,1	4,9	3,8	77	64	50	93	76	59	101,9	87,6	73,4	7,5	1	25
M620CM090i15	200	5,9	4,8	3,7	135	112	89	181	147	114				15	1	25
M620CM110i30	100	5,5	4,5	3,5	203	168	133	337	275	213				30	1	47
M620CM110i40	75	5,4	4,4	3,4	260	215	170	444	363	281				40	1	47
M620CM110i50	60	5,3	4,3	3,3	311	257	204	541	442	343				50	1	47
M620CM110i60	50	5,2	4,2	3,2	347	288	228	633	517	401				60	1	47

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



**Lubrication:** 6-7 gocce/1' in continuous service  
12-15 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 84dB

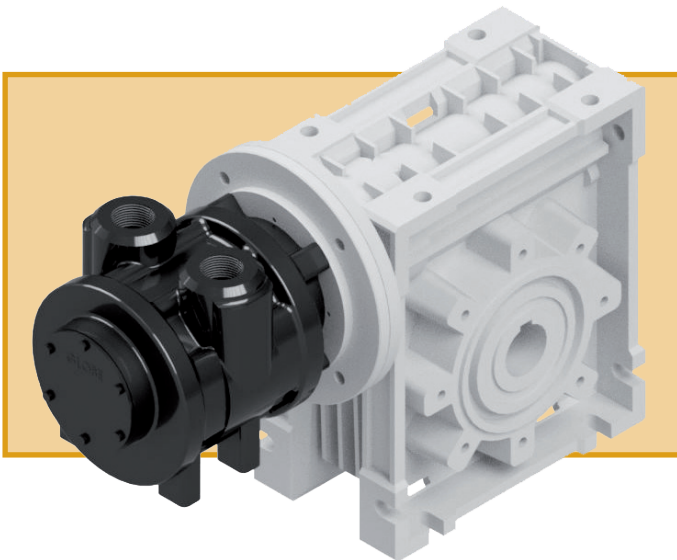
Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.



**SERIES M1100 - 9,2 KW / 12,53 HP**

PERFORMANCES AND DIMENSIONS																
Model	Speed RPM	Power KW			Min. starting torque Nm			Torque at max Power Nm			Consum l/sec			i	f.s.	Weight Kg.
		6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar	6 bar	5 bar	4 bar			
M1100CM090i7,5	320	11,1	9,1	7,1	155	129	102	212	174	136	132,5	116	99,5	7,5	1	35
M1100CM110i15	160	10,7	8,8	6,9	269	223	177	410	336	263				15	1	58
M1100CM110i20	120	10,6	8,7	6,8	353	292	232	541	444	347				20	1	58
M1100CM110i25	96	10,5	8,6	6,7	419	348	277	668	548	429				25	1	58
M1100CM110i30	80	10	8,2	6,4	409	340	270	765	628	490				30	1	58

The torque values indicated in the table refer to the wear resistance of the bronze crown for a theoretical duration of 10,000 hours with f.s. 1 and in ideal lubrication conditions.



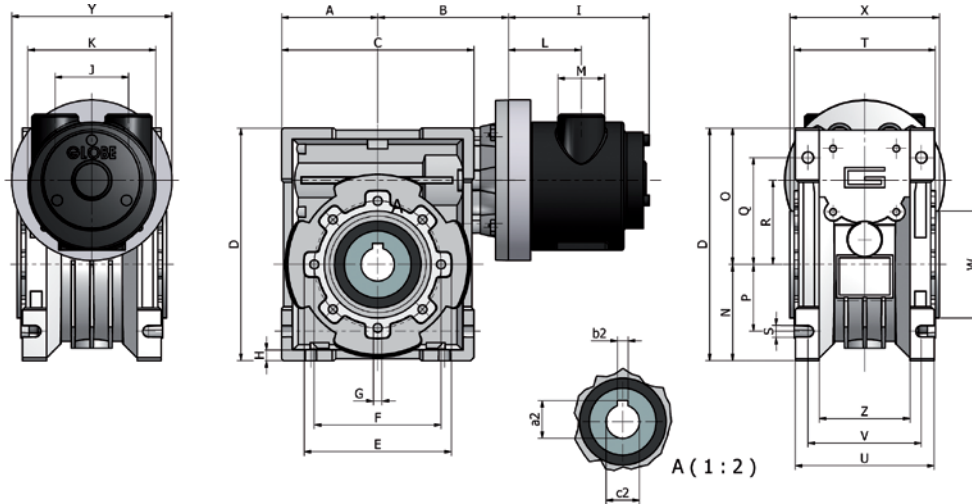
**Lubrication:** 8-10 gocce/1' in continuous service  
14-16 gocce/1' in intermittent service

**Filtration:** 64 µ or better

**Noise:** 86dB

Note: Sound pressure values are measured at maximum speed and power, with an operating pressure of 5.5 bar. TSA recommends to connect the exhaust pipes to a suitable oil separator filter with incorporated silencer, in order to allow for sufficient lubrication without the room becoming saturated with polluted air.

## DIMENSIONS

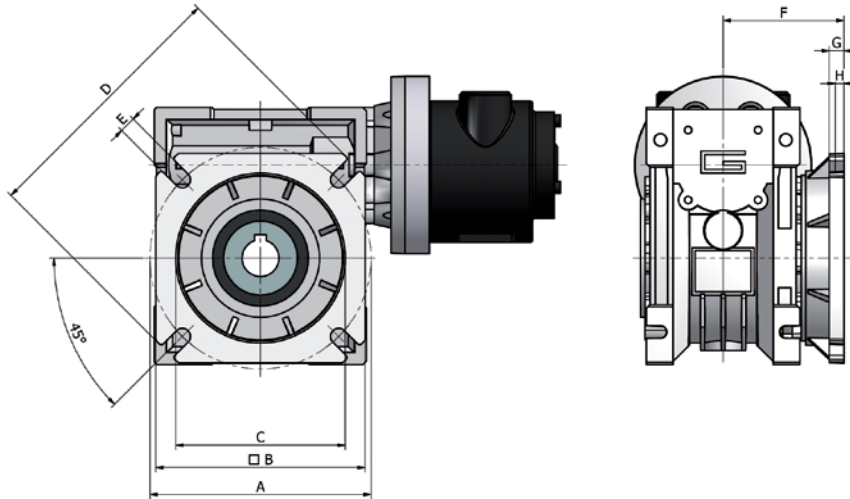


Models	A	B	C	D	ØE	ØF	G	H	I	L	M	N	O	P
M55CM030	40	55	80	97	75	65	M6	5.5	84	47	¼"NPT	40	57	27
M55CM040	50	70	100	121.5	87	75	M6	6.5	84	47	¼"NPT	50	71.5	35
M55CM050	60	80	120	144	98	85	M8	7	84	47	¼"NPT	60	84	40
M95CM040	50	70	100	121.5	87	75	M6	6.5	86.5	44	3/8"NPT	50	71.5	35
M95CM050	60	80	120	144	98	85	M8	7	86.5	44	3/8"NPT	60	84	40
M95CM063	72	98	144	174	110	95	M8	8	86.5	44	3/8"NPT	72	102	50
M250CM063	72	98	144	174	110	95	M8	8	105.5	54.5	½"NPT	72	102	50
M250CM090	103	130	206	238	160	130	M10	11	105.5	54.5	½"NPT	103	135	70
M410CM063	72	98	144	174	110	95	M8	8	150.5	77.5	¾"NPT	72	102	50
M410CM090	103	130	206	238	160	130	M10	11	150.5	77.5	¾"NPT	103	135	70
M410CM110	127.5	160	255	295	200	165	M10	14	150.5	77.5	¾"NPT	127.5	167.5	85
M620CM090	103	130	206	238	160	130	M10	11	168	90	1"NPT	103	135	70
M620CM110	127.5	160	255	295	200	165	M10	14	168	90	1"NPT	127.5	167.5	85
M1100CM090	103	130	206	238	160	130	M10	11	214.5	116.5	1.1/4"	103	135	70
M1100CM110	127.5	160	255	295	200	165	M10	14	214.5	116.5	1.1/4"	127.5	167.5	85

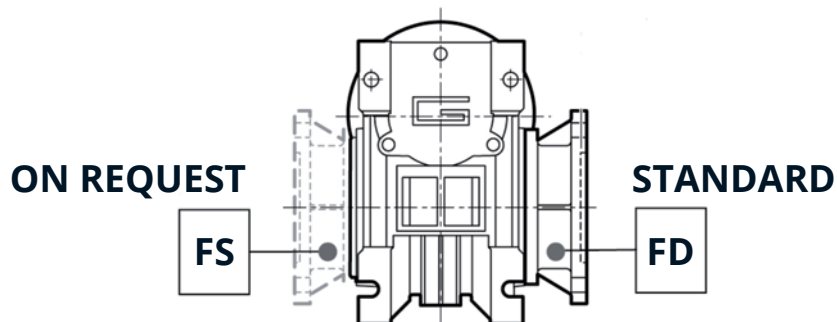
Models	Q	R	S	T	U	V	X	Z	ØY	ØK	J	ØW	a2	b2	Øc2
M55CM030	44	30	6.5	58	56	44	63	32	90	71	36	55h8	16.3	5	14H8
M55CM040	55	40	6.5	73	71	60	78	43	90	71	36	60h8	20.8	6	18H8
M55CM050	64	50	8.5	87	85	70	92	49	90	71	36	70h8	28.3	8	25H8
M95CM040	55	40	6.5	73	71	60	78	43	105	96	55	60h8	20.8	6	18H8
M95CM050	64	50	8.5	87	85	70	91	49	105	96	55	70h8	28.3	8	25H8
M95CM063	80	63	8.5	106	104	85	112	68	105	96	55	80h8	28.3	8	25H8
M250CM063	80	63	8.5	106	104	85	112	68	120	96	55	80 h8	28.3	8	28 H8
M250CM090	102	90	13	134	130	100	140	74	120	96	55	110 h8	38.3	10	35 H8
M410CM063	80	63	8.5	106	104	85	112	68	120	130	65	80 h8	28.3	8	28 H8
M410CM090	102	90	13	134	130	100	140	74	120	130	65	110 h8	38.3	10	35 H8
M410CM110	125	110	14	148	144	115	155	70	140	130	65	130 h8	45.3	12	42 H8
M620CM090	102	90	13	134	130	100	140	74	140	140	78	110 h8	38.3	10	35 H8
M620CM110	125	110	14	148	144	115	155	70	140	140	78	130 h8	45.3	12	42 H8
M1100CM090	102	90	13	134	130	100	140	74	200	160	90	110 h8	38.3	10	35 H8
M1100CM110	125	110	14	148	144	115	155	70	200	160	90	130 h8	45.3	12	42 H8



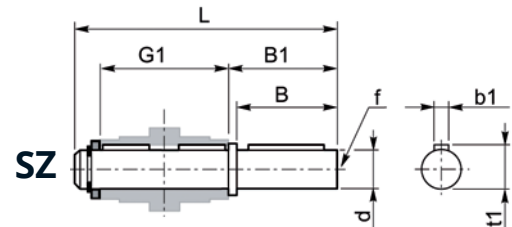
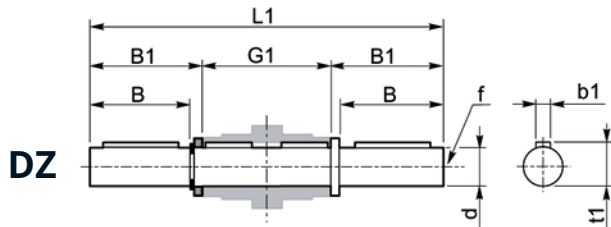
**FD / FS VERSIONS**



Models	A	B	C	D	E	F	G	H
M55CM030F	Ø 68	70	Ø 50 H8	Ø 80	6.5	54.5	6	4
M55CM040F	Ø 80-95	95	Ø 60 H8	Ø 110	9	80	8.5	5
M55CM050F	Ø 90-110	110	Ø 70 H8	Ø 125	11	89	9	5
M95CM040F	Ø 80-95	95	Ø 60 H8	Ø 110	9	80	8.5	5
M95CM050F	Ø 90-110	110	Ø 70 H8	Ø 125	11	89	9	5
M95CM063F	Ø 150-160	142	Ø 115 H8	Ø 180	11	82	10	6
M250CM063F	Ø 150-160	142	Ø 115 H8	Ø 180	11	82	10	6
M250CM090F	Ø 175-190	200	Ø 152 H8	Ø 210	14	111	13	6
M410CM063F	Ø 150-160	142	Ø 115 H8	Ø 180	11	82	10	6
M410CM090F	Ø 175-190	200	Ø 152 H8	Ø 210	14	111	13	6
M410CM110F	Ø 230	260	Ø 170 H8	Ø 280	14	131	15	6
M620CM090F	Ø 175-190	200	Ø 152 H8	Ø 210	14	111	13	6
M620CM110F	Ø 230	260	Ø 170 H8	Ø 280	14	131	15	6
M1100CM090F	Ø 175-190	200	Ø 152 H8	Ø 210	14	111	13	6
M1100CM110F	Ø 230	260	Ø 170 H8	Ø 280	14	131	15	6



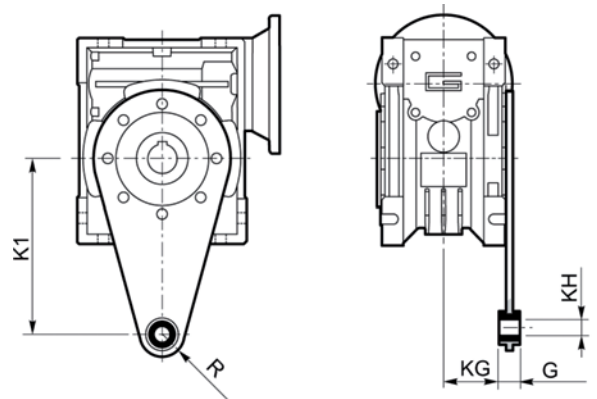
## SIMPLE AND DOUBLE SLOW SHAFT



CM	d h7	B	B1	G1	L	L1	f	b1	t1
030	14	30	32.5	63	102	128	M6	5	16
040	18	40	43	78	128	164	M6	6	20.5
050	25	50	53.5	92	153	199	M10	8	28
063	25	50	53.5	112	173	219	M10	8	28
090	35	80	84.5	140	234	309	M12	10	38
110	42	80	84.5	155	249	324	M16	12	45

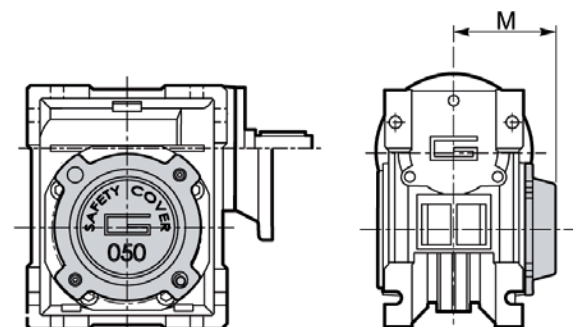
## REACTION ARM

CM	K1	G	KG	KH	R
030	85	14	23	8	15
040	100	14	31	10	18
050	100	14	38	10	18
063	150	14	47.5	10	18
090	200	25	56.5	20	30
110	250	30	62	25	35



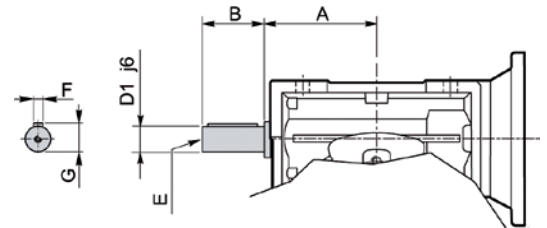
## SECURITY COVER

CM	M
030	47
040	54.5
050	62.5
063	73
090	94
110	102

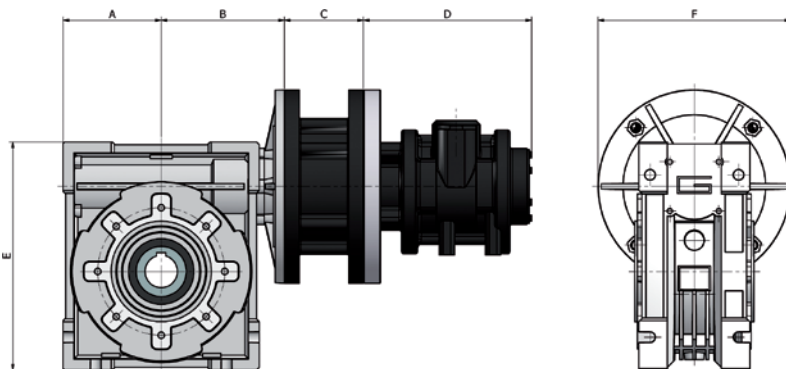




## VS - PROJECTING SCREW



Models	A	B	D1 j6	E	F	G
M55CM030	45	20	9	M4	3	10.2
M55CM040	53	23	11	M5	4	12.5
M55CM050	64	30	14	M6	5	16
M95CM040	53	23	11	M5	4	12.5
M95CM050	64	30	14	M6	5	16
M95CM063	75	40	Ø 19	M6	6	21.5
M250CM063	75	40	Ø 19	M6	6	21.5
M250CM090	108	50	Ø 24	M8	8	27
M410CM063	75	40	Ø 19	M6	6	21.5
M410CM090	108	50	Ø 24	M8	8	27
M410CM110	-	-	-	-	-	-
M620CM090	108	50	Ø 24	M8	8	27
M620CM110	-	-	-	-	-	-
M1100CM090	108	50	Ø 24	M8	8	27
M1100CM110	-	-	-	-	-	-



## PNEUMATIC BRAKES BN

The SERIES BN normally closed safety brakes (the spring brakes them and the air releases them) and can be used as static brakes and in certain applications even in dynamic conditions.

The pneumatic brakes are certified in accordance with the European directive on products intended for use in potentially explosive atmospheres ATEX II cat.2 G & D T3 (in static applications).

Models	A	B	C	D	E	F
M55CM050	60	80	106.5	78	144	Ø160
M95CM063	72	98	145	88.5	174	Ø200
M250CM063	72	98	145	105.5	174	Ø200
M250CM090	103	130	145	105.5	238	Ø200
M410CM063	72	98	145	145.5	174	Ø200
M410CM090	103	130	145	145.5	238	Ø200
M410CM110	127.5	160	145	145.5	295	Ø200
M620CM090	103	130	103	167.5	238	Ø250
M620CM110	127.5	130	103	167.5	295	Ø250
M1100CM090	103	130	103	218.5	238	Ø250
M1100CM110	127.5	160	103	218.5	295	Ø250

## PNEUMATIC ACCESSORIES

TSA offers a pneumatic component programme for air treatment and control of pneumatic motors on premium brands, including SMC, BOSCH, NORGREN, WILKERSON. This programme consists of air treatment units, valves and silencers. The available connections range from G1/4" to G2".

## AIR TREATMENT UNITS

All of the filters used have automated condensation discharge, the FRL units are installation-ready and fitted with a pressure gauge.

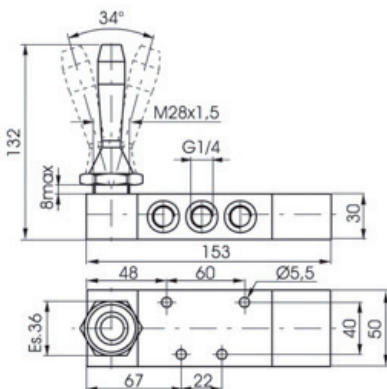
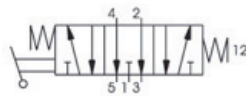
Models	TFRL3/8	TFRL1/2	TFRL3/4	TFRL1	TFRL2
Connection	3/8"	1/2"	3/4"	1"	2"
Max. operating pressure	10 Bar	10 Bar	10 Bar	10 Bar	20 Bar
Max. operating temperature	-5 a +60°C				
Standard filtration rate	8 Micron				
Flow rate in l/sec	56,6	63,2	67,5	149	660



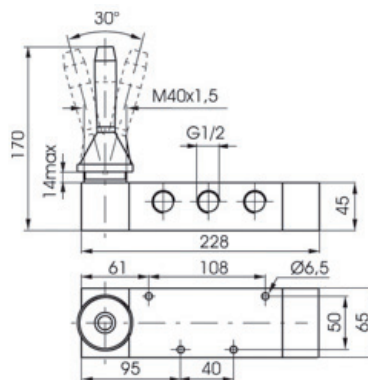
## MANUAL OR PNEUMATIC CONTROL VALVES

Easy and quick to install, the default valves fitted on TSA pneumatic motors are 5-way 3-position valves with centres open in idle position, with lever or pneumatic control.

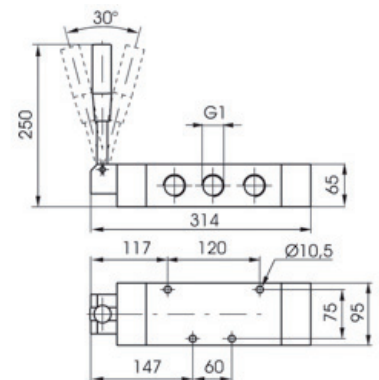
Modelli	VCM1/4	VCM1/2	VCM1	VCP1/4	VCP1/2	VCP1
Connection	G1/4"	G1/2"	G1"	G1/4"	G1/2"	G1"
Fluid	Filtered and lubricated air					
Max pressure operating	10 bar					
Temperature	-5°C +70°C					
Flow rate at 6 bar with $\Delta p = 1 \text{ NI} / \text{min}$	1280	3500	6500	1280	3000	6500
Ø Nominal passage	8mm	15mm	20mm	8mm	15mm	20mm
Body material	Aluminum					
Kg.	0,7	2	5	0,6	1,7	4,2
Minimum pilot pressure	-	-	-	3 bar	3 bar	3 bar
Pilot connection	-	-	-	G1/8"	G1/8"	G1/8"



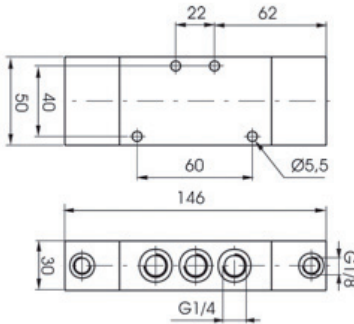
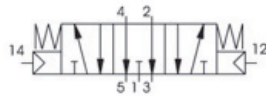
**VCM1/4**



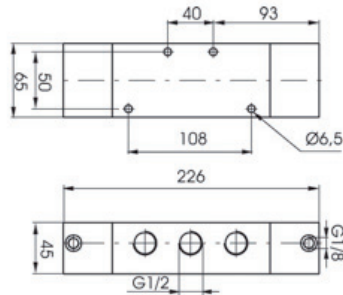
**VCM1/2**



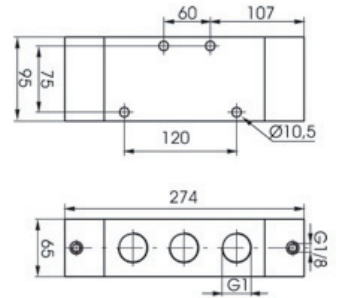
**VCM1**



**VCP1/4**



**VCP1/2**



**VCP1**

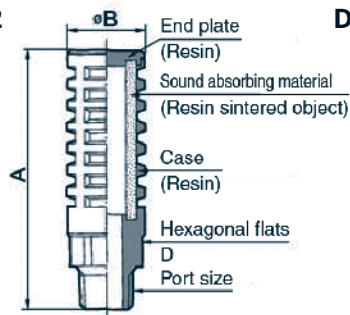
## SILENCERS

All motors are fitted with a threaded exhaust gate, which makes it possible to add a silencer in order to reduce the noise level. It is also possible to add another hose between exhaust and silencer which will further reduce the noise level.

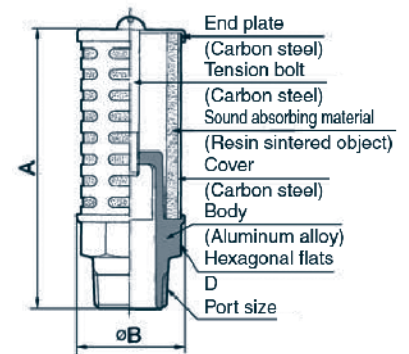


Models	S1/4	S3/8	S1/2	S3/4	S1	S1 1/4
Connection	¼ NPT	3/8 NPT	½ NPT	¾ NPT	1 NPT	1 ¼ NPT
Noise dB reduction	>30 dB(A)					
Fluid	compressed air					
Operating temperature	+5° C – 60° C					
Body	Plastic	Plastic	Plastic	Steel + Plastic	Steel + Plastic	Steel + Plastic

### Dimensions S1/4 – S1/2



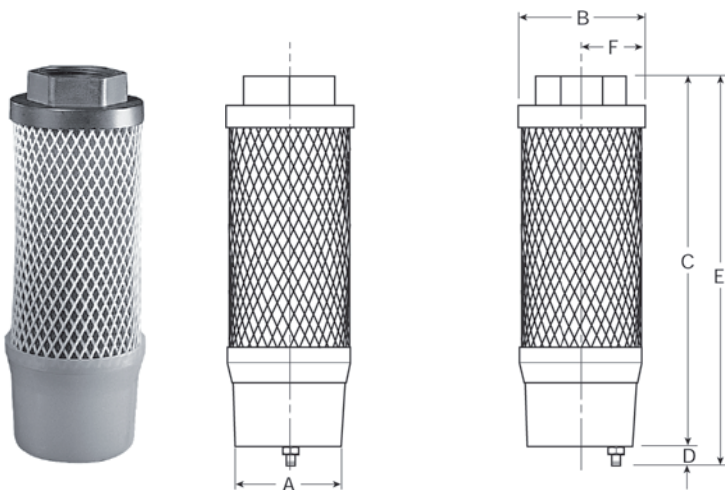
### Dimensions S3/4 – S1 1/4



Dimensions	S1/4	S3/8	S1/2	S3/4	S1	S1 1/4
A	63	84	92	107	127	186
B	22	25	30	46	50	74
D	19	22	27	36	41	50

## DISSOLATOR / SILENCER FILTER

Models	XMC-C4-000	XMC-C8-000	XMC-CB-000	S3/4	S1	S1 1/4
Connection	½ G	1 G	1 - 1/2 G	107	127	186
Bath capacity	2.2 fl. oz.	5 fl. oz.	5 fl. oz.	46	50	74
Drain	Manual	22	27	36	41	50
oiling	99.9%					
Operating temperature	2° C - 50° C					
Sound reduction	25 dB(A)					
Kg.	0.4					



### CONSTRUCTION MATERIALS

<b>Threaded cover</b>	Nylon
<b>Filter element</b>	
<b>Primary</b>	borosilicate cloth
<b>Secondary</b>	PVC fiber
<b>Oil cover of waste</b>	Plastic
<b>Sleeve support</b>	Plastic

Model	A	B	C	D	E	F
XMC-C4-000	51	60	100	10	150.9	30
XMC-C8-000	51	60	148	10	198.9	30
XMC-CB-000	76	87	208	11	284	-

## PNEUMATIC MOTORS



## GEAR-MOTORS



## TELESCOPIC ARMS



## ARTICULATED ARMS



## ACCESSORIES





