



Supplier of Industrial Tooling and Accessories for
Assembly, Fabrication & Maintenance

2 LZL

VANE MOTORS



LZL Vane motors

Introduction



LZL vane motors are available in five sizes, offering outputs of 1.05 kW, 1.3 kW, 2.3 kW, 3.4 kW and 5.2 kW, respectively.

They are designed to give outstanding starting and low speed performance. This is achieved by using a six vane motor and by optimum vane/cylinder sealing – obtained through a combination of 'vane air' and interconnecting pins.

Featuring few components, these motors are ruggedly constructed and offer a long service life.

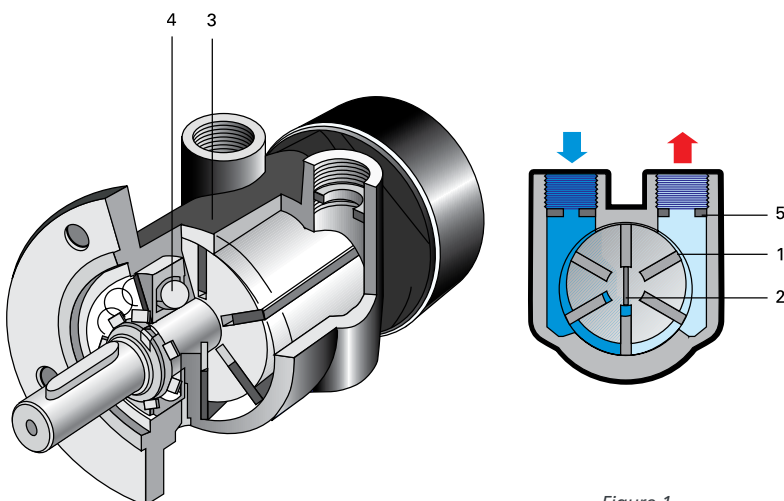


Figure 1

1. Six vanes for high starting torque.
2. Pins to force vanes out and provide starting reliability.
3. Cast iron housing.
4. Long life bearings.
5. Restriction at inlet and outlet ports.

Installing your air motor

Air lines

The recommended dimensions of air lines are given in the introductory section to each motor type. Note that exhaust hose is larger than inlet hose.

The recommendations are valid for hose lengths of up to 3 meters. For distances between 3 and 15 meters select a hose diameter one size up, and for distances between 15 and 50 meters select a hose diameter two sizes up.

It is important to note that the output of the motor will be reduced if these guidelines are not followed.

Recommended hose connectors

Because of the compact dimensions of Atlas Copco vane motors, special hose connectors are available with small key width – facilitating easy installation.

The hose connectors can be ordered through your local Atlas Copco representative.

Air preparation

For optimum performance and maximum machine life we recommend the use of compressed air with a maximum dew point of +10°C. We also recommend the installation of an Atlas Copco refrigeration-type air dryer.

To ensure reliable service an air filter and lubricator should be fitted into the inlet air line – within 3 meters from the motor.

It is recommended that a pressure regulator is also incorporated into the air preparation package. This has the function of maintaining the desired working pressure, and can be used to modify the motor’s output to meet the needs of the application.

When selecting an air preparation package, ensure all components have sufficient flow capacity to meet the requirements of the motor. The filter shall remove solid particles larger than 15 microns and also remove more than 90 % of liquid water. A typical arrangement of an air preparation installation is shown below, Figure 9.

Lubrication free vane motors

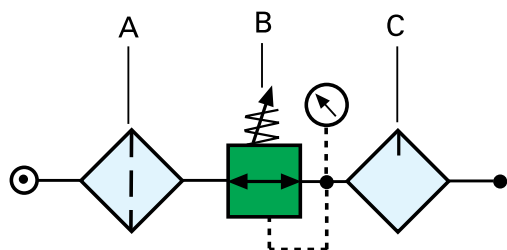
Atlas Copco’s LVB vane motors and LVB stainless steel run with lubrication free vanes as standard.

The LVB motors with lubricated free vanes can still be lubricated, if the application requires it, but is not dependent on lubricated air, as with traditional vanes.

If running a motor with 100% dry air and no lubrication, performance can be reduced depending on model.

The table below shows how reduced lubrication can affect service life and power for a lubricated vane motor.

Lubricant quantity mm³ oil in m³	Lubricant free vanes		Conventional lubricated vanes	
	Service life hours	Output power %	Service life hours	Output power %
50	1000 – 3000	100	1000 – 3000	100
10	1000 – 2000	100	500 – 1000	100
1	500 – 1000	85 – 95	200 – 500	90
0.1	500 – 1000	85 – 95	100 – 300	80
0	500 – 1000	85 – 95	10 – 30	30



A = Filter
B = Pressure regulator
C = Oil fog lubricator

Figure 9

Shaft loading

The permitted radial and axial shaft extension loadings are illustrated in Figure 2. These values have been calculated for shaft and bearing working lives of at least 1.000 hours at a speed that gives maximum output.

Restrictors

LZL vane motors are supplied with internal restrictors in the connection ports, to limit the maximum speed.

Clockwise rotation – the smaller restrictor (1) is fitted in the inlet port and the larger restrictor (2) in the outlet port (see Figure 3). This is how the motor is delivered.

Anti-clockwise rotation – the position of these restrictors must be reversed. Reversing duty – restrictor (1) must be replaced by a second restrictor of type (2). The restrictor (1) must then be fitted into the inlet to the control valve.

For further information, see page 11 chapter "Installation Examples".

It is permissible to remove these restrictors to increase motor output. However, the motor should not be run faster than max allowed speed (see data table).

Mounting

LZL vane motors may be mounted in any position. To facilitate this, a flange is integrated into the motor casing and a foot mounting is available for some motor variants.

Connection and hose dimensions

Information on connection size and recommended nipple and hose dimensions for use with LZL vane motors is shown in Table 2. These dimensions are valid for hose lengths up to 3m. For lengths above 3m, choose a hose one size larger.

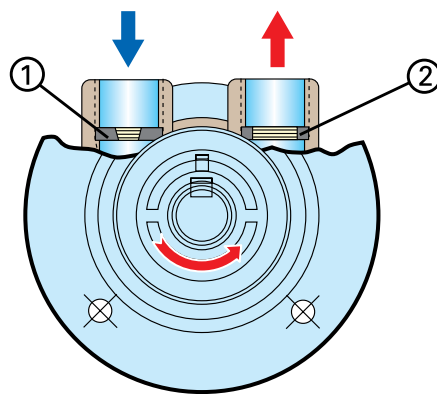
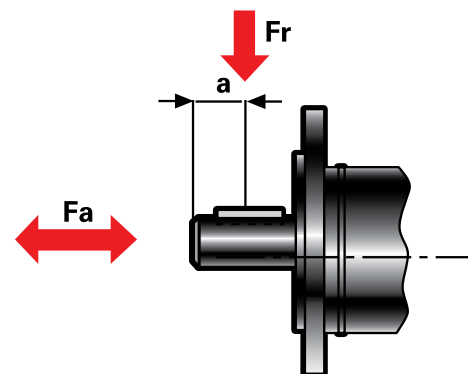


Figure 3



Hose size up to 3m length

Motor size	Used as	Inlet connection thread BSP	Inlet hose* mm	Inlet nipple* dia mm	Outlet connection thread BSP	Outlet hose* mm	Outlet nipple* dia mm
LZL03	Non-reversible	3/8	13	10.3	3/8	16	13.4
	Reversible	3/8	16	13.4	3/8	16	13.4
LZL05	Non-reversible	1/2	13	10.3	1/2	20	17
	Reversible	1/2	20	17	1/2	20	17
LZL15	Non-reversible	3/4	16	13.4	3/4	25	21.8
	Reversible	3/4	25	21.8	3/4	25	21.8
LZL25	Non-reversible	1	20	17	1	32	28
	Reversible	1	32	28	1	32	28
LZL35	Non-reversible	1 1/4	20	17	1 1/4	32	28
	Reversible	1 1/4	32	28	1 1/4	32	28

* Recommended minimum inner diameter

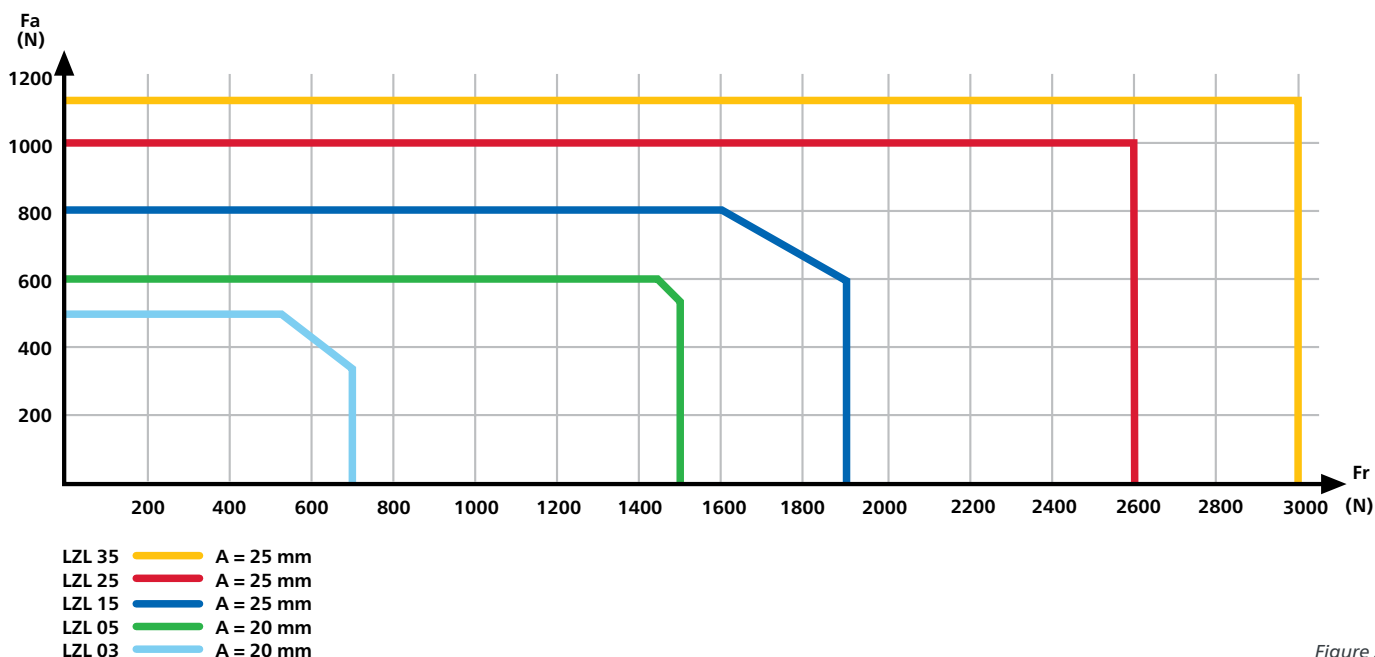


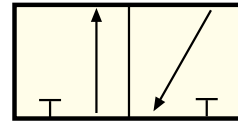
Figure 2

Directional control valves

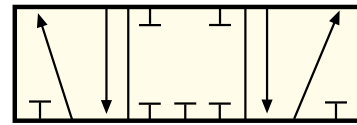
These valves are used to start or stop a motor, or to change its direction of rotation. It is most usual to use what is termed a 5/3 valve to control a reversible motor, and a 3/2 valve to control a Non-reversible motor.

The valve designations refer to the number of connection ports and the number of operating positions the valve provides, for a 5/3 valve this is 5-connection ports and 3 positions.

When selecting any control valve it is important to ensure that it has a sufficient flow capacity to supply the requirements of the motor.



3/2 valve



5/3 valve

Figure 6

The symbols used to represent these valves in an installation diagram.

Installation examples

Typical installation diagrams for type LZB and LZL air motors, together with their associated control valves, filters, regulators lubricators and silencers.

NOTE: For LZL air motors it is important that an inlet restrictor is placed upstream from the inlet. It must be placed so it does not affect the exhaust at reversible running. This means that it has to be placed before the control valve.

LZB Circuits

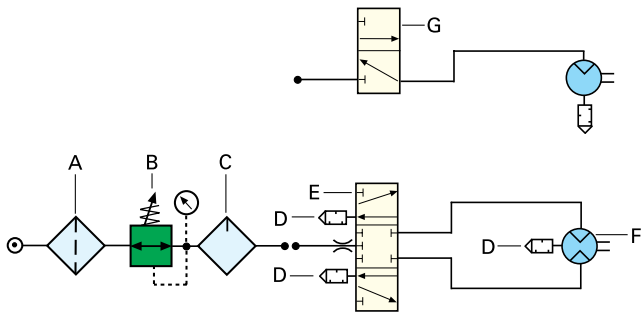
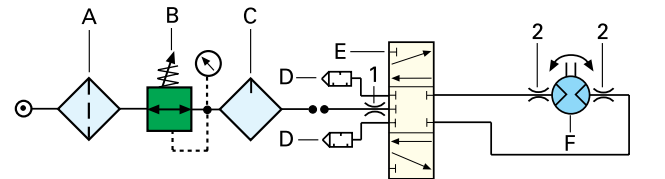


Figure 11

- A = Filter
- B = Pressure regulator
- C = Oil fog lubricator
- D = Silencer
- E = 5/3 valve
- F = Air motor

LZL Circuits

Non-reversible duty with 3/2 valve



Reversible duty with 5/3 valve and closed mid position

Reversible duty with 5/3 valve and open mid position

- A = Filter
- B = Pressure regulator
- C = Oil fog lubricator
- D = Silencer
- E = 5/3 valve

- F = Air motor
- G = 3/2 valve

- 1 = Inlet restrictor
- 2 = Outlet restrictor

Figure 12

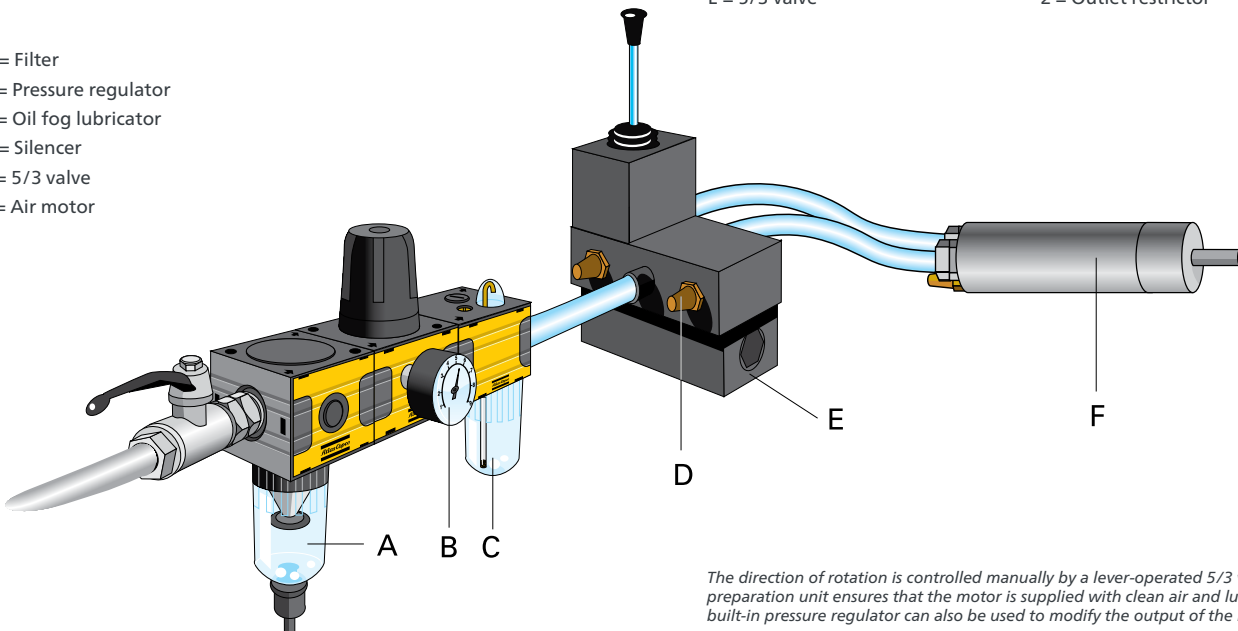


Figure 13

The direction of rotation is controlled manually by a lever-operated 5/3 valve. The air preparation unit ensures that the motor is supplied with clean air and lubrication. The built-in pressure regulator can also be used to modify the output of the motor.

Methods of modifying LZB – LZL motor output

Throttling

A throttle is usually fitted into the motor's inlet, although it can also be complemented with some throttling at the exhaust. You should never create a back pressure above 1 bar at the exhaust.

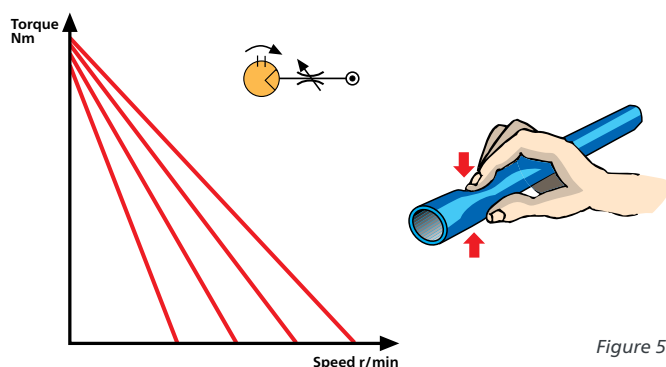


Figure 5

Pressure regulation

When using a pressure regulator it is mostly fitted into the motor's inlet hose. The use of pressure regulation is ideal when control of the stall torque is required and a high starting torque is not so important, Figure 6.

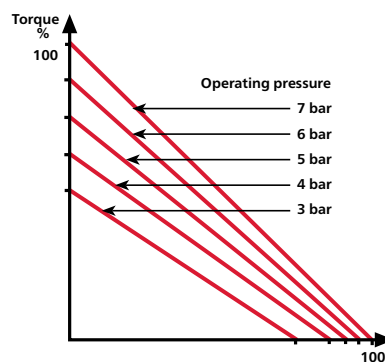


Figure 6

Pressure regulation

Sometimes the motor operates at other supply pressures than 6.3 bar. In these cases the performance of a motor must be re-calculated to ensure the working point can be achieved.

To calculate performance at supply pressures other than 6.3 bar, multiply the data at 6.3 bar by the correction factors shown in table below.

Correction factors					
Air pressure		Output	Speed	Torque	Air consumption
bar	psi				
7	101	1.13	1.01	1.09	1.11
6	87	0.94	0.99	0.95	0.96
5	73	0.71	0.93	0.79	0.77
4	58	0.51	0.85	0.63	0.61
3	44	0.33	0.73	0.48	0.44

It is also easy to calculate the inlet pressure required to achieve a desired working point.

Example:

An LZB22-L-A036-11 is required to run at 1155 r/min and produce 1.2 Nm; calculate the required inlet pressure to achieve this.

For this motor at maximum output the torque is 1.5 Nm and the speed is 1650 r/min.

M_1 = desired torque

n_1 = desired speed

M_2 = torque at maximum output

n_2 = speed at maximum output

Calculate the ratios M_1/M_2 and n_1/n_2

Therefore $M_1/M_2 = 0.8$ and $n_1/n_2 = 0.7$

Apply these values to the diagram in Figure 8 and read off the pressure at the intersection point.

The required inlet pressure is 4.2 bar (61 psi)

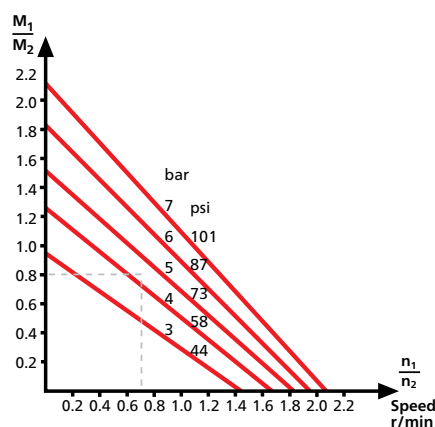
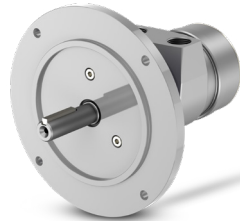
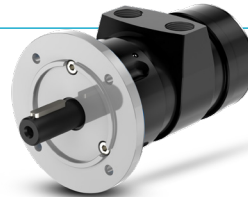


Figure 8

LZL vane motors

1.05 – 6.5 kW

1.4 – 8.7 hp



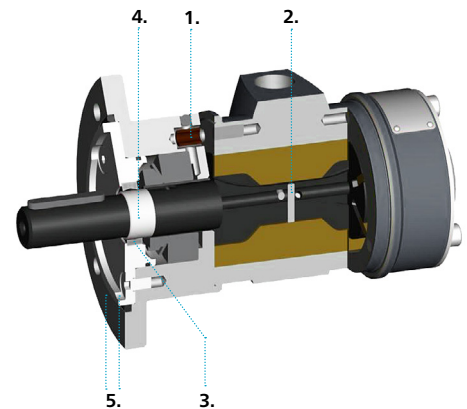
Power motors (P)

The power motors come in all five sizes and are designed to give highest power and still maintain good low speed characteristics. These motors are delivered with lube free vanes and can therefore operate without lubrication.

Typically these motors are characterized by:

- Reliable starting
- High starting torque and good low speed characteristics
- Wide speed and torque range
- Sturdy, compact construction to withstand rough treatment
- Inlet and outlet port restrictors permit free speed running.
- Long working life and easy servicing

EX certification valid for fixture mounted use only with a maximum surrounding temperature of +40°C (104°F).



1. Rubber hose valves for venting bearing and seals.
2. Vane pins.
3. Double seals.
4. Stainless steel bushing.
5. Aluminum front with stainless steel screws.

Data at air pressure 6.3 bar (91 psi)

Model Lubrication free	Max output		Speed at max output r/min	Torque at max output		Min starting torque		Stall torque		Free speed r/min	Max allowed speed r/min	Air consumption at max output		Weight		ATEX code**	Ordering No.
	kW	hp		Nm	lb-ft	Nm	lb-ft	Nm	lb-ft			l/s	cfm	kg	lb		
LZL03-L-P-AC	1.05	1.4	5300	1.9	1.4	2.8	2.1	3.8	2.8	11000		29	61	2.9	6.4	Ex II 2GD h T6 IIC T85°C X	8411 1009 70
LZL03-L-P-IEC	1.05	1.4	5300	1.9	1.4	2.8	2.1	3.8	2.8	11000		29	61	3.9	8.6	Ex II 2GD h T6 IIC T85°C X	8411 1009 88
LZL03-L-P-NEMA	1.05	1.4	5300	1.9	1.4	2.8	2.1	3.8	2.8	11000		29	61	3.8	8.4	Ex II 2GD h T6 IIC T85°C X	8411 1009 96
Unrestricted*	1.7	2.5	7500	2.2	1.6	2.8	2.1	3.8	2.8		11000	45	95				
LZL05-L-P-AC	1.3	1.7	4300	2.9	2.1	4.8	3.5	5.8	4.3	9000		37	78	3.9	8.6	Ex II 2GD h T6 IIC T85°C X	8411 1010 30
LZL05-L-P-IEC	1.3	1.7	4300	2.9	2.1	4.8	3.5	5.8	4.3	9000		37	78	4.8	10.6	Ex II 2GD h T6 IIC T85°C X	8411 1010 48
LZL05-L-P-NEMA	1.3	1.7	4300	2.9	2.1	4.8	3.5	5.8	4.3	9000		37	78	4.9	10.8	Ex II 2GD h T6 IIC T85°C X	8411 1010 55
LZL05-L-P-HUB	1.3	1.7	4300	2.9	2.1	4.8	3.5	5.8	4.3	9000		37	78	3.8	8.4	Ex II 2GD h T6 IIC T85°C X	8411 1011 50
Unrestricted*	2.1	2.8	6300	3.1	2.3	4.8	3.5	5.8	4.3		9200	50	106				
LZL15-L-P-AC	2.3	3.1	3380	6.5	4.8	10.9	8.0	13	9.6	7000		61	129	7.1	15.7	Ex II 2GD h T6 IIC T85°C X	8411 1011 19
LZL15-L-P-IEC	2.3	3.1	3380	6.5	4.8	10.9	8.0	13	9.6	7000		61	129	8.3	18.3	Ex II 2GD h T6 IIC T85°C X	8411 1011 68
LZL15-L-P-NEMA	2.4	3.2	3381	6.6	4.9	10.10	8.1	14	9.7	7000		61	129	8.3	18.3	Ex II 2GD h T6 IIC T85°C X	8411 1011 92
Unrestricted*	3.2	4.3	4500	6.8	5.0	10.9	8.0	13	9.6		7200	87	184				
LZL25-L-P-AC	3.4	4.6	2800	11.6	8.5	18	13.2	23	17	5800		86	182	11.3	24.9	Ex II 2GD h T6 IIC T85°C X	8411 1011 27
LZL25-L-P-IEC	3.4	4.6	2800	11.6	8.5	18	13.2	23	17	5800		86	182	15.2	33.5	Ex II 2GD h T6 IIC T85°C X	8411 1011 76
Unrestricted*	5.0	6.7	4000	12.0	8.8	18	13.2	23	17		6000	135	286				
LZL35-L-P-AC	5.2	7.0	2500	20	14.7	32	23.6	40	30	5000		130	275	20	44.1	Ex II 2GD h T6 IIC T85°C X	8411 1011 35
LZL35-L-P-IEC	5.2	7.0	2500	20	14.7	32	23.6	40	30	5000		13	275	20	44.1	Ex II 2GD h T6 IIC T85°C X	8411 1011 84
Unrestricted*	6.5	8.7	3100	20	14.7	32	23.6	40	30		5000	160	339				

* Motors without restrictor plates in the air in- and outlet, the motor should not be run above max allowed speed.

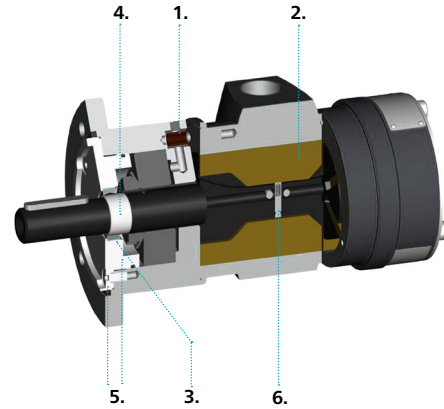
** Max allowed speed for the specified ATEX code is 5000 rpm.

Low to medium speed motors (M)

These motors are, among other applications, ideal for mixing.

To further ensure a clean and hygienic environment, a double shaft seal is used and all components that come in contact with the mixed medium are made of corrosion-resistant material. Thanks to the cylinder design and highly stable bearings, LZL motors require no extra drive shaft support and are ready for mounting without add-ons. For good adaptability, the motors are available with AC, IEC or NEMA.

EX certification valid for fixture mounted use only with a maximum surrounding temperature of +40°C (104°F).



1. Rubber hose valves for venting bearing and seals.
2. Lube free vanes.
3. Double seals.
4. Stainless steel bushing.
5. Aluminum front with stainless steel screws.
6. Spring loaded pins.

Model Lubrication free	Power at 3000 rpm		Torque at 3000 rpm		Stall torque		Max allowed speed r/min	Air consumption at 3000 rpm		Weight		ATEX code	Ordering No.
	kW	hp	Nm	lb-ft	Nm	lb-ft		l/s	cfm	kg	lb		
LZL03-L-M-AC	0.41	0.55	1.3	0.95	3.3	2.4	3000	16	34	2.9	6.4	Ex II 2GD h T6 IIC T85°C X	8411 1010 06
LZL03-L-M-IEC	0.41	0.55	1.3	0.95	3.3	2.4	3000	16	34	3.8	8.4	Ex II 2GD h T6 IIC T85°C X	8411 1010 14
LZL03-L-M-NEMA	0.41	0.55	1.3	0.95	3.3	2.4	3000	16	34	3.9	8.6	Ex II 2GD h T6 IIC T85°C X	8411 1010 22
Unrestricted*	1.0	1.3	3.3	2.4	3.8	2.8	3000	24	51				
LZL05-L-M-AC	0.63	0.84	2.0	1.5	5.8	4.3	3000	25	52	3.9	8.6	Ex II 2GD h T6 IIC T85°C X	8411 1010 63
LZL05-L-M-IEC	0.63	0.84	2.0	1.5	5.8	4.3	3000	25	52	4.8	10.6	Ex II 2GD h T6 IIC T85°C X	8411 1010 71
LZL05-L-M-NEMA	0.63	0.84	2.0	1.5	5.8	4.3	3000	25	52	4.9	10.8	Ex II 2GD h T6 IIC T85°C X	8411 1010 89
Unrestricted*	1.7	2.2	5.3	3.9	5.8	4.3	3000	35	74				

* Motor without restrictor plates in the air in- and outlet, the motors should not be run above max allowed speed.

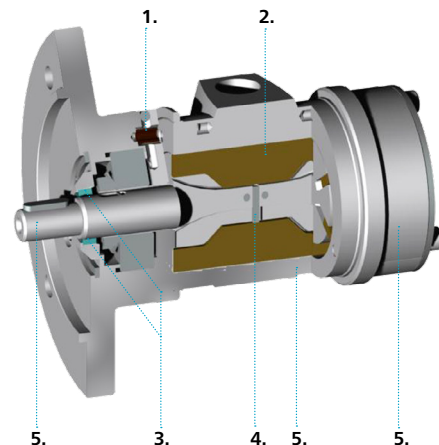
Stainless steel motors

Stainless steel motors are available in the size LZL05. They are lube free and have the same features as the other lube free motors. All external parts, including the output shaft, are made of stainless steel, which makes the motors very corrosion resistant and ideal for applications such as the food industry, corrosive mixing and the chemical industry.

The material used in all external parts is ISO 683/XIII Type 17, SS 14 2346, DIN 17440 X 12CrNiS188.

The material in the output shaft is ISO 683/XIII Type 9b, SS 14 2321, DIN 17440 X 22CrNi17.

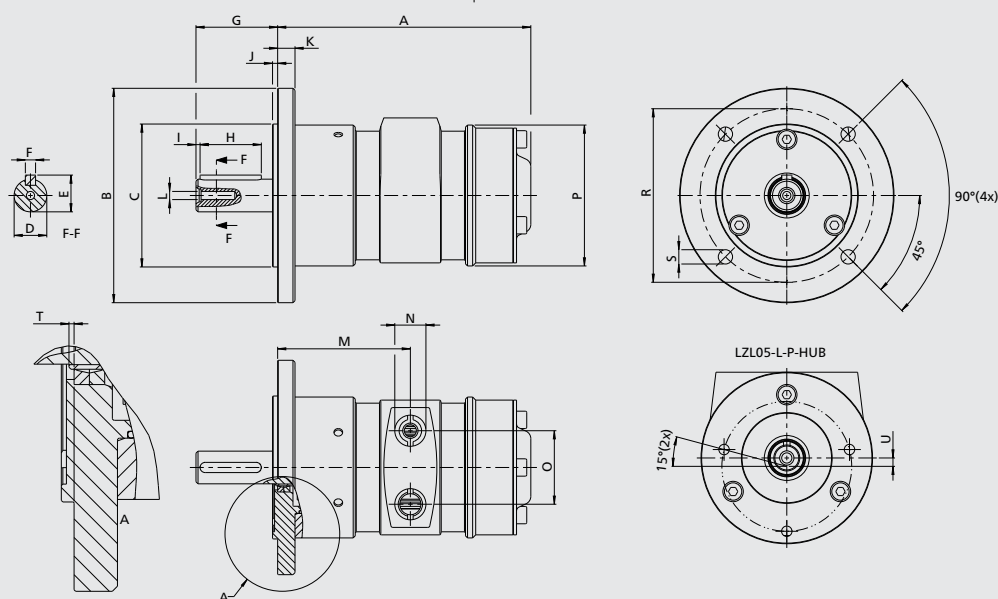
EX certification valid for fixture mounted use only with a maximum surrounding temperature of +40°C (104°F).



1. Rubber hose valves for venting bearing and seals.
2. Lube free vanes.
3. Double seals.
4. Vane pins.
5. Stainless steel.

Model Lubrication free	Power at 3000 rpm		Torque at 3000 rpm		Stall torque		Max allowed speed r/min	Air consumption at 3000 rpm		Weight		ATEX code	Ordering No.
	kW	hp	Nm	lb-ft	Nm	lb-ft		l/s	cfm	kg	lb		
LZL05-RL-P-IEC	0.63	0.84	2.0	1.5	5.8	4.3	3000	25	52	6.1	13.4	Ex II 2GD h T4 IIC T110°C	8411 1010 97
LZL05-RL-P-NEMA	0.63	0.84	2.0	1.5	5.8	4.3	3000	25	52	6.1	13.4	Ex II 2GD h T4 IIC T110°C	8411 1011 01
Unrestricted*	1.7	2.2	5.3	3.9	5.8	4.3	3000	35	74				

* Motor without restrictor plates in the air in- and outlet, the motors should not be run above max allowed speed.



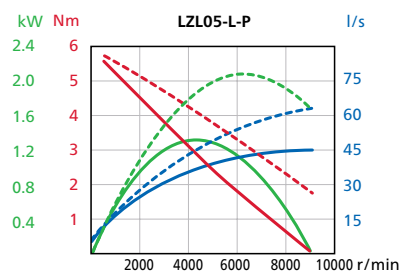
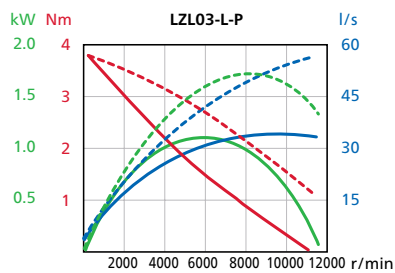
Model		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U
LZL03-L-M/P-AC	mm	124	Ø105	Ø70 j6	Ø16 j7	18	5 h9	40	30	2.0	2.5	8.5	M5x15	65	BSP 3/8"	36	Ø69	Ø85	Ø7	1	-
LZL03-L-M/P-IEC	mm	124	Ø160	Ø110 j6	Ø14 j7	16	5 h9	30	20	2.0	3.5	8.5	M5x15	65	BSP 3/8"	36	Ø69	Ø130	Ø10	-	-
LZL03-L-M/P-NEMA	mm	124	Ø165.1	Ø114.3	Ø15.875	17.85	4.75	51.5	31.75	1.7	3.175	10	M5x15	65	BSP 3/8"	36	Ø69	Ø149.225	3/8"-16 UNC	1	-
LZL03-L-M/P-NEMA	inch	4.88	Ø6.5	Ø4.5	Ø0.625	0.703	0.187	2.03	1.25	0.07	0.125	0.39	M5x15	2.56	BSP 3/8"	1.42	Ø2.72	Ø5.875	3/8"-16 UNC	0.04	-
LZL05-L-P-AC	mm	152	Ø105	Ø70 j6	Ø18 j7	20.5	6 h9	40	30	3.0	2.5	8.5	M5x15	81	BSP 1/2"	44	Ø76	Ø85	Ø7	-	-
LZL05-L-M-AC	mm	152	Ø105	Ø70 j6	Ø16 j7	18	5 h9	40	30	2.0	2.5	8.5	M5x15	81	BSP 1/2"	44	Ø76	Ø85	Ø7	0.5	-
LZL05-L-M/P-IEC	mm	152	Ø160	Ø110 j6	Ø14 j7	16	5 h9	30	20	2.0	3.5	8.5	M5x15	81	BSP 1/2"	44	Ø76	Ø130	Ø10	-	-
LZL05-L-M/P-NEMA	mm	152	Ø165.1	Ø114.3	Ø15.875	17.85	4.75	51.5	31.75	1	3.175	10	M5x15	81	BSP 1/2"	44	Ø76	Ø149.225	3/8"-16 UNC	0.5	-
LZL05-L-M/P-NEMA	inch	5.98	Ø6.5	Ø4.5	Ø0.625	0.703	0.187	2.03	1.25	0.04	0.125	0.39	M5x15	3.19	BSP 1/2"	1.73	Ø3	Ø5.875	3/8"-16 UNC	0.02	-
LZL05-L-P-HUB	mm	152	Ø84	Ø44.45 j6	Ø12.7	14.51	3.175 H7	45	12.3	6.8	16	8.5	-	81	BSP 1/2"	44	Ø76	Ø63.6	1/4"-20 UNC	15.5	4.1
LZL05-L-P-HUB	inch	5.98	Ø3.31	Ø1.75	Ø0.5	0.57	0.125	1.77	0.5	0.3	0.63	0.335	-	3.19	BSP 1/2"	1.73	Ø3	Ø2.5	1/4"-20 UNC	0.61	0.161
LZL05-RL-P-IEC	mm	152	Ø160	Ø110 j6	Ø14 j7	16	5 h9	30	20	2.0	3.5	8.5	M5x15	81	BSP 1/2"	44	Ø76	Ø130	Ø10	-	-
LZL05-RL-P-NEMA	mm	152	Ø165.1	Ø114.3	Ø15.875	17.85	4.75	51.5	31.75	1	3.175	10	M5x15	81	BSP 1/2"	44	Ø76	Ø149.225	3/8"-16 UNC	0.5	-
LZL05-RL-P-NEMA	inch	5.98	Ø6.5	Ø4.5	Ø0.625	0.703	0.187	2.03	1.25	0.04	0.125	0.39	M5x15	3.19	BSP 1/2"	1.73	Ø3	Ø5.875	3/8"-16 UNC	0.02	-
LZL15-L-P-AC	mm	181.5	Ø140	Ø95 j6	Ø22 j7	24.5	6 h9	52.5	40	5.0	3.0	12	M6x16	95	BSP 3/4"	54	Ø100	Ø115	Ø9	-	-
LZL15-L-P-IEC	mm	181.5	Ø200	Ø130 j6	Ø19 j6	21.5	6 h9	40.5	30	5.0	3.5	12	M6x16	95	BSP 3/4"	54	Ø100	Ø165	Ø12	-	-
LZL15-L-P-NEMA	mm	181.5	Ø165.1	Ø114.3	Ø15.875	17.85	4.75	51.5	31.75	1.5	3.175	12	M6x16	95	BSP 3/4"	54	Ø100	Ø149.225	3/8"-16 UNC	-	-
LZL15-L-P-NEMA	inch	7.15	Ø6.5	Ø4.5	Ø0.625	0.703	0.187	2.03	1.25	0.06	0.125	0.472	M6x16	3.74	BSP 3/4"	2.13	Ø3.94	Ø5.875	3/8"-16 UNC	-	-
LZL25-L-P-AC	mm	221	Ø160	Ø110 j6	Ø28 j7	31	8 h7	62.5	50	5.0	3	12	M10x22	118	BSP 1"	70	Ø120	Ø130	Ø10	-	-
LZL25-L-P-IEC	mm	221	Ø200	Ø130 j6	Ø24 j6	27	8 h7	49.5	40	5.0	3.5	12	M10x22	118	BSP 1"	70	Ø120	Ø165	Ø12	-	-
LZL35-L-P-AC	mm	248.5	Ø200	Ø130 j6	Ø28 j7	31	8 h7	60	50	5.0	3.5	14	M10x22	129	BSP 1 1/4"	70	Ø134	Ø165	Ø12	-	-
LZL35-L-P-IEC	mm	248.5	Ø250	Ø180 j6	Ø28 j6	31	8 h7	60	50	5.0	4.0	14	M10x22	129	BSP 1 1/4"	70	Ø134	Ø215	Ø14.5	-	-

LZL motors with IEC interface

Model	Flange mounting	IEC frame	Flange No.
LZL03-L-M/P-IEC	B5	71	FF 130
LZL05-L-M/P-IEC	B5	71	FF 130
LZL05-RL-M/P-IEC	B5	71	FF 130
LZL15-L-P-IEC	B5	80	FF 165
LZL25-L-P-IEC	B5	80	FF 165
LZL35-L-P-IEC	B5	100	FF 215

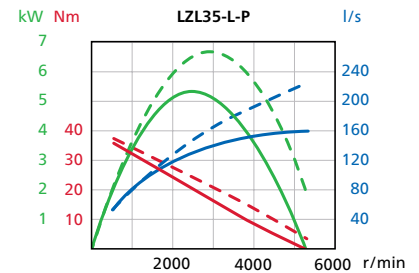
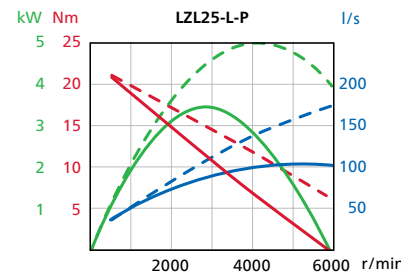
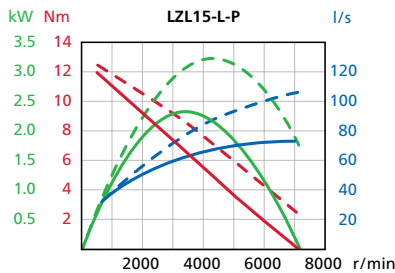
LZL: Performance curves at air pressure 6.3 bar (91 psi)

Power motors



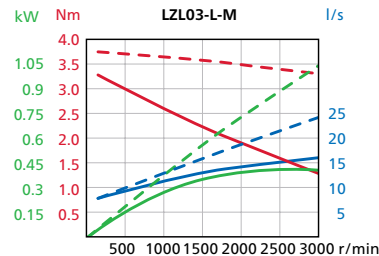
The solid lines represent restricted motors and the dotted lines unrestricted motors.

The restricted motors are guaranteed not to exceed the ATEX speed limit when running at 6.3 bar or below.

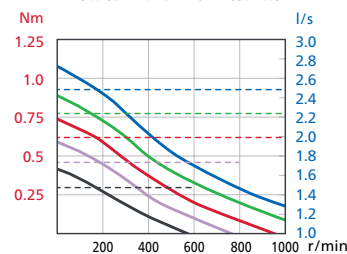


LZL: Performance curves at air pressure 6.3 bar (91 psi)

Low to medium speed

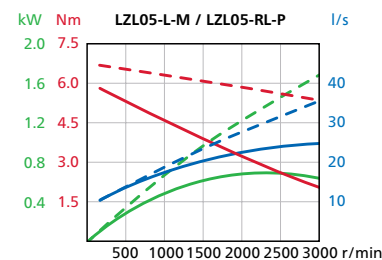


LZL03-L-M
Throttled with air flow restrictor

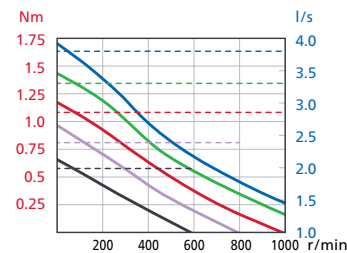


Curve idling speed

- 1400 rpm Torque --- 1400 rpm Air Cons.
- 1200 rpm Torque --- 1200 rpm Air Cons.
- 1000 rpm Torque --- 1000 rpm Air Cons.
- 800 rpm Torque --- 800 rpm Air Cons.
- 600 rpm Torque --- 600 rpm Air Cons.

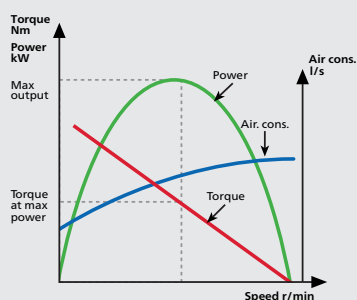


LZL05-L-M
Throttled with air flow restrictor



Curve idling speed

- 1400 rpm Torque --- 1400 rpm A
- 1200 rpm Torque --- 1200 rpm A
- 1000 rpm Torque --- 1000 rpm A
- 800 rpm Torque --- 800 rpm Air
- 600 rpm Torque --- 600 rpm Air



Conversion factors

- 1 kW = 1.34 hp
- 1 Nm = 0.74 lbf - ft
- 1 l/s = 2.1 cfm

- 1 hp = 0.75 kW
- 1 lbf-ft = 1.36 Nm
- 1 cfm = 0.47 l/s

For information about performance curves, see page 6.

Performance with restrictors

Performance without restrictors, (unrestricted)

LZL vane motor

gear unit combinations

Combined with helical gear units, LZL vane motors can be used over a very wide torque and speed range. Gears have a ratio range between 6.3:1 to 164.5:1, corresponding to a speed range of 512 to 17 r/min and output torque up to 1836 Nm at max. output.

Helical gear units, type BF

Helical gear units are available in 2, 3, or 4-stage configurations. They deliver high efficiency levels and are available in a wide choice of ratios, Figure 4.

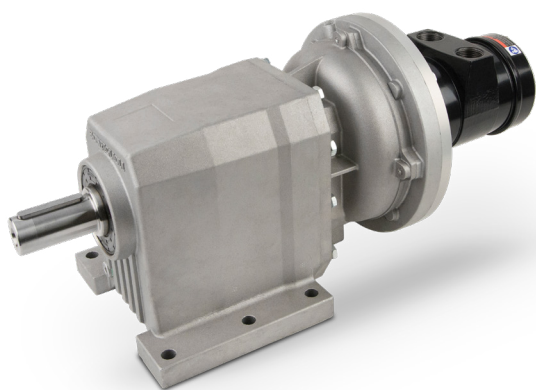


Figure 4

Shaft loading

The maximum allowable radial load on the output shaft of each gear unit, at the halfway point on the shaft can be obtained from the data tables for each model.

The maximum permitted axial load is 20% of the table value for radial load if full permitted radial load is occurring. If there is no radial load the maximum permissible axial load is 50% of the table value for radial force.

Calculating sprocket or gearwheel dimensions

If it is intended to fit a sprocket, gearwheel or pulley onto the output shaft, the radial load generated when running must be within the permitted level.

The following formula is used to calculate the minimum diameter of these components, to ensure the radial load does not exceed this limit.

$$D_{\min} = \frac{2 \times M \times k_t}{F} \text{ [m]}$$

where M = load torque in Nm
 F = permitted radial force halfway along the shaft extension
 k_t = 1.0 for sprocket
 1.3 for gear wheel
 1.5 for pulley

Operating speed

To avoid damage to seals the gear units should not be run continuously above 4200 rpm.

Mounting

There are two options of mounting arrangement: Foot or Flange as illustrated in Figure 5.

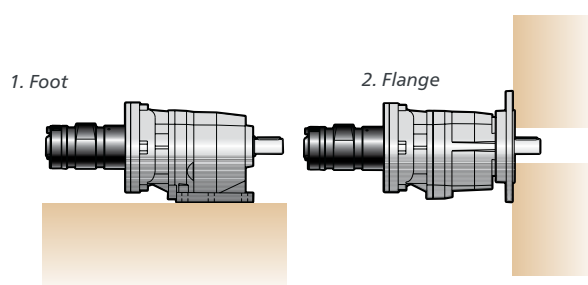


Figure 5

Temperature

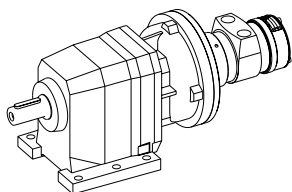
The gear units can operate within an ambient temperature range of -20°C (-4°F) and +40°C (104°F).

If it is required to use a gear unit outside these temperature limits please consult your local Atlas Copco representative.

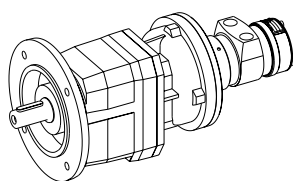
Mounting position

Allowed mounting positions are shown below. Installing the motor underneath the gear unit is not allowed.

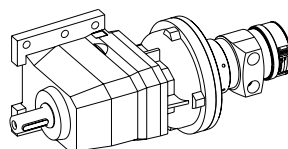
The alphanumeric numbers B3, B5, etc., are referred to in the product information enclosed at delivery.



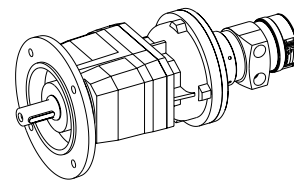
B3



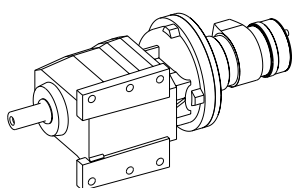
B5



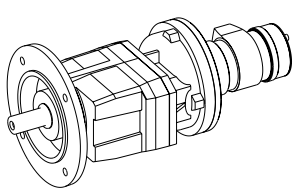
B6



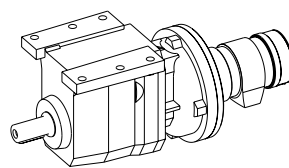
B51



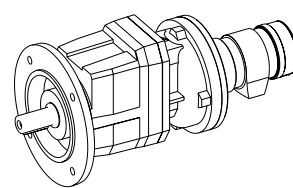
B7



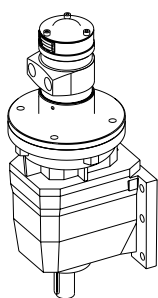
B53



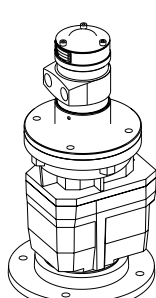
B8



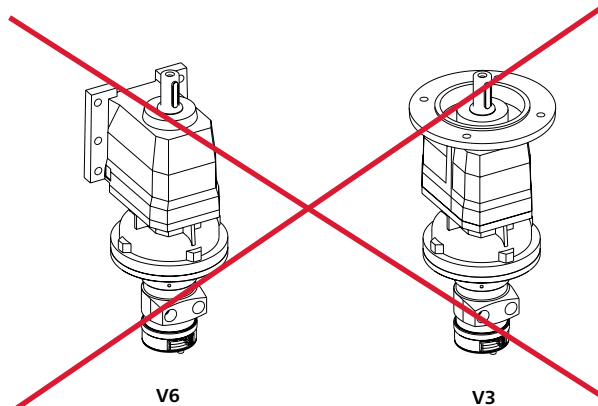
B52



V5



V1

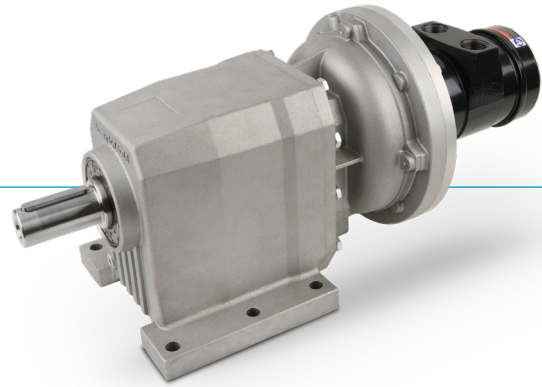


V6

V3

NOTE: For some positions additional oil needs to be added to the gear box, see service instructions for details

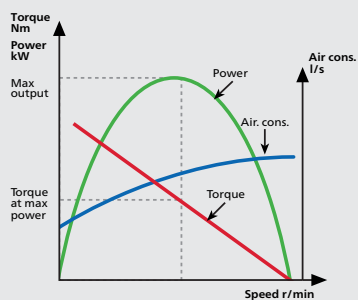
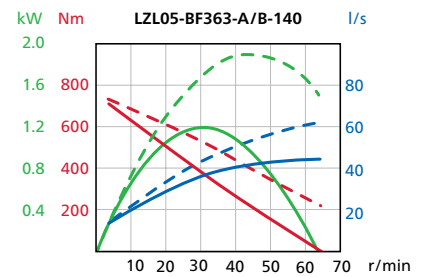
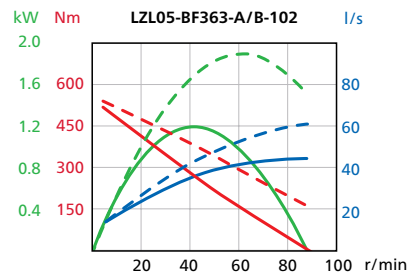
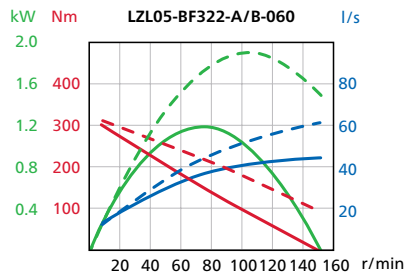
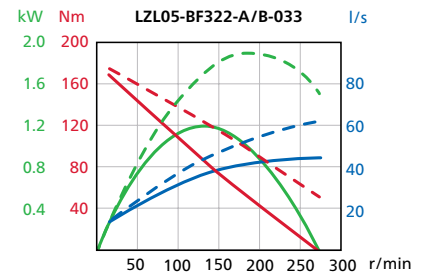
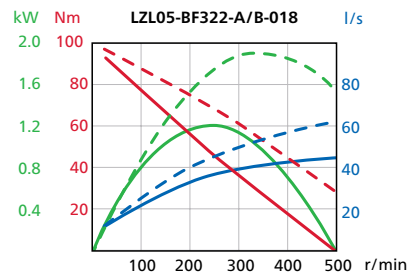
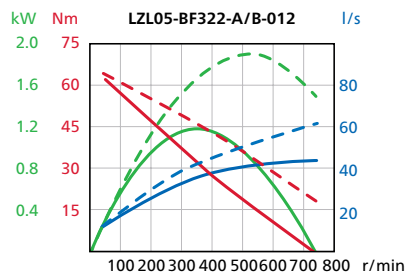
with helical gear units



Data at air pressure 6.3 bar (91 psi)

*) Unrestricted, the motors should not be run without load

Air motor LZL05 with helical gear units type BF: Performance curves at air pressure 6.3 bar (91 psi)



For information about performance curves, see page 6.

Conversion factors

1 kW	= 1.34 hp
1 Nm	= 0.74 lbf - ft
1 l/s	= 2.1 cfm
1 hp	= 0.75 kW
1 lbf-ft	= 1.36 Nm
1 cfm	= 0.47 l/s

Performance with restrictors

Performance without restrictors, (unrestricted)

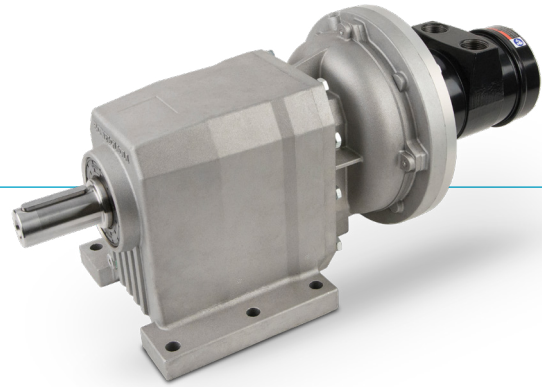
Air motors LZL15

with helical gear units

2.1 – 3.0 kW

2.9 – 4.1 hp

The LZL motor connects to the helical gear through an IEC interface

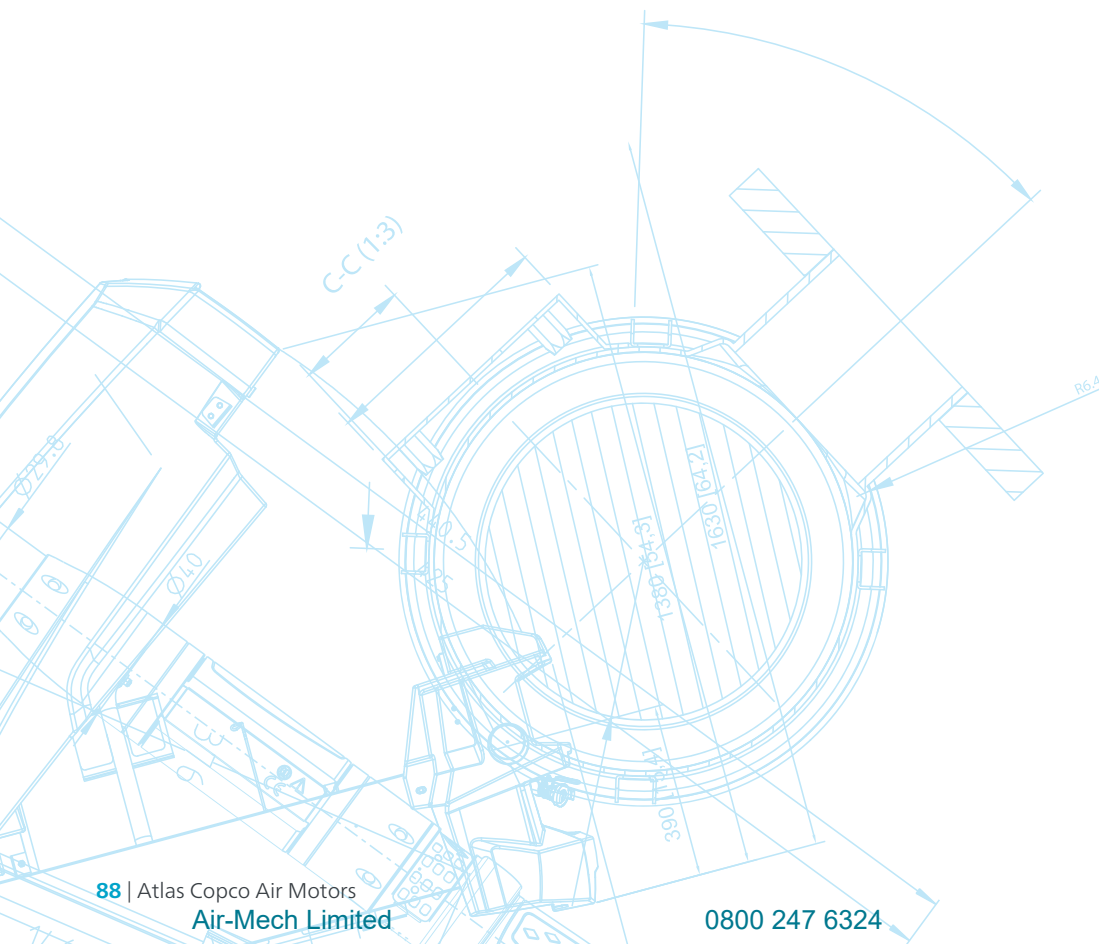


Data at air pressure 6.3 bar (91 psi)

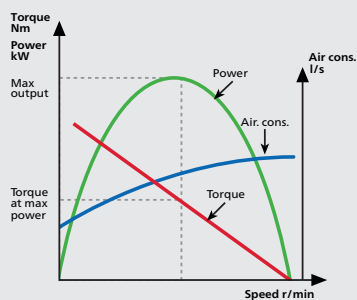
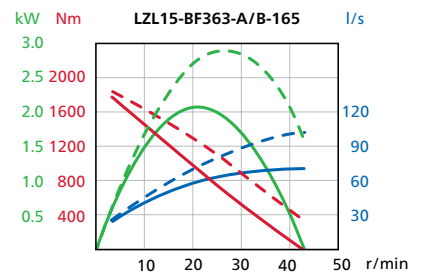
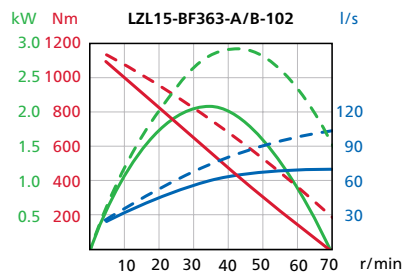
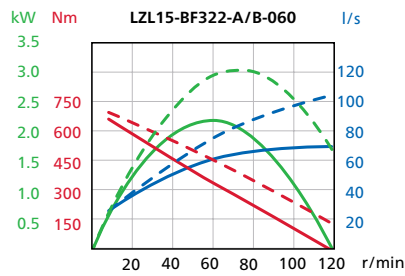
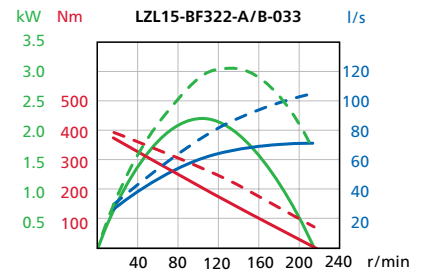
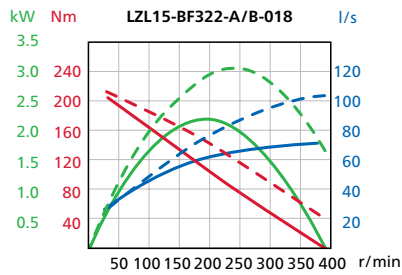
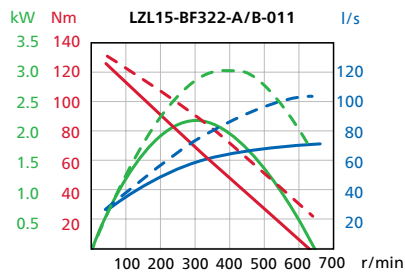
Model	Ratio	Max output		Speed at max output r/min	Torque max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air consumption at max output		Weight		Max radial load at max output N	Ordering No.
		kW	hp		Nm	lb-ft	Nm	lb-ft			l/s	cfm	kg	lb		
LZL15-BF322-A-011	11.2	2.2	2.9	307	68	50	116	86	639		61	129	19	42	2530	8411 1810 61
LZL15BF322-B-011	11.2	2.2	2.9	307	68	50	116	86	639		61	129	19	42	2530	8411 1810 79
Unrestricted*	11.2	3.0	4.1	389	74	55	116	86		639	86	181	19	42	2310	
LZL15-BF322-A-018	18.2	2.2	2.9	189	111	82	188	139	393		61	129	19	42	2970	8411 1810 87
LZL15-BF322-B-018	18.2	2.2	2.9	189	111	82	188	139	393		61	129	19	42	2970	8411 1810 95
Unrestricted*	18.2	3.0	4.1	239	121	89.3	188	139		393	86	181	19	42	2710	
LZL15-BF322-A-033	33.1	2.2	2.9	104	202	149	343	253	216		61	129	19	42	3600	8411 1811 03
LZL15-BF322-B-033	33.1	2.2	2.9	104	202	149	343	253	216		61	129	19	42	3600	8411 1811 11
Unrestricted*	33.1	3.0	4.1	132	220	162	343	253		216	86	181	19	42	3300	
LZL15-BF322-A-060	59.4	2.2	2.9	58	362	267	615	454	120		61	129	19	42	5150	8411 1811 29
LZL15-BF322-B-060	59.4	2.2	2.9	58	362	267	615	454	120		61	129	19	42	5150	8411 1811 37
Unrestricted*	59.4	3.0	4.1	73	395	291	615	454		120	86	181	19	42	4710	
LZL15-BF363-A-102	102.2	2.1	2.9	34	609	449	1036	764	70		61	129	27	60	6040	8411 1811 45
LZL15-BF363-B-102	102.2	2.1	2.9	34	609	449	1036	764	70		61	129	27	60	6040	8411 1811 52
Unrestricted*	102.2	3.0	4.0	43	665	491	1036	764		70	86	181	27	60	5520	
LZL15-BF613-A-165	164.5	2.1	2.9	21	981	723	1668	1230	43		61	129	70	154	15000	8411 1811 60
LZL15-BF613-B-165	164.5	2.1	2.9	21	981	723	1668	1230	43		61	129	70	154	15000	8411 1811 78
Unrestricted*	164.5	3.0	4.0	26	1071	790	1668	1230		43	86	181	70	154	15000	

*) Unrestricted, the motors should not be run without load

A = Foot mount. B = Flange mount



Air motor LZL15 with helical gear units type BF: Performance curves at air pressure 6.3 bar (91 psi)



Conversion factors

1 kW	= 1.34 hp
1 Nm	= 0.74 lbf - ft
1 l/s	= 2.1 cfm
1 hp	= 0.75 kW
1 lbf-ft	= 1.36 Nm
1 cfm	= 0.47 l/s

—————
Performance with restrictors

Performance without restrictors, (unrestricted)

For information about performance curves, see page 6.

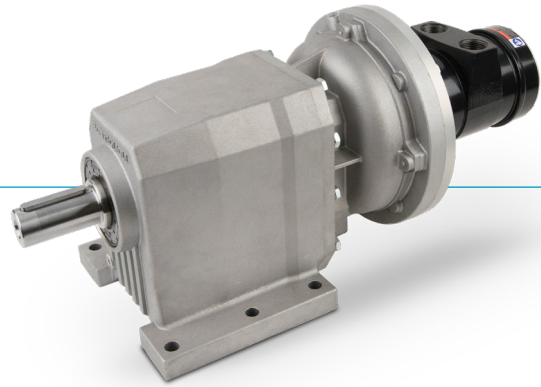
Air motors LZL25

with helical gear units

3.3 – 4.8 kW

4.4 – 6.4 hp

The LZL motor connects to the helical gear through an IEC interface

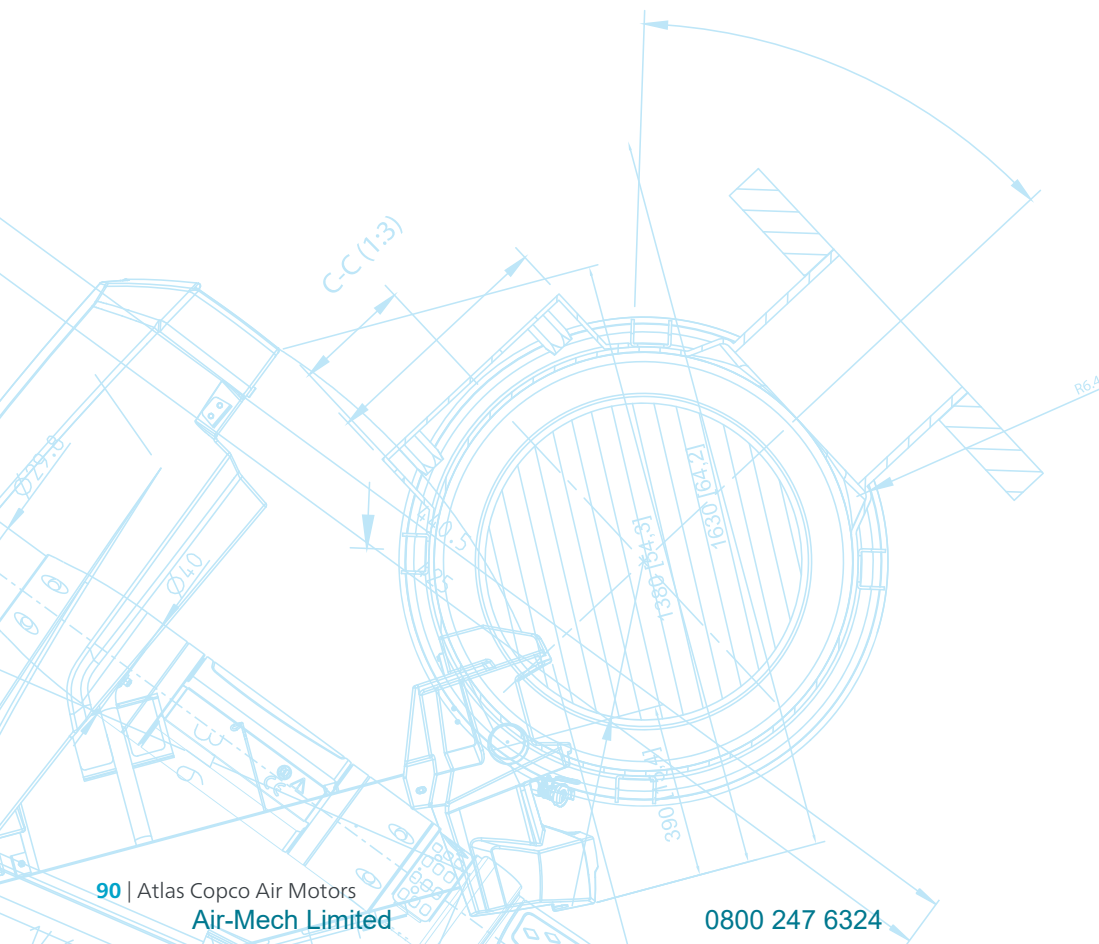


Data at air pressure 6.3 bar (91 psi)

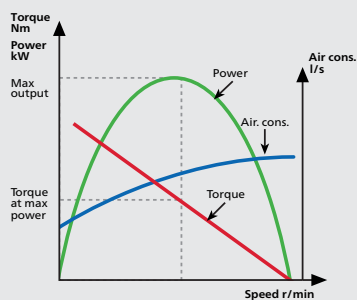
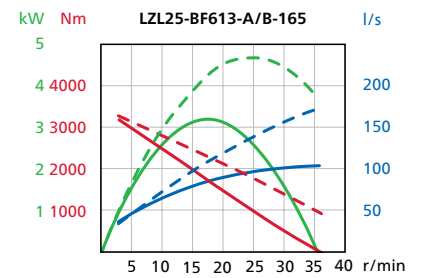
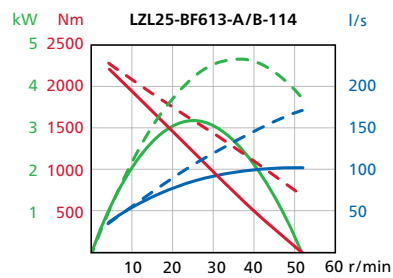
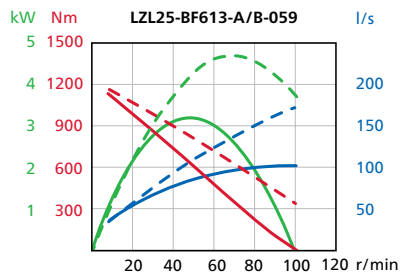
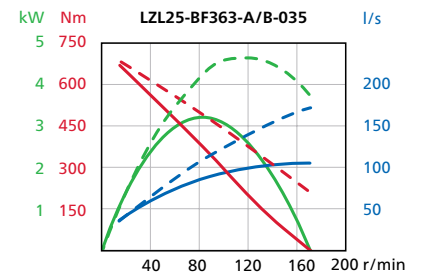
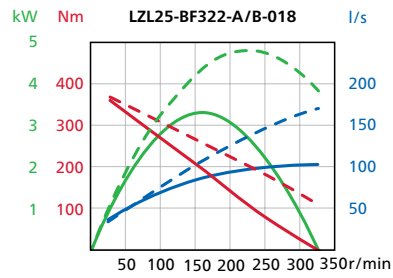
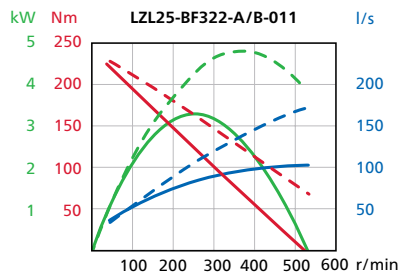
Model	Ratio	Max output		Speed at max output r/min	Torque max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air consumption at max output		Weight		Max radial load at max output N	Ordering No.
		kW	hp		Nm	lb-ft	Nm	lb-ft			l/s	cfm	kg	lb		
LZL25-BF322-A-011	11.2	3.3	4.4	254	123	91	192	141	531		86	183	26	57	2700	8411 1811 86
LZL25-BF322-B-011	11.2	3.3	4.4	254	123	91	192	141	531		86	183	26	57	2700	8411 1811 94
Unrestricted*	11.2	4.8	6.4	370	128	94	192	141		531	140	297	26	57	2430	
LZL25-BF322-A-018	18.2	3.3	4.4	156	201	148	311	230	327		86	183	26	57	3170	8411 1812 02
LZL25-BF322-B-018	18.2	3.3	4.4	156	201	148	311	230	327		86	183	26	57	3170	8411 1812 10
Unrestricted*	18.2	4.8	6.4	227	207	153	311	230		327	140	297	26	57	2860	
LZL25-BF363-A-035	34.6	3.2	4.3	82	373	275	579	427	172		86	183	34	75	4100	8411 1812 28
LZL25-BF363-B-035	34.6	3.2	4.3	82	373	275	579	427	172		86	183	34	75	4100	8411 1812 36
Unrestricted*	34.6	4.7	6.2	120	386	285	579	427		172	140	297	34	75	3700	
L25-BF613-A-059	58.6	3.2	4.3	48	632	466	981	724	101		86	183	77	170	13000	8411 1812 44
LZL25-BF613-B-059	58.6	3.2	4.3	48	632	466	981	724	101		86	183	77	170	13000	8411 1812 51
Unrestricted*	58.6	4.7	6.2	71	654	482	981	724		101	140	297	77	170	11700	
LZL25-BF613-A-114	113.6	3.2	4.3	25	1226	904	1902	1403	52		86	183	77	170	16000	8411 1812 69
LZL25-BF613-B-114	113.6	3.2	4.3	25	1226	904	1902	1403	52		86	183	77	170	16000	8411 1812 77
Unrestricted*	113.6	4.7	6.2	36	1268	935	1902	1403		52	140	297	77	170	16000	
LZL25-BF613-A-165	164.5	3.2	4.3	17	1775	1309	2754	2031	36		86	183	77	170	16000	8411 1812 85
LZL25-BF613-B-165	164.5	3.2	4.3	17	1775	1309	2754	2031	36		86	183	77	170	16000	8411 1812 94
Unrestricted*	164.5	4.7	6.2	25	1836	1354	2754	2031		36	140	297	77	170	16000	

*) Unrestricted, the motors should not be run without load

A = Foot mount. B = Flange mount



Air motor LZL25 with helical gear units type BF: Performance curves at air pressure 6.3 bar (91 psi)



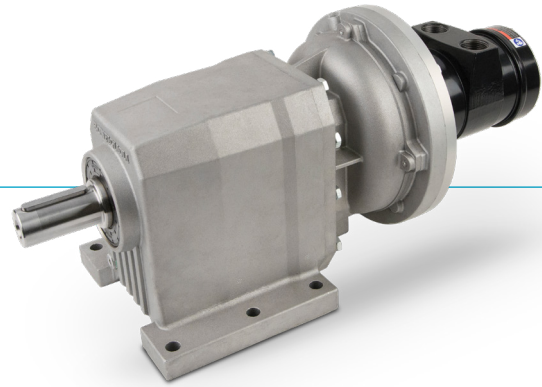
Conversion factors
 1 kW = 1.34 hp
 1 Nm = 0.74 lbf - ft
 1 l/s = 2.1 cfm

 1 hp = 0.75 kW
 1 lbf-ft = 1.36 Nm
 1 cfm = 0.47 l/s

—————
 Performance with restrictors
 - - - - -
 Performance without restrictors, (unrestricted)

For information about performance curves, see page 6.

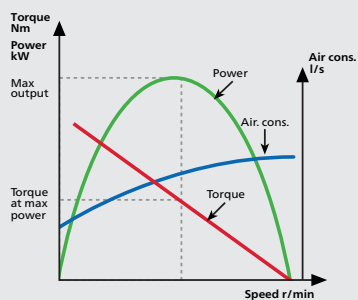
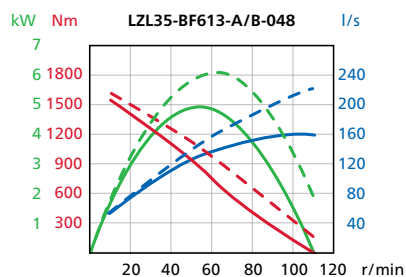
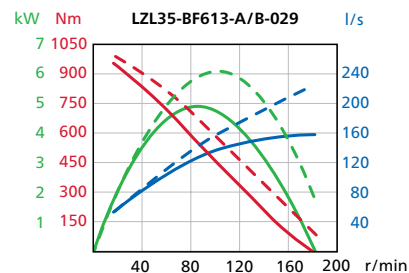
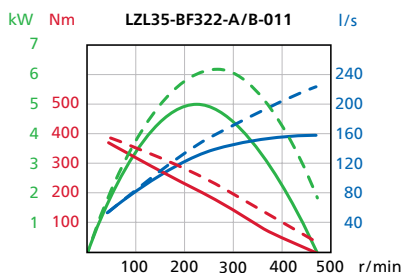
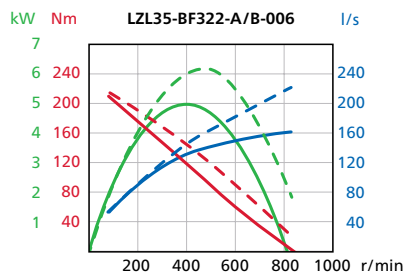
with helical gear units



Data at air pressure 6.3 bar (91 psi)

*) Unrestricted, the motors should not be run without load

Air motor LZL35 with helical gear units type BF: Performance curves at air pressure 6.3 bar (91 psi)



Conversion factors

1 kW	= 1.34 hp
1 Nm	= 0.74 lbf - ft
1 l/s	= 2.1 cfm
1 hp	= 0.75 kW
1 lbf - ft	= 1.36 Nm
1 cfm	= 0.47 l/s

—————
Performance with restrictors

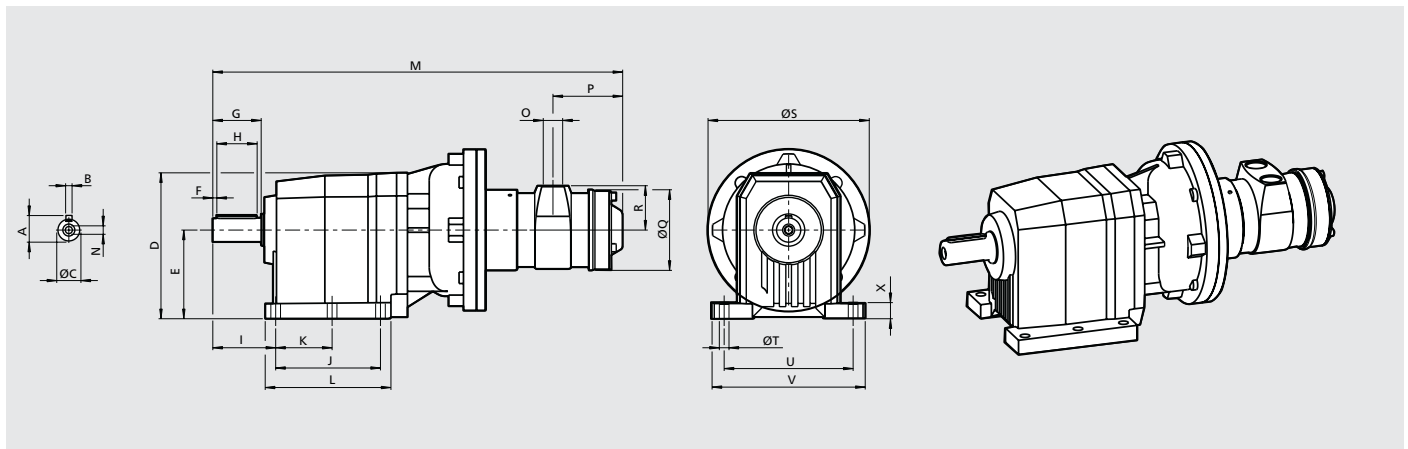
Performance without restrictors, (unrestricted)

For information about performance curves, see page 6.

Dimensions LZL with helical gear units

Foot models

Conversion factor 1 mm = 0.04 inch

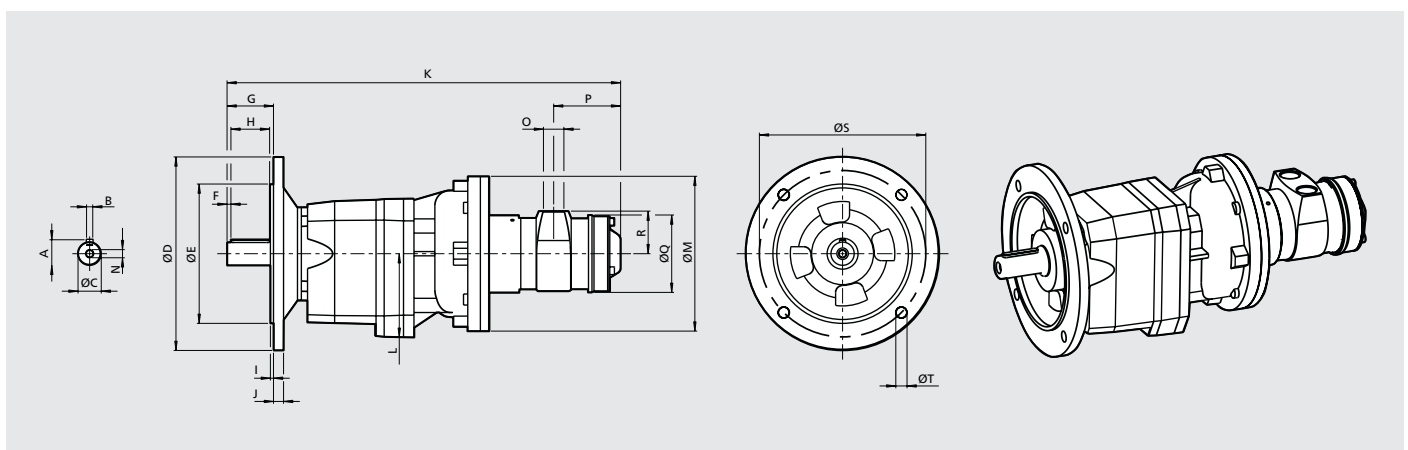


LZL type BF FOOT

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X
LZL05-BF322-A-xxx	33	8 h9	30 h6	181	110	5.0	60	50	78	130	70	156	459.5	M10x22	BSP 1/2	71	Ø76	42	Ø160	Ø11	160	190	20
LZL05-BF363-A-xxx	38	10 h9	35 h6	206	115	5.0	70	60	93.5	130	N/A	168	478	M10x22	BSP 1/2	71	Ø76	42	Ø160	Ø14	170	205	16
LZL15-BF322-A-xxx	33	8 h9	30 h6	181	110	5.0	60	50	78	130	70	156	509	M10x22	BSP 3/4	86.5	Ø100	55	Ø200	Ø11	160	190	20
LZL15-BF363-A-xxx	38	10 h9	35 h6	206	115	5.0	70	60	93.5	130	N/A	168	527.5	M10x22	BSP 3/4	86.5	Ø100	55	Ø200	Ø14	170	205	16
LZL15-BF613-A-xxx	53.5	14 h9	50 h6	316	195	5.0	100	90	125	180	N/A	232	617	M16x36	BSP 3/4	86.5	Ø100	55	Ø200	Ø18	250	300	25
LZL25-BF322-A-xxx	33	8 h9	30 h6	181	110	5.0	60	50	78	130	70	156	547.5	M10x22	BSP 1	103	Ø120	62	Ø200	Ø11	160	190	20
LZL25-BF363-A-xxx	38	10 h9	35 h6	206	115	5.0	70	60	93.5	130	N/A	168	566	M10x22	BSP 1	103	Ø120	62	Ø200	Ø14	170	205	16
LZL25-BF613-A-xxx	53.5	14 h9	50 h6	316	195	5.0	100	90	125	180	N/A	232	655.5	M16x36	BSP 1	103	Ø120	62	Ø200	Ø18	250	300	25
LZL35-BF322-A-xxx	33	8 h9	30 h6	181	110	5.0	60	50	78	130	70	156	585.5	M10x22	BSP 1 1/4	119.5	Ø134	68	Ø250	Ø14	160	190	20
LZL35-BF613-A-xxx	53.5	14 h9	50 h6	316	195	5.0	100	90	125	180	N/A	232	692.5	M16x36	BSP 1 1/4	119.5	Ø134	68	Ø250	Ø18	250	300	25

Flange models

Conversion factor 1 mm = 0.04 inch



LZL type BF FLANGE

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
LZL05-BF322-B-xxx	33	8 h9	30 h6	Ø250	Ø180 f7	5.0	60	50	4.0	13	459.5	108	Ø160	M10x22	BSP 1/2	71	Ø76	42	Ø215	Ø14
LZL05-BF363-B-xxx	38	10 h9	35 h6	Ø250	Ø180 f7	5.0	70	60	4.0	14	478	111	Ø160	M10x22	BSP 1/2	71	Ø76	42	Ø215	Ø14
LZL15-BF322-B-xxx	33	8 h9	30 h6	Ø250	Ø180 f7	5.0	60	50	4.0	13	509	108	Ø200	M10x22	BSP 3/4	86.5	Ø100	55	Ø215	Ø14
LZL15-BF363-B-xxx	38	10 h9	35 h6	Ø250	Ø180 f7	5.0	70	60	4.0	14	527.5	111	Ø200	M10x22	BSP 3/4	86.5	Ø100	55	Ø215	Ø14
LZL15-BF613-B-xxx	53.5	14 h9	50 h6	Ø300	Ø230 f7	5.0	100	90	4.0	16	617	178.5	Ø200	M16x36	BSP 3/4	86.5	Ø100	55	Ø265	Ø14
LZL25-BF322-B-xxx	33	8 h9	30 h6	Ø250	Ø180 f7	5.0	60	50	4.0	13	547.5	108	Ø200	M10x22	BSP 1	103	Ø120	62	Ø215	Ø14
LZL25-BF363-B-xxx	38	10 h9	35 h6	Ø250	Ø180 f7	5.0	70	60	4.0	14	566	111	Ø200	M10x22	BSP 1	103	Ø120	62	Ø215	Ø14
LZL25-BF613-B-xxx	53.5	14 h9	50 h6	Ø300	Ø230 f7	5.0	100	90	4.0	16	655.5	178.5	Ø200	M16x36	BSP 1	103	Ø120	62	Ø265	Ø14
LZL35-BF322-B-xxx	33	8 h9	30 h6	Ø250	Ø180 f7	5.0	60	50	4.0	13	585.5	108	Ø250	M10x22	BSP 1 1/4	119.5	Ø134	68	Ø215	Ø14
LZL35-BF613-B-xxx	53.5	14 h9	50 h6	Ø300	Ø230 f7	5.0	100	90	4.0	16	692.5	178.5	Ø250	M16x36	BSP 1 1/4	119.5	Ø134	68	Ø265	Ø14

Explosion preventive guidelines



In addition to the product instructions for air motors, the following guidelines apply to explosion protected air motors

Temperatures

- The maximum surrounding temperature for which the certification is valid is 40°C (104°F)
- 40°C (104°F) is also the maximum allowed temperature of the compressed air when it enters the motor
- If the motor is installed in a equipment, the entire equipment has to correspond to the guidelines 2014/35/EU
- Make sure that the compressed air fulfill our quality demands (quality classes 2.4.3. and 3.4.4 respectively 3.5.4 acc. to ISO/DIS 8573-1)
- Do not exceed maximum pressure of 6.3 bar, or as stated on the motor nameplate. Exceeding the operating pressure can increase the surface temperature due to higher rotating speed and the motor can become an ignition source