

The background of the page is a collage of industrial images. In the foreground, there are several large, grey, cylindrical air motors with blue top covers, each containing a yellow liquid. To the left, a large, polished metal flange is visible. In the background, a blue and black air motor is mounted on a yellow mechanical arm. The overall scene is industrial and dynamic, with a blue and yellow color scheme.

LZL

LZL Vane motors

Introduction



LZL vane motors 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 only 21 components, these motors are ruggedly constructed and offer a long service life.

The new LZL mixer models are designed for lube-free running, which results in a cleaner mixing area and no contaminating aerosols to come in contact with the media being blended. 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 a new cylinder design and highly stable bearings, LZL require no extra driveshaft support and is ready for mounting without add-ons. For good adaptability, the motors are available with IEC or NEMA.

The new LZL 03 and -05 are available in two versions: low speed for mixing and high power for other applications.

Type LZL vane motors are available in five sizes, offering outputs of 1.3 kW, 2.3 kW, 3.4 kW and 5,2 kW respectively. 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.

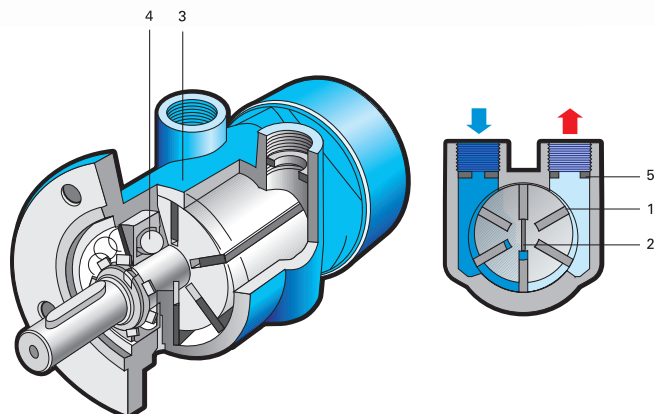


Figure 19

The general configuration and key design features of the Type LZL large vane motor are illustrated in Figure 19.

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.

Shaft loading

The permitted radial and axial shaft extension loadings are illustrated in Figure 20. These values have been calculated for shaft and bearing working lives of at least 1,000 hours at a speed that gives maximum output.

Mounting

Type 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 each motor variant.

Connection

Type LZL motors are supplied with internal restrictors in the connection ports. As illustrated in Figure 21, one is larger than the other.

Anti-Clockwise rotation – the smaller restrictor (1) is fitted in the inlet port and the larger restrictor (2) in the outlet port (as shown).

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 refer to ‘Installation Examples’ on page 74.

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).

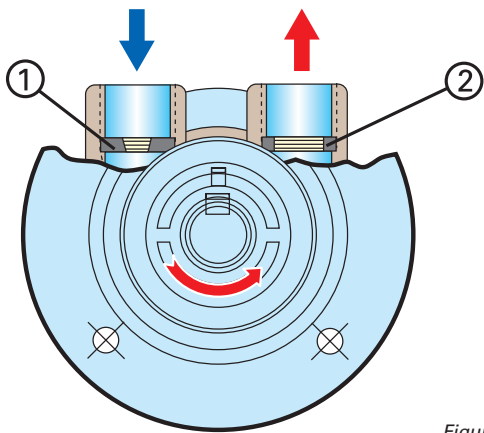
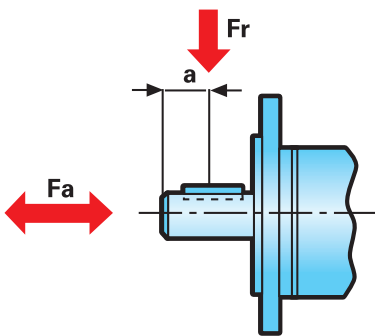


Figure 21



Motor type	Connection thread (BSP)	NON-REVERSIBLE DUTY		REVERSIBLE DUTY	
		Inlet hose diameter (mm)	Exhaust hose diameter (mm)	Inlet hose diameter (mm)	Exhaust hose diameter (mm)
LZL 03	3/8"	12.5	16	16	16
LZL 05	1/2"	12.5	20.0	20.0	20.0
LZL 15	3/4"	16.0	25.0	25.0	25.0
LZL 25	1"	20.0	32.0	32.0	32.0
LZL 35	1 1/4"	20.0	32.0	32.0	32.0

Table 2

Hose dimensions

Information on hose dimensions recommended for use with type LZL air motors is detailed in Table 2. These dimensions are valid for hose lengths up to 3 m. If lengths above that are used, choose a one size larger hose.

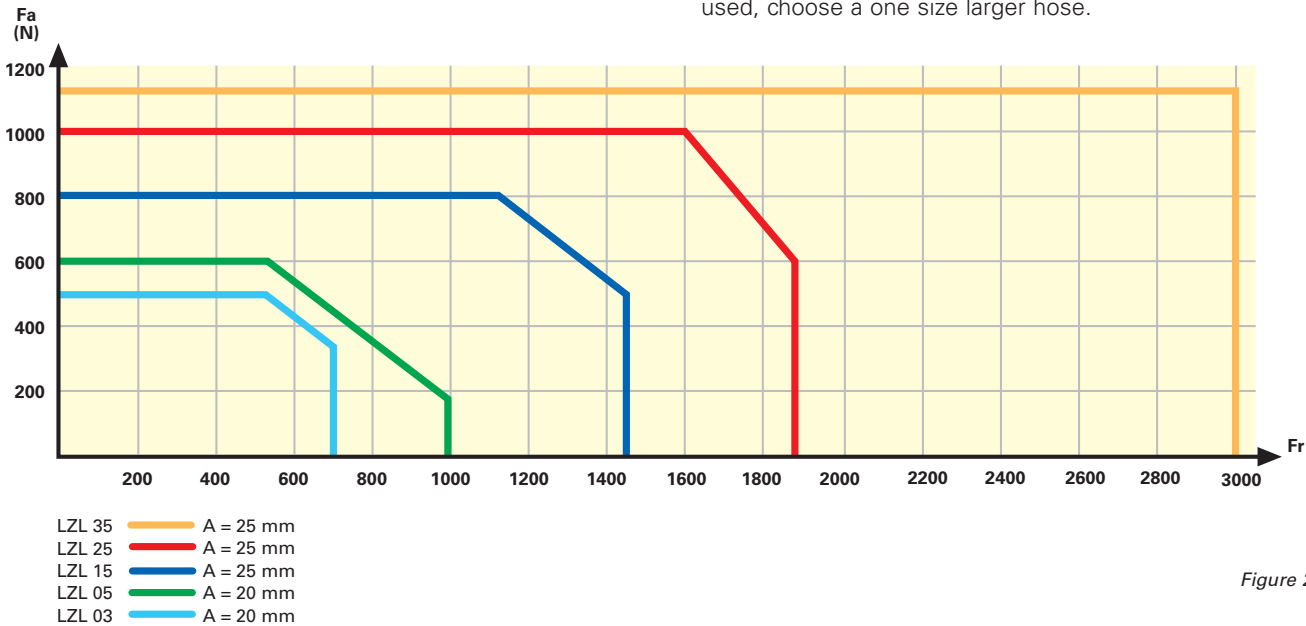


Figure 20

LZL Vane motors

1.05 – 6.5 kW
1.4 – 8.7 hp

Mixer motors are EX certified according to ATEX directive Ex II 2G T5 IIC D 85° C. For fixtured mounted use only. Power motors can be Ex certified according to the ATEX directive Ex II 2G T2 IIC D 240° C. For fixtured mounted use only. Please use ordering nr 9834 1109 00 book as one delivered together with the motor. Unrestricted motors cannot be Ex certified.



Data at air pressure 6.3 bar (91psi)

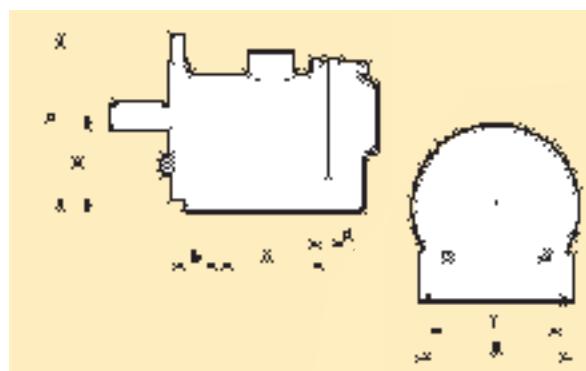
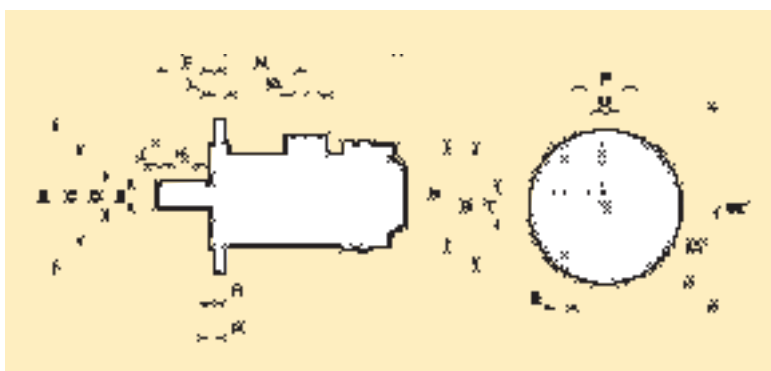
Mixer motors		Torque at half free speed		Stall torque		Free speed r/min	Air cons. at half free speed*		Weight	
Model	Ordering No.	Nm	lbf.ft	Nm	lbf.ft		l/s	cfm	kg	lb
LZL 03 M	8411 1006 73	1.5	1.1	3.2	2.35	5800	16	34	2.9	6.4
LZL 03 M-IEC	8411 1006 92	1.5	1.1	3.2	2.35	5800	16	34	3.8	8.4
LZL 03 M-NEMA	8411 1006 81	1.5	1.1	3.2	2.35	5800	16	34	3.9	8.6
LZL 05 M	8411 1007 23	3	2.2	6	4.4	5000	23	49	3.9	8.6
LZL 05 M-IEC	8411 1007 49	3	2.2	6	4.4	5000	23	49	4.8	10.6
LZL 05 M-NEMA	8411 1007 31	3	2.2	6	4.4	5000	23	49	4.9	10.8

* Note that the air consumption in a typical mixing application normally is less than 50% of the values in the table

Data at air pressure 6.3 bar (91psi)

Power motors		Max Output		Speed at max output	Torque max output		Min starting torque		Free speed	Max allowed speed	Air cons. at max output		Weight	
Model	Ordering No.	kW	hp	r/min	Nm	lbf.ft	Nm	lbf.ft	r/min	r/min	l/s	cfm	kg	lb
LZL 03 S*	8411 1006 32	1.05	1.4	5300	1.9	1.4	2.8	2.05	11000		29	61	2.9	6.4
LZL 03 S-IEC*	8411 1007 15	1.05	1.4	5300	1.9	1.4	2.8	2.05	11000		29	61	3.8	8.4
LZL 03 S-NEMA*	8411 1007 07	1.05	1.4	5300	1.9	1.4	2.8	2.05	11000		29	61	3.9	8.6
Unrestricted**		1.7	2.5	7500	2.2	1.6	3.0	2.2		11000	45	95		
LZL 05 S*	8411 1007 56	1.3	1.7	4200	3	2.2	4.8	3.5	9000		37	78	3.9	8.6
LZL 05 S-IEC*	8411 1007 72	1.3	1.7	4200	3	2.2	4.8	3.5	9000		37	78	4.8	10.6
LZL 05 S-NEMA*	8411 1007 64	1.3	1.7	4200	3	2.2	4.8	3.5	9000		37	78	4.9	10.8
Unrestricted**		1.7	2.3	5400	3	2.2	4.8	3.5		9200	50	106		
LZL 15	8411 1005 17	2.3	3.1	3380	6.5	4.8	10.9	8.0	7000		61	129	7.1	15.7
Unrestricted**		3.2	4.3	4500	6.8	5.0	10.9	8.0		7200	87	184		
LZL 25	8411 1005 25	3.4	4.6	2800	11.6	8.5	18.0	13.2	5800		86	182	11.3	24.9
Unrestricted**		5.0	6.7	4000	12.0	8.8	18.0	13.2		6000	135	286		
LZL 35	8411 1005 74	5.2	7.0	2500	20.0	14.7	32.0	23.6	5000		130	275	20	44.1
Unrestricted**		6.5	8.7	3100	20.0	14.7	32.0	23.6		5000	160	339		

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



Air motor

Measurements (mm) Conversion factor 1 mm = 0.04 inch

Foot bracket	LZL 05	LZL 15	LZL 25
Ordering No.	4430 0304 80	4430 0305 80	4430 0306 80

Foot bracket Measurements (mm)

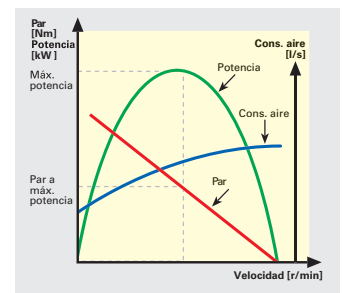
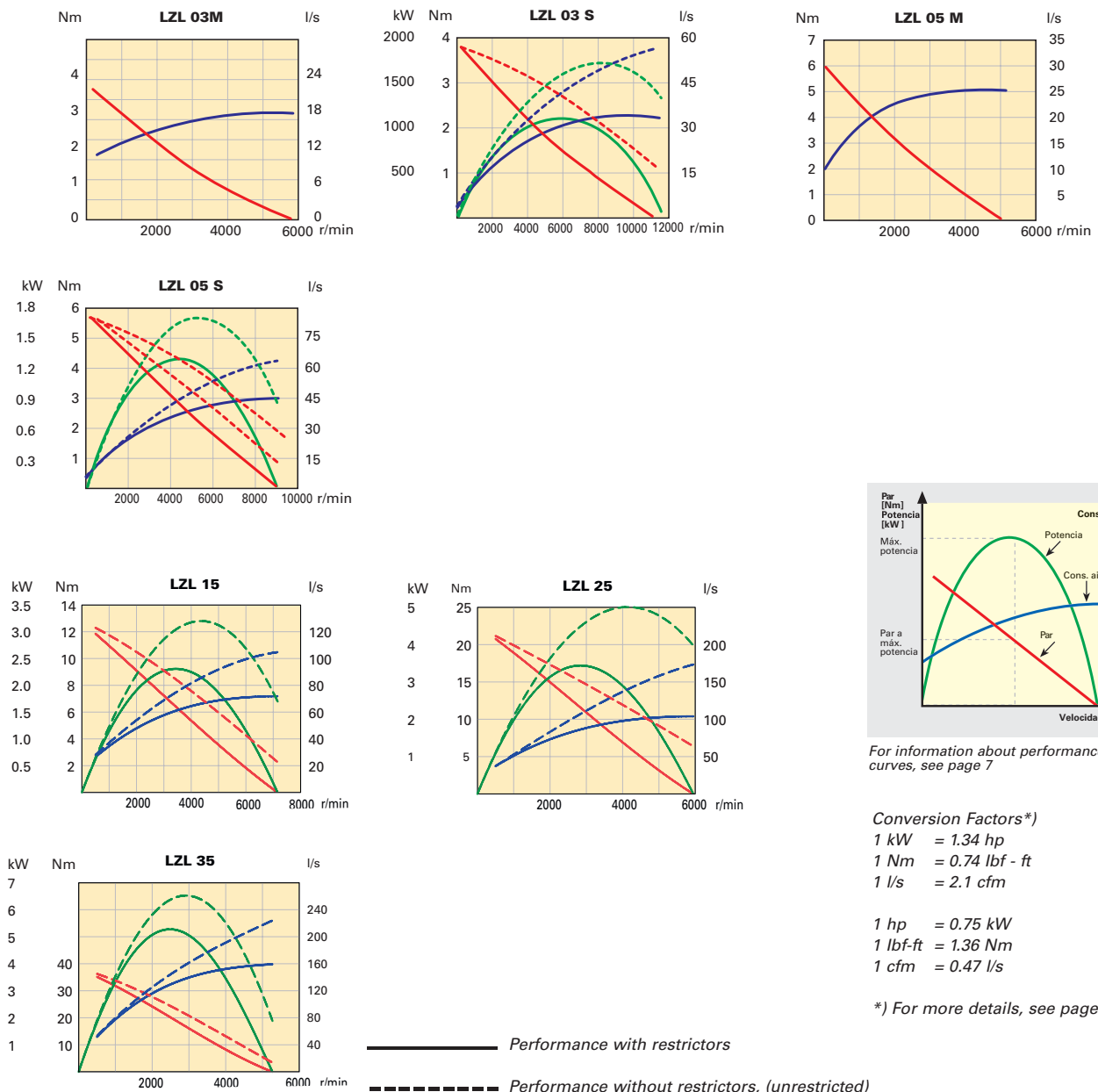
Type	a	b	c	d	e	f	g
LZL 05	56	32	71	5.8	109	90	104
LZL 15	80	40	90	7	150	112	130
LZL 25	90	53	100	10	170	125	146

Air motor

Measurements (mm) Conversion factor 1 mm = 0.04 inch

Model		A	B	C	D	F	G	J	K	L	M	N	O	P	R	S	T	U	
LZL 03 M/S	[mm]	124	ø105	ø70 j6	ø16 js7	40	2,5	2	30	8,5	65	ø69	BSP 3/8"	36	ø85	ø7	18	5 h9	
IEC	[mm]	124	ø160	ø110 j6	ø14 js7	30	3,5	2	20	10	65	ø69	BSP 3/8"	36	ø130	ø10	16	5 h9	
NEMA	[mm]	124	ø165,1	ø114,3	ø15,875	51,5	3	1,7	31,75	10	65	ø69	BSP 3/8"	36	ø149,4	3/8"-16 UNC	17,95	4,75	
NEMA	[inch]	4,88	ø6,5	ø4,5	ø0,625	2,03	0,12	0,07	1,25	0,39	2,56	ø2,72	BSP 3/8"	1,42	ø5,882	3/8"-16 UNC	0,706	0,187	
LZL 05 S	[mm]	153	ø105	ø70 j6	ø18 js7	40	2,5	3	30	8,5	81	ø76	BSP 1/2"	44	ø85	ø7	20,5	6 h9	
LZL 05 M	[mm]	153	ø105	ø70 j6	ø16 js7	40	2,5	2	30	8,5	81	ø76	BSP 1/2"	44	ø85	ø7	18	5 h9	
IEC	[mm]	153	ø160	ø110 j6	ø14 js7	30	3,5	2	20	10	81	ø76	BSP 1/2"	44	ø130	ø10	16	5 h9	
NEMA	[mm]	153	ø165,1	ø114,3	ø15,875	51,5	3	1,7	31,75	10	81	ø76	BSP 1/2"	44	ø149,4	3/8"-16 UNC	17,95	4,75	
NEMA	[inch]	6,02	ø6,5	ø4,5	ø0,625	2,03	0,12	0,07	1,25	0,39	3,19	ø3	BSP 1/2"	1,73	ø5,882	3/8"-16 UNC	0,706	0,187	
TYPE	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U
LZL 15	174	140	95 j6	22 js7	M8	52.5	3	0	5	40	10	84	100	BSP 3/4"	58	115	8.8	24.5	6 H9
LZL 25	206	160	110 j6	28 js7	M10	62.5	3.5	1.8	5	50	12	103	120	BSP 1"	70	130	8.8	31	8 H7
LZL 35	238	200	130 j6	28 js7	M10	62,5	3,5	1,8	5	50	14	119	134	BSP 1 1/4"	70	165	12	31	8 H7

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



For information about performance curves, see page 7

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 more details, see page 7.

LZL Vane motor/gear unit combinations

Combined with helical or worm gear units, type LZL vane air motors can be used over a very wide torque and speed range. Models are nominally available with gear ratios that range from 8:1 to 240:1, corresponding to a speed range of 460 to 10 r/min and an output torque of up to 5000 Nm.

Helical gear units type HG.

Helical gear units are available in 2-stage and 3-stage configurations. They deliver high efficiency levels and are available in wide choice of ratios, Figure 22.



Figure 22

Worm gear units type BS

Worm gear units are smaller and lighter in operation than helical gear units. However, they offer lower levels of efficiency. Where the highest gear ratios are required, it should be noted that starting efficiency can be as low as 30% , Figure 23.

A hollow shaft can be obtained by taking out the cylindrical output shaft for BS 50, BS 63 and BS 71.



Figure 23

Note. Gear units with different reduction ratios can be supplied to special order. For comprehensive information on these versions, please contact your local Atlas Copco representative.

Shaft loading

Motors with helical gear units

The maximum allowable radial load on the output shaft of each gear unit, at the half way point on the shaft can be obtained from the data tables for each model. The maximum permitted axial load is 50% of the radial load. All units will accept 100% momentary overloads on above stated capacities

Motors with worm gear units

Worm gear units have individual output shafts and the allowable radial load is therefore different for each version. The maximum allowable radial load, at the half way point on the shaft, is stated in the worm gear data tables on page 62, 64 and 66.

If the load is applied at another point on the shaft, the allowable radial load can be calculated by multiplying the stated value by the factor indicated by Figure 25. The permitted axial load is 40% of the radial load.

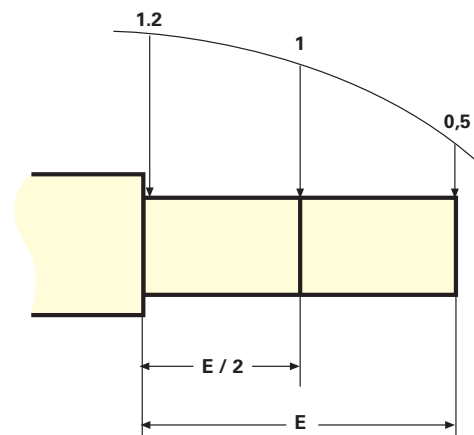


Figure 25

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.

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

where M = load torque in Nm
 F = permitted radial force halfway along the shaft extension
 kt = 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 the following speeds;

Helical gear units

Motor plus gear	Max input speed r/min
LZL 05-HG222	6300
LZL 05-HG432	6300
LZL 05-HG632	6300
LZL 15-HG222	6300
LZL 15-HG422	4300
LZL 15-HG432	4300
LZL 15-HG632	4300
LZL 15-HG832	4300
LZL 25-HG422	4300
LZL 25-HG522	4300
LZL 25-HG622	4300
LZL 25-HG732	4300
LZL 25-HG832	4300
LZL 35-HG422	4300
LZL 35-HG522	4300
LZL 35-HG622	4300
LZL 35-HG722	4300
LZL 35-HG822	4300
LZL 35-HG931	4300

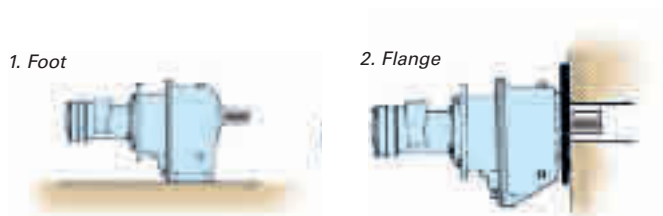
Worm gear units

Gear unit type	Max input speed r/min
BS 50	5500
BS 63	5000
BS 71	4500
BS 88	4000
BS 112	3000

Mounting

Motors with helical gear units

These units can be supplied with two different types of mounting arrangement: Foot or Flange as illustrated in fig. 26. The type required must be specified when ordering.



Mounting position

Figure 26

Motors with worm gear units

Suggested mounting arrangements are illustrated in Figure 27. Figure 28 shows how the units can be mounted if the mounting brackets are relocated. When the units are to be mounted vertically, the motor should point upwards.

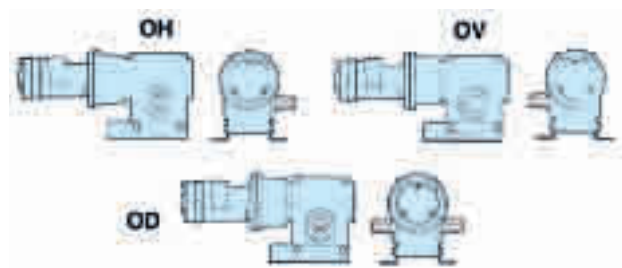


Figure 27

The worm gears are available in different dispositions.

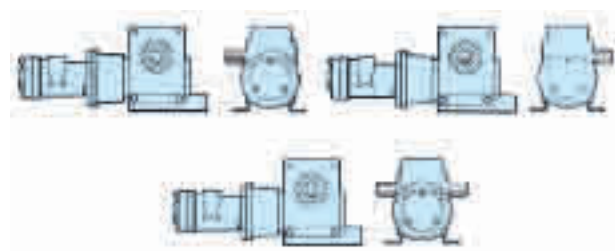


Figure 28

The dispositions are achieved by turning the motor 180° and for BS 50, -63, -71 by moving the attachment brackets.

Temperature

Helical gear units can operate within an ambient temperature range of -30°C and +60°C.

It is recommended that worm gear units are only operated within an ambient temperature range of -30°C and +30°C.

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

Air motors LZL 05 with helical gear units

1.3 – 1.6 kW
1.7 – 2.2 hp



Performance at 6.3 bar (91 psi)

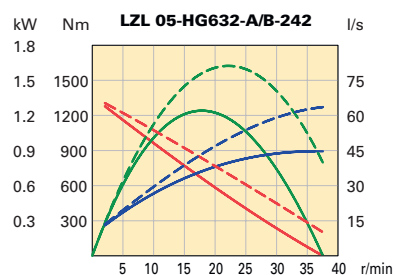
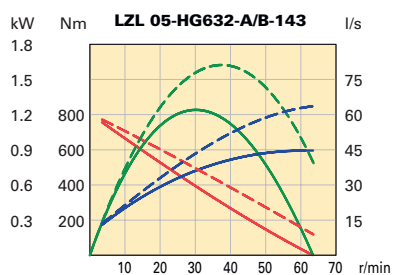
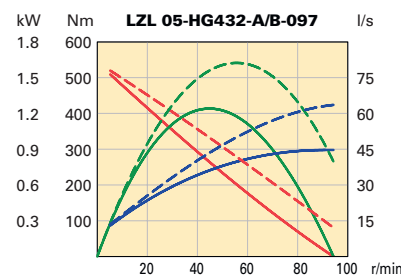
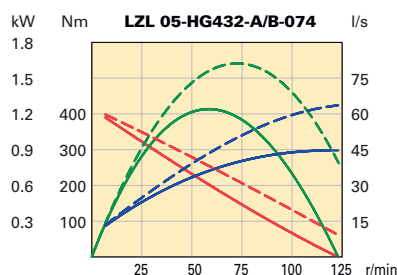
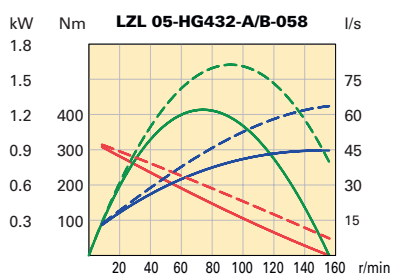
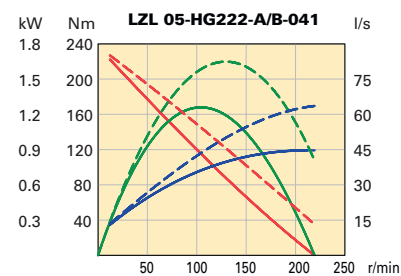
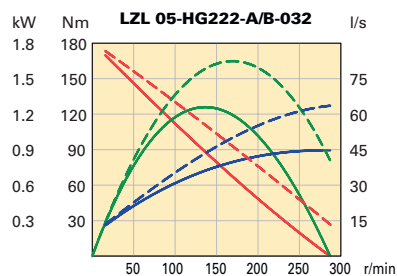
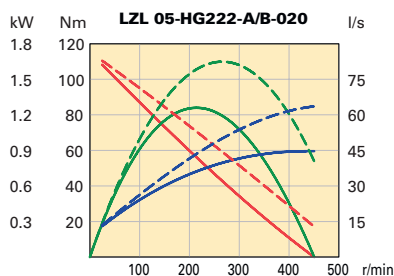
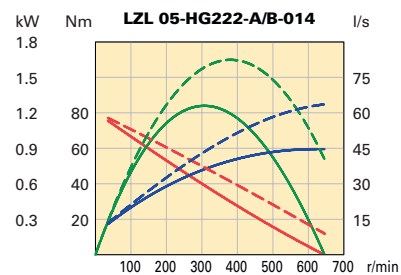
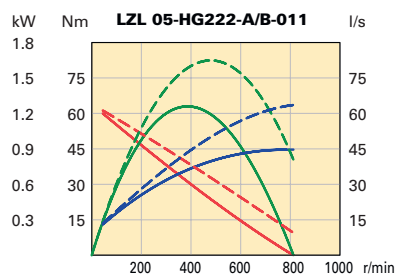
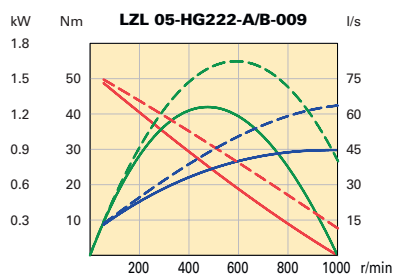
Designation	Ordering No.	Ratio	Max output		Speed at max output r/min	Torque at max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air cons. at max output		Weight		Max radial load at max output N
			kW	hp		Nm	lbf.ft	Nm	lbf.ft			l/s	cfm	kg	lb	
LZL 05-HG222-A-009	8411 1700 07	9.1	1.3	1.7	462	26	19	42	31	990		37	78	21.3	47	3660
LZL 05-HG222-B-009	8411 1701 06	9.1	1.3	1.7	462	26	19	42	31	990		37	78	19.3	43	3660
Unrestricted*		9.1	1.6	2.2	594	26	20	42	31		1012	50	106			3660
LZL 05-HG222-A-011	8411 1700 15	11.2	1.3	1.7	377	32	24	52	38	807		37	78	21.3	47	3740
LZL 05-HG222-B-011	8411 1701 14	11.2	1.3	1.7	377	32	24	52	38	807		37	78	19.3	43	3740
Unrestricted*		11.2	1.6	2.2	484	32	24	52	38		825	50	106			3740
LZL 05-HG222-A-014	8411 1700 23	14.1	1.3	1.7	299	40	30	65	48	640		37	78	21.3	47	3880
LZL 05-HG222-B-014	8411 1701 22	14.1	1.3	1.7	299	40	30	65	48	640		37	78	19.3	43	3880
Unrestricted*		14.1	1.6	2.2	384	41	30	65	48		655	50	106			3880
LZL 05-HG222-A-020	8411 1700 31	20.2	1.3	1.7	208	58	43	94	69	445		37	78	21.3	47	4000
LZL 05-HG222-B-020	8411 1701 30	20.2	1.3	1.7	208	58	43	94	69	445		37	78	19.3	43	4000
Unrestricted*		20.2	1.6	2.2	267	59	43	94	69		455	50	106			4000
LZL 05-HG222-A-032	8411 1700 49	31.7	1.3	1.7	133	91	67	148	109	284		37	78	21.3	47	4000
LZL 05-HG222-B-032	8411 1701 48	31.7	1.3	1.7	133	91	67	148	109	284		37	78	19.3	43	4000
Unrestricted*		31.7	1.6	2.2	170	92	68	148	109		290	50	106			4000
LZL 05-HG222-A-041	8411 1700 56	41.5	1.3	1.7	101	120	88	193	143	217		37	78	21.3	47	4000
LZL 05-HG222-B-041	8411 1701 55	41.5	1.3	1.7	101	120	88	193	143	217		37	78	19.3	43	4000
Unrestricted*		41.5	1.6	2.2	130	121	89	193	143		222	50	106			4000
LZL 05-HG432-A-058	8411 1702 05	58.4	1.2	1.7	72	166	122	268	198	154		37	78	33.3	73	6400
LZL 05-HG432-B-058	8411 1703 04	58.4	1.2	1.7	72	166	122	268	198	154		37	78	31.3	69	6400
Unrestricted*		58.4	1.6	2.2	92	170	125	268	198		158	50	106			6400
LZL 05-HG432-A-074	8411 1702 13	74.0	1.2	1.7	57	210	155	339	250	122		37	78	33.3	73	6760
LZL 05-HG432-B-074	8411 1703 12	74.0	1.2	1.7	57	210	155	339	250	122		37	78	31.3	69	6760
Unrestricted*		74.0	1.6	2.2	73	215	159	339	250		124	50	106			6760
LZL 05-HG432-A-097	8411 1702 21	96.5	1.2	1.7	44	274	202	443	327	93		37	78	33.3	73	7160
LZL 05-HG432-B-097	8411 1703 20	96.5	1.2	1.7	44	274	202	443	327	93		37	78	31.3	69	7160
Unrestricted*		96.5	1.6	2.2	56	281	207	443	327		95	50	106			7160
LZL 05-HG632-A-143	8411 1704 03	143.4	1.2	1.7	29	407	300	658	485	63		37	78	35.3	78	7200
LZL 05-HG632-B-143	8411 1705 02	143.4	1.2	1.7	29	407	300	658	485	63		37	78	32.3	71	7200
Unrestricted*		143.4	1.6	2.2	38	417	308	658	485		64	50	106			7200
LZL 05-HG632-A-242	8411 1704 11	242.4	1.2	1.7	17	688	507	1112	820	37		37	78	35.3	78	7200
LZL 05-HG632-B-242	8411 1705 10	242.4	1.2	1.7	17	688	507	1112	820	37		37	78	32.3	71	7200
Unrestricted*		242.4	1.6	2.2	22	705	520	1112	820		38	50	106			7200

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

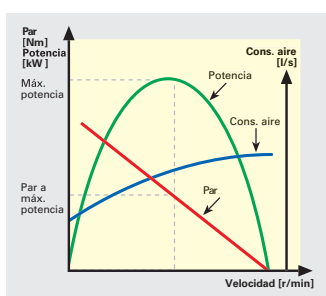
A = Foot mount

B = Flange mount

Air motor LZL 05 with helical gear units type HG
Performance curves at air pressure 6.3 bar (91psi)



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



For information about performance curves, see page 7

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 more details, see page 7.

Air motors LZL 15 with helical gear units

2.2 – 3.1 kW
3.0 – 4.2 hp



Performance at 6.3 bar (91 psi)

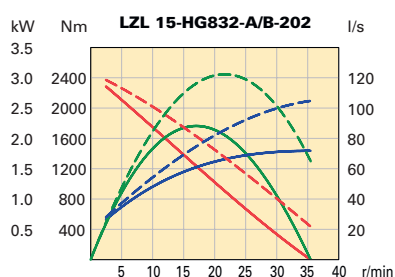
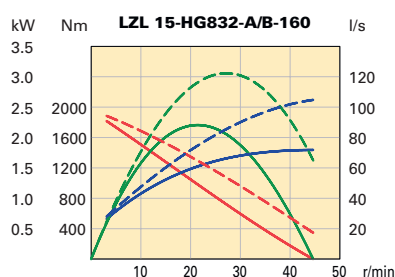
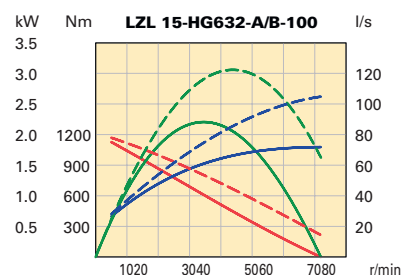
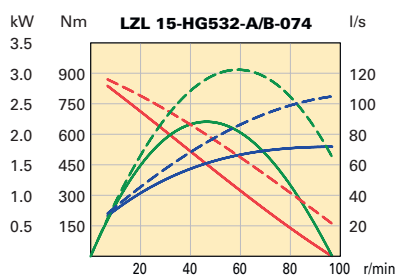
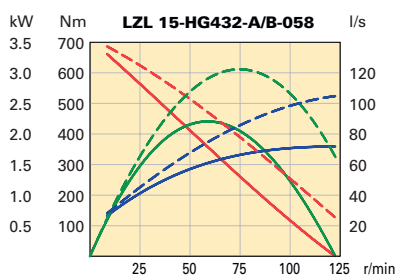
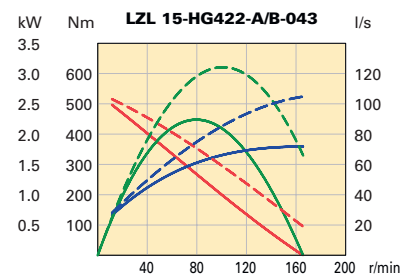
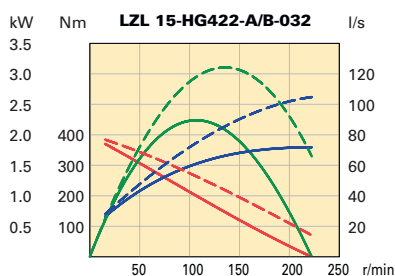
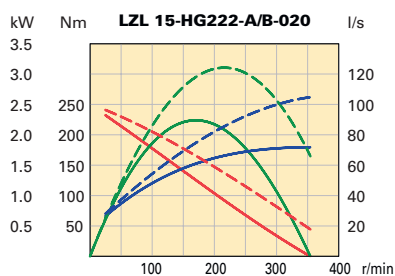
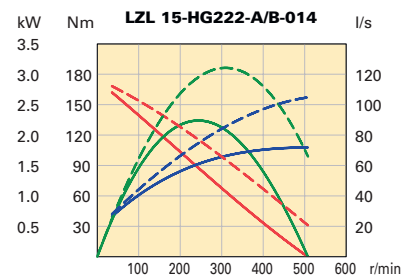
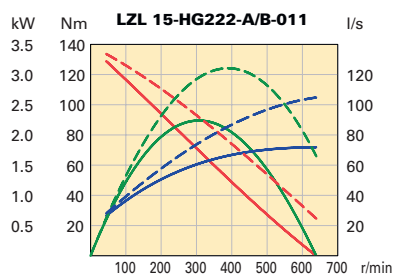
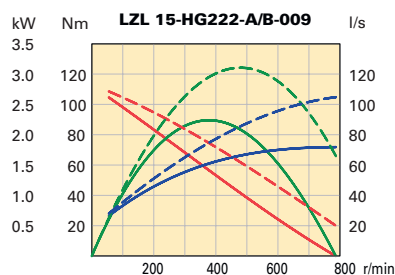
Designation	Ordering No.	Max output			Speed at max output r/min	Torque at max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air cons. at max output		Weight		Max radial load at max output N
		Ratio	kW	hp		Nm	lbf.ft	Nm	lbf.ft			l/s	cfm	kg	lb	
LZL 15-HG222-A-009	8411 1706 01	9.1	2.2	3.0	371	58	42	96	71	770		61	129	24.1	53.1	3570
LZL 15-HG222-B-009	8411 1707 00	9.1	2.2	3.0	371	58	42	96	71	770		61	129	22.1	48.7	3570
Unrestricted*		9.1	3.1	4.2	495	60	44	96	71		792	87	184			3570
LZL 15-HG222-A-011	8411 1706 19	11.2	2.2	3.0	303	71	52	118	87	628		61	129	24.1	53.1	3650
LZL 15-HG222-B-011	8411 1707 18	11.2	2.2	3.0	303	71	52	118	87	628		61	129	22.1	48.7	3650
Unrestricted*		11.2	3.1	4.2	403	74	54	118	87		646	87	184			3650
LZL 15-HG222-A-014	8411 1706 27	14.1	2.2	3.0	240	89	66	149	110	498		61	129	24.1	53.1	3730
LZL 15-HG222-B-014	8411 1707 26	14.1	2.2	3.0	240	89	66	149	110	498		61	129	22.1	48.7	3730
Unrestricted*		14.1	3.1	4.2	320	93	68	149	110		512	87	184			3730
LZL 15-HG222-A-020	8411 1706 35	20.2	2.2	3.0	167	128	95	214	158	346		61	129	24.1	53.1	3290
LZL 15-HG222-B-020	8411 1707 34	20.2	2.2	3.0	167	128	95	214	158	346		61	129	22.1	48.7	3290
Unrestricted*			3.1	4.2	222	133	98	214	158		356	87	184			3290
LZL 15-HG422-A-032	8411 1708 09	32.2	2.2	3.0	105	204	150	340	251	217		61	129	33.1	73.0	5360
LZL 15-HG422-B-032	8411 1709 08	32.2	2.2	3.0	105	204	150	340	251	217		61	129	31.1	68.6	5360
Unrestricted*		32.2	3.1	4.2	140	212	157	340	251		224	87	184			5360
LZL 15-HG422-A-043	8411 1708 17	43.2	2.2	3.0	78	274	202	457	337	162		61	129	33.1	73.0	5600
LZL 15-HG422-B-043	8411 1709 16	43.2	2.2	3.0	78	274	202	457	337	162		61	129	31.1	68.6	5600
Unrestricted*		43.2	3.1	4.2	104	285	210	457	337		167	87	184			5600
LZL 15-HG432-A-058	8411 1710 05	58.4	2.2	3.0	58	364	269	617	455	120		61	129	36.1	79.6	5910
LZL 15-HG432-B-058	8411 1711 04	58.4	2.2	3.0	58	364	269	617	455	120		61	129	34.1	75.2	5910
Unrestricted*		58.4	3.1	4.2	77	385	284	617	455		123	87	184			5910
LZL 15-HG532-A-074	8411 1712 03	74.0	2.2	3.0	46	461	340	782	577	95		61	129	36.1	79.6	4550
LZL 15-HG532-B-074	8411 1713 02	74.0	2.2	3.0	46	461	340	782	577	95		61	129	34.1	75.2	4550
Unrestricted*		74.0	3.1	4.2	61	488	360	782	577		97	87	184			4550
LZL 15-HG632-A-100	8411 1714 01	99.5	2.2	3.0	34	621	458	1053	776	70		61	129	38.1	84.0	7200
LZL 15-HG632-B-100	8411 1715 00	99.5	2.2	3.0	34	621	458	1053	776	70		61	129	35.1	77.4	7200
Unrestricted*		99.5	3.1	4.2	45	657	484	1053	776		72	87	184			7200
LZL 15-HG832-A-160	8411 1716 09	160.4	2.2	3.0	21	1001	738	1697	1251	44		61	129	81.1	178.8	20000
LZL 15-HG832-B-160	8411 1717 08	160.4	2.2	3.0	21	1001	738	1697	1251	44		61	129	77.1	170.0	20000
Unrestricted*		160.4	3.1	4.2	28	1059	781	1697	1251		45	87	184			20000
LZL 15-HG832-A-202	8411 1716 17	201.8	2.2	3.0	17	1259	929	2134	1574	35		61	129	81.1	178.8	19600
LZL 15-HG832-B-202	8411 1717 16	201.8	2.2	3.0	17	1259	929	2134	1574	35		61	129	77.1	170.0	19600
Unrestricted*		201.8	3.1	4.2	22	1331	982	2134	1574		36	87	184			19600

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

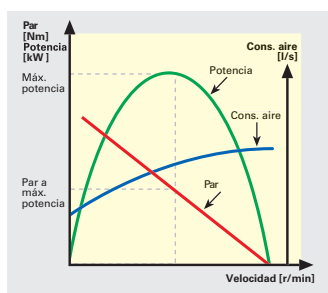
A = Foot mount

B = Flange mount

Air motor LZL 15 with helical gear units type HG
Performance curves at air pressure 6.3 bar (91psi)



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



For information about performance curves, see page 7

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 more details, see page 7.

Air motors LZL 25 with helical gear units

3.3 – 4.9 kW
4.4 – 6.5 hp



Performance at 6.3 bar (91 psi)

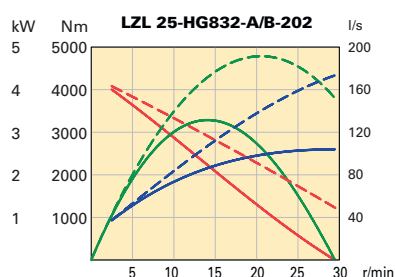
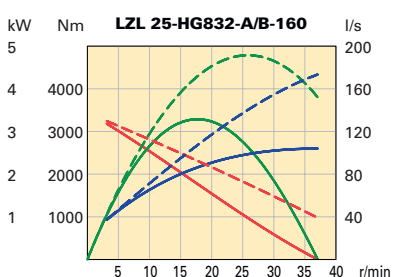
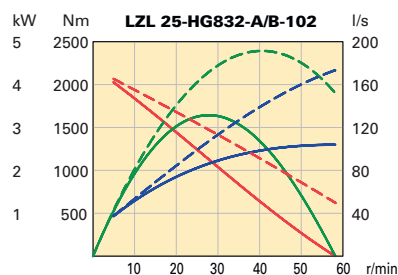
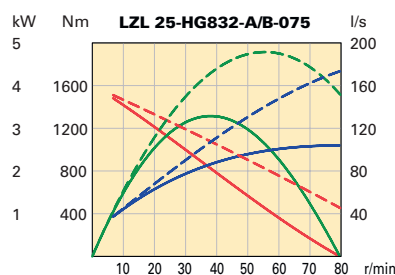
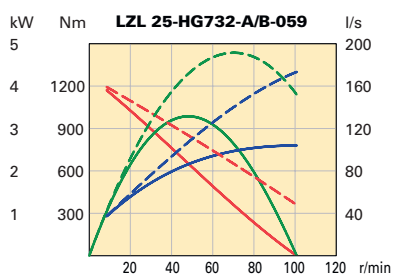
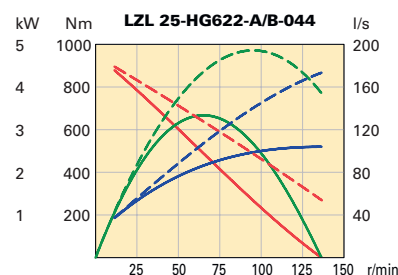
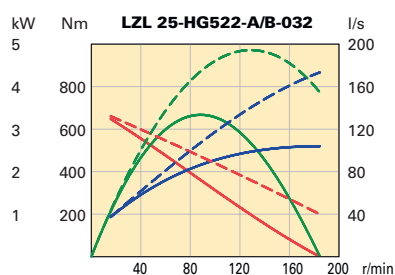
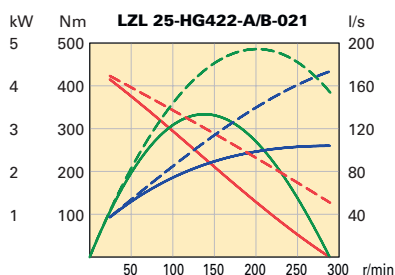
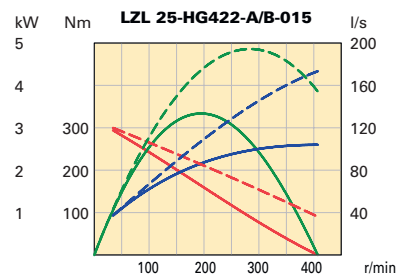
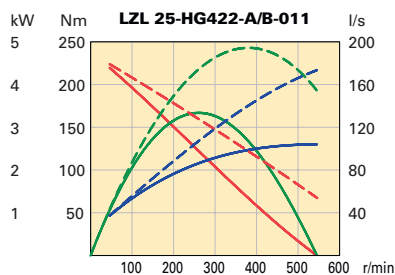
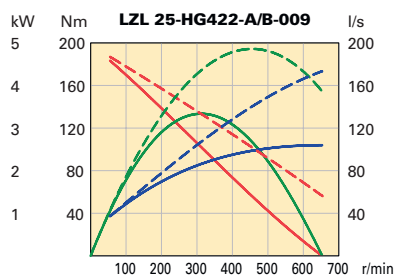
Designation	Ordering No.	Ratio	Max output		Speed at max output r/min	Torque at max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air cons. at max output		Weight		Max radial load at max output N
			kW	hp		Nm	lbf.ft	Nm	lbf.ft			l/s	cfm	kg	lb	
LZL 25-HG422-A-009	8411 1718 07	9.1	3.3	4.4	306	103	76	159	118	635		86	182	37.3	82.2	4490
LZL 25-HG422-B-009	8411 1719 06	9.1	3.3	4.4	306	103	76	159	118	635		86	182	35.3	77.8	4490
Unrestricted*		9.1	4.9	6.5	438	106	78	159	118		657	135	286			4490
LZL 25-HG422-A-011	8411 1718 15	10.9	3.3	4.4	257	123	91	190	140	533		86	182	37.3	82.2	4580
LZL 25-HG422-B-011	8411 1719 14	10.9	3.3	4.4	257	123	91	190	140	533		86	182	35.3	77.8	4580
Unrestricted*		10.9	4.9	6.5	367	127	93	190	140		551	135	286			4580
LZL 25-HG422-A-015	8411 1718 23	14.6	3.3	4.4	192	165	121	255	188	398		86	182	37.3	82.2	4690
LZL 25-HG422-B-015	8411 1719 22	14.6	3.3	4.4	192	165	121	255	188	398		86	182	35.3	77.8	4690
Unrestricted*		14.6	4.9	6.5	274	170	125	255	188		412	135	286			4690
LZL 25-HG422-A-021	8411 1718 31	20.6	3.3	4.4	136	233	172	360	265	281		86	182	37.3	82.2	4760
LZL 25-HG422-B-021	8411 1719 30	20.6	3.3	4.4	136	233	172	360	265	281		86	182	35.3	77.8	4760
Unrestricted*		20.6	4.9	6.5	194	240	177	360	265		291	135	286			4760
LZL 25-HG522-A-032	8411 1720 05	32.2	3.3	4.4	87	364	268	562	415	180		86	182	37.3	82.2	4630
LZL 25-HG522-B-032	8411 1721 04	32.2	3.3	4.4	87	364	268	562	415	180		86	182	35.3	77.8	4630
Unrestricted*		32.2	4.9	6.5	124	375	276	562	415		186	135	286			4630
LZL 25-HG622-A-044	8411 1722 03	43.6	3.3	4.4	64	493	364	762	562	133		86	182	39.3	86.6	7200
LZL 25-HG622-B-044	8411 1723 02	43.6	3.3	4.4	64	493	364	762	562	133		86	182	36.3	80.0	7200
Unrestricted*		43.6	4.9	6.5	92	508	375	762	562		137	135	286			7200
LZL 25-HG732-A-059	8411 1724 01	59.0	3.3	4.4	47	656	484	1014	748	98		86	182	53.3	118.0	8940
LZL 25-HG732-B-059	8411 1725 00	59.0	3.3	4.4	47	656	484	1014	748	98		86	182	49.3	109.0	8940
Unrestricted*		59.0	4.9	6.5	68	686	506	1014	748		102	135	286			8940
LZL 25-HG832-A-075	8411 1726 09	74.7	3.3	4.4	37	831	613	1285	948	78		86	182	88.3	195.0	20000
LZL 25-HG832-B-075	8411 1727 08	74.7	3.3	4.4	37	831	613	1285	948	78		86	182	84.3	186.0	20000
Unrestricted*		74.7	4.9	6.5	54	870	641	1285	948		80	135	286			20000
LZL 25-HG832-A-102	8411 1726 17	102.2	3.3	4.4	27	1137	839	1758	1297	57		86	182	88.3	195.0	20000
LZL 25-HG832-B-102	8411 1727 16	102.2	3.3	4.4	27	1137	839	1758	1297	57		86	182	84.3	186.0	20000
Unrestricted*		102.2	4.9	6.5	39	1190	878	1758	1297		59	135	286			20000
LZL 25-HG832-A-160	8411 1726 25	160.4	3.3	4.4	17	1785	1316	2760	2036	36		86	182	88.3	195.0	13200
LZL 25-HG832-B-160	8411 1727 24	160.4	3.3	4.4	17	1785	1316	2760	2036	36		86	182	84.3	186.0	13200
Unrestricted*		160.4	4.9	6.5	25	1868	1378	2760	2036		37	135	286			13200
LZL 25-HG832-A-202	8411 1726 33	201.8	3.3	4.4	14	2244	1655	3471	2560	29		86	182	88.3	195.0	6540
LZL 25-HG832-B-202	8411 1727 32	201.8	3.3	4.4	14	2244	1655	3471	2560	29		86	182	84.3	186.0	6540
Unrestricted*		201.8	4.9	6.5	20	2349	1733	3471	2560		30	135	286			6540

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

A = Foot mount

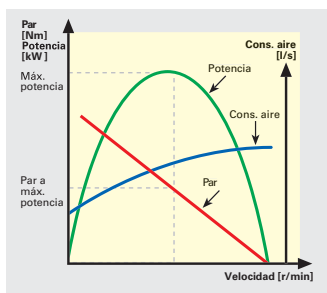
B = Flange mount

Air motor LZL 25 with helical gear units type HG
Performance curves at air pressure 6.3 bar (91psi)



————— Performance with restrictors

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



For information about performance curves, see page 7

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 more details, see page 7.

Air motors LZL 35 with helical gear units

5.1 – 6.3 kW

6.8 – 8.4 hp



Performance at 6.3 bar (91 psi)

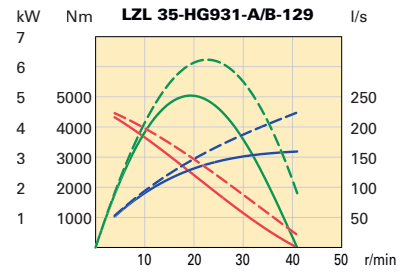
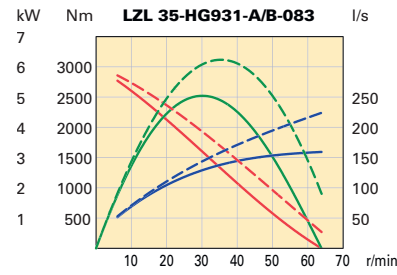
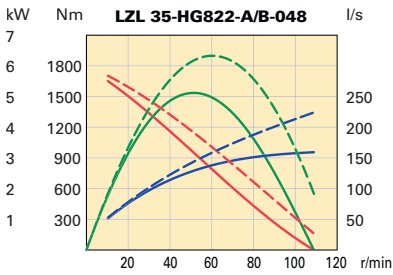
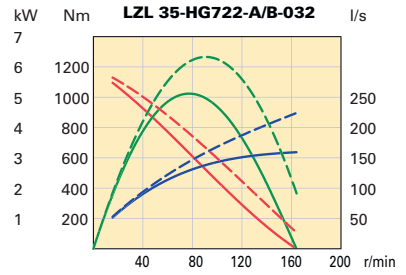
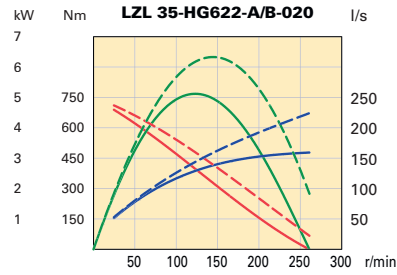
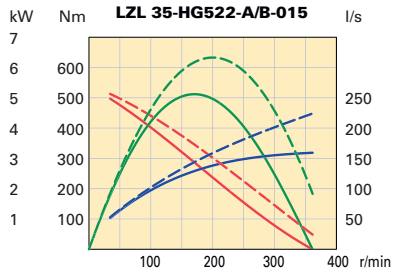
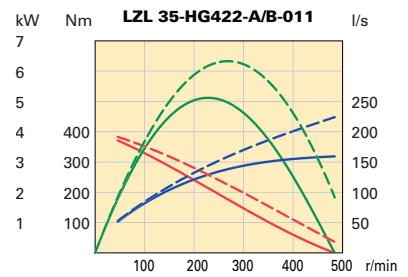
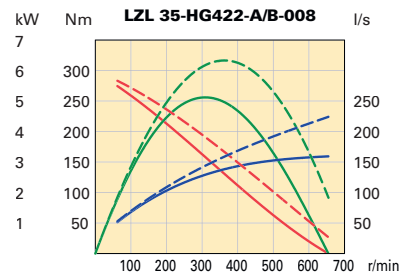
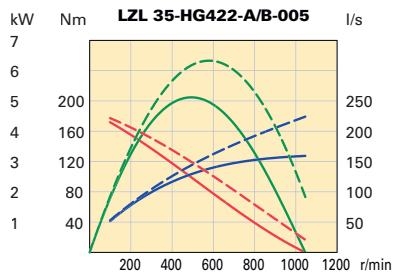
Designation	Ordering No.	Ratio	Max output		Speed at max output r/min	Torque at max output		Min starting torque		Free speed r/min	Max allowed speed r/min	Air cons. at max output		Weight		Max radial load at max output N
			kW	hp		Nm	lbf.ft	Nm	lbf.ft			l/s	cfm	kg	lb	
LZL 35-HG422-A-005	8411 1728 05	5.0	5.1	6.8	496	98	72	156	115	992		130	275	43.7	96.3	4130
LZL 35-HG422-B-005	8411 1729 04	5.0	5.1	6.8	496	98	72	156	115	992		130	275	46.7	103.0	4130
Unrestricted*		5.0	6.3	8.4	615	98	72	156	115		992	160	339			4130
LZL 35-HG422-A-008	8411 1728 13	8.1	5.1	6.8	311	156	115	250	184	621		130	275	43.7	96.3	4210
LZL 35-HG422-B-008	8411 1729 12	8.1	5.1	6.8	311	156	115	250	184	621		130	275	46.7	103.0	4210
Unrestricted*		8.1	6.3	8.4	385	156	115	250	184		621	160	339			4210
LZL 35-HG422-A-011	8411 1728 21	10.9	5.1	6.8	230	211	156	338	249	459		130	275	43.7	96.3	4250
LZL 35-HG422-B-011	8411 1729 20	10.9	5.1	6.8	230	211	156	338	249	459		130	275	46.7	103.0	4250
Unrestricted*		10.9	6.3	8.4	285	211	156	338	249		459	160	339			4250
LZL 35-HG522-A-015	8411 1730 01	14.6	5.1	6.8	171	283	209	453	334	343		130	275	44.7	98.5	4060
LZL 35-HG522-B-015	8411 1731 00	14.6	5.1	6.8	171	283	209	453	334	343		130	275	48.7	107.0	4060
Unrestricted*		14.6	6.3	8.4	213	283	209	453	334		343	160	339			4060
LZL 35-HG622-A-020	8411 1732 09	20.2	5.1	6.8	124	392	289	627	463	248		130	275	49.7	110.0	7200
LZL 35-HG622-B-020	8411 1733 08	20.2	5.1	6.8	124	392	289	627	463	248		130	275	49.7	110.0	7200
Unrestricted*		20.2	6.3	8.4	153	392	289	627	463		248	160	339			7200
LZL 35-HG722-A-032	8411 1734 07	32.1	5.1	6.8	78	623	460	997	735	156		130	275	60.7	134.0	6640
LZL 35-HG722-B-032	8411 1735 06	32.1	5.1	6.8	78	623	460	997	735	156		130	275	60.7	134.0	6640
Unrestricted*		32.1	6.3	8.4	97	623	460	997	735		156	160	339			6640
LZL 35-HG822-A-048	8411 1736 05	48.4	5.1	6.8	52	939	693	1503	1108	103		130	275	98.6	217.0	17800
LZL 35-HG822-B-048	8411 1737 04	48.4	5.1	6.8	52	939	693	1503	1108	103		130	275	98.6	217.0	17800
Unrestricted*		48.4	6.3	8.4	64	939	693	1503	1108		103	160	339			17800
LZL 35-HG931-A-083	8411 1738 03	82.5	5.0	6.7	30	1577	1163	2523	1861	61		130	275	152.6	336.0	28800
LZL 35-HG931-B-083	8411 1739 02	82.5	5.0	6.7	30	1577	1163	2523	1861	61		130	275	155.6	343.0	28800
Unrestricted*		82.5	6.2	8.3	38	1577	1163	2523	1861		61	160	339			28800
LZL 35-HG931-A-129	8411 1738 11	128.7	5.0	6.7	19	2459	1814	3935	2902	39		130	275	152.6	336.0	28200
LZL 35-HG931-B-129	8411 1739 10	128.7	5.0	6.7	19	2459	1814	3935	2902	39		130	275	155.6	343.0	28200
Unrestricted*		128.7	6.2	8.3	24	2459	1814	3935	2902		39	160	339			28200

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

A = Foot mount

B = Flange mount

Air motor LZL 35 with helical gear units type HG
Performance curves at air pressure 6.3 bar (91psi)



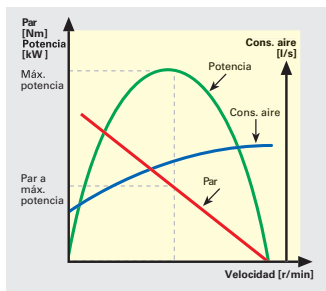
———— Performance with restrictors
 - - - - - Performance without restrictors, (unrestricted)
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Conversion Factors)*

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

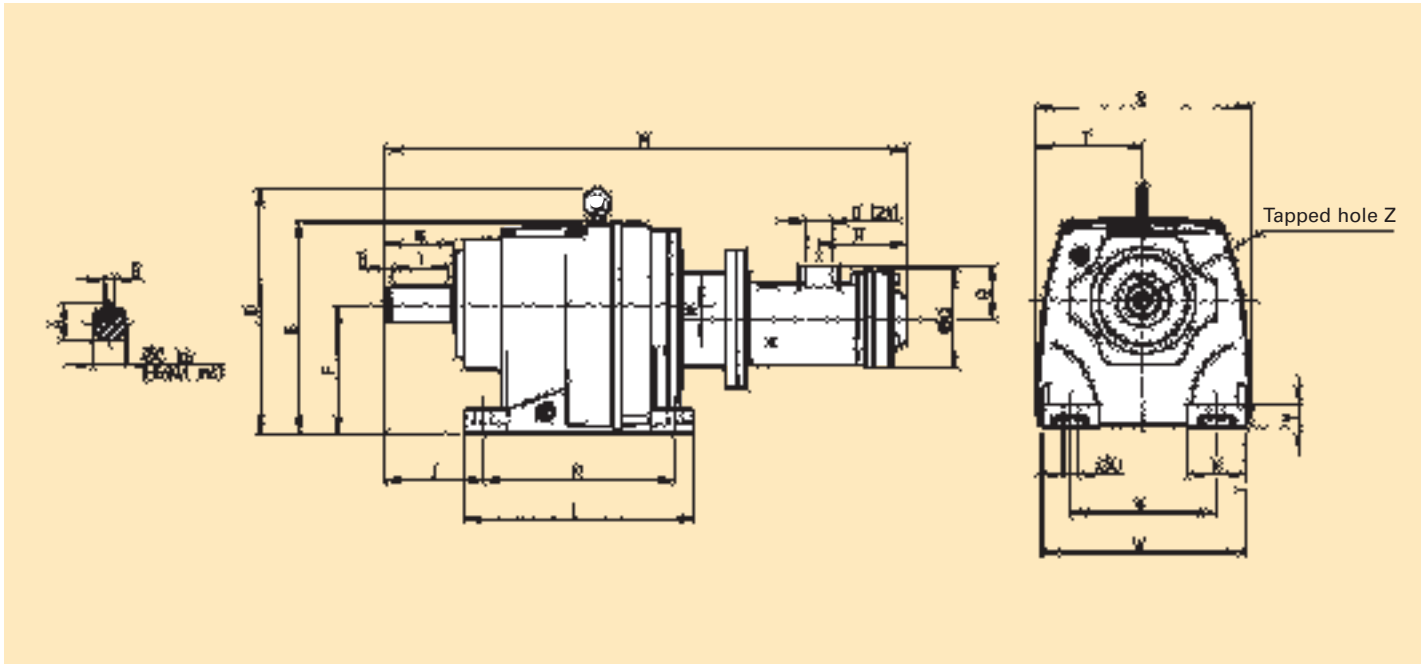
*) For more details, see page 7.



For information about performance curves, see page 7

Dimensions LZL with helical gear units, foot models

Conversion factor 1mm = 0.04 inch

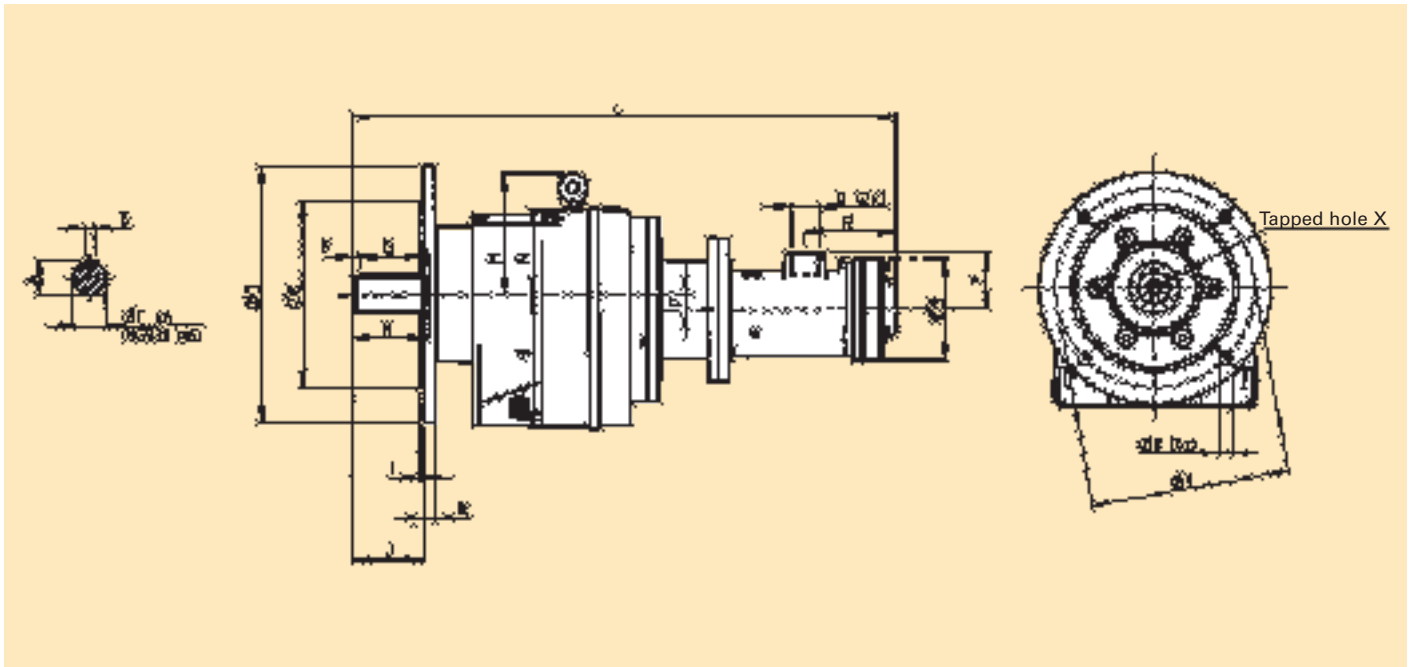


Measurements (mm)

Designation	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
LZL 05-HG222-A-XXX	28	8	25	—	180	90	4	50	40	75	130	152	419	—	BSP 1/2"	72	83	41	170	84	10	110	145	35	16	M10x1.5 Deep 22
LZL 05-HG432-A-XXX	33	8	30	—	208	115	4	60	50	90	165	200	479	—	BSP 1/2"	72	83	41	204	97	15	135	190	55	20	M10x1.5 Deep 22
LZL 05-HG632-A-XXX	38	8	35	246	214	130	7	70	60	100	195	235	510	14.5	BSP 1/2"	72	83	41	220	110	15	150	210	60	24	M10x1.75 Deep 28
LZL 15-HG222-A-XXX	28	8	25	—	180	90	4	50	40	75	130	152	419	—	BSP 3/4"	90	100	55	170	84	10	110	145	35	16	M10x1.5 Deep 22
LZL 15-HG422-A-XXX	33	8	30	—	208	115	4	60	50	90	165	200	478	—	BSP 3/4"	90	100	55	204	97	15	135	190	55	20	M10x1.5 Deep 22
LZL 15-HG432-A-058	33	8	30	—	208	115	4	60	50	90	165	200	501	—	BSP 3/4"	90	100	55	204	97	15	135	190	55	20	M10x1.5 Deep 22
LZL 15-HG532-A-074	38	10	35	—	208	115	7	70	60	100	165	200	511	—	BSP 3/4"	90	100	55	204	97	15	135	190	55	20	M12x1.75 Deep 28
LZL 15-HG632-A-100	38	10	35	246	214	130	7	70	60	100	195	235	532	14.5	BSP 3/4"	90	100	55	220	110	15	150	210	60	24	M12x1.75 Deep 28
LZL 15-HG832-A-XXX	53.5	14	50	360	310	180	10	100	80	140	260	310	648	—	BSP 3/4"	90	100	55	320	167	19	215	290	75	35	M16x2.0 Deep 36
LZL 25-HG422-A-XXX	33	8	30	—	208	115	4	60	50	90	165	200	537	—	BSP 1"	103	120	62	204	97	15	135	190	55	20	M10x1.5 Deep 22
LZL 25-HG522-A-032	38	10	35	—	208	115	7	70	60	100	165	200	547	—	BSP 1"	103	120	62	204	97	15	135	190	55	20	M12x1.75 Deep 28
LZL 25-HG622-A-044	38	10	35	246	214	130	7	70	60	100	195	235	568	14.5	BSP 1"	103	120	62	220	110	15	150	210	60	24	M12x1.75 Deep 28
LZL 25-HG732-A-059	43	12	40	295	250	140	5	80	70	115	205	245	592	—	BSP 1"	103	120	62	252	119	19	170	230	60	25	M16x2.0 Deep 36
LZL 25-HG832-A-XXX	53.5	14	50	360	310	180	10	100	80	140	260	310	692	—	BSP 1"	103	120	62	320	167	19	215	290	75	35	M16x2.0 Deep 36
LZL 35-HG422-A-XXX	33	8	30	—	208	115	4	60	50	90	165	200	585	—	BSP 1 1/4"	120	134	68	204	97	15	135	190	55	20	M10x1.5 Deep 22
LZL 35HG522-A-015	38	10	35	—	208	115	7	70	60	100	165	200	595	—	BSP 1 1/4"	120	134	68	204	97	15	135	190	55	20	M12x1.75 Deep 28
LZL 35HG622-A-020	38	10	35	246	214	130	7	70	60	100	195	235	616	14.5	BSP 1 1/4"	120	134	68	220	110	15	150	210	60	24	M12x1.75 Deep 28
LZL 35-HG722-A-032	43	12	40	295	250	140	5	80	70	115	205	245	641	—	BSP 1 1/4"	120	134	68	252	119	19	170	230	60	25	M16x2.0 Deep 36
LZL 35-HG822-A-048	53.5	14	50	360	310	180	10	100	80	140	260	310	707	—	BSP 1 1/4"	120	134	68	320	167	19	215	290	75	35	M16x2.0 Deep 36
LZL 35-HG931-A-XXX	64	18	60	433	394	225	10	120	100	160	310	365	814	—	BSP 1 1/4"	120	134	68	372	200	23	250	340	90	40	M20x2.5 Deep 42

Air motor LZL with helical gear units.flange models

Conversion factor 1mm = 0.04 inch



Measurements (mm)

Designation	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U ^{a)}	V	X
LZL 05-HG222-B-XXX	28	8	25	200	130	4	40	50	3.5	50	10	419	–	90	91	–	BSP 1/2"	72	83	41	11	165	M10x1.5 Deep 22
LZL 05-HG432-B-XXX	33	8	30	250	180	4	50	60	4	60	11	479	–	93	115	–	BSP 1/2"	72	83	41	13.5	215	M10x1.5 Deep 22
LZL 05-HG632-B-XXX	38	10	35	250	180	7	60	70	4	70	11	510	116	84	130	14.5	BSP 1/2"	72	83	41	13.5	215	M12x1.75 Deep 28
LZL 15-HG222-B-XXX	28	8	25	200	130	4	40	50	3.5	50	10	441	–	90	91	–	BSP 3/4"	90	100	55	11	165	M10x1.5 Deep 22
LZL 15-HG422-B-XXX	33	8	30	250	180	4	50	60	4	60	11	478	–	93	115	–	BSP 3/4"	90	100	55	13.5	215	M10x1.5 Deep 22
LZL 15-HG432-B-058	33	8	30	250	180	4	50	60	4	60	11	501	–	93	115	–	BSP 3/4"	90	100	55	13.5	215	M10x1.5 Deep 22
LZL 15-HG532-B-074	38	10	35	250	180	7	60	70	4	70	11	511	–	93	115	–	BSP 3/4"	90	100	55	13.5	215	M12x1.75 Deep 28
LZL 15-HG632-B-100	38	10	35	250	180	7	60	70	4	70	11	532	116	84	130	14.5	BSP 3/4"	90	100	55	13.5	215	M12x1.75 Deep 28
LZL 15-HG832-B-XXX	53.5	14	50	300	230	10	80	100	4	100	17	648	180	130	182	–	BSP 3/4"	90	100	55	13.5	265	M16x2.0 Deep 36
LZL 25-HG422-B-XXX	33	8	30	250	180	4	50	60	4	60	11	537	–	93	115	–	BSP 1"	103	120	62	13.5	215	M10x1.5 Deep 22
LZL 25-HG522-B-032	38	10	35	250	180	7	60	70	4	70	11	547	–	93	115	–	BSP 1"	103	120	62	13.5	215	M12x1.75 Deep 28
LZL 25-HG622-B-044	38	10	35	250	180	7	60	70	4	70	11	568	116	84	130	14.5	BSP 1"	103	120	62	13.5	215	M12x1.75 Deep 28
LZL 25-HG732-B-059	43	12	40	250	180	5	70	80	4	80	11	592	155	110	140	–	BSP 1"	103	120	62	13.5	215	M16x2.0 Deep 36
LZL 25-HG832-B-XXX	53.5	14	50	300	230	10	80	100	4	100	17	692	180	130	182	–	BSP 1"	103	120	62	13.5	265	M16x2.0 Deep 36
LZL 35-HG422-B-XXX	33	8	30	250	180	4	50	60	4	60	11	585	–	94	115	–	BSP 1 1/4"	120	134	68	13.5	215	M10x1.5 Deep 22
LZL 35-HG522-B-015	38	10	35	250	180	7	60	70	4	70	11	595	–	93	115	–	BSP 1 1/4"	120	134	68	13.5	215	M12x1.75 Deep 28
LZL 35-HG622-B-020	38	10	35	300	230	7	60	70	4	70	11	616	116	84	130	14.5	BSP 1 1/4"	120	134	68	13.5	265	M12x1.75 Deep 28
LZL 35-HG722-B-032	43	12	40	300	230	5	70	80	4	80	11	641	155	110	140	–	BSP 1 1/4"	120	134	68	13.5	265	M16x2.0 Deep 36
LZL 35-HG822-B-048	53.5	14	50	350	250	10	80	100	5	100	17	709	180	130	182	–	BSP 1 1/4"	120	134	68	17.5	300	M16x2.0 Deep 36
LZL 35-HG931-B-XXX	64	18	60	450	350	10	100	120	5	140	18	814	198	150	230	–	BSP 1 1/4"	120	134	68	18	400	M20x2.5 Deep 42

a) 8 holes LZL 35-HG931-B-XXX

Air motors LZL 05 with worm gear units type BS

**1.0 kW
1.4 hp**

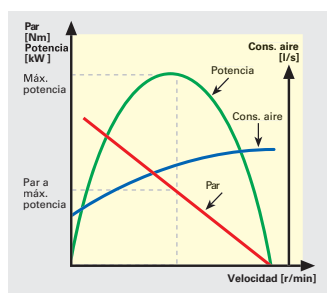
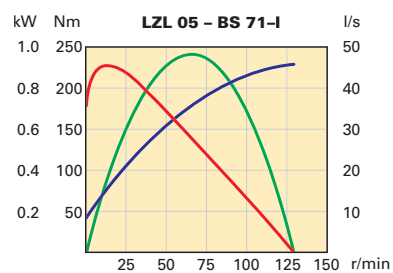
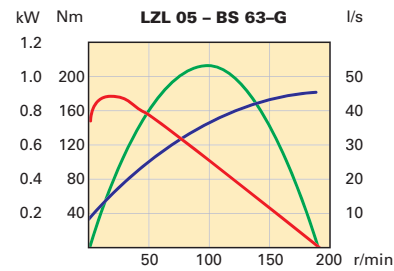
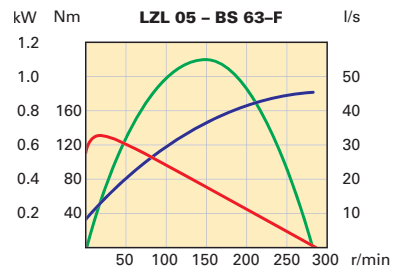
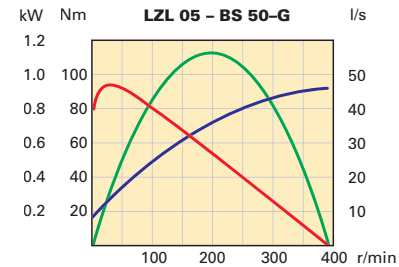
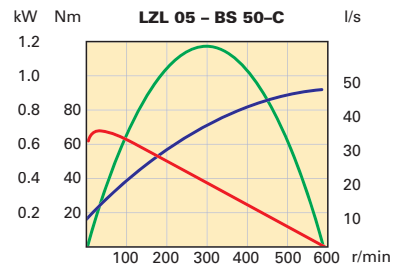
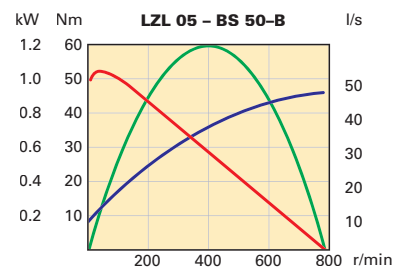
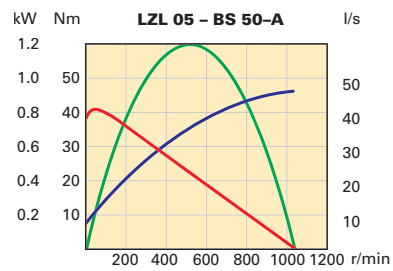


Air motor LZL 05 with worm gear units type BS
Performance at 6.3 bar (91 psi)

Designation	Ordering No.	Ratio	Max output		Speed at max output	Torque at max output		Free speed	Air cons. at max output		Weight		Max radial load
			kW	hp	r/min	Nm	lbf.ft	r/min	l/s	cfm	kg	lb	N
LZL 05-BS50-A-OH	8411 1645 70	8.0	1.0	1.4	525	19	14	1030	37	78.4	10.9	24.0	1700
LZL 05-BS50-A-OV	8411 1646 38	8.0	1.0	1.4	525	19	14	1030	37	78.4	10.9	24.0	1700
LZL 05-BS50-A-OD	8411 1646 95	8.0	1.0	1.4	525	19	14	1030	37	78.4	10.9	24.0	1700
LZL 05-BS50-B-OH	8411 1645 88	10.5	1.0	1.4	400	24	18	780	37	78.4	10.9	24.0	1900
LZL 05-BS50-B-OV	8411 1646 46	10.5	1.0	1.4	400	24	18	780	37	78.4	10.9	24.0	1900
LZL 05-BS50-B-OD	8411 1647 03	10.5	1.0	1.4	400	24	18	780	37	78.4	10.9	24.0	1900
LZL 05-BS50-C-OH	8411 1645 96	14.0	1.0	1.3	300	31	23	590	37	78.4	10.9	24.0	2200
LZL 05-BS50-C-OV	8411 1646 53	14.0	1.0	1.3	300	31	23	590	37	78.4	10.9	24.0	2200
LZL 05-BS50-C-OD	8411 1647 11	14.0	1.0	1.3	300	31	23	590	37	78.4	10.9	24.0	2200
LZL 05-BS50-E-OH	8411 1646 12	24.0	0.95	1.3	175	52	38	390	37	78.4	10.9	24.0	2700
LZL 05-BS50-E-OV	8411 1646 79	24.0	0.95	1.3	175	52	38	390	37	78.4	10.9	24.0	2700
LZL 05-BS50-E-OD	8411 1647 37	24.0	0.95	1.3	175	52	38	390	37	78.4	10.9	24.0	2700
LZL 05-BS63-F-OH	8411 1647 86	29.0	0.94	1.3	145	62	46	280	37	78.4	13.3	29.3	3300
LZL 05-BS63-F-OV	8411 1648 44	29.0	0.94	1.3	145	62	46	280	37	78.4	13.3	29.3	3300
LZL 05-BS63-F-OD	8411 1649 01	29.0	0.94	1.3	145	62	46	280	37	78.4	13.3	29.3	3300
LZL 05-BS63-G-OH	8411 1648 02	43.0	0.90	1.2	98	88	65	190	37	78.4	13.3	29.3	3800
LZL 05-BS63-G-OV	8411 1648 69	43.0	0.90	1.2	98	88	65	190	37	78.4	13.3	29.3	3800
LZL 05-BS63-G-OD	8411 1649 27	43.0	0.90	1.2	98	88	65	190	37	78.4	13.3	29.3	3800
LZL 05-BS71-I-OH	8411 1649 68	63.0	0.82	1.1	67	117	87	130	37	78.4	17.2	37.9	5600
LZL 05-BS71-I-OV	8411 1650 07	63.0	0.82	1.1	67	117	87	130	37	78.4	17.2	37.9	5600
LZL 05-BS71-I-OD	8411 1650 49	63.0	0.82	1.1	67	117	87	130	37	78.4	17.2	37.9	5600

Mounting arrangement is stated by OH, OV or OD acc. to page 51.

Air motor LZL 05 with worm gear units type BS
Performance curves at air pressure 6.3 bar (91psi)



For information about performance curves, see page 7

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 more details, see page 7.

Air motors LZL 15 with worm gear units type BS

**2.0 kW
2.7 hp**

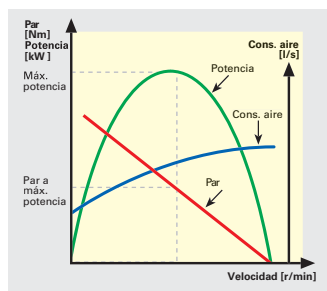
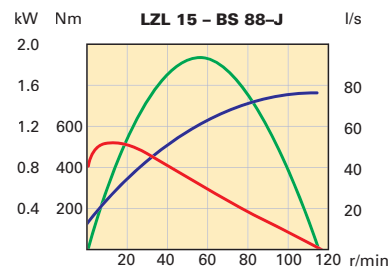
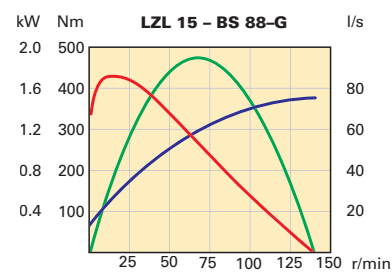
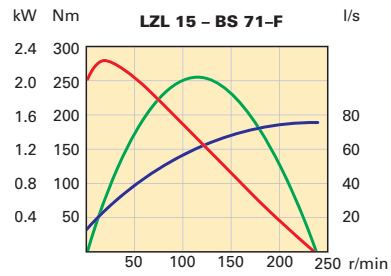
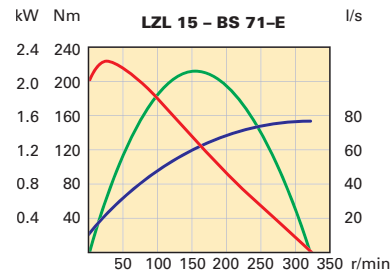
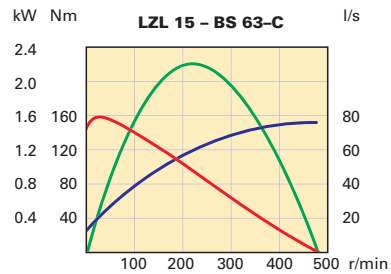
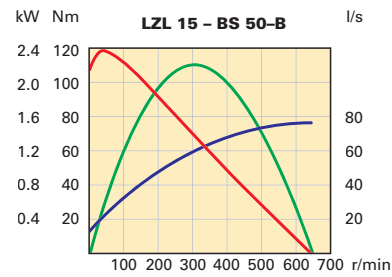
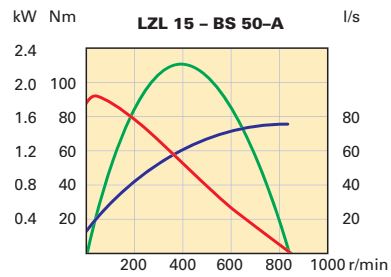


Air motor LZL 15 with worm gear units type BS
Performance at 6.3 bar (91 psi)

Designation	Ordering No.	Ratio	Max output		Speed at max output	Torque at max output		Free speed	Air cons. at max output		Weight		Max radial load
			kW	hp	r/min	Nm	lbf.ft	r/min	l/s	cfm	kg	lb	N
LZL 15-BS50-A-OH	8411 1650 56	8.0	2.0	2.7	422	46	34	840	61	129.0	14.4	31.7	1800
LZL 15-BS50-A-OV	8411 1650 72	8.0	2.0	2.7	422	46	34	840	61	129.0	14.4	31.7	1800
LZL 15-BS50-A-OD	8411 1650 98	8.0	2.0	2.7	422	46	34	840	61	129.0	14.4	31.7	1800
LZL 15-BS50-B-OH	8411 1650 64	10.5	2.0	2.7	321	59	43	640	61	129.0	14.4	31.7	2100
LZL 15-BS50-B-OV	8411 1650 80	10.5	2.0	2.7	321	59	43	640	61	129.0	14.4	31.7	2100
LZL 15-BS50-B-OD	8411 1651 06	10.5	2.0	2.7	321	59	43	640	61	129.0	14.4	31.7	2100
LZL 15-BS63-C-OH	8411 1651 30	14.0	2.0	2.7	241	78	58	480	61	129.0	16.6	36.6	2600
LZL 15-BS63-C-OV	8411 1651 71	14.0	2.0	2.7	241	78	58	480	61	129.0	16.6	36.6	2600
LZL 15-BS63-C-OD	8411 1652 13	14.0	2.0	2.7	241	78	58	480	61	129.0	16.6	36.6	2600
LZL 15-BS71-E-OH	8411 1652 54	21.0	1.9	2.6	161	113	83	320	61	129.0	20.4	45.0	3700
LZL 15-BS71-E-OV	8411 1652 96	21.0	1.9	2.6	161	113	83	320	61	129.0	20.4	45.0	3700
LZL 15-BS71-E-OD	8411 1653 38	21.0	1.9	2.6	161	113	83	320	61	129.0	20.4	45.0	3700
LZL 15-BS71-F-OH	8411 1652 62	28.0	1.9	2.5	121	148	109	240	61	129.0	20.4	45.0	4000
LZL 15-BS71-F-OV	8411 1653 04	28.0	1.9	2.5	121	148	109	240	61	129.0	20.4	45.0	4000
LZL 15-BS71-F-OD	8411 1653 46	28.0	1.9	2.5	121	148	109	240	61	129.0	20.4	45.0	4000
LZL 15-BS88-G-OH	8411 1653 95	39.0	1.7	2.3	87	193	142	130	61	129.0	54.5	120.0	8300
LZL 15-BS88-G-OV	8411 1654 60	39.0	1.7	2.3	87	193	142	130	61	129.0	54.5	120.0	8300
LZL 15-BS88-G-OD	8411 1655 36	39.0	1.7	2.3	87	193	142	130	61	129.0	54.5	120.0	8300
LZL 15-BS88-J-OH	8411 1654 11	58.0	1.7	2.3	58	279	206	115	61	129.0	54.5	120.0	9900
LZL 15-BS88-J-OV	8411 1654 86	58.0	1.7	2.3	58	279	206	115	61	129.0	54.5	120.0	9900
LZL 15-BS88-J-OD	8411 1655 51	58.0	1.7	2.3	58	279	206	115	61	129.0	54.5	120.0	9900

Mounting arrangement is stated by OH, OV or OD acc. to page 51.

Air motor LZL 15 with worm gear units type BS
Performance curves at air pressure 6.3 bar (91psi)



For information about performance curves, see page 7

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 more details, see page 7.

Air motors LZL 25 with worm gear units type BS

**3.1 kW
4.1 hp**

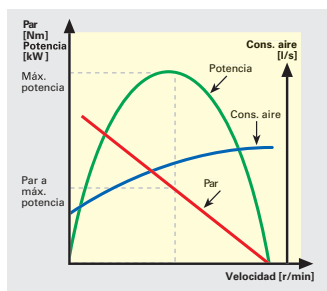
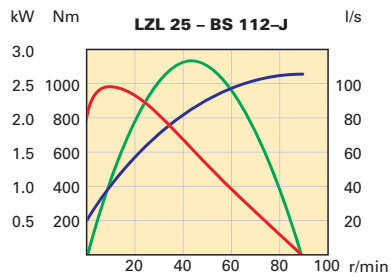
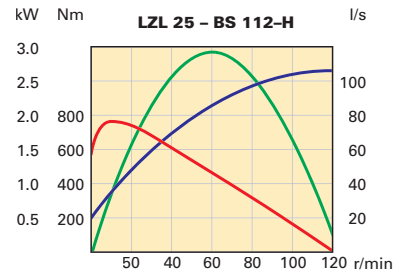
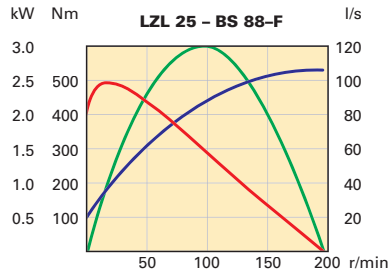
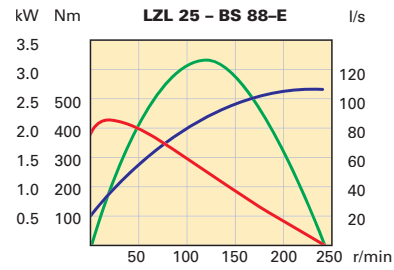
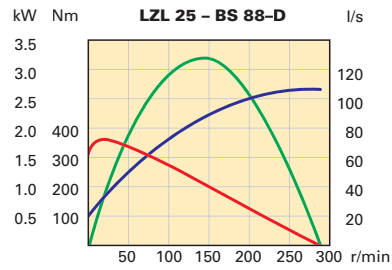
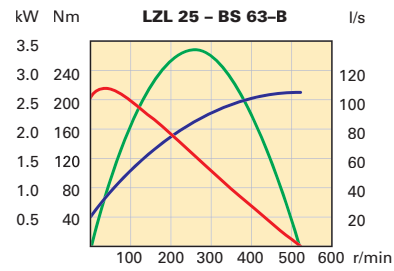
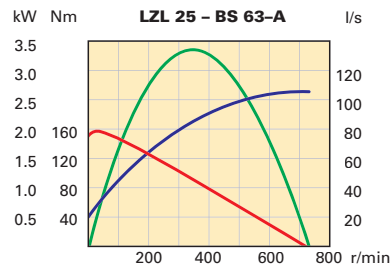


Air motor LZL 25 with worm gear units type BS
Performance at 6.3 bar (91 psi)

Designation	Ordering No.	Ratio	Max output		Speed at max output r/min	Torque at max output		Free speed r/min	Air cons. at max output		Weight		Max radial load N
			kW	hp		Nm	lbf.ft		l/s	cfm	kg	lb	
LZL 25-BS63-A-OH	8411 1655 69	7.75	3.1	4.1	361	82	60	740	86	182.0	21.0	46.3	2100
LZL 25-BS63-A-OV	8411 1655 85	7.75	3.1	4.1	361	82	60	740	86	182.0	21.0	46.3	2100
LZL 25-BS63-A-OD	8411 1656 01	7.75	3.1	4.1	361	82	60	740	86	182.0	21.0	46.3	2100
LZL 25-BS63-B-OH	8411 1655 77	11.0	3.1	4.1	254	115	85	520	86	182.0	21.0	46.3	2400
LZL 25-BS63-B-OV	8411 1655 93	11.0	3.1	4.1	254	115	85	520	86	182.0	21.0	46.3	2400
LZL 25-BS63-B-OD	8411 1656 19	11.0	3.1	4.1	254	115	85	520	86	182.0	21.0	46.3	2400
LZL 25-BS88-D-OH	8411 1657 34	19.5	2.9	3.9	143	195	144	290	86	182.0	58.5	129.0	6700
LZL 25-BS88-D-OV	8411 1658 09	19.5	2.9	3.9	143	195	144	290	86	182.0	58.5	129.0	6700
LZL 25-BS88-D-OD	8411 1658 74	19.5	2.9	3.9	143	195	144	290	86	182.0	58.5	129.0	6700
LZL 25-BS88-E-OH	8411 1657 42	23.5	2.9	3.9	119	232	171	240	86	182.0	58.5	129.0	7300
LZL 25-BS88-E-OV	8411 1658 17	23.5	2.9	3.9	119	232	171	240	86	182.0	58.5	129.0	7300
LZL 25-BS88-E-OD	8411 1658 82	23.5	2.9	3.9	119	232	171	240	86	182.0	58.5	129.0	7300
LZL 25-BS88-F-OH	8411 1657 59	29.0	2.8	3.7	96	273	201	190	86	182.0	58.5	129.0	7800
LZL 25-BS88-F-OV	8411 1658 25	29.0	2.8	3.7	96	273	201	190	86	182.0	58.5	129.0	7800
LZL 25-BS88-F-OD	8411 1658 90	29.0	2.8	3.7	96	273	201	190	86	182.0	58.5	129.0	7800
LZL 25-BS112-H-OH	8411 1659 65	46.0	2.7	3.6	61	422	311	120	86	182.0	73.5	162.0	14700
LZL 25-BS112-H-OV	8411 1660 21	46.0	2.7	3.6	61	422	311	120	86	182.0	73.5	162.0	14700
LZL 25-BS112-H-OD	8411 1660 88	46.0	2.7	3.6	61	422	311	120	86	182.0	73.5	162.0	14700
LZL 25-BS112-J-OH	8411 1659 73	63.0	2.7	3.6	44	571	421	90	86	182.0	73.5	162.0	15000
LZL 25-BS112-J-OV	8411 1660 39	63.0	2.7	3.6	44	571	421	90	86	182.0	73.5	162.0	15000
LZL 25-BS112-J-OD	8411 1660 96	63.0	2.7	3.6	44	571	421	90	86	182.0	73.5	162.0	15000

Mounting arrangement is stated by OH, OV or OD acc. to page 51.

Air motor LZL 25 with worm gear units type BS
Performance curves at air pressure 6.3 bar (91psi)



For information about performance curves, see page 7

Conversion Factors*)

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

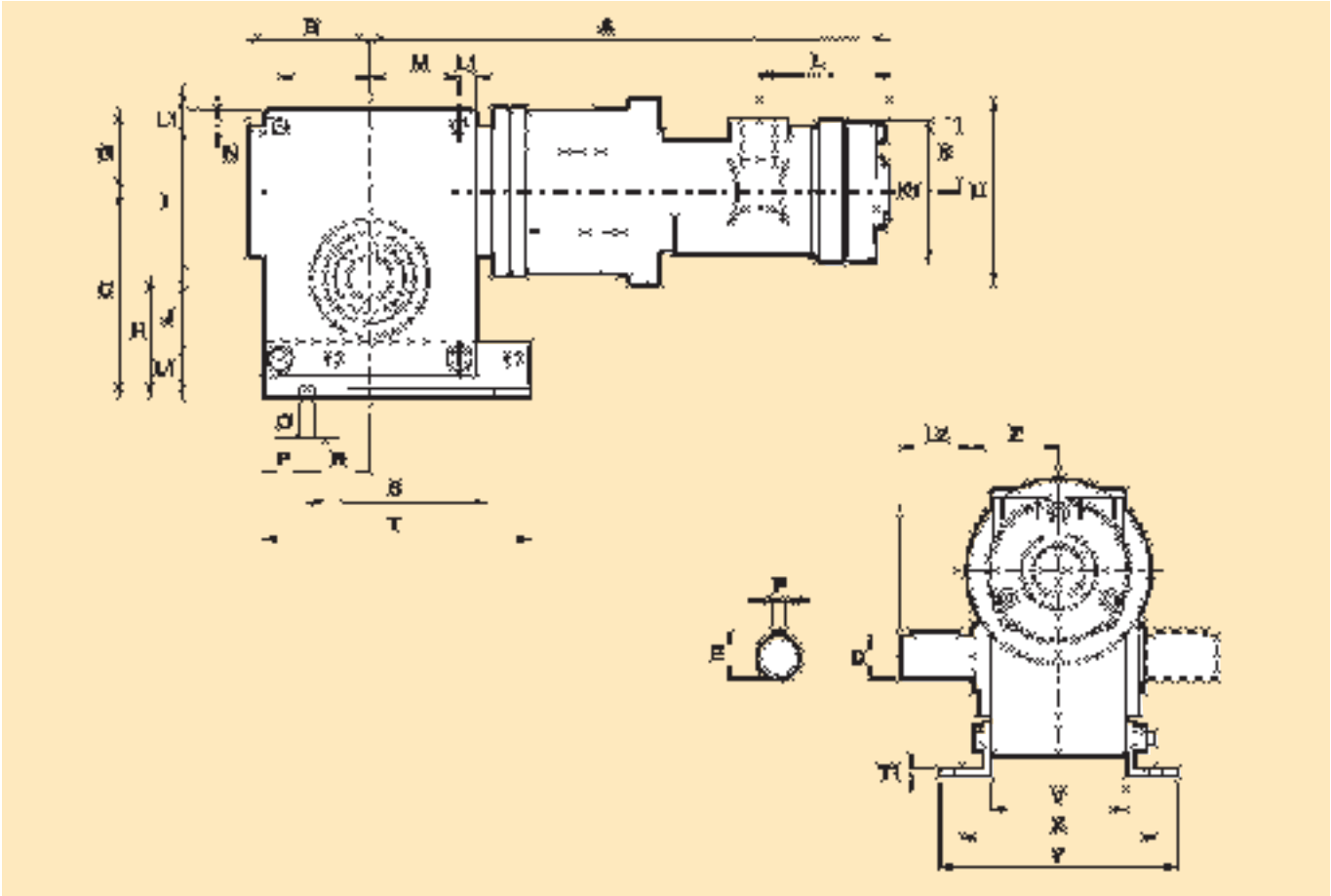
1 hp = 0.75 kW
 1 lbf-ft = 1.36 Nm
 1 cfm = 0.47 l/s

*) For more details, see page 7.

Dimensions LZL with worm gear units type BS

Dimensions

Conversion factor 1mm = 0.04 inch



BS 50, -63, -71

Measurements (mm)

Gear Unit Type	Air Motor Type	A	B	C	D	E	F	G	H	I	J	K	K1	L	L1	L2	M	N	O	P	R	S	T	T1	U	V	X	Y	Z	
BS 50	LZL 05	300	71	119	25j6	28	8h9	48	69	88	47	41	83	72	10	42	52	8.5	8.5	25.5	36.5	104	155	4	113	78	113	138	50	
	LZL 15	344										55	100	90																
BS 63	LZL 05	312	82	142	30j6	33	8h9	53	79	106	57	41	83	72	10	58	63	10.5	11	28.5	44.5	126	183	5	108	140	82	121	146	52
	LZL 15	355										55	100	90																
	LZL 25	398										62	120	103																
BS 71	LZL 05	328	86	153.5	35j6	38	10h9	63	82.5	120	61	41	83	72	14	58	68.5	12.5	12.5	36	46.5	137	209	6	160	102	144	170	62.5	
	LZL 15	371										55	100	90																

BS 88 and 112

Measurements (mm)

Gear Unit Type	Air Motor Type		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U	V	
BS 88	LZL 15		397	122	275	45k6	48	14h9	115	203	+0	55	100	90	200	140	30	70	14	170	140	20	82	70
	LZL 25		439.5								-0.5	62	120	103										
BS 112	LZL 25	i<60 i>60	473 460.5	143	340	55k6	59	16h9	140	252	+0 -0.5	62	120	103	250	175	37.5	87.5	18	210	175	23	82	82

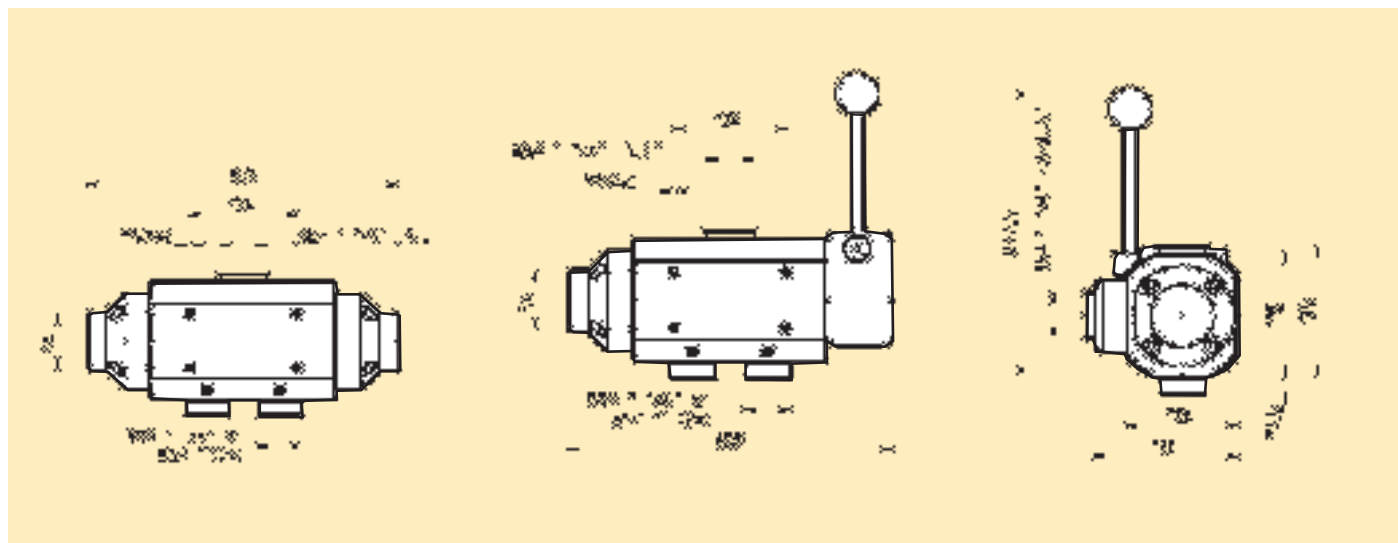
Accessories for LZL motors

The LCV 32 control valves have been developed for LZL 25 and LZL 35. These valves come in two versions; LCV 32-A which is air controlled and LCV 32-H which is hand operated with a lever. Both models are 4 ports / 3 positions design and can be step less controlled from zero to full flow. They can be mounted directly on to the motors or as remote control. All parts needed for assembly on LZL 25 or LZL 35 are included. When the valves are not assembled on top of the motors the air connections are external threaded nipples that can be chosen between BSP 1" and BSP 1 1/4" depending on which nipples are assembled by the user. Both types are included.



Valves LCV 32 for LZL 25 and 35

Designation	Ordering No.	Weight
LCV 32-A	8411 1006 40	7.25 kg
LCV 32-H	8411 1006 57	8.30 kg



Choosing your motor

The working point

When selecting an air motor for a certain application, the first step is to establish what is called the "working point." This is the point described by the desired operating speed for the motor and the torque required at that speed.

The wide operating range of the air motor makes it probable that a number of motors could run with the same working point. However, as it is most efficient to run an air motor at the maximum output speed, the motor that produces maximum power nearest to the working point should be selected.

The power required at the working point is calculated by:

$$\text{Power} = \frac{\pi \times M \times n}{30} \text{ [W]}$$

Where, M = Torque at working point (in Nm)
 n = Speed at working point (in r/min)

Example:

A non-reversible motor is required to run at 300 r/min and produce a torque of 10 Nm. Selection of correct motor size is as follows:
 Power required (W) = $3.14 \times 10 \times 300 / 30 = 314$
 From Table 5 the correct size of non-reversible motor for this application is the LZB 33.

Once the motor size has been identified, simply look at the performance curves for each motor variant and select the one with max output nearest to the working point. For the above example this would be the LZB 33 A007.

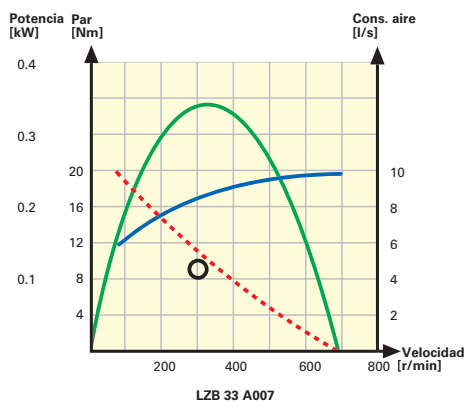


Figure 29

If necessary, one of the flow control methods can be used to modify the output of a motor to meet the working point exactly (Figure 30).

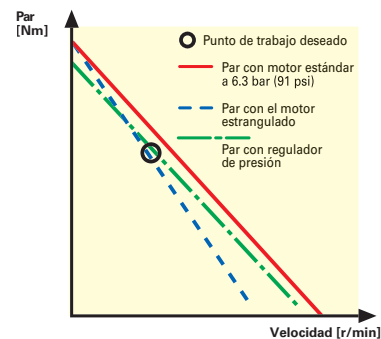


Figure 30

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 6.

Correction factors					
Air Pressure (bar)	Output	Speed	Torque	Air Consumption	
7	1.01	1.13	1.01	1.09	1.11
6	0.94	0.99	0.95	0.96	0.96
5	0.71	0.93	0.79	0.77	0.77
4	0.51	0.85	0.63	0.61	0.61
3	0.33	0.73	0.48	0.44	0.44

Table 6

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

Example:

An LZB 22 A036 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.
 Therefore $M1/M2 = 0.8$ and $n1/n2 = 0.7$
 The required inlet pressure is 4.2 bar (61 psi)

$M1$ = desired torque
 $n1$ = desired speed
 $M2$ = torque at maximum output
 $n2$ = speed at maximum output
 Calculate the ratios $M1$ and $n1$
 $M2$ and $n2$

Apply these values to the diagram in figure 31 and read off the pressure at the intersection point.

Vane motors														
	LZB 14	LZB 22	LZB 33/34	LZB 42	LZB 46	LZB 54	LZB 66	LZB 77	LZL 03	LZL 05	LZL 15	LZL 25	LZL 35	
Non reversible	A	A	A	A	A	A	A	A						
Reversible	AR	AR	AR	AR	AR	AR	AR	AR						
Output (kW)	0.10	0.16	0.25	0.23	0.39	0.50	0.65	0.58	0.84	0.78	1.20	1.40	1.80	2.50

Table 5

Shows the power output for all Atlas Copco vane motors. The correct motor size is determined by selecting a motor with a power output above that required at the working point.

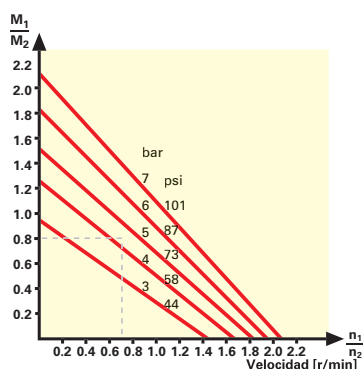


Figure 31

Starting torque and stall torque

Many applications demand that a motor produces a minimum torque at start up. In these a minimum starting torque, for a given motor, can be looked up in the tabular data. If it is necessary to modify the motor's output, but also maintain a high starting torque, the technique of throttling the air flow should be utilized.

Other applications require a certain stall torque. A motor's stall torque can be calculated by looking up the "torque at maximum output" and multiplying this value by two. Where it is desirable to control the stall torque, the technique of pressure regulation should be used.

Accelerating a load to speed

Certain applications require the acceleration of a load up to a given speed. In these cases, the choice of motor involves complex calculations. It is therefore recommended that you seek guidance from your nearest Atlas Copco representative before proceeding.

Shaft loading

Always ensure shaft loadings are within the stated allowable limits.

Silencing

The noise generated by an air motor is mainly caused by the exhaust air of the motor. The noise level increases with speed and is greatest at the free speed.

All Atlas Copco motors are supplied with a threaded exhaust port which, to reduce noise levels, can accept a screw in-silencer. However, an exhaust hose can also be fitted, and when used with a silencer, it can reduce noise levels even further. The effect of employing the various silencing techniques are indicated in Table 7.

Different noise reduction possibilities and the effects thereof:

0.36 – kW motor No-load speed Anechoic room Interval of 1 m	Measure	Noise Level dB (A)
	None	94
	Silencer Only	77
	Hose Only	84
	Hose with Silencer	75

Table 7

Temperature

Atlas Copco air motors can reliably operate in ambient temperatures that range from -20°C to $+60^{\circ}\text{C}$. However, below ambient temperatures of $+5^{\circ}\text{C}$ the compressed air may need to be dried to avoid freezing problems.

Please note it is often possible to operate these motors at much higher temperatures but this should not be attempted without first checking with your local Atlas Copco representative.

Hostile environments

Atlas Copco air motors are found in use in many hostile environments, often with little or no modification. These environments are typified as being:

Acidic – Explosive – Radioactive – High temperature – Moist – Dusty – Intense electric fields – Underwater – High humidity.

It is also possible to power an air motor with many types of compressed gas, for example nitrogen or natural gas.

However, to ensure safe and reliable service, we recommend you always consult your local Atlas Copco representative before using an air motor in a hostile environment.

Atlas Copco Airmotor Selection Program

The Atlas Copco Air Motor Selection Program makes it very easy for you to select the right motor. The Windows based program stores data on all Atlas Copco air motors. Only specify the required torque and speed of the motor and the program will select the most suitable motor for your application. Ordering No. 9833 9093 00.

Installing your air motor

Airlines

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

The recommendations are valid for hose lengths of up to 3 metres. For distances between 3 and 15 metres select a hose diameter one size up, and for distances between 15 and 50 metres 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 the Atlas Copco vane motors, special hose connectors are available with small key width – facilitating easy installation. Table 8.

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

Air preparation

To ensure reliable service an air filter and lubricator should be fitted into the inlet airline – within 5 metres 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 a flow capacity sufficient to meet the requirements of the motor. A typical arrangement of an air preparation installation is shown below, Figure 32.

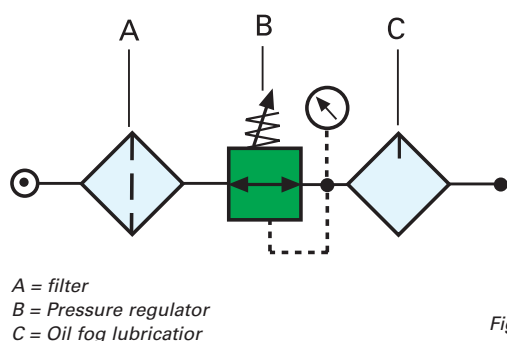


Figure 32

Thread in (in)	Hose size (mm)	(in)	Ordering No.	Thread in (in)	Hose size (mm)	(in)	Ordering No.
1/8 BSP	3.2	1/8	9000 0523 00	3/8 BSPT	10.0	3/8	9000 0242 00
1/8 BSP	5.0	3/16	4010 0031 00	3/8 BSPT	12.5	1/2	9000 0248 00
1/8 BSPT	6.3	1/4	9000 0240 00	1/2 BSPT	12.5	1/2	9000 0243 00
1/4 BSP	3.2	1/8	9000 0525 00	1/2 BSPT	16.0	5/8	9000 0244 00
1/4 BSPT	6.3	1/4	9000 0241 00	1/2 BSPT	20.0	3/4	4150 0429 00
1/4 BSPT	8.0	5/16	9090 1715 00	3/4 BSPT	20.0	3/4	9000 0245 00
1/4 BSPT	10.0	3/8	9000 0247 00	1 BSPT	25.0	1	9000 0246 00

Table 8

Lubrication

Atlas Copco air motors LZB 14, 22 and LZB 33/34 are available as standard in lubricated free versions. To achieve optimum service life and performance of the lubricated airmotors they should be supplied with 50 mm³ of oil for each cubic metre (1000 litres) of air consumed (1 drop = 15 mm³).

Insufficient lubrication will result in accelerated vane wear and a reduction in performance.

The following example shows how to calculate the lubrication required by a motor running at a known output.

Example:

A non-reversible LZB 42 motor running at maximum output consumes 13 litres/sec of air.

In one minute it consumes 780 litres of air, therefore the lubrication required is:

$$\frac{780}{1000} \times 50 = 39 \text{ mm}^3/\text{min}$$

If an oil-fog lubricator was to be used it should be set to deliver 3 drops of oil a minute (1 drop = 15 mm³).

The lubrication oil selected should have a viscosity which lies between 50 and 300 x 10⁶ m²/s at the motor's working temperature.

However, if it is necessary to reduce the level of oil exhaust from the motor, and a piped-away or filtered exhaust is not acceptable, then the lubrication level can be reduced.

Although this will effect the motor, the performance may still be acceptable. Table 9 shows how reduced lubrication can affect service life and output.

Lubricant quantity (mm ³ oil m ³)	Service life (hours)	Output power (%)
50	1000-3000	100
10	500-1000	100
1	200-500	90
0.1	100-300	80
0	10-30	30

1 drop of oil is appr. 15 mm³

Table 9

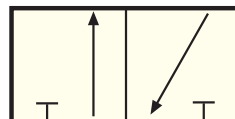
It is also possible to fit lubrication free vanes to other air motors than LZB 14, 22 and LZB 33. However, that is only suitable under certain conditions. Check with your local Atlas Copco representative if you require further information.

If the supply air is very dry the idling speed of the lubrication free motors may degrade somewhat after running for longer periods, a decrease of 10-15% may be noticeable. The power of the motors is, however, generally not affected. To guarantee longer service intervals the lubricated, standard motors are still the best choice.

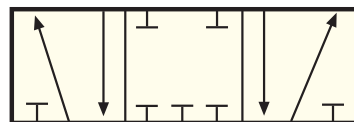
Directional control valves

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 port and 3 positions. When selecting any control valve it is important to ensure that it has a flow capacity that is sufficient to supply the requirements of the motor.



3/2 valve



5/3 valve

Figure 33

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

Installations examples

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

LZB Circuits

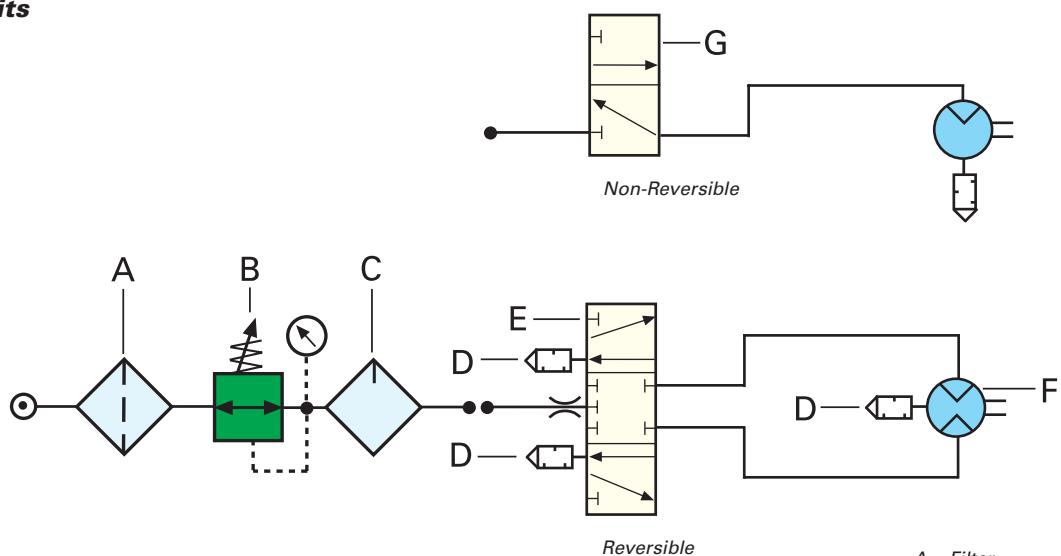


Figure 34

- A = Filter
- B = Pressure regulator
- C = Oil fog lubricator
- D = Silencer
- E = 5/3 valve
- F = Air motor
- G = 3/2 valve

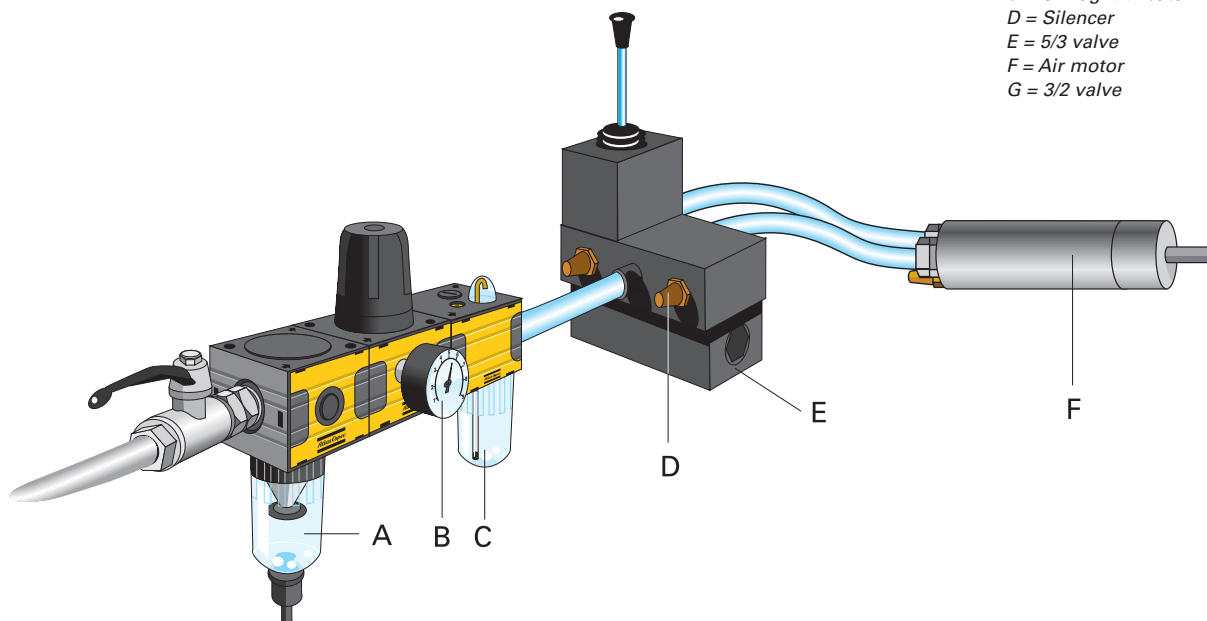


Figure 35

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.

For LZL air motors it is important that an inlet restrictor is placed upstream 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.

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*

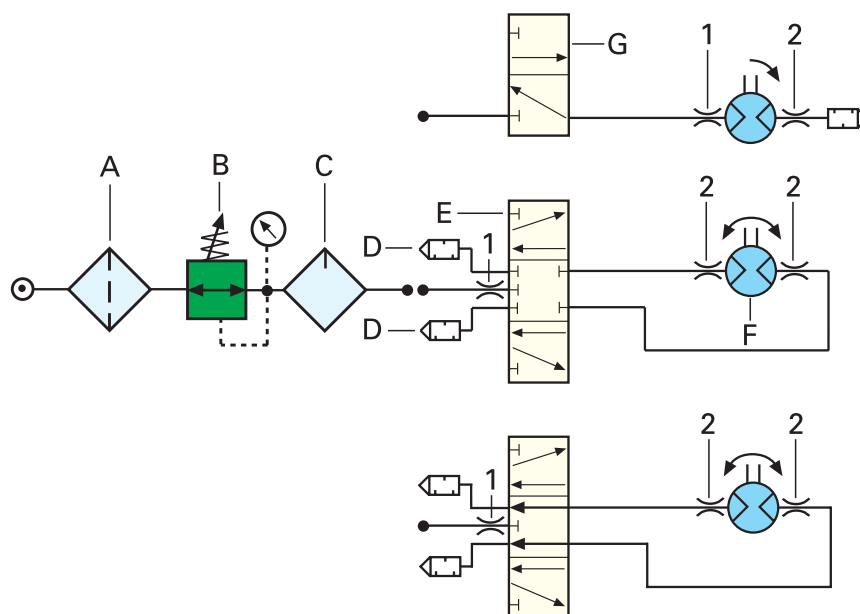


Figure 36

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

