ZL1600

Section 11374
Rotary Lobe Blower

INSTALLATION & OPERATION MANUAL

PREPARED FOR:

SLETTEN CONSTRUCTION COMPANY
City of Glasgow, MT

October 12, 2019

Sletten Construction Company
PO # GG - 010

TABLE OF CONTENTS

Atlas Copco Compressors LLC
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SECTION 1

PROJECT SPECIFIC INFORMATION

Scope of Supply
Clarifications & Exceptions
Warranty
ISO Certification

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SECTION 1.1

SCOPE OF SUPPLY

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Scope of Supply

Equipment	Qty.
Item: 001: Rotary Lobe Blower – ZL1600	**1**

- ZL1600, air cooled, oil free positive displacement rotary lobe blower featuring:
  - ABB 37kW / 50 HP Premium efficient 460V TEFC Inverter Duty drive motor
  - Tri – Lobe rotor
  - Inlet Silencer/ Filter
  - Outlet Silencer
  - Pressure relief valve (start-up valve)
  - Outlet flange compensator
  - Check valve
  - Automatic belt tensioner
  - Discharge pressure gauge
  - Belt drive cover
  - Package vibration isolators
  - Sound insulated enclosure
- Field Installed Accessories
  - DN150/PN10 x 6” ANSI 125# Discharge Expansion (Joint General Rubber 1101)
  - Discharge Temperature Switch (Ashcroft T450 T10-030 150/260°F)
- Spare Parts
  - (2) Oil Fillings
  - (1) Sets of V-Belts
  - (1) Sets of Filter elements
- Testing
  - Factory ISO 1217 Performance Test Report (Unwitnessed)
- Freight
- Start-up & Training
  - (1) Trip for (1) Days for installation check & Start-up
  - (1) Trip for (1) days for Training

SECTION 1.2

CLARIFICATIONS & EXCEPTIONS

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Clarifications:

General:

1. Installation, piping, elbows, spool pieces, piping hardware, piping gaskets, anchor bolts, housekeeping pads, and wiring to be provided by others.
2. We market the ZL lobe blowers under two main brand names Lutos and Atlas Copco. Production began in 1992 as Lutos. In 2004, we launched the ZL, branded under Atlas Copco. Municipal sales in the US for all Atlas Copco products where negligible due to the company's structure promoting its products through distributors in lieu of representatives. Previous management wanted the USA to only focus on "efficient" technology, so Atlas Copco stopped promoting the ZL in the US in 2012. The acquisition of HSI and its municipal representatives has allowed for a restructuring of how Atlas Copco approaches the municipal market. Under this approach current management realized the demand for these low-cost alternatives and has added the ZL back into our US portfolio which is why our national reference list is currently lacking. Atlas Copco has been producing the ZL or Lutos branded BAH/DT lobe blowers globally for over 25 years, and approximately 600+ units are produced each year globally.
3.

Spec Section: 11374

1. 2.04.C.3 – Rotor material is GJS500 which is equivalent to GGG50.
2. 2.04.D.1 – Vendor standard variable speed motors are only available with 1.00 service factor
3. 2.04.E.3 - Vendor Standard blower design at this pressure has 79[dB(A)] according to A-weighted emission sound pressure level at the workstation, LpWSAd, according ISO 2151:2004 using ISO 9614/2 (Intensity scanning), at Maximum Speed and pressure with an uncertainty +3dB.
4. 2.04.E.4 – Vendor standard enclosure uses doors or panels on all sides for multiple access options to blower components. Side access may be required for uncommon procedures.
5. 2.04.J.– Enclosure mounted instruments shall be vendor standard.

SECTION 1.3

WARRANTY

Atlas Copco Compressors LLC
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Atlas Copco Compressors, LLC

Warranty and Limitation of Liability

Seller hereby warrants the ZL - Series Blower manufactured by Atlas Copco to be free from defects in design, material and workmanship under normal use and service. The warranty will be for a period to begin with startup, beginning of beneficial use or achievement of substantial completion, whichever comes first, and will extend for a twenty-four (24) month period. The warranty period will not exceed thirty-six (36) months after shipment.

This warranty applies to all standard equipment located within our standard enclosure. Standard equipment shall be limited to the product make, model, and design as determined by Seller and shall not cover any customer specified modifications or changes, nor does it cover ancillary components not located with the enclosure. Standard wear items used in routine maintenance are not covered. Seller will repair or replace any defective part or parts, onsite, at no charge to the Owner. This includes shipment to and from the site, and excludes installation or removal of the unit as a whole as well as all electrical and mechanical connections to the unit.

Warranty shall be void if the product is repaired or tampered with in any manner other than by Seller's authorized service personnel. If inspection does not disclose a defect covered by the warranty, the equipment will be returned to Purchaser at its expense or, if Purchaser elects, the Seller will repair or replace the equipment and charge for such service at the regular rate.

Seller makes no warranties, expressed or implied, as to the merchantability or as to the suitability of the equipment for any particular purpose, and Seller does not warranty the equipment in any manner whatsoever except as expressly stated in this agreement.

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SECTION 1.4

ISO CERTIFICATION

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CERTIFICATE OF APPROVAL

This is to certify that the Quality, Environmental and Occupational Health & Safety Management System of:

Atlas Copco Airpower NV
Business Area Compressor Technique
Boomsesteenweg 957
2610 Wilrijk
Belgium

has been approved by Lloyd's Register Quality Assurance to the following Management System Standards:

ISO 9001 : 2015
ISO 14001 : 2015
OHSAS 18001 : 2007

The Quality, Environmental and Occupational Health & Safety Management System is applicable to:

Marketing, sales, design, manufacturing, distribution, assembling, installation and service of air/gas compressors, blowers, expanders, turbo machinery, vacuum pumps, air/gas treatment equipment, generator sets, assemblies and related products and services, under Atlas Copco brand as well as other Brands from the Brand portfolio.

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Approval Certificate No:			
ANT02146 (qms)	Original ISO 9001 Approval	:	9 December 2002
ANT02146.3	Original ISO 14001 Approval	:	1 January 2005
ANT02146.4	Original OHSAS 18001 Approval	:	11 September 2007
	Current Certificate	:	4 July 2018
	Certificate Expiry	:	1 January 2020

Issued by: Lloyd's Register EMEA, Antwerp Office for and on behalf of Lloyd's Register Quality Assurance Limited

UKAS MANAGEMENT SYSTEMS
001

Approval Certificate No: ANT02146

Jan Van Gentstraat 7 bus 202, 2000 Antwerp, Belgium. Company Number 0860.936.663
(For and on behalf of 71, Fenchurch Street, London EC3M 4BS, United Kingdom, registration number 1879380)
This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001

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SECTION 2

ZL GENERAL ARRANGEMENT DRAWING(S)

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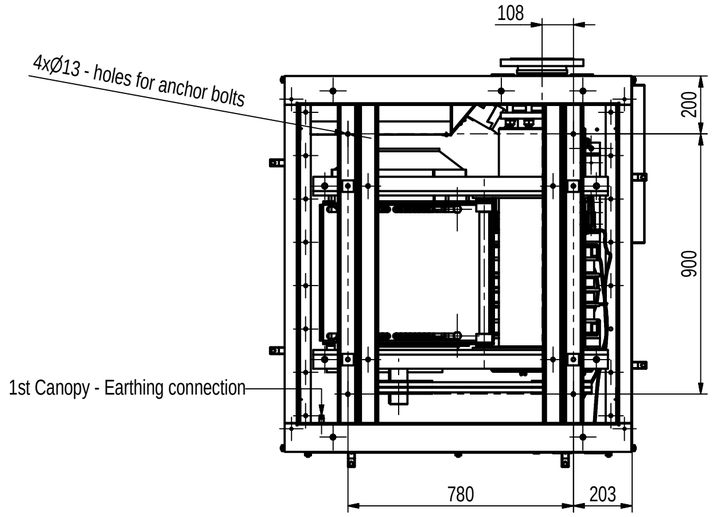
ZL 1600



DN150, PN10 acc. DIN2576
Blower air outlet compensator

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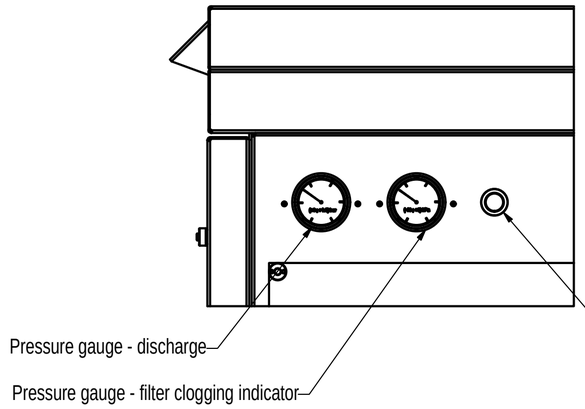

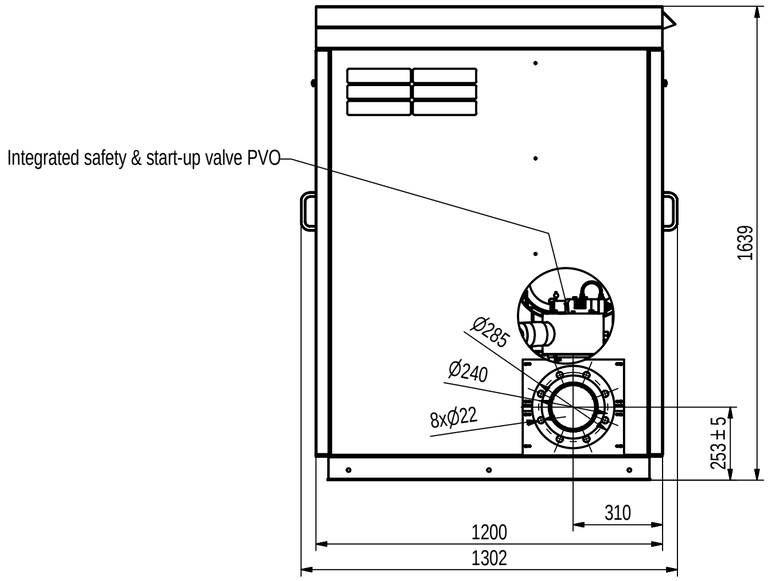

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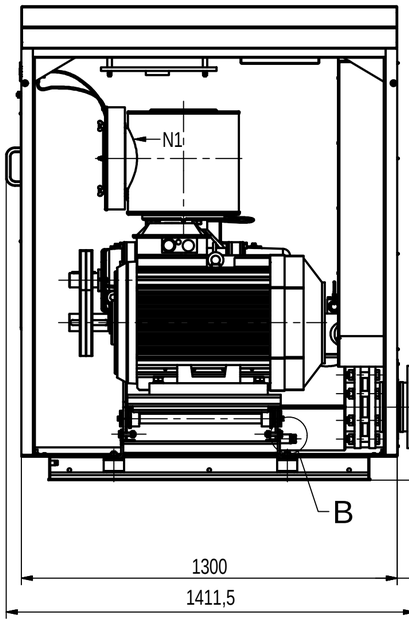

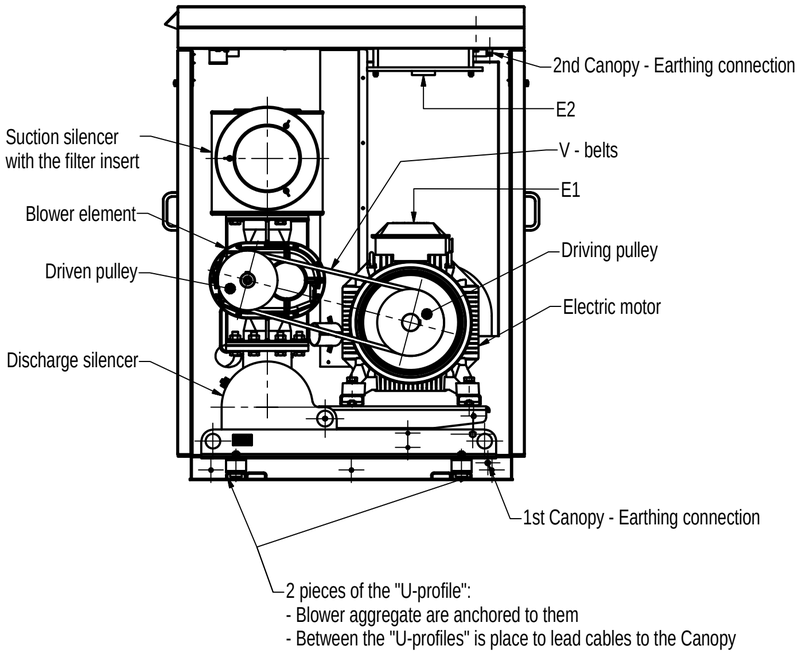

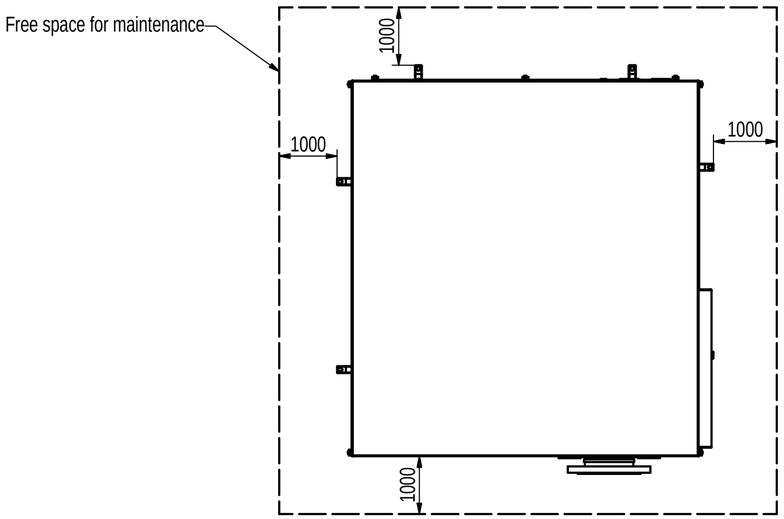

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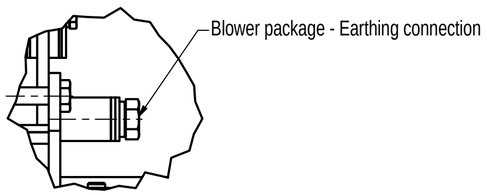

WEIGHTS	
Description	Value
Blower package	**425kg**
El. motor 15kW	**123kg**
El. motor 18,5kW	**137kg**
El. motor 22kW	**176kg**
El. motor 30kW	**225kg**
El. motor 37kW	**241kg**
El. motor 45kW	**326kg**
El. motor 55kW	**351kg**
Canopy	**220kg**
TOTAL (without el. motor)	**645kg**

COMMENTS	
Signification	Description
E1	**Main terminal box - El. motor**
E2	**Terminal box - Canopy fan**
N1	**Suction of the air**
N2	**Discharge of the air**

Parent 3D model	Ed. version 3D

Toleranties, indien niet aangegeven, zijn volgens:
Tolerances, if not indicated, according to: ATLAS COPCO STANDARD /Klasse/CLASS

Benaming / Name: **ZL 1600**
Geheimh.klasse / Secrecy Class
Materiaal / Material
Behandeling / Treatment
ISO E: EN ISO 5456-2

Atlas Copco

Schaal / Scale	1:15	Familie / Family	A2	Vergelijk / Compare	Eigenaar / Drawing owner
Getekend / Drawn by	Rott K.	Ruw nr. / Blank nr.		Vervangt / Replaces	
STATUS	Version Drwg: R01	Ruw gew. / Blank wt. kg	Afg gew. / Fini wt. kg	Identificatie/Designation	Blad/Sheet 1 / 1
	Des gez./chd.: Hormandl E.	Prod gez/chd.	Goedg./Appd.: Hormandl E.	Datum/Date: 15.02.2018	**1621 5130 87**

C:_Vault_Lutos\ProjektyVault\70 GA\1621513087.idw

All materials supplied are in compliance with the requirements of the List of Prohibited Substances

SECTION 3

ZL INSTALLATION PROPOSAL

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INSTALLATION AND ASSEMBLY

CONTENT

1 ASSEMBLY CONDITIONS

1.1 ASSEMBLY IN THE OPEN (OUTDOORS)

NOTE: Only for units with canopy

To install the sets in the open, consider local conditions (snow, possibility of floods, …) according to ENV 1991-1

See Marketing website > APC collection > ZL > "Installation proposal" for necessary area and lines for operators.

The canopies on sets designed for open-air installation serve as protectors against weather.

1.2 ASSEMBLY IN A MACHINE SHOP

The necessary area for the set is defined by the set's (or canopy's) maximum dimensions and by the one-meter minimum necessary operating on the sides of the set (or guard) and between the sets; and by 1.2-meter operating area meters between the wall and the machine or silencing guard. The machine shop room height depends on the chosen mode of operation.

When designing the machine shop, consider space required during assembly (sets are usually supplied assembled). Canopies can be dismantled. As well, consider space and equipment needed for handling the sets and motor while being maintained, repaired, or dismantled (hanging slot with crane trolley, area for a lifting vehicle, etc.).

2 INSTALLATION AND OPERATION AREA

The space needed for installing of individual types of the ZL sets depends on the dimensions listed, see Marketing website > APC collection > ZL > "Installation proposal".

3 ANCHORING REQUIREMENTS FOR THE SETS AND BLOWERS

WARNING: Anchor the set securely and fasten it tightly to the base.

Both blowers and motors are dynamically centered. Heavy bases are not required because there are no inertial forces. See ASC ZL > Tab06 > "Vibration measurements",

for mechanical oscillation force of blowers and motors. The load is equally balanced on the individual bases (for sets) or on the basic guard frame (for sets in guards).

There are no special requirements for the base under the set (guard); there are, however, some restrictions for placing the machine.

- You can attach additional canopy within the discharge piping axial height. There are three ways to install supplemental canopies, you can:
  - Make an additional order of the discharge piping distance piece of the canopy.
  - Design longer discharge piping (longer by the distance piece length) and shorten it to fit while installing.
  - Move the set by the discharge piping length in the direction from the discharge (see catalogue sheets of sets and canopies).

The installation floor should be as flat as possible. Level the set by putting plates under machine bases; the permissible deviation is 0.05 mm per meter.

Fasten the set to the concrete floor with anchors. While installing, drill holes in accordance with the base holes. See 3.1 “Anchoring dimensions while anchoring the sets to steelstructures” below, for anchoring dimensions while anchoring.

3.1 ANCHORING DIMENSIONS WHILE ANCHORING THE SETS TO STEELSTRUCTURES

Canopies of the ZL1600 type and larger are not anchored: but make sure of joint tightness between canopy and floor.

Level any possible floor unevenness to prevent side walls from being tight or bent.

To seal the joint between the canopy and floor, apply self-adhesive seal to the guard bottom edge while installing the canopy.

4 PIPING INSTALLATION REQUIREMENTS

If a discharge flange pressure gauge is not a part of the supply, you should place the pressure gauge on the pipeline, as near as possible to the set discharge flange. Due to pulsation of gas pressure gauges with pressure cyclic change resistance, e.g. a pressure gauge with glycerol filling, should be used or put an absorbing element between the piping and pressure gauge, etc.

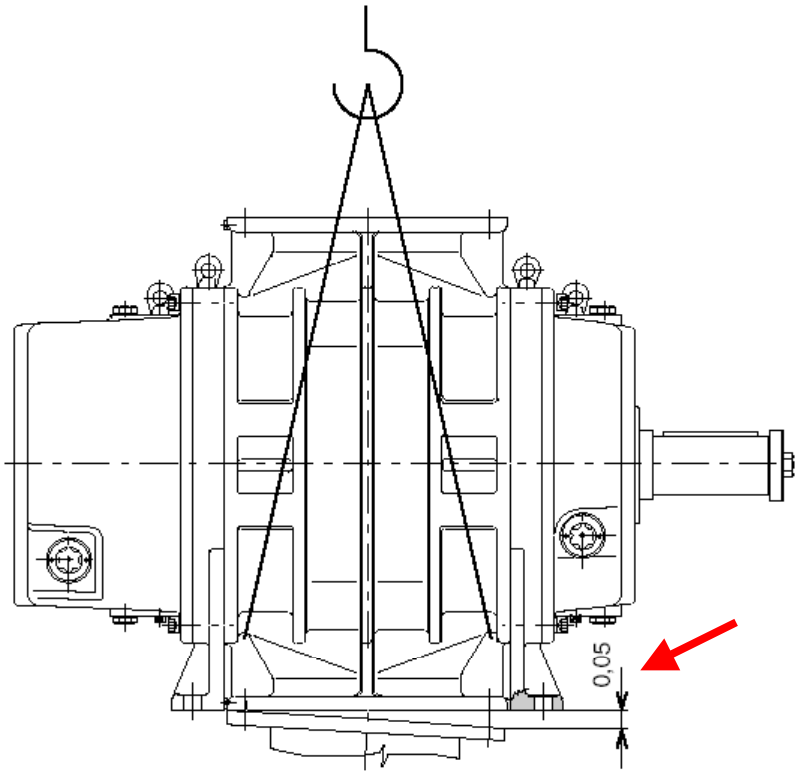

Figure 2

The piping should adjoin the blower flange before tightening. The maximum gap in the flat seal circuit should be 0.05 mm.

After tightening the flanges, the blower should rotate easily. If you use resilient mounting of a set with a blower, mount the piping with elastic elements (compensators). The resilient mounting is always better.

Piping should not weigh blower branches down.

While the blower is running, the piping can vibrate and make noise.

Before starting the machine, check the whole piping, including the intake and discharge ends. Foreign matter should be cleaned out of the blower piping carefully and thoroughly. If possible use an inlet strainer during the first 500 running hours.

- ***Attachment rules:***
  - Piping diameters should not be smaller than nominal inner diameters of blower flanges.
  - Recommended flow speeds within the piping are below 22 m/s.
  - Use the largest possible pipe bends to reduce flow losses.

- Place the closing elements as close as possible to the pipe branches to prevent creating blind piping ends, and thus limit any possible dirt build-up.
- Insulate hot discharge piping.
- Design the piping stationary point behind the intake and discharge compensators; other mountings can be movable.
- If piping forms the blower intake, place a compensator on the end of it.
- Piping wall passages should be resilient and insulated to limit noise (do not cement this piping).
- Place compensator on long and branched piping.
- Do not attach the piping perpendicularly to registers. Registers which can possibly develop standing wave motion should be checked for their length for the exciting frequency of the blower six-fold revolutions (pulsation frequency of the gas).

When designing pneumatic transportation, cement rippling, and similar applications where expansion of transported dirty gas can occur after turning off the machine (in the space between the swing-check valve and technological unit), evaluate the individual applications. If necessary, use a trap where the dirty gas is flowing back (the swing-check valves do not close immediately). Contact Atlas Copco in these cases.

5 CONNECTING THE SET TO ELECTRICAL SOURCE

WARNING:	Only an authorised person with appropriate electro-technical training should connect the machine.

Blowers, sets, silencing guards, and motors are equipped with earthing clips. Standard set protection is given by the electric motor protection IP55.

Electric installation should comply with the AN60204-1 requirements. The installer should ensure compliance. In a standard supply, Atlas Copco does not provide electrical material.

➢ ***Electrical clip earthing***

The electric motor connection should comply with the electric motor producer's recommendations, which are fixed on the internal side of the electric motor terminal board cover.

WARNING:	Without the blower producer's authorisation, electric motors with output over 22 kW should not be started directly (Delta connection).

By using Star-Delta start, you prevent the machine from damage. Connect the electric motor of a set with a silencing guard so that it can be started only with the simultaneous running of fan electric motors placed in the silencing guard.

NOTE: For more detailed instructions, see ASC ZL > Tab05 > “Service diagram instruction” and “Service diagrams”.

6 PRECAUTIONARY MEASURES

- Follow the instructions.
- Follow all minimum spaces stated in the instructions.
- Keep safety plates and marks legible.
- Provide operators with protective aids according to the instructions.
- Check the safety valve function, tightening cone movability according to EN134309 requirements - in operation, at pressure 80% or higher than the opening pressure.

  The ZL100 to ZL700 blower sets are equipped with safety valves. Check the cone movability by turning the milled nut at the valve body top. Turn the nut until you turn it with difficulty. Then turn the nut by additional 180 degrees (approximately), it will relieve the cone and the safety valve will start working. Last, screw the nut into position.

  The ZL1000 to ZL8200 blowers are equipped with safety valves with control inner tube valves. By disconnecting one side of the control valve tube, the valve will open automatically. After reconnecting the tube, check the joint tightness (e.g. by using soapy water).
- If you use pressure gauges with glycerol filling, remove the de-aeration cap (a drawing pin shape), so that the pressure gauge will show true values.

7 LIMITING VALUES OF SURROUNDINGS CONDITIONS

7.1 MACHINE SHOP VENTILATION

The heat of driving motors, blowers, equipment, and discharge piping raises the machine shop temperature.

➢ ***Precautions:***
Piping insulation and machine shop airing.

In most installations, you should ensure necessary machine shop airing with thermostat regulation.

The amount of cooling air is always stated in the offer.

You must design suitable large openings for cooling air suction and warm air release. The design should contain fans on the release side. The cooling air suction for the blower suction from the machine shop area should be designed to ensure both cooling air delivery and air volume consumed by the blower. If the blower intakes air from the outside area, the inlet and outlet openings can be equipped with fans having necessary cooling air volume capacity at the working point according to the shop machine design. If necessary, the inlet and outlet openings should be silenced. The air speed in openings should range between 5 and 10 ms. The blower outside surface is heated by gas compression and mechanical losses in bearings and sets. While the blower is in operation in the closed area, the heat should be suitably absorbed (you must also take into consideration the piping heat output). Atlas Copco will tell you the blower heat output, and evaluate your solutions. Do not forget that while the blower is in operation, it is heated and should be cooled down by natural ventilation.

WARNING:	Do not point a cooling air source at any blower part, as local cooling will occur and the blower could be damaged by heat deformation.

➢ ***Ventilation diagrams:***

Ⓛ Fixed point
Ⓜ Corrugated tube
Ⓝ Insulation
Ⓞ Elastic bearing
Ⓟ Protecting canopy
Ⓠ Delivery piping side

V: Air consumed by blower
V_v: Cooling air

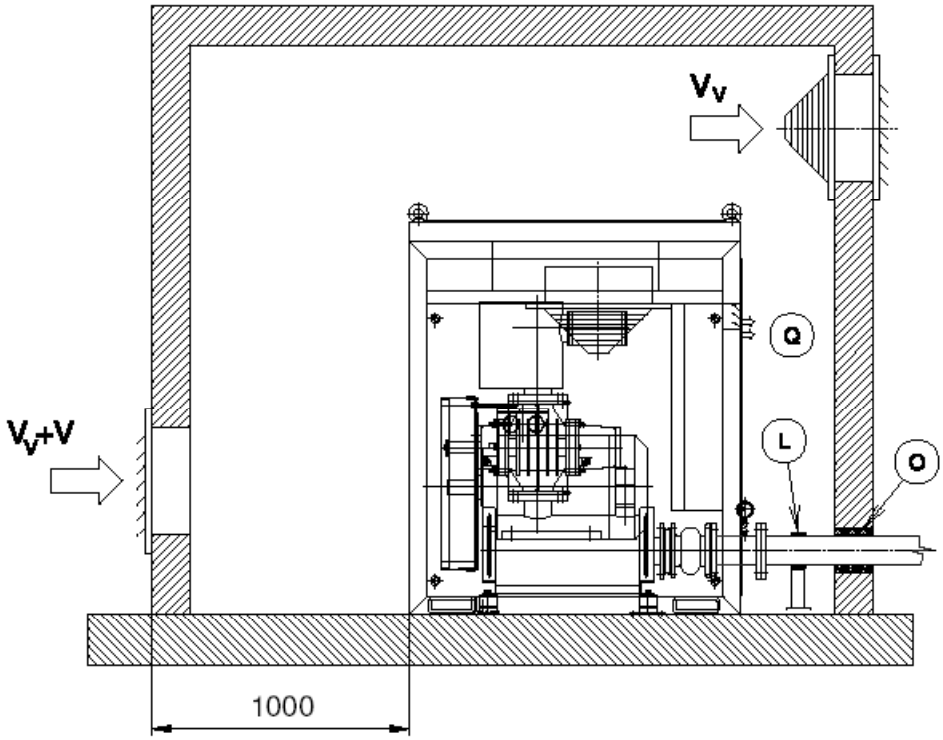

Figure 3: Forced ventilation, unit with canopy, blower intake from the engine room

SECTION 4

ZL ROTARY LOBE BLOWER(S)

ZL Brochure
ZL Flow Diagram
ZL Parts List
Check Valve
Safety Valve

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SECTION 4.1

ZL BROCHURE

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Atlas Copco Air Blowers

ZL 100 - 8200 series
Positive displacement rotary blower packages

THE COMPLETE
AND SILENT
SOLUTION

Atlas Copco

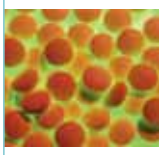
ZL blowers - reliable, quality air

The Atlas Copco ZL is a low noise, low vibration and low pulsation blower that comes in a complete, ready-to-run package. Because of the total separation of element and oil system, the ZL blower delivers top quality air; the risk of product contamination or environmental pollution is non-existent by design. The tri-lobe concept and the pre-filling canals ensure low pulsation air, a prolonged lifetime of rotating components, reduced noise and vibration levels and improved energy efficiency.

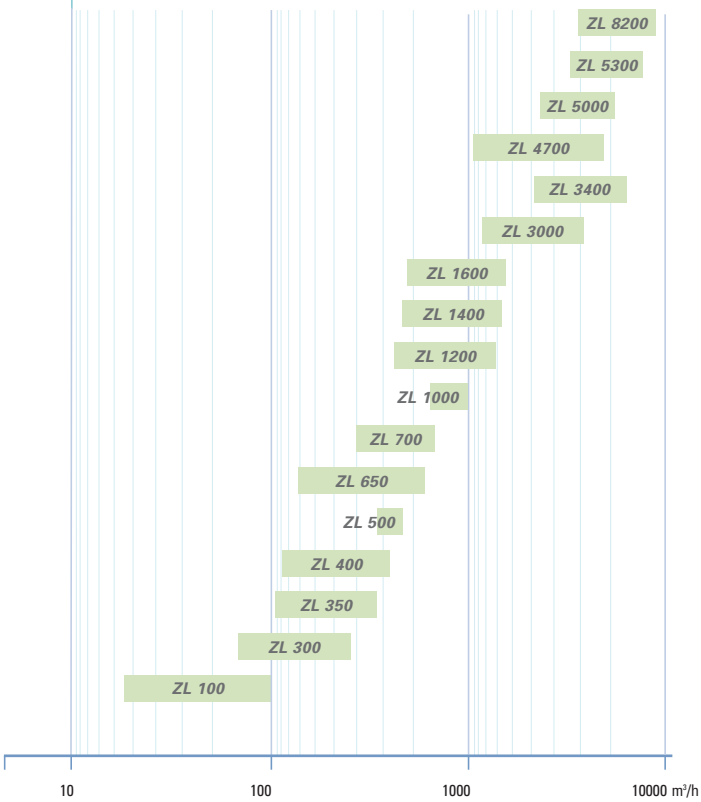
Whether it is for pneumatic conveying of granulates or powders, liquid homogenizing, aeration and filter flushing in water treatment plants, air supply to furnaces, drying of yarn or process air in chemical plants, the ZL series offers reliable, uninterrupted operation around the clock.

Complete range

The ZL range consists of 17 sizes for intake volumes of 100 to almost 8300 m^3/h, at overpressures of up to 1000 mbar, depending on the blower size.



Range chart



ZL blowers - trusted technology

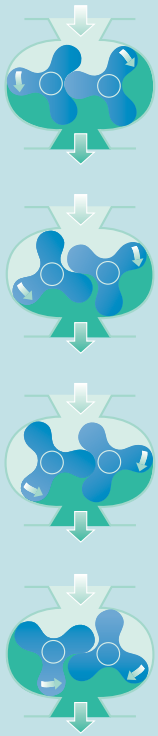
In the ZL blower element, two tri-lobe rotors turn inside an oval shaped casing. The motor transmits its power to the driving lobe, which in turn drives the driven lobe via timing gears. Hence, both rotors turn at the same speed, in opposite directions.

The rotors maintain a high precision clearance between each other and the wall of the casing. As a result, no internal lubrication is required and air remains 100% oil-free.

Compression principle

As the rotors turn, air is drawn into the blower when the lobe end of each rotor passes the suction port. The air is caught between two rotor tips and the casing; as the rotors continue their revolution, this volume is transferred from suction side to discharge side. With each turn, six of these enclosed volumes are displaced.

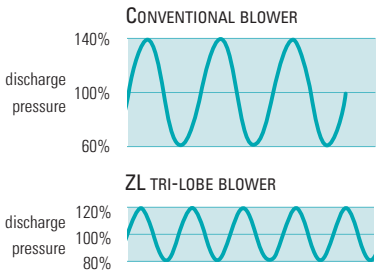
The ZL series delivers an almost constant flow rate, independent of the discharge pressure conditions. The flow rate is proportional to the operating speed.



Pulsation-free air

Traditionally, positive displacement blowers were designed around two-lobe rotors. The ZL series is based on tri-lobe rotors, which offer superior energy efficiency and a significantly smoother flow.

For further reduction of pressure pulsations, special canals have been milled in the blower casing, to pre-fill the reverse chamber. This design prolongs the lifetime of the flexible elements of aerating systems, but also protects conveyor systems against undesirable pulsations. Inside the blower, the reduction in pulsations has many advantages as well: less vibrations are transmitted to the bearings, increasing bearing lifetime.

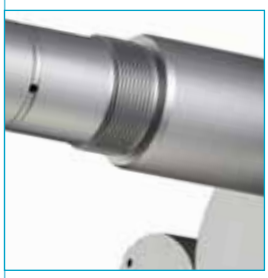


An additional advantage of this design is that the sound waves produced by the pre-filling cancel out much of the noise produced by the blower, resulting in an overall reduction of the noise level.

Rational design for superior performance

superior element design

precisely balanced tri-lobe rotor
with pre-filling canals,
for lowest air pulsations,
a long bearing lifetime,
less vibrations and lower noise



100% oil-free air

the separation of element and oil system via labyrinth seals, guarantees an absolutely oil-free air delivery, without any risk of contaminating the product or the environment

prolonged lifetime of motor and gears

the blower is driven by a Siemens electric motor with IP55 protection; the timing gears of the element ensure many hours of trouble-free running

guaranteed performance

every Atlas Copco blower is tested according to the latest international standards, so the data on capacity and power consumption are guaranteed

Complete package

filter pressure drop gauge

automatic belt tensioner

the weight of the motor is used to automatically tension the belt; this smart approach eliminates any additional alignments and periodic checks

low vibration

in addition to the vibration reduction resulting from the tri-lobe design, anti-vibration mounts support the blower/motor assembly to further reduce dynamic forces

suitable for harsh environments

the blower is designed for optimal heat removal to cope with high ambient temperatures;
the optional canopy is equipped with an integrated ventilation system

easy maintenance, long intervals

the excellent accessibility of all components facilitates maintenance; the tri-lobe design and the use of high quality components allow for long service intervals

Global support locally available

The Atlas Copco ZL blower comes as a ready-to-run, fully equipped machine. There are no hidden extras or costly additions.

Standard version

- IP55 electric motor
- inlet and outlet silencers
- inlet filter
- pressure relief valve
- outlet flange compensator
- outlet check valve
- start valve / pressure relief valve
- automatic belt tensioner
- filter change indicator
- discharge pressure gauge
- belt-drive cover
- package vibration isolators

Options

- sound insulated enclosure with canopy ventilation
- fitted with VSD-ready motor (Variable Speed Drive)

low noise

the innovative design of the element, with its pre-filling canals, decreases noise levels substantially; the inlet and outlet silencer further reduces the sound level, and the optional canopy absorbs another 25 dB(A)

Technical data

ZL 1600

Q [m³/h]: capacity of blower aggregate
T [°C]: temperature on the discharge blower flange
Pe [kW]: blower input
Pm [kW]: motor load
n [rpm]: blower speed
LmA [dB(A)]: level of acoustic pressure with and without noise enclosure

Δp mbar		ZL 1600										
		A	B	C	D	E	F	G	H	I	J	K
300	**Q [m³/h]**	**997**	**1070**	**1142**	**1215**	**1292**	**1380**	**1467**	**1560**	**1661**	**1769**	**1883**
	T [°C]	50	50	50	49	49	49	49	49	49	48.9	48.9
	Pe [kW]	10.8	11.5	12.2	12.9	13.7	14.5	15.4	16.4	17.5	18.6	19.8
	Pm [kW]	15	15	15	15	18.5	18.5	18.5	22	22	22	30
	n [rpm]	1880	1985	2107	2231	2358	2489	2630	2795	2945	3103	3304
	LmA [dB(A)]	65/87	66/88	67/89	67/89	68/90	69/91	70/92	71/92	72/94	73/95	74/97
400	**Q [m³/h]**	**981**	**1055**	**1132**	**1205**	**1278**	**1369**	**1456**	**1544**	**1646**	**1753**	**1865**
	T [°C]	61	60	60	60	59	59	59	59	59	58.3	58.2
	Pe [kW]	14.2	15.1	16.1	17.1	18	19.1	20.3	21.5	22.9	24.3	25.8
	Pm [kW]	18.5	18.5	22	22	22	30	30	30	30	30	30
	n [rpm]	1887	1992	2121	2235	2367	2502	2650	2800	2950	3108	3304
	LmA [dB(A)]	66/88	67/89	67/89	68/90	69/91	70/92	70/92	71/93	72/94	74/96	75/97
500	**Q [m³/h]**	**975**	**1040**	**1118**	**1191**	**1265**	**1353**	**1440**	**1528**	**1630**	**1738**	**1850**
	T [°C]	71	70	70	70	69	69	69	68	68	67.8	67.6
	Pe [kW]	17.8	18.8	20	21.2	22.3	23.7	25.1	26.5	28.3	30	31.8
	Pm [kW]	22	22	30	30	30	30	30	37	37	37	37
	n [rpm]	1893	1998	2124	2242	2360	2502	2650	2800	2950	3108	3304
	LmA [dB(A)]	66/88	67/89	68/90	68/90	69/91	70/92	71/93	72/94	73/95	75/97	76/98
600	**Q [m³/h]**	**963**	**1029**	**1105**	**1178**	**1251**	**1340**	**1427**	**1519**	**1620**	**1728**	**1840**
	T [°C]	82	81	81	80	79	79	79	78	78	77.4	77.1
	Pe [kW]	21.2	22.5	23.9	25.2	26.6	28.2	30	31.7	33.7	35.7	38
	Pm[kW]	30	30	30	30	37	37	37	37	45	45	45
	n [rpm]	1896	2002	2124	2242	2360	2502	2650	2800	2955	3122	3290
	LmA [dB(A)]	67/89	68/90	68/90	69/91	70/92	71/93	71/93	72/94	73/95	75/98	76/99
700	**Q [m³/h]**	**952**	**1018**	**1094**	**1167**	**1240**	**1331**	**1419**	**1508**	**1610**	**1724**	**1836**
	T [°C]	93	92	91	90	90	90	89	88	88	87	86.7
	Pe [kW]	24.7	26.1	27.7	29.3	30.9	32.8	34.9	36	39	41.6	44.2
	Pm [kW]	30	37	37	37	37	45	45	45	45	55	55
	n [rpm]	1896	2002	2124	2242	2360	2504	2654	2797	2955	3141	3321
	LmA [dB(A)]	67/89	68/90	68/90	69/91	70/92	71/93	71/93	72/94	73/95	74/96	76/98
800	**Q [m³/h]**	**942**	**1008**	**1084**	**1160**	**1233**	**1322**	**1410**	**1504**	**1606**	**1715**	
	T [°C]	104	103	102	101	100	99	99	98	98	96.7	
	Pe [kW]	28.1	29.7	31.6	33.4	35.3	37.4	39.7	42	44.6	47.4	
	Pm [kW]	37	37	37	45	45	45	45	55	55	55	
	n [rpm]	1896	2002	2124	2246	2364	2504	2654	2799	2965	3140	
	LmA [dB(A)]	68/90	68/90	69/91	69/91	70/92	71/93	72/94	73/95	74/96	76/98	
900	**Q [m³/h]**	**934**	**1002**	**1079**	**1152**	**1225**	**1319**	**1406**				
	T [°C]	115	114	113	111	110	109	109				
	Pe [kW]	31.6	33.4	35.5	37.6	39.6	42.2	44.7				
	Pm [kW]	37	45	45	45	45	55	55				
	n [rpm]	1896	2007	2129	2246	2364	2513	2647				
	LmA [dB(A)]	68/90	69/91	69/91	70/92	71/93	72/94	72/94				
1000	**Q [m³/h]**	**930**	**995**	**1061**	**1144**	**1223**						
	T [°C]	127	125	124	122	121						
	Pe [kW]	35.1	37.1	39.1	41.7	44.1						
	Pm [kW]	45	45	45	55	55						
	n [rpm]	1896	2007	2119	2261	2387						
	LmA [dB(A)]	69/91	69/91	70/92	71/93	72/95						

Reference conditions: Inlet pressure: 1.013 bar(a) - Inlet temperature: 20°C dry air

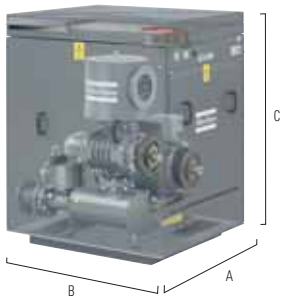
Dimensions

Standard unit

Sound enclosure

Model	A		B		C		Weight		Outlet connection
	mm	in	mm	in	mm	in	kg	lb	
ZL 100	892	35.1	940	37.0	1106	43.5	197	434	DN65, PN10 acc. DIN2501
ZL 300	892	35.1	940	37.0	1106	43.5	211	465	DN65, PN10 acc. DIN2501
ZL 350	892	35.1	940	37.0	1106	43.5	120	264	DN65, PN10 acc. DIN2501
ZL 400	892	35.1	940	37.0	1106	43.5	240	529	DN65, PN10 acc. DIN2501
ZL 500	1022	40.2	1157	45.5	1291	50.8	310	683	DN80, PN10 acc. DIN2576
ZL 650	1022	40.2	1157	45.5	1291	50.8	320	705	DN80, PN10 acc. DIN2576
ZL 700	1102	43.4	1247	49.1	1433	56.4	360	794	DN80, PN10 acc. DIN2576
ZL 1000	1102	43.4	1247	49.1	1433	56.4	416	917	DN100, PN10 acc. DIN2576
ZL 1200	1102	43.4	1247	49.1	1433	56.4	431	950	DN100, PN10 acc. DIN2576
ZL 1400	1102	43.4	1247	49.1	1433	56.4	511	1126	DN100, PN10 acc. DIN2576
ZL 1600	1302	51.2	1406	55.3	1636	64.4	645	1422	DN150, PN10 acc. DIN2576
ZL 3000	1890	74.4	1752	69.0	1838	72.4	1240	2734	DN200, PN10 acc. DIN2576
ZL 3400	2090	82.3	1900	74.8	2158	85.0	1515	3340	DN200, PN10 acc. DIN2576
ZL 4700	2090	82.3	1955	77.0	2158	85.0	1640	3615	DN250, PN10 acc. DIN2576
ZL 5000	2090	82.3	1955	77.0	2158	85.0	1915	4222	DN250, PN10 acc. DIN2576
ZL 5300	2090	82.3	2295	90.3	2158	85.0	2070	4563	DN300, PN10 acc. DIN2576
ZL 8200	2090	82.3	2295	90.3	2158	85.0	2290	5048	DN300, PN10 acc. DIN2576

Excluding motor



The face of innovation

What sets Atlas Copco apart as a company is our conviction that we can only excel in what we do, if we provide the best possible know-how and technology to really help our customers produce, grow and succeed.

There is a unique way of achieving that - we simply call it the Atlas Copco way. It builds on **interaction**, on long-term relationships and involvement in the customers' process, needs and objectives. It means having the flexibility to adapt to the diverse demands of the people we cater for.

It's the **commitment** to our customers' business that drives our effort towards increasing their productivity through better solutions. It starts with fully supporting existing products and continuously doing things better, but it goes much further, creating advances in technology through **innovation**. Not for the sake of technology, but for the sake of our customer's bottom line and peace-of-mind.

That is how Atlas Copco will strive to remain the first choice, to succeed in attracting new business and to maintain our position as the industry leader.

ISO 9001
A consistent quality earned us the industry's leadership and the customer's trust.

ISO 14001
Atlas Copco's Environmental Management System forms an integral part of each business process.

Never use compressed air as breathing air without prior purification in accordance with local legislation and standards.

Atlas Copco

2935 0457 11 - Printed in Belgium - Subject to alterations without prior notice

www.atlascopco.com

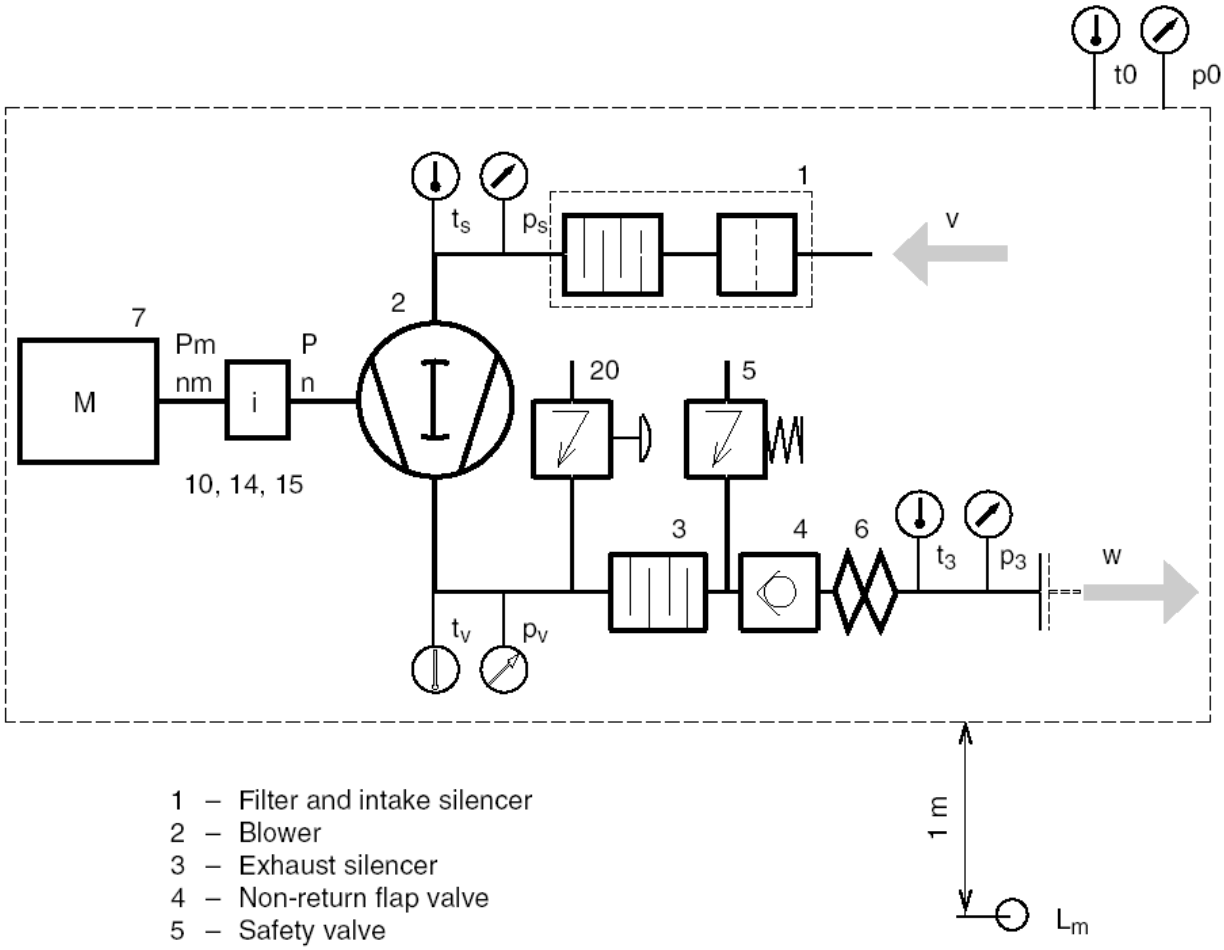
SECTION 4.2

ZL FLOW DIAGRAM

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

FLOW DIAGRAM ZL-BLOWER



1 – Filter and intake silencer
2 – Blower
3 – Exhaust silencer
4 – Non-return flap valve
5 – Safety valve
6 – Compensator
7 – Electric motor
10, 14, 15 – Belt drive
20 – Starting valve

SECTION 4.3

ZL PARTS LIST

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

Atlas Copco Air Blowers

ZL 1600

Parts list

- **Use only authorized parts**. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

No. 2930 1478 00

Registration code : APC ZL / 39

2006-11

www.atlascopco.com

Contents

Bodywork - ZL 1600

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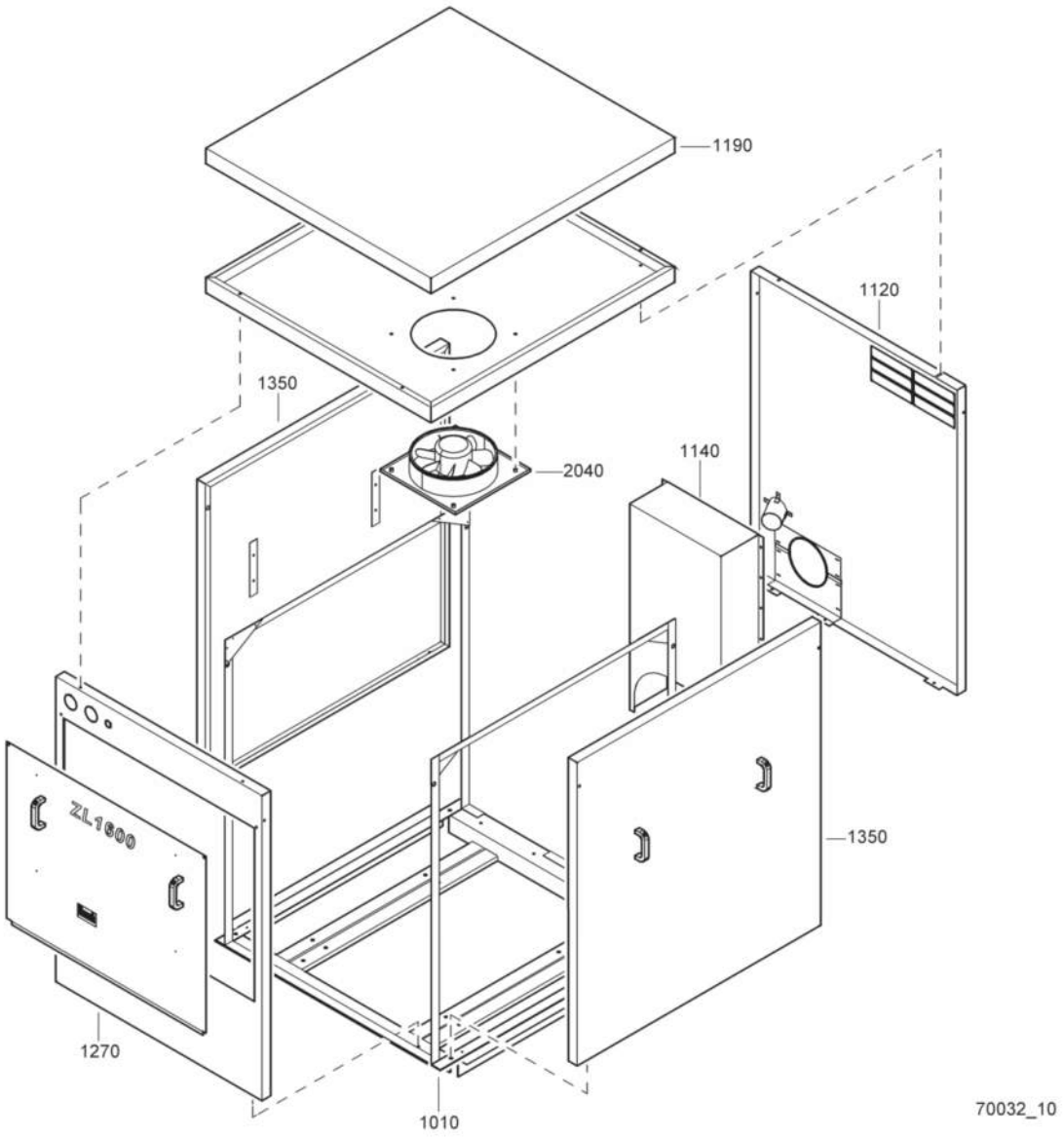

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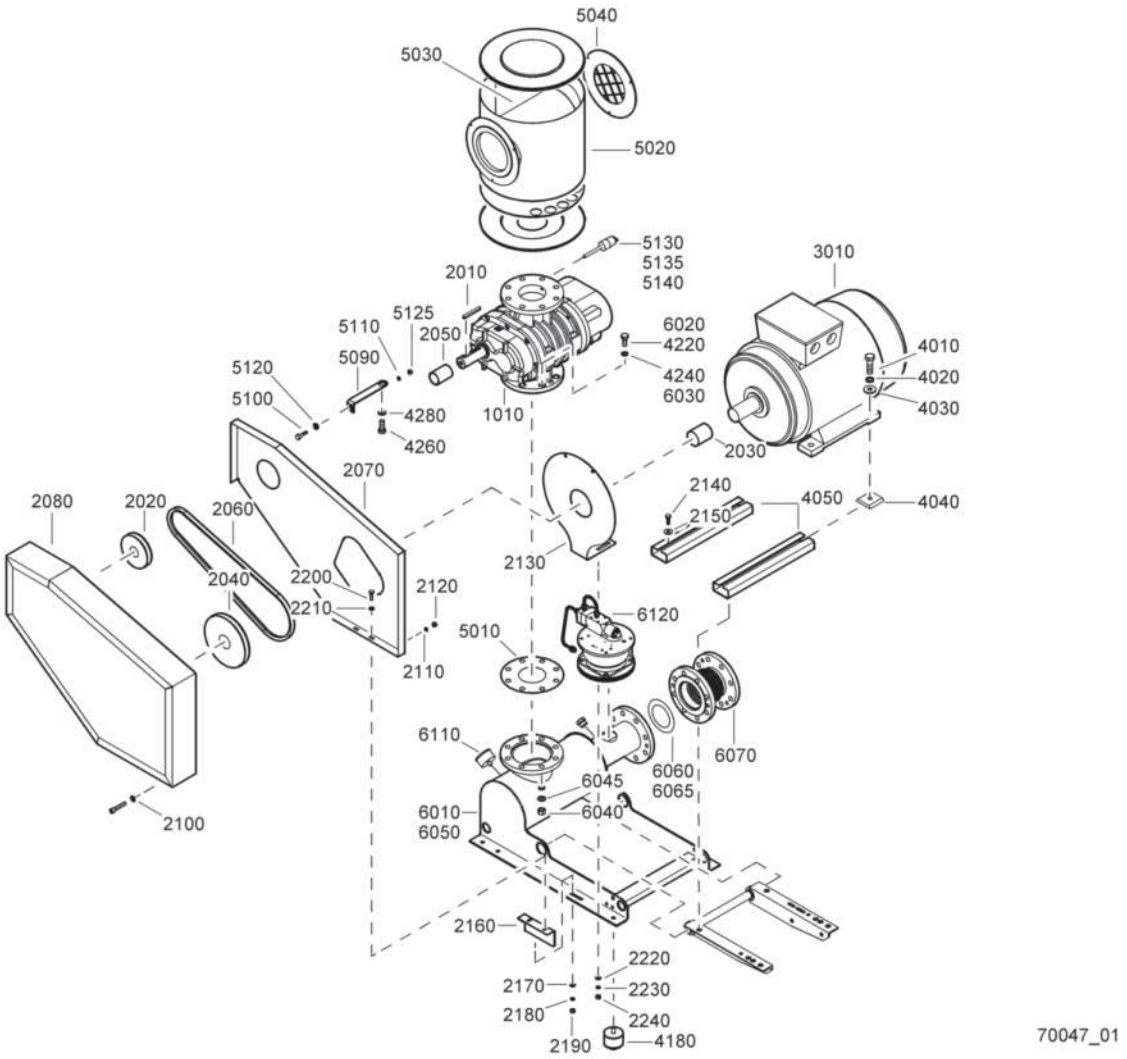
Ref.	Part number	Qty	Name	Remarks
1010	1621 5058 21	1	Frame	
1120	1621 5058 18	1	Rear panel	
1140	1621 5058 28	1	Inlet cover	
1190	1621 5058 19	1	Roof panel	
1270	1621 5058 20	1	Front panel	
1350	1621 5058 17	2	Side panel	
2040	1621 5055 28	1	Electrical fan	

2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6050
2100
2160
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2230
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2190
4180
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Core unit - ZL 1600

2

Ref.	Part number	Qty	Name	Remarks
1010	1621 5050 97	1	Service stage	
2010	1621 5056 70	1	Key	
2020		1	Pulley	
	1621 5056 73		ZL 1600 A 300mbar(e)	
	1621 5056 73		ZL 1600 A 400mbar(e)	
	1621 5054 14		ZL 1600 A 500mbar(e)	
	1621 5054 14		ZL 1600 A 600mbar(e)	
	1621 5054 14		ZL 1600 A 700mbar(e)	
	1621 5054 14		ZL 1600 A 800mbar(e)	
	1621 5054 14		ZL 1600 A 900mbar(e)	
	1621 5050 69		ZL 1600 A 1000mbar(e)	
	1621 5056 73		ZL 1600 B 300mbar(e)	
	1621 5056 73		ZL 1600 B 400mbar(e)	
	1621 5054 14		ZL 1600 B 500mbar(e)	
	1621 5054 14		ZL 1600 B 600mbar(e)	
	1621 5054 14		ZL 1600 B 700mbar(e)	
	1621 5054 14		ZL 1600 B 800mbar(e)	
	1621 5055 26		ZL 1600 B 900mbar(e)	
	1621 5055 26		ZL 1600 B 1000mbar(e)	
	1621 5056 74		ZL 1600 C 300mbar(e)	
	1621 5054 08		ZL 1600 C 400mbar(e)	
	1621 5051 62		ZL 1600 C 500mbar(e)	
	1621 5051 62		ZL 1600 C 600mbar(e)	
	1621 5051 62		ZL 1600 C 700mbar(e)	
	1621 5051 62		ZL 1600 C 800mbar(e)	
	1621 5056 75		ZL 1600 C 900mbar(e)	
	1621 5056 75		ZL 1600 C 1000mbar(e)	
	1621 5056 74		ZL 1600 D 300mbar(e)	
	1621 5055 22		ZL 1600 D 400mbar(e)	
	1621 5051 62		ZL 1600 D 500mbar(e)	
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	1621 5051 62		ZL 1600 D 900mbar(e)	
	1621 5056 75		ZL 1600 D 1000mbar(e)	
	1621 5051 84		ZL 1600 E 300mbar(e)	
	1621 5055 22		ZL 1600 E 400mbar(e)	
	1621 5051 62		ZL 1600 E 500mbar(e)	
	1621 5051 62		ZL 1600 E 600mbar(e)	
	1621 5051 62		ZL 1600 E 700mbar(e)	
	1621 5051 62		ZL 1600 E 800mbar(e)	
	1621 5051 62		ZL 1600 E 900mbar(e)	
	1621 5056 75		ZL 1600 E 1000mbar(e)	
	1621 5050 76		ZL 1600 F 300mbar(e)	
	1621 5051 62		ZL 1600 F 400mbar(e)	
	1621 5051 62		ZL 1600 F 500mbar(e)	
	1621 5051 62		ZL 1600 F 600mbar(e)	
	1621 5054 08		ZL 1600 F 700mbar(e)	
	1621 5054 08		ZL 1600 F 800mbar(e)	
	1621 5054 08		ZL 1600 F 900mbar(e)	
	1621 5050 76		ZL 1600 G 300mbar(e)	
	1621 5054 08		ZL 1600 G 400mbar(e)	
	1621 5054 08		ZL 1600 G 500mbar(e)	
	1621 5054 08		ZL 1600 G 600mbar(e)	
	1621 5054 08		ZL 1600 G 700mbar(e)	
	1621 5054 08		ZL 1600 G 800mbar(e)	
	1621 5055 22		ZL 1600 G 900mbar(e)	
	1621 5056 74		ZL 1600 H 300mbar(e)	
	1621 5054 08		ZL 1600 H 400mbar(e)	
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	1621 5051 62		ZL 1600 H 800mbar(e)	
	1621 5056 76		ZL 1600 I 300mbar(e)	
	1621 5052 74		ZL 1600 I 400mbar(e)	
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	1621 5051 62		ZL 1600 I 600mbar(e)	
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	1621 5054 08		ZL 1600 J 700mbar(e)	
	1621 5054 08		ZL 1600 J 800mbar(e)	
	1621 5051 62		ZL 1600 K 300mbar(e)	
	1621 5051 62		ZL 1600 K 400mbar(e)	
	1621 5051 62		ZL 1600 K 500mbar(e)	
	1621 5054 07		ZL 1600 K 600mbar(e)	
	1621 5052 74		ZL 1600 K 700mbar(e)	
2030		1	Clamping bush	
	1621 5050 36		ZL 1600 A 300mbar(e)	
	1621 5050 36		ZL 1600 A 400mbar(e)	
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	1621 5050 37		ZL 1600 E 900mbar(e)	
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	1621 5050 36		ZL 1600 F 300mbar(e)	
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	1621 5050 37		ZL 1600 F 700mbar(e)	
	1621 5050 37		ZL 1600 F 800mbar(e)	
	1621 5050 37		ZL 1600 F 900mbar(e)	
	1621 5050 36		ZL 1600 G 300mbar(e)	
	1621 5050 37		ZL 1600 G 400mbar(e)	

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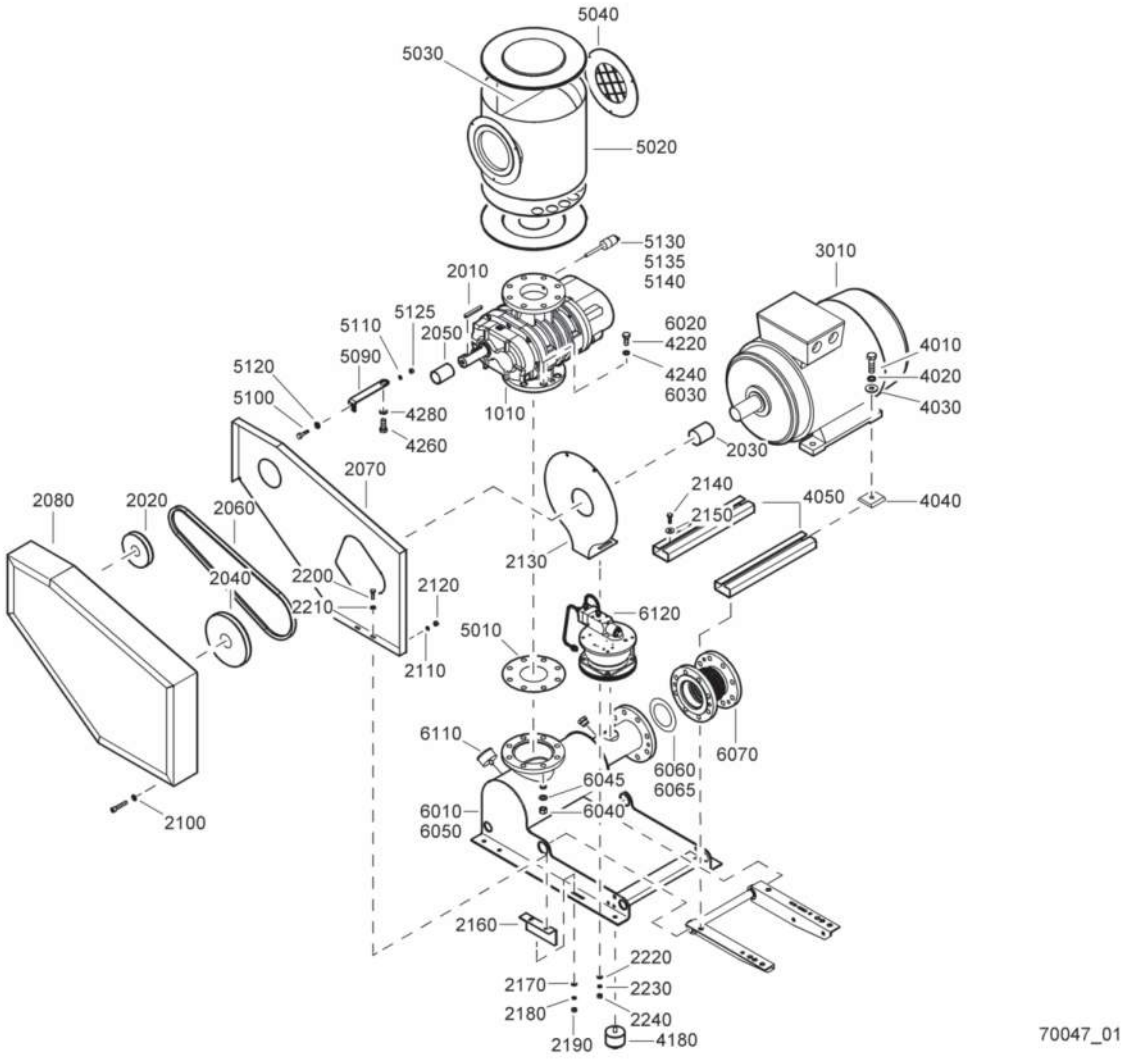
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Core unit - ZL 1600

Ref.	Part number	Qty	Name	Remarks
	1621 5050 37		ZL 1600 G 500mbar(e)	
	1621 5050 37		ZL 1600 G 600mbar(e)	
	1621 5050 37		ZL 1600 G 700mbar(e)	
	1621 5050 37		ZL 1600 G 800mbar(e)	
	1621 5050 37		ZL 1600 G 900mbar(e)	
	1621 5050 36		ZL 1600 H 300mbar(e)	
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	1621 5056 77		ZL 1600 A 400mbar(e)	
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	1621 5055 52		ZL 1600 D 900mbar(e)	
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	1621 5054 07		ZL 1600 G 400mbar(e)	
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	1621 5054 07		ZL 1600 H 700mbar(e)	
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	1621 5051 62		ZL 1600 J 800mbar(e)	
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	1621 5054 14		ZL 1600 K 400mbar(e)	
	1621 5054 14		ZL 1600 K 500mbar(e)	
	1621 5054 08		ZL 1600 K 600mbar(e)	
	1621 5055 22		ZL 1600 K 700mbar(e)	
2050		1	Clamping bush	
	1621 5054 89		ZL 1600 A 300mbar(e)	
	1621 5054 89		ZL 1600 A 400mbar(e)	
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	1621 5050 32		ZL 1600 A 800mbar(e)	
	1621 5050 32		ZL 1600 A 900mbar(e)	
	1621 5050 32		ZL 1600 A 1000mbar(e)	
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	1621 5052 94		ZL 1600 B 400mbar(e)	
	1621 5054 15		ZL 1600 B 500mbar(e)	
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	1621 5050 32		ZL 1600 B 700mbar(e)	
	1621 5050 32		ZL 1600 B 800mbar(e)	
	1621 5050 32		ZL 1600 B 900mbar(e)	
	1621 5050 32		ZL 1600 B 1000mbar(e)	
	1621 5054 89		ZL 1600 C 300mbar(e)	
	1621 5050 33		ZL 1600 C 400mbar(e)	
	1621 5050 32		ZL 1600 C 500mbar(e)	
	1621 5050 32		ZL 1600 C 600mbar(e)	
	1621 5050 32		ZL 1600 C 700mbar(e)	
	1621 5050 32		ZL 1600 C 800mbar(e)	
	1621 5050 32		ZL 1600 C 900mbar(e)	

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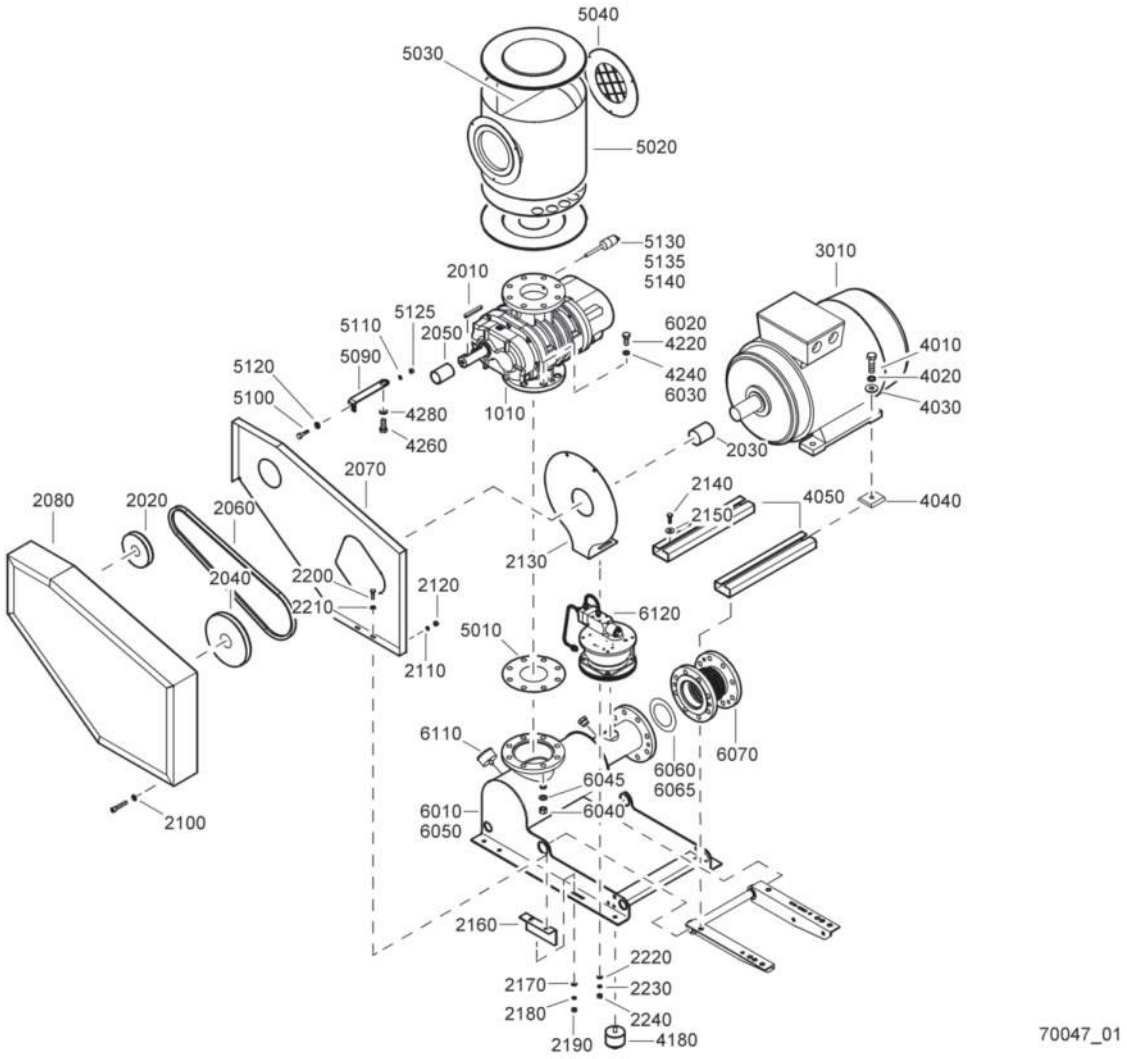
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Core unit - ZL 1600

Ref.	Part number	Qty	Name	Remarks
	1621 5050 32		ZL 1600 C 1000mbar(e)	
	1621 5054 89		ZL 1600 D 300mbar(e)	
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	1621 5050 32		ZL 1600 D 600mbar(e)	
	1621 5050 32		ZL 1600 D 700mbar(e)	
	1621 5050 32		ZL 1600 D 800mbar(e)	
	1621 5050 32		ZL 1600 D 900mbar(e)	
	1621 5051 63		ZL 1600 D 1000mbar(e)	
	1621 5054 89		ZL 1600 E 300mbar(e)	
	1621 5054 15		ZL 1600 E 400mbar(e)	
	1621 5050 32		ZL 1600 E 500mbar(e)	
	1621 5050 32		ZL 1600 E 600mbar(e)	
	1621 5050 32		ZL 1600 E 700mbar(e)	
	1621 5050 32		ZL 1600 E 800mbar(e)	
	1621 5050 32		ZL 1600 E 900mbar(e)	
	1621 5051 63		ZL 1600 E 1000mbar(e)	
	1621 5052 94		ZL 1600 F 300mbar(e)	
	1621 5050 32		ZL 1600 F 400mbar(e)	
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	1621 5050 32		ZL 1600 F 700mbar(e)	
	1621 5050 32		ZL 1600 F 800mbar(e)	
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	1621 5052 94		ZL 1600 G 300mbar(e)	
	1621 5050 32		ZL 1600 G 400mbar(e)	
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	1621 5050 32		ZL 1600 G 700mbar(e)	
	1621 5050 32		ZL 1600 G 800mbar(e)	
	1621 5051 63		ZL 1600 G 900mbar(e)	
	1621 5050 33		ZL 1600 H 300mbar(e)	
	1621 5050 32		ZL 1600 H 400mbar(e)	
	1621 5050 32		ZL 1600 H 500mbar(e)	
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	1621 5050 32		ZL 1600 H 700mbar(e)	
	1621 5051 63		ZL 1600 H 800mbar(e)	
	1621 5050 33		ZL 1600 I 300mbar(e)	
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	1621 5050 32		ZL 1600 I 700mbar(e)	
	1621 5051 63		ZL 1600 I 800mbar(e)	
	1621 5054 15		ZL 1600 J 300mbar(e)	
	1621 5050 32		ZL 1600 J 400mbar(e)	
	1621 5050 32		ZL 1600 J 500mbar(e)	
	1621 5050 32		ZL 1600 J 600mbar(e)	
	1621 5051 63		ZL 1600 J 700mbar(e)	
	1621 5051 63		ZL 1600 J 800mbar(e)	
	1621 5050 32		ZL 1600 K 300mbar(e)	
	1621 5050 32		ZL 1600 K 400mbar(e)	
	1621 5050 32		ZL 1600 K 500mbar(e)	
	1621 5050 32		ZL 1600 K 600mbar(e)	
	1621 5051 63		ZL 1600 K 700mbar(e)	
2060			V-belt	
	1621 5054 09	1	ZL 1600 A 300mbar(e)	
	1621 5054 09	1	ZL 1600 A 400mbar(e)	
	1621 5054 09	2	ZL 1600 A 500mbar(e)	
	1621 5054 09	2	ZL 1600 A 600mbar(e)	
	1621 5054 09	2	ZL 1600 A 700mbar(e)	
	1621 5054 09	2	ZL 1600 A 800mbar(e)	
	1621 5054 09	2	ZL 1600 A 900mbar(e)	
	1621 5054 09	3	ZL 1600 A 1000mbar(e)	
	1621 5054 09	1	ZL 1600 B 300mbar(e)	
	1621 5054 09	1	ZL 1600 B 400mbar(e)	
	1621 5054 09	2	ZL 1600 B 500mbar(e)	
	1621 5054 09	2	ZL 1600 B 600mbar(e)	
	1621 5054 09	2	ZL 1600 B 700mbar(e)	
	1621 5054 09	2	ZL 1600 B 800mbar(e)	
	1621 5054 62	3	ZL 1600 B 900mbar(e)	
	1621 5054 62	3	ZL 1600 B 1000mbar(e)	
	1621 5054 61	1	ZL 1600 C 300mbar(e)	
	1621 5054 61	2	ZL 1600 C 400mbar(e)	
	1621 5054 62	2	ZL 1600 C 500mbar(e)	
	1621 5054 62	2	ZL 1600 C 600mbar(e)	
	1621 5054 62	2	ZL 1600 C 700mbar(e)	
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	1621 5054 62	3	ZL 1600 C 900mbar(e)	
	1621 5054 62	3	ZL 1600 C 1000mbar(e)	
	1621 5054 61	1	ZL 1600 D 300mbar(e)	
	1621 5054 61	2	ZL 1600 D 400mbar(e)	
	1621 5054 62	2	ZL 1600 D 500mbar(e)	
	1621 5054 62	2	ZL 1600 D 600mbar(e)	
	1621 5054 62	2	ZL 1600 D 700mbar(e)	
	1621 5054 09	2	ZL 1600 D 800mbar(e)	
	1621 5054 09	2	ZL 1600 D 900mbar(e)	
	1621 5054 09	3	ZL 1600 D 1000mbar(e)	
	1621 5054 61	1	ZL 1600 E 300mbar(e)	
	1621 5054 61	2	ZL 1600 E 400mbar(e)	
	1621 5054 09	2	ZL 1600 E 500mbar(e)	
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	1621 5054 09	2	ZL 1600 E 700mbar(e)	
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	1621 5054 09	2	ZL 1600 E 900mbar(e)	
	1621 5054 09	3	ZL 1600 E 1000mbar(e)	
	1621 5054 09	1	ZL 1600 F 300mbar(e)	
	1621 5054 09	2	ZL 1600 F 400mbar(e)	
	1621 5054 09	2	ZL 1600 F 500mbar(e)	
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	1621 5054 09	2	ZL 1600 F 800mbar(e)	
	1621 5054 09	2	ZL 1600 F 900mbar(e)	
	1621 5054 09	1	ZL 1600 G 300mbar(e)	
	1621 5054 09	2	ZL 1600 G 400mbar(e)	
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	1621 5054 09	2	ZL 1600 G 700mbar(e)	
	1621 5054 09	2	ZL 1600 G 800mbar(e)	
	1621 5054 09	2	ZL 1600 G 900mbar(e)	
	1621 5054 09	1	ZL 1600 H 300mbar(e)	
	1621 5054 09	2	ZL 1600 H 400mbar(e)	
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	1621 5054 28	2	ZL 1600 H 800mbar(e)	
	1621 5054 61	1	ZL 1600 I 300mbar(e)	
	1621 5054 61	2	ZL 1600 I 400mbar(e)	
	1621 5054 61	2	ZL 1600 I 500mbar(e)	
	1621 5054 28	2	ZL 1600 I 600mbar(e)	
	1621 5054 28	2	ZL 1600 I 700mbar(e)	
	1621 5054 28	2	ZL 1600 I 800mbar(e)	
	1621 5054 09	2	ZL 1600 J 300mbar(e)	
	1621 5054 09	2	ZL 1600 J 400mbar(e)	
	1621 5054 09	2	ZL 1600 J 500mbar(e)	
	1621 5054 09	2	ZL 1600 J 600mbar(e)	
	1621 5054 28	2	ZL 1600 J 700mbar(e)	
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	1621 5054 28	2	ZL 1600 K 300mbar(e)	

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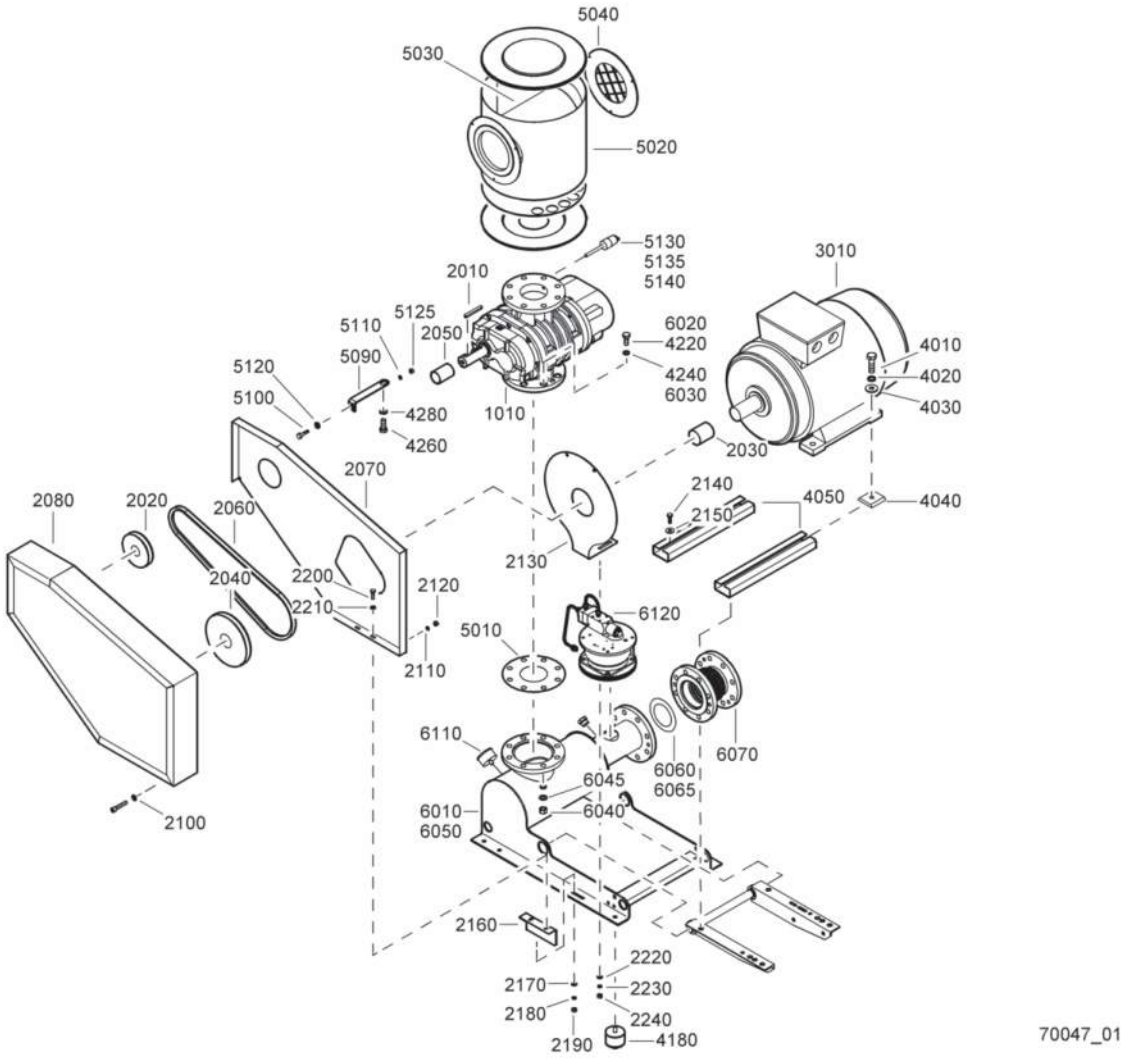
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Core unit - ZL 1600

Ref.	Part number	Qty	Name	Remarks
	1621 5054 28	2	ZL 1600 K 400mbar(e)	
	1621 5054 28	2	ZL 1600 K 500mbar(e)	
	1621 5054 09	2	ZL 1600 K 600mbar(e)	
	1621 5054 09	2	ZL 1600 K 700mbar(e)	
2070	1621 5059 62	1	Guard	
2080	1621 5059 63	1	Guard	
2100	0301 2321 00	6	Washer	
2110	0333 2174 13	6	Lock washer	
2120	0266 2108 00	6	Nut	
2130		1	Support	
	1621 5059 64		Motorsize 160	
	1621 5059 65		Motorsize 180	
	1621 5059 66		Motorsize 200	
	1621 5059 67		Motorsize 225	
	1621 5059 68		Motorsize 250	
2140	0147 1363 03	2	Bolt	
2150	0300 0274 17	2	Washer	
2160	1621 5059 69	1	Support	
2170	0300 0274 17	2	Washer	
2180	0333 2174 03	2	Lock washer	
2190	0266 2111 00	2	Nut	
2200	0147 1363 03	2	Bolt	
2210	0300 0274 17	2	Washer	
2230	0333 2174 03	2	Lock washer	
2240	0266 2111 00	2	Nut	
3010		1	Motor	
	1080 4031 42		ZL 1600 A 300mbar(e)	
	1080 4009 32		ZL 1600 A 400mbar(e)	
	1080 4275 01		ZL 1600 A 500mbar(e)	
	1080 4276 01		ZL 1600 A 600mbar(e)	
	1080 4276 01		ZL 1600 A 700mbar(e)	
	1080 4277 01		ZL 1600 A 800mbar(e)	
	1080 4277 01		ZL 1600 A 900mbar(e)	
	1080 4278 01		ZL 1600 A 1000mbar(e)	
	1080 4031 42		ZL 1600 B 300mbar(e)	
	1080 4009 32		ZL 1600 B 400mbar(e)	
	1080 4275 01		ZL 1600 B 500mbar(e)	
	1080 4276 01		ZL 1600 B 600mbar(e)	
	1080 4277 01		ZL 1600 B 700mbar(e)	
	1080 4277 01		ZL 1600 B 800mbar(e)	
	1080 4278 01		ZL 1600 B 900mbar(e)	
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	1080 4031 42		ZL 1600 C 300mbar(e)	
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	1080 4277 01		ZL 1600 C 700mbar(e)	
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	1080 4278 01		ZL 1600 C 900mbar(e)	
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	1080 4031 42		ZL 1600 D 300mbar(e)	
	1080 4275 01		ZL 1600 D 400mbar(e)	
	1080 4276 01		ZL 1600 D 500mbar(e)	
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	1080 4277 01		ZL 1600 D 700mbar(e)	
	1080 4278 01		ZL 1600 D 800mbar(e)	
	1080 4278 01		ZL 1600 D 900mbar(e)	
	1080 4279 01		ZL 1600 D 1000mbar(e)	
	1080 4009 32		ZL 1600 E 300mbar(e)	
	1080 4275 01		ZL 1600 E 400mbar(e)	
	1080 4276 01		ZL 1600 E 500mbar(e)	
	1080 4277 01		ZL 1600 E 600mbar(e)	
	1080 4277 01		ZL 1600 E 700mbar(e)	
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	1080 4278 01		ZL 1600 E 900mbar(e)	
	1080 4279 01		ZL 1600 E 1000mbar(e)	
	1080 4009 32		ZL 1600 F 300mbar(e)	
	1080 4276 01		ZL 1600 F 400mbar(e)	
	1080 4276 01		ZL 1600 F 500mbar(e)	
	1080 4277 01		ZL 1600 F 600mbar(e)	
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	1080 4279 01		ZL 1600 F 900mbar(e)	
	1080 4009 32		ZL 1600 G 300mbar(e)	
	1080 4276 01		ZL 1600 G 400mbar(e)	
	1080 4276 01		ZL 1600 G 500mbar(e)	
	1080 4277 01		ZL 1600 G 600mbar(e)	
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	1080 4275 01		ZL 1600 H 300mbar(e)	
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	1080 4277 01		ZL 1600 J 500mbar(e)	
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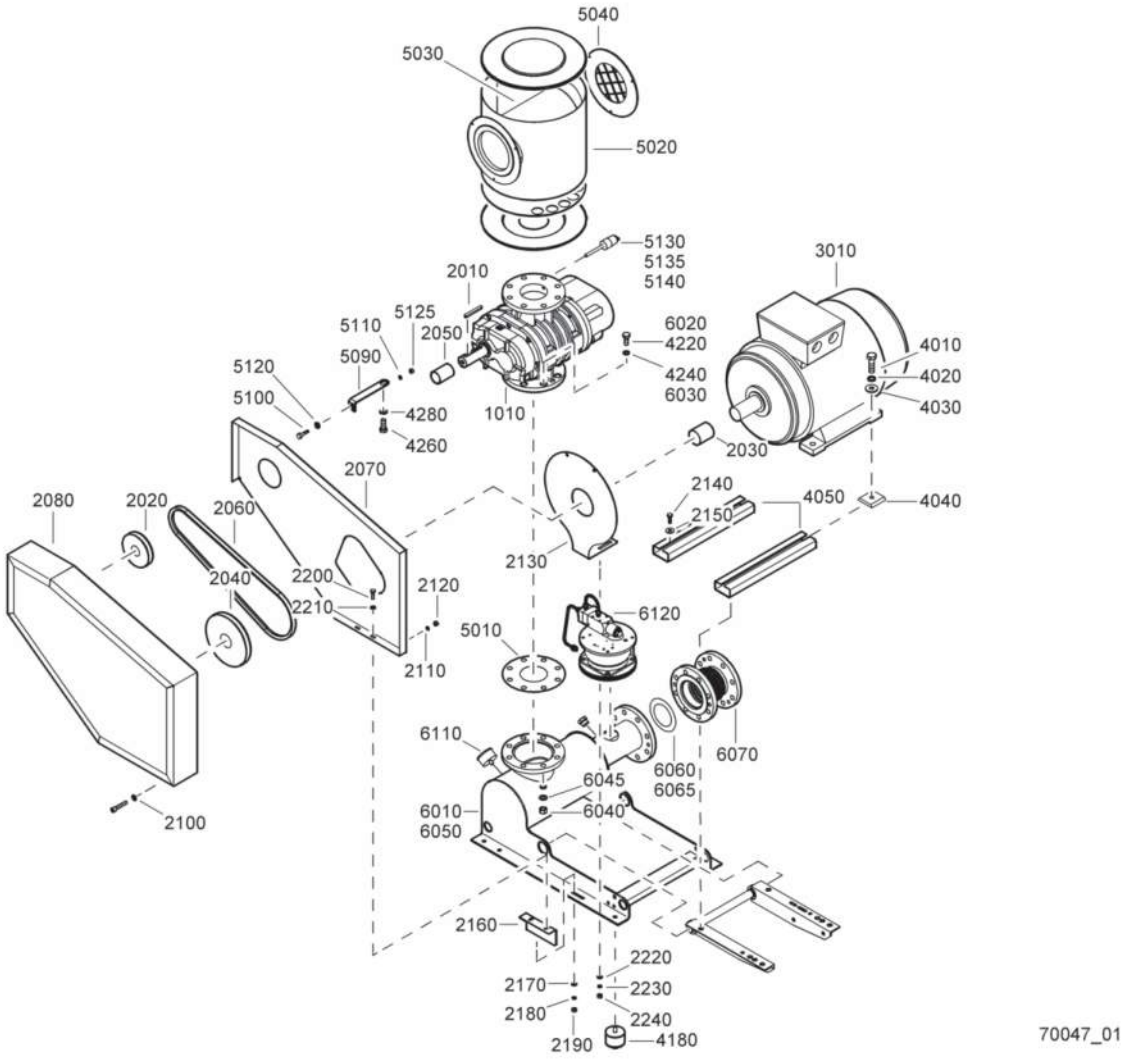
	1080 4276 01		ZL 1600 K 300mbar(e)	
	1080 4276 01		ZL 1600 K 400mbar(e)	
	1080 4277 01		ZL 1600 K 500mbar(e)	
	1080 4278 01		ZL 1600 K 600mbar(e)	
	1080 4279 01		ZL 1600 K 700mbar(e)	
4010		4	Bolt	
	0147 1404 03		Motorsize 160	
	0147 1404 03		Motorsize 180	
	0147 1480 03		Motorsize 200	
	0147 1482 03		Motorsize 225	
	0147 1555 03		Motorsize 250	
4020		4	Lock washer	
	0333 2136 02		Motorsize 160	
	0333 2136 02		Motorsize 180	
	0333 2174 04		Motorsize 200	
	0333 2174 04		Motorsize 225	
	0333 2174 54		Motorsize 250	
4030		4	Washer	
	0333 0276 67		Motorsize 160	
	0333 0276 67		Motorsize 180	
	0300 8010 00		Motorsize 200	
	0300 8010 00		Motorsize 225	
	0300 0274 13		Motorsize 250	
4040		4	Slide	
	1621 5059 40		Motorsize 160	
	1621 5059 40		Motorsize 180	
	1621 5059 41		Motorsize 200	
	1621 5059 41		Motorsize 225	
	1621 5059 70		Motorsize 250	
4050		2	C-profile	
	1621 5056 83		ZL 1600 A 300mbar(e)	
	1621 5056 83		ZL 1600 A 400mbar(e)	

2


5040
5030
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5135
5140
3010
2010
5125
5110
2050
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4220
4240
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4010
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5120
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5100
4280
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1010
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2040
2200
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2120
6120
5010
2110
6110
6070
6060
6065
6045
6040
6010
6050
2100
2160
2220
2170
2230
2180
2240
2190
4180
70047_01

70047_01

Core unit - ZL 1600

Ref.	Part number	Qty	Name	Remarks
	1621 5054 10		ZL 1600 A 500mbar(e)	
	1621 5054 10		ZL 1600 A 600mbar(e)	
	1621 5054 10		ZL 1600 A 700mbar(e)	
	1621 5054 10		ZL 1600 A 800mbar(e)	
	1621 5054 10		ZL 1600 A 900mbar(e)	
	1621 5054 10		ZL 1600 A 1000mbar(e)	
	1621 5056 83		ZL 1600 B 300mbar(e)	
	1621 5056 83		ZL 1600 B 400mbar(e)	
	1621 5054 10		ZL 1600 B 500mbar(e)	
	1621 5054 10		ZL 1600 B 600mbar(e)	
	1621 5054 10		ZL 1600 B 700mbar(e)	
	1621 5054 10		ZL 1600 B 800mbar(e)	
	1621 5054 10		ZL 1600 B 900mbar(e)	
	1621 5054 10		ZL 1600 B 1000mbar(e)	
	1621 5056 83		ZL 1600 C 300mbar(e)	
	1621 5054 10		ZL 1600 C 400mbar(e)	
	1621 5054 10		ZL 1600 C 500mbar(e)	
	1621 5054 10		ZL 1600 C 600mbar(e)	
	1621 5054 10		ZL 1600 C 700mbar(e)	
	1621 5054 10		ZL 1600 C 800mbar(e)	
	1621 5054 10		ZL 1600 C 900mbar(e)	
	1621 5054 10		ZL 1600 C 1000mbar(e)	
	1621 5056 83		ZL 1600 D 300mbar(e)	
	1621 5054 10		ZL 1600 D 400mbar(e)	
	1621 5054 10		ZL 1600 D 500mbar(e)	
	1621 5054 10		ZL 1600 D 600mbar(e)	
	1621 5054 10		ZL 1600 D 700mbar(e)	
	1621 5054 10		ZL 1600 D 800mbar(e)	
	1621 5054 10		ZL 1600 D 900mbar(e)	
	1621 5054 10		ZL 1600 D 1000mbar(e)	
	1621 5056 83		ZL 1600 E 300mbar(e)	
	1621 5054 10		ZL 1600 E 400mbar(e)	
	1621 5054 10		ZL 1600 E 500mbar(e)	
	1621 5054 10		ZL 1600 E 600mbar(e)	
	1621 5054 10		ZL 1600 E 700mbar(e)	
	1621 5054 10		ZL 1600 E 800mbar(e)	
	1621 5054 10		ZL 1600 E 900mbar(e)	
	1621 5054 10		ZL 1600 E 1000mbar(e)	
	1621 5056 83		ZL 1600 F 300mbar(e)	
	1621 5054 10		ZL 1600 F 400mbar(e)	
	1621 5054 10		ZL 1600 F 500mbar(e)	
	1621 5054 10		ZL 1600 F 600mbar(e)	
	1621 5054 10		ZL 1600 F 700mbar(e)	
	1621 5054 10		ZL 1600 F 800mbar(e)	
	1621 5054 10		ZL 1600 F 900mbar(e)	
	1621 5056 83		ZL 1600 G 300mbar(e)	
	1621 5054 10		ZL 1600 G 400mbar(e)	
	1621 5054 10		ZL 1600 G 500mbar(e)	
	1621 5054 10		ZL 1600 G 600mbar(e)	
	1621 5054 10		ZL 1600 G 700mbar(e)	
	1621 5054 10		ZL 1600 G 800mbar(e)	
	1621 5054 10		ZL 1600 G 900mbar(e)	
	1621 5054 10		ZL 1600 H 300mbar(e)	
	1621 5054 10		ZL 1600 H 400mbar(e)	
	1621 5054 10		ZL 1600 H 500mbar(e)	
	1621 5054 10		ZL 1600 H 600mbar(e)	
	1621 5054 10		ZL 1600 H 700mbar(e)	
	1621 5054 10		ZL 1600 H 800mbar(e)	
	1621 5054 10		ZL 1600 I 300mbar(e)	
	1621 5054 10		ZL 1600 I 400mbar(e)	
	1621 5054 10		ZL 1600 I 500mbar(e)	
	1621 5054 10		ZL 1600 I 600mbar(e)	
	1621 5054 10		ZL 1600 I 700mbar(e)	
	1621 5054 10		ZL 1600 I 800mbar(e)	
	1621 5054 10		ZL 1600 J 300mbar(e)	
	1621 5054 10		ZL 1600 J 400mbar(e)	
	1621 5054 10		ZL 1600 J 500mbar(e)	
	1621 5054 10		ZL 1600 J 600mbar(e)	
	1621 5054 10		ZL 1600 J 700mbar(e)	
	1621 5054 10		ZL 1600 J 800mbar(e)	
	1621 5054 10		ZL 1600 K 300mbar(e)	
	1621 5054 10		ZL 1600 K 400mbar(e)	
	1621 5054 10		ZL 1600 K 500mbar(e)	
	1621 5054 10		ZL 1600 K 600mbar(e)	
	1621 5054 10		ZL 1600 K 700mbar(e)	
4180	1621 5050 39	4	Anti-vibration damper	
4220	0147 1551 03	4	Bolt	
4240	0333 2174 54	4	Lock washer	
4280	0300 0274 13	1	Washer	
5010	1621 5056 72	2	Gasket	
5020	1621 5055 50	1	Suction silencer	
5030	1621 5050 92	1	Air filter element	
5040	1621 5056 58	1	Air inlet flange	
5090	1621 5059 71	1	Support	
5100	0147 1362 03	1	Bolt	
5110	0333 2174 03	1	Lock washer	
5120	0301 2344 00	2	Washer	
5125	0266 2111 00	1	Nut	
5130	1621 5052 97	1	Dp sensor	
5135	1621 5050 18	1	Underpressure gauge	
5140	1621 5055 86	1	Tube	
6010	1621 5056 16	1	Outlet silencer	
6020	0147 1962 45	8	Bolt	
6030	0333 2174 54	8	Lock washer	
6040	0266 2116 00	8	Nut	
6045	0300 0274 13	8	Washer	
6050	1621 5051 82	1	Check valve	
6060	1621 5056 84	3	Gasket	
6065	1621 5056 85	1	Gasket	
6070	1621 5053 11	1	Compensator	
6110		1	Pressure gauge	
	1621 5050 20		300mbar(e)	
	1621 5050 20		400mbar(e)	
	1621 5050 20		500mbar(e)	
	1621 5050 20		600mbar(e)	
	1621 5050 19		700mbar(e)	
	1621 5050 19		800mbar(e)	
	1621 5050 19		900mbar(e)	
	1621 5050 19		1000mbar(e)	
6120		1	Safety valve	
	1621 5054 06		300mbar(e)	
	1621 5054 06		400mbar(e)	
	1621 5054 06		500mbar(e)	
	1621 5054 06		600mbar(e)	
	1621 5054 06		700mbar(e)	
	1621 5054 06		800mbar(e)	
	1621 5055 51		900mbar(e)	
	1621 5055 51		1000mbar(e)	

3 Service kits

Ref.	Part number	Qty	Name	Remarks
	1615 5950 01	1	5 l - Oil can	
	1615 5951 01	1	20 l - Oil can	
	1615 5952 01	1	209 l - Oil barrel	

What sets Atlas Copco apart as a company is our conviction that we can only excel in what we do if we provide the best possible know-how and technology to really help our customers produce, grow and succeed.

There is a unique way of achieving that - we simply call it the Atlas Copco way. It builds on **interaction**, on long-term relationships and involvement in the customers' process, needs and objectives. It means having the flexibility to adapt to the diverse demands of the people we cater for.

It's the **commitment** to our customers' business that drives our effort towards increasing their productivity through better solutions. It starts with fully supporting existing products and continuously doing things better, but it goes much further, creating advances in technology through **innovation**. Not for the sake of technology, but for the sake of our customer's bottom line and peace-of-mind.

That is how Atlas Copco will strive to remain the first choice, to succeed in attracting new business and to maintain our position as the industry leader.

No. 2930 1478 00 / DC 2006.11

SECTION 4.4

CHECK VALVE

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

SWING-TYPE WAFER CHECK VALVE

DESCRIPTION

It is an intermediate flange (wafer) check valve with swing disk (heart) and without a return spring. Check valve generally ensures flow of the transported fluid in one direction, respectively, prevents the media flow in the opposite direction.

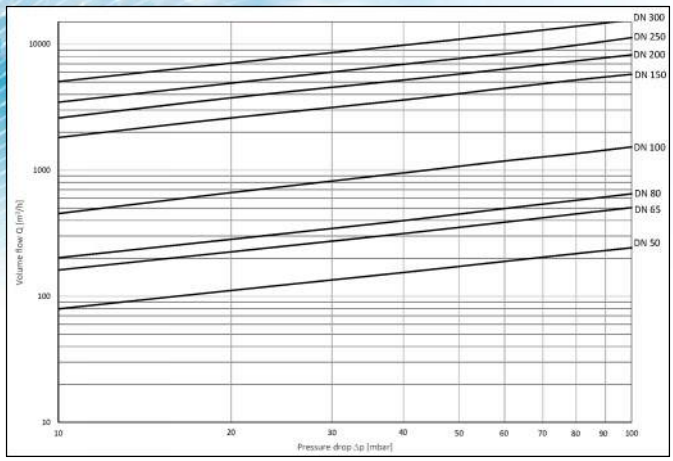
These valves are designed with regard to the use in the overpressure blower packages LuToS. They are located on the discharge side, behind the discharge silencers for packages series DT or right behind the blowers for packages series BAH

During normal operating state, due to the pressure of the flowing gas is the heard of the valve open. When the blower stops, occurs due to pressure difference between suction/discharge to the return movement of the gas, which immediately closes the valve. This prevents backflow and possible accidental reverse rotation (unacceptable) of the blower rotors.

Swing-type check valves are used for most LuToS blower packages. Only two packages are equipped with split-type check valves “single or double” and one with a universal threaded disc valve, see page 2. They have a different construction, but the basic principle is the same.

TECHNICAL DATA

- Swing-type check valves LuToS are primarily designed for the standard LuToS blower packages series and size :
  DT 6/42 to DT 60/102
  DT 66/202 to DT 110/82
  BAH 6/10 to BAH 40/60
- Marking of the check valves acc. to EN 19, stamped:
  LuToS / DN XX / PN YY / Material / flow direction
- Nominal diameter: DN50 – DN300
- Recommended connection between flanges:
  EN 1092-1 or similar acc. to DIN
- Recommended flange surface design:
  EN 1092-1, form A/B
- Tightness check:
  ČSN 13 3060, 6
  ISO 5208, 3
  DIN 3230, T3
- Testing with blower package: Internal reg. ZP01
- Basic temperature range: 0 to +140°C
- Pressure range: Δp = 2,5 bar
- Flow direction: (↔) ; (↑)
- Theoretical opening pressure: ~ 1 mbar (↔)
  ~ (5-20) mbar (↑)
- Working medium: AIR or similar gases
- Pressure drops:



For air, at 20°C, full opening

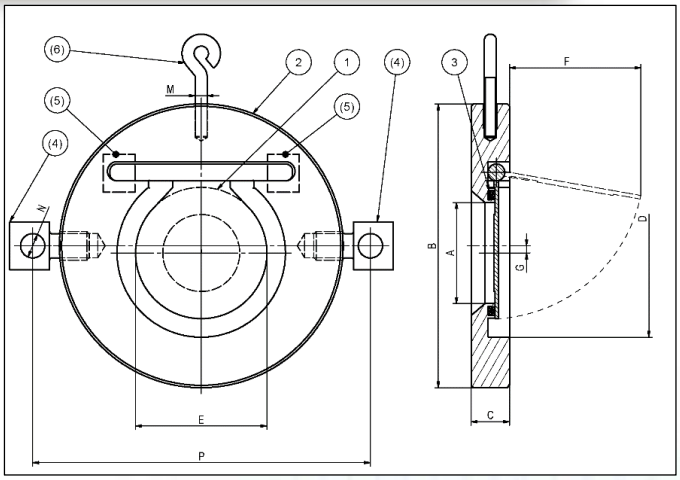
BASIC MATERIALS

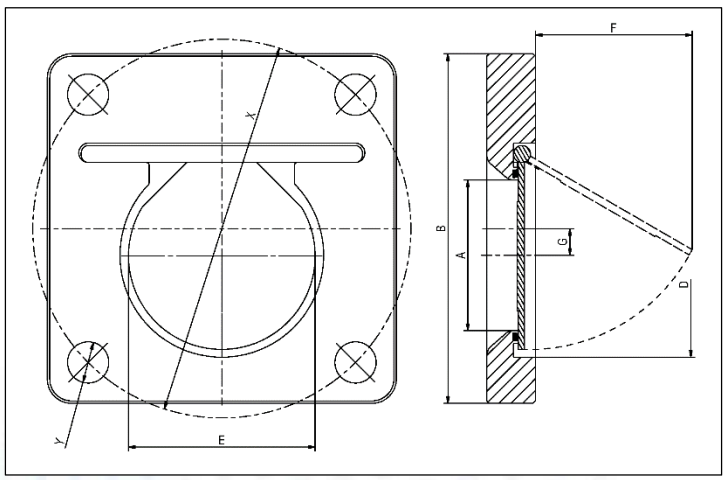
Pos.	Part	EN
1	Body	S235J2G3 (1.0116)
2	Disk (heart + pin)	S235J2G3 (1.0116)
3	O-ring (basic)	MVQ
(4)	Cubes	1.0036
(5)	Disk cubes	1.2842
(6)	Ring-bolt	1.0116

Positions and more info of the parts on the dimension scheme, see page 2.

- O-rings from other materials (NBR, EPDM, PTFE, FPM) on request.
- Surface finish of the check valve:
  galvanized Fe/Zn 15c
- Intermediate-flange flat seals for the check valve:
  Novapress Basic

DIMENSIONS





[mm]	DN 65									
A	Ø 42									
B	Ø 128									
C	16									
D	Ø 70									
E	Ø 54,6									
F*	55									
G	3									
M	M6									
N**	-									
P**	-									
X	-									
Y	-									

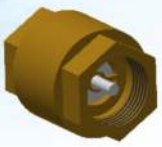
**Dimension of the fully opened check valve integrated in the blower package. **Cubes for fixation to the flange and ring-bolts are in standard installed only for DN250 and DN300 check valves. DN65-DN200 check valves with these parts on request. Disk cubes are parts of DN250 and DN300 check valves.*

- Weight of the check valves:

[kg]	DN 65									
m	1,3									

ID CODES

Order No.	Type	for blower package, size	Flat seal, size [mm]	Order No.
1621.5051.51	DN 65	DT 6/42 ; DT 10/42 ; DT 20/42 ; DT 30/42	1x127x77	**1621.5056.53**



SECTION 4.5

SAFETY VALVE

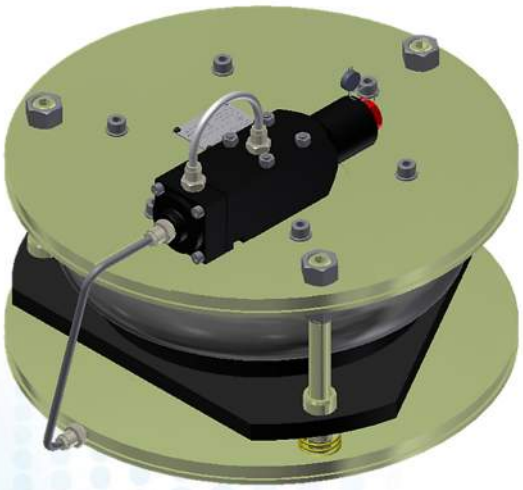
Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

INTEGRATED SAFETY AND STARTING VALVE

DESCRIPTION

It is an externally controlled pulse valve, which due to its construction consisting of a main valve with bellows and pilot valve combines starting and safety function.



If there is no pressure (before starting the blower), the main valve is open. When the blower is starting, pressure is generated in the gap between the seat and the disc of the main valve. The pilot valve will feed the pressure into the bellows. As the bellows area is larger and the bellows power is higher than the seat area and its power, the bellows will close within several seconds due to gradually increasing pressure. The bellows must simultaneously press the springs (those ensuring that the unloaded valve will open). This enabling the blower to start with the load increasing fluently (**starting function of the valve**).

By installing a solenoid valve (a special design), you could control start-up time of the blower electrically. When the electromagnet of this valve is turned on, the inner space of the bellows is interconnected with the atmosphere and the main valve is open.

During normal operation, after the blower has started the main valve is closed. The pilot valve interconnects the spaces of outlet pipeline and the bellows. If pressure exceeds the adjusted limit, the pilot valve will release it into the atmosphere. This will result in reducing the pressure in the bellows and opening the main valve. After the pressure has dropped, the control valve will stop releasing the pressure into the atmosphere, thus increasing the pressure in the bellows and closing the main valve. The blower is thus protected against overload, respectively against pressure rise above the permissible limit (**safety function of the valve**).

TECHNICAL DATA

- The valves are primarily designed for blower packages, size:
  DT 50/102 to DT 120/1002
- Marking of the complete valve: **PVO_XX-Y / ZZ**

  PVO..…….. basic designation
  XX……..…..…. valve size
  Y……..……..…… version
  ZZ…..... max. set overpressure
- Marking of the pilot valve: **RVX_YY-Z**

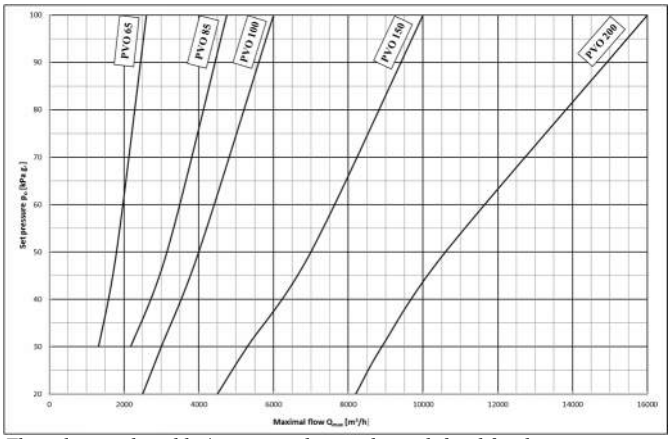
  RV.....….... basic designation
  X...…...…...…… valve type
  YY…… max. set overpressure
  Z……..……....…… version
- Design of the valve, testing:

  EN ISO 4126; ČSN 13 4309
  Internal regulation: TP 04.0025.01.2
- Climatic conditions:

  WT ČSN EN 60721-3-3; 3K7L, 3B1, 3C3, 3S2, 3M3
- Standard marking acc. to pressure equipment directive 97/23/EC: CE
- Working medium: AIR
- Ambient temperature: -20 to +40 °C
- Working medium temperature: -20 to +140 °C
- Variants of the pressure design (set overpressure range):

  p_o = 20(30) to 80 kPa g.
  p_o = 80 to 132 kPa g.
- Maximal flow:

p_o [kPa g.]	Q_{max} [m³/h]				
	PVO 65	**PVO 85**	**PVO 100**	**PVO 150**	**PVO 200**
20	-	-	2500	4500	8200
30	1320	2180	3000	5350	8900
50	1800	3150	4000	7000	10600
100	2600	4750	6000	10000	16000



The values in the table / curves in the graph are defined for the pressure 101,325 kPa, temperature 20°C, dry air and 0 m above sea level.

BASIC MATERIALS

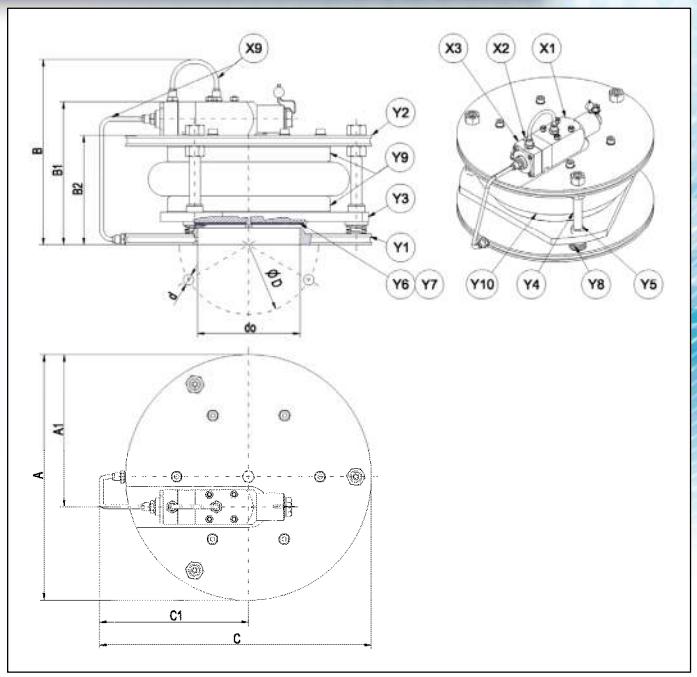
X	PILOT VALVES RV			Y	MAIN VALVES		
Pos.	Part	ČSN	EN	Pos.		ČSN	EN
X1	Body of RV	42 4254	EN AW-2007 T4	Y1	Bottom base	11 375	1.0038
X2	Flange of RV	42 4254	EN AW-2007 T4	Y2	Upper base	11 375	1.0038
X3	Cover of RV	42 4254	EN AW-2007 T4	Y3	Mobile base	42 4415	EN AW-5083 H111
X4*	Valve seat	19 312	1.2842	Y4	Guiding rods	11 373 / (11 600)	1.0036 / (1.0060)
X5*	Spring	Class 3	Class SM	Y5	Guiding bushes	42 3223 / (11 523)	CW617N / (1.0553)
X6*	Other basic steel parts	11 109	1.0715	Y6	Cover disk	11 321	1.0330
X7*	Membrane	R. 5106	MVQ	Y7	Sealing disk	R. 5106	MVQ
X8*	Seals	-	MVQ	Y8	Springs	Class 3	Class SM
X9	Tubes	-	PTFE	Y9	Flanges of bellow	42 4005	EN AW-1050 A
				Y10	Bellows	R. 31471	SBR

*The materials in the parentheses are intended only for PV0 200. For PVO 200 is bellows (Y10) supplied as a complete with flanges (Y9) – different type of the construction. * Position of internal parts – not showed on the dimension scheme. For more information, please contact LuToS*

- Surface finish of the valve:

Parts from aluminium – black anodized
Parts from steel – galvanized Fe/Zn 15c

DIMENSIONS



[mm]	PVO 65	PVO 85
A	Ø 207	
A1	130,5	
B	251	
B1	189,5	
B2	140	
C	267	
C1	163,5	
D	Ø 100	Ø 150
d	4x M10	

- Weight of the complete valve:

	PVO 85
m [kg]	8,9

- Minimal flow cross-section:

	PVO 85
d_o [mm]	90
A_o [mm^2]	6362

The value of the discharge coefficient Kv is not specified.

ID CODES

Order No.	PVO	with RV	for blower package, size
1621.5054.06	PVO 85-2/80	RV1/80-1	DT 66/202 ; DT 70/202
1621.5055.51	PVO 85-2/132	RV1/132-1	

SECTION 4.6

COOLING FAN

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

S&P USA

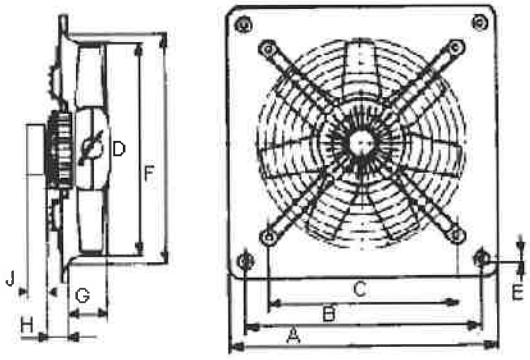
Qty:	1
Tag:	EF-1
Project:	ATLAS COPCO

WA12

Compact Wall Axial Fan

STANDARD FEATURES:

Constructed from die cast aluminum • Black polyester paint coating • Asynchronous induction capacitor run and start motor • Low profile design • Class F motor insulation • 100% speed controllable • Totally enclosed IP/65 protection • Suitable for working temperatures -40 deg F up to 140 deg F • Safety auto reset thermal overload protection • Motors prewired to wiring junction box •



Performance

Flow (CFM)	SP (in W.G.)	Nominal RPM	Max (HP)	Max Amps
1260	0	1500	.18	1.6

Altitude (Feet): 0 **Temperature (Fahrenheit):** 70 **Density (Lb/Ft3):** .075

Motor Information:

Volts/PH/Hz
115V/1PH/60HZ

Dimensions (Inches)

A	15.75	B	12.9375	C	11	D	12.4375	E	0.375
F	12.9375	G	2.875	H	1.25	I	2.5	J	
K		L		M		N		O	
P		Q		R		S		T	
U		V		W		X		Y	

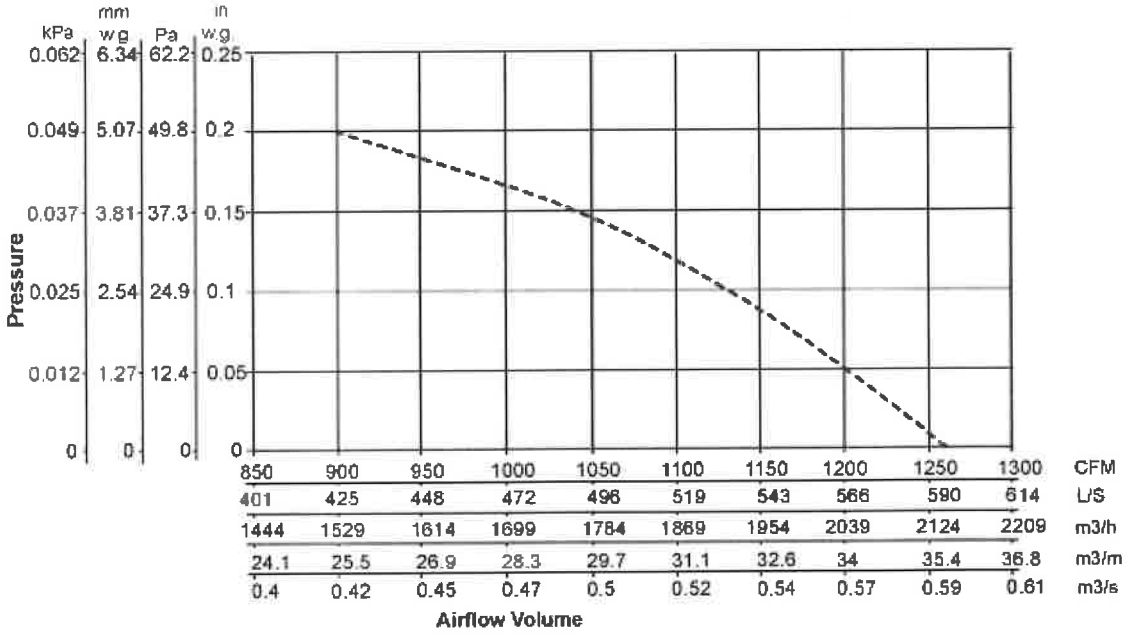
Note: Accessories may effect dimensions shown.

Avg. Shipping Weight (Lbs)*: 15

*Includes fan, motor, and packaging.

Accessories:

Submittal Notes:



SECTION 4.7

PRESSURE

GAUGE

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

B.1.3.

STANDARD PRESSURE GAUGE 358

diameter 63mm
bottom and back connection

DESCRIPTION:

- metal case
- glass/acrylate inspection hole
- connection 304 (bottom), 358 (back) CuZn and copper alloys
- measuring mechanism CuZn and copper alloys

APPLICATION:

- heating industry
- air-conditioning
- food industry
- health care
- hydraulics

TECHNICAL PARAMETERS:

- diameter: 63mm
- measure ranges: 0-1 Bar
- scale: Bar
- connection threads: M12x1,5, G1/4 (G1/8, G1/2, M10x1)
- design: pressure gauge, pressure-vacuum indicator, vacuum indicator
- accuracy class: 1,6%

SPECIFICATION:

Standard pressure gauges 304 bottom, 358 back are produced according to standard EN837-1. Mainly used for simple pressure measurement of liquids, vapour and gases, that do not have a corrosive effect on copper alloys and its viscosity allows for measuring using bourdon pen mechanism.

Standard pressure gauges are suitable for use in conditions without high demands on the device. Environment temperature -40 up to 60°C, maximum medium temperature T_{max} 60°C.

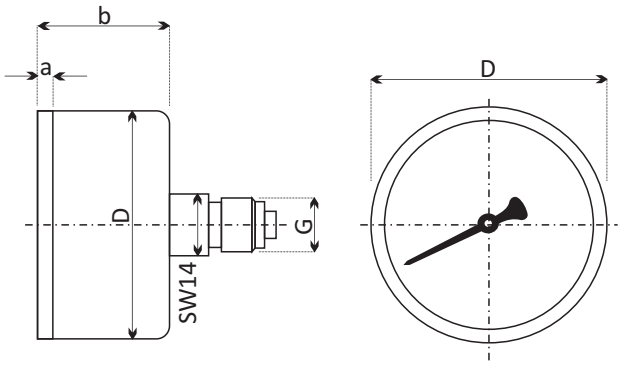
Other alternatives of design on request - special scale design, connection thread, max. pressure needle etc.

• (+420) 545 226 177-184 •
• info@thermis.cz • www.thermis.cz •

• Thermis, spol. s r.o. • Mateří 14 •
• 614 00 Brno • Czech Republic •

Code		358
Diameter	63mm	
Design		back connection
Accuracy class	1,6%	
Ranges	0-100kPa...0-40MPa, vacuum and pressure	
Highest accuracy	constant pressure - 3/4 from all range, fluctuating pressure - 2/3 from all range	
Case	black varnished metal	
Ring	without/ black varnished metal	
Inspection hole	acrylate/glass	
Scale	white Al sheet with black print according to DIN 16 109	
Needle	black varnished metal	
Mechine basis	CuZn - alloy	
Spring	Cu - alloy	
Connection	CuZn - alloy	
Thread	M12x1,5, G1/4 (G1/8, G1/2, M10x1)	
Medium temper.	T_{max} 60°C	
Environment temp.	T_{min} –40°C, T_{max} 60°C	
Measuring depend. on temperature	0,3%/10K for deviation from normal temperature 20°C	
Weight approx.	0,15kg	0,15kg

• 358 - back connection



Dimensions in mm							
Type	Nom. size	a	b	D	G	h	H
358	63	2	26	62	G1/4	54	82
						-	-

SECTION 4.8

SPARE PARTS

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

ZL Spare Parts List

QTY	Part	Part Number
2	V-Belt	1621505409
1	Filter Element	1621505092
1	Oil	1615595001

SECTION 5

ZL PREDICTED PERFORMANCE DATA

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

ZL Blower Performance

Date: 8/21/2018

Model Selected: ZL1600		**ZL1600 Operating Point**	**ZL1600 Min Flow @ Pressure**
Customer Conditions			
Site Elevation	ft asl	2100	2100
Barometric Pressure	PSIA	13.6	13.6
Inlet Pressure	PSIA	13.5	13.5
Inlet Temperature	°F	100	100
Relative Humidity	%	85	85
Reference Conditions			
Pressure	PSIA	14.7	14.7
Temperature	°F	68	68
Relative humidity	%	36	36
Model Performance			
Discharge Pressure	PSIG	8.2	8.2
Inlet Flow	CFM	873	287
Inlet Flow	scfm-ASME	719	236
Shaft Power	BHP	39.3	16.2
Specific Energy	bhp/100cfm	4.5	5.6
Blower Speed	rpm	2745	1144
Motor Speed	rpm	3546	1478
Discharge Temperature	°F	208	236
Other Information			
Sound Level			
- Without Enclosure	dBa	94	
- With Enclosure	dBa	72	
Heat Rejection	BTU/hr	16900	
Motor Size	HP	60	
Tolerances			
Inlet Flow			
- Up to 2500 CFM	%	±7	
- Over 2500 CFM	%	±5	
Discharge Pressure	%	±5	
Shaft Power			
- Up to 15HP	%	±10	
- Over 15HP	%	±7	
Sound Level	dBa	±2	

SECTION 5

ZL FACTORY TEST DATA

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

TEST REPORT

Date: 11.02.2019

As per ČSN EN 10204 - 2.2

Client:	***Atlas Copco s.r.o.***				
Item:	**A066P0266**		Order No.:	4503480656	
Type of blower / aggregate:	**ZL1600**				
Serial No. of blower only:	**CZL014619**		Serial No. of aggregate:	**CZL014619**	
Electric motor type :	**M3AA200MLB2**		Serial No. of electric motor :	**3G1P185100577**	
Electric motor power:	**37,00**	[kW]	Rated current:	**56,1**	[A]
Electric motor speed:	**3560**	[min^{-1}]	Blower speed :	**2840**	[min^{-1}]
E. motor - diameter pulley:	**200**	[mm]	Type of belt :	**XPB1800LW**	
Blower - diameter pulley:	**250**	[mm]	Number of belts :	**2**	
Gear ratio :	**0,80**	[-]	Strain of belt :	**- / -**	[N/mm]

Design parameters

Height above sea level:	**250**	[m]	Pressure difference (p3-p0):	**57**	[kPa]
Suction temperature:	**22**	[°C]	Discharge temperature (T3):	**93**	[°C]
Humidity:	**31,6**	[%]	Capacity (Qs - suction):	**1483**	[m^3/h]

Measured parameters according directive ZP01 and ISO 1217:2009 - Annex C
Testing to working parameters for 30 min

Current per phases [A]	**51,8**	I.:	**51,9**	II.:		**52,0**	III.:
Voltage:	460,0	[V]	Terminal power consuption:			39,6	[kW]
Blower speed:	**2840**	[min^{-1}]	Frequency:			60	[Hz]
Temperature of test room:	**22**	[°C]	Humidity:			**33**	[%]
Suction temperature:	**22**	[°C]	Atmospheric pressure:			**98,53**	[kPa abs.]
Discharge temperature:	**93**	[°C]	Diameter of orifice:			/	[mm]
Discharge pressure:	**57,1**	[%]	Pressure drop on orifice:			/	[Pa]
Capacity (Qs - suction):	**1569,0**	[m^3/h]	Capacity deviation (Qs):			**5,80**	[%]

Results: Blower DI and blower DT stand the test according to ZP01 - **OK**

Noise level measurement (**rough** measurement): with / without canopy 82 / 98 dB(A)

Measured by one of technics:

Name:	Luboš Málek	Dalibor Horáček
Signature:		

Atlas Copco s.r.o., division LUTOS Prumyslova 10, Praha 10 CZ-102 00,
Phone: +420 225 434 000, Fax: +420 225 434 343, e-mail: lutos@lutos.cz

SECTION 5

QUALITY AND ENTIRETY CERTIFICATE

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

Atlas Copco

QUALITY AND ENTIRETY CERTIFICATE

Document No.03/0010/00/2

Date : **11.2.2019**

Client:	**Atlas Copco s.r.o.**		
Item: Full order:	**A066P0266** **4503480656**	Order n.:	AB EB
Type of blower :	**ZL 1600**		
Serial number of blower only :	**CZL014619**	**Serial number of blower agg.:**	**CZL014619**
Blower speed :	**2840 / 1.min-1**	Power:	**37 KW / KW**
Motor - diameter pulley: Blower - diameter pulley:	**200** **250**	Motor type :	**M3AA200MLB 2**
Type of belt :	**XPB 1800LW**	Serial number of motor:	**3G1P185100577**
Number of belts :	**2**	Working pressure :	**570 mbar**
Strain of belt :	**/ N/mm**	Type of filter :	**TS 202-2** **369 G**
Capacity DT :	**1483,0 / m3/hod**	Sound enclosure:	type: **K 202** nr.: **0146/2019**

Noise - level of sound pressure A measured at a distance of 1m LpA	with	without enclosure
	77 dB	/ dB

The mentioned level of sound pressure A applies only if testing conditions maintained during the actual measurement are the same as those in the course of the reference measurement

Blower DI and blower aggregete DT stand the test.

Note :

	Range	
Possible range of operation:		Hz
Forbidden frequency:		Hz
		Hz
		Hz

MÁLEK Luboš RKJ

HORÁČEK Dalibor RKJ

Atlas Copco Airpower n.v. , Oil- free Air Division
P.O. Box 104, Boomsesteenweg 957 , B-2610 Wilrijk-Antwerpen , Belgium Phone : +32(0)3 870 21 11
Phone : +32(0)3 870 21 11 http:// www.atlascopco-compressors.com

SECTION 6

ZL MOTOR INFORMATION

Motor Data Sheet
Motor Drawing

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

SECTION 6.1

MOTOR DATA SHEET

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

ABB Motors and Generators	Technical Data Sheet - DOL			
	Project		Location	
Department/Author	Customer name		Customer ref.	Item name **1,00001**
Our ref.	Rev/Changed by **A**	Date of issue **30.11.2018**	Saving ident **untitled.xls**	Pages **1(3)**

No.	Definition	Data	Unit	Remarks	
1	Product	***TEFC, 3-phase, squirrel cage induction motor***			
2	Product code	***3GAA 201 420-ADL***		Calc. ref.	3GZF021020-356
3	Type/Frame	***M3AA 200MLB 2***			
4	Mounting	***IM1001, B3(foot)***			
5	Rated output P_N	***37***	kW		
6	Service factor	***1***			
7	Type of duty	***S1(IEC) 100%***			
8	Rated voltage U_N	***460***	VD	± 5 % (IEC 60034-1)	
9	Rated frequency f_N	***60***	Hz	± 2 % (IEC 60034-1)	
10	Rated speed n_N	***3560***	r/min		
11	Rated current I_N	***56,1***	A		
12	No-load current	***16,8***	A		
13	Starting current I_s/I_N	***10***		Meet IEC 60034-12, NE	
14	Nominal torque T_N	***99***	Nm		
15	Locked rotor torque T_S/T_N	***3,4***			
16	Maximum torque T_{max}/T_N	***4,2***			
17	Minimum torque T_{min}/T_N	***3,0***			
18	Speed at minimum torque	***684***	r/min		
	Load characteristics (IEC 60034-2-1:2014)	Load %	Current A	Efficiency %	Power factor
19	PLL determined from residual loss	*100*	**56,1**	**93,9 / IE3**	**0,88**
20		*75*	**43,5**	**94,2**	**0,85**
21		*50*	**31,8**	**93,6**	**0,78**
22		*Start*	**561**		**0,46**
23	Maximum starting time from hot	***15***	s		
24	Maximum starting time from cold	***27***	s		
25	Insulation class / Temperature class	***F / B***			
26	Ambient temperature	***40***	°C		
27	Altitude	***1000***	m.a.s.l.		
28	Enclosure	***IP55***			
29	Cooling system	***IC411 self ventilated***			
30	Bearing DE/NDE	***6312-2Z/C3 - 6209-2Z/C3***			
31	Type of Grease				
32	Sound pressure level (LP dB(A) 1m)	***78***	dB(A)	at load	
33	Moment of inertia J = ¼ GD2	***0,115***	kg-m2		
34	Balancing				
35	Vibration class				
36	Position of terminal box	***Top***			
37	Terminal box entries; no, dimens.				
38	Number of power terminals				
39	Direction of rotation	***CW or CCW***			
40	Weight of rotor	***48***	kg		
41	Total weight of motor	***185***	kg		
42	Dimension drawing no.				
43					
44					
45					
Ex-motors					
46					
47					
48					
Option	Variant Codes / Definition				
49					
50	PTC - thermistors (3 in series), 150 ºC, in stator winding - standard				
51					
52					

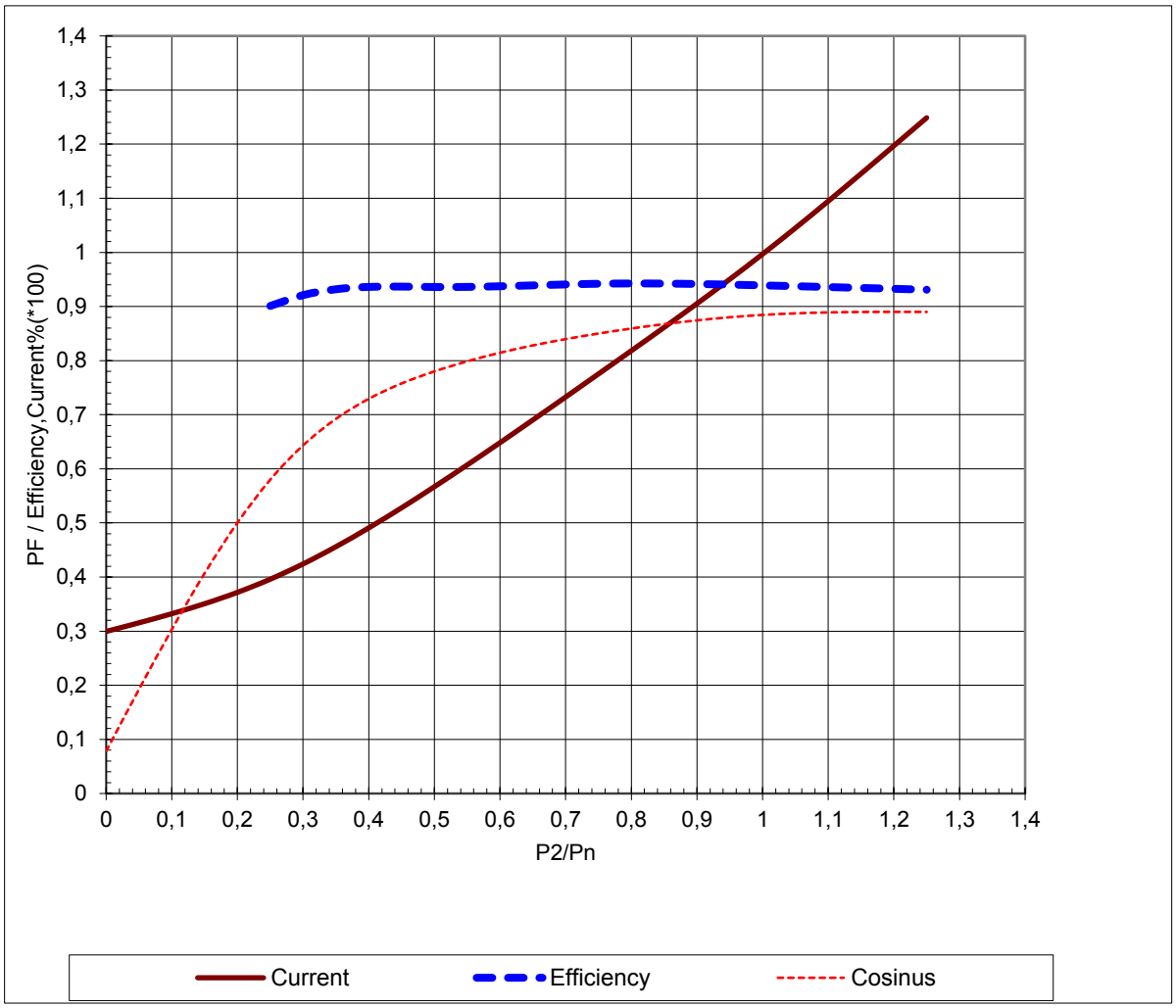
Remarks:

Data based on situation 3.9.2016
All data subject to tolerances in accordance with IEC
Guaranteed values on request

ABB Motors and Generators	Load Curves		
	Project	Location	
Department/Author	Customer name	Customer ref.	Item name **1,00001**
Our ref.	Rev/Changed by Date of issue **A** **30.11.2018**	Saving ident **untitled.xls**	Pages **2(3)**

Product	**TEFC, 3-phase, squirrel cage induction motor**				
Type/Frame	**M3AA 200MLB 2**			Calc. ref.	**3GZF021020-356**
Product code	**3GAA 201 420-ADL**				
Rated output P_N	**37**	kW	M3AA 200MLB 2		
Type of duty	**S1(IEC) 100%**				

Voltage (V)	**460**		Current I_N (A)	**56,1**	Power factor at P_N **0,88**
Frequency (Hz)	**60**		Speed (r/min)	**3560**	Efficiency (%) at P_N **93,9**



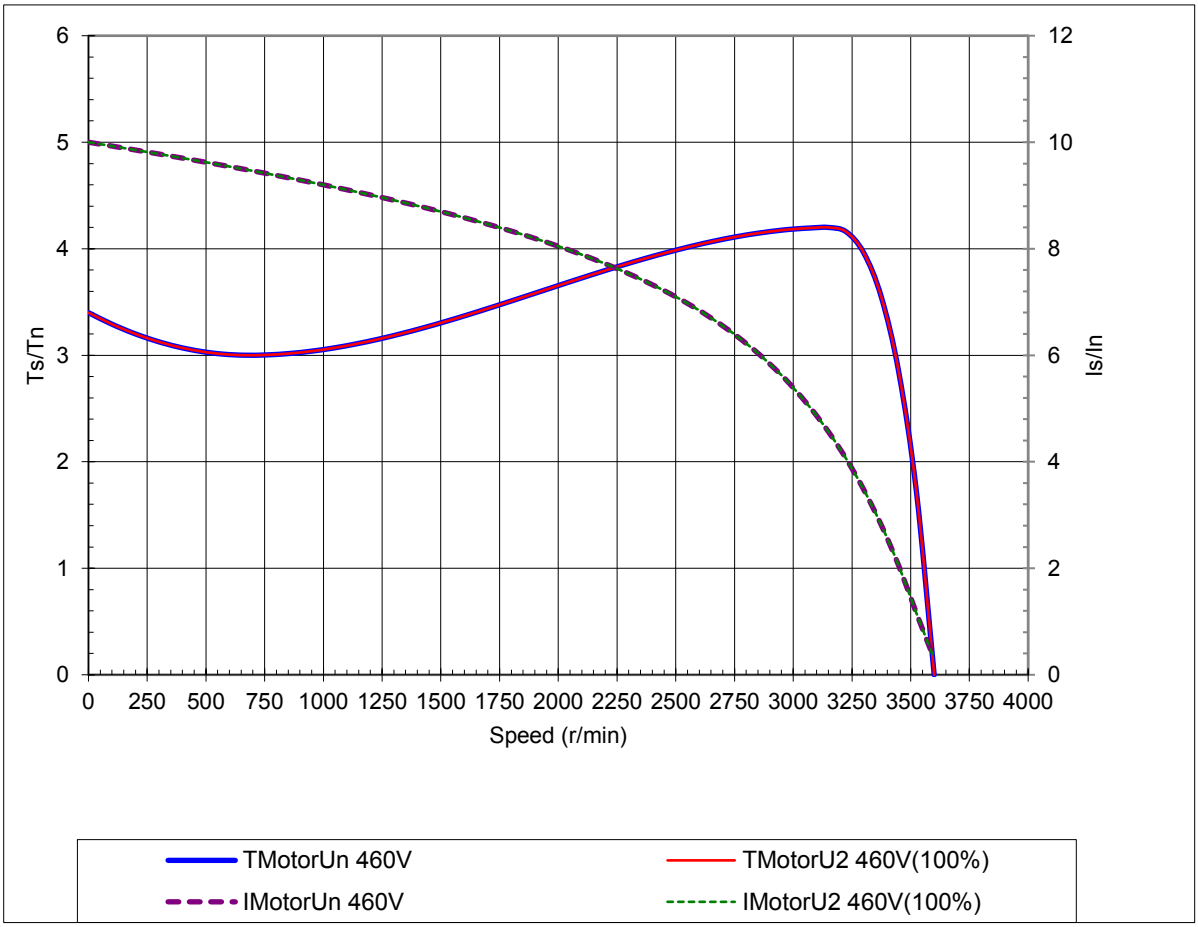
Load characteristics (IEC 60034-2-1:2014)
Data based on situation 3.9.2016

All data subject to tolerances in accordance with IEC

ABB Motors and Generators	Starting Curves		
	Project	Location	
Department/Author	Customer name	Customer ref.	Item name **1,00001**
Our ref.	Rev/Changed b Date of issue	Saving ident	Pages
	A **30.11.2018**	**untitled.xls**	**3(3)**

Type of product	**TEFC, 3-phase, squirrel cage induction motor**				
Type/Frame	**M3AA 200MLB 2**		Calc. ref.	3GZF021020-356	
Product code	**3GAA 201 420-ADL**		Frequency (Hz)	**60**	
Rated output P_N	**37** kW	M3AA 200MLB 2	Rated current I_N	**56,1**	A
Type of duty	**S1(IEC) 100%**				

J_{motor} (kgm2)	**0,12**	Voltage (V) 100%	***460***	Voltage (V)	***460V(100%)***
J_{load} (kgm2)		T_{start}/T_N	***3,4***	T_{start}/T_N	***3,4***
Speed (r/min)	**3560**	Starting time (s)		Starting time (s)	
T_N (Nm)	**99**	Speed (r/min)		Speed (r/min)	
T_{load} (Nm)		I_s/I_n	***10***	I_s/I_n	***10***
Nbr. of Consecutive Starts at UN		T_{max}/T_n	***4,2***	T_{max}/T_n	***4,2***



Load characteristics (IEC 60034-2-1:2014)
Data based on situation 3.9.2016

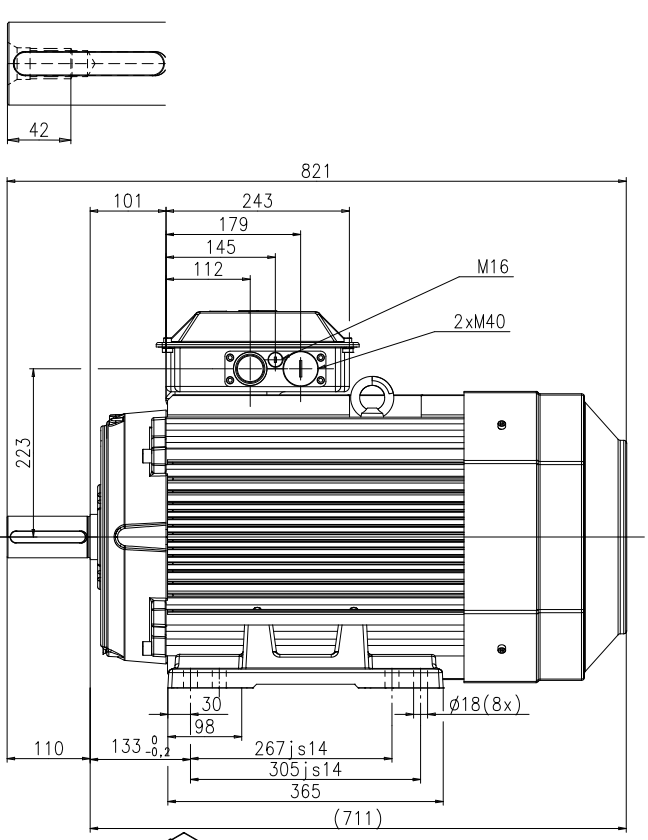
All data subject to tolerances in accordance with IEC

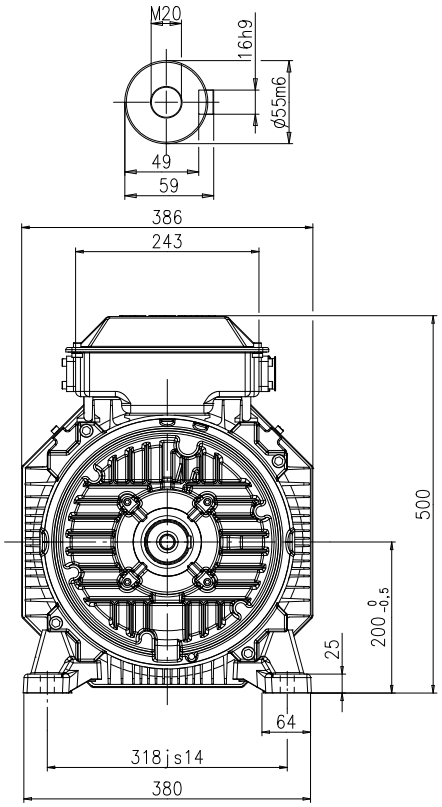
SECTION 6.2

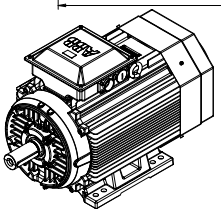
MOTOR DRAWING

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us







Motor Dimension Print	Motor Type: **M3AA 200 IM 1001**	Document No: **3GZV 102 028-A A1.5109**
Description: **Three phase motor,**		
Unit: ABB AB, LV Motors, Sweden.	Issued by: B Abujheisha	Replaces:
Date: **2012-09-29**	Approved by: N Jonsson	Replaced by:
	Customer Reference:	

SECTION 7

FIELD MOUNTED ACCESSORIES

Discharge Expansion Joint
Discharge Temperature Switch
Pressure Controller

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

SECTION 7.1

DISCHARGE EXPANSION JOINT

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

general rubber 800-233-6294

Customer: _____ Date: _____

Job/Project: _____

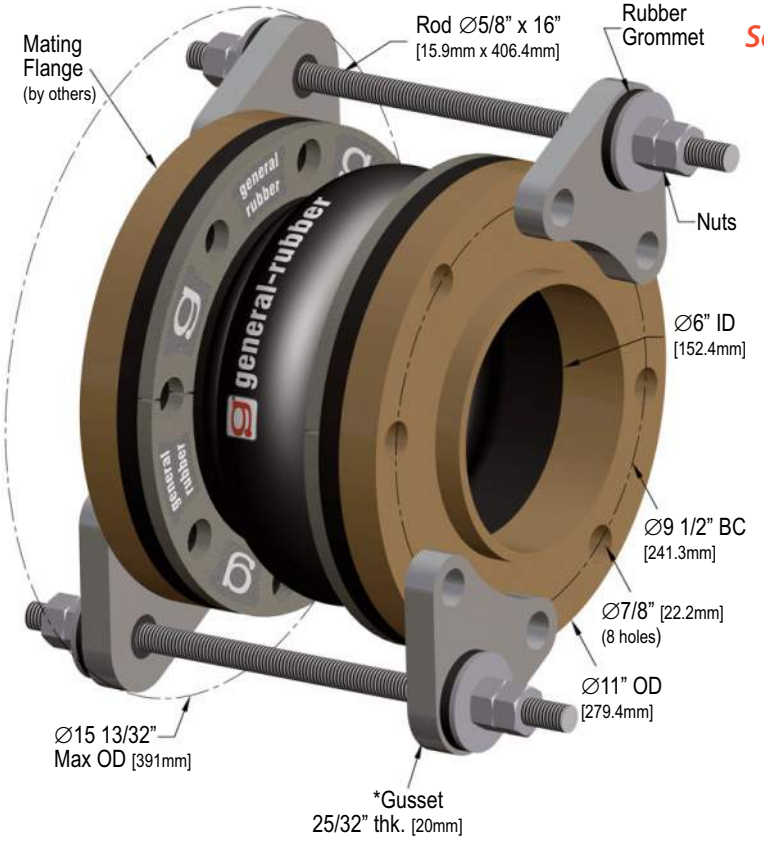
Quantity: _____ Ref/Tag: _____

*Shown with Control Unit GR/B

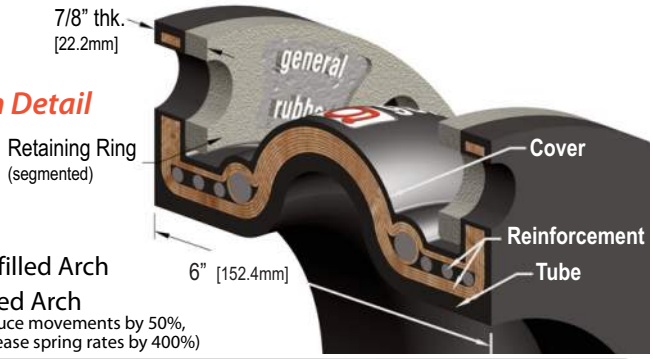
*Control Units are not required or provided

Style 1101 Rubber Expansion Joint

6" ID x 6" F/F (DN150mm x 152mm) - 150-lb Drilling | 1101-0006-3.16



Section Detail



☒ Unfilled Arch

☐ Filled Arch
(reduce movements by 50%, increase spring rates by 400%)

				EPDM	
Tube				☐	
Cover				☒	
Tire Cord:				° F [° C]	
☐ Polyester				250 [121]	
				350 [177]	

Maximum Temperature rating based on lowest temperature material selected. EPDM or Butyl w/Polyester Tire Cord rated 300°F (149°C) for Air Service up to 25 psig (1.7 barg)

Bill of Materials

ITEM	MATERIAL	FINISH
Retaining Ring	☒ Carbon Steel	Hot Dipped Galvanized
Metal Reinforcement	High Tensile Steel	Rubber Embedded
Textile Reinforcement	Tire Cord	RFL Coating

MOVEMENT (non-concurrent)					SPRING RATE					PRESSURE		WEIGHT	
Comp. in [mm]	Ext. in [mm]	Lateral in [mm]	Angular deg.	Torsional deg.	Comp. lb/in [N/mm]	Ext. lb/in [N/mm]	Lateral lb/in [N/mm]	Angular ft-lb/deg [N-m/deg]	Torsional ft-lb/deg [N-m/deg]	Pressure psig [barg]	Vacuum in-Hg [barg]	RBJ with Rings lbs [kg]	Control Unit lbs [kg]
1 3/4 [44]	7/8 [22]	1 [25]	15	3.2	820 [144]	1,050 [184]	790 [138]	6.3 [9]	10 [14]	225 [15.5]	30 [-1]	20 [9]	16 [7]

Optional Control Units

☒ No Control Units

*Gusset thickness and pressure listed above are for carbon steel gussets and ASTM A193 B7 rods. Contact General Rubber for stainless steel pressures and thicknesses.

Contact General Rubber Corporation for full product specifications, Warnings and installation instructions.

SECTION 7.2

DISCHARGE

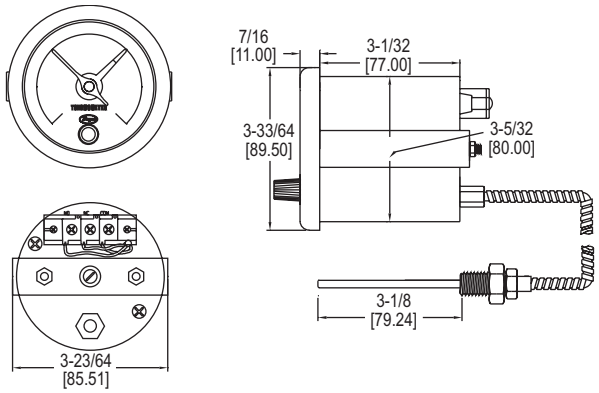
TEMPERATURE GAUGE/SWITCH

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
Telefax: (281) 590-5611
www.atlascopco.us

Series RRT3 Remote Reading Thermometer with Switch

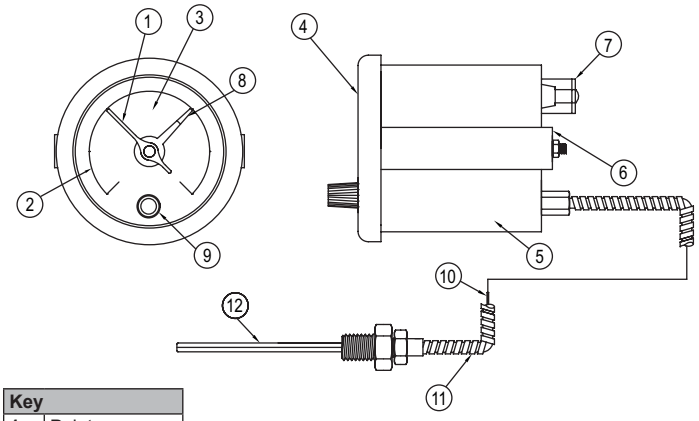
Specifications - Installation and Operating Instructions



The **Series RRT3 Remote Reading Thermometer with Switch** combines an easy to read 3-1/4″ dual scale dial thermometer and a SPDT relay. Color coordinated pointers display the current process temperature and set point. In order to change the set point, a front adjustment knob controls the red set point pointer. The design of the internal mechanical switch movement prevents the set point pointer from sticking to the process indicating pointer. A 10.5 ft (3.2 m) stainless steel flex hose capillary prevents kinking and leaking of the measuring fluid when bending the capillary. For quick installation, electrical connections can be made to male quick connects or to the finger-safe screw terminals. Thermometer includes a u-clamp mounting bracket for panel mounting.

OPERATING INSTRUCTIONS

SPECIFICATIONS
Wetted Materials: 304 SS.
Accuracy: ±3% FS.
Housing Material: 304 SS.
Temperature Limit: -4 to 158°F (-20 to 70°C).
Switch Type: SPDT, 3 A @ 250 VAC, .2 A @ 250 VDC.
Electrical Connections: Normally open (NO), normally closed (NC), and common (COM).
Process Connection: 1/2″ (12.7 mm) male NPT.
Dial Size: 3-1/2″ (90 mm).
Capillary Length: 10.5′ (3.2 m).
Bulb Length: 3-1/8″ (79.24 mm).
Weight: 2 lb (900 g).



Key	
1	Pointer
2	Scale plate
3	Glass disk
4	Cover
5	Case
6	Bracket
7	Terminal
8	Setting pointer
9	Setting knob
10	Capillary
11	Flexible tube
12	Thermobulb

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.
Phone: 219/879-8000 **www.dwyer-inst.com**
Fax: 219/872-9057 **e-mail: info@dwyermail.com**

Mechanical Installation

1. For mounting, select a clean, dry location, free from extreme temperatures.
2. Cut a 3-7/32″ (82 mm) diameter hole in the panel for the thermometer.
3. Prior to inserting the thermometer into the panel, remove the mounting bracket.
4. Insert the thermometer into the panel cutout from the front.
5. Place the U-bracket on the back of the thermometer (make sure the screws are aligned with the holes in the mounting bracket).
6. Secure the bracket into place by tightening the nuts until the bracket is tight against the panel.

NOTICE If panel thickness exceeds 13/64″ (5 mm), the bracket must be shortened accordingly.

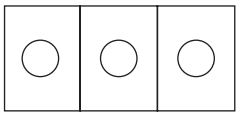
7. The probe should be mounted so the bulb is fully immersed in the media and where the media temperature will be evenly distributed.

NOTICE Since temperature effects along the capillary are compensated for, the capillary should not be located close to other temperature sources. Take care in arranging the steel capillary to avoid sharp bends that might kink internal capillary tube.

Electrical Connections

CAUTION Do not exceed the specified electrical ratings shown on the unit. Permanent damage, not covered by the warranty, will result.

1. Connections for the switch are made by three connections. The quick connect terminals are labeled N.O., N.C., and COM. N.O. is the normally open terminal, COM is the common terminal, and N.C. is the normally closed terminal.
2. For NC (normally closed) operation, make switch connections using terminals COM and N.C.
3. For NO (normally open) operation, make switch connections using terminals COM and N.O.



C : COMMON
NO : NORMAL OPEN
NC : NORMAL CLOSE

Set Point Operation

The switch set point is fully adjustable across the entire range of the unit. The unit is equipped with internal stops at the minimum and maximum values of a specified range.

Adjust the set point by rotating the black knob on the front of the dial case to the desired temperature setting.

MAINTENANCE/REPAIR

Upon final installation of the Series RRT3, no routine maintenance is required. The Series RRT3 is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

WARRANTY/RETURN

Refer to “Terms and Conditions of Sales” in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

Printed in U.S.A. 5/18

FR# 443930-00 Rev. 2

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.
Phone: 219/879-8000 **www.dwyer-inst.com**
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SECTION 7.3

PRESSURE SWITCH AND TRANSMITTER

Atlas Copco Compressors LLC
South Region Customer Center
15045 Lee Road
Houston, Texas 77032

Telephone: (281) 776-4900
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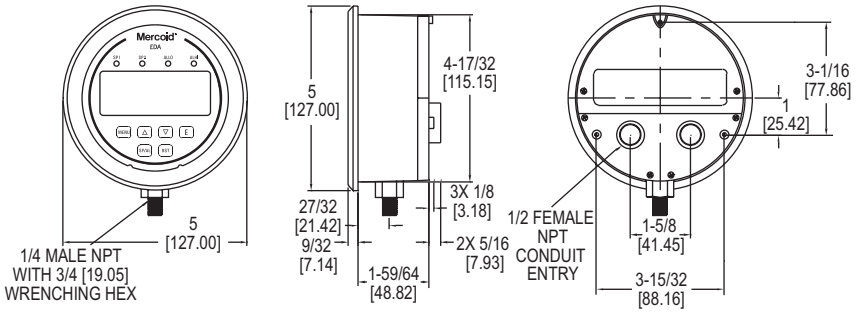
ELECTRONIC PRESSURE CONTROLLER

2 Switches, Indicating Gage, and Transmitter in One Package



Series EDA Electronic Pressure Controller is an extremely versatile compact package that can replace a separate gage, two switches, and a transmitter in a system saving money, installation time, and panel space. The EDA incorporates two SPDT relays that have the on and off points fully adjustable over the range for control or alarm use. Front face has LED indicators for switch status and a large backlight two-line display showing process value and indication units. Programming is easy with simple menu structure, two-line display, and external programming buttons. Weatherproof housing is ideal for a wide variety of applications with panel mount, flush mount, or pipe mount ability. Features include zero set, adjustable dampening, menu lock out, peak and valley indication, removable terminal blocks, adjustable time delay, and scalable transmitter output.

FEATURES/BENEFITS

- Versatile compact package that can replace a separate gage, two switches, and a transmitter in a system saving money, installation time, and panel space
- Fully programmable to meet simple or complex application needs
- Test mode function simulates input over the range without pressuring to easily test switches and transmitter output function
- Fail-safe relay output choices in case of sensor failure, over pressure, high temperature limit, low temperature limit, or keypad short
- Selectable alternation of set points between the relays for even wear on duplex pump applications
- Weatherproof housing is ideal for a wide variety of applications with panel mount, flush mount, or pipe mount ability

APPLICATIONS

- Process control
- Compressor control
- Filter status
- Duct or building static pressure
- Damper and fan control

SPECIFICATIONS

Service: Compatible liquids and gases.
Wetted Materials: 316L SS.
Housing: Polycarbonate.
Accuracy: ±1% of FS including linearity, hysteresis, and repeatability (indicator and transmitter).
Stability: < ±2% of FS per year.
Pressure Limits: 1.5 x range.
Temperature Limits: Ambient: 20 to 140°F (-6.6 to 60°C); Process: 0 to 176°F (-18 to 80°C).
Compensated Temperature Limits: 32 to 122°F (0 to 50°C).
Thermal Effect: ±0.05% of FS/°F.
Display: 4-digit backlit LCD (digits: 0.60˝H x 0.33˝ W).
Power Requirements: 12-30 VDC/AC.
Power Consumption: 2.5 watts.
Electrical Connections: Removable terminal blocks with two 1/2˝ female NPT conduit connections.
Enclosure Rating: Meets NEMA 4X (IP66).
Warm Up Time: <10 s.
Mounting Orientation: Any position.
Weight: 1.18 lb (535 g).
Agency Approvals: CE, UL.

SWITCH SPECIFICATIONS

Switch Type: 2 SPDT relays.
Electrical Rating: 5 A @ 120/240VAC, 1 A @ 30 VDC.
Repeatability: ±1% of FS (switching only).
Set Points: Adjustable 0-100% of FS.
Switch Indication: External LED for each relay on the front panel.
Switch Reset: Manual or automatic.

TRANSMITTER SPECIFICATIONS

Output Signal: 4-20 mA, 1-6 VDC, 1-5 VDC, 0-5 VDC, or 0-10 VDC (direct or reverse output selection).
Minimum Excitation: 14 VDC.
Zero and Span Adjustments: Menu scalable within the range.

MODEL CHART

MODEL #	EDA	W	-N1	E1	-02	T1		EDAW-N1E1-02T1
Series	EDA							Electronic pressure controller
Housing		W						Weatherproof
Process Connection			N1					1/4˝ NPT male bottom
Electrical Connection				E1				Two 1/2˝ female NPT conduit connections
Range					02			0-20 psi (1.379 bar)
					03			0-60 psi (4.14 bar)
					04			0-100 psi (6.89 bar)
					05			0-150 psi (10.34 bar)
					06			0-300 psi (20.68 bar)
					07			0-600 psi (41.4 bar)
					08			0-1000 psi (68.9 bar)
					09			0-1500 psi (103.4 bar)
					10			0-3000 psi (206.8 bar)
Transmitter Output						T0		None
						T1		4-20 mA
						T2		1-5 VDC
						T3		0-5 VDC
						T4		1-6 VDC
						T5		0-10 VDC

Mercoid®
By Dwyer

Series EDA Electronic Pressure Controller

Specifications - Installation and Operating Instructions

MERCOID A DIVISION OF DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.
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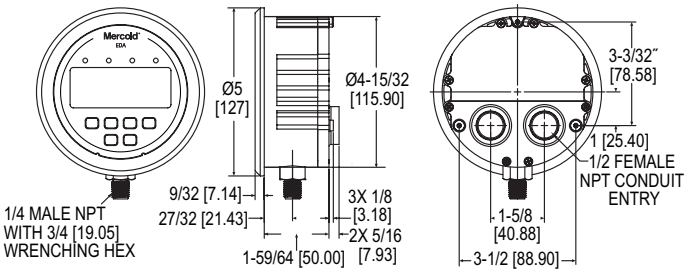
DIMENSIONS


Mercold
EDA
Ø5
[127]
Ø4-15/32
[115.90]
1/4 MALE NPT
WITH 3/4 [19.05]
WRENCHING HEX
9/32 [7.14]
27/32 [21.43]
3X 1/8
[3.18]
2X 5/16
[7.93]
1-59/64 [50.00]
3-3/32˝
[78.58]
1 [25.40]
1/2 FEMALE
NPT CONDUIT
ENTRY
1-5/8
[40.88]
3-1/2 [88.90]

SPECIFICATIONS

Service: Compatible liquids and gases.
Wetted Materials: 316L SS.
Housing: Polycarbonate.
Accuracy: ±1% of F.S. including linearity, hysteresis, and repeatability (indicator and transmitter).
Stability: < ± 2% of F.S. per year.
Pressure Limits: Ranges up to 6,000 psi: 1.5 x range; 8,000 psi range: 10,000 psi.
Temperature Limits: Ambient: 20 to 140°F (-6.6 to 60°C); Process: 0 to 176°F (-18 to 80°C).
Compensated Temperature Limits: 32 to 122°F (0 to 50°C).
Thermal Effect: ±0.05% of F.S./°F.
Process Connection: 1/4″ NPT male, 1/4″ BSPT male, or 7/16" SAE.
Display: 4-digit backlit LCD (Digits: 0.60″H x 0.33" W).
Display Update: 600 ms (dampening set to 1).
Power Requirements: 12 to 28 VDC (⎓) / AC (~) 50/60 Hz. (Can work at 8 VDC (⎓) for 45 seconds). For T5 option: 14 to 30 VDC (⎓) / AC (~) 50/60 Hz.
Power Consumption: 2.5 watts.
Electrical Connections: Removable terminal blocks with two 1/2″ female NPS conduit connections.
Enclosure Rating: Weatherproof type 4X IP65 (IP65 not evaluated by UL).
Warm Up Time: <10 seconds.
Mounting Orientation: Any position.
Weight: 1.18 lbs (535 g).
Installation Category: II (transient over-voltage).
Pollution Degree: 2.
Altitude Limit: 6560 ft (2000 m) max.
Environment: Intended for indoor and outdoor use.
Humidity: 0 to 95% RH up to 104°F (40°C) non-condensing, 10 to 50% at 140°F (60°C) non-condensing.

SWITCH SPECIFICATIONS

Switch Type: 2 SPDT relays.
Electrical Rating: 5A @ 120/240 VAC (~) 50/60 Hz, 1A @ 28 VDC (⎓).
Repeatability: ±1% of FS (switching only).
Set Points: Adjustable 0-100% of FS.
Switch Indication: External LED for each relay on the front panel.
Switch Reset: Manual or automatic.

TRANSMITTER SPECIFICATIONS

Output Signal: 4 – 20 mA, 1 - 6 VDC (⎓), 1 - 5 VDC (⎓), 0 - 5 VDC (⎓), or 0 - 10 VDC (⎓)(direct or reverse output selection).
Minimum Excitation: 14 VDC (⎓).
Zero and Span Adjustments: Menu scalable within the range.

MODEL CHART								
MODEL	**EDA**	**W**	**N1**	**E1**	**02**	**T1**		**EDAW-N1E1-02T1**
Series	EDA							Electronic pressure controller
Housing		W						Weatherproof
Process Connection			N1					1/4″ Male NPT
Conduit Connection				E1				Two 1/2″ NPT
Range					01			01 0-30 IN HG VAC
					02			02 0-20 PSIG
					03			03 0-60 PSIG
					04			04 0-100 PSIG
					05			05 0-150 PSIG
					06			06 0-300 PSIG
					07			07 0-600 PSIG
					08			08 0-1000 PSIG
					09			09 0-1500 PSIG
					10			10 0-3000 PSIG
Transmitter Output						T0		None
						T1		4 to 20 mA
						T2		1 to 5 VDC
						T3		0 to 5 VDC
						T4		1 to 6 VDC
						T5		0 to 10 VDC

Display

The EDA has two displays: a lower larger display and a smaller upper display. The Home Display is the normal display while the control is in operation if there are no errors or functions active. The Home display will indicate the process variable at the current condition with the lower display and the selected pressure units for the process variable with the upper display. When programming the unit both displays are also used. The Programming Chart in this instruction manual indicates what both displays show while programming the unit. For programming descriptions in this instruction manual the format used is “lower display – upper display”. For example Ctrl – 1SP shows that Ctrl would be in the lower display and 1SP would be in the upper display.

When the user presses the E key to edit an item’s value the upper display will flash “EDIT” and the lower display will blink. When the user presses the E key to then save the edit to the value the upper display will flash “SAVE” and the lower display will stop blinking.

1.0 INSTALLATION

1.1 UNPACKING

Remove the EDA from the shipping carton and inspect for damage. If damage is found, notify the carrier immediately.

1.2 MOUNTING

The EDA can be pipe, panel, or surface mounted. For pipe mounting thread the unit into a mating female fitting on the pipe. Use a wrench on the 3/4″ hex at the base of the housing to tighten the unit to the mating fitting. Do not thread the unit in by force on the housing. For panel mounting, insert the unit into the panel opening and secure in place with the machine screws and adapters provided with the unit as shown in Figure 1 below. Maximum panel thickness is 1/8" (3.5 mm) with supplied screws. For surface mounting, panel mount the unit into the A-EDA-BRK mounting bracket (See the Dwyer catalog or website for ordering details) also shown in Figure 1. The unit can also be directly surface mounted, as shown in Figure 2, with the proper panel cutout for the conduit entrances. Support the pressure connection hex with a wrench if attaching a fitting to the unit in the case of panel or flush mounting so that the pressure connection does not twist. Use a small amount of plumber's tape or other suitable sealants to prevent leaks around fitting.

Figure 1: Panel Mounting and Mounting in A-EDA-BRK Bracket

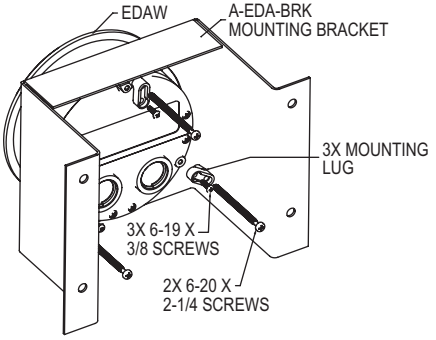
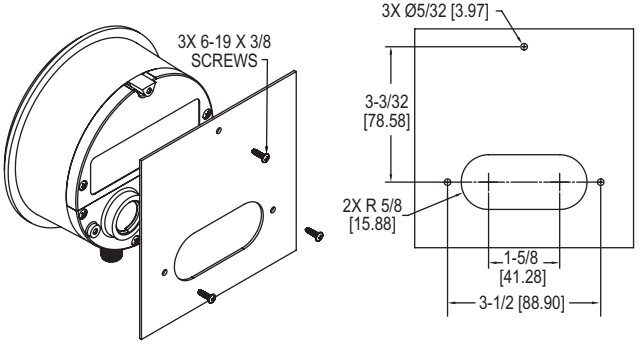


Figure 2: Surface Mounting



1.3 ELECTRICAL CONNECTIONS

DANGER **ELECTRIC SHOCK HAZARD.** DISCONNECT POWER BEFORE MAKING ELECTRICAL CONNECTIONS. Failure to do so will result in injury or death.

CAUTION **EQUIPMENT DAMAGE.** Do not exceed the specified supply voltage rating. Failure to do so may result in permanent equipment damage.

CAUTION **EQUIPMENT DAMAGE.** Do not allow wire to touch or press on PCBA components when fishing wire through the conduit connection. Failure to do so may result in damage to the circuitry.

NOTICE To maintain Type 4X rating of the enclosure, 1/2 NPT conduit fittings must have a UL Type 4X outdoor rating.

Note: Installation must be made in accordance with local codes and regulations.

Electrical connections are made to the removable terminal blocks inside the enclosure. Remove the top back cover, do not remove bottom cover. Feed stripped and tinned leads through the conduit opening and connect them as shown in Figure 3. The EDA provides two 1/2″ NPT female ports for conduit connection. The conduit connections must be made such that condensation is not allowed to enter the sensor housing. If necessary install a conduit breather drain in a separate conduit body to prevent buildup of moisture. It is recommended that shielded twisted pair wire be used for the transmitter output option if the potential exists for interference from external noise sources. When replacing top back cover tighten screws to 2 ±.25 in. lbs.

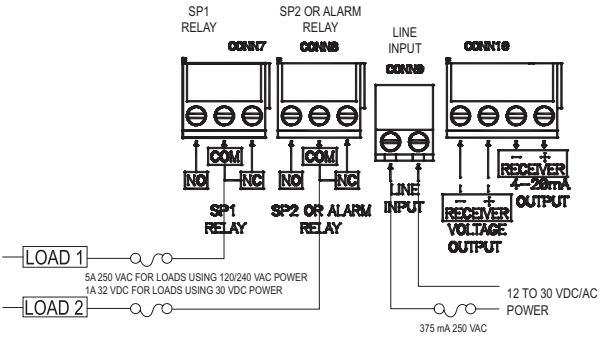


Figure 3: Wiring
An external power supply of 12-28 VDC/ AC with minimum current capability of 200 mA must be used to power the unit. The power supply connection is not polarity sensitive so the positive and negative connections may be made to either terminal of CONN9 terminal block. For voltage output option, connect the voltage receiver (-) to terminal 1 and voltage receiver (+) to terminal 2 of the CONN10 terminal block. For current output option, connect the current receiver (-) to terminal 3 and current receiver (+) to terminal 4 of CONN10 terminal block. DO NOT APPLY EXTERNAL POWER TO CONN10 TERMINALS - PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT.

Loads can be connected to connectors CONN7 and CONN8 terminal blocks based on the Control settings:

- For single set point mode (**CtrL-1SP**), connect the Load to **SP1** relay (CONN7).
- For two set points mode (**CtrL-2SP**), connect the Load1 to **SP1** relay (CONN7) and Load2 to **SP2** relay (CONN8).
- For single set point and alarm mode (**CtrL-SPAL**), connect the Load1 to **SP1** relay (CONN7) and Load2 to **ALARM** relay (CONN8).

Wiring
An external switch or circuit breaker should be added to during the installation as a disconnecting device. The switch or circuit breaker must meet the requirements of IEC 60947-1 and IEC 60947-3, shall disconnect all current carrying conductors, and shall not interrupt the protective earth ground. The disconnecting switch or circuit breaker must be marked or labeled with the symbols “I” for on and “O” for off, per IEC 60417-5007 & IEC 60417-5008 and shall be marked as “Disconnecting Device”. Do not position the PLS in a space where it is difficult to operate the disconnecting device that provides power. 300V @ 90°C 18 AWG/0.75 mm2 wiring with PVC or equivalent insulation with 94-V0 or FV-0 flammability rating is recommended for the switch outputs and power. Terminal blocks rated for 16-22 solid or stranded copper conductor. 6 lb in is suggested tightening torque.

NOTICE As a permanently installed piece of equipment, a power disconnect switch, circuit breaker, or other approved disconnect device must be installed in close proximity to the installed board and within easy reach of the operator. This disconnect device must include a label indicating its function as a mains disconnect. A circuit breaker or fuse device is recommended (see Figure 3).

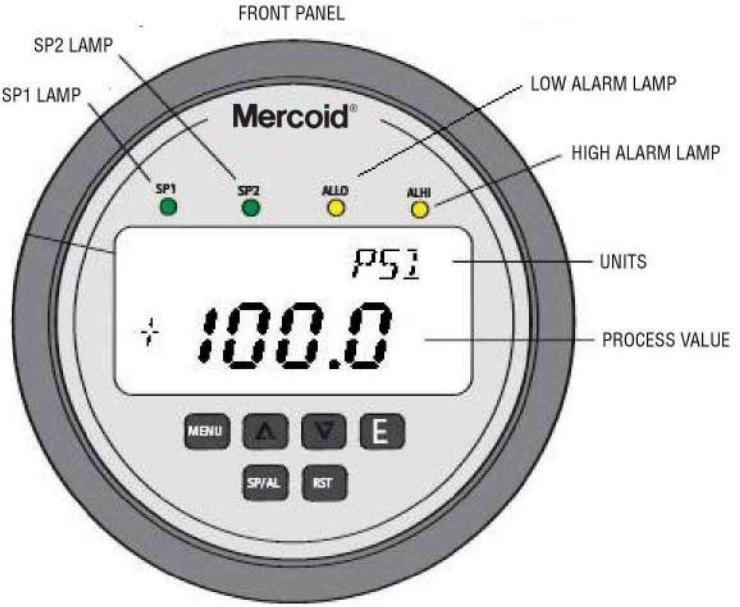
Explanation of Symbols:

Symbol	Publication	Description
⎓	IEC 50417 - 5031	Direct current
~	IEC 50417 - 5032	Alternating current
⏚	IEC 50417 - 5019	Protective conductor terminal
|	IEC 50417 - 5007	On (supply)
○	IEC 50417 - 5008	Off (supply)

2. OPERATING INSTRUCTIONS

2.1 FRONT PANEL & KEY FUNCTIONS

Figure 4: Front Panel Functions



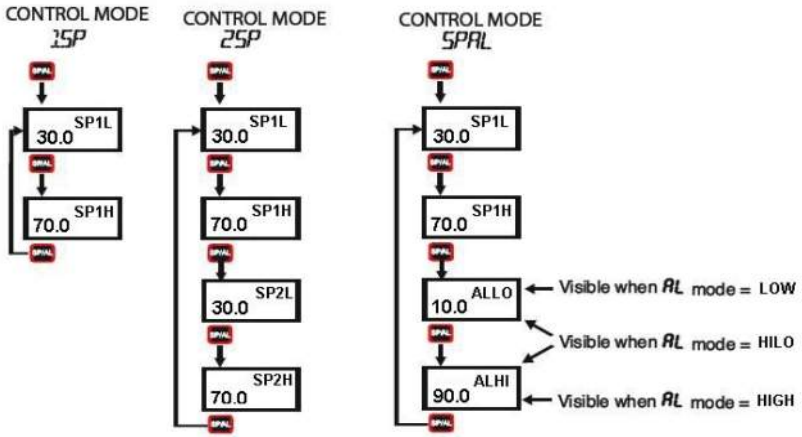
Key Functions			
	Home Position Function	**Main Menu Function**	**Item Function**
SP/AL **SP/AL**	Sequences the display through SET POINT and ALARM settings	Return to home position	Return to home position
MENU **MENU**	Allows access to menus	Return to home position	Return to previous menu
△ **UP ARROW**		Sequences through menus	Increments a value
▽ **DOWN ARROW**		Sequences through menus	Increments a value
E **ENTER**	Displays full scale range of unit	Enter into items	Changes a value or setting. Press Enter and display will blink. Adjust with UP or DOWN arrows. Press ENTER to store. Display will stop blinking.
RST **RESET**	Clears or resets an Alarm (alarm set for manual reset)		Peak/Valley resets display to present value.

2.2 SET POINTS & ALARMS

Setting Set Points and Alarms

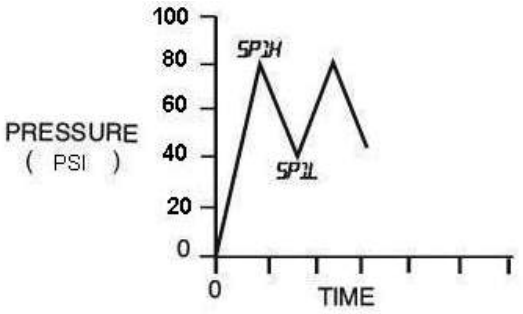
The SP/AL hot key provides direct access to the Set Point and Alarm settings.

The Set Point and Alarm settings that are displayed are based upon the Control (CtrL) menu item.



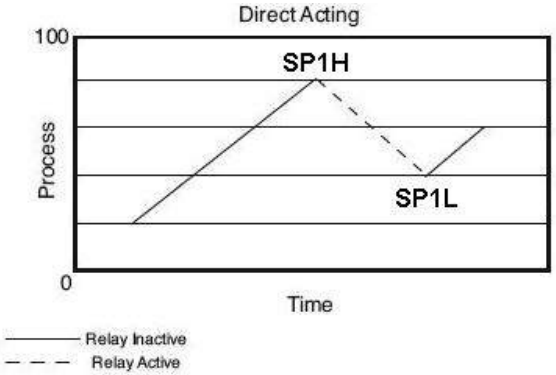
Set Point Adjustment

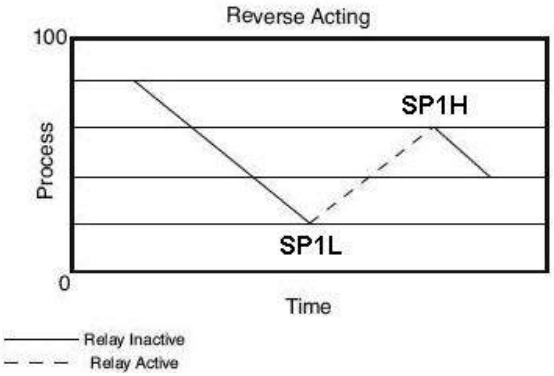
Adjusting the set points is quick and simple. Instead of setting a set point and dead band, simply adjust SP1H, Set Point 1 High, and SP2H, Set Point 2 High, for the desired relay turn on point, and then adjust SP1L, Set Point 1 Low, and SP2L, Set Point 2 Low, for the desired relay turn off point.



In the above graph, an instrument with a 100 psi range would have the **SP1** relay turn ON at 80 psi and OFF at 40 psi. **SP1H** sets the relay turn ON point, and **SP1L** sets the relay turn OFF point.

Relay Action





The relays outputs normally function in the direct acting mode, which means the relays turn ON with an increase in pressure. **SP1** and **SP2** may be configured to act as reverse acting relays (refer to the **CtrL** menu item). When set for reverse acting, **SP1H** and **SP2H** set the relay turn OFF point, and **SP1L** and **SP2L** set the relay turn ON point. The above graph demonstrates direct and reverse action on process (pressure) change.

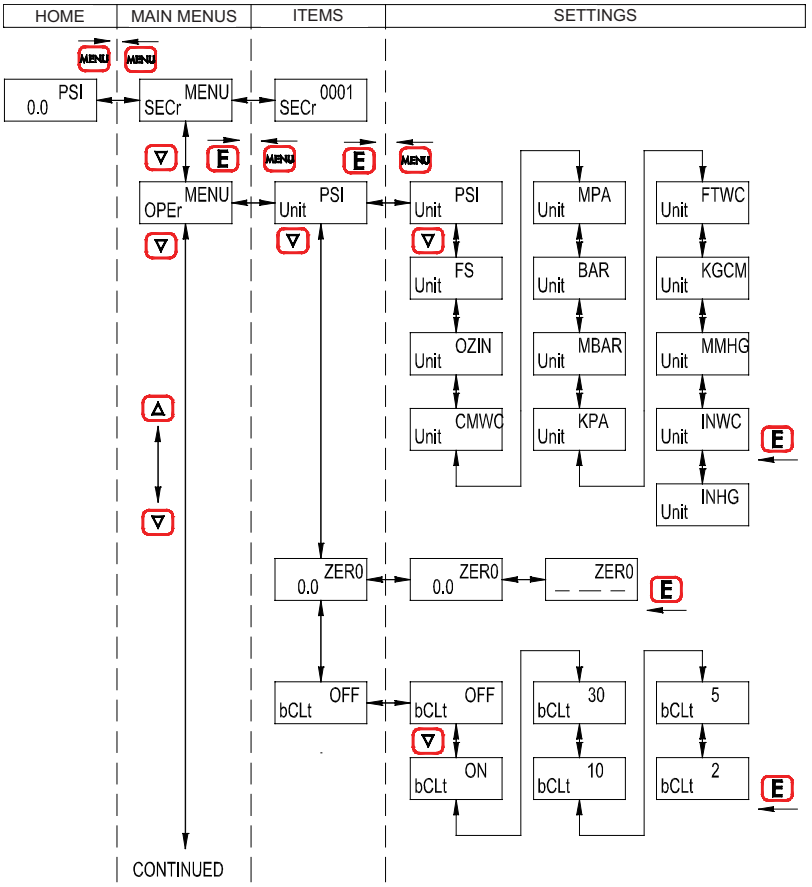
Alternating (Lead/Lag) Operation

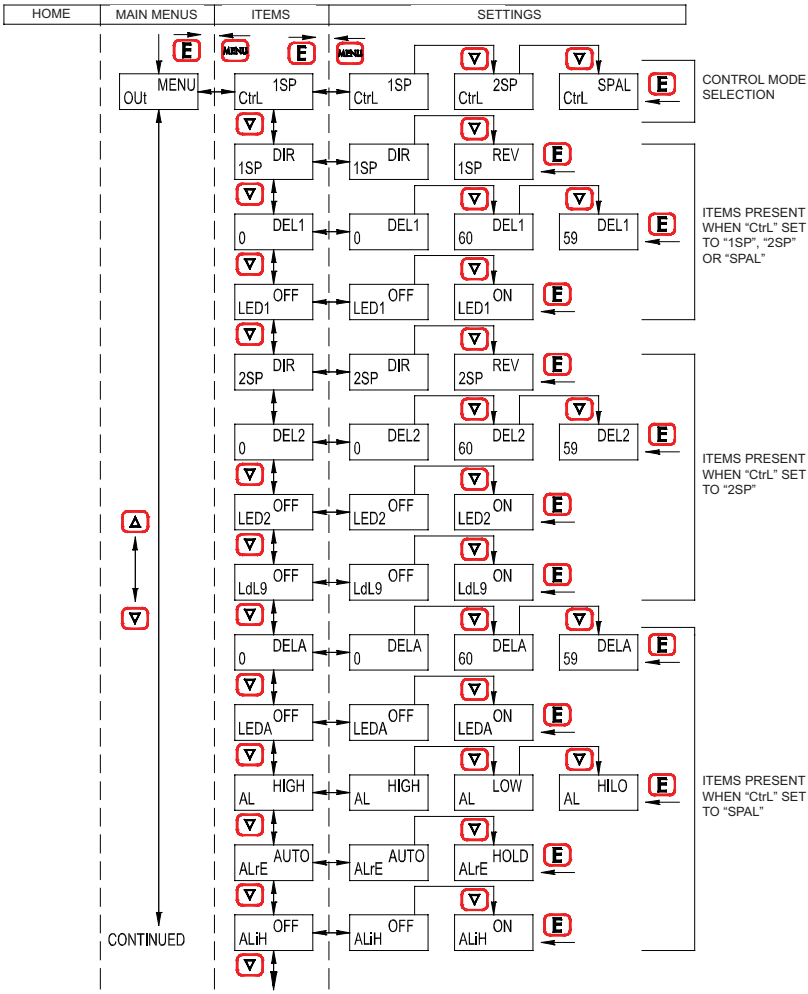
The EDA is designed to easily operate a pair of pumps in an alternating operation to minimize pump wear. The unit has programmable on and off set points for pump one and two. If the lead/lag feature is turned off then the relays remain attached to their corresponding set points, **SP1H** and **SP1L** control relay 1 (pump 1) and **SP2H** and **SP2L** control relay 2 (pump 2). There is no alternating function.

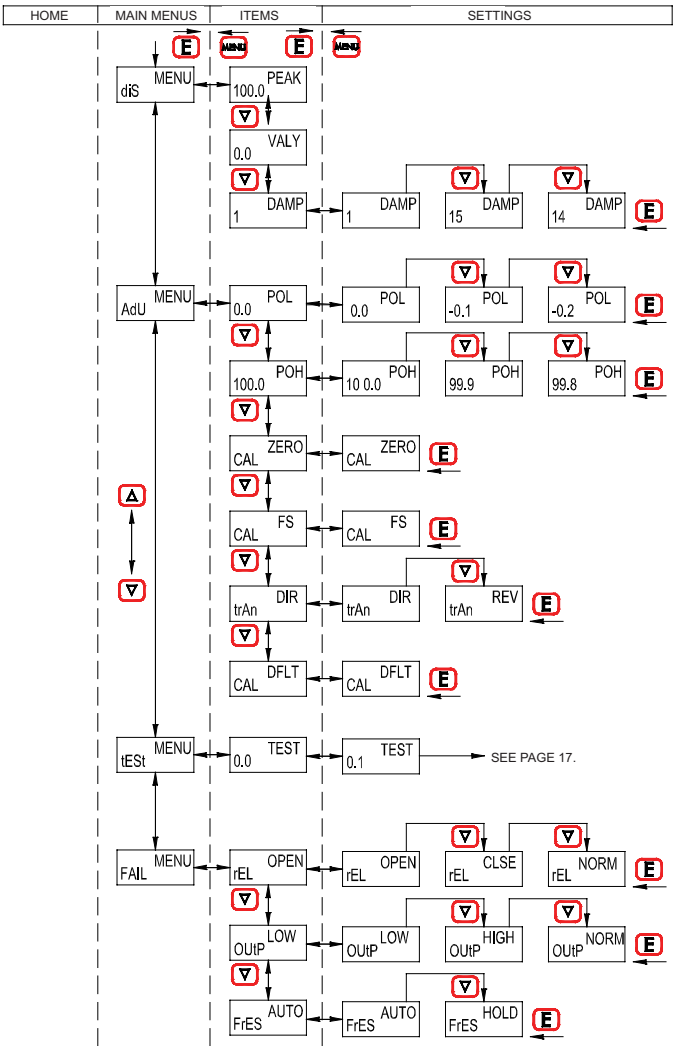
If lead/lag feature is turned on then the relays will alternate with set points **SP1H** and **SP1L** to **SP2H** and **SP2L** with every cycle of set points. The Last relay turned off will be last relay turned on with the next cycle. On the first cycle on increase of pressure, assuming direct acting, the **SP1** relay (pump 1) will come on and then on further increase of pressure the **SP2** relay (pump 2) will come on. On the subsequent decrease of pressure the **SP2** relay (pump 2) will come off and then the **SP1** relay (pump 1) will come off. When pressure increases on the next cycle the relay used on the last cycle for **SP2** will now be used for **SP1**, so that **SP1** now controls pump 2 and **SP2** now controls pump 1. Even if **SP2** is not used on the pressure cycle the relays still alternate on next cycle.

2.3 PROGRAMMING CHART

MENU MAP




HOME
MAIN MENUS
ITEMS
SETTINGS
MENU
OUt
CtrL 1SP
CtrL 2SP
CtrL SPAL
CONTROL MODE SELECTION
1SP DIR
1SP REV
0 DEL1
60 DEL1
59 DEL1
ITEMS PRESENT WHEN "CtrL" SET TO "1SP", "2SP" OR "SPAL"
LED1 OFF
LED1 ON
2SP DIR
2SP REV
0 DEL2
60 DEL2
59 DEL2
ITEMS PRESENT WHEN "CtrL" SET TO "2SP"
LED2 OFF
LED2 ON
LdL9 OFF
LdL9 ON
0 DELA
60 DELA
59 DELA
LEDA OFF
LEDA ON
AL HIGH
AL LOW
AL HILO
ITEMS PRESENT WHEN "CtrL" SET TO "SPAL"
ALrE AUTO
ALrE HOLD
ALiH OFF
ALiH ON
CONTINUED


HOME
MAIN MENUS
ITEMS
SETTINGS
MENU
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PEAK
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DAMP
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REV
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DFLT
CAL
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MENU
tESt
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0.0
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SEE PAGE 17.
MENU
FAIL
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CLSE
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NORM
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LOW
OUtP
LOW
OUtP
HIGH
OUtP
NORM
OUtP
AUTO
FrES
AUTO
FrES
HOLD
FrES

2.4 MAIN MENU SELECTIONS

Menu Selections
Press the **MENU** button to start the menu so that the upper right displays reads **MENU**. Press the ▼ key to advance to the next menu item. You can press the ▲ key to go back to the previous menu. Press the **E** key to enter a menu.

SECr Security Menu
Lock out access to set point and alarm settings, or lock out access to all settings.

OPEr Operation Menu
Select pressure units, zero the display, and turn the backlight on or off.

Out Output Menu
Select relay mode of operation, alternating function, time delay, and lamp indication.

diS Display Menu
Monitor and adjust display related settings: Peak, Valley and Dampening.

AdU Advanced Functions Menu
Modify advanced function parameters: transmitter output scaling, direct or reverse output setting, calibration, or restoring factory default calibration.

tESt Test Menu
Simulate input over the range without pressure to test switch and transmitter output function.

FAIL Failsafe Menu
Set the relay and transmitter outputs to certain preset values when failsafe conditions occur. Error codes will show on the display indicating the problem. User chooses if relay is de-energized, energized, or no action taken. With transmitter option, user chooses an output of 3.6 mA, 22 mA, or no action taken.

Menus and Values

SECr Security Menu

SECr When the security item is selected, the present security level is displayed in the upper right hand display. To change the security level, adjust the number displayed to the password value in the Password Table, shown below, by pressing the ▲ or ▼ key and then pressing the E key at the desired security level.

Security Level Displayed	Access	Password Value to Enter
1	All menus access	10
2	Menu Access SP/AL Locked	70
3	SP/AL Access Menus Locked	90
4	All settings locked	111

The password values shown in the table cannot be altered, so retain a copy of these pages for future reference.

OPEr Operation Menu

Unit Pressure Units
With the display reading Unit - PSI, press the E key. The upper display will blink. Press the ▼ key to change unit then press E key to save the new unit.

PSI	Pounds per square inch
FS	% of full scale
OZIN	Ounces per square inch
CMWC	Centimeters of water column
MPA	Megapascals
BAR	Bar
MBAR	Millibar
KPA	Kilopascals
FTWC	Feet of water column
KGCM	Kilograms per square centimeter
MMHG	Millimeters of mercury
INWC	Inches of water column
INHG	Inches of mercury

Pressure Range vs. Available Units

PSI	KG/CM2	BAR	INHg	FTWC	KPA	MPA	INWC	MBAR	CMWC	MMHg	OZ/IN2	% FS
-14.70	-1.033	-1.013	-29.93	-33.94	-101.4	-0.101	-407.3	-1013	-1034	-761	-235.2	100
20.00	1.406	1.379	40.7	46.1	137.9	0.1379	554	1379	1406	1035	320.0	100
60.0	4.22	4.14	122.2	138.4	414	0.414	1663			3105	960	100
100.0	7.03	6.89	203.6	230.7	689	0.689	2771				1600	100
150.0	10.55	10.34	305.4	346.0	1034	1.034					2400	100
300.0	21.09	20.68	611	692	2068	2.068						100
600	42.2	41.4	1222	1384		4.14						100
1000	70.3	68.9	2036	2307		6.89						100
1500	105.5	103.4	3054	3460		10.34						100
3000	210.9	206.8				20.68						100
6000	422	414				41.4						100
8000	562	551				55.1						100

ZERO Auto Zero
Note: DO NOT apply any pressure when performing this function. With the display reading **xx - ZERO**, press the **E** key. The upper display will blink. Press **E** again to zero the display. The display will read 0.0 if the zero offset is less than ±5% of full scale.

bCLt Backlight

ON	Backlight always on.
OFF	Backlight always off.
30	Backlight stays on for 30 minutes.
10	Backlight stays on for 10 minutes.
5	Backlight stays on for 5 minutes.
2	Backlight stays on for 2 minutes.

OUt Output Menu

CtrL Control Mode
- **1SP** Single set point.
- **2SP** Two fully independent set points.
- **SPAL** Single set point and alarm.

1SP **SP1**, Set Point 1, Reverse or Direct Acting
- **DIR** Direct. Relay turns on with increasing pressure.
- **REV** Reverse. Relay turns on with decreasing pressure.

DEL1 **SP1**, Set Point 1, Time Delay
Sets the amount of time a set point condition must be continuously met before the set point condition is recognized. The **DEL1** delay is adjustable from 0-60 seconds.

LEd1 **SP1**, Set Point 1, Lamp
- **OFF** The **SP1** LED on the front panel turns OFF when the SP1 relay turns OFF.
  The **SP1** LED on the front panel turns ON when the SP1 relay turns ON.
- **ON** The **SP1** LED on the front panel turns ON when the SP1 relay turns OFF.
  The **SP1** LED on the front panel turns OFF when the SP1 relay turns ON.

The following **SP2** function values are only activated when **CtrL** is set to **2SP**:

2SP **SP2**, Set Point 2, Reverse or Direct Acting
- **DIR** Direct. Relay turns on with increasing pressure.
- **REV** Reverse. Relay turns on with decreasing pressure.

DEL2 **SP2**, Set Point 2, time delay
Sets the amount of time a set point condition must be continuously met before the set point condition is recognized. The **DEL2** delay is adjustable from 0-60 seconds.

LEd2 **SP2**, Set Point 2, Lamp
- **OFF** The **SP2** LED on the front panel turns OFF when the **SP2** relay turns OFF.
  The **SP2** LED on the front panel turns ON when the **SP2** relay turns ON.
- **ON** The **SP2** LED on the front panel turns ON when the **SP2** relay turns OFF.
  The **SP2** LED on the front panel turns OFF when the **SP2** relay turns ON.

LdL9 Relay Alternation (See page 8)
- **OFF** There is no alternating function.
- **ON** Relays will alternate with set points **SP1H/L** and **SP2H/L** with every cycle of set points. **2SP** control mode only.

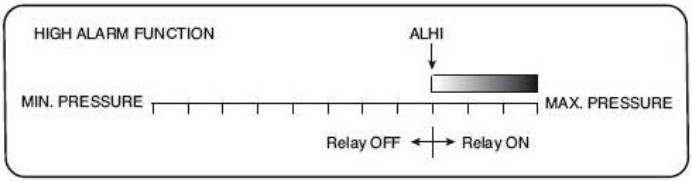
The following alarm function menu items are activated when **CtrL** is set to **SPAL**:

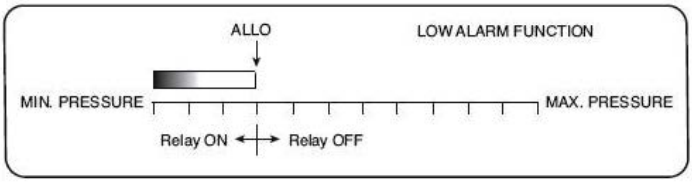
DELA Alarm Delay
Sets the amount of time an alarm condition must be continuously met before the alarm condition is recognized. The alarm delay is adjustable from 0 - 60 seconds.

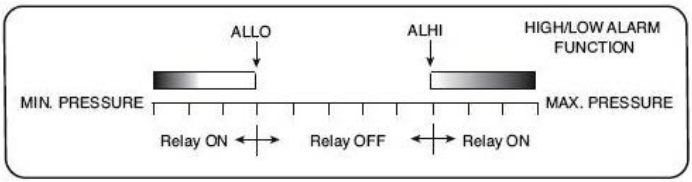
LEdA Alarm Lamps
OFF The **ALLO** LED or **ALHI** LED on the front panel turns OFF when the alarm relay turns OFF. The **ALLO** LED or **ALHI** LED on the front panel turns ON when the alarm relay turns ON.
ON The **ALLO** LED or **ALHI** LED on the front panel turns ON when the alarm relay turns OFF. The **ALLO** LED or **ALHI** LED on the front panel turns OFF when the alarm relay turns ON.

AL Alarm Type (see Alarm Adjustment below)
HIGH High alarm only.
LOW Low alarm only.
HILO For a high and low guard band type alarm. Share the same relay output.

Alarm Adjustment
Alarm settings are dependent upon the selected alarm type. The EDA pressure controller alarm may be configured as a High Alarm, Low Alarm, or High/Low Alarm. Alarm settings may be set to anywhere within the range of the instrument. The dead bands of the alarms are fixed at 1% of full scale.







ALrE Alarm Reset
AUTO Automatic reset.
HOLD Manual reset. An alarm is reset by pressing the **RST** key on the front panel.

ALiH Low Alarm Inhibit
OFF Alarm inhibit is off.
ON Alarm inhibit is on.
Note: If **ALiH** is selected ON, a low alarm condition is suspended upon power up until the process value passes through the alarm set point once.

diS Display Menu

PEAK Peak
The Peak feature stores the highest pressure reading the instrument has measured since the last reset or power up. At power up **PEAK** is reset to the present pressure reading. To manually reset the **PEAK** value, press the **RST** (RESET) key while in **PEAK**.

VALY Valley
The Valley feature stores the lowest pressure reading the instrument has measured since the last reset or power up. At power up **VALY** is reset to the present pressure reading. To manually reset the **VALY** value, press the **RST** (RESET) key while in **VALY**.

DAMP Dampening
Adjust from 1-15. Dampening stabilizes the display from instabilities due to things such as vibration and excessive pressure fluctuations. The dampening setting adjusts the amount of readings that are averaged for each display update. Adjust the dampening value until the display reads a stable value for the application.

AdU Advanced Menu

POL, Process Output Low, and **POH**, Process Output High are used to scale the transmitter output for a unit with the output option of 4 to 20 mA, 0-5 VDC, 0-10 VDC, 1-5 VDC, or 1-6 VDC. Below shows with 4 to 20 mA output option.

POL Process Output Low
Set to the desired display reading for the 4 mA output. May be set from 2% below minimum scale up to POH.

POH Process Output High
Set to the desired display reading for the 20 mA output. May be set from **POL** to 2% above maximum scale.

CAL – ZERO Zero Calibration
DO NOT apply any pressure when performing this function. With the display reading **CAL - ZERO**, press the **E** key. The upper display will blink. Press the **E** key again to complete the zeroing of the instrument or press the **MENU** key to cancel.

CAL – FS Full-scale Calibration
With the display reading **CAL - FS**, apply full-scale pressure to the unit, press the **E** key. The upper display will blink. Press the **E** key again to complete the calibration or press the **MENU** key to cancel.

trAn sets the transmitter output option function for a unit with the output option of 4 to 20 mA, 0-5 VDC, 0-10 VDC, 1-5 VDC, or 1-6 VDC. Below shows with 4 to 20 mA output option.

trAn

DIR Direct Output. 4 mA output at zero, 20 mA output at full scale pressure.
REV Reverse Output. 20 mA output at zero, 4 mA output at full scale pressure.

CAL - DFLT Factory Default Calibration
With the display reading **CAL - DFLT**, press the **E** key. The upper display will blink. Press **E** again to restore the original factory calibration values or press the **MENU** key to cancel.

tESt Test Menu

tESt When selected the unit simulates a pressure input over the range to test the programming and output function. To start an automatic simulated cycling through the pressure range press the **E** key. This test will run continually until the **E** key is pressed again. To manually adjust the simulated pressure press the ▲ or ▼ key to adjust the pressure value. To exit **tESt** press the **MENU** key.

FAIL Failsafe Menu

The Failsafe menu is used to set the relay and transmitter outputs to certain preset values when failsafe conditions occur. Error codes will show on the display indicating the problem. See Diagnostic Error Messages on the next page.

rEL Relay Output Failsafe Condition
- **OPEN** The relay is de-energized upon failsafe condition. The NO contacts will be opened, and the NC contacts will be closed.
- **CLSE** The relay is energized upon failsafe condition. The NO contacts will be closed, and the NC contacts will be opened.
- **NORM** No change applied to the relay upon failsafe condition.

OUtP sets the transmitter output option failsafe condition for a unit with the output option of 4 to 20 mA, 0-5 VDC, 0-10 VDC, 1-5 VDC, or 1-6 VDC. See below chart of transmitter output action according to output signal type.

OUtP Transmitter Output Failsafe Condition
- **LOW** Transmitter output goes to low failsafe condition.
- **HIGH** Transmitter output goes to high failsafe condition.
- **NORM** No change applied to transmitter output upon failsafe condition.

Output Signal	4-20 mA	0-5 VDC	0-10 VDC	1–6 VDC	1-5 VDC
LOW	3.6 mA	-0.125 VDC	-0.250 VDC	0.875 VDC	0.9 VDC
HIGH	22 mA	5.625 VDC	11.250 VDC	6.625 VDC	5.5 VDC

FrEs Failsafe reset
- **AUTO** Automatic reset - Failsafe is reset automatically when the failsafe error condition is removed.
- **HOLD** Manual reset - Failsafe is reset when the **MENU** key is pressed.

4. DIAGNOSTIC ERROR MESSAGES

Display	Meaning
Err1	Low temperature limit
	A temperature below 0°F has been applied to the sensor
Err2	High temperature limit
	A temperature above 180°F has been applied to the sensor
Err3	Sensor failure
	The micro-controller is receiving invalid signal from the sensor
Err4	Over pressure limit
	Proof pressure have been exceeded
Err5	Keypad short

5. MAINTENANCE/REPAIR

Upon final installation of the Series EDA, inspect and clean with water or damp cloth at regular intervals. The Series EDA is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty.

This symbol indicates waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your Local Authority or retailer for recycling advice.

6. WARRANTY/RETURN

Refer to “Terms and Conditions of Sales” in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

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SECTION 8

ZL INSTRUCTION BOOK

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Atlas Copco

INSTRUCTIONS FOR USE AND SERVICE MANUAL

Designed for blower assembly of the series:

- **ZL 100 – ZL 10000**

and blower of the series:

- **DI 6 – DI 120**

: **Machine type**:

: **Serial number**:

: **Production year**:

www.atlascopco.com

1. Content

2. Publisher details:

Registered office:
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Principal place of business:
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3. Machine designation

This manual is for:

Operating	Type
Blower assembly	ZL 1600
Blower element	DI 66

Specific machine identification:

Blower type / blower assembly:		
Serial number:		
Year of manufacture:		
Motor type (product code):		
Design parameters		
Suction pressure:	[kPa abs]	
Suction temperature:	[°C]	
Humidity:	[% rel]	
Power @ at the suction point:	[m3/h]	
Power @ at 0°C / 101.3 kPa / dry	[Nm3/h]	
Pressure difference:	[kPa]	
Pressure at discharge:	[kPa abs]	
Temperature at discharge:	[°C]	
Blower speed / Motor speed:	[1/min]	
Effective power input - blower shaft:	[kW]	
Power input at terminals:	[kW]	
Nominal motor power:	[kW]	
Transfer identification		
Blower (pulley / case):		
Engine (pulley / case):		
Belt:		

Table 1 – Machine identification

4. Declaration of conformity

The declaration made in paragraph 4.1**Chyba! Nenalezen zdroj odkazů.** appears in full as a separate appendix of this document. The general model of the declaration is outlined in Appendix I of this Manual.

4.1. Excerpt from the declaration

We, Atlas Copco s.r.o., declare under our sole responsibility that this product, which falls under the provisions of Article 12.2 of European Community Directive 2006/42/EC, complies with the relevant essential health and safety requirements of the above-mentioned Council Directive on the approximation of Member States' laws related to machinery. Information on the machine equipment can be obtained from Atlas Copco s.r.o., unless intellectual property rights would be violated. This equipment also meets the requirements of the guidelines and their supplements within the full meaning of this declaration.

4.2. Note

Atlas Copco s.r.o is not liable for any damage caused by the effects of the operating environment and the technological unit into which the equipment will be installed, including power supply, control circuits and other control or safety elements installed by the customer for specific control of the machine.

5. General description of the machinery

5.1. Basic information

The instructions for use and the service manual for the ZL blower assembly and DI blowers (hereinafter the "Manual") contain important instructions that must be observed from the moment the machinery is received and for its entire service life. The manual has been prepared for the complete ZL blower assembly (hereinafter), but it also applies to separately supplied DI blowers. ***Before installing the equipment and operating it, it is necessary to become familiar with this Manual, so as to ensure safe, trouble-free operation and achieve long service life.*** The Manual mentions and quotes safety regulations that are especially relevant to operation of the machinery. This Manual must always be available for the personnel entrusted with the machinery operation and maintenance, so that operation and maintenance related tasks are performed according to the instructions contained in the Manual. We advise that only professional Atlas Copco personnel perform repairs and reconstructions. During the warranty period, disassembly is performed only by professional Atlas Copco personnel or people authorised by them.

This Manual contains instructions for using standard blowers and assemblies used for air transport only. The instructions for the use of non-standard blowers and assemblies for the transport of other gases must be obtained from Atlas Copco.

In the event of a failure, the Atlas Copco service department must be contacted immediately. When asking questions, please provide the information on the model plate — the model and serial number of the assembly or blower.

5.2. Description of the blower

ZL model Atlas Copco blower assemblies are equipped with Atlas Copco blowers with Roots three-lobe DI rotors.

Roots Atlas Copco blowers operate on the principle of oil-free gas transport. These blowers are the most common two-rotor blowers. The rotors rotation axes are parallel, and their movement is connected to a synchronisation gear with the same number of teeth in both wheels. Synchronisation gear ensures non-contact rotor rotation; the rotors rotate against each other. Suction and discharge collar is joined between the rotor axes. Gas is transported by the blower without increasing pressure, and it is compressed in the discharge collar by the gas that has already been transported (blowers with external compression).

In the standard version, the rotor packings are labyrinthine, non-wearable. The excess pressure and negative pressure generated in the individual parts of the packing circuit is being balanced in its centre, which is additionally connected to the surrounding atmosphere by drilling. Therefore, the outlet of the air mass from the drilled holes is normal and its intensity depends on the state of clearance in the packings. If the oil is discharged during the outlet, it may be caused by a bearing failure or excessive oil. Because the labyrinthine packings do not guarantee an absolute tightness of the blower, the oil level in the reservoirs must not exceed the given limit. To prevent lubricating oil from leaking when it is transported or moved by the blower, fill the oil reservoir before starting the machine.

Blower drive

The blower is usually driven by an electric motor. Torque is transferred from the motor shaft to the blower shaft by a standard belt gear. The blower shaft is a part of one of the rotors.

5.3. Description of the assembly

Main parts of the assembly

- Air suction damper - resonant with replaceable filter insert
- Discharge damper - welded base frame structure with a container or with a resonant damper forms the carrier element for the blower and simultaneously for hanging and securing the rocker frame, hereinafter the motor rocker.
- Motor rocker - suspended by pins in the damper frame, allows the belt tensioning by tilting the motor.
- Clack valve - flanged, for discharge in negative pressure, for suction in excess pressure
- Safety valve - used to protect the blower from overload.
    - excess pressure: When opened, air (gas) is released into the atmosphere. In smaller assemblies, the valves are directly controlled, in a form of spring, where the opening pressure is set by pre stressing the spring. Larger assemblies (from ZL 1000) are protected by indirectly controlled safety valves combined with starting valve function — see the PVO valve description.
    - negative pressure: If the negative pressure set by the string is exceeded, the seat is lifted and air is sucked into the suction pipe from the atmosphere. The valves are directly controlled, in the form of spring, where the opening pressure is set by pre stressing the spring
- Compensator - flanged with metal bellows

- Electric motor - single turn spindle, exceptionally double turn, with the possibility of operation via frequency converter, with optional attributes according to customer's requirements and possibilities of the motor manufacturer.
- Belt drive with V-belts or toothed belts
- Belt guard - made of conventional construction steel

CAUTION

- **The standard assembly located in the sound enclosure is not equipped with a belt drive guard because this function is carried out by the sound enclosure.**

- Feet with rubber springs - to minimise vibration transfer to the base
- Visual indication of the suction filter clogging, in the case of an assembly, there is a manometer in the sound enclosure instead of an indicator
- Excess pressure manometer at discharge or negative pressure manometer for suction
- Optional equipment:
  - Manometer at suction or electrical filter clogging indicator instead of a visual indicator
  - Electric motor. Single phase, double phase or variable speed drive with frequency converter can be selected
- Accessories:
  - Sound enclosure for indoor or outdoor installation
  - Sound enclosure + pulley guard
  - Pressure and temperature sensors
  - Electrical switchboard with control unit including pressure and temperature sensor at the output
  - Supplementary discharge damper of a negative pressure assembly, to reduce the noise level when air is exhausted in the assembly (usually with a sound enclosure)
  - According to special customer requirements

Sound enclosure

Sound enclosures are used to reduce the noise levels created by the assembly. The enclosures are steel with absorbent damping material. The enclosures are equipped with a ventilator for forced ventilation. The cooling air suction and discharge holes are fitted with dampers.
For forced ventilation, a ventilator in K42 - K802 enclosures sucks the air out of the enclosure. For K1002 size, the air is sucked into the enclosure.

In terms of design, two types of enclosures are distinguished. For small assemblies up to size ZL 2500 with the KN202 enclosure, the assemblies are installed and attached to the base frame of the enclosure. The assembly is anchored to the base through the base frame of the enclosure. From ZL 3000 size with the K302 enclosure, the enclosure has no base frame and the assembly is not firmly attached to the frame. The enclosure and the assembly are attached to the base separately. Dimensional images of the enclosures are included in the current Atlas Copco catalogue.

A machine with the enclosure can be placed both outside and inside. Outdoor enclosures generally differ from indoor enclosures by the use of a different type of outdoor painting and sealing of the joints to prevent water from flowing into the enclosure. Enclosures with size up to KN202 are further supplemented with rain gutters to ensure proper drainage of the water flowing down the enclosure.

CAUTION

- **Forced ventilation of the enclosure does not replace ventilation of the machine room.**

5.4. Combined safety and starting PVO valves

Function

Combined PVO valve carries out two functions. When starting the blower, it gradually increases the pressure of the air mass and thus also the torque - ***function of the starting valve.*** In operation, it protects the blower from overloading (pressure rise above the acceptable limit) - ***function of the safety valve.***

Description of the valve

The numbers of the main parts correspond with the position numbers on the combined PVO valve assembly shown as Appendix II: Control valve (1), movable base (2), bottom base (3), upper base (4), bellows flange (5), tube (6), guide bar (7) bellows (14) springs (15).

Starting valve function

In the state without pressure, the main valve is opened - the lower base (3) is lifted by springs (15). The gap between the seat and valve head allows to create pressure that is applied by the control valve to the bellows when the blower is started. Due to dominance of the bellows to the seat in terms of covered surface and force, the bellows closes within a few seconds with a gradual increase of pressure to allow the blower to start with a continuous load increase. The bellows must compress the springs to ensure that the valve is opened in unloaded state. If the valve were not opened in the unloaded state, it would not fulfil the starting valve function. Therefore, by removing these springs, the starting valve function can be deactivated.

Safety valve function

Under normal operating conditions, i.e. after the blower starts, the main valve head is closed. The control valve connects the outlet pipe space and the bellows space. When the pressure is raised above the set limit, the control valve releases the pressure into the atmosphere. This lowers the pressure in the bellows and the main valve head opens. When the pressure drops, the control valve stops releasing the pressure into the atmosphere, pressure in the bellows raises again and the main valve head closes.

5.5. Symbols used in the Manual

5.5.1. Commands

	
Command: Read the User Manual!	***Command: Wear ear protection!***

Table 2 – Commands

5.5.2. Cautions

	
Caution: Ignoring these instructions may cause equipment damage or minor injury	***Caution: High temperature risk***

Table 3 – Cation

5.5.3. Prohibitions

	
Prohibition: Do not start!	***Prohibition: Do not use a hammer!***

Table 4 – Prohibitions

5.5.4. Information

	
Oil filling	***Suspension***

Table 5 – Information

5.6. Description of intended use

The blowers serve to transport and compress or suck gas. Considering that the rotors do not touch each other and do not come into the cabinet, the transported medium is not contaminated, even by oil, during transport.

- Waste water treatment plants
  - increasing the amount of oxygen in the water, keeping the bacteria in the uplift
  - Ventilation of activation tanks or sand traps in water treatment plants
- Pneumatic transport
  - Transport of all kinds of loose materials, granules, masses of different grain size
- Different
  - Filter blowback in drinking water treatment plants
  - Release of forces (tanks)
  - Curing loose substances and mixtures
  - Negative pressure transport
  - Air outlets in different technologies up to a maximum pressure of 50 kPa abs.
  - Supply of process air up to a maximum pressure of 100 kPa

Working media

Standard blowers are designed to compress or suck air or non-aggressive and non-explosive gases. When working in an environment with explosive hazards, when working with high-humidity gases or aggressive gases, it is necessary to use Atlas Copco blowers and assemblies designed and manufactured especially for these purposes.

Suction and discharge temperature

Suction and discharge temperature depends on the compression level. Suction and discharge temperature is shown in the blower assembly parameter calculation, or in chapter 3 of this Manual. The calculation is part of the assembly offer. Maximum media temperature upon discharge from a standard blower must not exceed **140°C.**

Suction and discharge pressure

Suction and discharge pressure is shown on the assembly model plate and in the blower assembly parameter calculation or in chapter 3 of this Manual. The assembly model plate shows the maximum allowable pressure difference for which the motor power input is dimensioned and also the safety valve is set. The pressure at the blower discharge flange is designated as p_v, the pressure at the blower suction flange is designated as p_s , the pressure at the assembly connection flange to the pipe system is designated as p_3.

Lubricant specification

The following table shows the **approximate** blower oil fill amounts.

Oil volume			
Oil			
Type	Propulsion side [l]	Gear side [l]	Total [l]
DI 65, 66	0.510	1.050	1.560

Table 6 – Oil volume

CAUTION

- **The prescribed oil is completely synthetic motor (automotive) oil, class SAE 5W-40, classifications: ACEA A3/B3; API SM/CF; API CJ-4; longlife; etc. The type of recommended oil is listed in the following table:**

Recommended lubricant:	Atlas Copco PAROIL E-xtra			Atlas Copco Airpower nv Boomsesteenweg 957 B-2610 Wilrijk, Belgium
Viscosity class:	SAE 5W-40			
Service category:	API CJ-4			
	Method	Value	Unit	Distribution
Kinematic viscosity at 40°C:	ASTM D 445	88.5	[mm^2/s]	**Atlas Copco s.r.o. Průmyslová 10 102 00 Prague 10 Czech Republic**
Kinematic viscosity at 100°C:	ASTM D 445	14.6	[mm^2/s]	
Viscosity index:	ASTM D 2270	160	[-]	
Burning point:	ASTM D 92	232	[°C]	
Freezing point:	ASTM D 97	-42	[°C]	

Table 7 – Type of oil

Use of other oils (such as for food industry applications) must be checked with Atlas Copco. Lubrication of electric motors is described in a separately included Electric Motor Manual. There are no other lubrication areas on the assembly.

Maximum temperature of the lubrication system

The maximum temperature of the oil must not exceed **120°C**, which is associated with standard bearing stabilisation in the blower.

Pulley rotation speed

The maximum rotation speed of the pulley is the same as the maximum rotation speed of the blowers. Using a pulley cover frame or sound enclosure ensures adequate strength in case of the tear or rupture of the pulley guard by a snapped belt.

Speed of working media

- speed in the openings for air mass entry and exit from the machine room — 5 to 10 m/s
- recommended speed in pipes — 22 m/s
- maximum speed in discharge pipes — 35 m/s
- maximum speed in suction pipes — 30 m/s

Required safety devices

If a manometer is not included in the delivery, ***it must be fitted to the blower discharge pipes***. The manometer must be glycerine based or with a damper, to ensure its reliable functioning.

Recommended for operation at temperatures up to 0˚C

The lower limit of ambient temperature at which the assembly can be operated stably is **–20°C**. For a short time the assembly can be operated up to **–30°C.** This limitation applies mainly to commonly used materials, belts, standard electric motors and PVO valves. No water cooling is part of the assembly. The condensate produced in the discharge pipes in a minimal amount can not affect the operation of the assembly.

5.7. Delivery, transport, data for transport and storage

5.7.1. Delivery

The assemblies are delivered assembled as a complete unit. The belts are supplied unassembled, the rocker frame of the motor (hereinafter referred to as the rocker) is secured in the lower position by screws. Compensators and clack valve of larger assemblies supplied with enclosures from size K302 are supplied unassembled. **The blowers are delivered without oil**, accessories designated in the contract of purchase are part of the delivery.

5.7.2. Transport

Assemblies must be transported in a covered cargo space.

CAUTION

- **The assembly must be transported with the belts removed! Otherwise the shafts and bearings can be damaged. The rocker must be secured in the lower position with the appropriate screws during transport!**

5.7.3. Acceptance

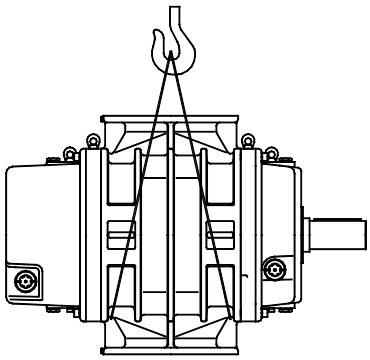
When the delivery arrives, it is necessary to check it for completeness against the packing slip. Any damage caused by transport must be recorded in writing **in the presence of the carrier**, and the carrier must immediately return the confirmed record to the supplier.

5.7.4. Handling

Handling requires use of a lift truck or crane, as described below.

Blower

The method of handling the blower is shown in the picture. Handling requires a soft rope sling or a steel rope, padded so as not to damage the paint.



CAUTION

- **Never hang the blower by its flange.**

The assembly

Handling the assembly requires a lift truck or a crane. The ideal method of handling is shown in the following pictures. Handling requires a soft rope sling or a steel rope, padded so as not to damage the paint. Furthermore, it is necessary to avoid too short binding ropes so that the suction filter does not deform during transport.

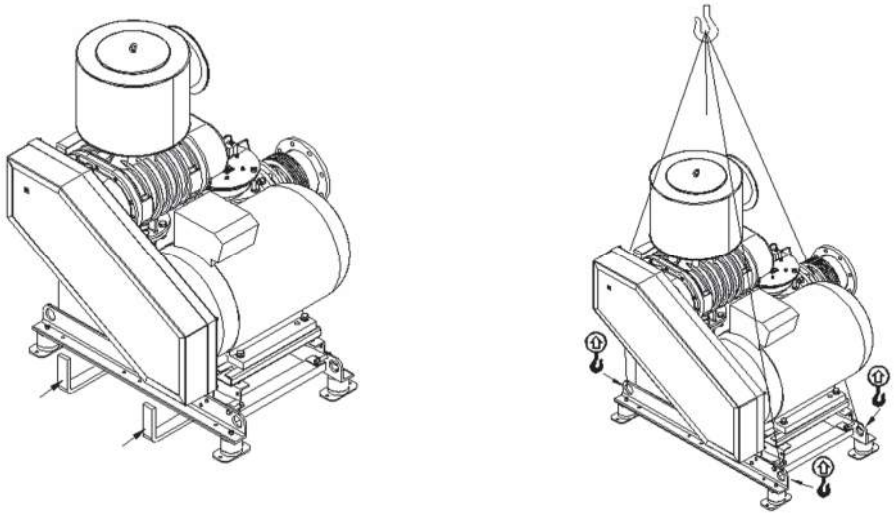
CAUTION

- **Never hang the assembly by its feet, blower flanges, suction damper or motor!**

CAUTION

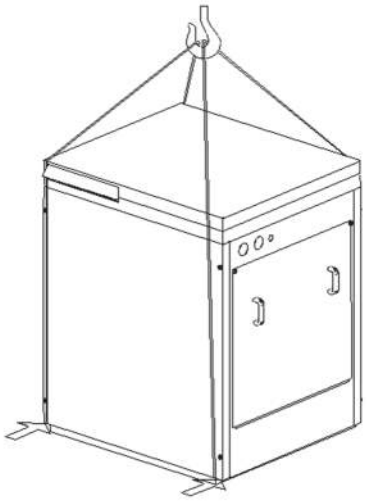
- **If you are unsure as to how to handle the assembly or blower, contact Atlas Copco!**

ZL with pulley guard



ZL with sound enclosure (up to size ZL 2500 + KN202)

Smaller size enclosures (up to KN202) in which the assembly is located, can be manipulated by a crane or a forklift truck. The ropes must be disengaged as shown in the figure, in the direction of the arrows below the base. It is also necessary to insert the forklift fork in the direction of the arrows.



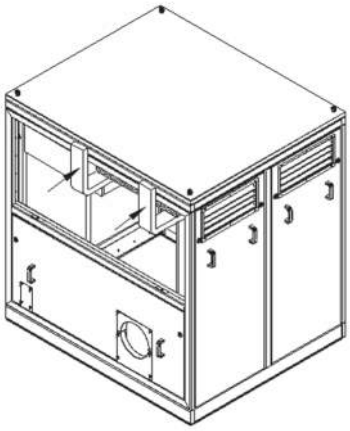
ZL without sound enclosure (from size ZL 3000 + K302)

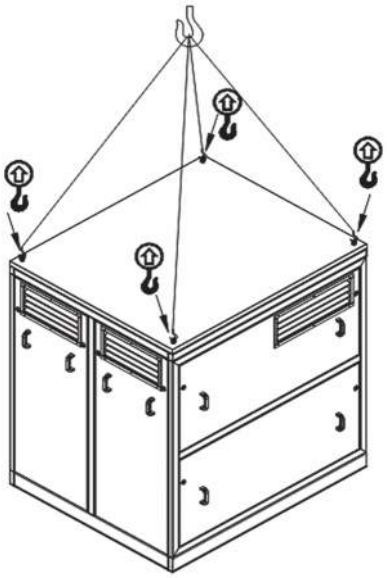
CAUTION

- **From size ZL 3000 with K302 enclosure, it is necessary to lift the enclosure separately first, as shown in the section "Sound enclosures"!**
- **Then, the assembly is handled separately, as shown in the section "ZL with pulley guard"!**
- **If the assembly is placed and secured to a pallet, never lift the pallet with the assembly and enclosure by the lifting lugs of the enclosure! The sound enclosure does not have a load-bearing function for the whole assembly!**
- **We urge you to pay attention to these warnings!**

Separate sound enclosure (from size ZL 3000 + K302)

Larger enclosures (from K302) are equipped with hanging nuts. If crane handling is not possible, the enclosures can be manipulated by a forklift truck. In this case, a wooden prism must be inserted at the lifting point so as not to damage the enclosure. The enclosure can also be dismantled into individual parts and then reassembled at the site.





CAUTION

- **The illustration above is only valid for a separate sound enclosure!**
- **The sound enclosure from size K302 does not have a load-bearing function for the whole assembly!**

Motors

Handling the motor is described in the motor manual. Motors are usually equipped with suspension bolts for this purpose.

5.7.5. Storage

The assembly in its original packaging must be stored in a dry place and protected from dust. Assemblies in outdoor sound enclosure can be stored in open air. For a storage period longer than 6 months, it is necessary to treat or retreat the assembly for rust. For this purpose, use ordinary treatment agents. Storage conditions:

Temperature: -30°C to +40°C
Relative humidity: up to 80%

6. Description of site and instructions for installation and assembly

6.1. Assembly

The minimum dimensions of the assembly site are determined by the maximum dimensions of the assembly (sound enclosure) and the required operating distance of **1 m**, preferably 1.2 m on the sides of the assembly (enclosures) and between the assemblies (enclosures) and 1.2 m between a wall and the sound enclosure discharge. The height of the machine room depends on the chosen method of handling.

When designing a machine room, it is necessary to bear in mind mounting holes (assemblies are supplied assembled by default). Sound enclosures are detachable. For handling during maintenance and repairs (the need to dismantle the blower and the motor in case of a failure), it is appropriate to equip the machine room with an underhung groove with a crane trolley, or to leave space for a forklift. The space required for installation of various types of ZL assemblies can be derived from the dimensions shown in the dimensional drawings.

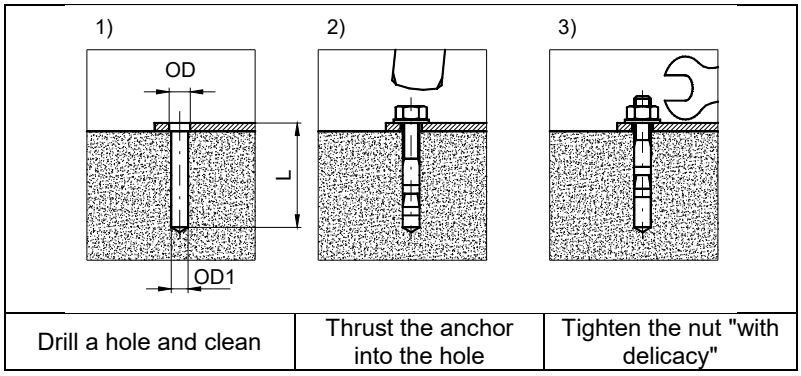
The installation floor must be level, dimensioned for the weight of the device and for the length of the anchor. From the point of view of load capacity, there are no special requirements, because the blowers are dynamically balanced, as are the motors. The degree of mechanical vibration of the blowers and motors is shown in Tab. 10. The weight of the assembly is distributed on individual foots. The weight of the added assembly is shown in the corresponding dimensional image.

The assembly must be placed in a horizontal position by placing metal plates under the machine feet, permissible deviation is **1 mm to 1 m**.

CAUTION

- **After placement, the assembly must be anchored to the floor. Otherwise the assembly may move spontaneously, which could lead to its damage.**

Work procedure for assembly and sound enclosures anchoring



Drill a hole and clean	Thrust the anchor into the hole	Tighten the nut "with delicacy"

Assembly - enclosure	Anchor	OD [mm]	OD1 [mm]	L [mm]
ZL 100 – ZL 400	Upat EXA M 8K	9	8	50
ZL 500 – ZL 10000	Upat EXA 12/15	13	12	105
K 42 – KN 202	Upat EXA M 8K	9	8	50
K 302 – K 1002	Upat EXA 12/15	13	12	105

Table 8 - Anchoring the assembly

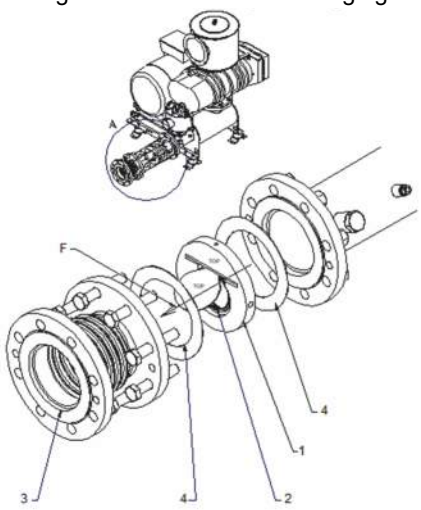
Pitches and diameters of the holes in the feet are listed in the current ZL catalogue or on the appropriate GA drawing. The procedure for anchoring sound enclosures is the same, only it is necessary to ensure tightness of the joint between the enclosure and the floor. In order to set up the enclosures, it is also necessary to compensate for any unevenness of the floor so that the side walls are not tilted. A polyurethane foam can be used to seal the gap between the enclosure and the floor. **The power cable must go through the floor.**

If you intend to place an assembly with the enclosure on a bar grate, it is necessary to order a non-standard enclosure, because the sound enclosures do not have a soundproof bottom.

6.2. Requirements for connecting pipes

6.2.1. Connecting to the ZL assembly

Since the entire unit is mounted on rubber springs, the pipes must be connected by means of flexible elements. Otherwise, a running blower might cause the pipes to vibrate and increase the noise level. The standard assemblies are supplied with a compensator for discharge connection. In the case of negative pressure assemblies or an assembly connected to a central suction, a compensator for suction connection is also provided. Compensators and valves of larger assemblies supplied with sound enclosures from size K 302 are supplied unassembled. These components must be mounted behind the discharge damper output flange, or also in front of the suction damper flange as shown in the following figures.



Overpressure (standard version)

In the excess pressure assembly, the manometer is placed on its discharge, in the negative pressure assembly, it is placed on the suction. In the case of a non-standard assembly or a stand-alone blower, the manometer must be placed on the pipes as close as possible to the discharge flange of the excess pressure assembly or blower or as close as possible to the suction flange of the negative pressure assembly or blower. Because of gas pulsation, it is necessary to use manometers resistant to cyclical pressure changes in the pipes, e.g. a manometer with a glycerine filling. When using an ordinary manometer, the damping element must be inserted between the pipes and the manometer. In manometers with glycerine filling, open air vent plug for venting after setting up the machine. Otherwise, the manometer will show incorrect data! If the assembly is supplied with a sound enclosure, it is necessary to connect the manometers mounted on the enclosure and the measuring points on the assembly with the supplied tubes, after the assembly and enclosure are installed.

In the case of a excess pressure assembly, the blower suction flange must be connected to the suction filter with a button connected to a manometer designed to measure the filter insert clogging. The same applies for the place on the discharge damper with a glycerine manometer.

For a negative pressure assembly, the place before the suction filter must be connected to a manometer on the enclosure.

6.2.2. Connection to the DI blower

Make sure that the suctioned medium has been freed of impurities.

In cases where the blower will draw in the air from the outside, it is sufficient to equip the blower with an Atlas Copco suction filter to ensure the purity of the suction air mass.

If air mass is to be supplied into the suction through pipes, it is advisable to equip the blower with an Atlas Copco suction filter, used in negative pressure assemblies, to connect the pipes. Additionally, it is necessary to include a compensator between the suction filter and the pipes.

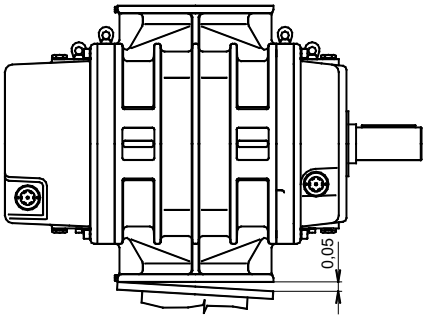
If the sucked air mass is filtered for multiple blowers centrally, the suction pipes must be carefully cleaned from foreign bodies. A compensator must be fitted between the blower and the suction pipes.

For the first 500 hours of operation, it is appropriate to use the suction sieve placed as close as possible to the blower suction flange. The suitable screen density is derived from the following table, which gives the permissible sizes of impurities for each blower size:

Blower				DI 65 DI 66		
Permissible impurity size [mm]				0.09		

Tab. 9 – Impurity size

The blower collars must not be weighed down by pipes. The pipe flange must fit the blower flange tightly even before it is screwed on. The maximum gap in the perimeter of the surface seal may be 0.05 mm, as shown in the figure.



After the flange connections are tightened, the blower must spin easily!

Connection principles:

- ✓ Pipes must be installed in the compensator axis.
- ✓ Pipes must be placed at firm points and sliding points. Compensator must not be weighed down by the weight of the pipes. The first firm point must be at the closest pipe to the compensator.
- ✓ The pipes diameters must not be smaller than the nominal brightness of the blower flanges.
- ✓ The recommended flow speed in the pipes is up to 22 $m.s^{-1}$.
- ✓ If possible, use wide pipe curve radii (reduced loss).
- ✓ Closing valves must be placed right at the turns to limit the possibility of impurity deposits in dead-end branches of the pipes.
- ✓ Use heat insulation on hot pipes (discharge pipes).
- ✓ Make passages through walls elastic with sound insulation for the pipes (do not firmly cement the pipes).
- ✓ Equip long or branched pipes with balancers.
- ✓ Avoid pipe inlets perpendicular to the registers. For registers with potential for stagnant waves, check the length of the of the registers for a excitation frequency six times the blower rotations (air mass frequency pulsations).

In the design of pneumatic handling, cement clarification and similar applications, where the contaminated conveyed air mass may expand after the blower is turned off (the volume between the clack valve and the technological device), it is necessary to assess individual applications or ensure the separation of pollutants during the air mass backflow (mechanical clack valves do not close immediately). Contact Atlas Copco in these cases.

6.3. Instructions for connecting the assembly to the energy source

NOTICE

- **Work on electrical equipment must be performed only by a person with appropriate electrotechnical qualifications.**

Blowers, blower assemblies, electric motors and sound enclosures are equipped with welded-on earthing elements. Enclosure for standard assemblies is determined by the electric motor enclosure, i.e., IP 55.

The electrical installation must meet the requirements for machinery pursuant to guideline 2006/42/ES, and above all the requirements given in ČSN EN 60204-1 ed. 2. The electrical parts supplier must ensure this. The standard Atlas Copco assembly delivery ends with electric motor terminals. If a control system is included, it is necessary to only connect the network cable, if the cable is not part of the delivery. More detailed instructions are included in the separate manual for the control system.

The power supply cable must not limit the movement of the motor and rocker!

Connection of electric motors is subject to the electric motor producers recommendations. The circuit diagram is fastened to the inner side of the electric motor terminal plate lid. It is recommended to use star / delta start (softstart, etc.) also in cases where the user can connect the high power electric motor directly (to the triangle). A “soft” start spares the assembly.

CAUTION

- **Electric motors of 11 kW output must not be run directly (in a triangle) without the approval of the blower manufacturer.**

CAUTION

- **In the case of an assembly with a sound enclosure, it is necessary to connect the electric motor of the assembly so that it can not be started without simultaneous operation of motors of ventilators in the sound enclosure, while the fan must suck air from the sound enclosure (for K802 and smaller enclosures). For the K1002 sound enclosure, the air must be sucked into the enclosure. The circuit diagram is shown in Appendix III.**

Electrical equipment details

The blower assembly is delivered standard without an electrical connection or controls. Basic data on the installed electrical and electronic devices are shown on their model plates and original documentation (manuals, circuit diagrams, ...). The supplier of the electrical part must ensure compliance with the requirements of the relevant standards, in particular with:

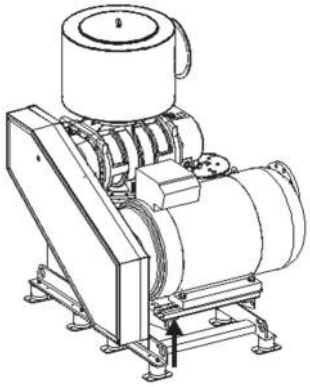
- ČSN EN 60204-1: Safety of machinery - Electrical equipment of machines safety of machinery - Electrical equipment of working machines.

The radiation requirements according to ČSN EN 61000-6-3 and ČSN EN 61000-6-4 for electric motor equipment with nominal current lower than 16A have not been verified, because it involves equipment with radiation depending on the installation and the characteristics of the entire technological unit in which the equipment is used. If an electrical switchgear with a control unit is included in the delivery, the basic information is provided in separate operating instructions.

6.4. Belts assembly

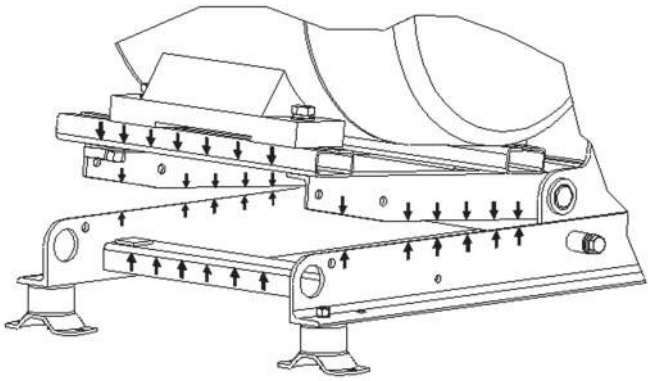
Because of the transport of blower assemblies, the belts are supplied unassembled and the rocker with the motor is secured in its lower position by screws. The belts can only be fitted after the assembly has been set up. First, it is necessary to remove the bolts securing the rocker in its transport position.

For the lifting itself it is necessary to use a jack of appropriate lifting capacity. The place for mounting the jack is indicated by an arrow in the image. For smaller assemblies up to size ZL 2500, a screw jack designed to lift passenger cars with a lifting capacity of 1000 kg or more is sufficient. For bigger assemblies, from size ZL 3000, with motors from 280 (axle height in mm), it is necessary to use a jack with a lifting capacity of 2000 kg or more, preferably hydraulic. The jack must stand on a solid base. If the surface is smooth, such as pavement or paint, it must be secured, for example, with a rubber pad to make sure that the jack does not slip.



CAUTION

- **When inserting the belts, take extra care to avoid injury if the rocker and motor suddenly come loose. Grasp the belt only in a place where it won't encircle the pulley after the rocker is released. Furthermore, it is forbidden to touch assemblies in the positions between the frame edges and the rocker, where there is a cutting effect when the rocker moves.**



When gradually lowering the rocker, make sure that the belts stay in the grooves of the pulleys.

6.5. Preventive measures

CAUTION

- **The operator must proceed according to the instructions in this Manual**
- **The operator must maintain the minimal distance contained in this Manual.**
- **The operator must make sure that plates and labels are clearly legible.**
- **The operator must provide the users with the safety equipment listed in this Manual.**

6.6. Ventilation of the machine room

The machine room is heated with heat emitted by the motors, blowers, discharge dampener and discharge pipes. To lower the temperature, it is necessary to conduct the heat out appropriately — by venting the machine room. If the output temperature is high, the output pipe must be insulated. In most cases, when air is sucked by the assembly directly from the machine room, it is necessary to ensure forced ventilation of the machine room.

CAUTION

- **It is forbidden to direct the cool air flow to any part of the blower cabinet! Localised cooling causes heat deformation and possible destruction of the blower.**

When designing the machine room, it is important to remember to have sufficient holes for suction of cooling air and for heated air exhausting. It is assumed that fans will be installed on the exhaust. The suction of the cooling air for blower suction from the machine room must be designed to provide both sufficient cooling air volume and assembly suction volume. If the sucked air is supplied by an outside pipe, it is sufficient to dimension the inlet opening only for the cooling air volume and to install fans with the required performance on the exhaust. The air velocity in the holes should be between 5 and 10 $m.s^{-1}$. The suction and exhaust holes must be designed so as not to leak noise from the machine room.

Scheme of forced and natural ventilation of the machine room is listed as Appendix IV.

7. Warnings on unacceptable use

CAUTION

- **Standard blowers must not work with reversed direction of the rotation.**
- **Standard blowers must not be subjected to pressure overload; the maximum compression ratio can be equal to 2.**
- **Standard blowers must not be subjected to heat overload.**
- **Standard blowers must be operated in environments with the risk of explosion.**
- **The size of impurities in the suctioned media must not exceed the values shown in Tab. 9.**

8. Information on other risks

8.1. Safety and health protection at work

Atlas Copco blowers conform to European health protection standards, but nonetheless may pose a health hazard. To prevent injuries, authorised workers must be sure to observe these principles:

- Users must be professionally educated and trained.
- During any operation, this Manual must be observed.
- No solid, liquid or powder materials should be in the suction area
- When in doubt, or if anything is unclear, contact Atlas Copco.
- **Blowers** must not **be handled while in operation**.
- **The blower** must not **be run when the suction is open, because its freely accessible rotors are hazardous if touched**
- Do not operate **the equipment with damaged guards — belt guards, ventilator guards etc.**
- Use protective gloves. During its operation and before cooling down, the machine may become hot.
- Use headphones when the sound enclosure is open or if the devices operates without a sound enclosure.
- In the case of a blower assembly with a sound enclosure, this enclosure also functions as a fixed protective enclosure. In this case, the pulley guard is not fitted as standard. This results in residual risk - chance of injury. It is therefore forbidden to operate the device without a closed sound enclosure.
- It is necessary to pay extra caution in the compartment of the rocker with motor, since the rocker is only held in its operating position by belt(s). When the belt breaks, the rocker position may suddenly change

- During maintenance and repair, the machine must be disconnected from the electrical source and secured to prevent from turning back on.
- When using cleaning agents, be aware that inhalation can be poisonous and that the agents are caustic to the touch. Follow the Manual and instructions of the cleaning agent manufacturer!

8.2. High-temperature areas

Excessively hot surfaces

CAUTION - HOT SURFACE

- **Blower**
- **Discharge damper**
- **Discharge piping**
- **Safety and starting valve**

8.3. Operator protection equipment

- Ear protectors
- Safety glasses
- Work gloves

8.4. Waste disposal

Packaging

All materials used for packaging are environmentally friendly and recyclable. Cardboard parts are made from recycled paper; wooden parts are untreated, and pallets can be sold to the nearest organisation that buys pallets. The plastics are marked as follows:

>PE< polyethylene, e.g., wrapping film

Blower and assembly

Replacement parts or the blower must be taken apart, cleaned of oil products and, depending on the material, taken for professional disposal.

If the blower is operational, it can be offered to the manufacturing plant for return purchase based on mutual agreement.

Operating media

The recommended oils do not contain polychlorinated biphenyls (PCB); for more information see the oil producer safety sheets (Atlas Copco will also send them on request). According to act No. 383/2001 Coll. of the Czech Republic, the waste code for oil is 130207. In the case of export - installation of blowers and blower assemblies outside the Czech Republic, it is necessary to comply with the relevant local legislation governing waste management requirements in the given country or territory.

9. Instructions for start-up

NOTICE

- **At least during the warranty period, an operating log must be kept, in which operating data, maintenance, inspections and repairs must be recorded. Maintaining an operating log is a condition of the warranty. This especially applies to the inspections listed in Table 15 and Table 16.**

CAUTION

- **The standard assembly located in the sound enclosure is not equipped with a belt drive casing because during operation, this functions is carried out by the sound enclosure. Activities that are directly related to putting the assembly into operation and which must be carried out with an open sound enclosure during the operation of the assembly must only be carried out by a person which is instructed to do so and provably aware of the danger of touching the rotating parts.**

9.1. Inspection before first start-up

An Atlas Copco service technician performs the inspection before first start-up. If it has been contractually agreed otherwise, proceed according to the following points:

Check the assembly

- perform assembly, tighten anchor bolts
- check the proper assembly of all parts that can be dismantled during assembly, with particular attention to worker safety
- check the opening of all valves and flaps in the discharge pipes

Fasteners

- check all fasteners for tightness.

Add oil

The blowers are delivered without oil. Approximate volume of oil fills is given in Table 6, recommended types of oils in Table 7. For more information see chapter 9.5.1.

CAUTION

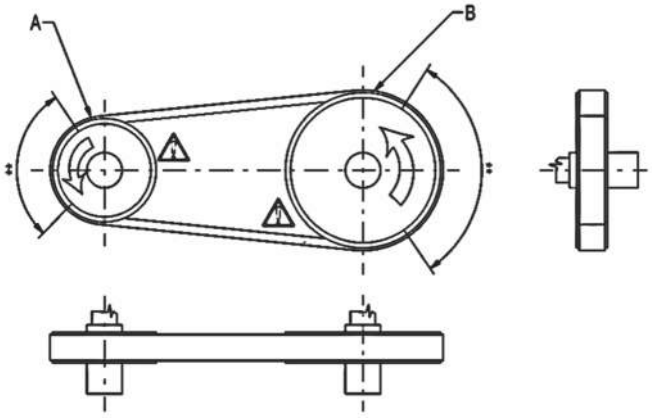
- **Oils must not be mixed under any circumstances!**

Check operation

Check the operation, whether the blower rotates easily (turning the pulley by hand).

CAUTION

- **Turning the pulleys may cause injury. The pulleys must be grasped in areas where the belt encircles them.**



A: Driven part - BLOWER
B: Driving part - ELECTRO MOTOR

**** Pulley holding compartment**

BE CAREFUL NOT TO CRUSH YOUR FINGERS!

WARNING - HIGH RISK OF INJURY!

Check the pipes

Check clearance on the suction and discharge sides.

Check the direction of rotation

Start up the blower for **no more** than **1s**. Rotating in the wrong direction for a longer time may damage the blower. The blower drive must turn in the direction of the arrow!

PROHIBITION!

- **Reverse operation will destroy the blower!**

PROHIBITION!

- **Do not turn the blower on when it is running down! Risk of considerable damage (the blower must be turned on from standstill).**

9.2. First start-up of assembly or blower

Unless contractually agreed otherwise, the first start-up will be performed by an authorised Atlas Copco service technician. Otherwise, it is necessary to proceed according to the following points:

- if installed open the sound enclosure
- during operation, check the activity and tuning of the safety valve
- after about 1 minute, check the operating pressure, and once the established pressure has been reached, turn off the propulsion unit
- check the blower run-down — the blower must slow down easily without jerks or sudden stops
- check correct fan speed - the air must flow from the hole above the sound enclosure ceiling

Safety valve operation check

Verification of safety valve function and sealing valve cone mobility according to the requirements of ČSN 13 4309 - during operation at a pressure of 80% of opening pressure or higher. For HEROSE valves, used in smaller assemblies, the valve cone mobility must be checked. It is necessary to reduce the load on the valve head by releasing the grooved nut in the lid of the valve body. The nut must be rotated until it is stiff, then by about 180° more – the valve cone is then relieved and the safety valve starts to "blow out". Then, tighten the nut again. Larger assemblies are equipped with safety valves with a control valve. After disconnecting one end of the tube on the control valve, the "bellows" compartment is opened to the atmosphere and the valve opens automatically. After reconnecting the tube, the tightness of the joint must be checked (e.g. with soapy water).

9.3. Test run

- check, monitor and document the operating pressures and temperatures.
- monitor the noise and vibration while the assembly is running.
- monitor the temperature on the blower surface for local overheating.
- monitor the oil level and amount on the oil gauges.

Blower type Blower speed [1.min^{-1}]															
									DI 66						
									3500						-
Working value (test)[mm.s^{-1}]									<7						<5
Shut down [mm.s^{-1}]									#8						<7.5

Note:

- The severity of mechanical vibration of blowers and methodology according to ČSN ISO 20816-1 and ČSN ISO 10816-3 with the exception of Table A1, A2 for special or specific machines.
- Vibration severity of motors that are not firmly fixed to a frame (automatic tensioning, etc.) is only approximate. Methodology for evaluating vibration severity of individual, fixed electric motors according to ČSN EN 60034-14, ed. 2.
- If the limit values of the vibration severity defined by Atlas Copco in this table are exceeded, it is necessary to shut down the machine, inspect the equipment and contact Atlas Copco.

Tab. 10 - Vibration severity

9.3.1. Inspection intervals for test run

- Every 15 minutes during the first two hours, Atlas Copco service performs the inspection and logs the values. During the first two hours, the service employee trains the permanent employees — the Atlas Copco employee logs the values.
- During the next two hours, every 30 minutes, the values are logged by the user's trained permanent employee into the operating log.
- During the next eight hours, every hour, the values are logged by the user's trained permanent employee into the operating log.

9.4. Emergency stop controls

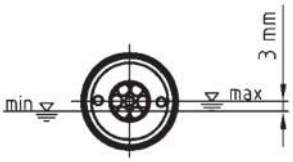
CAUTION

- **Emergency stop controls are not standard equipment on Atlas Copco assemblies. The electrical parts supplier must install them.**

9.5. Instructions for setting and adjusting

9.5.1. Adding and changing oil

The blower has two separate oil reservoirs. Oil is added through the filling holes located at the top of both lids. After the plugs have been unscrewed, oil can be added, preferably using a funnel, so that oil does not leak into the surroundings, soil the belt drive, etc.
Oil can be drained using the draining holes on the bottom surface of the lids. Used oil must be released into previously prepared containers of an adequate size. After unscrewing the plug of the drain hole, the plug of the filling hole must also be unscrewed to prevent a negative pressure during draining and so that the oil can drain into the container by itself. Used oil must be checked to see if it contains metal fragments or powder, whose presence can signal that bearings or gears are starting to fail. In that case, Atlas Copco service must be contacted . The blower cannot be refilled with oil until the last drops of oil have drained and the drain hole's plugs have been closed.



The upper oil level limit is at the middle of the oil gauge. The lower oil limit is 3 mm below that. The oil level — **measured in resting state** — must be maintained between these limits. **When the oil level drops to the lower limit, oil must be added immediately**. Add the oil carefully, so that its level does not exceed the middle of the oil gauge. Otherwise, during operation oil could leak through the blow holes or into the blower.

- **The oil temperature in the blower may, depending on the operating conditions, exceed the 100 ° C limit. Therefore it is necessary to drain and fill the oil after cooling down! Otherwise, there is a risk of burns.**

Greases (motor):

The bearings of smaller-size standard electric motors are lubricated by a permanent grease pack. In larger electric motors, the bearings must be greased. The greasing method is shown in the motor user manual.

9.5.2. Replacing filter insert of the suction filter

The suction filter clogging results in an increase in negative pressure in the blower suction, indicated by a red strip on the filter clogging sensor. If a manometer is used instead of a sensor, the working part is marked with green colour and increased negative pressure is indicated by red colour. In this case, it is necessary to replace the filter insert. The filter insert can be ordered according to the number on its flange or in the Certificate of Quality and Completeness.
For an assembly supplied without a sound enclosure, after replacing the filter insert, it is necessary to depress the mechanical catch of the filter clogging sensor to engage the red strip indicating increased negative pressure.

9.5.3. Pulleys and belt tightening

Standard assemblies are propelled by a V-belt drive. The torque from the pulleys to the shafts is transferred by Taper Lock bushings.

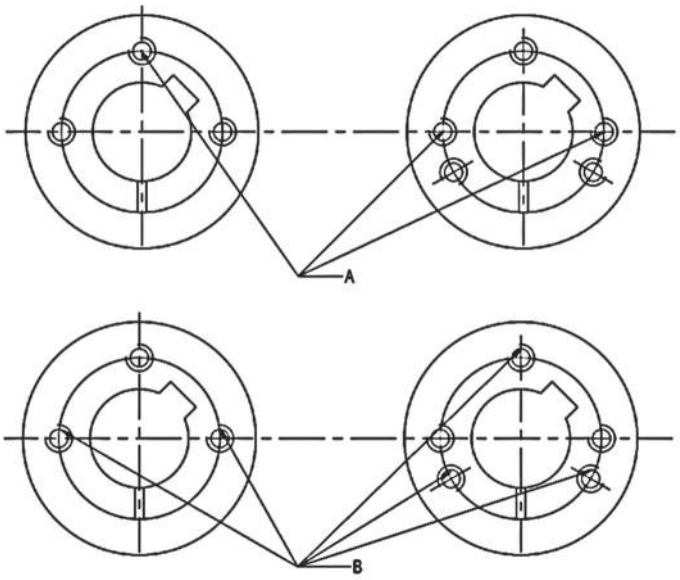
Taper Lock clamp bushings — disassembly and assembly

Disassembly procedure

Loosen and remove all screws. Turn the screws into the withdrawal threads evenly and tighten them alternately until the clamp bushing releases from the pulley.

Assembly procedure

Degrease the shaft cogs, the clamp bushing and the pulley hole. Insert the clamp bushing into the pulley. Place the hole with the half thread such that the holes in the bushing and pulley cover each other. Slightly oil the screws and screw them into the mounting holes. Do not tighten them yet! Slide the clamp bushing and pulley onto the shaft, and use a torque wrench to tighten them evenly in several steps to the torque $\mathbf{M_s}$ shown in Table 11. After a short run under load, check the screws for tightness (by torque). Fill the empty threaded holes with grease to prevent soil from entering.



A: disassembly - push holes
B: assembly - locking holes

FOLLOW THE INSTRUCTIONS IN THE MANUAL!

TIGHTEN BY TORQUE ACCORDING TO THE TABLE BELOW!

CHECK THE CORRECT BALANCING OF THE BELT PULLEYS!

Tightening torques of conical spring cover						
Type:	1008	1108	1210-1215	1310-1315	1610-1615	2012
Ms [Nm]	4.7	4.7	15	15	15	25
Wrench (thread):	3 (1/4“)	3 (1/4“)	5 (3/8“)	5 (3/8“)	5 (3/8“)	6 (7/16“)
Type:	2517	3020-3030	3525-3535	4030-4040	4535-4545	5040-5050
Ms [Nm]	35	70	115	170	190	270
Wrench (thread):	6 (1/2“)	8 (5/8“)	10 (1/2“)	12 (5/8“)	14 (3/4“)	14 (7/8“)

Table 11 – Clamp bushing torque

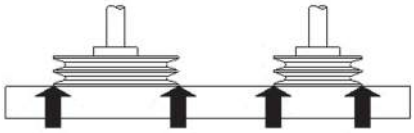
V-belt maintenance

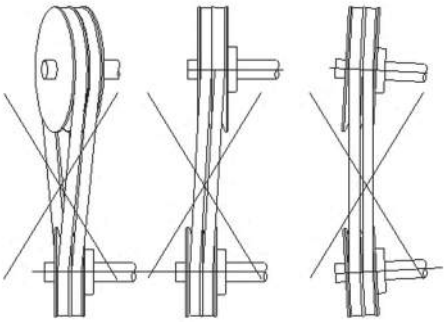
The belts work with pre-tension that depends on the transmitted load. The optimal belt tension is ensured automatically during operation by the motor rocker tilt.

The belt drive parameters — size and type of belt and number of belts are designed and optimised with regard to the desired gear ratio and performance so that the V-belts are used to the maximum. **If the number of functional belts in the drive is not complete, always equip the belt drive with a new set of belts of the same type and size. Always use belts with a guaranteed circuit speed of 50 m.s^{-1}! The type and length of the belt can be found in the Certificate of Quality and Completeness.**

The service life of the belt drive is guaranteed under compliance with the regular maintenance conditions and the use of belts of the same type as originally provided by Atlas Copco.

Production ensures that the blower and motor shafts are parallel and that the grooves of the pulleys are aligned. After the pulleys disassembly, make sure to slide them back onto the shaft such that all of both pulleys are on one plane. **The maximum permissible deviation is 0.4 % (maximum space between the ruler and the pulleys is 4 mm at a 1 m distance).** After the motor disassembly, make sure again that the shafts are parallel and that the pulleys are placed in line according to the picture:





9.6. Operation when doors are closed

The blowers standard operation is unattended. Their security against overload and sudden failure must be adapted to this.

The electrical parts supplier is responsible for providing current overload protection.

The operator must ensure that the device is not overloaded by permanent releasing of the safety valve. This concerns mainly the operation of several assembly simultaneously (e.g. in sewage treatment plants) when a discharge branch is closed, but the amount of air supplied is not reduced to the required value by reducing the speed or by stopping an assembly. If the air is released through the safety valve during operation for a long time, pressure pulsation is produced, which significantly reduces the service life of the bearings and the clack valve and, may result in the blower being destroyed.

To protect against thermal overloading, an electrical control of the permissible air temperature at the outlet and of ambient temperatures is appropriate (temperature sensing coupled with signalisation or stopping of the machine).

9.7. Type labels of blower and blower assemblies

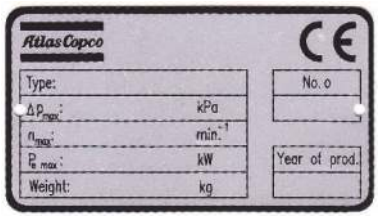
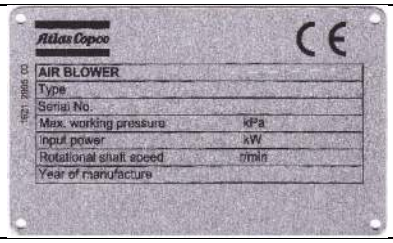
	
blower	assembly

Table 12 - Overview of type labels

NOTICE!

- **The labels in this chapter are illustrative.**
- **The specific design of type labels and the possible language variation depend on the requirements.**
- **The basic labels are CS / EN / RUS.**
- **The use of specific labels may vary depending on the required machine configuration.**

9.8. A general overview of safety and information labels

	
WARNING & INSTRUCTIONS - 3 in 1 combined	WARNING - hot surfaces
	
INFORMATION - oil filling	INFORMATION - lifting point
	
INFORMATION - correct direction of rotation of the shaft (blower & motor)	INFORMATION - earthing

<table>
<tr>
<td> 
</td>
<td> 

INFORMATION - oil-free transport, fill with oil before the first start-up
(On the suction sensor or manometer or, if the blower has been supplied separately, right on the blower, there is a hanging plate of stiff paper.)
 

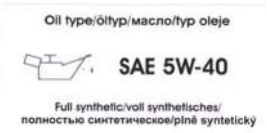
WARNING - do not operate without a closed sound enclosure</td>
</tr>
<tr>
<td>WARNING & INSTRUCTIONS - 7 in 1 combined</td>
<td>WARNING - hot surfaces</td>
</tr>
<tr>
<td>  </td>
<td>  </td>
</tr>
<tr>
<td>GENERAL WARNING - a label indicating an energized device, alternatively supplemented with an additional instruction table</td>
<td>GENERAL PROHIBITION - a label with a symbol forbidding to operate, open, enter, alternatively supplemented with an additional instruction table</td>
</tr>
<tr>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>INFORMATION - basic type of oil used</td>
<td>WARNING - cutting edge of a rocking mechanism</td>
</tr>
</table>

Table 13 - Overview of safety and information labels

NOTICE!

- **The labels in this chapter are illustrative.**
- **The specific design of type labels and the possible language variation depend on the requirements.**
- **The use of specific labels may vary depending on the required machine configuration.**

9.9. A general overview of transport pictograms

	
This side up / placement orientation	Centre of gravity
	
Fragile	Shipment weight
	
Protect from sun / heat	Protect from rain / moisture
	
Hung site	Do not stack

Table 14 - General overview of transport pictograms

NOTICE!

- **This is an illustrative overview of some transport pictograms.**
- **The specific design and use of the pictograms depends on the configuration of the shipment being transported.**
- **Only some pictograms, or different pictograms, might be used on the shipment.**
- **Pictograms are placed on a shipping box or on covering film if the machine is transported only on a pallet.**
- **Shipping boxes: Unless specified otherwise, the boxes in which blowers and blower assemblies are stored are not intended for stacking!**
- **The requested / preferred mode of transport is specified by the customer.**

10. Description and instructions for safe adjustment and maintenance performed by the user

10.1. Training for the operator

After the equipment has been received by the customer and set up for operation, the staff must be trained.

Training syllabus

1) Checking the amount and state of oil, adding and changing oil

Performed only when the assembly is at rest. The amount of oil depends on the blower model. During filling, the level must not exceed the middle of the oil gauge.

Explain the need to use recommended oil, explain how to perform oil changes, and their frequency.

2) Checking the state of the belt transmission

3) Inspecting and changing filter inserts.

Explain that these replacements are essential. The replacement frequency depends on the dustiness of the surroundings and on how the assembly is used.

4) Correct start-up

Explain the possible risks.

5) Content and importance of accompanying documents

Operating manual, Certificate of Quality and Completeness.

6) Servicing to the equipment

Identify the fault and possible remedies, procedure for ordering repair service.

7) Completion certificate

Both parties fill out the completion certificate and confirm it in writing:

- copy for Atlas Copco.
- the original for the customer

10.2. Ordinary maintenance and inspection

Blower inspection		
Operating time	Inspection	Lubrication
After 400 hours	Check blower operation. In a dry continental climate, perform anti-rust treatment on the rotors and cylinders for 6 weeks or more of downtime, longer in humid climates (see 5.7.5)	Check the level of the oil bath. First oil change after initial operation
After 4000 [2] hours	Check and replace the seal on the output shaft of the blower element.	Check operation of the lubrication disks (level slightly varies)
		Oil change
After 20000[1] hours	Measure oscillation strength (bearings)	
After 40000[1] hours	Check the bearings by measuring the oscillation strength, expected bearing replacement	Oil change

Notes:

[1] Performed by Atlas Copco service

[2] The oil change interval depends on the operating temperature of the oil bath (indirectly on the intake and discharge temperature of the transported air). If the oil temperature does not exceed 50°C, the oil can be changed once a year (after 8,000 hours). If the temperature is higher than 100°C the oil must be changed four times a year (after 2,000 hours), and at 120°C every month. The state of the oil is determined by comparing a sample of clean oil. Dark or thick oil indicates contamination or the onset of carbonation, i.e., the need to change the oil. A sample analysis is more reliable.

Table 15 – Blower inspections

Assembly inspection		
Operating time	Inspection	Lubrication
After 400 hours	Visual inspection, assembly operation, bolt connections, operating pressure, discharge temperature, noise level, sound enclosure fan Check the safety valve function (In PVO valve, check functioning of the valve's closing piston)[2)] Check suction filter and negative pressure in the intake	
After 800 hours	Check drive elements, motor operation, belt tension	
Depends on electric motor		Lubricate bearings per motor manufacturer recommendation, see Motor Operation and Maintenance
After 20000[1)] hours	Expected minimum bearing life in 2-pole motors	
After 30,000[1)] hours	Expected minimum bearing life in 4-, 6- and 8-pole motors	

Notes:
[1)] Performed by Atlas Copco service
[2)] Maintenance of the PVO control valve - no maintenance required in normal operation. In addition to checking its functioning (see 9) it is necessary to ensure the tightness of all joints, especially after disassembly or manipulation. In PVO 200 valve type, also check if the sealing cap at the top base is tight, if a mounting lug was used for handling (check the tightness by e.g. soapy water). If it is not tight, pressure in the rubber bellows drops and the valve opens. A clogged sieve or clogged nozzle in the control valve has the same effect (need to clean the sieve or blow out the nozzle).

Table 16 – Assembly inspections

CAUTION!

- **During any service, the blower must be shut down and secured against restart. Atlas Copco cannot provide a warranty if the technical conditions and warnings are not observed. For unusually demanding operating methods, contact Atlas Copco.**

When contacting LUTOS, please provide:

- Blower serial number and model
- Assembly serial number and model
- Motor serial number and model
- Occurring defects
- Measures you have taken to remedy the defects

If the blower needs to be sent back to Atlas Copco, please drain the oil. In addition, treat unpainted parts with a preservation oil and close the blower's suction and discharge lids. Please send the motor for repairs without the pulleys or clutches.

For a fee, Atlas Copco service technicians inspect the blower and assembly according to points 10.2, Table 15 and Table 16, including diagnostic measurements of the bearing condition and oscillation strength of the blowers and electric motors. This preventative measure can prevent a big failure.

11. Service inspections performed by Atlas Copco

11.1. Service branches

Atlas Copco s.r.o.,
Průmyslová 10
102 00 Prague 10
Czech Republic
www.atlascopco.cz

contact person: Petr Svoboda
tel.: +420 225 434 000
mobile: +420 604 245 613
e-mail: petr.svoboda@cz.atlascopco.com

12. Basic characteristics of instruments with which the device may be equipped

The device is not equipped with special instruments.

13. Procedure in the event of an accident or failure

13.1. Risk analysis - Instructions for finding simple faults

The blowers operating faults can be divided into two main groups:

- mechanical faults (bearings, gears, rotors, etc...)
- electrical faults (defective propulsion, electrical wiring, contacts, fuses, etc.)

For electrical fault, it is necessary to inform professionals who are authorised to perform this work.
If you are not sure you are proceeding correctly, contact the Atlas Copco service department.

FAULT	POSSIBLE CAUSE	REMOVAL
The device can not be turned on	A fault in electrical part	Check the electrical wiring, contacts, fuses, thermal or other protection, the state of the cable connection. Check the condition and functionality of the electric motor.
Oil leakage from vent holes	High oil level — measured while blower is shut down	Drain extra oil.
Increased noise, blower makes a metallic sound	Blower rotor knocking, bearing defect, limit clearance setting.	Atlas Copco repair service
High current consumption	Bearing defects, galling of rotors in its working space	Atlas Copco repair service
	High excess pressure at discharge pipes	Measure the excess pressure, remove the cause.
	High negative pressure	Change filter inserts
High lid temperature on the blower pulley side	Blower without oil	Atlas Copco repair service
	Bearing defect	
High lid temperature on the gear side	Blower without oil	Atlas Copco repair service
	Defective bearing - or gear	
Belt slippage	Greasy belt	Belt and pulley cleaning, degreasing with benzine
The blower is immediately loaded after being started (only for assemblies with PVO)	Function of the starting valve is deactivated	Adjust the combined safety and starting valve so that it is open in a standstill position
The blower rotates spontaneously in the opposite direction after switching off	Clack valve not functioning properly	Check the clack valve, replace if necessary
		Dismantle the pipes, replace the packing ring

FAULT	POSSIBLE CAUSE	REMOVAL
When operating the blower, the safety valve blows off	High excess pressure at discharge pipes	Measure excess pressure in outlet pipes - remove cause *) The safety valve is set to max. + 10% output excess pressure
	Faulty combined safety and starting valve	Remove leaks, impurities in the control valve or replace the rubber bellows.
When operating the blower, the safety valve is draws air	High negative pressure at inlet pipe	Measure negative pressure in inlet pipe - remove cause *) The safety valve is set to max. + 10% output excess pressure
When the full load of the blower is exceeded, the safety valve does not open	The safety valve is clogged with impurities (for Herose valves)	Disassemble and clean the valve
Blower overheated	Filter insert soiled	Replace the filter insert
	Overload	Adhere to maximum load - data
	Great piston clearance	Atlas Copco repair
No transport	The clack valve is incorrectly fitted	Assembly correction
	Slipped or broken belt	Belt failure, improperly set pulleys Blower malfunction
Low delivery volume	Poorly dimensioned blower	Check against the output table
	Safety valve not tight	Check valve setting and operating pressure
	Belt slips	Visually check belt functioning, belt must run without vibration, check motor power input, check belt condition
Vibration	Rotors touch	Check bearings and gear setting
	Damaged bearings	Replace bearings and oil
	Pulley or clutch improperly balanced	Adjust and tighten the belt in case of belt drive
	Loose screws holding motor or blower	Tighten and adjust
	Rotors imbalanced due to soiling	Clean the cargo space and rotors

Table 1 Possible faults and their causes

*) The cause can be, for example, a project error. Resistance in the pipes at a given flow is greater than the excess pressure required when entering the blower parameters. This is usually detected when the blower is started for the first time and when the project equipment is being put into operation. Another reason can be the change of resistance after a certain period of operation due to the clogging of the pipes, clogging of the aeration holes in the tanks of a sewage treatment plant, etc., or the lack of knowledge of the operator.

14. Replacement part specifications

Consumable replacement parts (filter inserts, belts, check valves or oil) are supplied at customer request. They are not part of the standard delivery. The factory performs repairs on its own blowers. For external service organisations, sets of replacement parts can be supplied for given blower models. Preparations are necessary for trouble-free assembly and disassembly. The main reason for repairs is bearing replacement. For specific problems, contact the Atlas Copco service department.

Parts and materials for ordinary service and simple repairs to the assembly:

- filter inserts
- V-belts
- check valves

15. Information on airborne noise emissions

15.1. General

Equivalent levels of acoustic pressure A at the operator's work area while using weighing filter A according to ČSN EN ISO 11200, ČSN ISO 7574, ČSN EN ISO 3740 ***are shown in the value tables in the Atlas Copco blower assembly catalogue.*** The values shown indicate the actual noise value of the blower assembly with and without a sound enclosure.

15.2. Negative pressure assemblies

For blowers working in a negative pressure, it must be considered that the catalogue values for equivalent acoustic pressure level A apply to conditions in which the air mass is led through the discharge pipe out of the area where the assembly is operating, or in which an additional discharge damper is mounted behind the suction flange. As the air escapes into the area of the assembly behind the discharge flange, the value of equivalent acoustic pressure level A is 15 to 20 dB higher than the values shown in the catalogue.

15.3. Pipe noise

The value of equivalent acoustic pressure level A does not include noise emitted from the surface of the suction or discharge pipes. When designing the pipes, great attention must be paid to preventing the pipes from resounding from the blower excitation frequency. It is necessary to choose the diameter, wall thickness, material and anchoring method, including support distance of the discharge and suction pipes. The excitation frequency of Atlas Copco three-tooth blowers ranges from 100 to 500 Hz. The excitation frequency is directly dependent on the blower rotations (blower rotations range from 1000 to 5000 RPM).

Upon customer request, a damper can be added into the pipes for the blower specific parameters. This makes it possible to avoid problems with noise emitted from the pipes in residential areas, etc.

15.4. Machine room

In the machine room, pipes also need great attention. At the same time, it is necessary to choose flexible outlets through the walls, so that pulsation from the pipes does not transfer to the machine room walls. Attention should also be paid to the machine room wall material, which should absorb emitted sound. If possible, avoid smooth concrete walls or steel constructions.

I. Appendix – Declaration of conformity template

DOI-AC-ZL-BC-EN-V20180324

Declaration of conformity

1. **Machine name:** Air blower aggregate

2. **Machine type:**

Air blower aggregates: ZL100, ZL300, ZL350, ZL400, ZL500, ZL650, ZL700, ZL1000, ZL1200, ZL1400, ZL1600, ZL2000, ZL2500, ZL3000, ZL3400, ZL4700, ZL5000, ZL5300, ZL8200, ZL10000

Other specification: / - / - / - / - / - /

3. **Serial number:**

We Atlas Copco Ltd., hereby declare that the product which falls under the provisions of article 12.2 of the EC-Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, as a components/quasi machine is in conformity with the relevant Essential Health and Safety Requirements of this directive. The information on the product can be obtained prejudice to the intellectual property rights of Atlas Copco Ltd. This machinery complies also with the requirements of the following directives and their amendments as indicated:

4. **Directive on the approximation of laws of the Member States:**

Directive on the approximation of laws of the Member States relating to:		
a.	Pressure equipment	2014/68/EU
b.	Simple pressure Vessel	2009/105/EC
c.	Electromagnetic compatibility	2004/108/EC
d.	Low voltage equipment	2006/95/EC

5. **The harmonized standards and technical:**

ČSN EN ISO 12100
ČSN EN ISO 13857
ČSN EN 349 + A1
ČSN EN ISO 13732 – 1
ČSN EN ISO 13850
ČSN ISO 3864 – 1
ČSN EN ISO 14123 – 1
ČSN EN 547 – 1 + A1
ČSN EN 547 – 2 + A1
ČSN EN ISO 15667
ČSN ISO 10816 – 3
ČSN EN 1012 – 1
IEC 60417 – DB
ČSN EN 60204-1 ed. 2
ČSN EN ISO 14120
ČSN EN ISO 5167 – 1
ČSN EN ISO 5167 – 2
ČSN EN ISO 5167 – 3
ČSN EN ISO 5167 – 4
ISO 5388
ČSN EN ISO 3740
ČSN EN ISO 3744
ČSN EN ISO 3746

6. Atlas Copco Ltd. is authorized to compile the technical file.

7. **Conformity of the product to the specification and by implication to the directives:**

8. **Issued by:** Atlas Copco Ltd.
Prumyslova 10, 102 00 Praha 10
Czech Republic

9. **Name:** .....

10. **Signature:** .....

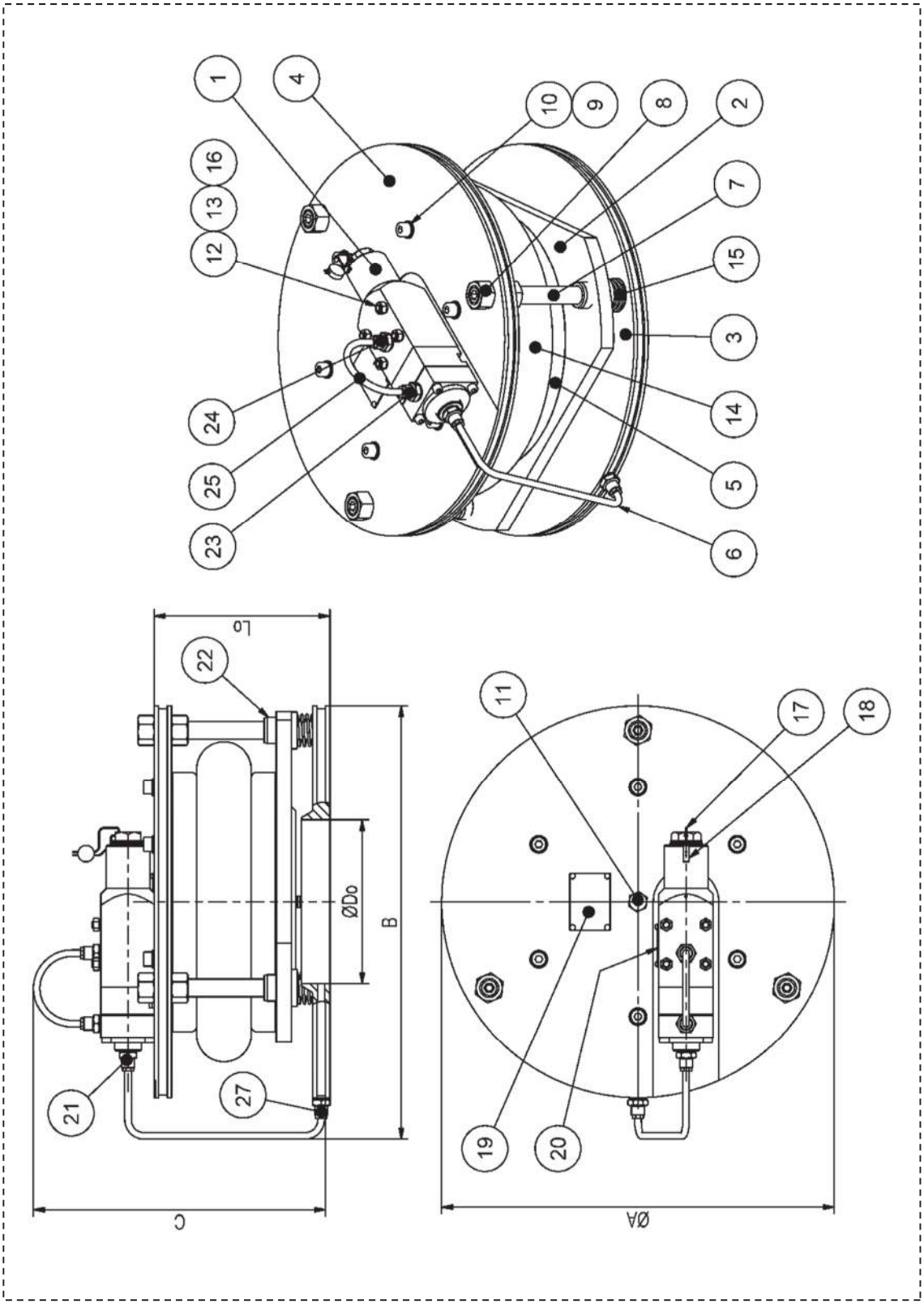
11. **Date:** .....

Address:
Atlas Copco Ltd.
Prumyslova 10, Praha 10,102 00
Czech Republic
www.atlascopco.com/cs-cz

Contact:
Phone: +420 225 434 000
Fax: +420 225 434 343
info@cz.atlascopco.com

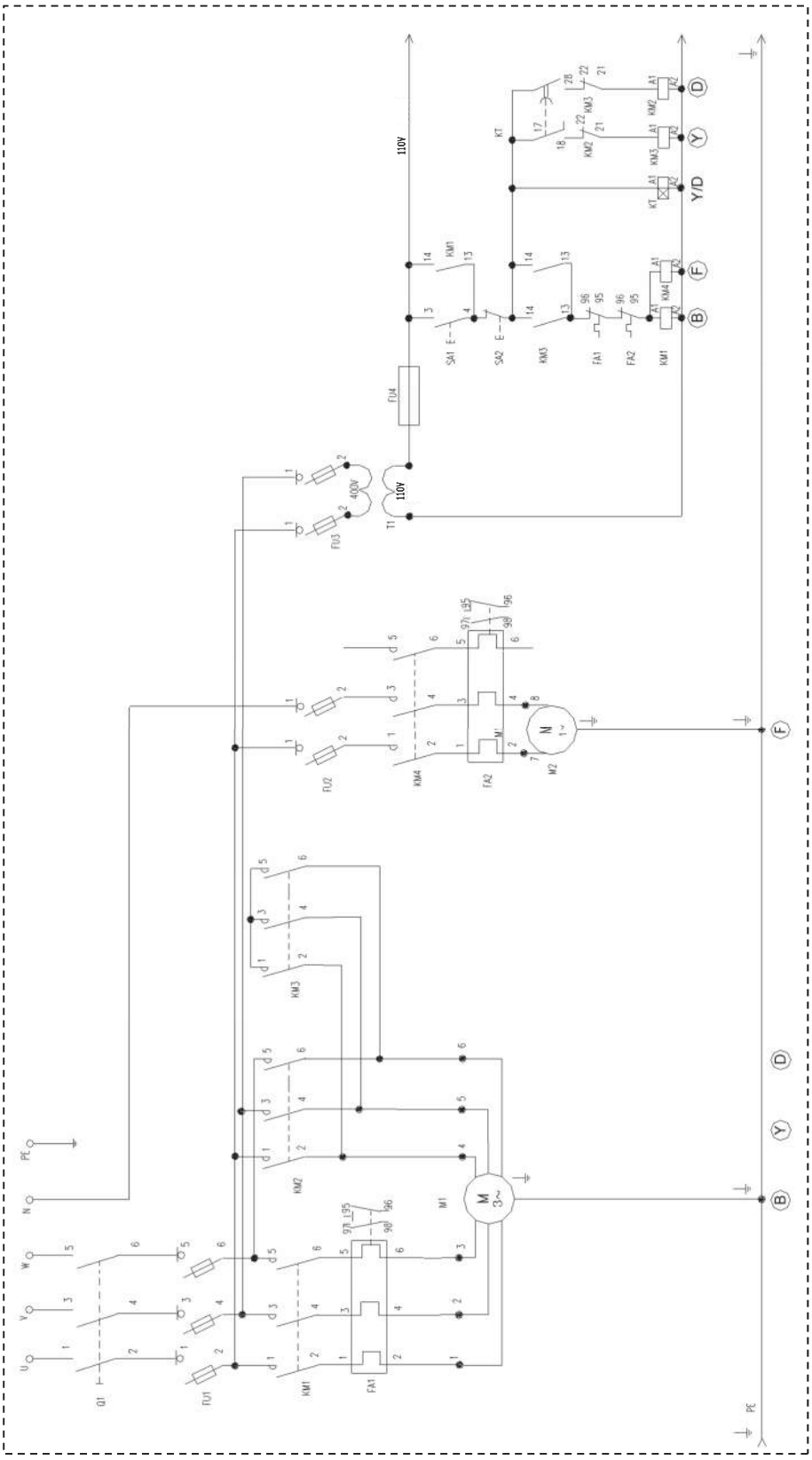
The company is registered in the Commercial Register held in Prague, Section C, insert 21114

II. Appendix – Combined safety and starting PVO valve



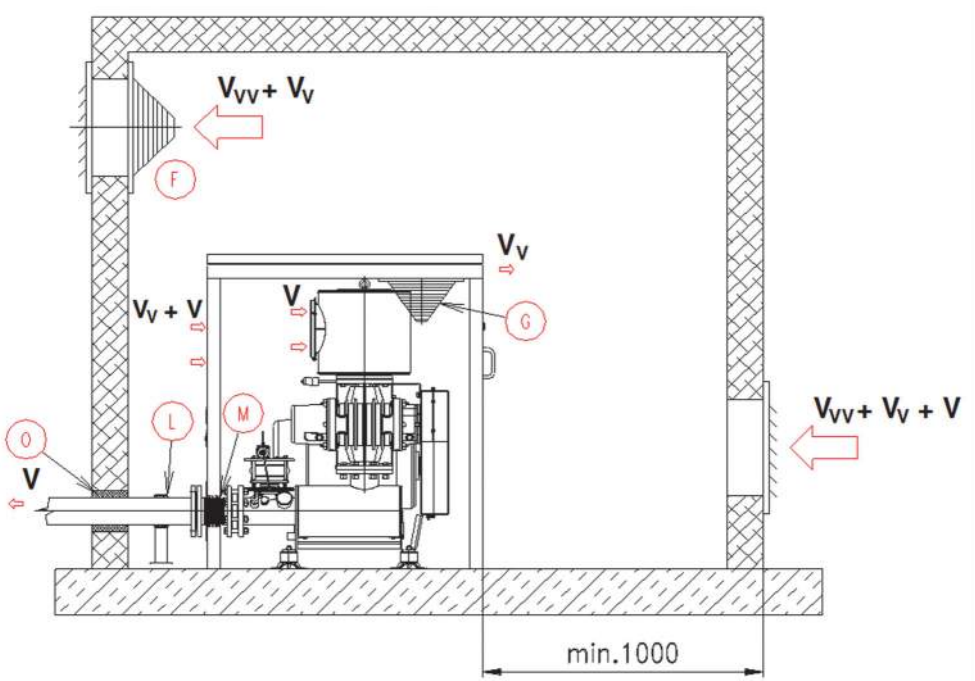
III. Appendix – Fan wiring diagram

B) Sound enclosure fan wiring diagram (1× 110V)



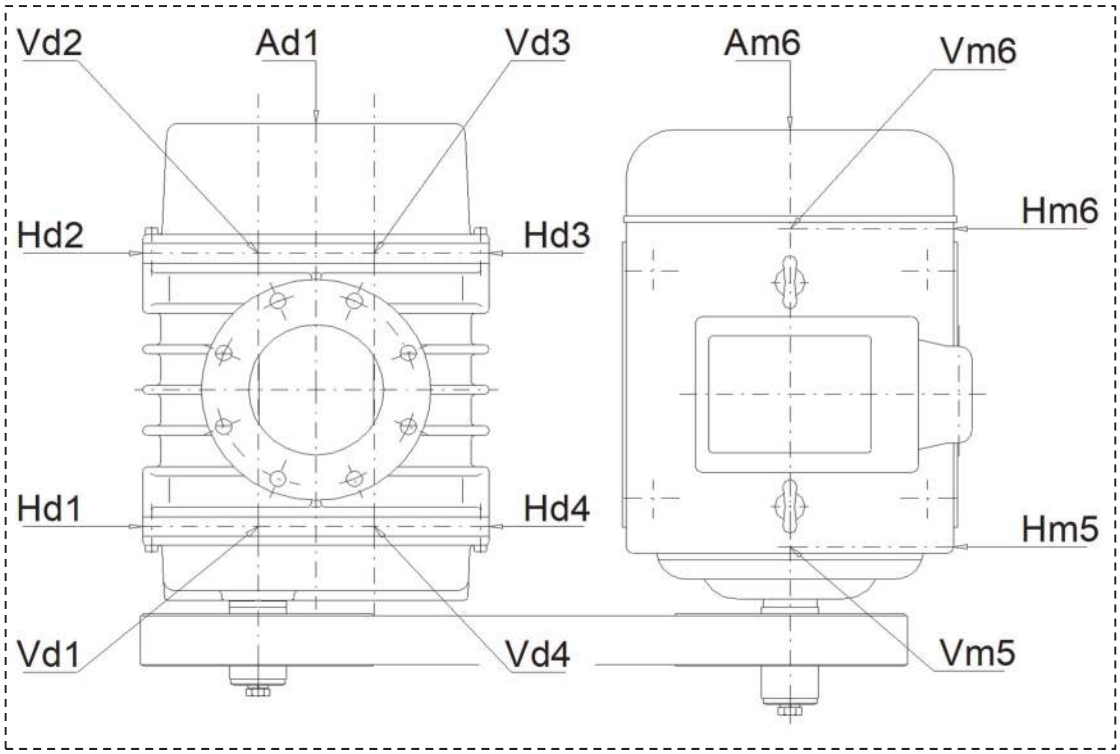
Blower motor 3 ~ ≥ 11 kW (Y/D); Fan 1
(**B** - Blower drive; **F** – Fan)

IV. Appendix - Machine room ventilation scheme



Forced ventilation, assembly in a sound enclosure, blower suction from the machine room
(**F** Fan; **G** Fan; **L** Fixed point; **M** Bellows; **O** Elastic fit)

V. Appendix – Vibration measurement inspection log



Vibration measurement									
Measuring point		C (total vibration) - F (frequency) - V (partial vibration)							
		C	F	V	F	V	F	V	F
		[mm / s]	[Hz]	[mm / s]	[Hz]	[mm / s]	[Hz]	[mm / s]	[Hz]
1	Vd								
	Hd								
	Ad								
2	Vd								
	Hd								
	-								
3	Vd								
	Hd								
	-								
4	Vd								
	Hd								
	-								
5	Vm								
	Hm								
	-								
6	Vm								
	Hm								
	Am								

VI. Appendix - List of separate appendices

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VII. Appendix - Notes


Atlas Copco

GLASGOW WATER SYSTEM

EQUIPMENT MAINTENANCE SUMMARY SHEET

Equipment: ZL 1600	Spec. Section: 11374
Location: 319 Third Street S. Glasgow, MT 59230	
Mfr.: Atlas Copco s.r.o, division LUTOS	Phone: 800-290-7408
Address: Prumyslova 10, Praha CZ-102 00	
Area Rep: Atlas Copco Compressors	Phone: 800-290-7408
Address:	

ELECTRICAL NAMEPLATE DATA

Serial No.: 3G1P185100577		ID No.: M3~		Model No.: 3GAA 201 420-ADL			Fram No.: M3AA 200MLB 2	
Mfr. No.: ABB	HP: 50	V: 460	Amp: 56.1	HZ: 60	Phase: 3	RPM: 3560	SF: 1	Duty: S1(IEC) 100%
Cat. No.: 4	Code: S	Insl. Cl.: ICLF	Design: IP55	Type: TEFC	°C Amp: 40	NEMA des.:	Rating:	Ratio:
Class: IE3		Group:		Staft End Brg: 6312-2Z/C3			Opposite End Brg: 6209-2Z/C3	

Miscellaneous Nameplate Data:

Recommended Spare Parts:

Lubricants: Summer Winter

MECHANICAL EQUIPMENT NAMEPLATE DATA

Serial No.: CZL014619	ID No.: B-300-1		Model No.: ZL1600			Fram No.: 1600	
Mfr. No.: A066PO266	HP:	RPM: 2840	Capacity: 1483 [m3/h]	Size:	Code:	Case No:	
Cat.:	TDH:	Imp Sz:	Ratio: 0,80	Max RPM: 2840	Min RPM: 1144	Lube Inst.: SAE 5W-40	
Belt No.: XPB1800LW	CFM: 873	Form:	Press:	Const.	Assy No.:	Order No.:	

Recommended Spare Parts:

Oil, Filter Inserts, V-belts, Check Valves

Lubricants: Summer Winter

RECOMMENDED PREVENTATIVE MAINTENANCE SCHEDULE

Task No.	Blower Inspection Description	Mfr. O&M Ref. Page No.	Frequency						
			D	W	M	Q	S	A	Hours
	Inspection - Check blower operation. In a dry continental climate, perform anti-rust treatment on the rotors and cylinders for 6 weeks or more of downtime, longer in humid climates.								400
	Lubrication - Check the level of the oil bath. First oil change after initial operation								
	Inspection - Check and replace the seal on the output shaft of the blower element.								4000
	Lubrication - Check operation of the lubrication disks (level slightly varies)								
	Oil Change (See Notes, 2)								
	Inspection - Measure oscillation strength (bearings)								20,000
	Lubrication - N/A								
	(See Notes, 1)								
	Inspection - Check the bearings by measuring the oscillation strength, expected bearing replacement.								40,000
	Lubrication - Oil Change								
	(See Notes, 1)								

Notes:

1) Performed by Atlas Copco Service

2) The oil change interval depends on the operating temperature of the oil bath (indirectly on the intake and discharge temperature of the transported air). If the oil temperature does not exceed 50 C, the oil can be changed once a year (After 8,000 hours). If the temperature is higher than 100 C the oil must be changed four times a year (After 2,000 hours), and at the 120 C every month. The state of the oil is determined by comparing a sample of clean oil. Dark or thick oil indicates contamination or the onset of carbonation, i.e., the need to change the oil. A Sample analysis is more reliable.

Storage: The assembly in its original packaging must be stored in a dry place and protect from dust. Assemblies in outdoor sound enclosure can be stored in open air. For storage period longer than 6 months, it is necessary to treat or retreat the assembly for rust. For this purpose, use ordinary treatment agents. Storage conditions:

Temperature: -30 C to +40 C
Relative humidity: up to 80%

RECOMMENDED PREVENTATIVE MAINTENANCE SCHEDULE

Task No.	Assembly Inspection Description	Mfr. O&M Ref. Page No.	Frequency						
			D	W	M	Q	S	A	Hours
	Inspection - Visual Inspection, assembly operation, bolt connections, operating pressure, discharge temperature, noise level, sound enclosure fan. - Check the safety valve function (In PVO valve, check functioning of the valve's closing piston)(See Notes, 2) - Check suction filter and negative pressure in the intake **Lubrication** - N/A								400
	Inspection - Check drive elements, motor operation, belt tension. **Lubrication** - N/A								800
	Inspection - Expected minimum bearing life in 2-pole motors **Lubrication** - Lubricate bearings per motor manufacturer recommendation, see motor operation and Maintenace (See Notes, 1)								20,000
	Inspection - Expected minimum bearing life in 4-, 6-, 8-pole motors **Lubrication** - Lubricate bearings per motor manufacturer recommendation, see motor operation and Maintenace (See Notes, 1)								40,000

Notes:
1) Performed by Atlas Copco Service
2) Maintenance of the PVO control valve - No maintenance required in normal operation. In addition to checking its functioning (see Section 9.1 Inspection before first start-up of IOM) it is necessary to ensure the tightness of all joints, especially after disassembly or manipulation. In PVO 200 valve type, also check if the sealing cap at the top base is tight, if a mounting lug was used for handling (check the tightness by e.g. soapy water). If it is not tight, pressure in the rubber bellows drops and the valve opens. A clogged sieve or clogged nozzle in the control valve has the same effect (Need to clean the sieve or blow out the nozzle).