



ZD 1200 - 4000 & VSD

40 bar / 50-60Hz



The Atlas Copco ZD: designed to delight customers ...



Although often hidden in a dark compressor room, the air supply is a critical resource in high pressure applications, such as PET blowing or aeronautics. An unreliable compressor or bad quality air can be detrimental to the continuity, profitability and reputation of your operation.

Furthermore, compressed air generation represents a major energy cost, and a smart choice can lead to substantial savings. It's important to look beyond the bare purchase price, and to take into account the quality and service life of the machine and its components, the cost of handling, installation and possible relocation, the direct cost of energy and maintenance, and the indirect cost of unplanned downtime, production loss, etc.



Top 10 customer requirements

- ▶ reliability of the machine
- ▶ high quality oil-free air at 40 bar
- ▶ easy to transport
- ▶ easy installation & possibility to relocate
- ▶ easy to service – limited downtime with reduced maintenance costs
- ▶ low noise
- ▶ lower energy costs
- ▶ stability of pressure (for stability of process)
- ▶ efficient after sales service with local presence
- ▶ a reliable, well established supplier



Let the ZD take the stage!

No longer "hidden" in the compressor room but installed at the centre of your operation, the ZD is committed to improve the overall quality of your process and save costs on every level. It's a truly unique combination of oil-free screw and piston technologies, and without a doubt, the most advanced compressor system in its field.



... through genuine innovations

▶ Why is the Atlas Copco ZD different?

The design criteria for the ZD were based on a survey conducted by Atlas Copco, asking customers for their top 10 requirements. These needs are not revolutionary or excessive, but over the years, the 40 bar reciprocating world has concentrated on small gradual improvements rather than on a complete rethinking of the fundamental technological offering.

Atlas Copco decided to leave the threaded paths and design a completely new system that meets these requirements like no other equipment has ever done. Not by little improvements, but by true, result driven innovation.



▶ Developed by an innovation oriented company

Atlas Copco has a proven track record when it comes to innovation, and holds a portfolio of “world premier” and patented technologies.

Based on the ISO 9001 certification, Atlas Copco has put in place a customer driven organization, building on field experience and encompassing environmental care, with ISO 14001 certification.



▶ ZD: a multi-disciplinary team effort!

The ZD has been developed in-house and reflects the thorough knowledge of compressors and their inner components. This know-how is supported by a wealth of state-of-the-art measuring and testing equipment and by the commitment of specialists from independent laboratories and suppliers.

The ZD development has also benefitted from the “shared innovation” process within the Atlas Copco Group. As the industry leader, Atlas Copco has a vast experience in the multi-disciplinary development of screw compressors, control systems, canopies, cooler shells and other components.

Only true innovation leads to important results. ZD is that result: the new “customer oriented” compressor.

ZD: the reliability of two industry standards



The ZD joins the world renowned ZR screw compressor that delivers quality dry air at medium pressure, and the D booster, bringing the air to 40 bar. This four stage combination offers an excellent compression ratio, reliability and component life. Designed as a complete and tightly integrated package from one single supplier, the ZD is the true plug-and-play solution.



MD water-cooled adsorption dryer with negligible power consumption

- ▶ integrated inside the canopy on models up to ZD 2750 and up to ZD 2800 VSD
- ▶ exterior to the canopy on models ZD 3050 to ZD 4000 and ZD 3500 VSD & ZD 4100 VSD



Superior elements

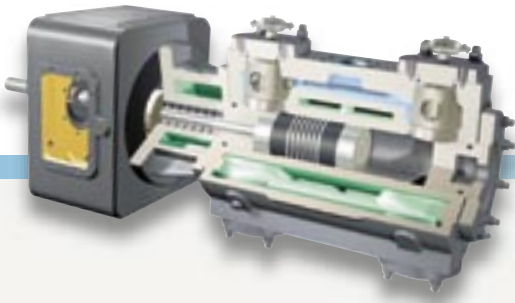
- ▶ safe running speeds
- ▶ fully synchronized rotors and efficient shaft sealing
- ▶ superior rolling element bearings for high stability under varying conditions

▶ Oil-free air

- ▶ proven Atlas Copco oil-free rotary screw technology
- ▶ no oil carry-over to compression chamber
- ▶ oil-free air assured without seal air

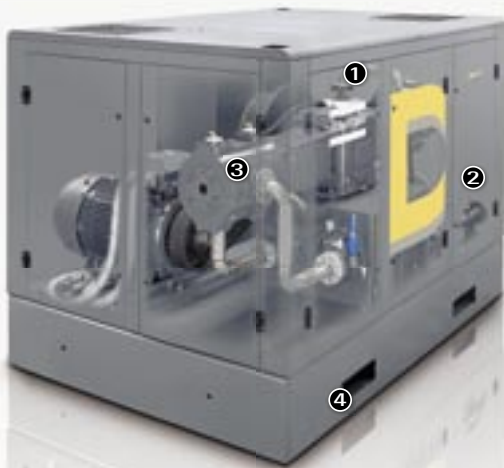


- ❶ - State-of-the-art Elektronikon® Mk IV control and monitoring system
 - Integrated instrumentation and safety devices
 - Dew point alarm and safety device at ZR outlet
- ❷ Fully integrated, silenced package
 - No foundation required
- ❸ High efficiency and energy saving stainless steel coolers, with minimal pressure drop
- ❹ Electronic drains, no air losses
- ❺ The best of screw technology:
 - high performance, long component life,
 - low maintenance, reduced downtime



▶ Oil-free air

- ▶ oil-free compression chambers
- ▶ PTFE piston rings



- 1 Integrated 10 bar pulsation damping vessel with integrated inlet filter
- 2 Two stage water-cooled booster; only two high pressure stages are reciprocating, which limits the use of costly valves; proven technology
- 3 Standardized cylinder and internal components (valves, piston rings, packings)
- 4 All components are on a common skid, provided with forklift slots

▶ Dry air

- ▶ The booster only receives perfectly dry air, which safeguards the compression in the two high pressure stages. No risk of moisture ensures longer lifetime for piston rings and valves.



Elektronikon®

- ▶ microprocessor based intelligent control
- ▶ system performance status (interactive service indications, alarms, shutdowns)



Integrated cubicle

- ▶ all electrical and electronic components and modules are integrated
- ▶ all connections are prewired



Stainless steel bundles

- ▶ star profile improves heat transfer
- ▶ better resistance against polluted water
- ▶ designed for life, not as a disposable consumable

Benefits

- ▶ superior technical quality for higher reliability in the process and less risk of downtime
- ▶ high quality oil-free air
- ▶ common equipment for easier management
- ▶ a single supplier for spare parts and service

True innovation for unprecedented integration

▶ Integrated functions

High in the “top ten chart” of customer requirements that guided the development of the ZD, was easy transportation & installation and noise level. The design challenge was to integrate a maximum of equipment on the compressors’ base plate.

▶ Integrated functions: the surest path to superior quality

Some compressors are almost like patchwork, with many loose building blocks and components that take time to install and tune... with numerous gaskets and connections. Often, ancillary devices like dryers or pressure vessels are tested individually but not as part of the complete unit.

In contrast, with so many functions integrated in the ZR screw compressor and D booster, you save time and aggravation during installation and maintenance. Shorter downtimes mean less costly production loss.

Benefits

Integrated MD adsorption dryer

- ▶ from ZD 1200 to ZD 2750 and corresponding VSD models, the MD dryer is integrated on the ZR base plate*
- ▶ no more separate installation
- ▶ factory tested as one unit
- ▶ fewer connections, gaskets and adjustments during service
- ▶ savings in floor space

* MD not integrated from ZD 3050 and from ZD 3500 VSD



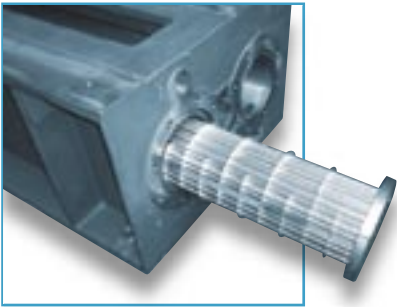
Intermediary pulsation capacities integrated in cylinders

- ▶ no separate pulsation damping vessels on coolers
- ▶ fewer connections
- ▶ no PED inspection (pressure vessel inspection)

Pulsation damper and instrumentation integrated in outlet pipe

- ▶ pulsation damping function and safety functions are now independent from the 40 bar vessel; this results in a much more flexible ZD installation (easier connection to a common receiver at a distance)
- ▶ safety valve, pressure and temperature sensors are fitted on the outlet pulsation damping pipe
- ▶ safer installation; a vessel from a different supplier that doesn't meet all compressor requirements is less of a risk

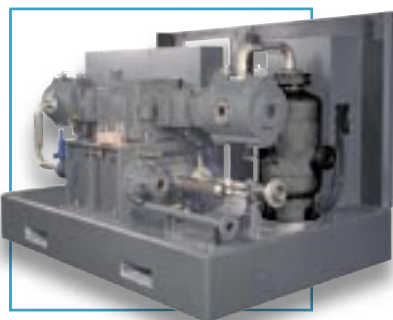




Integrated coolers

Coolers are no longer placed above the compressor but in the lower part (integrated inside the compressor frame)

- ⊙ suppression of the components on top leads to...
 - easy access to the coolers
 - no dangerous climbing - no need for fall protection or scaffolding
- ⊙ easy access to the piston and cylinder line: no need to dismantle components on top
- ⊙ shorter downtime for maintenance



Pulsation damping vessel integrated on the base plate, at the booster inlet

- ⊙ no more on-site installation
- ⊙ fewer connections



Integrated inlet filter

- ⊙ No more separate installation on site



Installation could not be easier...

- ⊙ All equipment is enclosed within the canopies

Benefits

- ⊙ optimized sizing
- ⊙ complete ZD, factory tested as a whole, no individually tested loose equipment
- ⊙ faster installation
- ⊙ shorter downtimes for maintenance, smaller part count, fewer gaskets and joints, less risk of bad assembly
- ⊙ time saved, production can start sooner

▶ Integrated cylinders

Cylinders constitute the core of the compressor: oil-free compression chambers with the inner “strategic” components such as valves, piston rings, packings.

While safeguarding the integrity of the cylinder and its famous reliability track record, the scientists chose the path of innovation to achieve several goals:

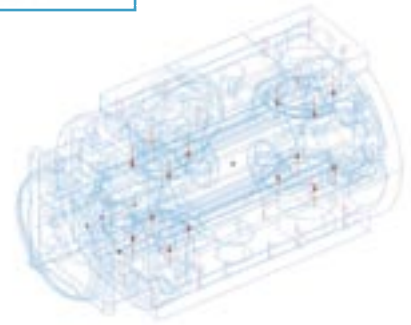
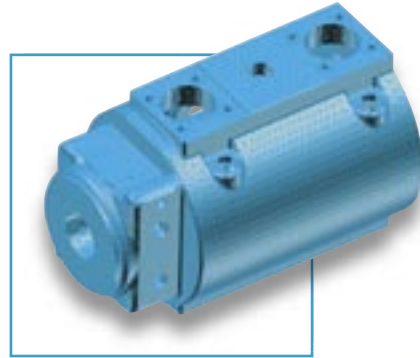
- ▶ simplification and integration of functions for a more compact machine, allowing for a canopy enclosure
- ▶ maintenance requirements included from the design phase
- ▶ further improvement of reliability and component life



Benefits

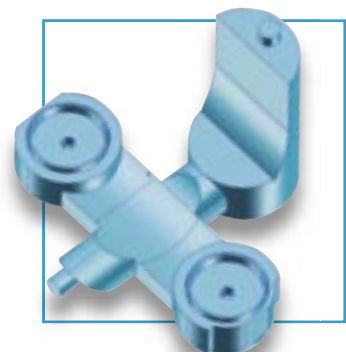
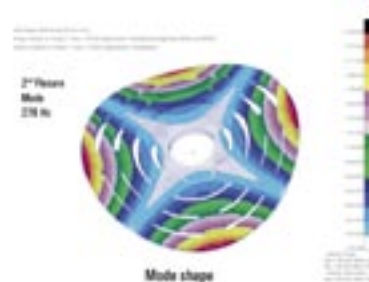
- ▶ simplified design
- ▶ no adaptation of separate pulsation dampers
- ▶ fewer components and gaskets
- ▶ no pressure vessel inspection a/c to PED (easier maintenance)
- ▶ more compact machine

Integration of pulsation damping volumes into the cylinders at foundry level



In-depth studies

In-depth studies and simulations, such as finite element analysis, provided more insight in components' behaviour and allowed the engineers to increase the component lifetime.



True innovation for easier maintenance

▶ A “maintenance” oriented design

Simplification: cylinder outer heads are not water cooled

- ▶ there is no need to drain the water before service interventions on the piston and shaft lines; no refill of water with antifreeze (no risk of accidentally changing the % of dilution during maintenance)

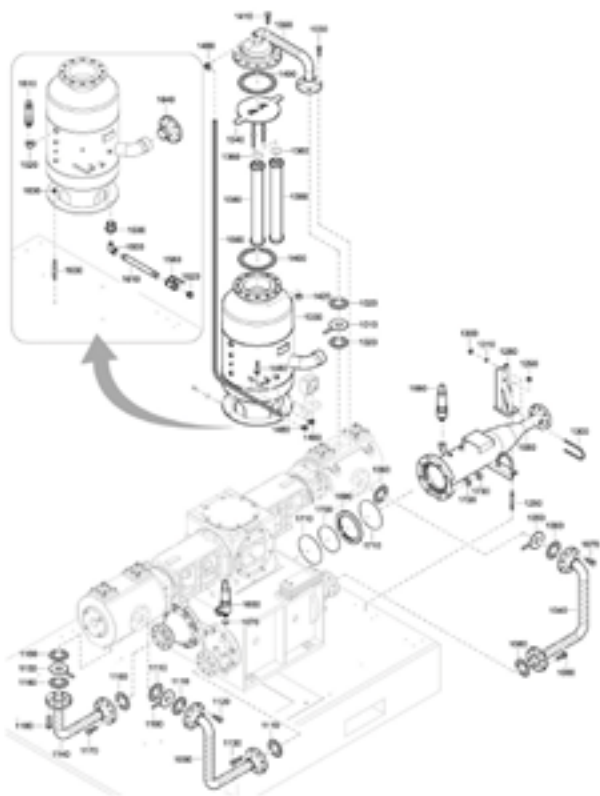
Standardization and reduction of number of cylinders

- ▶ reduction of the number of different inner parts: piston rings, valves, packings
- ▶ easier management of parts, less stock needed

Comprehensive and concise parts lists

3D “exploded views” show the exact location and reference of the spare parts.

- ▶ avoids costly misunderstandings
- ▶ no time wasted in searching or in correcting mistakes
- ▶ fast parts delivery.



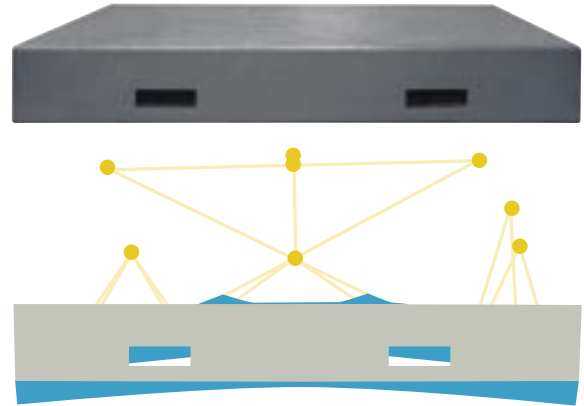
True innovation for easier installation / relocation ...

▶ Engineered hydraulic concrete base plate

Traditional 40 bar solutions require significant installation work: pouring a foundation, rigging the unit, and fixing it to the foundation with chemical bolts or anchor pads.

The ZD designers made a radical departure from this labourious approach. They designed a concrete filled chassis that allows the ZD to be installed without any preparations or fixation systems.

The special concrete has been studied in depth by a team of civil engineering and compressor specialists, on long term stability and behavior under dynamic stresses. The concrete has excellent dynamic characteristics for rigidity and vibration absorption.



Simulation of deformations and resonance frequencies.



On the move

Not only is installation greatly simplified, relocation to other production sites becomes easy as well – whereas traditional setups require costly dismantling and reinstallation work. Another source of substantial cost savings!

Benefits

- ▶ easy and cost saving handling
- ▶ can be transported using a forklift
- ▶ all models are containerizable
- ▶ easy and cost saving installation and relocation
- ▶ no specific civil engineering work required; only an industrial flat slab, able to support the weight of the machine
- ▶ no need for chemical bolts nor anchor bolts nor anti-vibration blocks
- ▶ no vibrations to the ground, hermetic structure to allow for a canopy



... and silent running anywhere in the plant

▶ Silenced canopy as standard

Because the concrete base plate absorbs vibrations and provides a sturdy and hermetic basis for a closed canopy, the Atlas Copco engineers have been able to design an all-encompassing, sound insulating canopy. It is provided as standard on the ZD, which is an industry first.

Benefits

- ▶ impressive reduction of the sound level [75 to 82 dB(A)]
- ▶ noise level allows operators to work near the machine with ear protection (in conformity with European legislation)
- ▶ improved comfort for the operators
- ▶ easy access for maintenance: completely removable panels



A separate compressor room is no longer required: cost saving

Your compressor is high tech equipment that deserves to be seen, rather than being hidden in a dark compressor room. Thanks to the effective sound insulation, it can now be part of your process installation, e.g. next to your blow moulding machine. A unified installation is a true cost saver on many levels: the investment in a separate compressor room is no longer required, you save in pipe length and thus in pressure drop, and supervision of the compressor and blow moulding machine can be managed at a glance, by the same operator.

True innovation for real cost savings

▶ Electronic shaft

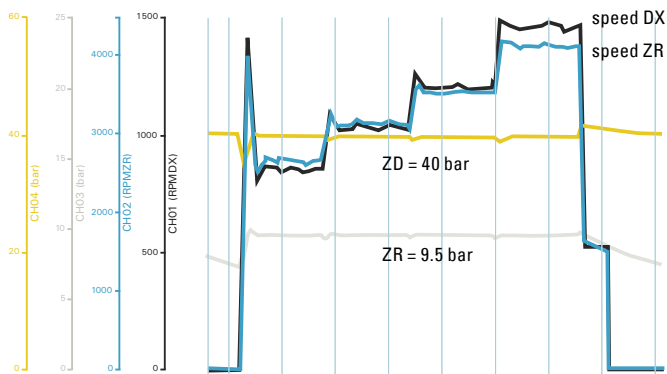
Both the ZR screw compressor and the D piston booster are monitored and controlled by the sophisticated Elektronikon® Mk IV. They ensure the best energy efficiency and safe operation, and offer the user a comprehensive information and warning function.

By networking both Elektronikon systems, the ZD compressor and booster work in perfect harmony.

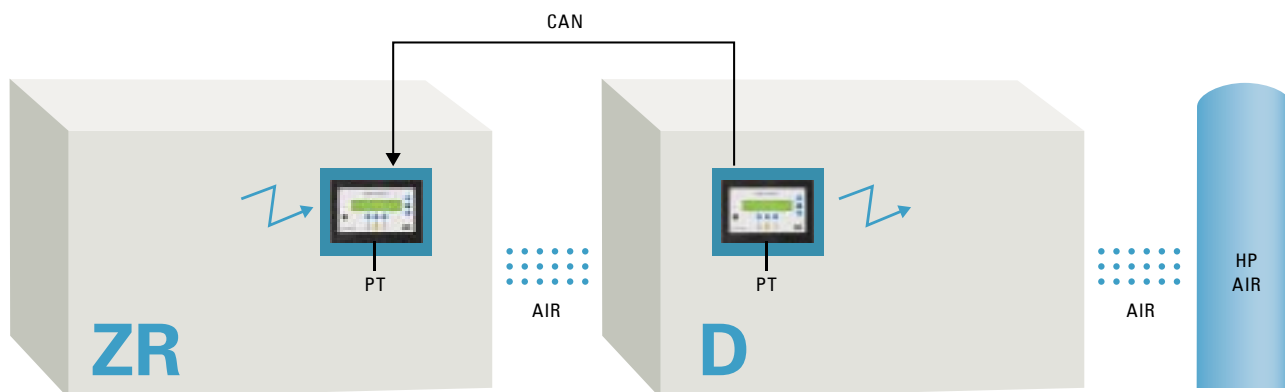


Benefits

- ▶ only one start and stop button for the ZD combination
- ▶ optimization of starting cycles to ensure a good reactivity of the ZD while limiting the current peaks at start-up
- ▶ fixed speed standard range ZD: synchronized loading and unloading sequences
- ▶ variable speed ZD VSD: synchronization of motor speed



As can be seen from the graph, the speed of the Z compressor and the D booster are tightly linked. A change in air demand is quickly followed by a speed correction of the ZD system. Despite the changing speeds, the pressure band is very narrow and the outlet flow remains extremely stable.



Benefits

Electronic shaft : suppression of the 10 bar storage vessel

- no external vessel is needed (only integrated vessel)
- more compact: everything on one base plate
- easier installation and maintenance

ZD Variable Speed Drive

ZD 1400 VSD - ZD 4100 VSD

▶ Up to 30...35 % in direct energy savings

VSD already has a long tradition within Atlas Copco and thousands of units are in everyday operation around the world. ZD VSD is an homogenous VSD combination with the ZR VSD screw compressor, the MD VSD dryer and the VSD D-booster.

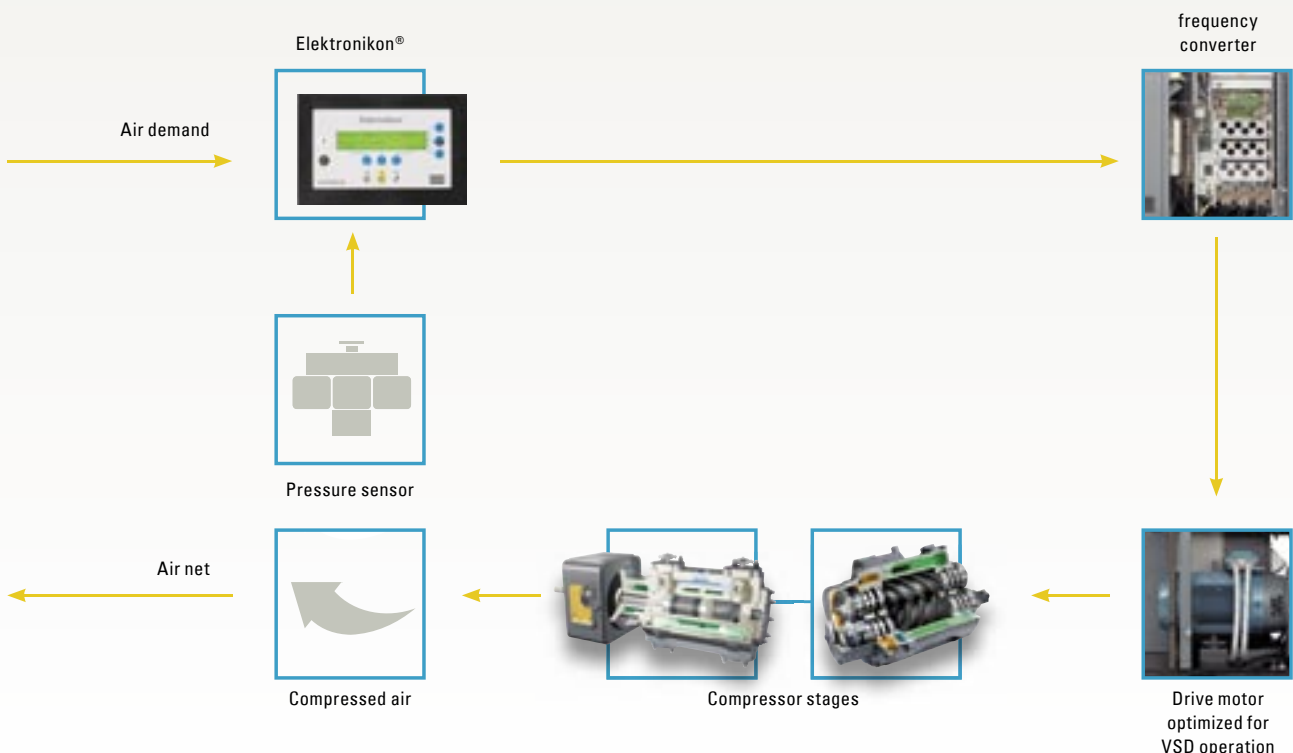
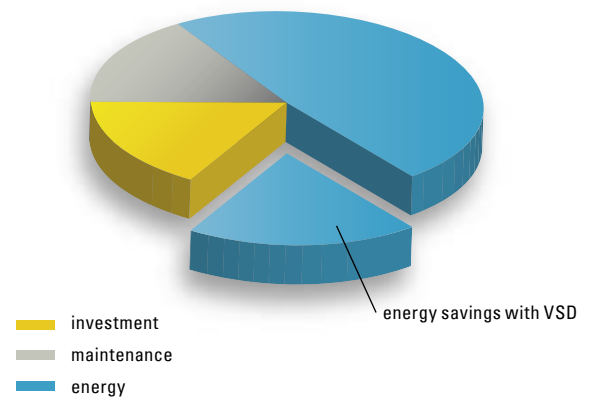
ZD VSD comes fully equipped with:

- ▶ integrated frequency converter
- ▶ anti-harmonics filters
- ▶ special motor with insulated bearings and reinforced ventilation

All these components have been designed and optimised for VSD use. The regulation range extends from 40% to 100% without speed windows. The whole system is perfectly tested, which ensures total peace-of-mind.

Air demand fluctuates. It is particularly true in the PET bottling industry: change of bottle size, change of line speed, seasonal peaks, maintenance, stops... Energy savings are now crucial for production costs.

VSD saves the energy losses traditionally due to the idle or partial load running of the machines.



▶ Complemented by numerous indirect energy savings

Low starting currents and smooth starting torques

- ▶ less stress on mechanical parts
- ▶ longer service life of wear parts
- ▶ no extra investment to correct cos Phi (approx. 1)
- ▶ no current peak penalties
- ▶ no penalties from utilities companies

Compressor integrity

- ▶ running continuously in loaded condition, the compressor is in optimal regime

High efficiency

- ▶ stepless speed regulation within the speed band, for a completely optimized control and maximum energy savings

Benefits

- ▶ energy savings up to 35% all over the life duration of the machine
- ▶ less risks for penalties from utility companies
- ▶ less stress on mechanical components: savings on maintenance
- ▶ easy integration as top load machine – no over-investment
- ▶ low noise level
- ▶ less stops/starts: stability of your process
- ▶ stability of pressure: stability of process

▶ Less noise

Thanks to the smooth operating modes, the machines are more quiet – 77.3 to 83.9 dB(A)

▶ Another customer requirement fulfilled: stability of the process

The VSD compressor operation is smooth and stepless. Its reliability ensures a highly reduced annual downtime and therefore brings immediate savings through the stability of your process.

ZD VSD can be connected either to VSD or non VSD machines. One of the configurations can be: non VSD compressors for base load production and one VSD machine to cope for the air fluctuations (top load production).

▶ VSD saves the investment of an additional compressor

With one or several VSD compressors to cater for the varying top load, you no longer need to over-invest in a compressor which will only work intermittently, depending on the process requirements.

ZD *plus* and ZD *plus* VSD

ZD RI and ZD RI VSD

▶ Modularity brings additional savings

ZD *plus* and ZD *plus* VSD

In a typical PET blowing operation, the moulding machines form the production centerpiece, but they are surrounded by equally vital peripheral equipment such as cappers, labellers and instrumentation. They too need a reliable quality air supply.

ZD *plus* comes with a larger model screw compressor, ready to handle medium pressure in your production line, in addition to feeding the 40 bar booster. This approach saves substantially over extra stand-alone compressors.

ZD RI and ZD RI VSD

Energy saving is the driving argument in all investments. Many blow moulding machines are now equipped with air reinjection systems. The recovered air is used both for pre-blow and reinjection. With ZD RI and ZD *plus* RI are perfectly adapted to reinjection and you can save substantially over energy costs, every day.

ZD *plus* benefits

- ▶ No requirement for separate medium pressure compressor
 - lower investment
 - simpler installation
 - lower maintenance and spare part costs
- ▶ Additional medium pressure high quality air
 - dry air

ZD RI Benefits

- ▶ Easily integrated in a new "reinjection" solution with adapted sizes of equipment
- ▶ Easy adaptation of existing ZD to reinjection solution with adaptation kit
- ▶ High energy savings
- ▶ VSD RI is particularly adapted to reinjection and fluctuating demand

VSD benefits

- ▶ Energy saving
- ▶ Stability of pressure



ZD and ZD VSD ranges

40 bar oil-free air

Versions

- ▶ CE 400V-50Hz IEC
- ▶ ASME 440V-60Hz IEC
- ▶ ASME 460V-60Hz UL/CSA
- ▶ configurations in U & I

Options

- ▶ dew point indicator 40 bar
- ▶ HAT version (40 < T °C < 50)
ZR HAT version + D with silencing canopy

ZD fixed speed 50 Hz	ZD Flow		
	Nm ³ /h	m ³ /h FAD	cfm FAD
ZD 1200	1067	1160	683
ZD 1400	1275	1386	816
ZD 1600	1443	1570	924
ZD 2100	1967	2139	1259
ZD 2500	2271	2470	1454
ZD 2750	2576	2801	1649
ZD 3050 *	2769	3010	1772
ZD 3350 *	3076	3345	1969
ZD 3750 *	3456	3759	2213
ZD 4000 *	3696	4018	2365

* MD not integrated

ZD fixed speed 60 Hz	ZD Flow		
	Nm ³ /h	m ³ /h FAD	cfm FAD
ZD 1200	1022	1113	655
ZD 1400	1252	1361	801
ZD 1600	1469	1599	941
ZD 1900	1752	1905	1121
ZD 2300	2110	2294	1350
ZD 2550	2387	2596	1528
ZD 3100 *	2831	3078	1812
ZD 3500 *	3155	3431	2020
ZD 4000 *	3715	4040	2378

* MD not integrated

ZD VSD type	Flow range		
	Nm ³ /h	m ³ /h FAD	cfm FAD
ZD 1200 VSD	444/1059	483/1152	284/678
ZD 1400 VSD	444/1266	483/1376	284/810
ZD 2300 VSD	1020/2071	1109/2252	653/1326
ZD 2800 VSD	1020/2444	1109/2658	653/1565
ZD 3500 VSD *	1455/3238	1583/3522	932/2073
ZD 4100 VSD *	1455/3637	1583/3956	932/2328

* MD not integrated

ZD *plus* and ZD RI ranges offer numerous combinations. So, please contact your local Atlas Copco Customer Centre on www.atlascopco.com for a customized selection.

Reference conditions (FAD):

ambient temp.: 20 °C – RH: 0 % – inlet pressure: 1 bar abs

Reference conditions (Nm³/h):

ambient temp.: 0 °C – RH: 0 % – inlet pressure: 1.013 bar abs

Ancillary equipment to safeguard overall reliability

▶ A full range of accessories

There is no point in having a good compressor in a bad installation... it can be detrimental to the whole system. Atlas Copco has studied and selected a complete range of accessories for a safe and comprehensive installation.

- ▶ a complete offer
- ▶ safe sizing
- ▶ high quality equipment
- ▶ preservation of the safe operating parameters of compressor and process thanks to adapted periphery
- ▶ easier management for maintenance and spare parts – shorter downtime (grouped interventions from a single supplier)



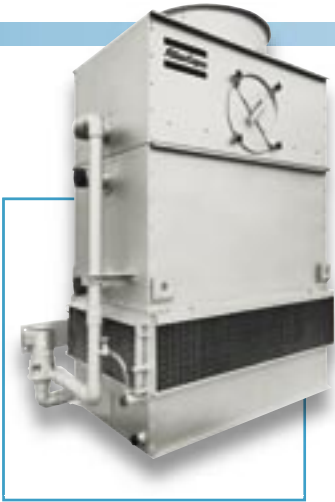
Airblast closed loop cooling unit

- ▶ water capacity from 4m³/h to 75m³/h
- ▶ maximum water pressure 6 bar
- ▶ maximum water temperature 70 °C
- ▶ versions for ambient T° down to - 40°C



Power distribution board with main switch

- ▶ simplified installation with one single power connection to the compressor



Closed loop cooling tower

- ⊙ high efficiency
- ⊙ water capacity from 4m³/h to 82m³/h
- ⊙ maximum water pressure 6 bar
- ⊙ maximum water temperature 80 °C
- ⊙ Versions for ambient T° down to - 40 °C



40 bar HTA air pressure vessel

- ⊙ volume from 500 to 3000 l
- ⊙ maximum working pressure 45 bar
- ⊙ maximum compressed air temperature 60 °C
- ⊙ hot dipped galvanized



High pressure fine filters and active carbon filters

- ⊙ in-line efficiency compressed air filters
- ⊙ nominal capacity from 161 to 1722 NI/s at 40 bar working pressure
- ⊙ maximum working pressure 50 bar
- ⊙ filtration efficiency for particle size: 0.1 micron (fine filter)
- ⊙ oil vapour removal down to 0.005 mg/m³ (carbon filter)



Water pump skid

- ⊙ capacity from 10 to 120 m³/h at 3 bar pressure drop
- ⊙ maximum water static pressure 1.5 bar
- ⊙ maximum ambient air temperature 40 °C



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