Air compressors for Airwell pumps

INSTALLATION & OPERATIONS MANUAL

AIRWELL GROUP PTY LTD | 30 Harris Rd, Malaga WA 6090 | P: +61 8 9209 2666 | www.airwellgroup.com.au

DESIGNED AND MANUFACTURED IN AUSTRALIA

A.B.N. 46 009 323 871
30 Harris Road, Malaga, Western Australia 6090
Tel: (61) 08 9209 3355 - Fax: (61) 08 9209 2666
Email: sales@airwellgroup.com.au
http://www.airwellgroup.com.au

Read this manual

Carefully read this manual before commissioning or servicing the product.

Notes:

- This documentation is part of the product.
- Retain the documentation during the entire service life of the product.
- Pass on the documentation to any subsequent user.
- Ensure that any supplement to this documentation is included, if necessary.

1 INTRODUCTION

The purpose of the air compressors described here, is to provide adequate air supply to Airwell pumping systems of different scale.

This manual is an extension to the manual supplied with your air compressor. It contains the additional information required to make an Airwell pumping system reliable and effective.

Note: This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

2 HOW THE AIRWELL PUMP WORKS

Compressed air is a particularly useful means of transferring energy to pump water. Air compressed at an existing power source can be carried significant distances through MDPE polyethylene pipe with limited loss of pressure, saving a costly power installation to the water source, whilst allowing the compressor to be used for multiple pumps, or other local purposes.

The Airwell pump component is a 316L grade stainless steel tube that can be manufactured in varying forms and sizes to suit a variety of different applications. The tube is enclosed at each end and incorporates a foot valve(s) to allow the submerged vessel to fill with water and a check valve on the outlet preventing the return of the expelled water. The valves are our own design and incorporate special features to provide exceptional ability to handle silt and sand, whilst keeping a very simple, maintenance free construction. The clean, hard valve seats provided for the polyurethane balls to close on are kept clean by the circulation of the water and are raised above the bottom of the pump to minimise contamination.

Within our most popular pumps there are two level (conductivity) probes; one long enough to reach the bottom of the pump to detect when the pump is empty, and one short one to detect when it's full. This is the key to the automatic function of the pump. We use the conductivity of water to monitor the high and low fluid levels in the pump. This means that a 'contact' is made when the water rises to the height of the short probe at the top of the vessel, (now both probes are wet) and is 'broken' when the water level falls below the lower probe at the bottom of the pump, (when both probes are dry).

An electronic circuit in the control unit detects this making and breaking of water contact, and subsequently changes the state of a 3-way solenoid valve, allowing compressed air to the pump when a 'full' signal is received, forcing the water up the discharge pipe, and then exhausting the air pressure to allow the pump to refill when the 'empty' signal is seen. The result of this is that the Airwell Pump will only cycle when a 'full' or 'empty' signal is received, regardless of this being every few seconds, minutes, hours, weeks or years.

The control unit is located close to the pump, but above water level. Besides carrying the 3-way valve for the air and the electronic control circuit, it also houses a 4.5 Amp/hour dry cell battery to power the system, which in turn is recharged by the solar panel on the lid of the controller. Mains powered systems are available for those applications where power is close to the water source, as are multiple pump controllers, flow monitoring and flow control options.

It should be noted that the solenoid valve is a 'latching' type valve and requires a short pulse of power (60 milliseconds) in one direction to change state and will stay that way until a pulse in the opposite direction changes it. A conventional solenoid requires permanent energisation to maintain either an open or closed state.

Should power be lost to the microprocessor, upon reconnection, the system will initialise on pressure, expelling any water in the pump, and regaining a reference for the controller. The water delivered by an Airwell system comes in surges, not a continuous flow like that of most electric pumps. Flow rates from the Airwell pump vary dependant on many factors.

3 AIR COMPRESSORS FOR USE WITH AIRWELL SYSTEMS

In today's world air compressors are probable one of the most common and diverse items of equipment, used by a very wide variety of domestic, commercial and industrial utilities. As with all things mechanical the quality and resulting performance and reliability is also very diverse.
The air compressor that is chosen to supply an Airwell Pumping system is very literally the heart of the system. Great care is taken to make the Airwell pump as reliable as possible; many units continue to operate for years longer than many thought possible in especially harsh conditions.
This reputation for high reliability can very quickly and easily be lost through the selection of a poor quality or badly matched air compressor. The Airwell system is demanding of compressors however, by following a few simple rules, relatively inexpensive compressors can be made to achieve considerable service life.
The factors that influence the long life and efficiency are as follows:

The Brand
The brand of an air compressor is important because of differences in manufacturing quality and support offered through manufacturers and dealer networks.
In the experience of Airwell pumps Pty Ltd, some of the worst service and very unreasonable repair costs have come from some of the biggest brand names. It also follows that the plethora of cheap imported units manufactured in developing countries are better suited to the DIY and light industry market rather than running constantly on an Airwell pump at high pressure.
The brand that we have come to recommend for a wide variety of reasons is the "Pilot" compressor. This Sydney (Australia) based company predominately uses the Italian "Chinook" compressor pump. It is easy for the uninformed to not make a distinction between this Italian equipment and similar looking pumps that currently come from much cheaper countries of manufacture. This would be a big mistake.
The level of communication and cooperation between "Pilot" and "Airwell pumps" over many years has resulted in this company manufacturing three units that are specifically modified to the particular needs of Airwell pumps.

The Style
The size range in air delivery that we require does not give much scope in regard to the style or methodology of compressing air. It is too little air for screw type options etc. to be viable and too harsh for most small close coupled types. Belt driven reciprocating piston compressors are the simplest and most cost effective at this time for single Airwell pump operation.
Where there are many Airwell pumps to be operated from one compressor, the use of screw type compressors comes into play.

Operating speed (RPM) and duty cycle
This is an area where we find that Airwell rubs up against conventional wisdom in the air compressor field. The standard line coming from most suppliers of reciprocating compressors is that they are not supposed to run full time, (not 100% duty cycle rated). They would suggest that a much larger compressor be selected. This is designed to cause the unit to cycle ON and OFF. This is said to give the compressor pump time to cool off. We reject this approach completely and would offer another solution.
If a compressor pump is de-rated sufficiently in RPM, the heat generated is reduced proportionally. Further to this the air compressor will only be producing the air volume and pressure that is required to operate an Airwell pump at that particular water pumping head and flow.
It is often the case that when a compressor is slowed down and is not over producing air, it may well be continuously running at say 500KPa rather than turning off at 1000KPa and back on again at 800KPa. We can assure you that running a piston compressor continuously at lower pressure will result in far less wear and consume less energy than the same unit, producing the same amount of air while cycling between 800 and 1000KPa.
If you are in any doubt about this try an experiment. Take your car and travel on a 500 km journey, maintaining a constant speed of 100 kilometres an hour. It will take you about 5 hours. Now on the way home try this instead. Drive your car at 200kilometres an hour for 10 minutes and spend the next 10 minutes parked under a shady tree.

Repeat this driving style all the way home. This journey will also take about 5 hours, (baring delays with traffic police). Your fuel consumption and vehicle wear and tear will be dramatically worse with this stop, start method.
By reducing the RPM of good quality reciprocating compressor pumps and changing the oil regularly with the correct grade of oil, we have come to expect excellent performance.
Some examples have achieved 7 years plus of 24-hour, 365-day running, at 800KPa before requiring a $300 rebuild ACAW10 (K25).

Variable speed drives (VSD)
There are a number of reasons why we have come to use VSD's on the majority of our air compressor units, with the first of these being the regrettable lack of three phase power in most rural areas. A three-phase motor is a far more reliable and cheaper motor inherently than a single-phase motor.
A VSD of the style that we use, can be plugged into a 15-amp single phase outlet and can produce three-phase at any Hz to drive a compressor motor at variable speed.
The variable speed and therefore variable compressed air output is very useful in matching the air compressor to the Airwell job.
Side benefits of VSD's are that you can achieve full ramp up starting, which completely eliminates the start-up spike in the motor power consumption normally associated with motor starting. The unit also provides excellent motor protection from over current and under voltage.
Finally, the VSD only requires a start signal from the compressor pressure switch to start and stop the motor. This means that a very simple inexpensive pressure switch is required.

Single and two stage compressors
As you will see from the attached graphs and tables there are marked advantages in using two stage compressors ACAW10(K25) over single stage units ACAW3(K8) & ACAW5(K17). The term two stage refers to the number of times the same air is compressed to achieve the desired pressure. A single stage compressor, regardless of how many cylinders it may have, draws the air in and achieves the desired pressure in one push. A two-stage compressor on the other hand must have at least two cylinders and typically one of these cylinders is of bigger diameter than the other. The air is drawn into the larger diameter cylinder and pushed across to the other smaller cylinder. Here it is compressed again to a higher pressure and delivered to the air receiver.
So why would you go to so much more trouble to compress it twice. To understand this, you need to remember a bit of high school physics. Notably Boyle's Law, Charles law and Ideal Gas Law, the relationship between Pressure (P), Volume (V), and Temperature (T).

$$\frac{P_1 \cdot V_1}{T_1} = \frac{P_2 \cdot V_2}{T_2}$$

This law states a number of things. Firstly, it simply says that if you start off with a body of gas at a starting pressure which for our purposes will be atmospheric pressure (101.2 KPa or 14.69 psi), if you halve the volume you will double the pressure that you started with, 2 to 1 ratio. If you have an 8 to 1 compression ratio you will simply achieve an 8-fold increase in pressure etc.
As a consequence of this compression, all the heat energy that was contained in the larger mass of gas is now contained or concentrated within a smaller space.
At a compression ratio of 8 to 1 the compressed gas temperature will be 8 times hotter than the starting temperature.
An 8 to 1 compression ratio would take atmospheric pressure from 14.69 psi or 101.2 KPa to 117.52 psi or 809.6 KPa actual pressure. When read on a standard pressure gauge (that starts at 1 atmosphere), this pressure would read 102.83 PSIg or 708.4 kPag.
You can see that even at 102.83 PSIg the air will get very hot when compressed at 8 to 1 ratio.
A two-stage compressor has the advantage that it need only operate at a much lower compression ratio to achieve the same end pressure, and therefore will run much cooler, more efficiently and with less maintenance.
As you will be able to see from the attached tables and graphs, two stage compressors will always be more efficient than single stage under all test conditions. However, the greatest benefits of efficiency and reliability are

gained when the operating pressure is higher. There are exceptions, however we (Airwell pumps) tend to specify only two stage units were the operating pressure exceeds 500 KPa continuous.

Drive pulley weights and cast-iron fly wheels

An unfortunate consequence of reducing the RPM of an air compressor is that as the RPM is reduced, the load on the motor and drive belt becomes lumpier. To rectify this problem, we add more weight to the drive pulley and replace the alloy compressor fly wheel with a heavier cast iron one. The result is to reduce the kWh power draw considerably and improve the operating smoothness, especially at low RPM. Drive belt life is also improved. Both these measures are standard equipment on compressors ordered from “Pilot compressors” as “Airwell specials”.

It is true that by adding this weight, the motor starting load is increased, however we generally set up an air compressor on an Airwell system so that it does not cycle on and off much anyway. The increased starting load is of no consequence to the Pilot ACAW10 (K25) model fitted with a VSD as the VSD achieves full ramp up to speed as a feature.

4 OPENING THE PACKAGE

The Airwell compressors are being shipped inside a wooden crate.
It is recommended to lift the compressor with a forklift - if available.

Heavy load

Use a forklift to lift.

Heavy object

To avoid muscle strain or back injury, use lifting aids and proper lifting techniques when removing.

Open the wooden crate carefully paying attention not to cause any damage to the air compressor.
The compressor is ready to connect to the electrical and compressed air networks.

Warning - Electricity
Three phase models are intended for installation only by technically qualified personnel. Failure to install it in compliance with national and local electrical codes and within Airwell Group recommendations, may result in fatal electrical shock or fire hazard, unsatisfactory performance, and equipment failure.

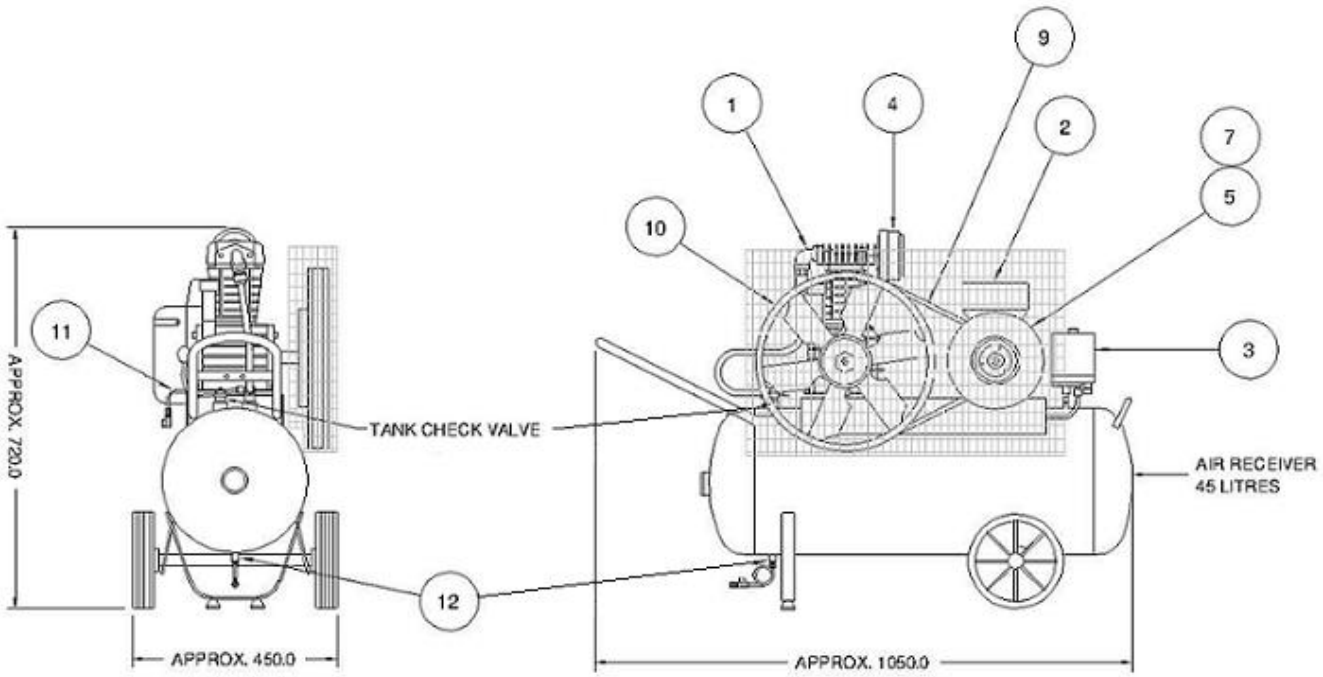
Compressed air
- Never point compressed air at yourself or others.
- Before releasing a fitting make sure it is not under pressure.
- Safety glasses should be worn at all times.
- Use hearing protection whenever allowing compressed air to escape.

Vessel under pressure

Over pressurized vessel may explode causing serious injury or even death.

5 TECHNICAL SPECIFICATIONS

5.1 ACAW3(K8) Air Compressor



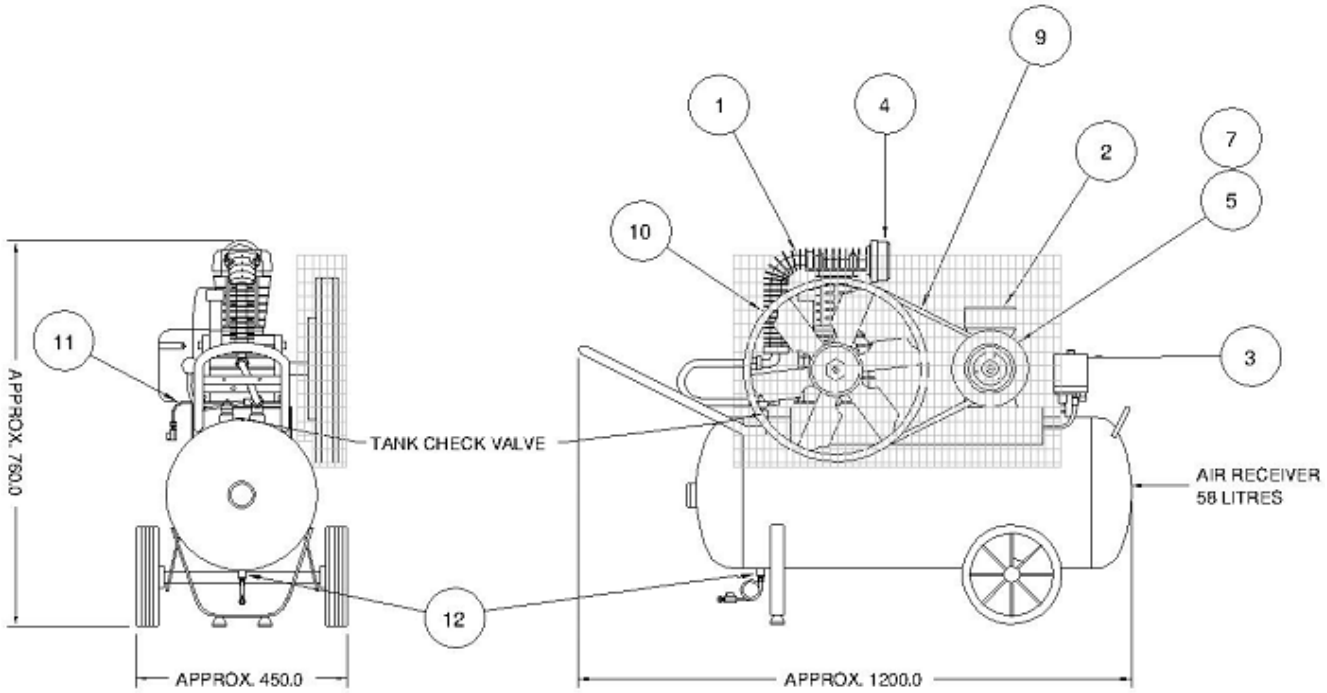
Spare parts list

Item	Part No	Description	Qty
1	ACAW3(K8)B	Pilot bare pump K8 (Standard aluminium flywheel)	1
2	ACAW3(K8)M	Electric motor 240V / 1.65kW	1
3	E202	Pressure switch 240V	1
4	AC160	Air filter	1
5	AC331	Counterweight / Pulley	1
7	AC333	Bush assembly 19mm	1
9	AC321	V-belt A46	1
10	AC330	Cast-iron pulley 310PD	1
11	AC155	Drain kit (oil)	1
12	AC150	Drain kit (water)	1

Performance details

Motor revs	2820 rpm
Drive pulley	71APD
Pump pulley	310PD
Pump revs	678 rpm
Compressor output (6 bar)	1.11 Lit / sec FAD (2.35 CFM FAD)
Weight	50 kg

5.2 ACAW5(K17) Air Compressor



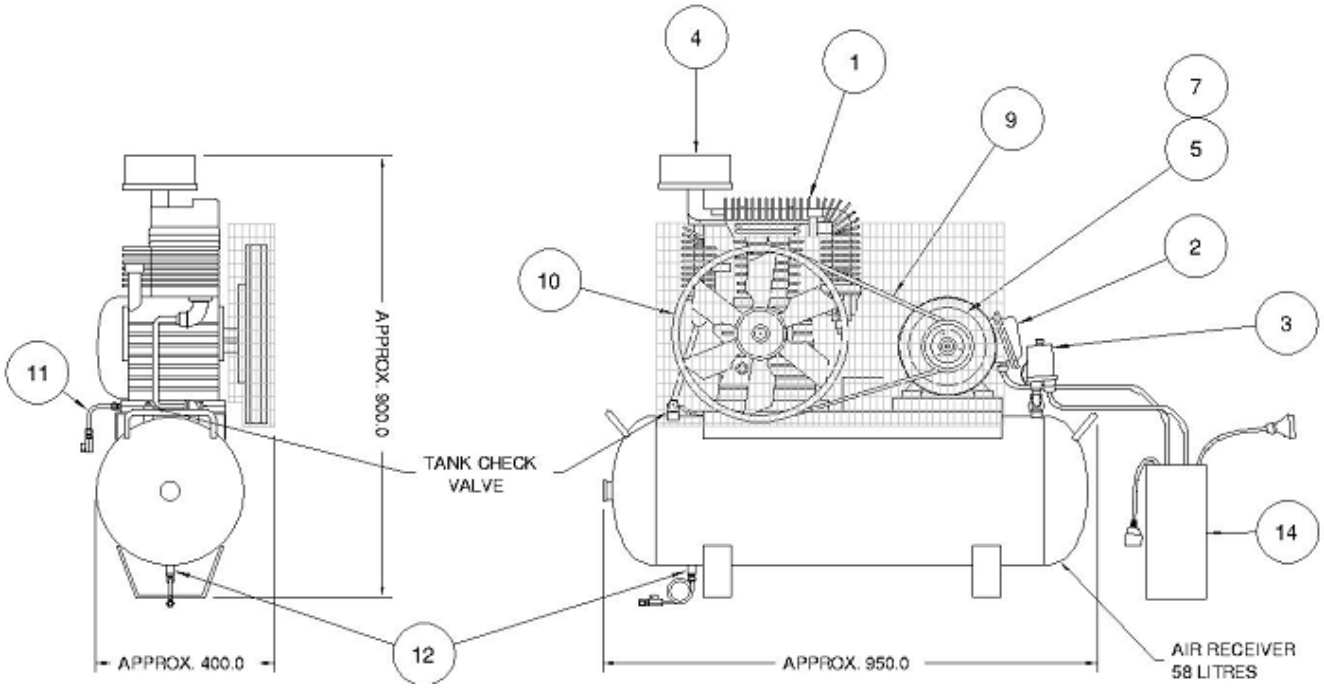
Spare Parts List

Item	Part Nos	Description	Qty
1	ACAW5(K17)B	Pilot bare pump K17 (standard aluminium flywheel)	1
2	ACAW5(K17)M	Electric motor 240V / 1.65kW	1
3	E202	Pressure switch 240V	1
4	AC160	Air filter	1
5	AC331	Counterweight / Pulley	1
7	AC333	Bush assembly 19mm	1
9	AC323	V-belt A52	1
10	AC330	Cast-iron pulley 310PD	1
11	AC155	Drain Kit (oil)	1
12	AC150	Drain Kit (water)	1

Performance details

Motor revs	2820 rpm
Drive pulley	71APD
Pump pulley	310PD
Pump revs	678 rpm
Compressor output (6 bar)	2.48 Lit / sec FAD (5.23 CFM FAD)
Weight	60 kg

5.3 ACAW10(K25)VVVF Air Compressor



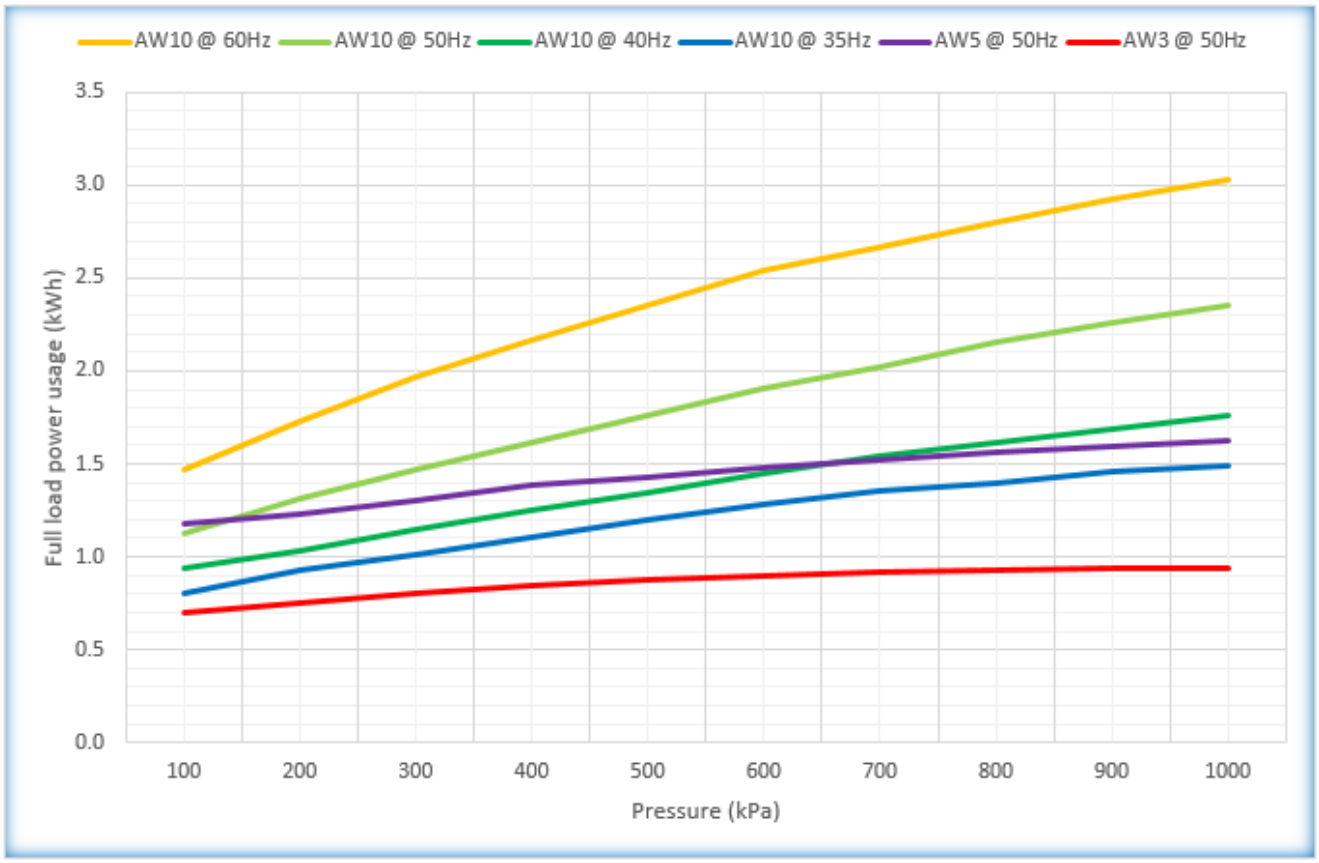
Spare Parts List

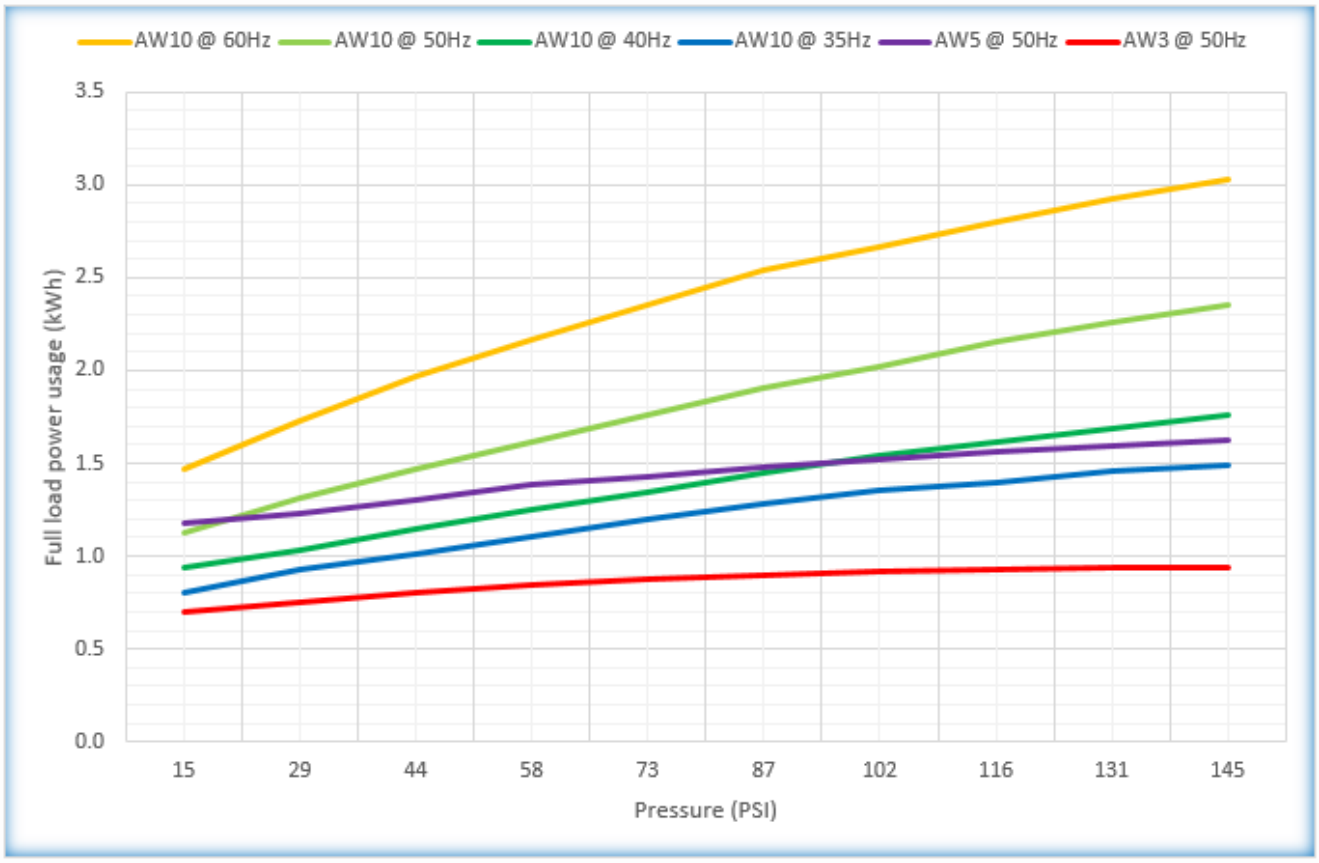
Item	Part Nos	Description	Qty
1	ACAW10(K25)B	Pilot bare pump K25 (standard aluminium flywheel)	1
2	ACAW10(K25)M	Electric motor 415V / 2.2kW	1
3	E202	Pressure switch 240V	1
	E200	Low hysteresis pressure switch	1
	E300	Pressure switch 415V	1
4	AC170	Air filter	1
5	AC331	Counterweight / Pulley	1
7	AC334	Bush assembly 24 mm	1
9	AC322	V-belt A51	1
10	AC330	Cast-iron pulley 310PD	1
11	AC155	Drain Kit (oil)	1
12	AC150	Drain Kit (water)	1
13	AC265	Solenoid unloader valve kit	1
14	AC307	Variable speed drive Lenze SMVector	1

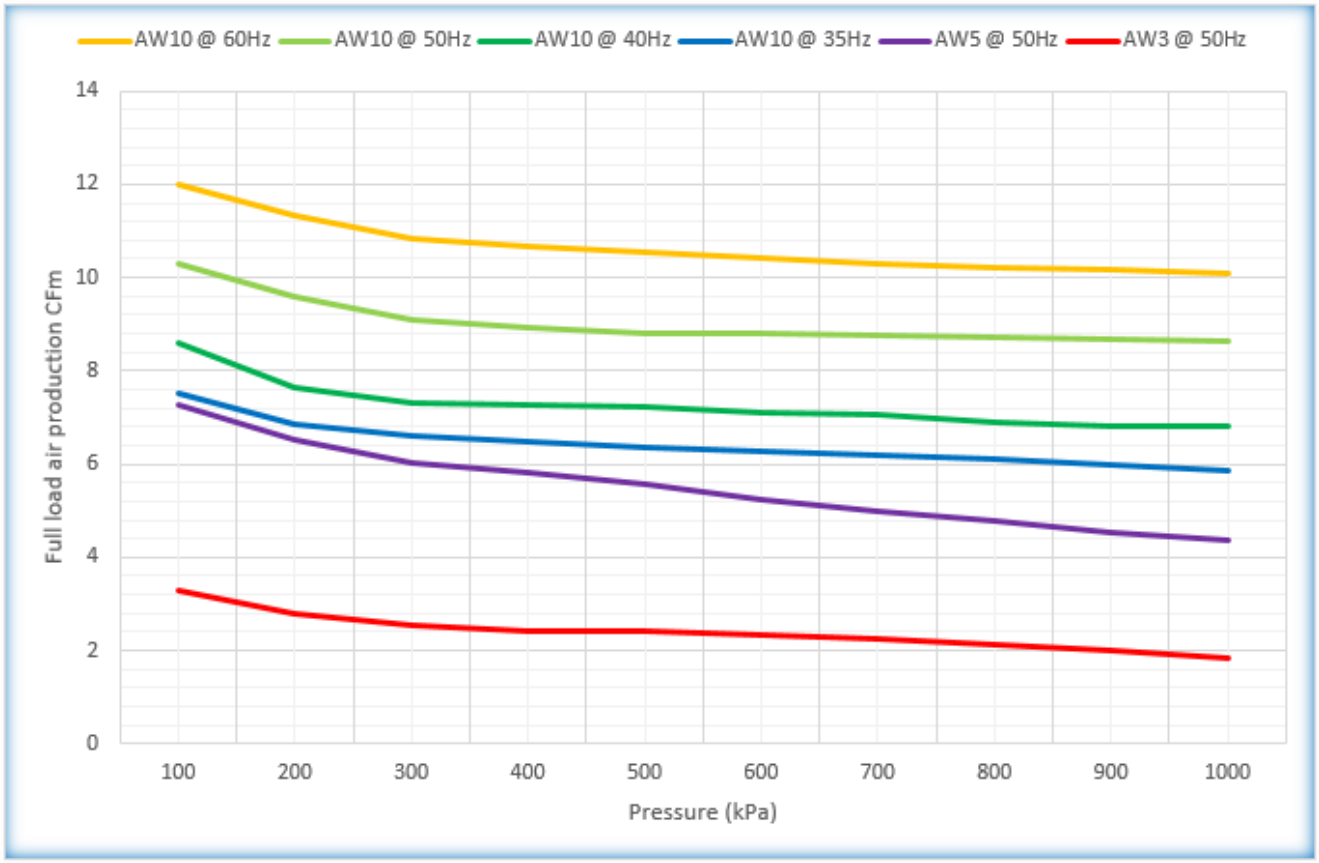
Performance details

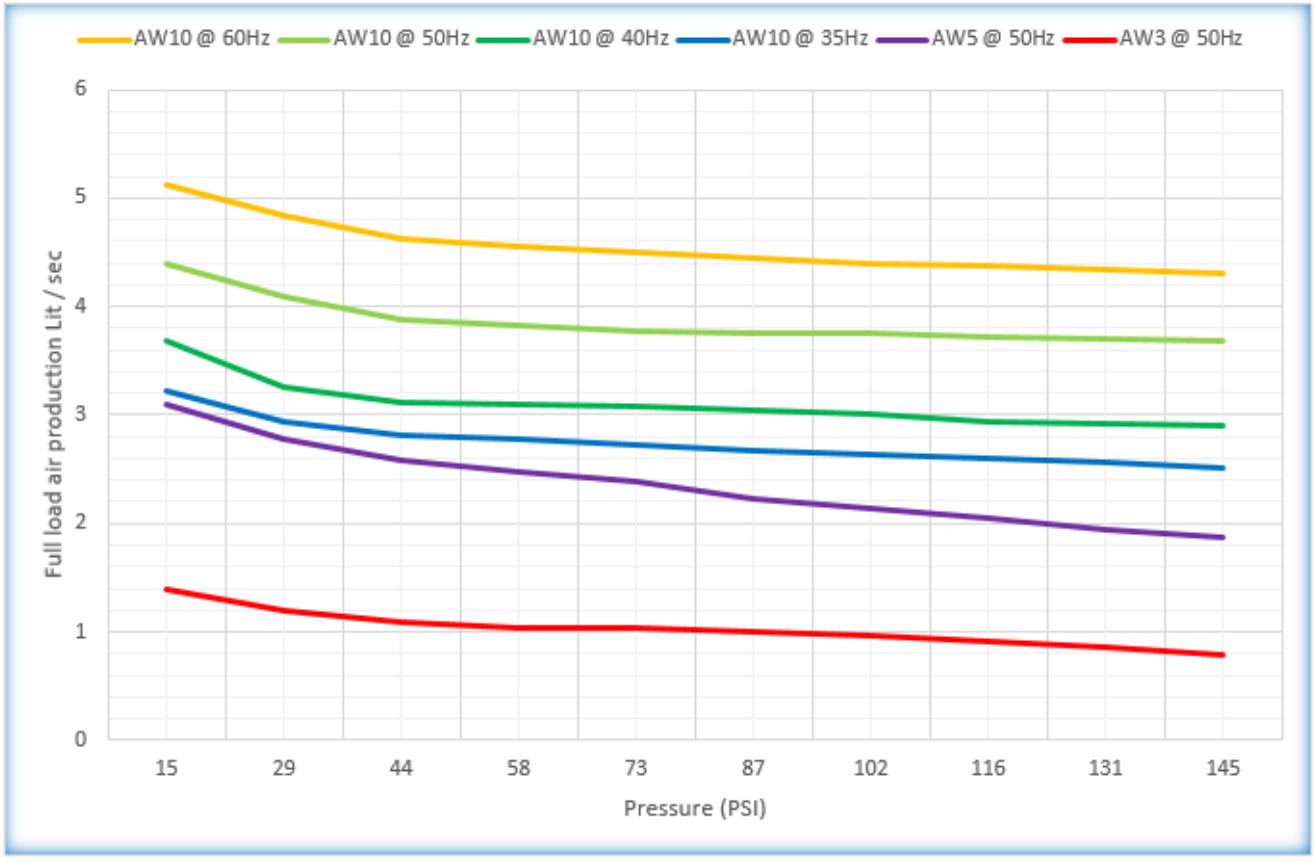
Motor revs	2840 rpm
Drive pulley	80APD
Pump pulley	310PD
Pump revs	517 - 885 rpm
Compressor output (6 bar)	2.97 - 494 Lit / sec FAD (6.27 – 10.42 CFM FAD)
Weight	75 kg

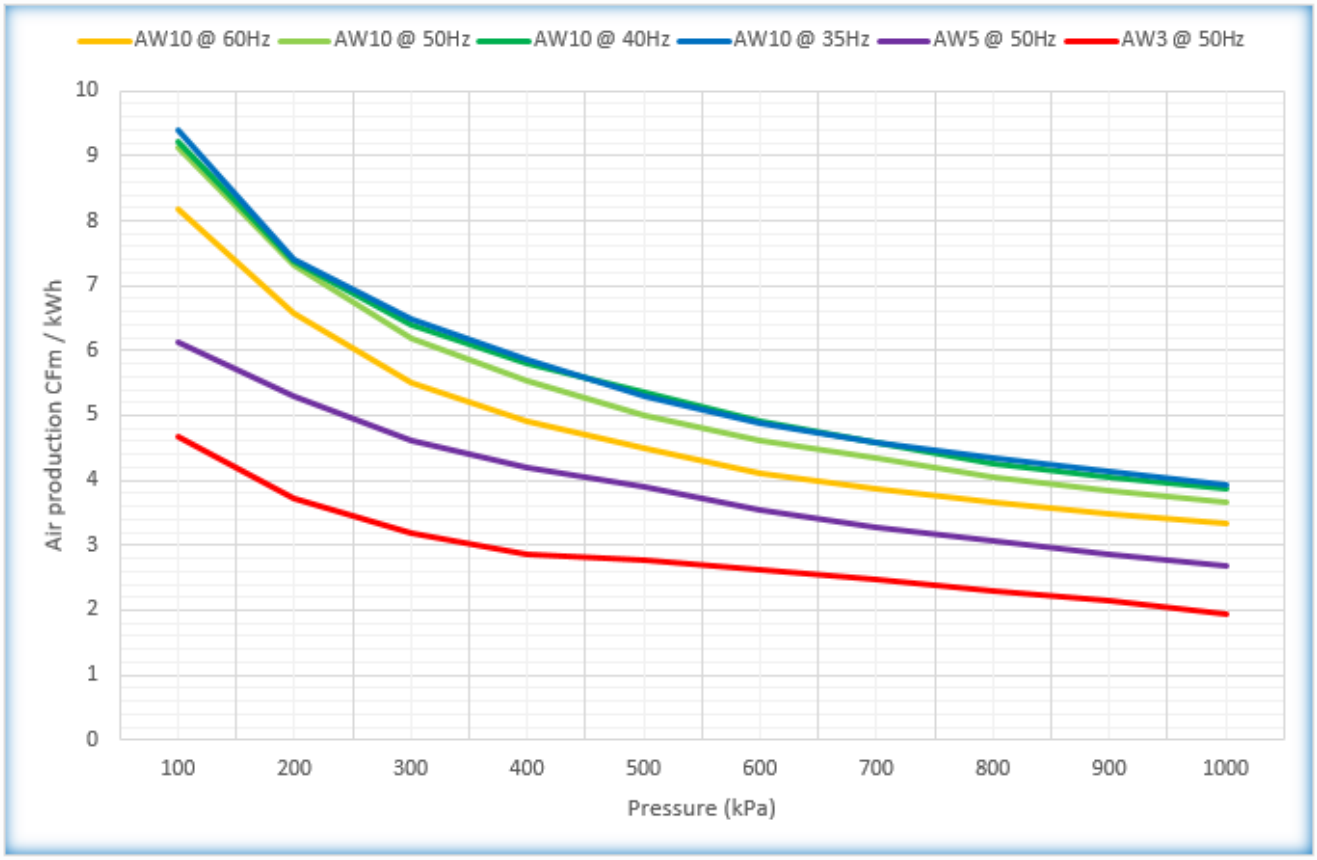
6 PERFORMANCE GRAPHS

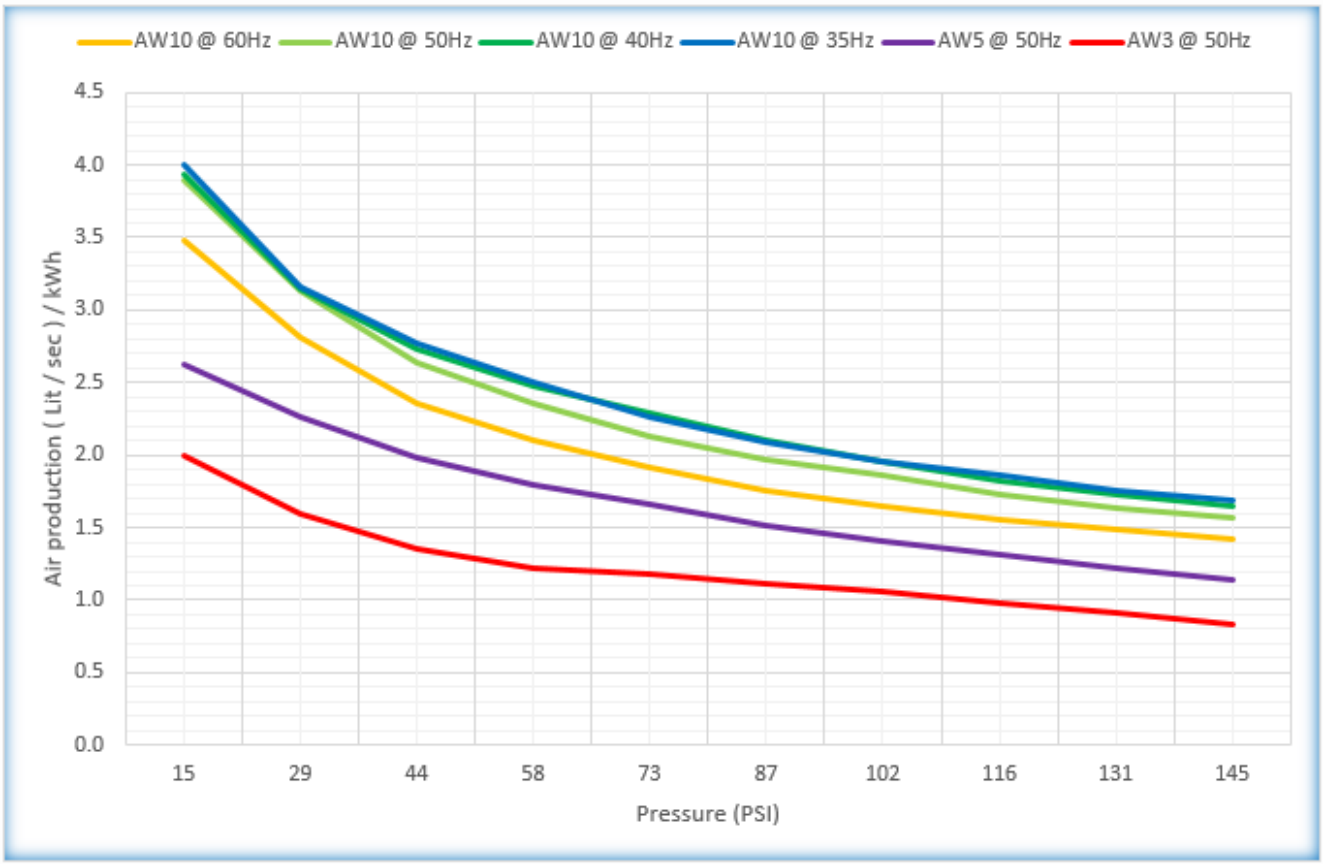


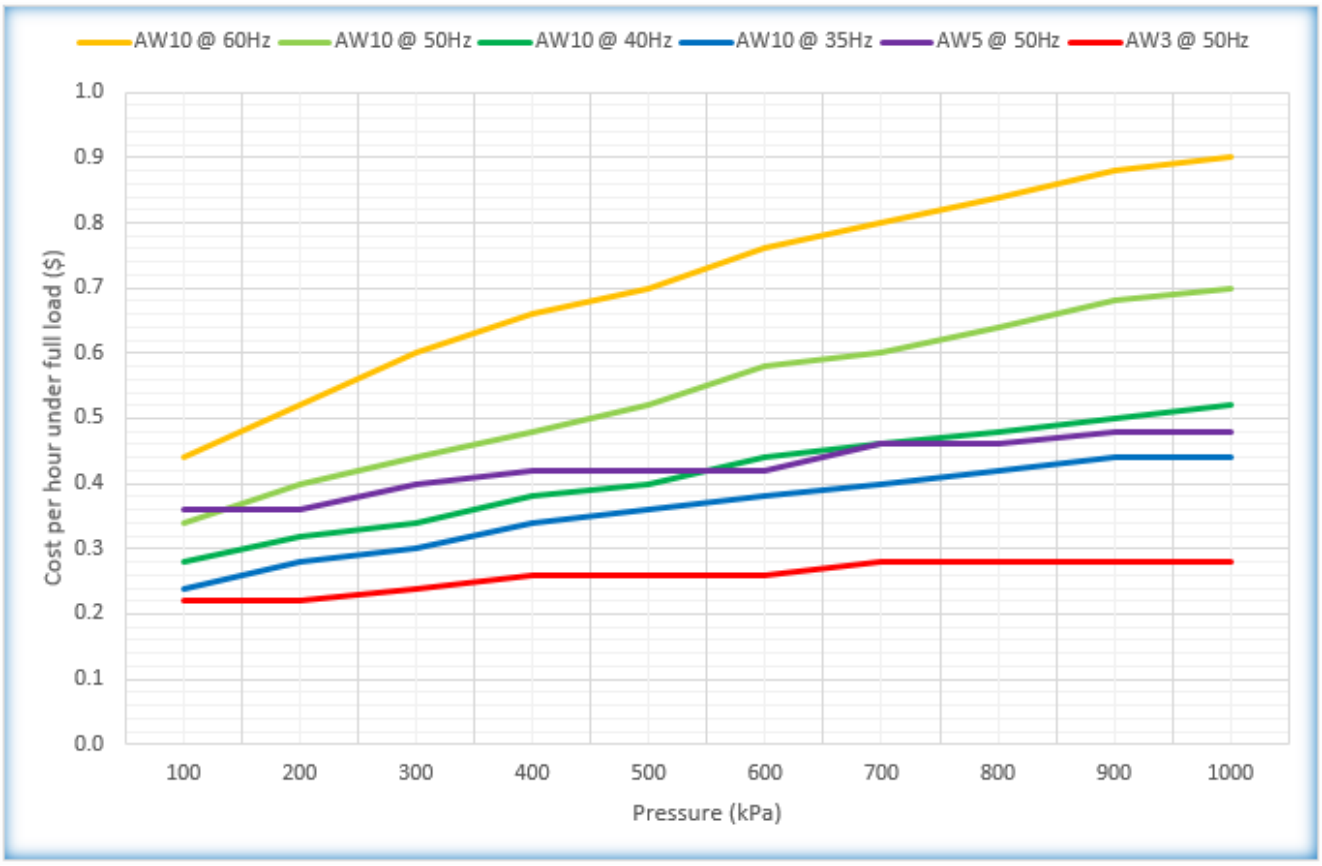


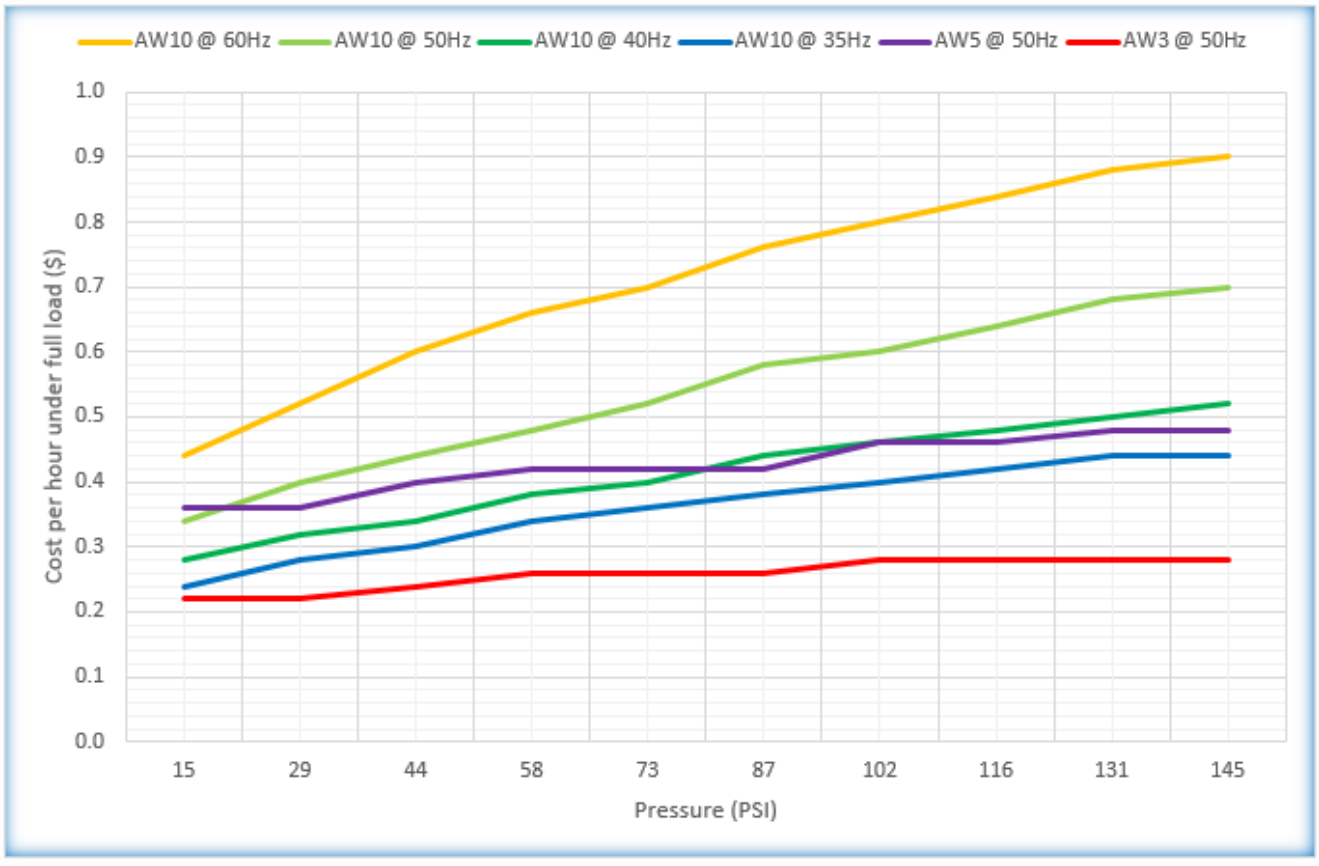

AW10 @ 60Hz
AW10 @ 50Hz
AW10 @ 40Hz
AW10 @ 35Hz
AW5 @ 50Hz
AW3 @ 50Hz
Full load air production CFm
0
2
4
6
8
10
12
14
100
200
300
400
500
600
700
800
900
1000
Pressure (kPa)


AW10 @ 60Hz
AW10 @ 50Hz
AW10 @ 40Hz
AW10 @ 35Hz
AW5 @ 50Hz
AW3 @ 50Hz
Full load air production Lit / sec
0
1
2
3
4
5
6
15
29
44
58
73
87
102
116
131
145
Pressure (PSI)


AW10 @ 60Hz
AW10 @ 50Hz
AW10 @ 40Hz
AW10 @ 35Hz
AW5 @ 50Hz
AW3 @ 50Hz
Air production CFm / kWh
0
1
2
3
4
5
6
7
8
9
10
100
200
300
400
500
600
700
800
900
1000
Pressure (kPa)


AW10 @ 60Hz
AW10 @ 50Hz
AW10 @ 40Hz
AW10 @ 35Hz
AW5 @ 50Hz
AW3 @ 50Hz
Air production (Lit / sec) / kWh
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
15
29
44
58
73
87
102
116
131
145
Pressure (PSI)

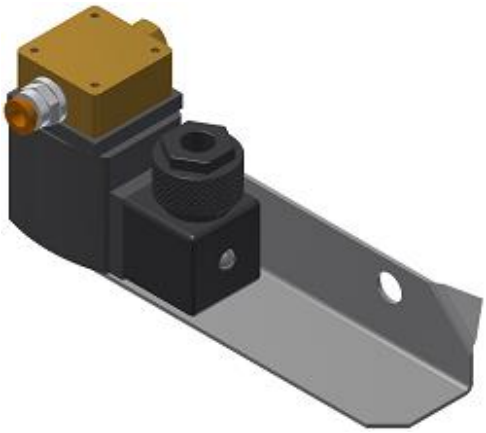




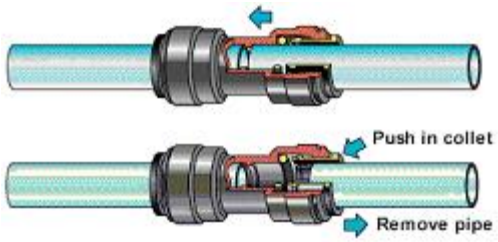
Estimated power supply cost: $0.30 per kWh

7 ACCESSORIES

7.1 Unloader valves



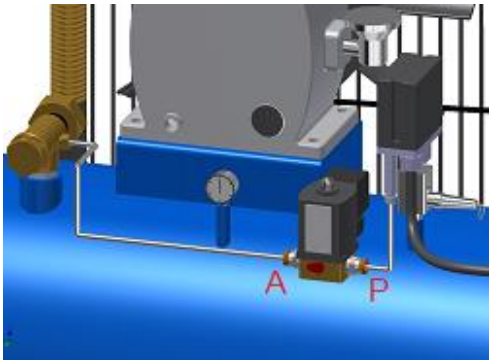
Most compressors are fitted with an unloading system that is operated by the electric pressure switch. In the event of a power failure the pressure switch will not have toggled over and therefore will not have operated the standard unloading valve.
The purpose of the unloader valve is to prevent the compressor from trying to start while still under load (under pressure) and may be required in areas were power failures are common.



It should be noted that the fittings supplied with the unloader valve are push-fit style. Cut the nylon tube with a sharp blade and simply push the cut end into the fitting to make the connection. If it is required that you remove this tube you must push the plastic ring around the fitting in, as you pull the tube out.

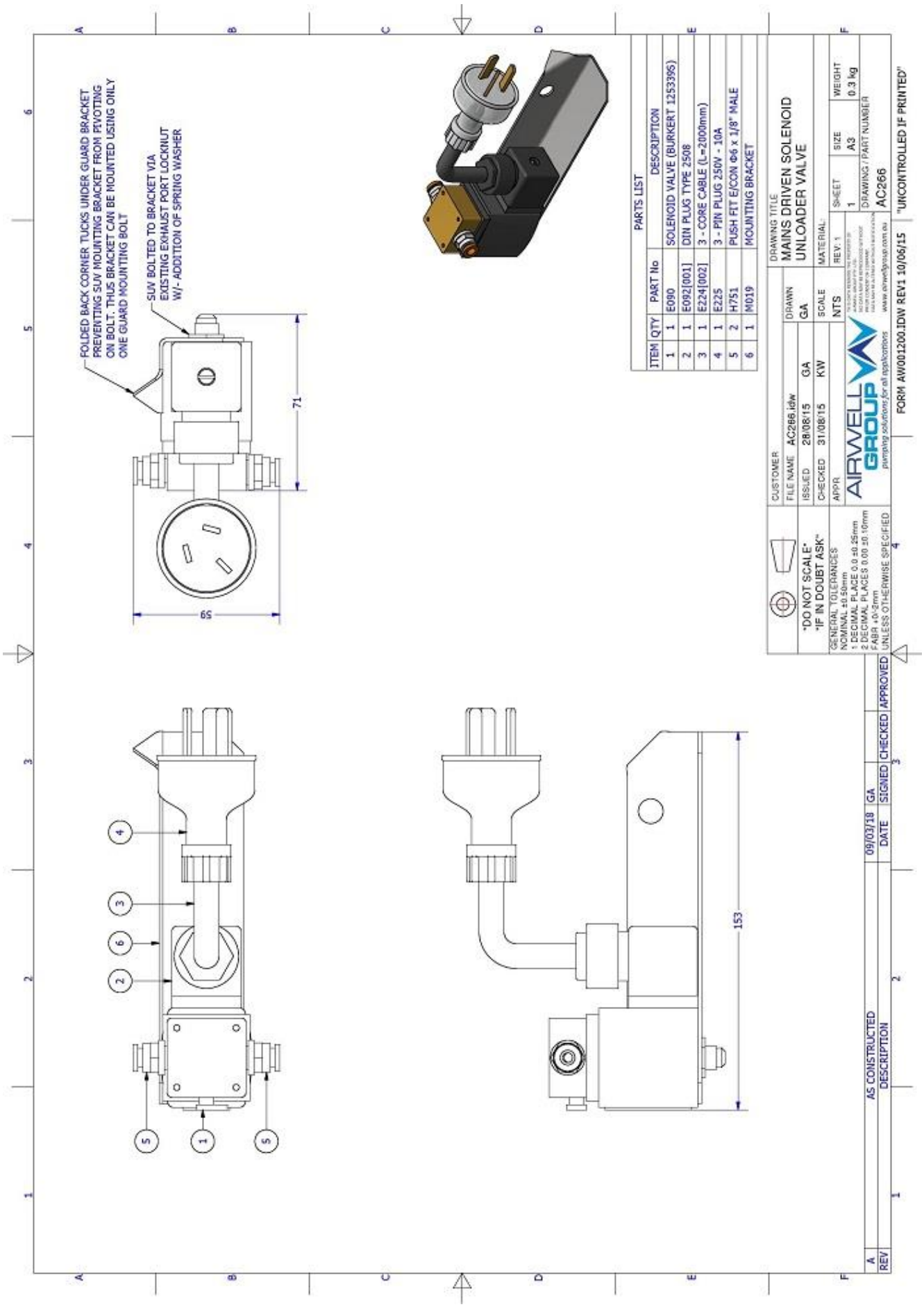
7.2 Installation instructions for mains driven unloader valves

Note: This type of installation suits any air compressor.



The valve is installed by cutting into the nylon unloader tube that connects the electric pressure switch to the compressor tank check valve and then plumbing this valve in line.
It is best to cut this nylon tube closer to the pressure switch end to avoid excess heat.
You will notice that there are two ports of the valve that have fittings screwed into them. One of these is marked P and the other is marked A.
The fitting marked A should be connected to the tube running to the compressor tank check valve and the fitting marked P should be connected to the tube running to the existing unloader valve under the pressure switch.

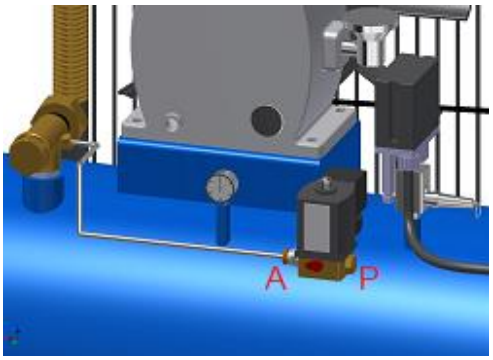
Plug the lead provided into a convenient GPO. The valve will remain energised while power is available. If power fails for any reason the valve will vent system pressure to the atmosphere and unload the compressor for easy starting when power resumes.


FOLDED BACK CORNER TUCKS UNDER GUARD BRACKET
PREVENTING SUV MOUNTING BRACKET FROM PIVOTING
ON BOLT. THUS BRACKET CAN BE MOUNTED USING ONLY
ONE GUARD MOUNTING BOLT
SUV BOLTED TO BRACKET VIA
EXISTING EXHAUST PORT LOCKNUT
W/- ADDITION OF SPRING WASHER
71
59
153
PARTS LIST
ITEM QTY PART No DESCRIPTION
1 1 E090 SOLENOID VALVE (BURKERT 125339S)
2 1 E092[001] DIN PLUG TYPE 2508
3 1 E224[002] 3 - CORE CABLE (L=2000mm)
4 1 E225 3 - PIN PLUG 250V - 10A
5 2 H751 PUSH FIT E/CON Φ6 x 1/8" MALE
6 1 M019 MOUNTING BRACKET
DRAWING TITLE
MAINS DRIVEN SOLENOID
UNLOADER VALVE
CUSTOMER
FILE NAME AC266.idw
ISSUED 28/08/15 GA
CHECKED 31/08/15 KW
APPR.
DRAWN GA
SCALE NTS
MATERIAL:
REV: 1
SHEET 1
SIZE A3
WEIGHT 0.3 kg
DRAWING / PART NUMBER
AC266
"DO NOT SCALE"
"IF IN DOUBT ASK"
GENERAL TOLERANCES
NOMINAL ±0.50mm
1 DECIMAL PLACE 0.0 ±0.25mm
2 DECIMAL PLACES 0.00 ±0.10mm
FABR ±0.3mm
UNLESS OTHERWISE SPECIFIED
AIRWELL GROUP
pumping solutions for all applications
www.airwellgroup.com.au
FORM AW001200.IDW REV1 10/06/15
"UNCONTROLLED IF PRINTED"
REV DESCRIPTION DATE SIGNED CHECKED APPROVED
A AS CONSTRUCTED 09/03/18 GA

7.3 Installation instructions for VSD driven unloader valves

Note: This type of installation suits only air compressors powered by Lenze VSD (Variable Speed Drive).

The valve is installed by cutting into the nylon unloader tube that connects the electric pressure switch to the compressor tank check valve and then plumbing this valve in line.
It is best to cut this nylon tube closer to the pressure switch end to avoid excess heat.
You will notice that there are two ports of the valve that have fittings screwed into them. One of these is marked P and the other is marked A.
The fitting marked A should be connected to the tube running to the compressor tank check valve and the fitting marked P should be plugged.



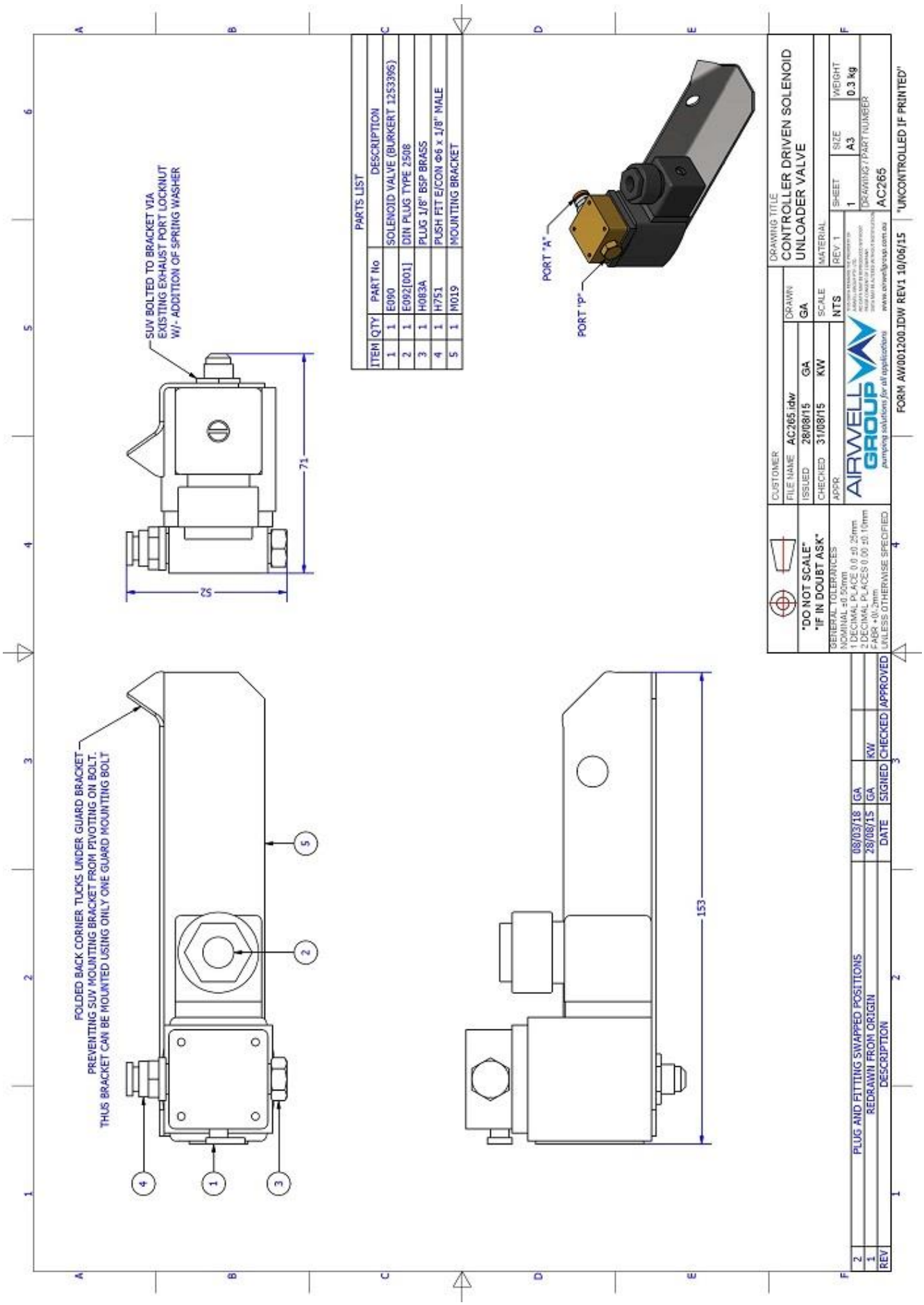
Connect the lead provided to the VSD terminal blocks (see diagram). The valve will open and release pressure until the compressor has reached the speed selected on the VSD. If power fails for any reason the valve will vent system pressure to the atmosphere and unload the compressor for easy starting when power resumes.

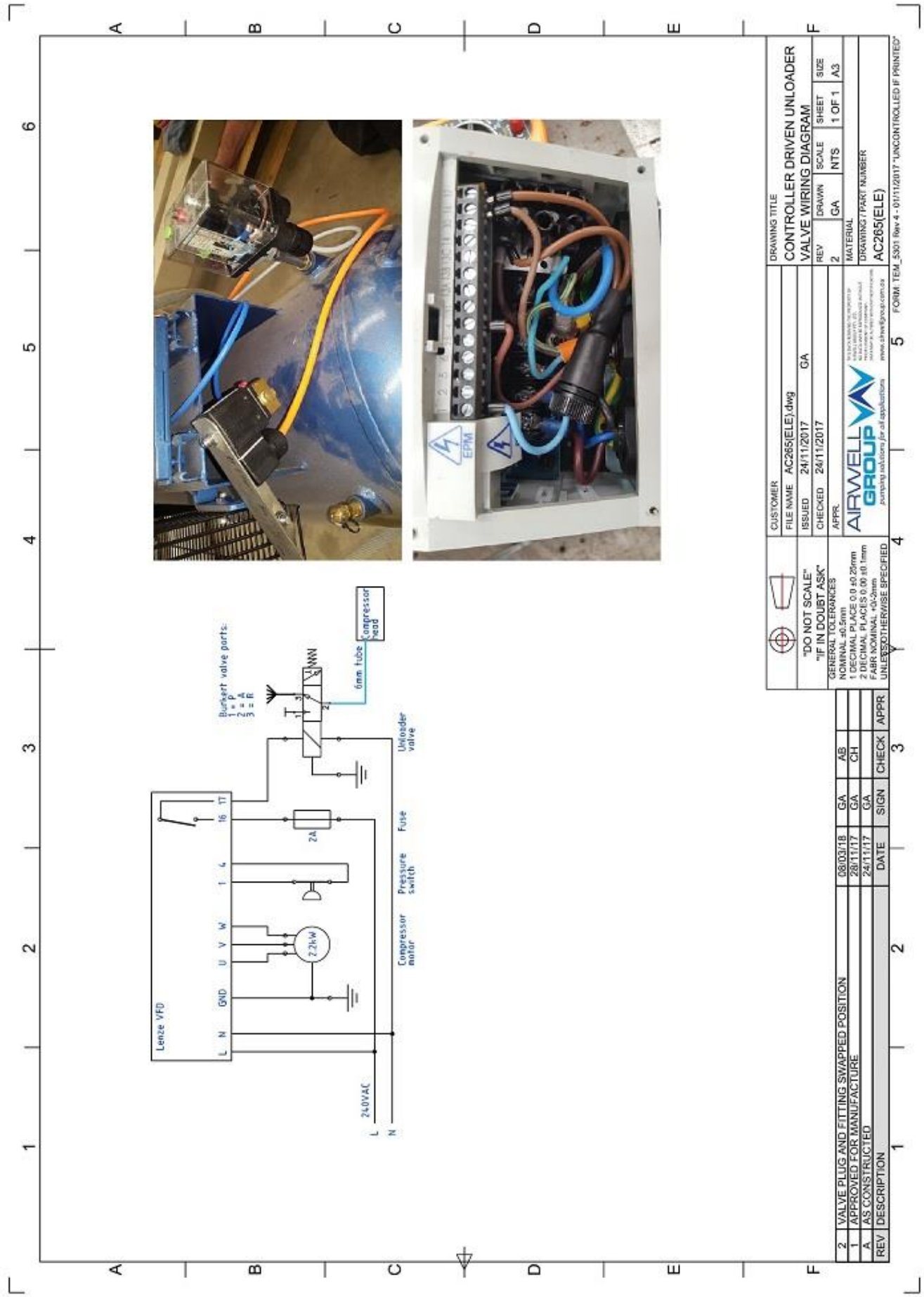
Warning - Electricity
This equipment is intended for installation, servicing or accessing only by technically qualified personnel. Failure to install it in compliance with national and local electrical codes and within Airwell Group recommendations, may result in fatal electrical shock or fire hazard, unsatisfactory performance, and equipment failure.

7.4 Low differential pressure switch

In situations where the air compressor is to be operated at very high pressure it may be necessary to fit a low differential pressure switch. This will allow the switch on-pressure to be increased without raising the switch off-pressure any more than necessary. These low differential switches generally have a poor reliability unloader valve if they have one fitted at all.
Therefore, this is an ideal use for a solenoid valve unloader.

Note: To be used with VSD driven compressors only.

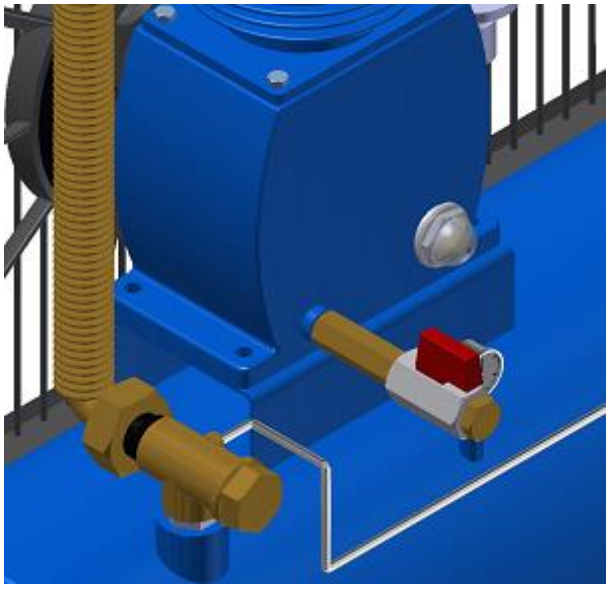

PARTS LIST
ITEM QTY PART No DESCRIPTION
1 1 E090 SOLENOID VALVE (BURKERT 1253395)
2 1 E092[001] DIN PLUG TYPE 2508
3 1 H083A PLUG 1/8" BSP BRASS
4 1 H751 PUSH FIT E/CON Φ6 x 1/8" MALE
5 1 M019 MOUNTING BRACKET
SUV BOLTED TO BRACKET VIA EXISTING EXHAUST PORT LOCKNUT W/- ADDITION OF SPRING WASHER
FOLDED BACK CORNER TUCKS UNDER GUARD BRACKET PREVENTING SUV MOUNTING BRACKET FROM PIVOTING ON BOLT. THUS BRACKET CAN BE MOUNTED USING ONLY ONE GUARD MOUNTING BOLT
PORT "A"
PORT "P"
71
52
153
DRAWING TITLE
CONTROLLER DRIVEN SOLENOID UNLOADER VALVE
CUSTOMER
FILE NAME AC265.idw
ISSUED 28/08/15 GA
CHECKED 31/08/15 KW
APPR
DRAWN GA
SCALE NTS
MATERIAL
REV 1
SHEET 1
SIZE A3
WEIGHT 0.3 kg
DRAWING / PART NUMBER AC265
"DO NOT SCALE"
"IF IN DOUBT ASK"
GENERAL TOLERANCES
NOMINAL ±0.50mm
1 DECIMAL PLACE 0.0 ±0.25mm
2 DECIMAL PLACES 0.00 ±0.10mm
FABR +0/-2mm
UNLESS OTHERWISE SPECIFIED
AIRWELL GROUP
pumping solutions for all applications
www.airwellgroup.com.au
FORM AW001200.IDW REV1 10/06/15
"UNCONTROLLED IF PRINTED"
REV DESCRIPTION DATE SIGNED CHECKED APPROVED
2 PLUG AND FITTING SWAPPED POSITIONS 08/03/18 GA
1 REDRAWN FROM ORIGIN 28/08/15 GA KW


Lenze VFD
L N GND U V W 1 4 16 17
2.2kW
2A
Compressor motor
Pressure switch
Fuse
Unloader valve
6mm tube
Compressor head
Burkert valve ports:
1 = P
2 = A
3 = R
240VAC
L
N
EPM
CUSTOMER
FILE NAME AC265(ELE).dwg
ISSUED 24/11/2017 GA
CHECKED 24/11/2017
APPR.
"DO NOT SCALE"
"IF IN DOUBT ASK"
GENERAL TOLERANCES
NOMINAL ±0.5mm
1 DECIMAL PLACE 0.0 ±0.25mm
2 DECIMAL PLACES 0.00 ±0.1mm
FABR NOMINAL +0/-2mm
UNLESS OTHERWISE SPECIFIED
DRAWING TITLE
CONTROLLER DRIVEN UNLOADER
VALVE WIRING DIAGRAM
REV 2
DRAWN GA
SCALE NTS
SHEET 1 OF 1
SIZE A3
MATERIAL
DRAWING / PART NUMBER
AC265(ELE)
AIRWELL GROUP
pumping solutions for all applications
FORM TEM_5301 Rev 4 - 01/11/2017 "UNCONTROLLED IF PRINTED"
2 VALVE PLUG AND FITTING SWAPPED POSITION 08/03/18 GA AB
1 APPROVED FOR MANUFACTURE 28/11/17 GA CH
A AS CONSTRUCTED 24/11/17 GA
REV DESCRIPTION DATE SIGN CHECK APPR

7.5 Oil drain extension kit

The AC155 oil drain extension kit prevents of spilling oil on the compressor tank during oil change.

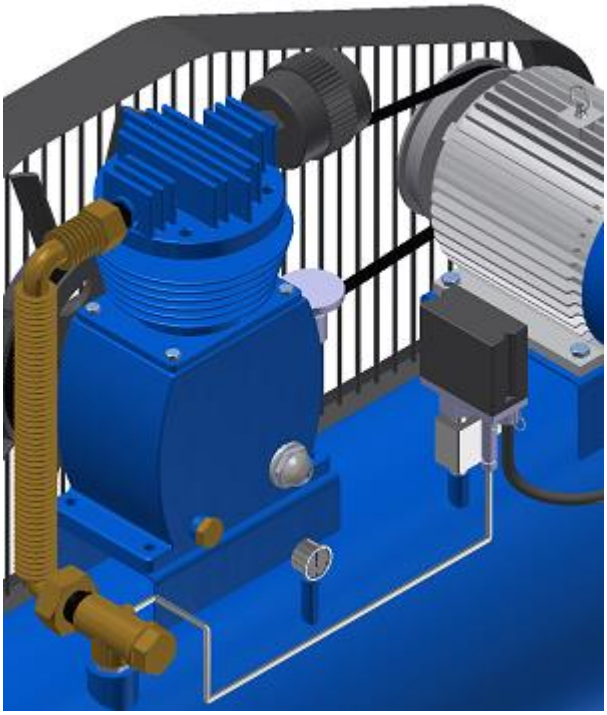
Compressor as bought



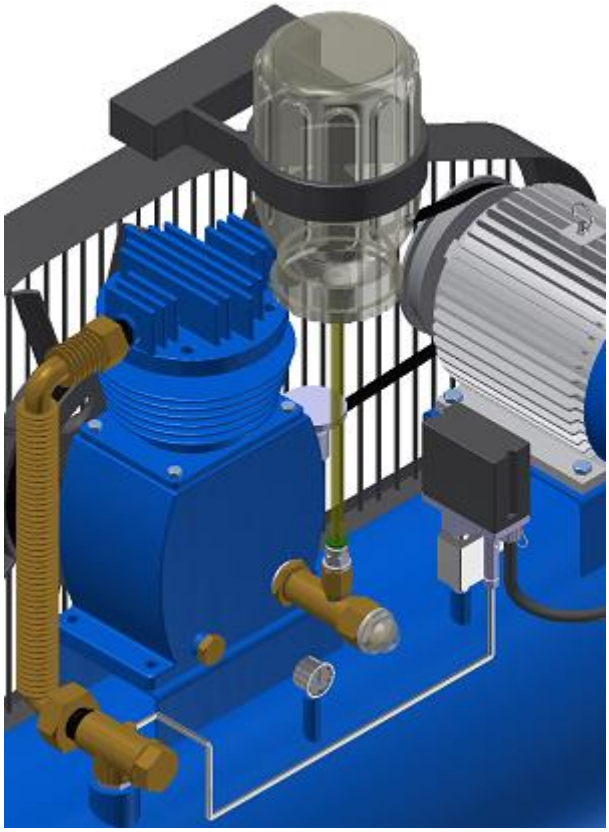
Compressor with AC155 kit fitted

7.6 Oil auto top – up kit

The AC290 oil auto top – up kit prevents the compressor from running dry or overfilled.



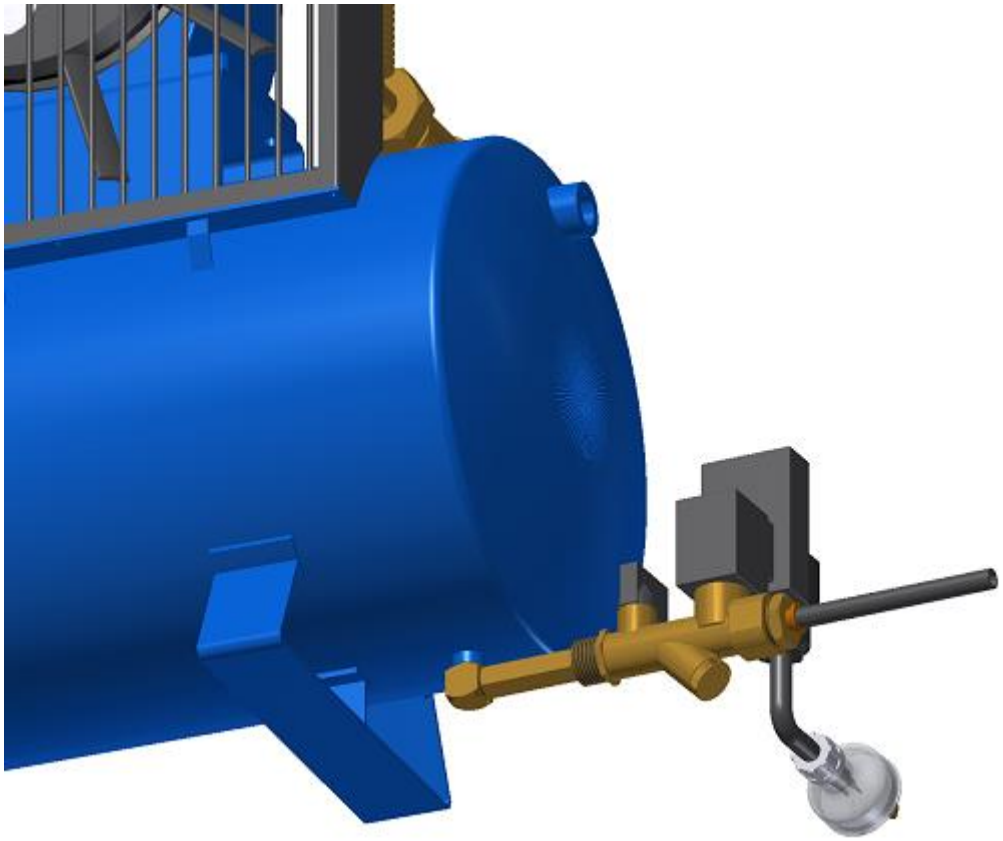
Compressor as bought

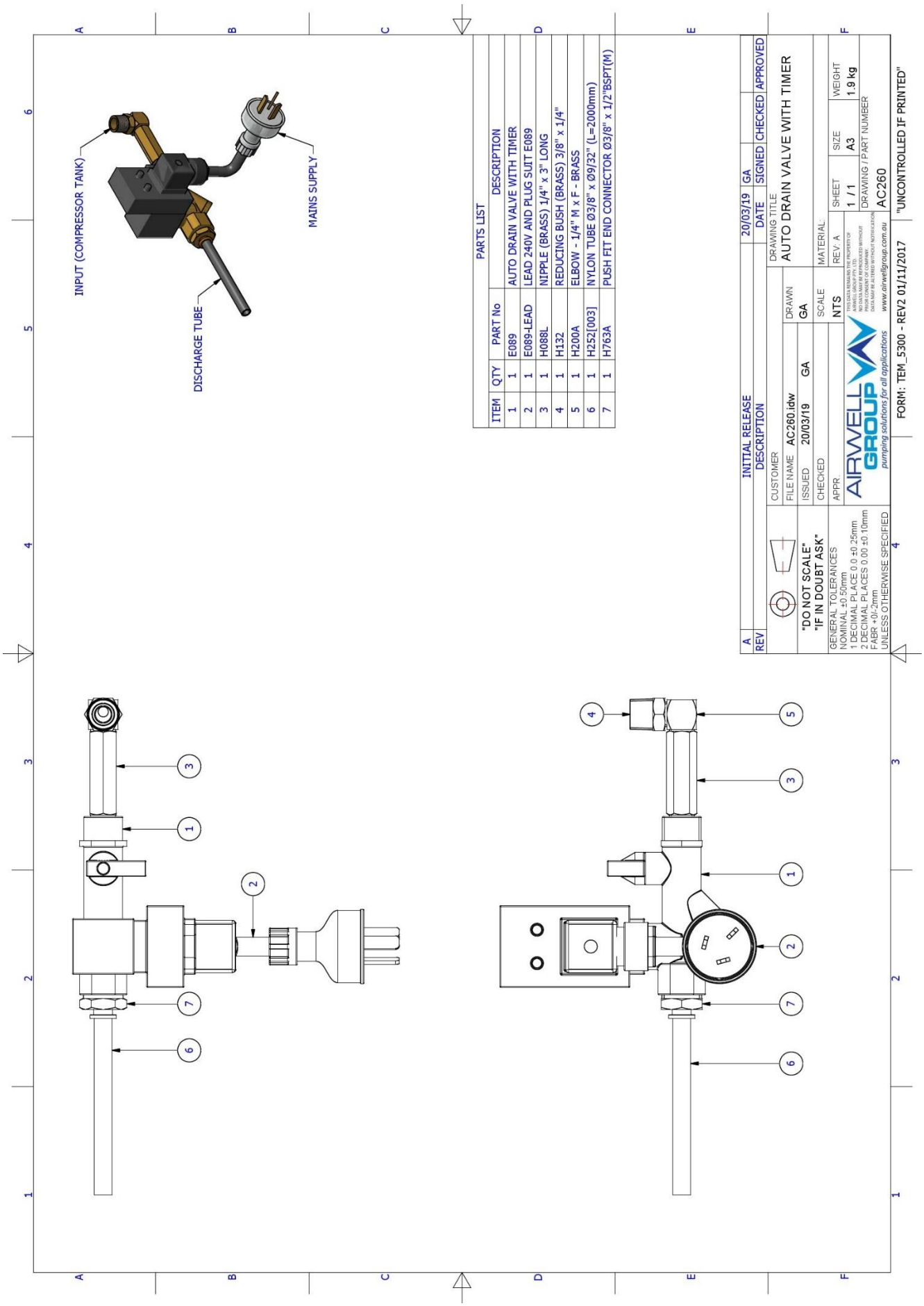


Compressor with AC290 kit fitted

7.7 Electronic water drain valve

As the air is being compressed the moisture contained in it, is converted to tiny water drops. These drops are sitting at the bottom of the compressor tank gradually forming a decent amount of water. This water is responsible for the corrosion of the compressor tank and the poor quality of the compressed air. Regular discharging of this water is required for the correct compressor maintenance.
The AC260 electronic water drain valve keeps the compressor tank free of condensed water, by periodically discharging a small amount of compressed air. The waiting and discharging time intervals can be adjusted with the two integrated timers.
The electronic water drain valve should be mounted at the lowest welded socket output of the compressor tank. The nylon discharge tube should be placed at the local drain or inside a bucket. In both cases it is suggested to tie down the nylon discharge tube as it is expected to fly during discharging.




INPUT (COMPRESSOR TANK)
MAINS SUPPLY
DISCHARGE TUBE
PARTS LIST
ITEM QTY PART No DESCRIPTION
1 1 E089 AUTO DRAIN VALVE WITH TIMER
2 1 E089-LEAD LEAD 240V AND PLUG SUIT E089
3 1 H088L NIPPLE (BRASS) 1/4" x 3" LONG
4 1 H132 REDUCING BUSH (BRASS) 3/8" x 1/4"
5 1 H200A ELBOW - 1/4" M x F - BRASS
6 1 H252[003] NYLON TUBE Ø3/8" x Ø9/32" (L=2000mm)
7 1 H763A PUSH FIT END CONNECTOR Ø3/8" x 1/2"BSPT(M)
A INITIAL RELEASE 20/03/19 GA
REV DESCRIPTION DATE SIGNED CHECKED APPROVED
"DO NOT SCALE"
"IF IN DOUBT ASK"
CUSTOMER
FILE NAME AC260.idw
ISSUED 20/03/19
CHECKED
APPR
DRAWN GA
SCALE NTS
DRAWING TITLE
AUTO DRAIN VALVE WITH TIMER
MATERIAL:
REV: A
SHEET 1 / 1
SIZE A3
WEIGHT 1.9 kg
DRAWING / PART NUMBER
AC260
GENERAL TOLERANCES
NOMINAL ±0.50mm
1 DECIMAL PLACE 0.0 ±0.25mm
2 DECIMAL PLACES 0.00 ±0.10mm
FABR +0/-2mm
UNLESS OTHERWISE SPECIFIED
AIRWELL GROUP
pumping solutions for all applications
www.airwellgroup.com.au
FORM: TEM_5300 - REV2 01/11/2017
"UNCONTROLLED IF PRINTED"

8 MAINTENANCE

Protective gloves must be worn.

Protective gloves may protect you from scratching or crushing your fingers during assembly or bolt fastening.

Eye protection must be worn.

The discharge line on the skid is operating in high pressure. Severe injuries, blindness or even death can be caused if you disassemble a component or part during being under pressure.

Caution – Disconnect before carrying out maintenance or repair.

xxx – Description

8.1 Regular checks

Oil type and oil change intervals

A side benefit of de-rating or reducing the working RPM of a reciprocating compressor is the much-reduced oil carry over, resulting in reduced oil level in the compressor pump. If an air compressor pump runs out or runs low in oil, it will quickly degrade. As the RPM is reduced, we recommend that the compressor be slightly over filled but not to more than to the top of the sight glass. The RPM of any compressor pump should never be run below 500 RPM as it will suffer from reduced splash lubrication. We have developed an auto top up device (Part No AC290) that when fitted to a compressor will virtually eliminate the possibility of dry running.

In extreme cases where the compressor runs non-stop, 24hours seven days, the oil should be changed each month or more often. If it were to operate for 12 hours in a day this can be extended to two months. The change period should never exceed 4 months as the oil will become degraded by moisture in any event. Oil changing is made a lot easier with the additional purchase of the oil drain extension kit (Part No AC155).

The type of oil used is important. Standard motor oils should not be used mainly because they tend to carbon up the valves in the head and contaminate the tank check valve. Castrol Aircol PD68 or an equivalent is preferred. This is a mineral oil.

Synthetic oils provide very great advantages in reciprocating air compressors over mineral oils and are preferred and recommended by some compressor manufacturers. Some will even extend the standard warranty from 1 to 2 years if used. It is also suggested that by using synthetic oils, the oil change interval can be extended to 12 months. Though Airwell pumps acknowledge that the oil change interval could be lengthened with synthetic oil use, we feel that though the oil may not break down it never the less will become contaminated and require changing anyway.

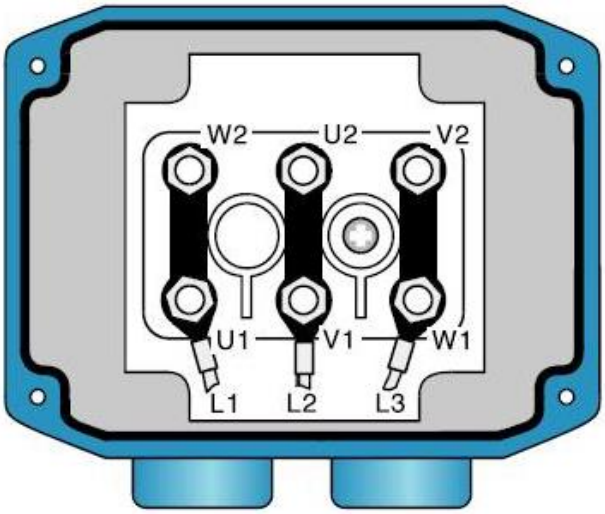
Synthetic oils are very good and further reduce the possibility of carbon build-up in the cylinder head, however they are very expensive and this price difference does create buyer resistance to synthetic oils.

V-belt

Check monthly for tension and wear.

8.2 Replacement Electric motor wiring diagram

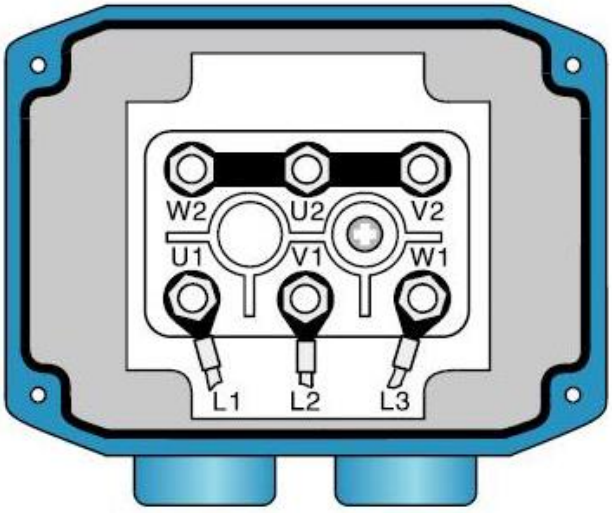
Airwell has found beneficial to use VSD drives to convert single - phase to three - phase.
As the supply voltage to the VSD drive is only 240V the motor on the compressor must be configured in **Delta** connection to operate from 220 Volt three - phase.
Occasionally we may feed a 480V single phase supply into a larger VSD drive and when this is the case the motor connection would be **Star** connection for 415 Volt three - phase.



Delta connection:

3 phase / 240 VAC operation
(Links in vertical position)

Connect L1, L2, L3 terminals to a single phase 240VAC variable speed drive.



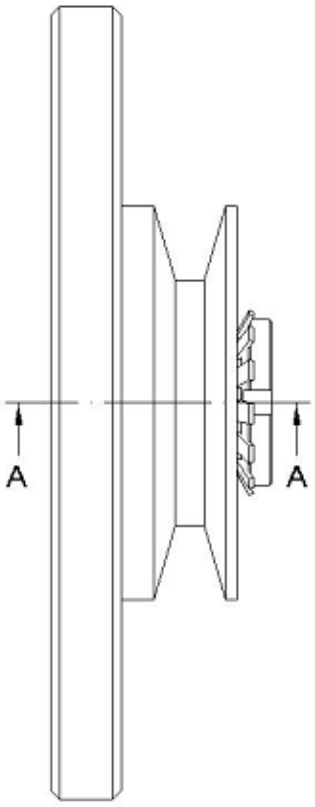
Star connection:

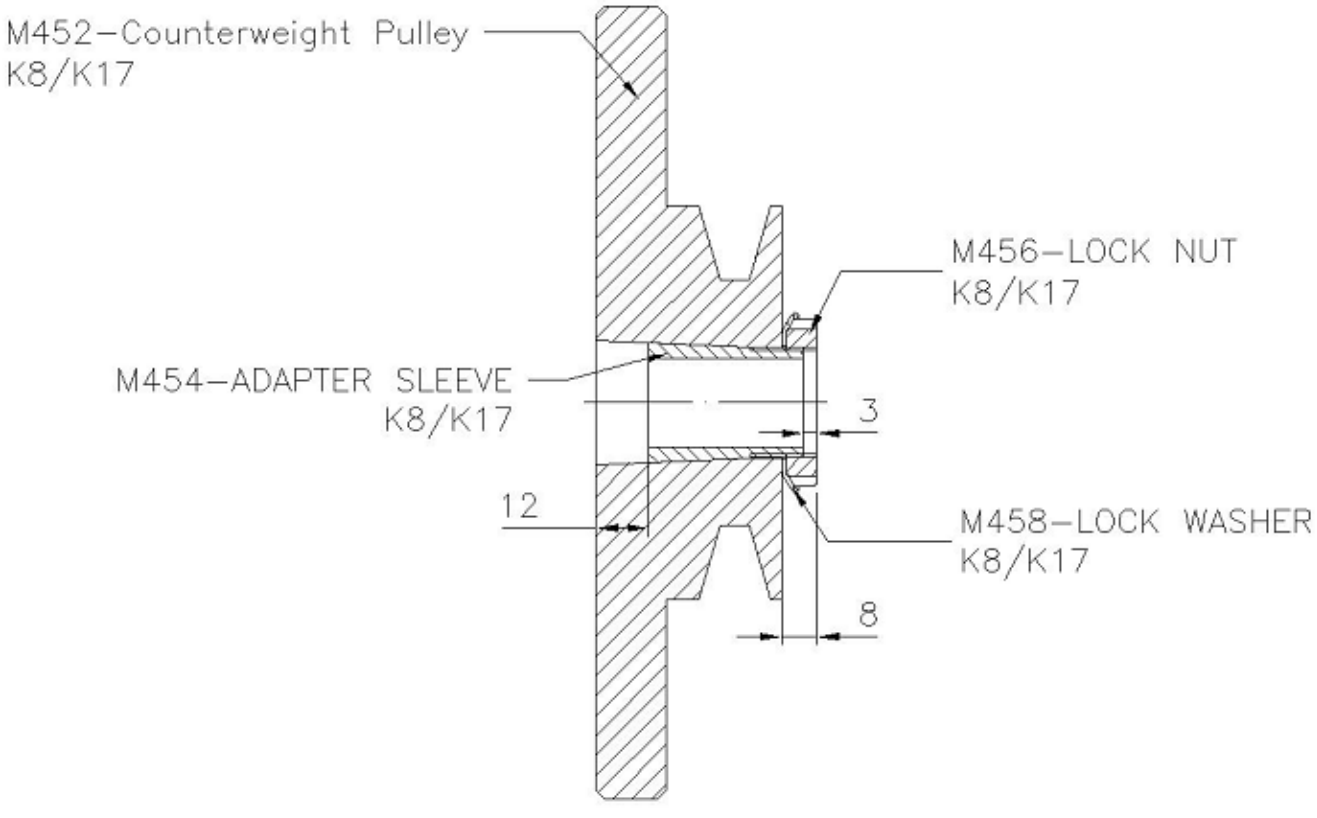
3 phase / 415 VAC operation
(Links in horizontal position)

Connect L1, L2, L3 terminals to a single phase 480VAC variable speed drive.

Warning - Electricity
This equipment is intended for installation, servicing or accessing only by technically qualified personnel. Failure to install it in compliance with national and local electrical codes and within Airwell Group recommendations, may result in fatal electrical shock or fire hazard, unsatisfactory performance, and equipment failure.

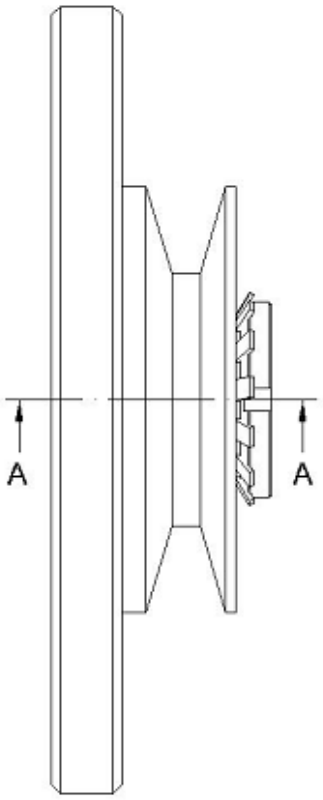
8.3 Counterweight / Pulley Assembly [ACAW3 (K8) & ACAW5 (K17)]

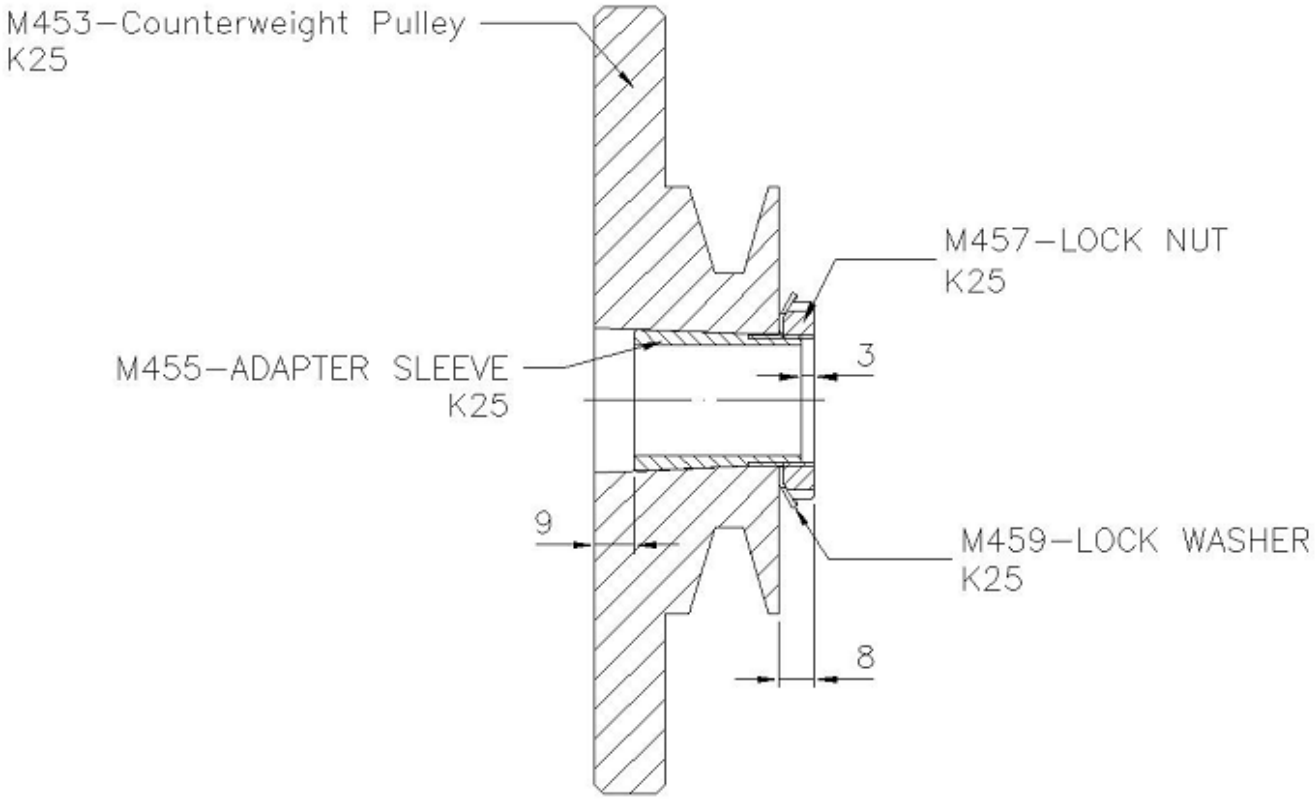




SECTION A-A

8.4 Counterweight / Pulley Assembly [ACAW10 (K25)]





SECTION A-A

8.5 VSD Settings for Lenze 2.2kW type SMVector VSD's

Parameter	Value	Units	Description
P199	4		Programme selection – Reset to 50 Hz default settings
P100	01		Start control source – Terminal strip
P102	35	Hz	Minimum frequency
P103	60	Hz	Maximum frequency
P104	1.0	sec	Acceleration time 1
P105	2.0	sec	Deceleration time 1
P110	03		Start method – Auto restart
P136	34	Hz	Pre-set speed # 6
P140	07		Relay output – Above pre-set speed # 6
P168	1.5	%	Fixed boost

8.6 VSD Settings for Lenze 7.5kW type SMVector VSD's

Parameter	Value	Units	Description
P199	4		Programme selection – Reset to 50 Hz default settings
P100	01		Start control source – Terminal strip
P102	35	Hz	Minimum frequency
P103	60	Hz	Maximum frequency
P104	2.0	sec	Acceleration time 1
P105	3.0	sec	Deceleration time 1
P110	03		Start method – Auto restart
P136	34	Hz	Pre-set speed # 6
P140	07		Relay output – Above pre-set speed # 6
P168	1.5	%	Fixed boost

The above parameters are factory set and password protected. They should not require adjustment, however if found to be corrupted please contact Airwell Pumps head office.

IMPORTANT

This is not a standard compressor.
It has been de-rated (slowed down) for use with Airwell Pumping Systems and is subject to different maintenance procedures than stated in the Compressor Manual as follows:

- Oil level should be maintained at 3/4 in the sight glass.
- Oil should be changed every 750 hours or monthly.
- Drain water from receiver tank at least weekly.

Failure to follow these procedures may void your warranty.

IMPORTANT

When topping up or changing oil – do not refill through the breather tube. Remove breather and fill as shown below.

Breather tube in place

Breather tube removed

9 TORQUE SETTINGS

	Strength grade				
	4.6	6.8	8.8	10.9	12.9
Metric thread	Torque setting (Nm)				
M 3 x 0.5	0.51	1.01	1.35	1.90	2.27
M 4 x 0.7	0.95	1.91	2.54	3.57	4.29
M 5 x 0.8	2.28	4.56	6.09	8.56	10.3
M 6 x 1	3.92	7.85	10.5	14.7	17.7
M 8 x 1.25	9.48	18.9	25.3	35.5	42.7
M10 x 1.5	19.1	38.1	50.9	71.5	86.8
M12 x 1.75	32.6	65.1	86.9	122	146
M14 x 2	51.9	104	139	195	234
M16 x 2	79.9	160	213	299	359
M18 x 2.5	110	220	293	413	495
M20 x 2.5	156	312	416	585	702
M22 x 2.5	211	422	563	792	950
M24 x 3	270	539	719	1010	1213
M27 x 3	398	795	1060	1490	1789
M30 x 3.5	540	1080	1440	2025	2430

Material	C/S		S/S 304		S/S 316		Brass	
Pipe thread	BSP	NPT	BSP	NPT	BSP	NPT	BSP	NPT
	Torque setting (Nm)							
1/8”	16	18	14	16	16	18	11	13
1/4"	34	50	31	45	34	50	24	35
3/8”	54	63	49	57	54	63	38	44
1/2"	73	160	66	144	73	160	51	112
3/4"	106	200	95	180	106	200	74	140
1”	152	340	137	306	152	340	106	238
1+1/4”	209	450	188	405	209	450	146	315
1+1/2”	286	560	257	504	286	560	200	392

Notes:
- Always lubricate zinc plated and stainless-steel bolts.
- To convert Nm to lb-ft, multiply by 0.7375.

10 WARRANTY DETAILS

Airwell Group Pty Ltd - WARRANTY

Airwell Group Pty Ltd is committed to providing our customers with hardware whose manufacture, selection of materials and inbuilt quality exceeds our customers product expectations. The Airwell system is designed to provide long-term, sustainable service in a wide variety of applications.

Airwell Group Pty Ltd warranty terms and conditions are not intended to restrict your rights or guarantees afforded to you under the Australian Consumer Laws.

Provided the system has been installed in accordance with the instructions incorporated in the 'Installation and Operations' manual, and periodically maintained, the following warranty is applicable:

1. Equipment manufactured by Airwell Group Pty Ltd is warranted to be free from manufacturing and material defects for **5 years** from date of purchase from Airwell Group or one of its recognised distributors.
2. Should a problem arise, **any defective parts are to be returned to the point of purchase at the expense of the owner**, for examination.
3. Replacement parts will be issued under warranty, provided the equipment has not been;
   i. repaired or altered by anyone other than an Airwell technician, or;
   ii. the equipment was improperly installed, abused, misused, neglected or accidentally damaged.
4. All repaired or replaced items covered under warranty will be returned to the owner at the owner's expense.
5. Return of the faulty parts for analysis also enables us to continually improve the Airwell product. Please ensure that the returned items are suitably packaged. **Transit damage is not warrantable**.
6. All third-party equipment is supplied in good faith, however, Airwell does not provide warranty on any third-party goods supplied. If required, Airwell will assist our clients with warranty claims on third party goods with the original equipment manufacturer/s. The final decision and responsibility of the warranty claim is reserved by the original equipment manufacturer/s.

Damage due to corrosion:

Airwell Group uses new first grade 316L stainless steel as a standard minimum specification in the manufacture of down hole pumping equipment. (Wire rope 304).

Every effort is made to maximise corrosion tolerance on all down hole equipment, however due to the unpredictable corrosive nature of ground water, Airwell Group Pty Ltd will not provide a warranty on corrosion.

The exception where a warranty would apply would be if the corrosion is caused by a piece of substandard or incorrect grade material being included in a pump unit. (If more than one section of material in a pump has corroded it is assumable that it is a general corrosion problem and not a particular piece of material).

Damage due to exposure to chemicals and other hazardous materials:

Every effort is made to maximise tolerance on all down hole and surface equipment to damage from exposure to chemicals or other hazardous materials contained in the fluids being pumped. Airwell Group Pty Ltd will not provide warranty on damage to any equipment damaged due to exposure to chemicals or other hazardous materials.

It is the responsibility of the customer to advise Airwell Group staff if the pump and associated pumping equipment is to be installed in areas deemed 'Hazardous', whereby the environment is potentially explosive.

Airwell Group Pty Ltd shall not be liable for incidental or consequential damages, including any damage to equipment or the environment caused by the failure of the Airwell system.

Please return the warranty registration card either by fax or post to your point of purchase at your earliest convenience. Alternatively, you can email the warranty registration card to sales@airwellgroup.com.au

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11 WARRANTY REGISTRATION CARD

WARRANTY REGISTRATION CARD

PLEASE POST OR FAX TO:

AIRWELL GROUP PTY. LTD.

30 Harris Road,

Malaga

Western Australia 6090

Please note: Warranty is conditional upon correct installation and operation of the product as per the Installation and Operations Manual provided with the unit and the warranty disclosure contained within the Installation and Operations Manual.

Pump serial number: - .....

Controller serial number: - .....

Company name: - .....

Address: - .....

Phone number: - (.....)..... Fax number: - (.....).....

Contact name: - .....

Equipment purchased from: - .....

Commissioned by: - ..... Date: - ...../...../.....

ARE YOU HAPPY WITH THE PRODUCT?

We appreciate your comments regarding our products and service and welcome any suggestions that may help to improve them.

Was there any transport damage?	☐ Yes	☐ No
Were you happy with the quality and presentation of the equipment?	☐ Yes	☐ No
Were you happy with the sales and service personnel?	☐ Yes	☐ No

Comments: