

User Handbook

## **HV11 - HV22 Models (ACE)**

**Stationary Air Compressors**



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## 1 Introduction

### IMPORTANT !

**BEFORE INITIAL START-UP, ENSURE THAT THE COMPRESSOR IS FILLED WITH A HYDROVANE APPROVED OIL. DO NOT OVERFILL.**

### 1.1 Support

Full support is available from your Hydrovane Distributor. If you need any specialist help or service, please contact your Distributor quoting the MODEL TYPE and SERIAL NUMBER.

### 1.2 Customer Warranty Terms

All compressors, which are serviced by an authorised Hydrovane Distributor, are guaranteed for 12 months from commissioning or 18 months from the date of shipment.

The warranty excludes normal service parts, oil and wear items, dirt ingress, cleaning of filters and fluid drain devices and the tightening of electrical or other connections. Also excluded is adjustment of the Controller settings. Consequential damage of any nature is not covered by the warranty.

An 'Advance' 10 year warranty is available for approved installations, contact your Hydrovane Distributor for details.

### 1.3 Product Development

Hydrovane adopt a policy of continual product development. The information in this Handbook, whilst fully up to date when issued, may be subject to change without notice.

### 1.4 Quality Standards

CompAir UK Ltd Quality Management Systems are approved to BS EN ISO 9001.

These instructions comply with the latest European Directives regarding content and are valid for machines carrying the CE mark.

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### 1.5 Model Range

This Handbook relates to all ACE HV11 - HV22 vertical range compressors and hypac models.

V11ACE08-4035S300	50Hz model
V11ACE10-4035S300	50Hz model
V11ACE08-2336D305	60Hz model
V11ACE10-2336D305	60Hz model
V11ACE08-5736D305	60Hz model
V11ACE10-5736D305	60Hz model
V11ACE08-4035V300	50/60Hz model

V15ACE08-4035S300	50Hz model
V15ACE10-4035S300	50Hz model
V15ACE08-2336D305	60Hz model
V15ACE10-2336D305	60Hz model
V15ACE08-5736D305	60Hz model
V15ACE10-5736D305	60Hz model
V15ACE08-4035V300	50/60Hz model
V15ACE08-2035V300	50/60Hz model

V18ACE08-4035S000	50Hz model
V18ACE10-4035S000	50Hz model
V18ACE08-2336D005	60Hz model
V18ACE10-2336D005	60Hz model
V18ACE08-5736D005	60Hz model
V18ACE10-5736D005	60Hz model

V22ACE08-4035S000	50Hz model
V22ACE10-4035S000	50Hz model
V22ACE08-2336D005	60Hz model
V22ACE10-2336D005	60Hz model
V22ACE08-5736D005	60Hz model
V22ACE10-5736D005	60Hz model
V22ACE08-4035V000	50/60Hz model
V22ACE08-2035V000	50/60Hz model

### 1.6 Product Terminology

The product code segments signifies:

V	Vane
11, 15, 18, 22	kW motor
ACE	Air Centre Electronic
08, 10	Delivery pressure in bars
20	200V
23	230V
40	400V
57	575V
3	3 phase
5, 6	50 Hz, 60Hz
D, S, V	Direct On Line, Star/Delta, Variable Speed
000,100,200,300	European Specification (50 Hz)
005,105,205,305	US Specification (60 Hz)

This publication refers to compressors with serial numbers from:

V11-000301-0706	-300 first build
V15-000352-0705	-300 first build
V18-000013-0705	-35040 sheet metal kit
V22-000041-0705	-35040 sheet metal kit



## 2 Safety

### 2.1 General Health and Safety Precautions

**Please read carefully and proceed in accordance with the following instructions before installation, operation, maintenance or repair of the compressor unit.**

### 2.2 The Health and Safety at Work Act, 1974

In order to comply with your responsibilities under the above act, it is essential that the compressor is transported, positioned, installed, operated and maintained by competent persons in accordance with the instructions in this Handbook.

The standard build of all Hydrovane products are designed to compress clean, dry, atmospheric air and are not intended for use in either Explosive or Potentially Explosive Atmospheres as defined in the ATEX Directive 94/9/EC.

A potentially Explosive atmosphere is an atmosphere which could become explosive due to local and operational conditions.

The compressor warranty will be invalidated if unapproved spare parts or oils are used. Using such items may cause the efficiency and service life of the compressor to be reduced, and could create a hazardous condition over which Hydrovane has no control.

Failure to maintain the compressor correctly, or modifying it without prior approval from Hydrovane, may also create a hazardous condition. This will also invalidate the warranty.

Read and fully understand the contents contained in the User Handbook.

Ensure that the User Handbook is not permanently removed from the compressor.

Check that there are no signs of damage and/or oil leaks from the compressor, cooler and associated pipework.

After completing work, tools and foreign matter should be removed from the compressor and its surrounding area.

In the unlikely event of a compressor fire, dry powder or carbon dioxide fire extinguishers should be used. Never use water.

### 2.3 Before Working on Compressor

Potentially dangerous voltages are used to power this machine. Do not carry out any work until the isolator is locked in the off position. Fit a safety notice to the isolator advising that work is being carried out and that the isolator must not be switched on. If in doubt, a qualified electrician may remove the fuses and keep them in a secure place until work is complete.

Ensure the compressor has been safely isolated from the main air system and cannot be re-introduced until all work has been completed. Fit a safety notice to the isolation valve advising that work is being carried out.

Do not undertake any work until the compressor and receiver, if fitted, have been relieved of all pressure.

Wait until the compressor's vent down cycle is complete.

Release any pressure contained in the aftercooler or associated pipework.

Check that the compressor pressure gauge reads zero. Do not proceed until it does.

Carefully unscrew the compressor filler plug. If any air or oil escapes before the plug is fully removed stop! Do not remove the plug until all pressure is lost.

Safety devices fitted to the compressor or pipework system should be checked at regular intervals and replaced if faulty. They should not be tampered with or modified. Non return valves should not be used as isolation devices.

To ensure the compressor operates safely you must carry out the specified maintenance procedures.

Only approved oils should be used for flushing purposes.

Extreme caution should be taken if the compressor has been subjected to severe operating temperatures or fire. Certain components may contain fluoroelastomer materials and under these conditions can leave extremely corrosive residues. Severe burns and permanent skin and tissue damage can be a result of skin contact.

The Health and Safety information contained in this Handbook is only intended to give general guidelines.

### 2.4 When Operating the Compressor

When in automatic mode the compressor may restart without warning.

Additional warnings will be required if the unit is configured for remote stop/start or to restart after power failure.

Do not remove any plugs or release pipework when the compressor is running.

Do not attempt to open the starter enclosure while the compressor is operating.

Beware of hot surfaces, both the compressor and electric motor are designed to run at elevated temperatures.

Compressed air is potentially dangerous and can be fatal if misused. Do not allow compressed air jets, discharged from any pipe or nozzle, to make contact with your body.

Wear safety glasses and suitable clothing when using or working in an area where compressed air is being used.

Hazardous vapours/fumes can be produced if compressed air is used to remove chemicals, cleaning agents and oils from equipment and components. Suitable respiratory and extraction equipment may be required in these circumstances. Never use compressed air for cleaning personal clothing.

Air discharged from compressors is unsuitable for breathing purposes. Air for human consumption must be subjected to further treatment to ensure that contaminant levels for odour and moisture content meet the requirements of BS 4275 1974.

We recommend that air supply to hand-held air guns is regulated to a lower pressure (refer to local Health and Safety regulations).

Do not insert any object or any part of your body through any opening of the compressor enclosure. Serious personal injury and/or damage may result.

Never run the compressor with any covers or guards missing, unless advised to do so.

### 2.5 Potential Oil Health Hazards

**This section relates to Hydrovane approved oil. For other oils refer to the Health and Safety Instructions issued with the relevant product.**

There are no significant hazards associated with this product when properly used and in the application for which it was designed. Frequent and/or prolonged skin contact may give rise to skin irritations and it is recommended that protective gloves are worn. The carcinogenic action of mineral oils should be brought to the attention of all users. \*

The oil may be hot so take care when carrying out oil changes.

Do not keep oily rags in pockets or wear contaminated clothing. Do not inhale fumes or vapours. Do not swallow. Avoid eye contact.

Always wash hands after use and before eating, drinking and smoking.

### 2.6 First Aid Measures

**Inhalation** - Remove from exposure into fresh air. If necessary give artificial respiration or oxygen. Seek medical advice.

**Skin Contact** - \*Mildly irritating. Remove by wiping. Wash with soap and water. Apply emollient cream.

**Eye Contact** - \*Mildly irritating. Flush with copious amounts of warm water. Seek medical advice if necessary.

**Ingestion** - Do not induce vomiting because of the risk of aspiration. Wash mouth out with water. Give 1/2 pint milk. Seek immediate medical attention.

#### Further Medical Treatment

**Aspiration** - If there is any suspicion of aspiration into the lungs (for example during vomiting) admit to hospital immediately.

**Pressure injection** - Obtain immediate medical attention, even if injury appears minor.

**Spillage** - Soak up with absorbent clay.

**Waste Disposal** - Oil, condensate, filter elements etc. should be disposed of in accordance with local regulations. Do not allow oil to contaminate water supplies.

\* See Cautionary Notice SHW 397 'Effects of Mineral Oil on the Skin' and MS(B) 5 'Skin Cancer Caused by Oil' published by the Health and Safety Executive.

### 2.7 Warnings, Cautions and Notes

**WARNING !** is used in the text to identify specific hazards which can cause injury or death. This type of hazard is identified below.



Risk of electric shock



Risk of hazard or danger



Risk of hot surfaces



Eye protection must be worn



Dust protection must be worn



Warning pressurised vessel



Warning pressurised component or system



Warning unit is remotely controlled and may start without warning



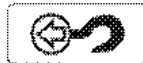
Read the instruction manual



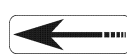
Do not operate the machine without the guard being fitted



Warning do not start the machine without consulting Handbook



Lifting point



Direction of rotation

**CAUTION !** is used in the text to identify incorrect procedures which can cause damage to the compressor.

**Note:** is used in the text to draw attention to specific points of importance.

Hydrovane declines all liability in the event of material damage or bodily injury resulting from negligence in the application of these precautions, from non-observation or lack of elementary supervision in respect of handling, operation, servicing or repair, even if not expressly stated in this instruction notice.

### 3 Product Information

#### 3.1 Operating Temperatures

Your compressor will give optimum performance and trouble-free service life when the bulk oil temperature is maintained between 75°C and 85°C.

Certain operating conditions sustained over a period of time may cause problems that effect the performance and reliability of this compressor.

Problems may occur when compressors run for short periods on low air demand where they don't reach normal operating temperatures.

Prolonged use under these conditions can cause condensation build up within the compressor and may eventually lead to emulsification of the oil.

Normal operating temperatures are reached in typically 10/15 minutes. To purge condensate from the compressor, a longer running period with a high air demand is needed, usually a minimum of 60 minutes will be required.

Conditions or applications which prevent the compressor temperature stabilising between these parameters should be avoided.

Consult your local Hydrovane Distributor if you have any particular concerns about operational characteristics of your compressor.

#### 3.2 High Operating Temperatures

Some of the reasons for high compressor oil temperatures are:

- Low oil level.
- Blocked oil cooler or cooler flow restrictions.
- Wrong type or grade of oil.
- High ambient temperature.
- Cooling fan stopped or operating incorrectly.

Note: The controller display will show a warning when the compressor temperature reaches 107°C.

Note: The compressor will stop automatically if the temperature rises above 110°C.

If the bulk oil temperature frequently reads 100°C, then Fluid Force HPO oil should be used.

#### 3.3 Noise Level

Although the sound pressure level for these units is relatively low, they should be positioned where noise will not be a problem.

**3.4 Technical Data**

Model Number	HV11	HV15	HV18	HV22	HV11RS	HV15RS	HV22RS
<b>PERFORMANCE</b>							
F.A.D. litres/sec (cfm) @ 8 bar	29 (61)	38 (81)	49 (104)	60 (127)			
F.A.D. litres/sec (cfm) @ 10 bar	25 (52)	33 (71)	42 (90)	52 (110)			
F.A.D. litres/sec (cfm) @ 6 bar					31 (66)	41 (87)	65 (137)
Noise Level - dBA	69	70	70	71	69	70	71
Power - kW (hp)	11 (15)	15 (20)	18 (25)	22 (30)	11 (15)	15 (20)	22 (30)
Starter Type	Automatic DOL & SD			Inverter Soft Start			
Drive Type	Direct						
Operating Controls	Continuous Run, Automatic Stop/Start, Reduced Energy Vent System				Variable		
Rotation Speed - rev/min 50Hz (60 Hz)	1450 (1760)				870-1650		870-1650
Ambient Temperature Range °C	0 to 45				0 to 40		
Maximum Relative Humidity %	85 non-condensing						
Air Discharge Temp - °C (above ambient)	<8	<10		<8	<10		
<b>FACTORY SETTINGS</b>							
Minimum Pressure Valve - bar	5.5 to 6.0						
Minimum Air Line Pressure - bar (PL)	7.5 or 9.5				8.0		
Maximum Air Line Pressure - bar (PU)	8.5 or 10.5				8.5		
REVS Delay Period (secs) (Rt)	60 (8 bar) 90 (10bar)				60		
Run-on-Time to Stop (secs) (St)	10						
Pressure Display Units (PD)	0 (bar) (1 = psi, 2 = kpa)						
Temperature Display Units (Td)	0 = °C (1 = °F)						
Servo Valve - bar	9.0 or 11.0				9.0		
Vacuum Relief Valve	One turn anti-clockwise						
<b>INSTALLATION</b>							
Air Outlet Size - Rp	3/4	1	1	3/4	1		
Minimum Room Volume - m <sup>3</sup>	25	35	35	25	35		
Air Inlet/Outlet Area - m <sup>2</sup>	0.5						
Ventilation Rate - m <sup>3</sup> /h	3400						
Cooling Air Flow m <sup>3</sup> /h (cfm)	3100 (1825)		4500 (2649)		3100 (1825)		4500 (2649)
Recommended Air Receiver Capacity - L	272						
<b>COMPRESSOR OIL</b>							
Approved compressor oil	Fluid Force Red 2000 & HPO						
Oil Capacity - litres	7.0	7.5		7.0	7.5		
<b>ELECTRICAL</b>							
Starter reference 400V 50 Hz SD	34994		34998		-		
Circuit diagram 400V 50Hz	76849		76856		-		
Starter reference 230-575V 60 Hz DOL	34995		34999		-		
Circuit diagram 230-575V 60Hz	76850		76857		-		
Starter reference 400/460V 50/60 Hz RS	-		-		34966		35000
Circuit diagram 400/460V 50/60 Hz RS	-		-		76851		76858
Starter reference 200V 50/60 Hz RS	-		-		-	34997	35001
Circuit diagram 200V 50/60 Hz RS	-		-		-	76852	76859

## 4 Transportation and Handling

### 4.1 Introduction

Lifting and transportation must only be carried out by authorised persons, fully trained in the use of the equipment employed.

Ensure that all means of transportation and/or lifting equipment are adequate for purpose and are rated to exceed the full load of the unit.

### 4.2 Lifting and handling (Fig. 4.1 and Fig. 4.2)

A fork lift or pallet truck are the most suitable means of transportation. Pay particular attention to ensure stability to prevent the unit tilting over.

Lift the hypac or compressor and place it in the desired location.

Damage to mountings may occur if you attempt to slide the compressor into position.

### 4.3 Model Weights

Table 4.1 shows the weights for the ACE HV11-HV22 compressors and the hypac range.



Fig. 4.1 - ACE HV11-22 Vertical Compressor

Table 4.1 - Model Weights

Model	ACE	ACER	ACED	AERD
HV11	384	521	446	586
HV15	397	534	459	599
HV18	481	618	543	683
HV22	494	631	556	696
HV11RS	393	528	453	593
HV15RS	406	541	466	606
HV22RS	520	657	582	722

All weights in kilograms



Fig. 4.2 - ACED HV11-22 Hypac Compressor



### 5 Installation and Commissioning

#### 5.1 Positioning Your Compressor - Basic Requirements

We recommend an approved installation from an authorized Hydrovane distributor with a service agreement to maintain your compressor.

Position the compressor/hypac in a room of adequate size on a firm surface, level in both planes within five degrees of the horizontal.

Ensure the area has sufficient load-bearing capacity, normally it is not necessary to bolt the unit down.

Sufficient access (1 metre) for all routine service procedures should be provided around the unit.

Site the compressor/hypac as far as possible from sources of dirt, coarse solids, abrasive particles, steam, liquids and gaseous impurities.

This is an industrial compressor and is intended for installation in an indoor environment.

Any air connection made to the compressor outlet must be flexible as the base incorporates resilient mountings.

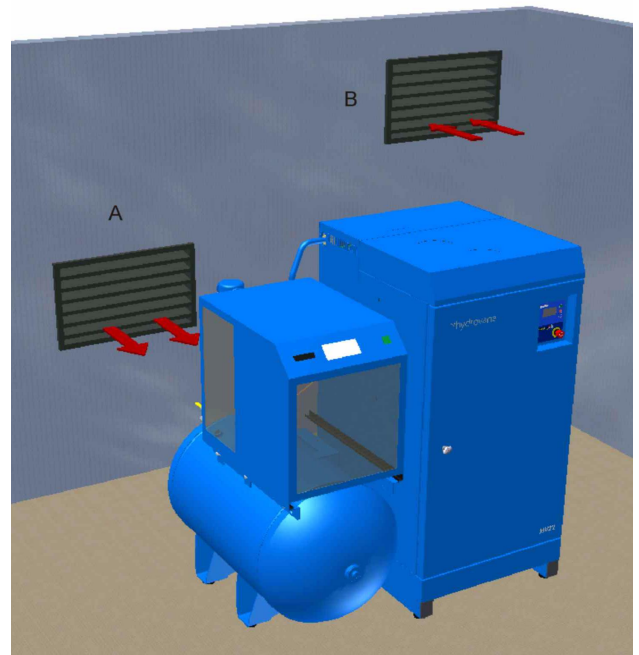


Fig. 5.1 - Compressor Ventilation

#### 5.2 Ventilation (Fig. 5.1)

Position the compressor/hypac in a well ventilated location. Do not restrict the air-flow around the compressor; Do not allow the hot air discharge to re-circulate into the compressor intake.

Any cooling-air inlet (A) should be positioned low allowing unrestricted air-flow to the compressor intake. The warm-air outlet (B) should be positioned high, and well away from the inlet, to ensure a positive cooling air-flow through the compressor.

For maximum efficiency and reliability, the compressor should be operated in a moderate ambient temperature. If temperatures frequently fall below 0°C, consult your Hydrovane Distributor. A different grade of oil may be required.

Compressor air intake and exhaust grills have captive nuts fitted as standard to attach ducting.

Air ducting, if fitted, must not cover or restrict the cooling air flow of the compressor. Total resistance of the system must not exceed 5mm w.g. (0.2in. water gauge). If resistance is expected to be greater than 5mm w.g. then fan assistance will be required.

#### 5.3 Electrical Connections

**WARNING !**

**CONNECTION TO, OR INSTALLATION OF, AN ELECTRICAL POWER SUPPLY MUST ONLY BE CARRIED OUT BY AUTHORISED AND QUALIFIED ELECTRICIANS. THEY MUST FULLY UNDERSTAND AND ADOPT CORRECT AND SAFE WORKING PRACTICES. ALL ASPECTS OF THE INSTALLATION MUST MEET THE WIRING REGULATIONS PRESENTLY IN PLACE.**

Before connecting to the mains electrical supply, ensure that the system can sustain the additional electrical load. To ensure reliable low resistance joints, make sure that your incoming supply cables are firmly secured to the starter terminals and that they are of correct size.

Note that the starter door panel should always be secured by the supplied key for safety reasons and to prevent unauthorized access.

Refer to starter circuit diagrams (located inside the starter door panel) before starting work. Note carefully the instructions given for earthing, fuses and cable size.

Fuses to BS 88 (Type gG) must be used to protect the compressor starter, refer to the sizes specified on the starter circuit diagrams.

Circuit breakers are not recommended since they may not fully protect the starter contacts in an overload condition.

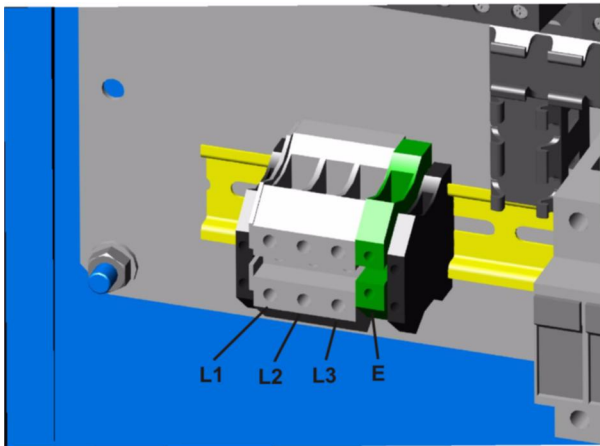
5.4 Electrical Installation (Fig. 5.2)

**WARNING !** 

**BEFORE STARTING WORK, ENSURE THAT THE MAIN-LINE FUSES HAVE BEEN REMOVED FROM THE DISTRIBUTION BOARD. PRECAUTIONS SHOULD BE TAKEN TO PREVENT THEM BEING REFITTED UNTIL THE INSTALLATION IS COMPLETE.**

Starter cables must be connected to the mains electrical supply via a lockable, switched and suitably rated fused isolator. The isolator should be positioned as near as possible to the compressor with clear, unrestricted access.

To access the starter terminals, unlock the starter door panel with the key provided. Pass the incoming cables through the entry hole in the floor and connect the three mains supply cables to the contactor terminals marked L1, L2 and L3, and connect the earth cable to the earth pin E. Ensure the connections are secure.



**Fig. 5.2 - Electrical Connections to Starter Terminal**

Cable sizes specified on the circuit diagram are the minimum size to suit a typical installation. If the compressor is located a long way from the isolator and/or the ambient temperature exceeds 35°C, the cable size should be increased.

Refer to IEEE Regulations for electrical equipment installed in buildings to determine the size required, pay particular attention to the circuit diagrams provided.

Check that the transformer fuse is positioned to suit the supply voltage of the installation.

Ensure all electrical connections are tight, high voltage supply to contactors and incoming terminals are critical.

Close the starter door and secure with the key provided.

Replace the main line fuses.

5.5 Check Direction of Motor Rotation

**WARNING !** 

**READ HEALTH AND SAFETY PRECAUTIONS BEFORE STARTING COMPRESSOR.**

Ensure that the compressor is filled with approved oil and that all plugs are fitted securely.

The cooling fan in the rear of the unit may be used as a visual aid to determine the correct rotation of the compressor.

To view the cooling fan, remove the cabinet filter from the lower half of the rear panel, the cooling fan can be viewed through the mesh grill.

With the mains isolator on, press the green start button mounted in the control panel. Compressor rotation is correct if the cooling fan rotates in a clockwise direction.

For single speed compressors, if rotation is correct, the compressor pressure display will rise immediately after starting. If rotation is not correct, the compressor pressure display will not rise.

Rotation for RS compressors will always be correct due to the inverter drive, however the cooling fan **must** be checked for correct clockwise rotation.

**CAUTION !** 

**If direction of rotation is incorrect, stop the Compressor immediately. Serious damage will occur if the motor is allowed to run in reverse!**

**WARNING !** 

**IF DIRECTION OF COMPRESSOR OR COOLING FAN ROTATION IS INCORRECT, STOP THE COMPRESSOR AND LOCK THE ISOLATOR IN THE OFF POSITION. FIT A SAFETY NOTICE TO THE ISOLATOR ADVISING THAT WORK IS BEING CARRIED OUT ON THE COMPRESSOR.**

Open the starter door with the key provided to gain access to the starter terminals.

Change over any two of the incoming cables connected to the starter terminals L1, L2 and L3.

Close the starter enclosure door and lock with the key provided to prevent unauthorised access.

Remove the safety notice and switch the mains electricity supply on.

Restart the compressor and verify that direction of rotation of both the compressor and cooling fan are correct.

Replace the cabinet filter in the rear panel with the direction arrow pointing inwards towards the cooling fan.

### 5.6 Regulated Speed Compressor Installation

The compressor should be installed generally as instructed for a standard fixed speed compressor of the same power (kW) rating.

Electrical supply fuse sizes are the same as for standard fixed speed compressors of the same power (kW) rating.

Alternatively, a circuit breaker (Type D) of suitable size and with motor starting characteristics may be used to protect the installation.

The maximum starting current under all starting conditions will not exceed 150% motor full load current and will generally be no more than 100% full load current.

The installation must be earthed in accordance with local regulations. The use of RCDs is not recommended.

Water drain, filters or dryers fitted downstream of the compressor discharge must be correctly sited to avoid excessive flow restrictions to ensure stable operation of the speed control system.

### 5.7 RS Operation with other Hydrovane Compressors

Hydrovane RS compressors may be operated efficiently in conjunction with other Hydrovane compressors fitted with automatic stop-start control.

Adjust the RS minimum air line pressure to midway between the maximum and minimum air line pressure settings of the other compressor. The RS compressor will automatically assume the lead compressor role after several cycles.

**IMPORTANT NOTES:** If the RS compressor is operated with other Hydrovane standard single speed compressors feeding a common pressure system, the minimum air line pressure of the RS compressor must be limited to the lowest maximum air line pressure of the single speed machine(s). No attempt must be made to increase the operating pressure of the single speed machine(s).

The pressure transducer sensing point is located in a valve housing adjacent to the outlet from the compressor. If the pipework from the compressor to the system is restricted, or prone to excessive pressure fluctuation, rapid speed changes and/or frequent stopping and starting of the motor may occur.

Should this condition arise, consult a Hydrovane Distributor who will arrange to re-site the pressure transducer location.



## 6 General Description

### 6.1 Compressor/Hypac (Fig. 6.1)

This User Manual covers the Hydrovane ACE HV11-HV22 vertical range of compressors. The hypac range contains a compressor and either a receiver or an air dryer or both, depending on the installation required.

The compressor alone is used where air demand is constant and does not exceed the output capacity of the compressor.

An air drier is used to provide dry air (pressure dew point 3°C) for specialised applications.

Where air demand fluctuates a compressor plus receiver is used to store large quantities of air. A drier can be combined with the compressor and receiver for applications requiring large volumes of dry air.

Figure 6.1 shows general views of typical units, the compressor assembly is detailed in Para 6.3/ Fig 6.2, the air drier is supplied with its own manual.



**Fig. 6.1 - General Views**

### 6.2 Control Systems

Compressors can be operated either in automatic Stop/Start mode or in continuous run mode.

All units benefit from REVS (Reduced Energy Venting System) to minimise power consumption during operation.

On start up a short delay prevents full pressure delivery to reduce motor power consumed.

With maximum line pressure established the venting system lowers compressor pressure to provide substantial cost savings due to the offload power reduction.

During offload run on time at minimum pressure the compressor will either stop with no air demand or return to onload running if more air is required.

#### Automatic Stop/Start Mode

This is the normal mode of operation giving maximum efficiency and economy. Recommended for applications with fluctuating air demands. With the auto mode selected, the compressor will load/unload and stop/start automatically in response to air demand.

Motor restarts are set to 15 times per hour, single speed units should be limited to 8 times per hour.

Run-on time to stop can be increased to reduce or limit motor restart frequency to the lower level required.

#### Continuous Run Mode

When the continuous run mode is selected, the compressor will continue to supply air from full to zero flow rates. In this mode the energy saving benefits of REVS will not be maintained.

#### Regulated Speed Operation

Regulated speed compressors are automatic stop/start operation only.

The Hydrovane Regulated Speed Vane compressor saves energy and operating cost when compared with a fixed speed compressor of similar size. The saving is achieved by automatically regulating the compressor speed to precisely match the compressor output to the system demand.

If the system pressure rises above the minimum air line pressure the electric motor speed will decrease, conversely, if the system pressure falls below the minimum air line pressure the motor speed will increase. The speed will vary between minimum and maximum limits dependent upon system demand.

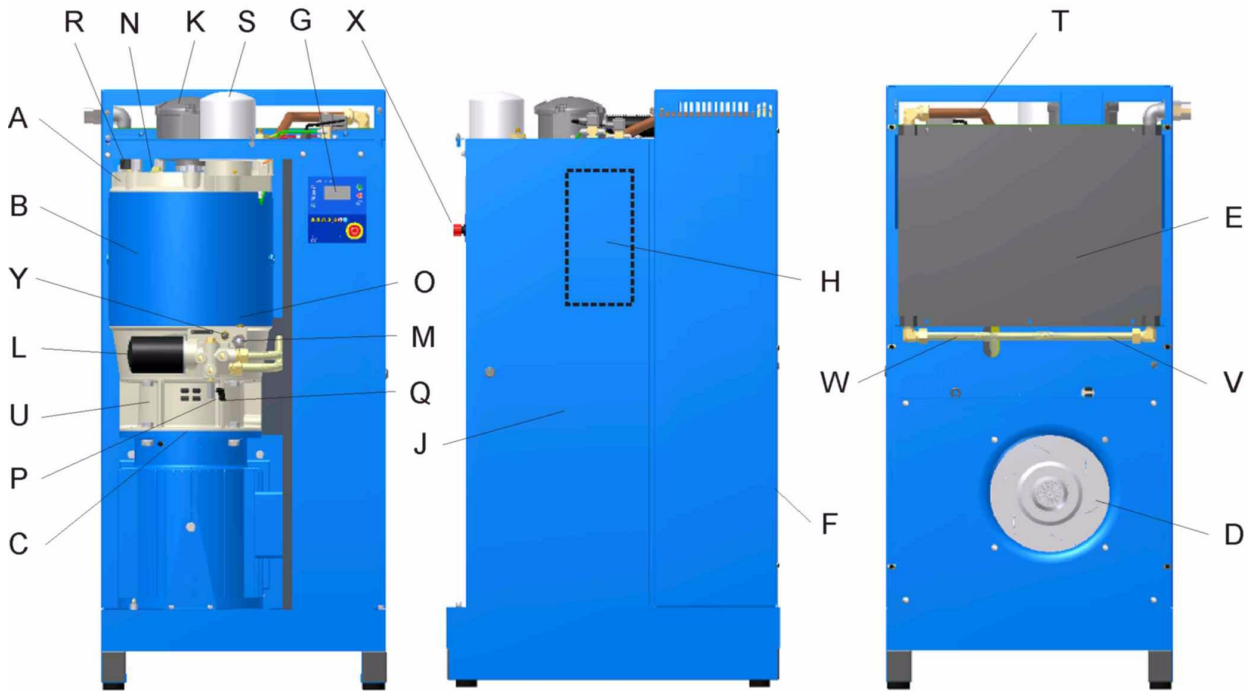


Fig. 6.2 - Compressor Assembly

### 6.3 Compressor Assembly (Fig. 6.2)

The unit comprises of a vertical single stage, oil flooded, rotary, sliding vane compressor driven by an electric motor mounted to a base. It is supplied with control panel, starter, and combination oil cooler/air aftercooler with all accessories piped in and electrically connected.

The intake cover (A) is assembled directly to the compressor (B) which is fitted to the flange face of the drive motor (C). A flexible coupling drives the compressor rotor from the motor drive shaft enclosed inside the bell housing (U). The motor is bolted to the vertical column supported by the base.

An electrically driven, impellor type, horizontally mounted fan (D) is located below the combination oil cooler/air aftercooler matrix (E). This draws cooling air through the air filter (F) and forces it through the cooler matrix.

The compressor electronic controller (G) with an LCD screen is mounted in the starter (J). An emergency stop button (X) is located on the front controller panel.

For RS models, the inverter drive (H) is mounted inside the starter compartment, behind the starter panel door (J).

The compressor air intake is protected by an air intake filter (K), and the oil system is filtered by an oil filter (L). An oil level sight glass (M) is mounted adjacent to the oil filter.

The compressor is filled and topped up with oil via the oil filler (N). The sight glass should be full to overflow from the level plug orifice (O).

Oil is drained from the compressor and cooler by removing the drain plug (P) and opening the drain tap (Q).

The compressor pressure gauge (R) is visible when the top panel is removed.

The oil separator (S) located on the top ensures air delivered through the minimum pressure valve has an oil cleanliness of less than 3 ppm (parts per million by weight). The air is delivered through the air delivery pipe (T) to the after cooler (E) before discharge from the unit.

The oil supply to the cooler is through oil feed pipe (V) with the cool oil return through oil return pipe (W). For a quick warm up, a thermal by-pass valve (Y) allows the oil supply to by-pass the cooler on initial start up.

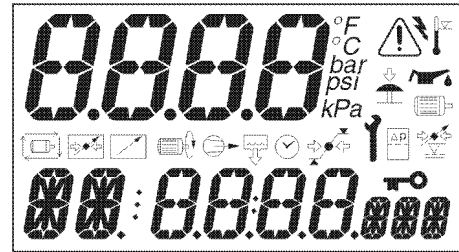
## 7 Operating Instructions

### 7.1 Operating Instructions

**WARNING !**

**READ HEALTH AND SAFETY PRECAUTIONS BEFORE YOU START ANY SERVICE WORK.**

**THE COMPRESSOR SHOULD ONLY BE OPERATED BY AUTHORISED PERSONS FULLY TRAINED IN THE STARTING, STOPPING AND EMERGENCY STOP PROCEDURES.**



**Fig. 7.1 - Controller Display**

The display then shows the software version code for a further three seconds before showing the normal operating display

For single speed compressors the controller allows two operating modes, automatic stop/start or continuous run.

#### 7.1.1 Checking Procedure Before Starting

- (a) Check sight glass is full.
- (b) Check filler, drain/oil level plugs are fitted securely.
- (c) Check for any signs of oil leaks.
- (d) Check air-outlet valve is open.
- (e) Check that the emergency stop button is released.
- (f) Turn mains electricity supply on.

#### 7.1.3 Compressor Operation

Automatic stop/start is set as default. For continuous running select Mo – MAN, using the touch sensitive symbol buttons on the controller panel.

#### 7.1.2 Operating Mode

When electricity is first switched on the electronic controller (Fig 7.2) displays all symbols and illuminates both green and red LED indicators for three seconds (Fig. 7.1)

Select Mo using plus up/minus down buttons, press the enter button, AUT will flash, press plus up/minus down button to change, press enter button to select.

The operating mode may be altered when the compressor is running or stopped.



**Fig. 7.2 - Controller**

Press Plus Up/Minus Down buttons to scroll through available user menu codes P00 (view only).

- (a) Mo - Select Automatic or Manual Control
- (b) Td – RSU\* temperature (View Only)  
\* Temperature at discharge from compression unit  
As a default value the Td – temperature appears in the bottom of the display.
- (c) PD – Delivery Pressure (View Only)
- (d) H1 – Hours Run (View Only)
- (e) H2 – Loaded Hours (View Only)
- (f) H3 – Hours Remaining to Service (View Only)

To select and lock other menu items, scroll to the menu required, when in view press the ENTER button, a flashing key symbol is displayed.

To cancel the locked selection and flashing key symbol press the ESCAPE (C) or reset button.

During operation, the controller records the total running hours, the hours run on load and counts down to the next service interval.

The service interval is set for 2000 hours when using Fluid Force Red 2000 oil. This interval will be reduced if the unit operates above the recommended temperature.

#### 7.1.4 Starting - Automatic Mode

Press the green START button. The compressor will start if system pressure is below the minimum air line pressure set point. On initial start with no pressure in the system, the pressure display will quickly rise to the full delivery pressure. During this period, the green LED will be continuously illuminated.

The compressor will continue to run and pressure will vary within the air line pressure set points to match the system demand.

If the system demand reduces and pressure rises to the maximum pressure set point, the REVS (Reduced Energy Venting System) sequence will begin.

If there is an air demand during the REVS run on time sequence the compressor returns to full load operation.

If there is no air demand during the REVS run on time sequence the compressor will stop.

Automatic restart will occur when system pressure falls to the minimum air line pressure set point.

#### 7.1.5 Starting - Continuous Mode

Press the green START button. The compressor will start, and run continuously within the air line pressure set points to match system demand.

On initial start with no pressure in the system, the pressure display will quickly rise to the maximum air line pressure set point. During this period, the green LED will be continuously illuminated.

#### 7.1.6 Starting - Regulated Speed

For variable speed models, the starting sequence is the same as that shown for single speed automatic mode except that, instead of the compressor continuing to run and pressure varying within the air line pressure set points, the compressor will continue to run and the speed will vary automatically to match system demand.

With no system demand when running at minimum speed the compressor will stop after the REVS venting sequence.

Automatic restart will occur when system pressure falls to the minimum air line set point.

#### 7.1.7 Stopping – All Models

To stop the compressor, press the red STOP button, system pressure will remain high initially, but will fall gradually with the rate of decay depending on system usage.

#### 7.1.8 Emergency Stop

If an emergency occurs, press the EMERGENCY STOP button.

The button will lock in the depressed position and stop the compressor immediately.

The red LED on the controller will flash quickly together with display symbols.

Clear any faults that may have occurred. Do not reset until it is safe to do so.

Reset the emergency stop button by twisting clockwise before restart.












Press the RESET button on the controller to cancel the red LED and display symbols.

Operation of the emergency stop button is recorded in the controller error log.

#### 7.1.9 Compressor Vent Down

Venting is controlled automatically by the REVS system for either operating mode for all models.

## 7.2 Operational Display Symbols

	Motor running		Power failure auto-restart (optional function)
	Loaded		Remote load or remote pressure regulation active
	Amount of time, timer		Remote start/stop
	Filter, differential pressure		Normal operational mode: Selected item locked as temporary default display
	Pressure set point indication (upper & lower set point indicators displayed independently)		Menu mode: Page item locked (adjustment inhibited)
	Condensate drain active (optional function)		

## 7.3 LED Indicators (Fig 7.2)

STATUS:	Green	°
FAULT	Red	

The indicator states are shown in Table 7.1.

**Table 7.1 - Compressor Status and LED Indicators**

Compressor State	LED Status °	LED Fault
Shutdown Error	OFF	FF
Startup Init	OFF	OFF *
Start Inhibit Check	OFF	OFF *
Start Inhibit Condition	OFF	SF
Ready to Start	OFF	OFF *
Blowdown (If Load Request) (Otherwise)	FF IF	OFF * OFF *
Standby	IF	OFF *
Start motor in Star/Delta (If LoadRequest) (Otherwise)	FF IF	OFF * OFF *
Load Delay (If Load Request) (Otherwise)	FF IF	OFF * OFF *
Load	ON	OFF *
Reload Delay (If Load Request) (Otherwise)	FF IF	OFF * OFF *
Standby Run-on-Time	IF	OFF *
Stop Run-on-Time	SF	OFF *

**Key:**

ON	Illuminated continuously
FF	Fast flash: on/off four times per second
SF	Slow flash: on/off once per second
IF	Intermittent flash: on/off every four seconds
OFF	Extinguished continuously
*	SF for alarm condition



## 8 Adjustments

### 8.1 Compressor Control (Fig. 8.1)

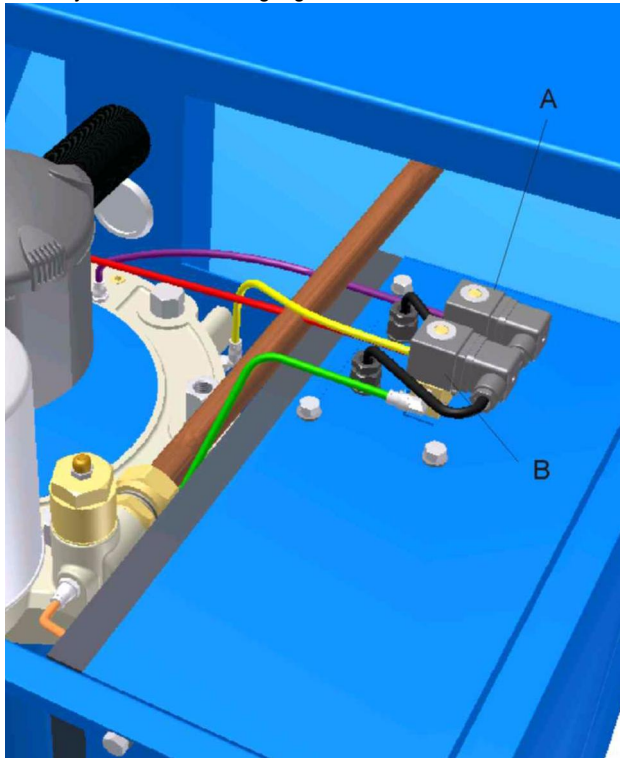
The compressor controller has additional user menus, P01 for operation and P02 for error log recording. The operation menu contains parameter settings that can be modified to suit system requirements.

The venting system (REVS) is controlled by solenoid valves mounted on the starter enclosure under the top panel cover.

A normally closed solenoid valve (A) controls compressor delivery pressure using the REVS start system to reduce power.

The normally open solenoid valve (B) vents the compressor during the REVS sequence for offload power savings and after stopping allows quick restart if required.

System pressure is shown on the controller, compressor pressure can only be viewed on the gauge fitted to the intake end cover.



**Fig. 8.1 - Solenoid Locations**

### 8.2 Pressure Adjustments

To alter default values in menu P01, or view error codes in P02, press the plus up/minus down buttons together on the controller, an access entry code will be displayed.

Use plus up/minus down buttons to enter zero for the first flashing character, then press ENTER. The next character flashes, repeat as before and enter zero for characters two and three, but enter 9 for the final character.

With all four characters set, press either menu P01 to change parameter settings, or P02 to view error codes.

In menu P01, press plus up/minus down buttons to scroll to either Pu maximum air line pressure or PL minimum air line pressure. With Pu or PL flashing, press ENTER, the value will flash, press

plus up/minus down to change the value to the desired pressure and press ENTER.

All items configured within menu P01 can be changed to suit the operational parameters for a particular installation.

- |     |    |                           |
|-----|----|---------------------------|
| (a) | Pu | Maximum Air Line Pressure |
| (b) | PL | Minimum Air Line Pressure |
| (c) | Rt | REVS Delay Period         |
| (d) | St | Run-on-Time to Stop       |
| (e) | PD | Pressure Display Units    |
| (f) | Td | Temperature display units |

Press ESCAPE to initiate a display jump-back to the normal display mode, level P00 view only.

Note that during changes, if no key activity is detected for one minute, the display will automatically jump back to the normal operational display.

The error log menu P02 retains the most recently recorded fault codes and the hours when the fault occurred. The display is view only and will automatically alternate between the two values.

An explanation of the fault codes recorded is given in Section 10, Fault Finding.

8.3 Pressure Control – RS Compressors

WARNING ! 

**ISOLATE THE COMPRESSOR FROM THE MAINS ELECTRICAL SUPPLY. LOCK THE ISOLATOR IN THE OFF POSITION. FIT A SAFETY NOTICE TO THE ISOLATOR ADVISING THAT WORK IS BEING CARRIED OUT ON THE COMPRESSOR.**

Compressors have factory settings for minimum and maximum line pressure, servo valve pressure, inverter/motor speed control.

Default settings are in **bold** type:

Operating pressure	7.0bar	<b>8.0</b>	9.0	10.0
Min Line pressure PL	7.0bar	<b>8.0</b>	9.0	10.0
Max Line pressure Pu	7.5bar	<b>8.5</b>	9.5	10.5
Servo	8.0bar	<b>9.0</b>	10.0	11.0

The minimum air line pressure may be adjusted from the 8 bar default setting in the range 7 to 10 bar.

Both parameters PL and Pu must be set together via the controller as above together with manual servo adjustment to ensure that the compressor functions correctly.

**USER WARNING**

Compressor pressure control adjustments should not be attempted by the user and must be carried out by a Hydrovane authorised service engineer. Failure to comply with this requirement may invalidate the compressor warranty.

## 9 Servicing

### 9.1 Introduction

**WARNING !**

**READ HEALTH AND SAFETY PRECAUTIONS BEFORE YOU START ANY SERVICE WORK.**

**SERVICING OF THE COMPRESSOR MUST ONLY BE CARRIED-OUT BY AUTHORISED PERSONS FULLY TRAINED AND COMPETENT IN THE MAINTENANCE, MAINS ELECTRICAL SUPPLY AND STARTER CONTROL EQUIPMENT OF HYDROVANE COMPRESSORS. THEY MUST FULLY UNDERSTAND AND ADOPT CORRECT AND SAFE WORKING PRACTICES.**

If you are unable to carry-out the work safely in the required manner, your Hydrovane Distributor will be pleased to help.

Use genuine CompAir parts and approved oils during routine servicing, the following premium service kits are available:

KO1122EP	2000 hour/ 6 month, oil change kit
KM1122EP	4000 hour/ 1 year, maintenance kit
KT1122E	20,000 hour/5 year, top-up kit/ full overhaul

### 9.2 Routine Service Schedule

The work listed in this section must be carried-out at the indicated running-hours, which must be regarded as a maximum. In dusty, hot or humid conditions, more frequent servicing may be necessary.

This section shows the minimum service requirements for your compressor. To ensure that the full maintenance programme is carried out, we recommend that your compressor is regularly serviced by an authorised Hydrovane Distributor.

### 9.3 Servicing (RS)

Servicing intervals and procedures are the same as specified for the standard fixed speed compressor of the same power (kW) rating.

The speed control unit does not require any routine servicing.

After very long periods, it is recommended that the speed control unit capacitors and cooling fan(s) be replaced to ensure continued reliability of the unit. Refer to your Hydrovane Distributor for details.

### 9.4 Check Compressor Operation

Assuming the compressor is serviced correctly, the machine is capable of operating in ambient temperatures up to a maximum of 45°C (40°C RS). At this ambient temperature the oil temperature will be typically 75°C to 85°C.

When the compressor is working, the temperature should be:-

Initial start-up and warm-up period. <70°C

Optimum working temperature. 75 - 85°C

High temperature. 90 -100°C

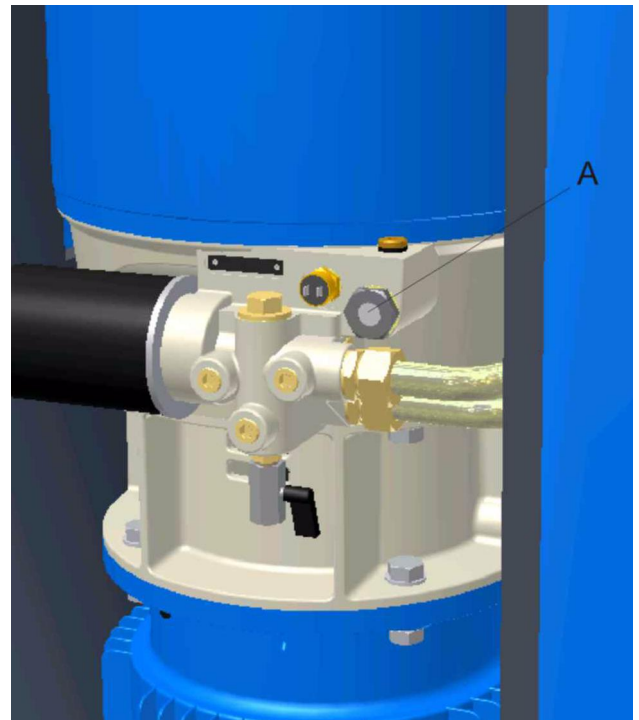
**Warning ! Consult your distributor. >107°C**

#### 9.4.1 Check Compressor Pressure

To check compressor pressure, open the front door panel, then remove the top panel from the snap fit location pegs, the pressure gauge is located adjacent to the air filter.

#### 9.4.2 Check oil level (Fig. 9.1)

With the compressor stopped check the oil level using the sight-glass (A) fitted near the end of the oil filter. The sight glass should appear full, if only part full or empty top up with approved oil.



**Fig. 9.1 - Oil Level Sight Glass Location**

9.5 Basic Service

**WARNING !** 

**STOP THE COMPRESSOR AND ISOLATE IT FROM THE MAINS ELECTRICAL SUPPLY. LOCK THE ISOLATOR IN THE OFF POSITION. FIT A SAFETY NOTICE TO THE ISOLATOR ADVISING THAT WORK IS BEING CARRIED OUT ON THE COMPRESSOR.**

**CLOSE THE AIR OUTLET VALVE TO ISOLATE THE COMPRESSOR FROM THE AIRLINE SYSTEM. FIT A SAFETY NOTICE TO THE VALVE ADVISING THAT IT IS NOT TO BE OPENED.**

**DO NOT PROCEED UNTIL THE AIR PRESSURE GAUGE READS ZERO !**

**CAUTION !** 

(1) When changing recommended oil types, it is advisable to flush the Compressor.

(2) When changing to Fluid Force Clear, the Compressor must be flushed out with Fluid Force Prime.

9.6 Access Panel Removal

With the compressor stopped ensure pressure is vented from the oil cooler/air aftercooler and associated pipework.

It is necessary to unlock (key provided) and open the hinged front door panel to allow removal of the top panel.

Remove the top panel from the snap fit location pegs and lift clear of the compressor.

Check that the compressor pressure gauge reads zero.

9.7 Oil Draining and Filter Replacement (Fig. 9.2 and Fig. 9.3)

**WARNING !** 

**AVOID UNNECESSARY CONTACT WITH HOT OIL AND COMPONENTS. GLOVES ARE RECOMMENDED IF DRAINING OIL WHEN THE COMPRESSOR IS HOT!**

9.8 Oil Draining

Remove the filler plug (Fig. 9.2 (A)) with bonded seal (B) to allow air to enter the compressor to aid drainage.

Place a suitable container below the oil drain point, remove drain plug (A) from the end of the tap (B) (Fig. 9.3), turn the tap and allow oil to drain.

When draining is complete, turn the drain tap to the off position and replace the drain plug in the tap. Clean away any oil spillages.

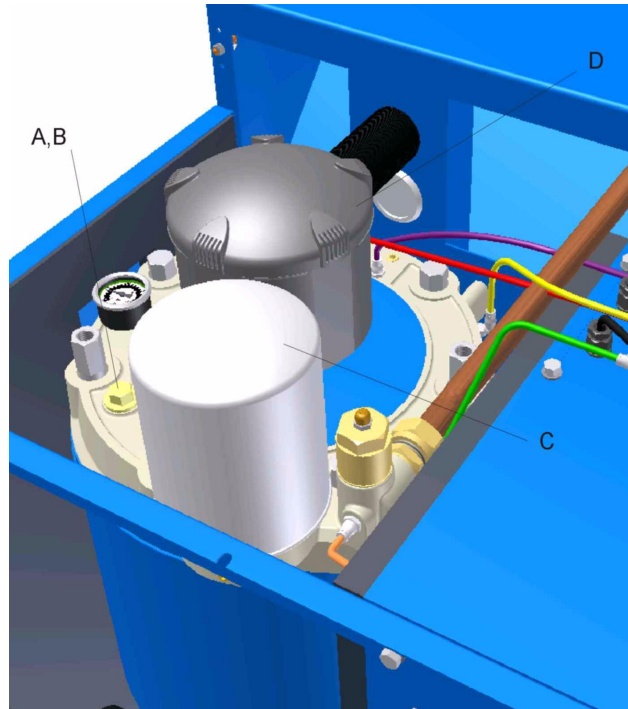


Fig. 9.2 - Oil Filler Plug, Air Filter and Separator Element Location

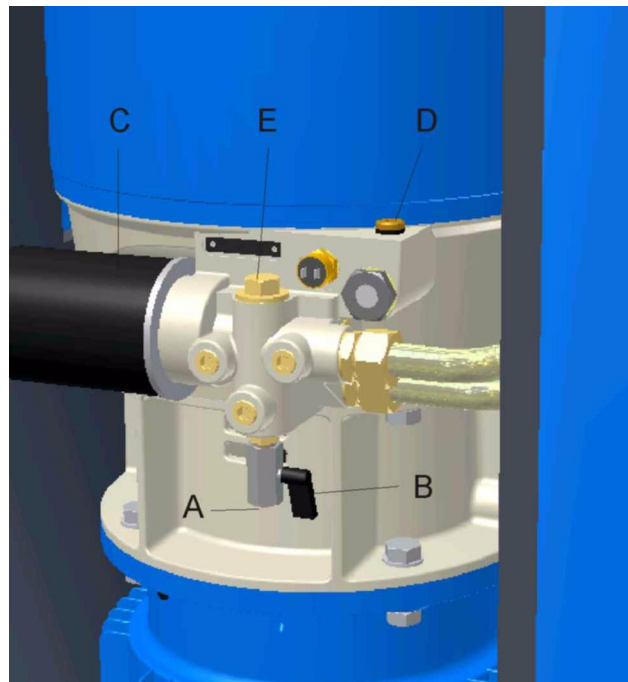


Fig. 9.3 - Oil Drain and Filter Location

9.9 Oil Filter Replacement (Fig. 9.3)

Unscrew the oil filter (C) in an anti-clockwise direction, minimise oil spillage from the canister. Clean away any spillage and discard the old filter in a safe manner.

Using a new filter, smear a small amount of oil onto the seal, screw in clockwise to tighten, hand tight only.

### 9.10 Oil filling / Top-up (Fig. 9.3)

Remove and retain the level plug (D) located just behind the bypass valve (E).

Fill the compressor with oil to overflow. Fluid Force Red 2000 is recommended as the standard oil.

When the level is correct, oil will overflow from the level plug. Stop filling and replace the level plug. Clean away any spillage.

Refit the filler plug Fig. 9.2 (A) and bonded seal (B). Renew the bonded seal if damaged, tighten the plug using a suitable spanner. Do not over tighten.

### 9.11 Air Filter Replacement (Fig. 9.2)

To change the air filter element, twist the cap of the air filter container (D) anti-clockwise then lift vertically to expose the element.

Remove the old element and discard in a safe manner and replace with a new element before replacing the cap.

### 9.12 Oil Separator Replacement (Fig. 9.2)

Unscrew the oil separator (C) in an anti-clockwise direction and discard in a safe manner.

Using a new separator, smear a small amount of oil onto the seal, screw clockwise to tighten, hand tight only.

### 9.13 Clean Oil Cooler/Aftercooler (Fig. 9.4)

Inspect the cooler matrix for signs of damage. If the matrix is damaged, consult your local Hydrovane Distributor.

The cooler matrix airflow is from the inside to outside; cleaning is best achieved by brushing and reversing the airflow to dislodge any accumulation of dirt.

Using low pressure air (2 bar) brush and blow over the whole area of the matrix (A). Undo two internal cap head screws at the top of the rear frame to remove the rear panel. Ease the rear panel away from the frame and lift it clear. Vacuum up debris from the cooler and surrounding area behind the cabinet filter (B).

All discarded items and waste oil must be disposed of in an approved manner.

### 9.14 Cabinet Air Filter

This is a disposable item located in the rear panel that should be changed every 2000 hours.

Remove the filter by sliding upwards and pull the bottom edge to clear retaining lips. Refit in the reverse sequence.

### 9.15 Panel Refitting

Refit the top panel (firm push fit), close the front panel door and lock with the key provided. Secure all panels including the starter panel door if opened.

Test run the compressor and check operation using the Controller.

If the oil filter has been replaced, run for compressor for a short time (30 seconds) and re-check the oil level.

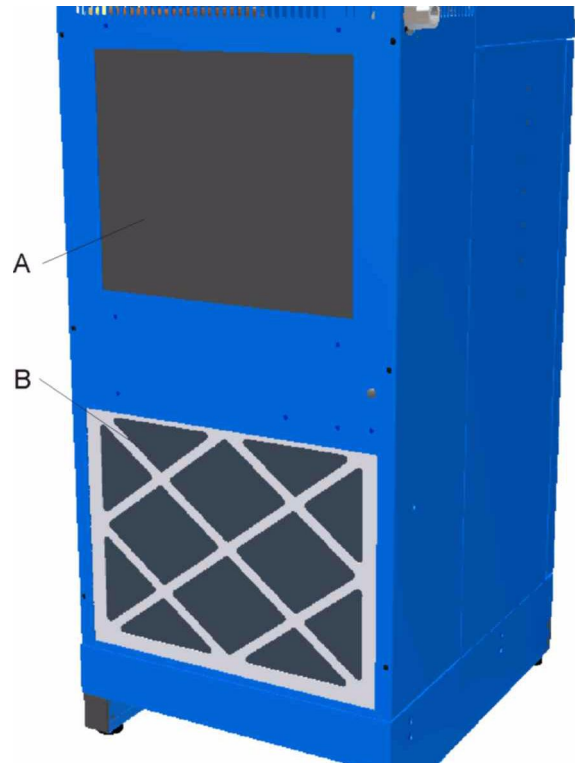


Fig. 9.4 - Matrix Cleaning

### 9.16 Electrical checks

**WARNING !**

**ISOLATE THE COMPRESSOR FROM THE MAINS ELECTRICAL SUPPLY. LOCK THE ISOLATOR IN THE OFF POSITION. FIT A SAFETY NOTICE TO THE ISOLATOR ADVISING THAT WORK IS BEING CARRIED OUT ON THE COMPRESSOR.**

Open the starter panel door with the key provided.

Remove any terminal covers fitted to contactors and incoming supply terminals.

Check for any signs of overheating and ensure that all electrical connections are tight.

Pay special attention to power connections, cables connected to contactors and incoming terminals and ensure all earthing wiring is present and undamaged.

Close the starter panel door and lock with the key provided to prevent unauthorised access.

#### 9.16.1 Clean motors

Remove any dust or dirt from motor bodies and motor air intake grill located under the compressor base.

Remove safety notices.

### 9.17 Servicing Requirements

The following preventive maintenance charts cover all Hydrovane compressors using Hydrovane Fluid Force Red 2000, Clear and HPO oils.

The work to be carried out must be done on or before the hours shown for this action, or every 6 months, whichever is soonest.

Tables 9.1 for 2000 hour oil change periods and 9.2 for 4000 hour oil change are shown in entirety, shaded items are Hydrovane Distributor maintenance tasks only.

Note: Certain items may not be applicable to all units.

### READ HEALTH AND SAFETY PRECAUTIONS BEFORE STARTING ANY WORK.

#### 9.18 Service Schedule: Fluid Force Red, Clear and HPO Oil

For normal ambient conditions bulk oil temperatures must not exceed 90°C (100°C for HPO oil) when using 2000 hour oil change periods.

In higher ambient conditions using 4000 hour oil change periods HPO oil should not exceed 90°C.

If the oil is working above these temperatures the oil life will be significantly reduced.

If changing to Fluid Force Clear the compressor must be flushed out with Fluid Force Prime in order to comply with USDA H1 standard.

The service life of the air filter and cabinet filter are an indication only, actual life durability will depend on the operating conditions.

Additional kits available for full product support are as follows:

KF1122E	2000 hour/6 month, cabinet filter kit.
KSVSD	8000 hour/2 year, solenoid valve kit.
KE1115E3	20000 hour/5 year, electrical kit 3PH SD.
KE15ERS	20000 hour/5 year, electrical kit RS.
KE1822E	20000 hour/5 year, electrical kit 1PH SD.
KE22ERS	20000 hour/5 year, electrical kit RS.
KW1122E	20000 hour/5 year, wear sleeve kit.
KBV160	20000 hour/5 year, motor bearing kit HV11/15.
KBV180	20000 hour/5 year, motor bearing kit HV18/22.

Table 9.1 - Service Schedule Fluid Force Red, Clear and HPO (2000 hour change period).

Maintenance Actions	Install	Daily	Weekly	Every 2000 hrs	Every 4000 hrs	Every 20000 hrs
Site-sufficient access for service	X					
Site-protected from weather	X					
Site-adequate ventilation	X	X	X	X	X	X
Site-ambient temperature within limit	X	X	X	X	X	X
Site-dust free ambient	X	X	X	X	X	X
Check/torque electrical connections	X			X	X	X
Check oil level filter at plug/sight glass	X	X	X	X	X	X
Check correct drive rotation	X					X
Check for air leaks	X		X	X	X	X
Check for oil leaks	X		X	X	X	X
Check air intake filter/clean if necessary	X		X			
Check power on-load	X			X	X	X
Check power off-load	X			X	X	X
Check oil temperature	X		X	X	X	X
Check RSU temperature	X		X	X	X	X
Check servo pressure off-load	X			X	X	X
Check motor gland/cables secure	X			X	X	X
Check motor for damage	X			X	X	X
Check motor for loose connections	X			X	X	X
Check motor cables and earth	X			X	X	X
Check motor for vibration	X			X	X	X
Check flexible oil pipes				X		
Check oil seal for leakage				X	X	
Check drive media/key						X
Check starter contactors					X	
Check motor insulation resistance						X
Check combi cooler matrix			X	X	X	X
Clean any external dirt from compressor	X		X	X	X	X
Clean any external dirt from motor	X		X	X	X	X
Clean cabinet filter			X			
Clean solenoids				X	X	X
Change separator element					X	X
Change 2000 hour oil				X	X	X
Change oil filter				X	X	X
Change air intake filter				X	X	X
Change cabinet filter				X	X	X
Change unloader valve seals					X	X
Change MPV seals					X	X
Change vacuum valve seals					X	X
Change flexible pipes					X	X
Change thermal motor					X	X
Grease motor bearings					X	
Full air end inspection (internal)						X
Clean servo filter						X
Change drive media/key						X
Change oil seal						X
Change pressure gauge						X
Change motor bearings						X
Full operational test/check	X			X	X	X
Filter element fitted to Hypac units only					X	

**Table 9.2 - Service Schedule Fluid Force HPO (4000 hour change period)**

Maintenance Actions	Install	Daily	Weekly	Every 4000 hrs	Every 20000 hrs
Site-sufficient access for service	X				
Site-protected from weather	X				
Site-adequate ventilation	X	X	X	X	X
Site-ambient temperature within limit	X	X	X	X	X
Site-dust free ambient	X	X	X	X	X
Check/torque electrical connections	X			X	X
Check oil level filter at plug/sight glass	X	X	X	X	X
Check correct drive rotation	X				X
Check for air leaks	X		X	X	X
Check for oil leaks	X		X	X	X
Check air intake filter/clean if necessary	X		X		
Check power on-load	X			X	X
Check power off-load	X			X	X
Check oil temperature	X		X	X	X
Check RSU temperature	X		X	X	X
Check servo pressure off-load	X			X	X
Check motor gland/cables secure	X			X	X
Check motor for damage	X			X	X
Check motor for loose connections	X			X	X
Check motor cables and earth	X			X	X
Check motor for vibration	X			X	X
Check flexible oil pipes				X	
Check oil seal for leakage				X	
Check drive media/key				X	X
Check starter contactors					X
Check motor insulation resistance					X
Check combi cooler matrix			X	X	X
Clean any external dirt from compressor	X		X	X	X
Clean any external dirt from motor	X		X	X	X
Clean cabinet filter			X		
Clean solenoids				X	X
Change separator element				X	X
Change 4000 hour oil				X	X
Change oil filter				X	X
Change air intake filter				X	X
Change cabinet filter				X	X
Change unloader valve seals				X	X
Change MPV seals				X	X
Change vacuum valve seals				X	X
Change flexible pipes				X	X
Change thermal motor				X	X
Grease motor bearings (if applicable)				X	
Full air end inspection (internal)					X
Clean servo filter					X
Change drive media/key					X
Change oil seal					X
Change pressure gauge					X
Change motor bearings					X
Full operational test/check	X			X	X
Filter element fitted to Hypac units only				X	

## 10 Fault Finding

### 10.1 Fault Finding

**WARNING !**

The Controller sequential logic monitors and checks the compressor status through all stages of the operational cycle. At each stage, the configuration and parameter limits set within the Controller must be met for continued safe operation of the compressor.

If faults occur they appear on the Controller display with a specific code, the last character, E, A or R, identifies the fault type.

### 10.2 Shutdown Trip Error (E) – Menu P03

A shutdown error stops the compressor immediately or by normal stopping sequence, preventing damage or a hazardous condition. The error condition must be located and corrected, press reset to cancel the error and the compressor can restart. Immediate shutdown error codes have a first character of 0, normal stopping sequence records 1 as the first character.

Er 0010 E	Emergency stop
Er 0020 E	Fan motor overtemperature or circuit breaker tripped
Er 0030 E	Motor overload tripped (if fitted)
Er 0080 E	Motor fault (fault relay contact, overload device contact or thermistor)
Er 0115 E	Delivery pressure sensor fault
Er 0119 E	Delivery pressure high
Er 0125 E	Delivery temperature sensor fault
Er 0129 E	Delivery temperature high
Er 0135 E	Compressor pressure sensor fault
Er 0821 E	Low resistance, short circuit/short circuit to earth condition, cable or sensor fault
Er 0836 E	Controller internal error
Er 0846 E	Delivery pressure sensor range set too low for default pressure settings to be applied
Er 0d01 E	485 communication not established
Er 0d02 E	485 communication lost
Er 0d03 E	Communication error reported by VSD
Er 0d06 E	VSD error (see P00 - dE)
Er 0d08 E	Safety interlock error (VSD physical start)

### 10.3 Alarm (A) – Menu P04

Alarms occur as a warning when normal operating conditions are exceeded, but will not stop the compressor from being started and run. General alarm codes start with a first character of 2, service alarms begin with 4.

Er 2118 A	Delivery pressure high
Er 2128 A	Delivery temperature high
Er 2816 A	Power failure in start mode
Er 2d07 A	Drive alarm (see P00 - dE)
Er 2d09 A	Motor overload, unloads until current reduced

A service timer counts down from set values until a routine service is due at 0 that sets off an alarm. A negative value count continues until the timer is reset by maintenance personnel after the required service.

Er 4804 A	Service hours time expired, service due (reset service hours countdown timer)
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### 10.4 Run Inhibit (R) – Menu P05

A run inhibit will prevent motor start until the fault is located and corrected. With normal operational status restored, press reset to cancel the error.

Er 3123 R	RSU delivery temperature (Td) below the set temperature run inhibit level.  Controller allows motor start when temperature increases above the set level.  Fluid Force 2000 is set at - 5°C Fluid Force HPO has a value of -15°C.
Er 3137 R	Run inhibited until restart time reached after power failure.
Er 3d04 R	Drive type mismatch
Er 3d05 R	Motor type mismatch

Further menus with restricted access codes are intended for service level activities 1 and 2. These are reserved for use by fully trained Hydrovane authorised service engineers.

We strongly advise that no attempt is made to access these structures, continued safe operation may be impaired and/or serious damage may occur.

### 10.5 Fault Display Symbols

	General fault
	Emergency stop
	Excess pressure
	Power failure
	Above set temperature limit
	Lubrication, oil, oil level
	Dewpoint
	Motor
	Service due, maintenance
	Filter differential, filter service

## 10.6 Diagnostic Menu P06

The menu structure allows a technician to check and test all the inputs and outputs to the Controller individually without running the compressor.

## 10.7 Configuration Menu P07

Basic operating configuration settings are applied to the compressor that control starting characteristics and pressure load and unload features with associated time delays

## 10.8 Speed Regulation Menu P08

This function controls response of the variable speed drive to ensure smooth speed changes and maintain a steady target/load pressure.

## 10.9 Calibration Menu P09

Pressure sensors must be set to atmospheric pressure with the Controller pressure display set to zero. Range calibration must be accurately applied to achieve correct performance and pressure related safety functions.

## 10.10 Access Level Configuration Menu P10

Special functions and settings that determine compressor specific configuration generally set once during factory default settings and site commissioning.

## 10.11 RS Motor Map Menu P12

Motor control features are set as factory defaults that maintain operation within safe limits.

## 10.12 RS Inverter Drive Map Menu P13

Parameters are set as factory defaults to match the inverter drive type and controlling features for variable speed operation.

If, for any reason, you feel unsure about fault rectification, or any service aspect relating to your Hydrovane compressor, please contact your nearest Hydrovane Distributor.



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