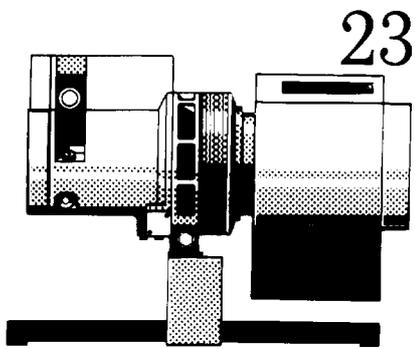


# Hydrovane



# Introduction

The 23 series Hydrovane Compressors are oil sealed sliding vane rotary air compressors directly driven by electric motors. Operation and routine maintenance only are detailed in this booklet, do not attempt any further work unless the appropriate instructions are available. The use of approved lubricants is vital to the compressor and the maintenance schedule must be strictly adhered to. A careful check on compressor running hours should therefore be kept.

## Installation–Siting

1. The compressor must not be sited where the surrounding air temperature is liable to cause the compressor oil temperature to exceed its permitted maximum of 104°C (220°F). The compressor oil temperature may be checked by introducing a small amount of oil and a thermometer into the pocket in the top of the oil filler plug.
2. Run the compressor in well ventilated conditions only. The flow of hot air from the oil cooler must not be restricted or allowed to recirculate.
3. The compressor must be sited in a readily accessible position for ease of routine maintenance.
4. The compressor must be level in both planes.

## Pipework Connections

1. The shut-off valve supplied should be fitted between the compressor outlet and the pipework system.
2. A union should be connected in the line after the shut-off valve.
3. The size of pipework used must be large enough to reduce friction and subsequent pressure drop to a minimum.
4. A drop leg and automatic drain water trap should be fitted in the pipework system so that any condensation forming in the pipes cannot drain back to the compressor.
5. The air main should slope down away from the compressor to aid condensate drainage. A slope of 2% is usually sufficient.
6. An air line fitted with a blow gun should be installed close to the compressor so that the oil cooler, air aftercooler and air intake filter may be cleaned periodically.
7. Branch pipes to individual equipment must always be taken from the top of the air main.
8. Water traps should be fitted as far away from the compressor and as close to the point of air usage as possible.
9. Where extra dry air is essential it may be found necessary to fit an air drier in the pipework system.
10. When a pressure switch is installed in a stop-start or multiple compressor installation this must be fitted to the air receiver (or air line) after all restrictions of valves, filters, etc.

## Electrical Connections

1. Compressor should be connected to a suitable supply via a switched and fused isolator.
2. Make electrical connections as shown in the 'WIRING DIAGRAM' noting suggested incoming cable and main line fuse sizes.
3. Set motor overload switch to the value shown in the 'WIRING DIAGRAM.'
4. Check overload is reset.
5. On a multiple compressor system, plug in connection leads between compressor starters to form a closed loop. A maximum wire size of 0.75 mm should be used.
6. On a multiple compressor system, set red switches on starter P.C. Boards (where applicable) for the required operation, either Sequential – setting 'S', or Cascade – setting 'C'. For single compressor stop-start control, set red switch to 'C' position.

**NOTE:** In multiple compressor systems, all switches must have the same setting.

**CAUTION:** Direction of compressor rotation is CLOCKWISE looking on the DRIVE END of the compressor. Incorrect rotation will cause serious damage and requires immediate shut down. To change direction of rotation, change over any two of the three incoming wires R, S, T.

7. To check direction of compressor rotation on a stop-start unit, or in multiple compressor systems, switch mode selector to 'MANUAL,' and press 'START' button. Press stop button when direction of rotation is determined.

# Settings and Adjustments

**WARNING:** WORK ON ELECTRICAL EQUIPMENT MUST BE CARRIED OUT BY SUITABLY QUALIFIED PERSONNEL.

## Servo Valve

The servo valve is factory pre-set to give a full load working pressure of either 7 bar (100 lbf/in<sup>2</sup>)\* or 10 bar (150 lbf/in<sup>2</sup>)\*.

If a slight correction to the operating pressure is found to be necessary, adjustment may be made by means of the servo adjusting screw situated near the base of the oil chamber at the intake end.

Adjustment should be made with the compressor at normal working temperature.

1. Close shut-off valve. Turn mode selector switch (where fitted) to 'MANUAL' position. Press start button.
2. Slacken servo locknut.
3. Adjust servo adjuster to:—  
7.7 bar (112 lbf/in<sup>2</sup>) to obtain a full load working pressure of 7 bar (100 lbf/in<sup>2</sup>)\*  
or  
10.7 bar (155 lbf/in<sup>2</sup>) to obtain a full load working pressure of 10 bar (150 lbf/in<sup>2</sup>)\*  
Screw adjuster CLOCKWISE to INCREASE or ANTI-CLOCKWISE to DECREASE pressure.
4. Open and close shut-off valve to check setting between adjustments.
5. Tighten servo locknut when correct setting is obtained.

\* THE SPECIFIED WORKING PRESSURE OF THE INDIVIDUAL COMPRESSOR MUST NOT BE EXCEEDED.

## Cycle Time Setting

The cycle times are factory pre-set via two adjustable potentiometers (RV1 and RV2, starter P.C. Board mounted) to the following approximate values:—

RV1 — 5 seconds initial start-up delay.

RV2 — 30 seconds, for the period of off-load running after which the compressor will stop.

**NOTE:** Adjustment to the cycle time settings should not be attempted without first referring to the detailed instructions given in the 'Power Manager' Control Kit Manual.

## Pressure Switch Setting

Pressure switches PS1 and PS2 are factory pre-set to the values shown below:—

PS1        Maximum Pressure  
             7.2 bar (105 lbf/in<sup>2</sup>)  
             or  
             10.2 bar (155 lbf/in<sup>2</sup>)

PS2        Minimum Pressure  
             5.5 bar (80 lbf/in<sup>2</sup>)

PS1 must be set to a higher pressure than PS2 to ensure correct operation of circuit.

**NOTE:** Adjustment to the pressure switch settings should not be attempted without first referring to the detailed instructions given in the 'Power Manager' Control Kit Manual.

# Compressor Operation

**CAUTION:** BEFORE INITIAL START-UP OF NEW COMPRESSOR, READ 'INSTALLATION.'  
CHECK OIL LEVEL AND TOP UP AS NECESSARY. CHECK DIRECTION OF  
ROTATION OF COMPRESSOR ON INITIAL START-UP, SEE 'ELECTRICAL  
CONNECTIONS.'

## Standard Control (Continual Running Operation only)

### START

1. Switch on power.
2. Close shut-off valve.
3. Press start button.
4. When compressor has reached maximum pressure, open shut-off valve.

### STOP

1. Close shut-off valve.
2. Press stop button.
3. Leave shut-off valve closed to clear the oil separator.

## Automatic Stop Start Control

### START

1. Switch on power. Open shut-off valve.
2. Select mode of operation on blue selector switch.  
Either A. Select 'MANUAL' for continual running operation.  
or B. Select 'AUTO' for automatic stop-start operation. This is the recommended mode for  
maximum economy where there is a fluctuating air demand.
3. Select 'LEAD' on white selector. Compressor will not start if switch is left in unmarked  
position.
4. Press start button. (There will be a short delay before start up).

**NOTE:** WHEN SWITCHING OVER DIRECTLY FROM 'MANUAL' TO 'AUTO', THE  
COMPRESSOR WILL STOP BRIEFLY BEFORE AUTOMATICALLY RE-STARTING  
IN 'AUTO' MODE. WHEN SWITCHING DIRECTLY FROM 'AUTO' TO 'MANUAL',  
COMPRESSOR WILL CONTINUE RUNNING.

### STOP

1. Press stop button.

## Multiple Compressor Control

**NOTE:** Ensure all switches on starter P.C. Boards have been set to the required operation, either  
'Sequential' or 'Cascade,' see 'ELECTRICAL CONNECTIONS.'

### START

1. Switch on power. Open shut-off valves.
2. In turn, switch blue selectors on all system compressors to 'AUTO' position
3. Push all start buttons.
4. Determine which compressor is to start first, then switch its white selector to 'LEAD'. There  
will be a short delay before start up.
5. If 'Sequential' control has been selected, return white switch to the unmarked position after  
compressor has started.
6. If 'Cascade' control has been selected, leave white switch in 'LEAD' position.

### STOP

1. Push all stop buttons.

# servicing

## SAFETY PRECAUTIONS

**BEFORE WORKING ON THE COMPRESSOR, ENSURE THAT IT IS ISOLATED FROM THE MAINS ELECTRICITY SUPPLY. ENSURE COMPRESSOR IS NOT PRESSURISED. WAIT TILL THE PRESSURE GAUGE READS ZERO THEN SLOWLY REMOVE THE FILLER PLUG. IF OIL STARTS BUBBLING OUT BEFORE THE PLUG HAS BEEN REMOVED, THE UNIT IS STILL PRESSURISED. DO NOT REMOVE THE PLUG UNTIL THE PRESSURE HAS BEEN LOST.**

### NOTE:

**IN ANY MULTIPLE COMPRESSOR INSTALLATION INDIVIDUAL COMPRESSORS CAN BE ISOLATED FOR ROUTINE MAINTENANCE. OTHER SYSTEM COMPRESSORS WILL CONTINUE TO OPERATE. 110 VOLTS WILL STILL BE PRESENT IN THE STARTER. REFER TO SPECIAL INSTRUCTIONS GIVEN IN POWER MANAGER CONTROL KIT MANUAL.**

## Air Intake Filter

1. Unscrew and remove the filter screw which is situated at the non-drive end of the compressor and collect the fibre washer.
2. Withdraw the filter cover and collect the filter element.
3. Clean the element by blowing off accumulated dirt with low pressure clean dry air or renew the element if necessary. Thoroughly clean the filter cover.
4. Place the element in the cover and position against the compressor casing ensuring that the element locates in its recess.
5. Secure the assembly with the filter screw and fibre washer.

## Oil Cooler and Air Aftercooler

The cooler sections and aftercooler matrix must be carefully cleaned, at the period detailed in "COMPRESSOR MAINTENANCE" by blowing out accumulated dirt with compressed air. The aftercooler drain filter should be serviced in accordance with the manufacturers instructions.

## Oil Return Valve

1. Remove screws and collect instruction plate. Discard gasket from behind it.
2. Unscrew and remove oil return valve and discard bonded seal.
3. Unscrew filter assembly from valve body and collect filter disc and orifice plate.
4. Remove circlip from valve body and collect backing discs and filter plug. Discard filter plug.
5. Thoroughly clean all components in white spirit or paraffin ensuring orifices in valve body, filter disc and orifice plate are free from blockage.
6. Position orifice plate and filter disc in threaded end of valve body. Refit filter assembly.
7. Position backing disc in valve body followed by new filter plug and second backing disc. Refit circlip.
8. With new bonded seal fitted, refit oil return valve to oil chamber.
9. With new gasket in position, refit instruction plate and secure with the screws.

## Electric Motors

Routine maintenance on electric motors i.e. greasing of bearings etc. should be carried out in accordance with the technical literature of the manufacturer concerned.

## Oil Filter

1. Drain the oil, as detailed in "OIL DRAINING AND FILLING".
2. Unscrew the two screws and remove the oil filter cover. Discard cover gasket. Remove oil filter element from bore in oil chamber.
3. Wash the filter element in white spirit or paraffin and wipe dry. Wipe out the filter bore in the oil chamber.
4. Replace oil filter element in oil chamber bore.
5. With new gasket, rubber bonded side facing away from the oil chamber, in position, refit oil filter cover and secure with the two screws.
6. Fill with oil, as detailed in "OIL DRAINING AND FILLING".

## Oil Draining and Filling

**NOTE:** This is best accomplished as soon as possible after shut down.

1. Isolate compressor from mains electricity supply.
2. When the pressure gauge reads zero slowly remove the oil filler plug to ensure that there is no pressure remaining in the unit and to allow venting to the oil chamber. If oil starts bubbling out before the filler plug is fully removed this indicates that some pressure still remains in the compressor and the filler plug must not be removed until this pressure has been lost.
3. Remove the two drain plugs situated in the base of the oil chamber. Drain the oil into a suitable receptacle.
4. Refit and tighten the drain plugs, ensuring that new bonded seals are fitted.
5. Fill the compressor with oil as specified in "APPROVED LUBRICANTS" to the top of the filler plug hole.
6. Replace the filler plug complete with new seal and run the compressor for approximately 10 seconds. Wait until the air pressure gauge reads zero and repeat operation 2.
7. Recheck oil level and top up as necessary to top of filler plug hole.

# Maintenance Schedule

PERIOD OPERATION	Every Day	Every 50 Hours	Every 2000 Hours▲
Check Oil Level	<b>X</b>	<b>X</b>	
Clean Air Intake Filter		<b>X</b>	
Clean Oil Cooler		<b>X</b>	<b>X</b>
Clean Air Aftercooler			<b>X</b>
Clean Oil Return Valve			<b>X</b>
Clean Oil Filter			<b>X</b>
Change Air Intake Filter Element			<b>X</b>
*Change Oil			<b>X</b>

To ensure trouble-free service it is important that the routine maintenance specified is strictly observed. The times indicated should be regarded as maximum. If the compressor is working in dusty conditions, routine maintenance should be carried out more frequently.

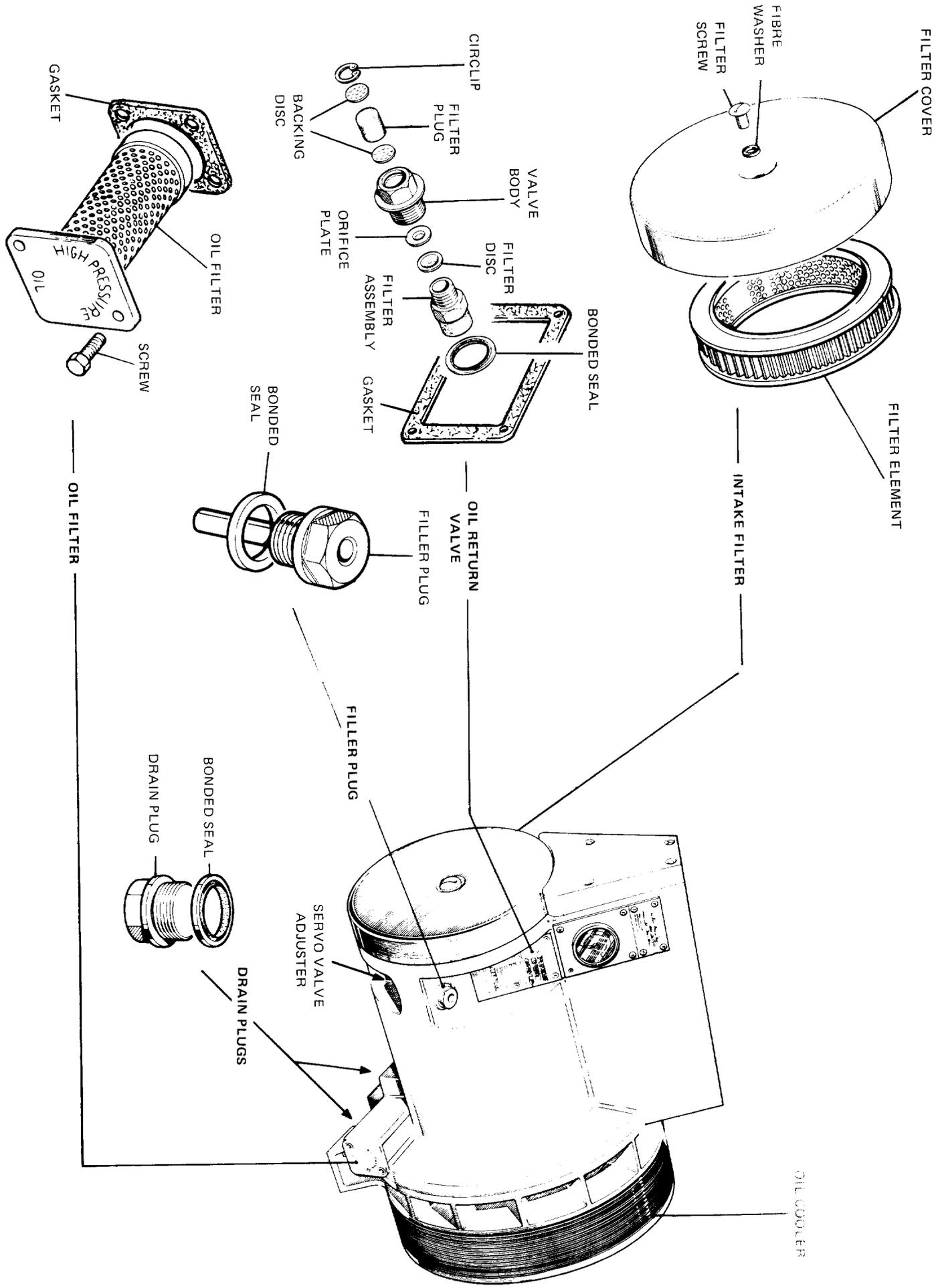
\*WHEN USING A SPECIFIED APPROVED LUBRICANT OTHER THAN HYDROVANE 2000, THE OIL CHANGE PERIOD IS AMENDED TO 400 HOURS.

▲ EVERY 2,000 HOURS RUNNING OR ONE YEAR, WHICHEVER OCCURS FIRST.

# Replacement Service Parts

LOCATION	DESCRIPTION	QTY	PART NO.
Air Intake Filter	Element	1	0119
	Fibre Washer	1	8802
Oil Return Valve	Gasket	1	9306
	Bonded Seal	1	9613
	Filter Plug	1	3051
Oil Filter Plug	Bonded Seal	1	9619
Drain Plug	Bonded Seal	2	9613
Oil Filter	Gasket	1	9304

All above listed items are available in an OIL CHANGE KIT for the 2000 hour service.



# Approved Lubricants

MAKE	HYDROVANE 2000	B.P. VANELLUS	SHELL RIMULA	MOBIL DELVAC	MOBILAND DIESEL	BURMAH-CASTROL DEUSOL	AGRICASTROL	ESSOLUBE	GULFLUBE MOTOR OIL	TEXACO URSA OIL EXTRA DUTY	CHEVRON E.P. INDUSTRIAL OIL
Over 5°C	↑ *	M 40	X 40	1240	40	CRI 40 CRB 40	40	HDX 40	XHD 40	SAE 40	68X
0°C to 5°C	↓	M 30	X 30	1230	30	CRI 30 CRB 30	30	HDX 30	XHD 30	SAE 30	55X
-7°C to 0°C	—	M 20	X 20	1220	20	CRI 20 CRB 20	20	HDX 20	XHD 20	SAE 20	55X
Below -7°C	Consult Hydrovane, B.P. VANELLUS 10W or equivalents are generally necessary										

\* 2000 Hour Oil Change      ● 400 Hour Oil Change

**IMPORTANT:** IN ORDER TO RETAIN ITS 2000 HOUR OIL CHANGE CHARACTERISTIC HYDROVANE 2000 MUST NOT BE MIXED WITH ANY OTHER APPROVED LUBRICANT. WHEN CHANGING FROM A STANDARD (400 HOUR) OIL TO HYDROVANE 2000, THE INITIAL OIL CHANGE MUST BE MADE AT 400 HOURS. SUBSEQUENT OIL CHANGES MAY THEN BE MADE AT THE RECOMMENDED 2000 HOUR INTERVALS.

## Data

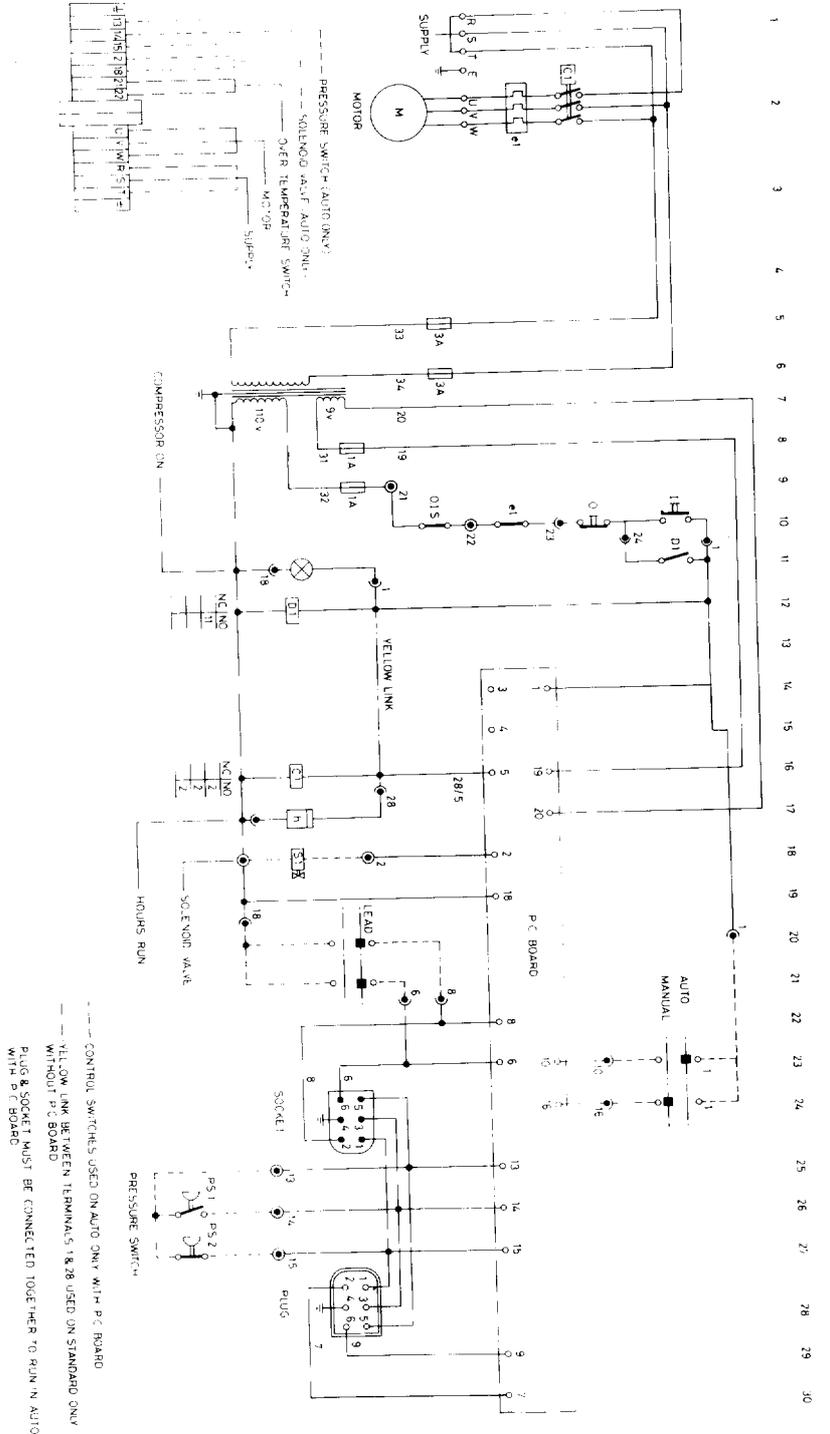
Displacement	10.9 litre/s (23 ft <sup>3</sup> /min)
Free Air Delivered	
Based on ISO 1217 (BS 1571)	10.1 litre/s (21.5 ft <sup>3</sup> /min)
Normal Operating Pressure	7 bar (100 lbf/in <sup>2</sup> )
Maximum Operating Pressure (Option Available)	10 bar (150 lbf/in <sup>2</sup> )
Motor Power	4 kW (5.5 hp)
Oil Capacity	3.4 litres (6 pints)
Maximum Oil Temperature	104°C (220°F)
Safety Valve Settings	
7 bar Operating Pressure	8.6 bar (125 lbf/in <sup>2</sup> )
10 bar Operating Pressure	12 bar (175 lbf/in <sup>2</sup> )
Air Outlet PU	½" B.S.P.
*Minimum Recommended Pipe Size (up to 1000 ft)	¾" I.D.

### AFTERCOOLER DATA

Air Discharge Temperature	2°C above ambient
Pressure Drop	0.07 bar (1 lbf/in <sup>2</sup> )
Air Outlet	½" B.S.P.

\*In view of possibility of additional air demands being added, a larger pipe size may be considered on original installation.

# Wiring Diagram



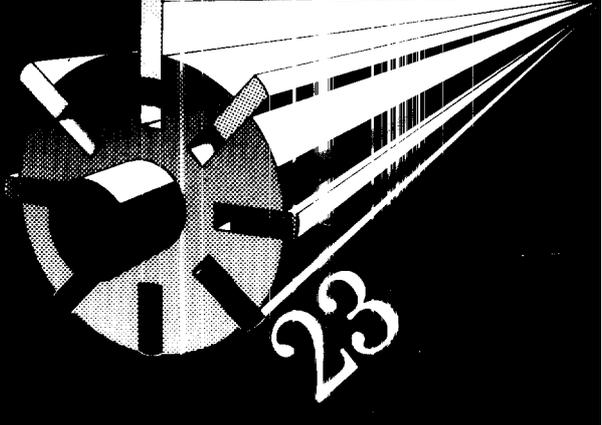
MOTOR POWER	WORMING VOLTAGE	VOLTAJE CLEARANCE	MOTOR OVER OAC SETTINGS	SUGGESTED WINDING CABLE SIZE	SUGGESTED SUPR SIZE
4 kW	270	1.5V	15 AMPS	4mm <sup>2</sup>	30 AMPS
	346	1.5V	11 AMPS	4mm <sup>2</sup>	25 AMPS
	380	1.5V	10 AMPS	4mm <sup>2</sup>	25 AMPS
	415	1.5V	9 AMPS	4mm <sup>2</sup>	25 AMPS

# Maintenance Record

Date	Hours run	Work carried out
Date	Hours run	Work carried out

# Maintenance Record

# Hydrovane



Date	Hours run	Work carried out

The Hydrovane Compressor Company Limited  
Claybrook Drive  
Washford Industrial Estate, Redditch  
Worcestershire, England B98 0DS  
Telephone Redditch (0127) 25522  
Telex 339343

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