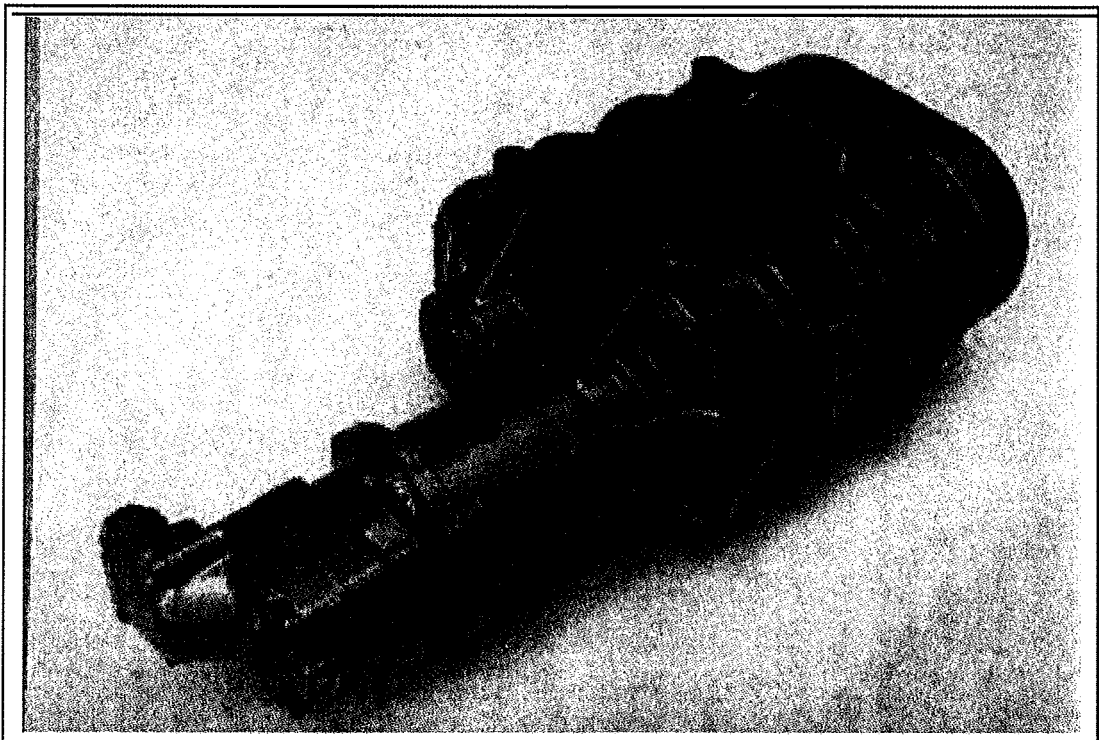


INSTALLATION AND OPERATING INSTRUCTIONS

HOLMES POSITIVE DISPLACEMENT AIR BLOWERS FOR BULK TRANSPORT VEHICLES TYPE 613 RBTM



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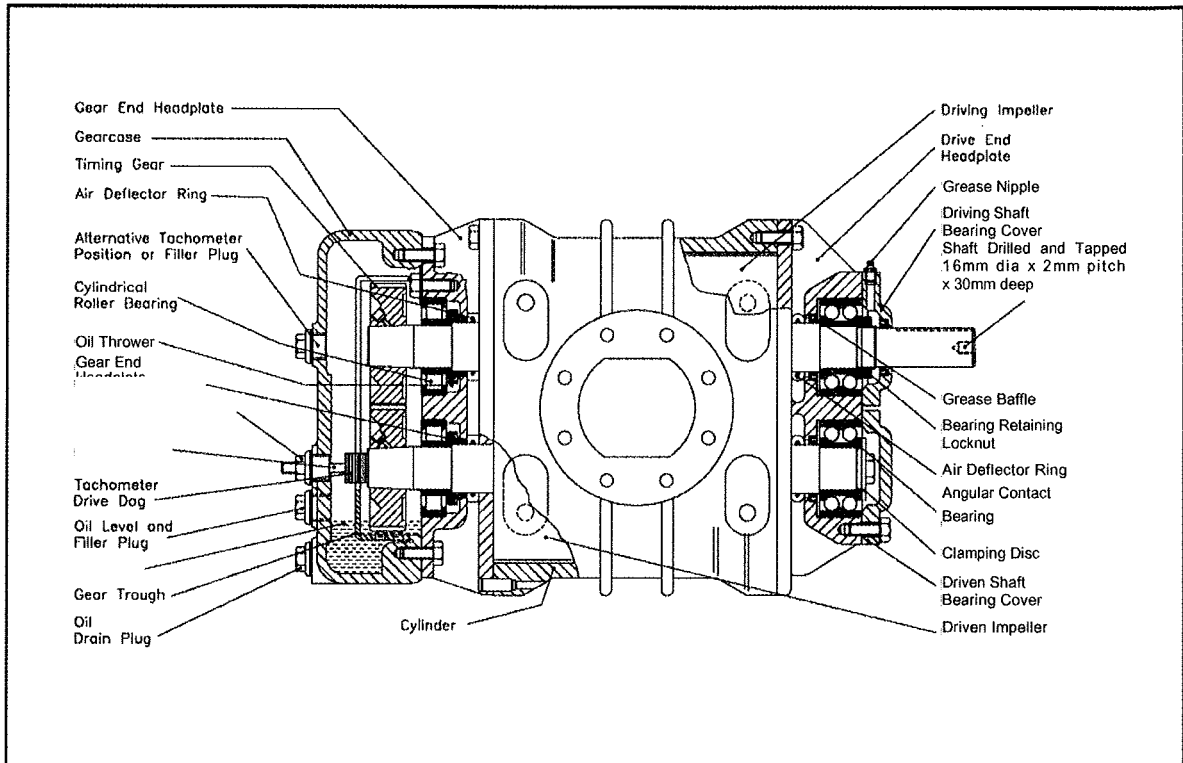
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WARNING
THE BLOWER IS NOT DELIVERED WITH OIL, AND OIL MUST BE ADDED PRIOR TO START UP
(S E E L U B R I C A T I O N)



Foreword

All Holmes Positive Displacement Air Blowers are performance tested to and beyond the most arduous operating conditions likely to be encountered in service. As far as the 613 RBTM machine is concerned, this involves a cold start against full load, 840 mbar (12.2 psig), at a test speed of 1,000 rpm. Blowers must also deliver the required volume of air before acceptance.

Providing that the installation, operating and maintenance instructions given in this folder are followed, machines will operate for long periods with minimum attention.

A specially designed and patented oil control trough is fitted around the gears to provide controlled splash lubrication. This feature enables high maximum speeds to be achieved, and in addition permits the blower to be installed with longitudinal inclination of up to 10° without detriment to the gear lubrication.

Position of Drive Shaft

The 613 RBTM blower has centre timing which enables the impellers to rotate in either direction. When a standard machine is to provide horizontal air flow the top shaft is extended for the drive. If the machine is mounted for vertical air flow the drive shaft is on the right. The tachometer is driven from the bottom shaft.

Should a bottom drive shaft be required for a horizontal air flow machine or a left hand drive shaft for a vertical air flow machine, the gearcase should be removed complete with the tachometer drive assembly. The tachometer drive dog and lock washer will then be visible and should be removed and fitted to the other shaft.

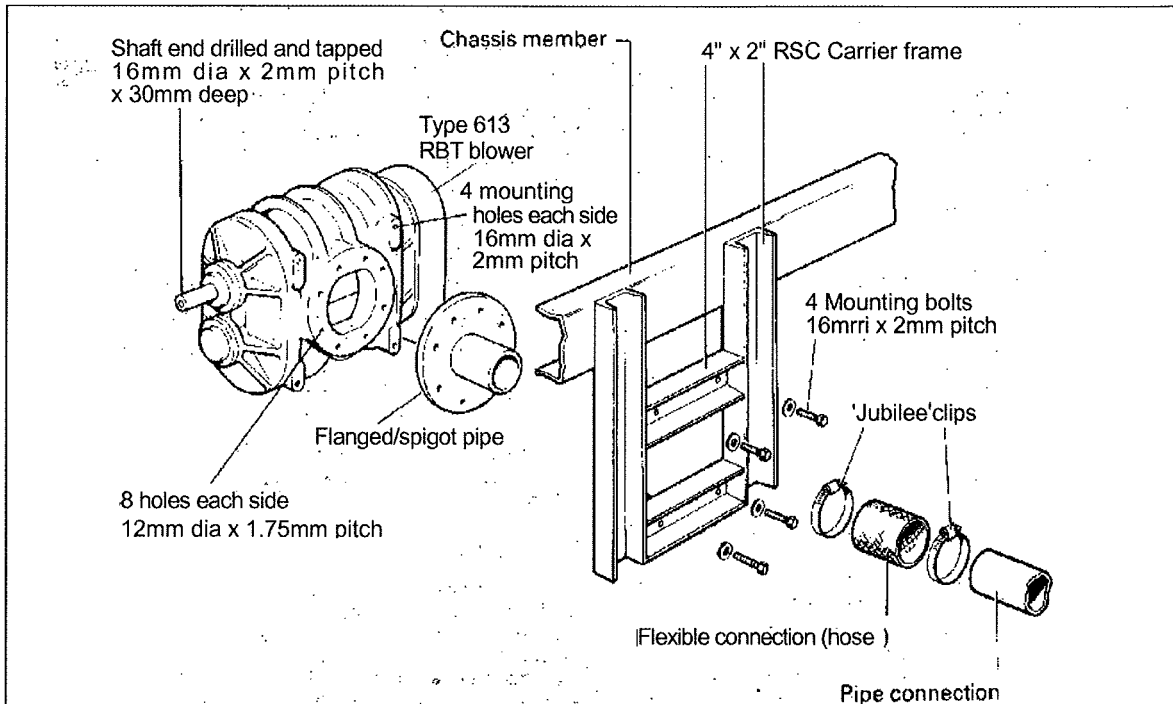
The 'U shaped oil control trough which is attached to the headplate by four setscrews around the gears should be removed. The screws and all six holes should be thoroughly degreased. The trough must then be re-positioned 180° from its original location and secured to the headplate by the four setscrews using a thread sealant such as 'Loctite'.

Loctite or a similar anaerobic adhesive should also be used on the gearcase setscrews.

The gearcase should then be re-fitted in the new position using a suitable jointing compound. The design of the gearcase ensures correct location of the sump in relation to the oil control trough.

The drive shaft should be rotated to ensure that the tachometer drive spindle is correctly located and that there is no restriction to free movement.

If more convenient the tachometer may be driven from the top shaft. Should this be required, change the tachometer drive spindle as indicated and reposition the tachometer assembly in the gearcase.



Mounting

The blower is generally installed for horizontal air flow and is located within the chassis and carried on a steel channel frame bolted to the side of the chassis. An alternative arrangement would be to use a 13" wide bracket made from 3/8" steel plate. Whichever arrangement is used, the blower would be mounted by means of four bolts in the appropriate holes on the blower facing.

Cross braces from the carrier frame to the opposite side of the chassis, or indeed any other arrangement which could exert strain on the blower casing should be avoided. Distortion could occur when the vehicle is standing on uneven ground causing the chassis to flex.

Providing that the blower is mounted by four bolts, any combination of two pairs of mounting holes may be used. The blower could for example be suspended using the two top holes on each side or it could be supported on a cradle using the two lower holes on each side.

When the drive is taken direct from the vehicle power take-off, a suitable universally jointed and splined drive shaft should be used. This should be installed in accordance with the manufacturers recommendations. Care should be taken to ensure that no end thrust or restriction to axial movement is imposed on the blower drive shaft. The face of the blower drive coupling should be parallel with the power take-off coupling face.

The blower can also be driven by V-belts. If this type of drive is used the belts should be carefully aligned and tensioned. The maximum pulley width should not exceed 4-SPB (BETA) belts, and the pulley should be not less than 150 mm diameter.

The blower can also be direct coupled to a diesel engine, petrol engine, or an electric motor. In this case, a suitable flexible coupling should be used: 'Fennerflex' type couplings have been found to be satisfactory. Once again, it is important that no end thrust or restriction to movement be imposed on the blower drive shaft. Direct coupled units should be carefully aligned, and both the prime mover and the blower, together with associated supports should be dowelled after final alignment.

At each stage during installation the drive shaft should be rotated to ensure that the impellers rotate freely and that there is no distortion of the cylinder.

Connections and Ancillary Equipment

It is recommended that a flanged/spigot pipe be provided for connection to and from the blower. The spigot should be connected to and from the blower. The spigot should be connected to the inlet/outlet pipework by a sleeve of pneumatic hose to prevent vibration being passed back to the blower. The length of hose should be as short as possible, and the distance between the two rigid sections of pipe kept to a minimum.

Alternatively, a special 'pancake' type silencer can be supplied, this would fit directly onto the blower facing.

It is essential that pipe connections should match up to the blower facings without strain, and for the pipework to be adequately supported independent of the blower. After the pipework has been connected, the drive shaft should be rotated by hand to ensure that rotation is perfectly free.

A non-return valve should be fitted to prevent the feed material being forced back into the blower should the blower stop whilst the tank or receiving hopper are pressurised.

A pressure relief valve of adequate size must be fitted on the outlet of the blower prior to the non-return valve. This should be capable of passing the whole of the air volume delivered by the blower at its **maximum** operating speed without the pressure at the blower outlet exceeding 840 mbar (12.2 psig). A pressure tapping point should be incorporated in the discharge pipework as near as possible to the blower outlet in order that the operation of the relief valve can be checked and adjustments made if necessary.

A filter and silencer or a combined filter/silencer should be fitted to the inlet of the blower to muffle the inlet air noise and to prevent dust and grit being drawn into the machine. A suitable weatherhood should be fitted over the filter, and should be positioned in such a way that rain or condensate cannot drain into the blower. An outlet silencer is recommended. This should be mounted as near to the blower as possible to ensure optimum performance.

A tachometer off-take point on the blower is provided as standard, and a suitably calibrated tachometer should be fitted. The off-take will also drive a generator should an electric tachometer be preferred.

If the Blower Stops

If the blower should stop for any reason whatsoever, regardless of whether or not the engine has stalled, no attempt should be made to re-engage the drive until the reason for the stoppage has been ascertained.

If a blowback has occurred, and the non-return valve has not prevented material from passing back into the blower or if the blower has seized for any other reason, severe damage can be caused to the blower, transmission, power take-off or gearbox if attempts are made to re-start. The first thing to do if a blowback occurs is to rotate the drive shaft by hand to ensure that the impellers rotate freely and without knocking. If they do not, remove both inlet and outlet connections. Clean as much material from the blower casing as possible and rotate the drive shaft to and fro by hand. The remaining material can then be blown out of the casing by means of an air line. Once again, rotate the drive shaft by hand to ensure that the impellers rotate freely. If they do, run the blower slowly for four or five minutes, finishing with a short run at high speed. This should be done with the inlet and outlet connections still removed.

Alternatively a high pressure steam lance can be used to clean the interior of the blower. After washing out all foreign matter rotate the impellers by hand and then run the blower with inlet and outlet connections removed until all water is ejected and the impellers and cylinder are perfectly dry. This is important.

Clean and re-connect the pipework and run the blower at 1000 rpm to pressurise the tank. Continue running against the correctly set relief valve for approximately 20 minutes, keeping a close watch for excessive noise, vibration or abnormal heat. During this period ensure that the pressure does not exceed 840 mbar (12.2 psig).

If this test is satisfactory the blower can usually be returned to service without the need for a time consuming strip-down or major overhaul.

Lubrication

When checking the gear oil level, the vehicle should be standard on level ground with the blower stationary. The combined oil level filler plug should then be removed. If oil oozes from the hole, the level is correct. Should topping up be required, fill through the level/filler hole until oil begins to overflow. Excess oil should be allowed to drain off before the plug is replaced.

In some installations, it may be easier to use the alternative tachometer position plug as a filler whilst using the oil level/filler plug to check the level only.

Weekly:

Check the blower oil level and at the same time check the gearcase for possible leaks.

500 Operating Hours:

The following procedure should be carried out every 500 operating hours or every six months whichever is sooner. Drain, flush and refill the blower gearcase with the appropriate lubricant. Grease the bearings and the tachometer drive spindle with a suitable grease.

Recommended Oils & Greases

Oil Specification:

The recommended oils and greases should be used wherever possible. If it is impossible to obtain these then a high grade straight mineral oil may be used. Additives (excluding EP) are permitted provided they do not emulsify.

Maximum viscosity at *minimum ambient* temperature 2,500 centistokes.

Minimum viscosity at *maximum oil* temperature 30 centistokes.

Grease Specification:

Bearing greases should comply with National Lubricating Grease Institute No 3. This is a mineral oil with a calcium complex or lithium base.

Maintenance

Daily:

Check the blower, drive, relief valve, filter and other ancillary equipment for damage or deterioration.

Weekly:

Inspect the filter element and clean or replace as necessary. Run the blower and check the relief valve to ensure that it passes the total volume from the blower with the outlet pressure **not exceeding** 840 bar (12.2 psig). This check is of particular importance when the blower is not in daily use.

Ensure that the prime mover can maintain the minimum blower speed when under load. Re-adjust the hand throttle or re-tune engine as required.

Vehicle Service

Repeat the daily and weekly lubrication and maintenance procedures, and in addition check all mounting and flange bolts for tightness and security. The pipe and pipe supports, drive, operation of the non-return valve and the condition of any flexible sections of pipework should also be checked.

Where direct driven blowers are concerned, the condition of the coupling and any flexible membrane or element should be carefully inspected for mechanical damage or deterioration. When the drive is by means of V-belts, the belts should be carefully checked. If the blower is driven from the power take-off by means of a drive shaft, the shaft should be checked for mechanical damage or mis-alignment. The splines and universal joints should be lubricated and checked for serviceability. The blower half coupling and coupling bolts should also be checked.

Start-up Check List

When the blower is brought into service for the first time or after re-installation, the following procedures should be carried out:

1. Grease the bearings and the tachometer drive spindle.
2. Fill the gearcase to the correct level with a suitable oil.
3. Check that the impellers rotate freely.
4. Check the filter element for cleanliness, and clean or replace as necessary.
5. Check the action of the non-return valve.
6. Check the relief valve for freedom of movement.
7. Check the transmission, mounting, pipework and all other equipment for security and correct location.
8. Engage the drive and allow the blower to run at not less than 1,000 rpm on no-load for a few minutes. Check that there is no abnormal vibration or noise.
9. Increase the blower speed to 1,500 rpm allowing it to operate into a closed tank. Monitor the blower outlet pressure with a manometer or a master test gauge tapped into the outlet pipework to check the lift pressure and operation of the relief valve. **NB: Pressure to be measured as near to the blower discharge port as possible.**
10. Ensure that the prime mover maintains the minimum safe blower speed when under load. Re-adjust the hand throttle or re-turn the engine as necessary.

Operational Check List

1. Do not run the blower under conditions of high pressure at low speed, not even for short periods. See note 8 for recommend speeds.
2. Engage the vehicle clutch slowly to prevent rapid acceleration of the blower. If an air shift power take-off is fitted, ensure that it is engaged before releasing the clutch. Never allow the blower to operate with the engine idling.
3. When the blower is direct coupled to the engine power pack unit, and a warm-up valve is fitted, the valve should be opened before starting the engine. Ensure that the engine is driving the blower at above the minimum recommended speed after closing the valve.
4. **On** completion of cargo discharge, disengage the power take-off at the minimum recommended blower speed. **On** power pack units open the warm-up valve before finally stopping the engine.
5. During cold weather, check the inlet air filter and relief valve for free operation at frequent intervals as both could become blocked with ice or snow. Before engaging the clutch, rotate the drive shaft or pulley by hand to ensure that condensate or rain has not frozen in the blower casing. If this has happened, do not attempt to free the impellers by engine power otherwise both blower and power take-off could become damaged.
6. Check the diaphragm or element of a flexible coupling frequently to ensure that mechanical damage or deterioration has not occurred.

7. **Keep within the recommended speeds.**

Type 68 RBTM	1	Maximum 2,400 rpm*
Type 610 RBTM		Minimum 1,000 rpm
Type 613 RBTM	J	

613 RBTM

***Important:**

For a minimum recommended speed of 1,000 rpm, the relief valve should pass all volume delivered without the pressure at the blower outlet **exceeding 12.2 psig.**

8. If at any time the blower should **become** excessively hot, if it should **sound** noisy or the gears **sound** harsh, **it should be stopped immediately.**

10. All performance data is related to blower operation with inlet conditions of 15°C and 1,013 mbar.

Safety

Air blower fitting is skilled work and should be undertaken only by competent fitters. All repairs should be carried out using approved equipment and tools only.

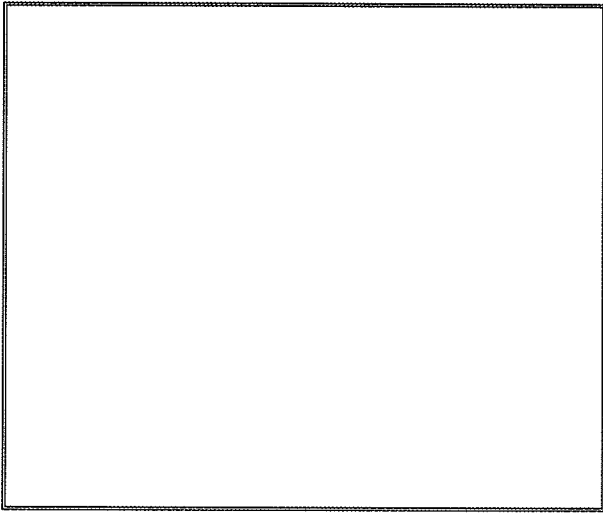
Maintenance work can be dangerous if correct procedures are not carried out. Where possible, the blower should be removed from the vehicle using safe, adequate lifting equipment. When this cannot be done, the starter battery should be removed or isolated to prevent the drive engine being inadvertently started.

Special care must be taken when working on pressure tank vehicles as differences in pressure between the air contained in the pipework or tank and normal atmospheric pressure can cause the impellers to rotate even when the drive is disconnected.

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DRI-

YOUR LOCAL DISTRIBUTOR IS:



Alternatively contact:

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44 (0) 7776 242464
F a x : 44 (0)169552620
E-Mail: graeme.wadsworth@dresser.com
Web Site: www.rootsblower.com



WARRANTY CLAIM FORM

Roots
Distributor / Agent

Customer _____

Location _____

Blower Size _____

S/N _____

Mnths in Service _____

Operating Conditions

RPM _____ Inlet Pressure _____ Discharge Pressure _____

Inlet Temp _____ Discharge Temp _____ Driver _____

DAMAGED PARTS

CONDITION

- Drive Bearing
- Other Bearings
- Gears
- Impellers
- Shafts
- Seals
- Headplates
- Cylinder
- Gearbox
- Other

PROBABLE CAUSE OF FAILURE

- Improper Maintenance
- Mishandling
- Foreign Material in Unit
- Improper Installation
- Defective Material
- Improper Application
- Incorrect Clearances
- Improper Machining
- Improper Assembly
- Other

GENERAL OBSERVATIONS

Signature _____ Date _____

Note: Failure to fill out this form completely will result in delays in credit or replacements



Roots

AFTERSALES SERVICE REQUEST FORM

IN THE EVENT THAT YOU REQUIRE OUR ASSISTANCE, PLEASE COMPLETE THIS FORM AS FAR AS POSSIBLE AND RETURN TO:

GRAEME WADSWORTH, AFTERMARKET CONTROLLER - DRESSER ROOTS DRESSER HOUSE
GILLIBRANDS ROAD SKELMERSDALE WN8 9TU
FAX NO: 44 (0)169552620
TEL NO: 44 (0)7776 242464
E-MAIL: graeme.wadsworth@dresser.com

CUSTOMER DETAILS

CONTACT NAME: _____ COMPANY: _____

ADDRESS: _____

TELEPHONE NUMBER: _____ FAX NUMBER: _____

SITE ADDRESS (IF DIFFERENT): _____

SITE TELEPHONE NUMBER: _____ SITE FAX NUMBER: _____

DIRECTIONS TO SITE ATTACHED YES/NO _____ SITE CONTACT: _____

BLOWER DETAILS

BLOWER SIZE: _____ SERIAL NUMBER _____ MONTHS IN SERVICE _____

APPLICATION _____

OPERATING CONDITIONS (IF KNOWN)

BLOWER SPEED: _____ RPM INLET PRESSURE: _____ DISCHARGE PRESSURE _____

INLET TEMPERATURE: _____ DISCHARGE TEMPERATURE: _____ DRIVER: _____

RELIEF VALVE FITTED: SETTING: _____ PRESSURE SWITCH FITTED: _____ YES/NO SETTING: _____

REASON FOR _____

REQUEST: _____

ACTION REQUIRED: VISIT OF SERVICE ENGINEER SUPPLY OF SPARES _____ REPAIR AT OUR FACILITY

DATE: _____ CUSTOMER ORDER NUMBER: F333.2