



**INSTALLATION
OPERATION
MAINTENANCE INSTRUCTIONS**

**MDC72 – MDC124
WATERCOOLED
COMPRESSOR**

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This booklet has been written to enable you to obtain the best possible service from your Rotary Compressor. We ask you to give it to the person responsible for the installation and operation of this machine and not just file it away.

The normal routine of running the machine is very simple. If it is carried out strictly at all times, many years of trouble free service can be expected. We emphasise three points of paramount importance:

1: FILTRATION OF THE INCOMING AIR OR GAS

2: LUBRICATION

3: COOLING WATER SUPPLY

To satisfy oneself that the compressor is maintaining a consistent performance we suggest that a logbook is maintained with weekly readings recording the following data for both intake and discharge:

A: COOLING WATER TEMPERATURES

B: AIR/GAS TEMPERATURES

C: AIR/GAS PRESSURES

Any decline in performance will be apparent and enable planned maintenance. From these readings the following deductions can be made:

- 1: Rising water temperature indicates lack of coolant (Check filters) or rising discharge temperature.**
- 2: Rising air/gas discharge temperature without corresponding increase in air/gas inlet temperature or air/gas discharge pressure could indicate dirty air/gas intake filter or machine wear.**
- 3: Fall in air/gas discharge pressure could indicate dirty intake filter and/or machine wear.**

STORAGE:

If the unit is not used immediately, the compressor and all adjoining equipment should be placed in a clean, dry storage area protected from the weather. The intake and discharge connections must be kept covered at all times, as foreign matter could enter the compressor and cause serious damage.

INSTALLATION:

LOCATION:

The unit should be installed in a clean, dry, well-ventilated area. Ample space and facilities should be provided for ease of servicing and inspection.

PIPEWORK:

Suction and discharge piping should incorporate flexible pipe couplings, be adequately supported and aligned correctly to prevent strain being transmitted to the compressor.

Connecting pipework on the intake side of the machine must be thoroughly cleaned to remove internal rust and scale. An intake pipeline strainer to trap pipe debris is fitted to compressor intake.

Use PTFE tape for making joints since surplus from jointing compounds will damage the blades if drawn into the compressor.

A non-return valve is fitted in the discharge pipework to prevent the machine running in reverse direction when shutting down.

When connecting the cooling water pipeline, make provisions to drain down the machine for maintenance.

COOLING SYSTEM:

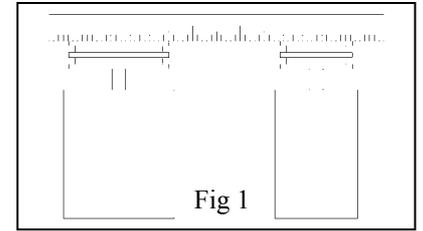
An ample supply of clean water is required. Dirty or scale forming cooling water coats the water passages, thereby reducing cooling efficiency. Where freezing conditions may be experienced, extreme care must be taken to prevent frost damage to the compressor and cooling system, core plugs are added to the cylinder to help with freezing conditions.

PRE - STARTUP CHECKS AND COMMISSIONING

Manually rotate the compressor shaft through a few revolutions to ensure free running.

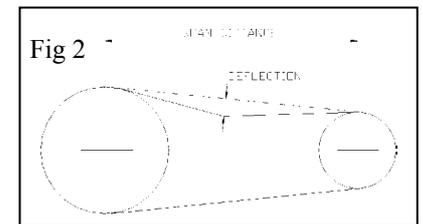
Remove drive belts and start motor to ensure that direction of rotation is correct. Replace belts and re-tension.

If at any stage realignment of belts is required then place a straight edge across the face of the driving and driven pulleys. If properly aligned (Fig 1), the straight edge will contact both pulley faces squarely.



Belt tension should receive regular inspections. This is particularly important for the first week running after initial installation. Belts, which are too tight, will result in excessive bearing loads and loose belts will slip and fail prematurely. When replacing belts in a multiple set, ALL belts should be replaced with a new set. Recommended procedure to set belt tension is as follows:

Measure span of belts between tangent points of the two pulleys. For every 25mm (1 inch) between these points the belt should deflect 0.4mm (1/64") when subjected to a central load of approximately 5.5kgs (12lbs). (Fig 2)



Fill the oil reservoir with the grade of oil recommended in the **LUBRICATION** section.

The lubricator has been set at the correct drip rate before despatch and there should be no need to adjust.

The minimum flow rates for each indicator is 10 drops per minute.

Ensure all oil pipes are primed.

START-UP

Open cooling water supply valve and throttle the flow to a moderate rate. Adjust the cooling water flow during the initial 20 minutes of full load operation to give an outlet temperature 38°C - 43°C (100 to 110°F).

Some machines are fitted with a manual startup bypass which must be fully opened before startup.

Start the drive motor.

When full speed is reached, slowly close the manual start-up bypass valve.

Regulate the water flow so a water temperature rise across the machine of 10°C (50°F) maximum is achieved.

SHUTTING DOWN

Trip out the motor and **STOP THE COOLING WATER IMMEDIATELY**. If the machine is to be shut down during freezing conditions protect the cylinder and coverplates to prevent ice forming in the water jackets, and drain down if considered necessary. Use anti-freeze with closed circuit cooling systems. Where unit is on standby service, run every week for a few minutes.

OPERATING AND MAINTENANCE

Daily, check the oil bottle level.

If fitted with an inlet pipeline filter, remove the element after the first 50 running hours, clean and replace. Failure to carry out this simple maintenance will result in loss of performance and overheating.

After the initial running in period, check the belt tension. Belt squeal denotes a loose belt that requires re-tensioning.

Check blades for wear and condition every 4,000 running hours. (See **INSPECTION AND SERVICE**)

Blades can be checked for wear more frequently using a quick method. (See **CHECK BLADE WEAR**)

A sudden increase in the discharge temperature could mean inadequate cooling, insufficient or dirty filters.

The unit should be stopped and thoroughly inspected to identify the cause of the problem. Should there be a loss of cooling water, stop the machine immediately and do not restart until the unit is completely cool and full water flow is resumed.

LUBRICATION

A multi-feed mechanical lubricator feeds oil onto the rotor end faces, into the cylinder bore, mechanical seals and bearings. The overflow from the oil feed to the bearings is returned to the compressor inlet. The lubricator feed will be set at our factory and the drip rate will be stamped on the lubricator. The following is the specification for an oil which will be suitable for operating with air/gas intake temperatures between -20°C and +32°C:

TYPICAL CHARACTERISTICS FOR A PARAFFINIC OIL WITH ADDITIVES FOR RECOGNISED COMPRESSOR SPECIFICATIONS

Normal discharge temperature range 90°C to 160°C
Grade - ISO VG150 VD-L (SAE 40)
DIN 51506 ISO 3448 BS4321.1975
150 cST at 40°C
DENSITY (15 deg C) .901kg/litre
Closed flash point 213°C

**RECOMMENDED OILS:
SHELL CORENA OIL P150
OR SUITABLE EQUIVALENT**

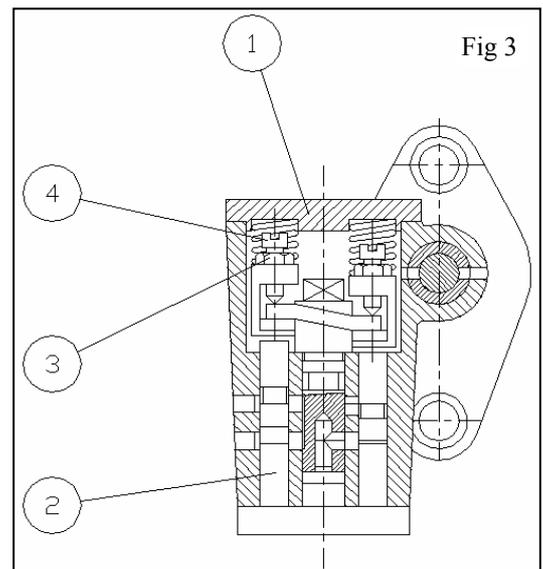
LUBRICATION SYSTEM

Prime all oil pipes prior to initial start and every time the machine is dismantled for service. At least once a year, or if the machine has been out of use for a long period of time, the oil pump must be thoroughly flushed out with petrol / kerosene to clear any oil residues which may have solidified in the control ducts.

OIL PUMP ADJUSTMENT

The pump is adjusted to the correct flow rate when dispatched from our works. If it is found necessary to alter the oil feed settings then proceed as follows:

- 1: Remove cover (1) to expose the two pistons (2).
- 2: Slacken off the locknuts (3) and adjust the feed as required.



To increase the flow, turn the adjusting screw (4) clockwise, or anti-clockwise to decrease.

1: TO CHECK BLADE WEAR

- 1.1 Carry out the following procedure after the first 2000 running hours and repeat every 4000-hour interval. Record all measurements.
- 1.2 With the compressor stationary and without pressure in the system, remove the plug on the top of the cylinder and insert into the hole beneath a pointed measuring rod 6mm dia x 150mm long or alternatively, a pencil until contact is made with the rotor, scribe a mark on the rod level with the cylinder. Slowly rotate the shaft by hand until the rod drops onto the tip of a blade mark the rod again. Measure the amount of movement and renew the blades if this exceeds 5mm. Replace the plug.

2: INSPECTION AND SERVICE

The unit should be inspected internally when checking for blade wear after 4000 hours of operation. From this inspection it can be determined how long the compressor can be operated before new blades or other new spare parts are required.

Inspection commences with the dismantling of the drive end.

- 2.1 Remove the oil feed pipes.
- 2.2 Undo three screws (27) and remove end cap (3) taking care not to lose the shim (19).
- 2.3 Remove the locknut (16) and tab washer (17).
- 2.4 Take off six nuts (25) and washers (26) and remove drive end coverplate (2) complete with outer race of roller bearing (13) and bearing shims (19).
- 2.5 Measure and note the thickness of the gaskets (22) fitted between the coverplate (2) and the cylinder (1).
- 2.6 Remove the blades (6) for inspection. Blades should be checked for laminating, chipping or charring on their rubbing edges and also for concave wear on their sides. For any wear other than polished surfaces or if the blade depth has been reduced to 33mm (1 5/16"), then renew the blades.
When fitting new blades make sure they slide freely in their slots and if necessary remove high spots with fine emery cloth. Lightly smear all surfaces of the blades with oil before re-assembly. The two grooves in one side of the blade must be in the leading face when positioned in the rotor slot.
- 2.7 Inspect the visible part of the cylinder bore and rotor for any signs of excessive wear or scuffing and for excessive slot wear. If there is any sign of cylinder rubbing completely dismantle the machine. Factory reconditioning is recommended, but if the work has to be carried out on site, we advise you most strongly to consult **Utile Engineering** Service Department for advice. During the inspection, determine if the correct oil is being used. Bearings, cylinder wall, rotor/shaft assembly and blades should show a polished surface with a light film of oil. Hard baked deposits indicate inferior oil, dirt or excessive temperature.

3: RE-ASSEMBLY AFTER BLADE INSPECTION/RENEWAL

Re-assemble in reverse order taking note of the following point:

- 3.1 If coverplate gaskets have been replaced it is essential that they are the same thickness as the originals, otherwise clearances will be affected and could cause serious damage. Lightly smear with oil before replacing.
- 3.2 Replace coverplate over cylinder studs. Tighten retaining nuts to a torque of 12kg.m (80lbs.ft).
- 3.3 Secure bearing locknut and tab washer and replace remaining parts.
- 3.4 When assembled make sure the compressor turns freely by hand.
- 3.5 Re-assemble and prime oil pipes.

4: FURTHER DISMANTLING OF THE DRIVE END

After removal of the drive end coverplate (2) as described in **section 2**, dismantle further as follows:

- 4.1 Renew the roller bearing (13) if there are any signs of pitting, wear or other damage. To remove bearing inner race from the shaft, first remove the spacing ring (7) by carefully cracking in half with a sharp chisel. The inner race can now be pulled off the shaft using a two-leg pulley drawer.
- 4.2 At this stage examine and renew the oil seals (15) if the wiping lip is damaged or the shaft (5) shows signs of marking, if replacing ensure the tension spring faces the bearing.
Before fitting the replacement spacing ring, first accurately measure the width of the old ring and grind the replacement to the same width to give the correct clearance on assembly.

5: DISMANTLE THE REAR END

- 5.1 Remove any remaining oil feed pipes, and bracket (39) with oil drip indicators (40).
- 5.2 Take off oil pump (21) and slip out coupling (8).
- 5.3 Undo three screws (28) and remove end cap (4) and bearing shim (19).
- 5.4 Take off six nuts (25) and washers (26) and remove rear end coverplate (2) complete rotor and shaft assembly (5) from the cylinder (1).
- 5.5 Measure and note the thickness of the gaskets (22) fitted between the coverplate (2) and the cylinder (1).
- 5.6 Take off circlip (18) taking care not to damage or lose any shims fitted between the circlip and retaining washer.
- 5.7 Using a pulley drawer pull the coverplate (2) and ball bearing (14) from the shaft (5), this releases the inner shim (19) the ball bearing (14) can be tapped out from the coverplate.

6: RE-ASSEMBLY PROCEDURE

Before commencing re-assembly, it is essential that all parts are perfectly clean. Ensure all oilways in coverplates, cylinder and end caps are clear.

Commence at rear end

The correct clearance are:

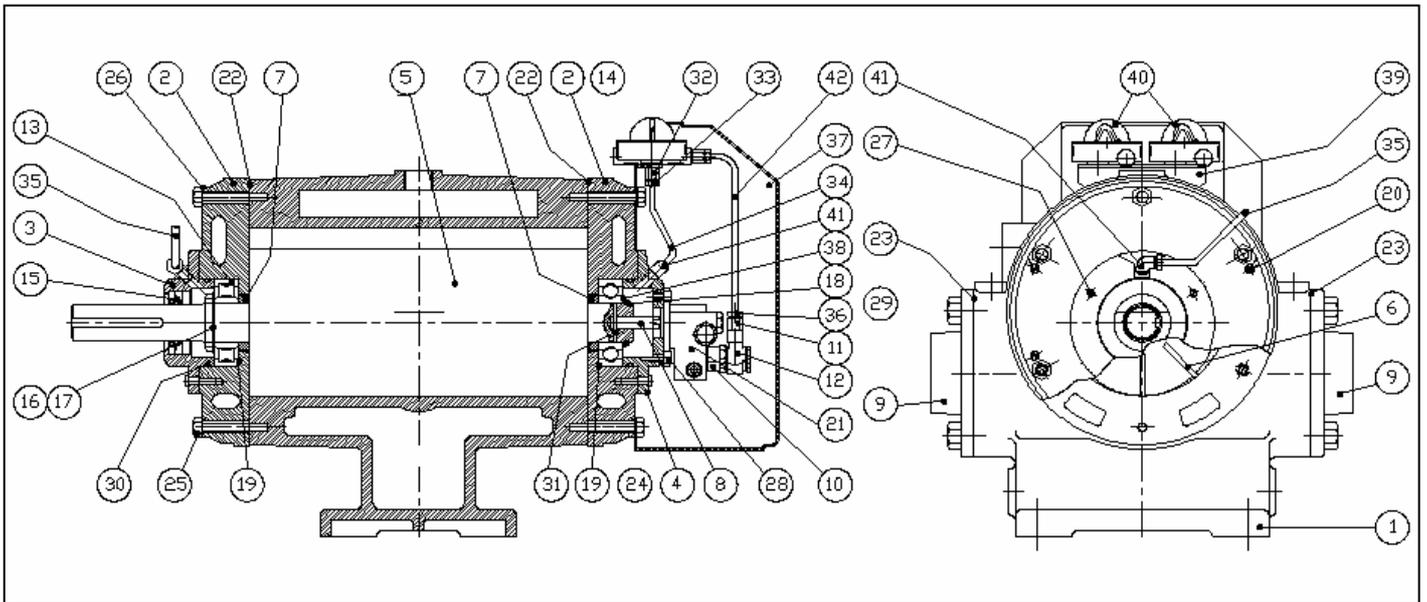
Drive end coverplate / rotor	-	MDC72	0.33mm / 0.38mm
	-	MDC124	0.51mm / 0.56mm
Rear end coverplate / rotor	-		0.08mm / 0.10mm
Rotor / cylinder bore	-		0.13mm / 0.15mm

- 6.1 If fitting new spacing rings, grind to the exact size of the originals to maintain internal clearances. Fix spacing rings onto shaft, using Loctite primer and 648 adhesive. Press spacing rings firmly against the rotor whilst the adhesive is setting.
- 6.2 Press ball bearing (14) and any shims (19) into coverplate (2).
- 6.3 Lay rotor/shaft assembly on the bottom of the cylinder bore.
- 6.4 Lightly smear coverplate gaskets with oil and fit to cylinder.
- 6.5 Fit coverplate assembly onto rotor/shaft assembly (5) and secure in place with any shims (19), retaining washer (38) and circlip (18).
- 6.6 Assemble onto cylinder and tighten cylinder stud nuts to a torque of 12kg.m (80lbs.ft), ensure coverplate dowels are replaced.
- 6.7 Replace coupling (8), end cap (4) and oil pump (21).

Re-assemble drive end

- 6.8 Follow steps 3.1 to 3.5 inclusive

ALWAYS QUOTE THE MACHINE SERIAL NUMBER WHEN ORDERING SPARE PARTS.



ITEM	DESCRIPTION	PART NUMBER		QTY
		MDC72	MDC124	
1	CYLINDER	S 1835/1	S 1835/2	1
2	COVERPLATE	S 1841	S 1841	2
3	END CAP - DRIVE END	S 1839	S 1839	1
4	END CAP - REAR END	S 1840	S 1840	1
5	ROTOR & SHAFT ASSEMBLY	S 1735/1	S 1735/2	1
6	BLADE	S 1568/1	S 1568/2	8
7	SPACING RING	S 1516/5	S 1516/5	2
8	COUPLING	S 1787	S 1787	1
9	FLANGE	S 1633/3	S 1633/3	2
10	STEM ADAPTOR	S 8912/1	S 8912/1	2
11	REDUCING CONNECTOR	S 8958/1	S 8958/1	2
12	BANJO / NRV	R 1044	R 1044	2
13	ROLLER BEARING	H 1031	H 1031	1
14	BALL BEARING	H 1003	H 1003	1
15	SHAFT SEAL	F 1151	F 1151	2
16	LOCK NUT	B 1052	B 1052	1
17	TAB WASHER	B 1004	B 1004	1
18	CIRCLIP	B 1013	B 1013	1
19	BEARING SHIM	K 1084	K 1084	4
20	DOWEL	E 1012	E 1012	4
21	OIL PUMP	T 1014	T 1014	1
22	GASKET - COVERPLATE	S 1757	S 1757	2
23	GASKET - FLANGE	S 1697	S 1697	2
24	STUD	S 1822	S 1822	12
25	NUT	B 1044	B 1044	12
26	WASHER	U 1027	U 1027	12
27	SOCKET HEAD CAP SCREW	G 1116	G 1116	6
28	SOCKET HEAD CAP SCREW	G 1121	G 1121	2
29	HEX HEAD SCREW	G 1149	G 1149	8
30	'O' RING	F 1120	F 1120	2
31	PIN	E 1022	E 1022	1
32	ADAPTOR	R 1055	R 1055	2
33	TUBING NUT	R 1040	R 1040	8
34	OIL DELIVERY PIPE - DRIPPER TO END CAP R.E.	X 1082	X 1082	1
35	OIL DELIVERY PIPE - DRIPPER TO END CAP D.E.	X 1084	X 1083	1
36	TUBING NUT	R 1040	R 1040	2
37	GUARD	S 1831	S 1831	1
38	BEARNG RETAINING WASHER	S 1516/5	S 1516/5	1
39	BRACKET	S 1825	S 1825	1
40	OIL DRIP INDICATOR	S 8899	S 8899	2
41	ELBOW	R 1061	R 1061	2
42	OIL FEED PIPE - PUMP TO DRIPPER	X 1085	X 1085	2