OPERATOR'S
SPARE PARTS &
SERVICE MANUAL

Centrifugal Pumps
Models 303 & 404

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1. INTRODUCTION

Fairport Self Priming Centrifugal Pumps are petrol; diesel or electric powered and are capable of operating with suction lifts up to approximately 7.5 metres (25ft)

This manual contains the operating; servicing and overhaul instructions together with spare parts list for the trolley mounted diesel engine powered 75mm (3") and 100mm (4") pumps models 303 series and 404 series. For operating and servicing details applicable to the engine, reference should be made to the manufacturer's operating instructions supplied with the pump.

2. TECHNICAL DATA

	303P		404L
Engine make	Lister Petter	Hatz	Lister Petter
Engine model	AC1	1B30	TS1
Net BHP:	6.3	6.5	8.1
At operating RPM:	3300	3300	3300
Max. output, m3/hr:	60.0	60.0	90.9
Max. total hd, m:	27.4	27.4	27.4
Max. dia solids, mm:	10	10	12
Length cm:	950	950	1390
Breadth cm:	520	520	800
Height cm:	730	730	950
Weight kg:	90	TBA	275

Guaranteed Sound Power, 108 Lwa dB(A)

Materials – all pumps

Pump body:	Aluminium LM25
Impeller:	Manganese bronze
Seal faces:	Carbon/ceramic.

3. SAFETY

Always operate pump on level surface.

Do not run petrol or diesel engine driven pumps in confined spaces.

Never attempt to carry out any maintenance with engine or motor running.

Never top up fuel tank with engine running.

Always comply with site and plant safety regulations.

Turn fuel tap to off after use.

Always chock wheels of trolley mounted pumps.

Never attempt to carry out maintenance with engine running.

Disconnect spark plug on all petrol engines before carrying out any repairs or maintenance.

Do not smoke when refueling.

Wipe up spilt fuel and dispose of fuel contaminated wipes safely.

Do not use equipment in areas that have a hazardous or explosive atmosphere.

Always comply with engine manufacturer's recommendations.

Pump only water or mildly contaminated water, DO NOT attempt to pump acids, alkalis, solvents, flammable or volatile Liquids.

4. INSTALLATION

Site the pump in a level position, as close as possible to the surface of the liquid to the pumped.

Suction hoses must always be wire reinforced, whilst delivery hoses may be of the collapsible type. Hose couplings should have sealing washers in good condition. It is essential that when screwed on the branch, the suction line is absolutely airtight.

All pumps will prime without the use of a foot valve, but the strainer supplied with the pumps must always be fitted to the suction hose.

For maximum efficiency, the suction hose should be as short as possible and neither the suction or delivery hose should have any kinks or sharp bends.

With the suction hose strainer fully immersed, discharge at low suction lifts should commence in 30/50 seconds from starting the engine. At high suction lifts (5 metres or more) priming time will extend to 2 to 3 minutes.

Important: In freezing weather conditions it is necessary to drain the pump body when not in use, unless the pump is stored in a heated building. This is achieved by removing drain plugs or drain plates at sides of pump body.

5. OPERATION

Before installing or operating the pump read the section entitled SAFETY.

It is necessary to "INITIAL PRIME" the pump by filling the pump body with clean water. This can be done through the discharge branch, or if hose is attached, by removing the priming plug.

Before starting the pump check the engine oil, fuel etc., in accordance with the manufacturer's instruction.

Start engine in accordance with the engine manufacturer's instructions supplied with the pump

The maximum speed of the engine should be set at 3300 rpm.

6. CLACK VALVE

To check the condition of the clack valve, remove the 4 nuts securing the suction branch to the pump body. Remove the suction branch and clack valve. Examine the clack valve rubber and its sealing face on the discharge branch. Replace the rubber if worn, damaged or suspect. Replace or remachine the face of the discharge branch if this is not flat and free from damage.

When refitting the clack valve and suction branch the joint must be sufficiently tight to prevent air leaks but care must be taken not to over tighten as distortion of the valve rubber may interfere with correct seating. Note that the clack weight is positioned on the pump side of the clack valve.

7. PUMP BODY

Remove suction and discharge hoses.

Model 404 pumps; remove bolts holding pump body to chassis.

Remove the nuts securing the pump body to the seal housing (model 303 pumps) or seal housing (model 404.pumps). Ease pump body away from pump body or seal housing.

8. REFITTING PUMP BODY

Refitting the pump body is the reverse of the procedure detailed in section 7. However for optimum performance and priming it is first necessary to check front impeller clearance before the pump body is refitted. To do this, proceed as detailed in section 9.

9. IMPELLER

To gain access to the impeller first remove the pump body as described in section 7.

Check the impeller back clearance. If this exceeds 0.25mm (0.01") remove the impeller by unscrewing in an anti-clockwise direction looking onto the front of the impeller. Using a block of wood tap lightly on one of the vanes until the impeller can be unscrewed by hand.

Remove or add shims behind the impeller as required to give a maximum clearance of 0.25mm (0.01"). On 303 model pumps the shims are located at the bottom of the threaded hole in the impeller. On 404 model pumps the shims are located at the shoulder on the impeller shaft. On both sizes of pump shims are available in thicknesses of 0.12mm (0.005") and 0.25mm (0.010").

To replace the impeller, screw on the engine shaft in a clockwise direction and tighten by using a wooden block to tap lightly on one of the vanes. Clearance between the front of the impeller and the wear plate should be not more than 0.25mm.

To set front clearance; offer up the pump body to the seal housing (303 model) or hub (404 model), without any gaskets between the pump body and the seal housing or hub.

Ensure that the pump body is held in firm contact with the impeller and measure the gap between the pump body and the seal housing or hub flange using feeler gauges.

Fit the pump body with suitable gaskets to equal the measured gap plus a maximum of 0.25mm (0.010"). Gaskets are available for both pumps in thicknesses of 0.4mm (0.015") and 1.5mm (0.063")

After refitting the pump body and tightening the fastenings, check that the impeller does not foul the wear plate by rotating the engine by hand prior to putting the pump into service.

10. SEAL ASSEMBLY

To examine the seal assembly first remove the pump body and impeller as described above. On model 404 pumps also remove the hub, item 39.

On model 303 pumps note location of spacer item 44. On model 404 pumps remove the collar, item 52, which supports the spring of the seal by slackening the two M3 grub screws in the collar.

Remove the seal spring. If the shaft on model 404 pumps is burred or damaged where the grub screws secured the collar, make smooth with very fine emery cloth. On model 303 pumps wrap the threads on the shaft with PVC tape to protect the sealing lip of the rotating face when it is removed.

Remove the rotating face from the shaft.

Unscrew the seal housing fastenings and remove the seal housing.

Examine the mechanical seal faces and renew the seal as a complete unit if the faces are worn or damaged. Renew the lip seal. Note that the lip seal has its open or spring side facing the impeller end of the shaft.

Check the condition of the impeller shaft. Renew or renovate with very fine emery cloth as necessary.

Assembly is the reverse of the dismantling procedure, but note the following with regard to the mechanical seal:

- Check the shaft is clean, free from burs and wear and is not bent.
- Check that all sharp corners over which the rubber components are fitted are rounded. The threads on model 303 pump shafts should be wrapped with PVC tape.
- Lubricate outside diameters of stationary seal and lip seal with light mineral oil (do not use a graphite or molybdenum lubricant). Ensure they are fitted firmly to the bottom of their housings.
- Lubricate the shaft with light mineral oil prior to installation of the rotating face. Do not use a graphite or molybdenum grease.
- Push rotating head onto shaft to contact stationary face.
- Locate spring and plate onto seal head.
- Model 404 pumps – Place collar onto shaft to compress spring to give an overall working length from seal face to collar of 33mm. Lock collar in position with grub screws.
- Model 303 pumps – Do not forget to replace the spacer prior to fitting the impeller.

11. MAINTENANCE

TOP UP ENGINE OIL DAILY and refer to the engine manufacturer's operating instructions supplied with the pump.

Model 303 pumps – Give the grease cup ½ turn daily whilst pump is working, recharge as necessary, see section 12...

Model 404 pumps – Check grease feeder weekly and recharge as necessary, see section 12.

In freezing conditions drain the pump body at the end of pumping operations every day, unless the pump is stored in a heated building.

12. LUBRICANTS

The grade of lubricant depends on ambient temperature according to the following table:

Temperature	Grease NLGI No.
Below 5°C	1
5°C to 43°C	2
Above 43°C	3

When refilling the grease feeder fitted to model 404 pumps with a push type grease gun support it with your free hand to avoid putting undue strain on the coupler. Never allow the piston to go beyond the red line. Always replace the nipple cap.

When refilling a 'dry' housing, first remove the plug on the underside of the seal housing. Fill with grease until the grease is seen to emerge from the plughole. Replace the plug and refill the grease feeder as described above, or grease cup as applicable.

During running in and in operation the seal may leak a few drops of water past the seal. This is not detrimental to the operation of the seal and there is no need to flush the grease out of the seal housing and replace it with new grease.

13. FAULT FINDING

PUMP FAILS TO PUMP WATER

POSSIBLE CAUSE	REMEDY
Pump not "initial primed"	Fill pump body with clean water.

Note: after initial prime and starting engine, commencement of discharge may vary from 30 seconds to 3 minutes depending on suction lift. See section 4.

Suction hose coupling not tight or seal damaged.	Check tightness of coupling and conditions of threads. Replace sealing washer if suspect.

Suction hose damaged or hose clip	Replace hose. Tighten hose clip. Check suction hose is not porous.

Note: suction hose and connections must be absolutely airtight.

Seal worn allowing air to leak past	Replace seal
Suction hose strainer not completely submerged.	Submerge totally.
Suction hose collapsing or incorrect type.	Fit reinforced hose.
Pump height above water level exceeds 7.5 metres.	Move pump to lower position.

Note: if pump is worn, maximum operating height will be reduced.

Discharge head too high.	Reduce.
Clack valve malfunction causing loss of priming water.	Examine and rectify fault. Valve must seat correctly.
Priming holes blocked.	Remove drain plugs and clear blockage.
Pump badly worn, seals worn.	Complete overhaul required.
Excessive impeller clearance.	Check and adjust.

PUMP OUTPUT DROPS AFTER OPERATING SATISFACTORILY

POSSIBLE CAUSE	REMEDY
Suction hose strainer blocked.	Clear blockage.
Water level receded, pump operating at maximum suction lift.	Move pump to lower position.

Check engine operating instructions. Set to 3300 rpm.

Air leak developed on suction side.	Check and rectify, i.e. loose connections, damaged or porous hose etc.

Check also factors listed in section ‘Pump Fails to Pump Water’.

14. WARRANTY CONDITIONS AND CLAIMS PROCEDURE

All products supplied by Fairport Construction Equipment Ltd (hereafter referred to as FCE) are warranted to be free of defects due to faulty materials or workmanship for a period of 12 months from the date of original despatch from FCE or as specified below:

Hydraulic hoses and hydraulic couplings – 3 months.
Hydraulic accumulators – 6 months.
Flexible drives – 6 months.
All spare parts used in repairs carried out by FCE or an authorised dealer or repairer – 3 months.

If the goods have been purchased through a stockist the above warranty periods also apply from receipt of the goods by the user of the equipment up to a total of a further 6 months from date of despatch from FCE whichever is earlier.

Filter elements, gauges and oils are specifically excluded from this warranty.

FCE shall at their option repair or replace during normal working hour's goods accepted as faulty free of charge to the user.

For proprietary items such as engines, the original manufacturer's warranty and conditions shall apply.

CONDITIONS

The goods shall be returned at the purchaser's expense to FCE or to a destination FCE may reasonably direct. Carriage costs will be refunded if warranty is accepted.

Warranty claims will not be considered where there is evidence that failure has been caused by carelessness, improper use, negligence, inadequate servicing, incorrect engine speeds, fair wear and tear or non-compliance with instructions issued by the manufacturer.

To the extent permitted by law, the liability of FCE under this section is confined only to providing a remedy for defective goods and does not extend to any consequential loss, loss of profit, injury or damage suffered.

Warranty will not be accepted on dismantled goods unless dismantling was carried out with the written permission of FCE.

No claim shall be considered if other than genuine parts supplied by FCE have been used.

Products are only covered by this warranty in the country to where they were supplied by FCE.

Warranty on products applies only to the original user of the equipment.

This warranty shall not apply if the serial number or other identifying numbers or marks applied by FCE have been removed, defaced or are otherwise illegible.

CLAIMS PROCEDURE

Check that the goods are still under warranty before returning them to FCE (see above for warranty periods).

Return the goods to FCE with an order number for the work to proceed. If warranty is accepted no charge will be made. If warranty is not accepted a quotation will be given for the repair and the conditions under the section headed REPAIRS AND ESTIMATES will apply.

In the customer's interest, goods must be accompanied by documentation detailing the nature of the fault or its symptoms. Phrases such as 'Faulty' are unacceptable and will result in delays and possible charges to defray costs incurred in identifying the fault.

In the case of hydraulic breakers and power packs, both the breaker and the pack should be returned

15. REPAIRS AND ESTIMATES

When returning a machine, or an assembly for repair, always include an Advice Note quoting model and serial number of the machine.

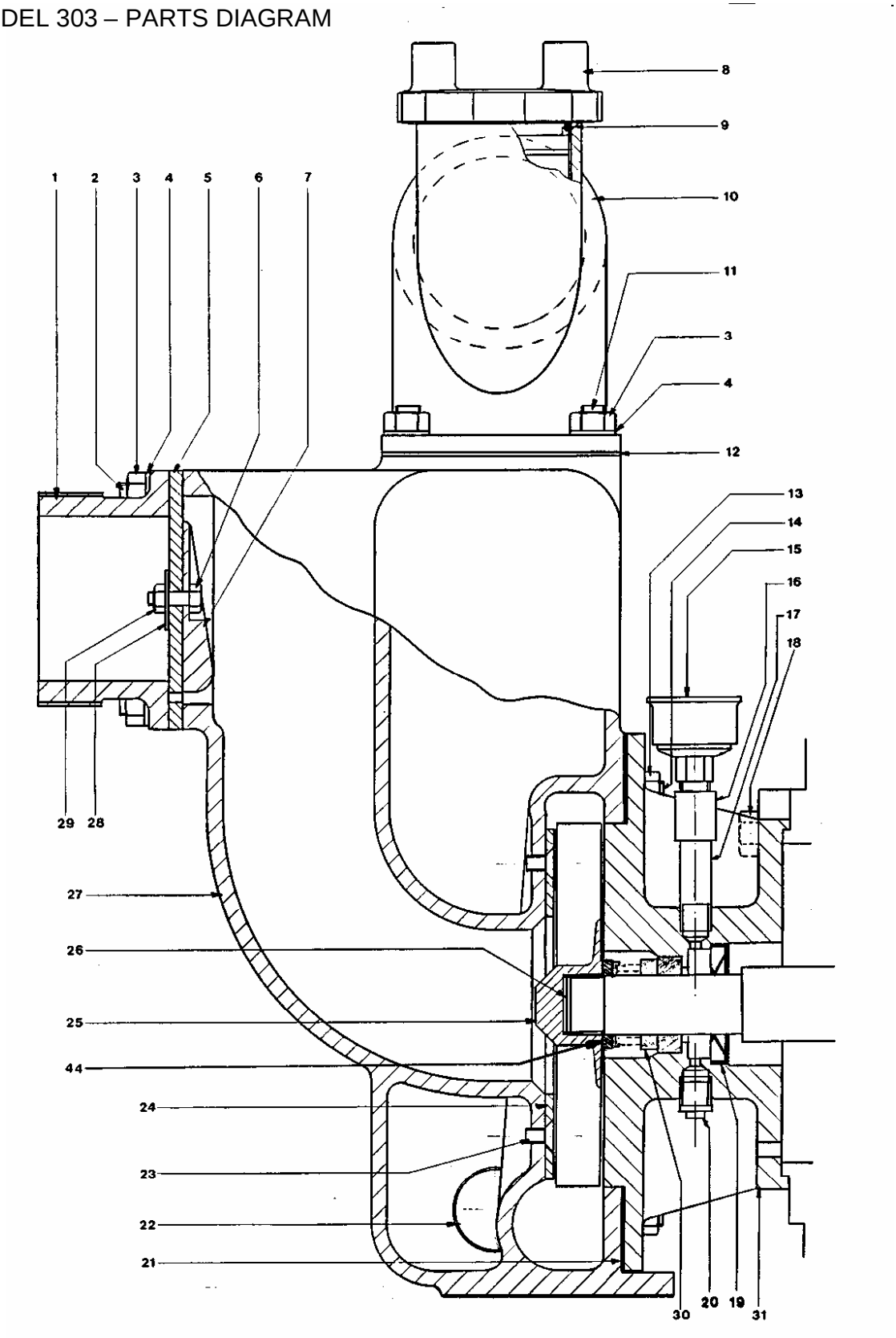
An official order must also be forwarded to FCE giving detailed instructions. No repair work can be carried out unless covered by an official order.

An estimate will be submitted before proceeding with any repair. To partly cover the cost in dismantling, cleaning and inspection, a small charge will be made; this however will be waived upon receipt of your official instructions to proceed with the repair.

In the event of the estimate not being accepted, a further charge will be made to defray the rebuilding of the machine.

Estimates must be treated as approximate only as it may be found necessary to use additional parts on further examination.

MODEL 303 – PARTS DIAGRAM

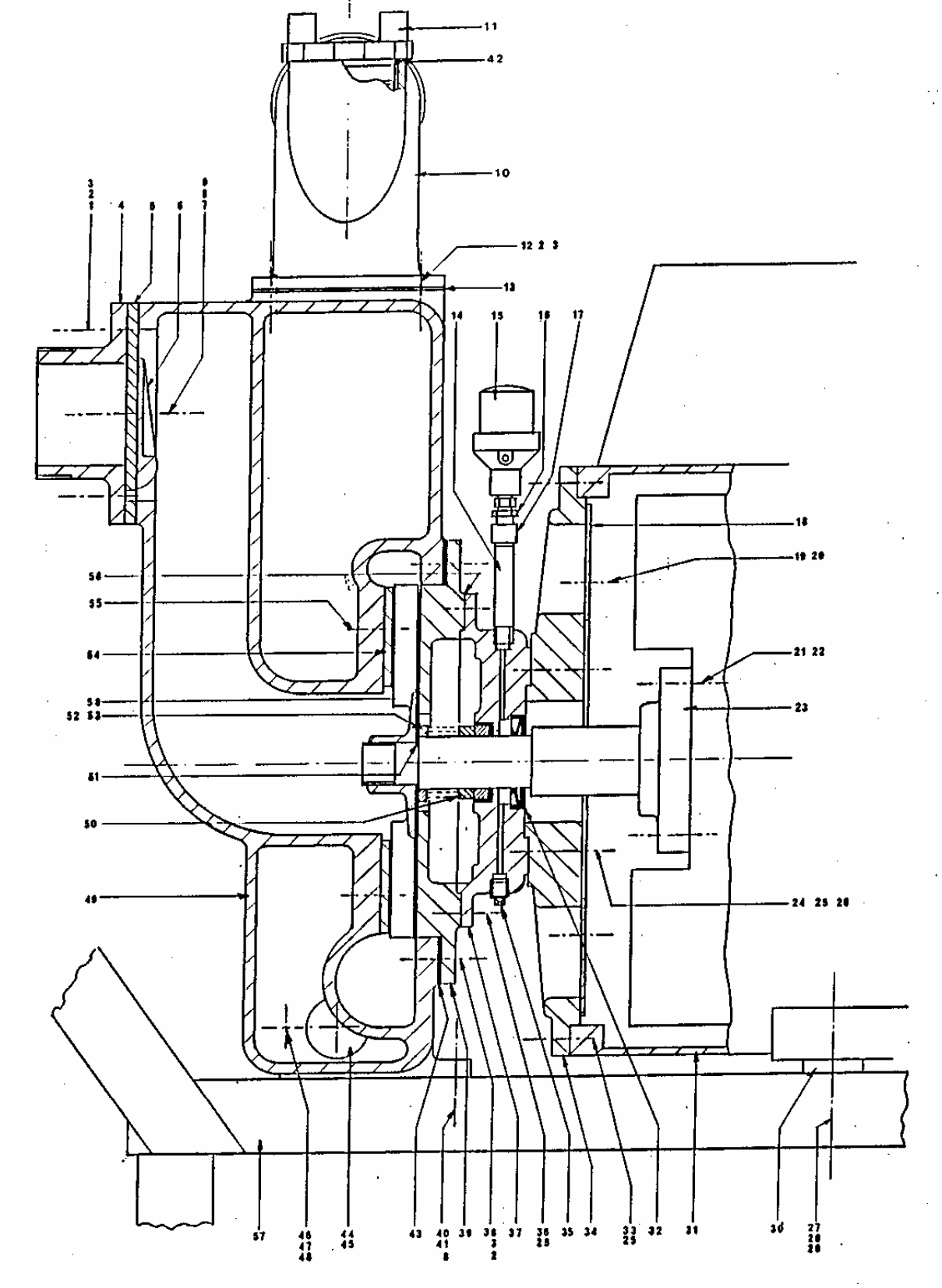


16. PARTS LIST – MODEL 303

Item	Part No.	Description	Qty
1	W67183	Suction branch	1
2	518/6/24	3/8" BSW stud x 1 ½"	4
3	411/6	3/8" BSW nut	8
4	421/6	Washer	8
5	W66424	Clack valve	1
6	400/4/12	¼" BSW bolt x ¾"	1
7	W66421	Clack weight	1
8	W67322	Priming plug	1
9	W81121	'O' ring	1
10	W67166	Discharge branch	1
11	518/6/24	3/8" BSW x 1 ½" stud	4
12	W66429	Discharge branch gasket	1
13	411/5	5/16" BSW nut	6
14	518/5/20	5/16"BSW x 1 ¼"stud	6
15	W86011	Grease cup	1
16	W86085	¼" BSP socket	1
17	W67887	Grease tube	1
18	405/6/24	3/8" UNC x 1 ½"bolt	4
19	W81227	Lipseal 2" x 1" x 5/16"	1
20	W84142	¼" BSP plug	1
21	W66423	Hub gasket 1.5mm	As required
	W66422	Hub gasket 0.4mm	As required
22	W87802	Drain plug	2
23	499/4/8/SS	¼" BSW x ½" csk ss screw	4
24	W66431	Wear plate	1
25	W67321	Impeller	1
26	W84178	Impeller shim 0.25mm	As required
	W84177	Impeller shim 0.12mm	As required
27	W67318	Pump body	1
28	525/4/16	¼" washer x 1" o/d	1
29	411/4	¼" BSW nut	1
30	W81228	Mechanical seal	1
31	W67317	Seal housing	1
44	W67339	Spacer	1
	W81891	Engine, AC1, rope start	
	W81887	Engine, AC1, handle start, limited kick back	
	W81795	Engine, AC1, handle start, non limited kick back	
	W67350	Silencer guard, AC1.	
	W82187	Engine Hatz 1B30	

W82188	Engine Spacer
67362	Shaft

MODEL 404 PARTS DIAGRAM



17. PARTS LIST MODEL 404

Item	Part No	Description	Qty
1	518/8/28	½" BSW x 1 ¾" stud	4
2	411/8	½" BSW nut	8
3	421/8	½" washer	8
4	W67815	Suction branch	1
5	W67178	Clack valve	1
6	W67176	Clack weight	1
7	400/4/12	¼" BSW bolt x ¾"	1
8	411/4	¼" BSW nut	1
9	525/4/16	¼" washer x 1" o/d	1
10	W67824	Discharge branch	1
11	W67322	Priming plug	1
12	518/8/24	½" BSW stud x 1 ½"	4
13	W67200	Discharge branch gasket	1
14	W67887	Grease tube	1
15	W80474	Grease feeder	1
16	W86031	¼" BSP x 1/8" bush	1
17	W86085	¼" BSP socket	1
18	W67873	Guard	1
19	437/6/12	M6 x 12 setscrew	4
20	525/4/16	¼" washer x 1" o/d	4
21	435/12/40	M12 x 40 bolt	6
22	433/12	M12 star washer	6
23	W67214	Impeller shaft	1
24	518/6/40	3/8" BSW x 2 ½" stud	6
25	426/6	3/8" star washer	6
26	411/6	3/8" BSW nut	6
27	435/12/80	M12 x 60 bolt	4
28	418/12	M12 nut	4
29	480/12	M12 Nyloc nut	4
30	W67920	Spacer	4
31	W81875	Engine, TS1, LKB, EU spec	1
	W81803	Engine, TS1, non EU spec	1
32	W81230	Lip seal, 2 ½" x 1 3/8" x 3/8"	1
33	405/6/29	3/8" UNC x 1 ¼" bolt	12
34	W67872	Adaptor	1
35	W84142	¼" BSP plug	1
36	403/6/12	3/8" BSW x ¾" setscrew	6
37	W67884`	Seal housing	1
38	518/8/28	½" BSW x 1 ¾" stud	6
39	W67885	Hub	1

40	400/4/20	¼" BSW x 1 ¼" bolt	2
41	421/4	¼" washer	2
42	W81121	'O' ring	1
43	W67179	Gasket, 1.5mm	As required
	W67287	Gasket, 0.4mm	As required
44	W66401	Drain plate	2
45	W65707	Drain plate gasket	2
46	518/5/20	5/16"BSW x 1 ¼" stud	4
47	4115/5	5/16" BSW nut	4
48	421/5	5/16" washer	4
49	W67185	Pump body	1
50	W81229	Mechanical seal	1
51	W84185	Impeller shim, 0.12mm	As required
	W84186	Impeller shim, 0.25mm	As required
52	W67886	Collar	1
53	462/3/6	M3 x 6 grub screw	2
54	W67181	Wear plate	1
55	499/5/12/SS	5/16" BSW x ¾" csk ss screw	5
56	W66422	Gasket	1
57	95220	Trolley complete	1
58	W67247	Impeller	1

18. 303P TROLLEY PARTS LIST

(Not illustrated)

W67323	Frame	1
W66494	Axle	1
W67365	Axle (Hatz)	1
W67222	Wheel spacer	2
W67364	Wheel spacer (Hatz)	2
W66444	Wheel retaining collar	2
W67363	Wheel retaining collar (Hatz)	2
W67332	Foot	1
W87604	Wheel	2
W67208	Handle	1
W52139	Engine spacer	8 (fits under engine)
W67335	Starting handle holder, none Limiting kick back	1
W67349	Starting handle holder, limited Kick back	1
435/6/45	Wheel retainer fastening bolt	2
480/6	Wheel retainer fastening nut	2
435/10/55	Engine fastening bolt	4
435/10/35	Handle/frame/foot fastening bolt	4
480/10	M10 nut	4

435/8/40	M8 x 40 bolt	1 (fits thro' axle and frame)
480/8	M8 nut	1

19. 404L TROLLEY PARTS LIST

(Not illustrated)

W67904	Frame	1
W67996	Axle	1
W67836	L. H. wheel spacer	1
W67837	R. H. wheel spacer	1
W66444	Wheel retaining collar	2
W67846	Foot	1
W84145	Wheel	2
W67186	R. H. handle	1
W67187	L. H. handle	1
W67820	Stay bar	1 (fits between handles)
W80148	Handle grip	2
435/6/45	Wheel retainer fastening bolt	2
480/6	Wheel retainer fastening nut	2
435/10/35	Handle/frame/foot fastening bolt	4
435/10/30	Stay bar/handle fastening bolt	2
480/10	M10 nut	6
435/8/40	M8 x 40 bolt	1 (fits thro' axle and frame)
480/8	M8 nut	1

EC Declaration of Conformity

We Fairport Construction Equipment Limited

Blagden Street

Sheffield

S2 5QS

Declare that the product Centrifugal Pumps Models 303 & 404

Manufactured from 1 Sept 2004

conforms to the following Directives:

89/336/EEC, 89/392/EEC, 91/368/EEC, 2000/14/EC

uses the following standards:

BS EN 292-1, BS EN 292-2, BS EN 60204-1, BS EN 294

complies with the relevant essential health and safety requirements of the Machinery Directive, and is in conformity with the protection requirements of Council Directive 89/336/EEC

Technical Construction File no.95195

Competent Body (name, address) N/A

Technical Manager

Signature	Position
Robert Castle G.C.G.I. I I.Eng M.I.Mech.E.	12/12/2005
Signed by	Date