

Maintenance Manual

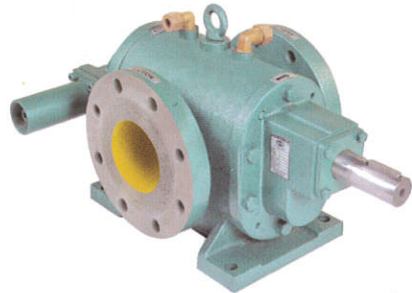
Series : FTRB/FTRN/FTRX



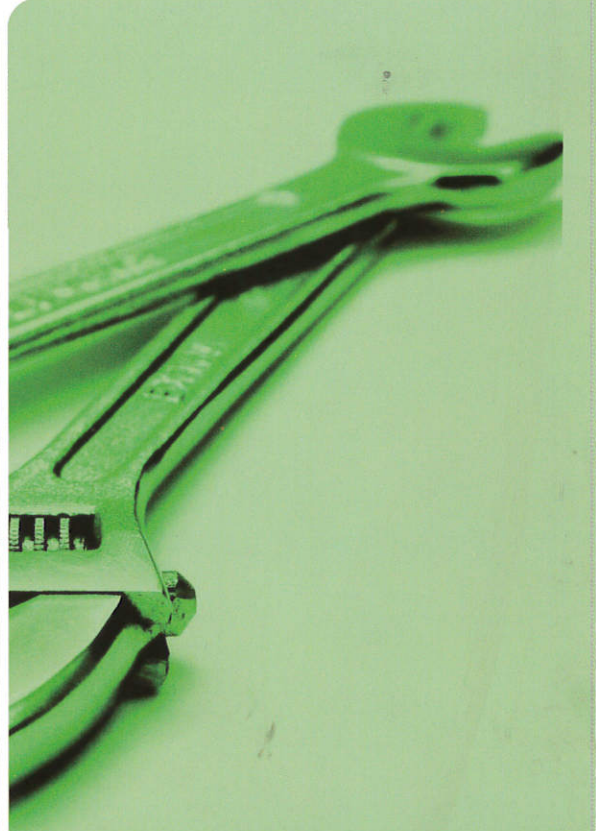
Rotary Gear Pumps
SINCE : 1993



STANDARD



JECKETED





Rotary Gear Pumps
SINCE : 1993

QUALITY POLICY

We, Fluid Tech Systems are committed to continually improve the Quality Management Systems by

- Providing consistent Quality Products as per agreed Specifications enhancing Customer Satisfaction levels by proactive interactions and remedial actions.
- To comply with the applicable legal and statutory requirements to which the organization subscribes.
- Involvement of employees through training & knowledge sharing.
- Setting up measurable goals and objectives on annual basis.
- Operating and adhering to, a Quality Management system, based on and Compliant with, the requirements of ISO 9001:2008 to continually improve the effectiveness of the Quality Management System.

M.B.Patel
Director

01st October, 2014

*"Let Our
Quality Speak
for Itself"*

Mfd. By:



An 9001 : 2008 Certified Company
Fluid Tech Systems

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READ CAREFULLY

We recommend to keep always this Handbook within Operator's reach, and to preserve it in its integral form.



Caution

⌘ GENERAL SAFETY AND ACCIDENT PREVENTION TERMS :-

- This Instruction Handbook must always be within Operator's reach; for a prompt consultation in order to check correct operation cycle in case of doubts.
- For any intervention necessary to change the pump or its use, please contact the MANUFACTURER through its e-mail and ask for approval. Without written approval, MANUFACTURER will not assume any responsibility for possible troubles caused by the improper use or changes in the pump.



Warning

- Don't smoke and don't approach flames - including welding operations - during interventions for oil - either change of oil or adding oil. There is a chance of fire.



Caution

⌘ ABNORMAL CONDITIONS :-

- The pump can be used only in the conditions specified within this operation and maintenance manual. No tempering with the pump or its safety devices is allowed, and the use must be limited to normal working conditions.

In order to avoid unusual working conditions, several recommendations to the operator are listed below. However, any condition, which is not mentioned within this handbook, should be avoided.

- If the Customer wants to install on the pump a piece of equipment which has not been supplied by FLUIDTECH SYSTEMS, the compliance with the safety conditions specified in the respective Standards has to be checked.
- For such a piece of equipment which has not been supplied by FLUIDTECH SYSTEMS, we won't bear any responsibility on defects caused by the use of this part.
- The pump shall not be installed and used in corrosive or explosive environments.



The interventions must be performed by Supplier, subsequently to their authorization and under Supplier's instruction, by a skilled mechanical engineer of the Buyer:



Safety Protection

- If you are processing material which is other than specified or agreed, or if you are running the pump at higher speed than specified and supplied, it may generate higher pressure than specified.
- It is advisable to use ear plugs when the noise is higher than 85db.

⌘ PRODUCT INTRODUCTION :-

- The pump is heavy duty foot mounting type positive displacement rotary twin gear pump.
- The pump is having three piece constructions - it is easily cleanable & maintainable.
- The pump is having a double helical refined gear and hardened grind finished shaft, double helical gear prevent axial load & side thrust which increase life and performance of the pump.

Pump Selection

@ Model FTRN/FTRB : The self lubricated needle roller bearing type Model FTRN used for clean viscous liquid having sufficient lubricating property such as clean Lube oil, Gear oil, Animal oil, Fish oil, Hydraulic oil, Honey, Vegetable oil, SAE lubricating oil for continuous duty, However for Intermittent duty Bush Bearing type pump Model FTRB is used

@ Model FTRX : This Model independent lubricated needle roller bearing type pump is suitable for handling of Crude oil, Dirty lube oil, HSD, Kerosene, LDO, Paints, Varnish, Wood Pulp, Liquid which have poor lubricant value.

@ Model FTRBJ : This Model should be selected for liquid which tends to solidify at room temperature such as Bitumen, Furnace oil, Asphalt, Tar, Starch, Molasses, Naptha, RFO, Silicate, Wax, Shop solution. This model has jacketing construction to facilitate the heating the pump by steam or thermic fluid.

Product specification

Model	Material of construction	Pressure	Range	Size
FTRN / FTRB / FTRX	Body : CI/CS	Max 10 kg/cm ²	8 to 2083 LPM	1/2" to 6"
	Front/Back Cover : CI/CS			
	Gland Cover : CI/CS			
	Gear : EN-24, EN-353			
	Rotor/Stator Shaft : EN - 19			
	Bush/Needle Bearing : INA/IKO (Japan) or Non-Ferrous			
	Sealing : "GFO" Pack Teflon / Oil Seal Mechanical Seal			
Wear Plate : Bronze				

Limitations

Cannot handle material

- of viscosity more than 1,00,000 SSU
- of temperature more than 200°C
- at working pressure more than 10 kg/cm²
- at less or more than specified LPM

Estimated life of machine : 2 years (depending of type of material and usage)

Parts need to be replaced

- Bearing bush
- Gear and shaft
- Seals
- Packing

Working environment

- Free of dust, acid fumes, corrosive gases, salt, etc.
- Not subjected to any radiations (microwave, ultraviolet, X- rays)
- Free of vibration, shocks and bumps.

Refer Sales literature of product

Website: www.rotofluidpumps.com

✦ GUIDELINES FOR PROPER INSTALLATION :-

- 1) Correct alignment is absolutely essential for successful operation. A flexible coupling will not compensate for slight changes in alignments which may occur during normal operation.
- 2) Suction piping should never be fewer diameters than the full size of the pumps suction opening. It should be short and direct as possible and thoroughly clean. It should be uniformly graded up from the source of the supply to the pump.
- 3) When drawing liquid over long distance or on high suction lifts or when handling thick, viscous liquids, the diameter of the suction pipe should be greater than the opening in the pump to convey the liquid with minimum pipe friction loss.
- 4) When pumping highly volatile liquid such as butane, propane, hot oils etc there must be sufficient static head on the suction in addition to the vapour pressure to prevent vaporization of the liquid within the pump. Rapid wear or brazing will result if these pumps are allowed to run dry.
- 5) The suction line should be perfectly air-tight. A leak will result in reduced or entire loss of capacity.
- 6) To protect the pump against excessive pressures caused by increased pipe friction in cold weather or accidental closing of valve should be set slightly higher than maximum pump discharge pressure but not more than 10%.
- 7) When gland packing is provided, do not tighten the glands too tightly as a slight leakage will help to lubricate the packing.
- 8) Before starting up for the first time, prime up the wet gears for effective suction.
- 9) Never start or run the pump dry. This will invariably cause galling, seizing or destructive wear between the rotors, end plates and casing.
- 10) Direction of rotation is marked with an arrow on the pump.
- 11) Before starting, prime the pump and then check the prime mover for correct rotation.
- 12) Check pressure or vacuum on the inlet and outlet side to be sure that the pump will deliver full capacity without overloading the driver.
- 13) It is advisable to start operation at reduced load gradually increasing to maximum service

✦ GUIDELINES FOR PROPER MAINTENANCE :-

- 1) To protect the pump from rapid failure and to achieve longer life, the bushings must be checked for excess clearance between 'The Bush and Rotor Shaft/Stator Shaft'.
- 2) Replace the assembly set of Rotor Shaft/Stator Shaft, Bushes, Oil Seals, and Packing etc whenever required.
- 3) For Preventive Maintenance, one must keep certain spare parts recommended by Manufacturer
- 4) For smooth running of Pump, Suction Filter (if provided) must be cleaned regularly.
- 5) Check alignment of motor shaft & pump shaft at regular intervals.
- 6) Periodically check piping and / or hoses for leak proof joints. Particular care must be taken at suction side.
- 7) The maintenance must be carried with trained service technician as otherwise; the functioning of the pump will be disturbed. Refer catalogue and guidance provided by manufacturer to solve any kind of problems related to pump.
- 8) Protect the 'Motor Pump' assembly from the dust and rainfall by covering with proper guard at site. If the pump has to be kept as a spare, care must be taken to protect from dusty and corrosive atmosphere.
- 9) Mark proper warning for electrical supply. Make sure that the pump assembly and our body parts should be dry before handling it for repairing or maintenance. Wet condition may result in electric shock.
- 10) Use proper overload tripping system, earth leakage circuit breaker with alarm and signals for human safety.
- 11) Be sure that when the pump is dismantled for any maintenance, use proper tools for reassembling the parts.
- 12) Proper alignment and air tight joints must be ensured after reassembling the unit and relevant pipe lines if they are dismantled.
- 13) Clean the oil tank periodically to increase the life span of the pump. Decide the time interval at the best convenient period.
- 14) In order to prevent the dry running of the pump, minimum oil level must be maintained in the Oil Tank / Reservoir. Oil level sensors must be incorporated in the system so as to maintain the minimum level.
- 15) All joints at suction line and delivery line must be air -tight after re-assembling.

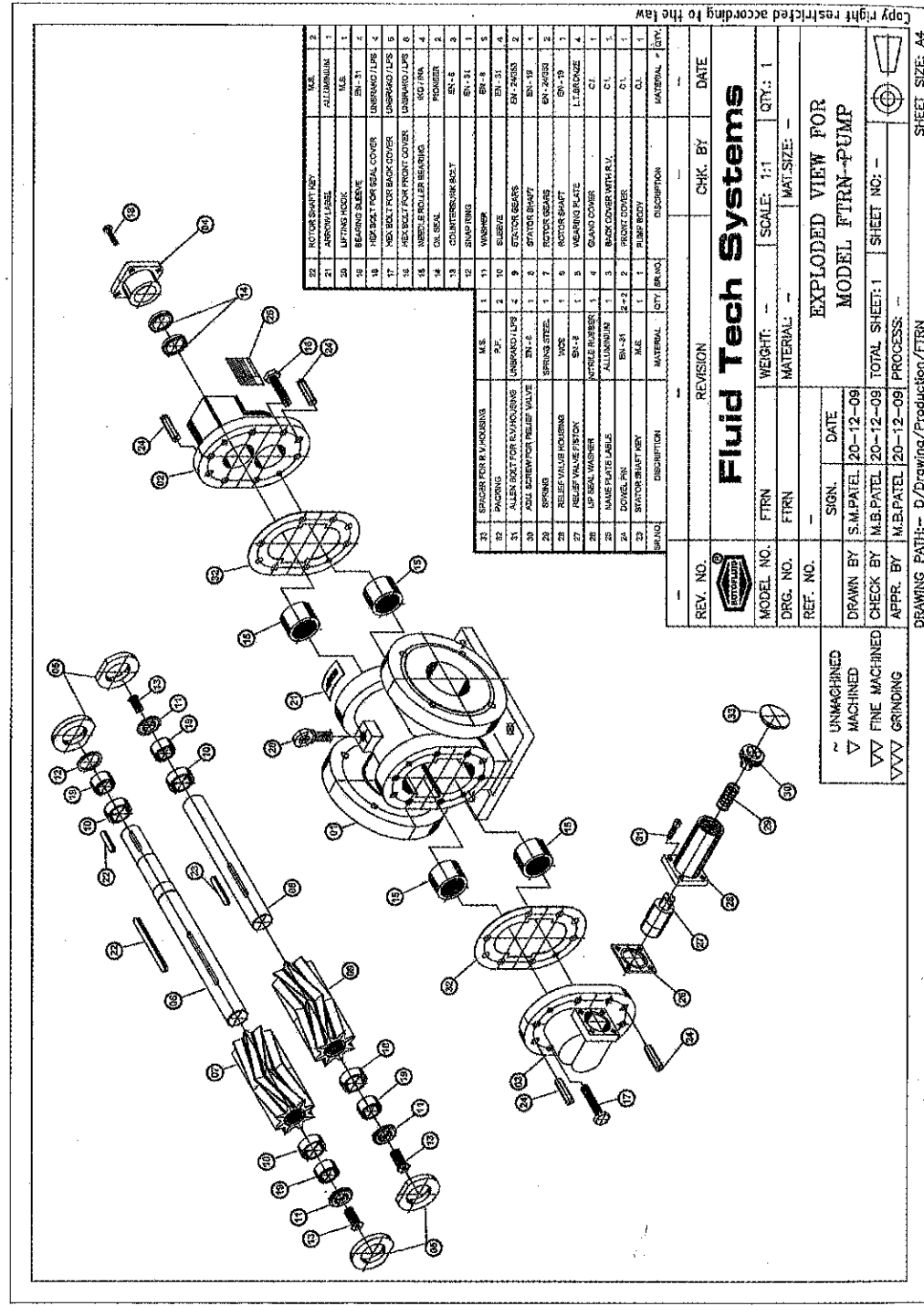
✕ TROUBLE SHOOTING :-

S.No.	Error	Prime Cause	Remedial Action
1.	Pump does not prime	Rotation Wrong.	Check rotation If necessary, change the connection of motor.
		Pump is Dry.	Fill pump initially with Oil
		Suction line is not tight.	Tighten all bolts and nuts on suction side. If necessary, pressure test suction line, attach vacuum gauge which should show approx. 0.6kg/cm ² vacuums at closed suction valve.
		Relief Valve not tight. Damaged valve joint. Foreign body between valve seat and valve	Remove valve and check seal. If necessary grind in. Check joint between suction and discharge opening in the pump, if necessary replace joint. Remove foreign body. In case of damage to valve seat, grind in tighten bolts of cover.
In the case of working against closed discharged line.	Evacuated air cannot pass through the pressurized oil column and streams back into the suction line.	Arrange de-aeration cock on discharge side of Pump. When pump is started, open this cock until all air is exhausted and then close. In the suction line, when switching off pump, remains full.	
2	Loss of Output	Speed too slow.	Check speed by means of a tachometer. Check frequency and voltage on motor name plate. Check pump as in the case of overload, speed can be dropped. Check star-delta and compare with voltage.
		Relief valve opens too soon.	Remove valve cover and adjusting screw. If spring is fatigued, replace. Take care when adjusting that the pressure rise with closed discharged valve does not overload, speed can be dropped.
		Loss in output due to Air in stuffing box.	Tighten all bolts and nuts on suction side.
		Suction line friction too great.	Fit vacuum gauge & check suction lift which should not be greater than 16-20 feet.
		Suction pipe too small.	Only a larger suction line or a reduction in length can help.
		Suction line too long.	
		Suction filter blocked.	
3	Pump is noisy	Badly aligned coupling.	Disconnect pump from motor & align coupling.
		Spindle not running.	Strip motor and remove main spindle. Test with clock gauge between centers.
	Mechanical Noise	Gear Flanks are damaged	Remove gears and correct damaged flanks by foreign bodies with oil stone finally grind by hand.
		Delivery against low	Load gear flanks by closing discharge, valve giving approximately 15 -20psi. Noise will be eliminated.

		The pumped medium contains air	Determine whether air is drawn through leak or whether return line is unsuitable in case of a circulating pump. In such a case it is also necessary that the return pipe terminates below liquid level.
	Hydraulic or Pneumatic	Cavitations due to- -Too high suction lift. -Excessive speed in the case of very viscous liquids. -Pumping of liquids which are highly volatile like petrol, solvents etc.	-Reduce the suction lift. -Reduce speed. Only a vacuum is permissible. -Under certain circumstances liquid may require pressurization, depending on its vapour pressure.
4	Motor is heating up	Wrong connection or motors or only two phases.	Connecting motor according to name plate and check voltages in all three phases.
		Wrong frequency.	Check frequency on name plate.
		Pump, seizing	Disconnect pressure gauge on the discharge branch and check whether delivery pressure is in accordance with the name plate of the pump.
		Delivery pressure too high.	Connect pressure gauge on the discharge branch and check whether delivery pressure is in accordance with the same plate of the pump.
		Viscosity too high.	Check viscosity at pumping temperature and compare with name plate of the pump.
		Mis -alignment	Re-align coupling
5	Fluctuating Delivery	Frothing Medium	Avoid air entry in the Oil.
6	Pump detained	Excessive pressure due to wrongly adjusted relief valve.	Check relief valve pressure at close discharge valve, re-adjust relief valve, so that it opens approximately at 10% above working pressure.
		Foreign body in pumped medium.	Dismantle pump. Remove foreign body, smoother seized area with oil stone, if necessary, fit new bearings and provide suction filter.
		Dry running.	Remove seized area as above. Fill with oil and wet rotors before starting up. Under certain circumstances check de -aeration.
		Insufficient lubricating quality of pumped medium	Check whether pumped medium has lost its lubricating properties due to elevated temperature. If a pump has seized, gear and bearings, should be dismantled. All seized areas to be smothered with oil stone. The bearing should be scraped and casting bores ground if necessary. Reassemble the pump and put it in operation initially at low pressure.
7	Relief valve chattering	Valve is jammed	Fit new spring, check valve for easy movement in the valve seat.

DISPOSAL ACTION :-

Once the life of the machine is over or it gets destructed or broken then please removes the electric power from it and dispose to a safer place considering the environmental safety & local regulatory requirement.



REV. NO.	REVISION	CHK. BY	DATE
1			

20	ROTOR SHAFT KEY	M.E.	ALUMINIUM	1
21	ARCWHA LABEL	M.E.	M.E.	1
22	LIFTING HOOD	EN-31		1
23	BEARING HOUSING	EN-31		1
24	ROTOR SHAFT FOR SEAL COVER	UNBRAND/LPS		2
25	ROTOR SHAFT FOR BACK COVER	UNBRAND/LPS		2
26	ROTOR SHAFT FOR FRONT COVER	UNBRAND/LPS		2
27	ROTOR SHAFT	EN-19		2
28	ROTOR SHAFT	EN-19		2
29	ROTOR SHAFT	EN-19		2
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31	ROTOR SHAFT	EN-19		2
32	ROTOR SHAFT	EN-19		2
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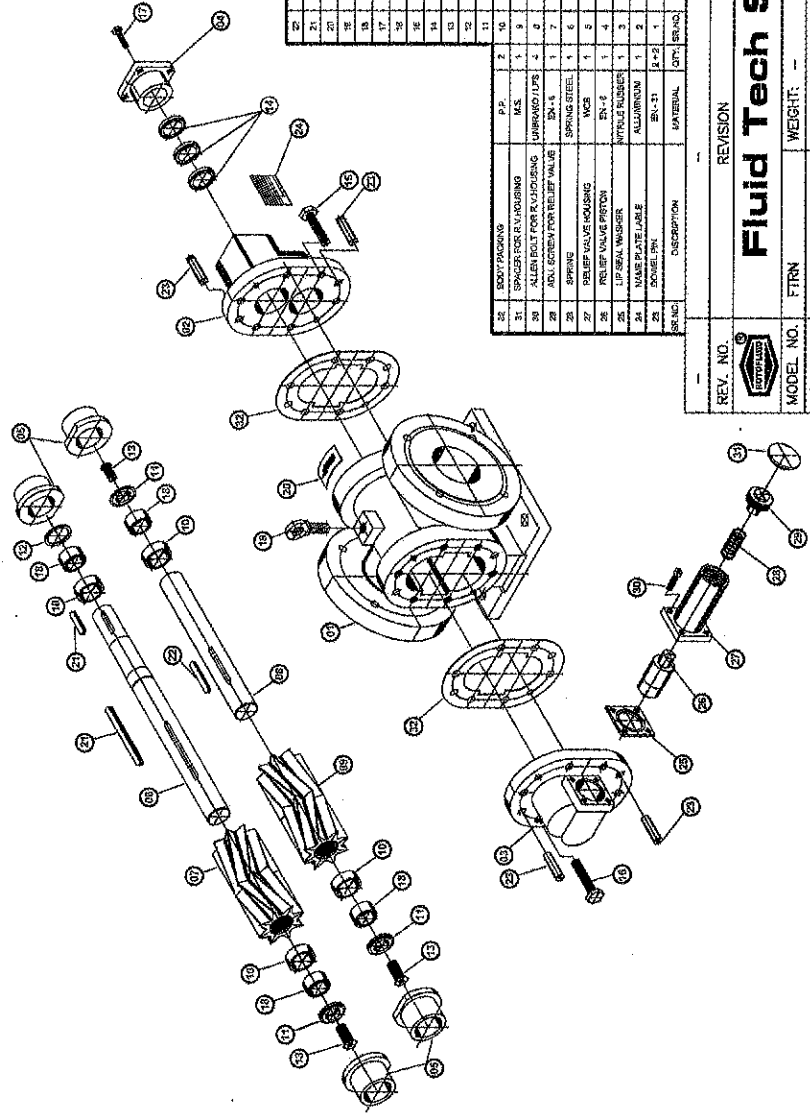
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Fluid Tech Systems
EXPLODED VIEW FOR MODEL FTRN-pump

UNMACHINED
 MACHINED
 FINE MACHINED
 GRINDING

WEIGHT: -- SCALE: 1:1 QTY: 1
 MATERIAL: -- MAT. SIZE: --
 TOTAL SHEET: 1 SHEET NO: --
 PROCESS: --
 DRAWING PATH: D:/Drawing/Productory/FTRN

SHEET SIZE: A4

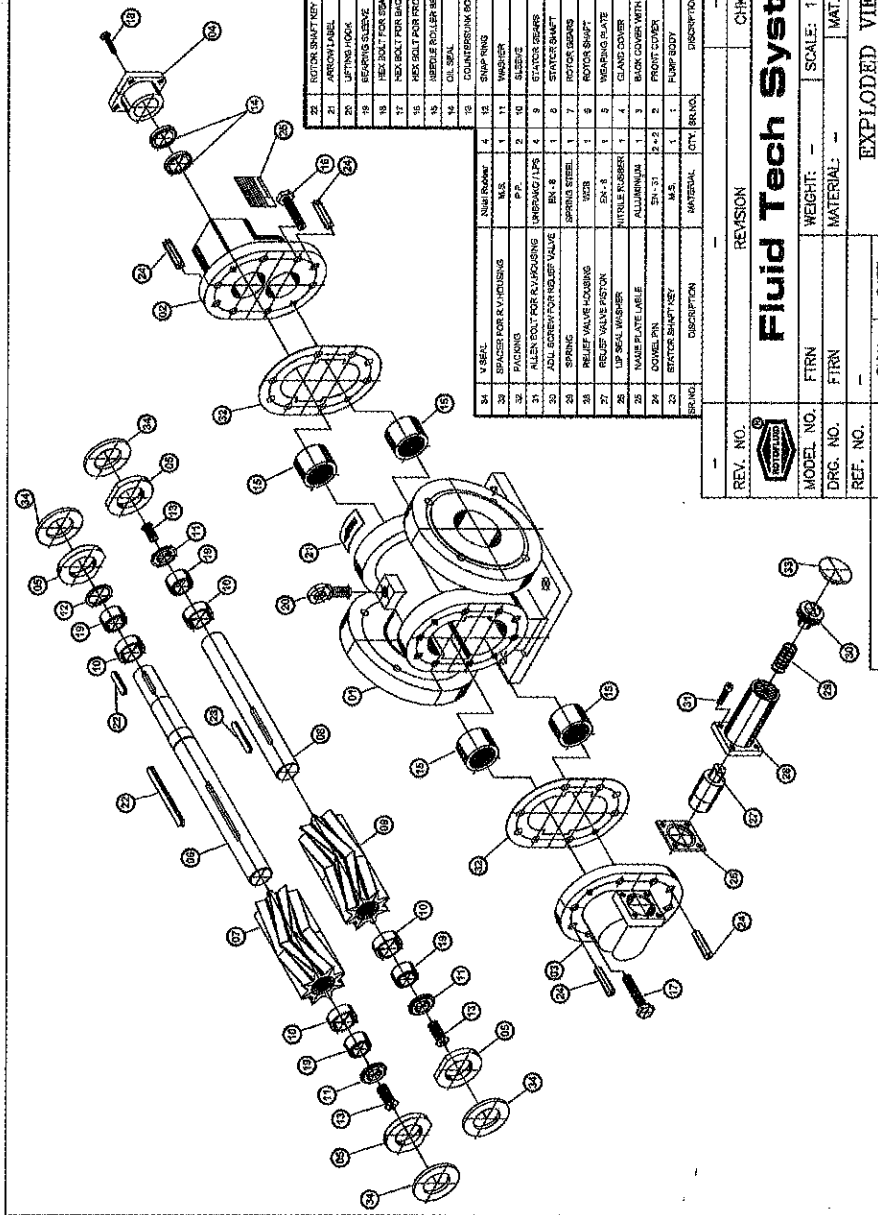


REV. NO.	DESCRIPTION	QTY	SERIAL NO.	MATERIAL	QTY	DESCRIPTION	MATERIAL	QTY
22	ROTOR SHAFT KEY	1		A.S.S.	1	ROTOR SHAFT KEY	A.S.S.	1
21	ROTOR SHAFT	2		ALUMINUM	2	ROTOR SHAFT	ALUMINUM	2
20	ARROW LABEL	1		BASE	1	ARROW LABEL	BASE	1
19	LIFTING LOCK	1		EN-31	1	LIFTING LOCK	EN-31	1
18	WEARING SLAVE	4		EN-31	4	WEARING SLAVE	EN-31	4
17	HEX BOLT FOR SEAL COVER	4		UNBRAND LPS	4	HEX BOLT FOR SEAL COVER	UNBRAND LPS	4
16	HEX BOLT FOR EACH COVER	8		UNBRAND LPS	8	HEX BOLT FOR EACH COVER	UNBRAND LPS	8
15	HEX BOLT FOR FRONT COVER	8		UNBRAND LPS	8	HEX BOLT FOR FRONT COVER	UNBRAND LPS	8
14	GLAND PACKING	8		GLD	8	GLAND PACKING	GLD	8
13	COUNTERSHANK BOLT	8		EN-8	8	COUNTERSHANK BOLT	EN-8	8
12	SNAP-RINGS	1		EN-21	1	SNAP-RINGS	EN-21	1
11	SLIDE WASHER	8		EN-4	8	SLIDE WASHER	EN-4	8
10	SLAVE	4		EN-21	4	SLAVE	EN-21	4
9	STATOR GEARS	2		EN-2602	2	STATOR GEARS	EN-2602	2
8	STATOR SHAFT	1		EN-19	1	STATOR SHAFT	EN-19	1
7	ROTOR GEAR	2		EN-160	2	ROTOR GEAR	EN-160	2
6	ROTOR SHAFT	2		EN-20	2	ROTOR SHAFT	EN-20	2
5	GLANDS PLATE GUM BUSH	4		L.T. BRONZE	4	GLANDS PLATE GUM BUSH	L.T. BRONZE	4
4	GLAND COVER	1		CC	1	GLAND COVER	CC	1
3	BACK COVER WITH N.V.	1		CC	1	BACK COVER WITH N.V.	CC	1
2	FRONT COVER	1		CC	1	FRONT COVER	CC	1
1	PUMP BODY	1		CC	1	PUMP BODY	CC	1

Fluid Tech Systems
 EXPLODED VIEW FOR
 MODEL FTRB PUMP

REV. NO. _____ CHK. BY _____ DATE _____
 MODEL NO. FTRN WEIGHT: --- SCALE: 1:1 QTY: 1
 DRG. NO. FTRN MATERIAL: --- MAT. SIZE: ---
 REF. NO. ---
 DRAWN BY S.M.PATEL 20-12-09
 CHECK BY M.B.PATEL 20-12-09 TOTAL SHEET: 1 SHEET NO: ---
 APPR. BY M.B.PATEL 20-12-09 PROCESS: ---
 DRAWING PATH: D:\Drawing\Production\FTRN SHEET SIZE: A4

~ UNMACHINED
 ▽ MACHINED
 ∇∇ FINE MACHINED
 ∇∇∇ GRINDING



REV. NO.	DESCRIPTION	QTY	SERIAL NO.	MATERIAL	QTY	DESCRIPTION	MATERIAL	QTY
34	OIL SEAL	1		EN-18	1	OIL SEAL	EN-18	1
33	BRACER FOR R/V HOUSING	4		EN-4	4	BRACER FOR R/V HOUSING	EN-4	4
32	PACKING	2		EN-8	2	PACKING	EN-8	2
31	ALLEN BOLT FOR R/V HOUSING	4		EN-20	4	ALLEN BOLT FOR R/V HOUSING	EN-20	4
30	ADJ. SCREW FOR ROUER VALVE	1		EN-8	1	ADJ. SCREW FOR ROUER VALVE	EN-8	1
29	SPRING	1		EN-19	1	SPRING	EN-19	1
28	RELIEF VALVE HOUSING	1		EN-18	1	RELIEF VALVE HOUSING	EN-18	1
27	LIP SEAL WASHER	1		EN-19	1	LIP SEAL WASHER	EN-19	1
26	VALVE PLATE LABEL	1		ALUMINUM	1	VALVE PLATE LABEL	ALUMINUM	1
25	SOCKET PIN	2-4		EN-31	2-4	SOCKET PIN	EN-31	2-4
24	STATOR SHAFT/KEY	1		A.S.S.	1	STATOR SHAFT/KEY	A.S.S.	1
23	FRONT COVER	1		CC	1	FRONT COVER	CC	1
22	PUMP BODY	1		CC	1	PUMP BODY	CC	1

Fluid Tech Systems
 EXPLODED VIEW FOR
 MODEL FTRX PUMP

REV. NO. _____ CHK. BY _____ DATE _____
 MODEL NO. FTRN WEIGHT: --- SCALE: 1:1 QTY: 1
 DRG. NO. FTRN MATERIAL: --- MAT. SIZE: ---
 REF. NO. ---
 DRAWN BY S.M.PATEL 20-12-09
 CHECK BY M.B.PATEL 20-12-09 TOTAL SHEET: 1 SHEET NO: ---
 APPR. BY M.B.PATEL 20-12-09 PROCESS: ---
 DRAWING PATH: D:\Drawing\Production\FTRN SHEET SIZE: A4

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