

प्रस्तावना INTRODUCTION

These pumps are used on Indian Railways coaching stock for lifting water from under frame mounted main tank to auxiliary tank located at the ceiling of the coaches to supply water in toilets & wash basins.

These are horizontal centrifugal self priming mono set pumps which are driven by 3- phase, 50 Hz. 415 V ac supply.



तकनीकी आँकड़े TECHNICAL DATA

(Ref: Amendment no. 1 to RDSO/PE/SPEC/AC/0022-(Rev.0)-2002 dated 13.01.2004)

मोटर Motor

Type	Squirrel cage induction motor TEFC
Rated Output	0.5 HP/0.37 kW
Rated Voltage	415 V \pm 6 %, 3 Phase AC
Rated Frequency	50 Hz \pm 3 %.
Load Current	1.1 Amps
Speed	2800 RPM
Insulation Class	F
Winding Connection	Y (Star)
Duty	Continuous (S1 duty as per IS: 325)
Type of mounting	Foot mounted

पम्प Pump

Type	Self Priming, Centrifugal
Total Head	8 Mtrs
Suction Head	3 mtrs.
Discharge Head	5 mtrs
Discharge in LPH	2520 (0.7 liters/second)
Suction Flange Size	1" BSP (25 mm)
Delivery Flange Size	1" BSP (25 mm)

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सामान्य विवरण GENERAL DESCRIPTION

पम्प एवं मोटर Motor and Pump

Motor body, pump casing, rear cover and front end bracket are molded out of high quality cast iron. Pump casing is hydrostatic pressure tested at 1.5 times the maximum discharge pressure. The stator is constructed with electrical grade silicon steel laminated stampings. The rotor is made of high conductivity aluminium by pressure die casting.



पम्प शाफ्ट Pump Shaft

The shaft for rotating rotor is dynamically balanced, (with impeller) to minimize vibration at the highest allowed speed and to ensure smooth running and increased life of the bearings. It is made of stainless steel of AISI 410 Grade or as per IS: 6603.



इम्पेलर Impeller

Impeller is the rotary element of the pump and is secured on a shaft mounted on suitable bearings. It is made of brass and properly balanced.



The entry of water from pump to motor is prevented by providing high quality Nitrile rubber seal.

रबर सील Rubber Seal

बियरिंग Bearing

Only sealed low function RZ type bearing of SKF/ FAG makes are used The minimum life of bearing is 1,00,000 Hrs.



अर्थिंग Earthing

Motor casing is provided with two independent earthing terminals which are connected to the coach body.

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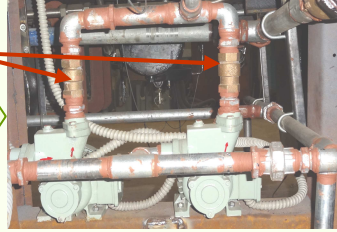


पानी टैंक Water Tank

Four cylindrical water tanks are fitted under frame of the coach body which are inter connected to each other with a pipe.

नॉन रिटर्नवाल्व Non Return Valve (NRV)

Non return valve is provided on each pump at out let pipe to avoid back flow of water while pump is not working



इनलेट एवं ओवर फ्लोर वाल्व In let & Over flow pipe

Inlet pipe is connected to the top of the tank & an over flow pipe is also provided to allow the flow of extra water from main tank while refilling.



टर्मिनल बाक्स एवं उसके कनेक्शन Terminal Box & Connections

The terminal connection for supply are brought out in a terminal box on the motor and clearly marked RYB (embossed) on the terminal plate to obtain correct direction of rotation. The terminal plate is made of epoxy reinforced glass fiber material conforming to BS-3815 and it is also anti- moisture absorbent and free from porosity.



Cable entry to the terminal box is made in the bottom at right angle along with the suitable size of cable gland. Silver brazed joints/ fused for connecting terminals leads and wires are used. Soldered joints are not acceptable. The terminal box cover and lid is made of die-cast aluminium..

प्रवेश आवरण Ingress Protection

The entire motor portion have ingress protection IP 55 as per IS 4691.

पम्प नियंत्रक Pump Controller

Pump controller is provided in AC coach power panel. It has a selector switch to operate the pump either in auto or manual mode. Pump 1 or 2 may be selected in manual mode. In auto mode pump change over takes place automatically after 4-6 hrs. It also displays running time of pump-motor and LED displays are provided for working status/faulty condition for individual pump.



क्रिया WORKING

Water is pumped in the coach from under slung water tanks through Mono-block pump. Either pump works continuously and water is pumped in auxiliary tanks mounted over the each toilets. The extra water overflows from auxiliary tanks to the main tank through a recycle pipe.

संचालन निर्देश OPERATIONAL INSTRUCTIONS

The following points shall be checked:

- Ensure that the main tanks are filled with water.
- Ensure that pump selector switch of pump controller is on 'Auto' mode.
- Ensure that the outlet valve of main tank to pump is in open condition.
- Ensure that motor rotates in the correct direction as painted/embossed.
- Ensure that the pump set runs quickly and smoothly.
- Check the availability of the water in toilets and wash basins.

खोलना एवं पुनः लगाने की क्रिया विधि

DISMANTLING AND RE-ASSEMBLY PROCEDURE

- ☞ Isolate supply connections and dismantle the pump from the pipe lines and foundation.
- ☞ Remove the bolts, which are holding the casing to remove casing from the assembly and slide out the impeller.
- ☞ Remove the screw on end cowl then remove fan, remove bolts on end cover and pull out the end cover. The shaft with stuffing box can be taken out from the frame.
- ☞ All parts are to be checked and replace if damaged and worn out.
- ☞ Check bearing condition and replace if necessary.
- ☞ Replace rubber seals and gaskets before re-assembly.
- ☞ While re-assembly, follow the reverse procedure of dis-assembly, if the impeller is tight, tap the shaft at the non-driving end.
- ☞ Shaft rotates freely after assembly.
- ☞ Ensure that the non return valve (NRV) is kept at right position while installation.

समस्या, कारण एवं उनके उपाय

PROBLEMS, CAUSES & THEIR REMEDIES

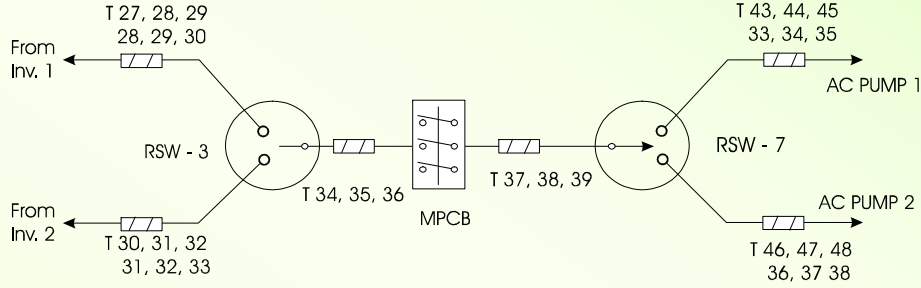
SN	PROBLEM	CAUSES	REMEDIAL ACTION
1	Motor does not rotate/fails to start	No power supply	Ensure 3 phase power supply at different locations.
		Over heating	Remove fan cover and check for free rotation of motor shaft along with fan and allow the motor to cool & switch on.

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S N	PROBLEM	CAUSE	REMEDIAL ACTION
		Impeller stuck due to keeping idle for a longer time.	Rotate the shaft by hand/with the help of screwdriver to ensure free rotation.
		Motor winding defective	Check winding for open circuit etc.
2	Pump does not lift water	Priming not sufficient	Fill water till it flows continuously without air lock
		Air leak in suction pipe	Use proper sealing to arrest leak or use teflon tape at joints.
		Blocked suction pipe	Clean the suction pipe
		Leaking seal	Replace the seal
		Air cock side leaking	Tighten the air cock, renew if required.
		Mono block pump running in opposite direction	By changing any one phase of the electrical connection the direction can be changed.
3	Leaking mechanical seal	Running face is damaged	Lap the running face or replace it.
4	Insufficient discharge/ Capacity decrease	Strainer clogged.	Clean the strainer.
		Wrong direction of rotation.	Interchange any two phase to correct the direction.
6	Pump set draws more current	Defective bearing	Replace defective bearing.
		impure water	Ensure clean water
7	Pump set making noise	Wrong direction of rotation.	Interchange any two phase to correct the direction.
		Defective bearings	Replace defective bearings.
8	Motor starts with a humming sound, does not rotate and then trip	Pump jammed	Switch off the supply and rotate the shaft with the help of screw driver/by hand.

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रेखा चित्र SCHEMATIC DIAGRAM



अनुरक्षण गतिविधियाँ MAINTENANCE ACTIVITIES

Sr.	Activities	TI (D1)	M (D2)	HY (D3)	IOH (SS-1)	POH (SS-2)
1.	Check functioning of water pumping arrangement in auto mode/ manual mode through pump controller.	✓	✓	✓	✓	✓
2.	Visually check the mounting arrangement for any abnormality.	✓	✓	✓	✓	✓
3.	Check running of pump-motor for any abnormal sound, water leakage from pipe lines, joints etc.	--	✓	✓	✓	✓
4.	Check cable connections on terminal box for tightness and for sign of overheating etc.	--	--	✓	✓	✓
5.	Check rubber seal/ gasket for any damages/ water leakage.	--	--	✓	✓	✓

डिस्क्लेमर Disclaimer:

यह स्पष्ट किया जाता है कि यह पैम्फलेट आरडीएसओ, रेलवे बोर्ड या मूल उपकरण निर्माता द्वारा विनिर्दिष्ट किसी भी विधान को विस्थापित नहीं करती। यह पैम्फलेट केवल मार्गदर्शन हेतु है एवं यह एक स्टेच्यूटरी डॉक्यूमेंट नहीं है।

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If you have any suggestion or comment, please write to:

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भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS

आर एम पी यू वातानूकूलित डिब्बों में पानी चढ़ाने वाले मोनो सेट पम्प

पर पम्फलेट

PAMPHLET ON

WATER RAISING MONO SET PUMP FOR RMPU AC COACHES

CAMTECH/E/2013-14/WRA/1.0
April 2013



Indian Railways
Centre for Advanced Maintenance Technology

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