



**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**TROUBLE SHOOTING MANUAL
OF
POINT AND CROSSING TAMPING MACHINE
(UNIMAT)**

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RESEARCH DESIGNS AND STANDARDS ORGANISATION

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P_R_E_F_A_C_E

About 444 On-Track Machines are presently working on Indian Railways covering different works related to track maintenance and renewals. To improve utilization of these machines, it is important to reduce their downtime and repair them in the shortest possible time. In this context, need was felt to develop Trouble Shooting Manuals for different On-track Machines. The Trouble Shooting Manuals for Continuous Tamping Machine (CSM09-32), Ballast Cleaning Machine (BCM), Ballast regulating machine (BRM Model 66-4), TTM (UNO) & TTM (DUO) and Provisional Trouble Shooting Manuals for Point and Crossing Tamping Machine (UNIMAT), Dynamic Track Stabilizer (DGS), Point and Crossing Changing Machine (T-28), Shoulder Ballast Cleaning Machine (FRM-80), PQRS, Plasser make WST (08-32) and Track Relaying Train (P811S) have already been prepared and issued. This trouble shooting manual of Point and Crossing Tamping Machine (Unimat) is also an effort in the same direction.

It is hoped that this manual will be quite useful for field staff attending breakdown of machines. However, there is always scope for improvement for which suggestions may be sent to the undersigned.

Lucknow.
March, 2006

Vijay Sharma
Executive Director/TM
RDSO/Lucknow-226011.

EXPLANATORY NOTES

While preparing the Trouble Shooting Manual of Point and Crossing Tamping Machine (Unimat), the terms used and their meanings are explained below:

- CHECK - Ensure a specific condition does (or does not) exist.
- INSPECT - Look for damage and defects including breakage, distortion cracks, corrosion and wear, check for leaks, security and that all items are completed.
- REPLACE - Remove old parts and substitute with a new or overhauled or reconditioned part. Fit new or overhauled or reconditioned part in place of missing part.
- OVERHAUL - Dismantle, examine, recondition or renew parts as necessary against given specifications, reassemble, inspect and test.

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I. ENGINE

S. No.	Faults	Probable Causes	Remedial Actions
1.	Engine does not start	<ol style="list-style-type: none"> 1. Emergency stop switch is pressed. 2. No fuel in the tank. 3. Shut down mechanism is stuck 4. Air in fuel system. 5. Governor is stuck. 6. Misconnection of starting switch. 7. Valve clearance is not proper. 8. Weak batteries. 	<ol style="list-style-type: none"> 1. Emergency stop switch should be in release position. 2. Fill fuel in the tank and bleed air from fuel system as given in following steps: <ol style="list-style-type: none"> i) Loosen the bleed plug on the fuel filter and operate the priming pump until the fuel emerges free of bubbles. Tighten the bleed plug. ii) Then loosen banjo plug on injection pump and operate the priming pump until fuel emerges free of bubbles. Tighten the banjo plug. 3. Check the electrical supply at coil. if it is ok, then lubricate the piston of shut down coil and mechanism with lub oil and operate it manually. If still not working, then coil may be defective. Replace it. 4. Bleed air from fuel system as explained in item no. 2 above. 5. Replace the complete fuel injection pump 6. Check starting switch and if any misconnection is noticed, rectify it. 7. Adjust the valve clearance as given in engine manual. 8. Check electrolyte level in the batteries. Terminals should be clean and the charging system should be working. Over-aged batteries should be replaced.

S. No.	Faults	Probable Causes	Remedial Actions
		9. Injectors not properly functioning.	9. Remove defective injectors and get them overhauled/calibrated or replace them with new one.
		10. Valves not seating properly.	10. i) Check the valves spring and replace the broken spring if any. ii) Lap the valves. iii) Lap the valve seat, if required.
2.	Engine running too hot.	1. Coolant level too low.	1. Check coolant level and top up to the mark in the filler neck.
		2. Defective thermostat.	2. Check thermostat as given in the following steps: i) Drain cooling water and store it for reuse. ii) Loosen hose clamps, pull back hoses and then remove thermostat. iii) Heat the water in container to approx. 85° C and place thermostat in it. Maintain temperature of water by agitating iv) By short circuiting and radiator opening, check whether the thermostat opens fully. If not, then install new thermostat.
		3. Defective water pump.	3. Check/repair the water pump.
		4. V-belt for water pump needs adjustment.	4. Check the V-belt tension. To adjust, release the guide pulley and regulate tension in the belt. Then tighten the guide pulley. If required, replace the V-belt.
		5. Oil cooler not working properly.	5. Repair / replace the Oil Cooler.
		6. Valve clearance is not proper.	6. Adjust the valve clearance as explained in engine manual.
		7. Air filter is choked.	7. Clean the air filter.

S. No.	Faults	Probable Causes	Remedial Actions
		8. RPM of coolant fan is too low.	8. Adjust the RPM of the motor to 1600. Check hydraulic system and change pump and motor if necessary.
		9. Water radiator choked.	9. Get the radiator cleaned.
		10. Radiator cap missing or worn out	10. Fit new cap.
		11. Water hose too old.	11. Replace the water hose.
3.	Engine misfiring	1. Dirty fuel filter.	1. Replace the fuel filters.
		2. No / less fuel in tank.	2. Fill fuel in the tank and follow steps as given in s. no.1, item no.2.
		3. Air in fuel system.	3. Bleed air from the fuel system as explained in s. no.1, item no.2.
		4. Defective Injector.	4. Remove the defective injector and get them overhauled/calibrated/replace with new one as required.
		5. Valve clearance is not proper.	5. Adjust valve clearances as given in engine manual
		6. Fuel injection timing not proper.	6. Adjust the timings.
4.	Excessive engine smoking.	1. Engine oil level too high.	1. Check oil level. For this, draw dipstick and clean with lint-free cloth. Return dipstick, wait a little until the oil has wetted the dipstick. Then remove the dipstick again and check oil level.
		2. Defective injector	2. Follow the s.no.1, item no.9.
		3. Valve clearance is not proper.	3. Follow the s. no.1, item no.7.

S. No.	Faults	Probable Causes	Remedial Actions
		4. Air in fuel system. 5. Clogged air cleaner. 6. Excessive carbon on cylinder head and piston. 7. Engine overloaded.	4. Follow the s.no.1, item no.2. 5. Clean the element or change if required. 6. De-carbonise the engine. 7. Check and reduce the load.
5.	Engine stops	1. No fuel. 2. Air in the fuel system. 3. Valve clearances are not proper. 4. Governor is stuck. 5. Overheating of engine 6. Shut down circuit fails.	1. Fill fuel in the tank and follow the steps as given in s. no. 1, item no.2. 2. Bleed air from fuel system as explained in s. no.1, item no.2. 3. Adjust the valve clearances as explained in s.no.1, item no.7 above. 4. Replace complete fuel injection pump. 5. Take remedial action as given in s.no.2 above. 6. Check the electrical circuit and repair as required.
6.	Engine knocking	1. Incorrect Injector setting. 2. Mechanical damage to piston/cylinder. 3. Valve clearance is not proper. 4. Fuel injection timing is not proper.	1. Remove the faulty injector and get it reset or replace it with new one. 2. Get the engine top overhauled. 3. Adjust the valve clearance as given in engine manual. 4. Correct the timings.

S. No.	Faults	Probable Causes	Remedial Actions
7.	Output of the engine too low	<ol style="list-style-type: none"> 1. Dirty fuel filter and fuel line. 2. Air in fuel system. 3. Defective Injectors. 4. Valve clearances are not proper. 5. Air filter choked. 6. Improper compression 7. Governor is stuck. 	<ol style="list-style-type: none"> 1. Check the fuel filter and line, if necessary change the filter. 2. Bleed the air from system as explained in s. no.1, item no.2. 3. Remove the defective injectors and get them overhauled or replace with new one. 4. Adjust the valve clearances as given in engine manual. 5. Clean the air filter element or replace if required. 6. Engine needs to be top overhauled. 7. Replace the complete fuel injection pump.
8.	Oil pressure low.	<ol style="list-style-type: none"> 1. Dirty lube oil filter. 2. Oil control valve not working. 3. Dirty oil cooler 	<ol style="list-style-type: none"> 1. Replace the lube oil filter. 2. Repair the control valve or replace it. 3. Clean the oil cooler.
9.	Oil film present in crank case ventilation	<ol style="list-style-type: none"> 1. Incorrect compression. 2. Lube oil brands. 	<ol style="list-style-type: none"> 1. Engine needs to be top overhauled 2. Use lube oil of proper brand and grade as recommended by the OEM.
10.	Engine speed is irregular.	<ol style="list-style-type: none"> 1. Air in fuel system 2. Governor is stuck. 	<ol style="list-style-type: none"> 1. Bleed air from the system as explained in s. no.1, item no.2. 2. Replace complete fuel injection pump.

S. No.	Faults	Probable Causes	Remedial Actions
11.	Fuel consumption too high.	<ol style="list-style-type: none"> 1. Use of incorrect lube oil brand. 2. Incorrect setting of Injector. 3. Incorrect engine timing. 4. Clogged air filter. 5. Poor compression 	<ol style="list-style-type: none"> 1. Use proper grade and quality lube oil. 2. Overhaul/ Replace the defective injectors. 3. Get the engine timing reset. 4. Clean the air filter. 5. Engine needs to be top overhauled.
12.	Lube oil consumption too high.	<ol style="list-style-type: none"> 1. Incorrect lube oil brand. 2. Poor compression 3. Oil filter dirty. 	<ol style="list-style-type: none"> 1. Use proper grade and quality lube oil as recommended by OEM. 2. Engine needs to be top overhauled. 3. Replace the filter.

II. ZF GEAR BOX

S. No.	Faults	Probable Causes	Remedial Actions.
1.	Control Pressure too low in all speed.	<ol style="list-style-type: none"> 1. Pressure gauge defective. 2. Low pressure. 	<p>Pressure will be checked at point 65 at normal test temperature 80°C to 100°C and 1000 rpm -</p> <ol style="list-style-type: none"> 1. If it is between 12 to 14 bar that means pressure gauge in operator's cabin is defective. This should be replaced. 2. If it is below 12 bar, then pressure will be checked at points 59 & 60 of K/III & KV. If it is 12+2 bar then, following action should be taken:- <ol style="list-style-type: none"> i) Control orifice will be checked on intermediate plates of shifter assembly for its elongation of hole which should not be more than 0.6 mm. ii) If (i) is OK, pressure control spool will be cleaned and inspected for its movement. iii) If any one of above is faulty, control valve assembly will be replaced. 3. If pressure at points 59 & 60 is too low (below 12 bar), following action will be taken:- <ol style="list-style-type: none"> i) Check Torque limit (Max.20 N-m) of all the Allen bolts of control valve assembly. ii) If it is still not OK, repair control pressure valve after dismantling the same .

S. No.	Faults	Probable Causes	Remedial Actions.
2.	Main pressure too low in several speeds.	1. Pump flow is less 2. Pressure drop at clutch. 3. Oil tubing inside the gear box may be choked.	iii) Pressure filter of 25 microns need replacement. iv) As a last rectification step, gear pump will be replaced. Check pressure at point 65. If it is less than 12 bar in any selected speed, then: 1. Check pump flow by flow meter at 1000 rpm. It should be 40 LPM. If it is less, replace the pump. 2. Check individual clutch, where the pressure is dropping. It will be carried out after dismantling of gear box in workshop. 3. Oil tubing inside the gear box may be choked which should be cleaned/repaired.
3.	Clutch shifting time too long in all speed.	1. Oil level too low. 2. Orifice of pressure control valve is blocked. 3. Pressure control valve defective.	Check pressure build up time on point 65 (by Micro Chronometer and Pressure Gauge). If it is more than 1.7 sec., following repair will be carried out: 1. Check oil level at 40° C/1000 rpm for lower mark & at 80° C/1000 rpm for upper mark and recoup it if required. 2. Check orifice of control pressure valve. If choked, it should be cleaned. 3. If orifice of control pressure valve is less than 0.6 mm, it needs replacement.

S. No.	Faults	Probable Causes	Remedial Actions.
4.	Shifting time too short.	<ol style="list-style-type: none"> 1. Main control pressure too low. 2. Pressure control orifice is blocked. 3. Pressure control valve defective. 4. Torque limit of cap screw of control valve assembly is less. 	<ol style="list-style-type: none"> 1. Check pressure build-up time on point no.65 (by Micro Chronometer, pressure gauge and pressure switch of Test Box H). If it is less than 1.17 sec., control orifice hole will be checked. 2. Pressure control valve will be repaired. 3. Defective control valve will be replaced. 4. Torque limit of cap screws will be checked (20 Nm) on shifter assembly.
5.	Temperature too high.	<ol style="list-style-type: none"> 1. Oil level too low. 2. Oil cooler blocked. 3. Converter pressure not proper. 4. Converter holding valve defective. 	<ol style="list-style-type: none"> 1. Oil level checking shall be carried out at 80° C & 40° C at 1000 rpm for higher and lower level. If less, it should be recouped. 2. Then oil temperature difference at inlet and outlet of oil cooler will be checked. If 8 to 10° C difference is not available, it shows that cooler needs cleaning. 3. If temperature difference at cooler is correct, converter inlet and outlet pressure will be checked at point 51 & 63 (Nominal value is 5-7 bar at inlet and 3-6 bar at outlet, 1000 rpm, temperature range 80 to 100° C). If it is OK, then it shows that vehicle is being driven in wrong speed. 4. If temperature in step 3 above is high, then it indicates problem in converter control valve. Repair the control valve by checking of spool & spring and change if needed.

S. No.	Faults	Probable Causes	Remedial Actions.
		5. Converter relief valve defective.	5. If converter inlet and outlet pressure is low, then there may be problem in converter relief valve. Change it with new valve.
		6. Converter sealing may be worn-out.	6. If relief valve is OK, then converter sealing should be checked and repair will be carried out after dismantling of gear box.
6.	No drive transmission in all speed.	1. Low level of oil. 2. Cardon shaft may be damaged. 3. Main pressure too low. 4. Electrical supply cut off.	1. Check oil level as per s.no.3, item no.1 and recoup if required. 2. Check cardon shaft and its coupling from engine to converter. Replace/repair if damaged. 3. Check main pressure at 65 no. point. If pressure is less than 12 bar, take action as per s.no.1, item no.2. 4. If pressure at 65 no. point is 12-14 bar, current will be checked with the help of PR49 test kit - i) If no current in above, 5 Amp fuse may be damaged. Replace the fuse.

S. No.	Faults	Probable Causes	Remedial Actions.
7.	No function in 1st & 2nd speed.	<ol style="list-style-type: none"> 1. Cut off switch in ON position. 2. Current not supplied on corresponding solenoid. 3. Control valve assembly gets defective. 4. Pressure switch of brake circuit defective. 5. Solenoid defective. 	<ol style="list-style-type: none"> 1. Cut off switch should not be in operated condition. 2. Current at solenoids M1, M2, M3 and M5 will be checked with Pr.49. Test Kit. Prescribed current is 0.25 to 0.5 Amp. 3. If current input is OK, control valve assembly needs repairing. 1. If current on solenoids as per coding is not available, it indicate wrong coding, then pressure cut off switch will be checked by pressure 49. If there is no reaction, pressure switch of brake circuit is defective. 5. If coding is OK but signal is not coming, then change defective solenoid.
8.	Reduced Tractive Power and increased temperature.	<ol style="list-style-type: none"> 1. Converter outlet pressure too low due to- <ol style="list-style-type: none"> i) Converter relief valve may be defective. ii) Suppression speed not OK (Maximum rpm of engine i.e. 1800 should not drop). iii) Wrong coding. 	<ol style="list-style-type: none"> 1. Converter output pressure will be checked at point no.63. If pressure is found below 5 bar, converter relief valve should be checked at point no.51 (inlet). If pressure is found correct 12-14 bar, suppression speed will be measured by: <ol style="list-style-type: none"> a) Applying brake above 3 bar, b) Then put gear in 3rd speed. c) And increase the rpm upto maximum. Where the rpm needle stops, that is the suppression speed.

S. No.	Faults	Probable Causes	Remedial Actions.
		<p>2. Hydraulic circuit may be defective.</p>	<p>If suppression speed is correct, solenoid selection will be checked. If suppression speed is high, diesel supply of engine and diesel filter will be checked.</p> <p>2. Hydraulic working will be checked if no defect is found in item 1 above.</p>
9.	Lock-up clutch not functioning.	<p>Lock-up clutch pressure too low/no pressure due to -</p> <p>1. Lock-up clutch may be defective.</p> <p>2. Inductive transmitter may be defective.</p> <p>3. Solenoid M5 may be defective.</p>	<p>Check lock-up clutch pressure at measuring point 66.</p> <p>1. If pressure is correct i.e. 12+2 bar then lock-up clutch have mechanical defect. Torque converter will need repair at workshop.</p> <p>2. If there is no pressure at point 66, signal will be checked by Pr49/Pr 78A. If there is no signal, check inductive transmitter and cable harness.</p> <p>3. If signal test in step 2 above is OK, solenoid M5 is defective and need to be replaced.</p>

III. Machine General

S. No.	Faults	Probable causes	Remedial Actions
1.	Tamping Unit not lowering	<p>1. No hydraulic pressure.</p> <p>2. Battery is not connected to bus bar</p> <p>3. Electrical and Pneumatic switch is not properly 'ON' in working cabin.</p>	<p>Note: Before proceeding further, Check whether the lock is opened properly, transducer chord wire, transducer, fork or for any mechanical damage.</p> <p>1. Put Hyd. Multi station switch to position1. Pressure gauge should read 120-140 bar if not.</p> <p>(i) 38-17 system pump defective, shaft broken etc. replace it.</p> <p>(ii) Unloader valve defective, replace it.</p> <p>(iii) Safety valve defective, replace it.</p> <p>2. Check connection and ensure that voltmeter on engine panel is indicating voltage.</p> <p>3. Check switch. If the switch is proper, input signal X22 and X23 should come. Voltmeter fitted on lower panel of working cabin will read the voltage as indicated below:-</p> <p>Position1, power supply to programmer +12 V</p> <p>Position2, power supply to programmer +24 V</p> <p>Position3, power supply to Leveling system +24 V</p> <p>Position4, power supply to Lining system +24 V</p> <p>Position5, power supply to Proportional system +24 V</p> <p>Position6, power supply to Locking system +24 V</p> <p>Position7, power supply to Motor system1 +24 V</p> <p>Position8, power supply to Motor system2 +24 V</p> <p>If not , check PCB EK812, battery and alternator</p>

S. No.	Faults	Probable causes	Remedial Actions
		4. Voltmeter not reading	4. i) Check relay 13 d9 in electrical Box No.13, replace if faulty. ii) Check whether Hydraulic pressure & voltage is OK. iii) Check a) Sub routine QO4-XO4 for RH Unit . b) Sub routine QOB-XOB for LH Unit. QO4-XO4 should indicate if not check- i) When RH pedal operated, X91 indication should come. If not, pedal switch is faulty ,replace it. ii) X20 Indication should not come (half automatic switch 1X 'ON'). If 'ON' change the position of auto switch to NORMAL. iii) X50 Indication should not come (Half automatic switch 2X 'ON'). If 'ON' change the position of auto switch to NORMAL. iv) X24 or X96 and X23 should be 'ON' position ,if not, check switch for its operation. v) QO9-X09, QO8-XO8 should not be 'ON'. vi) X56 working stop should be 'ON'. vii) X1C tamping unit lateral lock should not be 'ON'. If 'ON', check the sensor of lateral lock. i) X1D tamping unit upper lock should not be 'ON'. If ON, check the limit switch of upper position lock.
2.	RH Tamping Unit not lowering.		QOB-XOB should come on multi check . If not, then check, i) LH tamping unit pedal operated, X90 indication should be 'ON', if not, check pedal switch.
3.	LH Tamping unit not lowering..		

S. No.	Faults	Probable causes	Remedial Actions
4.	Plain track operation (both tamping unit lowered together) not functioning.		<ul style="list-style-type: none"> ii) Main Switch P&C X26 should be 'ON'. If not, check the main switch iii) Conditions (iv) to (viii) of item-2 are fulfilled. <ol style="list-style-type: none"> 1. When the indications QO4-XO4 and QOB-XOB indications do not come. Then check:- <ul style="list-style-type: none"> i) LH T/Unit upper position X13 should come. If not, check the relay Re6 (EL-T277) of PCB EK132. ii) RH T/Unit upper position X14 should come. If not, check the relay Re6 of PCB EK132. iii) QOC-XOC should be 'ON'. If not, change the position of Automatic switch to 'ON'. iv) When RH T/Unit pedal pressed, X91 should indicate. 'ON'. If not, check pedal switch. v) Q61-X61 should not indicate, if indication comes, switch 'OFF' lining without tamping switch. vi) Main switch of plain track operated X25 should indicate, if not, check the switch. vii) Working stop switch X56 should indicate, if not, check it. viii) Q62-X62 should indicate. If not, check lock physically. 2. If indication QO4-XO4 & QOB-XOB is OK. Then check for deflection in galvanometer in respective position. If deflection of galvanometer is OK, then - <ul style="list-style-type: none"> i) The proportional valve is stuck up and needs to be replaced/ repaired. ii) Tamping unit up and down cylinder is defective. iii) Cable from panel box to proportional valve open- circuit.

Repair it.

S. No.	Faults	Probable causes	Remedial Actions
5.	Tamping unit not going up.		iv) PCB EK 132 defective. Replace/repair it. Check electrical and pneumatic switches are 'ON' and their respective LED are glowing. Check hydraulic pressure which should be 120 to 140 bar. i) X90 should not glow. If glowing, pedal switch is faulty, requires replacement. ii) X91 should not glow. If glowing pedal switch is faulty, requires replacement. iii) Tamping tools may be obstructed by rail foot or by ST sleeper. Remove it manually. iv) Proportional valve may be faulty, replace, if required. v) Tamping unit up and down cylinder piston rod may be broken or slipped off from the unit. vi) EK132 may be faulty, replace if required. vii) PCB EK813 may be faulty, voltage can be checked by multi check and replace, if required. viii) Transducer should be checked for proper voltage.
6.	Lining is not taking place.		Ensure that - i) Electrical & Pn. switches are 'ON'. ii) All the tolleys are down on the track and their respective limit switch is operated. iii) Lining chord wire is given tension. iv) Datum towards left or right is given. v) Hyd. pressure within 120 to 140 bar.

S. No.	Faults	Probable causes	Remedial Actions
			<p>Both red & yellow LED for Sub Routine QOA-XOA should glow, after fulfilling the following conditions:</p> <ol style="list-style-type: none"> 1. SR61 (lining without tamping) should glow. If not, check the following:- <ol style="list-style-type: none"> i) X1F should glow, if not, adjust gap of track sensor LHS. ii) X59 should glow, if not, adjust gap of track sensor RHS. iii) X27 should glow, if not derailment bridging switch may be faulty. iv) X24 should not glow, if glowing, change the position of automatic tamping switch. v) X96 should not glow, if glowing, change manual squeezing switch. vi) X91 should glow, if not glowing, check the pedal switch. vii) X10 should glow, if not, change lining automatic start switch. 2. X19 should glow, if not lining trolley pre-load to right switch may be faulty, or X1A should glow, if not lining trolley pre-load to left switch may be faulty. 3. X10 should glow, if not, check the position of lining automatic start switch. 4. X1B should not glow, if glowing, check limit switch of measuring trolley lock , adjust if required. 5. X1E should not glow, if glowing, limit switch of front bogie lock should be adjusted. 6. X57 should glow, if not, adjust limit switch of LH lifting unit in unlocked condition. 7. X58 should glow, if not, adjust limit switch of RH lifting unit in unlocked condition.

S. No.	Faults	Probable causes	Remedial Actions
7.	Lifting Unit not lifting.	<p>1. Electrical problem</p> <p>2. Lifting Unit not lifting up when switch X28 for lifting unit fully up position is put to 'ON'.</p> <p>3. QL22 both red & yellow LED glows with reduced light –</p> <p>4. QL22 Red LED glows but yellow LED does not glow-</p>	<p>8. After glowing SROA, QL20 should indicate. If not, check relay 7002/S4 & 4 amp micro fuse for it. Replace if required.</p> <p>1. Ensure battery is connected to Bus bar.</p> <p>2. i) Ensure that electrical main switch X23 and Pneumatic system 'ON', switch X22 is operated and input signal X22 & X23 are coming. ii) If no input signal, check relay 13d9 in electrical box No.13 and replace if faulty. iii) Check emergency stopper in working cabin and release latch.</p> <p>2.i) X28 indication should come. If not, check the switch. ii) QL22 for LHS & QL24 for RHS should operate, red LED should extinguish and yellow LED should glow.</p> <p>3.i) Electrical solenoid of LHS lifting unit is open circuited, rectify it. ii) Cable up to solenoid is open circuit, rectify open circuit.</p> <p>4.i) Check 4A micro fuse of circuit QL1 & 2, replace if necessary. ii) Check relay 7002/S4 of circuit QL2, replace if necessary. iii) Check solenoid for short circuit. iv) For Auto-lifting Sub routine 06 should glow. If not, check the followings: - a) Pre-selector hook X72 or pre-selector roller clamp X73 is 'ON' and indication X72 or X73 is coming, if not, check pre-selector switch. b) LH hook is not in down position and indication X40 is not 'ON'. If 'ON', transistor array at 6u5 may be faulty.</p>

S. No.	Faults	Probable causes	Remedial Actions
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- c) Lifting unit is properly resting on rail and track sensor indication X1F or derailment bridging indication X27 is 'ON'. If not , adjust the gap of sensor.
 - d) QO5-XO5 indication is coming. If not , check limit switch of lining unit.
 - e) Levelling chord tight indication X12 is 'ON', if not , check chord wire.
 - f) Lifting start switch X4A is 'ON' & indication X4A is coming, If not , check the switch.
 - g) RHS Tamping unit switch X2A is not 'ON' & indication X2A is not coming, if so, check the switch.
 - h) Rear feeler rod limit switch is operated and signal XAE is 'ON, If not , adjust the limit switch.
 - v) For Manual Lifting
 - a) X23 Main switch circuit "ON" and indication is coming, If not , check the switch.
 - b) X4A lifting start switch 'ON', If not , check the switch.
 - c) X7A manual lifting LH switch 'ON' , If not , press the manual lifting switch.
 - d) X57 and X58 lining unit unlock indication is 'ON', If not , unlock the unit or check limit switch.
- OR
- a) X23 main switch circuit 'ON' and indication is coming, if not , check the switch.
 - b) X28 tamping unit fully up position switch 'ON'.
 - c) LHS and RHS hook in upper position and X42 and X43 indication is 'ON'
 - c) Pre-selector roller clamp not "ON" & indication X73 is not 'ON'.

S. No.	Faults	Probable causes	Remedial Actions
	<p>5. QL.22 Yellow LED is glowing but not lifting.</p> <p>6. No hydraulic pressure (multi station switch in position 1 and gauge indicate no hydraulic pressure).</p>	<p>5. Check deflection in galvanometer for servo valve putting toggle switch to LH, If no deflection –</p> <p>i) Servo valve may be defective.</p> <p>ii) EK 2041 may be defective., replace if defective.</p> <p>iii) Check electrical connection of Servo valve. Coupler wire should not be short circuited.</p> <p>6. i) 38/17 Hydraulic pump defective or shaft broken. Replace if defective.</p> <p>ii) Check unloader valve and replace if defective.</p> <p>iii) Check Safety valve defective, replace defective item and ensure that the pressure is between 120 – 140 bar.</p>	
<p>8. Forward working drive not taking place.</p>		<p>Note : Similarly RHS Unit can also be checked.</p> <p>1. Electrical problem</p>	<p>1. Ensure battery is connected to Bus bar.</p> <p>2. SR 08 is not glowing i.e. both red and yellow LED.</p> <p>3. Ensure main switch X23 and pneumatic switch X22 is operated.</p> <p>4. i) First condition:-</p> <p>a) X94 Pedal switch in RHS or X95 pedal switch in LHS 'ON' and indication is coming.</p> <p>b) Main switch for plain track X25 or P&CX26 should be 'ON' and indication is coming.</p> <p>c) X53 Hydraulic working brake should be 'ON'. If X53 is 'ON' and no indication, check pressure switch.</p> <p>d) Sub-routine 60 is satisfied. If not, check hydraulic working brake pressure switch.</p>

S. No.	Faults	Probable causes	Remedial Actions
			<p>e) Sub-routine QBD-XBD should not be 'ON'. If 'ON', switch off automatic cycle switch.</p> <p>f) Sub routine QO6-XO6 & QO7-XO7, indicating lifting start for LH & RH is not 'ON'.</p> <p>g) X44 and X45 indicating working drive reverse is not 'ON'.</p> <p>ii) Second condition :-</p> <p>a) Main switch to plain track working X25 'ON'.</p> <p>b) X91 Pedal switch tamping unit RH 'ON', if not, check pedal switch.</p> <p>c) Half Automatic switch X20 'ON', if not check position of switch.</p> <p>d) Item no.(d) to (g) of condition 4(i) should be fulfilled.</p> <p>iii) Third condition :-</p> <p>a) Main switch for plain track working X25 is 'ON', if not, check main switch.</p> <p>b) X91 RH Tamping Unit pedal switch 'ON', if not, check pedal switch.</p> <p>c) X50 Half automatic switch 'ON', if not, check position of switch.</p> <p>d) Sub-routine Q6B should not be 'ON'. If SR 08 is 'ON', and still machine is not moving. Then check:-</p> <p>i) Pneumatic pressure should be more than 3.8 bar if not, check pn. pressure switch.</p> <p>ii) Check working drive motor, replace if damaged.</p> <p>iii) Check work drive gear box, replace if required.</p> <p>iv) Check work drive cardon shaft, replace if required.</p> <p>v) Check distributor gear box, replace if required.</p> <p>vi) Check, whether brakes are applied.</p>

S. No.	Faults	Probable causes	Remedial Actions
9.	Machine travel drive not taking place.(forward or reverse).	1. When electrical main switch and pneumatic switch are in 'ON' position, Q1B should glow. 2. All locked' indication 5b17 and 11b17 not glowing.	1. i) X52 measure run recorder should be 'ON' ii) X53 Hyd. working brake should be 'ON'. iii) E2 Axle gear box (I) should be disengaged. iv) E3 Axle gear box (II) should be disengaged. Relay 7u1/D will energize causing contact 1 & 7 to close providing earth for relay 28u2 which will cut off supply to cable G4 & G7 extinguishing of lamp h3. 2. Check in working cabin, glowing of following LED's: i) Rear Trolley locking indication 23h8, 23b20. ii) Measuring trolley lock indication 23 h 21. iii) Tamping unit lateral locking indications 23h 10, 23 h 9. iv) Tamping unit upper locking indications 23 h 17, 23 h 23. v) Lining bogie locking indication 23 h 18. vi) Lifting unit locking indications 23 h 19, 23 h 14. vii) Front trolley locking indication 23 h 16 is 'ON'. viii) Additional lift LH inward close. ix) Additional lift RH inward close. x) Supply through 23u/1, 23u/2, 23u/3,23u/4 relays. All the items (i) to (ix) should be physically checked for proper locking and for proper contact of limit switches.

S. No.	Faults	Probable causes	Remedial Actions
10.	Lifting Unit not lowering.	<p>3. All locking indications 5h17 & 11h17 are glowing but M/c is still not moving.</p> <p>1. Lifting Unit not coming down when X28 switch is put on full down position.</p> <p>2. Both Red & Yellow LED's of QL 23 for LH clamp lowering are glowing.</p> <p>3. Both Red & Yellow LED's of QL 25 for RH clamp down glowing.</p>	<p>3. Check: -</p> <p>i) Pn switch 1b 113 near ZF gear box.</p> <p>ii) Limit switch for disconnection of axle gear box 1b185, 1b291 & 1b 321 for proper disconnection.</p> <p>iii) ZF key for proper contact (Pn. Brake applied should be released automatically).</p> <p>iv) Brake switch 1b33 in brake panel box.</p> <p>v) Releasing of hydraulic brake relay 13d9. 3rd contact.</p> <p>vi) ZF pressure</p> <p>Check electrical main switch X23 & Pn. switch X22 is 'ON' and indication is coming.</p> <p>All electrical systems are 'ON' and system pressure is indicating on pressure gauge when multi- station switch at position no.1.</p> <p>1.</p> <p>i) Check X28 yellow LED glowing. If not, switch is defective.</p> <p>ii) Q16 & Q17 red LED should glow.</p> <p>iii) QL23 & QL25 red LED should extinguish and yellow LED should glow.</p> <p>2. i) If red & yellow LED's glows with reduced brilliancy, solenoid for LH clamp lowering 1S26B is open-circuited, rectify it.</p> <p>ii) Electrical cable to 1S26B is open circuited, rectify it.</p> <p>3. If red & yellow LED's glow with reduced brilliancy, solenoid of RH clamp lowering open-circuited for cable to solenoid open-circuited. Rectify it.</p>

S. No.	Faults	Probable causes	Remedial Actions
	<p>4. QL23 yellow LED does not glow, only red is glowing.</p>	<p>4. QL23 yellow LED does not glow, only red is glowing.</p>	<p>4. Check signal Q16. If no signal on Q16, check : FIRST CONDITION:- (Manual lowering of lifting unit while tamping)- i) X23 main switch 'ON'. ii) X4A lifting start switch 'ON'. iii) X7A manual lifting switch LH 'ON'. iv) X28 switch should not be 'ON' v) Sub-routine Q06-X06 should not be 'ON'. SECOND CONDITION:- (Automatic lowering of lifting unit while tamping) i) Sub routine Q04-X04 should be 'ON'. ii) X12 leveling chord tight switch should be 'ON'. iii) X32 over-lift cut-off signal 'ON' iv) Long sleepers LH switch X48 should not be 'ON'. v) Manual lifting signal X7A should not be 'ON'.</p>
	<p>5. QL 23 is not glowing but Q16 is glowing.</p>	<p>5. i) 4Amp micro fuse of 0 and 3 circuit may be fused, replace it. ii) Relay 7002/S4 of QL23 may be defective, replace if necessary.</p>	
	<p>6. QL 23 yellow LED is glowing but lifting unit not lowering.</p>	<p>6. i) Check servo valve. ii) Check PCB EK 2041.</p>	

Note: In the same manner RH side is to be checked. In this case QL25 and Q17 is to be checked.

S. No.	Faults	Probable causes	Remedial Actions
11.	3 rd rail not lifting in automatic mode.	When electrical & Pn. System is 'ON' & Hyd. Pressure applied with other system 'ON' but LH side lifting not taking place.	<p>QLC6 should operated, yellow LED should glow & red LED should extinguish. If not, check:-</p> <ul style="list-style-type: none"> i) SR66, it should glow. ii) XC9 for additional lift hook lock should be 'ON'. If not check switch on panel 34(remote). iii) XE5 for additional lift LH travel position should be OFF, if 'ON', check limit switch. iv) XCA for additional lifting unit longitudinal forward should be OFF. If not, check the switch. v) XCB for additional lifting unit longitudinal reverse should be OFF. If not, check the switch. vi) XC6 for additional lift manual lifting should be OFF. If not, check the switch. vii) XC7 for additional lift manual lowering should be OFF. If not, switch may be faulty. viii) XC4 for cantilever arm outward should be OFF. If not, check the switch. ix) XC5 cantilever arm inward should be OFF. If not, check the switch. x) XCC for derailment of 3rd bridging should be 'ON', if not, check sensor or gap to be adjusted. xi) XDE for additional lift unit lock LH should be off, if 'ON', check limit switch for its locking. xii) XC2 for pre-selector additional lift LH should be 'ON', if not, check switch on remote.

S. No.	Faults	Probable causes	Remedial Actions
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Note: During automatic lifting of 3rd rail, none of the switch on remote control to be operated, otherwise lifting will be cut OFF. For locking of 3rd rail, mechanical lock should be opened and lifting start switch on panel No. 22, X4A should be in OFF condition.

Note: In the same way RH side automatic lifting can be checked.

12. 3rd rail manual lifting not taking place.

Position control switch should be towards LHS & XC2 should glow.

For manual lifting QLC4 should glow, if not, check the following -

- a) XC2 should glow, if not, check position control switch.
- b) XC6 should glow, if not, switch on remote is faulty and requires replacement.
- c) Check relay 7002/S4 & micro fuse may be faulty and replace if necessary.

13. 3rd rail manual lowering is not taking place for LHS

For manual lowering, QLC5 should indicate. If not, check the following:

- a) XC2 should glow, if not check position switch.
- b) XC7 should glow, if not, check the switch on remote control & change if required.
- c) QLC5 should be 'ON', if not, check the relay 7002/S4 and 4 amp micro fuse, replace if required.

Note: In the same way RHS can be checked.

S. No.	Faults	Probable causes	Remedial Actions
14.	3 rd rail cantilever is not coming out for LHS		Ensure:- i) Electrical switch X23 should be 'ON', if not, switch is faulty and requires replacement. ii) Pn. Switch X22 should be 'ON', if not, switch is faulty and requires replacement. iii) Hyd. Pressure should be switch with in 120 to 140 bar, then- a) Position control switch on remote control should be towards LHS & XC2 should glow, if not, switch is faulty and requires replacement. b) Cantilever switch in remote control should be operated and XC4 should glow, if not switch is faulty and requires replacement. c) After above two indications as (a) and (b), QLCO should operate & yellow LED should glow, if not check the following: <ul style="list-style-type: none"> • XC2 should glow, if not, check position control switch. • XC4 should glow, if not, check the switch. • XC1 should not glow, if glowing, mechanical lock may not be opened or limit switch is faulty and requires replacement or adjustment to be done.
15.	3 rd rail canti-lever is not going inward for LHS.		<ol style="list-style-type: none"> 1. Position control switch should be towards LHS & XC2 should glow, if not, check the switch. 2. Cantilever switch inward in the remote control to be operated & XC5 should glow, if not, check the switch.

S. No.	Faults	Probable causes	Remedial Actions
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16. L.H. outside roller clamp is not getting close.

i) Hydraulic problem

3. After above two indications as in (1) and (2), QLC1 should operate & yellow LED should glow, if not, check the micro-fuse & relay 7002/S4.

Check 24V supply at coupler of valve for L.H outside roller clamp close by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.

- i) Operate the 4-way valve for L.H. outside roller clamp close. If clamp is not operating, then valve may be stick up. Replace the valve.
- ii) If spool of valve is moving freely but clamp is still inoperative, Then hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar
- iii) Safety valve of the circuit should be set at 210 bar.
- iv) Unloader valve should be set at 140-160 bar.
- v) Single pump may also not delivering the oil. Check and do the needful.
- vi) Suction filter of clamp circuit may also be choked. Check and change if required.

ii) Electrical problem

If by operating the concerned hydraulic valve manually, L.H. outside clamp is getting close then problem is in electrical circuit. Check it as follows.

S. No.	Faults	Probable causes	Remedial Actions
17.	R.H. outside roller clamp is not getting close.	i) Hydraulic problem	<p>i) Operate all the electrical controls and check the following.</p> <p>a) Q67→X67 should come on multi check. If not coming then check all the conditions of Q67→X67 from programme logic on multi check and do the needful.</p> <p>b) Switch for roller clamp L.H. inner should be in off position.</p> <p>c) QBF→XBF should not come on multi check. If coming, then check the conditions of QBF→XBF from programme logic and do the needful.</p> <p>ii) Relay QL5A may also be damaged. Check and do the needful.</p> <p>iii) Fuse for QL5A may also be blown. Check and do the needful.</p> <p>Check 24V supply at coupler of valve for R.H outside roller clamp close by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <p>i) Operate the 4-way valve for R.H. outside roller clamp close. If clamp is not operating, then valve may be stick up. Replace the valve.</p> <p>ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar</p>

S. No.	Faults	Probable Causes	Remedial Actions.
18.	L.H. outside roller clamp is not getting open.	i) Hydraulic problem ii) Electrical problem	iii) Safety valve of the circuit should be set at 210 bar. iv) Unloader valve should be set at 140-160 bar. v) Single pump may also not delivering the oil. Check and do the needful. vi) Suction filter of clamp circuit may also be choked. Check and change if required. If by operating the concerned hydraulic valve manually, R.H. outside clamp is getting close then problem is in electrical circuit. Check it as follows. i) Operate all the electrical controls and check the following. a) Q68→X68 should come on multi check. If not coming then check all the conditions of Q68→X68 from programme logic on multi check and do the needful. b) Switch for roller clamp R.H. inner should be in OFF position. c) QBF→XBF should not come on multi check. If coming, then check the conditions of QBF→XBF from programme logic and do the needful. ii) Relay QL5E may also be damaged. Check and do the needful. iii) Fuse for QL5E may also be blown. Check and do the needful. Check 24V supply at coupler of valve for L.H outside roller clamp open by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.

S. No.	Faults	Probable Causes	Remedial Actions.
			<ul style="list-style-type: none"> i) Operate the 4-way valve for L.H. outside roller clamp open. If clamp is not operating, then valve may be stick up. Replace the valve. ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar iii) Safety valve of the circuit should be set at 210 bar. iv) Unloader valve should be set at 140-160 bar. v) Single pump may also not delivering the oil. Check and do the needful. vi) Suction filter of clamp circuit may also be choked. Check and change if required.
	ii) Electrical problem		<p>If by operating the concerned hydraulic valve manually, L.H. outside clamp is getting open then problem is in electrical circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Either preselector switch for L.H. clamps and switch for L.H. inner clamp are not in ON position or preselector switch for L.H. hook is in OFF position or switch for lifting unit fully up is in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from programme logic.

S. No.	Faults	Probable Causes	Remedial Actions.
19.	R.H. outside roller clamp is not getting open.	i) Hydraulic problem	<p>ii) Preselector switch for L.H. hook and preselector switch for L.H. roller clamp should be in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and do the needful.</p> <p>iii) Relay QL5B may also be defective. Check and do the needful.</p> <p>iv) Fuse for relay QL 5B may also be blown. Check and do the needful.</p> <p>Check 24V supply at coupler of valve for R.H outside roller clamp open by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <p>i) Operate the 4-way valve for R.H. outside roller clamp open. If clamp is not operating, then valve may be stick up. Replace the valve.</p> <p>ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar.</p> <p>iii) Safety valve of the circuit should be set at 210 bar.</p> <p>iv) Unloader valve should be set at 140-160 bar.</p> <p>v) Single pump may also not delivering the oil. Check and do the needful.</p> <p>vi) Suction filter of clamp circuit may also be choked. Check and change if required.</p>

S. No.	Faults	Probable Causes	Remedial Actions.
		ii) Electrical problem	<p>If by operating the concerned hydraulic valve manually, R.H. outside clamp is getting open then problem is in electrical circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Either preselector switch for R.H. clamps and switch for R.H. inner clamp are not in ON position or preselector switch for R.H. hook is in OFF position or switch for lifting unit fully up is in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from programme logic. ii) Preselector switch for R.H. hook and preselector switch for R.H. roller clamp should be in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and do the needful. ii) Relay QL5F may also be defective. Check and do the needful. iii) Fuse for relay QL 5F may also be blown. Check and do the needful.
20.	L.H. Inner roller clamp is not getting open.	i) Hydraulic problem	<p>Check 24V supply at coupler of valve for L.H inner roller clamp open by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Operate the 4-way valve for L.H. inner roller clamp open. If clamp is not operating, then valve may be stick up. Replace the valve.

S. No.	Faults	Probable causes	Remedial Actions
	ii) Electrical problem		<p>ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar.</p> <p>iii) Safety valve of the circuit should be set at 210 bar.</p> <p>iv) Unloader valve should be set at 140-160 bar.</p> <p>v) Single pump may also not delivering the oil. Check and do the needful.</p> <p>vi) Suction filter of clamp circuit may also be choked. Check and change if required.</p> <p>If by operating the concerned hydraulic valve manually, L.H. inner clamp is getting open then problem is in electrical circuit. Check it as follows.</p> <p>i) Either preselector switch for L.H. clamps and switch for L.H. outer clamp are not in ON position or preselector switch for L.H. hook is in OFF position or switch for lifting unit fully up is in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from programme logic.</p> <p>ii) Preselector switch for L.H. hook and preselector switch for L.H. roller clamp should be in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and do the needful.</p> <p>ii) Relay QL5B may also be defective. Check and do the needful.</p>

S. No.	Faults	Probable causes	Remedial Actions
			<p>condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from programme logic.</p> <p>ii) Preselector switch for R.H. hook and preselector switch for R.H. roller clamp should be in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and do the needful</p> <p>iii) Relay QL5F may also be defective. Check and do the needful.</p> <p>iv) Fuse for relay QL 5F may also be blown. Check and do the needful.</p>
22.	L.H. inner roller clamp is not getting open.	i) Hydraulic problem	<p>Check 24V supply at coupler of valve for L.H inner roller clamp open by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <p>i) Operate the 4-way valve for L.H. inner roller clamp open. If clamp is not operating, then valve may be stick up. Replace the valve.</p> <p>ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar</p> <p>iii) Safety valve of the circuit should be set at 210 bar.</p> <p>iv) Unloader valve should be set at 140-160 bar.</p>

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	v) Single pump may also not delivering the oil. Check and do the needful. vi) Suction filter of clamp circuit may also be choked. Check and change if required. If by operating the concerned hydraulic valve manually, L.H. inner clamp is getting open then problem is in electrical circuit. Check it as follows. i) Either preselector switch for L.H. roller clamp and switch for L.H. outer clamp are in OFF position or preselector switch for L.H. hook or switch for lifting unit fully up is in OFF position and condition Q67→X67 should come on multi check. If not coming then check all the conditions of Q67→X67 from programme logic on multi check and do thr needful. b) Switch for roller clamp L.H. inner should be in off position. c) QBF→XBF should not come on multi check. If coming, then check the conditions of QBF→XBF from programme logic and do the needful. ii) Relay QL5D may also be damaged. Check and do the needful. iii) Fuse for QL5D may also be blown. Check and do the needful.
23.	L.H. inner roller clamp is not getting close.	i) Hydraulic problem	Check 24V supply at coupler of valve for L.H. inner roller clamp close by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.

S. No.	Faults	Probable causes	Remedial Actions
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- i) Operate the 4-way valve for L.H. inner roller clamp close. If clamp is not operating, then valve may be stick up. Replace the valve.
- ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar
- iii) Safety valve of the circuit should be set at 210 bar.
- iv) Unloader valve should be set at 140-160 bar.
- v) Single pump may also not delivering the oil. Check and do the needful.
- v) Suction filter of clamp circuit may also be choked. Check and change if required.

ii) Electrical problem

If by operating the concerned hydraulic valve manually, L.H. inner clamp is getting close then problem is in electrical circuit. Check it as follows.

- i) Operate all the electrical controls and check the following.
 - a) Q67→X67 should come on multi check. If not coming then check all the conditions of Q67→X67 from programme logic on multi check and do the needful.
 - b) Switch for roller clamp L.H. outer close should be in OFF position.
 - c) QBF→XBF should not come on multi check. If coming, then check the conditions of QBF→XBF from programme logic and do the needful.

S. No.	Faults	Probable causes	Remedial Actions
			<ul style="list-style-type: none"> ii) Relay QL5C may also be damaged. Check and do the needful. iii) Fuse for QL5C may also be blown. Check and do the needful.
24.	R.H. inner roller clamp is not getting close.	<ul style="list-style-type: none"> i) Hydraulic problem ii) Electrical problem 	<p>Check 24V supply at coupler of valve for R.H inner roller clamp close by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Operate the 4-way valve for R.H. inner roller clamp close. If clamp is not operating, then valve may be stick up. Replace the valve. ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar. iii) Safety valve of the circuit should be set at 210 bar. iv) Unloader valve should be set at 140-160 bar. v) Single pump may also not delivering the oil. Check and do the needful. vi) Suction filter of clamp circuit may also be choked. Check and change if required. <p>If by operating the concerned hydraulic valve manually, R.H. inner clamp is getting close then problem is in electrical circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Operate all the electrical controls and check the following.

S. No.	Faults	Probable causes	Remedial Actions
25.	R.H. inner roller clamp is not getting open.	i) Hydraulic problem	<p>a) Q68→X68 should come on multi check. If not coming then check all the conditions of Q68→X68 from programme logic on multi check and do the needful.</p> <p>b) Switch for roller clamp R.H. outer should be in OFF position.</p> <p>c) QBF→XBF should not come on multi check. If coming, then check the conditions of QBF→XBF from programme logic and do the needful.</p> <p>ii) Relay QL70 may also be damaged. Check and do the needful.</p> <p>iii) Fuse for QL70 may also be blown. Check and do the needful.</p> <p>Check 24V supply at coupler of valve for R.H inner roller clamp close by operating all the electrical controls. If it is existing there, then electrical circuit is OK and problem is in hydraulic circuit. Check it as follows.</p> <p>i) Operate the 4-way valve for R.H. inner roller clamp open. If clamp is not operating, then valve may be stick up. Replace the valve.</p> <p>ii) If spool of valve is moving freely but clamp is still inoperative, Then check hydraulic accumulator pressure at position 2 of pressure gauge selector, It should show 85 bar</p> <p>iii) Safety valve of the circuit should be set at 210 bar.</p> <p>iv) Unloader valve should be set at 140-160 bar.</p> <p>v) Single pump may also not delivering the oil. Check and do the needful.</p> <p>vi) Suction filter of clamp circuit may also be choked. Check and change if required.</p>

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	<p>If by operating the concerned hydraulic valve manually, R.H. inner clamp is getting open then problem is in electrical circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Operate all the electrical controls and check the following. ii) Preselector switch for R.H. roller clamp and switch for R.H. outer roller clamp are not in ON position or preselector switch for R.H. hook is in OFF position or switch for lifting unit fully up is in OFF position and condition Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and do the needful. iii) Relay QL71 may also be damaged. Check and do the needful. iv) Fuse for QL71 may also be blown. Check and do the needful.
26.	Rear tension trolley is not moving towards left hand	i) Pneumatic problem	<p>Check 24V supply at coupler of Pneumatic valve for rear tension trolley towards L.H. by operating all the electrical controls. If it is existing there then electrical circuit is OK and problem is in Pneumatic circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Operate the concerned Pneumatic valve. If trolley is not moving towards L.H. then valve may be stick up. Check and do the needful. ii) Pipe line between rear bogie tension cylinder and concerned pneumatic valve may be heavily leaking. Check and do the needful. iii) Gauge should show pneumatic pressure more than 4 bar. iv) 4-way valve 90345 may also be defective. Check and do the needful.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	iv) Either air oiler or water separator or overflow valve 90246 may be defective. Check and do the needful. If 24 V supply is not coming on the coupler of Pneumatic valve for rear tension trolley, then follow the electrical circuit as follows. i) Either switch for lining trolley preload to left and lining chord tensioning and main circuit switch should be in ON position and indication should come on multi check. OR ii) Switch for lining trolley preload to left and ling chord tensioning should be in OFF position and switch for tension bogie rear to L.H. ON track and main circuit switch should d be in ON position and indication should come on multi check. iii) Relay QL D6 may be defective. Check and do the needful. iv) Fuse for QLD6 may also be blown. Check and do the needful
27.	Rear tension trolley is not working towards right hand	i) Pneumatic problem	Check 24V supply at coupler of Pneumatic valve for rear tension trolley towards R.H. by operating all the electrical controls. If it is existing there then electrical circuit is OK and problem is in Pneumatic circuit. Check it as follows. i) Operate the concerned Pneumatic valve. If trolley is not moving towards R.H. then valve may be stick up. Check and do the needful.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	ii) Pipe line between rear bogie tension cylinder and concerned pneumatic valve may be heavily leaking. Check and do the needful. iii) Gauge should show pneumatic pressure more than 4 bar. iv) 4-way valve 90345 may also be defective. Check and do the needful. v) Either air oiler or water separator or overflow valve 90246 may be defective. Check and do the needful. If 24 V supply is not coming on the coupler of Pneumatic valve for rear tension trolley, then follow the electrical circuit as follows. i) Either switch for lining trolley preload to right and lining chord tensioning and main circuit switch should be in ON position and indication should come on multi check. OR ii) Switch for lining trolley preload to left and ling chord tensioning should be in OFF position and switch for tension bogie rear to L.H. ON track and main circuit switch should be in ON position and indication should come on multi check. iii) Relay QL D7 may be defective. Check and do the needful. iv) Fuse for QL D7 may also be blown . Check and do the needful.
28.	Measuring trolley is not moving towards left hand	i) Pneumatic problem	Check 24V supply at coupler of Pneumatic valve for measuring trolley towards L.H. by operating all the electrical controls. If it is existing there then electrical circuit is OK and problem is in Pneumatic circuit. Check it as follows.

S. No.	Faults	Probable causes	Remedial Actions
29.	L.H. hook is not getting lower	i) Hydraulic problem ii) Electrical problem	i) Operate the concerned Pneumatic valve. If trolley is not moving towards L.H. then valve may be stick up. Check and do the needful. ii) Pipe line between measuring bogie tension cylinder and concerned pneumatic valve may be heavily leaking. Check and do the needful. iii) Gauge should show pneumatic pressure more than 4 bar. iv) 4-way valve 90345 may also be defective. Check and do the needful. v) Either air oiler or water separator or overflow valve 90246 may be defective. Check and do the needful. If 24 V supply is not coming on the coupler of Pneumatic valve for measuring trolley, then follow the electrical circuit as follows. i) Either switch for lining trolley preload to right and lining chord tensioning and main circuit switch should be in ON position and indication should come on multi check. OR ii) Switch for lining trolley preload to left and ling chord tensioning should be in OFF position and switch for measuring bogie rear to L.H. ON track and main circuit switch should be in ON position and indication should come on multi check. iii) Relay QL D8 may be defective. Check and do the needful. iv) Fuse for QL D8 may also be blown. Check and do the needful. Operate the spool of logic valve for L.H. hook lowering, if hook is not getting lowered then problem is in hydraulic circuit. Check it ads follows.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	i) Check accumulator pressure. It should be 85 Bar. ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar. iv) 38X17 pump may not delivering the oil v) Filter for 38X17 pump may be choked. vi) Hydraulic 4-way valve may also be defective. Check and do the needful. If hydraulic circuit is found Ok then problem is in electrical circuit. Check it as follows. i) Switch for LH hook down should be in ON position and signal should come on multi check or subroutine Q00→X00 should come on multi check and following conditions should also be fulfilled. a) Preselector switch for LH hook should be in ON position b) Switch for LH lining unit unlock should be in ON position and indication should come on multi check. c) Switch for LH hook always down should be in ON position and indication should come on multi check. d) If indication for all above conditions are not coming on multi check then check the lifting circuit.
30.	R.H. hook is not getting lower	i) Hydraulic problem	Operate the spool of logic valve for R.H. hook lowering, if hook is not getting lowered then problem is in hydraulic circuit. Check it as follows.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	i) Check accumulator pressure. It should be 85 Bar. ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar. iv) 38X17 pump may not delivering the oil v) Filter for 38X17 pump may be choked. vi) Hydraulic 4-way valve may also be defective. Check and do the needful. If hydraulic circuit is found Ok then problem is in electrical circuit. Check it as follows. i) Switch for RH hook down should be in ON position and signal should come on multi check or subroutine Q01→X01 should come on multi check and following conditions should also be fulfilled. a) Preselector switch for RH hook should be in ON position b) Switch for RH lining unit unlock should be in ON position and indication should come on multi check. c) Switch for RH hook always down should be in ON position and indication should come on multi check. d) If indication for all above conditions are not coming on multi check then check electrical circuit.
31.	R.H. hook is not going outward	i) Hydraulic problem	Operate the spool of concerned valve for R.H. hook outward. If hook is not going outward .Then problem is in hydraulic circuit. Check it as follows.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	i) Check accumulator pressure. It should be 85 Bar. ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar. iv) 38X17 pump may not delivering the oil v) Filter for 38X17 pump may be choked. If hydraulic circuit is found Ok then problem is in electrical circuit. Check it as follows. i) Condition Q63→X63 should be fulfilled and indication should come on multi check. ii) Condition Q06→X06 should not come on multi check. iii) Condition Q07→X07 should not come on multi check. iv) Preselector switch for RH hook should be in ON position and indication should come on multi check. v) RH lining unit should be in unlock condition and indication should come on multi check. vi) If any one of the above condition is not fulfilling, the relay QL72 may be defective. Check and do the needful. vii) Fuse for QL72 may also be blown. Check and do the needful.
32.	L.H. hook is not going outward	i) Hydraulic problem	Operate the spool of concerned valve for L.H. hook outward. If hook is not going outward. Then problem is in hydraulic circuit. Check it as follows. i) Check accumulator pressure. It should be 85 Bar.

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar. iv) 38X17 pump may not delivering the oil v) Filter for 38X17 pump may be choked. If hydraulic circuit is found Ok then problem is in electrical circuit. Check it as follows. i) Condition Q63→X63 should be fulfilled and indication should come on multi check. ii) Condition Q06→X06 should not come on multi check. iii) Condition Q07→X07 should not come on multi check. iv) Preselector switch for LH hook should be in ON position and indication should come on multi check. v) LH lining unit should be in unlock condition and indication should come on multi check. vi) If any one of the above condition is not fulfilling, the relay QL74 may be defective. Check and do the needful. vii) Fuse for QL74 may also be blown. Check and do the needful.
33.	R.H. hooks is not coming inward	i) Hydraulic problem	Operate the spool of concerned valve for R.H. hook inward. If the hook is not coming inward then problem is in hydraulic circuit. Check it ads follows. i) Check accumulator pressure. It should be 85 Bar. ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar.

S. No.	Faults	Probable causes	Remedial Actions
36.	LH Tamping Unit is not going towards RH	i) Hydraulic problem	<ul style="list-style-type: none"> ii) Switch for tamping unit lateral displacement should be in ON position and indication should come on multi check. iii) Switch for LH tamping unit displacement towards LH should be in ON position and indication should come on multi check. b) Or check following conditions. <ul style="list-style-type: none"> i) Indication Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and rectify if required. ii) Switch for LH tamping unit displacement towards LH should be in ON position and indication should come on multi check . c) If (a) or (b) are fulfilling then relay QL 32 may be defective. Check and do the needful. d) Fuse for QL32 may also be blown. Replace if required. <p>Operate the concerned 4-way hydraulic valve for LH tamping unit to RH movement. If unit is not moving towards RH then problem is in hydraulic circuit. Check it as follows.</p> <ul style="list-style-type: none"> i) Accumulator pressure gauge should indicate 85 Bar at position 1 of gauge selector. ii) Safety valve should be set at 175 Bar. iii) Unloader valve should be set at 140 bar. iv) 38X17 pump may not delivering the oil

S. No.	Faults	Probable causes	Remedial Actions
		ii) Electrical problem	<ul style="list-style-type: none"> v) Filter for 38X17 pump may be choked. vi) Double check valve HY 155.11 may also be choked. Replace it if required. a) If hydraulic circuit is found Ok then problem is in electrical circuit. Check it as follows. <ul style="list-style-type: none"> i) Main switch for plain track should be in ON position and indication should come on multi check. ii) Switch for tamping unit lateral displacement should be in ON position and indication should come on multi check. iii) Switch for LH tamping unit displacement towards RH should be in ON position and indication should come on multi check. b) Or check following conditions. <ul style="list-style-type: none"> i) Indication Q66→X66 should come on multi check. If not coming then check all the conditions for Q66→X66 from logic programme and rectify if required. ii) Switch for LH tamping unit displacement towards RH should be in ON position and indication should come on multi check . c) If (a) or (b) are fulfilling then relay QL 33 may be defective. Check and do the needful. d) Fuse for QL33 may also be blown. Replace if required.

IV. HYDRAULIC PUMP

S. No.	Faults	Probable Causes	Remedial Action
1.	Pump not delivering oil.	<ol style="list-style-type: none"> 1. Pump driven in wrong direction (at the time of new pump fitment, this problem may occur). 2. Oil level too low in the reservoir (if oil level is very low, aeration may take place and pump will not deliver oil). 3. Intake filter/pipe choked. 4. Air leaks at pump intake joints. 5. Broken pump shaft or rotor. 6. Pump speed too slow. (The delivery rate of discharge is prescribed at a certain rpm of engine. If engine speed become less than ideal speed, it may affect the proper suction of oil). 	<ol style="list-style-type: none"> 1. Check the pump rotation by hand priming. Pour the hydraulic oil into inlet port and rotate the shaft. See whether the oil is delivering through outlet port or not. If not, change the rotation according to the engine shaft rotation. 2. Check oil level in reservoir. It should be above minimum mark. If necessary, recoup the oil. 3. Clean or replace filter for proper flow of oil. 4. Pour hydraulic oil on intake joints and on observing abnormal sound, tighten the intake joint as required. 5. Replace the broken shaft or rotor. Also align the prime mover shaft 6. Pump should run at prescribed speed. Engine rpm should be checked.

S. No.	Faults	Probable Causes	Remedial Action
		7. Dirty suction filter.	7. Replace the filter.
		8. Faulty suction valve.	8. Repair or change the valve.
		9. Air in system.	9. Discharge air from the system.
		10. Pump drive inoperative.	10. i) Replace the broken pump shaft. ii) Change defective coupling.
		11. Clutch out of adjustment.	11. Adjust clutch.
		12. Pump is damaged.	12. Replace with new one.
2.	Pump makes noise	1. Aeration.	1i) Fill the reservoir with the oil up-to required level to prevent aeration. ii) Check condition of pump shaft seal. Change, if required.
		2. Intake line or suction filter partly clogged.	2. Clean or replace the filter or line.
		3. Pump running too fast.	3. Reduce speed up to prescribed limit.
		4. Coupling misaligned (Due to this bearing may get damaged, play at shaft may develop).	4. Realign the pump shaft and prime mover shaft.
		5. Reservoir not vented properly.	5. Air breather screening element should be cleaned.
		6. Suction filter too small in size.	6. Replace by proper size of filter.
		7. Air leaks at pump intake pipe joints and air drawn through inlet line.	7. Take action as explained in s.no.1, item no. 4.
		8. Oil viscosity too high. (In cold climate oil viscosity becomes high so no free flow will take place and cavitation will occur).	8. Start the engine for few minutes to warm-up the hydraulic oil used in machine for proper flow. Use only proper grade of oil.

S. No.	Faults	Probable Causes	Remedial Action
		9. Cavitation. 10. Shaft seal leaks. 11. Foams in oil. 12. Casing leaks. 13. Vane spring broken. 14. Any part of pump defective. 15. Foreign bodies in suction line. 16. System dirty. 17. Sharp bends in suction line. 18. Oil temperature too high. 19. Boost pump failed. 20. Vibration in system 21. Pump worn out or damaged.	9. i) Check condition of suction filter and return line filters. Clean or change as necessary. ii) Check clogging of inlet line. Clean or change as necessary. iii) Check loose fittings on suction lines. Tighten, if required. iv) Clean hydraulic tank breather. 10. Replace the seal. 11. Vent the system. 12. First tighten bolts, then check for cracks and sealing. 13. Change spring. 14. Replace defective parts. 15. Remove foreign bodies. Flush the system if required. 16. Flush the system 17. Eliminate or reduce the bends in suction line. 18. Check the hydraulic circuit. Oil cooler may be ineffective. Rectify the defect. 19. Check boost pump and repair as required. 20. Check unusual occurrence in the system 21. Pump should be replaced.
3	Pump overheats	1. Wrong oil grade. 2. Oil speed in system too high. 3. Oil level too low. 4. Pump rotor groove worn out 5. Radial or axial loading too high.	1. Fill oil as recommended. 2. Install pipes of proper size. 3. Fill the oil up to safe level 4. Change the worn out parts 5. Loading should be restricted to prescribed limit. Check alignment limit.

S. No.	Faults	Probable Causes	Remedial Action
		6. Initial speed rises 7. Inadequate cooling 8. Cooling system is dirty. 9. Differential pressure too low 10. Pressure too high 11. Wrong type of pressure valve 12. Wrong seal size 13. Filter dirty or too small. 14. Pump running speed high 15. Cavitation 16. Foams in oil 17. Venting dirty 18. System contaminated 19. Sharp bends in suction line 20. Boost pump failed	6. Check max. pressure. If needed replace with larger capacity and install pipe of nominal bore. 7. Increase cooling capacity. 8. Clean the cooling system. 9. Increase pressure setting of relief valve. 10. Reduce pressure setting. 11. Replace by appropriate type of valve. 12. Replace by suitable size of seal. 13. Clean filter or replace by larger size. 14. Reduce speed. 15. Bleed the system. 16. Vent the system. 17. Clean the vents. 18. Flush the system. 19. Eliminate bends or at least reduce them. 20. Check boost pump and repair as required.
4	Pump develops no pressure	1. Wrong pressure setting 2. Pressure valve spool stuck 3. Leakage in system 4. Pump shaft broken 5. System contaminated 6. Improper gasket and seal	1. Modify the pressure setting. 2. Repair/ Replace the valve. 3. Replace defective parts. 4. Replace shaft. 5. Flush the system completely. 6. Replace seals and gaskets.
5.	Speed loss on pump.	1. Inlet pressure too low. 2. Outlet pressure too high. 3. Oil temperature too high.	1. Increase pressure. 2. Check system pressure. 3. Check the circuit.

S. No.	Faults	Probable Causes	Remedial Action
6.	Pump does not work.	1. Pressure too low. 2. 'O' Ring on port plate defective. 3. Too much play in the shaft.	1. Increase pressure setting. 2. Replace 'O' Ring. 3. Replace bearing.
7.	Hydraulic oil overheated.	1. System pressure is too high. 2. Dirty oil 3. Oil level is low. 4. Hydraulic oil of incorrect viscosity. 5. Faulty cooling system. 6. Internal leakage of hydraulic oil due to worn pump, valve, motor and cylinder.	1. Adjust the pressure to the required limit. 2. Clean or change filters and strainers. 3. Fill up the oil to the upper mark. 4. Check oil for proper viscosity. If change of oil is required, flush the entire system and change filter before adding fresh oil. 5. Check oil cooler for trash on outside cooling surfaces. Clean with air pressure or steam pressure. 6. Overhaul or replace faulty components.
8.	Bearing failure.	1. Chips or other contaminants in bearing. 2. Coupling misaligned. 3. Inadequate lubrication. 4. Pump running too fast. 5. Excessive or shock loads. (Excessive loads due to operating pressure may damage the bearing).	1. Replace bearings and check intrusion of contaminants. 2. Align prime mover shaft and pump. 3. Lubricate system properly. 4. Adjust speed of prime mover. 5. Reduce operating pressure.

V. HYDRAULIC RELIEF VALVE

S. No.	Faults	Probable Causes	Remedial Actions
1.	Erratic pressure.	1. Foreign material in the oil. 2. Worn poppet valve or seat. (oil from pilot stage will go to tank due to worn poppet valve or seat and pressure will drop). 3. Piston sticking in main body.	1. Drain the oil, clean the tank and refill with clean oil. 2. Replace poppet valve or seat as required. 3. Clean piston after dismantling. Check free movement after re-assembling .
2.	Low pressure or no pressure.	1. Valve improperly adjusted. 2. Vent connection is open. 3. Balance hole in main piston choked. 4. Poppet in cover not seating. 5. Broken or weak spring. 6. Dirt, chip etc keeps valve partially open.	1. Adjust valve by adjusting knob to proper pressure setting. 2. Plug the vent connection. 3. Remove piston and clean the orifice. Clean the tank and replace hydraulic oil. 4. Check the poppet condition. If required, replace it. 5. Replace the spring and again set the pressure with adjusting knob. 6. Clean the complete valve.
3.	Excessive noise or chatter.	1. High oil velocity through valve. 2. Distorted control spring. 3. Worn poppet. 4. Vent line too long. 5. Valve pressure setting too close to that of another valve in circuit.	1. Check valve flow rating. Replace with larger valve, if necessary. 2. Replace spring. 3. Replace the poppet. 4. Replace restrictions e.g. needle valve or orifice. Plug in vent line next to the relief valve. 5. Set relief valve pressure at-least 150 PSI higher than other valves in circuit.

S. No.	Faults	Probable Causes	Remedial Action
4.	Valve do not function	1. Spool sticks. 2. Oil temperature too high. 3. Oil speed too high. 4. Internal leakage. 5. Tank line under high pressure. 6. Control line dirty.	1. Clean stuck spool. 2. Check the function of oil cooler and clean the radiator fins. 3. Check speed of the pump. 4. Prevent leakage. 5. Check pressure in tank line.
5.	Valve over-heating	1. System pressure too high. 2. Dirt in the system. 3. Spool sticks. 4. Spool defective	6. Clean lines properly. 1. Adjust the pressure. 2. Clean the system. 3. Check and clean spool. 4. Check and replace spool, if defective.

VI. HYDRAULIC UNLOADER VALVE

S. No.	Faults	Probable Causes	Remedial Actions
1.	Low or no pressure.	1. Orifice of main piston choked. 2. Vent connection open to tank. 3. Safety valve at zero setting 4. Broken or weak spring	1. Clean the orifice. 2. Plug the vent connection. 3. Set the safety valve at proper pressure. 4. Replace the spring.
2.	Fails completely to unload pump.	1. Valve pressure setting too high. 2. Valve spool binding in body. 3. Incorrect assembly. 4. Nil or low nitrogen pressure in the accumulator. 5. Punctured bladder.	1. Set valve at proper pressure. 2. Clean the spool or replace if required 3. Assemble as per proper drawing. 4. Check pressure and recharge the accumulator . 5. Change the bladder.

VII. HYDRAULIC MOTOR

S. No.	Faults	Probable Causes	Remedial Action
1.	Motor makes loud Noise.	<ol style="list-style-type: none"> 1. Vane spring broken. 2. Shaft seal leaks. 3. Casing leaks. 4. Oil temperature too high. 5. Motor parts defective. 	<ol style="list-style-type: none"> 1. Change the spring. 2. Replace the seal. 3. First tighten bolts, then check for cracks and sealing. 4. Check cooling circuits. 5. Replace defective parts. Tighten bolts uniformly.
2.	Motor overheats	<ol style="list-style-type: none"> 1. Motor is of under capacity 2. Rotor worn out. 3. Inadequate cooling. 4. Pressure too high. 5. Wrong seal size. 	<ol style="list-style-type: none"> 1. Install motor of proper capacity 2. Change the rotor. 3. Check cooling pump 4. Reduce pressure setting on relief valve. 5. Replace by suitable seals.
3.	Speed loss on motor.	<ol style="list-style-type: none"> 1. Inlet pressure too low. 2. Motor parts defective. 3. Oil temperature too high 4. Out let pressure too high 5. Port plate does not make contacts. 	<ol style="list-style-type: none"> 1. Increase pressure by resetting relief valve. 2. Change defective parts. 3. Check cooling circuit. Hydraulic oil cooler may be defective . 4. Check the system pressure. 5. Dismantle the motor and repair as per requirement.

GENERAL SAFETY NOTES

1. The machine has to be operated as per existing Indian Railways rules and regulations.
2. The safety of yourself and other people is a most important consideration in the operation and maintenance of the machine.
3. Remember the machine is a working unit, carrying delicate instruments. Therefore the machine should not be driven at excessive speed over bad track or turnouts.
4. Always keep your eyes open for other men working close to the machine.
5. Do not forget to look out for signals, switches and track obstructions.
6. Remember to make sure that all protection equipment and safety devices are in place on the machine and in working order especially when it is being driven from one site to another.
7. Always keep the machine clean. Excessive oil or grease on the machine can cause you to slip or fall and is also a potential fire hazard.
8. Always lock the machine before you leave. Make sure that the machine is protected in accordance with railways regulations.
9. Whenever you have the opportunity while waiting to get out on a job, do some of the smaller maintenance jobs such as tightening loose nuts and bolts and cleaning the machine.
10. Do not permit unauthorized persons to operate the machine.
11. It is prohibited to use exposed light or fire on or near the machine.

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