

DEMU Sytems

Lecturer(E)

WORKING PRINCIPLE OF DPC

- BRUSHLESS 3 PHASE TRACTION ALTERNATOR DRIVEN BY DIESEL ENGINE.
- THE OUTPUT OF TA RECTIFIED BY 3 PHASE BRIDGE RECTIFIER
- THE RECTIFIED DC OUTPUT IS GIVEN TO 4 AXLE MOUNTED SELF VENTILATED TRACTION MOTORS IN THE TWO BOGIES
- THROUGH MECHANICAL GEARS DRIVE IS TRANSMITTED TO AXLES

TECHINICAL DETAILS

Description	700 HP(LOW HP)	1400 HP (HIGH HP)
Engine model	VTA 1710L	KTA 50L
No. of cylinders	12 (V TYPE)	16 (V TYPE)
CYL. Bore	140 mm	159 mm
Stroke Length	152 mm	159 mm
Min/Max Engine RPM	700/ 1800	700/ 1800
OSTA tripping	2000	2000
No.of Turbos	2	2
Turbo RPM (MAX)	12500	12500
Fuel oil capacity	1750 Its	3000 Its
Lub.Oil capacity	112 Its	151 Its
Cooling water tank capacity	110 Its	153 Its
Hydraulic Oil	175 Its	320 Its
Compressor Oil	1.35 Its	3 Its
MR pressure set at	6 to 7 kg/cm2	7 to 8 kg/cm2

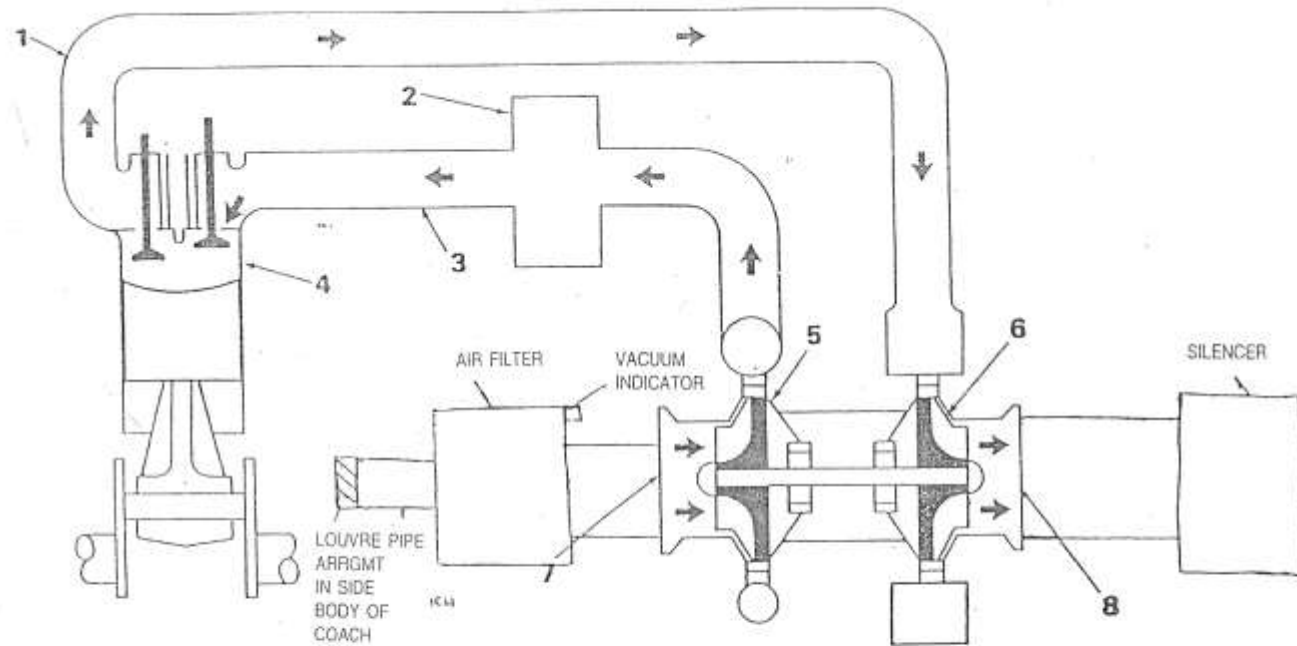
TECHINICAL DETAILS

Description	700 HP	1400 HP
Governor	LCC	LCC
Maximum axle load	17T (DPC) 15T (TC)	20T (DPC) 16T (TC)
Power transmission	Elec.AC/DC	Elec.AC/DC
Traction out put	610HP	1317HP
Max. operating speed	90KMPH	100KMPH
Wheel diameter in mm	952Max 877Min	952Max 877Min

NOTCH WISE ENGINE SPEED

Notch	Speed in RPM
Idle	700
1 st	700
2 nd	1000
3 rd	1200
4 th	1300
5 th	1400
6 th	1500
7 th	1650
8 th	1800

CHARGED AIR SYSTEM

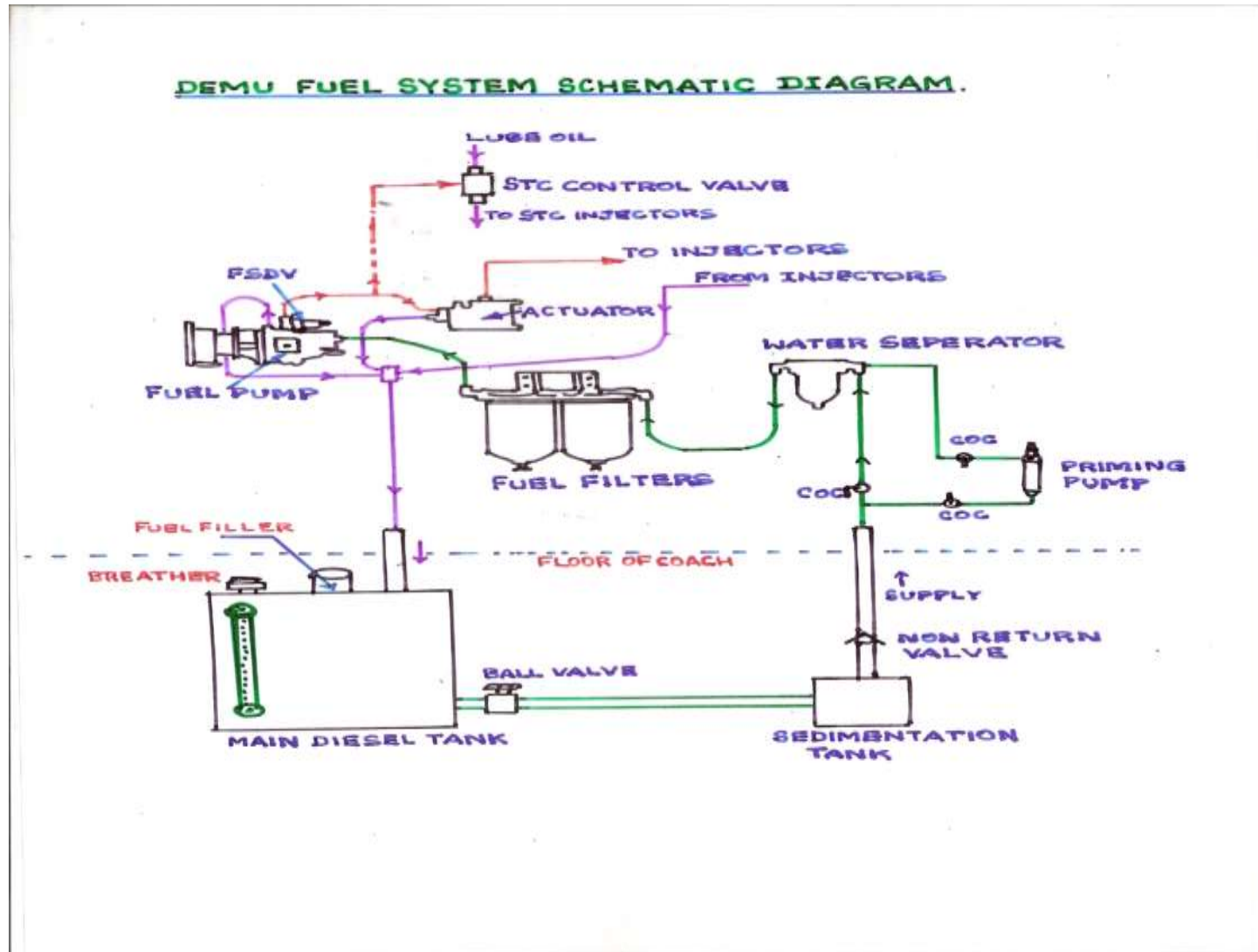


AIR INDUCTION AND EXHAUST SYSTEM

1. EXHAUST MANIFOLD
2. AFTERCOOLER
3. INLET MANIFOLD
4. ENGINE CYLINDER

5. TURBOCHARGER COMPRESSOR WHEEL
6. TURBOCHARGER TURBINE WHEEL
7. AIR INLET
8. EXHAUST OUTLET

Fuel Oil System





FUEL TANK capacity = 1750 lts

Minimum balance to be maintained = 300 lts



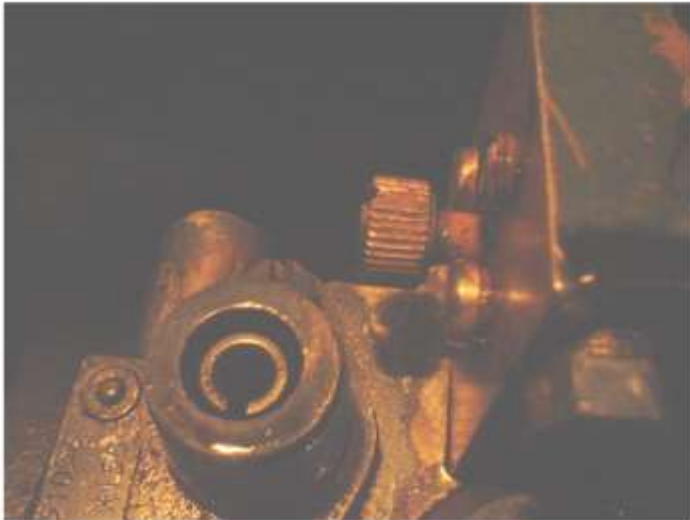
FUEL OIL MAIN COC



FUEL FILTERS

FUEL SHUT DOWN COIL ASSEMBLY (FSDV)

- It is fitted above the fuel pump
- when engine starts working its coil is magnetised resulting in the opening of fuel supply.
- But whenever any shut down safety devices are operated its coil is demagnetised and the fuel passage will be closed and engine will shut down with fuel oil starvation.



The interlocks are LLOP, OS & HBT

ACTUATOR

- It is provided near the fuel oil pump.
- It supplies fuel oil as per throttle notch controlled by governor.
- If fuel rack connection of actuator works out, the engine will not respond to throttle



HAND OPERATED PRIMING PUMP

- IT SHOULD BE OPERATED WHEN THERE IS FUEL STARVATION IN FUEL GALLERY
- IT CAN BE OPERATED WHEN THERE IS AIRLOCK IN THE FUEL OIL SYSTEM
- IT IS ADVISABLE TO OPERATE PRIMING PUMP BEFORE CRANKING AND THE PRIMING CAN BE COMPLETED WHEN WE FEEL TIGHT PUMPING OPERATION



LUB OIL SYSTEM

Components in lubrication system

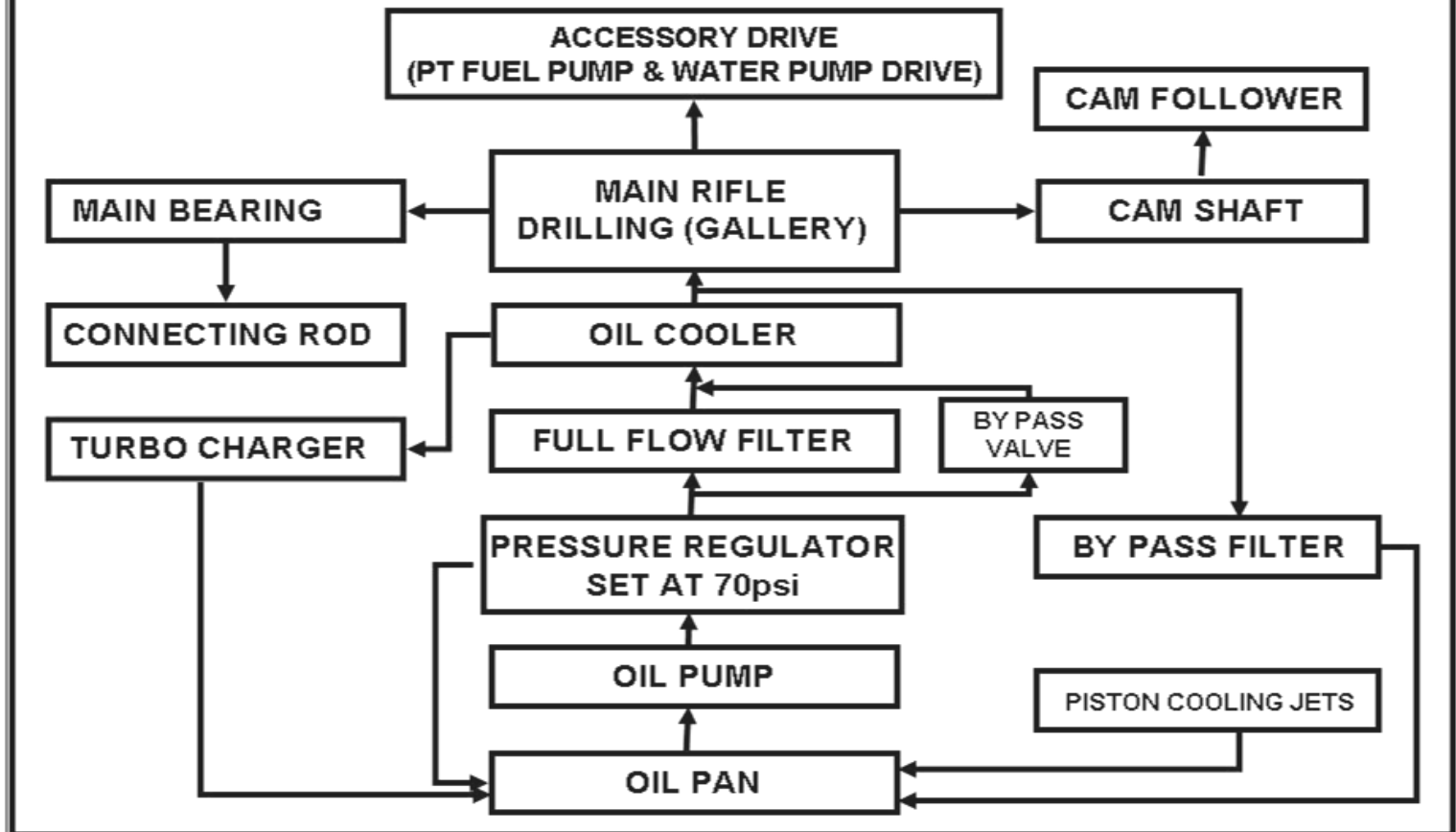
- Oil pan
- Oil pump
- Pressure regulator
- Lubricating oil filter
- Super by-pass filter
- Filter head
- Oil coolers
- Piston cooling nozzles
- Pressure gauge
- Dip stick



Sump capacity: 78 Ltr in 700HP
and 151 Ltr in 1400 HP

And Lubricating oil

LUBRICATING OIL SYSTEM



LUBOIL FILTERS 3 NOS IN LOW HP DEMU



LUB OIL COOLER



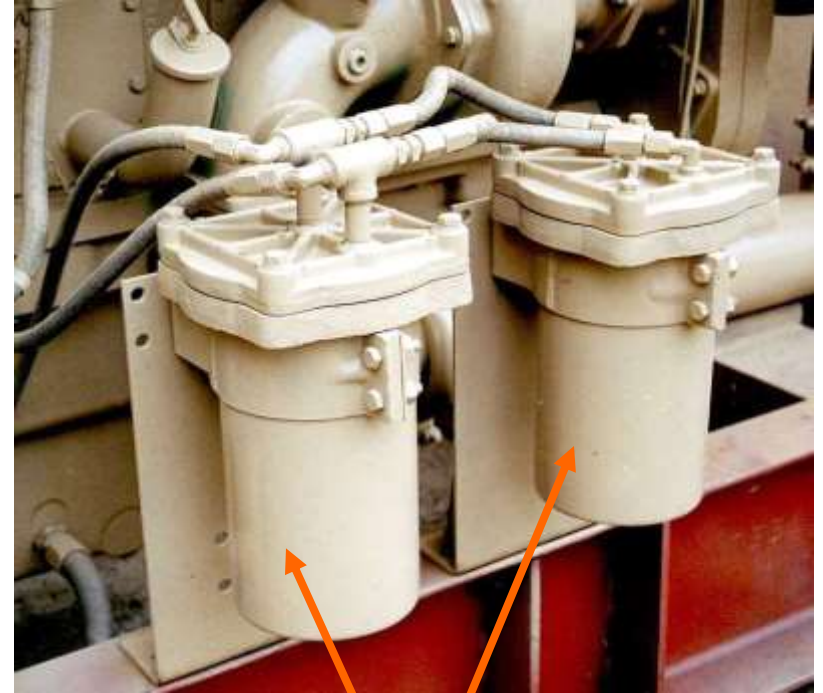
LUB OIL FILTERS 4 NOS IN HIGH HP DEMU

LUB OIL FILTERS 3 NOS IN 700 HP DEMU

BYEPASS FILTER



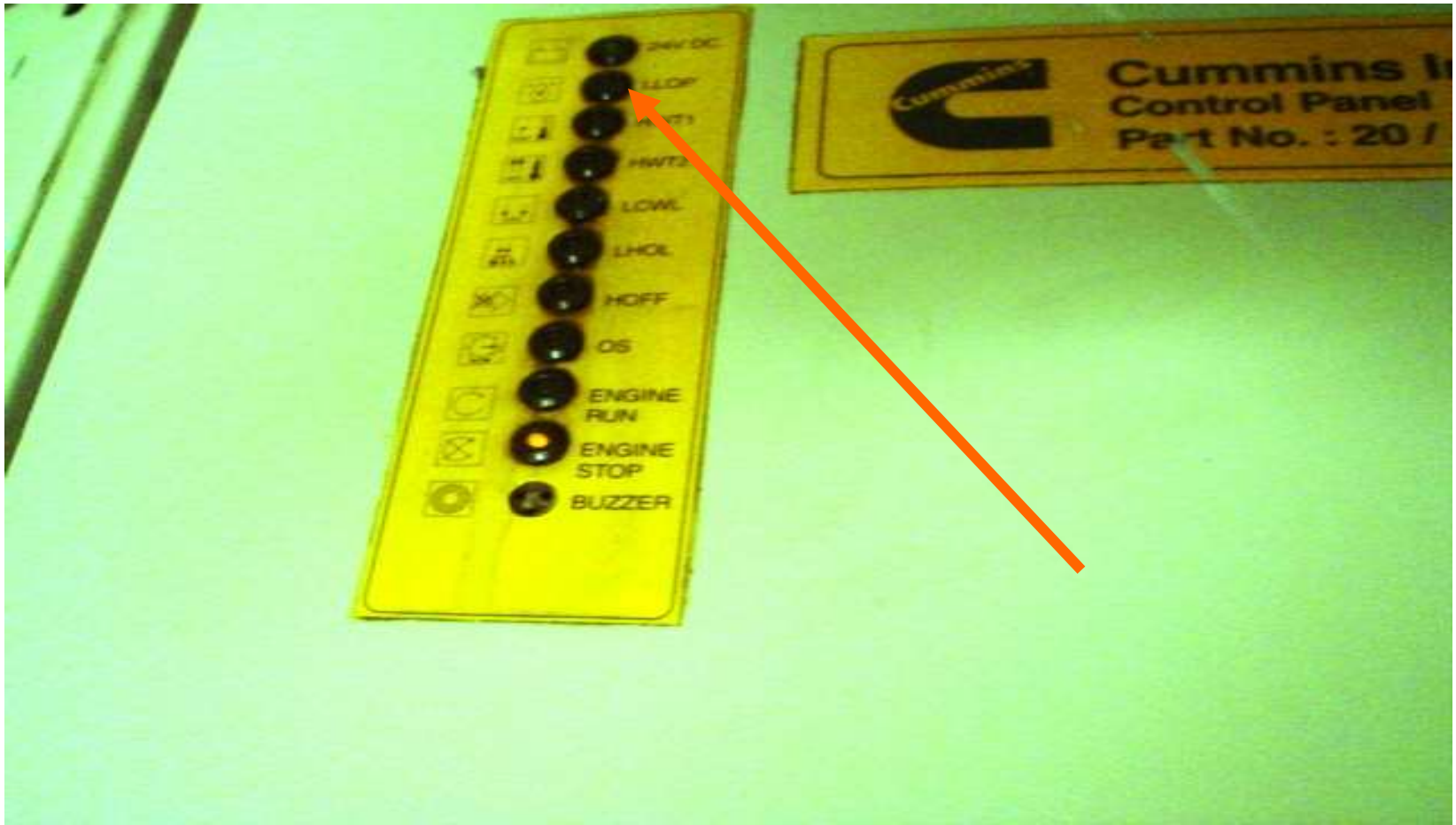
BYEPASS
FILTER



SUPER BYEPASS
FILTERS

LUB OIL SYSTEM

- LUB OIL PRESSURE MAINTAINED = 3 TO 6 KG/CM²
- WHEN LUB OIL PRESSURE DROPS BELOW 0.9 KG/CM² ENGINE WILL SHUT DOWN BY THE OPERATION OF LUB.OIL PRESSURE SWITCH
- WHEN ENG SHUTS DOWN DUE TO LOW LUB OIL ONE INDICATION LAMP WILL GLOW ON CONTROL PANEL



LUB OIL SYSTEM

THE POSSIBLE REASONS FOR THE LUB OIL PRESSURE DROP SHOULD BE INVESTIGATED. IF EVERYTHING NORMAL ENGINE CAN BE CRANKED AFTER PRESSING THE RESET BUTTON



COOLING WATER SYSTEM

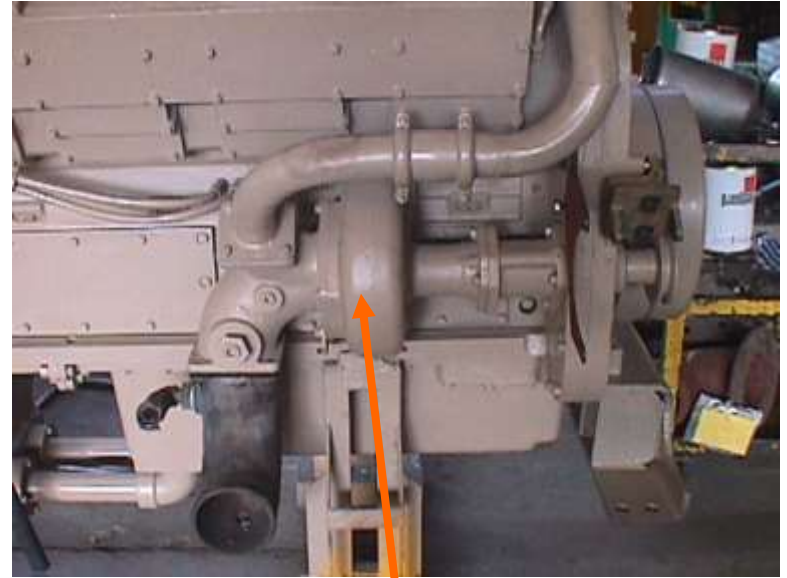
CAPACITY OF THE SYSTEM = 180 TO 210 LTS

TANK CAPACITY : 110 LTS IN 700 HP DEMU and
153 LTS IN HIGH HP DEMU



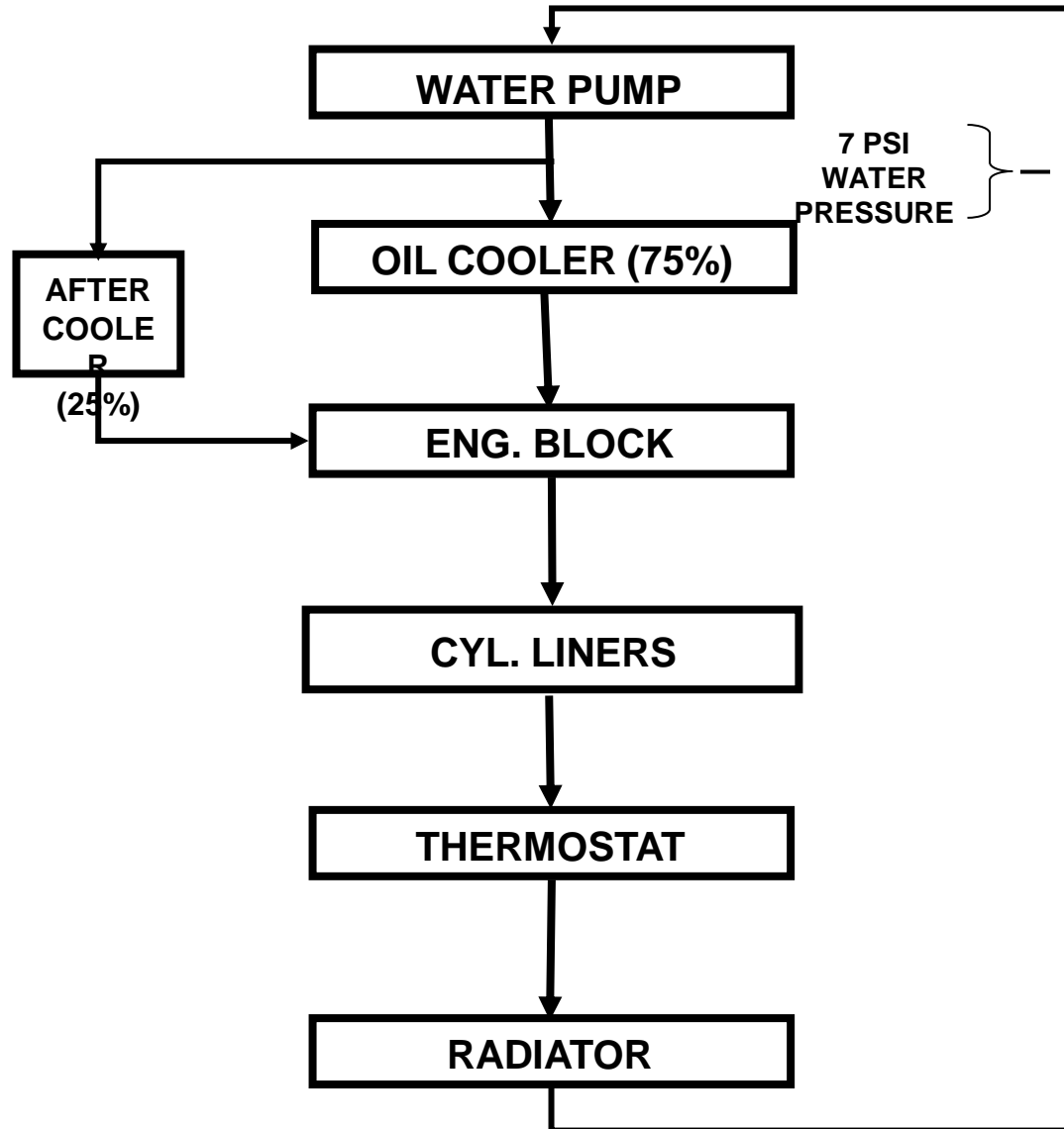


WATER PUMP DRIVEN BY 2 BELTS
IN 700 HP DEMU



WATER PUMP GEAR DRIVEN
IN 1400 HP DEMU

COOLING WATER SYSTEM



AFTER COOLER



LUBOIL COOLER



75% OF
WATER

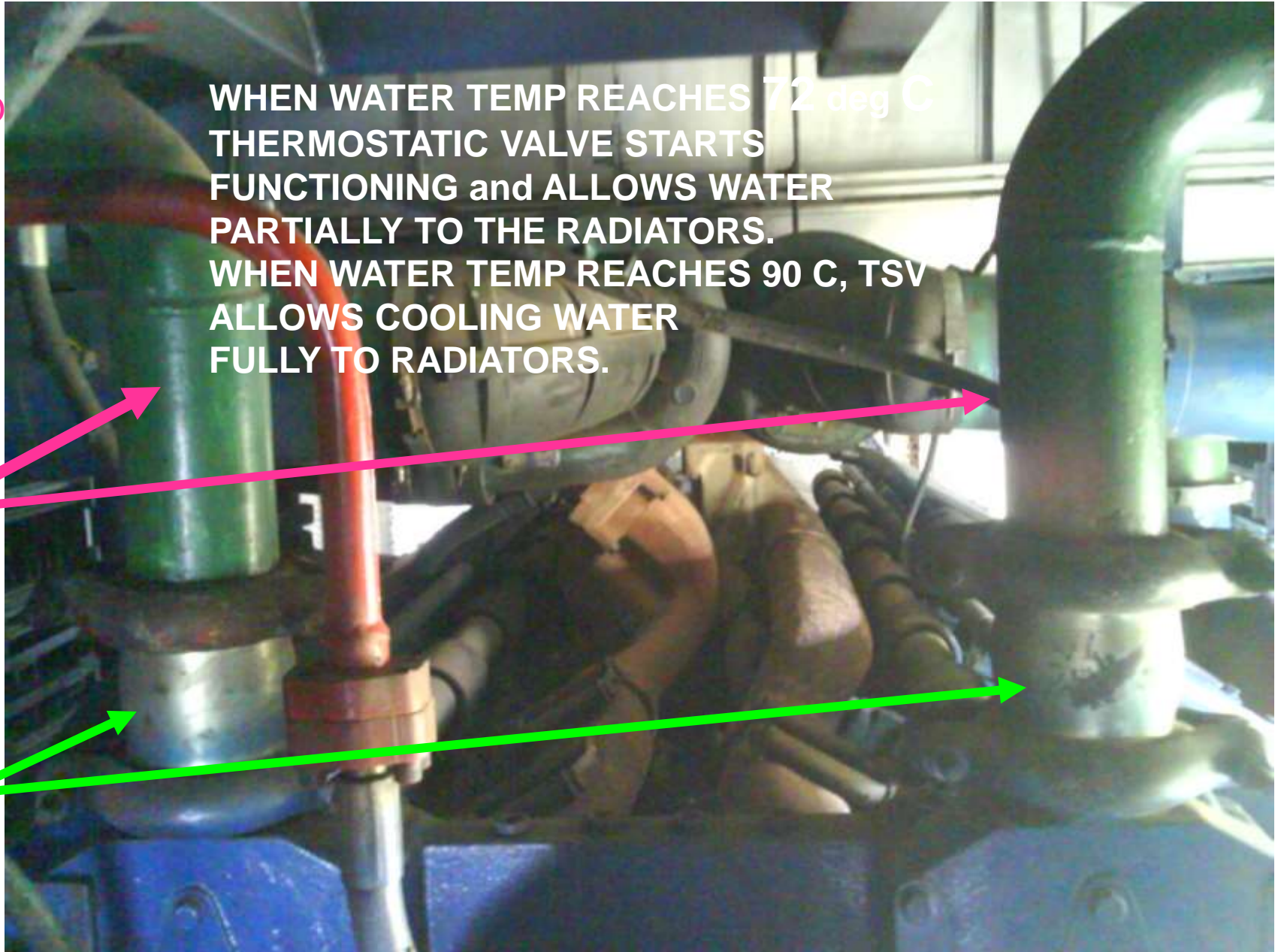
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THEMOSTAT LOCATION

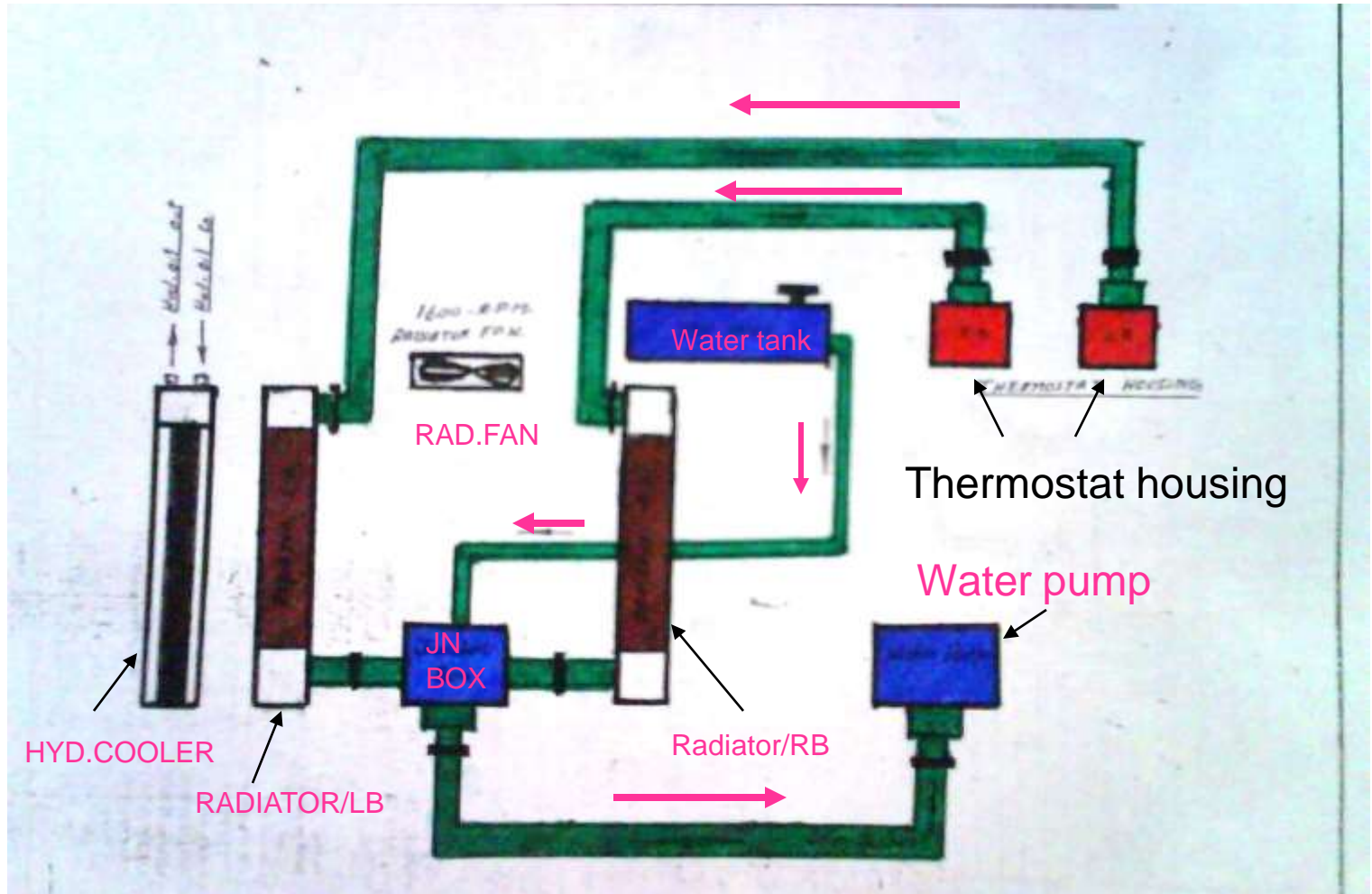
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WHEN WATER TEMP REACHES 72 deg C
THERMOSTATIC VALVE STARTS
FUNCTIONING and ALLOWS WATER
PARTIALLY TO THE RADIATORS.
WHEN WATER TEMP REACHES 90 C, TSV
ALLOWS COOLING WATER
FULLY TO RADIATORS.

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COOLING WATER SYSTEM DEMU

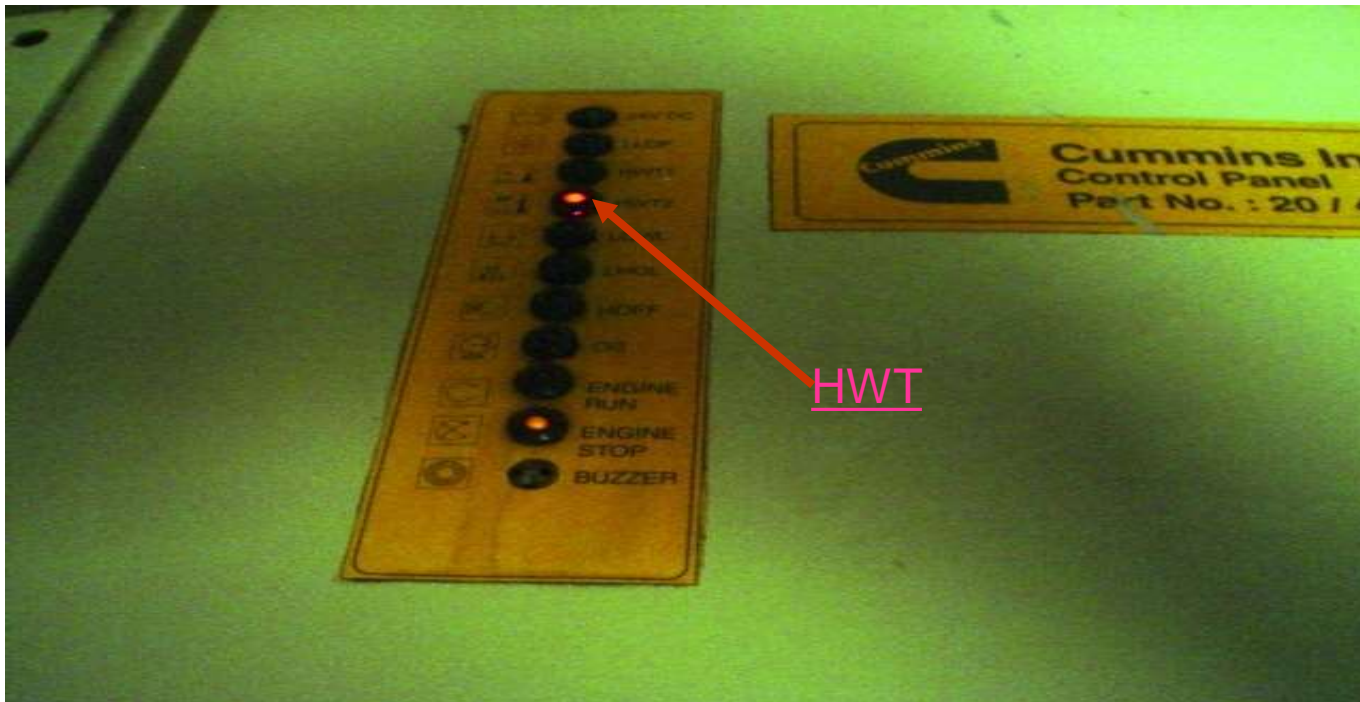


SAFETY DEVICES IN COOLING WATER

HWT

WHEN WATER TEMP REACHES 97 C HWT SAFETY DEVICE WILL OPERATE EXCITATION WILL BE CUT OFF. INDICATION LAMP WILL GLOW ON BACK PANEL AND **ENGINE CONTROL PANEL**. GIVE FAST AIR PUMPING AT 4TH NOTCH TO BRING DOWN TEMP BELOW 95 C.

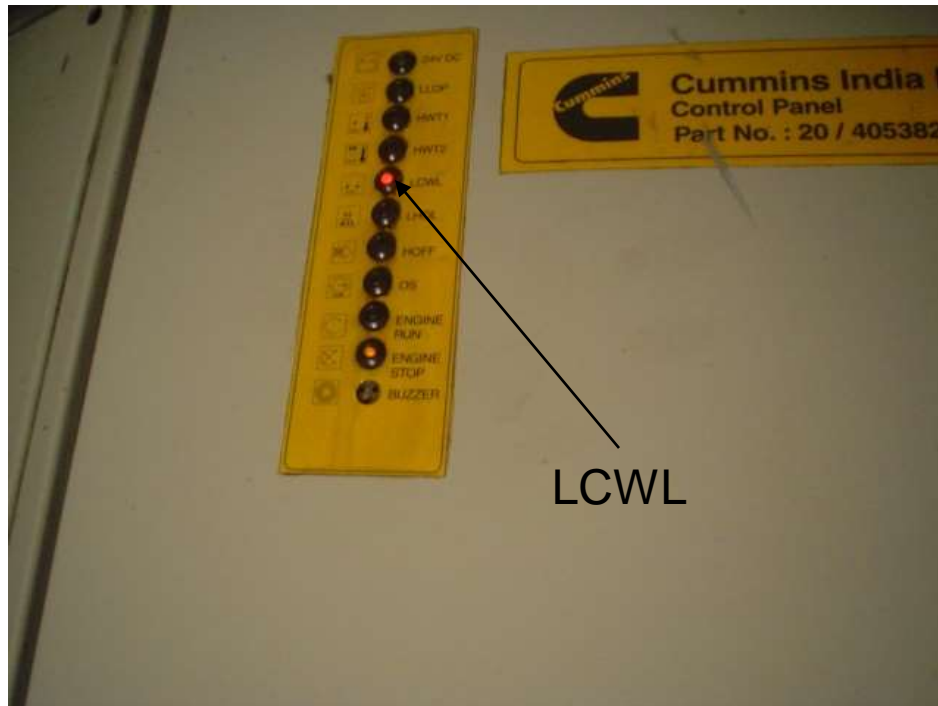
DO NOT OPERATE RESET IN ENGINE CONTROL PANEL.
IF RESET IS PRESSED ENGINE WILL COME TO SHUTDOWN



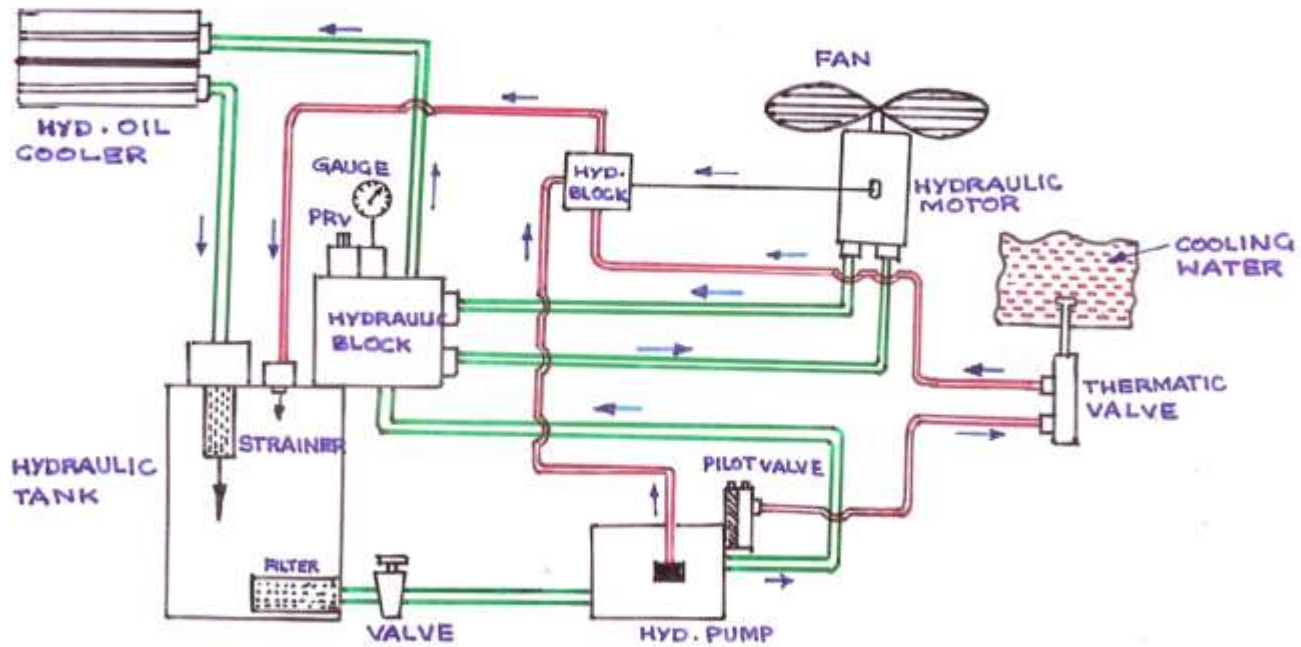
SAFETY DEVICES IN COOLING WATER

LCWL: WHEN WATER LEVEL COMES TO HALF TANK OR BELOW LCWL SAFETY DEVICE IS OPERATED AND ENGINE SHUTS DOWN. INDICATION LAMP WILL GLOW ON BACK PANEL AND ENGINE CONTROL PANEL

IF WATER LEVEL IS LOW ADD WATER AND CRANK THE ENGINE
IF WATER LEVEL IS FOUND SATISFACTORY SELECT MECHANICAL MODE IN FUEL SHUTDOWN VALVE AND CRANK THE ENGINE.



RADIATOR FAN DRIVE



HYDRAULIC SYSTEM

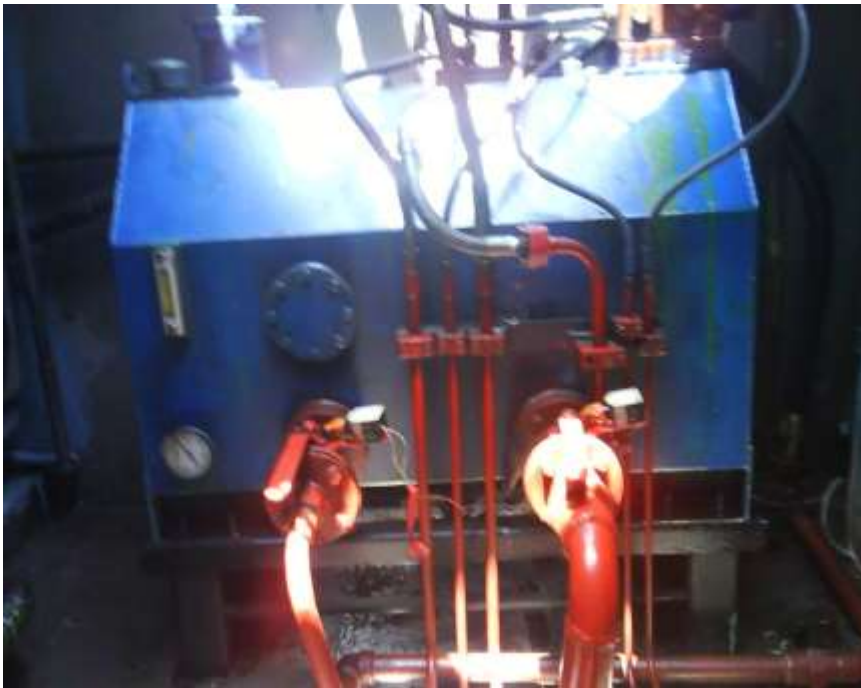
THIS SYSTEM IS PROVIDED FOR FUNCTIONING OF RADIATOR FAN
AND VENTILATOR FAN

CAPACITY IN LOW HP DEMU

= 175 LTS

CAPACITY IN HIGH HP DEMU

= 320 LTS



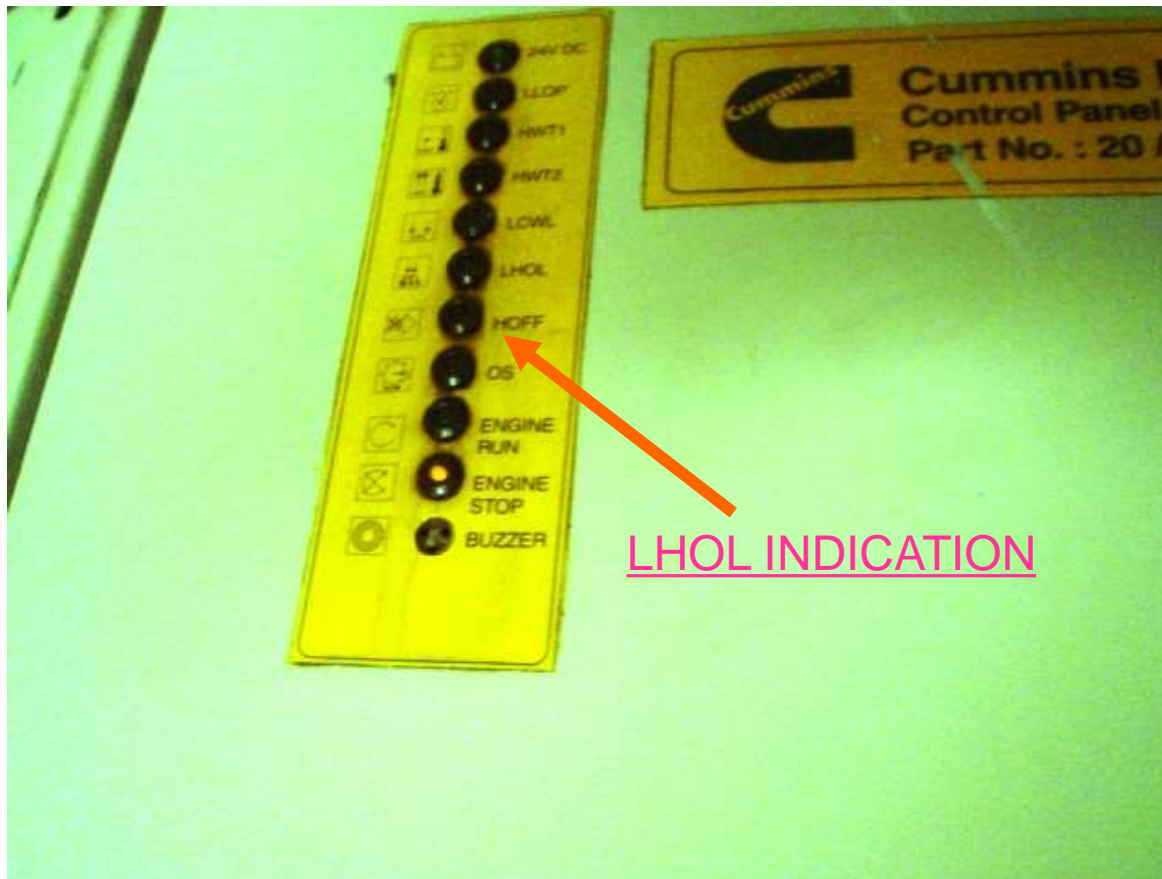
ONE HYDRAULIC OIL TANK IS
AVAILABLE AT RADIATOR ROOM



A TUBE GLASS PROVISION IS
AVAILABLE TO CHECK THE OIL

IF HYD OIL LEVEL IS LOW

- ENGINE STOP INDICATION WILL COME WITH **LHOL** INDICATION ON ENGINE CONTROL PANEL
- **ENGINE WILL NOT CRANK**
- IF HYD OIL LEVEL IS SATISFACTORY, SELECT MECHANICAL MODE IN FSDV AND CRANK THE ENGINE



HYDRAULIC OIL FLOW FAULT

- IN CASE OF HYDRAULIC OIL FLOW FAULT ENGINE STOP INDICATION WILL COME ALONG WITH **HOFF** INDICATION IN ENGINE CONTROL PANEL
- CHECK FOR THE PROPER OPENING OF MAIN COC
- IF MAIN COC IS OPEN AND THE PROBLEM STILL CONTINUING, **SELECT MECHANICAL MODE IN FUEL SHUT DOWN VALVE AND CRANK THE ENGINE**





BEST OPERATING
RANGE
20°C TO 60° C

HYDRAULIC OIL MAIN COC



HYDRAULIC OIL TEMPERATURE GAUGE
(BEST OPERATING RANGE 20°C TO 60° C)

HYDRAULIC OIL COOLER

- HYD. OIL PASSES THROUGH COPPER TUBES (FINNED WITH WIRE BUNDLES AND GETS COOLED BY THE AMBIENT AIR CIRCULATED BY THE COOLING FAN
- IT CAN BE CLEANED BY PRESSURISED AIR/WATER JET IN CASE OF DUST ACCUMULATION
- **NORMALLY IT DOES NOT NEED ANY PERIODIC MAINTENANCE**



HYDRAULIC OIL
COOLER

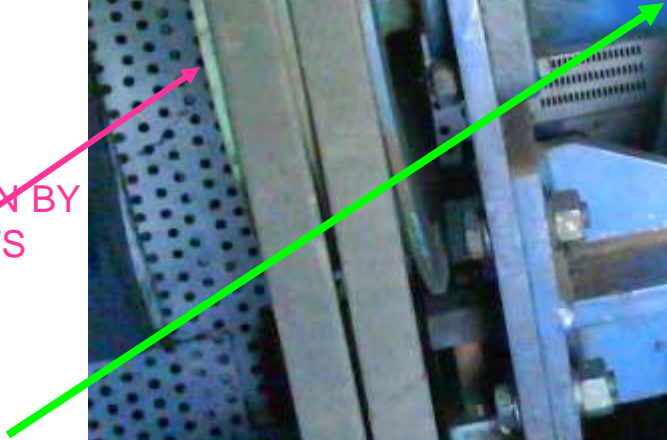
HYDRAULIC PUMP FOR RADIATOR FAN



HYDRAULIC PUMP FOR VENTILATOR FAN



DRIVEN BY
2 BELTS



THANK
YOU