PART NO. TO18L-E-00

HITACHI

Technical Manual

Operational Principie

EX

2500-6

Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TO18L-E
Technical Manual (Troubleshooting)	: Vol. No.TT18L-E
Workshop Manual	: Vol. No.W18L-E

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OIL COOLER FAN MOTOR SPEED CONTROL

Function: Controls the oil cooler fan motor speed at four steps to maintain the hydraulic oil temperature in the proper temperature range.

Operation:

1. The hydraulic oil sensor (oil cooler fan motor speed control) sends signals to MC depending on oil temperature,
2. MC controls the oil cooler fan motor speed control solenoid valve in response to the received signals to deliver pilot pressure oil to the oil cooler fan drive pump regulator. (Refer to COMPONENT OPERATION/Pump Device group.)
3. As a result, the delivery flow rate from the oil cooler fan drive pump is controlled, adjusting the oil cooler fan motor speed.
4. The detection data from the hydraulic oil temperature sensor is sent to IDU through CAN.

Oil Cooler Fan Motor Speed Vs. Hydraulic Oil Temperature

Hydraulic Oil Temperature (°C)	Pilot Oil Pressure from Solenoid Valve (Current: From MC)	Oil Cooler Fan Motor Speed (min^{-1})
59 °C (120 °F) or Lower	0 MPa (0 kgf/cm^2) [50 mA]	200
60 to 69 °C (122 to 156 °F)	1.8 MPa (18.4 kgf/cm^2) [280 mA]	850
70 to 79 °C (158 to 207 °F)	2.22 MPa (22.6 kgf/cm^2) [310 mA]	1150
80 °C (176 °F) or Higher	3.51 MPa (35.8 kgf/cm^2) [400 mA]	1370

NOTE: The listed oil cooler fan motor speeds are those at the rated engine speed (1800 min^{-1}).

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Constant Torque Control
(Main Pump and Fan Motor Drive Pump)

NOTE: The constant torque control has the two following functions.
- *Overload Prevention Operation*
  As load (pressure) increases, the pump delivery flow rate is reduced so that the engine is not overloaded.
- *Flow Rate Recover Operation*
  As load (pressure) decreases, the pump delivery flow rate is increased so that the engine output can be effectively utilized.

- Overload Prevention Operation

1. When pump delivery oil pressure (P) increases from P1 to P2, compensating piston (16) pushes compensating rod (20) to the right until the oil pressure force balance with outer spring (21) and inner spring (22).

2. Compensating rod (20) moves lever 2 (17) via pin (24). Lever 2 (17) rotates around pin (18) (secured in the housing) counterclockwise.

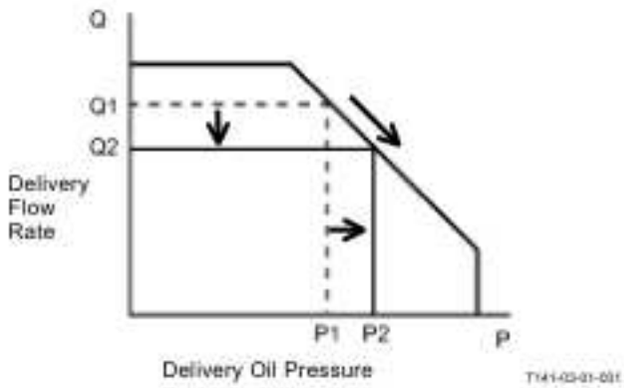
3. As pin (5) installed in feedback lever (12) is inserted into hole (19) on lever 2 (17), feedback lever (12) is rotated around pin (13) by lever (2) (17) clockwise, moving spool (3) to the right.

4. When spool (3) is moved, pump delivery pressure oil is routed into the large chamber of servo piston (14) through spool (3). Although the same pressure oil is routed into the small chamber, servo piston (14) moves to the right due to the difference in the pressure receiving area between the servo piston ends.

5. According to servo piston (14) moving, the pump swash angle is reduced so that the pump flow rate is reduced.

6. As servo piston (14) moves, feedback lever (12) is moved via pin (13). Since compensating rod (20) and lever 2 (17) do not move, feedback lever (12) is rotated around pin (5) counterclockwise, moving spool (3) to the left. Then, when the notches on spool (3) and sleeve (2) close. Thoroughly the oil pressure isn't routed into the large chamber of servo piston (14), then servo piston (14) stops moving.

7. Consequently, the pump flow rate decreases from Q1 to Q2, reducing the pump loads.



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Cooling Operation

The cooling circuit consists of compressor (10), condenser (1), receiver dryer (9), expansion valve (3), evaporator (5), thermistor (6), thermo sensor tube (4), and blower fan (2). The circuit is charged with refrigerant. Air from the fresh and / or circulation air inlet is sent to evaporator (5) by blower fan (2). As evaporator (5) is cool, air is cooled while passing through evaporator (5). Then, cooled air is sent into the cab from the vents.

Each component functions as follows:

- Compressor
  Draws and compresses refrigerant from the low pressure circuit (between the evaporator and the compressor), then sends it to the condenser. (Refrigerant generates heat when compressed.)
- Condenser
  Cools hot refrigerant.
- Receiver Dryer
  Removes moisture from refrigerant and stores refrigerant.
- Expansion Valve
  Atomizes high pressure liquid refrigerant into low pressure gas via an orifice.
- Evaporator
  Vaporizes refrigerant to absorb heat from atmosphere.
- Thermo Sensor Tube
  Checks air temperature after passing through the evaporator and adjusts the orifice on the expansion valve in response to air temperature change to control the refrigerant flow.
- Thermistor
  Stops the compressor if temperature on the fin surface of evaporator falls lower than 0 °C.
- Blower Fan
  Sends air from the fresh and/or circulation air inlet to the evaporator.

Heating Operation

During heating operation, valve (8) is opened so that high temperature engine coolant circulates through heater (7). Air from blower fan (2) is warmed as it passes through heater (7) and is sent into the cab from the vents.

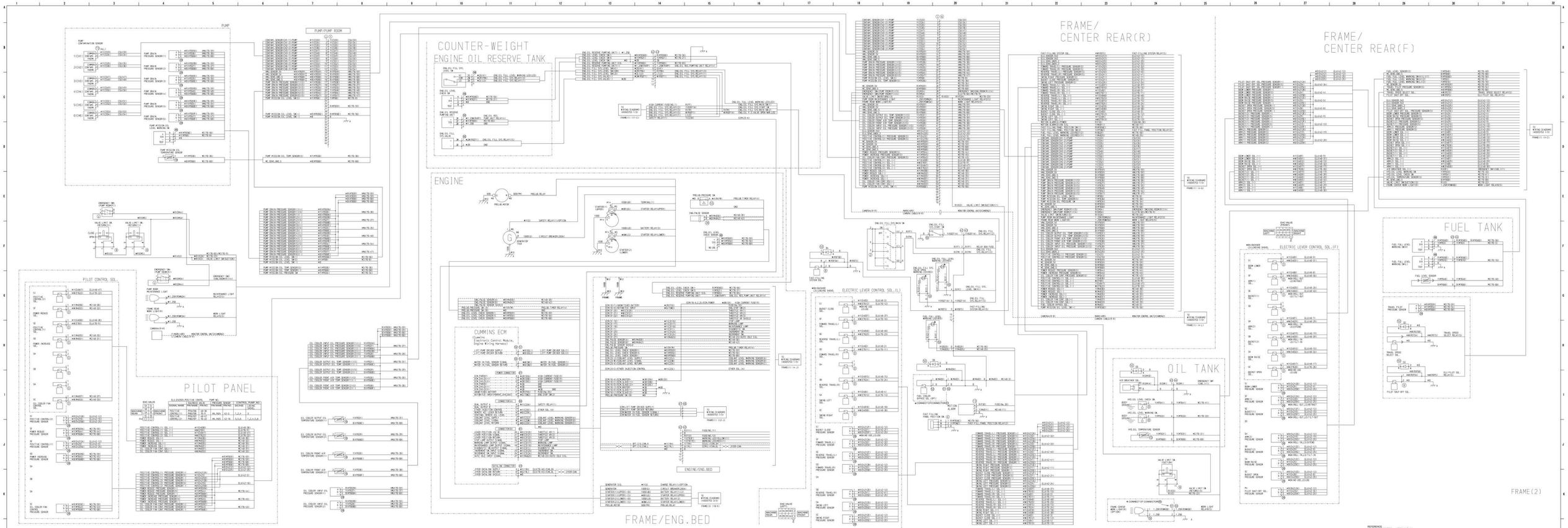
Dehumidifying and Heating

During dehumidifying and heating, the cooling and heating systems are operated at the same time. Air from blower fan (2) is cooled and dehumidified at evaporator (5) then, air is warmed at heater (7) before being sent into the cab.

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EX2500-6 ELECTRICAL CIRCUIT DIAGRAM 2/3

Authorized Hitachi Dealer Use Only.
Parts numbers on the drawing are provided only for reference.
To order parts on the drawing,be sure to consult the parts catalog.



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