FORKLIFT

SERVICE MANUAL

110DF-7

HYUNDAI

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CONTENTS

SECTION 1 GENERAL

Group 1 Safety hints 1-1
Group 2 Specifications 1-5
Group 3 Operational checkout record sheet 1-16

SECTION 2 REMOVAL AND INSTALLATION OF UNIT

Group 1 Structure 2-1
Group 2 Removal and Installation of Unit 2-2

SECTION 3 POWER TRAIN SYSTEM

Group 1 Structure and operation 3-1
Group 2 Operation and maintenance 3-53
Group 3 Disassembly and assembly 3-65
Group 4 Adjustment 3-147

SECTION 4 BRAKE SYSTEM

Group 1 Structure and function 4-1
Group 2 Operational checks and troubleshooting 4-24
Group 3 Tests and adjustments 4-32
Group 4 Disassembly and assembly 4-35

SECTION 5 STEERING SYSTEM

Group 1 Structure and function 5-1
Group 2 Operational checks and troubleshooting 5-9
Group 3 Tests and adjustments 4-17
Group 4 Disassembly and assembly 5-21

SECTION 6 HYDRAULIC SYSTEM

Group 1 Structure and function 6-1
Group 2 Operational checks and troubleshooting 6-28
Group 3 Disassembly and assembly 6-33

SECTION 7 ELECTRICAL SYSTEM

Group 1 Component location 7-1
Group 2 Electrical circuit 7-3
Group 3 Cluster 7-14
Group 4 Transmission message indicator 7-27
Group 5 Switches 7-31

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Group 6 Electrical component specification 7-35
Group 7 Connectors 7-43
Group 8 Troubleshooting 7-60

SECTION 8 MAST

Group 1 Structure 8-1
Group 2 Operational checks and troubleshooting 8-4
Group 3 Adjustment 8-7
Group 4 Removal and installation 8-9

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3. SPECIFICATION FOR MAJOR COMPONENTS

1) 110/130DF-7

(1) ENGINE

Item	Unit	Specification
Model	-	HMC D6GA
Type	-	4 cycle turbocharged, Intercooler
Cooling Method	-	Water cooling
Number of cylinders and arrangement	-	6 cylinders, In-line
Firing order	-	1-5-3-6-2-4
Combustion chamber type	-	Direct injection
Cylinder bore X stroke	mm(in)	103 × 118mm(4.06" × 4.65")
Piston displacement	cc(cu in)	5899 (360)
Compression ratio	-	17.0 : 1
Rated gross horse power	ps/rpm	180/2200
Maximum gross torque at rpm	kgf - m/rpm	80/1500
Engine oil quantity	/ (U.S.gal)	24.5(6.5)
Dry weight	kg(lb)	575(1268)
High idling speed	rpm	2300± 50
Low idling speed	rpm	900
Rated fuel consumption	g/ps.hr	144
Starting motor	V-kW	DENSO, 24-5
Alternator	V-A	24-70
Battery	V-AH	24-100

(2) MAIN PUMP

Item	Unit	Specification
Type	-	Axial piston variable gear pump
Capacity	cc/rev	71+63
Maximum operating pressure	bar	280
Rated speed (Max/Min)	rpm	2800/300

(3) MAIN CONTROL VALVE

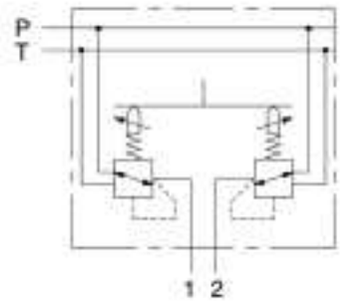
Item	Unit	Specification
Type	-	Sectional
Operating method	-	Hydraulic pilot
Main relief valve pressure	bar	210/165
Flow capacity	lpm	180

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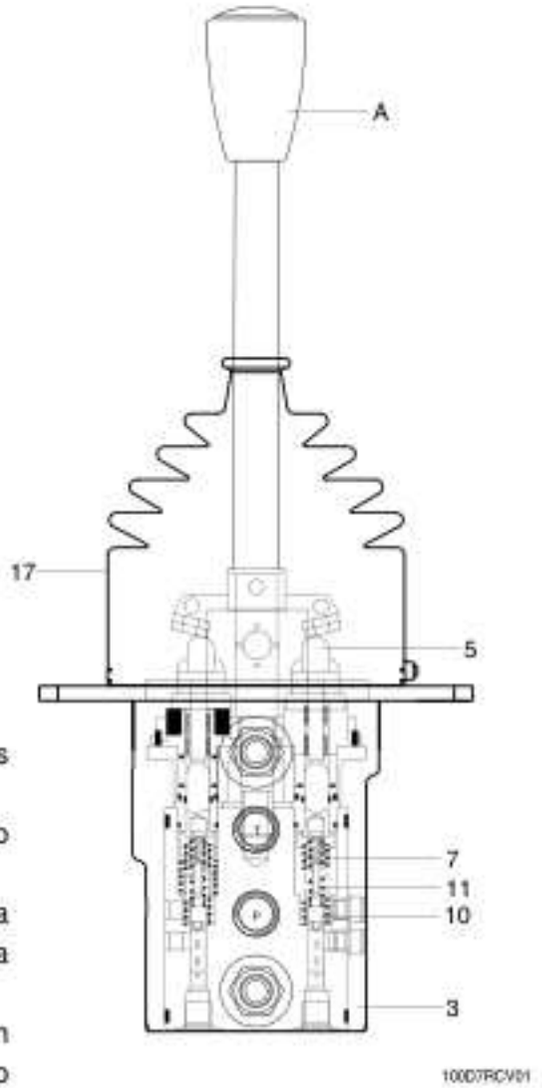
Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair
BB	**Slippage at converter lockup clutch** TCU calculates a differential speed at closed converter lockup clutch. If this calculated value is out of range, TCU interprets this as slipping clutch · Low pressure at converter lockup clutch · Low main pressure · Wrong signal at engine speed sensor · Wrong signal at turbine speed sensor · Wrong size of the sensor gap · Clutch is defective	-	· Check pressure at converter lockup clutch · Check main pressure in the system · Check sensor gap at engine speed sensor · Check sensor gap at turbine speed sensor · Check signal at engine speed sensor · Check signal at turbine speed sensor · Replace clutch
BD	**S.C. to ground at engine brake solenoid** TCU detected a wrong voltage at the output pin, that looks like a S.C. to vehicle ground · Cable is defective and is contacted to vehicle ground · Engine brake solenoid has an internal defect · Connector pin is contacted to vehicle ground	No reaction OP mode : Normal	· Check the cable from TCU to engine brake solenoid · Check the connectors from engine brake solenoid to TCU · Check the resistance* of engine brake solenoid * See page 3-36
BE	**S.C. to battery voltage at engine brake** TCU detected a wrong voltage at the output pin, that looks like a S.C. to battery voltage · Cable is defective and is contacted to battery voltage · Engine brake solenoid has an internal defect · Connector pin is contacted to battery voltage	No reaction OP mode : Normal	· Check the cable from TCU to the engine brake solenoid · Check the connectors from engine brake solenoid to TCU · Check the resistance* of engine brake solenoid * See page 3-36
BF	**O.C. at engine brake** TCU detected a wrong voltage at the output pin, that looks like a O.C. for this output pin · Cable is defective and has no connection to TCU · Engine brake solenoid has an internal defect · Connector has no connection to TCU	No reaction OP mode : Normal	· Check the cable from TCU to the engine brake solenoid · Check the connectors from engine brake solenoid to TCU · Check the resistance* of engine brake solenoid * See page 3-36

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2) OPERATION



HYDRAULIC CIRCUIT



(1) Hydraulic functional principle

Pilot devices with end position locks operate as direct operated pressure reducing valves.

They basically comprise of control lever(A), two pressure reducing valves, body(3) and locks.

Each pressure reducing valve comprises of a plunger kit(5), a metering spring(7) and a spring(11).

At rest, control lever(A) is held in its neutral position by return springs(11). Ports(1, 2) are connected to tank port T.

When control lever(A) is deflected, plunger kit(5) is pressed against return spring(11) and metering spring(7).

Metering spring(7) initially moves docking rod(10) downwards and closes the connection between the relevant port and tank port T. At the same time the relevant port is connected to port P. The control phase starts as soon as docking rod(10) finds its balance between the force from metering spring(7) and the force, which results from the hydraulic pressure in the relevant port(ports 1, 2).

Due to the interaction between docking rod(10) and metering spring(7) the pressure in the relevant port is proportional to the stroke of plunger(5) and hence to the position of control lever(A).

This pressure control which is dependent on the position of the control lever and the characteristics of the control spring permits the proportional hydraulic control of the main directional valves and high response valves for hydraulic pumps.

A rubber bellows(17) protects the mechanical components in the housing from contamination.

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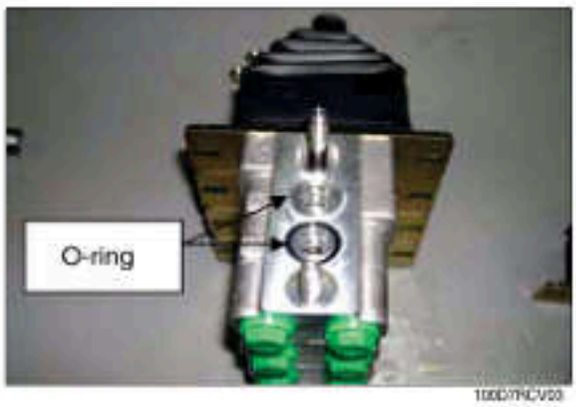
6) DISASSEMBLY & ASSEMBLY

(1) Replacing complete working section

Loosen two tightening bolts with 13mm spanner.



Taking out the damaged section and insert new one. Pay attention 2 O-rings on the internal passage to be in right position.



Tight M13 nut with proper torque 3.06kgf · m(22.1lbf · ft).



(2) Replacing pilot pressure spool

Loosen 4 screws holding upper part to the body with 3mm wrench holding mounting plate no to spring up by return springs inside.



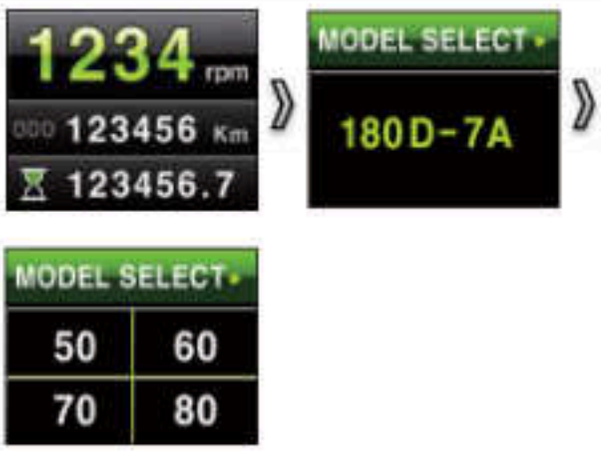
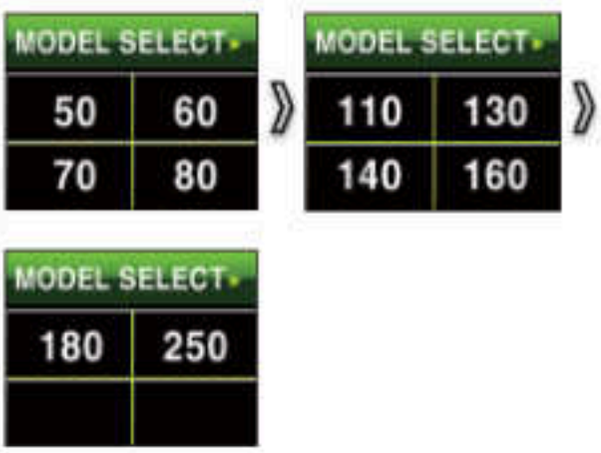
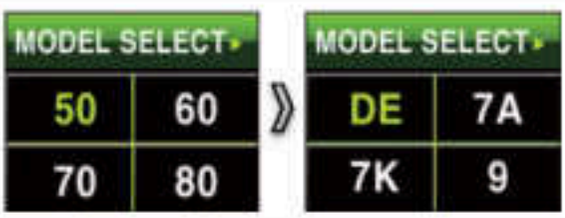
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(4) Menu and next buttons



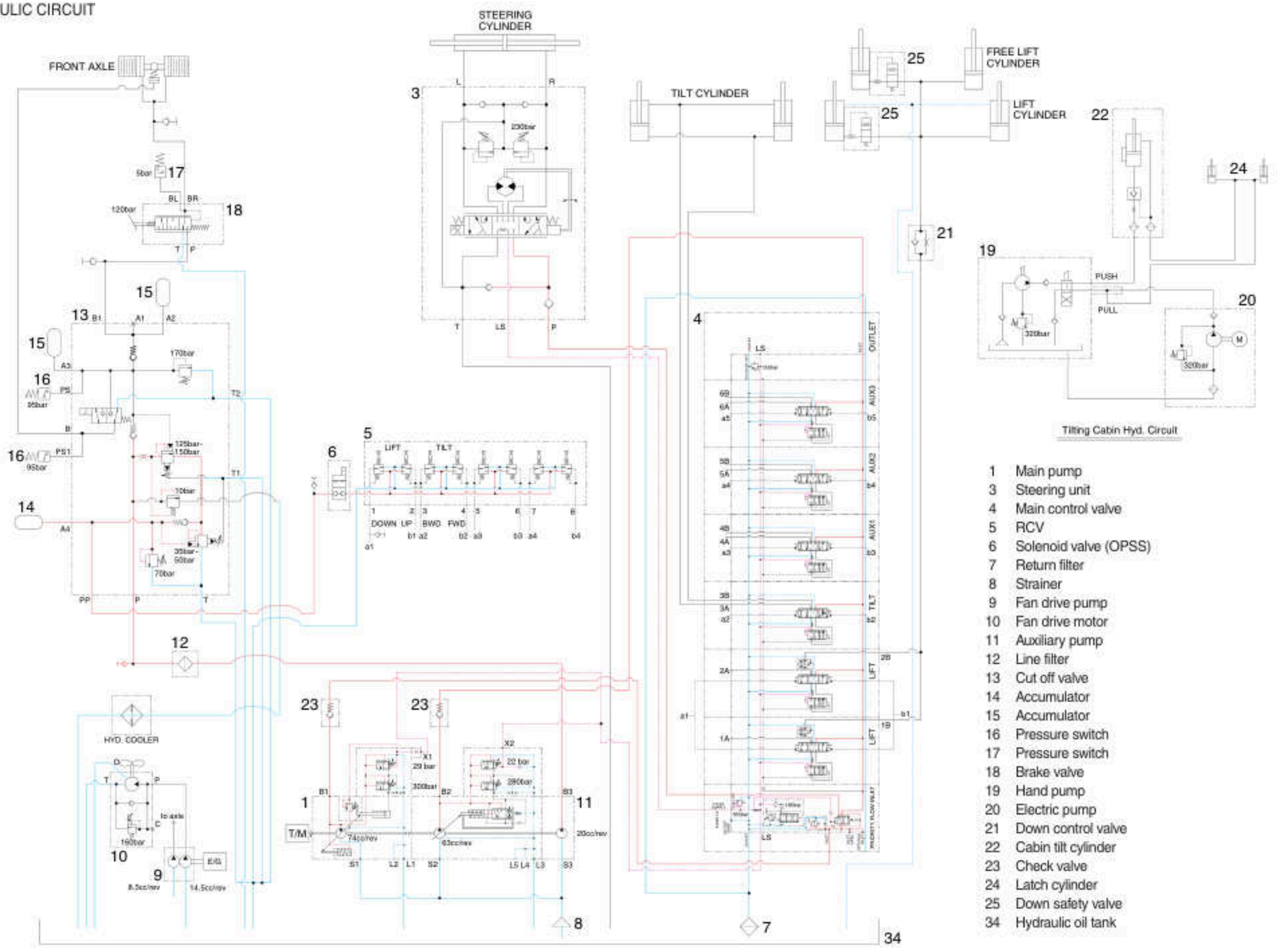
※ These buttons are used to select the model select mode.

※ The initial model is selected at the factory, so don't change the different model.

Display	Description
	① Press MENU and ▶ until model select mode is displayed, where parking is ON. To select model select mode, press ▶
	② To change another ton group, press ▶. (Equipment ton group screen)
	③ To set the location of ton group, press ⏎. And then to change another ton press ▶.
	④ To set the ton, press ⏎. Go to the equipment model screen.

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2. HYDRAULIC CIRCUIT



Tilting Cabin Hyd. Circuit

1 Main pump
3 Steering unit
4 Main control valve
5 RCV
6 Solenoid valve (OPSS)
7 Return filter
8 Strainer
9 Fan drive pump
10 Fan drive motor
11 Auxiliary pump
12 Line filter
13 Cut off valve
14 Accumulator
15 Accumulator
16 Pressure switch
17 Pressure switch
18 Brake valve
19 Hand pump
20 Electric pump
21 Down control valve
22 Cabin tilt cylinder
23 Check valve
24 Latch cylinder
25 Down safety valve
34 Hydraulic oil tank

110DEH501K

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