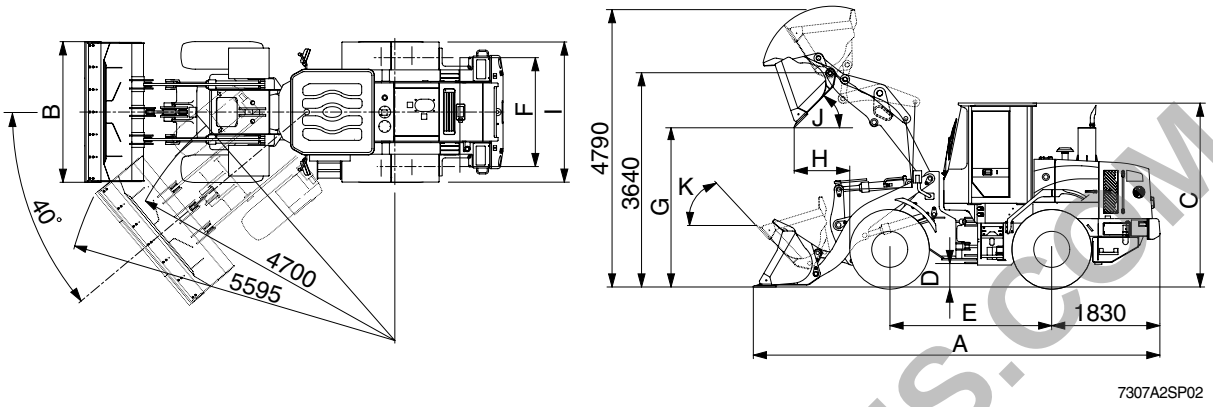
2. SPECIFICATIONS

1) WITH BOLT-ON CUTTING EDGE TYPE BUCKET(HL730-7A)



7307A2SP02

Description		Unit	Specification
Operating weight		kg(lb)	9700(21400)
Bucket capacity	Struck	$m^3(yd^3)$	1.5(2.0)
	Heaped		1.8(2.4)
Overall length	A	mm(ft-in)	6850(22' 6")
Overall width	B		2450(8' 0")
Overall height	C		3170(10' 5")
Ground clearance	D		370(1' 3")
Wheelbase	E		2750(9' 0")
Tread	F		1850(6' 0")
Dump clearance at 45°	G		2730(8' 11")
Dump reach(Full lift)	H		1005(3' 4")
Width over tires	I		2295(7' 6")
Dump angle	J	Degree (°)	48
Roll back angle(Carry position)	K		48
Cycle time	Lift(With load)	sec	5.6
	Dump(With load)		1.0
	Lower(Empty)		2.8
Maximum travel speed		km/hr(mph)	36.0(22.4)
Braking distance		m(ft-in)	12(39' 4")
Minimum turning radius(Center of outside tire)			4.7(15' 5")
Gradability		Degree (°)	30
Travel speed	Forward	First gear	6.2(3.9)
		Second gear	11.4(7.1)
		Third gear	22.1(13.7)
		Fourth gear	36.0(22.4)
	Reverse	First gear	6.5(4.0)
		Second gear	12.0(7.5)
		Third gear	23.1(14.4)

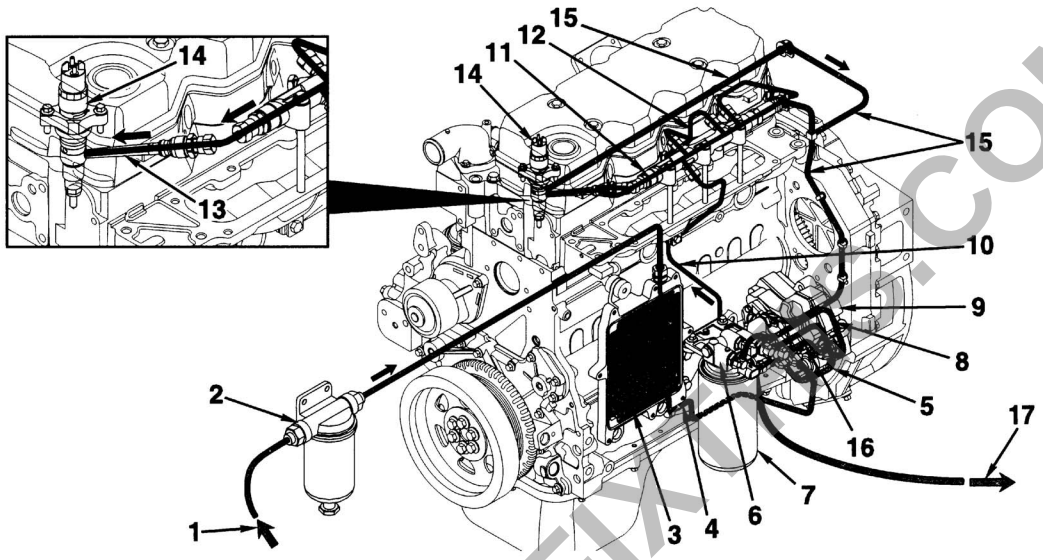
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2. SYSTEM DIAGRAMS

The following drawings show the flow through the engine systems.

1) FUEL SYSTEM



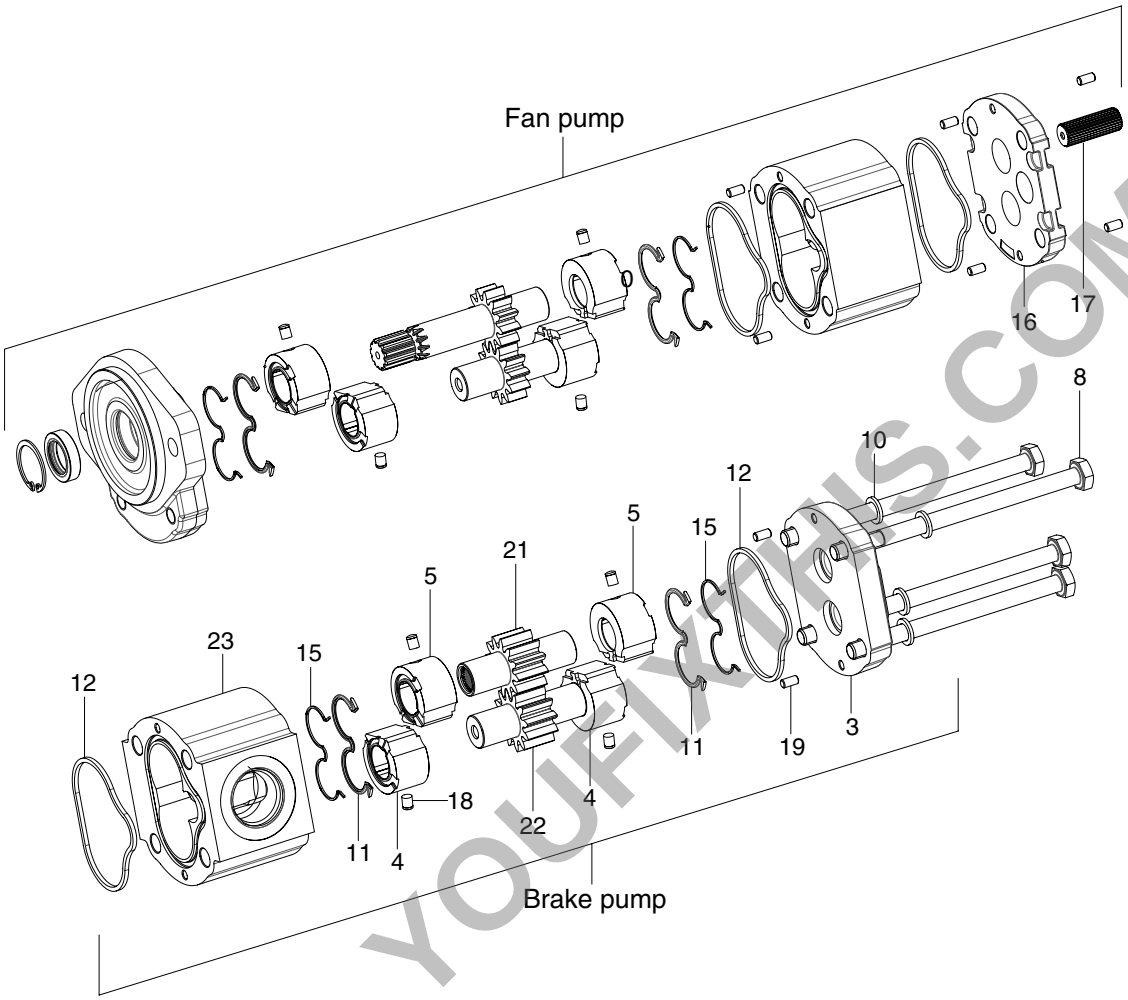
7607AEG02

1 From fuel tank
2 Water/fuel separator(**not** mounted on engine)
3 ECM cooling plate
4 To fuel gear pump
5 To fuel filter
6 Fuel filter head
7 Fuel filter
8 To high-pressure pump
9 High-pressure pump
10 To fuel rail
11 Fuel rail
12 To injectors
13 High-pressure connector
14 Injector
15 Fuel return from injectors and fuel rail to fuel filter head
16 Fuel return from high-pressure pump to fuel filter head
17 To fuel tank

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2) DISASSEMBLY



※ Before disassembling ensure that the unit itself, bench and tools are thoroughly clean.

(1) Lightly mark the rear cover(3), body(23) and flange(16) to ensure reassembly in the correct position.

(2) Remove the bolts(8) and separate the brake pump unit from the fan pump using a soft faced hammer.

(3) Remove splined shaft(17).

(4) Remove the flange(16) from the body(23), free from flange using a soft faced hammer.

(5) Remove the back up ring(15), the seal element(11) and the body seal(12).

(6) Remove the rear cover(3) from the body(23).

(7) Remove the back up ring(15), the seal element(11) and the body seal(12).

※ Before removing the internal components each plate(4,5) must be marked to denote its location within the body. On the plain area of the bush away from the seal location, lightly mark.

(8) With the unit laying on its side grasp hold of the drive gear(21) and pull it squarely out of the body(23) bringing the plate(4,5) with it.

(9) Remove the driven gear(22) and the remaining plate(4,5).

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2. TROUBLESHOOTING

1) TRANSMISSION

※ **Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :**

Step 1. Operational check out procedure(See group 3 in section 1.)
Step 2. Operational checks(In this group.)
Step 3. Troubleshooting
Step 4. Tests and/or adjustments(See group 3.)

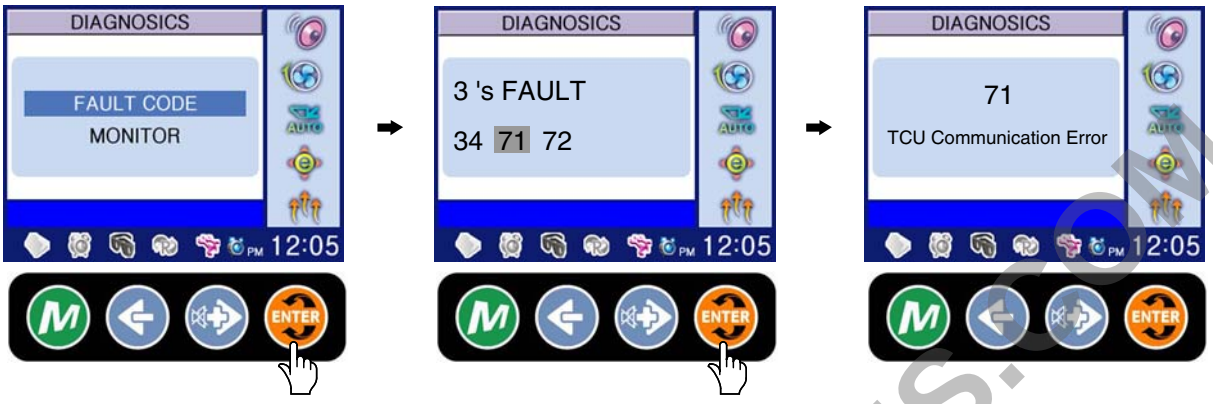
Problem	Cause	Remedy
Transmission slippage	Low oil level.	Add oil.
	Wrong oil grade.	Change oil.
	Restricted transmission pump suction screen.	Remove and clean screen.
	Leak in transmission control valve or gasket.	Remove valve and inspect gaskets.
	Low transmission pump flow due to worn pump.	Do transmission pump flow test.
	Weak or broken pressure regulating valve spring.	Do transmission system pressure test.
Error code on display	Something wrong in transmission.	Go to transmission error code group at page 3-32~3-51.

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(3) Machine fault code

When selecting the fault code menu, it shows all of the fault codes which mean abnormal conditions of present time.



7707A3CD36

※ To go out from fault explanation window, press ← button.
(Press ENTER , M to go out to main.)

※ **No error** will be indicated in case that there's no fault.

Description	Code	Meaning	Remark
Electrical system	010	Power input voltage low	Below 18V
	011	Power input voltage high	Above 38V
	012	Alternator voltage low	Below 5V
	013	Alternator voltage high	Above 36V
	014	Buzzer circuit open or short to ground	
	015	Buzzer circuit short to power	
Hydraulic system	020	Hydraulic oil temperature sensor open or short to power	
	021	Hydraulic oil temperature sensor short to ground	
Engine system	030	Fuel level sensor open or short to power	
	031	Fuel level sensor short to ground	
	034	Cooling fan driving valve open or short to ground	
	035	Cooling fan driving valve short to power	
T/M system	050	Auto select switch supply power open or short to power	
	051	Auto select switch supply power short to ground	
	052	Clutch cutoff supply power open or short to power	
	053	Clutch cutoff supply power short to ground	
Steering system	060	Emergency steering relay open or short to ground	Option
	061	Emergency steering relay short to power	Option
Communication	070	MCU communication error	
	071	TCU communication error	
	072	ECM communication error	

MCU : Machine control unit TCU : Transmission control unit ECM : Engine control module

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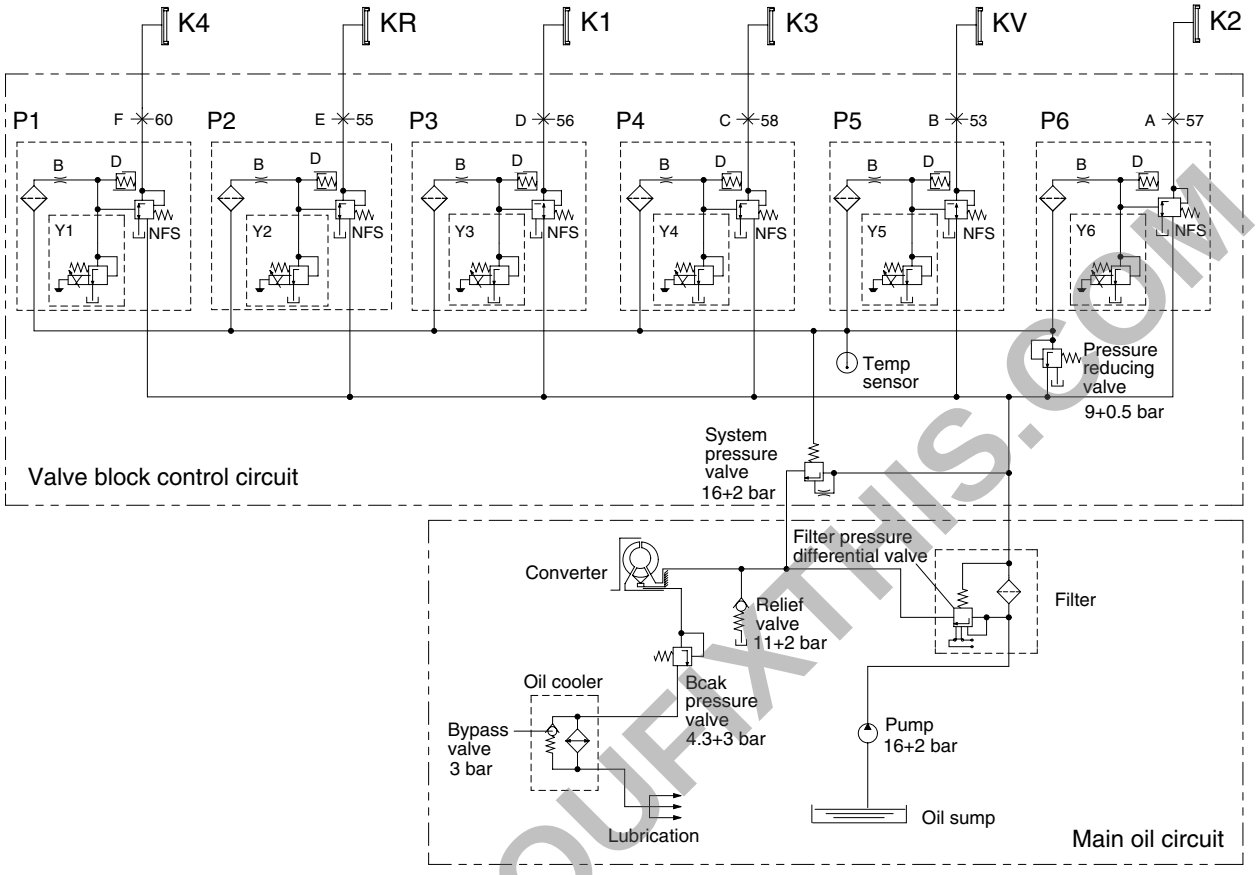


7307AEL00

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HYDRAULIC CIRCUIT



7607APT18

NFS	Follow-on slide	P3	Proportional valve K1
D	Vibration damper	P4	Proportional valve K3
B	Orifice	P5	Proportional valve KV
P1	Proportional valve K4	P6	Proportional valve K2
P2	Proportional valve KR	Y1~Y6	Pressure regulator

Speed	Forward				Reverse			Neutral	Engaged clutch	Positions on the valve block	Current No. of the measuring points
	1	2	3	4	1	2	3				
Y1				X					K4	F	60
Y2					X	X	X		KR	E	55
Y3	X				X				K1	D	56
Y4			X	X			X		K3	C	58
Y5	X	X	X						KV	B	53
Y6		X				X			K2	A	57
Engaged clutch	K1,KV	KV,K2	K3,KV	K4,K3	KR,K1	KR,K2	KR, K3		-	-	-

X : Pressure regulator under voltage

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5. TIGHTENING TORQUE OF MAJOR COMPONENT

No	Items		Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut(4EA)	M16×2.0	29.7±4.5	215±32.5
2		Engine mounting bolt(Bracket)	M12×1.75	10.7±1.6	77.4±11.6
3		Radiator mounting bolt	M16×2.0	29.7±4.5	215±32.5
4		Fuel tank mounting bolt	M16×2.0	29.7±4.5	215±32.5
5		Air cleaner mounting bolt(4EA)	M 8×1.25	2.5±0.5	18.1±3.6
6	Hydraulic system	Main pump housing mounting bolt	M14×2.0	19.6±2.9	142±20.9
7		Main control valve mounting bolt	M12×1.75	12.8±3.0	92.6±21.7
8		Steering unit mounting bolt	M10×1.5	6.9±1.4	49.9±10.1
9		Priority valve	M 8×1.25	2.5±0.5	18.1±3.6
10		Brake valve mounting bolt	M 8×1.25	2.5±0.5	18.1±3.6
11		Fan and brake pump mounting bolt	M10×1.5	6.9±1.4	49.9±10.1
12		Cut-off valve mounting bolt	M12×1.75	12.8±3.0	92.6±21.7
13		Remote control lever mounting bolt	M 6×1.0	1.1±0.2	8.0±1.4
14		Pilot supply unit mounting bolt	M 8×1.25	2.5±0.5	18.1±3.6
15		Safety valve	M 8×1.25	2.5±0.5	18.1±3.6
16		Hydraulic oil tank mounting bolt	M16×2.0	29.7±4.5	215±32.5
17	Power train system	Transmission mounting bolt(Bracket, front)	M20×2.5	57.9±8.7	419±62.9
18		Transmission mounting bolt(Bracket, rear)	M16×2.0	18.4±2.0	133±14.5
19		Front axle mounting bolt, nut	M24×2.5	100±15	723±109
20		Rear axle support mounting bolt, nut	M24×2.0	100±15	723±109
21		Tire mounting nut(17.5-25, 12PR, L3)	M22×1.5	79±2.5	570±18.1
22		Drive shaft joint mounting bolt	3/8-24UNF	6.0±0.8	43.4±5.8
23	Others	Counterweight mounting bolt, nut	M24×3.0	100±15	723±108
24		Operator's seat mounting bolt	M 8×1.25	3.4±0.8	24.6±5
25		ROPS Cab mounting bolt(4EA)	M24×3.0	27.5±2.5	199±18.1

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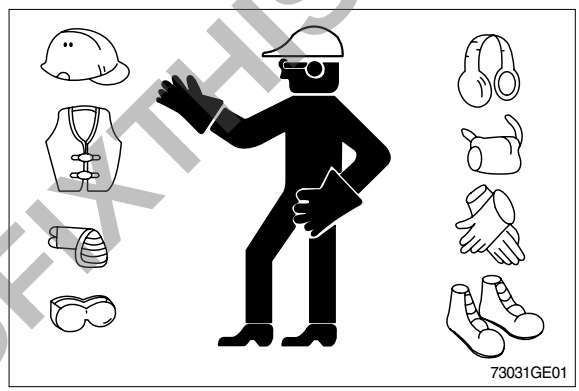
GROUP 1 SAFETY HINTS

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

WEAR PROTECTIVE CLOTHING

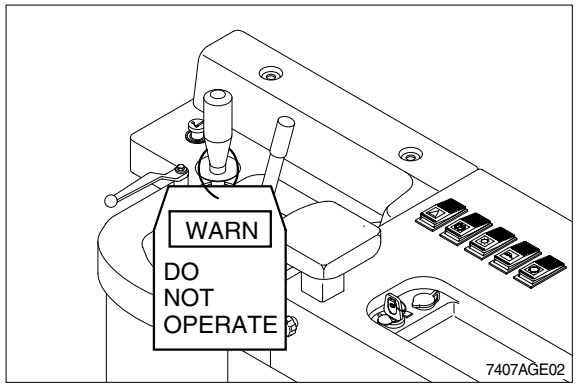
Wear close fitting clothing and safety equipment appropriate to the job.



WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.

Before performing any work on the wheel loader, attach a 「Do Not Operate」 tag on the right side controller lever.



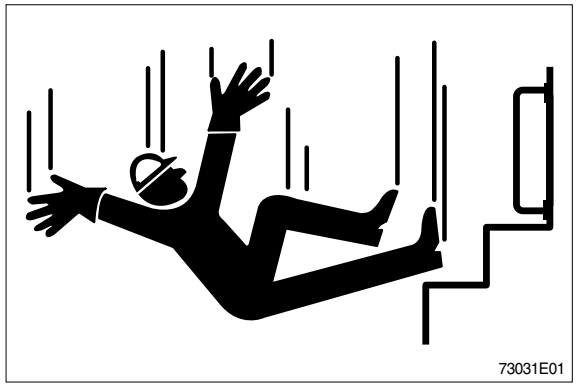
USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.

When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.

Never jump on or off the machine. Never mount or dismount a moving machine.

Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



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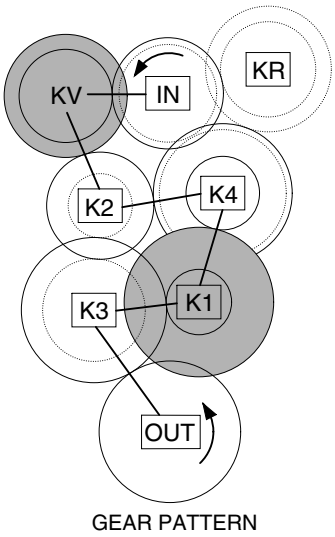
3) OPERATION OF TRANSMISSION

(1) Forward

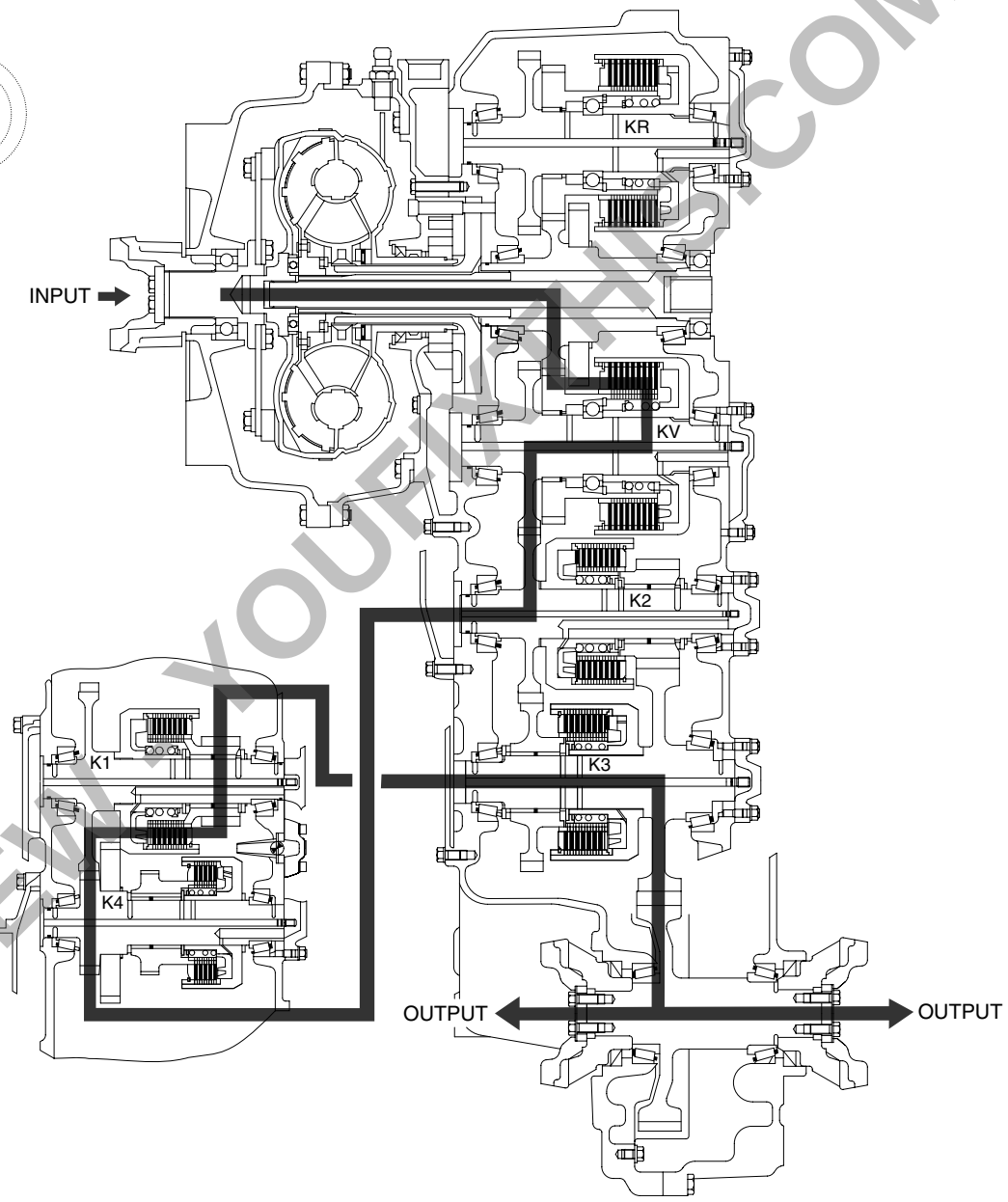
① Forward 1st

In 1st forward, forward clutch and 1st clutch are engaged.

Forward clutch and 1st clutch are actuated by the hydraulic pressure applied to the clutch piston.



GEAR PATTERN



7607PT04

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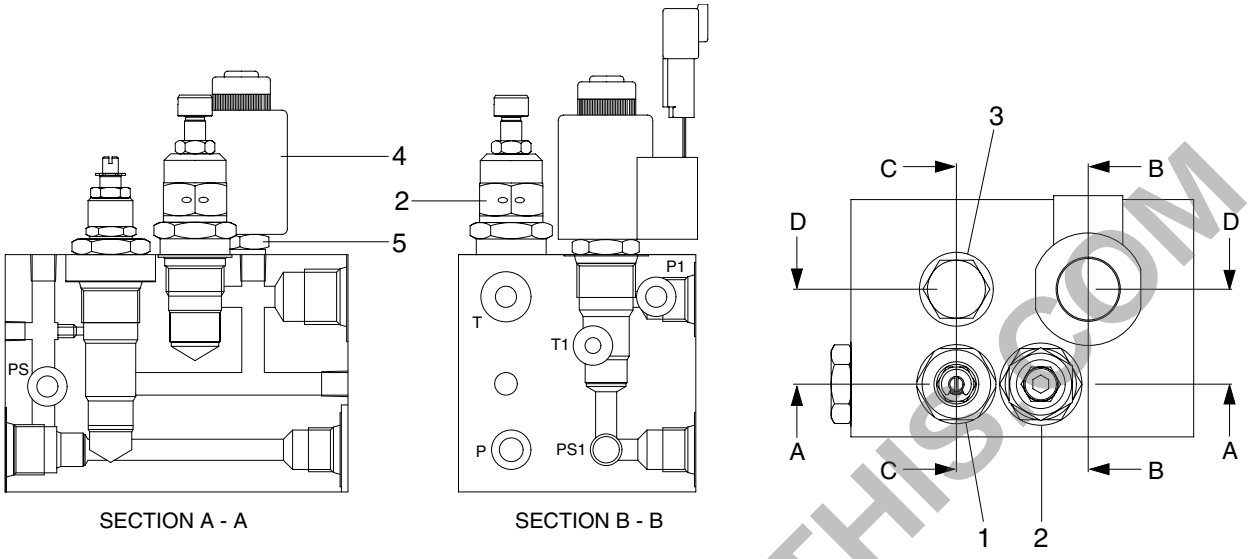
Fault code (Hex)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair
E1	**S.C. battery voltage at speedometer output**	-	※ Not used
E2	**S.C. to ground or O.C at speedometer output**	-	※ Not used
E3	**S.C. to battery voltage at display output** TCU sends data to the display and measures always a high voltage level on the connector · Cable or connectors are defective and are contacted to battery voltage · Display has an internal defect	No reaction OP mode : Normal	· Check the cable from TCU to the display · Check the connectors at the display · Change display
E4	**S.C. to ground at display output** TCU sends data to the display and measures always a high voltage level on the connector · Cable or connectors are defective and are contacted to battery voltage · Display has an internal defect	No reaction OP mode : Normal	· Check the cable from TCU to the display · Check the connectors at the display · Change display
E5	**Communication failure on DeviceNet**	Shift to neutral OP mode : TCU shutdown	· Check Omron master · Check wire of DeviceNet-Bus · Check cable to Omron master
E5	**DISPID1 timeout** Timeout of CAN-massage DISPID1 from display controller · Interference on CAN-Bus · CAN wire/connector is defective · Can wire/connector is defective and has contact to vehicle ground or battery voltage	TCU select parameter set with ID0 OP mode : Limp home	· Check display controller · Check wire of CAN-Bus · Check cable display controller

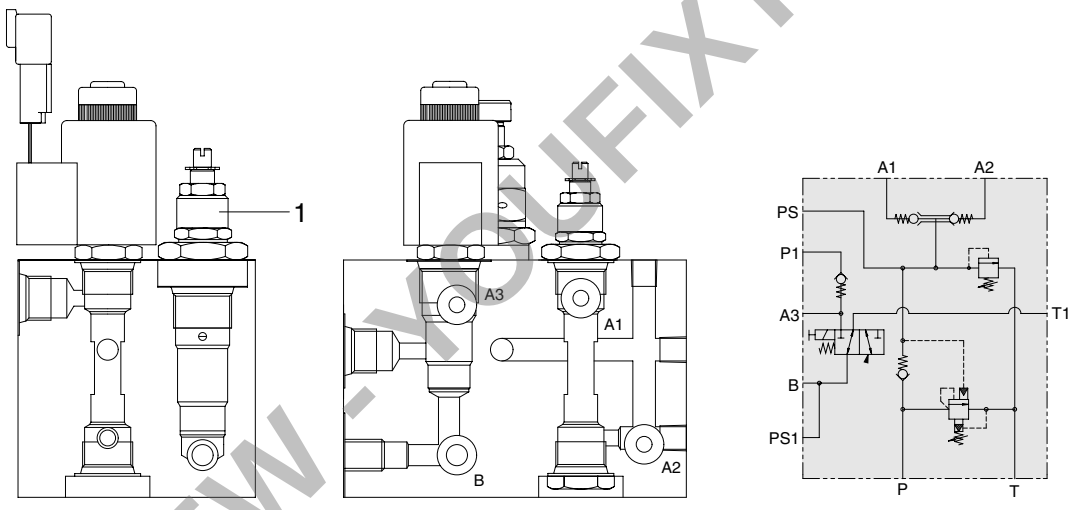
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5. CUT-OFF VALVE

1) STRUCTURE





7407ABS11

1 Cut-off valve
2 Relief valve
3 Check valve
4 Coil
5 Solenoid valve

2) OPERATION

When the pump works, the oil under the pressure flows into P port.
The oil in P port is stored in the accumulator on A1 or A2 port.
As the pressure on P line rises to 150bar, the cut off valve(1) starts cut-offing and the oil in the P port is unloaded. The pressure on P line goes down 120bar by the minute leakage from valve and other factors.
At this pressure, the cut-off valve starts cut-ining.
This process is repeated in the regular period of 30~40 seconds.

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1. HYDRAULIC OIL CLEAN UP PROCEDURE USING PORTABLE FILTER CADDY

※ **Service equipment and tool**
- Portable filter caddy
- Two 4000mm × 1" 100R1 Hoses
- Quick disconnect fittings
- Discharge wand
- Connectors

※ **Steering system use oil from hydraulic oil tank. Flush all lines in the steering system.**

※ **Disassemble and clean major components for steering system.**
Steering components may fail if steering system is not cleaned after hydraulic oil tank contamination.

1) If hydraulic system is contaminated due to a major component failure, remove and disassemble steering cylinders to clean debris from cylinders.

2) Install a new return filter element. Inspect filter before installing new element.

※ **For a failure that creates a lot of debris, remove access cover from hydraulic oil tank. Drain and clean hydraulic oil tank of fill the specified oil to hydraulic oil tank through upper cover.**

3) To minimize oil loss, pull a vacuum in hydraulic oil tank using a vacuum pump. Connect filter caddy suction line to drain port at bottom of hydraulic oil tank using connector. Check to be sure debris has not closed drain port.

4) Put filter caddy discharge line into hydraulic oil tank filler hole so end is as far away from drain port as possible to obtain a thorough cleaning of oil.

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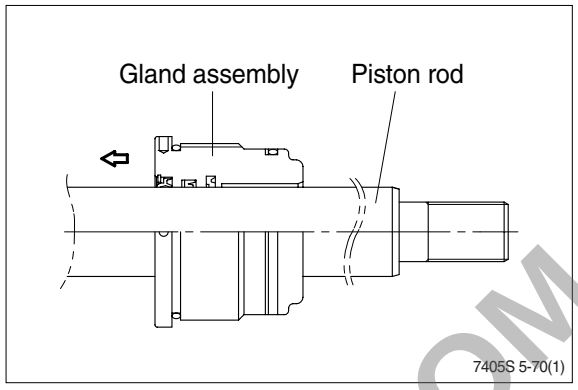
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(3) Install piston and gland assembly

① Fix the piston rod assembly to the work bench.

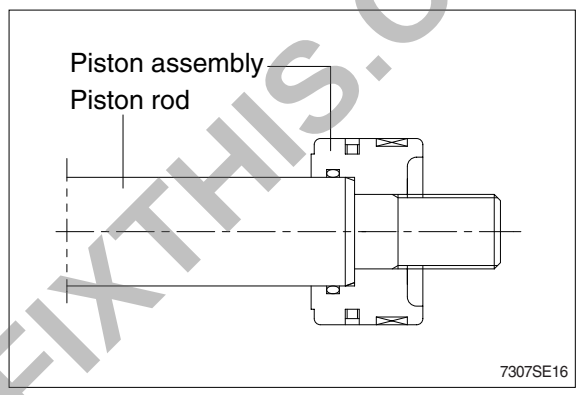
② Apply hydraulic oil to the outer surface of piston rod(2), the inner surface of piston and gland.

③ Insert gland assembly to piston rod(2).



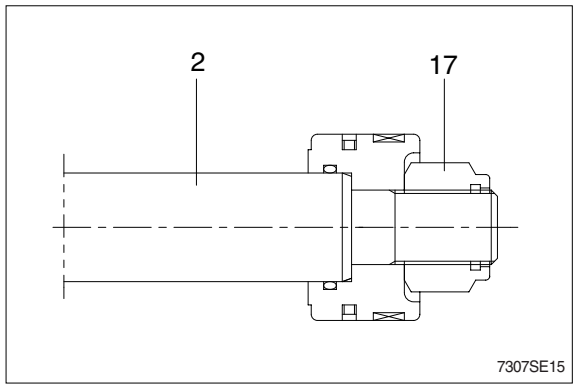
④ Fit piston assembly to piston rod.

· Tightening torque : 65 ± 7kgf · m
(470 ± 51lbf · ft)



⑤ Tighten nylon nut(17) to piston rod(2).

· Tightening torque : 40 ± 4kgf · m
(289 ± 29lbf · ft)



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GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

1. OPERATIONAL CHECKS

This procedure is designed so the mechanic can make a quick check of the system using a minimum amount of diagnostic equipment. If you need additional information, read **Structure and function**, Group 1.
A location will be required which is level and has adequate space to complete the checks.

The engine and all other major components must be at operating temperature for some checks.

Locate system check in the left column and read completely, following the sequence from left to right. Read each check completely before performing.

At the end of each check, if no problem is found(OK), that check is complete or an additional check is needed. If problem is indicated(NOT OK), you will be given repair required and group location.

If verification is needed, you will be given next best source of information:

Chapter 2 : Troubleshooting
Group 3 : Tests and adjustments

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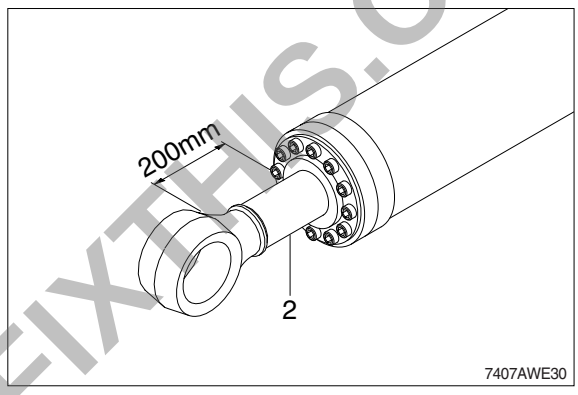
4) DISASSEMBLY

(1) Remove gland and piston rod

※ Procedures are base on the boom cylinder.

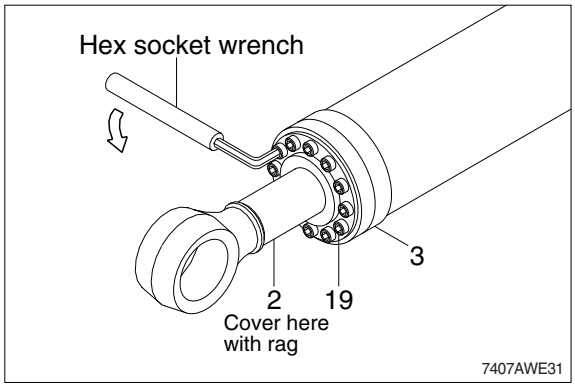
① Hold the clevis section of the tube in a vise. Use mouth pieces so as not to damage the machined surface of the cylinder tube. Do not make use of the outside piping as a locking means.

② Pull out piston rod(2) about 200㎜ (7.8 in). Because the piston rod is rather heavy, finish extending it with air pressure after the oil draining operation.



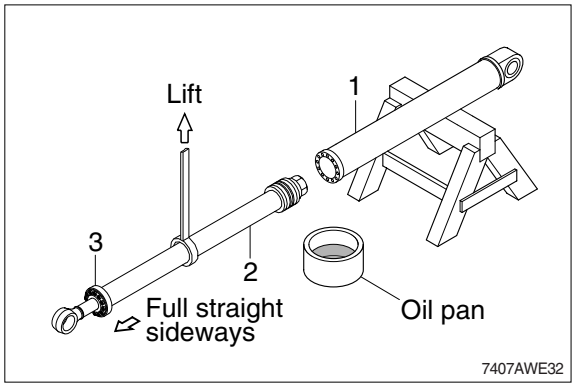
③ Loosen and remove socket bolts(19) of the gland(3) in sequence.

※ Cover the extracted piston rod(2) with rag to prevent it from being accidentally damaged during operation.



④ Draw out gland(3) and piston rod (2) assembly together from cylinder tube(1).

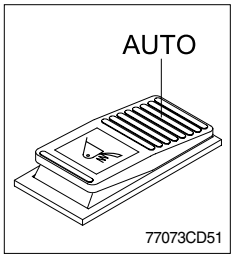
※ Since the piston rod assembly is heavy in this case, lift the tip of the piston rod(2) with a crane or some means and draw it out. However, when piston rod(2) has been drawn out to approximately two thirds of its length, lift it in its center to draw it completely.



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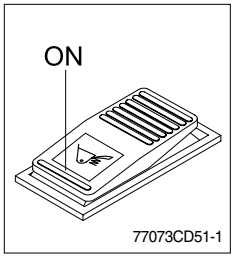
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11) RIDE CONTROL SWITCH (Option)



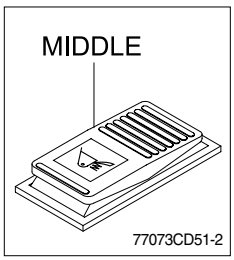
(1) AUTO position

Push in the top of the ride control switch in order to turn on the automatic ride control. The automatic ride control automatically turns on when the travel speed exceeds a preset speed of approximately 9.5km/h. The automatic ride control automatically shuts off during low speed 8km/h travel mode.



(2) ON position

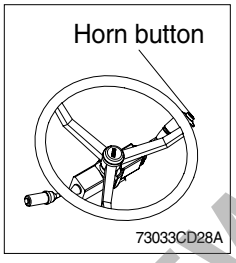
Push in the bottom of the ride control switch in order to turn on the system for ride control regardless speed. The ride control will smooth the ride of the machine during travel.



(3) MIDDLE position

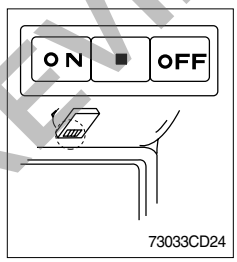
Push the ride control switch to the middle position in order to turn off the system for the ride control.

12) HORN BUTTON



(1) If you press the button on the top of the multifunction switch, the horn will sound.

13) CAB LAMP SWITCH



(1) This switch turns ON the cab room lamp.

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