Section 21
Transmissions

JX1060C, JX1070C, JX1075C Tractors

Repair Manual

87046863

CASE

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JX1060C, JX1070C, JX1075C REPAIR MANUAL CONTENTS

SECTION 00 – GENERAL
SECTION 10 – ENGINE
SECTION 18 – CLUTCH



SECTION 21 – TRANSMISSIONS

SECTION 23 – MFD TRANSFER BOX
SECTION 25 – FRONT AXLE (MFD)
SECTION 27 – REAR MECHANICAL DRIVE
SECTION 31 – MECHANICAL POWER TAKE-OFF
SECTION 33 – BRAKING SYSTEM
SECTION 35 – HYDRAULIC SYSTEM
SECTION 41 – STEERING
SECTION 44 – AXLES AND WHEELS
SECTION 50 – CAB AIR CONDITIONING SYSTEM
SECTION 55 – ELECTRICAL SYSTEM
SECTION 90 – PLATFORM, CAB, BODYWORK

The sections used through out all Case IH product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the JXC Series Tractors.

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TORQUE SETTINGS

Component (Refer to Figure 1)	Thread	Tightening torque	
		N·m	ft. lb.
Lift intervention speed adjustment cap valve (C_1)	–	54	40
Control valve block pin spring cap (C_2)	–	54	40
Bolts securing control valve block to lift (C_3)	M8 x 1.25	26	19
Bolts securing union to control valve block (C_4)	–	44	33
Check valve return (C_5)	M24 x 1.5	83	68
Cylinder safety valve (C_6)	M20 x 1.5	83	68
Control valve cap (C_7)	M20 x 1.5	83	66
Lift cylinder retaining bolts:			
– front (C_8)	M14 x 1.5	157	116
– upper (C_{10})	M16 x 1.5	260	192
Bolts securing lift to rear transmission housing (C_9)	M12 x 1.25	98	72
Control lever quadrant cover stud bolts (C_{11})	–	49	36
Nuts for lever quadrant cover stud bolts (C_{12})	M8 x 1.25	25	19
Fast Raise/Lower Control lever quadrant retaining nut (C_{13})	–	54	40
Lifting arm plate retaining bolts (C_{14})	M14 x 1.5	142	105
Eccentric pin retaining nuts (C_{15})	–	49	36
Eccentric pin seat cap (C_{16})	–	83	68
Fast Raise/Lower Control lever retaining bolts (C_{17})	–	54	40
Quadrant with arms control pivot cam retaining bolts (C_{18})	–	49	36
Internal lever mechanisms support pin (C_{19})	–	54	40
Flex bar gasket support retaining bolts	–	64	47
Lateral stabilizer strut support retaining bolts	M16 x 1.5	221	163
Pick-up hitch hook support retaining bolts	M16 x 1.5	221	163
Remote valve stack through bolts	–	21	16
Control valve elements locknut (remote valves)	3/8″ – 24 UNF	20.4	15
Front and rear cover retaining bolts (remote valves)	1/4″ – 20 UNC	11	8
Remote control valve retaining bolts	M10 x 1.25	59	44

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POWER SHUTTLE FAULT CODE PRIORITY

CODES	FAULT	PRIORITY	CORRECTION	EFFECT
11	CPDL_POT_LO_DISABLING_ERR	14	SL	Dis
11	CPDL_POT_LO_ERR	75′	Fixed	Lim
12	CPDL_POT_HI_DISABLING_ERR	15	SL	Dis
12	CPDL_POT_HI_ERR	74′	Fixed	Lim
13	UD_SW_ON_ERR	67	Auto	None
14	C1_SW_HI_DIS_ERR	22	CP/SL	Dis
14	C1_SW_HI_ERR	83′	Fixed	Mod
15	C1_SW_LO_DIS_ERR	23	CP/SL	Dis
15	C1_SW_LO_ERR	84′	Fixed	Mod
16	G1_SW_HI_DIS_ERR	24	CP/SL	Dis
16	G1_SW_HI_ERR	85′	Fixed	Mod
17	G1_SW_LO_DIS_ERR	25	CP/SL	Dis
17	G1_SW_LO_ERR	86′	Fixed	Mod
18	CREEPER_ENG_SW_HI_ERR	47	Fixed	Mod
19	CREEPER_ENG_SW_LO_ERR	48	Fixed	Mod
21	CH_HARN_ERR	1	Fixed	Crit.Dis
22	SOL_A_SHORT_DIS_ERR	39	CP/SL	Dis
22	SOL_A_SHORT_ERR	97′	Fixed	Lim
23	SOL_B_SHORT_DIS_ERR	37	CP/SL	Dis
23	SOL_B_SHORT_ERR	95′	Fixed	Lim
24	CL_UNCAL_ERR	100	Fixed	Mod
26	ERPM_HI_ERR	65	Fixed	Mod
27	ERPM_LO_ERR	66	Fixed	Mod
28	B_CL_UNCAL_ERR	101	Fixed	Mod
29	A_CL_UNCAL_ERR	102	Fixed	Mod
31	SOL_SHTL_SHORT_DIS_ERR	31	CP/SL	Dis
31	SOL_SHTL_SHORT_ERR	90′	Fixed	Lim
32	SOL_HL_SHORT_DIS_ERR	33	CP/SL	Dis
32	SOL_HL_SHORT_ERR	92′	Fixed	Lim
33	SOL_DUMP_SHORT_DIS_ERR	35	CP/SL	Dis
33	SOL_DUMP_SHORT_ERR	98′	Fixed	Lim
35	SOL_DUMP_SHORT_12V_ERR	8	Fixed	Crit.Dis
36	SOL_DUMP_OPEN_OR_GND_DIS_ERR	34	CP/SL	Dis
36	SOL_DUMP_OPEN_OR_GND_ERR	99′	Fixed	Lim
37	CL_SW_OC_ERR	13	CP/SL	Dis

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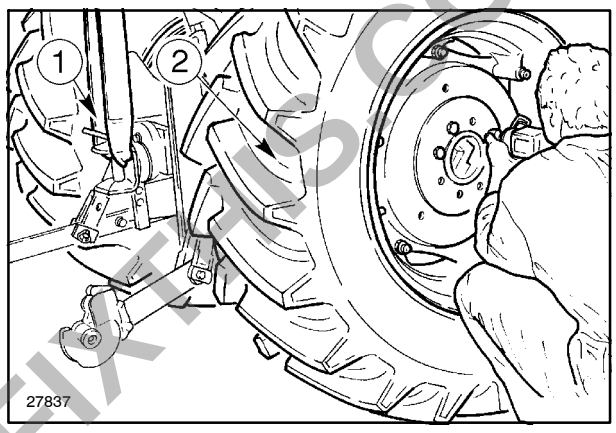
Op. 21 118 10 - 21 118 12
REAR TRANSMISSION-GEARBOX CASING
Removal-Installation

⚠ DANGER ⚠

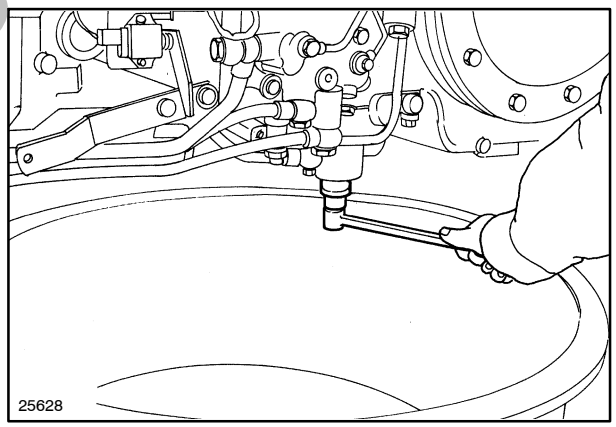
Lift and handle all heavy parts using suitable lifting equipment
Make sure that the units or parts are supported by means of suitable slings and hooks. Make sure that no-one is standing in the vicinity of the load to be lifted.

Proceed as follows.

1. Carry out operation **90 150 10** cab with platform removal (see Section 90, Chapter 1).
2. Carry out operation **23 101 26** transmission shafts and guard removal (see Section 23, Chapter 1).
3. Carry out operation **10 216 10** fuel tank removal (see Section 10, Chapter 1).
4. Lock the front wheels using chocks.
5. Remove the top link of the third point.
6. Using a hoist and sling (1) raise the rear part of the tractor, position a fixed support stand under the towing hook, then remove the right-hand (2) and left hand wheels.
7. Unscrew the plug and drain the oil from the rear transmission casing (the prescribed quantity is 42 litres [11.09 gal]).

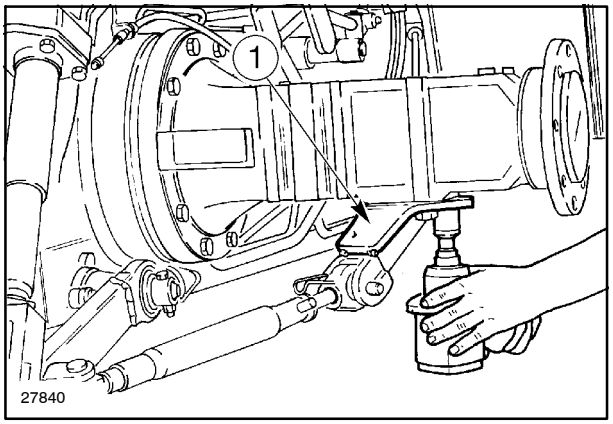


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8. Unscrew the stabilizer strut bracket retaining bolts (1).

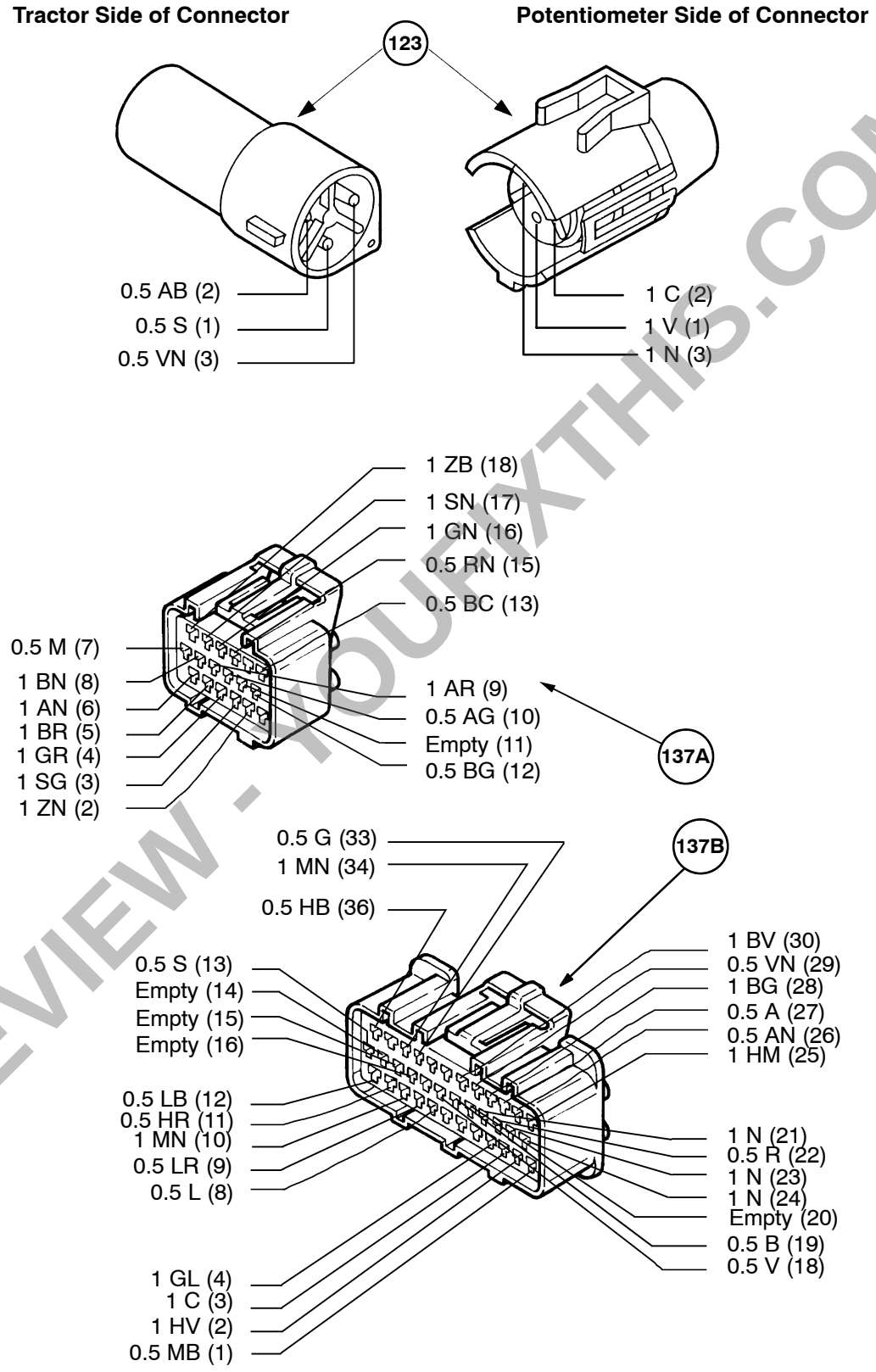


12

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FAULT CODE 11



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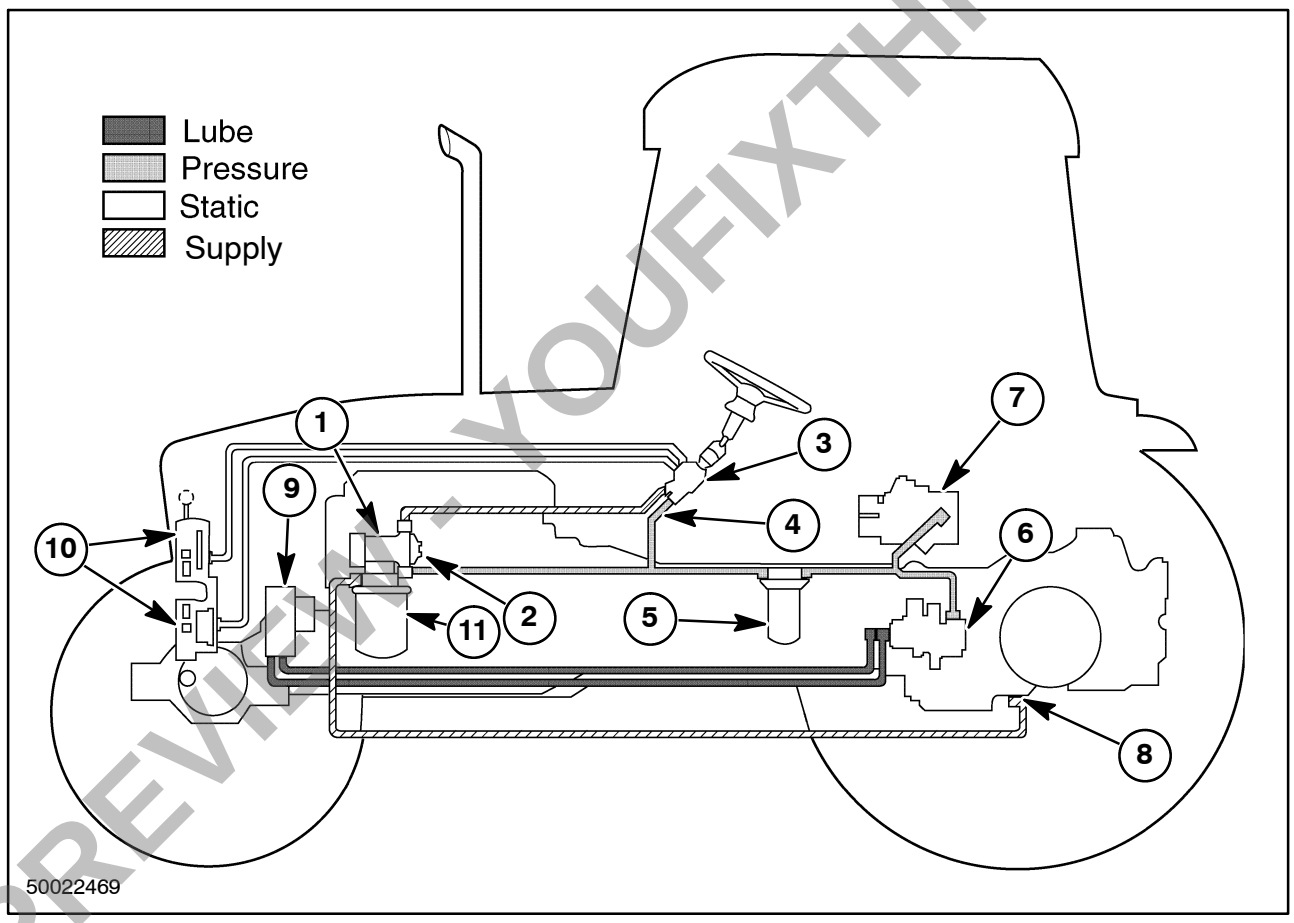
LOW-PRESSURE, STEERING AND LUBRICATION SYSTEM - GENERAL DESCRIPTION

The low-pressure system pump mounts on the right-hand side of the engine aft of the high-pressure pump. It is a fixed displacement, open-center, gear type pump driven by the engine timing gear. The pump supplies oil to the low-pressure system at a rate of 28 l/m (7.2 g/m) on models including a mechanical shuttle transmission or 35 l/m (9.2 g/m) for models with a power shuttle transmission.

The low-pressure system is an open-center type, which allows the constant flow of oil through the system and back to return. This reduces wear on the valve seals, and prevents damage to components from prolonged static pressure, while continually providing lubrication and cooling for the transmission.

There is a relief valve installed in the steering control valve, services control valve, and in the transmission, to protect the low-pressure, steering and lubrication circuits from damage caused by over-pressurization.

A filter assembly removes contaminants from the oil supplied by the rear axle casing before the oil enters the pump. Tractors configured with a power shuttle transmission will include an additional filter assembly, power shuttle control valve and oil cooler as shown in Figure 1.



1

Low Pressure System with Power Shuttle Transmission

1. Low-pressure (Steering) Pump
2. Priority Flow Valve (larger steering pumps)
3. Steering System Control Valve
4. Steering System Exhaust Line
5. Power Shuttle Filter (Power Shuttle models only)
6. Services Control Valve
7. Power Shuttle Control Valve(Power Shuttle models only)
8. Rear Axle Housing
9. Oil Cooler (with larger rated pump)
10. Power Steering Cylinders
11. Main Filter Assembly

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DESCRIPTION AND OPERATION

Gearbox and Shuttle (Synchronized Mechanical Shuttle)

4-speed gearbox with constant-mesh helical gears controlled by two synchronizers.

The range gear has cascade-type constant-mesh spur gears.

The range gear provides 4 gears (16 x 16 version).

The gearbox and the range gears are controlled by two independent levers located on the right-hand side of the operator.

The shuttle is a mechanical device making it possible to obtain 16 forward gears and 16 reverse gears. It is controlled by a lever located on the cab platform to the left of the operator.

The shuttle is composed of a group of three spur gears: reverser driving gear, reverser driven gear and intermediate gear, engagement is by means of a synchronizer located in the gear unit.

The shuttle is installed inside the clutch casing, between the clutch and the gearbox.

Lubrication is by means of the oil in the rear transmission/gearbox.

GEARBOX, GEAR RANGE AND SHUTTLE TROUBLESHOOTING

Problems	Possible causes	Remedies
Spontaneous disengagement of gearbox.	1. Levers and relay rods incorrectly adjusted.	Adjust correctly.
	2. Control levers retaining springs damaged.	Replace springs.
	3. Synchronizer teeth or selection sleeves damaged.	Remove the transmission-gearbox casing and replace the synchronizers or the sleeves.
	4. Engagement stroke incomplete.	Eliminate the cause and reset the complete stroke.

(continued overleaf)

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SECTION 23 - MFD TRANSFER BOX

Chapter 1 - MFD Transfer Box

CONTENTS

Section	Description	Page
23 000	Main Data	1
	Torque settings	2
	Tools	3
	Cross-Sectional Views	5
	Description and Operation	8
	Troubleshooting	9
23 101 26	Transmission Shafts and Guard. Removal-Installation	10
23 101 42	Drive Gear Housing (Removed). Disassembly-Assembly Mechanical	12
23 202 52	Drive Gear Housing (Removed). Disassembly-Assembly Electro-hydraulic	14

MAIN SPECIFICATIONS - MFD ELECTROHYDRAULIC ENGAGEMENT

Reduction ratio of drive gear device		43/28X28/39 = 1:1.1
Internal diameter of sliding sleeve (16, fig. 4)	in. (mm)	1.3811 to 1.3826 (35.080 to 35.119)
Diameter of coupled shaft	in. (mm)	1.3769 to 1.3779 (34.975 to 35.000)
Internal diameter of sliding sleeve	in. (mm)	1.9716 to 1.9731 (50.080 to 50.119)
Diameter of coupled shaft	in. (mm)	1.9281 to 1.9645 (48.975 to 49.900)
Internal diameter of fixed sleeve	in. (mm)	0.8687 to 0.87 (22.065 to 22.098)
Diameter of coupled shaft	in. (mm)	0.8653 to 0.8661 (21.979 to 22.000)
Length of spring (with spring free)	in. (mm)	3.22 (82)
Length of spring under a load of 133.37 to 144.40 lbs. (60.5 to 65.5 kg)	in. (mm)	1.57 (40)

MAIN SPECIFICATIONS - TRANSMISSION SHAFT

Thickness of shims (2, fig. 5) that adjust the position of the front sleeve (3, fig. 5) on the MFD transmission shaft	in. (mm)	0.059 - 0.074 - 0.086 - 0.098 - 0.0110 - 0.0118 - 0.0129 - 0.0145 - 0.0157 - 0.0169 (1.5 - 1.9 - 2.2 - 2.5 - 2.8 - 3 - 3.3 - 3.7 - 4 - 4.3)
Axial clearance (L, fig. 5) of the front sleeve	in. (mm)	0.039 to 0.059 (1.0 to 1.5)

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H1 - CLUTCHES A and B CALIBRATION

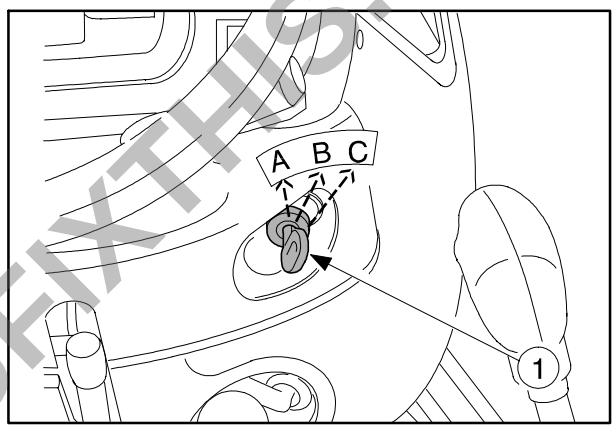
The H1menu provides access to Power Shuttle clutches (A) and (B) calibration, reducing the engine speed when the clutches start engaging. The ECM reads engine RPM from the alternator to accomplish this.

The calibration of the clutches is necessary when the following has occurred:

- Poor transmission performance
- Solenoid valve has been replaced
- Erasure of non-volatile memory in the ECM (using the H8 menu)
- ECM has been replaced
- After initial break-in period - first 50 hrs.

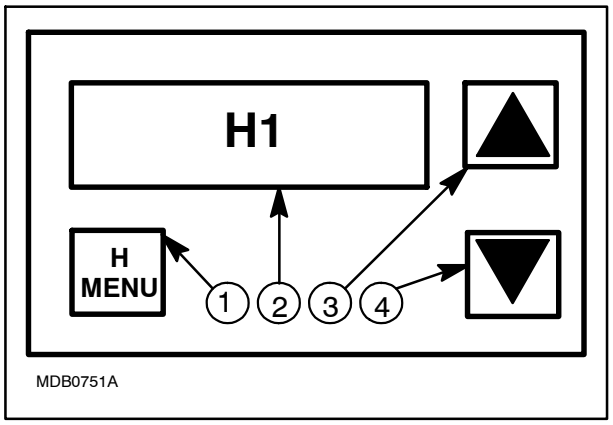
Use the following procedure to calibrate the clutches.

1. Make sure the key switch (1) is in the "OFF" position (A) and connect the CDU to the Power Shuttle ECM as described previously in this manual.



19

2. While holding the "HMENU" button (1) on the CDU display (2), turn the key to the "START" position (C).
3. After the tractor has gone through self diagnosis and has started, release the "HMENU" button (1). "HMENU" should appear on the CDU display (2).
4. Press the "HMENU" button (1) once. "H1" should appear on the CDU display (2). After a few seconds, "CALIBR" will appear momentarily on the CDU display (2) and then change to the transmission fluid temperature.
5. Make sure the parking brake is firmly set and increase the engine speed to 1300 $\pm$ 100 RPM.



20

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1. **Clutch Pedal Potentiometer**, (ON)
   - released, (pedal up), **542** (maximum)
   - depressed, (pedal down), **38** (minimum)
2. **Transmission Oil Temperature Sensor**, (ON)

NOTE: *"HC Menu" will display transmission oil temperature in degrees Celsius.*

- At 0° C (32° F) **463 ± 69**
- At 30° C (86° F) **225 ± 33**
- At 60° C (140° F) **136 ± 20**
- At 90° C (194° F) **53 ± 8**

3. **ECM +12 VF Keyed Battery Supply Voltage**, (ON)
   - Battery charge at 9V (low charge, prolonged cranking) **428**
   - Battery charge at 12V (normal) **595**
   - Battery charge at 16V (overcharge) **762**
4. **ECM +12VD Keyed Battery Voltage,** (START)
   a) Clutch pedal released and Power Shuttle FNR lever in the forward or reverse position.
   - Battery charge at 9V (low charge) **428**
   - Battery charge at 12V (normal) **595**
   - Battery charge at 16V (overcharge) **762**

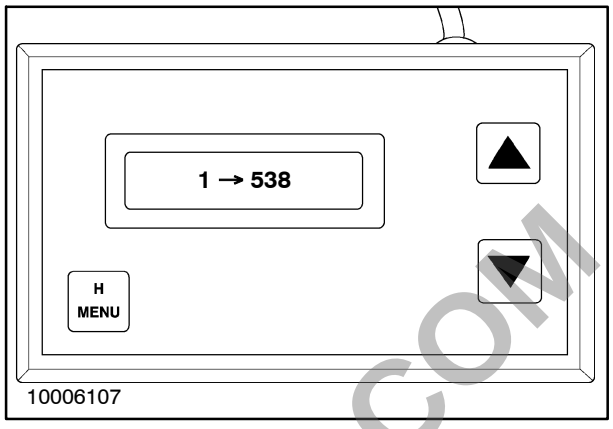
   b) Power Shuttle FNR lever in the neutral position or clutch pedal depressed 0-95
5. **Synchronizer Forward (Hi/Lo) Position Switch**, (NOT USED JX1060C, JX1070C, OR JX1075C MODELS)
6. **Synchronizer Reverse (Shuttle) Position Switch**, (NOT USED JX1060C, JX1070C, OR JX1075C MODELS)

⚠ WARNING ⚠

The tractor will move when checking channels 7 and 8. Be sure the area around the tractor is clear of people and objects before performing the following test, otherwise bodily injury, death or damage may occur.

NOTE: *For channels 7 and 8, reading will vary depending upon clutch calibration values.*

NOTE: *Allow at least six seconds for the CDU to indicate an actual reading as solenoids ramp up to proper amperage. Ramp up time is dependent upon operating temperature of hydraulic fluid.*



51

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MAIN DATA

(cont.)

Clearance between sides of side pinion and ring gear teeth	in. (mm)	0.0059 (0.15)
Thickness of planet pinion thrust washers	in. (mm)	0.0578 to 0.0602 (1.470 to 1.530)
Diameter of cross pin for planet pinions	in. (mm)	0.8637 to 0.8645 (21.939 to 21.960)
Side pinion cross pin bore diameter	in. (mm)	0.9031 to 0.8685 (22.040 to 22.061)
Clearance between cross pin and bores	in. (mm)	0.0031 to 0.0048 (0.080 to 0.122)
Axle shafts and steering knuckles		
Diameter of outer axle shafts in relation to bushings	in. (mm)	1.7706 to 1.7716 (44.975 to 45.000)
Inside diameter of installed bushes	in. (mm)	1.7755 to 1.7785 (45.100 to 45.175)(1)
Clearance between axle shafts and bushes	in. (mm)	0.0039 to 0.0078 (0.100 to 0.200)
Interference fit between bushes and respective bores	in. (mm)	0.0025 to 0.0050 (0.064 to 0.129)
Thickness of steering knuckle bearing adjuster plates	in. (mm)	0.0039 - 0.0059 - 0.0078 - 0.0098 - 0.0118 (0.10 - 0.15 - 0.20 - 0.25 - 0.30)
Epicyclic final drives		
Gear ratio		12 : (12 + 60) = 1 : 6
Thickness of driven gears thrust rings	in. (mm)	0.0303 to 0.0326 (0.77 to 0.83)
Axle pivot		
Axle clearance on pivot between body and support	in. (mm)	0.0118 to 0.0433 (0.3 to 1.1)
Maximum permitted wear clearance	in. (mm)	0.0787 (2)
Diameter axle pivot front pin	in. (mm)	2.0729 to 2.0736 (52.652 to 52.671)
Installed front bush internal diameter	in. (mm)	2.0755 to 2.0783 (52.720 to 52.790)(1)
Clearance between pin and bush	in. (mm)	0.0019 to 0.0054 (0.049 to 0.138)
Outside diameter of rear bush installed in the bevel pinion support	in. (mm)	3.8984 to 3.8996 (99.020 to 99.050)
Inside diameter of rear bush installed in the axle pivot support	in. (mm)	3.9033 to 3.9063 (99.146 to 99.221)(1)
Assembly clearance between the two bushes	in. (mm)	0.0037 to 0.0079 (0.096 to 0.201)
Thickness of the front and rear front axle thrust washers	in. (mm)	0.1948 to 0.1968 (4.95 to 5.00)

(1) Measurement to be obtained without reaming

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MAINTENANCE OF THE AIR CONDITIONING SYSTEM

At the start of the season in which it will be used, check the efficiency and operation of the system.

If the system has been out of use and charged for a prolonged period, oil may have flowed out of the compressor to other parts of the system and consequently this oil must be returned to the compressor.

To carry out this operation, proceed as follows:.

1. Start the engine and leave it running at 1500 rpm.
2. Make sure that the switch (3, fig. 14) is turned fully to the left, in order to exclude the heating function and provide maximum cooling.
3. Adjust the electric fan (1) to maximum speed.
4. Press push button (2) to switch on the air conditioning.

After the system has been in operation for about 15 minutes, check the following values:

Check that the relative temperatures of the external ambient air and the air flowing out of the vents inside the cab correspond to the values indicated in the table on page15.

If the temperature values are correct, the system is perfectly efficient and only requires a visual inspection of the main components:

1) COMPRESSOR: check the mountings, the tension of the drive belt and the oil level.

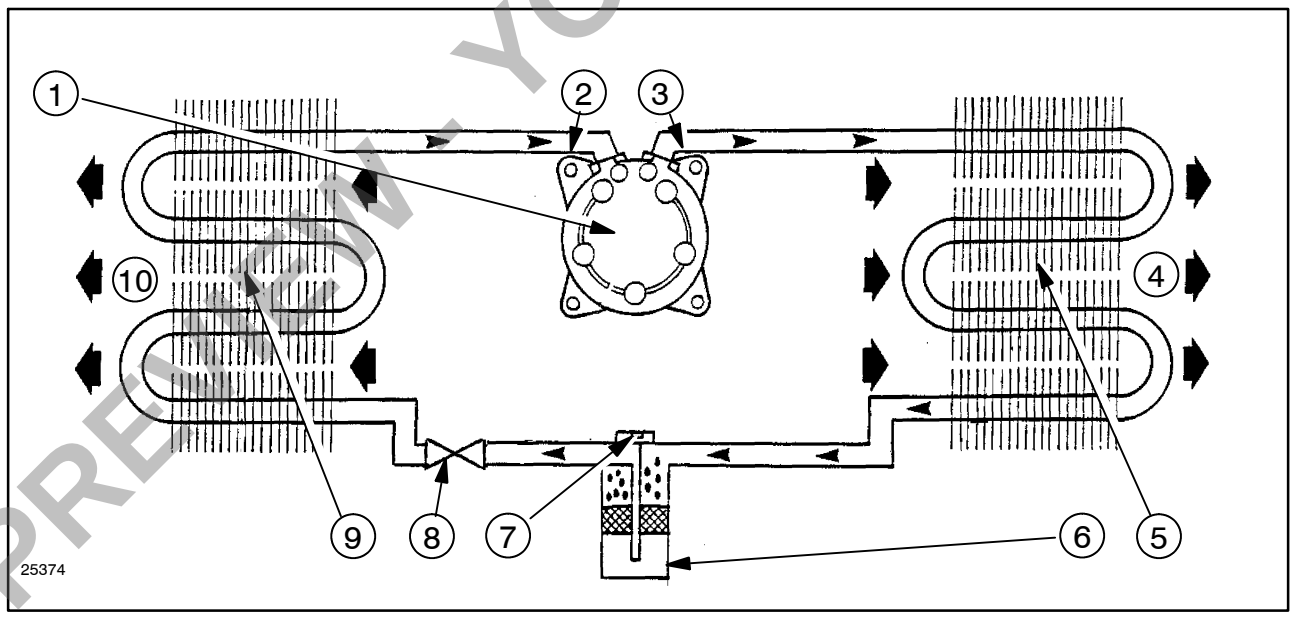
2) CONDENSER: check mounting and that the fins are free of excessive deposits. Straighten any bent fins using the comb tool **380000312.**

NOTE: *Carry out the same checks on the EVAPORATOR (9) and the CONDENSER (5).*

3) FILTER/DRYER: the sight glass on the receiver-dryer can provide useful information about system operation, as described below. Replace the receiver-dryer after the system has been repaired on two occasions.

4) EXPANSION VALVE: this valve does not require maintenance; in the event of malfunction contact specialized personnel of the CASE IH service network.

If the temperature of the air at the vent outlets does not conform to the indications given in the table on page 15, proceed with the system troubleshooting operations described on the following pages.



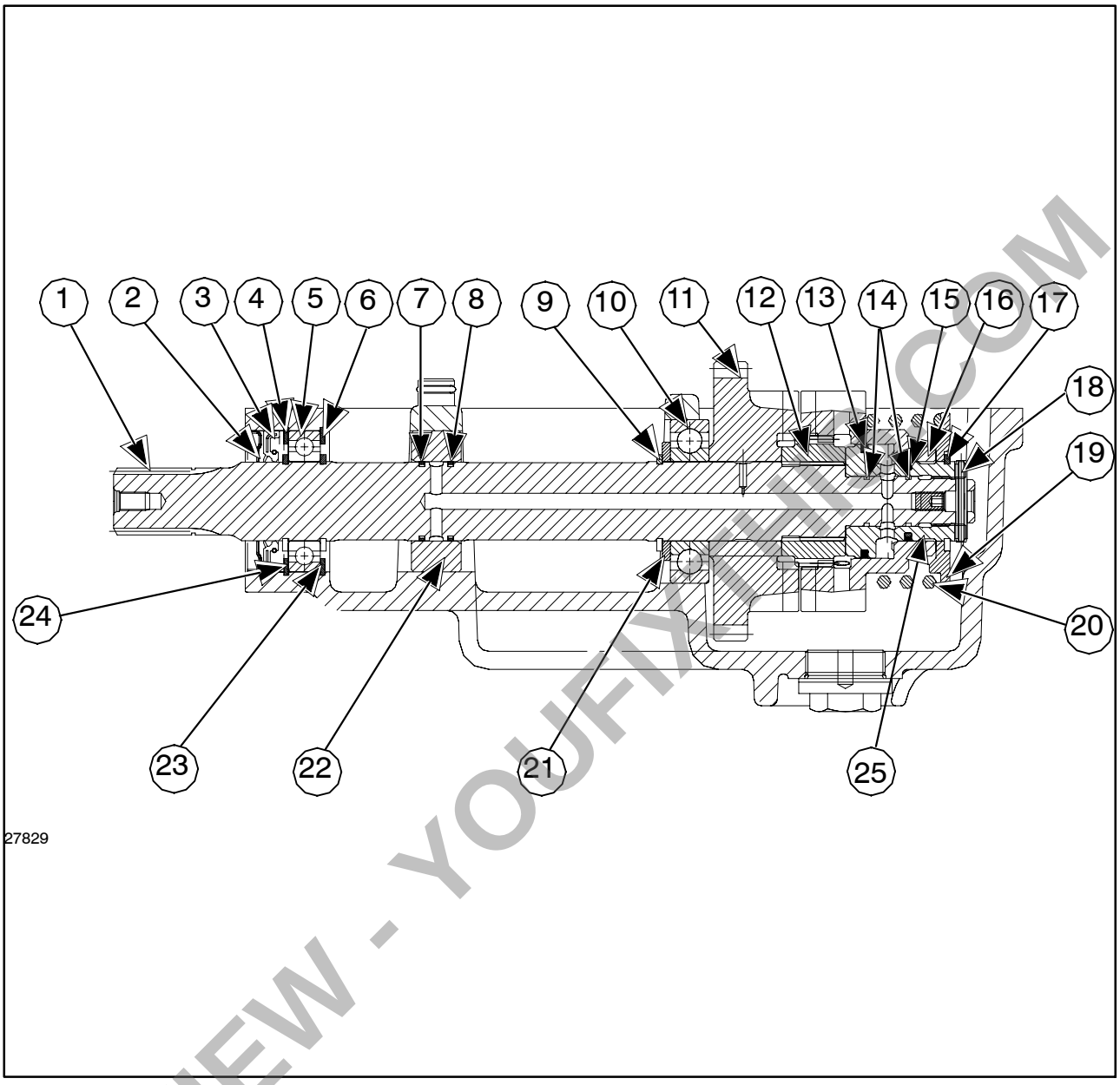
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Schematic diagram of the air conditioning system.

1. Compressor.
2. Inlet pipe (low pressure).
3. Outlet pipe (high pressure).
4. Warm air.
5. Condenser.
6. Filter/dryer.
7. Sight glass.
8. Expansion valve with thermostatic sensor.
9. Evaporator.
10. Cool, dehumified air.

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4

Sectional view of drive gear electrohydraulic coupling

1. Driven shaft.
2. Dust ring.
3. Seal.
4. Circlip.
5. Bearing.
6. Circlip.
7. Metal seal segment.
8. Metal seal segment.
9. Circlip.
10. Bearing.
11. Driving gear.
12. Gear sleeve.
13. Seal.
14. Metal seal segments.
15. Seals.
16. Mobile coupling.
17. Circlip.
18. Pin.
19. Washer.
20. MFD engage spring.
21. Thrust washer.
22. Manifold ring.
23. Circlip.
24. Circlip.
25. Gland nut

NOTE: *On installation, apply sealing compound to the surfaces* ***X*** *(see Section 27, Chapter 1).*

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SHUTTLE UNIT MAIN DATA

Type	mechanical type with spur gearing, located between the main clutch and the gearbox.
Operating system	hand lever located on left-hand side of operator

GEARBOX AND RANGE GEAR MAIN DATA

Gearbox (Synchro-Command)		4-speed constant mesh, synchronized on all gears with synchronized F/R shuttle shift.
Gearing type		helical
Range gear (16 x 16)		ordinary gear train with 4 ranges for a total of 16 speeds.
Thickness of gearbox driving shaft adjustment ring (4, page 8)	mm	0.5 - 0.75 - 1.0 - 1.25 - 1.5 - 1.75 - 2.0 - 2.25
	(in.)	(0.19 - 0.29 - 0.39 - 0.49 - 0.59 - 0.68 - 0.78 - 0.88)
Thickness of gearbox driven shaft adjustment ring (12, page 8)	mm	0.5 - 0.75 - 1.0 - 1.25 - 1.5 - 1.75 - 2.0 - 2.25
	(in.)	(0.19 - 0.29 - 0.39 - 0.49 - 0.59 - 0.68 - 0.78 - 0.88)
Springs for detent balls on gearbox and range gear control rods:		
- spring free length	mm	42
	(in.)	(1.65)
- length of springs under load of 75.5 to 83.3 N (16.97 to 18.72 ft. lbs.)	mm	35
	(in.)	(1.37)
Springs (1, page 10) for gearbox and range gear control levers:		
- spring free length	mm	44
	(in.)	(1.73)
- length of springs under load of 31.4 to 35.3 N (7.05 to 7.943 ft. lbs.)	mm	35
	(in.)	(1.37)

TORQUE SETTINGS

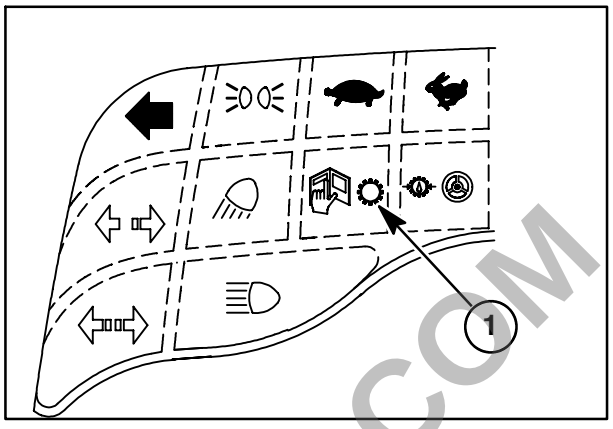
PART	Thread	Tightening torque	
		Nm	ft. lbs.
Sleeve cover retaining nuts (C_1, fig. 1)	M 8 x 1.25	20 to 25	15 to 19
Gearbox driving and driven shafts bearing cover screws (C_2)	M 10 x 1.25	84 to 93	62 to 69
Retaining bolts securing creeper clutch casing to rear transmission/gearbox casing (C_3)	M 12 x 1.25	117 to 129	87 to 96
Driven gear shaft locknut (C_4)	M 32 x 1.5	280 to 309	207 to 228
Drive gear housing cover retaining screws (C_5)	-	43 to 51	32 to 38
Pressure switches (C_6)	-	51 to 72	38 to 54
Parking brake inspection cover, gearbox and range control relay levers support cover retaining screws (C_7)	M 10 x 1.25	43 to 51	32 to 38
Bolts or nuts securing creeper clutch casing to the engine (C_8)	M 12 x 1.25	117 to 129	87 to 96

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Disabled with no error codes stored

If during normal operation, when the FNR lever is placed in either the forward or reverse position, or while moving, the tractor transmission becomes disabled, the status light (1) (fig. 10) begins flashing, and no error codes are signaled on the alarm lamp (1) (fig. 12).

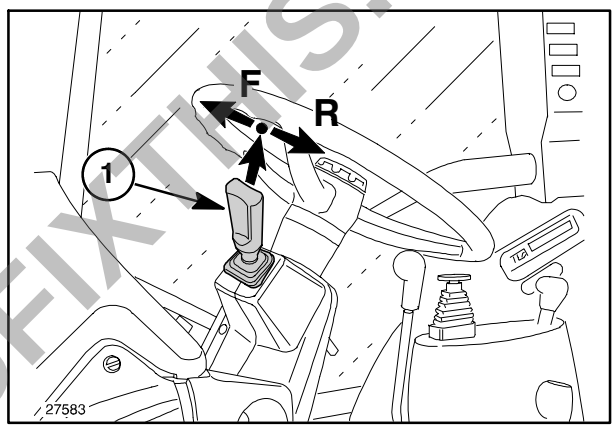


12

The tractor will not move until either the FNR lever (1) or the clutch pedal is cycled.

This condition can be caused by either operator fault (not seated, gear/range levers not properly engaged, incorrect starting sequence) or system fault (seat switch faulty, gear/range lever position switches mis-adjusted/faulty, and alternator W+ wire).

NOTE: *See Electrical Section 55 of this manual for proper operation of operator's presence circuit for seat switch.*



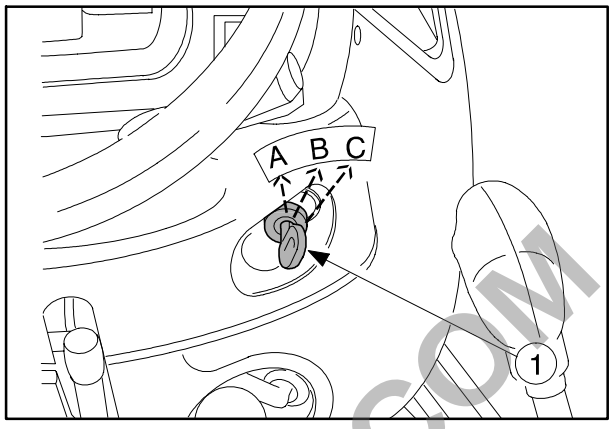
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7. Turn the key switch (1) to the “OFF” position (A) and wait approximately 5 seconds to store the revised data.

NOTE: *The functional software is always disabled when the EST is connected to the diagnosis connection, unless otherwise specifically noted. Consult the description of the individual HH menus in order to understand why the functional software is disabled.*



96

⚠ WARNING ⚠

Park the tractor on level ground in an unobstructed area (in case of sudden movement).

Engage the handbrake, switch off all electrical switches and the air conditioning system, if on.

Set the Shuttle control lever in neutral, the hydraulic lift lower arms down, the remote control valve levers in neutral and switch off the engine.

Put safety wedges under the front and rear wheels.

Check that the transmission oil temperature is between 20 to 50 °C (68 to 122 °C).

Unless otherwise specified, the levers:
- Shuttle;
- Gear shift;
- Range gear;
- Creeper;

are in the NEUTRAL position.

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FAULT CODE 18 - VOLTAGE FROM CREEPER (N) SWITCH (CREEPER LEVER) TOO HIGH. (NOT USED JX1060C, JX1070C OR JX1075C MODELS)

Conditions/Detection:

- Voltage at ECM connector 2, pin 21 goes above 4.2 volts.

Causes:

- Short circuit to +5 or +12 volts between creeper switch and ECM connector 2, pin 21.
- Short circuit at switch terminals or switch failure.
- ECM failure

Effects:

- Creeper lever neutral position cannot be detected
- The ECM will assume the creeper is engaged and the tractor will attempt to move when the shuttle lever is in the forward or reverse position and the clutch pedal is raised.

Recovery:

- Cause must be resolved and the error must be cleared using the CDU or EST, HF Menu.

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FAULT CODE 39

Turn the starter key to the OFF position.
Remove the rear left-hand wheel and the solenoid valves unit guard.
Disconnect connection (66) on the clutch solenoid valve (B).
Using a digital tester, measure the electrical resistance of the solenoid valve coil.
Is the resistance ~ 10 Ω?

NO → Replace the solenoid valve coil if interrupted.

YES

Is wire (BN) on the solenoid valve wiring in short to ground?

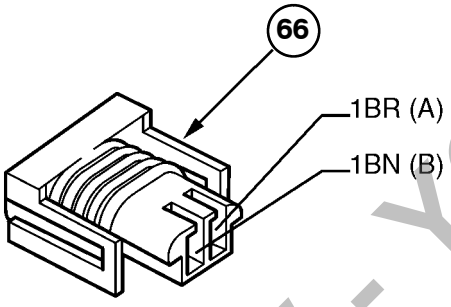
NO → Disconnect the control panel and the connections (137) on the ECM.
Is wire (BR) on the solenoid valve wiring in short to ground?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

YES

Check the wiring and eliminate the cause of the short to ground?



Lift the engine bonnet and disconnect connection (177).
Is there electrical continuity between pin (A5) (BN) and connection (66) on the solenoid valve?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Is there electrical continuity between pin (A8) (BR) and connection (66) on the solenoid valve?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Is there electrical continuity between pin CN1-11 (BN) on connections (137) and pin (A5) (BN) on connection (177)?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Is there electrical continuity between pin CN1-5 (BR) on connections (137) and pin (A8) (BR) on connection (177)?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Replace the ECM.

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FAULT CODE 61 – VOLTAGE FROM SYNCHRONIZER HI-LO (FORWARD) POSITION SWITCH (S) SHORT TO 5 OR 12 VOLTS.

(NOT USED JX1060C, JX1070C OR JX1075C MODELS)

NOTE: *The Transmission Status Lamp is the Hi(Rabbit) and Lo(Turtle) lamps. They will flash in a alternating manner.*

NOTE: *On the 32x16 transmission, the Synchronizer Shuttle (Reverse) and Hi-Lo (Forward) Position Switches are located on the left side of the transmission between the Power Shuttle Control Valve and the Service Control Valve. The Synchronizer Shuttle (Reverse) Position Switch is toward the rear of the tractor. The Synchronizer Hi-Lo (Forward) Position Switch is toward the front of the tractor.*

Conditions:

1. While the Power Shuttle FNR Lever is in the forward position, voltage at the ECM connector 2, pin 2 is above 4.2 volts.
2. While the Power Shuttle FNR Lever is in the neutral position, voltage at the ECM connector 2, pin 23 is above 4.2 volts.

Causes:

- Faulty wiring; circuit shorted to 12 volts between ECM connector 2, pin 20 and Synchronizer Hi-Lo (Forward) Position switch, or short to 5v across switch terminals, or short to 5 or 12v between Synchronizer Hi-Lo (Forward) Position Switch and ECM connector 2, pin 2. Or common 5 volt sensor supply wire from ECM connector 2, pin 20 is short to 12v between switch and any other 5 volt sensor.
- Faulty Synchronizer Hi-Lo (Forward) Position Switch (S).
- Faulty ECM.

Tests:

- H9, channel 5 is above 860 counts.
- H5 doesn't display "d27".
- HD displays "unkn".

Effects of Condition 1:

- The Transmission Status Lamp is flashing.
- Transmission is disabled, but can be re-enabled by cycling the Power Shuttle FNR Lever or Clutch Pedal.

Effects of Condition 2:

- Transmission is limited; only Synchronizer Shuttle (Reverse) Position Switch is available (reverse movement). Any shuttle into forward will not work. Transmission is neutralized whenever Power Shuttle FNR is put into forward position. Then ECM will look for detection of Synchronizer Shuttle (Reverse) Position Switch and move synchronizer to reverse position.

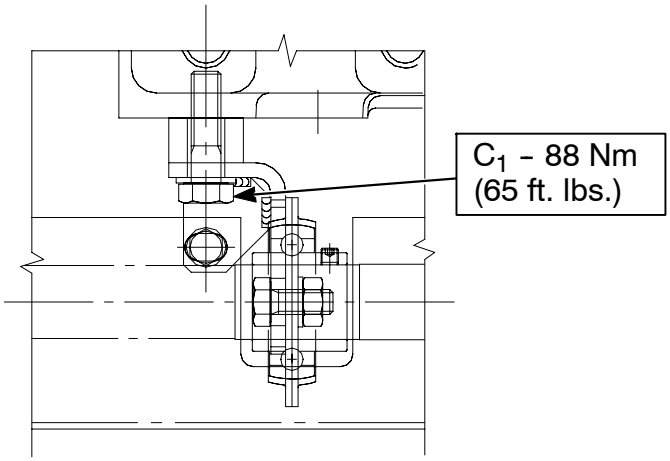
Recovery:

- Cause must be resolved and error must be cleared using the CDU or EST, HF Menu.

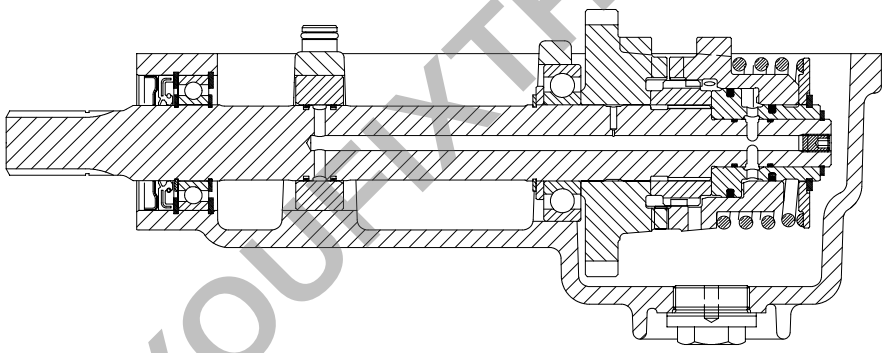
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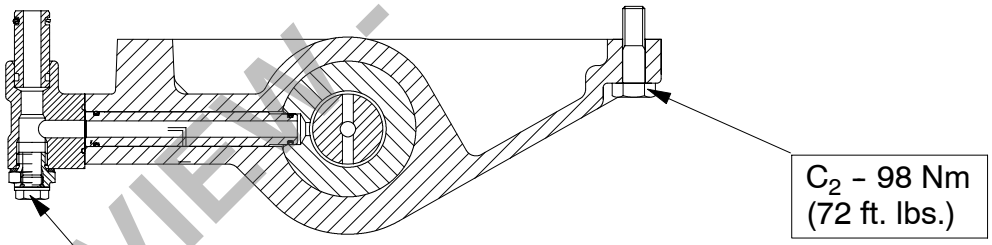
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TIGHTENING TORQUES



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1

PARTS TO TIGHTEN	Thread	Tightening torque	
		Nm	ft. lbs.
Transmission shaft central support retaining bolt (C_1)	M 12 x 1.5	88	65
Drive gear housing retaining bolt (C_2)	M 12 x 1.25	98	72
Control cylinder oil delivery union (C_3)	M 18 x 1.50	49	36

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DESCRIPTION AND OPERATION

The rear transmission delivers power from the gearbox to the final drives by means of the bevel gear pair. The bevel gear pair is of the helical tooth type and is supported by taper-roller bearings.

The lateral final drives are of the epicyclical type and are operated by the bevel gear pair output half shafts, the same shafts that control the service brakes.

BEVEL GEAR PAIR AND DIFFERENTIAL TROUBLESHOOTING

Problems	Possible causes	Remedies
Transmission is noisy while the tractor is moving, even when the gears are in neutral (not due to lateral final drives).	1. Incorrect adjustment or wear of sun or planet gears.	Remove the rear transmission gearbox and replace the worn parts, then correctly adjust the differential gears (page 24).
	2. Excessive clearance between half-shaft keyed groove and sun gears.	Remove the rear transmission gearbox and replace the damaged parts.
Transmission is noisy when tractor is under or released from load.	1. Internal part faulty.	Remove the rear transmission gearbox and replace the worn parts, then correctly adjust the differential gear clearance (page 24).
Transmission is noisy and assembly overheats.	1. Insufficient coupling clearance between the teeth of the pinion and the ring gear.	Remove the rear transmission gearbox and correctly adjust the ring bevel gear bearings (page 21).

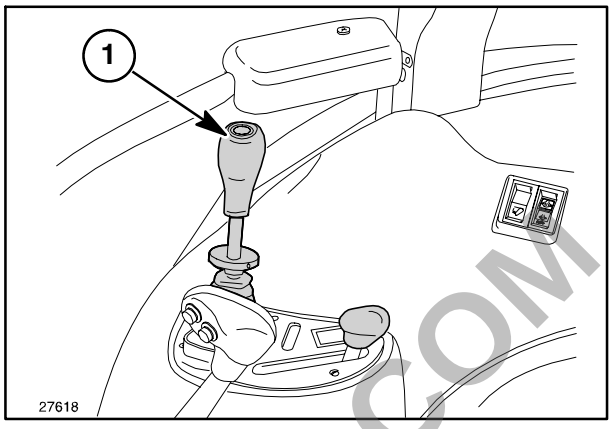
FINAL DRIVES TROUBLESHOOTING

Problems	Possible causes	Remedies
Final drives are noisy while the tractor is moving, even when the gears are in neutral.	1. Internal part faulty.	Remove the final drive housing and replace the damaged parts.
	2. Excessive clearance between wheel axle shaft spline and epicyclic final drives.	Remove the final drive housing and replace the damaged parts.

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A joystick (1) controls the mid-mount remote valves for front-end loader operations.



2

35 104 HIGH-PRESSURE SYSTEM HYDRAULIC PUMP

The high-pressure system pump mounts on the right-hand side of the engine. It is a fixed displacement, open-center, gear type pump driven by the engine timing gear. The pump supplies oil at a pressure range of 190–195 bar (2756–2828), at a rate of 47 l/m (12.4 g/m) on JX1060C and JX1070C models with a mechanical shuttle transmission, or 64 l/m (16.9 g/m) on JX1075C with mechanical shuttle and on all power shuttle transmissions.

When operating orbital motors or front-end loaders, it is desirable to use a factory installed optional 64 l/m (16.9 g/m) 16.9 g/m pump on tractors with a mechanical shuttle transmission, which will include the installation of an oil cooler.

The type of hydraulic pump installed in each system depends on the configuration of the tractor, and the transmission. Refer to Table 1.

TABLE 1. HYDRAULIC PUMPS BY MODEL

MODEL	HIGH-PRESSURE PUMP FLOW RATE	
	47 l/m (12.4 g/m) [C-42]	64 l/m (16.9 g/m) [BOSCH 25]
JX1060C, JX1070C Mechanical Shuttle	STANDARD	OPTIONAL
JX1060C, JX1070C Power Shuttle		STANDARD
JX1075C Mechanical or Power Shuttle		STANDARD

Refer to Table 2 for the recommended oil of the JX1060C, JX1070C and JX1075C series tractor hydraulic system.

TABLE 2. HYDRAULIC OIL SPECIFICATION

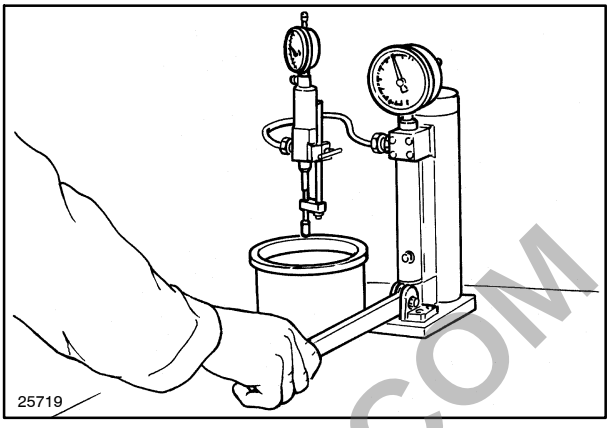
TYPE	SPECIFICATION	QUANTITY
AKCELA NEXPLORE 134	API GL4 ISO 32/46 SAE 10W-30	42 liters (11 gal)

Refer to Table 3 for a listing of the different systems and components that affect the hydraulic system of each model tractor. A better understanding of the configuration of the tractor will greatly ease the burden of troubleshooting if the need arises. Use Table 3 as a reference only, with the understanding that changes do occur.

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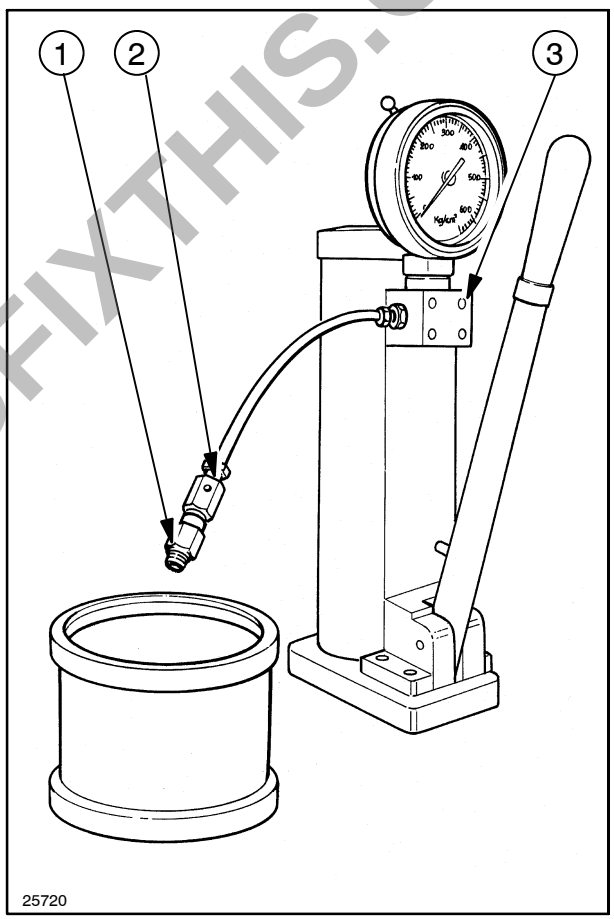
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13. Operate the hand pump until the oil in the system reaches a pressure of 3553 psi (245 bar). Using the pressure gauge, check that it takes more than six seconds for the pressure to fall 2842 psi (196 bar) to 1421 psi (98 bar). If it takes less than this time, replace the control valve block pin. Bear in mind that this part is supplied together with the relevant seat.



84

14. Install the cylinder safety valve (1) on the valve union **380000218** (2) and connect to the hand pump **380000217** (3).
15. Operate the hand pump (3) and check that the cylinder safety valve opens at a pressure of 3046 to 3118 psi (210 to 215 bar). If the valve setting does not correspond with the specified value, it is advised to change the valve immediately. If necessary it can be adjusted by turning the threaded cap using wrench **380000230**. Tighten to increase the valve setting value or loosen to reduce the value.



85

Assembly

⚠ ATTENTION ⚠

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

16. To reinstall the hydraulic control valve block, proceed as follows:

- Respect the tightening torques prescribed on page 7.
- Install the complete control valve block pin.
- Install the check valve.
- Install the cylinder safety valve.
- Install the control valve.
- Install the intervention speed adjustment valve.
- Install the oil feed union.

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MAIN SPECIFICATIONS OF HYDRAULIC PUMP A 31 XRP2

Type		gear type with incorporated regulated output, oil suction from rear transmission casing.
Location		on right-hand side of engine
Model		A 31 XRP 2
Construction		CNH
Operating system		driven by engine shaft
Direction of rotation (as seen from drive side)		counter-clockwise
Engine speed to pump speed ratio		1 : 1.08
Maximum speed of rotation (with engine at maximum power ... 2300 rpm)		2484
Corresponding rated output	l/min. (gal./min)	34.77 (9.2)
Rated output at 1000 rpm	l/min. (gal./min)	14 (3.7)
Start of flow control valve	rpm	1216
Flow control valve output	l/min. (gal./min)	18 to 22 (4.75 to 5.8)
Diameter of driven and driving gear shafts	mm	17.400 to 17.418
	(in.)	(0.68503 to 0.68574)
Internal diameter of seats in supports	mm	17.450 to 17.470
	(in.)	(0.6870 to 0.6877)
Clearance between gear shafts and seats on supports	mm	0.032 to 0.070
	(in.)	(0.0012 to 0.0027)
- maximum clearance due to wear	mm	0.1
	(in.)	(0.00393)
Radial clearance of gears in pump body	mm	0.020 to 0.064
	(in.)	(0.00078 to 0.00251)
maximum wear on pump body, suction side, at position of gears	mm	0.1
	(in.)	(0.00393)
Width of gears	mm	24.000 to 24.015
	(in.)	(0.9448 to 0.9454)
Width of supports	mm	24.490 to 24.510
	(in.)	(0.9641 to 0.9649)
Radial clearance of gears in pump body	mm	73.135 to 73.160
	(in.)	(2.879 to 2.88)
Clearance of gears complete with supports in pump body (recondition if necessary)	mm	0.100 to 0.180
	(in.)	(0.0039 to 0.0070)

Filter	
Type	full-flow, with replaceable paper cartridge
Location	on pump intake

PART TO BE TIGHTENED	Thread	Tightening torque	
		Nm	ft. lbs.
Pump control coupling hub locknut	7/16 20 UNF	29	21

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