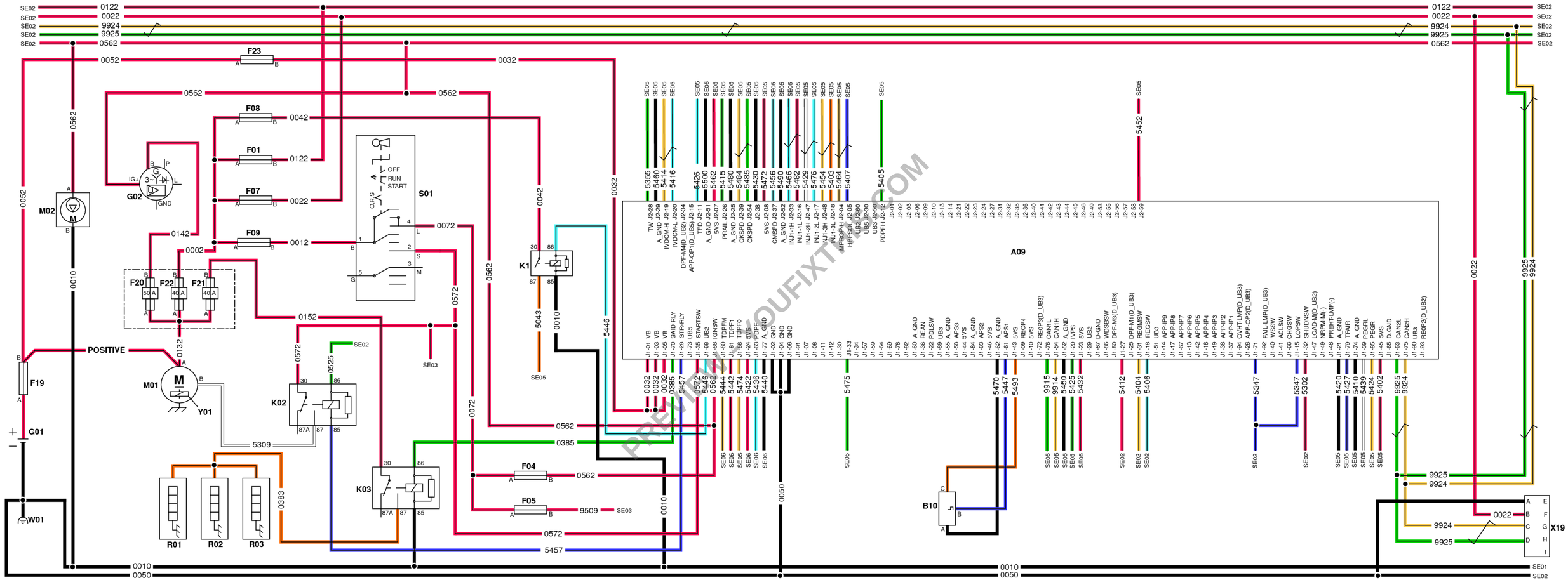
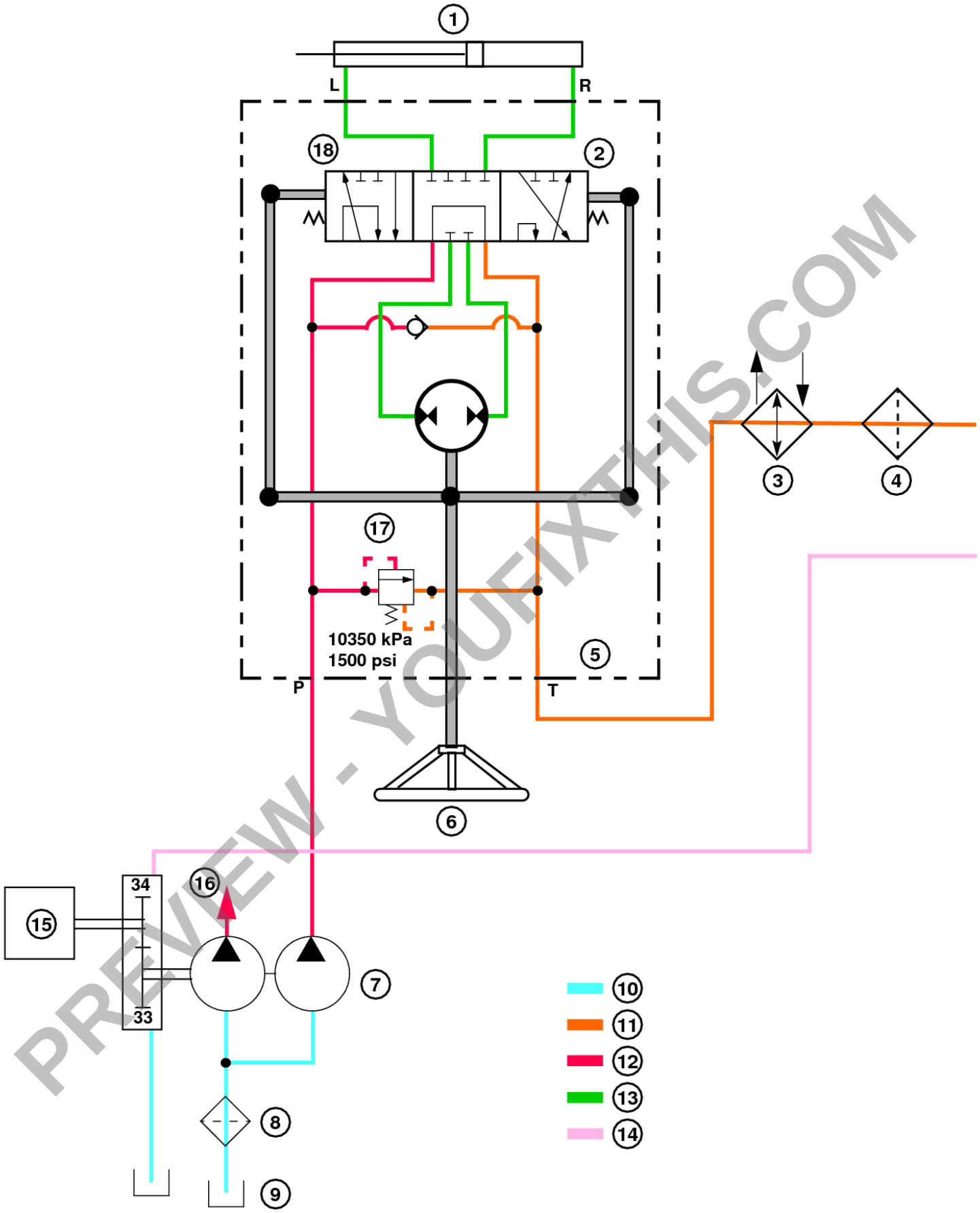


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Steering System and Hydrostatic Schematic



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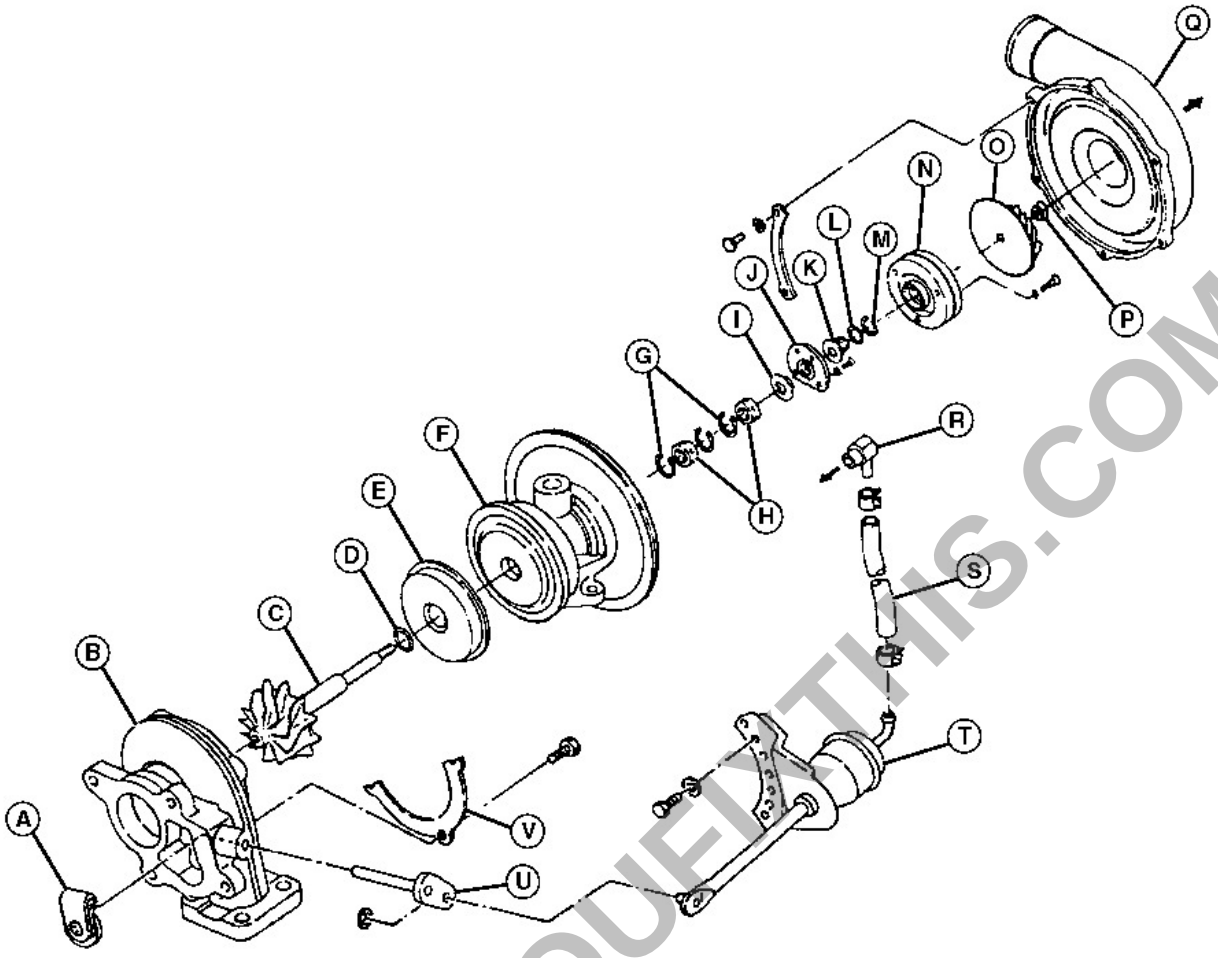
Steering System Schematic

LEGEND:

1	Steering Cylinder
2	Right Turn
3	Oil Cooler
4	Spin-On Charge Pressure Filter

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Turbocharger Components



Turbocharger Components

LEGEND:

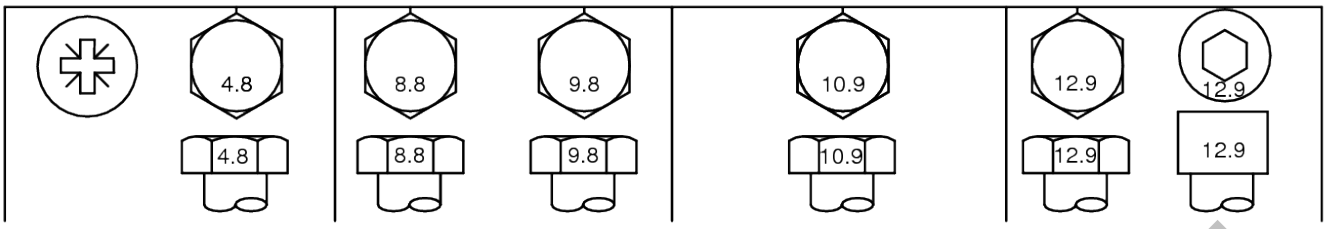
A	Waste Gate Valve
B	Turbine Housing
C	Turbine Shaft
D	Seal Ring (Turbine Side)
E	Heat Shield
F	Bearing (Center) Housing
G	Retaining Ring
H	Journal Bearing
I	Thrust Bushing
J	Thrust Bearing
K	Oil Thrower
L	Seal Ring
M	Seal Ring
N	Seal Plate
O	Impeller
P	Lock Nut (Left-Hand Thread)
Q	Compressor Housing
R	Fitting (To Intake Manifold)
S	Hose
T	Waste Gate Actuator
U	Waste Gate Link Plate
V	Lock Plate

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Group 05 - General Specifications

Metric Bolt and Screw Torque Values



Metric Bolt and Screw

Metric Torque Values

Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]	
	N˙m	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N˙m	**lb.-ft.**														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

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Group 05 - General References

Diagnostic Trouble Codes Overview

SPN.FMI Codes

Diagnostic Trouble Codes (DTC) are based on the CAN ISO and J1939 SAE Standards. These are worldwide standards for automotive and off-highway vehicles and are controlled by an ISO industry committee. There are two main parts that make up a DTC:

SPN - 'Suspect Parameter Number' - this is intended to identify where the problem exists. An example is '94' which the standard defines as "Fuel Delivery System". Any vehicles using the '94' in the DTC will therefore be defining a problem with the fuel delivery system. The list of possible SPNs is too large to provide here, but basically, codes in the lower numbers (at this time, below 5000) are 'assigned' numbers that are set standards. SPNs that contain 6 digits, such as 524255 are called 'proprietary', and are set up in blocks. An example would be 520000 – 540000 which might be assigned to John Deere Waterloo to use for parameters that are not already defined. At some point, if these proprietary numbers are approved by SAE and the CAN committee, they may be assigned a lower number and become available industry-wide.

FMI - ′Failure Mode Indicator′ - this is a standard set of numbers that defines how the SPN failed. FMIs are defined by the J1939 standard.

By combining the SPN and FMI, the code 000094.03 would mean the Fuel Delivery System input voltage is high. With the universal standard, this would apply to any CAN based vehicle.

Failure Modes:

Failure Modes

FMI	Condition
00	Data valid but above normal operating range- most severe level
01	Data valid but below normal operational range - most severe level
02	Data erratic, intermittent or incorrect
03	Voltage above normal, or shorted to high source
04	Voltage below normal, or shorted to low source
05	Current below normal or open circuit
06	Current above normal or grounded circuit
07	Mechanical system not responding or out of adjustment
08	Abnormal frequency or pulse width or period
09	Abnormal update rate
10	Abnormal rate of change
11	Root cause not known
12	Bad intelligent device or component
13	Out of calibration
14	Special instructions
15	Data valid but above normal operating range - least severe level
16	Data valid but above normal operating range - moderately severe level
17	Data valid but below normal operating range - least severe level
18	Data valid but below normal operating range - moderately severe level
19	Received network data in error
20	Data drifted high
21	Data drifted low
22-30	Reserved for SAE assignment
31	Not available or condition exists

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1. Connect test harness (B) to performance monitor (A).
2. Turn key switch to ON position.

→NOTE: The performance monitor automatically performs a self test and a bulb check (which takes about 2 seconds) once connected to the Service ADVISOR™ connector.
→NOTE: The performance monitor receives its power via the Service ADVISOR™ connector from the battery positive terminal, not via the key switch.

Connect test harness (B) to the Service ADVISOR™ connector (C).

4. There are two different entry modes into diagnostic mode: operator mode and technician mode. All diagnostic trouble codes can be accessed with the engine on or off and with the tractor in park or in motion. **Operator Mode:** The key switch must be on before connecting the performance monitor to the Service ADVISOR™ connector.Connect the performance monitor to the Service ADVISOR™ connector and wait a minimum of 5 seconds before pressing the service button. Hold the service button until the display changes to DIA.**Technician Mode:** Turn the key switch to OFF position.Turn the key switch back to ON before connecting the performance monitor to the Service ADVISOR™ connector.

→NOTE: If the service button is not pressed within 5 seconds, the operator mode is automatically selected.

Connect the performance monitor to the Service ADVISOR™ connector and within 5 seconds press and hold the service button.Hold the service button until the display changes to DIA.

5. Press the up button (A) or the down button (D) to scroll through the list of control units. Press the set/save button (C) once the desired control unit is displayed.

LEGEND:

A	Up Button
B	Next Button
C	Set/Save Button
D	Down Button
E	Clear Button
F	Service Button

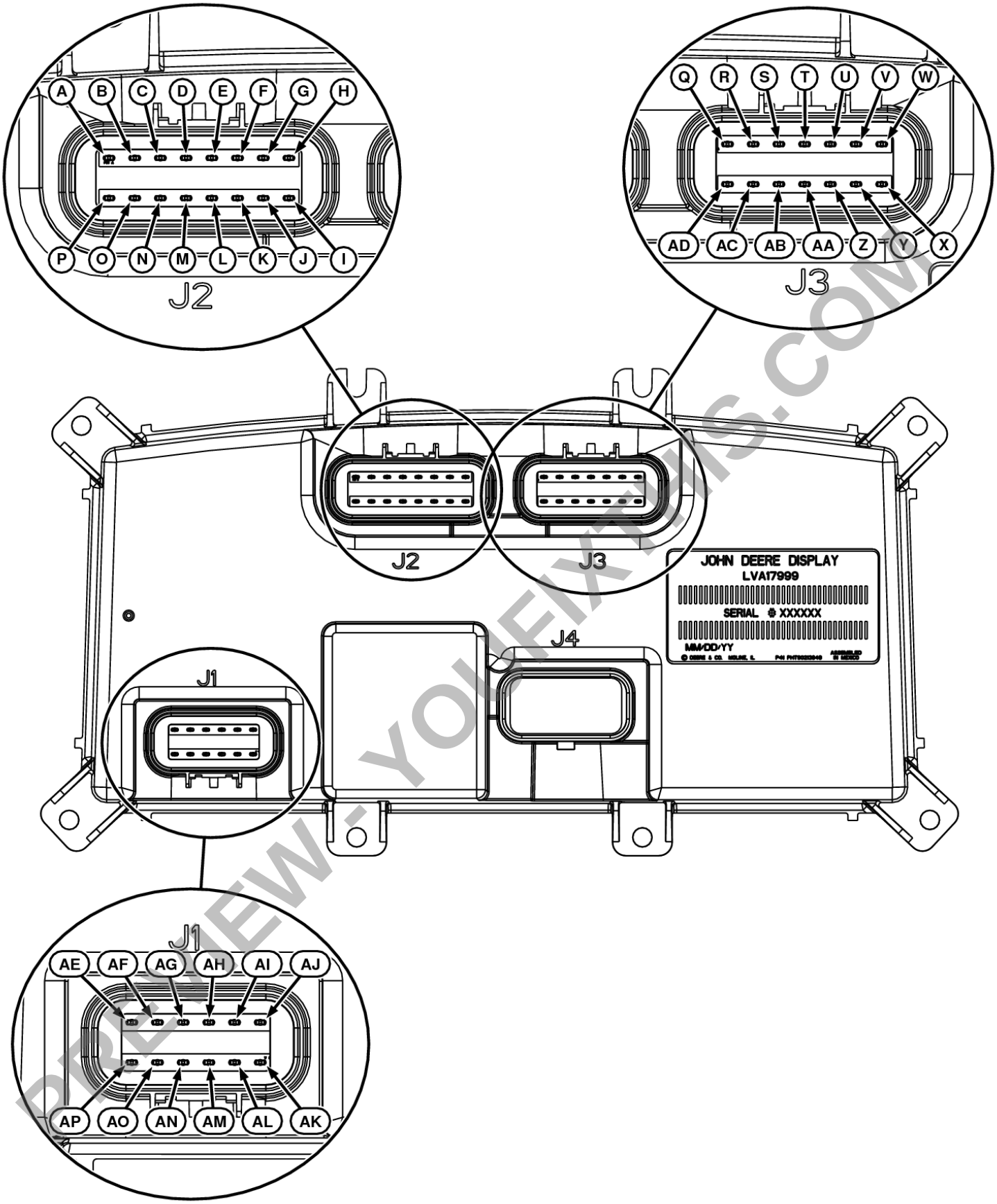


Performance Monitor

6. Momentarily press the up button (A) or the down button (D) until address 001 is displayed.
7. If ”CODE” displays, press the set/save button (C) to enter the address to view stored codes. Go to step 8.If ”NONE” displays, there are currently no stored codes to display. Press the clear button (E) to return to the address list and press it again to return to the control unit list. Go back to step 5.
8. Momentarily press the up button (A) or the down button (D) to cycle through and record stored code information.

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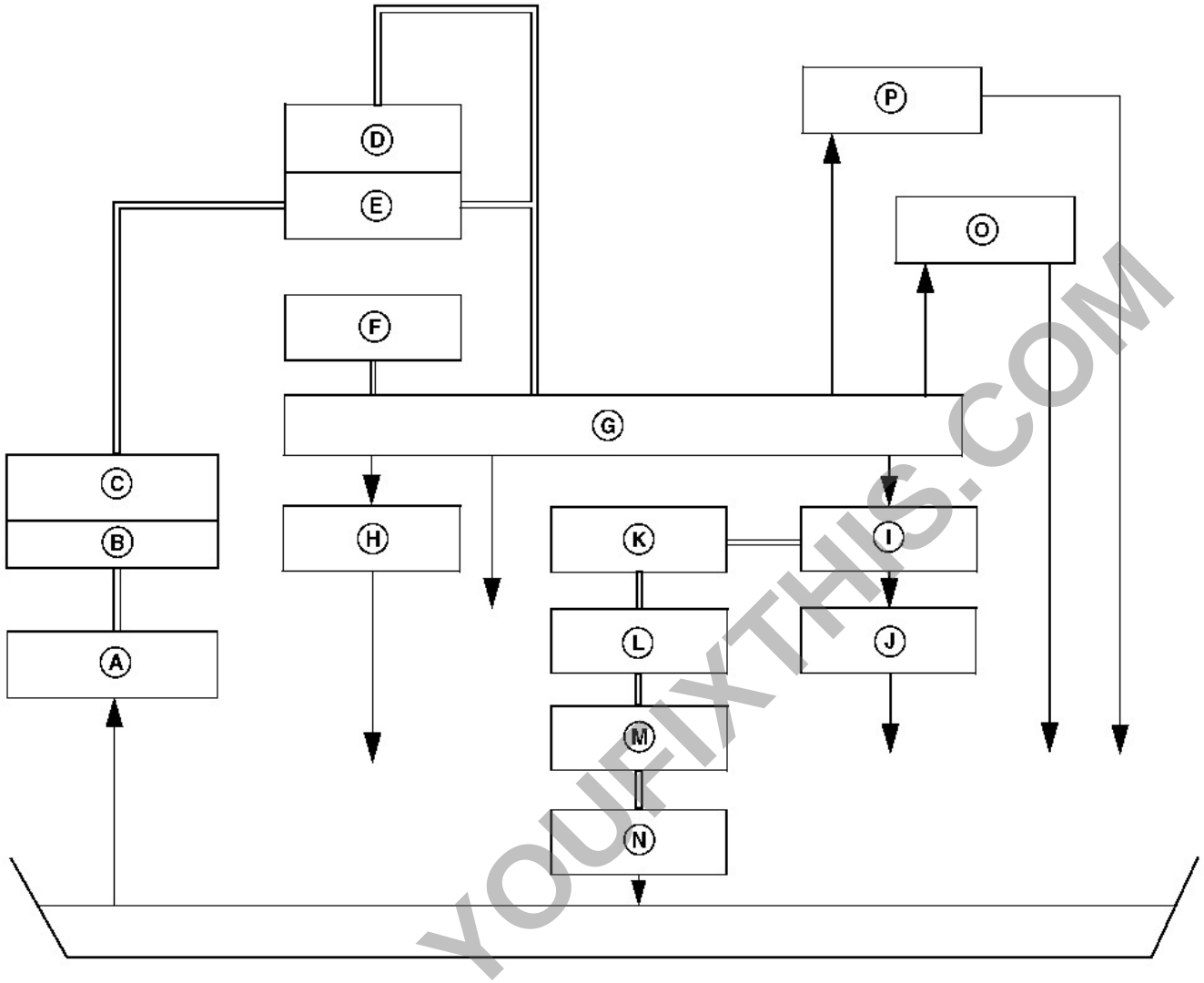
Control Panel Connector Terminals

LEGEND:

A	J2-A— Can_Lo (9925 Grn)
B	J2-B— Can_Hi (9924 Yel)
C	J2-C— Warning/Hazard Switch Input (1103 Org)
D	J2-D— Backlight Illumination Input (1118 Gry)
E	J2-E— Not Used
F	J2-F— Not Used

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Lubrication System Operation



Lubrication System Operation

LEGEND:

A	Oil Strainer
B	Positive Displacement Oil Pump
C	Oil Pressure Regulating Valve
D	Full Flow Oil Filter
E	Oil Filter Bypass Valve
F	Electrical Pressure Warning Switch
G	Engine Block Main Oil Galley
H	Intermediate Gear Shaft
I	Crankshaft Main Bearing Journals
J	Connecting Rod Bearings
K	Camshaft Bearings
L	Rocker Arm Bearings
M	Rocker Arms
N	Cam Followers and Valves
O	Fuel Injection Pump
P	Turbocharger Bearing Housing

Function:

A full pressure system lubricates engine parts with filtered oil.

Theory of Operation:

The pressure lubrication system consists of an oil strainer (A), positive displacement oil pump (B), oil pressure regulating valve (C), full flow oil filter (D), oil pressure bypass valve (E) and an electrical pressure warning switch (F).

The pump draws lubrication oil from the oil pan through a strainer and a suction tube. The oil is then pumped through an oil

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Engine Oil Diagnostics

Symptom	Problem	Solution
Crankcase Contamination	Fuel in crankcase.	Broken or seized piston ring - replace rings and check cylinder.
		Seized intake and exhaust valve - replace valve and check valve guide.
		Piston ring, piston, or cylinder worn - bore or hone cylinder and replace piston.
	Water in crankcase.	Leaking cylinder head gasket - replace head gasket.
		Cracked water jacket - repair or replace water jacket.

Symptom	Problem	Solution
Low Oil Pressure	Oil level low.	Add oil.
	Oil filter clogged.	Replace Oil Filter.
	Incorrect viscosity	Check oil for too low viscosity, or coolant-or-fuel-diluted engine oil.
		Change engine oil.
	External oil leaks	Repair as necessary
	Oil pressure relief valve worn.	Clean, adjust, or replace relief valve.
	Oil pump defective.	Remove and inspect oil pump. (See Oil Pump in Section 30, Group 30.)
	Coolant in oil.	(See Coolant in Oil or Oil in Coolant in Section 30, Group 20.)
	Fuel in oil.	Broken or seized piston ring. Replace rings and check cylinder.
		Seized intake or exhaust valve. Check valve guides and stems.
		Piston ring, piston, or cylinder worn. Bore or hone cylinder and replace piston.
	Oil pump screen clogged or pick-up tube cracked.	Remove oil pan and clean screen. Replace pick-up tube. (See Oil Pan and Strainer in Section 30, Group 30.)
	Intake and Exhaust valves worn.	Check valve guides and stems.
	Crankshaft pin or bearing worn.	Regrind crank and replace bearings.
	Connecting rod cap screw loose.	Check for damage and re-torque cap screws.
	Excessive volume of fuel injected.	Check fuel injection pump and injectors.
	Broken or seized piston ring.	Replace rings and check cylinder.
	Excessive main or connecting rod bearing clearance.	Determine bearing clearance. (See Connecting Rod Bearing Clearance Check in Section 30, Group 25.)
	Piston ring, piston, or cylinder worn.	Bore or hone cylinder and replace piston.
	Piston ring end gaps not correct.	Stagger piston ring gaps.
	Piston rings installed incorrectly.	Install piston rings correctly.
	Excessive fumes or dripping oil; appears to be caused by turbocharger boost pressure.	Check the turbocharger, repair, or replace as needed. (See Turbocharger Failure Analysis in Section 30, Group 20.)
	Excessive fumes or dripping oil observed; does not appear to be caused by turbocharger boost pressure.	Excessive blow-by, not caused by boost pressure is most likely caused by faulty piston rings and cylinder bores not providing an adequate combustion seal. Perform a compression test to verify this is the case. (See Cylinder Compression Test in Section 30, Group 25.)
	Check for turbocharger oil seal leaks. Signs of oil leakage present.	Investigate problems associated with oil leakage as outlined in the test procedure, perform necessary repairs, and retest. (See Turbocharger Oil Seal Leak Check in Section 30, Group 25.)
High Oil Pressure	High oil pressure	Improper engine oil viscosity and type - replace engine oil and filter.
		Oil pressure relief valve failed. Inspect oil pressure relief valve. (See Oil Pump in Section 30, Group 30.)

Excessive Fuel Consumption

Symptom	Problem	Solution
Excessive Fuel Consumption	Compression leakage from valve seat.	Grind valve seat; regrind valves.
	Engine running too cool.	Check thermostat.
	Excessive volume of fuel injected.	Check fuel injection pump and injectors.
	Poor fuel injection pattern.	Clean or replace fuel injector nozzles.

Incorrect Manifold Pressure

Symptom	Problem	Solution
Low Manifold Pressure	Improper intake or exhaust valve clearance.	Adjust valve clearance.
	Compression leakage from valve seat	Grind valve seat; regrind valves.

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General Specifications

Item	Measurement	Specification
General Specifications		
Engine Make		Yanmar
Engine Type		4-Cycle Diesel
Engine Model		3TNV84T (3036E)
Number of Cylinders		3
Firing Order (number 1 cylinder on flywheel side)		1 - 3 - 2 - 1
Compression Ratio		19:1
Direction of Rotation		Counterclockwise (viewed from flywheel)
Combustion System		Direct Injection Type
Oil Capacity (with filter)	Capacity	Approximately 4.5 L
		4.8 qt.
Bore and Stroke		
3TNV84T	Diameter (bore)	84 mm
		3.31 in.
	Distance (stroke)	90 mm
		3.54 in.
Displacement		
3TNV84T	Displacement	1.496 L
		91.29 cu. in.
Cooling		
3TNV84T	Type	Liquid
	Capacity	Approximately 4.2 L
		4.4 qt.
Radiator Cap	Pressure	90 kPa
		0.9 bar
		13 psi
Engine Speed		
3TNV84T	Governor	Centrifugal
	Low Idle Speed	950 ± 50 rpm
	High Idle Speed	2600 ± 25 rpm
	Rated Speed	2400 rpm
	Operating Range	1200—2700 ± 25 rpm
Engine Torque		
3TNV84T	Net Torque (at 2600 rpm)	98.4 N·m
		72.6 lb.-ft.
	Maximum Torque (at 1800 rpm)	125.0 N·m
		92.1 lb.-ft.

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Rolling Tire Circumference—Calibration

Reason:

To configure the display logic to match the circumference of the tires installed.

Equipment:

- Measuring device to measure up to 50 meters accurately.
- Functioning machine with a fully charged battery.
- At least 50m (54.68 yd) of open space to drive the machine in a straight line.

Procedure:

The following steps are used to read or modify the configuration parameters for the circumference of the rear tires.

[1] -

→NOTE:

The default tire size value is 2972 mm. This procedure will use the default value in all the examples. The actual value for the tires installed on the machine may vary.

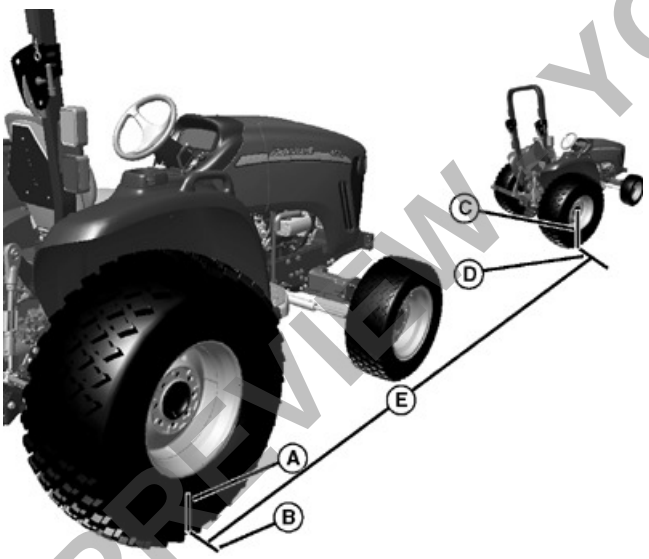
The tire size configuration value is measured and entered in millimeters.

Set rear tire pressure to specification for the type of tire installed on the machine. Be sure to use an accurate low pressure gauge. Be aware that no two tires will have the exact same circumference at the same air pressure—this is normal. Ordering new tires will not correct this situation.

[2] - Move machine to an open, flat level surface at least 50m (54.68 yd) long to drive the machine in a straight line.

[3] - Stop engine and lock park brake.

[4] -



LEGEND:

A	Tire Center Point Of Ground Contact
B	Start Ground Mark
C	10 Revolutions And The Tire
D	End Ground Mark
E	Distance Of Travel

Editing Tire Size

Mark the tire at the center of the point where it contacts the ground (A). Mark the ground at this same point (B).

[5] - Start the engine and drive the machine slowly forward until the rear tire completes 10 revolutions and the tire mark is centered on the ground again (C).

[6] - Stop engine and lock park brake.

[7] - Mark the ground at the new tire center point (D).

[8] - Measure the distance (E) between the two ground points (B and D). Divide this measurement by 10. This number is the circumference of the rear tires. The default value is 2972 mm.

[9] - Enter Diagnostic Mode 1, See Entering Diagnostic and Calibration Modes .

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Tests and Adjustment Specifications

Item	Measurement	Specification
Adjustment Specifications:		
Valve	Clearance	0.15—0.25 mm
		0.006—0.010 in.
Connecting Rod Side Play	Distance	0.2—0.4 mm
		0.008—0.016 in.
Connecting Rod Bearing	Clearance	0.04—0.07 mm
		0.002—0.003 in.
Crankshaft End Play	Distance	0.09—0.27 mm
		0.004—0.011 in.
Crankshaft Main Bearing	Clearance	0.04—0.07 mm
		0.001—1.003 in.
Camshaft End Play	Distance	0.05—0.25 mm
		0.002—0.010 in.
Timing Gear (all except hydraulic pump gear)	Backlash	0.07—0.15 mm
		0.003—0.005 in.
Timing Gear (hydraulic pump gear)	Backlash	0.11—0.19 mm
		0.004—0.008 in.
Fuel Injection Nozzle (opening pressure)	Pressure	19600 + 1000/-0 kPa
		2843 + 145/-0 psi
Fuel Injection Nozzle Leakage [at 11 032 kPa (1600 psi)]	Pressure	None for a minimum of 10 seconds
Chatter and Spray Pattern [at 19 600 ± 1000 kPa (2843 ± 145 psi)]	Slow Hand Lever Movement	Fine Stream; Chatter Sound
Chatter and Spray Pattern [at 19 600 ± 1000 kPa (2843 ± 145 psi)]	Fast Hand Lever Movement	Fine Atomized Spray; 150° Spray Pattern
Alternator Drive Belt Deflection	Deflection	10—15 mm
		0.4—0.6 in.
Fuel Injection Pump	Timing	11° ± 1° BTDC
Turbocharger Rotor Play in Axial Direction	Play	0.022—0.053 mm
		0.001—0.002 in.
Turbocharger Rotor Play in Axial Direction (wear limit)	Play	0.07 mm
		0.007 in.
Turbocharger Rotor Play in Radial Direction	Play	0.061—0.093 mm
		0.002—0.004 in.
Turbocharger Rotor Play in Radial Direction (wear limit)	Play	0.12 mm
		0.005 in.

Operational Tests

Item	Measurement	Specification
Tests Specifications:		
Cooling System Test	Pressure	88 ± 15 kPa
		12.8 ± 2.2 psi
Engine Coolant Temperature Switch (from OFF to ON)	Temperature	110 °C ± 3 °C
		230 °F ± 5 °F
Minimum Lift Height above 85 °C (185 °F)	Height	8.0 mm
		0.135 in.
Radiator Cap Opening	Pressure	88 ± 15 kPa
		12.8 ± 2.2 psi
Cylinder Compression Pressure @ 250 rpm	Pressure	2940 ± 100 kPa
		426 ± 14.5 psi
Cylinder Compression Pressure @ 250 rpm (minimum)	Pressure	2450 ± 100 kPa
		355 ± 14.5 psi
Difference Between Cylinders	Pressure	200—300 kPa
		29—43 psi

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Repair Specifications

Item	Measurement	Specification
Valve Train:		
Rocker Arm Shaft	OD	15.966—15.984 mm 0.6285—0.6295 in.
Rocker Arm Shaft (wear limit)	Thickness	15.94 mm 0.6275 in.
Rocker Arm and Shaft Support Bushing	ID	16.00—16.02 mm 0.630—0.631 in.
Rocker Arm and Shaft Support Bushing (wear limit)	Thickness	16.09 mm 0.633 in.
Oil Clearance	Clearance	0.02—0.05 mm 0.001—0.002 in.
Oil Clearance (wear limit)	Thickness	0.15 mm 0.006 in.
Push Rod Bend		0.0—0.03 mm 0.0—0.001 in.

Item	Measurement	Specification
Cylinder Head and Valves:		
Cylinder Head	Distortion	0.0—0.05 mm 0.0—0.002 in.
Cylinder Head (wear limit)	Thickness	0.15 mm 0.006 in.
Intake Valve Seat	Width	1.07—1.24 mm 0.042—0.049 in.
Intake Valve Seat (wear limit)	Width	1.74 mm 0.069 in.
Exhaust Valve Seat	Width	1.24—1.45 mm 0.042—0.049 in.
Exhaust Valve Seat (wear limit)	Width	1.94 mm 0.076 in.
Intake Valve Stem	OD	7.96—7.98 mm 0.313—0.314 in.
Intake Valve Stem (wear limit)	OD	7.9 mm 0.311 in.
Exhaust Valve Stem	OD	7.96—7.97 mm 0.313—0.314 in.
Exhaust Valve Stem (wear limit)	OD	7.9 mm 0.311 in.
Valve Head (intake)	Thickness	1.24—1.44 mm 0.049—0.057 in.
Valve Head (exhaust)	Thickness	1.35—1.55 mm 0.053—0.061 in.
Valve Head (wear limit)	Thickness	0.50 mm 0.020 in.
Intake Valve Recession	Thickness	0.31—0.51 mm 0.012—0.020 in.
Intake Valve Recession (wear limit)	Thickness	1.00 mm 0.039 in.
Exhaust Valve Recession	Thickness	0.3—0.5 mm 0.012—0.020 in.
Exhaust Valve Recession (wear limit)	Thickness	1.00 mm

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Practice Safe Maintenance



Keep Area Clean

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet , and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

Avoid Hot Exhaust

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Section 10 - SAFETY

Table of contents

Group 05 - Safety 1
- Recognize Safety Information 1
- Understand Signal Words 1
- Follow Safety Instructions 1
- Prepare for Emergencies 2
- Wear Protective Clothing 3
- Protect Against Noise 3
- Handle Fuel Safely—Avoid Fires 3
- Handle Starting Fluid Safely 4
- Fire Prevention 4
- In Case of Fire 5
- Keep ROPS Installed Properly 5
- Use Foldable ROPS and Seat Belt Properly 6
- Stay Clear of Rotating Drivelines 7
- Use Steps and Handholds Correctly 8
- Read Operator Manuals for ISOBUS Implements 8
- Use Seat Belt Properly 8
- Operating the Tractor Safely 10
- Avoid Backover Accidents 11
- Limited Use in Forestry Operation 11
- Operating the Loader Tractor Safely 11
- Keep Riders Off Machine 12
- Instructional Seat 12
- Use Safety Lights and Devices 13
- Use a Safety Chain 13
- Transport Towed Equipment at Safe Speeds 15
- Towing Trailers/Implements Safely (Mass) 16
- Use Caution On Slopes and Uneven Terrain 16
- Freeing a Mired Machine 17
- Avoid Contact with Agricultural Chemicals 18
- Handle Agricultural Chemicals Safely 18
- Handling Batteries Safely 19
- Avoid Heating Near Pressurized Fluid Lines 21
- Remove Paint Before Welding or Heating 21
- Handle Electronic Components and Brackets Safely 22
- Practice Safe Maintenance 23
- Avoid Hot Exhaust 23
- Clean Exhaust Filter Safely 24
- Work In Ventilated Area 26
- Support Machine Properly 26
- Prevent Machine Runaway 26
- Park Machine Safely 27
- Transport Tractor Safely 27
- Service Cooling System Safely 28
- Service Accumulator Systems Safely 28
- Service Tires Safely 29
- Service Front-Wheel Drive Tractor Safely 29
- Tightening Wheel Retaining Bolts/Nuts 30
- Avoid High-Pressure Fluids 30
- Do Not Open High-Pressure Fuel System 31

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Table of contents

FOREWORD
Section 10 - SAFETY
Group 05 - Safety
Section 20 - SPECIFICATIONS AND INFORMATION
Group 05 - General Specifications
Group 10 - Fuel and Lubricants
Group 15 - Serial Number Locations
Section 25 - DIAGNOSTIC TROUBLE CODES
Group 05 - General References
Group 10 - Instrument Cluster Control (ICC) Diagnostic Trouble Codes
Group 15 - Engine Control Unit (ECU) Diagnostic Trouble Codes
Section 30 - ENGINE—DIESEL
Group 05 - Specifications
Group 10 - Component Location
Group 15 - Theory of Operation
Group 20 - Diagnostics
Group 25 - Tests and Adjustments
Group 30 - Repair
Section 40 - ELECTRICAL
Group 05 - General Information
Group 10 - Specifications
Group 15 - Component Location
Group 20 - Schematics and Harnesses
Group 25 - Operation and Diagnostics
Group 30 - Tests and Adjustments
Group 35 - Repair
Section 40A - ELECTRICAL — 3036E
Group 05 - Component Location
Group 10 - Schematics and Harnesses
Group 15 - Operation and Diagnostics
Section 45 - ELECTRONIC CONTROL UNITS
Group 05 - General References
Group 10 - Theory of Operation
Group 15 - Programing and Calibrations
Group 20 - Test and Adjustments
Group 25 - Diagnostic Addresses
Section 50 - POWER TRAIN
Group 05 - Specifications
Group 10 - Component Location
Group 15 - Theory of Operation
Group 20 - Diagnostics
Group 25 - Troubleshooting
Group 30 - Tests and Adjustments
Group 35 - Repair
Section 60 - HYDRAULICS
Group 05 - Specifications
Group 10 - Component Location and Schematics
Group 15 - Theory of Operation
Group 20 - Troubleshooting
Group 25 - Tests and Adjustments
Group 30 - Repair
Section 70 - STEERING

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Torque Values, Non-Standard Fasteners

Item	Measurement	Specification
Torque Specifications:		
Starting Motor Cable Nut	Torque	10 ± 2 N·m
		(7.4 ± 1.5 lb.-ft.)
Starting Motor Cap Screw	Torque	88 N·m
		(65 lb.-ft.)
Cylinder Head Cap Screws (lubricating oil applied)	Torque	85—91 N·m
		63—67 lb.-ft.
Connecting Rod Cap Screws (lubricating oil applied)	Torque	44—54 N·m
		33—40 lb.-ft.
Damper Cap Screws	Torque	48—50 N·m
		35—37 lb.-ft.
Flywheel Mounting Cap Screws (lubricating oil applied)	Torque	83—88 N·m
		62—65 lb.-ft.
Main Bearing Cap Screws (lubricating oil applied)	Torque	96—100 N·m
		71—74 lb.-ft.
Crankshaft Pulley Cap Screw (lubricating oil applied)	Torque	113—122 N·m
		83—90 lb.-ft.
Fuel Injector Nozzle Nut	Torque	6.8—8.8 N·m
		60—78 lb.-in.
Governor Weight Support Nut	Torque	44—49 N·m
		33—36 lb.-ft.
Rocker Arm Mounting Cap Screw and Nut	Torque	26 N·m
		19 lb.-ft.
Oil Pump Mounting Cap Screw	Torque	25 N·m
		18 lb.-ft.
Starting Motor Mounting Cap Screw	Torque	47 N·m
		35 lb.-ft.
Turbocharger Waste Gate Actuator Set Cap Screw	Torque	3.9—4.9 N·m
		34.5—43.4 lb.-in.
Turbocharger Blower Impeller Set Nut (left-hand thread)	Torque	0.9—1.19 N·m
		8.0—10.5 lb.-in.
Lock Plate Set Cap Screw		11.8—12.8 N·m
		104.4—113.3 lb.-in.
Thrust Bearing Set Screw	Torque	1.2—1.4 N·m
		10.6—12.4 lb.-in.
Seal Plate Set Screw	Torque	1.2—1.4 N·m
		10.6—12.4 lb.-in.
Glow Plug (if equipped)	Torque	15—20 N·m
		133—177 lb.-in.
Glow Plug Connector Nut	Torque	1—1.5 N·m
		9—13 lb.-in.

Service Equipment and Tools

→NOTE:

Order tools according to information given in the U.S. SERVICEGARD ™ Catalog or in the European Microfiche Tool Catalog (MTC).

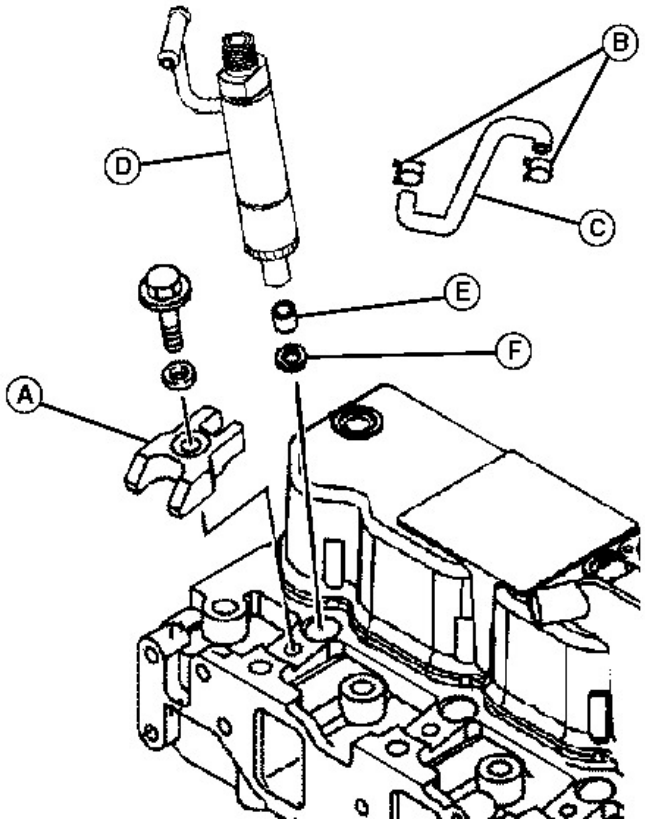
Dial Indicator

(English, in.) D17526CI or (Metric, mm) D17527CI

Use with JDG451 to measure valve recess.

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LEGEND:

A	Retaining Plate
B	Clamp
C	Leak Off Hose
D	Injection Nozzle
E	Ring
F	TEFLON ™ Heat Protector

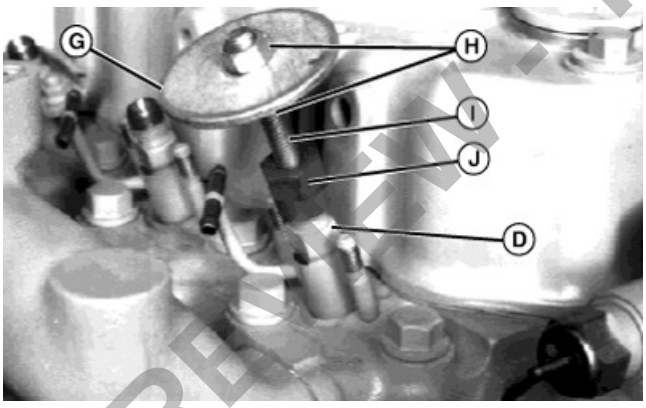
Fuel Injection Nozzles

Remove clamps (B) and leak off hoses (C).

[8] - Remove nuts and retaining plates (A).

[9] - Remove injection nozzle (D), ring (E) and TEFLON® heat protector (F). If ring and protector stay in cylinder head, thread a cap screw into protector and pull from cylinder head.

[10] -



LEGEND:

G	Large Flat Washer
H	Nut (2 used)
I	Cap Screw
J	Nut From Old Injection Line

Fuel Injection Nozzles

If nozzles are stuck in cylinder head:

a. Grind the head of a cap screw (I) so it fits inside a nut from an old injection line (J).
b. Use two nuts (H) to attach a large flat washer (G) to the cap screw.
c. Install assembly onto nozzle (D) and use a puller and slide hammer to pull nozzle from cylinder head.

[11] - Test injection nozzles. (See Fuel Injection Nozzle Test in Section 30, Group 25.)

Installing:

Installation is the reverse of removal.

- Install a new ring and heat protector when installing injection nozzles.

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R02—Glow Plug

R03—Glow Plug

S01—Key Switch

S02—Light Switch

S03—Turn Signal Switch

S04—Transmission Neutral Switch

S05—PTO Switch

S38—Seat Switch

S39—Park Brake Switch

S40—Chassis Brake Switch

S42—Brake Switch

S46—Cruise Control Switch

S47—Display Mode Switch

S48—Diesel Particulate Switch

W01—Ground

Y01—Starting Motor Solenoid

Y03—Rear PTO Solenoid

Connectors:

A01-J1—Instrument Cluster Control (ICC) Connector

A01-J2—Instrument Cluster Control (ICC) Connector

A01-J3—Instrument Cluster Control (ICC) Connector

A09-J1—Engine Control Unit (ECU) Connector

A09-J2—Engine Control Unit (ECU) Connector

X03-W1—Main Harness W1 to Cruise Control Harness W2

X03-W2—Cruise Control Harness W2 to Main Harness W1

X14—Load Center Connector

X19—Service ADVISOR Connector

X20—Engine Connector 1

X21—Engine Connector 2

X22—Engine Connector 3

X23—Engine Connector 4

X24—Battery Power

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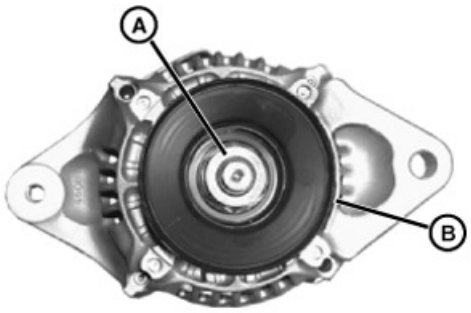
Alternator Disassembly and Assembly

Disassembly:

[1] -

→NOTE:

Clamp pulley in soft jaw vise and use an impact wrench to remove pulley nut.



LEGEND:

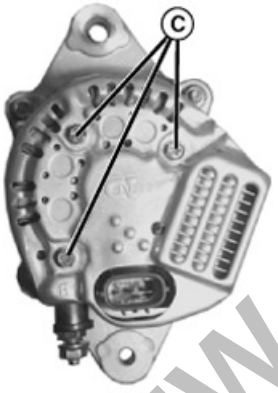
A	Pulley Nut
B	Puley

Alternator—Disassembly Step 1 and 2

Remove pulley nut (A).

[2] - Use a puller to remove pulley (B).

[3] -



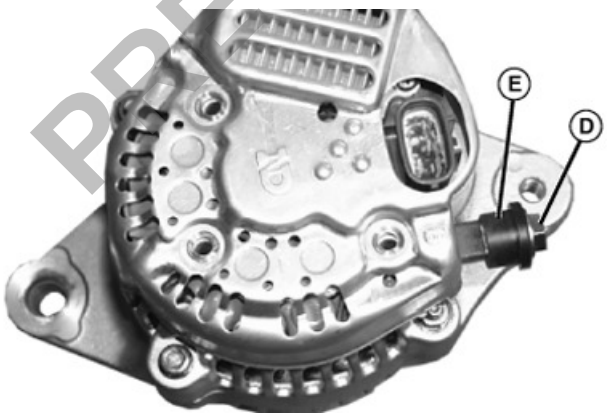
LEGEND:

C	Screw (3 used)

Alternator—Disassembly Step 3

Remove three screws (C) securing alternator rear cover to alternator.

[4] -



LEGEND:

D	Positive Post Retaining Nut
E	Insulator

Alternator—Disassembly Step 4

Loosen positive post retaining nut (D) enough to pull insulator (E) clear of rear cover. Remove rear cover.

[5] -

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G1	Battery
M1	Starting Motor
S1	Key Switch
SE1	Starting and Preheat
SE2	Charging
SE3	Fuel and Horn
W1	Frame Ground
Y1	Starting Motor Solenoid

PTO and Safety Circuit Schematic (2 of 3)

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Diagnostic Addresses—Instrument Cluster Control (ICC) Controller

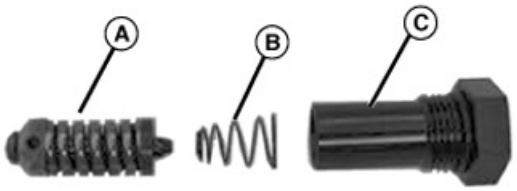
NOTE: The tractor must be in diagnostic mode 1 (RLLRLR) for reading or editing control unit addresses. For more information on accessing control unit address or editing address parameters, see Entering Diagnostic and Calibration Modes .

ICC Diagnostic Addresses

Number	Type	Address Name	Function or Control	Display or Range
ICC—000	Status	Initial Address	Control Unit Addresses—Access	
ICC—001	Status	Recall Trouble Codes	Recall, Record, and Clear Codes	
ICC—002	Status/Beep	System Beep Address	System Address Beep Test	
ICC—003	Configuration	SCV Continuous Flow	Edit SCV Continuous Flow Address See Entering Diagnostic and Calibration Modes	0X=Disabled 1X=Enabled
		Seat Alarm	Edit Seat Alarm Address See Entering Diagnostic and Calibration Modes	X0=Disabled X1=Enabled
ICC—004	Configuration	Wheel Speed Units	Edit Seat Alarm Address See Entering Diagnostic and Calibration Modes	X0=mph X1=km/h
		Mid PTO	Edit Mid PTO Address See Entering Diagnostic and Calibration Modes	0X=Disabled 1X=Enabled)
ICC—005	Configuration	MotionMatch Setting	Edit MotionMatch Setting Address See Entering Diagnostic and Calibration Modes	3=Long 5=Default 7=Short
ICC—006	Configuration	LoadMatch Setting	Edit Seat Alarm Address See Entering Diagnostic and Calibration Modes	0=Load OFF 1=Load ON
ICC—007	Configuration	Load Match and MotionMatch Option	Edit Load Match and MotionMatch Option Address See Entering Diagnostic and Calibration Modes	0=Switch Not Present 1=Switch Present 2=Feature Not Available
ICC—008	Configuration	Fuel Gauge Enable	Edit Fuel Gauge Enable Address See Entering Diagnostic and Calibration Modes	0X=Disabled 1X=Voltage Type Fuel Gauge 2X=Reed SW Type Fuel Gauge
		Wheel Speed Enable	Edit Wheel Speed Enable Address See Entering Diagnostic and Calibration Modes	X0=Disabled X1=Enabled
ICC—009	Configuration	Operator Station Type	Edit Operator Station Type Address See Entering Diagnostic and Calibration Modes	0X=Open Station 1X=Cab
		TCM Present	Edit Seat Alarm Address See Entering Diagnostic and Calibration Modes	X0=TCM Not Present X1=TCM Present
ICC—010	Configuration	Region Setting	Edit Region Setting Address See Entering Diagnostic and Calibration Modes	0X=EEC 1X=NA
		Engine Type	Edit Engine Type Address See Entering Diagnostic and Calibration Modes	X0=No ECU X1=Yes ECU
ICC—011	Configuration	540E PTO Enable	Edit 540E PTO Address See Entering Diagnostic and Calibration Modes	0X=No 1X=Yes
		Neutral Switch Enable	Edit Neutral Switch Enable Address See Entering Diagnostic and Calibration Modes	X0=No X1=Yes
ICC—012	Configuration	Tractor variant setting	Edit Tractor variant setting Address See Entering Diagnostic and Calibration Modes	00=4M 01=4R 02=3E 03=3R 99=Default
ICC—013	Configuration	Hybrid Exhaust Actuator Option	Edit Hybrid Exhaust Actuator Option Address See Entering Diagnostic and Calibration Modes	0X=Option Not Available 1X=Option Available
		Integrated Switch Present	Edit Integrated Switch Present Address See Entering Diagnostic and Calibration Modes	X0=Integrated SW Not Present X1=Integrated SW Present
ICC—014	Configuration	Front PTO	Edit Front PTO Address See Entering Diagnostic and Calibration Modes	0X=No Front PTO 1X=Front PTO
		RIO Feature	Edit RIO Feature Address See Entering Diagnostic and Calibration Modes	X0=No Rio X1=RIO PTH X2=RIO PTR
ICC—015	Status	Tachometer Input Frequency vs 3000 RPM on Display	Control Unit Data	XXX=Hz
ICC—016	Status	Engine Speed	Control Unit Data	XXXX==rpm or km/h (depending on selection from address 4)
ICC—017	Status	Right Turn Signal/	Control Unit Data	0X=Off 1X=On

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LEGEND:

A	Scr Valve
B	Spring
C	Plug

Inspect Mating Seats

Inspect mating seats in the center section for damage or foreign material.

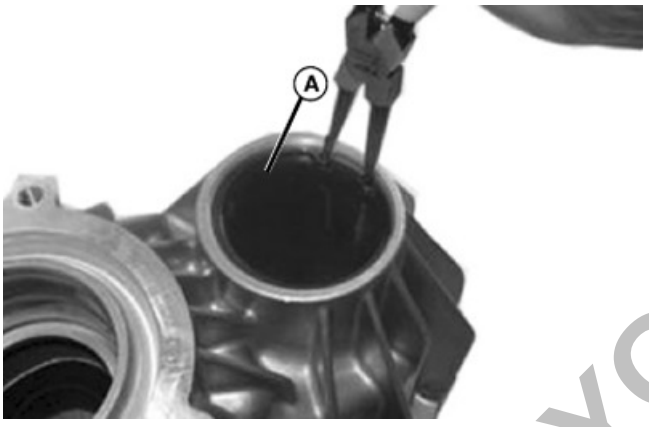
[3] - Install new spring (B) on SCR valve (A) into plug (C) and install into center section tighten to specification.

Item	Measurement	Specification
SDR Valve Plug to Center Section	Torque	68 N·m (50 lb.-ft.)

[4] - Repeat procedure for other side.

Bore plug seal:

[1] -



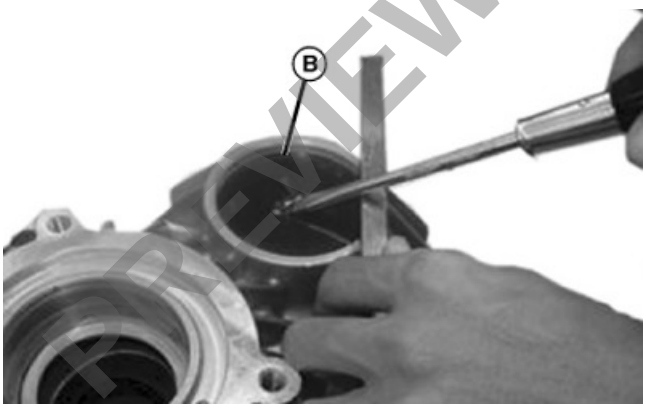
LEGEND:

A	Retaining Ring

Remove Retaining Ring

Remove retaining ring (A) from housing.

[2] -



LEGEND:

B	Seal

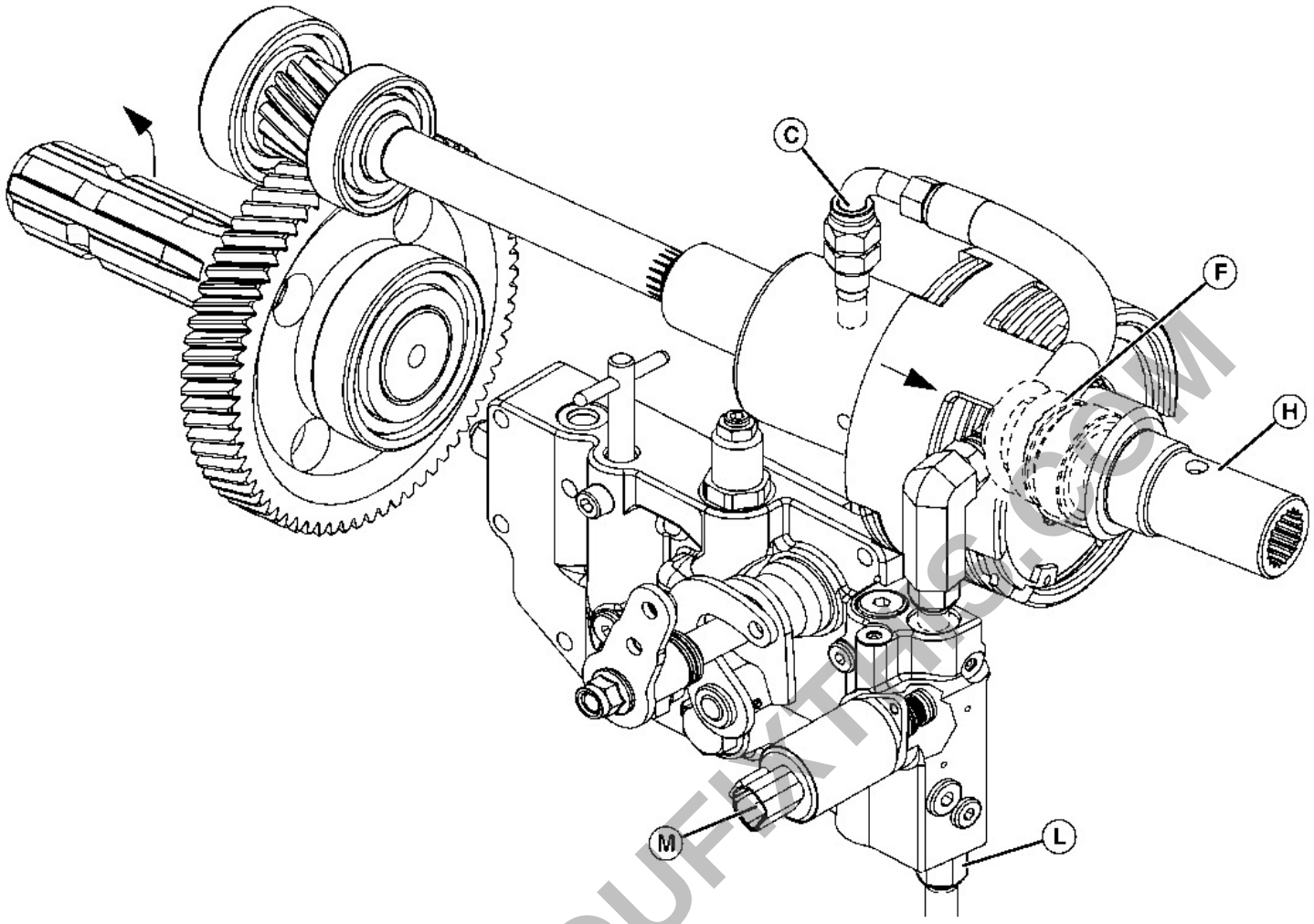
Pull Seal

Carefully pull seal (B) out of housing bore as not to damage the bore, housing mounting surface, or bearing as shown.

[3] -

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PTO Clutch Operation

LEGEND:	
C	Pressure Oil
F	PTO Clutch Spring
H	PTO Boss
L	Charge Pressure Oil
M	PTO Solenoid Valve

Theory:

The PTO clutch (A) and PTO brake (B) are engaged or disengaged by the operator with the PTO switch. This switch operates a PTO solenoid valve, which provides pressure oil (C) to the PTO clutch.

The PTO brake contained inside the housing of the PTO clutch and brake unit is a spring-loaded multi-plate wet brake and is normally engaged, preventing the PTO output shaft (D) from rotating. The PTO clutch is a multi-plate wet clutch and is normally disengaged.

When the PTO solenoid is energized, pressure oil 2070 kPa (300 psi) flows behind the piston (E) in the PTO clutch housing. Piston action compresses the PTO clutch spring (F) and applies pressure to the clutch pack; at the same time releasing pressure on the interlock pins (G) and disengaging the PTO brake (B). Pressure applied to the clutch pack locks the friction disks (splined to the PTO boss (H), to the separator plates (locked to the clutch housing (I)).

The clutch housing is splined to the clutch drive shaft (D). Power is transferred from the input shaft to the PTO boss, through the clutch plates and disks, to the clutch housing, and finally to the PTO drive shaft, which turns in a clockwise rotation when viewed from rear of machine.

While the PTO is engaged, lubrication oil is provided to the clutch plates from the hydrostatic unit through the front cover. Lube oil pressure [69 kPa (10 psi)] is controlled by a spring and ball (J) in the front cover that limits hydrostatic case pressure and lube pressure. Oil is forced to flow through a passage in the front cover into the interior of boss (H). Sealed bearings on the outside and inside of the boss direct oil to the clutch disks.

A lube shutoff valve (K) moves inside the PTO shaft. When the clutch is disengaged, lube pressure pushes the lube shut off valve to the rear and lube oil is shut off to the clutch pack.

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