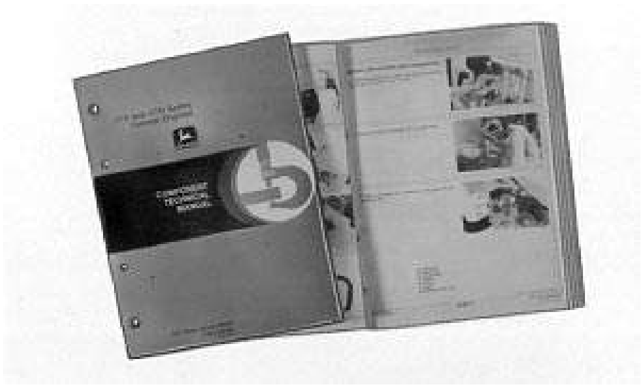
Alternators And Starting Motors—Use CTM77

For additional information, the component technical manual (CTM) is also required.

Use the CTM in conjunction with this machine manual.



TS225 –UN–17JAN89

TX,20,111114 –19–04SEP96–1/1

9015
20
1

Diagnostic Trouble Code Quick Reference List

CCU SERVICE CODES

- F0275 CCU Power Dissipation Excessive

TRANSMISSION SYSTEM CODES:

- F0300 Oil Temperature High Long
- F0305 TCU Output Speed Zero
- F0306 TCU Voltage Low
- F0307 TCU Voltage High
- F0308 TCU Valve Solenoid Power
- F0309 TCU Park Brake Solenoid Power
- F0315 Oil Filter Circuit Short-to-Power
- F0320 1st Gear Clutch Slippage
- F0321 2nd Gear Clutch Slippage
- F0322 3rd Gear Clutch Slippage
- F0323 4th Gear Clutch Slippage
- F0324 Forward Gear Clutch Slippage
- F0325 Reverse Gear Clutch Slippage
- F0330 Clutch Cut-Off Circuit Voltage Low
- F0331 Clutch Cut-Off Circuit Voltage High
- F0336 TCU Configuration Bad
- F0337 TCU Memory Bad
- F0339 Temperature Sensor Voltage Short-to-Ground
- F0340 Temperature Sensor Voltage Short-to-Power
- F0341 Output Speed Signal Bad
- F0342 Output Speed Circuit Short-to-Ground
- F0343 Output Speed Circuit Short-to-Power
- F0344 Internal Clutch Speed Signal Bad
- F0345 Internal Clutch Speed Circuit Short-to-Ground
- F0346 Internal Clutch Speed Circuit Short-to-Power
- F0347 Turbine Speed Signal Bad
- F0348 Turbine Speed Circuit Short-to-Ground
- F0349 Turbine Speed Circuit Short-to-Power
- F0350 Input Speed Signal Bad
- F0351 Input Speed Circuit Short-to-Ground
- F0352 Input Speed Circuit Short-to-Power
- F0353 FWD High Range Clutch Pack Solenoid Open
- F0354 FWD High Range Clutch Pack Solenoid Short to Ground
- F0355 FWD High Range Clutch Pack Solenoid Short to Power
- F0356 Third Speed Clutch Pack Solenoid Open
- F0357 Third Speed Clutch Pack Solenoid Short-to-Ground
- F0358 Third Speed Clutch Pack Solenoid Short-to-Power
- F0359 Second Speed Clutch Pack Solenoid Open
- F0360 Second Speed Clutch Pack Solenoid Short-to-Ground
- F0361 Second Speed Clutch Pack Solenoid Short-to-Power
- F0362 First Speed Clutch Pack Solenoid Open
- F0363 First Speed Clutch Pack Solenoid Short-to-Ground
- F0364 First Speed Clutch Pack Solenoid Short-to-Power
- F0365 Reverse Clutch Pack Solenoid Open
- F0366 Reverse Clutch Pack Solenoid Short-to-Ground
- F0367 Reverse Clutch Pack Solenoid Short-to-Power
- F0368 FWD Low Range Clutch Pack Solenoid Open
- F0369 FWD Low Range Clutch Pack Solenoid Short-to-Ground
- F0370 FWD Low Range Clutch Pack Solenoid Short-to-Power
- F0375 Gear Selector
- F0377 Oil Temperature Circuit Short-to-Power
- F0378 Oil Temperature Circuit Open
- F0379 FNR Selector Switch Open
- F0380 Oil Filter Restricted
- F0384 Reverse Alarm Relay Short-to-Power
- F0385 Reverse Alarm Relay Short-to-Ground
- F0386 Reverse Alarm Relay Open
- F0387 Park Brake Solenoid Short-to-Power
- F0388 Park Brake Solenoid Short-to-Ground
- F0389 Park Brake Solenoid Open
- F0396 Oil Temperature High

Continued on next page

CED,TX17864,29 –19–30MAR99–1/3

NOTE: Some engine codes are listed more than once. Access codes with Service ADVISOR to determine SPN.FMI number. If using monitor both diagnostic procedure should be followed.

Fuel injection system will be Level 3 or Level 9 Electronic fuel injection system. The term level is simply a means to identify fuel systems. Level 3 system meters the fuel at the injection pump. Level 9 system uses a High Pressure Common Rail (HPCR) and meters fuel at the injectors. See Distinguishing ECUs on 8.1 L Engines in CTM134.

ENGINE SYSTEM CODES:

- F0400 Oil Pressure Low Long
- F0411 Analog Throttle (A) Input High
- F0412 Analog Throttle (A) Input Low
- F0413 PWM Throttle Input Too High
- F0414 PWM Throttle Input Too Low
- F0415 CCU Throttle Circuit Voltage Low
- F0416 CCU Throttle Circuit Voltage High
- F0419 ECU Sensor Voltage High
- F0420 ECU Sensor Voltage Low
- F0423 Ambient Air Temperature Input Voltage High (Level 3 ECU)
- F0423 Ambient Air Temperature Input Voltage High (Level 9 ECU)
- F0424 Ambient Air Temperature Input Voltage Low (Level 3 ECU)
- F0424 Ambient Air Temperature Input Voltage Low (Level 9 ECU)
- F0425 Engine Coolant Temperature Input Voltage High (Level 3 ECU)
- F0425 Engine Coolant Temperature Input Voltage High (Level 9 ECU)
- F0426 Engine Coolant Temperature Input Voltage Low (Level 3 ECU)
- F0426 Engine Coolant Temperature Input Voltage Low (Level 9 ECU)
- F0431 Cylinder #1 EI Circuit Open
- F0431 Cylinder #1 EI Circuit Shorted
- F0432 Cylinder #2 EI Circuit Open
- F0432 Cylinder #2 EI Circuit Shorted
- F0433 Cylinder #3 EI Circuit Open
- F0433 Cylinder #3 EI Circuit Shorted
- F0434 Cylinder #4 EI Circuit Open
- F0434 Cylinder #4 EI Circuit Shorted
- F0435 Cylinder #5 EI Circuit Open
- F0435 Cylinder #5 EI Circuit Shorted
- F0436 Cylinder #6 EI Circuit Open
- F0436 Cylinder #6 EI Circuit Shorted
- F0437 Fuel Temperature Input Voltage Too High (Level 3 ECU)
- F0437 Fuel Temperature Input Voltage High (Level 9 ECU)
- F0438 Fuel Temperature Input Voltage Too Low (Level 3 ECU)
- F0438 Fuel Temperature Input Voltage Too Low (Level 9 ECU)
- F0439 Pump Control Valve #1 Error
- F0440 Pump Control Valve #2 Error
- F0441 Crank Position Input Missing
- F0442 Crank Position Input Noise
- F0442 Crank Position Input Pattern Error
- F0443 Pump Position Sensor Input Missing
- F0444 Pump Position Sensor Input Noise
- F0444 Pump Position Sensor Input Pattern Error
- F0445 Crank Position/Pump Position Timing Moderately Out of Sync
- F0446 Rack Measurement Error
- F0447 Rack Position Error
- F0448 Rack Position Voltage High
- F0449 Rack Position Voltage Low
- F0450 Fuel Rail Pressure Input Voltage High
- F0451 Fuel Rail Pressure Input Voltage Low
- F0453 Water in Fuel Signal Voltage High
- F0454 Water in Fuel Signal Voltage Low
- F0455 Manifold Air Temperature Moderately High
- F0456 Pump Control Valve #2 Fuel Flow Not Detected
- F0462 ECU Primary Speed Error
- F0463 ECU Start Signal Missing
- F0464 Engine Overspeed
- F0465 ECU Auxiliary Speed Error
- F0466 ECU Speed Signal Mismatch
- F0467 ECU Start Signal Active
- F0468 Fuel Shutoff Fault
- F0469 Pump Control Valve #1 Fuel Flow Not Detected
- F0470 Fuel Rail Pressure Control Error

Continued on next page CED,TX17864,29 –19–30MAR99–2/3

9015
20
3

- F0471 Fuel Rail Pressure Sensor Supply Voltage Low
- F0478 Oil Pressure Circuit Voltage Low
- F0479 Oil Pressure Circuit Voltage High
- F0485 Water in Fuel Detected
- F0499 Engine Oil Pressure Low
- F0500 Engine Coolant Temperature High Long
- F0515 Engine Air Filter Restriction Circuit
- F0516 Engine Fuel Level Circuit Voltage Low
- F0517 Engine Fuel Level Circuit Open
- F0575 Engine Coolant Level Circuit
- F0576 Engine Coolant Temperature Circuit Noisy
- F0577 Engine Coolant Temperature Circuit Short-to-Ground
- F0578 Engine Coolant Temperature Circuit Open
- F0580 Engine Air Filter Restricted
- F0588 Engine Coolant Level Low
- F0599 Engine Coolant Temperature High

STEERING SYSTEM CODES:

- F0998 Steering Pressure Circuit
- F0999 Steering Pressure Low

BRAKE SYSTEM CODES:

- F1097 Service Brake Pressure Circuit
- F1099 Service Brake Pressure Low

ELECTRICAL SYSTEM CODES:

- F1620 CCU Spare Relay #1 Short
- F1621 CCU Spare Relay #3 Short
- F1622 CCU Spare Relay #4 Short
- F1623 CCU Spare Relay #5 Short
- F1624 Air Preheat Driver Short Ground
- F1625 Detent Enable Driver Short-to-Ground
- F1626 Ride Control Boom Driver Short-to-Ground
- F1628 Ride Control On Driver Short-to-Ground
- F1629 Left Turn Driver Short-to-Ground
- F1630 Right Turn Driver Short-to-Ground
- F1633 Secondary Steering Driver Short-to-Ground
- F1634 Rear Wiper Driver Short-to-Ground
- F1635 Front Wiper Driver Short-to-Ground
- F1636 CCU Relay Driver Overtemp
- F1637 CCU Timer Reset
- F1638 Proportional Fan Drive Solenoid Circuit Error
- F1639 Reverse Fan Drive Solenoid Circuit Error
- F1641 Drive Light Switch Circuit Open
- F1644 MDU Memory Bad
- F1645 CCU Memory Bad
- F1647 Machine Odometer Bad
- F1648 Machine Hourmeter Bad
- F1649 CCU Hourmeter Bad
- F1651 No ECU CAN Transmit
- F1653 No CCU CAN Transmit
- F1655 No TCU CAN Transmit
- F1658 Power Voltage Balance
- F1660 Alternator Voltage High
- F1661 Alternator Voltage Low
- F1662 Power Voltage High
- F1663 Power Voltage Low
- F1664 Brake Light Pressure Circuit
- F1665 Drive Light Switch Circuit
- F1667 Turn Switch Circuit Short
- F1668 Hazard Switch Circuit
- F1671 Return to Carry Detent Solenoid Circuit Error
- F1672 Boom Height Kickout Detent Solenoid Circuit Error
- F1699 Configuration Bad

HYDRAULIC SYSTEM CODES:

- F2100 Oil Temperature High Long
- F3115 Oil Filter Restriction Circuit Short-to-Ground
- F3150 Oil Filter Restriction Circuit Short-to-Power
- F3160 Ride Control Circuit Short-to-Power
- F3161 Ride Control Auto Circuit Short-to-Ground
- F3162 Ride Control On Circuit Short-to-Ground
- F3163 Boom Position Voltage Low
- F3165 Boom Position Voltage High
- F3171 Hydraulic Oil Pressure Circuit Voltage Low
- F3172 Hydraulic Oil Pressure Circuit Voltage High
- F3173 LPM Mode Circuit
- F3174 LPM Enable Circuit Short-to-Ground
- F3175 Hydraulic Oil Temperature Circuit Short-to-Ground
- F3176 Hydraulic Oil Temperature Circuit Open
- F3177 Hydraulic Oil Temperature Circuit Noisy
- F3199 Hydraulic Oil Temperature High

CED,TX17864,29 –19–30MAR99–3/3

Transmission Diagnostic Trouble Codes (DTCs)

IMPORTANT: Whenever a Transmission Control Unit (TCU), a Chassis Computer Unit (CCU), or Monitor Display Unit (MDU) is replaced, the MDU must be reconfigured in the Service Menu. See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

NOTE: A Diagnostic Trouble Code (DTC) is the same as a Service Code. The term DTC conforms with the standards set by the Society of Automotive Engineers (SAE).

References:

See System Functional Schematic

Symptom	Problem	Solution
F0275 CCU Power Dissipation Excessive	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0300 Transmission Oil Temperature High Long* **Tell-Tale Code displayed in MDU “Service” menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.**	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Oil Level Too High or Too Low	Transmission Oil Level (Check/Adjust)

Continued on next page

TX,9015,111902 –19–30MAR99–1/32

Symptom	Problem	Solution
	Transmission Oil Cooler Internal Restriction	Transmission Oil Cooler Internal Restriction (Check/Repair)
	Transmission Oil Cooler Air Flow Restriction	Transmission Oil Cooler Air Flow Restriction (Check/Repair)
		Transmission Oil Cooler Air Flow Restriction (Check/Clean)
	Transmission Oil Temperature Sensor (B32) Short-To-Ground	Transmission Oil Temperature Sensor (B32) Short-To-Ground (Check/Replace)
	Transmission Main Pressure Regulating Valve Spring Broken	Transmission Main Pressure Regulating Valve Spring Broken (Check/Replace)
	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Check/Clean)
	Transmission Control Valve Gasket	Transmission Control Valve Gasket (Check/Replace)
	Torque Converter Relief Valve Stuck Open	Torque Converter Relief Valve (Check/Repair)
	Transmission Oil Cooler Bypass Valve Stuck Open	Transmission Oil Cooler Bypass Valve Stuck Open (Check/Repair)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
F0305 TCU Output Speed Zero	Rocker, Restriction, Radio Switches 5A fuse (F23)	Rocker, Restriction, Radio Switches 5A fuse (F23), Check/Replace
	Transmission Output Shaft Speed Sensor (B31)	Transmission Output Shaft Speed Sensor (B31), Check/Replace
	Wire M10 (Purple) Harness (W10) Short-To-Power	Transmission Harness (W10)—M10 (Purple) Short-To-Power (Check/Repair)
	Wire R22 (Black) Harness (W10) Short-To-Battery	Transmission Harness (W10)—R22 (Black) Short-To-Battery (Check/Repair)

Continued on next page

TX,9015,111902 –19–30MAR99–2/32

Symptom	Problem	Solution
	TCU (A3)	TCU (Replace)
F0306 TCU Voltage Low	Batteries	Batteries (Recharge/Replace)
	Alternator	Alternator (G4), Check/Repair
F0307 TCU Voltage High	Batteries	Batteries (Recharge/Replace)
	Alternator	Alternator (G4), Check/Repair
F0308 TCU Valve Solenoid Power	TCU (A3)	TCU (Replace)
F0309 TCU Park Brake Solenoid Power	TCU (A3)	TCU (Replace)
F0315 Transmission Oil Filter Circuit Short-To-Power	Transmission Oil Filter Restriction Switch (B20) Short-To-Power	Transmission Oil Filter Restriction Switch (B20) Short-To-Power (Check/Replace)
	Wire N03 (Yellow) Harness (W10) Short-To-Power	Transmission Harness (W10) - N03 (Yellow) Short-To-Power (Check/Repair)
	Wire N03 (Yellow) Harness (W3) Short-To-Power	Load Center Harness (W3) - N03 (Yellow) Short-To-Power (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0320 Transmission 1st Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)

Continued on next page
TX,9015,111902 –19–30MAR99–3/32

Symptom	Problem	Solution
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Output Speed Shaft Sensor (B31) Open	Transmission Output Speed Shaft Sensor (B31) Open (Check/Repair)
	Wire M10 (Purple) Harness (W10) Open	Transmission Harness (W10) - M10 (Purple) Open (Check/Repair)
	Wire M10 (Purple) Harness (W3) Open	Load Center Harness (W3) - M10 (Purple) Open (Check/Repair)
F0321 Transmission 2nd Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–4/32

Symptom	Problem	Solution
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Output Speed Shaft Sensor (B31) Open	Transmission Output Speed Shaft Sensor (B31) Open (Check/Repair)
	Wire M10 (Purple) Harness (W10) Open	Transmission Harness (W10) - M10 (Purple) Open (Check/Repair)
	Wire M10 (Purple) Harness (W3) Open	Load Center Harness (W3) - M10 (Purple) Open (Check/Repair)
F0322 Transmission 3rd Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–5/32

Symptom	Problem	Solution
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Output Speed Shaft Sensor (B31) Open	Transmission Output Speed Shaft Sensor (B31) Open (Check/Repair)
	Wire M10 (Purple) Harness (W10) Open	Transmission Harness (W10) - M10 (Purple) Open (Check/Repair)
	Wire M10 (Purple) Harness (W3) Open	Load Center Harness (W3) - M10 (Purple) Open (Check/Repair)
F0323 Transmission 4th Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–6/32

Symptom	Problem	Solution
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Output Speed Shaft Sensor (B31) Open	Transmission Output Speed Shaft Sensor (B31) Open (Check/Repair)
	Wire M09 (Purple) Harness (W10) Open	Transmission Harness (W10) - M09 (Purple) Open (Check/Repair)
	Wire M09 (Purple) Harness (W3) Open	Load Center Harness (W3) - M09 (Purple) Open (Check/Repair)
F0324 Transmission Forward Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–7/32

Symptom	Problem	Solution
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Internal Clutch Speed Sensor (B30) Open	Transmission Internal Clutch Speed Sensor (B30) Open (Check/Repair)
	Wire M09 (Purple) Harness (W10) Open	Transmission Harness (W10) - M09 (Purple) Open (Check/Repair)
	Wire M09 (Purple) Harness (W3) Open	Load Center Harness (W3) - M09 (Purple) Open (Check/Repair)
F0325 Transmission Reverse Gear Clutch Slippage	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen (Clean)
	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Control Valve	Transmission Control Valve (Check/Replace)
	Transmission Control Valve Gasket Leaking	Transmission Control Valve Gasket (Replace)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Control Solenoid (Y1) Malfunction	Transmission Control Solenoid (Y1) (Replace)
	Transmission Control Solenoid (Y2) Malfunction	Transmission Control Solenoid (Y2) (Replace)
	Transmission Control Solenoid (Y3) Malfunction	Transmission Control Solenoid (Y3) (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–8/32

Symptom	Problem	Solution
	Transmission Control Solenoid (Y4) Malfunction	Transmission Control Solenoid (Y4) (Replace)
	Transmission Control Solenoid (Y5) Malfunction	Transmission Control Solenoid (Y5) (Replace)
	Transmission Control Solenoid (Y6) Malfunction	Transmission Control Solenoid (Y6) (Replace)
	Transmission Internal Clutch Speed Sensor (B30) Open	Transmission Internal Clutch Speed Sensor (B30) Open (Check/Repair)
	Wire M09 (Purple) Harness (W10) Open	Transmission Harness (W10) - M09 (Purple) Open (Check/Repair)
	Wire M09 (Purple) Harness (W3) Open	Load Center Harness (W3) - M09 (Purple) Open (Check/Repair)
F0330 Transmission Clutch Cut-off Circuit Voltage Low	Clutch Cut-off Sensor (B33) Open Or Short-To-Ground	Clutch Cut-off Sensor (B33) Open/Short-To-Ground (Check/Replace)
	Wire T20 (Blue) Harness (W3) Open Or Short-To-Ground	Load Center Harness (W3) - T20 (Blue) Open or Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0331 Transmission Clutch Cut-off Circuit Voltage High	Clutch Cut-off Sensor (B33) Short To Power Or Open	Clutch Cut-off Sensor (B33) Short To Power or Open (Check/Replace)
	Wire T20 (Blue) Harness (W3) Short to Power or Open	Load Center Harness (W3) - T20 (Blue) Short-To-Power or Open (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–9/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0336 TCU Configuration Bad	MDU Configuration Incorrect	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure)
F0337 TCU Memory Bad	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0339 Transmission Temperature Sensor Voltage Short-To- Ground	Transmission Oil Temperature Sensor (B32) Short-To-Ground	Transmission Oil Temperature Sensor (B32) Short-To-Ground (Check/Replace)
	Wire P23 (Red) Harness (W3) Short-To-Ground	Load Center Harness (W3) - P23 (Red) Short-To-Ground (Check/Repair)
	Wire P23 (Red) Harness (W10) Short-To-Ground	Transmission Harness (W10) - P23 (Red) Short-To-Ground (Check/Repair)
	Transmission Clutch Cutoff Sensor (B33) Short-To-Ground	Transmission Clutch Cutoff Sensor (B33) Short-To-Ground (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–10/32

Symptom	Problem	Solution
	Wire P60 (Red) Harness (W3) Short-To-Ground	Load Center Harness (W3) - P60 (Red) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0340 Transmission Temperature Sensor Voltage Short-To- Power	Transmission Oil Temperature Sensor (B32) Short-To-Power	Transmission Oil Temperature Sensor (B32) Short-To-Power (Check/Replace)
	Wire P23 (Red) Harness (W3) Short-To-Power	Load Center Harness (W3) - P23 (Red) Short-To-Power Check/Repair)
	Wire P23 (Red) Harness (W10) Short-To-Ground	Transmission Harness (W10) - P23 (Red) Short-To-Power (Check/Repair)
F0341 Transmission Output Speed Signal Bad	Transmission Output Shaft Speed Sensor (B31) Open	Transmission Output Shaft Speed Sensor (B31) Open (Check/Replace)
	Wire M10 (Purple) Harness (W10) Open	Transmission Harness (W10) - M10 (Purple) Open (Check/Repair)
	Wire M10 (Purple) Harness (W3) Open	Load Center Harness (W3) - M10 (Purple) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0342 Transmission Output Speed Circuit Short-To- Ground	Transmission Output Shaft Speed Sensor (B31) Short-To-Ground	Transmission Output Shaft Speed Sensor (B31) Short-To-Ground (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–11/32

Symptom	Problem	Solution
	Wire M10 (Purple) Harness (W10) Short-To-Ground	Transmission Harness (W10) - M10 (Purple) Short-To-Ground (Check/Repair)
	Wire M10 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M10 (Purple) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0343 Transmission Output Speed Circuit Short-To- Power	F2—Start Aid, Converter and Secondary Steering 10A Fuse	Check fuse F2. See Fuse Specifications..
		Suspect fuse F2 only for Serial Number (578660—-)
	Transmission Output Shaft Speed Sensor (B31) Short-To-Power	Transmission Output Shaft Speed Sensor (B31) Short-To-Power (Check/Replace)
	Wire M10 (Purple) Harness (W10) Short-To-Power	Transmission Harness (W10) - M10 (Purple) Short-To-Power (Check/Repair). See System Functional Schematic. See Transmission Harness (W10) Component Location.
	Wire M10 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M10 (Purple) Short-To-Power (Check/Repair). See System Functional Schematic. See Load Center Harness (W3) Component Location..

Continued on next page

TX,9015,111902 –19–30MAR99–12/32

Symptom	Problem	Solution
	Wire P04 Red Open	Check P04 Wire. See System Functional Schematic. See Transmission Harness (W10) Component Location. Suspect wire P04 only for Serial Number (578660—-)
	Wire P27 Red Open	Check P27 Wire. See System Functional Schematic. See Transmission Harness (W10) Component Location. Suspect wire P27 only for Serial Number (—578659)
	TCU (A3)	TCU (Replace) MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0344 Transmission Internal Clutch Speed Signal Bad	Transmission Internal Clutch Speed Sensor (B30) Open	Transmission Internal Clutch Speed Sensor (B30) Open (Check/Replace)
	Wire M09 (Purple) Harness (W10) Open	Transmission Harness (W10) - M09 (Purple) Open (Check/Repair)
	Wire M09 (Purple) Harness (W3) Open	Load Center Harness (W3) - M09 (Purple) Open (Check/Repair)
	TCU (A3)	TCU (Replace) MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX,9015,111902 –19–30MAR99–13/32

Symptom	Problem	Solution
F0345 Transmission Internal Speed Circuit Short-To- Ground	Transmission Internal Clutch Speed Sensor (B30) Short-To-Ground	Transmission Internal Clutch Speed Sensor (B30) Short-To-Ground (Check/Replace)
	Wire M09 (Purple) Harness (W10) Short-To-Ground	Transmission Harness (W10) - M09 (Purple) Short-To-Ground (Check/Repair)
	Wire M09 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M09 (Purple) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0346 Transmission Internal Speed Circuit Short-To- Power	Transmission Internal Clutch Speed Sensor (B30) Short-To-Power	Transmission Internal Clutch Speed Sensor (B30) Short-To-Power (Check/Replace)
	Wire M09 (Purple) Harness (W10) Short-To-Power	Transmission Harness (W10) - M09 (Purple) Short-To-Power (Check/Repair)
	Wire M09 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M09 (Purple) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0347 Transmission Turbine Speed Signal Bad	Torque Converter Output Speed Sensor (B29) Open	Torque Converter Output Speed Sensor (B29) Open (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–14/32

Symptom	Problem	Solution
	Torque Converter Output Speed Sensor (B29) Loose	Torque Converter Output Speed Sensor (B29) Open (Check/Replace)
	Wire M08 (Purple) Harness (W10) Open	Transmission Harness (W10) - M08 (Purple) Open (Check/Repair)
	Wire M08 (Purple) Harness (W3) Open	Load Center Harness (W3) - M08 (Purple) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0348 Transmission Turbine Speed Short-To-Ground	Torque Converter Output Speed Sensor (B29) Short-To-Ground	Torque Converter Output Speed Sensor (B29) Short-To-Ground (Check/Replace)
	Wire M08 (Purple) Harness (W10) Short-To-Ground	Transmission Harness (W10) - M08 (Purple) Short-To-Ground (Check/Repair)
	Wire M08 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M08 (Purple) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0349 Transmission Turbine Speed Short-To- Power	Torque Converter Output Speed Sensor (B29) Short-To-Power	Torque Converter Output Speed Sensor (B29) Short-To-Power (Check/Replace)
	Wire M08 (Purple) Harness (W10) Short-To-Power	Transmission Harness (W10) - M08 (Purple) Short-To-Power (Check/Repair)

Continued on next page

Symptom	Problem	Solution
	Wire M08 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M08 (Purple) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0350 Transmission Input Speed Signal Bad	Torque Converter Input Speed Sensor (B28) Open	Torque Converter Input Speed Sensor (B28) Open (Check/Replace)
	Wire M07 (PUR) Harness (W10) Open	Transmission Harness (W10) - M07 (PUR) Open (Check/Repair)
	Wire M07 (PUR) Harness (W3) Open	Load Center Harness (W3) - M07 (PUR) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0351 Transmission Input Speed Circuit Short-To-Ground	Torque Converter Input Speed Sensor (B28) Short-To-Ground	Torque Converter Input Speed Sensor (B28) Short-To-Ground (Check/Replace)
	Wire M07 (Purple) Harness (W10) Short-To-Ground	Transmission Harness (W10) - M07 (Purple) Short-To-Ground (Check/Repair)
	Wire M07 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M07 (Purple) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–16/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0352 Transmission Input Speed Circuit Short-to-Power	Torque Converter Input Speed Sensor (B28) Short-To-Power	Torque Converter Input Speed Sensor (B28) Short-To-Power (Check/Replace)
	Wire M07 (Purple) Harness (W10) Short-To-Power	Transmission Harness (W10) - M07 (Purple) Short-To-Power (Check/Repair)
	Wire M07 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M07 (Purple) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0353 Transmission FWD High Range Clutch Pack Solenoid Open	Transmission Control Solenoid (Y1) Open	Transmission Control Solenoid (Y1) Open (Check/Replace)
	Wire T04 (Blue) Harness (W3) Open	Load Center Harness (W3) - T04 (Blue) Open (Check/Repair)
	Wire T04 (Blue) Harness (W10) Open	Transmission Harness (W10) - T04 (Blue) Open (Check/Repair)
	Wire T04 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T04 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page TX,9015,111902 –19–30MAR99–17/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0354 Transmission FWD High Range Clutch Pack Solenoid Short-To-Ground	Transmission Control Solenoid (Y1) Short-To-Ground	Transmission Control Solenoid (Y1) Short-To-Ground (Check/Replace)
	Wire T04 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T04 (Blue) Short-To-Ground (Check/Repair)
	Wire T04 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T04 (Blue) Short-To-Ground (Check/Repair)
	Wire T04 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T04 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0355 Transmission FWD High Range Clutch Pack Solenoid Short-To-Power	Transmission Control Solenoid (Y1) Short-To-Power	Transmission Control Solenoid (Y1) Short-To-Power (Check/Replace)
	Wire T04 (Blue) Harness (W3) Short to Power	Load Center Harness (W3) - T04 (Blue) Short-To-Power (Check/Repair)
	Wire T04 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T04 (Blue) Short-To-Power (Check/Repair)

Continued on next page TX,9015,111902 –19–30MAR99–18/32

Symptom	Problem	Solution
	Wire T04 (Blue) Control Valve Internal Harness Short-To-Power	Transmission Control Valve Internal Harness - T04 (Blue) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0356 Transmission Third Speed Clutch Pack Solenoid Open	Transmission Control Solenoid (Y4) Open	Transmission Control Solenoid (Y4) Open (Check/Replace)
	Wire T06 (Blue) Harness (W3) Open	Load Center Harness (W3) - T06 (Blue) Open (Check/Repair)
	Wire T06 (Blue) Harness (W10) Open	Transmission Harness (W10) - T06 (Blue) Open (Check/Repair)
	Wire T06 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T06 (Blue) Open (Check/Repair
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0357 Transmission Third Speed Clutch Pack Solenoid Short-to-Ground	Transmission Control Solenoid (Y4) Short-To-Ground	Transmission Control Solenoid (Y4) Short-To-Ground (Check/Replace)
	Wire T06 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T06 (Blue) Short-To-Ground (Check/Repair)
	Wire T06 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T06 (Blue) Short-To-Ground (Check/Repair)

Continued on next page

TX,9015,111902 –19–30MAR99–19/32

Symptom	Problem	Solution
	Wire T06 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T06 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0358 Transmission Third Speed Clutch Pack Solenoid Short-To-Power	Transmission Control Solenoid (Y4) Short-To-Power	Transmission Control Solenoid (Y4) Short-To-Power (Check/Replace)
	Wire T06 (Blue) Harness (W3) Short-To-Power	Load Center Harness (W3) - T06 (Blue) Short-To-Power (Check/Repair)
	Wire T06 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T06 (Blue) Short-To-Power (Check/Repair)
	Wire T06 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T06 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0359 Transmission Second Speed Clutch Pack Solenoid Open	Transmission Control Solenoid (Y6) Open	Transmission Control Solenoid (Y6) Open (Check/Replace)
	Wire T08 (Blue) Harness (W3) Open	Load Center Harness (W3) - T08 (Blue) Open (Check/Repair)

Continued on next page

TX,9015,111902 –19–30MAR99–20/32

Symptom	Problem	Solution
	Wire T08 (Blue) Harness (W10) Open	Transmission Harness (W10) - T08 (Blue) Open (Check/Repair)
	Wire T08 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T08 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0360 Transmission Second Speed Clutch Pack Solenoid Short-To-Ground	Transmission Control Solenoid (Y6) Short-To-Ground	Transmission Control Solenoid (Y6) Short-To-Ground (Check/Replace)
	Wire T08 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T08 (Blue) Short-To-Ground (Check/Repair)
	Wire T08 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T08 (Blue) Short-To-Ground (Check/Repair)
	Wire T08 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T08 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0361 Transmission Second Speed Clutch Pack Solenoid Short-To-Power	Transmission Control Solenoid (Y6) Short-To-Power	Transmission Control Solenoid (Y6) Short-To-Power (Check/Replace)

Continued on next page TX,9015,111902 –19–30MAR99–21/32

Symptom	Problem	Solution
	Wire T08 (Blue) Harness (W3) Short-To-Power	Load Center Harness (W3) - T08 (Blue) Short-To-Power (Check/Repair)
	Wire T08 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T08 (Blue) Short-To-Power (Check/Repair)
	Wire T08 (Blue) Control Valve Internal Harness Short-To-Power	Transmission Control Valve Internal Harness - T08 (Blue) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0362 Transmission First Speed Clutch Pack Solenoid Open	Transmission Control Solenoid (Y3) Open	Transmission Control Solenoid (Y3) Open (Check/Replace)
	Wire T05 (Blue) Harness (W3) Open	Load Center Harness (W3) - T05 (Blue) Open (Check/Repair)
	Wire T05 (Blue) Harness (W10) Open	Transmission Harness (W10) - T05 (Blue) Open (Check/Repair)
	Wire T05 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T05 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0363 Transmission First Speed Clutch Pack Solenoid Short-To-Ground	Transmission Control Solenoid (Y3) Short-To-Ground	Transmission Control Solenoid (Y3) Short-To-Ground (Check/Replace)

Continued on next page
TX,9015,111902 –19–30MAR99–22/32

Symptom	Problem	Solution
	Wire T05 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T05 (Blue) Short-To-Ground (Check/Repair)
	Wire T05 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T05 (Blue) Short-To-Ground (Check/Repair)
	Wire T06 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T05 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0364 Transmission First Solenoid Speed Clutch Pack Short-To-Power	Transmission Control Solenoid (Y3) Short-To-Power	Transmission Control Solenoid (Y3) Short-To-Power (Check/Replace)
	Wire T05 (Blue) Harness (W3) Short to Power	Load Center Harness (W3) - T05 (Blue) Short-To-Power (Check/Repair)
	Wire T05 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T05 (Blue) Short-To-Power (Check/Repair)
	Wire T05 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T05 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX,9015,111902 –19–30MAR99–23/32

Symptom	Problem	Solution
F0365 Transmission Reverse Clutch Pack Solenoid Open	Transmission Control Solenoid (Y2) Open	Transmission Control Solenoid (Y2) Open (Check/Replace)
	Wire T03 (Blue) Harness (W3) Open	Load Center Harness (W3) - T03 (Blue) Open (Check/Repair)
	Wire T03 (Blue) Control Valve Harness Open	Transmission Harness (W10) - T03 (Blue) Open (Check/Repair)
	Wire T03 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T03 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0366 Transmission Reverse Clutch Pack Solenoid Short-To-Ground	Transmission Control Solenoid (Y2) Short-To-Ground	Transmission Control Solenoid (Y2) Short-To-Ground (Check/Replace)
	Wire T03 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T03 (Blue) Short-To-Ground (Check/Repair)
	Wire T03 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T03 (Blue) Short-To-Ground (Check/Repair)
	Wire T03 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T03 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX,9015,111902 –19–30MAR99–24/32

Symptom	Problem	Solution
F0367 Transmission Reverse Clutch Pack Solenoid Short-To-Power	Transmission Control Solenoid (Y2) Short-To-Power	Transmission Control Solenoid (Y2) Short-To-Power (Check/Replace)
	Wire T03 (Blue) Harness (W3) Short to Power	Load Center Harness (W3) - T03 (Blue) Short-To-Power (Check/Repair)
	Wire T03 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T03 (Blue) Short-To-Power (Check/Repair)
	Wire T03 (Blue) Control Valve Internal Harness Short-To-Power	Transmission Control Valve Internal Harness - T03 (Blue) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0368 Transmission FWD Low Range Clutch Pack Solenoid Open	Transmission Control Solenoid (Y5) Open	Transmission Control Solenoid (Y5) Open (Check/Replace)
	Wire T07 (Blue) Harness (W3) Open	Load Center Harness (W3) - T07 (Blue) Open (Check/Repair)
	Wire T07 (Blue) Harness (W10) Open	Transmission Harness (W10) - T07 (Blue) Open (Check/Repair)
	Wire T07 (Blue) Control Valve Internal Harness Open	Transmission Control Valve Internal Harness - T07 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page TX,9015,111902 –19–30MAR99–25/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0369 Transmission FWD Low Range Clutch Pack Solenoid Short-To-Ground	Transmission Control Solenoid (Y5) Short-To-Ground	Transmission Control Solenoid (Y5) Short-To-Ground (Check/Replace)
	Wire T07 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T07 (Blue) Short-To-Ground (Check/Repair)
	Wire T07 (Blue) Harness (W10) Short-To-Ground	Transmission Harness (W10) - T07 (Blue) Short-To-Ground (Check/Repair)
	Wire T07 (Blue) Control Valve Internal Harness Short-To-Ground	Transmission Control Valve Internal Harness - T07 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0370 Transmission FWD Clutch Pack Solenoid Short-To-Power	Transmission Control Solenoid (Y5) Short-To-Power	Transmission Control Solenoid (Y5) Short-To-Power (Check/Replace)
	Wire T07 (Blue) Harness (W3) Short to Power	Load Center Harness (W3) - T07 (Blue) Short-To-Power (Check/Repair)
	Wire T07 (Blue) Harness (W10) Short-To-Power	Transmission Harness (W10) - T07 (Blue) Short-To-Power (Check/Repair)
	Wire T07 (Blue) Control Valve Internal Harness Short-To-Power	Transmission Control Valve Internal Harness - T07 (Blue) Short-To-Power (Check/Repair)

Continued on next page

TX,9015,111902 –19–30MAR99–26/32

Symptom	Problem	Solution
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0375 Transmission Gear Selector	Shifter Switch (Gear Selector) (S10) Open	Shifter Switch (S10) (Gear Selector) Open (Check/Repair)
	Wire P24 (Red) Harness (W4) Open	Front Console Harness (W4) P24 (Red) Open (Check/Repair)
	Wire P24 (Red) Harness (W3) Open	Load Center Harness (W3) P24 (Red) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
F0377 Transmission Oil Temperature Circuit Short-To-Power	Transmission Oil Temperature Sensor (B32) Short-To-Power	Transmission Oil Temperature Sensor (B32) Short-To-Power (Check/Replace)
	Wire X06 (Yellow) Harness (W3) Short-To-Power	Load Center Harness (W3) - X06 (Yellow) Short-To-Power (Check/Repair)
	Wire X06 (Yellow) Harness (W10) Short-To-Power	Transmission Harness (W10) - X06 (Yellow) Short-To-Power (Check/Repair)
F0378 Transmission Oil Temperature Circuit Open	Transmission Oil Temperature Sensor (B32) Open	Transmission Oil Temperature Sensor (B32) Open (Check/Replace)
	Wire X06 (Yellow) Harness (W3) Open	Load Center Harness (W3) - X06 (Yellow) Open (Check/Repair)
	Wire X06 (Yellow) Harness (W10) Open	Transmission Harness (W10) - X06 (Yellow) Open (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page TX,9015,111902 –19–30MAR99–27/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0379 Transmission FNR Selector Switch Open	Shifter Switch (FNR) (S10) Open	Shifter Switch (S10) Replace
	Wire P23 (Red) Harness (W4) Open	Front Console Harness (W4) - P23 (Red) Open (Check/Repair)
	Wire T13 (Blue) Harness (W4) Open	Front Console Harness (W4) - T13 (Blue) Open (Check/Repair)
	Wire T14 (Blue) Harness (W4) Open	Front Console Harness (W4) - T14 (Blue) Open (Check/Repair)
	Wire E02 (White) Harness (W4) Open	Front Console Harness (W4) - E02 (White) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0380 Transmission Oil Filter Restricted	Transmission Oil Filter Restriction Switch (B20) Short-To-Ground	Transmission Oil Filter Restriction Switch (B20) Short-To-Ground (Check/Replace)
	Wire N03 (Yellow) Harness (W10) Short-To-Ground	Transmission Harness (W10) — N03 (Yellow) Short-To-Ground (Check/Repair)
	Wire N03 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - N03 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–28/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0384 Reverse Alarm Relay Short-To- Power	Back-up Alarm Relay (K10) Short-To-Power	Back-up Alarm Relay (K10) Short-To-Power (Check/Replace)
	Wire M28 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M28 (Purple) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0385 Reverse Alarm Relay Short-to-Ground	Back-up Alarm Relay (K10) Short-To-Ground	Back-up Alarm Relay (K10) Short-To-Ground (Check/Replace)
	Wire M28 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M28 (Purple) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0386 Reverse Alarm Relay Open	Back-up Alarm Relay (K10) Open	Back-up Alarm Relay (K10) Open (Check/Replace)
	Back-up Alarm Relay Fuse (F13) Open	Park Brake And Back-up Alarm Fuse (F13) Open (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–29/32

Symptom	Problem	Solution
	Wire M28 (Purple) Harness (W3) Open	Load Center Harness (W3) - M28 (Purple) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0387 Park Brake Solenoid Short-to- Power	Transmission Park Brake Release Solenoid (Y19) Short-To-Power	Transmission Park Brake Release Solenoid (Y19) Short-To-Power (Check/Replace)
	Wire T09 (Blue) Harness (W2) Short-To-Power	Loader Frame Harness (W2) - T09 (Blue) Short-To-Power (Check/Repair)
	Wire T09 (Blue) Harness (W3) Short-To-Power	Load Center Harness (W3) - T09 (Blue) Short-To-Power (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0388 Park Brake Solenoid Short-to- Ground	Transmission Park Brake Release Solenoid (Y19) Short-To-Ground	Transmission Park Brake Release Solenoid (Y19) Short-To-Ground (Check/Replace)
	Wire T09 (Blue) Harness (W2) Short-To-Ground	Loader Frame Harness (W2) - T09 (Blue) Short-To-Ground (Check/Repair)
	Wire T09 (Blue) Harness (W3) Short-To-Ground	Load Center Harness (W3) - T09 (Blue) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–30/32

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0389 Park Brake Solenoid Open	Engine Controller Switched 15A Fuse Bad	Engine Controller Switched 15A Fuse Check/Replace
	Transmission Park Brake Release Solenoid (Y19) Open	Transmission Park Brake Release Solenoid (Y19) Open (Check/Replace)
	Wire T09 (Blue) Harness (W2) Open	Loader Frame Harness (W2) - T09 (Blue) Open (Check/Repair)
	Wire T09 (Blue) Harness (W3) Open	Load Center Harness (W3) - T09 (Blue) Open (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0396 Transmission Oil Temperature High	Transmission Oil Type Wrong	Transmission Oil Type (Check/Replace)
	Transmission Oil Level	Transmission Oil Level (Check/Adjust)
	Transmission Oil Cooler Internal Restriction	Transmission Oil Cooler Internal Restriction (Check/Repair)
	Transmission Oil Cooler Air Flow Restriction	Transmission Oil Cooler Air Flow Restriction (Check/Repair)
	Transmission Oil Pump Inlet Screen Plugged	Transmission Oil Pump Inlet Screen Plugged (Check/Replace)
	Transmission Control Valve Gasket	Transmission Control Valve Gasket (Check/Replace)

Continued on next page

TX,9015,111902 –19–30MAR99–31/32

Symptom	Problem	Solution
	Converter Relief Valve Stuck Open	Torque Converter Relief Valve (Check/Repair)
	Transmission Main Pressure Regulating Valve Spring Broken	Transmission Main Pressure Regulating Valve Spring Broken (Check/Replace)
	Transmission Oil Cooler Relief Bypass Valve Stuck Open	Transmission Oil Cooler Relief Bypass Valve Stuck Open (Check/Repair)
	Transmission Oil Pump Worn	Transmission Oil Pump Worn (Check/Replace)
	Transmission Oil Temperature Sensor (B32) Short-To-Ground	Transmission Oil Temperature Sensor (B32) Short-To-Ground (Check/Replace)
	Wire X06 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - X06 (Yellow) Short-To-Ground (Check/Repair)
	Wire X06 (Yellow) Harness (W10) Short-To-Ground	Transmission Harness (W10) - X06 (Yellow) Short-To-Ground (Check/Repair)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

TX,9015,111902 –19–30MAR99–32/32

Engine Related Diagnostic Trouble Codes (DTCs)

These DTCs are related to engine operation, but not created by the Engine Control Unit (ECU).

Symptom	Problem	Solution
F0400 Engine Oil Pressure Low Long **Tell-Tale Code displayed in MDU “Service” menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.**	Engine Oil Pressure Switch (B24) Short-To-Ground	Engine Oil Pressure Switch (B24) Short-To-Ground (Check/Replace)
	Engine Oil Pressure Sensor (B23)	Engine Oil Pressure Sensor (B23) Short-To-Ground (Check/Replace)
	Wire N02 (Yellow) Harness (W6) Short-To-Ground	Engine Harness (W6) - N02 (Yellow) Short-To-Ground (Check/Repair)
	Wire N02 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - N02 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0415 CCU Throttle Circuit Voltage Low	(CCU) Analog Throttle Position Sensor (B14) Shorted to Ground	(CCU) Analog Throttle Position Sensor (B14) Short To Ground (Check/Replace)
	Wire E12 (Yellow) Harness (W3) Short to Ground	Load Center Harness (W3) - E12 (White) Short To Ground (Check/Repair)
	CCU (A2)	CCU (Replace)

9015
20
37

Continued on next page

TX17961,0000006 –19–12AUG02–1/9

Symptom	Problem	Solution
F0416 CCU Throttle Circuit Voltage High	(CCU) Analog Throttle Position Sensor (B14) Shorted to Battery	(CCU) Analog Throttle Position Sensor (B14) Short To Battery (Check/Replace)
	Wire E12 (White) Harness (W3) Short to Battery	Load Center Harness (W3) - E12 (White) Short To Battery (Check/Repair)
	ECU (A1)	ECU (Replace)
		ECU (Reprogram)
F0478 Engine Oil Pressure Circuit Voltage Low	Engine Oil Pressure Sensor (B23)	Engine Oil Pressure Sensor (B23) Short-To-Ground (Check/Replace)
	Wire N02 (Yellow) Harness (W6) Short-To-Ground	Engine Harness (W6) - N02 (Yellow) Short-To-Ground (Check/Repair)
	Wire N02 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - N02 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0479 Engine Oil Pressure Circuit Voltage High	Engine Oil Pressure Sensor (B23) Short-To-Power	Engine Oil Pressure Sensor (B23) Short-To-Power (Check/Replace)
	Wire N02 (Yellow) Harness (W6) Short-To-Power	Engine Harness (W6) - N02 (Yellow) Short-To-Power
	Wire N02 (Yellow) Harness (W3) Short-To-Power	Load Center Harness (W3) - N02 (Yellow) Short-To-Power
	CCU (A2)	CCU (A2) (Replace)

Continued on next page TX17961,0000006 –19–12AUG02–2/9

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0499 Engine Oil Pressure Low	Engine Oil Level Too High or Too Low	Engine Oil Level (Check)
	Wrong Oil Type	Engine Oil (Drain/Refill)
	Engine Oil Filter	Engine Oil Filter Restricted (Check/Replace)
	Oil Passages Restricted	Engine Oil Passage (Check/Clean)
	Engine Oil Pump	Engine Oil Pump (Check/Replace)
	Engine Oil Pressure Sensor (B23) Open	Engine Oil Pressure Sensor (B23) Open (Check/Replace)
	Wire N02 (Yellow) Harness (W6) Open	Engine Harness (W6) - N02 (Yellow) Open (Check/Repair)
	Wire N02 (Yellow) Harness (W3) Open	Load Center Harness (W3) - N02 (Yellow) Open
	CCU (A2)	CCU (A2) (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0500 Engine Coolant Temperature High Long **Tell-Tale Code displayed in MDU "Service" menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.**	Engine Coolant Temperature Sensor (CCU) (B16) Open	Engine Coolant Temperature Sensor (CCU) (B16) Open (Check/Replace)

9015
20
39

Continued on next page

TX17961,0000006 –19–12AUG02–3/9

Symptom	Problem	Solution
	Wire X04 (Yellow) Harness (W3) Open	Load Center Harness (W3) - X04 (Yellow) Open (Check/Repair)
	Wire X04 (Yellow) Harness (W6) Open	Engine Harness (W6) - X04 (Yellow) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0515 Engine Air Filter Restriction Circuit	Engine Air Filter Restriction Switch (B19) Short-To-Ground	Engine Air Filter Restriction Switch (B19) Short-To-Ground (Check/Repair)
	Wire M06 (Purple) Harness (W6) Short-To-Ground	Engine Harness (W6) - M06 (Purple) Short-To-Ground (Check/Repair)
	Wire M06 (Purple) Harness (W3) Short-To-Ground	Load Center Harness (W3) - M06 (Purple) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0516 Fuel Level Circuit Voltage Low	Fuel Level Sender (B17) Short-To-Ground	Fuel Level Sender (B17) Short-To-Ground (Check/Replace)
	Wire Y02 (Yellow) Harness (W5) Short-To-Ground	Engine Frame Harness (W5) - Y02 (Yellow) Short-To-Ground (Check/Repair)
	Wire Y02 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - Y02 (Yellow) Short-To-Ground (Check/Repair)

Continued on next page

TX17961,0000006 –19–12AUG02–4/9

Symptom	Problem	Solution
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0517 Engine Fuel Level Circuit Open	Fuel Level Sender (B17) Open	Fuel Level Sender (B17) Open (Check/Replace)
	Wire Y02 (Yellow) Harness (W5) Open	Engine Frame Harness (W5) - Y02 (Yellow) Open (Check/Repair)
	Wire Y02 (Yellow) Harness (W3) Open	Load Center Harness (W3) - Y02 (Yellow) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0575 Engine Coolant Level Circuit (S.N. —574739)	Engine Coolant Level Switch (B18) (S.N. —574739) Short-To-Ground	Engine Coolant Level Switch (B18) Short-To-Ground (Check/Replace)
	Wire Y01 (Yellow) Harness (W13) Short-To-Ground	Rear Frame Harness (W13) - Y01 (Yellow) Short-To-Ground (Check/Repair)
	Wire Y01 (Yellow) Harness (W5) Short-To-Ground	Engine Frame Harness (W5) - Y01 (Yellow) Short-To-Ground (Check/Repair)
	Wire Y01 (Yellow) Harness (W3) Short-To-To Ground	Load Center Harness (W3) - Y01 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)

Continued on next page TX17961,0000006 –19–12AUG02–5/9

Symptom	Problem	Solution
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0576 Engine Coolant Temperature Circuit Noisy	Engine Coolant Temperature Sensor (CCU) (B16) Noisy	Engine Coolant Temperature Sensor (CCU) (B16) Noisy (Check/Replace)
	Wire X04 (Yellow) Harness (W3) Noisy	Load Center Harness (W3) - X04 (Yellow) Noisy (Check/Repair)
	Wire X04 (Yellow) Harness (W6) Noisy	Engine Harness (W6) - X04 (Yellow) Noisy (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0577 Engine Coolant Temperature Circuit Short-To-Ground	Engine Coolant Temperature Sensor (CCU) (B16) Short-To-Ground	Engine Coolant Temperature Sensor (CCU) (B16) Short-To-Ground (Check/Replace)
	Wire X04 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - X04 (Yellow) Short-To-Ground (Check/Repair)
	Wire X04 (Yellow) Harness (W6) Short-To-Ground	Engine Harness (W6) - X04 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page
TX17961,0000006 –19–12AUG02–6/9

Symptom	Problem	Solution
F0578 Engine Coolant Temperature Circuit Open	Engine Coolant Temperature Sensor (CCU) (B16) Open	Engine Coolant Temperature Sensor (CCU) (B16) Open (Check/Replace)
	Wire X04 (Yellow) Harness (W3) Open	Engine Harness (W6) - X04 (Yellow) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0580 Engine Air Filter Restricted	Engine Air Filter Restriction Switch (B19) Short-To-Power	Engine Air Filter Restriction Switch (B19) Short-To-Power (Check/Repair)
	Wire M06 (Purple) Harness (W6) Short-To-Power	Engine Harness (W6) - M06 (Purple) Short-To-Power (Check/Repair)
	Wire M06 (Purple) Harness (W3) Short-To-Power	Load Center Harness (W3) - M06 (Purple) Short-To-Power (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0588 Engine Coolant Level Low (S.N. —574739)	Engine Coolant Level Switch (B18) (S.N. —574739) Short-To-Power	Engine Coolant Level Switch (B18) Short-To-Power (Check/Replace)
	Wire Y01 (Yellow) Harness (W13) Short-To-Power	Rear Frame Harness (W13) - Y01 (Yellow) Short-To-Power (Check/Repair)
	Wire Y01 (Yellow) Harness (W5) Short-To-Power	Engine Frame Harness (W5) - Y01 (Yellow) Short-To-Power (Check/Repair)

Continued on next page

Symptom	Problem	Solution
	Wire Y01 (Yellow) Harness (W3) Short-To-To Power	Load Center Harness (W3) - Y01 (Yellow) Short-To-Power (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0599 Engine Coolant Temperature High	Radiator Coolant Level Too Low	Radiator Coolant Level Too Low (Check/Adjust)
	Radiator Cap Leaking	Radiator Cap Leaking (Check/Replace)
	Engine Fan Belt Worn or Loose	Engine Fan Belt Worn or Loose (Check/Adjust)
	Engine Fan on Backwards	Engine Fan on Backwards (Check/Adjust)
	Wire X04 (Yellow) Harness (W6) Noisy	Engine Harness (W6) - X04 (Yellow) Noisy (Check/Repair)
	Engine Coolant Temperature Sensor (B16) Resistance Out of Specification	Engine Coolant Temperature Sensor (CCU) (B16) Resistance Out of Specification (Check/Replace)
	Wire X04 (Yellow) Harness (W3) Noisy	Load Center Harness (W3) - X04 (Yellow) Noisy (Check/Repair)
	Wire G01 (Black) Harness (W3) Poor Connection	Load Center Harness (W3) - G01 (Black) Poor Connection (Check/Repair)

Continued on next page
TX17961,0000006 –19–12AUG02–8/9

Symptom	Problem	Solution
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

TX17961,0000006 –19–12AUG02–9/9

Engine Diagnostic Trouble Codes (DTCs) on Level 3 ECU (S.N. —585560)

Fuel injection system will be Level 3 or Level 9 Electronic fuel injection system. The term “level” is simply a means to identify fuel systems. Level 3 system meters the fuel at the injection pump. Level 9 system uses a High Pressure Common Rail (HPCR) and meters fuel at the injectors. See Distinguishing ECUs on 8.1 L Engines in CTM134.

- **Level 3 ECU**
  - 2 ECU connectors (30 and 18-way connectors)
  - Bosch In-Line Injection Pump
  - Mechanically-controlled injection nozzles
- **Level 9 ECU**
  - 2 ECU connectors (Two 30-way connectors)
  - Denso High Pressure Common Rail (HPCR) and High Pressure Pump
  - Electronically-controlled injection nozzles

Wire harness information (Group 9015-10):

- See System Functional Schematic
- See Loader Frame Harness (W2) Component Location
- See Load Center Harness (W3) Component Location
- See Front Console Harness (W4) Component Location
- See Engine Frame Harness (W5) Component Location
- See Engine Harness (W6) Component Location
- See Engine Air Heater Harness (W7) Component Location

Symptom	Problem	Solution
F0411 (000029.03)	Analog Throttle (A) Input High	See LEVEL 3 ECU - T3 - ANALOG THROTTLE (A) INPUT HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0412 (000029.04)	Analog Throttle (A) Input Low	See LEVEL 3 ECU - T4 - ANALOG THROTTLE (A) INPUT LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0413 (000091.03)	PWM Throttle Input High	See LEVEL 3 ECU - T8 - PWM THROTTLE INPUT HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page RG40854,0000002 –19–08AUG02–1/9

Symptom	Problem	Solution
F0414 (000091.04)	PWM Throttle Input Low	See LEVEL 3 ECU - T9 - PWM THROTTLE INPUT LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0419 (000620.03)	Sensor Supply Voltage High	See LEVEL 3 ECU - DTC SPN 620 FMI 3 SENSOR SUPPLY VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0420 (000620.04)	Sensor Supply Voltage Low	See LEVEL 3 ECU - DTC SPN 620 FMI 4 SENSOR SUPPLY VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0423 (000171.03)	Ambient Air Temperature Input Voltage High	See LEVEL 3 ECU - DTC SPN 171 FMI 3 AMBIENT AIR TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0424 (000171.04)	Ambient Air Temperature Input Voltage Low	See LEVEL 3 ECU - DTC SPN 171 FMI 4 AMBIENT AIR TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0425 (000110.03)	Engine Coolant Temperature Input Voltage High	See LEVEL 3 ECU - DTC SPN 110 FMI 3 ENGINE COOLANT TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0426 (000110.04)	Engine Coolant Temperature Input Voltage Low	See LEVEL 3 ECU - DTC SPN 110 FMI 4 ENGINE COOLANT TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–2/9

Symptom	Problem	Solution
F0437 (000174.03)	Fuel Temperature Input Voltage High	See LEVEL 3 ECU - DTC SPN 174 FMI 3 FUEL TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0438 (000174.04)	Fuel Temperature Input Voltage Low	See LEVEL 3 ECU - DTC SPN 174 FMI 4 FUEL TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0446 (000733.02)	Rack Position Error with Engine OFF	See LEVEL 3 ECU - DTC SPN 833 FMI 2 RACK POSITION ERROR WITH ENGINE OFF DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0447 (000638.07)	Rack Position Error	See LEVEL 3 ECU - DTC SPN 834 FMI 07 RACK POSITION ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0448 (000733.03)	Rack Position Voltage High	See LEVEL 3 ECU - DTC SPN 833 FMI 3 RACK POSITION VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0449 (000733.04)	Rack Position Voltage Low	See LEVEL 3 ECU - DTC SPN 833 FMI 4 RACK POSITION VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0462 (000190.02)	Engine Speed Input Noise	See LEVEL 3 ECU - DTC SPN 190 FMI 2 ENGINE SPEED INPUT NOISE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0463 (001041.02)	Start Signal Missing	See LEVEL 3 ECU - DTC SPN 1041 FMI 2 START SIGNAL MISSING DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–3/9

Symptom	Problem	Solution
F0464 (000190.00)	Engine Overspeed Extreme	See LEVEL 3 ECU - DTC SPN 190 FMI 0 ENGINE OVERSPEED EXTREME in Section 04, Group 160 of CTM134.
F0465 (000191.02) (000723.02)	Pump Speed Input Noise	See LEVEL 3 ECU - DTC SPN 191 FMI 2 PUMP SPEED INPUT NOISE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0466 (000190.14)	Engine Speed/Pump Speed Out of Sync	See LEVEL 3 ECU - DTC SPN 190 FMI 14 ENGINE SPEED/PUMP SPEED OUT OF SYNC DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0467 (001041.03)	Start Signal Always Active	See LEVEL 3 ECU - DTC SPN 1041 FMI 3 START SIGNAL ALWAYS ACTIVE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
F0468 (000632.11)	Fuel Shut-off Circuit Fault	See LEVEL 3 ECU - DTC SPN 632 FMI 11 FUEL SHUT-OFF CIRCUIT FAULT DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000051.02	CAN Throttle Invalid	See LEVEL 3 ECU - T7 - CAN THROTTLE INVALID DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000091.08	PWM Abnormal Pulse Width	See LEVEL 3 ECU - T10 - PWM ABNORMAL PULSE WIDTH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000091.09	CAN Throttle Invalid	See LEVEL 3 ECU - T7 - CAN THROTTLE INVALID DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–4/9

Symptom	Problem	Solution
000100.01	Engine Oil Pressure Extremely Low	See LEVEL 3 ECU - DTC SPN 100 FMI 1 ENGINE OIL PRESSURE EXTREMELY LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000100.03	Engine Oil Pressure Input Voltage Low	See LEVEL 3 ECU - DTC SPN 100 FMI 3 ENGINE OIL PRESSURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000100.04	Engine Oil Pressure Input Voltage Low	See LEVEL 3 ECU - DTC SPN 100 FMI 4 ENGINE OIL PRESSURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000100.18	Engine Oil Pressure Moderately Low	See LEVEL 3 ECU - DTC SPN 100 FMI 18 ENGINE OIL PRESSURE MODERATELY LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000105.03	Manifold Air Temperature Input Voltage High	See LEVEL 3 ECU - DTC SPN 105 FMI 3 MANIFOLD AIR TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000105.04	Manifold Air Temperature Input Voltage Low	See LEVEL 3 ECU - DTC SPN 105 FMI 4 MANIFOLD AIR TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000105.16	Manifold Air Temperature Moderately High	See LEVEL 3 ECU - DTC SPN 105 FMI 16 MANIFOLD AIR TEMPERATURE MODERATELY HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–5/9

Symptom	Problem	Solution
000110.00	Engine Coolant Temperature High Extremely High	See LEVEL 3 ECU - DTC SPN 110 FMI 0 ENGINE COOLANT TEMPERATURE HIGH MOST SEVERE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000110.16	Engine Coolant Temperature Moderately High	See LEVEL 3 ECU - DTC SPN 110 FMI 16 ENGINE COOLANT TEMPERATURE HIGH MODERATELY SEVERE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000158.02	Intermittent Loss of ECU Power Supply	See LEVEL 3 ECU - DTC SPN 158 FMI 2 INTERMITTENT LOSS OF ECU POWER SUPPLY in Section 04, Group 160 of CTM134.
000174.16	Fuel Temperature Moderately High	See LEVEL 3 ECU - DTC SPN 174 FMI 16 FUEL TEMPERATURE MODERATELY HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000190.03	Engine Speed Input Voltage High	See LEVEL 3 ECU - DTC SPN 190 FMI 3 ENGINE SPEED INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000190.04	Engine Speed Input Voltage Low	See LEVEL 3 ECU - DTC SPN 190 FMI 4 ENGINE SPEED INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000190.05	Engine Speed Circuit Open	See LEVEL 3 ECU - DTC SPN 190 FMI 5 ENGINE SPEED CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–6/9

Symptom	Problem	Solution
000190.16	Engine Overspeed Moderate	See LEVEL 3 ECU - DTC SPN 190 FMI 16 ENGINE OVERSPEED MODERATE in Section 04, Group 160 of CTM134.
000191.14	Engine Speed/Pump Speed Out of Sync	See LEVEL 3 ECU - DTC SPN 190 FMI 14 ENGINE SPEED/PUMP SPEED OUT OF SYNC DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000191.16	Engine Overspeed Extreme	See LEVEL 3 ECU - DTC SPN 190 FMI 0 ENGINE OVERSPEED EXTREME in Section 04, Group 160 of CTM134.
000629.13	ECU Error	See LEVEL 3 ECU - DTC SPN 629 FMI 13 ECU ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000638.02	Rack Instability	See LEVEL 3 ECU - DTC SPN 834 FMI 02 RACK INSTABILITY DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000639.02	CAN Error	See LEVEL 3 ECU - DTC SPN 639 FMI 13 CAN ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000639.13	CAN Error	See LEVEL 3 ECU - DTC SPN 639 FMI 13 CAN ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000833.02	Rack Position Error with Engine OFF	See LEVEL 3 ECU - DTC SPN 833 FMI 2 RACK POSITION ERROR WITH ENGINE OFF DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page

RG40854,0000002 –19–08AUG02–7/9

Symptom	Problem	Solution
000833.03	Rack Position Voltage High	See LEVEL 3 ECU - DTC SPN 833 FMI 3 RACK POSITION VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000833.04	Rack Position Voltage Low	See LEVEL 3 ECU - DTC SPN 833 FMI 4 RACK POSITION VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000834.02	Rack Instability	See LEVEL 3 ECU - DTC SPN 834 FMI 2 RACK INSTABILITY DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000834.03	Rack Actuator Circuit Shorted to Power	See LEVEL 3 ECU - DTC SPN 834 FMI 3 RACK ACTUATOR CIRCUIT SHORTED TO POWER DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000834.05	Rack Actuator Circuit Open	See LEVEL 3 ECU - DTC SPN 834 FMI 5 RACK ACTUATOR CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000834.06	Rack Actuator Circuit Grounded	See LEVEL 3 ECU - DTC SPN 834 FMI 6 RACK ACTUATOR CIRCUIT GROUNDED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
000834.07	Rack Position Error	See LEVEL 3 ECU - DTC SPN 834 FMI 7 RACK POSITION ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.
001041.03	Start Signal Always Active	See LEVEL 3 ECU - DTC SPN 1041 FMI 3 START SIGNAL ALWAYS ACTIVE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM134.

Continued on next page RG40854,0000002 –19–08AUG02–8/9

References

Symptom	Problem	Solution
001569.31	Fuel Derate	See LEVEL 3 ECU - DTC SPN 1569 FMI 31 FUEL DERATE in Section 04, Group 160 of CTM134.
002000.13	Security Violation	See LEVEL 3 ECU - DTC SPN 2000 FMI 13 SECURITY VIOLATION in Section 04, Group 160 of CTM134.

RG40854,0000002 –19–08AUG02–9/9

Engine Diagnostic Trouble Codes (DTCs) on Level 9 ECU (S.N. 585561—)

Fuel injection system will be Level 3 or Level 9 Electronic fuel injection system. The term level is simply a means to identify fuel systems. Level 3 system meters the fuel at the injection pump. Level 9 system uses a High Pressure Common Rail (HPCR) and meters fuel at the injectors. See Distinguishing ECUs on 8.1 L Engines in CTM134.

- **Level 3 ECU**
  - 2 ECU connectors (30 and 18-way connectors)
  - Bosch In-Line Injection Pump
  - Mechanically-controlled injection nozzles
- **Level 9 ECU**
  - 2 ECU connectors (Two 30-way connectors)
  - Denso High Pressure Common Rail (HPCR) and High Pressure Pump
  - Electronically-controlled injection nozzles

Wire harness information (Group 9015-10):

- See System Functional Schematic
- See Loader Frame Harness (W2) Component Location
- See Load Center Harness (W3) Component Location
- See Front Console Harness (W4) Component Location
- See Engine Frame Harness (W5) Component Location
- See Engine Harness (W6) Component Location
- See Engine Air Heater Harness (W7) Component Location

Symptom	Problem	Solution
F0423 (000105.03)	Manifold Air Temperature Input Voltage High	See LEVEL 9 ECU - DTC SPN 105 FMI 3 MANIFOLD AIR TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0424 (000105.04)	Manifold Air Temperature Input Voltage Low	See LEVEL 9 ECU - DTC SPN 105 FMI 4 MANIFOLD AIR TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–1/10

Symptom	Problem	Solution
F0425 (000110.03)	Engine Coolant Temperature Input Voltage High	See LEVEL 9 ECU - DTC SPN 110 FMI 3 ENGINE COOLANT TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0426 (000110.04)	Engine Coolant Temperature Input Voltage Low	See LEVEL 9 ECU - DTC SPN 110 FMI 4 ENGINE COOLANT TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0431 (000651.05)	Cylinder #1 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 651 FMI 5 CYLINDER #1 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0431 (000651.06)	Cylinder #1 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 651 FMI 6 CYLINDER #1 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0432 (000652.05)	Cylinder #2 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 652 FMI 5 CYLINDER #2 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0432 (000652.06)	Cylinder #2 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 652 FMI 6 CYLINDER #2 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0433 (000653.05)	Cylinder #3 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 653 FMI 5 CYLINDER #3 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page
RG40854,0000003 –19–08AUG02–2/10

Symptom	Problem	Solution
F0433 (000653.06)	Cylinder #3 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 653 FMI 6 CYLINDER #3 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0434 (000654.05)	Cylinder #4 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 654 FMI 5 CYLINDER #4 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0434 (000654.06)	Cylinder #4 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 654 FMI 6 CYLINDER #4 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0435 (000655.05)	Cylinder #5 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 655 FMI 5 CYLINDER #5 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0435 (000655.06)	Cylinder #5 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 655 FMI 6 CYLINDER #5 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0436 (000656.05)	Cylinder #6 EI Circuit Open	See LEVEL 9 ECU - DTC SPN 656 FMI 5 CYLINDER #6 EI CIRCUIT OPEN DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0436 (000656.06)	Cylinder #6 EI Circuit Shorted	See LEVEL 9 ECU - DTC SPN 656 FMI 6 CYLINDER #6 EI CIRCUIT SHORTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page RG40854,0000003 –19–08AUG02–3/10

Symptom	Problem	Solution
F0437 (000174.03)	Fuel Temperature Input Voltage High	See LEVEL 9 ECU - DTC SPN 174 FMI 3 FUEL TEMPERATURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0438 (000174.04)	Fuel Temperature Input Voltage Low	See LEVEL 9 ECU - DTC SPN 174 FMI 4 FUEL TEMPERATURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0439 (001347.05)	Pump Control Valve #1 Error	See LEVEL 9 ECU - DTC SPN 1347 FMI 5 PUMP CONTROL VALVE #1 ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0440 (001348.05)	Pump Control Valve #2 Error	See LEVEL 9 ECU - DTC SPN 1348 FMI 05 PUMP CONTROL VALVE #2 ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0441 (000637.08)	Crank Position Input Missing	See LEVEL 9 ECU - DTC SPN 637 FMI 08 CRANK POSITION INPUT MISSING DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0442 (000637.02)	Crank Position Input Noise	See LEVEL 9 ECU - DTC SPN 636 FMI 02 CRANK POSITION INPUT NOISE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0442 (000637.10)	Crank Position Input Pattern Error	See LEVEL 9 ECU - DTC SPN 637 FMI 10 CRANK POSITION INPUT PATTERN ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–4/10

Symptom	Problem	Solution
F0443 (000636.08)	Pump Position Sensor Input Missing	See LEVEL 9 ECU - DTC SPN 636 FMI 08 PUMP POSITION SENSOR INPUT MISSING DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0444 (000636.02)	Pump Position Sensor Input Noise	See LEVEL 9 ECU - DTC SPN 636 FMI 02 PUMP POSITION SENSOR INPUT NOISE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0444 (000636.10)	Pump Position Sensor Input Pattern Error	See LEVEL 9 ECU - DTC SPN 636 FMI 10 PUMP POSITION SENSOR INPUT PATTERN ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0445 (000637.07)	Crank Position/Pump Position Timing Moderately Out of Sync	See LEVEL 9 ECU - DTC SPN 637 FMI 7 CRANK POSITION/PUMP POSITION TIMING MODERATELY OUT OF SYNC DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0450 (000094.03)	Fuel Rail Pressure Input Voltage High	See LEVEL 9 ECU - DTC SPN 94 FMI 3 FUEL RAIL PRESSURE INPUT VOLTAGE HIGH DIAGNOSTIC PROCEDUREin Section 04, Group 160 of CTM255.
F0451 (000094.04)	Fuel Rail Pressure Input Voltage Low	See LEVEL 9 ECU - DTC SPN 94 FMI 3 FUEL RAIL PRESSURE INPUT VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0453 (000097.03)	Water in Fuel Signal Voltage High	See LEVEL 9 ECU - DTC SPN 97 FMI 3 WATER IN FUEL SIGNAL VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–5/10

Symptom	Problem	Solution
F0454 (000097.04)	Water in Fuel Signal Voltage Low	See LEVEL 9 ECU - DTC SPN 97 FMI 4 WATER IN FUEL SIGNAL VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0455 (000105.16)	Manifold Air Temperature Moderately High	See LEVEL 9 ECU - DTC SPN 105 FMI 16 MANIFOLD AIR TEMPERATURE MODERATELY HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0456 (001348.10)	Pump Control Valve #2 Fuel Flow Not Detected	See LEVEL 9 ECU - DTC SPN 1348 FMI 10 PUMP CONTROL VALVE #2 FUEL FLOW NOT DETECTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0469 (001347.10)	Pump Control Valve #1 Fuel Flow Not Detected	See LEVEL 9 ECU - DTC SPN 1347 FMI 10 PUMP CONTROL VALVE #1 FUEL FLOW NOT DETECTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0470 (001347.07)	Fuel Rail Pressure Control Error	See LEVEL 9 ECU - DTC SPN 1347 FMI 7 FUEL RAIL PRESSURE CONTROL ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0471 (001080.04)	Fuel Rail Pressure Sensor Supply Voltage Low	See LEVEL 9 ECU - DTC SPN 1080 FMI 4 FUEL RAIL PRESSURE SENSOR SUPPLY VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
F0485 (000097.16)	Water in Fuel Detected	See LEVEL 9 ECU - DTC SPN 97 FMI 16 WATER IN FUEL DETECTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–6/10

Symptom	Problem	Solution
000091.09	CAN Throttle Invalid	See LEVEL 9 ECU - T7 - CAN THROTTLE INVALID DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000094.10	Fuel Rail Pressure Loss Detected	See LEVEL 9 ECU - DTC SPN 94 FMI 10 FUEL RAIL PRESSURE LOSS DETECTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000094.13	Fuel Rail Pressure Higher Than Expected	See LEVEL 9 ECU - DTC SPN 94 FMI 13 FUEL RAIL PRESSURE HIGHER THAN EXPECTED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000094.17	Fuel Rail Pressure Not Developed	See LEVEL 9 ECU - DTC SPN 94 FMI 17 FUEL RAIL PRESSURE NOT DEVELOPED DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000110.00	Engine Coolant Temperature High Extremely High	See LEVEL 9 ECU - DTC SPN 110 FMI 0 ENGINE COOLANT TEMPERATURE HIGH MOST SEVERE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000110.16	Engine Coolant Temperature Moderately High	See LEVEL 9 ECU - DTC SPN 110 FMI 16 ENGINE COOLANT TEMPERATURE HIGH MODERATELY SEVERE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000158.17	ECU Power Down Error	See LEVEL 9 ECU - DTC SPN 158 FMI 17 ECU POWER DOWN ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–7/10

Symptom	Problem	Solution
000174.16	Fuel Temperature High Moderately Severe	See LEVEL 9 ECU - DTC SPN 174 FMI 16 FUEL TEMPERATURE HIGH MODERATELY SEVERE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000611.03	Electronic Injector Wiring Shorted To Power Source	See LEVEL 9 ECU - DTC SPN 611 FMI 3 ELECTRONIC INJECTOR WIRING SHORTED TO POWER SOURCE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000611.04	Electronic Injector Wiring Shorted To Ground	See LEVEL 9 ECU - DTC SPN 611 FMI 4 ELECTRONIC INJECTOR WIRING SHORTED TO GROUND DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000620.03	Sensor Supply 1 Voltage High	See LEVEL 9 ECU - DTC SPN 620 FMI 3 SENSOR SUPPLY 1 VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000620.04	Sensor Supply 1 Voltage Low	See LEVEL 9 ECU - DTC SPN 620 FMI 4 SENSOR SUPPLY 1 VOLTAGE LOW DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000627.01	Electronic Injector Supply Voltage Problem	See LEVEL 9 ECU - DTC SPN 627 FMI 1 ELECTRONIC INJECTOR SUPPLY VOLTAGE PROBLEM DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000629.13	ECU Error	See LEVEL 9 ECU - DTC SPN 629 FMI 13 ECU ERROR in Section 04, Group 160 of CTM255.
000639.13	CAN Bus Error	See LEVEL 9 ECU - DTC SPN 639 FMI 13 CAN BUS ERROR DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–8/10

Symptom	Problem	Solution
000651.07	Cylinder #1 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 651 FMI 7 CYLINDER #1 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000652.07	Cylinder #2 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 652 FMI 7 CYLINDER #2 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000653.07	Cylinder #3 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 653 FMI 7 CYLINDER #3 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000654.07	Cylinder #4 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 654 FMI 7 CYLINDER #4 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000655.07	Cylinder #5 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 655 FMI 7 CYLINDER #5 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
000656.07	Cylinder #6 EI Fuel Delivery Failure	See LEVEL 9 ECU - DTC SPN 656 FMI 7 CYLINDER #6 EI FUEL DELIVERY FAILURE DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.
001080.03	Fuel Rail Pressure Sensor Supply Voltage High	See LEVEL 9 ECU - DTC SPN 1080 FMI 3 FUEL RAIL PRESSURE SENSOR SUPPLY VOLTAGE HIGH DIAGNOSTIC PROCEDURE in Section 04, Group 160 of CTM255.

Continued on next page

RG40854,0000003 –19–08AUG02–9/10

References

Symptom	Problem	Solution
001568.02	Torque Curve Selection Invalid	See LEVEL 9 ECU - DTC SPN 1568 FMI 2 TORQUE CURVE SELECTION INVALID in Section 04, Group 160 of CTM255.
001569.31	Fuel Derate	See LEVEL 9 ECU - DTC SPN 1569 FMI 31 FUEL DERATE in Section 04, Group 160 of CTM255.

RG40854,0000003 –19–08AUG02–10/10

Steering and Brake Diagnostic Trouble Codes

Symptom	Problem	Solution
F0998 Steering Pressure Circuit	Steering System Pressure Switch (B25) Short-To-Ground	Steering System Pressure Switch (B25) Short-To-Ground (Check/Repair)
	Wire N08 (Yellow) Harness (W17) Short-To-Ground	Secondary Steering Switch Harness (W17) - N08 (Yellow) Short-To-Ground (Check/Repair)
	Wire N08 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - N08 (Yellow) Short-To-Ground (Check/Repair)
	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F0999 Steering Pressure Low	Power for Pressure Switches Fuse (F10)	Power for Pressure Switches Fuse (F10) (Check/Replace)
	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Steering System Pressure Switch (B25) Open	Steering System Pressure Switch (B25) Open (Check/Repair)
	Wire N08 (Yellow) Harness (W17) Short-To-Power	Secondary Steering Switch Harness (W17) - N08 (Yellow) Short-To-Power (Check/Repair)
	Wire N08 (Yellow) Harness (W3) Open	Load Center Harness (W3) - N08 (Yellow) Open (Check/Repair)
F1097 Service Brake Pressure Circuit	Service Brake System Pressure Switch (B27) Short-To-Power	Service Brake Pressure Switch (B27) Short-To-Power (Check/Repair)

Continued on next page

Symptom	Problem	Solution
	Wire N07 (Yellow) Harness (W3) Short-To-Power	Load Center Harness (W3) - N07 (Yellow) Short-To-Power (Check/Repair)
F1099 Service Brake Pressure Low	Service Brake System Pressure Switch (B27) Open	Service Brake Pressure Switch (B27) Open (Check/Repair)
	Load Center Harness (W3) - T20 (Blue) Open	Load Center Harness (W3) - T20 (Blue) Open (Check/Repair)
	Wire N07 (Yellow) Harness (W3) Open	Load Center Harness (W3) - N07 (Yellow) Open (Check/Repair)

TX17961,0000003 –19–12AUG02–2/2

Electrical System Diagnostic Trouble Codes

Symptom	Problem	Solution
F1620 Spare Relay 1 Driver Short	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1621 Spare Relay 3 Driver Short	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1622 Spare Relay 4 Driver Short	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1623 Spare Relay 5 Driver Short	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–1/16

Symptom	Problem	Solution
F1624 Air Preheat Driver Short-To- Ground	Engine Air Heater Coil Relay (K34) Short-To-Ground	Engine Air Heater Relay (K34) Short-To-Ground (Check/Replace)
	Wire E13 (White) Harness (W3) Short-To-Ground	Load Center Harness (W3) - E13 (White) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1625 Detent Enable Driver Short-To-Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Detent Enable and Pilot Enable Relay (K32) Short-To-Ground	Detent Enable Relay (K32) Short-To-Ground (Check/Replace)
	Wire H25 (Green) Harness (W3) Short-To-Ground	Load Center Harness (W3) - H25 (Green) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–2/16

Symptom	Problem	Solution
F1626 Ride Control Boom Driver Short-To- Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Ride Control Boom Relay (K30) Short-To-Ground	Ride Control Boom Relay (K30) Short-To-Ground (Check/Repair)
	Wire J04 (Tan) Harness (W3) Short-To-Ground	Load Center Harness (W3) -J04 (Tan) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1628 Ride Control On Driver Short-To- Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Ride Control On/Off Relay (K31) Short-To-Ground	Ride Control On/Off Relay (K31) Short-To-Ground (Check/Replace)
	Wire J06 (Tan) Harness (W3) Short-To-Ground	Load Center Harness (W3) - J06 (Tan) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

Symptom	Problem	Solution
F1629 Left Turn Driver Short-To-Ground	Left Flasher Relay (K23) Short-To-Ground	Left Flasher Relay (K23) Short-To-Ground (Check/Replace)
	Wire L08 (Brown) Harness (W3) Short-To-Ground	Load Center Harness (W3) - L08 (Brown) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1630 Right Turn Driver Short-To- Ground	Right Flasher Relay (K24) Short-To-Ground	Right Flasher Relay (K24) Short-To-Ground (Check/Replace)
	Wire L11 (Brown) Harness (W3) Short-To-Ground	Load Center Harness (W3) - L11 (Brown) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

TX17961,0000004 –19–12AUG02–4/16

Symptom	Problem	Solution
F1633 Secondary Steering Driver Short-To- Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Secondary Steering Relay (K21) Short-To-Ground	Secondary Steering Relay (K21) Short-To-Ground (Check/Replace)
	Wire H14 (Green) Harness (W3) Short-To-Ground	Load Center Harness (W3) - H14 (Green) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1634 Rear Wiper Driver Short-To-Ground	Rear Intermittent Wiper Relay (K18) Short-To-Ground	Rear Intermittent Wiper Driver Relay (K18) Short-To-Ground (Check/Replace)
	Wire A29 (Orange) Harness (W3) Short-To-Ground	Load Center Harness (W3) - A29 (Orange) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–5/16

Symptom	Problem	Solution
F1635 Front Wiper Driver Short-To-Ground	Front Intermittent Wiper Relay (K16) Short-To-Ground	Front Intermittent Wiper Relay (K16) Short-To-Ground (Check/Replace)
	Wire A27 (Orange) Harness (W3) Short-To-Ground	Load Center Harness (W3) - A27 (Orange) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1636 CCU Relay Driver Overtemp	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1637 CCU Timer Reset	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–6/16

Symptom	Problem	Solution
F1638 Proportional Fan Drive Circuit Error **CCU output for proportional fan drive has short to ground, circuit overload, or open circuit**	Y37 Variable Speed Fan Motor Relief Solenoid	Check solenoid for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10.
	H35 Green Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10. Normal operation: Supplies 0-12 V to Y37.
	R23 Black Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10.

Continued on next page

TX17961,0000004 –19–12AUG02–7/16

Symptom	Problem	Solution
F1639 Reverse Fan Circuit Error **CCU output for reverse fan drive has short to ground, circuit overload, or open circuit**	Y38 Reverse Fan Solenoid	Check solenoid for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10.
	H26 Green Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10. Normal operation: Supplies 24 V to Y38.
	R23 Black Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE18. See Engine Frame Harness (W5) Component Location. Go to Group 9015-10.
F1641 Drive Light Switch Circuit Open	Drive and Tail/Marker Light Switch (S26) Open	Drive and Tail/Marker Switch (S26) Open (Check/Replace)
	Wire L17 (Brown) Harness (W3) Open	Load Center Harness (W3) - L17 (Brown) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

TX17961,0000004 –19–12AUG02–8/16

Symptom	Problem	Solution
F1644 MDU Memory Bad	MDU (H2)	MDU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1645 CCU Memory Bad	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1647 Machine Odometer Bad	MDU (H2)	MDU (Replace)
Tell-Tale Code displayed in MDU "Service" menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.		
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–9/16

Symptom	Problem	Solution
F1648 Machine Hourmeter Bad	MDU (H2)	MDU (Replace)
Tell-Tale Code displayed in MDU “Service” menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.		
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1649 CCU Hourmeter Bad	CCU (A2)	CCU (Replace)
Tell-Tale Code displayed in MDU “Service” menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.		
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1651 No ECU Transmit	Wire M12 (Purple) Harness (W3) Open	Load Center Harness (W3)—M12 (Purple) Open (Check/Repair.)
	Wire M13 (Purple) Harness (W3) Open	Load Center Harness (W3)—M13 (Purple) Open (Check/Repair.)
	ECU	ECU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

Symptom	Problem	Solution
F1653 No CCU Transmit	Wire M12 (Purple) Harness (W3) Open	Load Center Harness (W3)—M12 (Purple) Open (Check/Repair.)
	Wire M13 (Purple) Harness (W3) Open	Load Center Harness (W3)—M13 (Purple) Open (Check/Repair.)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1655 No TCU CAN Transmit	Engine Controller Switched 15A Fuse Bad	Engine Controller Switched 15A Fuse Check/Replace
	Wire M12 (Purple) Harness (W3) Open	Load Center Harness (W3) M12 (Purple) Open (Check/Repair.)
	Wire M13 (Purple) Harness (W3) Open	Load Center Harness (W3) M13 (Purple) Open (Check/Repair.)
	Wire R02 (Black) Harness (W3) Open	Load Center Harness (W3) R02 (Black) Open (Check/Repair.)
	TCU (A3)	TCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1658 Battery Voltage Balance	CCU 12V Battery Unswitched Fuse (F9) Open	CCU 12V Battery Unswitched Fuse (F9) Open (Check/Replace)
	Wire P31 (Red) Harness (W3) Open	Load Center Harness (W3) - P31 (Red) Open (Check/Repair)

Continued on next page

TX17961,0000004 –19–12AUG02–11/16

Symptom	Problem	Solution
F1660 Alternator Voltage High	Alternator (G4) Output Voltage Too High	Alternator (G4) Output Voltage Too High (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1661 Alternator Voltage Low	Alternator Output Voltage Too Low	Alternator (G4) Output Voltage Too Low (Check/Repair)
	Wire B10 (Red) Harness (W3) Open	Load Center Harness (W3) - B10 (Red) Open (Check/Repair)
	CCU 28V Battery Switched Fuse (F11) Open	CCU 28V Battery Unswitched Fuse (F11) Open (Check/Replace)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1662 Power Voltage High	Alternator (G4) Output Voltage Too High	Alternator G4 Output Voltage Too High (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

Symptom	Problem	Solution
F1663 Power Voltage Low	CCU 28V Battery Switched Fuse (F11) Open	CCU 28V Battery Switched Fuse (F11) Open (Check/Replace)
	Wire B10 (Red) Harness (W3) Open	Load Center Harness (W3) - B10 (Red) Open (Check/Repair)
F1664 Brake Light Pressure Circuit	Brake Light Pressure Switch (B40) Short-To-Ground	Brake Light Pressure Switch (B40) Short-To-Ground (Check/Replace.)
	Wire L03 (Brown) Harness (W3) Short-To-Ground	Load Center Harness (W3) - L03 (Brown) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1665 Drive Light Switch Circuit	Drive and Tail/Marker Light Switch (S26) Open	Drive and Tail/Marker Switch (S26) Open (Check/Replace)
	Wire L06 (Brown) Harness (W3) Open	Load Center Harness (W3) - L06 (Brown) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–13/16

Symptom	Problem	Solution
F1667 Turn Switch Circuit Short	Turn Switch (S25) Short-To-Ground	Turn Switch (S25) Short-To-Ground (Check/Repair)
	Wire L07 (Brown) Harness (W4) Short-To-Ground	Front Console Harness (W4) - L07 (Brown) Short-To-Ground (Check/Repair)
	Wire L10 (Brown) Harness (W4) Short-To-Ground	Front Console Harness (W4) - L10 (Brown) Short-To-Ground (Check/Repair)
	MDU (H2)	MDU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F1668 Hazard Switch Circuit	4-Way Flasher Switch (S24) Short-To-Ground	4-Way Flasher Switch (S24) Short-To-Ground (Check/Replace)
	Wire L20 (Brown) Harness (W3) Short-To-Ground	Load Center Harness (W3) - L20 (Brown) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000004 –19–12AUG02–14/16

Symptom	Problem	Solution
F1671 Return to Carry Detent Solenoid Circuit Error **CCU output for Return to Carry Detent Solenoid has short to ground, circuit overload, or open circuit**	Return to Carry (RTC)/Float Detent Solenoid Coil in A4 Pilot Controller	Check solenoid for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10.
	H34 Green Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10. Normal operation: Supplies 24 V to Return to Carry detent solenoid coil in A4 Pilot Controller.
	R23 Black Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10.

Continued on next page TX17961,0000004 –19–12AUG02–15/16

Symptom	Problem	Solution
F1672 Boom Height Kickout Detent Solenoid Circuit Error **CCU output for Boom Height Kickout Detent Solenoid has short to ground, circuit overload, or open circuit**	Boom Height Kickout Detent Solenoid Coil in A4 Pilot Controller	Check solenoid for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10.
	H33 Green Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10. Normal operation: Supplies 24 V to Boom Height Kickout Detent Solenoid in A4 Pilot Controller.
	R23 Black Wire	Check wire for short to ground, circuit overload, or open circuit. See System Functional Schematic, section SE27 and SE18. Go to Group 9015-10.
F1699 Configuration Error	Controllers Not All Configured For 624H (Reconfigure)	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

TX17961,0000004 –19–12AUG02–16/16

Hydraulic System Diagnostic Trouble Codes

Symptom	Problem	Solution
F2100 Hydraulic Oil Temperature High Long **Tell-Tale Code displayed in MDU “Service” menu. See Monitor Display Unit —Service Menu—Tell-Tale Diagnostic Trouble Codes (S 02) in Group 9015-15.**	Hydraulic Oil Temperature Sensor (B15) Short-To-Ground	Hydraulic Oil Temperature Sensor (B15) Short-To-Ground (Check/Replace)
	Wire X01 (Yellow) Harness (W5) Short-To-Ground	Engine Frame Harness (W5) (X35) (Yellow) Short-To-Ground (Check/Repair)
	Wire X01 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - X01 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000005 –19–12AUG02–1/9

Symptom	Problem	Solution
F3115 Hydraulic Oil Filter Restriction Short-To-Ground	Hydraulic Oil Filter Restriction Switch (B21) Short-To-Ground	Hydraulic Oil Filter Restriction Switch (B21) Short-To-Ground (Check/Replace)
	Wire N01 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - N01 (Yellow) Short-To-Ground (Check/Repair)
	Wire N01 (Yellow) Harness (W5) Short-To-Ground	Engine Frame Harness (W5) - N01 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F3150 Hydraulic Oil Filter Restriction Circuit Short-To-Power	Hydraulic Oil Filter Restriction Switch (B21) Short-To-Power	Hydraulic Oil Filter Restriction Switch (B21) Short-To-Power (Check/Replace)
	Wire N01 (Yellow) Harness (W3) Short-To-Power	Load Center Harness (W3) - N01 (Yellow) Short-To-Power
	Wire N01 (Yellow) Harness (W5) Short-To-Power	Engine Frame Harness (W5) - N01 (Yellow) Short-To-Power (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page
TX17961,0000005 –19–12AUG02–2/9

Symptom	Problem	Solution
F3160 Ride Control Circuit Short-to-Power	Monitor Configuration Wrong	Monitor Configuration Wrong (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Ride Control Switch (S31) Short-To-Power	Ride Control Switch (S31) Short-To-Power (Check/Repair)
	Wire J05 (Tan) Harness (W3) Short-To-Power	Load Center Harness (W3) - J05 (Tan) Short-To-Power (Check/Repair)
	Wire J02 (Tan) Harness (W3) Short-To-Power	Load Center Harness (W3) - J02 (Tan) Short-To-Power (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page TX17961,0000005 –19–12AUG02–3/9

Symptom	Problem	Solution
F3161 Ride Control Auto Circuit Short-To- Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Ride Control Switch (S31) Short-To-Ground	Ride Control Switch (S31) Short-To-Ground (Check/Repair)
	Wire J05 (Tan) Harness (W3) Short-To-Ground	Load Center Harness (W3) - J05 (Tan) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F3162 Ride Control On Circuit Short-To- Ground	Monitor Configuration Wrong	MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
	Ride Control Switch (S31) Short-To-Ground	Ride Control Switch (S31) Short-To-Ground (Check/Repair)
	Wire J02 (Tan) Harness (W3) Short-To-Ground	Load Center Harness (W3) - J02 (Tan) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

Continued on next page

TX17961,0000005 –19–12AUG02–4/9

Symptom	Problem	Solution
F3163 Boom Position Sensor Voltage Low **CCU input voltage for the Boom Position Sensor is less than 0.2 V.**	B9 Boom Position Sensor	Check sensor for short to ground or open circuit. See System Functional Schematic, section SE18. Go to Group 9015-10.
	H28 Green Wire	Check wire for short to ground or open circuit. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Input voltage to CCU from B9 Boom Position Sensor.
	P51 Red Wire	Check wire for short to ground or open circuit. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Supplies 5 V to B9 Boom Position Sensor.
	R13 Black Wire	Check wire for short to ground. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Return circuit to CCU from B9 Boom Position Sensor.

Continued on next page TX17961,0000005 –19–12AUG02–5/9

Symptom	Problem	Solution
F3164 Boom Position Sensor Voltage High **CCU input voltage for the Boom Position Sensor is greater than 4.8 V.**	H28 Green Wire	Check wire for short to power or open circuit. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Input voltage to CCU from B9 Boom Position Sensor.
	P51 Red Wire	Check wire for short to power. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Supplies 5 V to B9 Boom Position Sensor.
	R13 Black Wire	Check wire for open circuit. See System Functional Schematic, section SE18. Go to Group 9015-10. Normal operation: Return circuit to CCU from B9 Boom Position Sensor.
F3165 Reverse Fan Switch Short	S41 Reverse Fan Switch	Check switch.See System Functional Schematic, section SE16. Go to Group 9015-10
	H36 Green	Check wire. See System Functional Schematic, section SE16. Go to Group 9015-10
F3171 Hydraulic Oil Pressure Circuit Voltage Low	Hydraulic System Pressure Sensor (B8) Short to Battery	Hydraulic System Pressure Sensor (B8) Short To Battery (Check/Replace)
	Wire N05 (Yellow) Harness (W3) Short to Battery	Load Center Harness (W3) - N05 (Yellow) Short To Battery (Check/Repair)
	Wire N05 (Yellow) Harness (W5) Short to Battery	Engine Frame Harness (W5) - N05 (Yellow) Short to Battery (Check/Repair)
	CCU (A2)	CCU (Replace)

Continued on next page TX17961,0000005 –19–12AUG02–6/9

Symptom	Problem	Solution
F3172 Hydraulic Oil Pressure Circuit Voltage High	Hydraulic System Pressure Sensor (B8) Short to Ground	Hydraulic System Pressure Sensor (B8) Short To Ground (Check/Replace)
	Wire N05 (Yellow) Harness (W3) Short to Ground	Load Center Harness (W3) - N05 (Yellow) Short To Ground (Check/Repair)
	Wire N05 (Yellow) Harness (W5) Short to Ground	Engine Frame Harness (W5) - N05 (Yellow) Short To Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
F3173 LPM Mode Circuit	LPM Switch (Off/On) (S5) Shorted to Battery	LPM Switch (Off/On) (S5) Short To Battery (Check/Replace)
	Wire H10 (Green) Harness (W14) Short to Battery	LPM Mode Harness (W14)— H10 (Green) Short To Battery (Check/Repair)
	Wire H10 (Green) Harness (W3) Short to Battery	Load Center Harness (W3)—H10 (Green) Short to Battery
	CCU (A2)	CCU (Replace)
F3174 LPM Enable Circuit Short-To-Ground	LPM Switch (Off/On) (S5) Short-To-Ground	LPM Switch (Off/On) (S5) Short-To-Ground (Check/Replace)
	Wire H10 (Green) Harness (W14) Short-To-Ground	LPM Mode Harness (W14) (Check/Repair)
	Wire H10 (Green) Harness (W3) Short-To-Ground	Load Center Harness (W3) (Check/Repair)
	CCU (A2)	CCU (Replace)

Continued on next page TX17961,0000005 –19–12AUG02–7/9

Symptom	Problem	Solution
F3175 Hydraulic Oil Temperature Circuit Short-To-Ground	Hydraulic Oil Temperature Sensor (B15) Short-To-Ground	Hydraulic Oil Temperature Sensor (B15) Short-To-Ground (Check/Replace)
	Wire X01 (Yellow) Harness (W5) Short-To-Ground	Engine Frame Harness (W5) - X01 (Yellow) Short-To-Ground (Check/Repair)
	Wire X01 (Yellow) Harness (W3) Short-To-Ground	Load Center Harness (W3) - X01 (Yellow) Short-To-Ground (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F3176 Hydraulic Oil Temperature Circuit Open	Hydraulic Oil Temperature Sensor (B15) Open	Hydraulic Oil Temperature Sensor (B15) Open (Check/Repair)
	Wire X01 (Yellow) Harness (W5) Open	Engine Frame Harness (W5) - X01 (Yellow) Open (Check/Repair)
	Wire X01 (Yellow) Harness (W3) Open	Load Center Harness (W3) - X01 (Yellow) Open (Check/Repair)

Continued on next page TX17961,0000005 –19–12AUG02–8/9

Symptom	Problem	Solution
F3177 Hydraulic Oil Temperature Circuit Noisy	Hydraulic Oil Temperature Sensor (B15) Noisy	Hydraulic Oil Temperature Sensor (B15) Noisy (Check/Replace)
	Wire X01 (Yellow) Harness (W5) Noisy	Engine Frame Harness (W5) - X01 (Yellow) Noisy (Check/Repair)
	Wire X01 (Yellow) Harness (W3) Noisy	Load Center Harness (W3) - X01 (Yellow) Noisy (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.
F3199 Hydraulic Oil Temperature High	Hydraulic Oil Temperature Sensor (B15) Open	Hydraulic Oil Temperature Sensor (B15) Open (Check/Replace)
	Wire X01 (Yellow) Harness (W3) Open	Load Center Harness (W3) - X01 (Yellow) Open (Check/Repair)
	Wire X01 (Yellow) Harness (W5) Open	Engine Frame Harness (W5)—X01 (Yellow) Open (Check/Repair)
	CCU (A2)	CCU (Replace)
		MDU (Reconfigure). See Monitor Display Unit Reconfiguration Access Service Menu, Machine Model (S 01), Tire Size (S 03), Enable Options (S 06), and Delete Diagnostic Trouble Codes in Group 9015—15.

TX17961,0000005 –19–12AUG02–9/9

Battery Specifications

Specification	
Standard Battery—Volts	12
Standard Battery—Cold Cranking Power	625 amps at —18°C (0°F)
Standard Battery—Reserve Capacity	160 minutes at 25 amps
Standard Battery—BCI Group Size	30H
Standard Battery—Fully Charged Electrolyte Specific Gravity	1.265—1.280

Specification	
Heavy Duty Battery—Volts	12
Heavy Duty Battery—Cold Cranking Power	950 amps at —18°C (0°F)
Heavy Duty Battery—Reserve Capacity	190 minutes at 25 amps
Heavy Duty Battery—BCI Group Size	31
Heavy Duty Battery—Fully Charged Electrolyte Specific Gravity	1.265—1.280

TX,20,111126 –19–04SEP96–1/1

Check Controller

- Review diagnostic procedures closely before replacing the controller.
- Recheck connectors, wire crimps, 5 volt and 24 volt power terminals, and ground terminals.

If a failed connection or wire is suspected to be the cause of the intermittent problem: clear diagnostic trouble codes, then check the connection or wire by wiggling it while watching for new diagnostic trouble codes.

To check the connection between the harness and a sensor or the harness and the controller, use JT07328, Connector Adapter Test Kit.

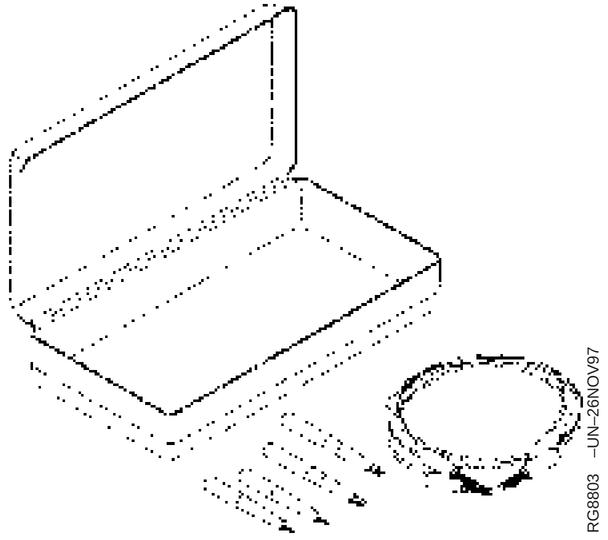
Insert the male end of the appropriate test adapter into the female end of the controller or sensor connector terminal. There should be moderate resistance when the test adapter is inserted into the terminal. If the connection is loose, replace the female terminal.

If all other components related to the system failure have checked OK, it is reasonable to assume the controller is malfunctioning.

CED,TX17961,83 –19–27MAR00–1/2

Connector Adapter Test Kit JT07328

Used with JT07306 Digital Multimeter to make voltage and resistance measurements in control system wiring harness connectors. Can also be used to test terminals for proper fit.



RG8803 –UN–26NOV97

CED,TX17961,83 –19–27MAR00–2/2

Diagnose Battery Malfunctions

Symptom	Problem	Solution
Battery Using Too Much Water	Shorted battery cell	Check battery state of charge. (See Procedure for Testing Batteries.)
	High ambient temperature	Add distilled water.
	Cracked battery case	Check battery hold down clamps. Replace battery.
	Regulator	Do Alternator Output Check. See Monitor Basic Display, Alternator Output Check And Seat Belt Indicator Check. (Group 9005-10)
Cracked Battery Case	Battery hold down clamp too tight, too loose or missing	Install new battery. Install hold down clamps correctly.
	Frozen battery	Keep electrolyte at correct level and battery fully charged during cold weather.
Low Battery Output	Low water level	See Battery Using Too Much Water and Cracked Battery Case symptoms.
	Dirty or wet battery top, causing discharge	Clean battery top. Recharge battery.
	Corroded or loose battery cable ends	Clean and tighten cable end clamps. Recharge battery.
	Broken or loose battery posts	Wiggle posts by hand. If posts are loose or will turn, replace battery.
	Loose fan/alternator belt or worn pulleys	Inspect belt or pulley. Adjust or replace as necessary.

TX,20,111117 –19–04SEP96–1/1

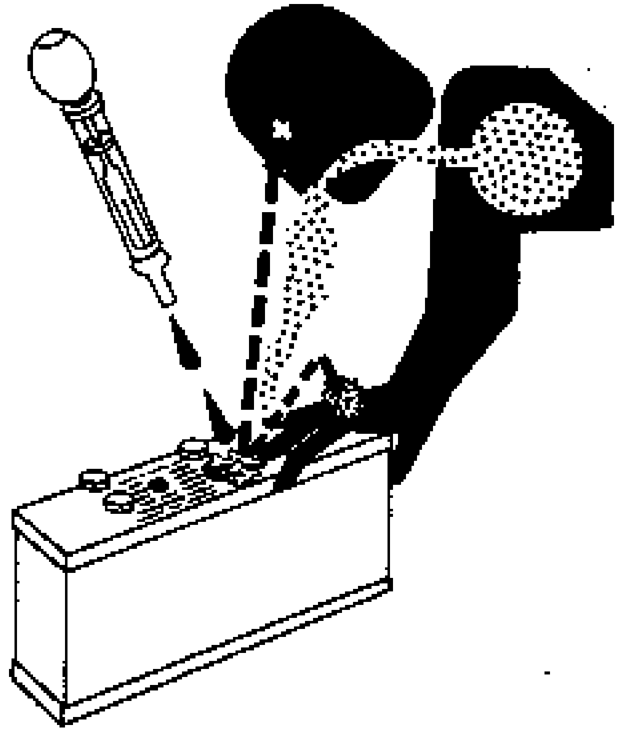
Check Battery Electrolyte Level And Terminals

1. Remove hold-down clamps.

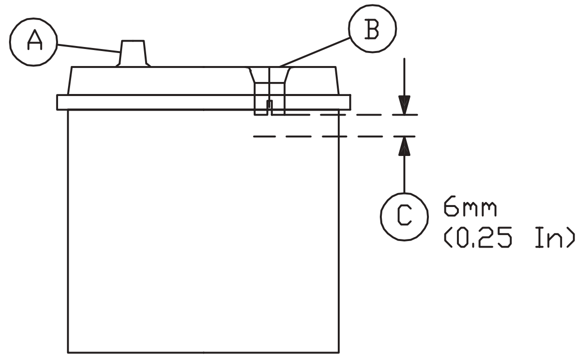
2. Remove battery covers.

Continued on next page TX,20,111118 –19–04SEP96–1/3

A—Battery Post
B—Fill Tube
C—Electrolyte Level Range

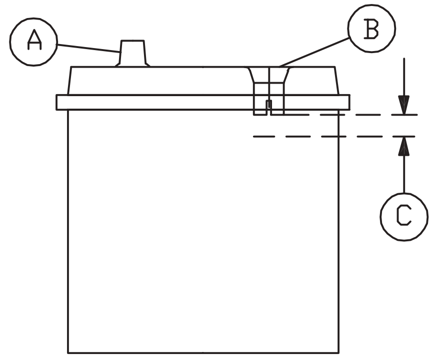


TS203 –UN–23AUG88



T6996DB –UN–09SEP03

Single Level Fill Tube Application



T6996DA –UN–09SEP03

Dual Level Fill Tube Application

Continued on next page

TX,20,111118 –19–04SEP96–2/3

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace it last.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

If you spill acid on yourself:

1. **Flush your skin with water.**
2. **Apply baking soda or lime to help neutralize the acid.**
3. **Flush your eyes with water for 10—15 minutes. Get medical attention immediately.**

Specification	
Flush Eyes With Water—Time	10-15 minutes

If acid is swallowed:

1. **Drink large amounts of water or milk.**
2. **Then drink milk of magnesia, beaten eggs, or vegetable oil.**
3. **Get medical attention immediately.**

IMPORTANT: During freezing weather, batteries must be charged after water is added to prevent battery freezing. Charge battery using a battery charger or by running the engine.

3. Fill each cell to within specified range with distilled water. DO NOT overfill.

TX,20,111118 –19–04SEP96–3/3

9015
20
97

Procedure For Testing Batteries

Visual Check

1. Check for damage such as cracked or broken case and electrolyte leakage.

   If damage is seen, replace battery.

2. Check electrolyte level. (See procedure in this group)

   If low, add distilled water to specified level and charge battery.

3. Check terminals for corrosion.

   If corroded, clean using a wire brush or battery post cleaner such as JT05838 Battery Post/Clamp Cleaner.

4. Check posts for looseness.

   If posts are loose, replace battery.

Hydrometer Test

1. Check specific gravity with a hydrometer or battery tester such as JT05460 Coolant/Battery Tester.

2. Record specific gravity reading for each cell.

   If high and low readings vary LESS than 0.050 and average specific gravity is between 1.225 and 1.280, battery is fully charged, go to LOAD TEST.

   If high and low readings vary LESS than 0.050 and average specific gravity is LESS than 1.225, charge battery and repeat test. If average specific gravity is still LESS than 1.225, replace both batteries.

   If high and low readings vary MORE than 0.050, charge battery and repeat test. If high and low readings still vary MORE than 0.050, replace both batteries.

https://www.truck-manuals.net/

Continued on next page

TX,20,111119 –19–01AUG96–1/2

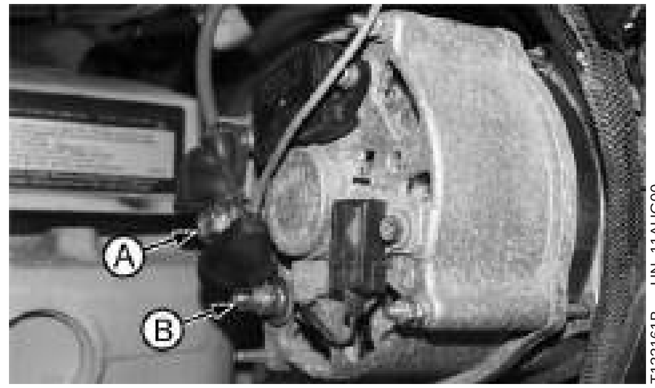
Load Test

1. Check battery capacity with a load tester such as JT05832 Battery Load Tester. Follow tester manufacturer's instructions for proper load test procedures.

2. If one battery fails load test, replace both batteries.

TX,20,111119 –19–01AUG96–2/2

Alternator Check



A—B+ terminal
B—D+ terminal

1. Perform Monitor Basic Display, Alternator Output Check And Seat Belt Indicator Check using SERVICE ADVISOR™ system Battery Power template (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

   Or use monitor display. (Go to 9005-10).

   If battery voltage is not within specification, check alternator using the follow checks:

2. Measure voltage at B+ terminal (A) using multimeter with engine off. Battery voltage should be present.

3. Measure voltage at D+ terminal (B) with engine running. Battery voltage should be within specification.

Alternator—Specification

Output at D+ terminal—Engine running—Voltage	18—28 Volts

If alternator is within specification and SERVICE ADVISOR system Power 24VDC template or monitor display battery voltage out does not match alternator output, check harnesses.

See Charging Circuit Theory of Operation for more information on the entire charging circuit. (Go to 9015-15.)

CED,TX17994,366 –19–22AUG00–1/1

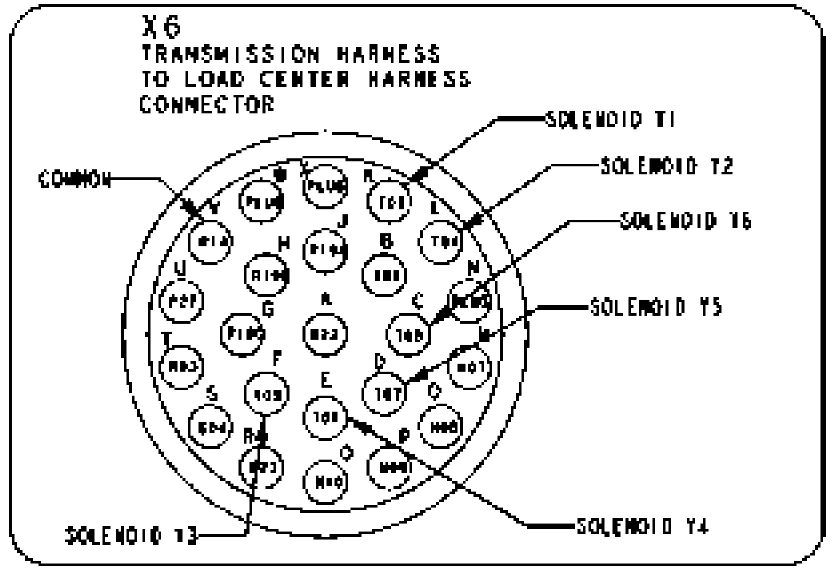
Transmission Control Valve Solenoid Check

TRANSMISSION CONTROL VALVE

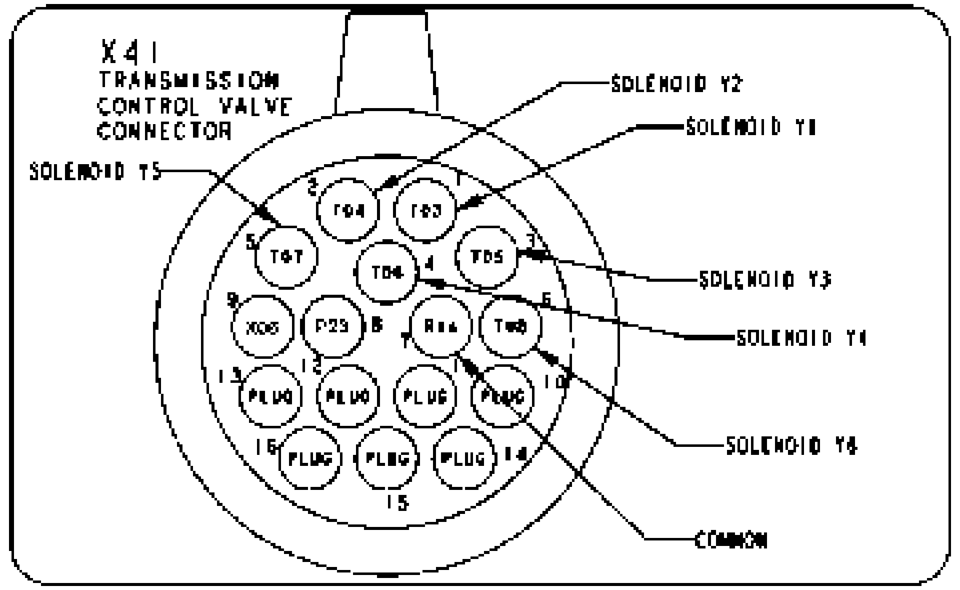
	FORWARD				REV			N
SOL	1	2	3	4	1	2	3	N
Y1				•				
Y2					•	•	•	
Y3	•				•			
Y4			•	•			•	
Y5	•	•	•					
Y6		•				•		

• SOLENOID ACTUATED

A	R22	BLK	B31
B	X06	YEL	B32
C	T08	BLU	Y6
D	T07	BLU	Y5
E	T06	BLU	Y4
F	T05	BLU	Y3
G	R19	BLK	B28, B29, B30
H	R19	BLK	B28, B29, B30
J	R19	BLK	B28, B29, B30
K	T03	BLU	Y1
L	T04	BLU	Y2
M	PLUG		
N	W07	PUR	B28
O	W08	PUR	B29
P	W09	PUR	B30
Q	W10	PUR	B31
R	P23	RED	B32
S	G04	BLK	B20
T	W03	YEL	B20
U	P27	RED	B31
V	R14	BLK	Y1, Y2, Y3, Y4, Y5, Y6
W	PLUG		
X	PLUG		



1	T03	BLU	Y1
2	T04	BLU	Y2
3	T05	BLU	Y3
4	T06	BLU	Y4
5	T07	BLU	Y5
6	T08	BLU	Y6
7	R14	BLK	Y1, Y2, Y3, Y4, Y5, Y6
8	P23	RED	B32
9	X06	YEL	B32
10	PLUG		
11	PLUG		
12	PLUG		
13	PLUG		
14	PLUG		
15	PLUG		
16	PLUG		



REAR VIEW OF CONNECTOR SHOWN

T110958

T110956 –19–27AUG97

Continued on next page

TX,15,111260 –19–13FEB97–1/2

Following is a simple test to check electrical operation of the transmission control valve solenoids:

1. Disconnect the X6 Transmission Harness to Load Center Harness Connector. (See Transmission Harness (W10) Component Location in Group 9015—10 for location on machine.)
2. Using an ohmmeter, check the resistance between the common pin terminal (pin V) and each solenoid terminal as shown.

Specification

Control Valve Solenoid—
Resistance .... 15—20 ohms

3. This check can also be done at the X41 Transmission Control Valve Connector.

TX,15,111260 –19–13FEB97–2/2

Clutch Cutoff Sensor Check and Adjustment

1. Turn key switch ON.

2. Press MENU on monitor until Diagnostic Menu (d) is displayed.

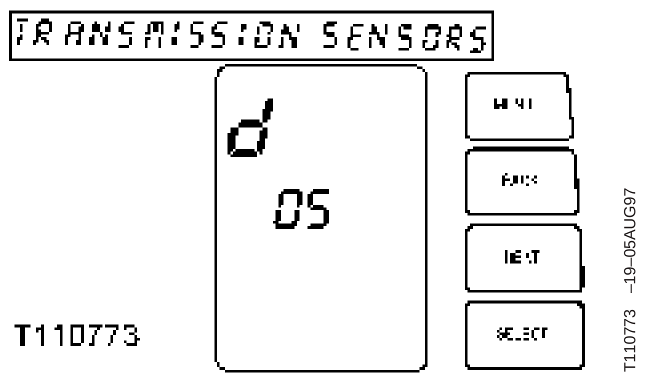
TX,20,111903 –19–14JUL00–1/4

3. Press SELECT to get (d 01) displayed, then press NEXT until (d 05) is displayed.

4. Press SELECT to get (d 052) clutch cutoff sensor voltage displayed.

5. Without stepping on either brake pedal, record clutch cutoff voltage displayed on monitor.

   Fully depress either brake pedal and record voltage displayed on monitor. Both voltages should be within specification.



Deluxe Monitor Display Unit Shown

Clutch Cutoff Sensor Voltages—Specification

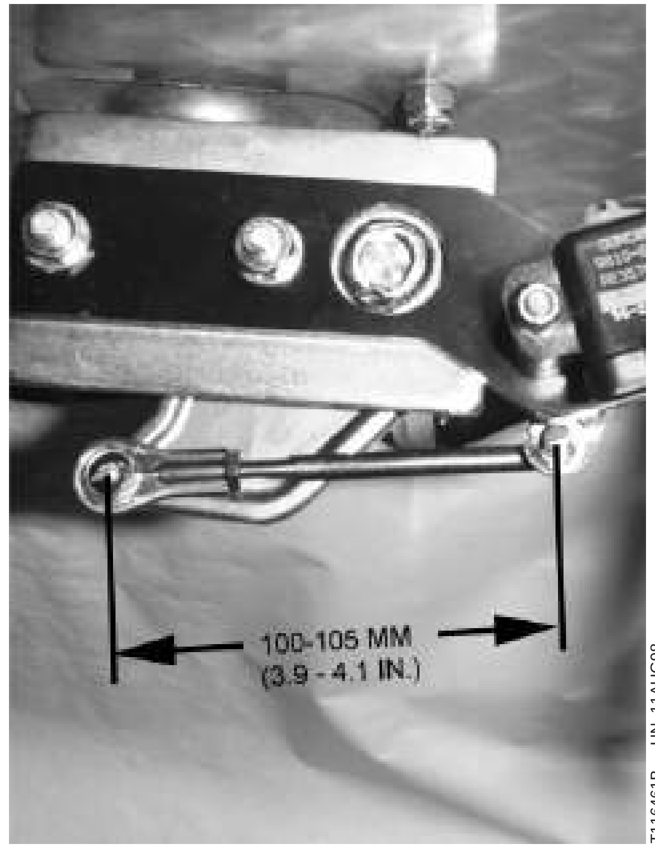
Pedal Up—Voltage... 0.9 ± 0.1 volts
Pedal Fully Depressed—Voltage .... 4.5 ± 0.1 volts

Continued on next page TX,20,111903 –19–14JUL00–2/4

6. If voltage is not within specification, disconnect end of link with ball joint. Adjust link to specification. This length is a starting point. Adjust as needed to meet the voltage specifications.

Specification

Clutch Cutoff Link—Starting
Length... 100—105 mm (3.9—4.1 in.)

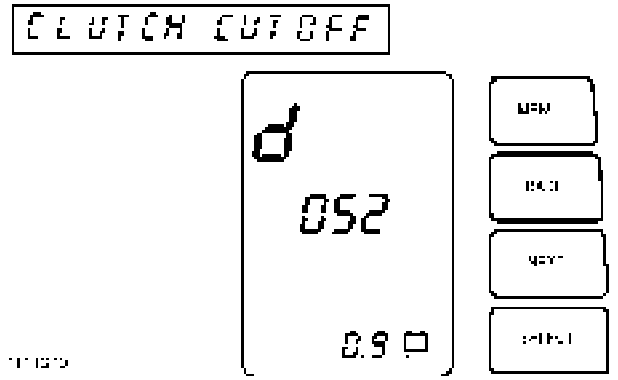


T116461B –UN–11AUG98

Clutch Cutoff Link Adjustment

TX,20,111903 –19–14JUL00–3/4

7. Reconnect link. Make sure brake pedal is in the up position and verify voltage is within specification.



T111379 –19–12SEP97

d 052 Display

TX,20,111903 –19–14JUL00–4/4

Engine Control Unit Temperature Sensors Test (S.N. 585561—)

SPECIFICATIONS	
Temperature Sensor Ranges	
Manifold Air Temperature Sensor (B7) Resistance	3050 ± 30 ohms
Coolant Temperature Sensor (B1) Resistance	2882 ± 30 ohms
Fuel Temperature Sensor (B3) Resistance	2770 ohms

1. Measure resistance as indicated. Resistance may vary from one sensor to another.

Temperature Sensor Ranges—Specification

Manifold Air Temperature Sensor (B7)—Resistance .... 3050 ± 30 ohms
Coolant Temperature Sensor (B1)—Resistance .... 2882 ± 30 ohms
Fuel Temperature Sensor (B3)—Resistance .... 2770 ohms

2. SERVICE ADVISOR™ can also be use to check sensor is functioning properly with engine running. Connect to machine and Perform Engine Sensor Check. See Monitor Display Unit—Diagnostics Menu—Engine Sensors (d 04).

For machine location of temperature sensors, See Engine Harness (W6) Component Location Diagram. (Group 9015-10.)

SERVICE ADVISOR is a trademark of Deere & Company

TX17994,0000345 –19–09SEP02–1/1

Engine Control Unit Speed Sensors Test (S.N. 585561—)

SPECIFICATIONS	
Speed Sensor Ranges	
Injection Pump Position Sensor (B4) Resistance	2000 ± 30 ohms
Crank Position Sensor (B3) Resistance	3000 ± 30 ohms

1. Measure resistance as indicated. Resistance may vary from one sensor to another.

Speed Sensor Ranges—Specification

Engine Cam Speed Sensor (B5)—Resistance.. 2000 ± 30 ohms
Engine Crank Speed Sensor (B4)—Resistance.. 3000 ± 30 ohms

2. Service ADVISOR can also be use to check sensor is functioning properly with engine running. Connect to machine and Perform Engine Sensor Check. See Monitor Display Unit—Diagnostics Menu—Engine Sensors (d 04). (Group 9015-15.)

For machine location of sensor, See Engine Harness (W6) Component Location Diagram. (Group 9015-10.)

TX17994,0000346 –19–09SEP02–1/1

Engine Control Unit Pressure Sensors and Solenoids Test (S.N. 585561—)

SPECIFICATIONS	
Pressure Sensor Ranges	
Fuel Rail Pressure Sensor (B3) Resistance	11.7k ohms (Pins 1—2)
Fuel Rail Pressure Sensor (B3)	13.4k ohms (Pins 2—3)
High Pressure Fuel Pump Solenoids 1 and 2 (Y8 and Y9) Resistance	3.2 ohms

1. A suspect pressure sensor or solenoid can be checked by switching positions with a known good sensor or solenoid. If the problem follows the suspect pressure sensor or solenoid, it has failed.

   If the problem remains, the harness has failed.

2. To check a pressure sensor or solenoid using an ohmmeter, remove it from the machine.

3. Measure resistance as indicated. Resistance may vary from one sensor or solenoid to another.

Pressure Sensor Ranges—Specification

Fuel Rail Pressure Sensor (B3)—
Resistance .... 11.7k ohms (Pins 1—2)
13.4k ohms (Pins 2—3)

High Pressure Fuel Pump
Solenoid 1 and 2 (Y8 and Y9)—
Resistance .... 3.2 ohms

For machine location of sensor and solenoid, see Engine Harness (W6) Component Location Diagram. (Group 9015-10.)

TX17994,000034A –19–25SEP02–1/1

Analog Throttle Position Sensor Adjustment

SPECIFICATIONS	
Sensor Reading Voltage	0.6 ± .1
High Idle Engine Speed RPM	2350 ± 25

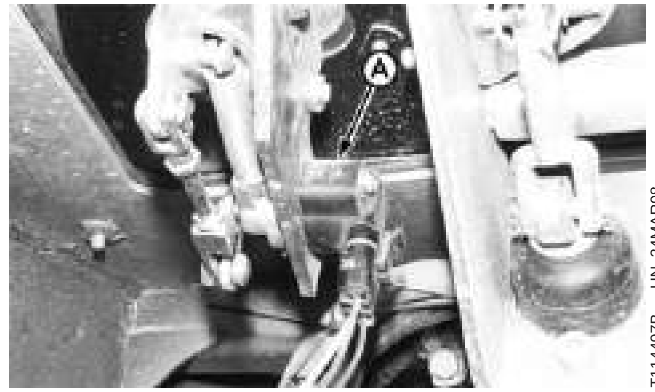
B14 Analog Throttle Position Sensor sends signals to the chassis computer unit. The chassis computer unit then sends the throttle command to the engine controller unit by way of the CAN link.

Continued on next page CED,TX17864,22 –19–10MAR99–1/3

9015
20
,105

NOTE: The throttle position sensor is located under cab on foot throttle assembly.

Before adjusting sensor check voltage to make sure adjustment is required starting with step number 2.



T114497B –UN–24MAR98

1. With the engine not running, loosen the screws holding the sensor (A) to the bracket.

2. Select the Monitor Display Unit menu for User Diagnostics (d).

3. Press NEXT

4. At the Monitor Display Unit menu for User Diagnostics (d), press SELECT.

9015
20
,106

CED,TX17864,22 –19–10MAR99–2/3

5. Press NEXT until the Engine Sensors (d 04) display is shown.

6. Press SELECT, then NEXT until the Throttle (d 043) display is shown. This display will monitor the voltage as adjustments are made.

7. With engine off and accelerator pedal not pressed down, turn sensor until voltage reading shown in monitor basic display window is 0.6 ± .1.

Specification

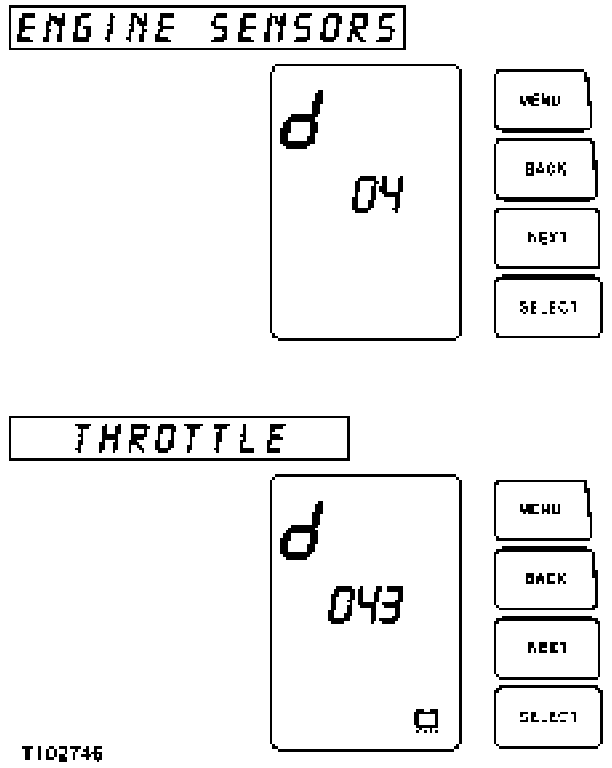
Sensor Reading—Voltage .... 0.6 ± .1

8. Tighten sensor.

9. Start engine and press accelerator pedal all the way down. The high idle rpm must be 2350 ± 25.

Specification

High Idle Engine Speed—RPM .... 2350 ± 25



T102746 –19–15AUG96

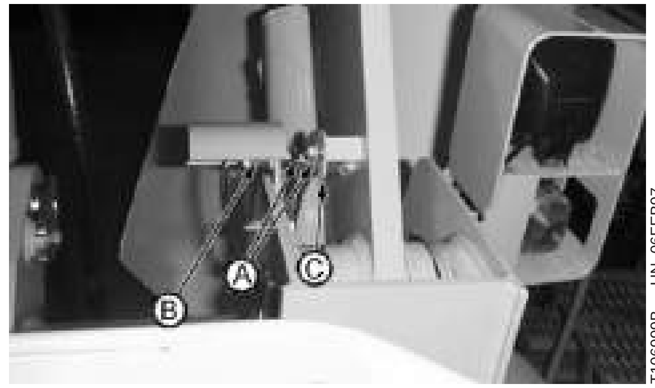
CED,TX17864,22 –19–10MAR99–3/3

https://www.truck-manuals.net/

Boom Height Kickout Adjustment

Boom Height Kickout Adjustment (— 585560)

A—Cap Screws (2 used)
B—Switch
C—Adjustable Plate



Loader

Continued on next page CED,TX04577,515 –19–05JUN02–1/2

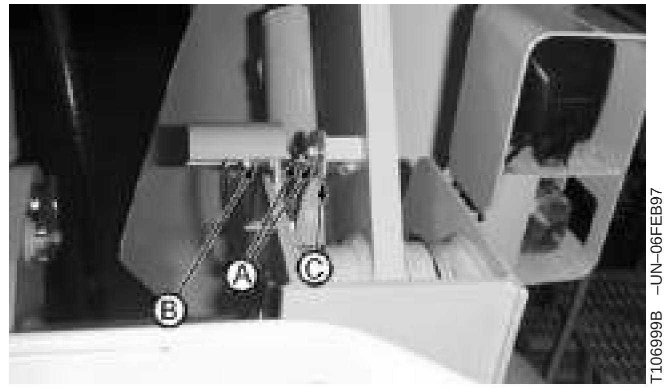
1. Move loader control lever to boom raise detent position and release.

2. After loader control lever returns to neutral, make a mark on plate edge and mounting block.

3. Position the boom in the desired boom height kickout position. Stop engine.

4. Loosen cap screws (A) and adjust plate to align marks on plate and loader frame or mounting block.

5. Inspect air gap between switch (B) and adjustable plate (C), it must be 5—8 mm (0.197— 0.315 in.)



Loader

A—Cap Screws (2 used)
B—Switch
C—Adjustable Plate

Specification

Boom Height Kickout
Adjustment—Gap .... 5—8 mm (.197—.315 in.)

9015
20
,108

6. If air gap is out of specifications, loosen hex nuts and adjust switch (B) to get correct air gap.

7. Start engine and check boom height kickout for correct adjustment. Readjust as required.

Boom Height Kickout Adjustment (S.N. 585561 —)

Boom height kickout position can be adjusted from cab using the following procedure:

1. Position boom at the desired height.

2. Push up on BOOM switch on right console. Hold until monitor beeps.

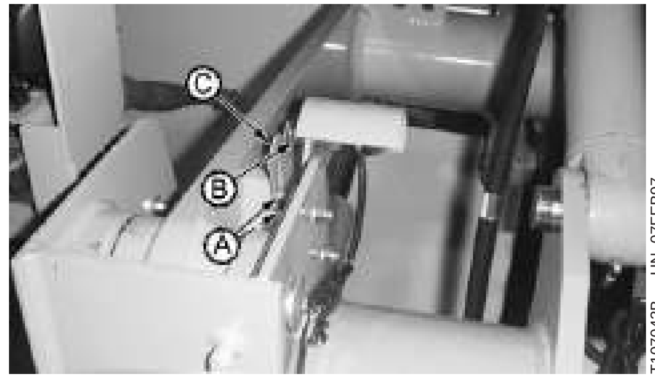
3. Lower boom.

4. Move loader control lever to boom raise detent position and release.

   Boom should raise to the set position.

CED,TX04577,515 –19–05JUN02–2/2

Return-To-Carry Kickout Adjustment



Loader

A—Cap Screw (2 used)
B—Switch
C—Adjustable Plate

Return-To-Carry Kickout Adjustment (S.N. — 585560)

1. Move CARRY switch on right console to ON (center) position. Raise boom to maximum height.

2. Put boom lever in “Float” detent position and observe at what position boom stops lowering and control lever releases from detent.

3. Stop engine. Make a mark on the adjustable plate and loader frame for the tool carrier. For the loader, make a mark on plate edge and mounting block.

4. Start engine and position boom in desired Return-To-Carry position.

5. Stop engine. Loosen cap screws (A) and adjust plate (B) to align marks on plate and loader frame or mounting block.

6. Inspect air gap between switch (B) and adjustable plate (C), it must be 5—8 mm (0.197— 0.315 in.)

Specification

Return-To-Carry Kickout
Adjustment (S.N. — 585560)—
Gap .... 5—8 mm (.197—.315 in.)

7. If air gap is out of specifications, loosen hex nuts on switch and adjust switch (B) to get correct air gap.

8. Start engine and check boom Return-To-Carry kickout for correct adjustment. Readjust as required.

NOTE: The boom “Float” position detent will not operate at ground level with CARRY switch ON. Turn CARRY switch off to activate normal “Float” function of boom.

Return-To-Carry Kickout Adjustment (S.N. 585561 —)

Return to carry kickout position can be adjusted from the cab using following procedure:

1. Position boom at the desired height.

Continued on next page CED,TX04577,516 –19–05JUN02–1/2

2. Push up on CARRY switch on right console. Hold until monitor beeps.

3. Raise boom.

4. Move loader control lever to boom lower detent position and release.

   Boom should lower to the set position.

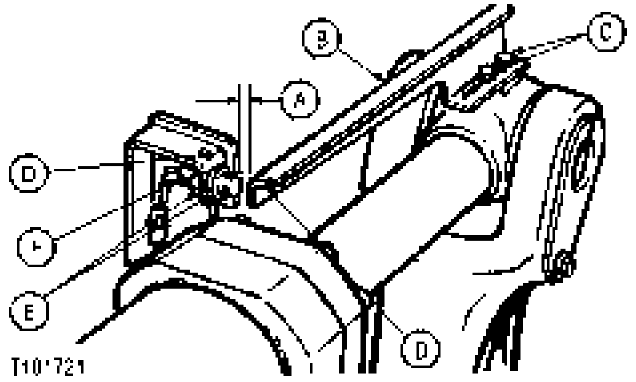
CED,TX04577,516 –19–05JUN02–2/2

Return-To-Dig Adjustment

Return-To-Dig Adjustment (S.N. —574612)

SPECIFICATIONS	
Cap Screw Torque	121 N•m (89 lb-ft)
Air Gap Between Switch and Bar Distance	5—8 mm (0.197— 0.315 in.)

OTHER MATERIAL
T43512 U.S. Thread Lock and Sealer (Medium Strength)LOCTITE® Products
TY9473 Canadian Thread Lock and Sealer (Medium Strength)LOCTITE® Products
242 Thread Lock and Sealer (Medium Strength)LOCTITE® Products
TY6305 U.S. Clean And Cure PrimerLOCTITE® Products
TY9485 Canadian Clean And Cure PrimerLOCTITE® Products
764 Clean And Cure PrimerLOCTITE® Products



T101721 –UN–16AUG96

A—Air Gap Switch-To-Bar
B—Adjustable Bar
C—Cap Screws
D—Alignment Marks
E—Adjusting Nuts (2)
F—Switch

9015
20
,111

1. Raise boom adequately to allow clearance for full bucket dump position.

2. Move loader control lever to return-to-dig detent position and release.

3. After control lever returns to neutral, scribe a mark (D) on the switch bracket and adjustable bar (B) to align with each other.

4. Position the boom and bucket in the desired return-to-dig position. Stop engine.

5. Loosen cap screws (C). Adjust bar to align marks on switch bracket and end of bar. Torque cap screws to specification.

Specification

Cap Screw—Torque .... 121 N•m (89 lb-ft)

6. Loosen adjusting nuts to switch (F). Adjust air gap (A) between switch and adjustable bar (B) to 5—8 mm (0.197— 0.315 in.). Retighten adjusting nuts.

Specification

Air Gap Between Switch and Bar—Distance... 5—8 mm (0.197— 0.315 in.)

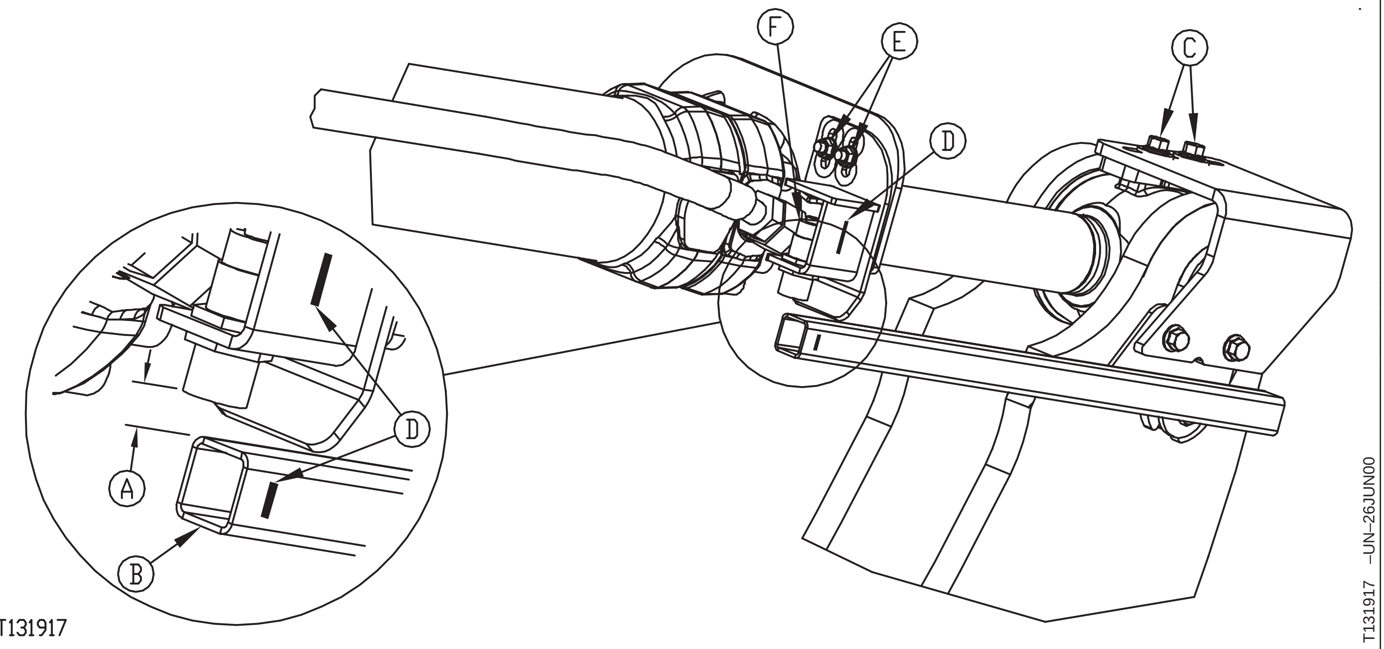
LOCTITE is a trademark of Loctite Corp.

Continued on next page

TX,20,SS3661 –19–05JUN02–1/3

7. Raise boom. Cycle bucket from full rollback to dump. Adjust as required to get desired position.

TX,20,SS3661 –19–05JUN02–2/3



T131917 –UN–26JUN00

A—Air Gap Switch-To-Bar
B—Adjustable Bar
C—Cap Screws
D—Alignment Marks
E—Hex Nuts
F—Switch

Return-To-Dig Adjustment (S.N. 574613—)

SPECIFICATIONS	
Cap Screw Torque	121 N•m (89.0 lb-ft)
Air Gap Between Switch and Bar Distance	5—8 mm (0.197— 0.315 in.)
Hex Screw Torque	75 N•m (55 lb-ft)

1. Raise boom adequately to allow clearance for full bucket dump position.

2. Move loader control lever to return-to-dig detent position and release.

3. After control lever returns to neutral, scribe a mark (D) on the switch bracket and adjustable bar (B) to align with each other.

4. Position the boom and bucket in the desired return-to-dig position. Stop engine.

5. Loosen cap screws (C). Adjust bar to align marks on switch bracket and end of bar. Torque cap screws to specification.

Specification
Cap Screw—Torque .... 121 N•m (89.0 lb-ft)

6. Loosen hex nuts (E) to switch bracket. Adjust air gap (A) between switch and adjustable bar (B) to 5—8 mm (0.197— 0.315 in.). Torque hex nuts to specification.

Specification
Air Gap Between Switch and
Bar—Distance....................................... 5—8 mm (0.197— 0.315 in.)
Hex Screw—Torque .... 75 N•m (55 lb-ft)

TX,20,SS3661 –19–05JUN02–3/3

Continuity Check For Sensors With Two Wires

This procedure checks if a failure of the wiring harness or the sensor is causing a two wire sensor diagnostic trouble code to be generated. Use the monitor or SERVICE ADVISOR™ system. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

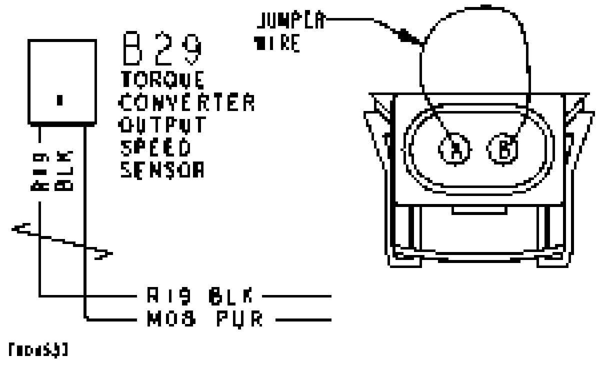
Performing Two-Wire Sensor Check

1. Record and clear diagnostic trouble codes. See Monitor Display Unit Reconfiguration—Delete Diagnostic Trouble Codes (DTC) in Group 9005-10.

SERVICE ADVISOR is a trademark of Deere & Company

CED,TX17994,362 –19–27JUL00–1/2

9015
20
,113



T104537 –19–21OCT96

2. With key switch OFF, disconnect suspected sensor wiring harness connector. Connect a jumper wire between the wires in the harness connector.

3. Start engine and run for several seconds. Stop engine.

4. Record all diagnostic trouble codes as in Step 1 above.

5. If a new diagnostic trouble code appears, a failed sensor is indicated. (You created the new diagnostic trouble code when you connect the jumper wire, proving the harness is OK.)

6. If a new diagnostic trouble code does not appear, a failed harness or controller is indicated. (The harness cannot send the new diagnostic trouble code to the CCU)

CED,TX17994,362 –19–27JUL00–2/2

https://www.truck-manuals.net/

Continuity Check For Sensors With Three Wires

This procedure checks if a failure of the wiring harness or the sensor is causing a three wire sensor diagnostic trouble code to be generated. Use the monitor or SERVICE ADVISOR™ system. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

Performing Three-Wire Sensor Check

1. Record and clear diagnostic trouble codes. See Monitor Display Unit Reconfiguration—Delete Diagnostic Trouble Codes (DTC) in Group 9005-10.

2. With key switch OFF disconnect the suspected sensor wiring harness connector. If the original diagnostic trouble code was “Short to Power” connect a jumper wire between the sensing wire and the ground wire in the wiring harness connector.

SERVICE ADVISOR is a trademark of Deere & Company

CED,TX17994,363 –19–27JUL00–1/2

If the original diagnostic trouble code was “Short to Ground” connect a jumper wire between the sensing wire and the power wire in the wiring harness connector.

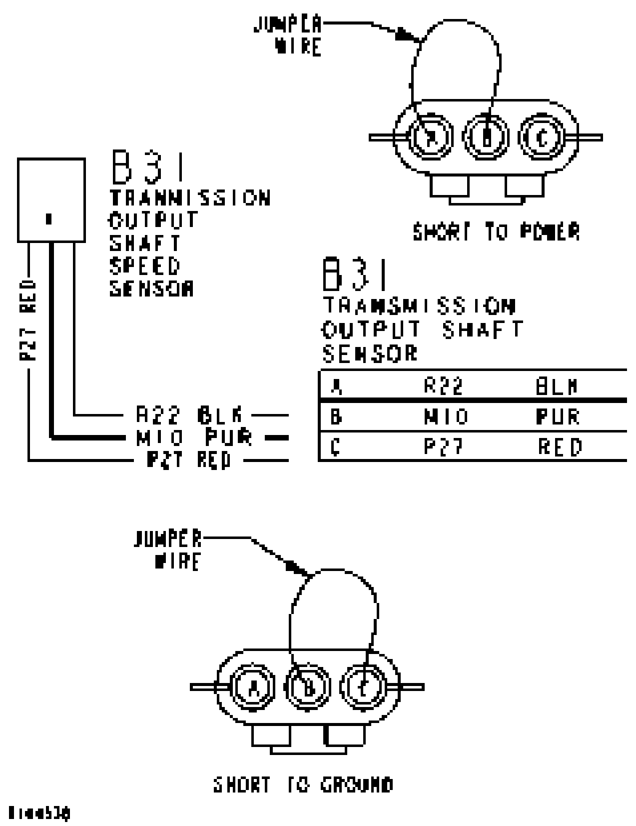
3. Start engine and run several seconds. Stop engine.

4. Press Next to display the next diagnostic trouble code. Record all diagnostic trouble codes.

5. Record all diagnostic trouble codes as in Step 1 above.

6. If a new diagnostic trouble code appears, “Short-to-Ground” or “Short-to-Power”, a failed sensor is indicated. (You created the new diagnostic trouble code when you connected the jumper wire, proving the harness is OK.)

7. If a new diagnostic trouble code does not appear, a failed harness or controller is indicated. (The harness cannot send the new diagnostic trouble code to the CCU)



T104538 –19–21OCT96

CED,TX17994,363 –19–27JUL00–2/2

Replace METRI-PACK™ Connectors

1. A small locking tab is located inside of the METRI-PACK™ connector. Use a small screwdriver to move tab outward to the first detent position; the tab will “click.”

2. Slide JDG939 METRI-PACK™ Extractor Tool into connector body until it is positioned over terminal contact.

3. Gently pull wire out of connector body.

IMPORTANT: Install contact in proper location using correct size grommet.

4. Push contact straight into connector body until positive stop is felt.

5. Pull on wire slightly to be certain contact is locked in place.

6. Transfer remaining wires to correct terminal in new connector.

7. Use a small screwdriver to move tab inward to the first detent position; the tab will “click” and lock the wires in the connector body.

METRI-PACK is a trademark of Packard Electric

TX,16,1111112 –19–28MAY98–1/1

Replace DEUTSCH™ Connectors

1. Select correct size extractor tool for size of wire to be removed:

    1. JDG361 Extractor Tool for 12 to 14 gauge wire.
    2. JDG362 Extractor Tool for 16 to 18 gauge wire.
    3. JDG363 Extractor Tool for 20 gauge wire.

2. Start correct size extractor tool over wire at handle (A).

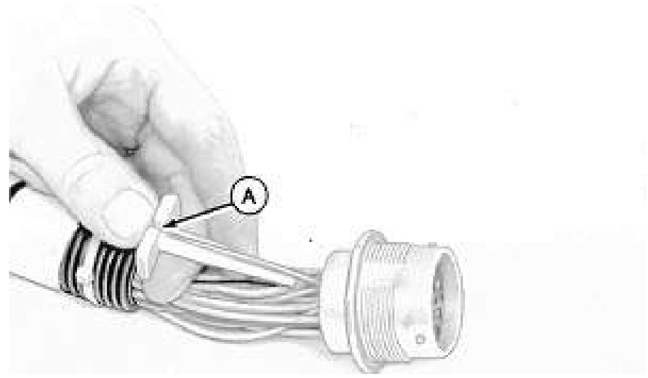
3. Slide extractor tool rearward along wire until tool tip snaps onto wire.

IMPORTANT: Do NOT twist tool when inserting in connector.

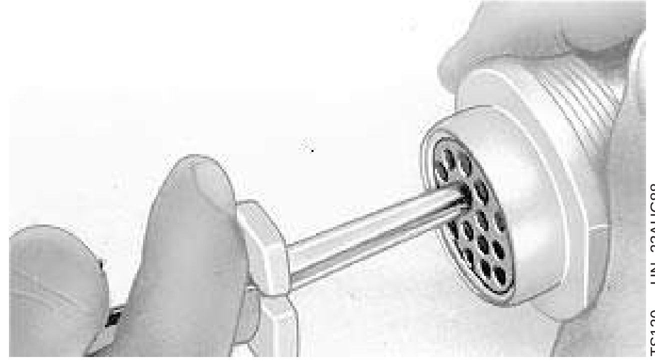
9015 20 ,116

4. Slide extractor tool along wire into connector body until it is positioned over terminal contact.

A—Handle



TS0124 –UN–23AUG88


TS120 –UN–23AUG88

DEUTSCH is a trademark of Deutsch Co.

TX,1674,111990 –19–28MAY98–1/2

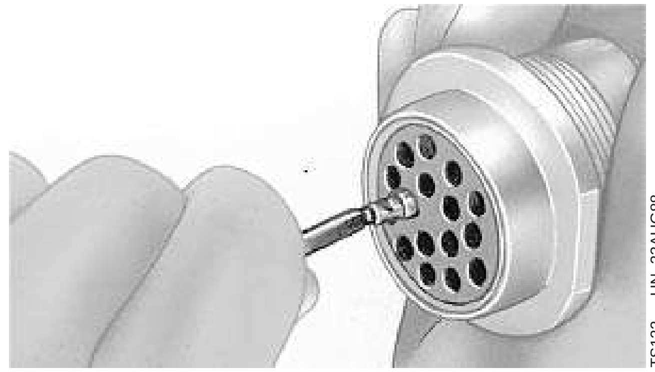
5. Pull wire out of connector body, using extractor tool.

IMPORTANT: Install contact in proper location using correct size grommet.

6. Push contact straight into connector body until positive stop is felt.

7. Pull on wire slightly to be certain contact is locked in place.

8. Transfer remaining wires to correct terminal in new connector.


TS122 –UN–23AUG88

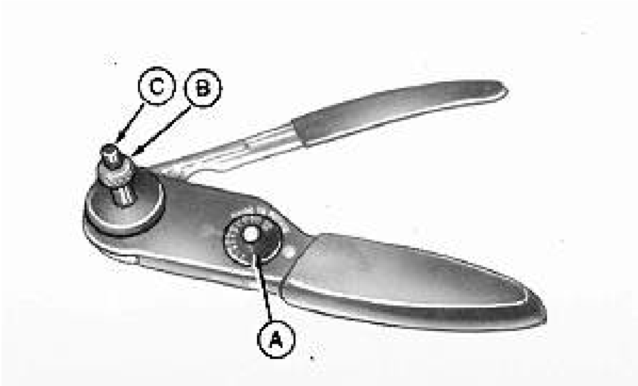
TX,1674,111990 –19–28MAY98–2/2

Install DEUTSCH™ Contact

1. Strip 6 mm (1/4 in.) insulation from wire.

2. Adjust selector (A) on JDG360 Crimper for correct wire size.

3. Loosen lock nut (B) and turn adjusting screw (C) in until it stops.



TS117 –UN–23AUG88

A—Selector
B—Lock Nut
C—Adjusting Screw

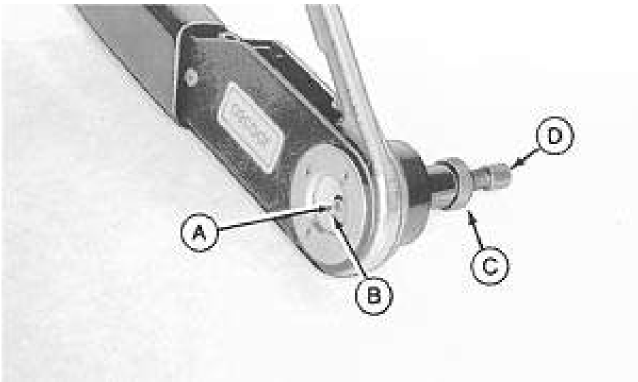
DEUTSCH is a trademark of Deutsch Co.

TX,16,1111115 –19–28MAY98–1/4

IMPORTANT: Select proper size contact "sleeve" or "pin" to fit connector body.

4. Insert contact (A) and turn adjusting screw (D) until contact is flush with cover (B).

5. Tighten lock nut (C).



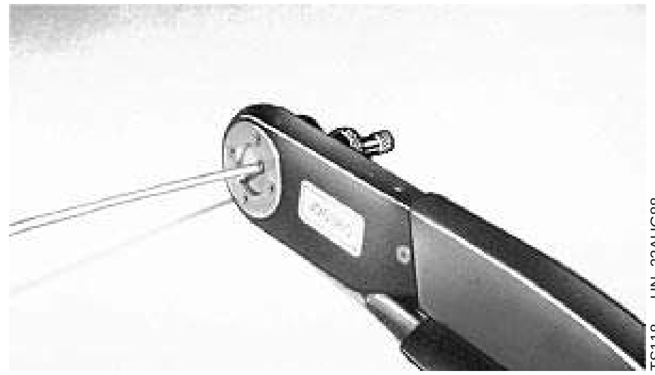
TS0134 –UN–23AUG88

A—Contact
B—Cover
C—Lock Nut
D—Adjusting Screw

TX,16,1111115 –19–28MAY98–2/4

IMPORTANT: Contact must remain centered between indentors while crimping.

6. Insert wire in contact and crimp until handle touches stop.



TS118 –UN–23AUG88

Continued on next page

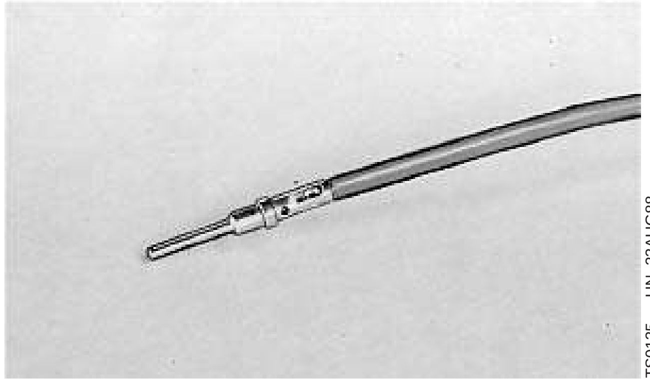
TX,16,1111115 –19–28MAY98–3/4

7. Release handle and remove contact.

IMPORTANT: If all wire strands are not crimped into contact, cut off wire at contact and repeat contact installation procedures.

NOTE: Readjust crimping tool for each crimping procedure.

8. Inspect contact to be certain all wires are in crimped barrel.



TS0135 –UN–23AUG88

9015
20
,118

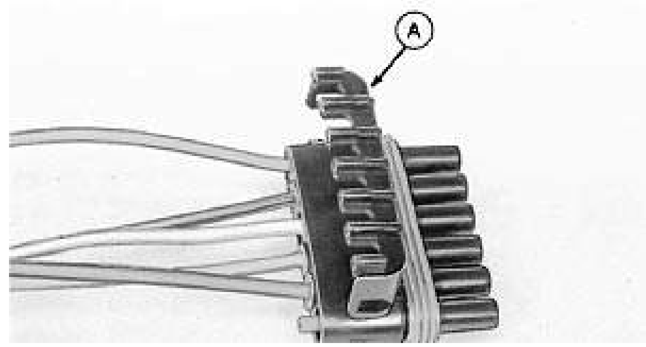
TX,16,1111115 –19–28MAY98–4/4

Replace WEATHER PACK™ Connectors

IMPORTANT: Identify wire color locations with connector terminal letters.

1. Open connector body (A).

A—Connector Body



TS0127 –UN–23AUG88

WEATHER PACK is a trademark of Packard Electric.

TX,16,QQ9343 –19–28MAY98–1/4

2. Insert JDG364 Extraction Tool over terminal contact in connector body.

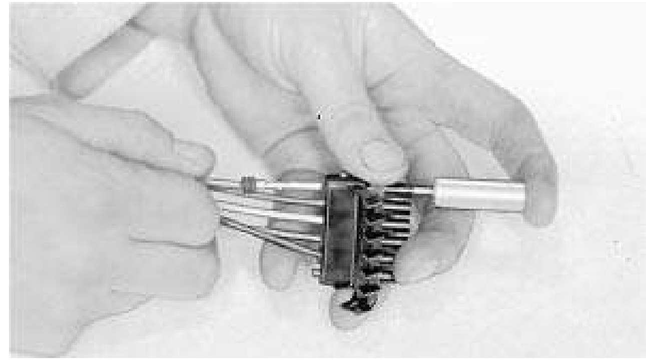
TS0128 –UN–23AUG88

Continued on next page

TX,16,QQ9343 –19–28MAY98–2/4

3. Hold extractor tool fully seated and pull wire from connector body.

NOTE: If terminal can not be removed, insert wire or nail through extractor tool handle and push terminal contact from connector.



TS0129 –UN–23AUG88

TX,16,QQ9343 –19–28MAY98–3/4

IMPORTANT: Carefully spread contact lances to assure good seating in connector body.

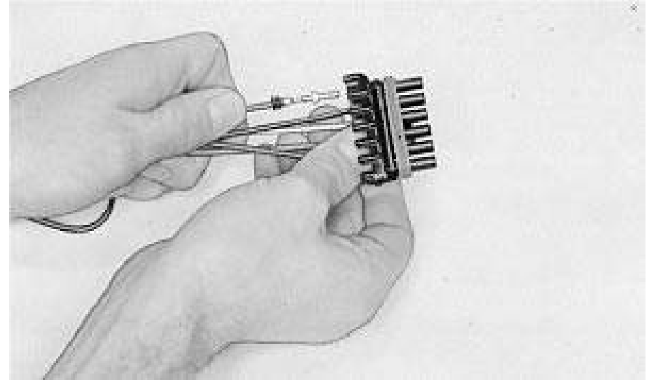
NOTE: Connector bodies are "keyed" for proper contact mating. Be sure contacts are in proper alignment.

4. Push contact into new connector body until fully seated.

5. Pull on wire slightly to be certain contact is locked in place.

6. Transfer remaining wires to correct terminal in new connector.

7. Close connector body.



TS0130 –UN–23AUG88

TX,16,QQ9343 –19–28MAY98–4/4

Install WEATHER PACK™ Contact

NOTE: Cable seals are color coded for three sizes of wire:

- *Green - 18 to 20 gauge wire*
- *Gray - 14 to 16 gauge wire*
- *Blue - 10 to 12 gauge wire*

1. Slip correct size cable seal on wire.

TS0136 –UN–23AUG88

WEATHER PACK is a trademark of Packard Electric.

Continued on next page

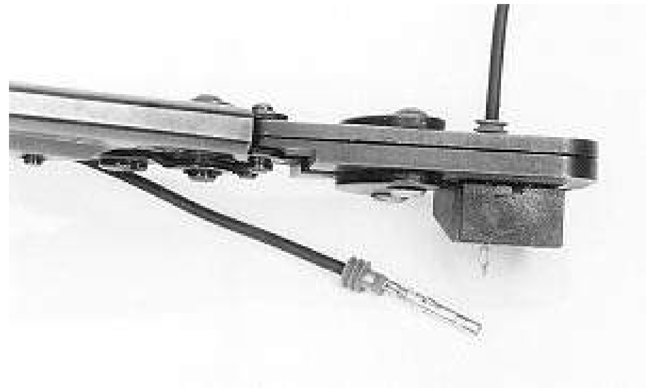
TX,1674,111993 –19–28MAY98–1/3

2. Strip insulation from wire to expose 6 mm (1/4 in.) and align cable seal with edge of insulation.

NOTE: Contacts have numbered identification for two sizes of wire:

1. #15 for 14 to 16 gauge wire
2. #19 for 18 to 20 gauge wire

3. Put proper size contact on wire and crimp in place with a “W” type crimp, using JDG783 Crimping Tool



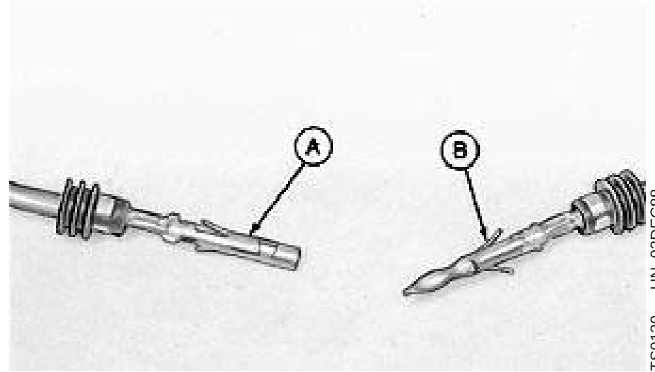
TS1623 –UN–02NOV94

TX,1674,111993 –19–28MAY98–2/3

4. Secure cable seal to contact as shown, using JDG783 Crimping Tool.

IMPORTANT: Proper contact installation for “sleeve” (A) and “pin” (B) is shown.

A—Sleeve
B—Pin



TS0139 –UN–02DEC88

TX,1674,111993 –19–28MAY98–3/3

Remove And Install Transmission Control Valve Connector Body

1. A small locking tab is located inside of the connector. Use a small screwdriver (B) to move tab (A) outward to the first detent position; the tab will “click.”

A—Tab
B—Screwdriver

T104764B –UN–01NOV96

Continued on next page TX,16,RP3113 –19–28MAY98–1/3

2. Slide JDG140 METRIMATE™ Extractor Tool (B) into connector body until it is positioned over terminal contact.

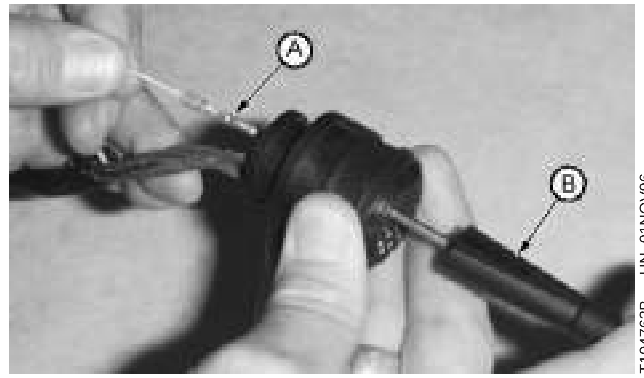
3. Push on end of extractor tool (B) and gently pull wire (A) out of connector body.

IMPORTANT: Install contact in proper location using correct size grommet.

4. Push contact straight into connector body until positive stop is felt.

5. Pull on wire slightly to be certain contact is locked in place.

6. Transfer remaining wires to correct terminal in new connector.



T104763B –UN–01NOV96

A—Wire
B—Extractor Tool

METRIMATE is a trademark of AMP Inc.

TX,16,RP3113 –19–28MAY98–2/3

7. Use a small screwdriver (B) to move tab (A) inward to the first detent position; the tab will “click” and lock the wires in the connector body.

A—Tab
B—Screwdriver

T104764B –UN–01NOV96

TX,16,RP3113 –19–28MAY98–3/3

Install Transmission Control Valve Connector Contact

1. Slip correct size cable seal on wire.

2. Strip insulation from wire to expose 6 mm (1/4 in.) and align cable seal with edge of insulation.

TS0136 –UN–23AUG88

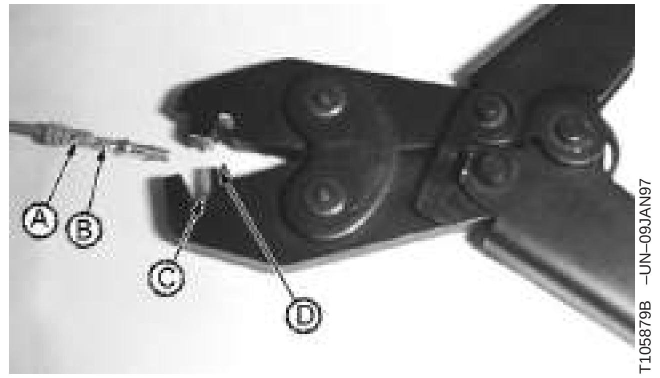
Continued on next page

TX,16,RP3112 –19–28MAY98–1/2

9015
20
,121

3. Put contact on wire and insert into crimper at location (D) and crimp on contact at location (B) using JDG707 crimping tool.

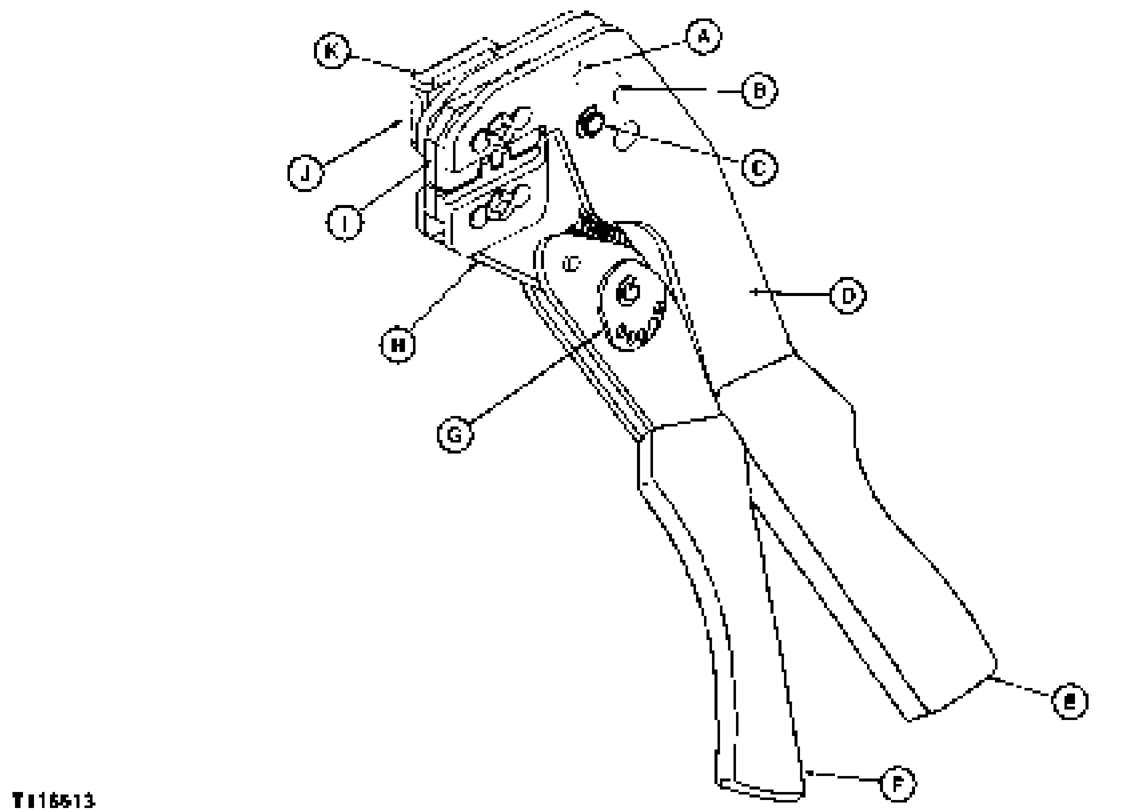
4. Secure cable seal to contact by crimping at location (A) on contact and crimp at location (C) on JDG707 crimping tool.



A—Contact Location
B—Contact Location
C—Crimper Location
D—Crimper Location

TX,16,RP3112 –19–28MAY98–2/2

Crimper Tool For Transmission Controller Unit Connector—Operation



T116613 –UN–28JUL98

A—Stationary Jaw
B—Back of Tool (Wire Side)
C—Pivot Pin
D—Frame
E—Stationary Handle
F—Moving Handle
G—Ratchet Adjustment Wheel
H—Moving Jaw
I—Die Assembly
J—Front of Tool (Locator Side)
K—Locator Assembly

The Crimper Tool is used to crimp wires for the junior timer contacts and the micro timer contacts of the transmission controller unit connector. The tool has a frame with a stationary jaw and handle, a moving jaw, a moving handle and an adjustable ratchet that ensures full contact crimping. The tool frame holds a die assembly with two crimping sections.

The die assembly features a wire anvil, an insulation anvil, a wire crimper, and an insulation crimper.

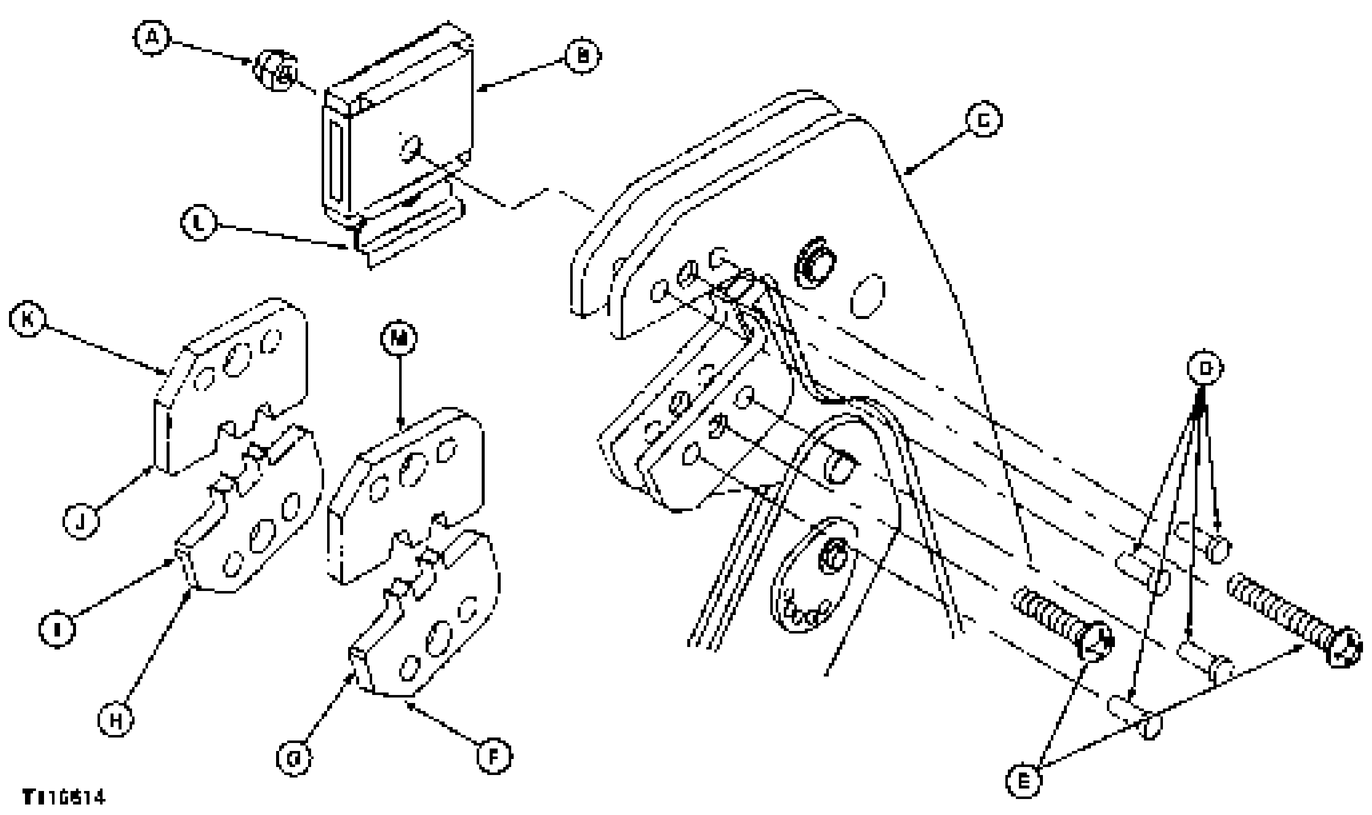
Attached to the outside of the frame is a locator assembly, which contains a locator, a spring retainer, and a contact support.

Die retaining pins and die retaining screws are used to position and secure the dies in the tool frame. A nut is used on the upper die retaining screw to hold the locator assembly in place.

CED,OUOE003,1033 –19–24JUL98–1/1

9015
20
,124

Crimper Tool For Transmission Controller Unit Connector—Remove And Install Die Set



A—Nut
B—Locator Assembly
C—Tool Frame
D—Die Retaining Pins
E—Die Retaining Screws
F—Chamfer
G—Insulation Anvil
H—Wire Anvil
I—Offset
J—Wire Crimper
K—Chamfer
L—Locator
M—Insulation Crimper

1. Open the tool handles and remove the two die retaining screws (E) from the tool jaws.

2. Place the wire anvil (H) and insulation anvil (G) so that their chamfered sides and their marked surfaces face outward, when mounted in the moving jaw of the tool frame.

3. Insert the two die retaining pins (D).

4. Insert the short die retaining screw through the jaw and through both anvil dies, and tighten the screw just enough to hold the dies in place. DO NOT tighten the screw completely at this time.

5. Place the wire crimper (J) and insulation crimper (M) so that their chamfered sides and their marked surfaces face outward, when mounted in the stationary jaw of the tool frame.

6. Insert the two die retaining pins.

7. Insert the long die retaining screw through the jaw and through both crimper dies. Tighten the screw just enough to hold the dies in place. DO NOT tighten the screw completely at this time.

8. Carefully close the tool handles, making sure that the anvils and crimpers align properly. Continue closing the tool handles until the ratchet in the tool frame has engaged sufficiently to hold the anvils and crimpers in place, then tighten both die retaining screws.

Continued on next page

CED,OUOE003,1034 –19–24JUL98–1/2

9. Place the locator assembly over the end of the long screw, and position the locator assembly against the side of the tool jaw.

10. Place the nut onto the end of the long screw and tighten the nut enough to hold the locator to slide up and down.

11. To disassemble, close the tool handles until the ratchet releases. Remove the nut, the locator assembly, the two die retaining screws, and the four die retaining pins. Slide the anvils and crimpers out of the tool jaws.

CED,OUOE003,1034 –19–24JUL98–2/2

Crimper Tool For Transmission Controller Unit Connector—Contact Support Adjustment

NOTE: The contact support is preset prior to shipment, but minor adjustment may be necessary.

1. Make a sample crimp and determine if the contact is straight, bending upward, or bending downward.

2. If adjustment is required, loosen the screw that holds the contact support onto the locator assembly.

NOTE: The ratchet has detents that create audible clicks as the tool handles are closed.

3. Place a contact with wire into the proper nest and close the tool handles until the ratchet reaches the sixth click, or until the contact support touches the contact.

4. Slightly loosen the nut that holds the locator assembly onto the tool frame.

5. Move the contact support as required to eliminate the bending of the contact.

6. Tighten the nut and close the handles until the ratchet releases.

7. Remove and inspect the contact.

8. Make another sample crimp. If the contact is straight, tighten the contact support screw. If the contact is still being bent during crimping, repeat the adjustment procedure.

TX,16,1111104 –19–28MAY98–1/1

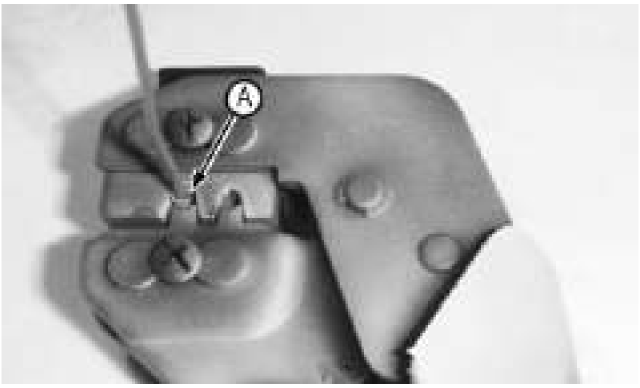
Crimper Tool For Transmission Controller Unit Connector—Crimping Procedure

IMPORTANT: Verify crimp height before using the tool to crimp desired contacts and wire sizes. See Crimp Height Inspection and Crimp Height Adjustment in this group.

1. Select wire of the specified size and insulation diameter. Strip the wire to length indicated. Do not nick or cut wire strands.

Contact	Size (AWG)	Wire Insulation Diameter	Strip Length
Junior Timer Contacts	0.5—1.0 mm	2.0 mm (0.079 in.) Max.	4.7 mm (0.185 in.)
Micro Timer Contacts	0.5—1.0 mm	1.6 mm (0.063 in.) Max.	4.3 mm (0.170 in.)

A—Contact Slot



T112336C –UN–21JUL98

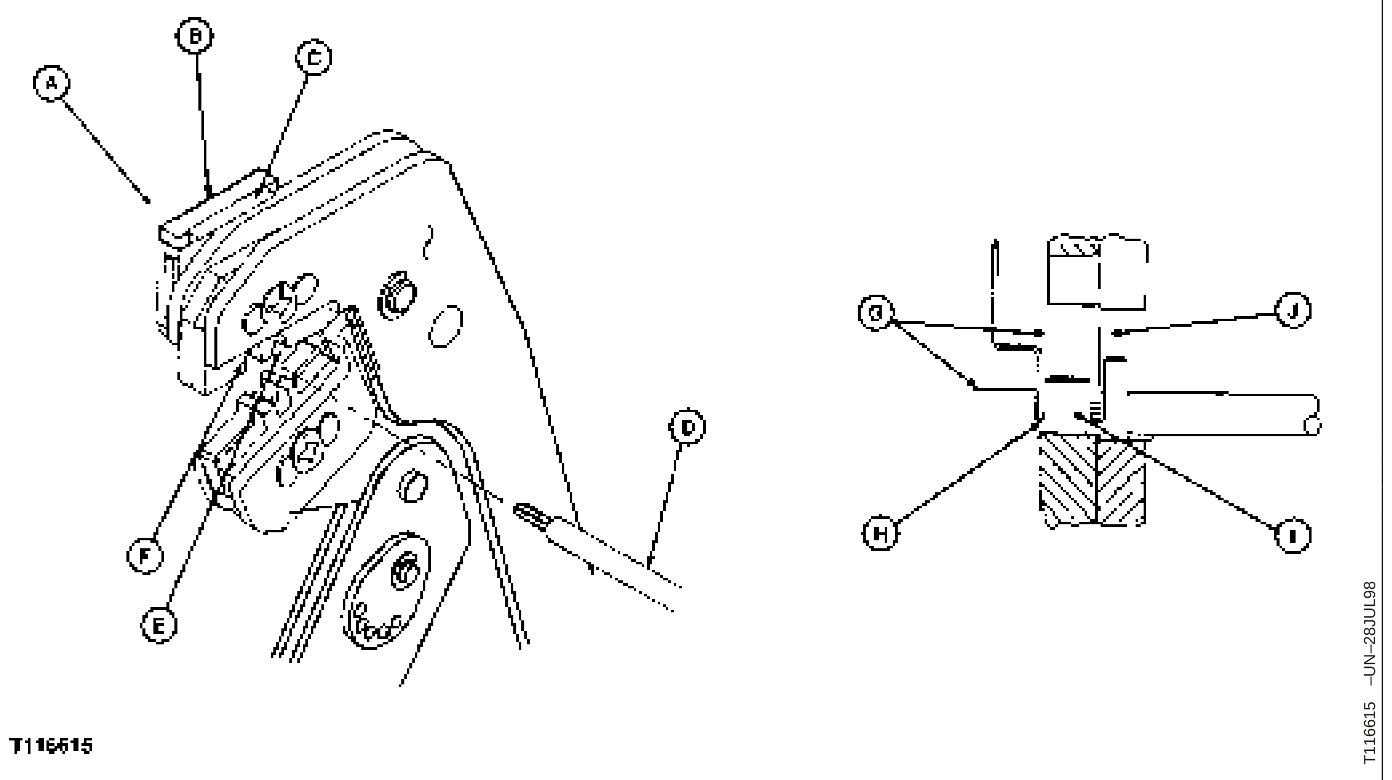
Micro Timer Contact Slot

T112335C –UN–21JUL98

Junior Timer Contact Slot

Continued on next page CED,OUOE003,1035 –19–24JUL98–1/3

9015 20 ,129



A—Adjustment Screw for Contact Support
B—Contact Support
C—Locator
D—Wire
E—Junior Timer Slot
F—Micro Timer Slot
G—Contact
H—Locator in Wire Stop Slot
I—Wire Inserted to Stop

2. Hold the tool so that the back (wire side) is facing you. Squeeze tool handles together and allow them to open fully.

3. Holding the contact by the mating end, insert the contact—insulation barrel first—through the front of the tool and into the appropriate crimp section.

IMPORTANT: Make sure that both sides of the insulation barrel are started evenly into the crimping section. Do NOT attempt to crimp an improperly positioned contact.

4. Position the contact so that the mating end of the contact is on the locator side of the tool, so that the open "U" of the wire and insulation barrels face the top of the tool. Place the contact up into the nest so that the movable locator drops into the slot in the contact. Butt the front end of the wire barrel against the movable locator.

5. Hold the contact in position and squeeze the tool handles together until ratchet engages sufficiently to hold the contact in position. Do NOT deform insulation barrel or wire barrel.

6. Insert stripped wire into contact insulation and wire barrels until it is butted against the wire stop.

7. Hold the wire in place: squeeze tool handles together until ratchet releases. Allow tool handles to open and remove crimped contact.

Continued on next page CED,OUOE003,1035 –19–24JUL98–2/3

NOTE: *The crimped contact may stick in the crimping area. It can be easily removed by pushing downward on the top of the locator.*

8. Check the contact crimp height. If necessary, adjust the crimp height. See Crimp Height Inspection and Crimp Height Adjustment.

CED,OUOE003,1035 –19–24JUL98–3/3

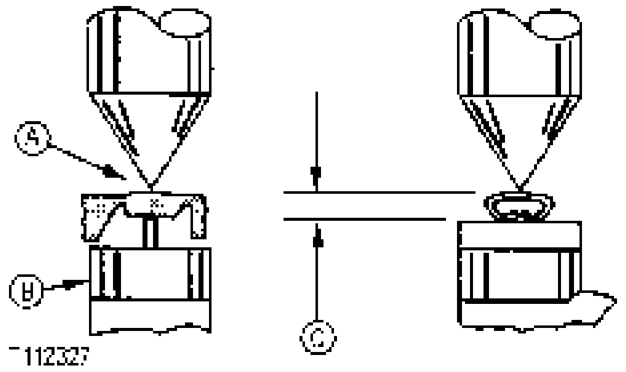
Crimper Tool For Transmission Controller Unit Connector—Crimp Height Inspection

1. Use a crimp height comparator to measure the wire barrel crimp height as shown.

WIRE SIZE AWG (MAX)	CRIMP SECTION (WIRE SIZE MARKING)	CRIMP HEIGHT DIM. (C) AND TOLERANCE (±)
1.0 mm	Junior	1.27 ± 0.051 mm (0.0500 ± 0.0020 in.)
1.0 mm	Micro	1.20 ± 0.051 mm (0.0472 ± 0.0020 in.)

2. If the crimp height conforms to specifications, the tool is considered dimensionally correct.

   If not, the tool must be adjusted. See Crimp Height Adjustment.



T112327 –UN–21NOV97

A—Position Point on Center of Wire Barrel Opposite Seam
B—Modified Anvil
C—Dimension

TX,16,1111106 –19–28MAY98–1/1

Crimper Tool For Transmission Controller Unit Connector—Crimp Height Adjustment

Apply a load to the pivoting handle until the ratchet releases. The force at approximately 1 3/4 in. from handle ends should vary between 5—35 lbs. Depending on the style/type and size of contact and/or wire size.

The style type of contact crimped determines the level of handle pre-load, with larger contacts requiring higher pre-loads for properly completed crimps.

To adjust the tool to obtain the proper force values, use the following procedure:

1. Open handle and remove cam locking screw (B) with a 1/8 in. hex wrench.

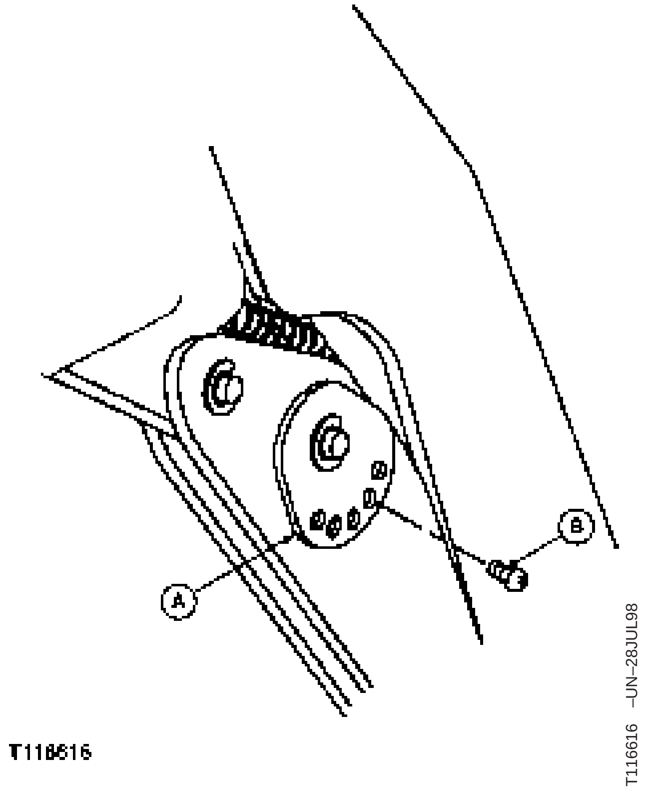
2. Rotate cam (A) counterclockwise to increase handle load or clockwise to decrease handle load.

3. Position odd numbers on cam in locking screw hole adjacent to the letter “L” and even numbers adjacent to the letter “T”.

4. Lock the cam at the desired handle load setting and measure force.

5. Continue adjustment if necessary.

NOTE: If over crimping of contacts results, adjust ratchet release force to 15—30 lbs.



A—Eccentric Cam
B—Lock Screw

CED,OUOE003,1036 –19–24JUL98–1/1

Replace Transmission Controller Unit Connector Terminals

The transmission controller unit connector has two size terminals:

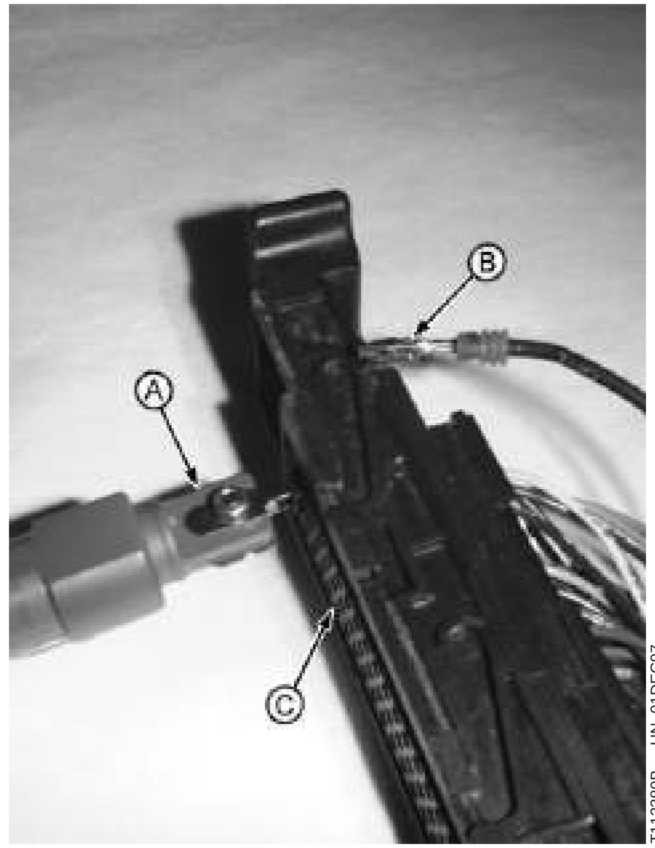
- Junior Timer Contacts (Large)—Use JDG1177 Extractor
- Micro Timer Contacts (Small)—Use FKM10457 Extractor

1. Insert extractor (A) into front (terminal side) of connector (C). Use extractor to press in the locking tabs of terminal.

2. Remove extraction tool and pull wire with terminal (B) through rear of connector.

3. Install new terminal into rear of connector, pushing it in until it stops. Locking tabs must be properly lined up with the socket.

4. Pull on wire slightly to be certain terminal is locked in place.



T112380B –UN–01DEC97

A—Extractor
B—Wire
C—Connector

TX,16,1111113 –19–28MAY98–1/1

9015
20
,133

Replace Chassis Computer Unit Connector Terminals

(S.N. —783564)

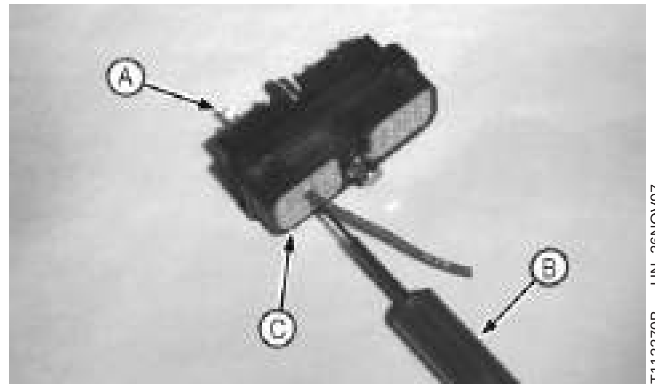
NOTE: The chassis computer unit connectors have "pull-to-seat" contacts.

1. Disconnect chassis computer unit connector (C).

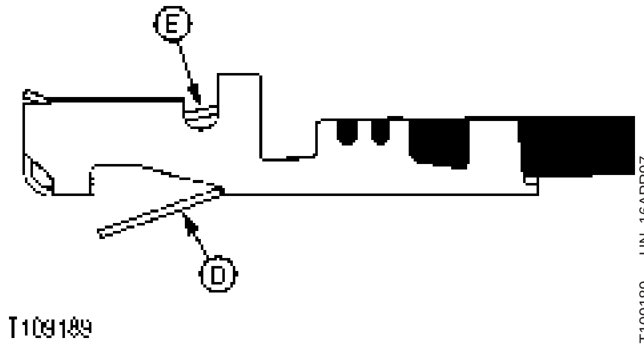
2. Insert JDG777 Terminal Extraction Tool (B) into wire side of the connector. Push terminal locking tab (D) inward releasing tab (E).

3. Remove extraction tool and push wire with terminal (A) through socket.

A—Wire
B—Extraction Tool
C—Connector
D—Locking Tab
E—Tab



T112370B –UN–26NOV97

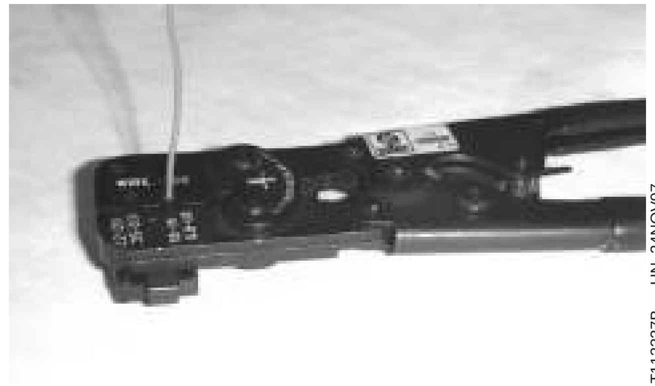


T109189 –UN–16APR97

TX,16,1111114 –19–17APR01–1/5

4. Remove terminal, cut, strip and crimp wire through connector. Insert wire in the 18—16 slot of crimping tool.

5. Make sure locking tab on new terminals is in outward position. Then pull back on wire until terminal locks in connector body.



T112337B –UN–24NOV97

JDG1179 Crimper For CCU Connector

Continued on next page

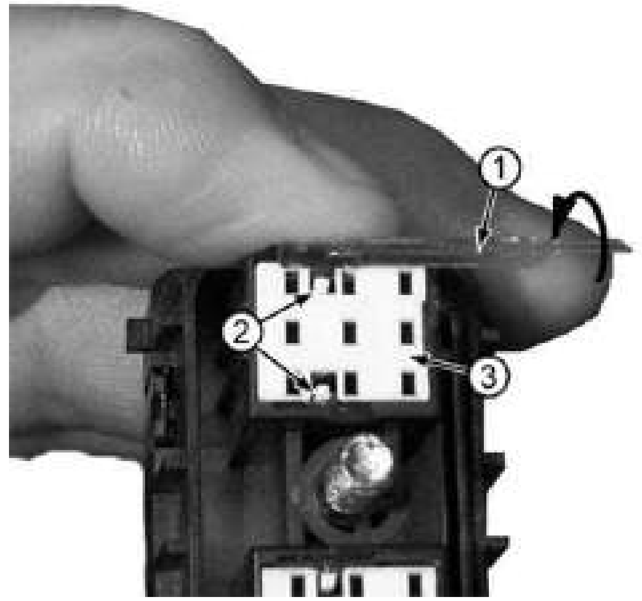
TX,16,1111114 –19–17APR01–2/5

(S.N. 783565—)

1. Remove extraction tool (1) from the loading side of connector.

2. Insert blade of extraction tool into locking tabs (2) of secondary lock (3). Rotate tool away from the connector to pry one side of the secondary lock out of the locked position. Repeat this step for the other locking tab.

NOTE: After unlocking one side of the secondary lock, a screw driver or similar device may need to be used to hold it in the unlocked position while unlocking the second locking tab.



T132105B –UN–29JUN00

1—Extraction Tool
2—Secondary Lock Locking Tabs
3—Secondary Lock

TX,16,1111114 –19–17APR01–3/5

3. Remove secondary lock (3).

T132301B –UN–29JUN00

3—Secondary Lock

Continued on next page

TX,16,1111114 –19–17APR01–4/5

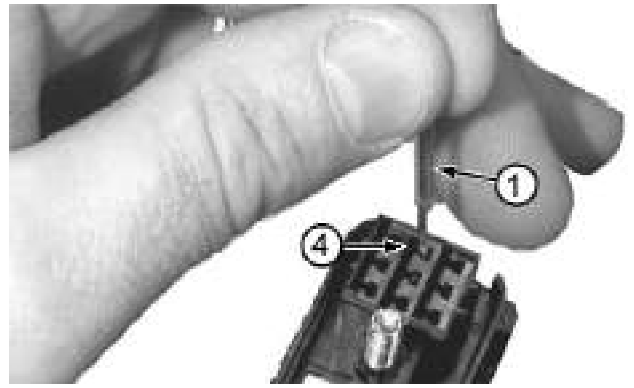
4. Insert pointed side of extraction tool into the contact cavity so that the flat side of tool faces secondary lock cavity (4). This will release the primary contact locking tab.

5. Gently pull wire out of the connector.

6. Repair/Replace terminals as necessary using procedure in this group. (See Install CINCH Contact.)

7. Insert contact and wire into connector until it clicks.

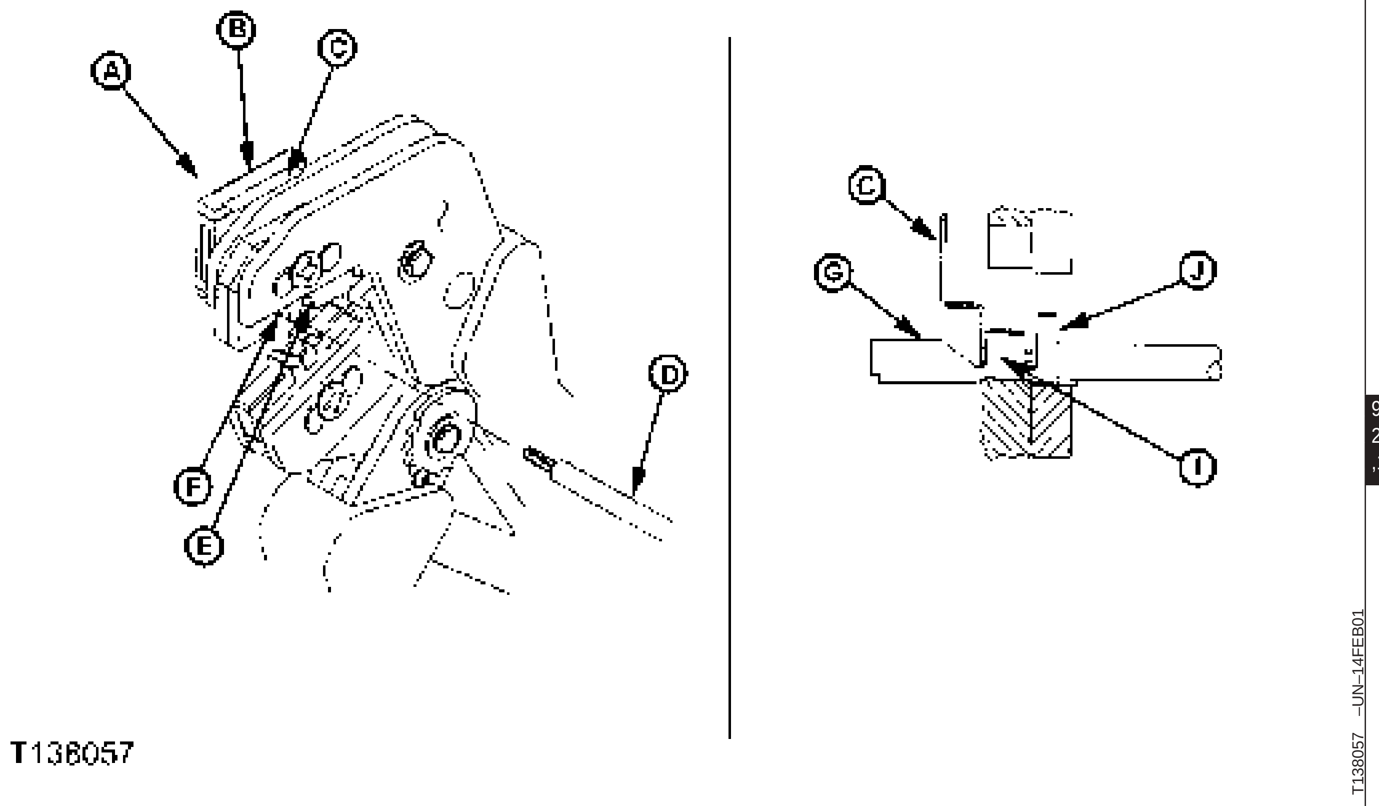
8. Install secondary lock.



T132107B –UN–29JUN00

TX,16,1111114 –19–17APR01–5/5

Install CINCH™ Contact



A—Top of Tool
B—Contact Support
C—Locator
D—Wire
E—Micro Timer Slot
F—Junior Timer Slot
G—Contact
I—Wire Tab
J—Insulation Tab

1. Hold JDG708 crimping tool so that the tool is facing you as shown (left side of graphic). Squeeze tool handles together and allow them to open fully.

IMPORTANT: **Make sure that both sides of the insulation barrel are started evenly into the crimping section. Do NOT attempt to crimp an improperly positioned contact.**

2. Position the contact so that the mating end of the contact (G) is on the locator side of the tool (C). Wire and insulation tabs (I and J) should point to top of tool (A). Butt wire tab (I) against the movable locator (C).

3. Hold the contact in position and squeeze the tool handles together until ratchet engages sufficiently to hold the contact in position. Do NOT deform wire and insulation tabs (I and J).

4. Insert stripped wire into contact insulation and wire tabs until it is butted against locator (C).

5. Hold the wire in place. Squeeze tool handles together until ratchet releases. Allow tool handles to open and remove crimped contact.

6. Install contact into connector. See Install CINCH Contact. (Go to procedure in this group.)

CINCH is a trademark of the Cinch Co.

CED,TX17994,330 –18–29JUN00–1/1

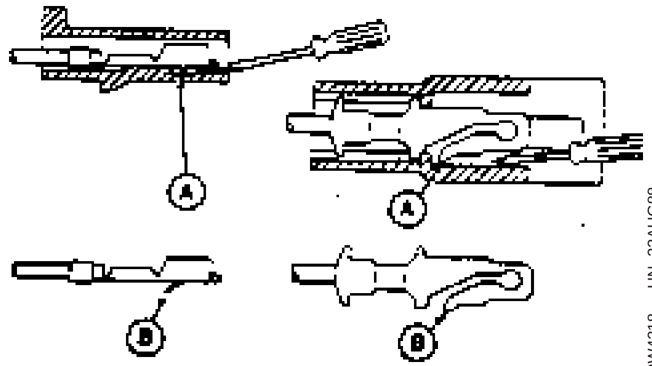
9015
20
,137

Remove Connector Body From Blade Terminals

1. Depress locking tang (A) on terminal, using a small screw driver. Slide connector body off.

2. Be sure to bend locking tang back to its original position (B) before installing connector body.

A—Locking Tang
B—Locking Tang Original Position



RW4218 –UN–23AUG88

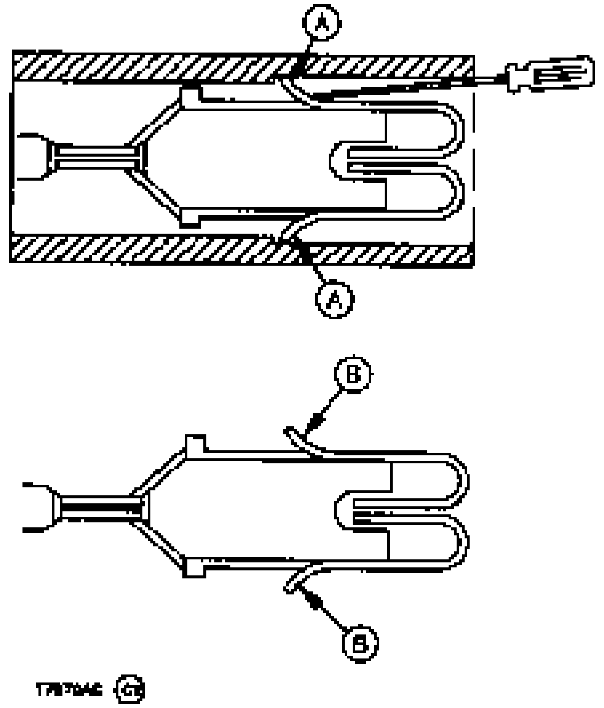
TX,1674,111994 –19–28MAY98–1/1

Remove Blade Terminals From Fuse Block

Use small screw driver to depress each locking tang (A) on terminal. Pull terminal out of fuse block.

Be sure to bend locking tangs back to original position (B) before installing in fuse block.

A—Locking Tang
B—Locking Tang Original Position



T7670AC –UN–14DEC91

TX,1674,111995 –19–28MAY98–1/1

Remove and Install Pressure Switches


X9811 –UN–23AUG88

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

Before removing any pressure switch, operate all hydraulic control valves to relieve hydraulic pressure.

With boom raised slightly, turn ignition switch to ON position. Cycle the ride control switch from OFF to ON (center position). Boom will jump up unexpectedly if ride control accumulator is energized. Press boom enable switch and move the control lever into the float position and hold for 5 seconds.

Push brake pedal at least 40 times to discharge brake accumulators.

TX,1674,MM3113 –19–13OCT98–1/1

Section 9020
Power Train

Contents

Transmission Clutch Engagement And Solenoids Activated

Transmission Clutch Engagement and Solenoids Activated— Manual Mode						
	Directional Pack Engaged			Speed Pack Engaged		
	Lo-Range Forward (KV)	Hi-Range Forward (K4)	Reverse (KR)	1st (K1)	2nd (K2)	3rd (K3)
Gear						
N1						
N2						
N3						
N4						
F1	Solenoid Y5			Solenoid Y3		
F2	Solenoid Y5				Solenoid Y6	
F3	Solenoid Y5					Solenoid Y4
F4		Solenoid Y1				Solenoid Y4
R1			Solenoid Y2	Solenoid Y3		
R2			Solenoid Y2		Solenoid Y6	
R3			Solenoid Y2			Solenoid Y4

See Transmission Operation for theory of operation.

This table shows the clutch packs that are engaged with their corresponding solenoids for a selected gear. For example, in first forward (F1) solenoids Y1 and Y3 are energized to engage lo-range forward direction clutch pack (K4) and 1st speed clutch (K1). Notice in the neutral gears no clutch packs are engaged.

TX,9020,ME421 –19–10JUL97–1/1

Power Train Component Location

NOTE: See Power Train Component Location. (Go to Group 9020-15.)

The power train consists of the following components:

- Drive dampener
- Drive shaft
- Torque converter
- Transmission
- Front and rear drive shafts
- Park brake
- Front and rear axles

Engine power is transmitted to the transmission torque converter by a drive dampener on the engine flywheel and a universal joint drive shaft.

A single stage torque converter drives a hydraulically engaged four speed forward, three speed reverse, countershaft type power shift transmission.

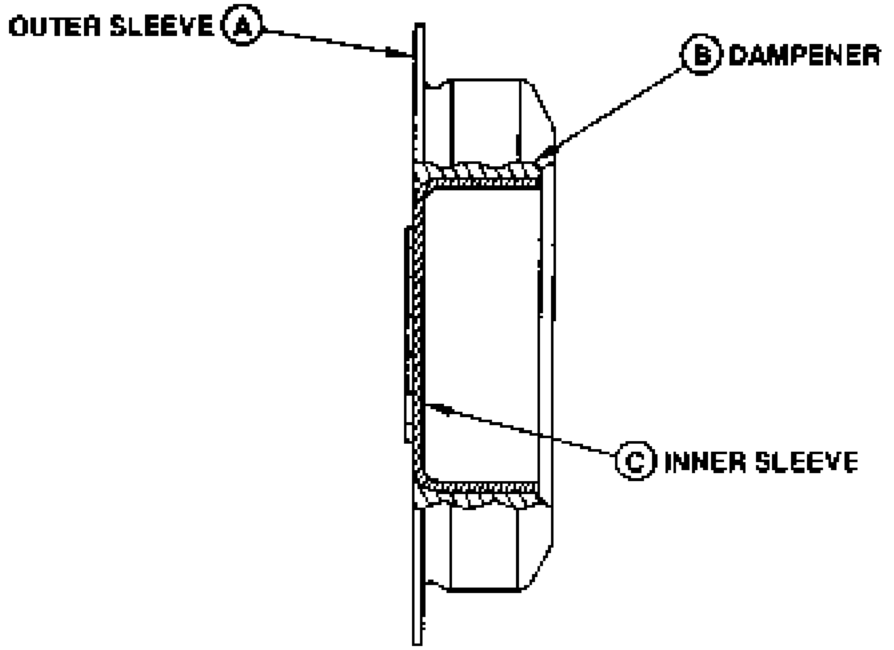
A multiple wet disk park brake is located in the front drive line. The park brake also functions as a bearing support for the front driveline.

The transmission outputs through universal joints and through two telescoping drive shaft assemblies. The front axle is mounted directly to the loader frame. The front axle may be equipped with either a standard differential, hydraulic differential lock or a limited slip differential.

The rear axle is mounted on an oscillating pivot. The rear axle can be equipped with the same differential options as the front.

TX,9020,ME422 –19–13FEB97–1/1

Drive Dampener



T7799CE –19–26AUG92

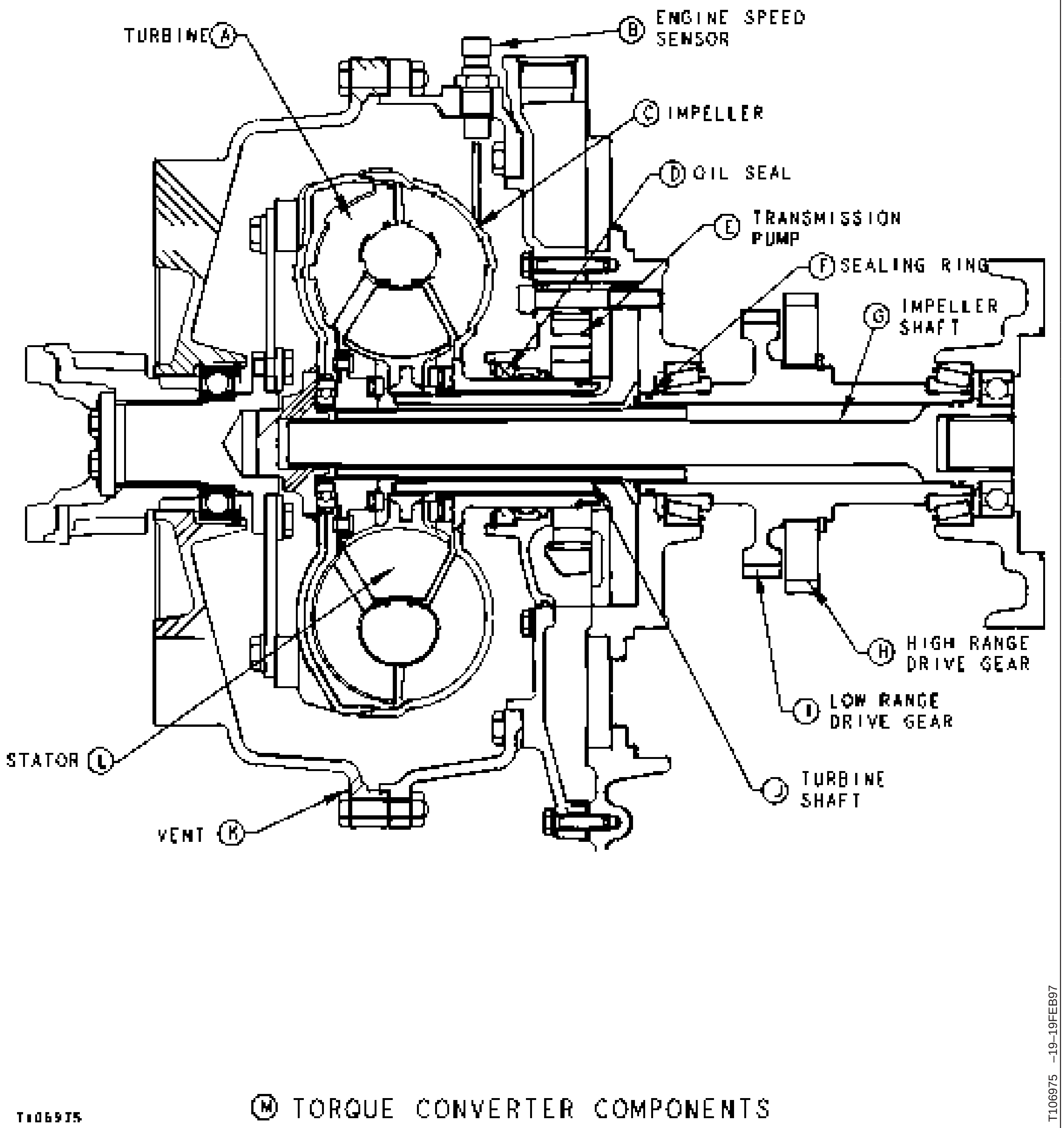
The drive dampener is located between the engine and the input shaft

to the transmission. The drive dampener absorbs torque spikes encountered during machine operation.

The outer sleeve (A) is bolted to the engine flywheel. The inner sleeve (C) is bolted to the input shaft to the transmission. The dampener (B) is a solid rubber ring bonded to the inner sleeve and pressed into the outer sleeve. The drive dampener is serviced as an assembly.

TX,9020,ME423 –19–10FEB97–1/1

Torque Converter Operation



T106975 –19–19FEB97

Continued on next page

TX,9020,ME424 –19–10AUG96–1/2

A—Turbine
B—Engine Speed Sensor
C—Impeller
D—Oil Seal
E—Transmission Pump
F—Sealing Ring
G—Impeller Shaft
H—High Range Drive Gear
I—Low Range Drive Gear
J—Turbine Shaft
K—Vent
L—Stator
M—Torque Converter Components

A single-stage torque converter is used. There are 3 main parts to the torque converter.

- Impeller
- Turbine
- Stator

There are three components that are directly driven:

- Impeller
- Impeller Shaft
- Transmission Pump

The impeller (C) is the driving force for the oil in the torque converter. A notched ring is welded to the impeller. This provides a pickup point for the engine speed sensor.

A drive tube is also welded to the impeller shell. This tube drives the inner gear of the transmission pump. The impeller shaft (G) is splined to the torque converter input shaft and it drives the hydraulic pump.

As the impeller rotates, the impeller vanes force oil to flow against the turbine vanes. The turbine rotates in the same direction as the impeller. The turbine is splined to the turbine shaft (J), which rotates the drive gears (I and H) to transfer torque to the transmission countershafts and clutches.

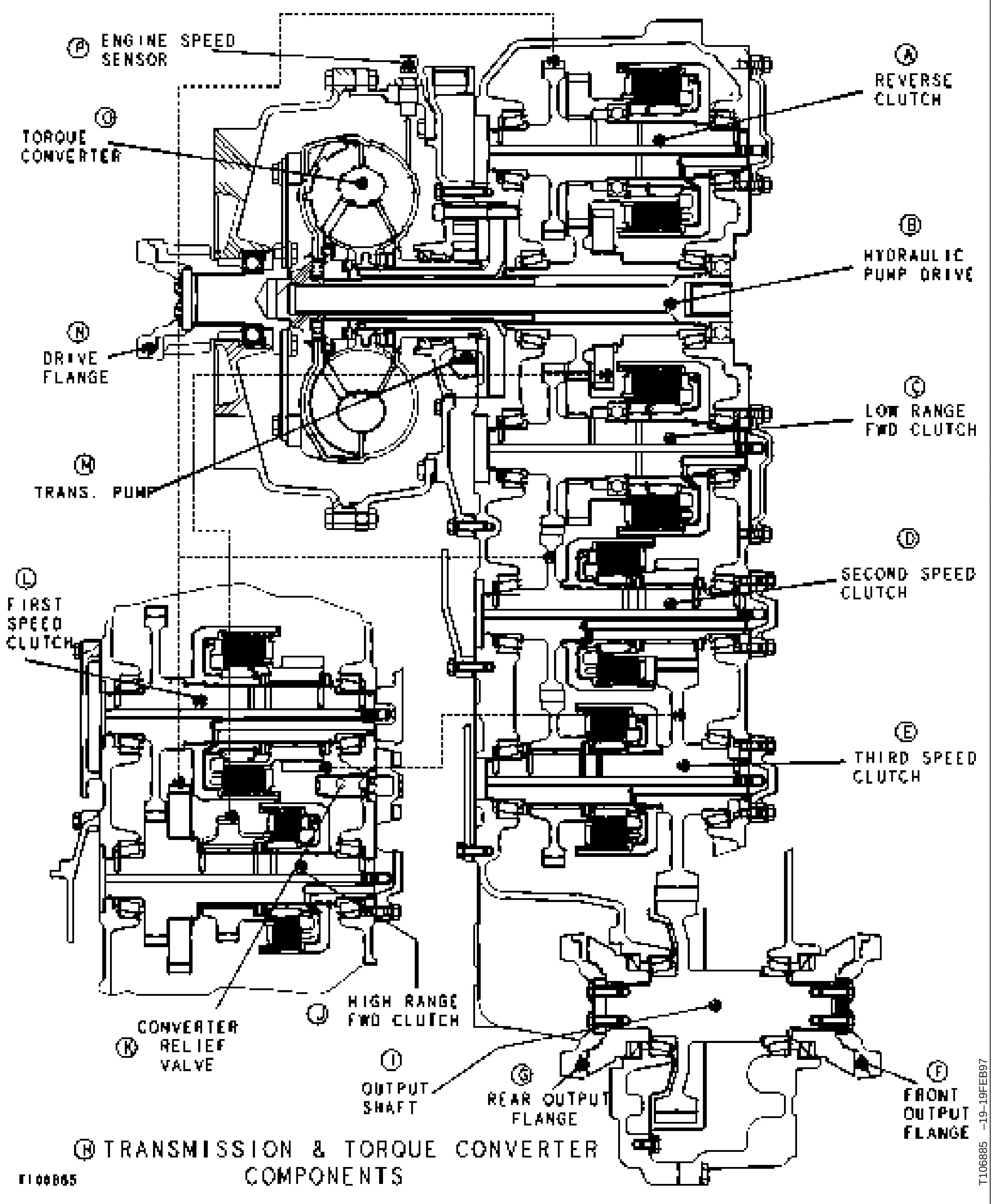
As the oil leaves the turbine, it is moving in the opposite direction of the impeller. This oil then enters the stationary stator (L). The stator blades are curved so the oil flow changes direction and exits the stator moving in the same direction as the impeller. The turbine rotates at a slower speed than the impeller. This allows the torque converter to function as a torque multiplier. Maximum output torque is produced at stall, when the impeller is turning at maximum speed and the turbine is stationary.

The torque converter housing compartment is a dry-type design. Normally there is no oil leakage into this area. Oil seal (D) blocks all oil leakage from the transmission pump and converter-in and out oil flow. Should the oil seal (D) fail, leakage in the housing will drain through vent (K). Sealing ring (F) provides a dynamic seal with minimal leakage from the Converter-in and out oil.

There are no serviceable parts inside the torque converter. If it is defective replace the entire assembly.

TX,9020,ME424 –19–10AUG96–2/2

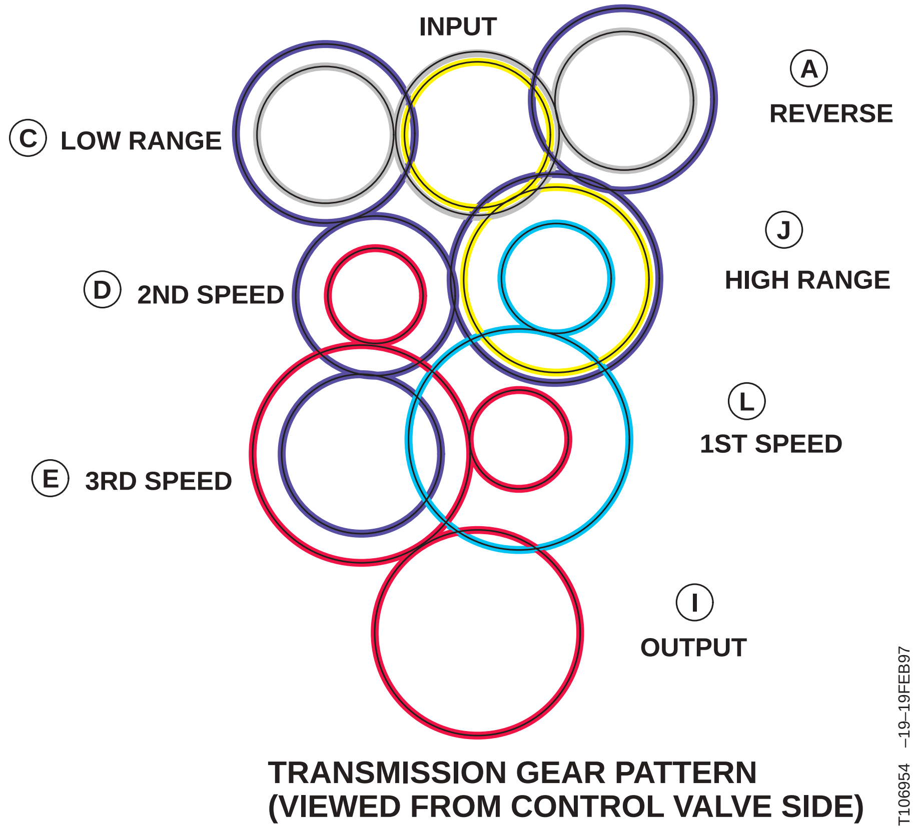
Transmission Operation



Continued on next page TX,9020,ME425 –19–10AUG96–1/3

A—Reverse Clutch (KR)
B—Hydraulic Pump Drive
C—Low Range FWD Clutch (KV)
D—Second Speed Clutch (K2)
E—Third Speed Clutch (K3)
F—Front Output Flange
G—Rear Output Flange
H—Transmission and Torque Converter Components
I—Output Shaft
J—High Range FWD Clutch (K4)
K—Converter Relief Valve
L—First Speed Clutch (K1)
M—Transmission Pump
N—Drive Flange
O—Torque Converter
P—Engine Speed Sensor

TX,9020,ME425 –19–10AUG96–2/3



T106954

TRANSMISSION GEAR PATTERN (VIEWED FROM CONTROL VALVE SIDE)

The transmission is a hydraulically engaged four speed forward, three speed reverse countershaft-type, powershift transmission.

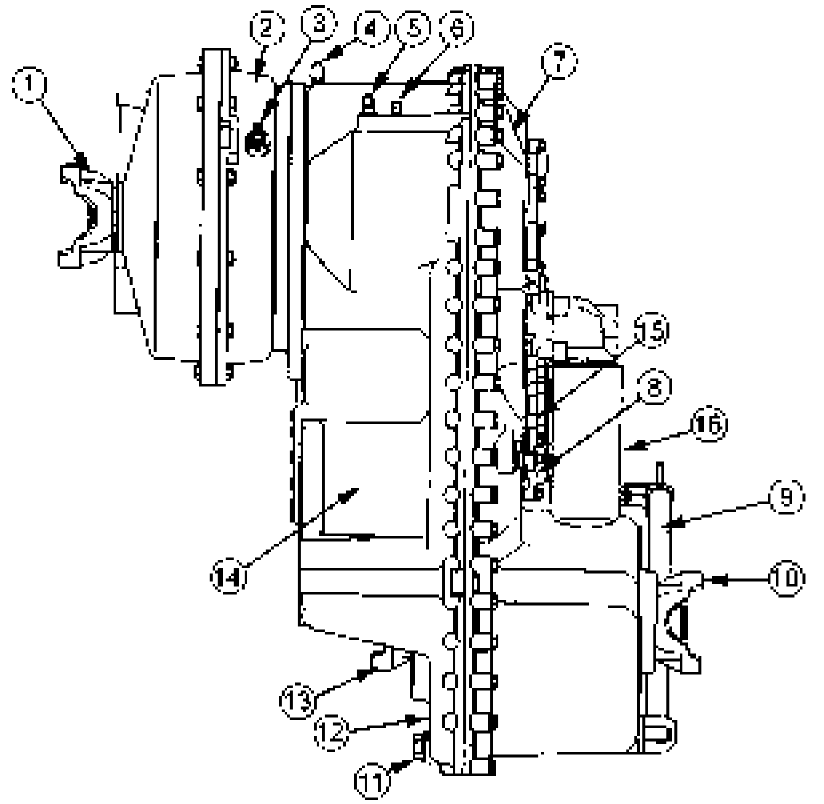
Six clutch packs provide four forward and three reverse speeds. Two clutch packs, have to be engaged for movement: One directional clutch pack, either Low-range forward (KV), High-range forward (K4) or Reverse and one speed clutch pack, either 1st (K1), 2nd (K2) or 3rd (K3). (See Transmission Clutch Engagement And Solenoids Activated chart for solenoid/clutch pack combinations.) The torque converter supplies torque to two drive gears which are in constant mesh with the forward low-range (KV), reverse clutch (KR) and the high range froward clutch (K4) hubs. The reverse clutch (KR), high range forward clutch (K4) and 2nd speed clutch (K2) output gears are in constant mesh. As are the 1st speed clutch (K1) hub gear and the 3rd speed clutch (K3) output gear.

Main pressure oil is routed through a passage in the countershaft to engage the clutches.

Lube oil is routed to each clutch shaft through a manifold plate mounted between the torque converter and the transmission case.

TX,9020,ME425 –19–10AUG96–3/3

Transmission Side View

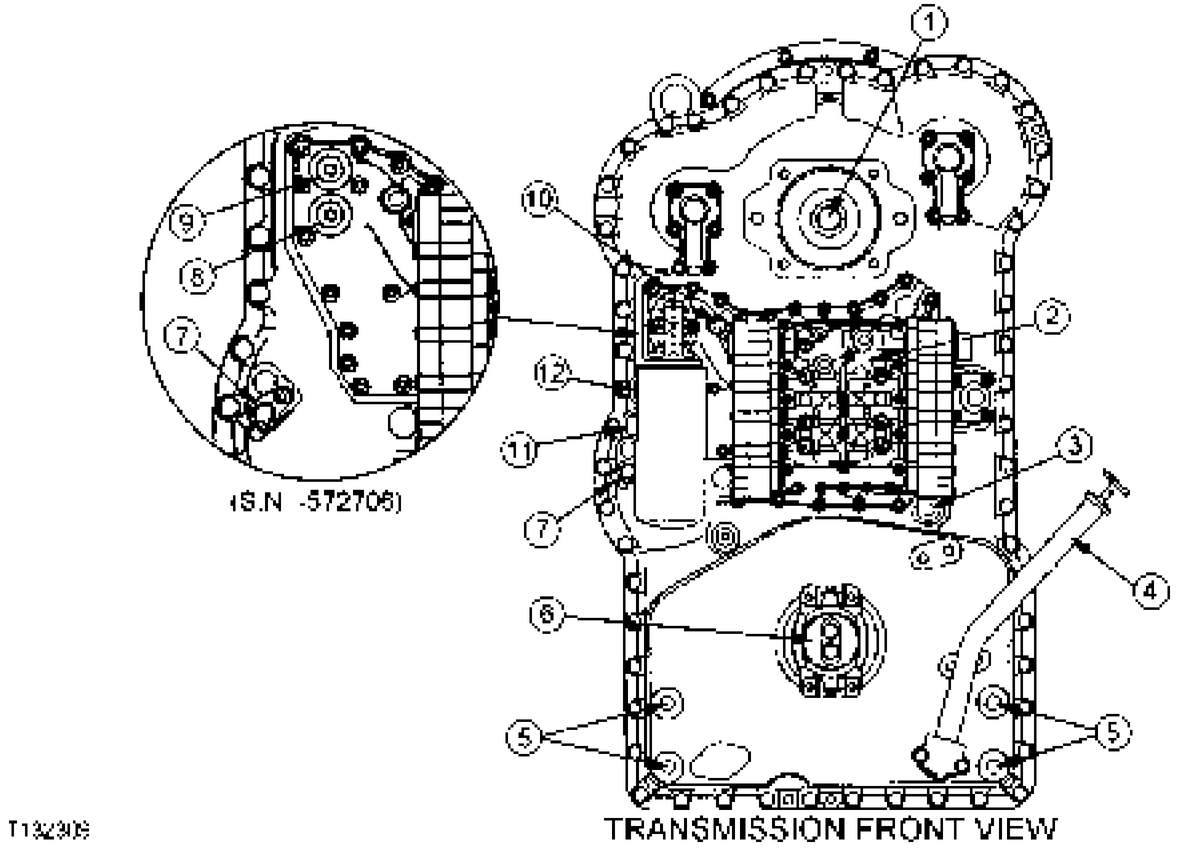


1—Input Shaft
2—Converter Bell Housing
3—Engine Speed Sensor
4—Breather
5—Internal Clutch Speed Sensor (Middle Gear)
6—Turbine Output Speed
7—Transmission Case Cover
8—Output Speed Sensor
9—Oil Filler Pipe with Oil Dipstick
10—Output Flange Front Axle
11—Oil Drain Plug with Magnetic Insert M38 x 1.5
12—Model identification Plate
13—Output Flange Rear Axle (Converter Side)
14—Transmission Case
15—Oil Filter Restriction Switch
16—Filter (S.N.—572706 filter remote mounted)

TX,9020,ME426 –19–10FEB97–1/1

9020
05
8

Transmission Front View



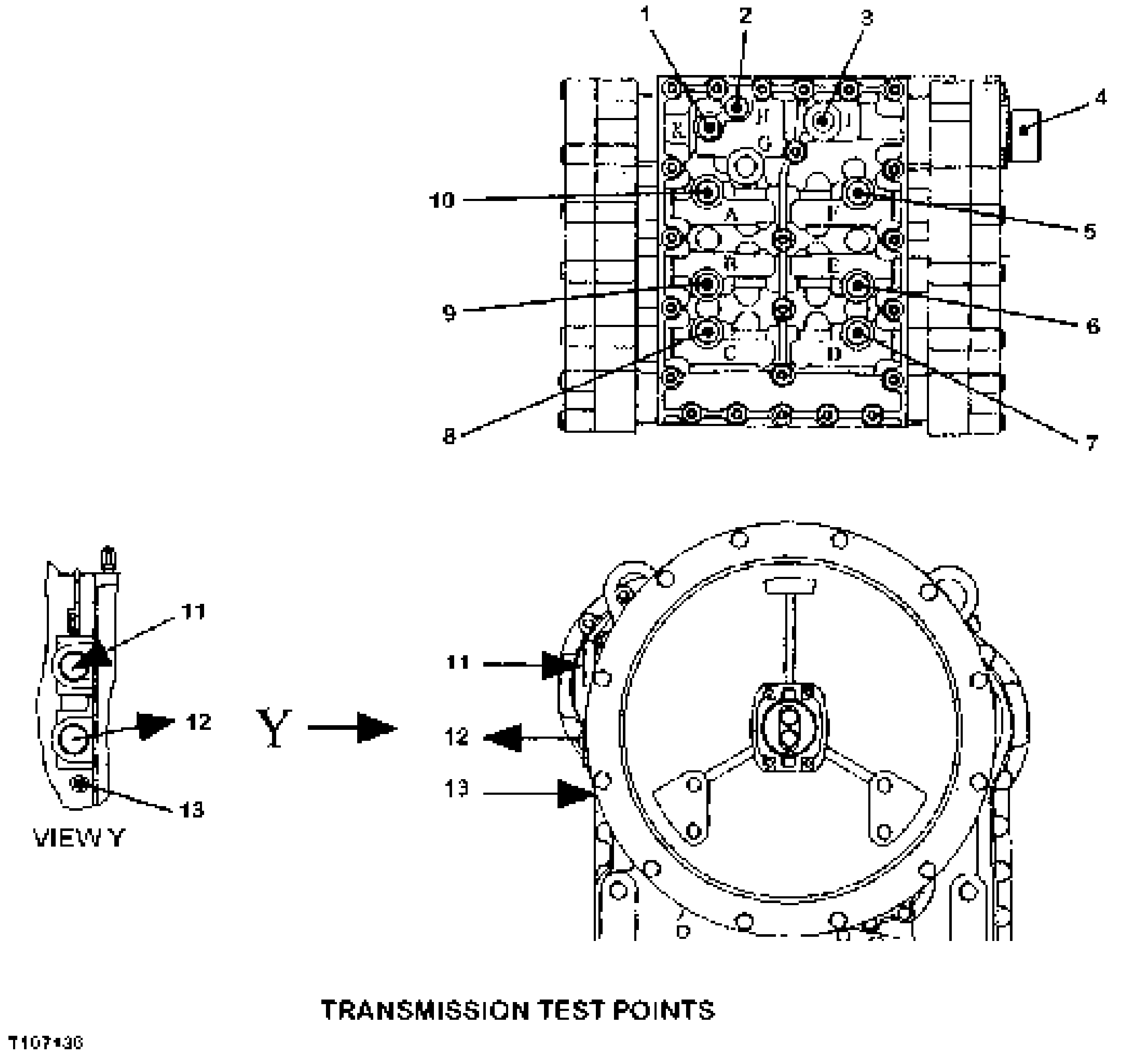
T132309 –UN–14JUL00

1—Hydraulic Pump Drive
2—Transmission Control Valve
3—Port—Return Line from Parking Brake
4—Oil Filler Pipe with Oil Dipstick
5—Transmission Mounts
6—Output Flange Front Axle
7—Output Speed Sensor
8—Port—(System Pressure) to remote mounted Filter
9—Port—Return Line from remote mounted Filter
10—Port—(System Pressure) to Park Brake Valve
11—Oil Filter Restriction Switch
12—Filter (S.N.—572706 filter remote mounted)

TX,9020,ME427 –19–10FEB97–1/1

9020
05
10

Transmission Test Points

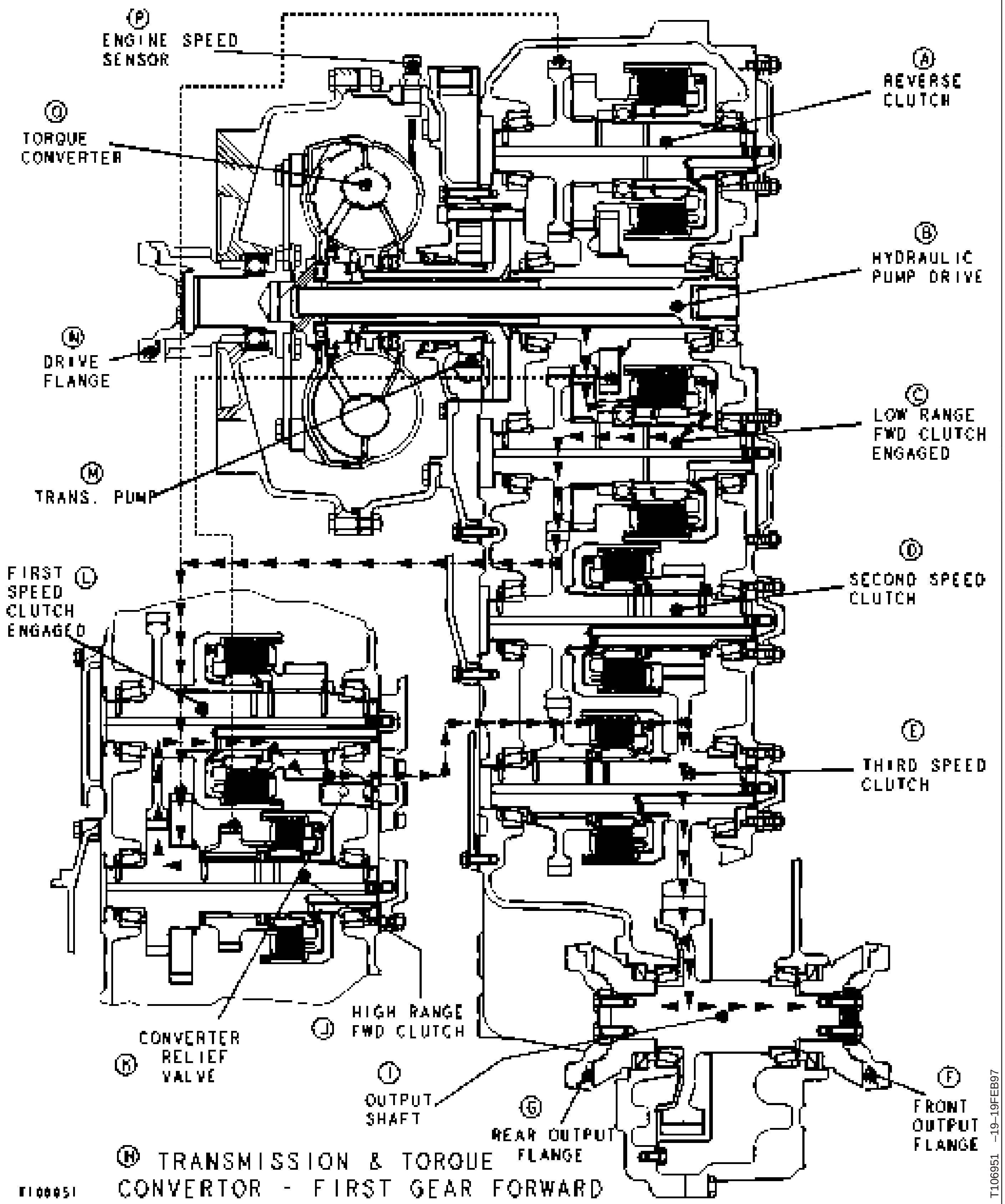


T107136 –19–19FEB97

1—System Pressure
2—Converter-In Pressure
3— Reduced Pressure
4—Transmission Harness Connector
5—Clutch Forward High Range (K4)
6—Reverse Clutch (KR) (With diagnostic coupler)
7—Clutch C1 (K1) (With diagnostic coupler)
8—Clutch C3 (K3)
9—Clutch Forward Low Range (KV) (With diagnostic coupler)
10—Clutch C2 (K2) (With diagnostic coupler)
11—Cooler (Lube Pressure)
12—To Cooler
13—Converter-Out Pressure

TX,9020,ME428 –19–10FEB97–1/1

Transmission Operation—First Gear Forward



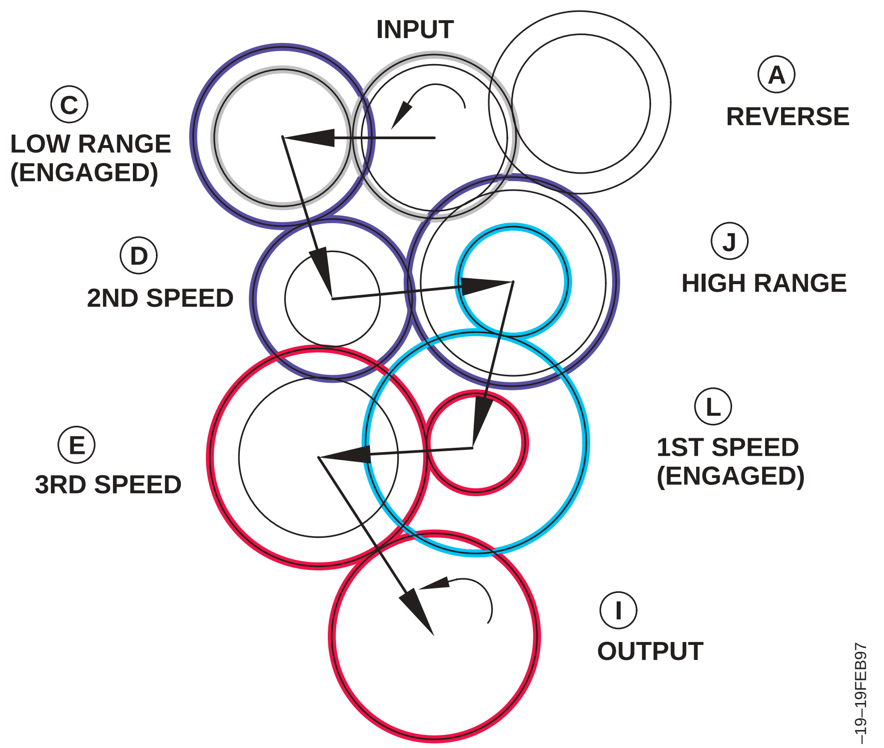
Continued on next page

TX,9020,ME429 –19–10AUG96–1/3

A—Reverse Clutch (KR)
B—Hydraulic Pump Drive
C—Low Range (KV) FWD Clutch Engaged
D—Second Speed (K2) Clutch
E—Third Speed Clutch (K3)
F—Front Output Flange
G—Rear Output Flange
H—Transmission and Torque Converter—First Gear Forward
I—Output Shaft
J—High Range (K4) FWD Clutch
K—Converter Relief Valve
L—First Speed (K1) Clutch Engaged
M—Transmission Pump
N—Drive Flange
O—Torque Converter
P—Engine Speed Sensor

Continued on next page

TX,9020,ME429 –19–10AUG96–2/3



T106956

POWER FLOW - 1ST FORWARD

With the transmission in first forward, the low-range forward clutch (C) and the first speed clutch (L) are engaged.

Main pressure oil is routed through the drilled passage in the countershaft to the low-range-forward and first speed clutches. This causes the pistons to extend, compressing the plates and disks causing both clutches to rotate as a unit through the upper clutch drum.

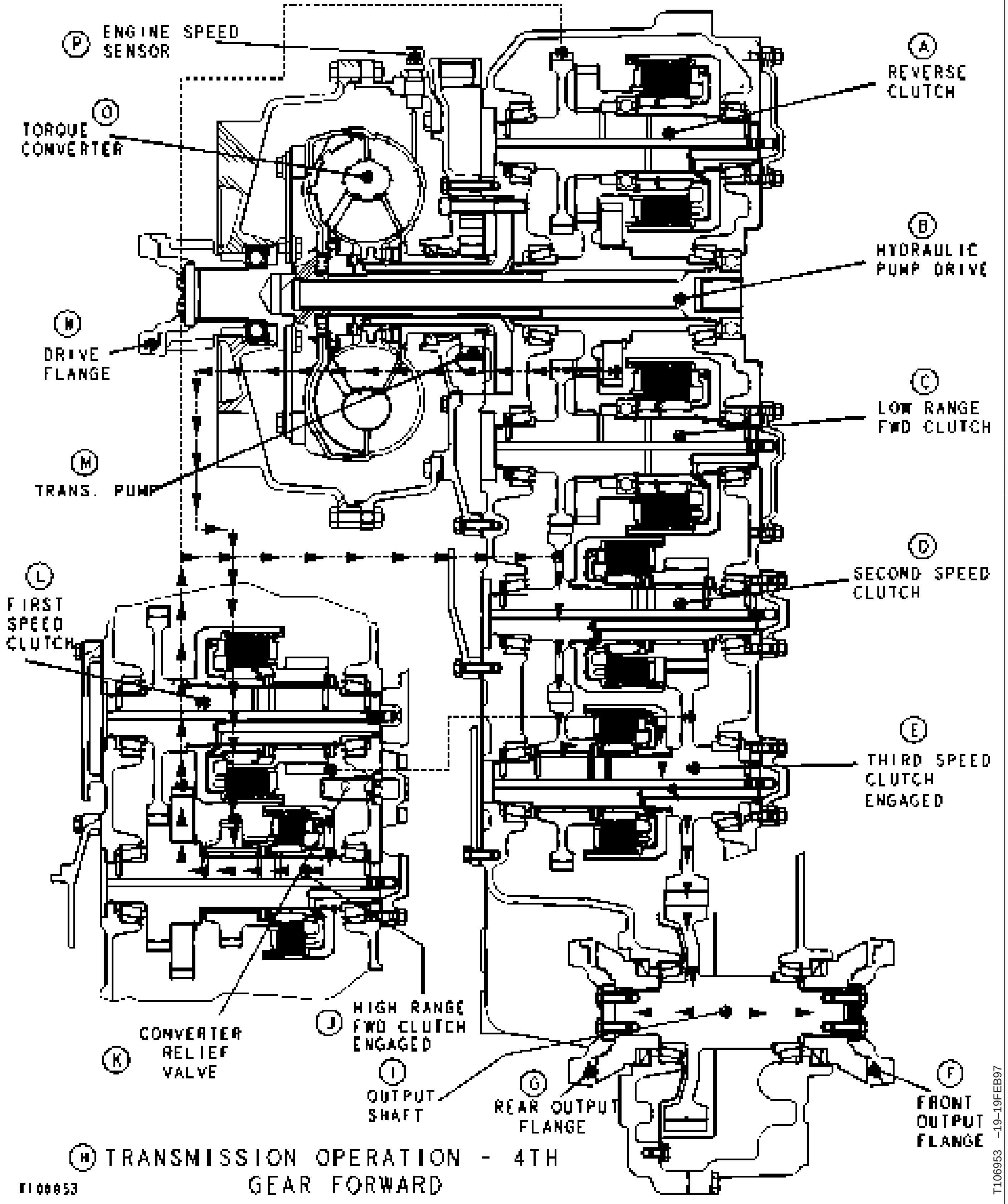
The torque converter supplies torque to a drive gear which meshes with the gear on the low-range forward clutch hub (C).

Power flow from the low range clutch output gear is connected through the 2nd speed output gear, the high range forward output gears to the 1st speed clutch drum and gear.

Power flow continues out the 1st speed hub gear to the 3rd speed output gear and finally on to the output shaft gear.

TX,9020,ME429 –19–10AUG96–3/3

Transmission Operation—Fourth Gear Forward



T106953 –19–19FEB97

Continued on next page

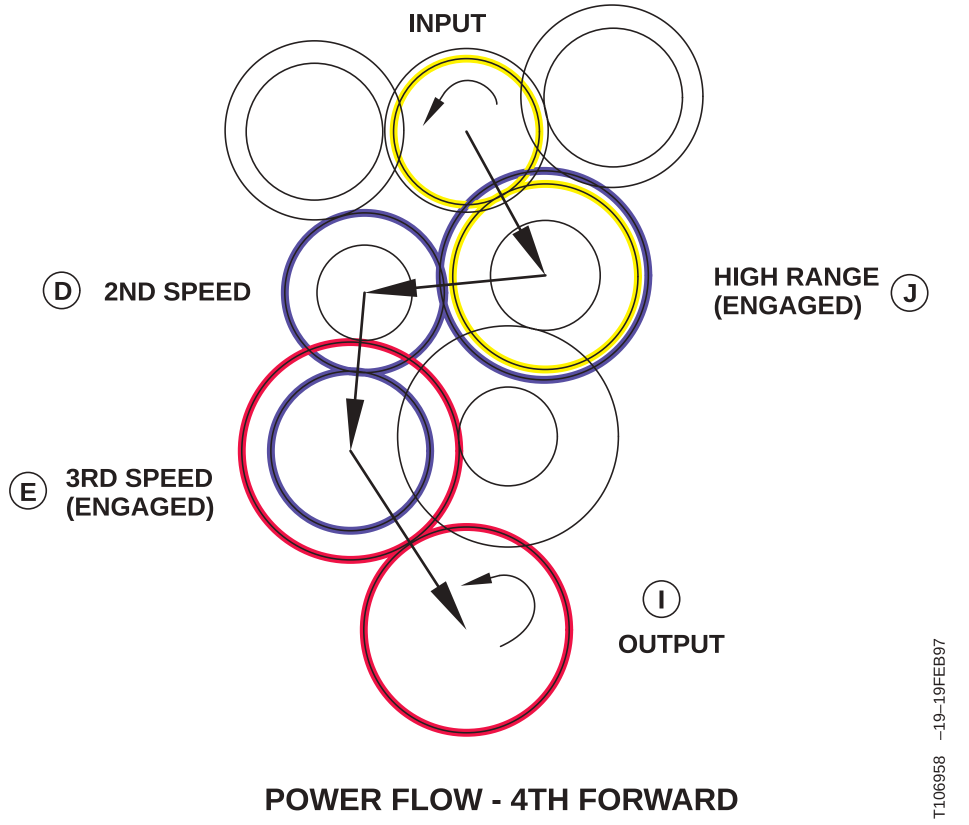
TX,9020,ME430 –19–10AUG96–1/3

9020 05 16

https://www.truck-manuals.net/

A—Reverse Clutch (KR)
B—Hydraulic Pump Drive
C—Low Range FWD Clutch (KV) Engaged
D—Second Speed Clutch (K2)
E—Third Speed Clutch (K3)
F—Front Output Flange
G—Rear Output Flange
H—Transmission Operation—4th Gear Forward
I—Output Shaft
J—High Range FWD Clutch (K4)
K—Converter Relief Valve
L—First Speed Clutch (K1) Engaged
M—Transmission Pump
N—Drive Flange
O—Torque Converter
P—Engine Speed Sensor

TX,9020,ME430 –19–10AUG96–2/3



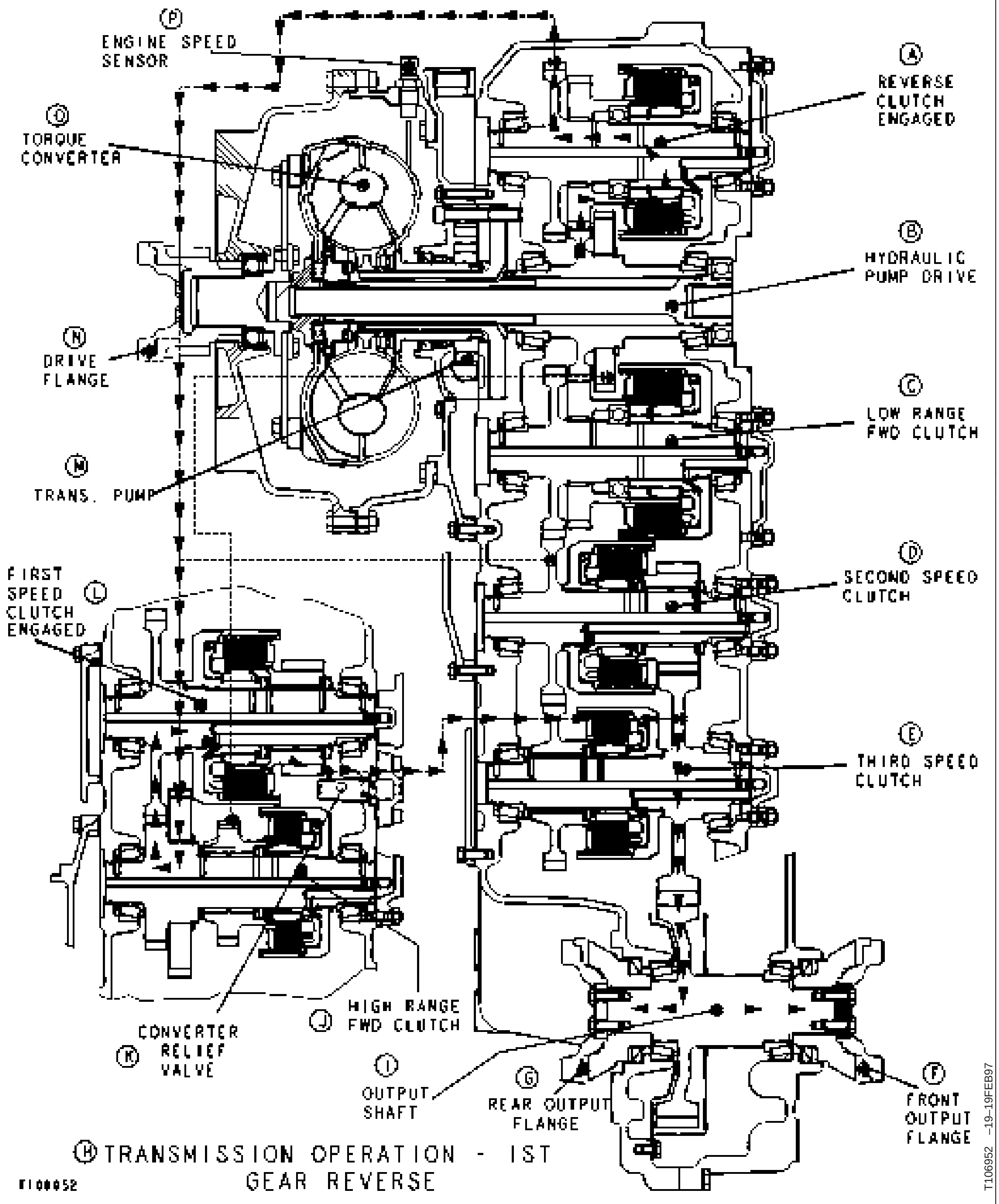
T106958

POWER FLOW - 4TH FORWARD

With the transmission in fourth gear forward, the high-range forward clutch (J) and the third speed clutch (E) are engaged. The torque converter supplies torque to the large drive gear which meshes with the hub gear on the high range forward clutch (J). Power flow continues through the clutch and output gear to the 2nd speed output gear (D) which is in mesh with the 3rd speed hub gear (D). With 3rd speed clutch engaged power flows to the drum and gear to the output shaft gear.

TX,9020,ME430 –19–10AUG96–3/3

Transmission Operation—First Gear Reverse



Continued on next page

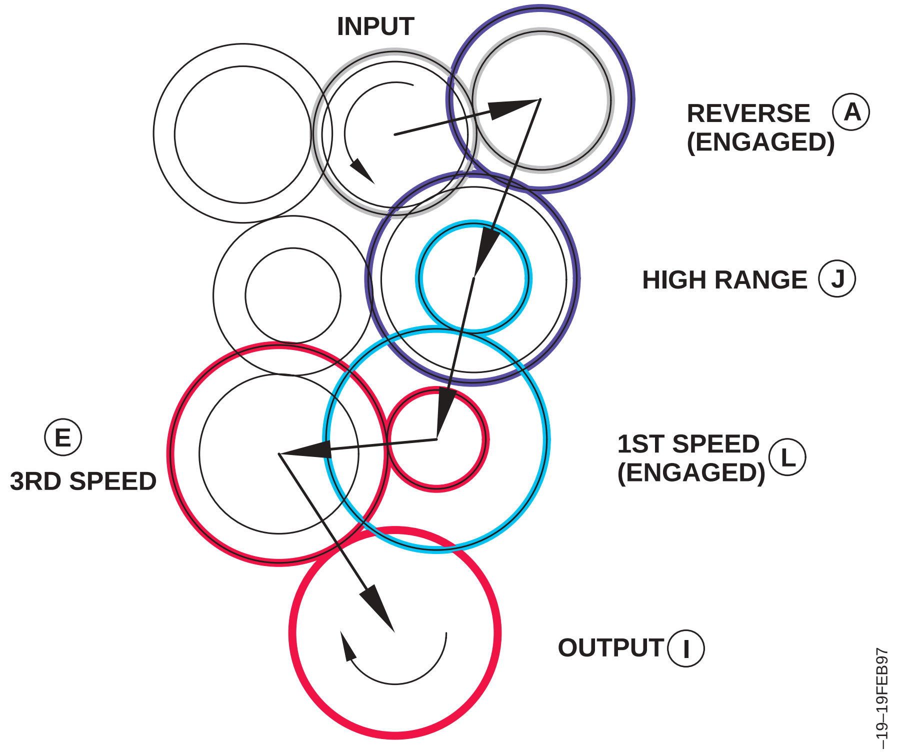
TX,9020,ME431 –19–10AUG96–1/3

9020
05
18

https://www.truck-manuals.net/

A—Reverse Clutch (KR)
B—Hydraulic Pump Drive
C—Low Range FWD Clutch (KV) Engaged
D—Second Speed Clutch (K2)
E—Third Speed Clutch (K3)
F—Front Output Flange
G—Rear Output Flange
H—Transmission Operation—First Gear Reverse
I—Output Shaft
J—High Range FWD Clutch (K4)
K—Converter Relief Valve
L—First Speed Clutch (K1) Engaged
M—Transmission Pump
N—Drive Flange
O—Torque Converter
P—Engine Speed Sensor

TX,9020,ME431 –19–10AUG96–2/3



T106957

POWER FLOW - 1ST REVERSE

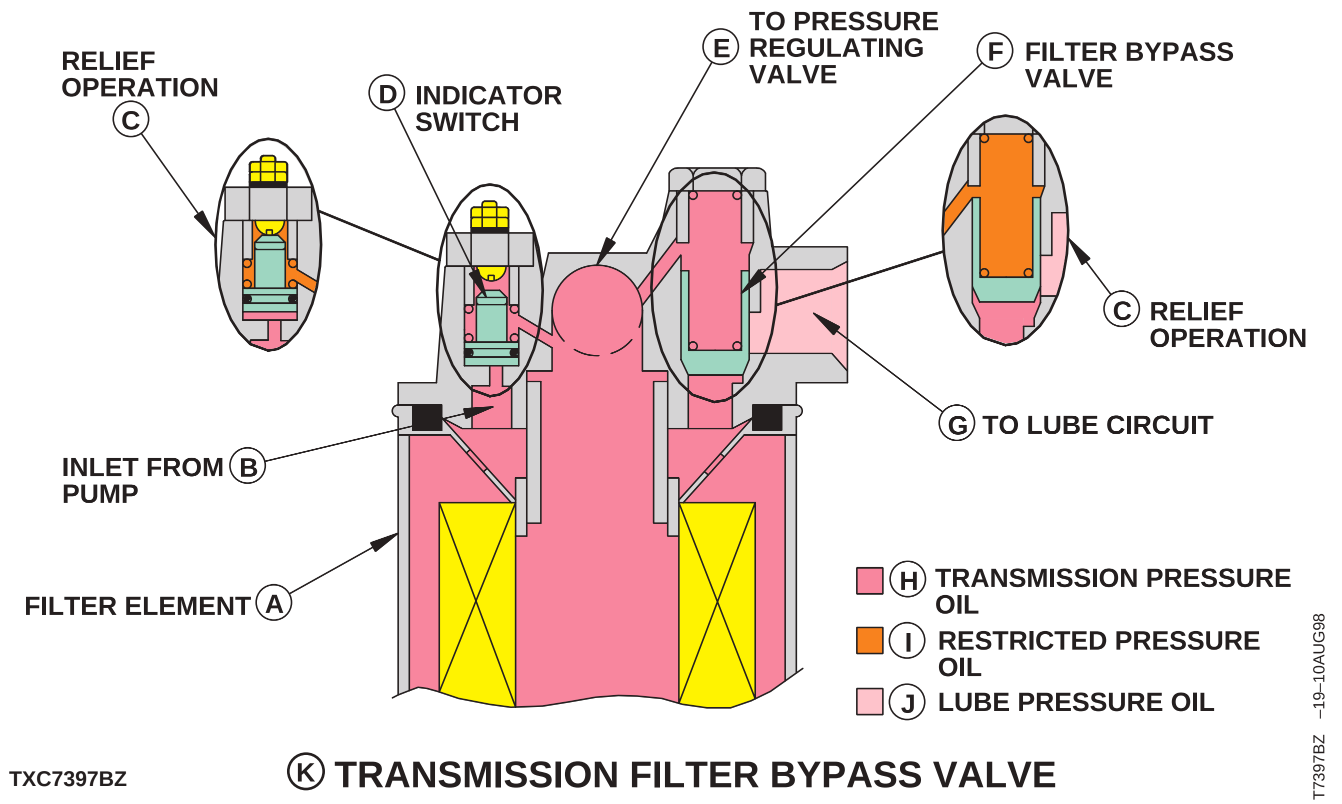
9020
05
19

With the transmission in first gear reverse, the reverse clutch (A) and the first speed clutch (L) are engaged. The torque converter supplies torque to the small drive gear. This drive gear meshes with the gear on the reverse clutch hub (A).

Power flows through the clutch and output gear to the high range forward clutch output gears. It continues out the smaller gear to the 1st speed drum and gear. With the 1st speed clutch engaged, power is out the hub gear to the 3rd speed output gear and then on to the output shaft gear.

TX,9020,ME431 –19–10AUG96–3/3

Transmission Filter Bypass Valve (S.N. —572706)



Transmission Filter Bypass Valve (S.N. —572706)

The spin-on type transmission filter (A) is remote mounted in front of the transmission. The filter is protected by a pressure differential type bypass valve (F) and an indicator switch (D).

Inlet oil from the transmission pump (B) is sensed on the bottom side of both the bypass valve and the indicator switch. The oil goes through the filter element and is sensed on the spring side of both the bypass valve and the indicator switch as it goes to the pressure regulating valve (E) in the transmission control valve.

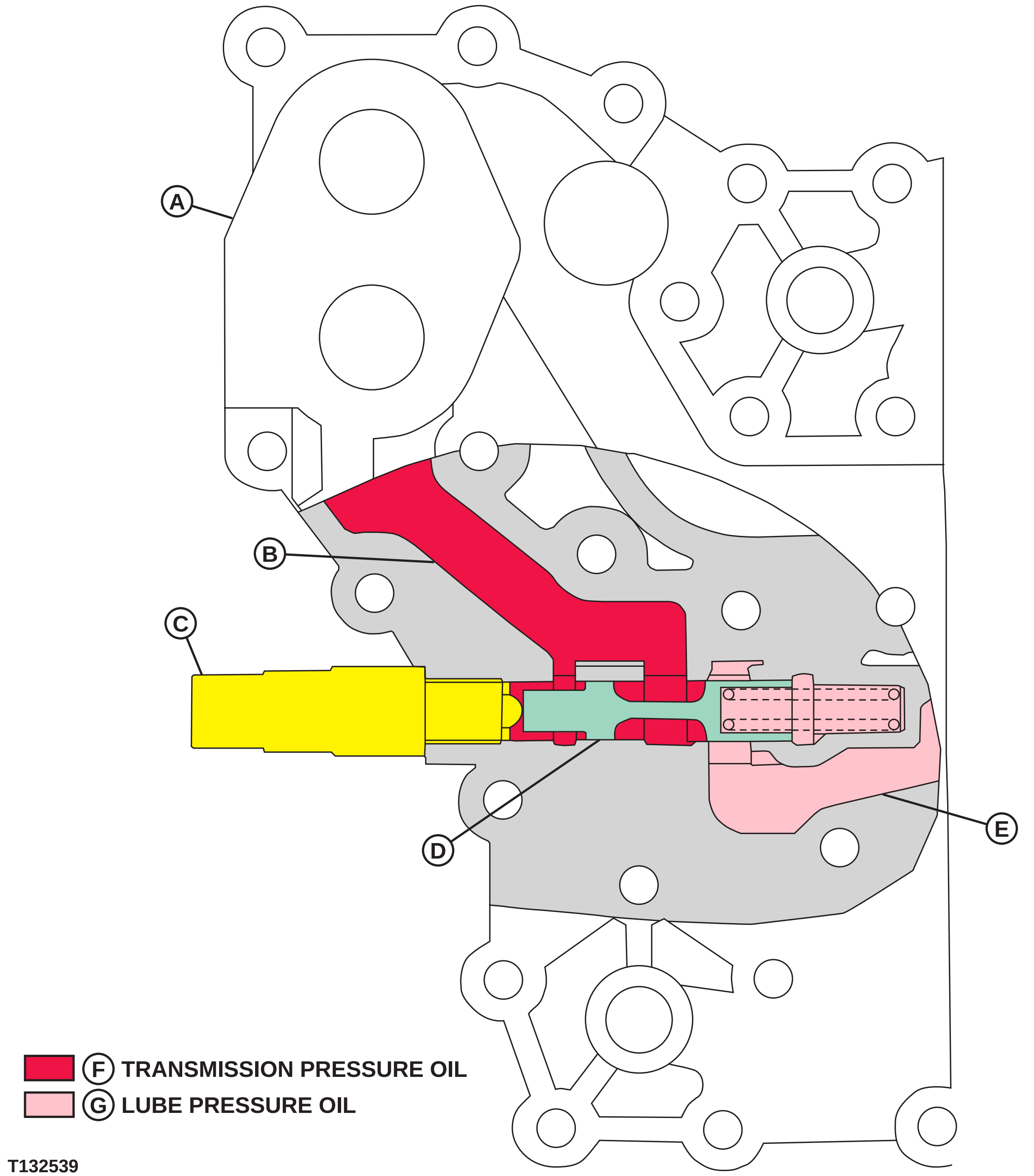
During normal operation, the inlet pressure and outlet pressure are nearly equal and the valve and indicator remain seated. If the filter becomes plugged, or the oil is real cold, the inlet pressure becomes higher than the outlet pressure and spring force.

During relief operation (C), the indicator switch piston moves upward contacting the terminal and providing a ground signal to the monitor. The bypass valve also opens and routes the unfiltered oil to the lube circuit (G).

TX,9020,ME432 –19–13FEB97–1/1

9020
05
20

Transmission Filter Bypass Valve (S.N 572707—)



Transmission Filter Bypass Valve (S.N. 572707—)

A—Transmission Filter and Filter Base Mounting Area
B—Inlet Oil from Transmission Pump
C—Indicator Switch
D—Bypass Valve Spool

The spin-on type transmission filter and filter base is mounted on front of the transmission (A). A pressure differential type bypass valve (C) and an indicator switch (D) protects the filter.

Continued on next page

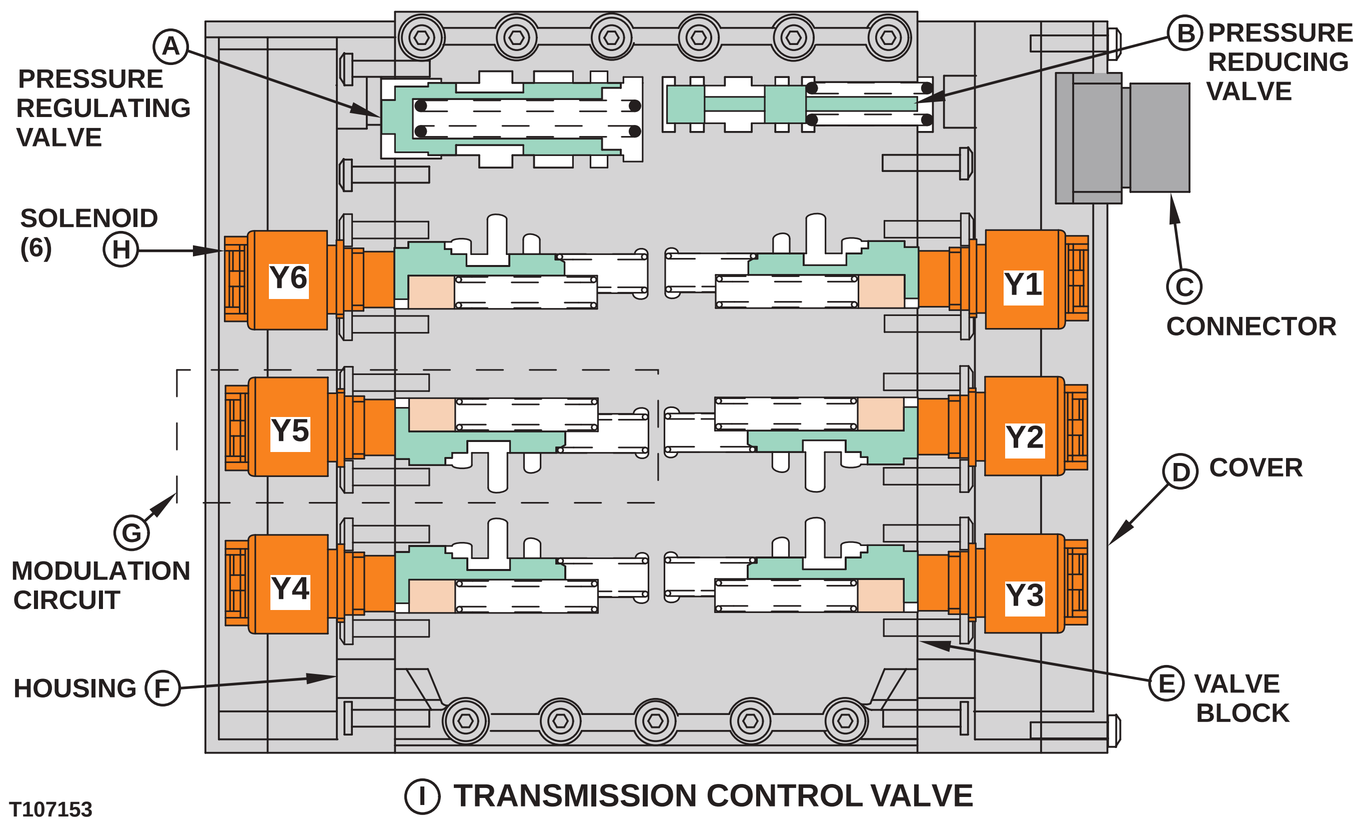
The bypass valve senses inlet oil from the transmission pump (B). The bypass valve is located in series with the system pressure passage. The by-pass valve spool is held in the closed position by a spring and filtered downstream oil pressure entering the control valve.

During normal operation, the inlet and outlet pressures of the filter are nearly equal, and the spool valve and indicator remain seated. If the filter becomes plugged, or the oil is very cold, the inlet pressure becomes higher than the outlet pressure and spring tension.

During relief operation, the spool is shifted overcoming spring tension causing the indicator switch to close and the filter restriction indicator light to illuminate on the monitor. The bypass valve allows unfiltered oil to the lube circuit (E).

CED,TX18076,47 –19–13JUL00–2/2

Transmission Control Valve Components

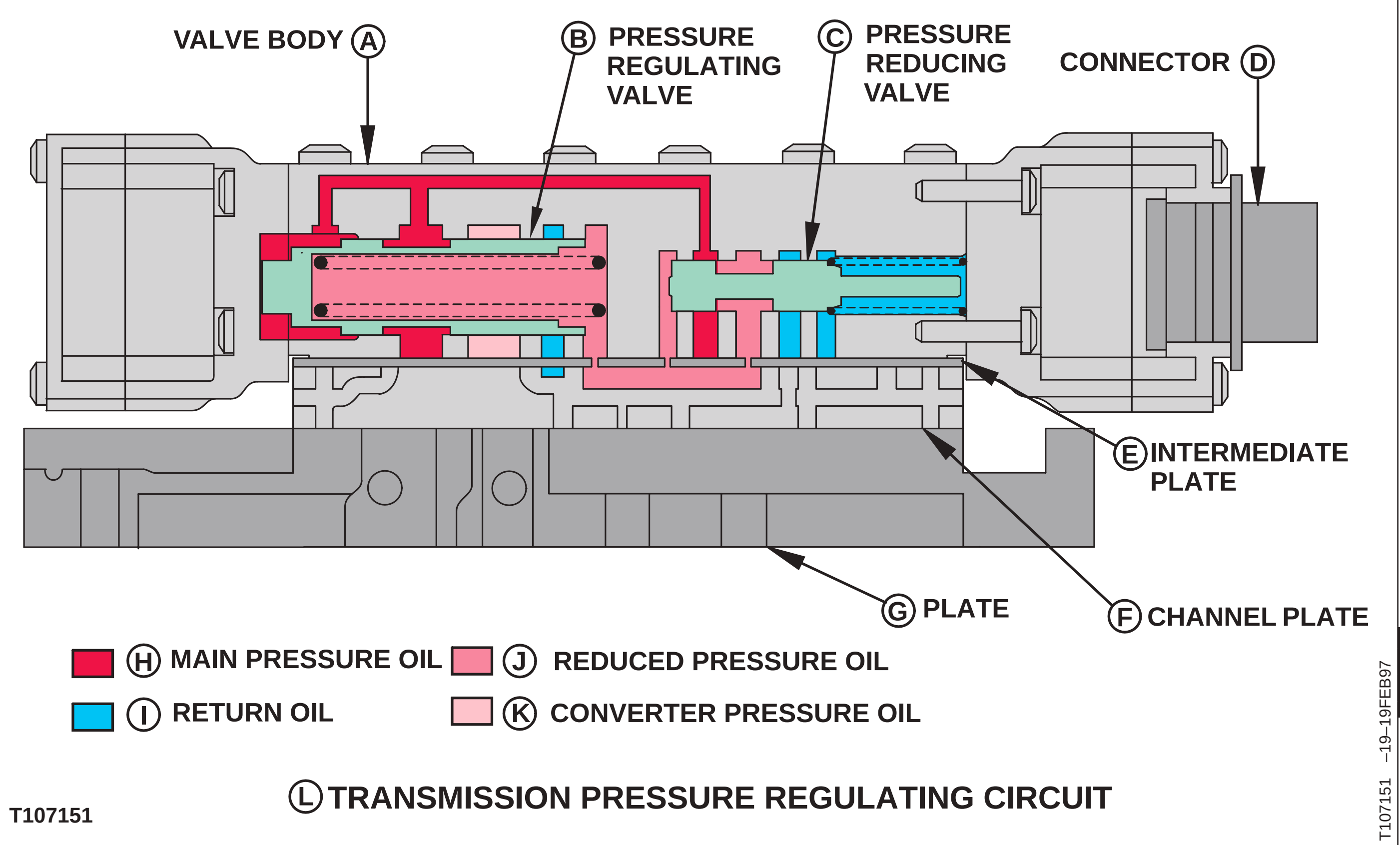


T107153 –19–19FEB97

A—Pressure Regulating Valve
B—Pressure Reducing Valve
C—Connector
D—Cover
E—Valve Block
F—Housing
G—Modulation Circuit
H—Solenoid (6)
I—Transmission Control Valve

TX,9020,ME433 –19–13FEB97–1/1

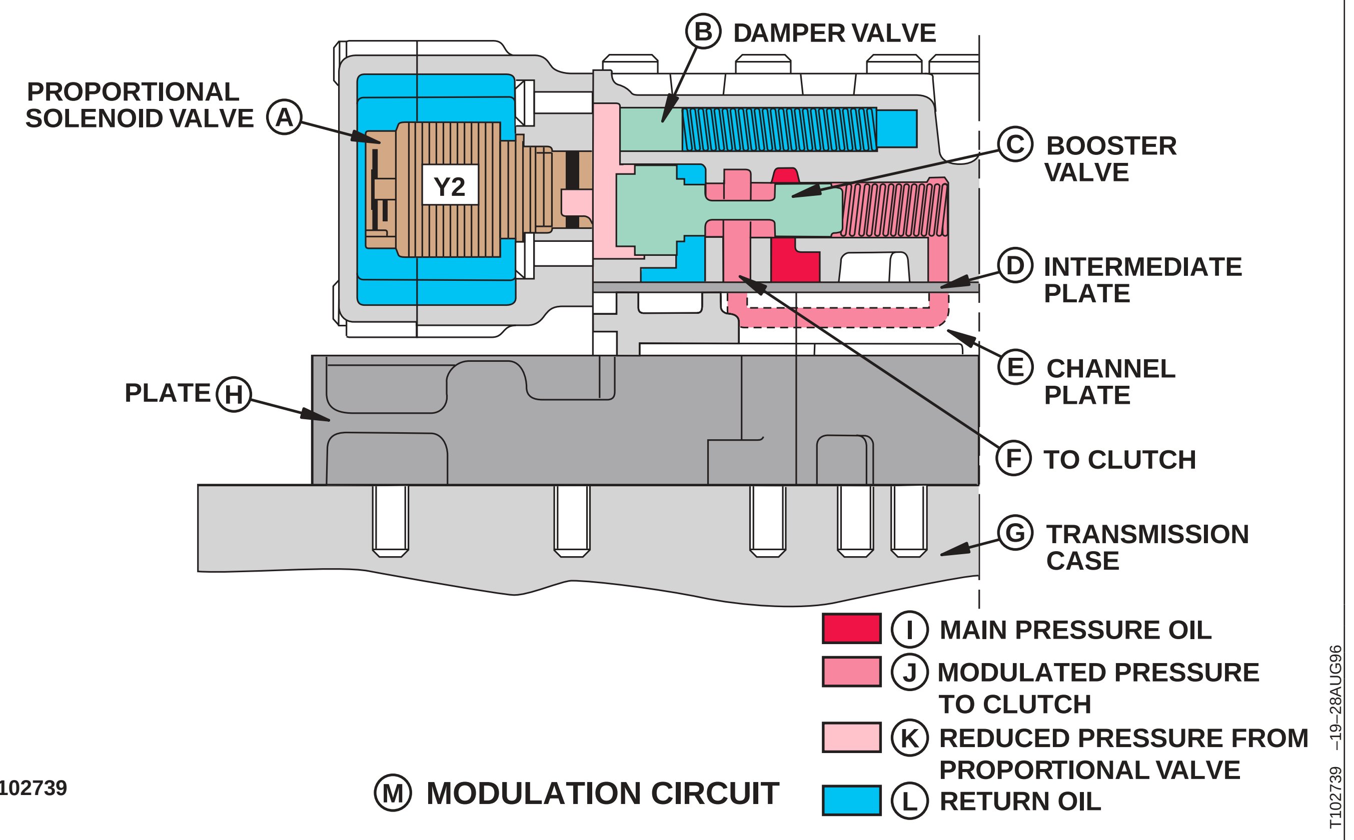
Transmission Pressure Regulating Circuit



A—Valve Body
B—Pressure Regulating Valve
C—Pressure Reducing Valve
D—Connector
E—Intermediate Plate
F—Channel Plate
G—Plate
H—Main Pressure Oil
I—Return Oil
J—Reduced Pressure Oil
K—Converter Pressure Oil
L—Transmission Pressure Regulating Circuit

TX,9020,ME434 –19–13FEB97–1/1

Modulation Circuit



A—Proportional Solenoid Valve
B—Damper Valve
C—Booster Valve
D—Intermediate Plate
E—Channel Plate
F—To Clutch
G—Transmission Case
H—Plate
I—Main Pressure Oil
J—Modulated Pressure To Clutch
K—Reduced Pressure From Proportional Valve
L—Return Oil
M—Modulation Circuit

NOTE: See Transmission Control System. (Go to Group 9020-15.)

NOTE: See Transmission Control Circuit-First Forward. (Go to Group 9020-15.)

The transmission control valve assembly regulates the hydraulic control circuit of the transmission. The control valve receives electrical signals from the transmission controller to energize the proportional solenoids which direct oil to move the booster valves. When the booster valves are shifted against the spring, oil pressure begins to start modulation and fill the oncoming pack.

The transmission control valve contains:

- Pressure regulating valve
- Pressure reducing valve
- 6 dampening valves
- 6 booster valves
- 6 proportional solenoid valves

The pressure regulating valve is a spring-loaded spool valve which regulates main pressure oil by controlling flow into the control circuit. Excess oil from the control circuit flows to the torque converter.

Main pressure oil flows to the solenoid pressure reducing valve. The pressure reducing valve provides a constant oil pressure to the proportional solenoids and is not affected by shift modulation. The solenoid pressure reducing valve is not adjustable.

Continued on next page

TX,9020,ME435 –19–13FEB97–1/2

The six proportional solenoid valves direct oil to the booster valves to provide machine direction, speed selection and shift modulation. The transmission controller sends a varying electrical signal to the proportional solenoids which controls the speed of clutch engagement during a shift. All of the proportional solenoid valves are identical.

- Y1 solenoid valve engages the Hi-range forward booster valve.
- Y2 solenoid valve engages the reverse booster valve.
- Y3 solenoid valve engages the first speed booster valve.
- Y4 solenoid valve engages the third speed booster valve.
- Y5 solenoid valve engages the Low-range forward booster valve.
- Y6 solenoid valve engages the second speed forward booster valve.

All booster valves and springs are identical.

The dampening valves act as an accumulator in the control circuit. Any pressure spikes will be absorbed by the dampening valve which allows for smooth and quiet operation of the booster valves. All dampening valves and springs are identical.

Two clutch packs have to be engaged for the machine to move. One directional clutch pack, either Low-range forward (KV), High-range forward (K4) or reverse (KR) and one speed clutch pack, either first (K1), second (K2) or third (K3).

TX,9020,ME435 –19–13FEB97–2/2

Transmission Clutch Modulation

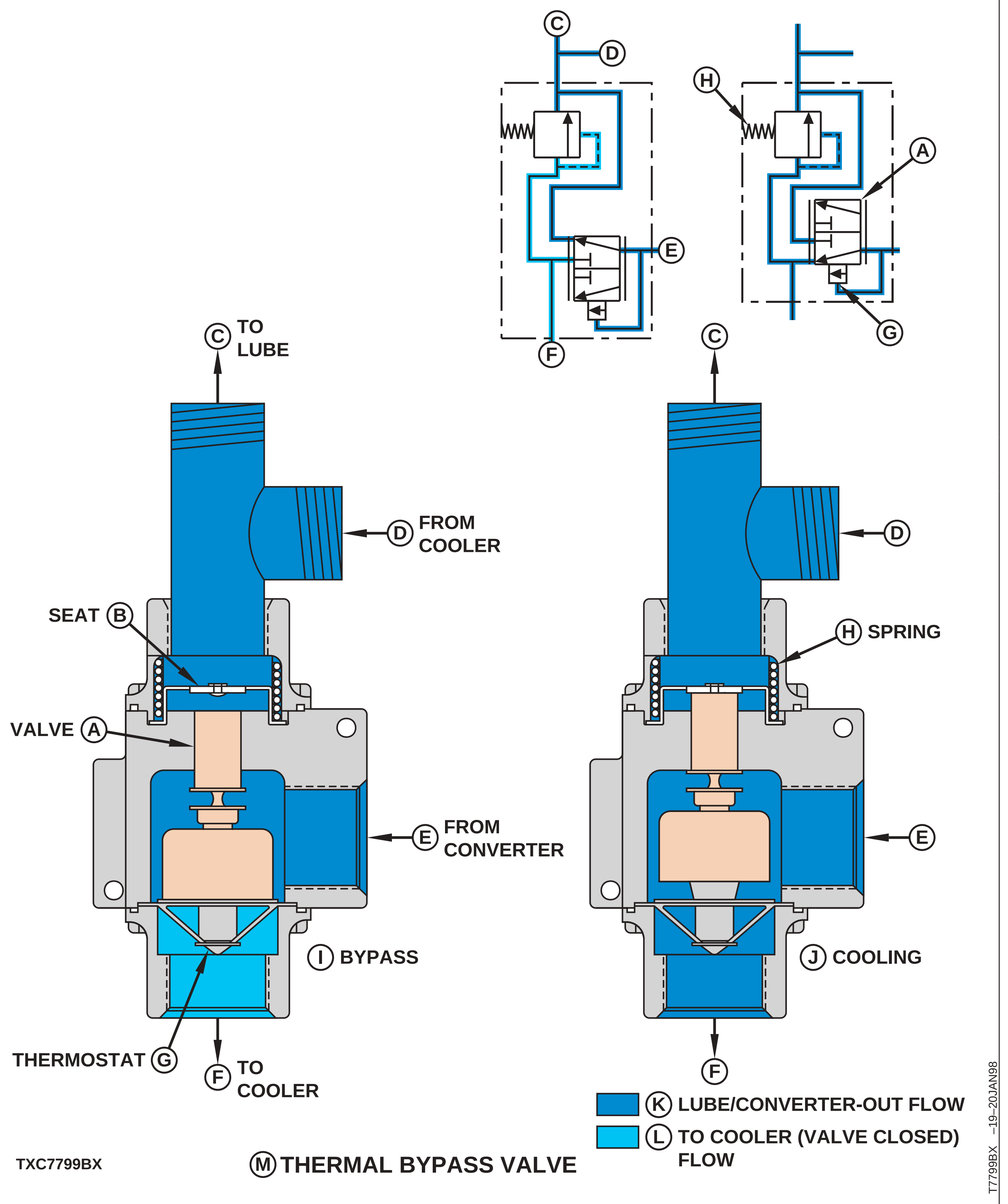
The transmission controller will vary the clutch modulation according to a number of speed and load factors. Therefore if clutch modulation is checked in a test condition with the machine stopped and the transmission in stalled condition, the clutch modulation will be different than normal operation.

The proportional solenoids control both the rate of engagement and disengagement of clutches. This provides the optimum timing of the engaging rod disengaging clutches. This provides a smooth shift between each gear under all operating conditions.

In neutral-to-1st forward shift only, the Lo Range forward clutch (KV) is modulated. The same is true for the reverse shift, only the reverse clutch (KR) is modulated. In all of the speed changes in forward and reverse only the on-coming clutch is modulated.

TX,9020,ME436 –19–23AUG96–1/1

Thermal Bypass Valve Operation



Continued on next page

TX,9020,ME437 –19–28AUG96–1/2

A—Valve
B—Seat
C—To Lube
D—From Cooler
E—From Converter
F—To Cooler
G—Thermostat
H—Spring
I—Bypass
J—Cooling
K—Lube/Converter-Out Flow
L—To Cooler (Valve Closed) Flow
M—Thermal Bypass Valve

The thermal bypass valve is used to maintain the transmission oil temperature at a level which provides optimum torque converter performance. It was located on left side of engine frame on earlier versions and later relocated to mount directly on the transmission.

The valve contains a standard automotive-type thermostat element connected to a hollow valve spool.

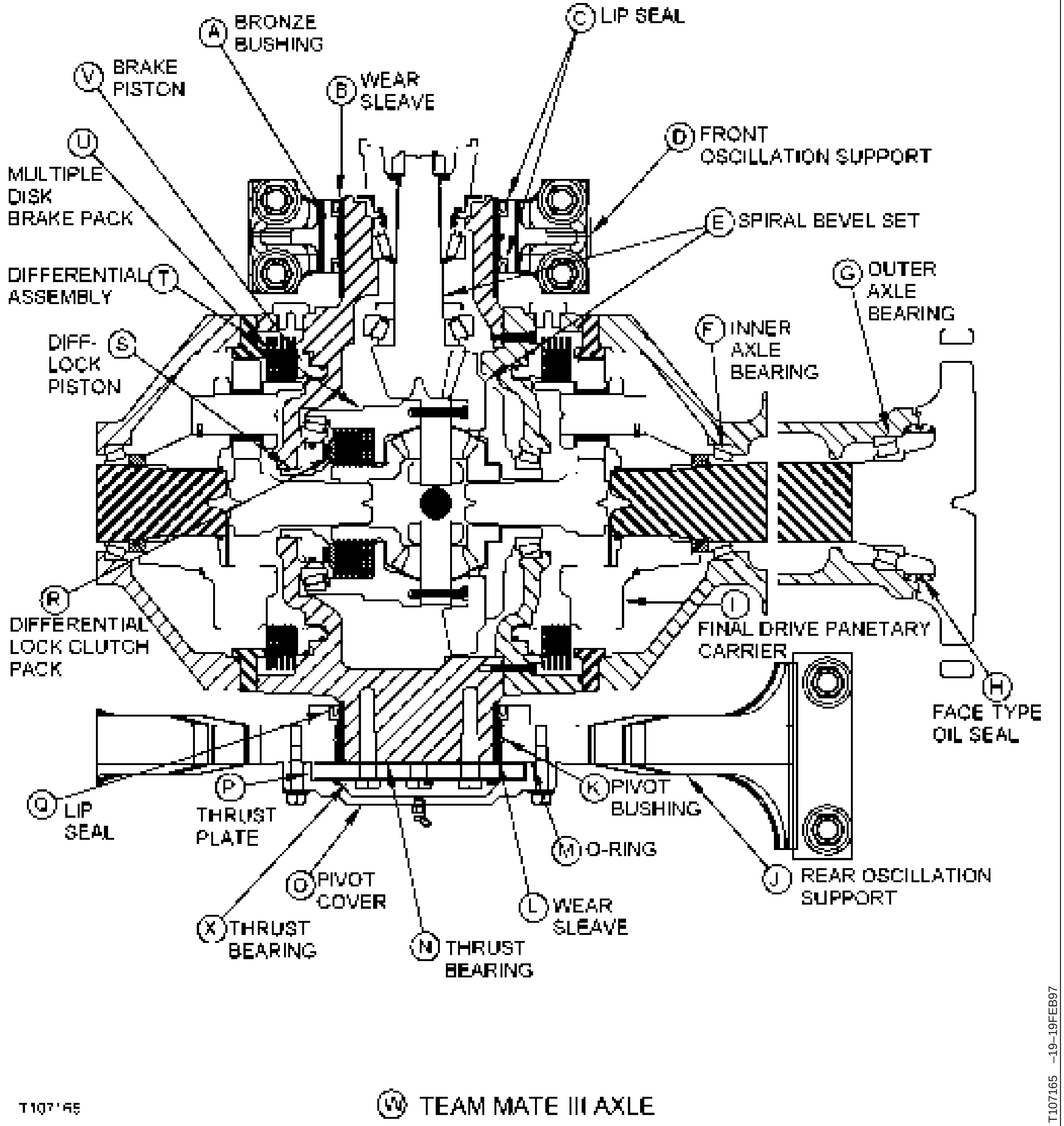
The valve is designed to bypass the transmission oil cooler at low temperatures. Converter outlet flow enters passage (E) and flows through the valve (A) to lube (C).

At higher temperatures, the thermostat (G) begins to open, allowing flow out of passage (F) to the transmission oil cooler. The thermostat will go to the full open position, forcing the valve closed against the seat (B). The spring loaded seat will act as a relief valve in the event cooler flow is blocked.

TX,9020,ME437 –19–28AUG96–2/2

9020
05
28

John Deere TeamMate™III Axles



TeamMate is a trademark of Deere & Company

Continued on next page

TX,9020,ME438 –19– 8APR96–1/2

A—Bronze Bushing
B—Wear Sleeve
C—Lip Seal
D—Front Oscillation Support
E—Spiral Bevel Set
F—Inner Axle Bearing
G—Outer Axle Bearing
H—Face-Type Oil Seal
I—Final Drive Planetary Carrier
J—Rear Oscillation Support
K—Pivot Bushing
L—Wear Sleeve
M—O-Ring
N—Thrust Bearing
O—Pivot Cover
P—Thrust Plate
Q—Lip Seal
R—Differential Lock Clutch Pack
S—Diff-Lock Piston
T—Differential Assembly
U—Multiple Disk Brake Pack
V—Brake Piston
W—Teammate III Axle
X—Thrust Bearing

This axle has several important design features:

- One piece differential housing with integral oscillation pivots.
- O-ring joint sealing (no gaskets).
- No differential lock sealing rings.
- Low speed multiple disk brakes.
- Outer axle face-type seals.
- Improved oscillation pivot design.
- Dipstick oil level check.

It is available with three differential options: standard, hydraulic differential lock and limited slip. These are covered in detail in the following pages.

The multiple disk brake pack (U) has the disks splined to the planetary carrier and the plates tanged to the housing. The annular brake piston (V) has low pressure oil supplied from the brake valve. There is no brake piston return spring. The relative disk-plate movement releases the brake when pressure is removed. Due to the brake pressure port and hose location the brakes are self-bleeding.

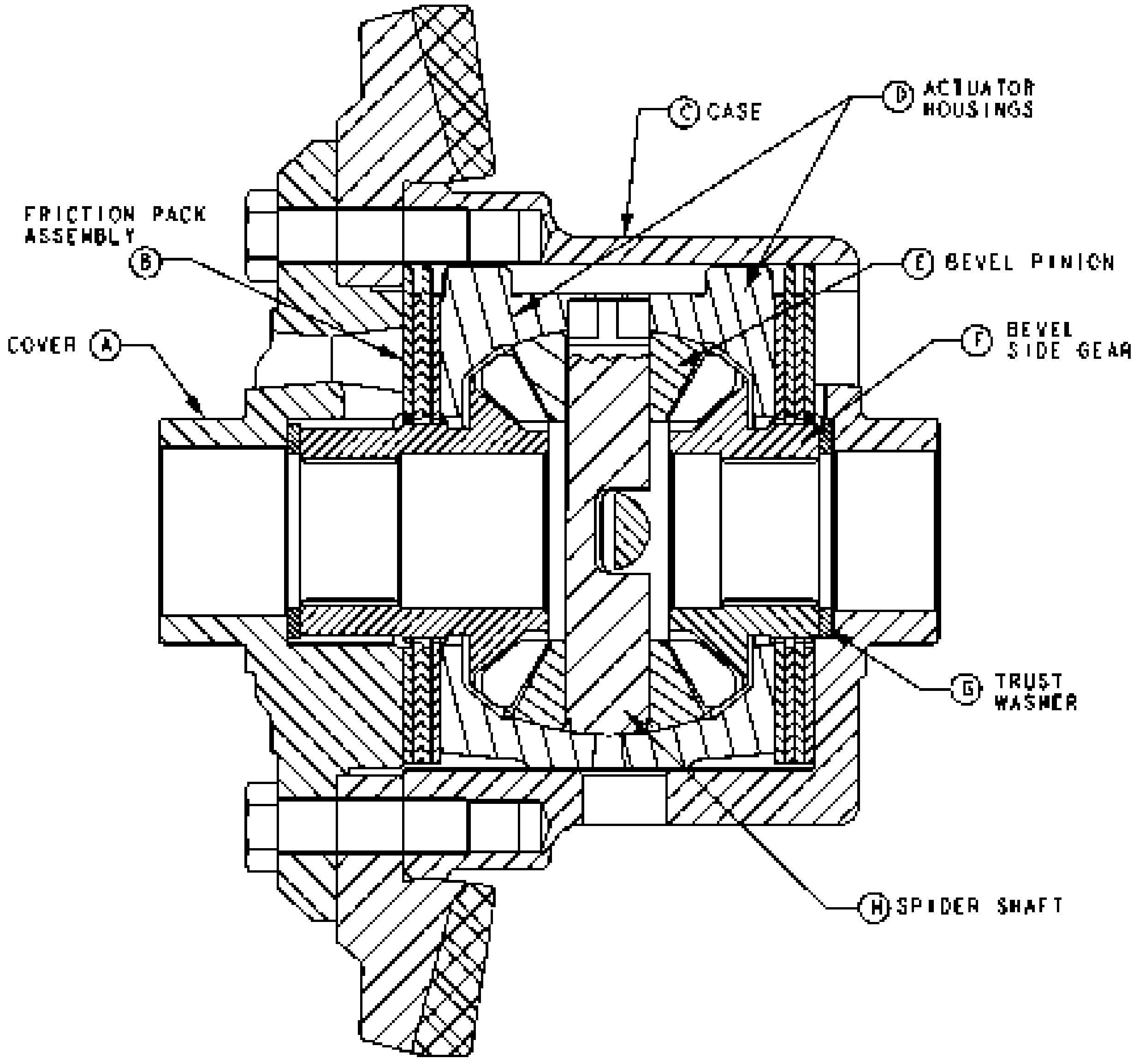
The oscillating supports (D and J) are located on the rear axle and are sealed and grease lubricated by a remote grease bank with one exception. The axial thrust bearings (X) on both sides of the thrust plate (P) are greased with a fitting on the pivot cover (O). It is normally greased at the same time as the drive shaft yokes. There is no adjust for axial end play. If end play is excessive the probable cause is worn thrust bearings (X).

The axle bearing adjustment is controlled by a spanner nut on the axle shaft. The spanner nut is locked in place by a tang on the planetary carrier (I).

A face-type seal is used between the axle flange and the housing. This allows the axle sump oil to constantly lubricate the axle bearings.

TX,9020,ME438 –19– 8APR96–2/2

Limited Slip Differential Operation



I LIMITED SLIP DIFFERENTIAL

T106224

T106224 –19–24JAN97

Continued on next page

TX,9020,ME439 –19–20FEB97–1/2

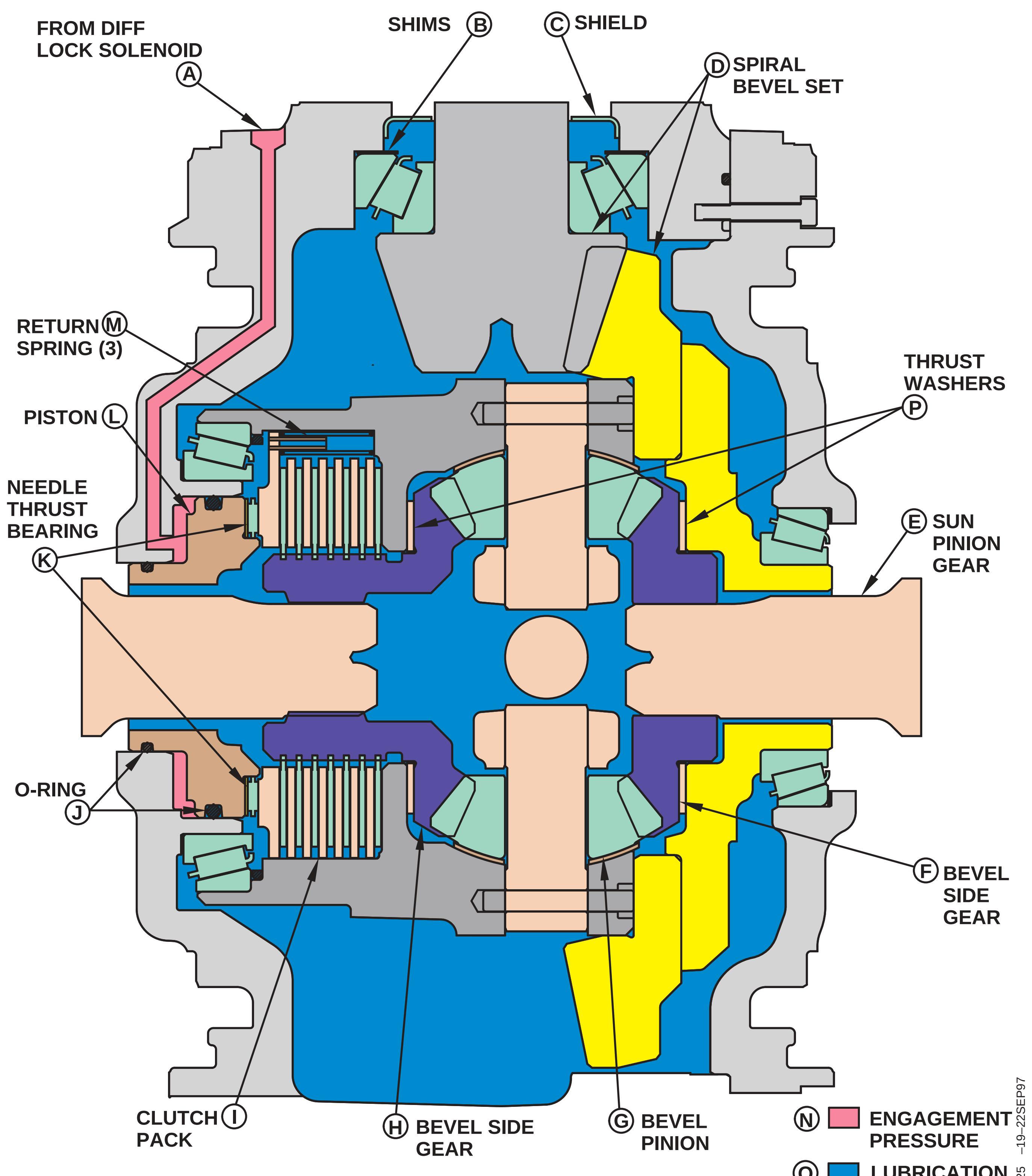
A—Cover
B—Friction Pack Assembly
C—Case
D—Actuator Housing
E—Bevel Pinion
F—Bevel Side Gear
G—Thrust Washer
H—Spider Shaft
I—Limited Slip Differential

The limited slip differential is available as an option on the front and (or) rear axles. Limited slip function provides some traction improvement when the wheels are on poor traction surfaces. This is accomplished by partially engaging two friction pack assemblies. When one wheel is on a poor traction surface, it starts to slip. This causes differential action between the bevel side gears (F) and bevel pinions (E). There is an outward force created on the bevel pinions which is transmitted as an outward force on the actuator housings (D). The outward force of the actuator housings (D) partially engages the friction pack assemblies (B). Thus restricting the differential action and limiting the slippage of the wheel with poor traction

This differential will NOT provide complete locking like a hydraulic differential lock. It will limit differential action automatically and provide improved traction. Traction improvement is proportional to the surface being operated on. With a wheel on ice there will be little or no traction improvement. With a wheel on mud, traction will be significantly improved.

TX,9020,ME439 –19–20FEB97–2/2

Differential Lock Operation



T106225

Q DIFFERENTIAL LOCK OPERATION

Continued on next page

TX,9020,ME440 –19–25JAN97–1/2

A—From Differential Lock Solenoid
B—Shims
C—Shield
D—Spiral Bevel Set
E—Sun Pinion Gear
F—Bevel Side Gear
G—Bevel Pinion
H—Bevel Side Gear
I—Clutch Pack
J—O-Ring
K—Needle Thrust Bearing
L—Piston
M—Return Spring (3 used)
N—Engagement Pressure
O—Lubrication Oil
P—Thrust Washers
Q—Differential Lock Operation

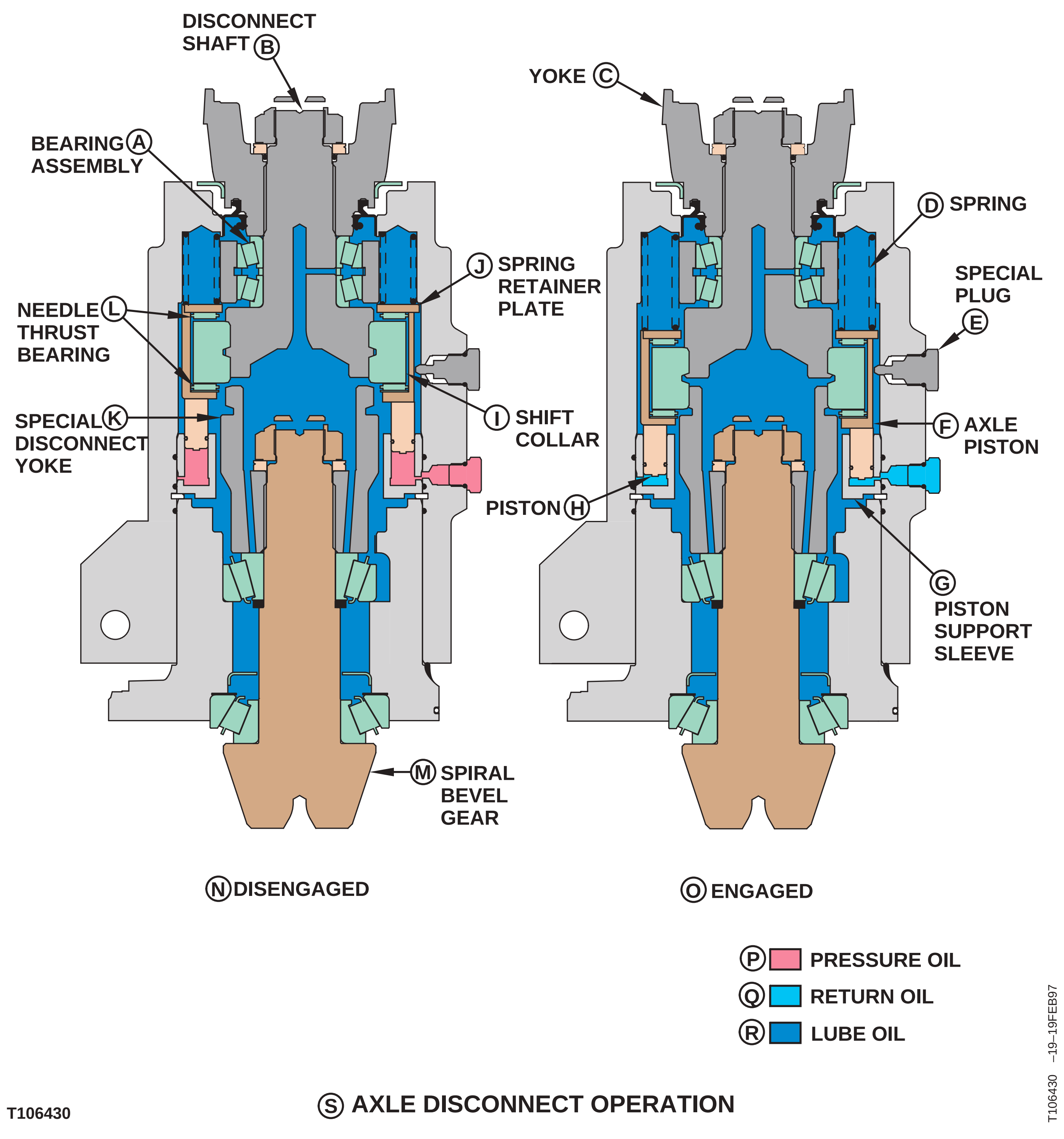
When the operator pushes the differential lock foot switch, the switch energizes the differential lock solenoid on the pressure reducing valve. When the differential lock solenoid is energized, pressure oil flows from differential lock solenoid inlet (A) to the piston (L). The piston (L) is stationary to rotation in the differential housing. Pressure oil forces the piston against a needle thrust bearing (K) and the clutch pack (I). The compressed clutch pack locks the sun pinion gears (E) together causing both axles to rotate at the same speed.

Since the piston does not ’t rotate in the differential housing, the O-rings (J) provide zero piston leakage.

When the operator disengages the differential lock, three springs (M) force the outer plate of the clutch pack (I) to move the piston to the disengaged position. This ensures there is minimal drag in the clutch pack (I).

TX,9020,ME440 –19–25JAN97–2/2

Axle Disconnect Operation



T106430

S AXLE DISCONNECT OPERATION

A—Bearing Assembly
B—Disconnect Shaft
C—Yoke
D—Spring
E—Special Plug
F—Axle Piston
G—Piston Support Sleeve
H—Piston
I—Shift Collar
J—Spring Retainer Plate
K—Special Disconnect Yoke
L—Needle Thrust Bearing
M—Spiral Bevel Gear
N—Disengaged
O—Engaged
P—Pressure Oil
Q—Return Oil
R—Lube Oil
S—Axle Disconnect Operation

Continued on next page

TX,9020,ME441 –19–19FEB97–1/2

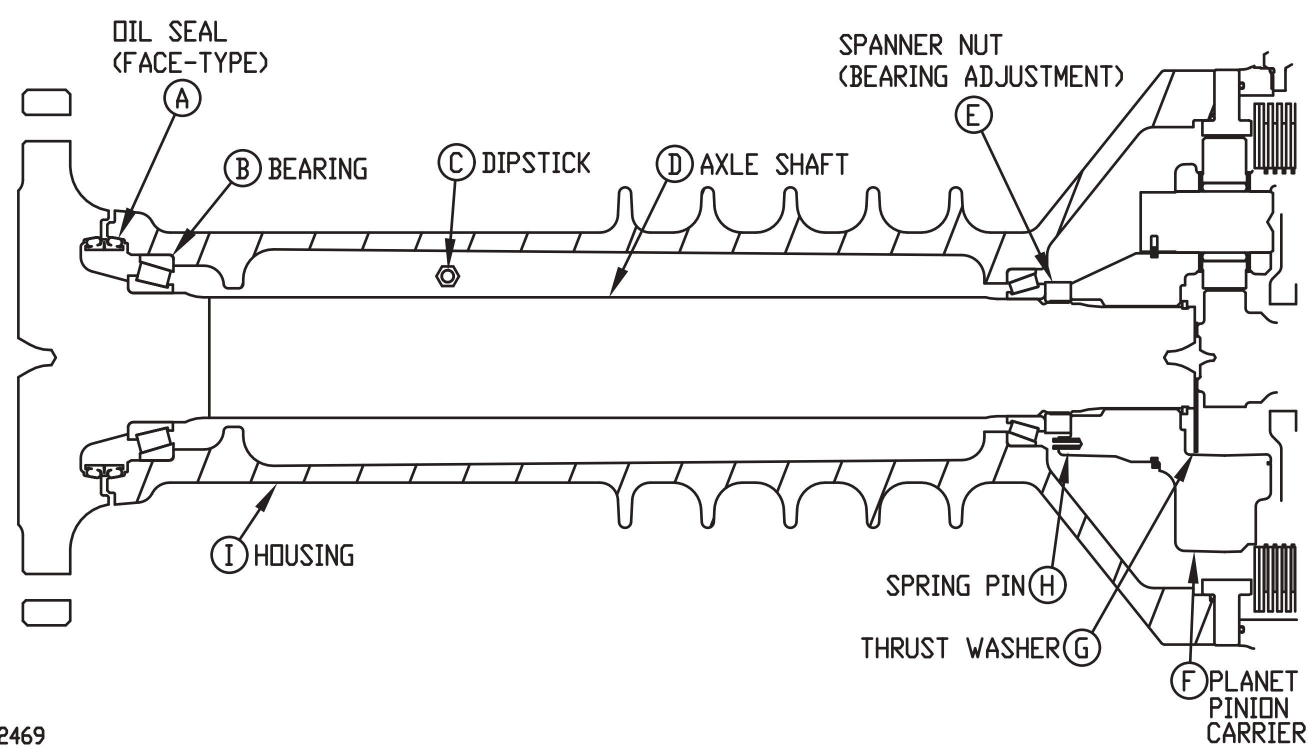
A hydraulic release spring engaged axle disconnect is available as an option on the front axle. The disconnect housing is mounted directly on the input housing. It is secured by clamping force with a large cap screw. The regular yoke on the spiral bevel gear shaft (M) is replaced with a special disconnect yoke (K). The disconnect shaft (B) and yoke (C) provide the input drive. The disconnect yoke (K) has splined ends that match the splines on the shift collar (I). The shift collar (I) is always in mesh with the disconnect shaft (B). In the engaged mode, four springs (D) move the shift collar (I) in to mesh with the special disconnect yoke (K) and the disconnect shaft (B). The four pistons (H) are connected to return oil (Q) and are completely retracted.

In the disengaged mode, pressure oil (P) is supplied to the pistons (H). The pistons (H) extend moving the shift collar (I) out of mesh with the special disconnect yoke (K) and disengaging the front axle.

The disconnect components are lubricated with lube oil (R).

TX,9020,ME441 –19–19FEB97–2/2

Axle Shaft And Housing

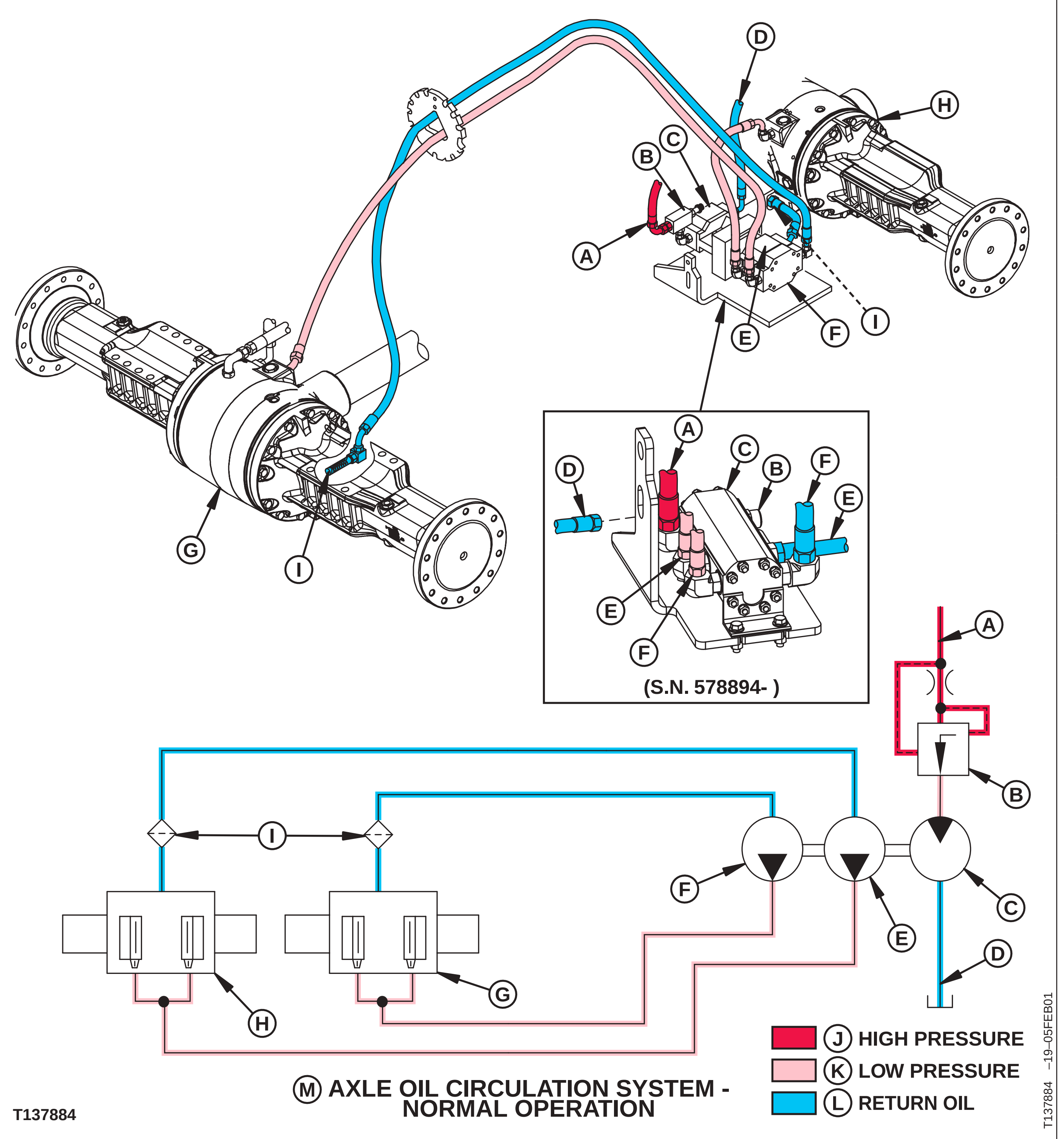


A—Oil Seal (Face-Type)
B—Bearing
C—Dipstick
D—Axle Shaft
E—Spanner Nut (Bearing Adjustment)
F—Planet Pinion Carrier
G—Thrust Washer
H—Spring Pin (Nut Lock)
I—Housing
J—Axle Shaft And Housing

The outboard bearing (B) of the axle shaft (D) is lubricated with oil from the differential housing. The structure of the axle housing (I) retains oil for the outboard bearing (B) even on a slope. The seal (A) is a face type which provides excellent sealing even under adverse operating conditions. A spanner nut (E) is used for axle bearing adjustment. The spanner nut (E) is locked with a spring pin (H) in the planet pinion carrier (F). Dipstick (C) provides a convenient method for checking axle oil lever.

TX,9020,ME442 –19–12JUL00–1/1

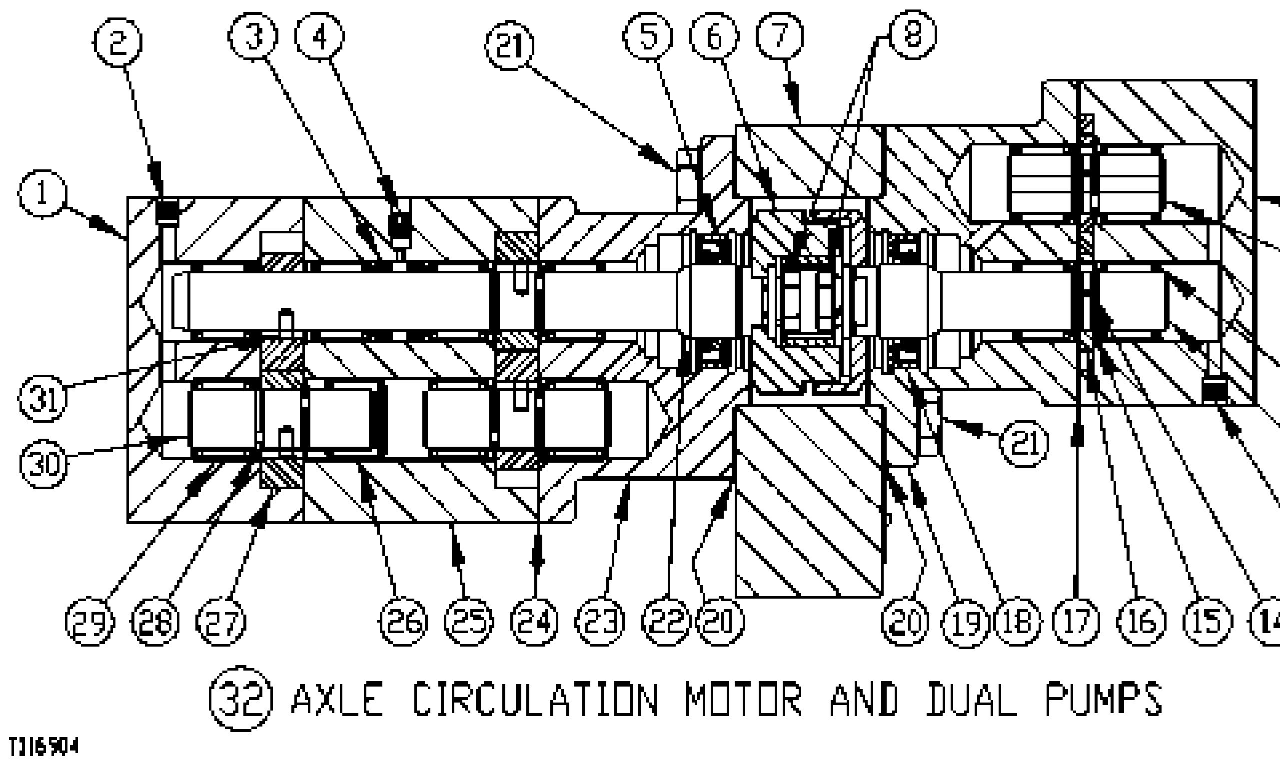
Axle Recirculation Motor and Dual Pumps



A—Inlet From Main Hydraulic Pump
B—Flow Control Valve
C—Motor
D—Return Oil to Reservoir
E—Rear Axle Pump
F—Front Axle Pump
G—Front Axle
H—Rear Axle
I—Suction Screen (2 used)
J—High Pressure
K—Low Pressure
L—Return Oil
M—Axle Oil Recirculation System

Continued on next page

CED,TX03679,3581 –19–12AUG98–1/3



T116904 –UN–28AUG98

Axle Recirculation Motor and Dual Pumps (S.N. —578893)

1—Pump Housing
2—Plug
3—Oil Seal
4—Hex Plug
5—Oil Seal
6—Coupling Assembly
7—Adapter Housing
8—Hex Screw (2 used)
9—Motor Housing
10—Idler Shaft Assembly
11—Needle Bearing
12—Drive Shaft (Motor)
13—Plug
14—Drive Pin
15—Crescent Ring
16—Gear
17—Gasket
18—Oil Seal
19—Stator (Motor)
20—Mounting Gasket (2 used)
21—Hex Screw (2 used)
22—Drive Shaft (Pump)
23—Stator (Pump)
24—Gasket
25—Center Pump Housing
26—Needle Bearing
27—Gear
28—Crescent Ring
29—Needle Bearing
30—Idler Shaft Assembly
31—Drive Pin
32—Axle Recirculation Motor and Dual Pumps (S.N. —578893)

The TeamMate III axle has an axle oil recirculation system. This system is designed to circulate oil from the sump of each axle over the braking elements. This oil flow will help keep the brakes and differential hydraulic oil from over heating. The oil recirculation system consists of a motor (C) with dual pump assembly (E and F), inlet suction screens (I), pressure compensated flow control valve (B), tubing, hoses and various fittings. The gear type motor and dual pumps are connected by a coupling assembly (S.N. —578893).

(S.N. 578894—) The new version motor and dual pump assembly has a through shaft which eliminates the coupler. It also has a integral flow control valve. The recirculation motor and dual pump assembly is serviced as a complete assembly with the exception of the flow control valve. The flow control valve is not adjustable.

Continued on next page

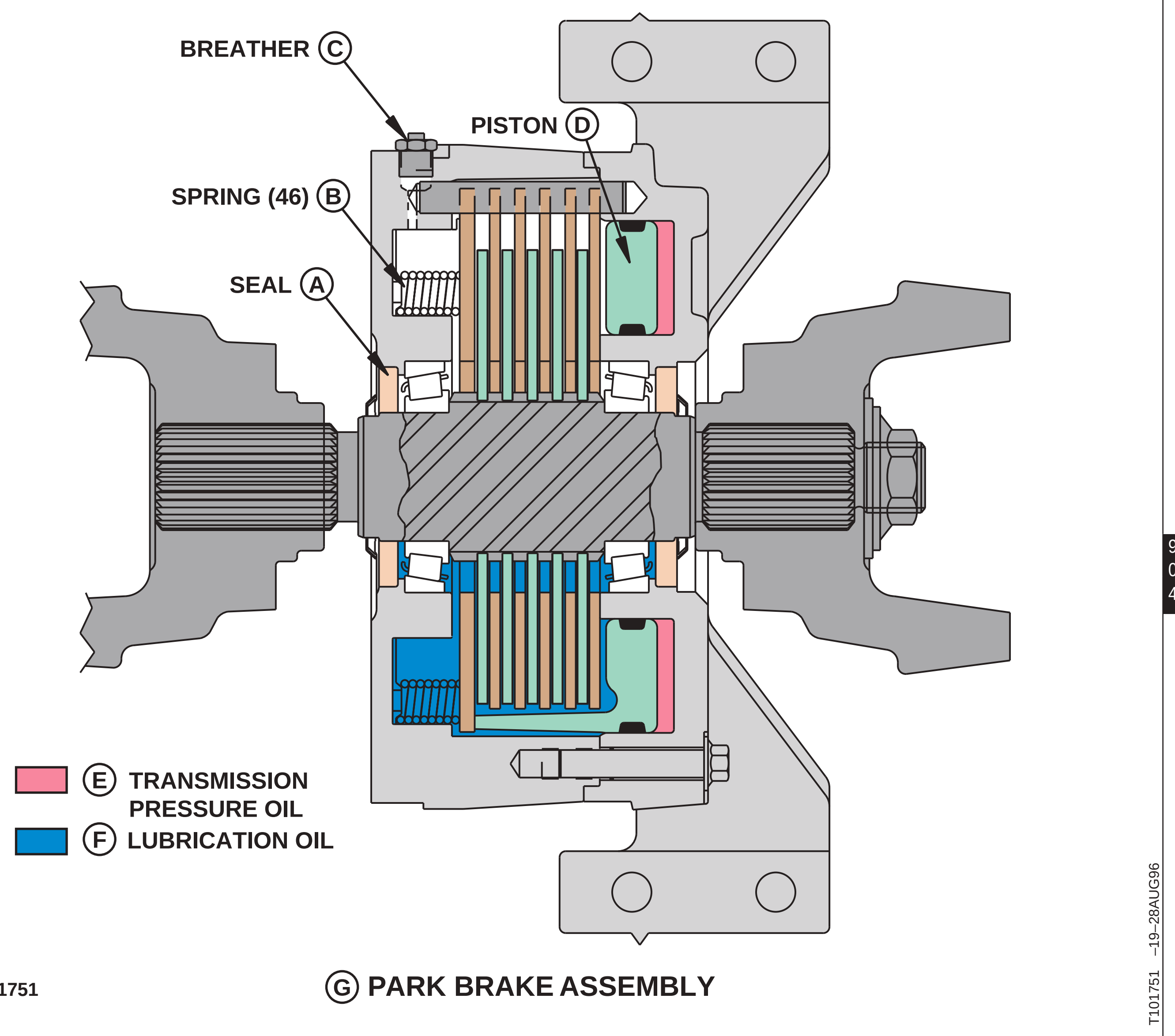
CED,TX03679,3581 –19–12AUG98–2/3

9020
05
39

The system functions by taking fluid power from the main hydraulics to spin a motor that drives the two axle pumps. Each pump draws fluid from a single axle and returns it to the same axle. There is no mixing of fluids, meaning the main hydraulic oil is used to operate the motor with system pressure. The motor drives the front and rear pumps through a mechanical coupling to circulate axle hydraulic oil. The fluid is drawn through an inlet suction screen in the bottom of the differential housing and returned to the top of axle where it is distributed to the brakes. The oil flows through the brake and back into the sump.

CED,TX03679,3581 –19–12AUG98–3/3

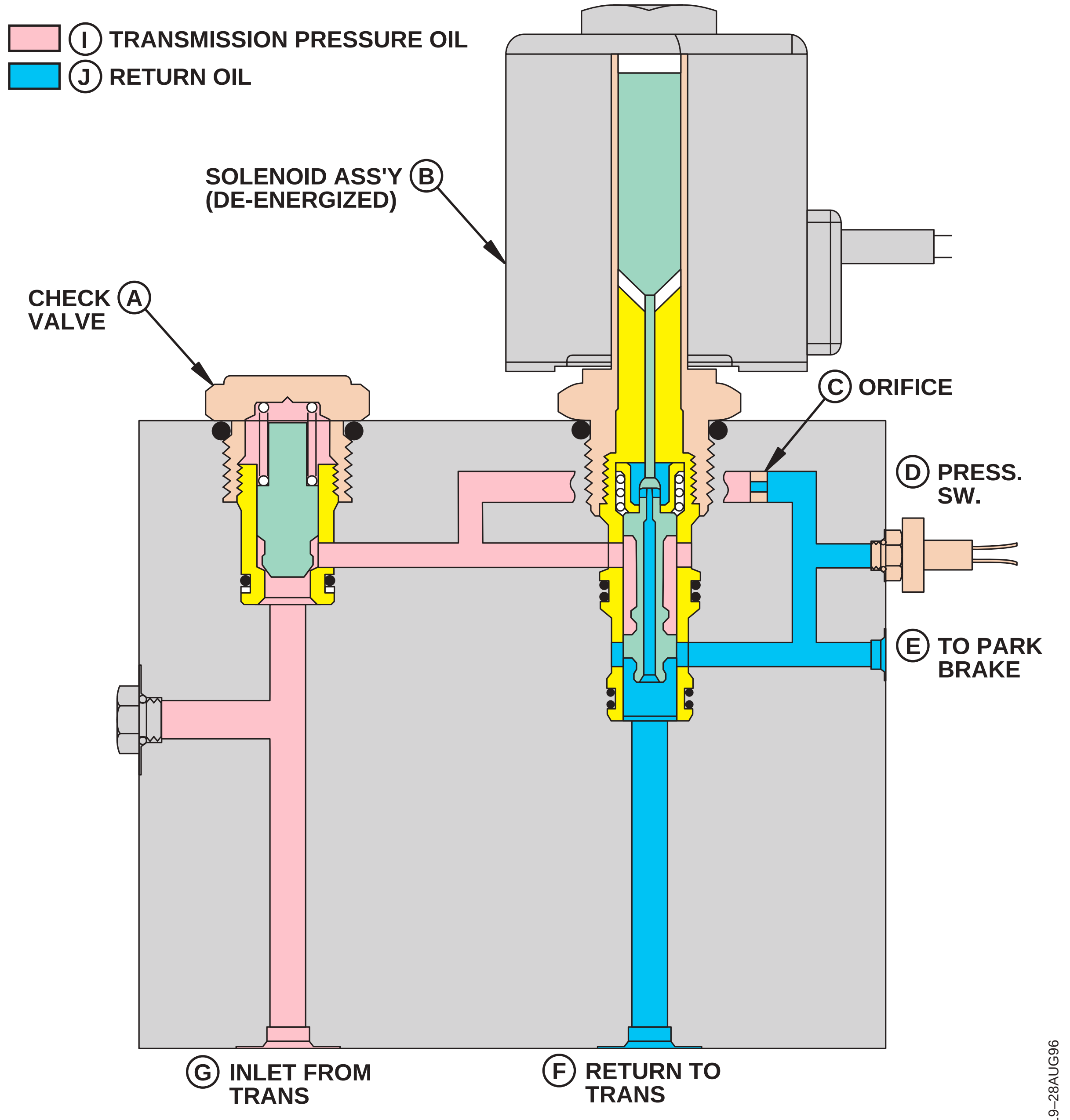
Park Brake Operation



A—Seal
B—Spring (46)
C—Breather
D—Piston
E—Transmission Pressure Oil
F—Lubrication Oil
G—Park Brake Assembly

Continued on next page

TX,9020,ME443 –19–10AUG96–1/3



T101936

PARK BRAKE SOLENOID – PARK BRAKE "ON"

A—Check Valve
B—Solenoid Assembly (De-energized)
C—Orifice
D—Pressure Switch
E—To Park Brake
F—Return To Transmission
G—Inlet From Transmission
H—Park Brake Solenoid—Park Brake "ON"

The multiple wet disk park brake is located in the loader frame, it has two functions, not only is it the park brake for the loader but it also serves as the front drive line support bearing. The park brake is spring applied and hydraulically released.

Continued on next page

TX,9020,ME443 –19–10AUG96–2/3

The separator plates are held stationary with the brake housing. The brake disks are splined to the shaft. When the park brake is released the park brake solenoid valve is energized and pressure oil from the transmission pump enters the cavity behind the piston moving it to the right against the spring retainer which compresses the springs. This allows the disks to rotate with the shaft and the drive line is free to turn.

When the park brake is applied or the machine is shut off, the park brake solenoid valve is de-energized. The solenoid valve blocks oil from the transmission pump and opens the piston cavity to return. The springs force the spring retainer and piston to the left compressing the plates against the disks. This locks the drive line to the brake housing to apply the park brake.

To release the park brake, the switch has to be moved to the momentary reset position with the engine running.

The park brake can be released by using a hand-operated hydraulic pump in a machine down situation. See Towing Procedure (Go to Operator's Manual).

TX,9020,ME443 –19–10AUG96–3/3

Diagnose Transmission System Malfunctions

NOTE: 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. See Monitor Display Unit—Diagnostics Menu—Diagnostic Trouble Codes (d 01). (Go to Group 9015-20.)

Step 2. See Complete Machine Operational Checkout. (Go to Group 9005-10.

Step 3. See Diagnose Transmission System Malfunctions. (Go to Group 9020-15.)

Step 4. See Monitor Display Unit—Accessing Menus. See Transmission Controller Unit (TCU)—Electronic Clutch Adjustment (S.N. 573382—). (Go to Group 9020-20 and/or 9020-25.)

Symptom	Problem	Solution
Transmission Clutch Slippage	Low oil level	See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Wrong oil grade	See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Restricted Transmission pump suction screen	Remove and clean screen.
	Plugged orifice in control valve	Inspect and clean orifice. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Leak in transmission control valve or gasket	Remove valve and inspect gaskets. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Low transmission pump flow due to worn pump	See Transmission Pump Flow Test. (Go to Group 9020-25.)

Continued on next page TX,9020,ME444 –19–19FEB97–1/11

Symptom	Problem	Solution
	Weak or broken pressure regulating valve spring	See Transmission System Pressure Test. (Go to Group 9020-25.)
	Control valve	See Transmission Clutch Pressure Test. (Go to Group 9020-25.)
	Stuck solenoid valve	See Transmission Control Valve Solenoid Check. (Go to Group 9015-15.)
		Remove and inspect solenoid valve. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Damaged clutch sealing ring	Remove cover and inspect rings. See Remove Clutches, Input And Output Shafts. (Go to Group 0360 in Repair Manual.)
	Worn clutch pack	Check shift times in manual mode.
	Clutch pack leakage	See Transmission System Leakage Test. (Go to Group 9020-25.)
Machine Will Not Move	Diagnostic Trouble Code problem	Check Diagnostic Trouble Codes to define problem.See Diagnostic Trouble Code Quick Reference List. (Go to Group 9015-20.)
	Applied park brake	Check park brake fuse. See Functional Schematic And Component Location Legend. (Go to Group 9015-15.)
		See Continuity Check For Sensors With Two Wires. (Go to Group 9015-20.)
	Low oil level	Check transmission oil level.
	Clutch cutoff activated	Check that brake pedal is fully released.

Continued on next page

TX,9020,ME444 –19–19FEB97–2/11

Symptom	Problem	Solution
	No power to Transmission Controller Unit	Check Transmission Controller Switched 5A fuse. See Fuse Specifications. (Go to 9015-10.) See Load Center Harness (W3) Component Location. (Go to 9015-10.) Check Monitor and Transmission Controller Unswitched fuse. See Fuse Specifications. (Go to 9015-10.)See Load Center Harness (W3) Component Location. (Go to 9015-10.)
	Hydraulic failure of park brake	Park brake light ON. See Driveline Bearing—Park Brake Pressure Test. (Go to Group 9020-25.) If park brake light is OFF, inspect Park Brake. Remove and Install Driveline Bearing Park Brake. See Remove And Install Park Brake. (Go to Group 1111 in Repair Manual.)
	Malfunctioning park brake solenoid valve	Remove and inspect park brake solenoid valve. See Remove And Install Park Brake Release Solenoid Valve. (Go to Group 1160 in Repair Manual.) Check for power to solenoid valve.
	Failed shift switch	Check that Basic display window shows correct gear when shift switch is moved. See Monitor Display Unit—Normal Display. (Go to Group 9015-15.)
	Excessive leakage in transmission.	See Transmission System Leakage Test. (Go to Group 9020-25.)
	Low or no transmission pressure	See Transmission System Pressure Test. (Go to Group 9020-25.)

Continued on next page

TX,9020,ME444 –19–19FEB97–3/11

Symptom	Problem	Solution
	Failed torque converter	Check torque converter output speed in neutral, should equal engine rpm. Use diagnostic mode d 054.See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)
	Broken shafts or gears	Drain transmission to determine if large pieces of metal contamination are present.
	Broken drive shafts	Inspect drive shafts and universal joints for external damage. See Remove And Install Universal Joint And Universal Drive Shaft. (Go to Group 0225 in Repair Manual.)
	Broken ring or pinion gear	If drive shafts rotate with transmission in gear but machine does not move, a differential failure is indicated. See Remove and Install Universal Joint and Universal Drive Shaft. (Go to Group 0225 in Repair Manual.)
Machine Does Not Engage In Low Gear	Clutch cutoff activated	Check that brake pedal is fully released.
	Malfunctioning transmission control solenoid valve	See Transmission Control Valve Solenoid Check. (Go to Group 9015-15.)
	Stuck spool in transmission control valve	Remove and inspect transmission control valve spools. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Plugged orifice in control valve	Remove control valve to inspect. Replace if necessary. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)

Continued on next page

TX,9020,ME444 –19–19FEB97–4/11

Symptom	Problem	Solution
	Failed sealing ring	Remove 1st gear sealing ring cover an inspect. See Remove Clutches, Input And Output Shafts. (Go to Group 0350 in Repair Manual.)
Machine Will Not Shift Correctly	Transmission shifts fast in fourth gear automatic	Wrong Transmission Controller Unit for machine model number. Install correct controller.
	Transmission will not shift out of second in automatic mode	Wrong Transmission Controller Unit for machine model number. Install correct controller.
	Speed sensor disconnected or failed	See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)
	Transmission Controller Unit failure	See Check Controller. (Go to Group 1675 in Repair Manual.)
Transmission System Pressure Is Low In Neutral	Low oil level	Check transmission oil level and refill if necessary.
	Transmission filter clogged	Replace filter.
	Park brake light ON	Low park brake pressure, check transmission system pressure. See Transmission System Pressure Test. (Go to Group 9020-25.)
	Plugged suction screen	Transmission pump may be noisy if transmission suction screen is clogged. Disassemble transmission to remove and clean suction screen.
	Stuck transmission pressure regulating valve or broken spring	Remove transmission pressure regulating valve. Inspect for damage. See Remove and Install Converter Minimum Pressure Regulator Valve. (Go to Group 0360 in Repair Manual.)

Continued on next page TX,9020,ME444 –19–19FEB97–5/11

Symptom	Problem	Solution
	Failed control valve gasket	Inspect transmission control valve for external leakage. Remove control valve. Inspect or replace gasket. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Seal blown on solenoid valve	Inspect solenoid valve. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Failed transmission pump	See Transmission Pump Flow Test. (Go to Group 9020-20.)
Transmission System Pressure Is Low (One Or Two Gears)	Failed transmission control valve gasket	Inspect transmission control valve for external leakage. Remove control valve. Inspect or replace gasket. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Leakage in clutch piston or seal ring	Air check to confirm leak. Disassemble and repair. See Disassemble Clutch Pack KV And KR. (Go to Group 0350 in Repair Manual.)
	Solenoid valve malfunction	Check for a transmission Diagnostic Trouble Code on monitor, then check solenoids using Monitor diagnostics. See Diagnostic Trouble Code Quick Reference List. (Go to Group 9015-20.)
Transmission Shifts Too Slow	Low oil level (aeration of oil)	Add oil.
	Low transmission pressure	If park brake lights is ON, do transmission system pressure test. See Transmission System Pressure Test. (Go to Group 9020-25.)

Continued on next page

TX,9020,ME444 –19–19FEB97–6/11

Symptom	Problem	Solution
	Restricted transmission pump suction screen	Disassemble transmission to remove and clean suction screen. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Low transmission pump flow	See Transmission Pump Flow Test. (Go to Group 9020-25.)
	Excessive transmission internal leakage	See Transmission System Leakage Test. (Go to Group 9020-25.)
	Transmission Controller Unit is programmed incorrectly	Program for correct machine model and accessories with Monitor. See Monitor Display Unit—Accessing Menus. (Go to Group 9015-15.)
	Plugged orifice in control valve	Inspect and clean orifice. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
	Restricted oil passages between control valve and transmission.	Remove control valve and inspect oil passages. See Remove Hydraulic Control Valve. (Go to Group 0360 in Repair Manual.)
Transmission Shifts Too Fast	Failed speed sensor	See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)
	System pressure too high	See Transmission System Pressure Test. (Go to Group 9020-25.)
	Broken piston return spring	Disassemble and inspect clutch. See Remove Clutches, Input and Output Shafts. (Go to Group 0350 in Repair Manual.)
	Transmission Controller Unit	See Check Controller. (Go to Group 1675 in Repair Manual.)
Machine "Creeps" In Neutral	Warped disks and plates in two pack of transmission	Check transmission. See Remove Transmission Pump. (Go to Group 0360 in Repair Manual.)

Continued on next page

TX,9020,ME444 –19–19FEB97–7/11

Symptom	Problem	Solution
	Control valve leakage	See Transmission System Leakage Test. (Go to Group 9020-25).
	Plugged screen on solenoid valve	Remove solenoid valve and clean. See Disassemble Transmission Control Valve. (Go to Group 0360 in Repair Manual.)
Transmission Hydraulic System Overheats	High oil level	Transmission overfilled or hydraulic pump seal leaking. See Check Transmission Oil Level. (Operator's Manual Group 60)
	Low oil level	See Check Transmission Oil Level. (Operator's Manual Group 60)
	Wrong oil grade	See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Park brake dragging	Check for heat in park brake area.
	Pinched, restricted or leaking lube lines	Check cooler lines.
	Malfunction in temperature gauge or sender	Install temperature sensor to verify temperature.
	Restricted air flow through oil cooler or radiator	See Transmission Oil Cooler, Hydraulic Oil Cooler, Air-to-Air Aftercooler, and Radiator External Cleaning Procedure. (Operator's Manual Group 90)
	Failed oil cooler bypass valve (in thermal bypass valve)	Disassemble and inspect. See Disassemble and Assemble Radiator, Oil, and Air Cooler. (Go to Group 0510 in Repair Manual.)
	Failed thermal bypass valve	Remove thermal bypass valve and check to see if machine still overheats. See Transmission Oil Cooler Thermal Bypass Valve Test. (Go to Group 9020-25.)

Continued on next page

TX,9020,ME444 –19–19FEB97–8/11

Symptom	Problem	Solution
	Internally restricted oil cooler	Do Transmission Oil Cooler Restriction Test. See Group 9020-25.
	Missing turbulators in oil cooler	Replace oil cooler. See Repair Manual.
	Leakage in transmission hydraulic system	Do Transmission System Pressure Test and Converter-Out Flow Test. See Group 9020-25.
	Malfunction in converter relief valve or circuit	Do Converter-Out Pressure Test. See Group 9020-25.
	Low transmission pump output	Do Transmission Pump Flow Test. See Group 9020-25.
Excessive Transmission Noise (under load or no load)	Too low engine slow idle	Check engine slow idle speed. See Group 9010-20.
	Worn parts or damaged in transmission	Disassemble transmission to inspect suction screen for metal particles. Repair as necessary. See Repair Manual.
	Damaged drive dampener	Inspect drive dampener.
	Converter bearings failed	Replace converter. See Repair Manual.
	Low or no lube	Do Converter-Out and Lube Pressure Test. See Group 9020-25. Do Transmission Pump Flow Test. See Group 9020-25.
	Driveline or park brake	Inspect drive line and park brake.
Foaming Oil	Incorrect type of oil	Change oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45) See Change Transmission Oil. (Operator's Manual Group 85)

Continued on next page

TX,9020,ME444 –19–19FEB97–9/11

Symptom	Problem	Solution
	High oil level	Transmission overfilled or hydraulic pump seal leaking. See Check Transmission Oil Level. (Operator's Manual Group 60)
	Low oil level	Add oil. See Check Transmission Oil Level. (Operator's Manual Group 60)
	Air leak on suction side of pump	Check oil pickup tube on inside of transmission.
Oil Ejected From Dipstick	Plugged breather	Inspect breather on top of transmission. Replace.
Machine Vibrates	Aerated oil	Add oil. See Check Transmission Oil Level. (Operator's Manual Group 60)
	Low engine speed	Check engine speed. See Group 9010-20.
	Failed universal joints on transmission drive shaft or differential drive shafts	Check universal joints. See Repair Manual.
	Damaged drive dampener.	Inspect drive dampener.
Machine Lacks Power And Acceleration	Engine high idle speed set too low	Adjust engine high idle. See Group 9010-20.
	Incorrect transmission oil	Drain transmission oil and refill. See Change Transmission Oil. (Operator's Manual Group 85)
	Aerated oil	Add oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Warped transmission clutch	See Forward, Reverse Clutch Pack Drag Check. Group 9005-10.
	Torn transmission control valve gasket	Inspect gasket. See Repair Manual.
	Brake drag	Do Brake Drag Check. See Group 9005-10.

Continued on next page

Symptom	Problem	Solution
	Failed torque converter	Do Torque Converter Stall Speed Test. See Group 9020-25.
	Low engine power	Do Engine Power Test. See Group 9010-25.
	Converter relief valve stuck open	Inspect and repair. See Repair Manual.
Torque Converter Stall RPM Too High	Aerated oil	Put clear hose on thermal bypass outlet port. Run machine to check for bubbles in oil.
	Stuck open converter relief valve	Do Converter-Out Pressure Test. Group 9020-25.
	Leakage in torque converter seal	Do Converter-Out Pressure Test. Group 9020-25.
	Torque converter not transferring power (bent fins, broken stator)	Replace torque converter. See Repair Manual.
Torque Converter Stall RPM Too Low	Low engine power	Do engine power test. See Group 9010-25.
	Mechanical malfunction	Remove and inspect torque converter. See Repair Manual.
	Engine high idle speed set too low.	Adjust engine high idle. See Group 9010-20.

TX,9020,ME444 –19–19FEB97–11/11

Diagnose Differential And Axle Malfunctions

Symptom	Problem	Solution
No differential Lock Operation	Malfunction in electrical circuit	With engine stopped and key switch on, activate differential lock and listen for a click from solenoid valve. Do Differential Lock Operational Checks. See Group 9005-10.
	Stuck differential lock solenoid valve	With engine stopped and key switch on, activate differential lock and listen for a click from solenoid valve. Remove and inspect valve. See Repair Manual.
	Malfunction in pressure reducing valve or setting low	Do Differential Lock Pressure Test. See Group 9025-25.
	Excessive leakage in differential lock piston seals	Do Differential Lock Pressure Test. See Group 9025-25.
	Stuck differential lock piston	Disassemble, inspect, repair. See Repair Manual.
	Excessive wear on differential lock disks and plates	Disassemble, inspect, repair. See Repair Manual.

Continued on next page

TX,9020,ME445 –19–19FEB97–1/5

Symptom	Problem	Solution
Differential Lock Slips Or Chatters When Engaged	Axle oil broken down	Change axle oil. See Section 00, Group 0004
	Malfunction or setting low on pressure reducing valve	Do Pressure Reducing Valve Pressure Test. See Group 9025-25. Remove and inspect regulating valve.
	Excessive leakage differential lock piston seals	Do Differential Lock Pressure Test. See Group 9025-25.
	Failed seals on differential lock solenoid valve or regulating valve	Remove and inspect seals. See Repair Manual.
	Stuck differential lock piston	Disassemble, inspect and repair. See Repair Manual.
	Excessive wear of differential lock disks and plates	Disassemble, inspect, and repair. See Repair Manual.
	Warped differential lock disks and plates	Disassemble, inspect, and repair. See Repair Manual.
	Stuck differential lock piston	Disassemble, inspect, and repair. See Repair Manual.
Differential Lock Will Not Release	Stuck foot switch	Inspect.
	Malfunction in electrical circuit	With engine stopped and key switch on, activate differential lock and listen for a click from solenoid valve. Do Differential Lock Operational Checks. See Group 9005-10.
	Stuck differential lock solenoid valve	With engine stopped and key switch on, activate differential lock and listen for a click from solenoid valve. Remove and inspect valve. See Repair Manual.
	Stuck differential lock piston	Disassemble, inspect, repair. See Repair Manual.
	Warped differential lock disks and plates	Disassemble, inspect, repair. See Repair Manual.

Continued on next page

TX,9020,ME445 –19–19FEB97–2/5

Symptom	Problem	Solution
Differential Overfilled With Oil	Differential lock piston leaking	Replace differential lock piston seal. See Repair Manual Group 0250.
	Leak in brake piston seals	Remove differential check plugs and check leakage from check plug with brakes applied.
Differential Low On Oil	External leakage	Inspect axle and differential for leaks.

Continued on next page

TX,9020,ME445 –19–19FEB97–3/5

Symptom	Problem	Solution
Excessive Differential And/Or Axle Noise	Low oil level in differential	Check oil. Remove drain plug and inspect for metal particles in differential case. Disassemble and determine cause. See Repair Manual.
	Dragging brakes	Do brake check. See Group 9005-10.
	Engaged differential lock	Release lock.
		If circuit remains pressurized, check if foot switch is sticking. Remove and inspect.
		Check solenoid valve for sticking. Remove and inspect valve. See Repair Manual.
	Failed pinion bearing	Remove and inspect pinion. Check to ensure pinion housing was indexed. See Repair Manual.
	Incorrect gear mesh pattern between ring and pinion gear	Remove pinion gear housing and inspect ring and pinion gear. See Repair Manual.
	Failed differential pinion gears and/or cross shafts	Remove differential housing drain plug and inspect for metal particles. Disassemble and inspect. See Repair Manual.
	Failed axle bearing	Replace Axle Bearing. See Repair Manual.
	Mechanical failure in axle planetary	Repair differential. See Repair Manual.
	Defective axle recirculation motor dual pump.	Do Axle Recirculation Motor Dual Pump Flow Test. See Group 9020-25.

Continued on next page

Symptom	Problem	Solution
Oil Seeping From Outer Axle Seal	Dirt in face seal	Inspect or replace face seals. See Repair Manual
	Face seal out of place.	Replace face seal. See Repair Manual.
	Excessive end play in axle	Inspect Axle Bearing and Adjust or replace as needed. See Repair Manual.
	Worn outer bearing and/or cup	Inspect Axle Bearing and Adjust or replace as needed. See Repair Manual.
	Overfilled differential	Check differential lock oil return system for excessive internal restriction. See Repair Manual.
	High pressure in axle	Check Axle Breather. See Axle Breather Test. Group 9020.25.
Axle Overheats	Low differential oil	Add oil. See Check Front and Rear Differential Oil Level. (Operator's Manual Group 80)
	Overfilled differential	See Differential Overfills with OilSee this Group.
	Brake drag	See Brakes Drag in this group.
	Axle recirculation motor dual pump	Do Axle Recirculation Dual Pump Flow and Temperature Tests. See Group 9020-25.
	Axle recirculation motor dual pump screens plugged	Inspect axle recirculation filter screen located in differential housing below input yoke. See Power Train Component LocationSee this Group.

TX,9020,ME445 –19–19FEB97–5/5

Diagnose Service Brake Malfunctions

Symptom	Problem	Solution
Poor or No Brakes	Axle overheated	Do Axle Recirculation Dual Pump Flow and Temperature Tests. See Group 9020.25.
	Brake disks worn or warped	Do External Service Brake Inspection in Group 9020—20.
	Brake pressure low	Do Brake Valve Pressure Test in Group 9025—25.
	Leakage in brake piston seals	Check differential oil level. If over filled, brake system or differential lock is leaking.
	Brake valve leaking internally	Do Brake Valve Leakage Test in Group 9025—25.
	Brake shuttle valve stuck	Remove and disassemble to repair. See Repair Manual.
Aggressive Brakes	Clutch cutoff mode set to Steep Slope	Turn clutch cutoff switch OFF.
	Brake Valve Malfunction	Disassemble and inspect. See Repair Manual.
Brakes Drag	Brake pedal not returning	Inspect floor mat and pedal.
	Brake valve piston not returning to neutral position.	Disassemble and inspect. See Repair Manual.
	Brake piston not returning.	Disassemble axle and inspect brake pistons. See Repair Manual.

Continued on next page TX,9020,ME446 –19–08JUN00–1/2

Symptom	Problem	Solution
Brakes Chatter	Brake disk friction material worn	Inspect brake disks. See External Service Brake Inspection Group 9020—20.
	Oil broken down	Change oil. See Section 00 Group 004
	Wrong oil in hydraulic system	Drain hydraulic reservoir and differentials. Refill with correct oil. See Change Hydraulic Oil and Change Front and Rear Differential Oil in Operators Manual.
		See Excessive Differential or Axle Noise. (This Group.)
Hissing Noise When Brake Pedal is Pushed	Brake valve or brake piston leakage	Do Brake Valve Leakage Test in Group 9025—25.
Brake Pressure Indicator Light Will Not Go Out Or Stays On Excessively Long After Start-up	Brake accumulator pressure too low	Do Brake Accumulator Precharge Test in Group 9025—25.
	Brake Pressure Switch	Replace switch. See Repair Manual.
	Low hydraulic pump low standby pressure too low	Do Hydraulic Pump Margin And Low Standby Pressure Adjustment Test. See Group 9025—25.

TX,9020,ME446 –19–08JUN00–2/2

Diagnose Drive Line Malfunctions

Service Brake Malfunctions

Symptom	Problem	Solution
Excessive Drive Line Vibration Or Noise	Yokes not in line on drive shafts	Inspect. Align drive shaft yokes. See Repair Manual.
	Worn park brake bearings	Inspect, repair. See Repair Manual.
	Lack of lube in park brake	Inspect park brake oil level and adjust as required. See Check Park Brake Oil Level. (Operator's Manual)
	Bent drive shaft	Inspect all drive shafts. Replace. See Repair Manual.
	Loose yoke retaining nuts (drive shafts wobble at high speed)	Inspect. Replace. See Repair Manual.
	Rear axle oscillating support	Inspect. See Repair Manual.
	Lack of lubrication	Lubricate with proper grade of grease. See Grease. (Operator's Manual Group 45)

TX,9020,ME447 –19–20AUG96–1/1

Diagnose Park Brake Malfunctions

Symptom	Problem	Solution
Brake Will Not Hold	Piston seals leaking and oil coming out of the breather	Replace seals. See Repair Manual
	Breather plugged	Inspect and clean breather.
	Malfunctioning park brake solenoid	Inspect and replace
	Worn brake disk and/or plates	Disassemble, inspect, repair. See Repair Manual.
	Brake piston hangs up in bore	Remove and inspect. Repair. See Repair Manual.
	Broken springs in park brake	Inspect and repair park brake. See Repair Manual.
Brake Overheats	Overfilled with oil.	Adjust oil level. See Check Park Brake Oil Level. (Operator's Manual)
	Solenoid not functioning properly	See Driveline Bearing Park Brake Pressure Test. (Group 9020-25)
	Breather plugged	Inspect and clean breather.
	Low transmission pressure	Test Park Brake pressure. See Group 9020-25.
	Brake disk or plates warped	Inspect and repair. See Repair Manual.
	Brake drags	Test Park Brake Pressure. See Group 9020-25.
		Disassemble, inspect brake. Repair if necessary. See Repair Manual.
	Bearing failure in park brake	Disassemble, inspect brake. Repair if necessary. See Repair Manual.

Continued on next page

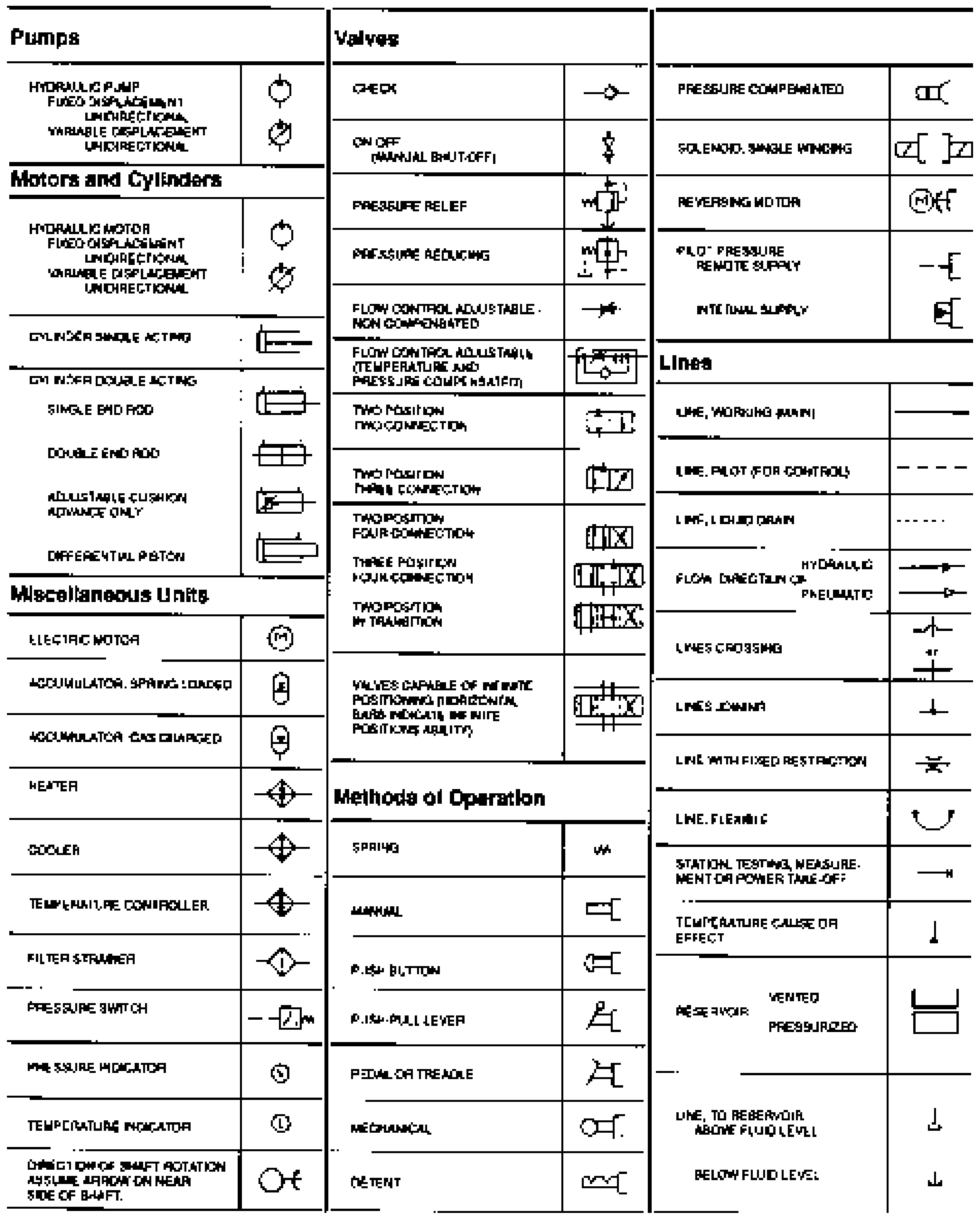
TX,9020,ME448 –19–20AUG96–1/2

Symptom	Problem	Solution
Park Brake Indicator In Monitor Comes On When Shifting From Fwd to Rev (All Other Gears OK)	Low oil level	Add oil. See Section 00 Group 0004.
	Cold oil	Warm oil to specification. See Group 9020-25
	Solenoid not functioning	Inspect or repair. See Repair Manual
Park Brake Light Comes On For Each Shift	Cold oil	Warm oil to specification. See Group 9020-25.
	Low transmission pressure	Do Transmission System Pressure Test. See Group 9020-25.
	Leak in transmission pressure circuit	Do Converter Out Pressure Test. See Group 9020-25.
	Failed transmission pump	Do Transmission Pump Flow Test. See Group 9020-25.
	Malfunctioning park brake solenoid	Do Park Brake Pressure Test. See Group 9020-25. Or replace park brake solenoid.
Park Brake Indicator In Monitor Does Not Come On When Brake Applied	Faulty wiring or switch	Inspect for loose or broken wires between brake indicator switch and indicator on dash.
		See Continuity Check For Sensors With Two Wires. (Group 9015-20.)
Brake Will Not Apply	Malfunctioning wiring, switch, or solenoid	Check electric circuit. See Group 9015-15.
	Restriction between transmission port and park brake valve	Remove hose and inspect. Replace.

TX,9020,ME448 –19–20AUG96–2/2

Hydraulic Circuit Symbols

These are ISO and ANSI standard hydraulic symbols for use in reading circuit diagrams.

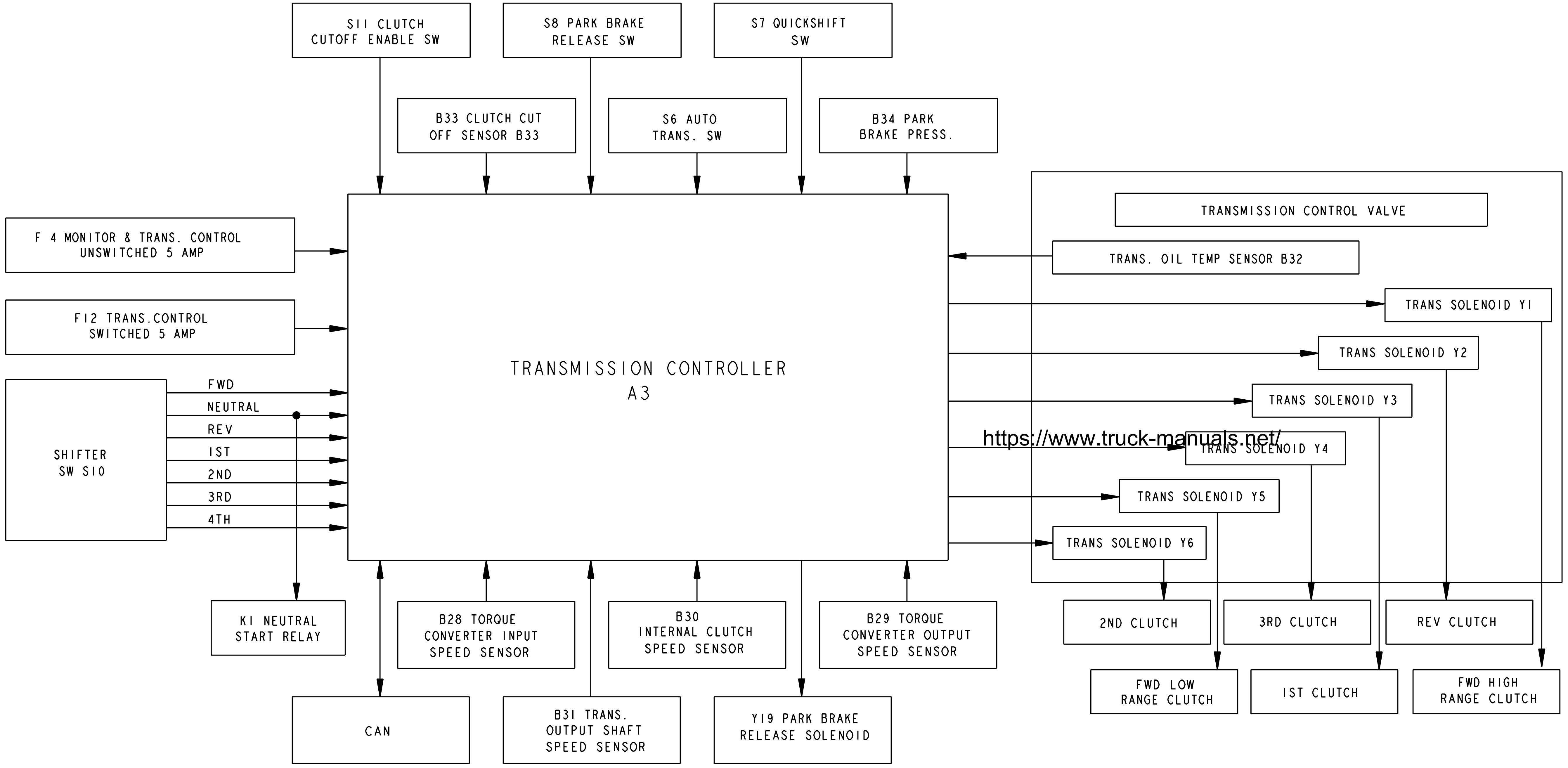


TS700 –19–28SEP89

TX,9020,ME449 –19–20AUG96–1/1

Transmission Control System

T111416 –19–08APR99

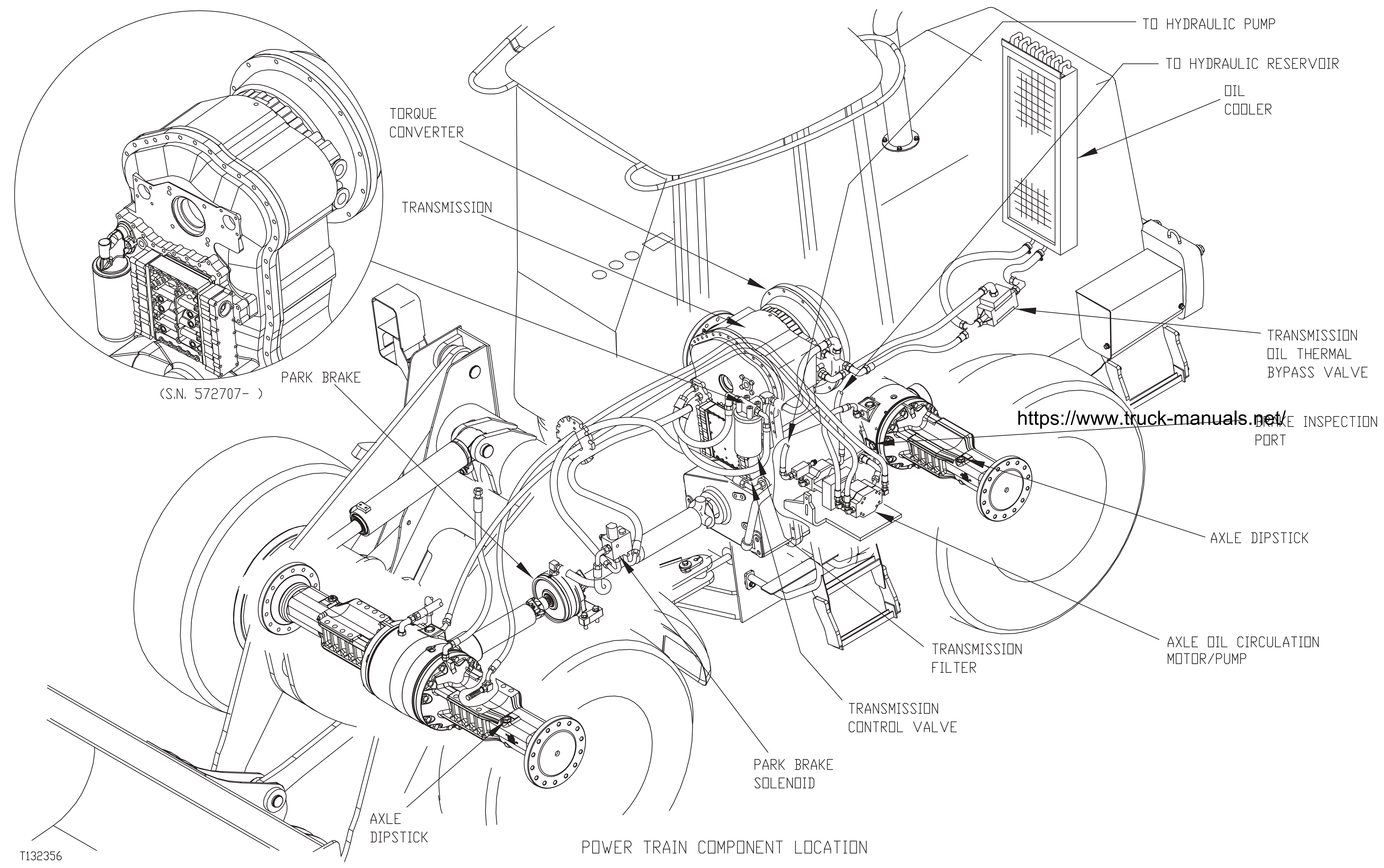


T111416

TX,9020,ME450 –19–27AUG96–1/1

Power Train Component Location

T132356 –19–14JUL00



Power Train Component Location (S.N —578517)

T151532 –UN–

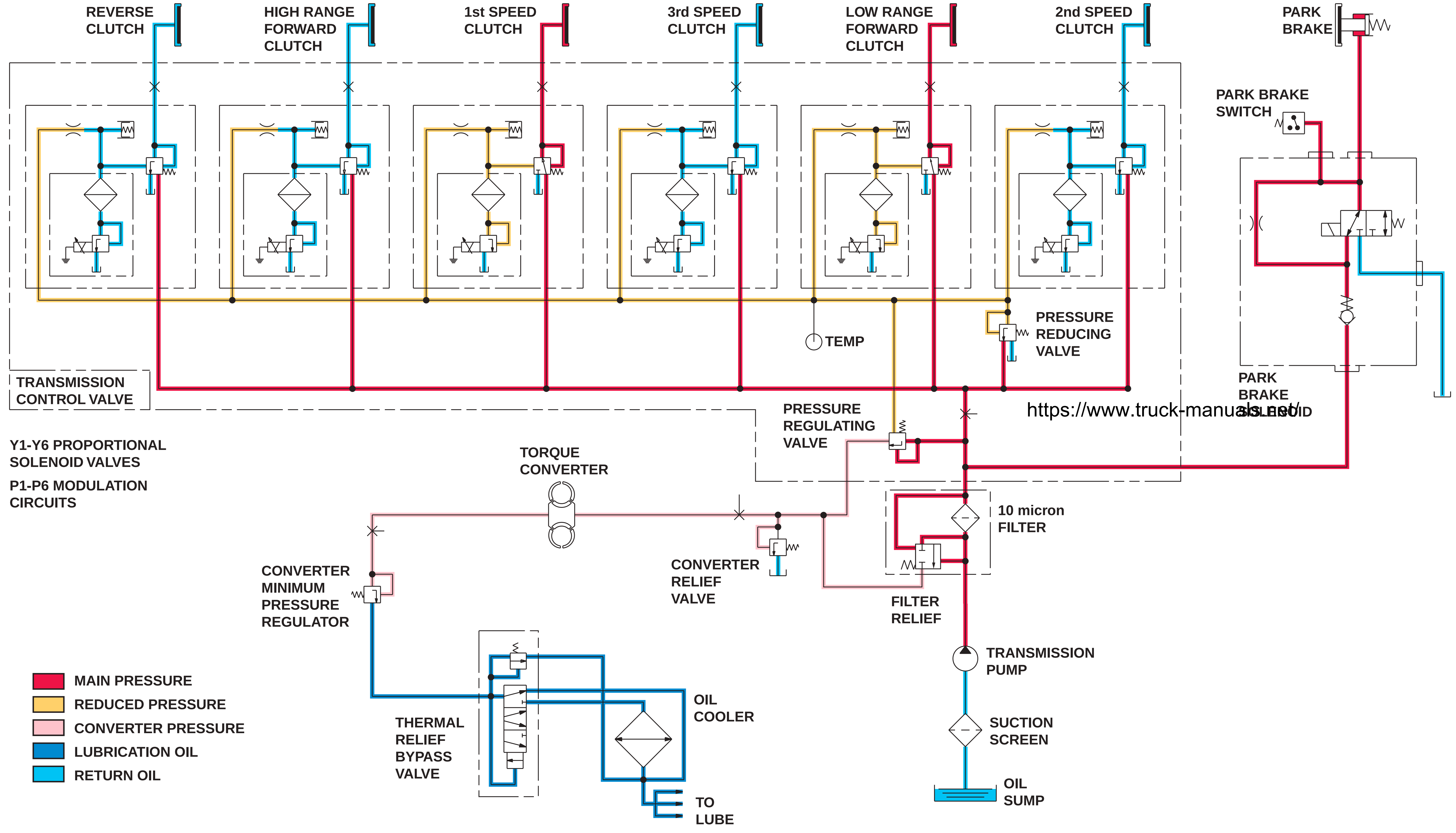
TX,9020,ME451 –19–07APR99–1/2

1—Park Brake
2—Transmission
3—Torque Converter
4—To Hydraulic Pump
5—To Hydraulic Reservoir
6—Transmission Oil Thermal Bypass Valve
7—Transmission Oil Cooler
8—Axle Dipstick—Rear
9—Brake Inspection Port
10—Axle Oil Circulation Motor/Pumps
11—Transmission Control Valve
12—Transmission Filter
13—Park Brake Solenoid
14—Axle Dipstick—Front

TX,9020,ME451 –19–07APR99–2/2

Transmission Control Circuit—First Forward

T156776 –19–03JUL02



T156776

Transmission Control Circuit-First Forward

TX,9020,ME452 –19–27AUG96–1/1

External Service Brake Inspection

IMPORTANT: Do first inspection at 5000 hours followed by 1000 hours inspection intervals after the first 5000 hours inspection.

If the service brakes are subjected to severe duty, inspect more frequently.

1. Remove plug form brake inspection port.

2. Start engine and run for one minute.

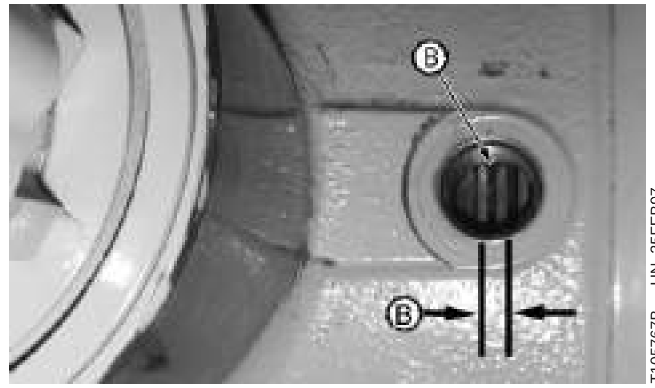
3. Stop and apply the brakes. Block pedal or have someone hold brakes on.

4. Using a feeler gauge at (A) measure the thickness of disks at dimension (B). Check dimension of two different disks.

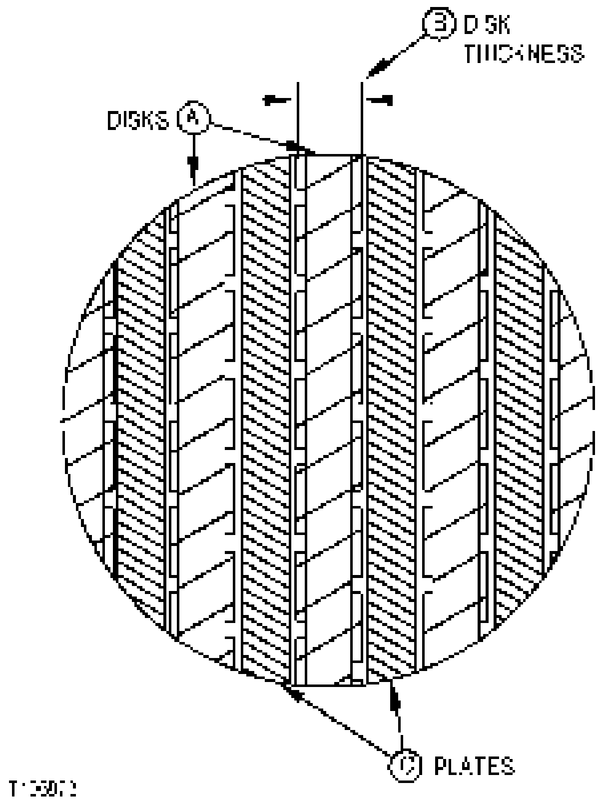
5. If either of the disks thickness at dimension (B) is less than the minimum specification, the brake packs must be replaced. See Repair Manual.

Specification	
Disk New—Thickness	2.90 mm (0.114 in.)
Disk Used (minimum)—Thickness	2.29 mm (0.090 in.)

T105193B –UN–02NOV98



T105767B –UN–25FEB97



T106873 –19–12FEB97

TX,9020,ME453 –19–11FEB97–1/1

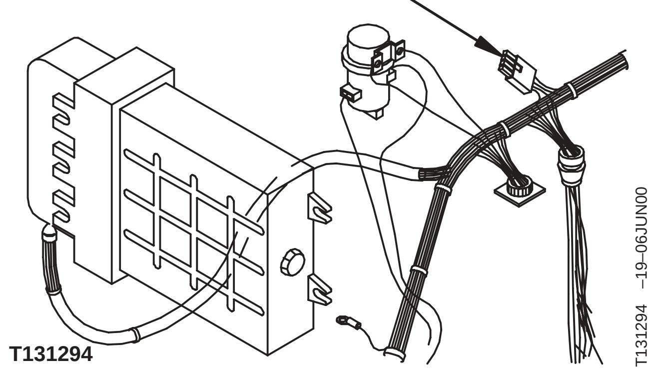
Transmission Controller Unit (TCU)—Electronic Clutch Adjustment (S.N. 573382—)

SPECIFICATIONS	
Engine Speed	900 ± 25 RPM
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)

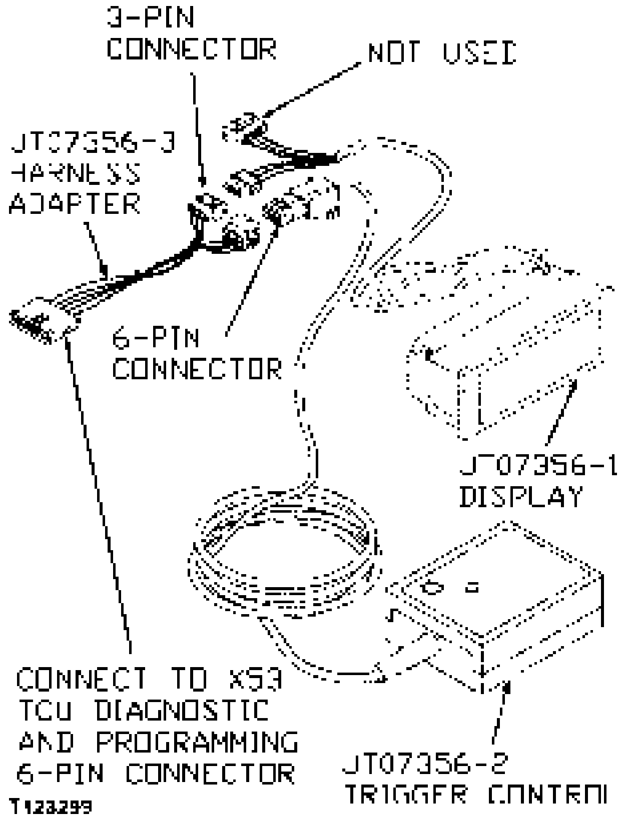
ESSENTIAL TOOLS
JT07356-3 Harness Adapter[a]
JT07356-1 Display[a]
JT07356-2 Trigger Control[a]
[a]Contained inside JT07356 TCU Electronic Clutch Adjustment Kit

NOTE: This adjustment is required after a tractor has transmission rebuilt, replaced or Transmission Controller Unit (TCU) is replaced. It is also recommended to perform this adjustment after all transmission oil change intervals including the initial 100 hour interval on new tractor or transmission. The adjustment will optimize the clutch pack shift operation by electronically adjusting the transmission controller unit for the exact transmission used in the tractor. Adjustment requires JT07356 TCU Electronic Clutch Adjustment Kit . This kit contains three tools: JT07356-1 Display, JT07356 -2 Trigger Control, and JT07356-3 Harness Adapter.

1. Open load center panel on right outside of cab and locate TCU diagnostic and programming 6 pin connector (X53). Remove dust cover from connector.



Diagnostic & Programming Connector (S.N. 573382—)



TCU Electronic Clutch Adjustment Kit Connections

Continued on next page CED,TX04577,848 –19–13APR99–1/4

NOTE: Transmission oil temperature must be warmed to specification when doing this adjustment. If oil temperature drops below specification while performing adjustment you must disconnect from harness from connector to allow transmission to be warmed up again. Then reconnect and continue doing adjustment.

2. Heat transmission oil to test specifications. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15).

   Or Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

Specification

Engine—Speed	900 ± 25 RPM
Transmission Oil—Temperature	80 ± 6°C (176 ± 10°F)

3. Connect JT07356-3 harness adapter to 6 way connector coming from TCU load center harness.

4. Connect JT07356-1 display with 3 pin connector to harness adapter.

5. Connect JT07356-2 trigger control with 6 pin connector (only 4 used) to harness adapter.

NOTE: Engine speed must be at proper specified speed when doing electronic clutch adjustment.

6. Run engine at slow idle. Park Brake “ON” and “Auto” transmission switch in the “OFF” position.

7. Press and hold start button on trigger control until display module indicates to start activation process.

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX04577,848 –19–13APR99–2/4

8.Display		
Symbol	**Meaning**	**Remarks**
PL	Trigger control is plugged into diagnostic plug on tractor.	
ST	Button at the trigger control is pressed.	
K1,K2,K3,K4,KV,KR	Clutch number being adjusted	
One bar and clutch number (K1...etc)	Wait for start, initialization of clutch being adjusted	
Two bars and clutch number (K1...etc)	Compensating pressure determined by clutch	
Three bars and clutch number (K1...etc)	Fast fill time determined by clutch	
OK	Trigger Control has been successfully completed	
Stop	Trigger Control canceled (activation stopped).	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
Stop and Clutch number (K1... etc.)	Trigger Control stopped. Clutch number shown cannot be calibrated	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
Spanner and Clutch number (K1... etc.)	Clutch number shown could not be calibrated. Trigger controller is finished.	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
Diamond shape facing up with a letter "E"	Engine speed to high	Lower engine speed
Diamond shape facing down with a letter "E"	Engine speed to low	Raise engine speed
Diamond shape facing up with a letter "T"	Temperature to low	Warm up oil
Diamond shape facing down with a letter "T"	Temperature to high	Cool down oil
FT	Transmission temperature not in defined range during calibration	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
FB	Operating mode not NORMAL or transmission sensor defective or storing of calibrated values to EEPROM has failed	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
FO	Output speed not zero	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
FN	Shift lever not in neutral position	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
FP	Park Brake not applied	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.
Stop	Trigger Controller was used incorrectly or is defective	Transmission stays in neutral, you have to restart the TCU by turning key Off & On.

Continued on next page

CED,TX04577,848 –19–13APR99–3/4

The display will read which clutch the trigger control is currently calibrating. Note: If the transmission falls below 70° C or climbs above 90° C, the display will read “T” and indicate that the temperature is too low or too high. Simply warm the transmission up to above 70° C or cool below 90° C and the trigger control will continue from where it left off.

If engine speed is raised above 1000 rpm, the display will read E and indicate that the engine speed must be lower. Again, the trigger control will pick up from where it left off once engine speed is below 1000 rpm. When the trigger control has been fully activated the display will read OK. Procedure is now completed.

9. Remove harness adapter and connections from load center harness. Install dust cover on 6 pin connector in load center harness.

CED,TX04577,848 –19–13APR99–4/4

Transmission Oil Warm-Up Procedure

NOTE: SERVICE ADVISOR™ system or vehicle monitor display can be used to indicate transmission oil temperature. Temperature sensor is located in transmission control valve.

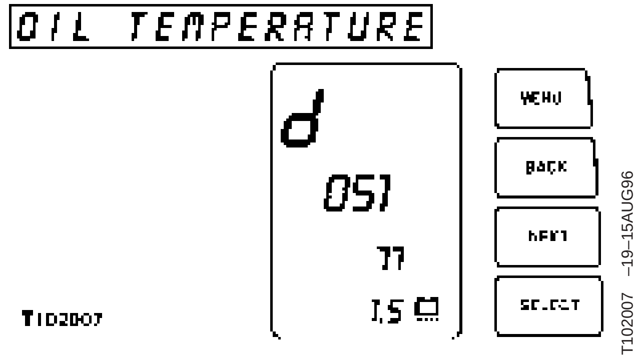
1. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature.

   See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. — 573732) or (S.N. 573733 —) in PDM kit instructions)

SERVICE ADVISOR is a trademark of Deere & Company

TX,9020,ME456 –19–26AUG96–1/2



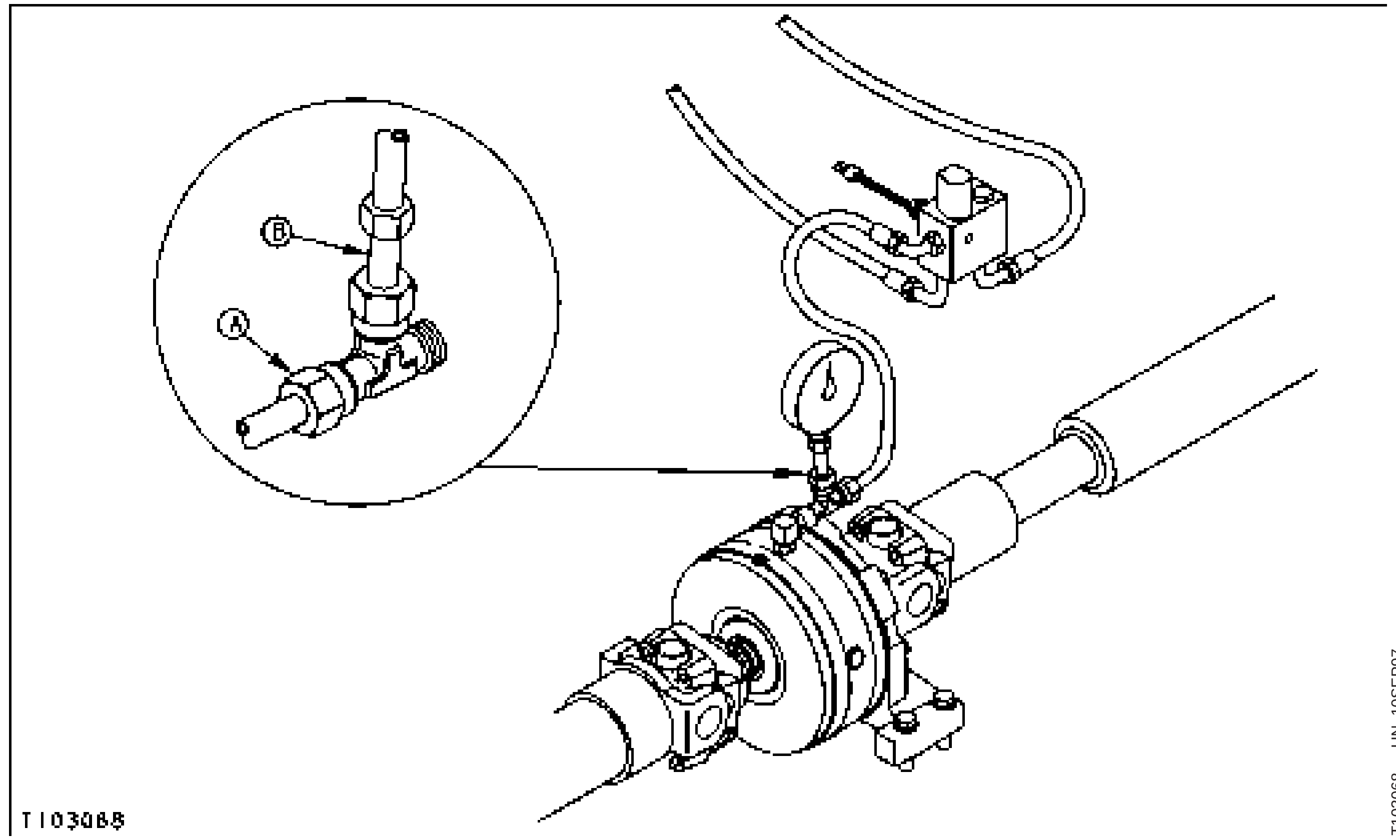
2. Release park brake.
3. Apply service brakes.
4. Shift to third gear forward.
5. Run engine at high idle until test specification is met or for 30 seconds (whichever comes first).
6. Reduce speed, shift to neutral and run for 15 seconds.
7. Repeat steps 3 to 5 until oil is to test specification.

NOTE: The monitor can remain in this mode during testing and adjustment or return to normal mode.

8. Press MENU to return to normal mode.

TX,9020,ME456 –19–26AUG96–2/2

Driveline Bearing—Park Brake Pressure Test



A—Tee B—Fitting

SPECIFICATIONS	
Transmission Oil Temperature	65 ± 6° C (150 ± 10° F)
Engine Speed Slow Idle	900 ± 25 RPM
Park Brake Pressure (Off)	1500—1800 kPa (15—18 bar) (218—260 psi)
Park Brake Pressure (On)	0 kPa (0 bar) (0 psi)

ESSENTIAL TOOLS
38H1030 (—6 M ORFS X —6 F ORFS X —6 M ORFS) (Parker No. 6R6LO-S Tee

SERVICE EQUIPMENT AND TOOLS
3447 kPa (34.5 bar) (500 psi) Gauge

1. Connect gauge and fittings (A and B).

2. See Transmission Oil Warm-Up Procedure. (See procedure in this group.) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

   Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

Specification
Transmission Oil—Temperature.................... 65 ± 6° C (150 ± 10° F)

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page TX,9020,ME457 –19–26AUG96–1/2

3. Run engine at test specification.

Specification

Engine Speed (Torque Converter Input Speed)—Slow Idle .... 900 ± 25 RPM

4. Push Park brake switch from “ON” to "OFF" position.

5. Record driveline bearing park brake pressure with switch in “OFF” position.

6. Push park brake switch to “ON” position.

7. Record driveline bearing park brake pressure with switch in “ON” position.

8. Compare recorded pressure to specifications.

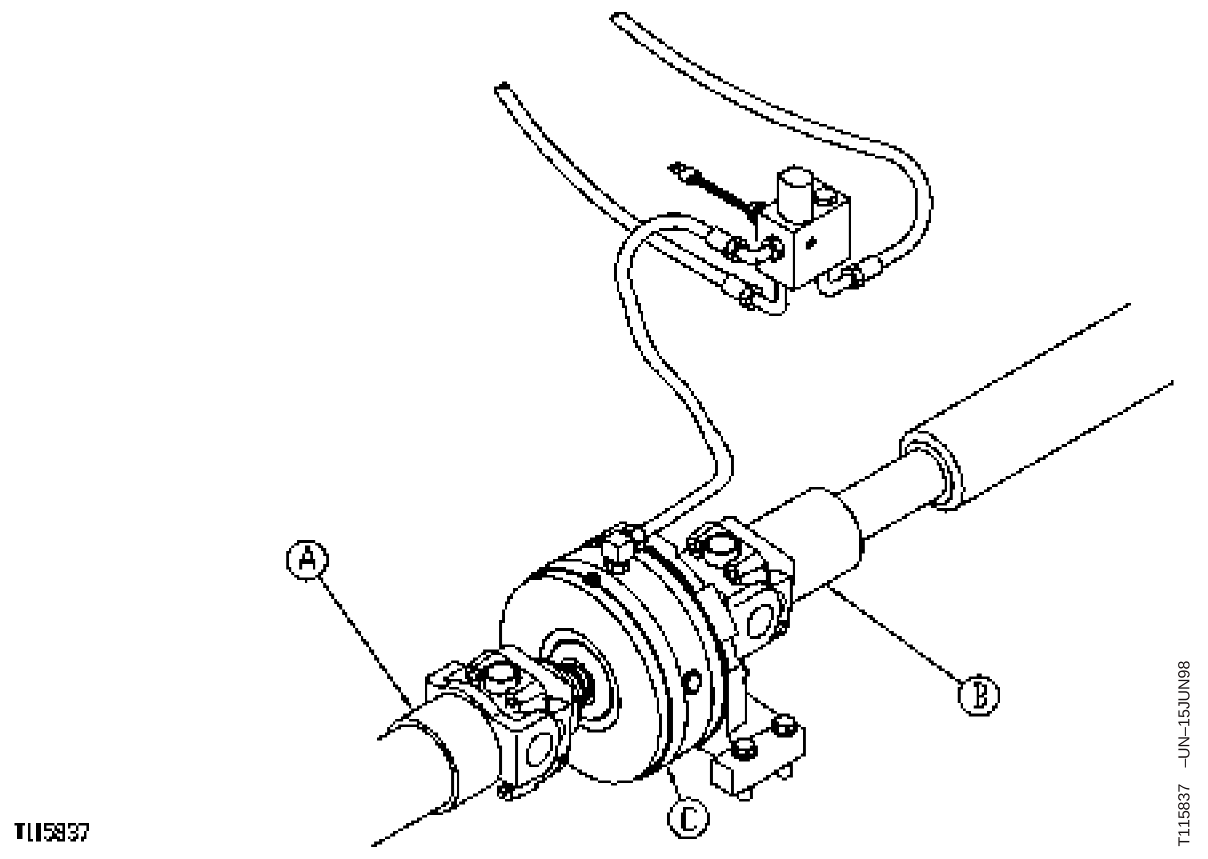
Specification

Driveline Bearing Park Brake—Pressure, Switch “ON” .... 0 kPa (0 bar) (0 psi)
Driveline Bearing Park Brake—Pressure, Switch “OFF” .... 1500—1800 kPa (15—18 bar) (218—260 psi)

- If pressure is too high or low, Do Transmission System Pressure Test in this group.
- If pressure does not drop to 0 when park brake is ON remove and inspect park brake solenoid valve
- If pressure is momentarily present when park brake is turned OFF and park brake pressure switch value in SERVICE ADVISOR system does not go to OFF (switch does not open), park brake pressure switch has failed closed.

TX,9020,ME457 –19–26AUG96–2/2

Driveline Bearing—Park Brake Drag Test



A—Drive Shaft (Front axle-to-Park Brake)
B—Drive Shaft (Transmission-to-Park Brake)
C—Park Brake

SPECIFICATIONS	
Park Brake Drag Resistance	Turn Free with Hand
Drive Shaft Universal Joint Cap Screw Torque	78 N•m (58 lb-ft)

NOTE: This test checks for excessive brake drag due to internal park brake parts being damaged or worn. This test should be done only after Park Brake Pressure Test is completed in this group.

CAUTION: Prevent possible injury from unexpected machine movement. Place blocks in front and rear of tires to prevent machine from rolling.

1. Place machine on level surface. Place blocks in front and rear of tires to prevent machine from rolling.

2. Install fame locking bar.

CAUTION: Prevent possible injury from unexpected machine movement. Connect frame locking bar to both frames before you work in frame pivot area.

3. Move neutral lock to “LOCKED” position on transmission shift lever.

4. Remove both drive shafts (A & B) from park brake (C) only. See Repair Manual Group 0200.

Continued on next page
CED,TX17994,359 –19–27JUL00–1/2

5. Start machine and turn park brake switch “OFF”.

6. Turn park brake yoke by hand. Should turn free with hand.

Specification

Park Brake Drag—Resistance........................... Turn Free with Hand

7. Turn park brake switch “ON” and turn machine “OFF”.

IMPORTANT: DO NOT reuse drive shaft universal joint cap screws. Replace cap screws to avoid machine damage.

8. Install drive shaft-to-park brake with new capscrews. Tighten to specification.

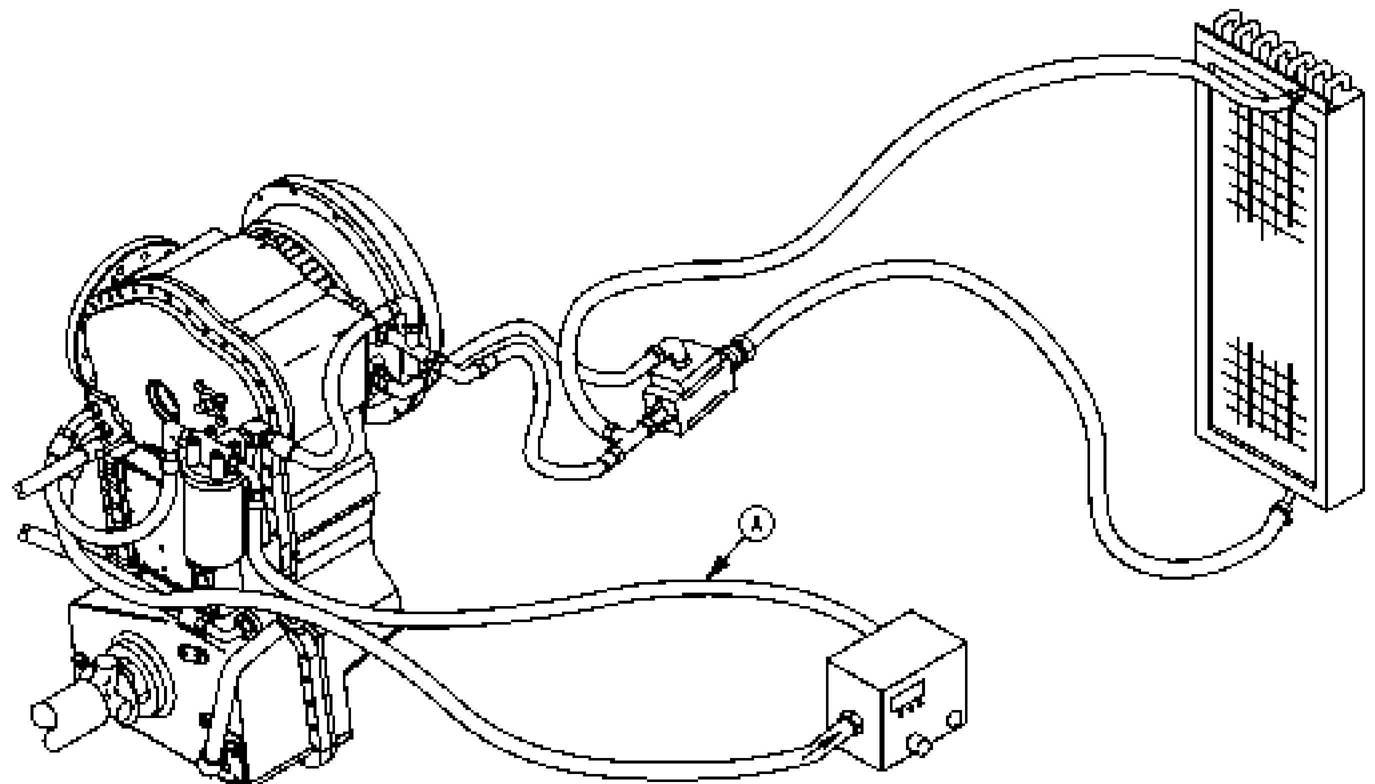
Specification

Drive Shaft Universal Joint Cap Screw—Torque... 78 N•m (58 lb-ft)

If not to specification remove park brake and inspect for worn or damaged parts.

CED,TX17994,359 –19–27JUL00–2/2

Transmission Pump Flow Test (S.N. —572706)



T113724

T113724 –UN–23FEB98

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
New Pump Flow (minimum)	72 L/min (19 gpm)
Used Pump Flow (minimum)	67 L/min (18 gpm)

ESSENTIAL TOOLS
(-12 Hose with -12F ORFS Ends) Flow Meter Test Hose

SERVICE EQUIPMENT AND TOOLS
JTO7148 Flow Meter

1. Make test connections as shown.

IMPORTANT: Before starting engine, check that flow meter loading valve is open. Pump can be damaged if engine is started with loading valve closed.

2. Warm transmission oil to test specification. See Transmission Oil Warm-Up Procedure. (Go to this group.)

Specification
Transmission Oil—Temperature...................... 80 ± 6°C (176 ± 10°F)

3. Operate engine at specified rpm. Measure pump flow.

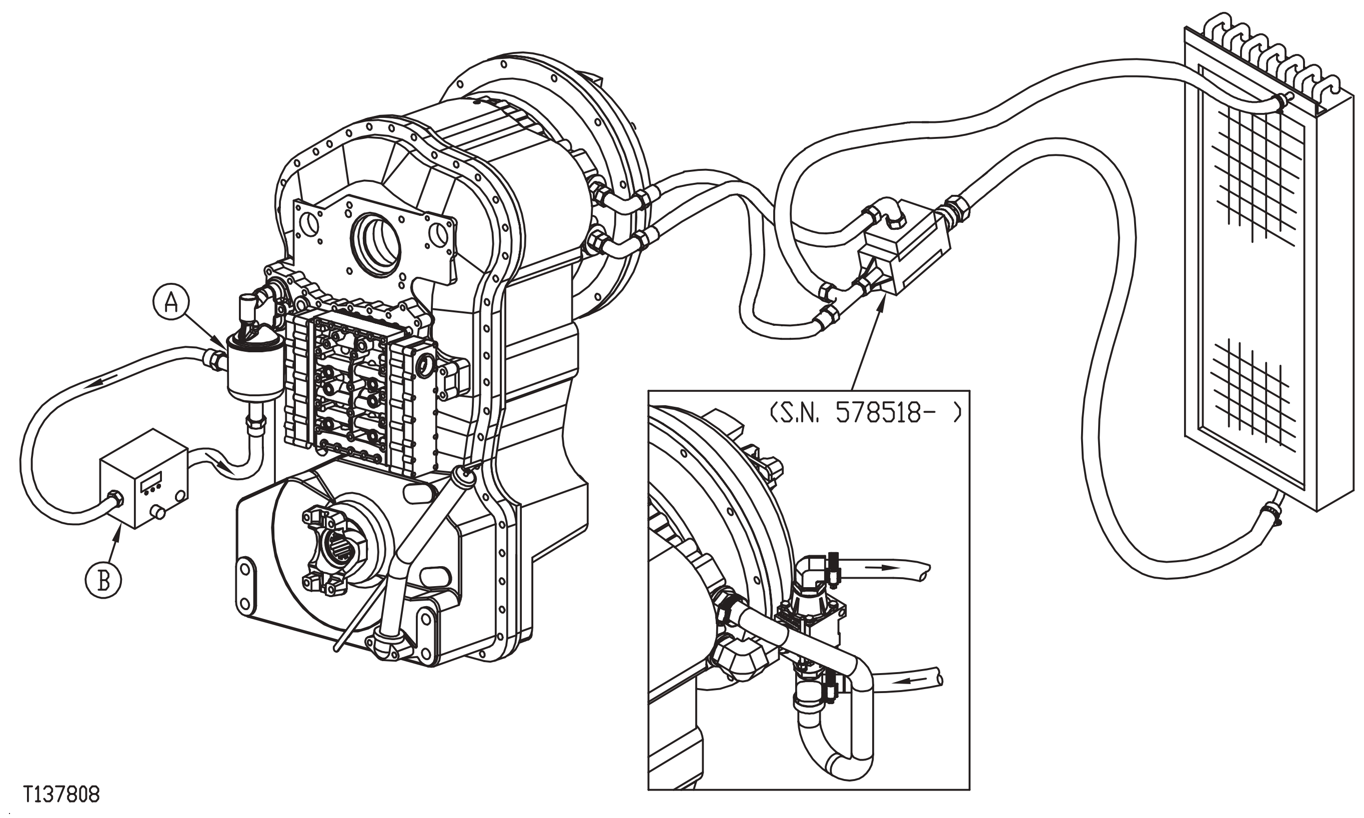
Specification
Engine—Speed... 1500 rpm
New Pump—Flow (minimum)................................ 72 L/min (19 gpm)
Used Pump—Flow (minimum)............................... 67 L/min (18 gpm)

Low transmission pump flow can be caused by:

- Low oil level in transmission.
- Cold transmission oil.
- Plugged suction screen.
- Air leak in pump suction tube.
- Worn transmission pump.

CED,TX04577,505 –19–14JUL00–1/1

Transmission Pump Flow Test (S.N. 572707—)



T137808 –UN–05FEB01

A—Filter Adapter B—Flow Meter

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
New Pump Flow (minimum)	72 L/min (19 gpm)
Used Pump Flow (minimum)	67 L/min (18 gpm)

ESSENTIAL TOOLS
JDG596 Filter Adapter
JDG596A1 Spacer and Sealing Washer Kit

SERVICE EQUIPMENT AND TOOLS
JT0148 Flow Meter

1. Make test connections as shown.

2. Install one washer on each side of spacer when installing filter adapter.

IMPORTANT: Before starting engine, check that flow meter loading valve is open. Pump can be damaged if engine is started with loading valve closed.

3. Warm transmission oil to specification. See Transmission Oil Warm-Up Procedure. (Go to this group.) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

   Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX18076,48 –19–01FEB01–1/2

Specification

Transmission Oil—Temperature	80 ± 6°C (176 ± 10°F)

4. Operate engine at specified rpm. Measure pump flow.

Specification

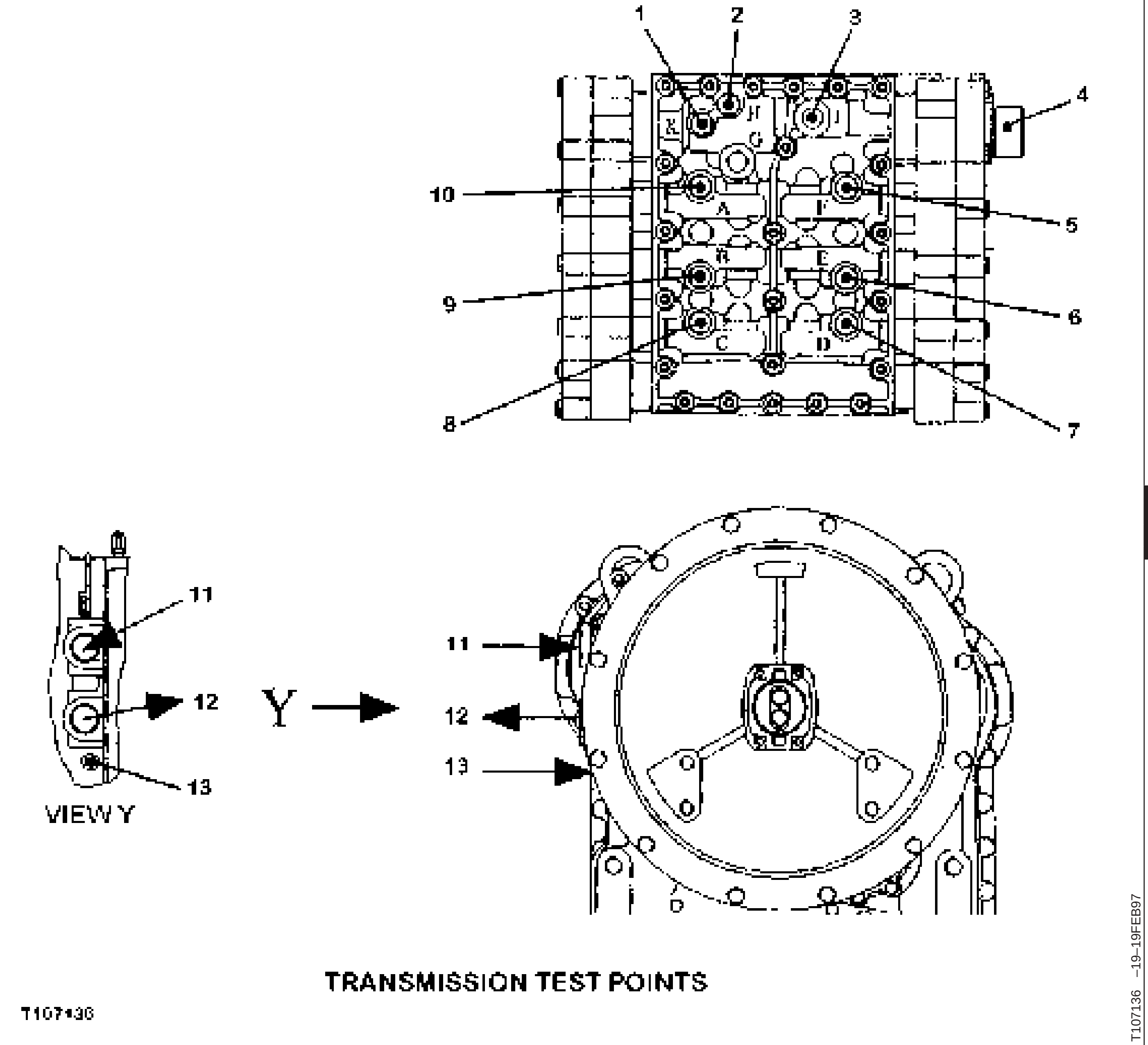
Engine—Speed	1500 rpm
New Pump—Flow (minimum)	72 L/min (19 gpm)
Used Pump—Flow (minimum)	67 L/min (18 gpm)

Low transmission pump flow can be caused by:

- Low oil level in transmission.
- Cold transmission oil.
- Plugged suction screen.
- Air leak in pump suction tube.
- Worn transmission pump.

CED,TX18076,48 –19–01FEB01–2/2

Transmission System Pressure Test



1—System Pressure
2—Converter-In Pressure
3— Reduced Pressure
4—Transmission Harness Connector
5—Clutch Forward High Range (K4)
6—Reverse Clutch (KR) (With diagnostic coupler)
7—Clutch C1 (K1) (With diagnostic coupler)
8—Clutch C3 (K3)
9—Clutch Forward Low Range (KV) (With diagnostic coupler)
10—Clutch C2 (K2) (With diagnostic coupler)
11—Cooler (Lube Pressure)
12—To Cooler
13—Converter-Out Pressure

Continued on next page

CED,TX04577,506 –19–01FEB01–1/2

NOTE: Four diagnostic couplers are supplied to points on the transmission for checking pressure. Additional diagnostic couplers may be purchased through John Deere Parts or existing couplers may be removed and reinstalled into points being tested.

SPECIFICATIONS	
Transmission Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
System Pressure	1500—1800 kPa (15—18 bar) (218—260 psi)

ESSENTIAL TOOLS
AT202955 (1/8 x M10 —1.5 M ORB) Diagnostic Coupler

SERVICE EQUIPMENT AND TOOLS
2000 kPa (20 bar) (300 psi) Gauge

9020
25
10

1. Install diagnostic coupler in test point (1) and connect gauge.

2. Use Monitor Display Unit Diagnostic Mode (d 051) to display transmission temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

3. Heat transmission oil to test specification.

Specification
Transmission—Temperature .... 80 ± 6°C (176 ± 10°F)

4. Check system pressure as follows:

- Run engine at 1500 rpm.

Specification
Engine—Speed .... 1500 rpm

- Record pressure with transmission in neutral.

5. Compare pressure to specifications.

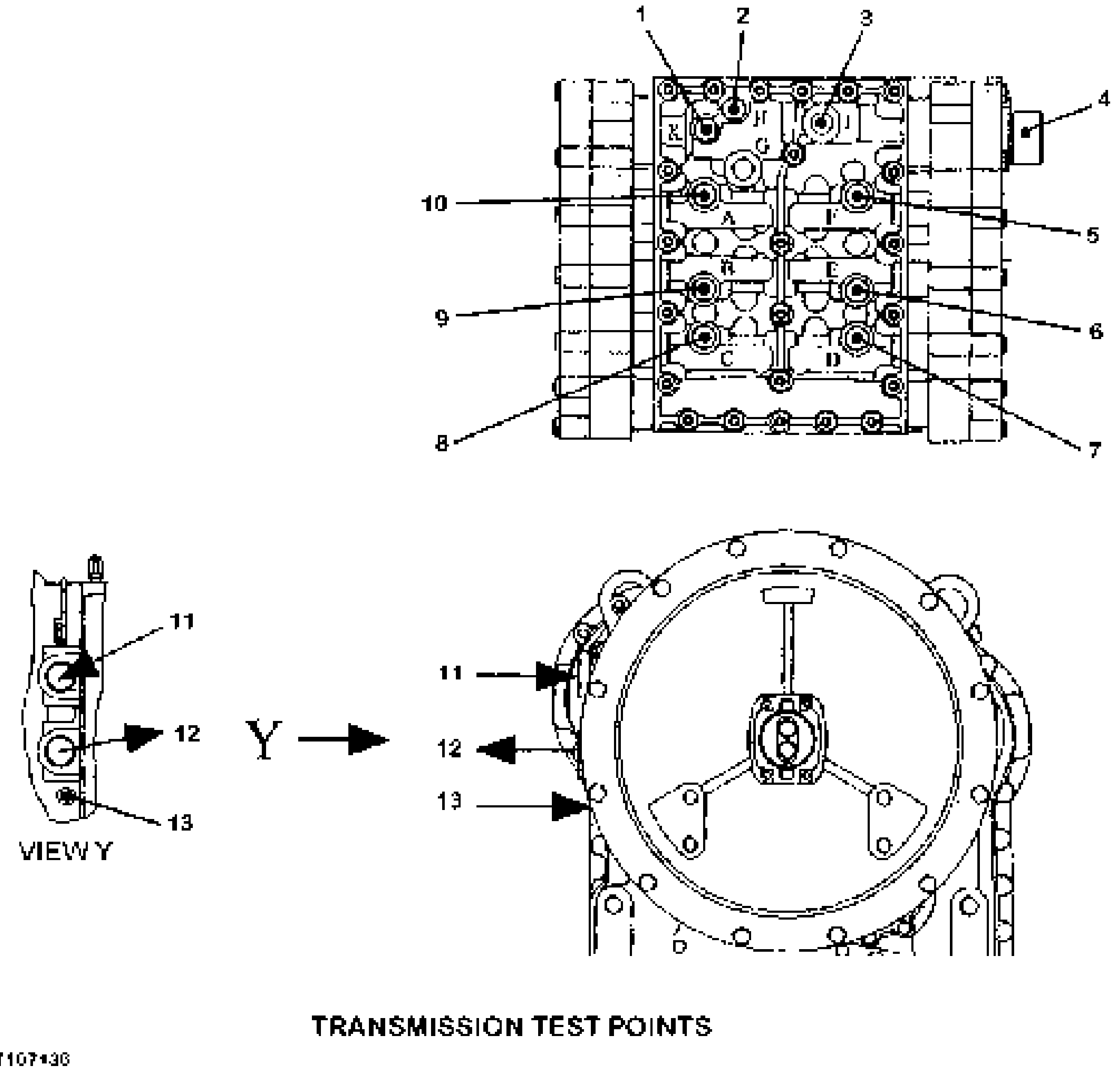
Specification
System—Pressure .... 1500—1800 kPa (15—18 bar) (218—260 psi)

6. If pressure is low:

- Do Transmission Pump Flow Test in this group. If flow is to specifications, inspect pressure regulating valve spring in control valve. See Repair Manual.

CED,TX04577,506 –19–01FEB01–2/2

Transmission Clutch Pressure Test



T107136 –19–19FEB97

1—System Pressure
2—Converter-In Pressure
3— Reduced Pressure
4—Transmission Harness Connector
5—Clutch Forward High Range (K4)
6—Reverse Clutch (KR) (With diagnostic coupler)
7—Clutch C1 (K1) (With diagnostic coupler)
8—Clutch C3 (K3)
9—Clutch Forward Low Range (KV) (With diagnostic coupler)
10—Clutch C2 (K2) (With diagnostic coupler)
11—Cooler (Lube Pressure)
12—To Cooler
13—Converter-Out Pressure

Continued on next page

CED,TX04577,508 –19–01FEB01–1/3

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
Clutch Pressure	1500—1800 kPa (15—18 bar) (218—260 psi)

SERVICE EQUIPMENT AND TOOLS
2000 kPa (20 bar) (300 psi) Gauge
AT202955 (1/8 x M10 —1.5 M ORB) Diagnostic Coupler

NOTE: Four diagnostic couplers are supplied on the transmission for checking pressure. Additional diagnostic couplers may be purchased through John Deere Parts. Existing couplers may be removed and placed in test points being tested.

NOTE: The test can be performed with one gauge but the test time required will be longer. Preferably use six gauges if available.

This test is performed to test modulation circuits which electronically control clutch pressure in each clutch.

1. Install diagnostic coupler in test points being tested. Connect gauge or gauges to test points (5 thru 10).

2. Use Monitor Display Unit Diagnostic Mode (d 051) to display transmission temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

3. Heat transmission oil to test specifications.

Specification
Transmission Oil—Temperature .... 80 ± 6°C (176 ± 10°F)

4. Run engine at specified speed.

Specification
Engine—Speed .... 1500 rpm

NOTE: Clutch—cutoff switch (Neutral) and Automatic transmission switch (Auto) must be OFF to perform this test.

5. Push clutch-cutoff switch (Neutral) OFF.

6. Push automatic transmission switch (Auto) OFF.

7. Apply service brakes.

8. Shift through all forward and reverse gears. Record pressures for each gear at test points indicated. The engagement pressure for each clutch should be the same.

9. Repeat test for all remaining clutch packs at points (5 thru 10) in neutral. Pressure should be zero.

NOTE: Main transmission pressure is used to engage the clutch packs. If clutch engagement pressure is below specification, it doesn't always mean a clutch pack is leaking. Low voltage to a proportional solenoid or a plugged orifice in the modulation circuit can also cause low pressure. The modulation circuit uses reduced main pressure and is not affected by clutch leakage.

10. Compare pressures to specifications.

Specification
Clutch—Pressure .... 1500—1800 kPa (15—18 bar) (218—260 psi)

- If low pressure at slow idle and not at 1500 rpm, the clutch is leaking. See Disassemble and Assemble Clutch Pack in Repair ManualSee Group 0350
- If pressure is low at both speeds, check for control valve problem.See Disassemble Transmission Control Valve in Repair ManualSee Group 3060.
- There should be some modulation when shifting gears, but since the Transmission Controller Unit (TCU) varies clutch modulation according to load and speed, there is no specified modulation time specification.

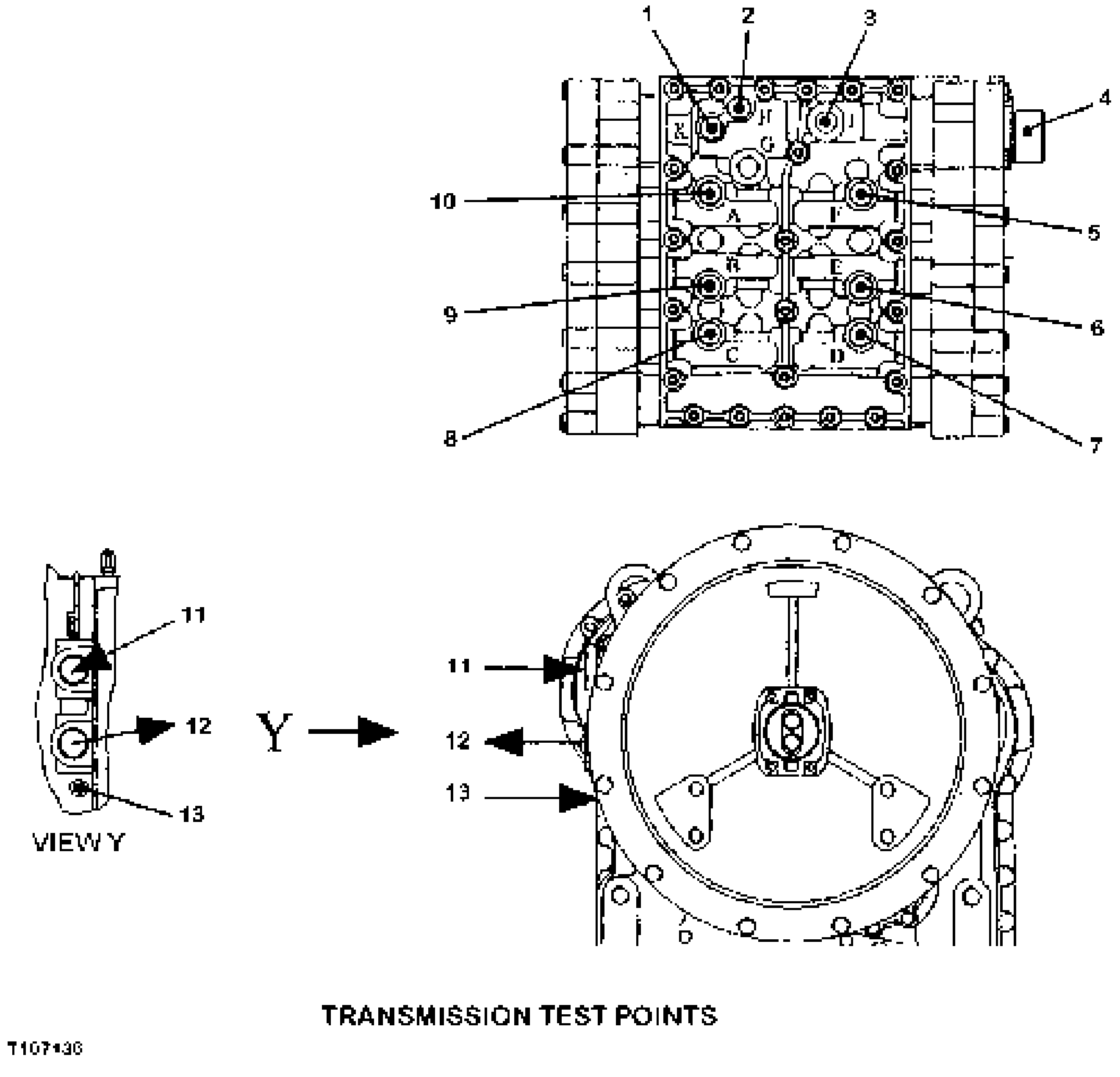
Continued on next page CED,TX04577,508 –19–01FEB01–2/3

- If pressure in one clutch is much lower than the other clutch pressures and system pressure, the probable cause is the modulation circuit for that clutch. (See Transmission Control Valve in Repair Manual to check Pressure Control Valves.) Check Diagnostic Trouble Codes in monitor display unit and refer to Group 9015-20 Diagnostic Trouble Code Interpretation.

TEST RESULTS		
Gear	Test Points	Pressure
1 Forward	9	
	7	
2 Forward	9	
	10	
3 Forward	9	
	8	
4 Forward	5	
	8	
1 Reverse	6	
	7	
2 Reverse	6	
	10	
3 Reverse	6	
	8	

CED,TX04577,508 –19–01FEB01–3/3

Transmission System Leakage Test



1—System Pressure
2—Converter-In Pressure
3— Reduced Pressure
4—Transmission Harness Connector
5—Clutch Forward High Range (K4)
6—Reverse Clutch (KR) (With diagnostic coupler)
7—Clutch C1 (K1) (With diagnostic coupler)
8—Clutch C3 (K3)
9—Clutch Forward Low Range (KV) (With diagnostic coupler)
10—Clutch C2 (K2) (With diagnostic coupler)
11—Cooler (Lube Pressure)
12—To Cooler
13—Converter-Out Pressure

Continued on next page

TX,9020,ME463 –19–01FEB01–1/2

NOTE: Four diagnostic couplers are supplied on the transmission for checking pressure. Additional diagnostic couplers may be purchased through John Deere Parts. Existing couplers may be removed and placed in test points being tested.

NOTE: This test will help isolate leakage in clutches from other components in the transmission or torque converter.

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
Converter-In Pressure Maximum Difference Between Gears Pressure	28 kPa (0.28 bar) (4 psi)

ESSENTIAL TOOLS
AT202955 (1/8 x M10 —1.5M ORB) Diagnostic Coupler

SERVICE EQUIPMENT AND TOOLS
690 kPa (7 bar) (100 psi) Gauge

1. Connect gauge to test port (2).

2. Use Monitor Display Unit Diagnostic Mode (d 051) to display transmission temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

3. Heat transmission oil to test specifications. (See Transmission Oil Warm-up Procedure in this group.)

Specification
Transmission Oil—Temperature .... 80 ± 6°C (176 ± 10°F)

4. Maintain specified engine speed and temperature.

Specification
Engine—Speed .... 1500 rpm

5. Push clutch cutoff switch (Neutral) to OFF

6. Push automatic transmission switch (AUTO) to OFF.

7. Apply service brakes

8. Shift through all forward and reverse gears. Record Converter-out pressure for each gear.

Analyze test results as follows:

- Pressures should all be nearly the same.
- If pressure difference is more than specification, clutch leakage is indicated.

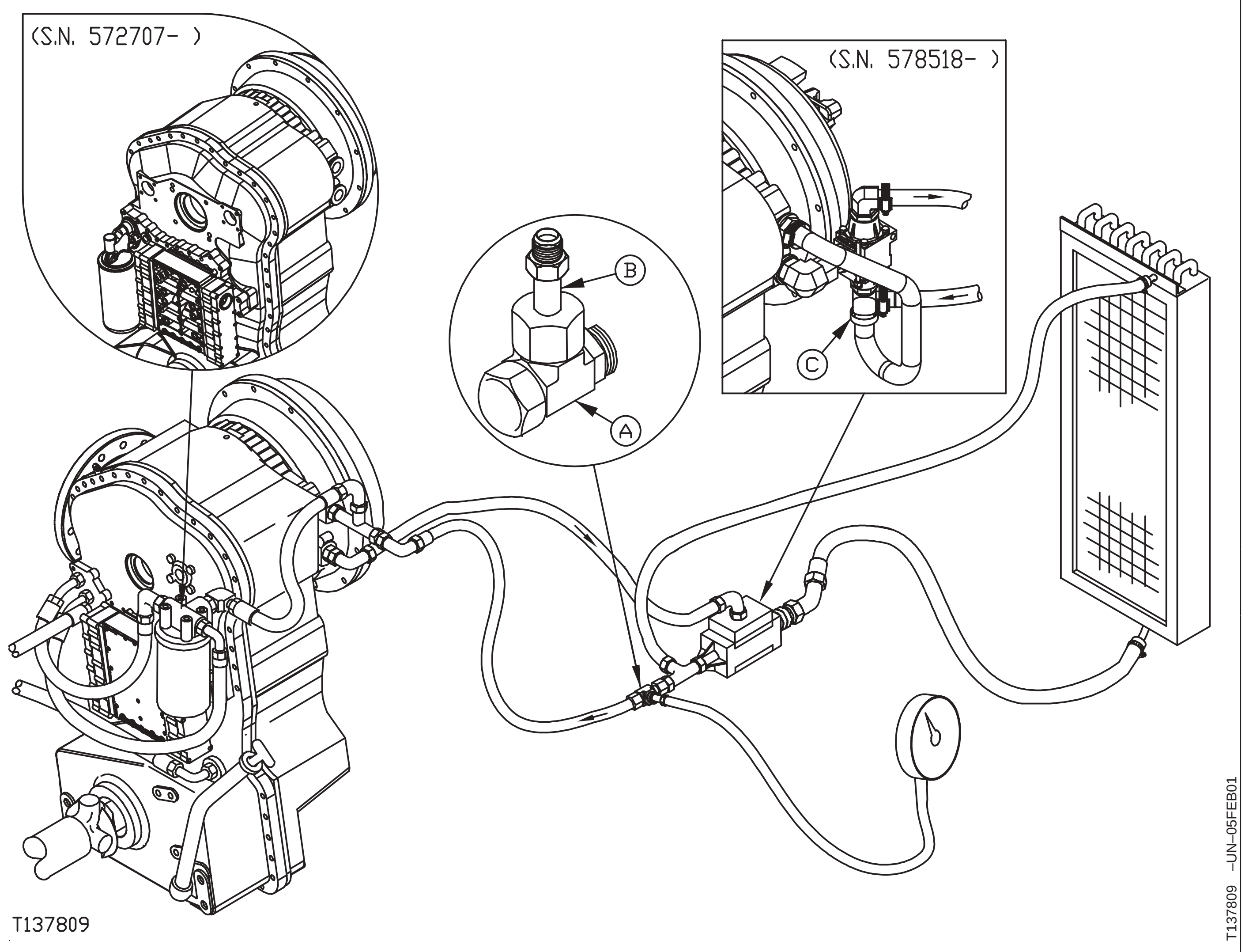
Specification
Converter-In Pressure
Maximum Difference Between
Gears—Pressure .... 28 kPa (0.28 bar) (4 psi)

- Use the Transmission Clutch Engagement And Solenoids Activated chart in Group 9020—05 to identify the clutch common to gears with low pressure. Repair the transmission

TEST RESULTS	
Gear	Pressure
1st Forward	
2nd Forward	
3rd Forward	
4th Forward	
1st Reverse	
2nd Reverse	
3rd Reverse	

TX,9020,ME463 –19–01FEB01–2/2

Lube Pressure Test



A—Running Tee B—Adapter C—Hose (Return)

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	High idle
Transmission Lube Pressure	50—150 kPa (0.5—1.5 bar) (7—22 psi)

ESSENTIAL TOOLS
38H1002 (-16 M ORFS x -16 M ORFS x -16 F ORFS) (Parker No. 16R6LO-S) Running Tee
JT03460 (7/16 -20 M 37° x -16 F ORFS) Adapter

SERVICE EQUIPMENT AND TOOLS
414 kPa (4 bar) (60 psi) Gauge
Barb Tee Fitting (1 in)
Shop Hose (1 in x 2 ft)
Gauge 414 kPa (4 bar) (60 psi)

Continued on next page TX,9020,ME465 –19–01FEB01–1/2

1. (S.N. —578517) Disconnect return hose from thermal bypass valve to converter at thermal bypass valve. Install running tee (A), adapter (B) and gauge

2. (S.N. 578518—) Remove return hose (C) on bypass valve. Make connections to gauge using shop hose and barb tee fitting.

3. Use Monitor Display Unit Diagnostic Mode (d 051) to display transmission temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

4. Heat transmission oil to test specification.

Specification

Transmission Oil—Temperature .... 80 ± 6°C (176 ± 10°F)

5. Run engine at test specification and record pressure

Specification

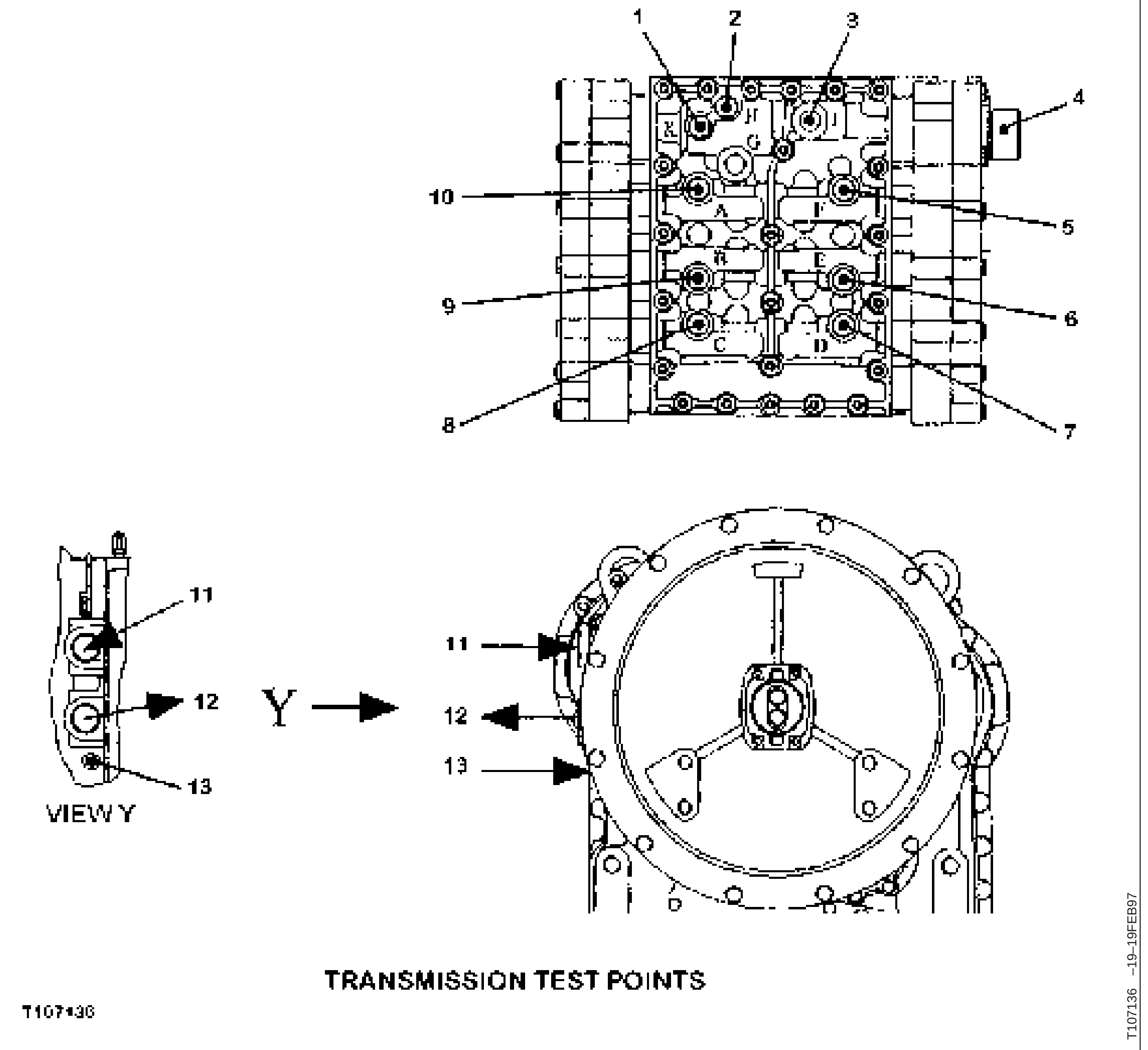
Engine—Speed .... High idle
Transmission Lube—Pressure .... 50—150 kPa (0.5—1.5 bar) (7—22 psi)

Low lube pressure can be caused by:

- Hose pinched or restricted. Check hoses between torque converter and transmission oil cooler.
- Converter relief valve stuck open. Do Converter Relief Pressure Test in this group.
- Thermal bypass valve restriction. Disassemble and inspect components.
- Transmission pump worn. Do Transmission Pump Flow Test in this group.

TX,9020,ME465 –19–01FEB01–2/2

Converter—In Pressure Test



1—System Pressure
2—Converter-In Pressure
3—Regulated Reduced Pressure
4—Plug Connection for Hydraulic Control Unit
5—Clutch Forward High Range
6—Reverse Clutch (With diagnostic coupler)
7—Clutch C1 (With diagnostic coupler)
8—Clutch C3
9—Clutch Forward Low Range (With diagnostic coupler)
10—Clutch C2 (With diagnostic coupler)
11—Connection from Cooler
12—Connection to Cooler
13—Converter-Out Pressure

Continued on next page

CED,TX13067,52 –19–01FEB01–1/2

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
Converter-In Minimum Pressure	276 kPa (2.8 bar) (40 psi)

ESSENTIAL TOOLS
Connector (7/16 M 37° x M10 x 1) (Parker No. 4-M10x1 F80X-S)
Gauge 1000 kPa (10 bar) (150 psi)

1. Remove transmission control valve test plug and make test connection to (2).

2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

   Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733 —) in PDM kit instructions)

3. Heat transmission oil to test specifications.

Specification

Transmission Oil—Temperature .... 80 ± 6°C (176 ± 10°F)

4. Run engine at specified test speed with transmission in neutral. Record converter in pressure.

Specification

Engine—Speed .... 1500 rpm
Converter-In—Minimum
Pressure .... 276 kPa (2.8 bar) (40 psi)

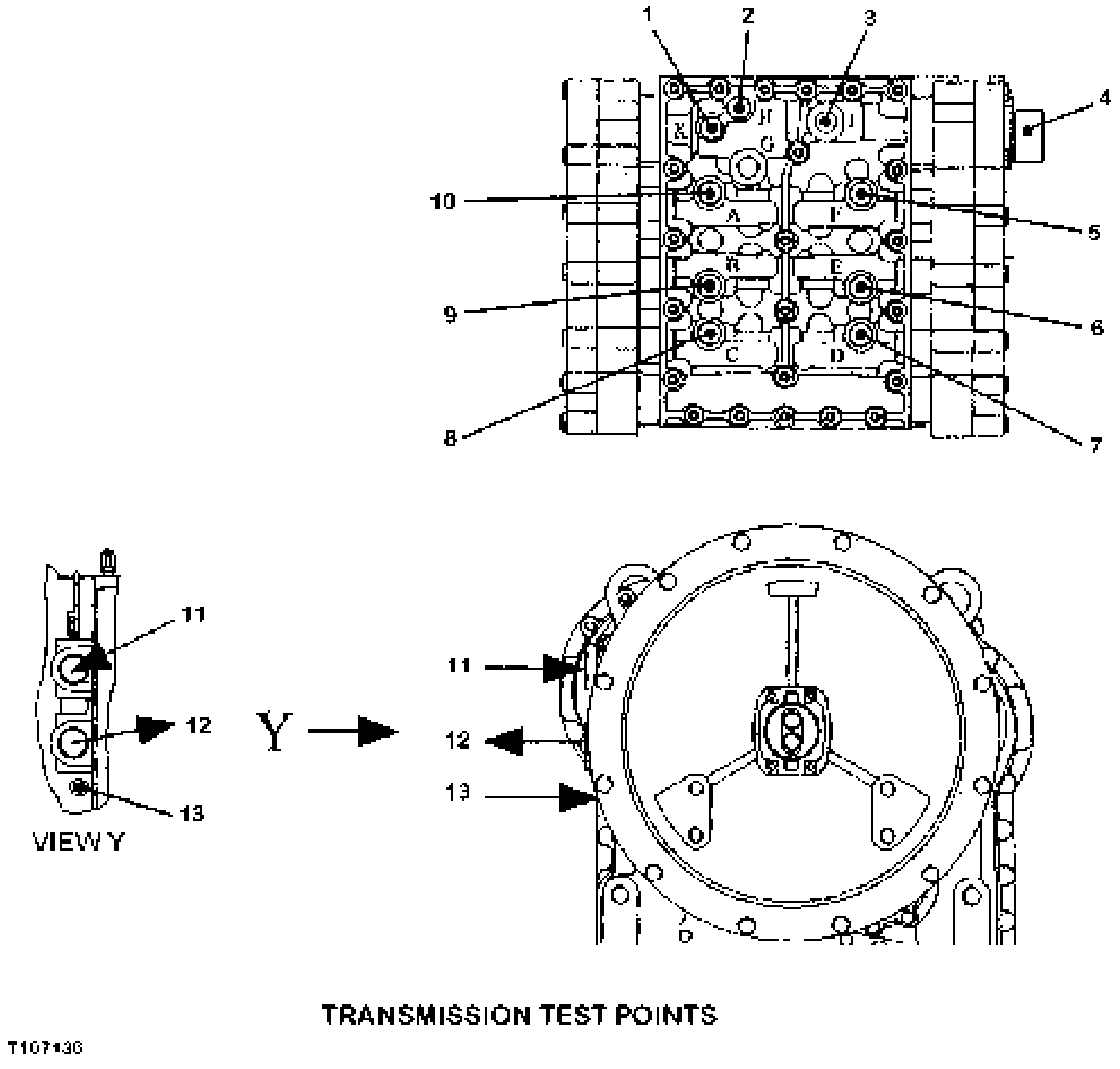
Low converter-in pressure can be caused by:

- Converter minimum pressure regulator valve set too low, stuck open, or spring broken or weak.
- Transmission pump worn. DoTransmission Pump Flow Test in this group.
- Control valve or valve gasket leakage. Remove and inspect.
- Converter relief valve set too low, stuck open, or spring broken or weak. Do Converter Relief Pressure Test in this group.

SERVICE ADVISOR is a trademark of Deere & Company

CED,TX13067,52 –19–01FEB01–2/2

Converter—Out Pressure Test



1—System Pressure
2—Converter-In Pressure
3— Reduced Pressure
4—Transmission Harness Connector
5—Clutch Forward High Range (K4)
6—Reverse Clutch (KR) (With diagnostic coupler)
7—Clutch C1 (K1) (With diagnostic coupler)
8—Clutch C3 (K3)
9—Clutch Forward Low Range (KV) (With diagnostic coupler)
10—Clutch C2 (K2) (With diagnostic coupler)
11—Cooler (Lube Pressure)
12—To Cooler
13—Converter-Out Pressure

Continued on next page

TX,9020,ME470 –19–01FEB01–1/2

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
Converter-Out Pressure	250—600 kPa (2.5—6.0 bar) (36—86 psi)

ESSENTIAL TOOLS
JT05491 (7/16 M 37° x 14M - 1.5M ORB) Connector

SERVICE EQUIPMENT AND TOOLS
2069 kPa (21 bar) (300 psi) Gauge

1. Use Monitor Display Unit Diagnostic Mode (d 051) to display transmission temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

2. Connect gauge to test port (13).

3. Heat transmission oil up to test specifications. (See Transmission Oil Warm-Up Procedure in this group.)

Specification
Transmission Oil—Temperature .... 80 ± 6°C (176 ± 10°F)

4. Measure Converter-out pressure at specified engine speed.

Specification
Engine—Speed .... 1500 rpm
Converter-Out—Pressure .... 250—600 kPa (2.5—6.0 bar) (36—86 psi)

Low Converter-out pressure can be caused by:

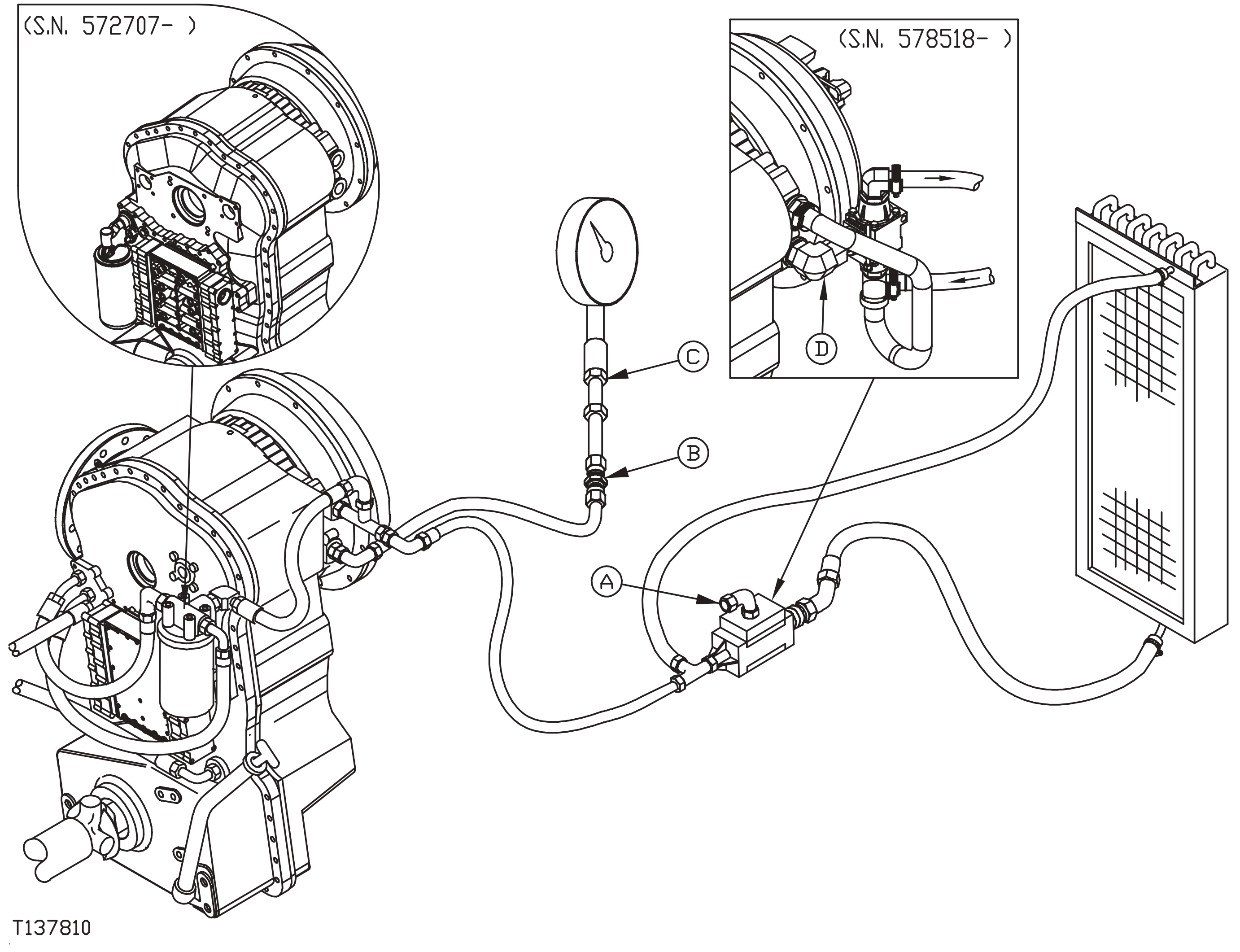
- Transmission pump worn. Do Transmission Pump Flow Test in this group.
- Control valve or valve gasket leakage. Remove and inspect.
- Torque converter leakage. Disassemble and inspect.
- Converter relief valve set too low, stuck open, or spring broken or weak. Do Converter Relief Pressure Test in this group.
- Plugged suction screen. Disassemble transmission to inspect suction screen.

High Converter-out pressure can be caused by:

- Pinched or restricted hose. Check converter-out-to-thermal bypass inlet and return hoses.
- Thermal bypass valve restriction. Disassemble and inspect components.

TX,9020,ME470 –19–01FEB01–2/2

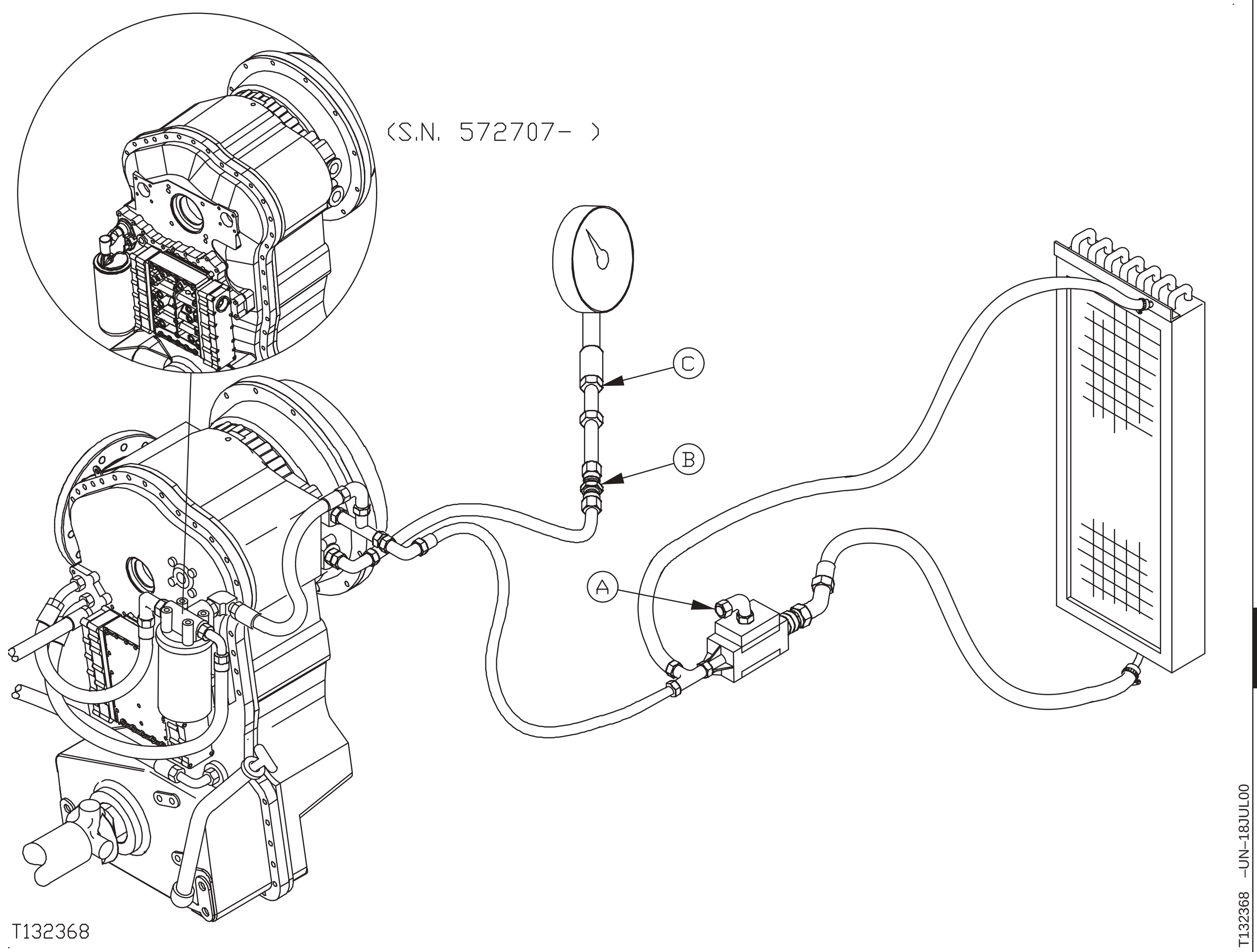
Converter Relief Pressure Test



A—Cap **B—Adapter** **C—Union** **D—Elbow**

Continued on next page

TX,9020,ME472 –19–01FEB01–1/3



T132368 –UN–18JUL00

A—Cap B—Adapter C—Union D—Elbow

NOTE: Do this test only if machine fails Converter-Out Pressure Test.

SPECIFICATIONS	
Transmission Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	Slow idle
Converter Pressure Relief Valve Setting Pressure	850—1050 kPa (8.5—10.5 bar) (125—155 psi)

ESSENTIAL TOOLS
38H1419 (-16 ORFS) (Parker No. 16 FNL-S) Cap
38H1281 (-16 M ORFS X -16 M ORFS) (Parker No. 16 HLO-S) Union
JT03460 (7/16 -20 M 37° X 1-7/16 -16 F ORFS) Adapter

SERVICE EQUIPMENT AND TOOLS
2000 kPa (20 bar) (300 psi) Gauge

1. (S.N. —578517) Disconnect converter out hose at elbow, install cap (A) on elbow.

2. (S.N. 578518—) Disconnect bypass valve at elbow (D). Plug fitting on valve. Connect gauge with adapter to elbow.

Continued on next page

TX,9020,ME472 –19–01FEB01–2/3

IMPORTANT: DO NOT heat transmission with cooler flow dead headed to gauge. Transmission damage can occur from overheating.

3. Heat transmission oil to test specifications. (See Transmission Oil Warm-Up Procedure in this group.)

Specification

Transmission Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

4. Use monitor Diagnostic Mode (d 051) to display transmission temperature.

5. Run engine at specification.

Specification

Engine—Speed .... Slow idle

6. Read pressure gauge.

Specification

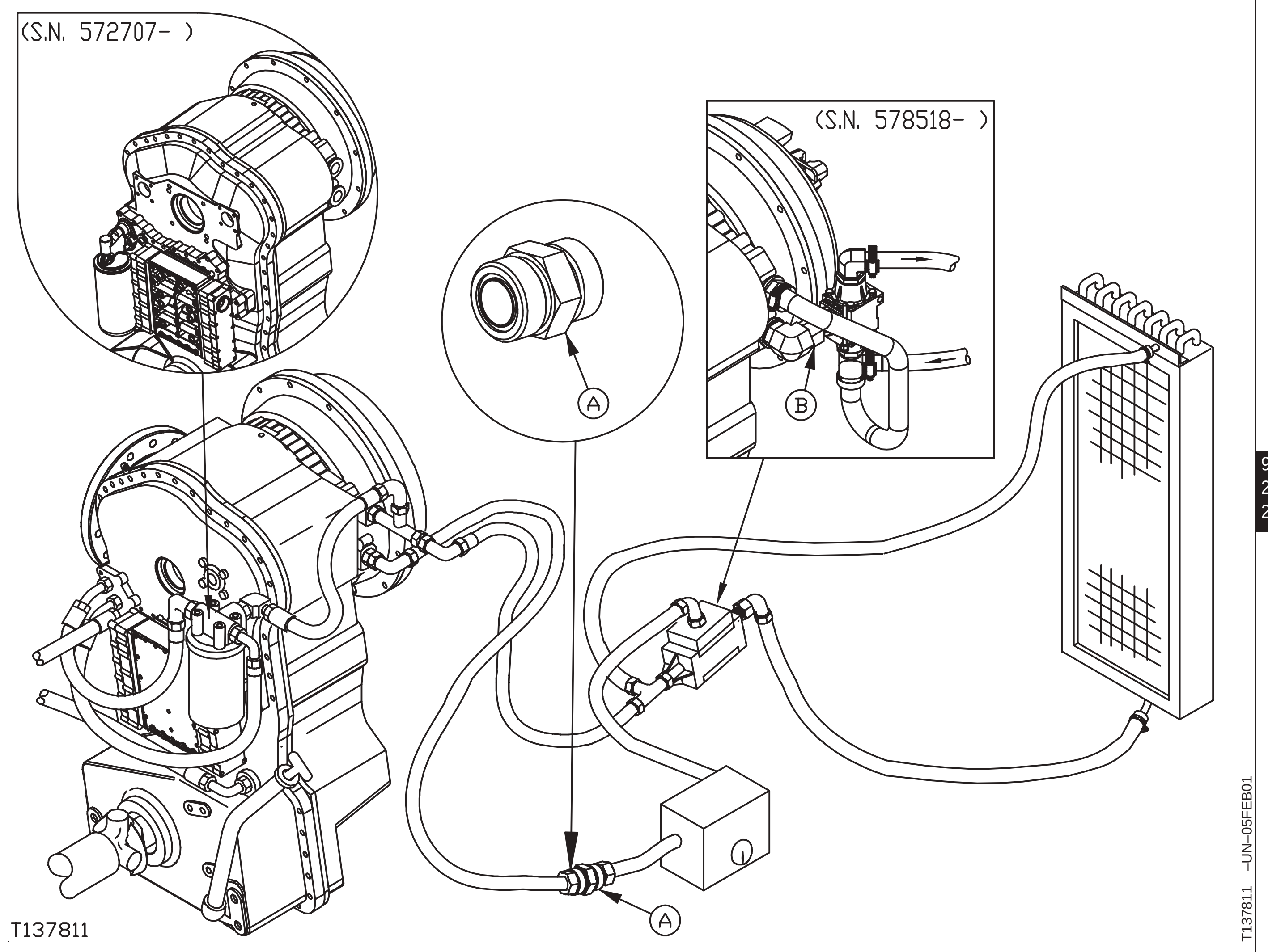
Converter Pressure Relief
Valve Setting—Pressure.................... 850—1050 kPa (8.5—10.5 bar) (125—155 psi)

Low converter relief valve pressure can be caused by:

- Transmission control valve or gasket leakage. Remove and inspect. (See Group 0360.)
- Torque converter leakage. Disassemble and inspect. (See Group 0350.)
- Converter relief valve stuck open or spring broken or weak. Remove transmission control valve and manifold plate for access. See Repair Manual.

TX,9020,ME472 –19–01FEB01–3/3

Converter Out Flow Test



A—Union B—Elbow—To Bypass Valve

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	1500 rpm
Flow (minimum)	50 L/min (13 gpm)

SERVICE EQUIPMENT AND TOOLS
JT07148 (0.5— 15GPM) Flow Meter
Barb Fitting (1 in) (two used)
Shop Hose (1 in x 2 ft)

ESSENTIAL TOOLS
38H1281 (-16 M ORFS X -16 M ORFS) (Parker No. 16HLO-S) Union

1. (S.N. —578517) Disconnect hose from thermal bypass valve. Connect union (A) and flowmeter.

Continued on next page

TX,9020,ME473 –19–01FEB01–1/2

2. (S.N. 578518—) Remove bypass valve from elbow (B). Connect flow meter with union, 1 in hose, and 1 in barb fittings.

3. Use monitor Diagnostic Mode (d 051) to display transmission temperature.

4. Heat transmission oil to test specification. (See Transmission Oil Warm-Up Procedure in this group).

Specification

Transmission Oil—Temperature...................... 80 ± 6°C (176 ± 10°F)

NOTE: New machine minimum flow will be higher than the minimum specification.

If Converter-out flow is low in one gear, check for piston or sealing ring leakage in the elements for that gear.

9020
25
26

5. Measure Converter-out flow at test specification in each gear.

Specification

Engine—Speed.. 1500 rpm
Flow (minimum)—.. 50 L/min (13 gpm)

If Converter-out flow is low in all gears, check the following:

- Low oil level in transmission.
- Cold transmission oil.
- Plugged suction screen.
- Air leak in pump suction tube.
- Plugged thermal bypass valve or lube passage. (See Lube Pressure Test in this group).
- Low transmission pump flow. (Do Pump Flow Test in this group.)
- Transmission control valve gasket leakage. Remove and inspect gasket.
- Converter relief valve stuck open or spring weak or broken. (Do Converter Relief Pressure Test in this group.)
- Torque converter leakage. Disassemble and inspect. See Repair Manual.

TEST RESULTS	
Gear	Flow
1st Forward	
2nd Forward	
3rd Forward	
4th Forward	
1st Reverse	
2nd Reverse	
3rd Reverse	

TX,9020,ME473 –19–01FEB01–2/2

Torque Converter Stall Speed Test

SPECIFICATIONS	
Hydraulic Oil Temperature	65 ± 5°C (150 ± 10°F)
Transmission Hydraulic Oil Temperature	82 ± 6°C (180 ± 10°F)
Engine Speed	High idle
644H No. 1 Fuel—Torque Converter Stall Speed	2070-2190 rpm—Standard Cooling System
644H No. 2 Fuel—Torque Converter Stall Speed	2100-2220 rpm—Standard Cooling System
644H No. 1 Fuel—Torque Converter Stall Speed	2040-2170 rpm —High Ambient Cooling System
644H No. 2 Fuel—Torque Converter Stall Speed	2070-2190 rpm —High Ambient Cooling System
644H MH No. 1 & 2 Fuel—Torque Converter Stall Speed	2155-2185 rpm—High Ambient Cooling System

1. Use the monitor or SERVICE ADVISOR™ system to read engine rpm, hydraulic oil temperature, and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15) See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Torque Converter Input Stall Speed SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Hydraulic Oil—Temperature .... 65 ± 5°C (150 ± 10°F)
Transmission Hydraulic Oil—
Temperature .... 82 ± 6°C (180 ± 10°F)

2. Press NEXT to get (d 053) Torque Input Speed (engine rpm) to display.

3. Auto and clutch cutoff (Neutral) switches must be in the “OFF” position. Apply service brakes and release Park brake.

4. Run engine at high idle with transmission in 3rd forward.

Specification

Engine—Speed .... High Idle

5. Engine speed must be at specification.

Specification

644H No. 1 Fuel—Torque
Converter Stall—Speed .... 2070-2190 rpm—Standard Cooling System
644H No. 2 Fuel—Torque
Converter Stall—Speed .... 2100-2220 rpm—Standard Cooling System
644H No. 1 Fuel—Torque
Converter Stall—Speed .... 2040-2170 rpm—High Ambient Cooling System
644H No. 2 Fuel—Torque
Converter Stall—Speed .... 2070-2190 rpm—High Ambient Cooling System
644H MH No. 1 & 2 Fuel—
Torque Converter Stall—Speed .... 2155-2185 rpm—High Ambient Cooling System

NOTE: 644H MH is offered with high ambient cooling package only. Also, 644H MH has same stall speed in both fuels because engine speed is controlled by the electronic controller.

If Engine Rpm Is Excessively Low:

- Engine horsepower or an incorrect torque converter is indicated.

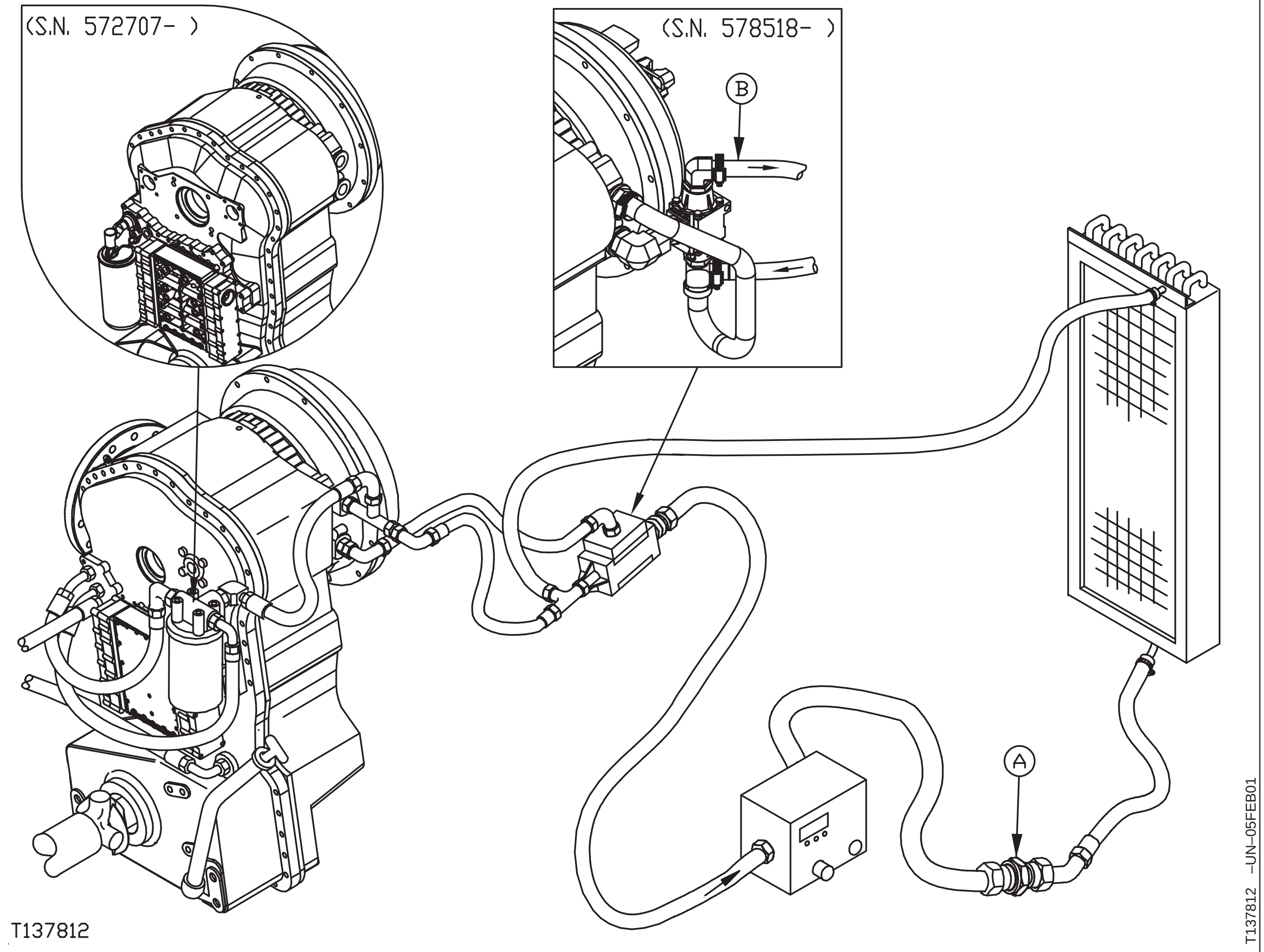
If Engine Rpm Is Excessively High:

- Clutch slippage or incorrect torque converter is indicated. Press NEXT on monitor until (d 054) Torque Output Speed is displayed. This is torque converter output must equal approximate engine speed when in neutral. It must go to 0 rpm when torque converter is at STALL. If it reads anything above 0 rpm, the transmission is slipping.

Engine Is Overpowered:

- Do Engine Power Test Using Engine Pulldown.
- Remove and replace torque converter. See Repair Manual.

Transmission Oil Cooler Thermal Bypass Valve Test



A—Union **B—Hose-to-Cooler**

SPECIFICATIONS	
Thermal Bypass Valve Flow: (Starting To Open) Temperature	82 ± 3° C (180 ± 5° F)
Thermal Bypass Valve Flow: (Full Open) Temperature	96° C (205° F)

SERVICE EQUIPMENT AND TOOLS
Shop Hose (1 in x 2 ft)
Barb Fitting —Straight (1 in)
Flow Meter
Temperature Reader

ESSENTIAL TOOLS
38H1281 (-16M ORFS X -16M ORFS) (Parker No. 16 HLO-S) Union

Continued on next page TX,9020,ME475 –19–01FEB01–1/2

SPECIFICATIONS	
Thermal Bypass Valve Flow: (Starting To Open) Temperature	80 ± 3° C (176 ± 5° F)
Thermal Bypass Valve Flow: (Full Open) Temperature	96° C (205° F)

ESSENTIAL TOOLS
38H1281 (-16M ORFS X -16M ORFS) (Parker No. 16 HLO-S) Union

SERVICE EQUIPMENT AND TOOLS
Shop Hose (1 in x 2 ft)
Barb Fitting —Straight (1 in)
Flow Meter
Temperature Reader

1. (S.N —578517) Disconnect hose from cooler at thermal bypass valve. Install union (A) and flow meter.

2. (S.N. 578518—) Disconnect hose going to cooler (B) from valve. Connect flow meter with 1 in shop hose and barb fitting.

3. Install temperature reader at flowmeter.

4. Open restriction valve on flowmeter.

5. Start engine.

6. Apply and hold service brakes and release Park brake.

7. Put transmission in 3rd forward.

8. Increase engine speed to high idle.

9. Observe temperature at which flow meter reading starts to increase.

10. Observe temperature at which flow meter reading is at maximum flow.

11. If valves does meet specifications, inspect valve and repair.

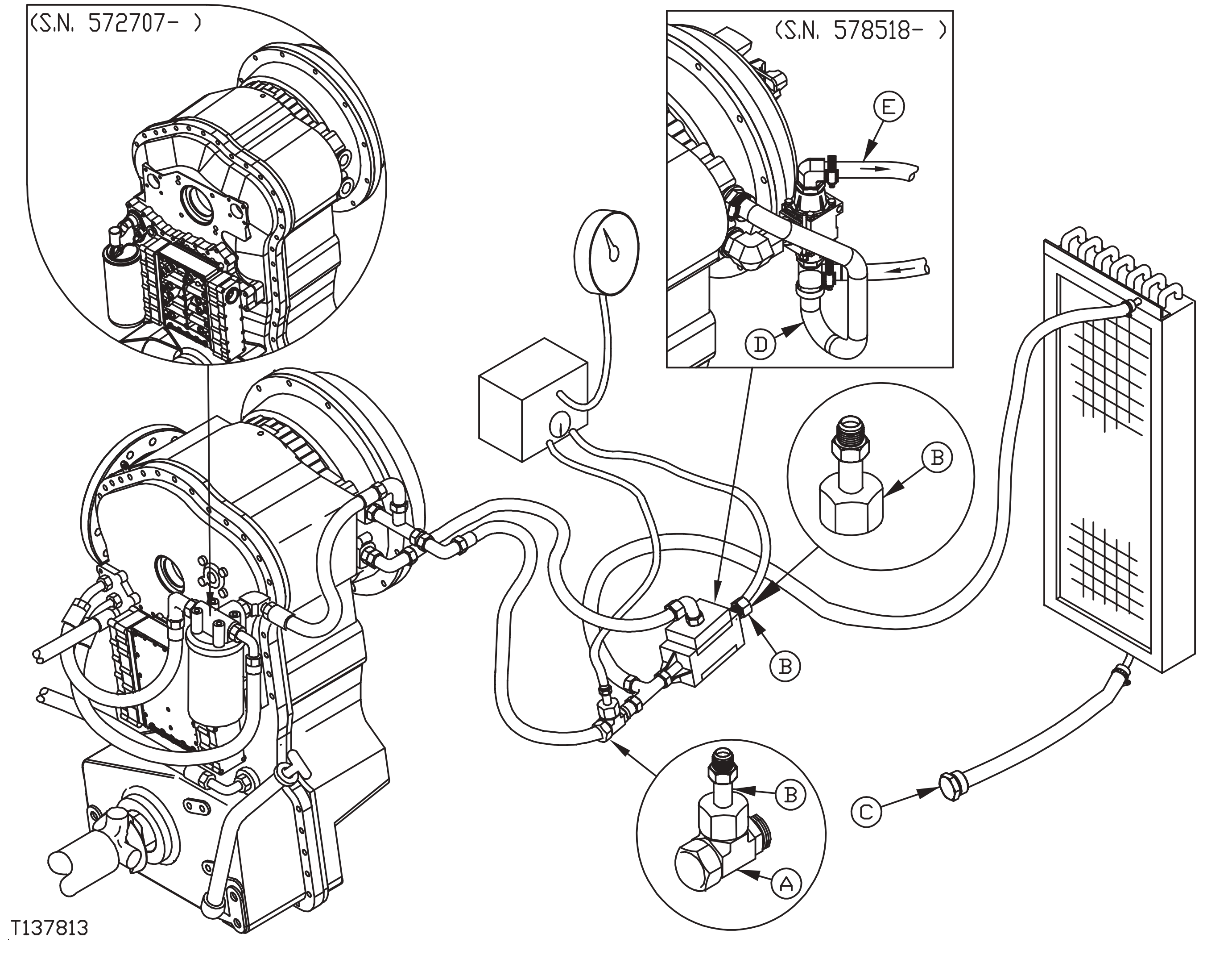
Specification

Thermal Bypass Valve Flow:
(Starting To Open)—
Temperature .... 80 ± 3° C (176 ± 5° F)
Thermal Bypass Valve Flow:
(Full Open)—Temperature.. 96° C (205° F)

12. Repeat test.

TX,9020,ME475 –19–01FEB01–2/2

Transmission Oil Cooler Thermal Bypass Valve Pressure Test



A—Tee
B—Adapter
C—Cap
D—Hose-from-Cooler
E—Hose-to-Cooler

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	Slow Idle
Cooler Bypass Pressure Differential Pressure	214—269 kPa (2.1—2.7 bar) (31—39 psi)

SERVICE EQUIPMENT AND TOOLS
700 kPa (7 bar) (100 psi) Gauge
Temperature Reader
JTO5753 Hydraulic Switch Box or Differential Pressure Gauge

ESSENTIAL TOOLS
38H1002 (-16 M ORFS x -16 F ORFS x -16 M ORFS Tee
JT03460 (7/16 M 37° x -16 F ORFS) (2 used) Adapter
38H1150 (-16 M ORFS) Plug

Continued on next page
TX,9020,ME476 –19–01FEB01–1/2

NOTE: If an oil cooler bypass valve malfunction is suspected, the thermal bypass valve can be removed and inspected in less time than it takes to perform a test.

1. (S.N. —578517) Disconnect hose from oil cooler at thermal bypass valve and install plug, in hose.

2. (S.N. 578518—) Disconnect hose (E) going to cooler. Plug hose. Connect differential pressure gauge to valve with 1 in. shop hose and 1 in. barb fitting.

   Disconnect return hose (D). Connect differential pressure gauge inline to return hose using 1 in shop hose and barb tee fitting.

3. Heat transmission oil to specification. See Transmission Oil Warm-Up Procedure. (Procedure in this group) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

   Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Transmission Oil—Temperature	80 ± 6°C (176 ± 10°F)

NOTE: Pressure differential should start out low and then when thermal bypass valve opens, pressure differential will increase.

4. Observe pressure gauges during warm-up.

5. When oil temperature is at specification, put transmission in neutral and run engine at specification.

Specification

Transmission Oil—Temperature	80 ± 6°C (176 ± 10°F)
Engine—Speed	Slow Idle

6. Record differential pressure.

Specification

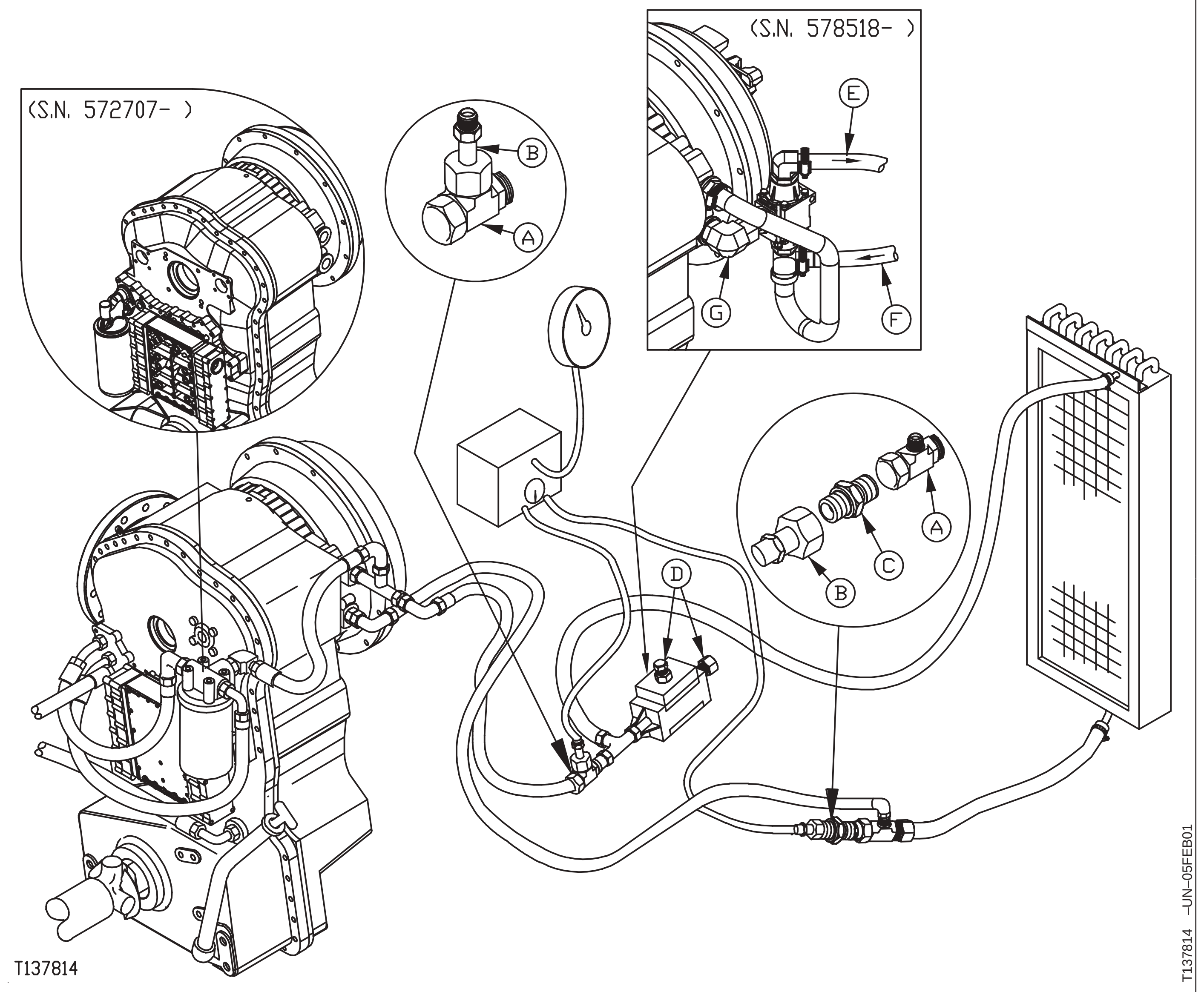
Cooler Bypass Pressure Differential—Pressure	214—269 kPa (2.1—2.7 bar) (31—39 psi)

If Pressure Is Low:

- A failed thermal bypass valve is indicated. Disassemble and inspect valve or replace.

TX,9020,ME476 –19–01FEB01–2/2

Transmission Oil Cooler Restriction Test



A—Tee
B—Adapter
C—Union
D—Cap
E—Hose-to-Cooler
F—Hose-from-Cooler
G—Elbow

SPECIFICATIONS	
Transmission Oil Temperature	80 ± 6°C (176 ± 10°F)
Engine Speed	High Idle
Pressure Differential Between Inlet and Outlet (maximum) Restriction Pressure	276 kPa (2.8 bar) (40 psi)

Continued on next page

TX,9020,ME477 –19–01FEB01–1/2

ESSENTIAL TOOLS
38H1002 (-16 M ORFS X -16 M ORFS X -16 F ORFS) (Parker No. 16 R6LO-S) (2 used) Tee
JT03460 (7/16 -20 M 37° x -16 F ORFS) (2 used) Adapter
38H1281 (-16 M ORFS X -16 M ORFS) (Parker No. 16 HLO-S Union
38H1419 (-16 F ORFS) (Parker No. 16 FNL-S) (2 used) Cap

SERVICE EQUIPMENT AND TOOLS
2069 kPa (21 bar) (300 psi) Gauge
JTO5753 Hydraulic Switch Box
Shop Hose (1 in x 2 ft) (2 used)
Barb Tee Fitting (1 in) (2 used)

NOTE: If an internally restricted oil cooler is suspected, the cooler can be backflushed in less time than it takes to run his test. Use filter caddy to backflush.

1. (S.N. —578517) Make test connections as shown. Connect cooler inlet and Converter-out with tees (A), adapters (B), union (C) and caps (D).

2. (S.N. 578518—) Remove bypass valve from elbow (G). Disconnect hose (E) from valve. Cap off port on valve where hose (E) was removed. Connect one side of differential pressure gauge inline with hose (E) and elbow (G) using shop hose and barb tee fitting.

   Remove hose (F). Connect the differential pressure gauge inline with hose (F) and valve.

3. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and transmission oil temperature. See Monitor Display Unit—Diagnostics Menu—Transmission Sensors (d 05). (Group 9015-15)

   Or access Transmission Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

4. Heat transmission oil to test specifications.

Specification

Transmission Oil—Temperature...................... 80 ± 6°C (176 ± 10°F)

Read pressure on inlet and outlet sides of oil cooler.

Specification

Engine—Speed.. High Idle
Pressure Differential Between
Inlet and Outlet (maximum)
Restriction Pressure—Pressure .... 276 kPa (2.8 bar) (40 psi)

If Difference Is Greater Than Specification:

- Backflush oil cooler using a filter caddy.

If Cooler Does Not Meet Specifications After Backflushing:

- Replace cooler.

SERVICE ADVISOR is a trademark of Deere & Company

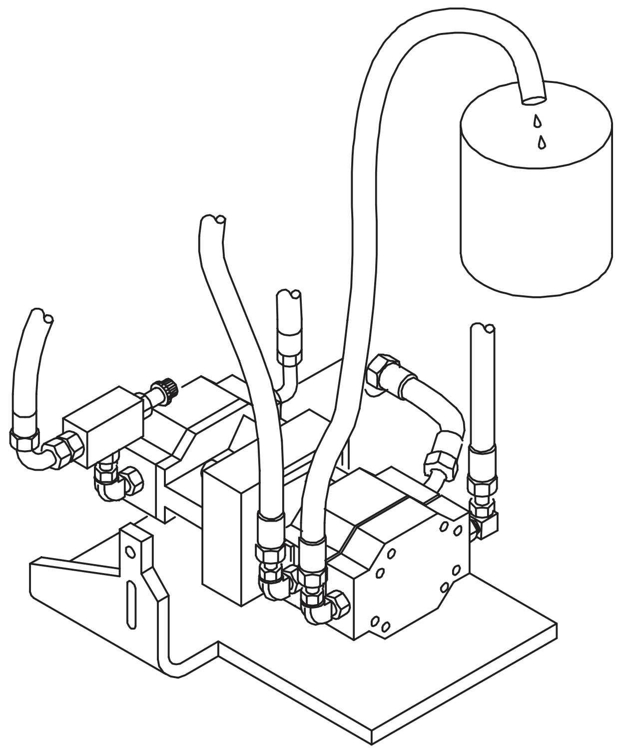
TX,9020,ME477 –19–01FEB01–2/2

9020
25
33

Axle Recirculation Dual Pump Flow and Temperature Tests

SPECIFICATIONS	
Axle Oil Temperature	49 °C (120 °F)
Axle Recirculation Dual Pump Flow Rate	3.8 L/min (1.0 gpm) Minimum—One Pump
Engine Speed	Slow Idle

SERVICE EQUIPMENT AND TOOLS
JT05800 Digital Thermometer
—6 Test Hose with —6 ORFS End



T132202 –UN–30JUN00

1. Warm axle to operating temperature.

2. Record temperature at which axle oil stabilizes during operation by using a digital thermometer.

Specification
Axle Oil—Temperature .... 49 °C (120 °F)

9020
25
34

3. Install test hose between Axle Recirculation Dual Pump outlet and clean container. Check both pumps individually.

Specification
Axle Recirculation Dual Pump—
Flow Rate .... 3.8 L/min (1.0 gpm)
Minimum—One Pump

4. Run engine at slow idle and record flow through Axle Recirculation Dual Pump.

Specification
Engine—Speed .... Slow Idle

CED,TX13067,447 –19–21AUG98–1/1

Axle Recirculation Motor Flow Test

SPECIFICATIONS	
Axle Motor Flow Rate	1.9 L/min (0.50 gpm) Minimum
Engine Speed	Slow Idle

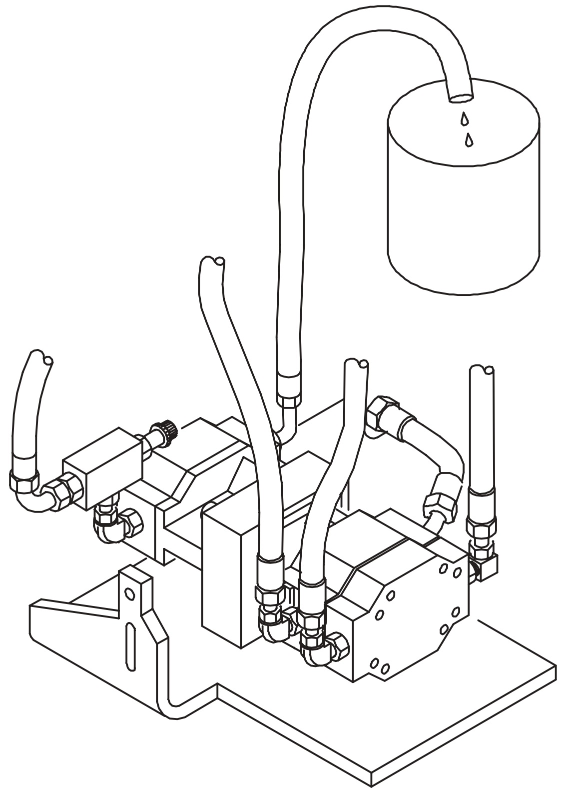
SERVICE EQUIPMENT AND TOOLS
—6 Test Hose with —6 ORFS End

1. Install test hose between motor outlet and clean container.

Specification
Axle Motor—Flow Rate .... 1.9 L/min (0.50 gpm) Minimum

2. Run engine at slow idle and record axle motor flow rate.

Specification
Engine—Speed .... Slow Idle


T132203

T132203 –UN–30JUN00

CED,TX13067,448 –19–21AUG98–1/1

Axle Breather Test


T116846B –UN–27AUG98

SPECIFICATIONS	
1400 Series Axle Breather Pressure Rating	35 + 14 - 0 kPa (0.35 + 0.14 - 0 bar) (5 + 2 - 0 psi)

1. If Axle level is low and/or leaking from outer axle seals, cause could be a plugged breather.

2. Assure correct breather is in axle, pressure rating is stamped on top of the breather.

3. Measure axle internal pressure by installing a gauge in the fill port. Operate machine to warm axle to normal temperature.

Specification

1400 Series Axle—Breather
Pressure Rating...................................... 35 + 14 - 0 kPa (0.35 + 0.14 - 0 bar) (5 + 2 - 0 psi)

Pressure may exceed specification by 2 psi and not be excessive.

If Pressure is Within Specification:

- Breather is OK. Repair outer axle seals.

If Pressure is Greater Than Specification:

- Replace or clean breather.

CED,TX13067,464 –19–03SEP98–1/1

Axle Recirculation Pump Inlet Suction Check

SPECIFICATIONS	
Axle Recirculation Pump Inlet Vacuum	1.7 kPa (170 mbar) (5 in. HG) Maximum

1. Install a “tee” between pump inlet line and pump.

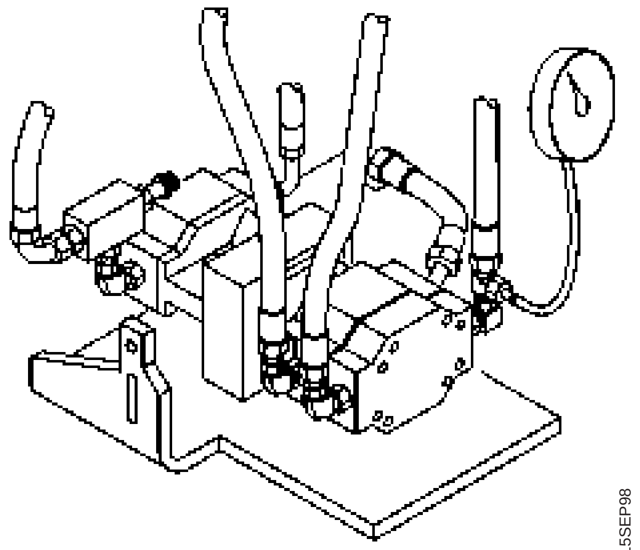
   Connect a vacuum gauge to “tee”.

2. Start machine and run at slow idle, hold bucket in roll back over relief.

   Record vacuum.

Specification

Axle Recirculation Pump Inlet—
Vacuum.. 1.7 kPa (170 mbar) (5 in. HG) Maximum



T117061 –UN–15SEP98

If Vacuum is “0”:

- Pump or motor may not be turning. Repair as needed.

If Vacuum is Above Specification:

- Suction screen is clogged. Clean debris from screen.

CED,TX13067,465 –19–03SEP98–1/1

9020
25
37

Section 9025
Hydraulic System

Contents

Continued on next page

9025

https://www.truck-manuals.net/

Loader Hydraulic System

NOTE: See Hydraulic System Schematics

See Loader Hydraulic System Component Location. (Group 9025-15.)

All the hydraulic functions are incorporated into one system utilizing a singe axial piston pump. These include the loader, steering and service brake functions. Plus the optional differential lock, axle disconnect, pin disconnect, ride control and oil cooler functions. These components are tied together by a pressure flow compensating load sense system.

The major components include:

1. A variable displacement axial piston pump with load sense flow and pressure control.
2. An orbital steering valve.
3. A loader control valve with load sense, individual workport flow compensation and with a circuit providing priority for steering and loader pilot control valve.
4. A pressure reducing valve module that provides low regulated pressure for the pilot controller and the optional differential lock, axle disconnect and pin disconnect.
5. A low pressure brake valve pressure limiting and modulation.

Design features include:

1. All closed center control valves
2. Improved system efficiency with minimal relief flow losses
3. Metering independent of load
4. A single load sense circuit controlling pump flow, providing priority to steering and proportional and pressure flow compensation to all loader functions

Overall System Operation:

NOTE: See Loader Hydraulic System Component Location. (Group 9025-15.)

See Hydraulic System Schematics. (Group 9025-15.)

Neutral

The hydraulic pump supplies a low standby pressure to all closed center control valves. There is essentially no flow. With the pilot enable/boom down switch in the center on position, both the boom down and the pilot enable solenoid provides low regulated pressure to the pilot controller. All load sense lines and passages are bled to return. The pin disconnect is shown in the disconnected position.

Steering Operation

When the steering valve is rotated and steering is started, the pressure to the steering cylinders is also picked up in the valve and sent out as a load sense. It is directed to both ends of the loader control valve. One path is to a shuttle check valve, through a 0.055 in. orifice and then back to the pump. The pump goes into stroke and starts suppling pressure oil to the steering valve maintaining the margin pressure difference between load sense and output pressure.

The other path for load sense in the loader valve is to the spring end of each compensator valve. This will have no effect on the steering circuit until one of the loader functions is operated.

The axle disconnect solenoid is shown in the disconnect position which hydraulically disengages the front axle.

Steering and Boom Down

Continued on next page TX,9025,ME311 –19–14FEB97–1/2

Both steering and boom down functions are being operated at the same time. Without some type of flow control to the boom cylinder rod ends all the pump flow would go to the boom circuit because little or no oil pressure is required for lowering the boom. With relatively high pressures required for steering, there would be little or no steering with this condition.

To provide priority for the steering circuit in this situation, compensators are used in each valve section. Load sense pressure, which will be relatively high, from the steering valve is directed to the spring side of each compensator, thus restricting or blocking flow through the compensator to the boom down circuit with very low pressures. Therefore, the steering circuit will always have priority when any of the loader functions are at a low pressure.

Boom Raise and Bucket Dump

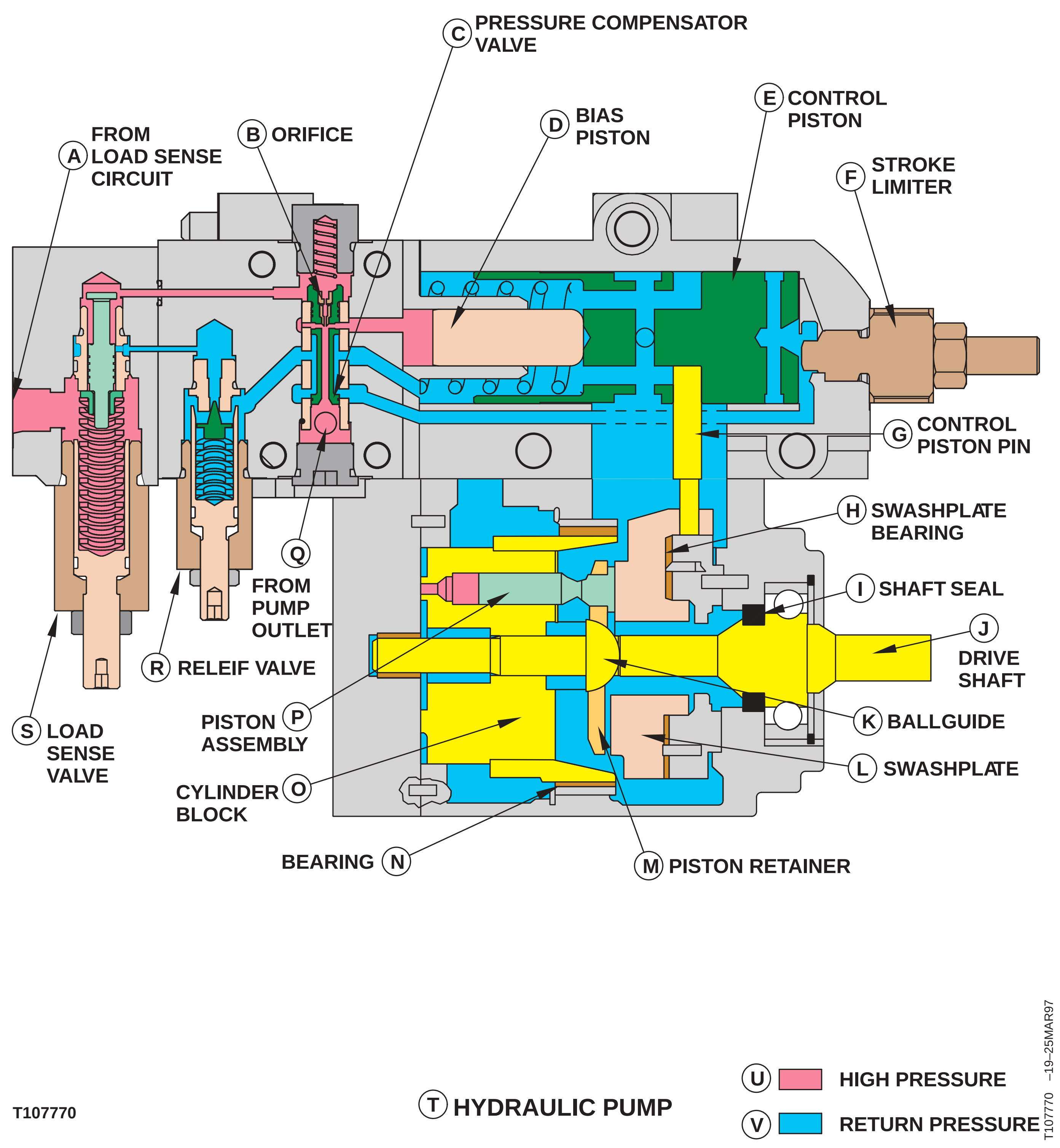
When both the boom raise and bucket dump functions are being operated at the same time, without flow control to the bucket dump circuit all of the pump flow would go to that function and there would be no boom raise.

To provide equal flow to both functions, compensators are used in both circuits. The metered load sense pressure from boom raise will be much higher than that from bucket dump. It will flow through the boom C1 check and on through C4, the orifice and then to the hydraulic pump and isolation valve. The metered load sense from the bucket will be blocked at its C1 check because of the much higher load sense pressure on the other side.

The boom regulated load will flow through C2 to the isolation valve end. The bucket regulated load sense at low pressure will be blocked at the boom C2 check. The regulated boom load sense will control the isolation valve output so that it is equal to the boom regulated load sense. This pressure which is essentially the boom raise work load is sent through all C3 checks to all the compensators. Since the pump will be working against equal pressures at the compensators, the flow will be equal to both functions, though the bucket work load pressure is much less than that for the boom.

TX,9025,ME311 –19–14FEB97–2/2

Hydraulic Pump



Continued on next page

TX,9025,ME312 –19–10AUG96–1/2

https://www.truck-manuals.net/

A—From Load Sense Circuit
B—Orifice
C—Pressure Compensator Valve
D—Bias Piston
E—Control Piston
F—Stroke Limiter
G—Control Piston Pin
H—Swashplate Bearing
I—Shaft Seal
J—Drive Shaft
K—Ball Guide
L—Swashplate
M—Piston Retainer
N—Bearing
O—Cylinder Block
P—Piston Assembly
Q—From Pump Outlet
R—Relief Valve—Low Pressure Standby
S—Load Sense Valve—Margin Pressure
T—Hydraulic Pump
U—High Pressure
V—Return Pressure

The hydraulic pump is an axial piston, variable displacement pump (T). The pump is driven by a splined coupling on the end of the torque converter impeller shaft. The pump drive shaft (J) is supported by a ball bearing on the splined end and a bearing sleeve in the valve plate end cap.

With the engine running, the drive shaft drives the cylinder block (O) and 9 piston assemblies (P). A piston retainer (M) backed by a spring-loaded ball guide holds the piston slippers against the swash plate (L). As the cylinder block rotates, the pistons move in and out of their bores creating a pumping action. The cylinder block is supported by a bearing (N).

The swash plate rides on a bearing and is moved by a pin (G) that moves with the pressure compensator control piston.

TX,9025,ME312 –19–10AUG96–2/2

Hydraulic Pump Control

Components:

- Control piston
- Bias piston
- Load sense valve—Margin Pressure
- Relief valve—Low pressure standby
- Pressure compensator spool (4-way valve)

Control piston:

- Move the swash plate to increase or decrease pump flow

Bias piston

- Works with the control piston spring to hold the control piston at a given pump flow position

Load sense valve—Margin pressure:

- Maintains a margin differential pressure between pump discharge and load sense whenever hydraulic functions are activated.

Relief valve—Low standby pressure:

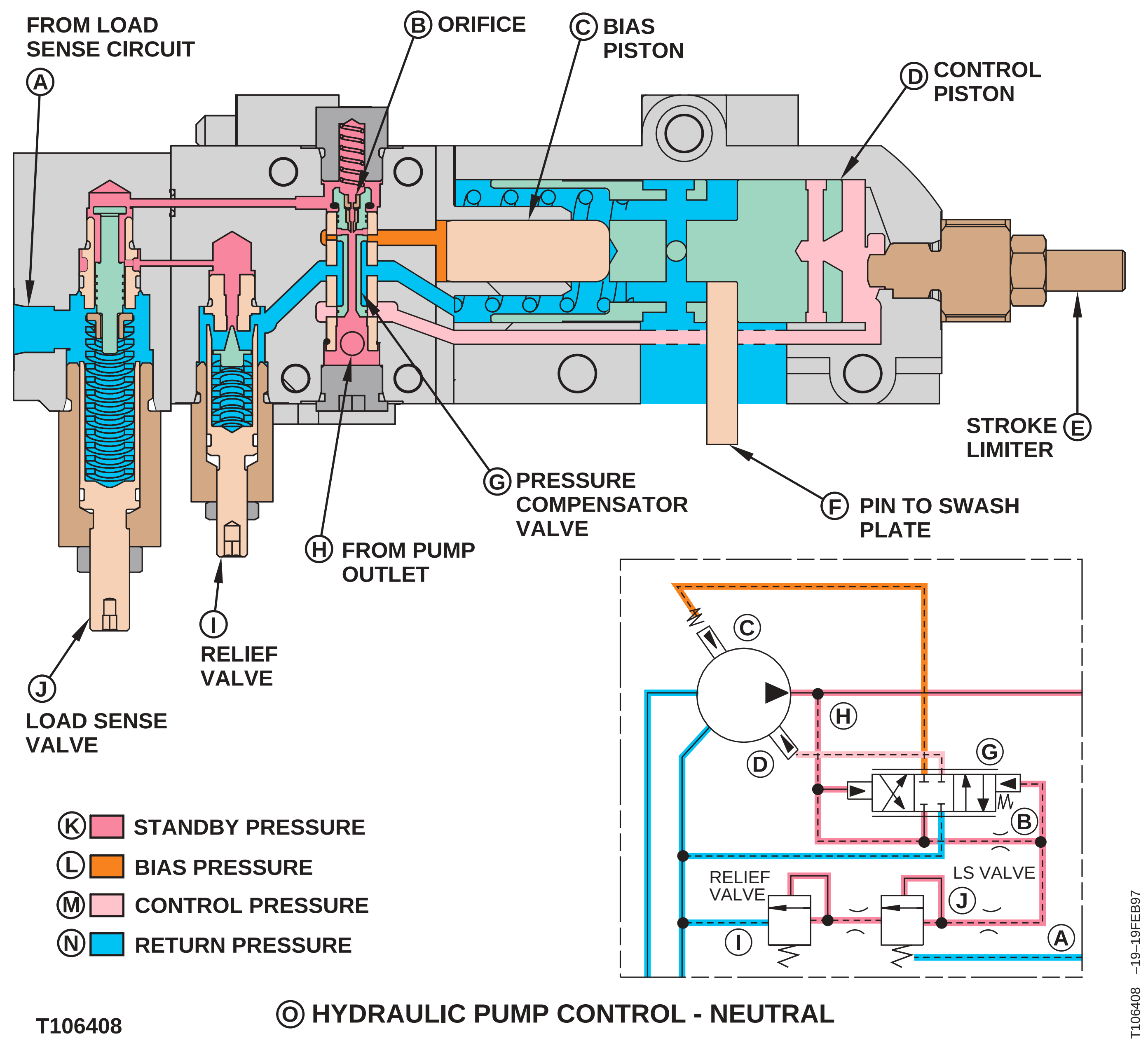
- Regulates pump low pressure standby discharge in neutral
- Necessary to supply both the service brakes and the pilot circuit with adequate pressure

Pressure compensator spool (4-way valve)

- Routes pump discharge pressure to the bias piston to increase pump flow
- Routes pump discharge pressure to the control piston to decrease pump flow

TX,9025,ME313 –19–28AUG96–1/1

Hydraulic Pump Control—Neutral



A—From Load Sense Circuit
B—Orifice
C—Bias Piston
D—Control Piston
E—Stroke Limiter
F—Pin to Swash Plate
G—Pressure Compensator Valve
H—From Pump Outlet
I—Relief Valve—Low Standby Pressure
J—Load Sense Valve—Merging Pressure
K—Standby Pressure Oil
L—Bias Pressure
M—Control Pressure
N—Return Pressure
O—Hydraulic Pump Control—Neutral

When the machine is first started, the pump is at full swash.

Pump pressure will continue to rise until the low pressure standby setting is reached.

- In neutral pump discharge pressure is at low pressure standby. This is necessary to supply both the service brakes and the pilot circuit.

Continued on next page

TX,9025,ME314 –19–28AUG96–1/2

Low pressure standby is achieved when pump discharge pressure is high enough to open both the load sense valve (J) and the relief valve (I) which are in series.

- The Load sense valve is set at margin pressure. Margin pressure is the difference between pump output pressure and load sense pressure that will open the load sense valve. In neutral load sense pressure is equal to return pressure. When operating a function load sense pressure is essentially workport pressure.
- The relief valve is set to obtain low pressure standby
- The combined setting of the two valves equals low pressure standby

Pressure oil from the pump outlet passage (H) works on the end of the pressure compensator valve (G) spool trying to open it by pushing it against the spring.

A small amount of oil flows through the center of the pressure compensator spool and combines with the spring force to hold the compensator spool closed.

With the spool in the closed position, a passage is open which allows oil to flow to the cavity behind the bias piston (C).

- The bias piston works with the control piston spring to hold the pump at full stroke until pressure rises.

Pressure oil working with the spring to hold the pressure compensator spool closed is also trying to open the load sense valve (J).

When pump discharge pressure reaches margin pressure, the load sense valve will open. Oil flowing across the load sense valve is now sensed on the poppet of relief valve (I).

Pump discharge pressure increases until relief valve opens.

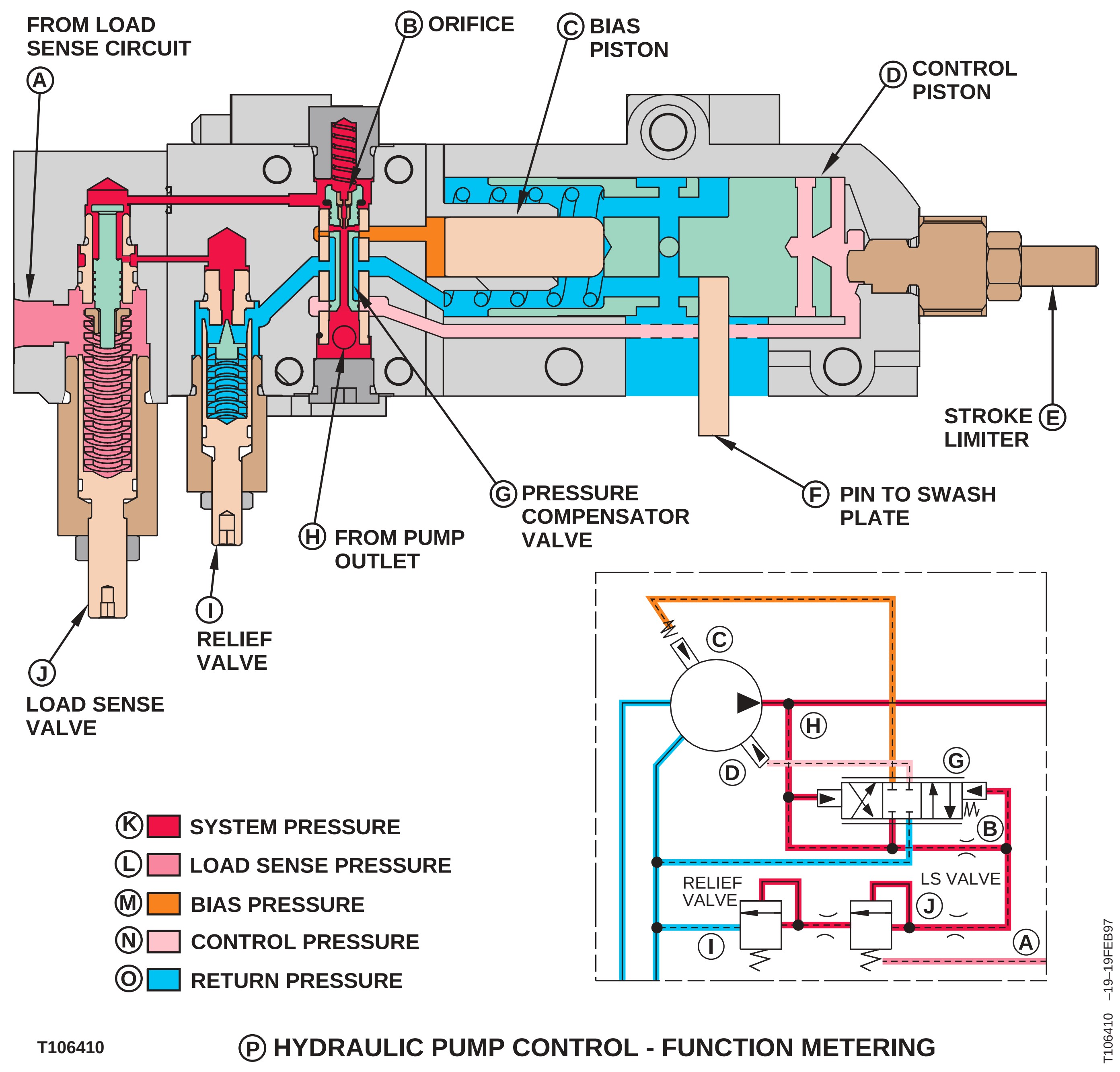
This causes a pressure drop on the spring side of the compensator valve spool. Pump discharge pressure will move the pressure compensator valve spool against the spring, opening a path to the large end of the control piston (D).

The bias piston cavity is open to return until the pump reaches the required flow.

The control piston will move to the left, destroking the pump to maintain the flow required.

TX,9025,ME314 –19–28AUG96–2/2

Hydraulic Pump Control—Function Metering



T106410 (P) HYDRAULIC PUMP CONTROL - FUNCTION METERING

A—From Load Sense Circuit
B—Orifice
C—Bias Piston
D—Control Piston
E—Stroke Limiter
F—Pin to Swash Plate
G—Pressure Compensator Valve
H—From Pump Outlet
I—Relief Valve—Low Standby Pressure
J—Load Sense Valve—Margin Pressure
K—System Pressure
L—Load Sense Pressure
M—Bias Pressure
N—Control Pressure
O—Return Pressure
P—Hydraulic Pump Control—Function Metering

When the operator starts to move or operate a function, the pump discharge pressure from the pump outlet (H) will drop.

Load sense is equal to the highest workport pressure and is routed to the spring area of the load sense valve (J).

Continued on next page TX,9025,ME315 –19–28AUG96–1/2

Load sense plus spring force will close the load sense valve until pump discharge pressure is at the margin pressure above load sense.

With the load sense valve closed, pressure will build on the left side of the pressure compensator valve spool (G), causing the spool to shift momentarily to the right. This opens a path for the some of the oil on the large end of the control piston (D) to drain to tank.

A small amount of pump pressure flows through the center of the pressure compensator spool and is routed to the cavity behind the bias piston to work with the control piston spring and bring the pump into stroke.

If the operator continues to meter the function, pump discharge will increase until it begins to open the load sense valve.

When this differential pressure is reached, the load sense valve and relief valve (I) will start to open causing a pressure drop on the left side of the pressure compensator spool.

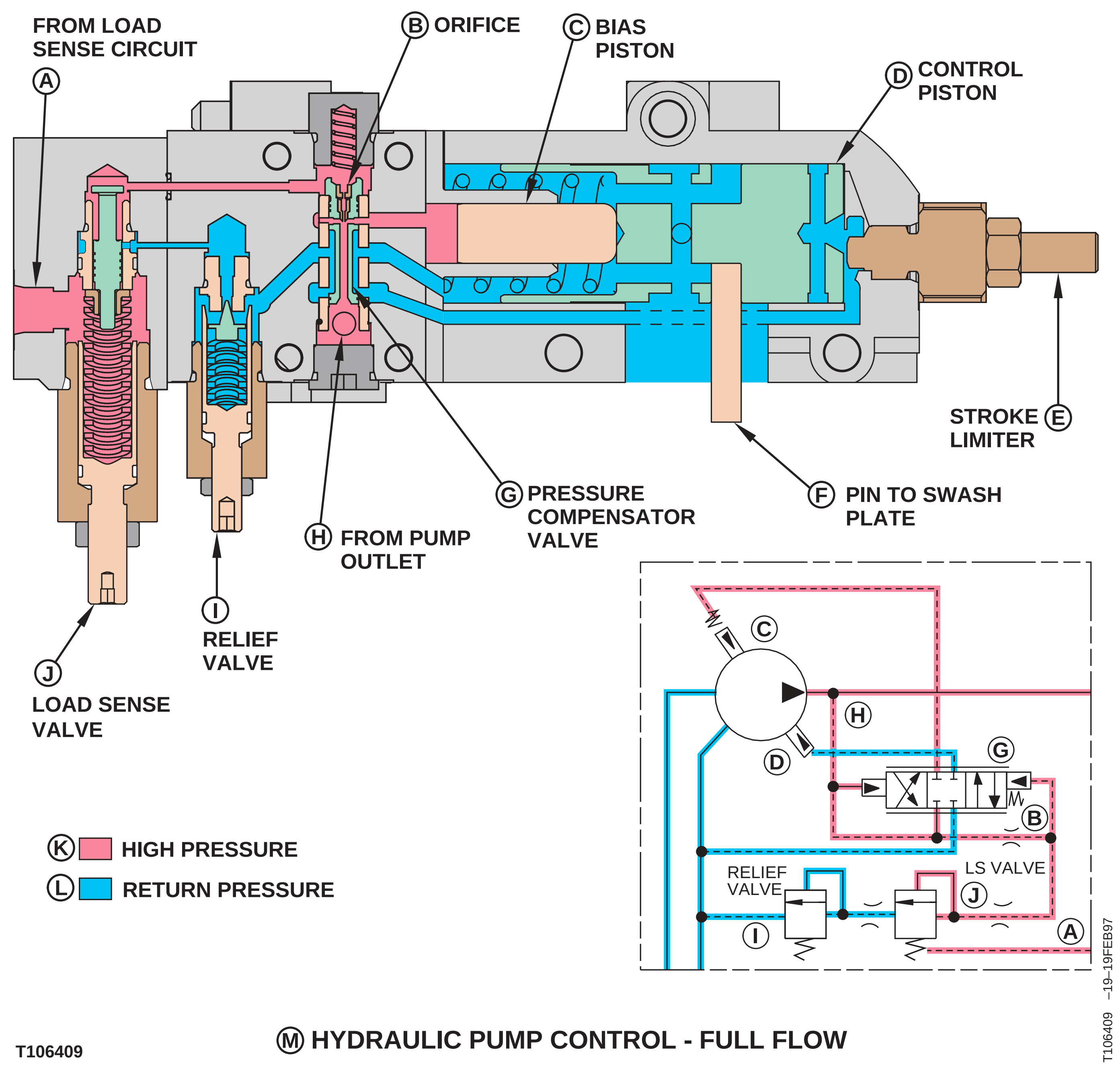
Pump discharge pressure will move the spool to the left which blocks the path to return and traps oil in the large end of the control piston.

Oil in the cavity behind the bias piston is also trapped by the pressure compensator spool.

The pump is being held at a fixed displacement at this time.

TX,9025,ME315 –19–28AUG96–2/2

Hydraulic Pump Control—Full Flow



T106409

M HYDRAULIC PUMP CONTROL - FULL FLOW

A—From Load Sense Circuit
B—Orifice
C—Bias Piston
D—Control Piston
E—Stroke Limiter
F—Pin to Swash Plate
G—Pressure Compensator Valve
H—From Pump Outlet
I—Relief Valve—Low Standby Pressure
J—Load Sense Valve—Margin Pressure
K—High Pressure
L—Return Pressure
M—Hydraulic Pump Control—Full Flow

If the operator is running several functions at one time the flow requirements will be high and pump discharge pressure from pump outlet (H) will drop.

Load sense is equal to the highest workport pressure and is routed to the spring area of the load sense valve (J).

Continued on next page

TX,9025,ME316 –19–28AUG96–1/2

Load sense plus spring force will close the load sense valve until pump discharge pressure is at margin pressure above load sense.

With the load sense valve closed, pressure will build on the left side of the pressure compensator valve spool (G), causing the spool to shift to the right. This opens a path for the oil on the large end of the control piston (D) to drain to tank.

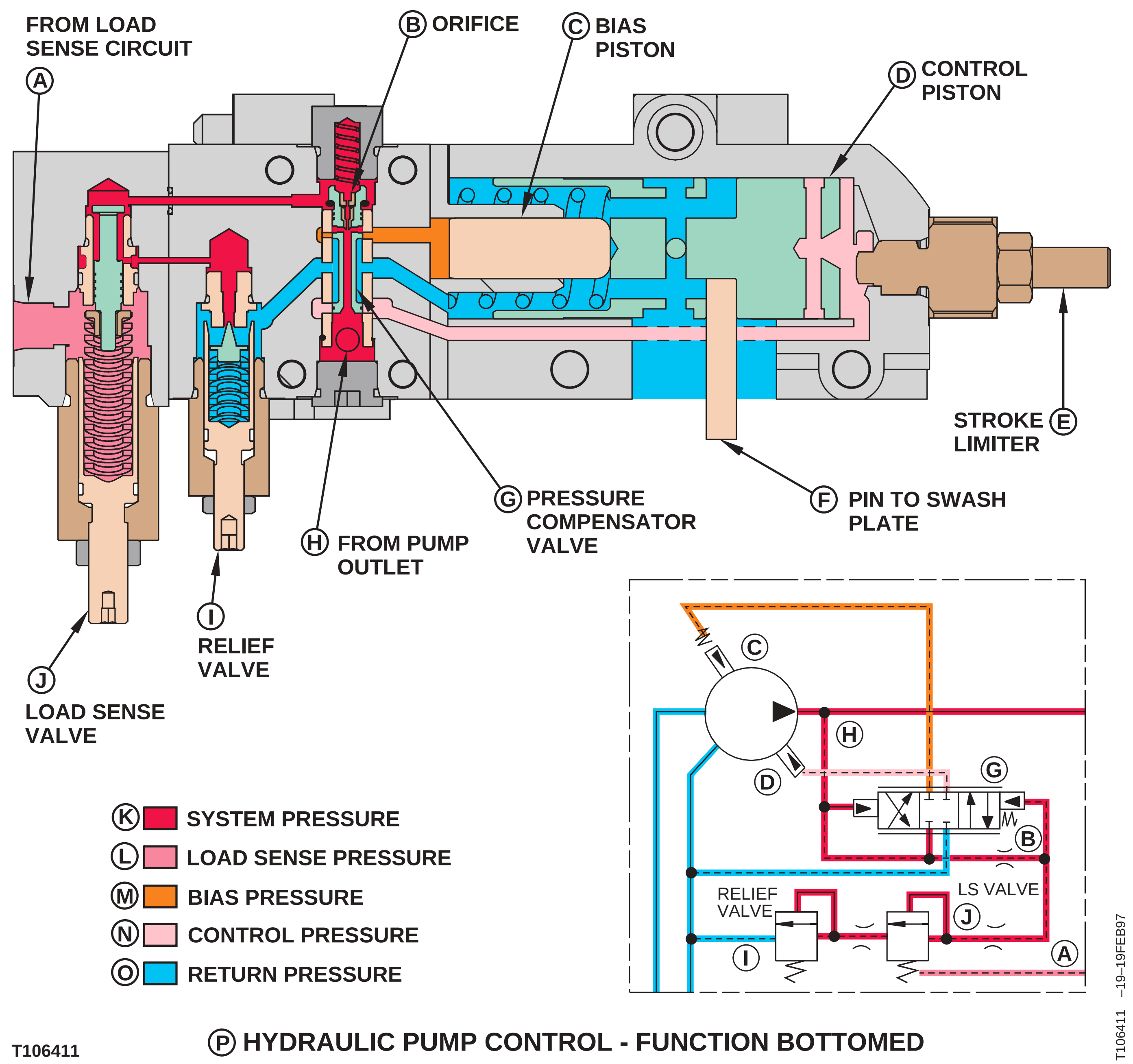
A small amount of pump pressure flows through the center of the pressure compensator spool and is routed to the cavity behind the bias piston (C) to work with the control piston spring and bring the pump into stroke.

If the operator continues to run several functions at one time and flow requirements are high, all of the oil on the large end of the control piston will drain to tank.

The control piston will move all the way to the right and the pump will be at full stroke.

TX,9025,ME316 –19–28AUG96–2/2

Hydraulic Pump Control—Function Bottomed



T106411

P HYDRAULIC PUMP CONTROL - FUNCTION BOTTOMED

A—From Load Sense Circuit
B—Orifice
C—Bias Piston
D—Control Piston
E—Stroke Limiter
F—Pin to Swash Plate
G—Pressure Compensator Valve
H—From Pump Outlet
I—Relief Valve—Low Standby Pressure
J—Load Sense Valve—Margin Pressure
K—System Pressure
L—Load Sense Pressure
M—Bias Pressure
N—Control Pressure
O—Return Pressure
P—Hydraulic Pump Control—Function Bottomed

Continued on next page

TX,9025,ME317 –19–28AUG96–1/2

If the operator fully actuates a function, the cylinder will travel to the end of its stroke and load sense pressure will continue to rise until it reaches the setting of the load sense relief valve in the outlet section of the loader control valve. At this point load sense pressure is limited to this setting. Pump outlet pressure will continue to increase until it is at the margin pressure above load sense. At this point the load sense valve opens, flow begins through the compensator valve (G) moving it against the spring. This opens the bias piston (C) to return and directs pressure oil to the control piston (D) head end.

The control piston moves against the spring causing the pump to destroke until there is just enough flow to maintain maximum system pressure. This pressure will be equal to the setting of the load sense relief valve plus the margin pressure setting of the load sense valve.

TX,9025,ME317 –19–28AUG96–2/2

Fan Drive Operation

Standard Speed Fan

The fan drive system consist of a gear type pump, a gear type motor with integral relief valve and plumbing connections to the hydraulic system. The pump is directly driven off the front gear train of the engine. Oil flow to the pump comes from the hydraulic reservoir. Pump output is connected to the motor inlet. When the motor and fan rotate, return flow is to the hydraulic system filter inlet and then to the hydraulic reservoir. With all hydraulic functions in neutral and no hydraulic return flow, the return flow from the fan motor will go through the cooler and then back to the reservoir. This is due to the 25 PSI relief valve in the return circuit. Internal motor leakage is routed through a case drain line to the reservoir. The function of the bypass type relief valve in the motor housing is to limit the motor and fan speed. When the engine is running at slower speeds the pump oil flow to motor is low and the fan speed is slow. The fan load is light and the oil pressure required to rotate the motor is low. As the engine speed is increased, the fan load and oil pressure increases. When the engine speed reaches approximately rated speed the oil pressure is high enough to cause the relief valve to open and bypass some of the oil flow from the motor. As a result, fan speed is limited by the bypass restriction and any engine speed increases will cause little or no fan speed increase.

Variable Speed Fan (Optional)

With the variable speed option, a variable position solenoid is used to control the fan motor relief valve. If engine, transmission, hydraulic, and charge air system temperatures are cool, voltage is applied to the relief solenoid (Y37). This reduces relief valve pressure setting which reduces fan speed. As system heats up during normal operation the voltage applied to the solenoid decreases, the pressure setting increases, and causes the fan speed to increase.

The Engine Coolant Sensor (B1), Transmission Oil Temperature Sensor (B32), Hydraulic Oil Temperature Sensor (B15), and Intake Manifold Air Temperature Sensor (B7) send system temperatures to the engine (ECU), Chassis (CCU) and transmission (TCU) Control Units. These temperatures are relayed to the Chassis Control Unit (CCU) which controls the relief valve solenoid.

This controlled fan speed is more economical and fuel efficient.

TX,9025,ME406 –19–02OCT02–1/1

Steering System Components

NOTE: See Brakes/Steering Component Location drawing in Group 9025-15 for location of components.

The steering hydraulic system consists of a variable-displacement pump supplying a closed center steering and loader system. The components of the steering system are:

- Piston Pump
- Steering valve with Load Sense
- Priority valve
- Steering cylinders

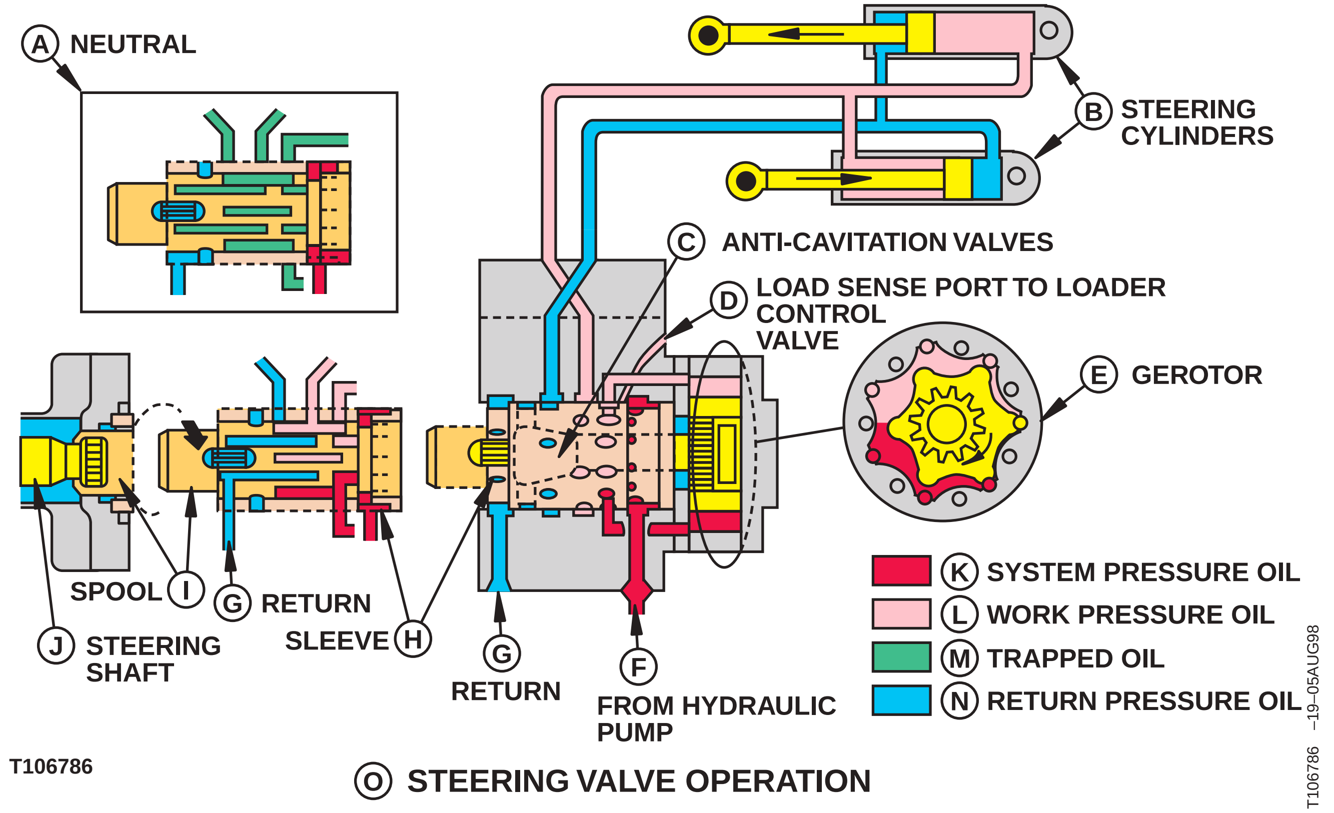
The hydraulic pump draws oil from the reservoir. Outlet flow from the pump flows to the steering valve. When the machine is steered, the steering valve routes flow to the steering cylinders to articulate the machine.

Steering load sense is directed through the load control valve and back to the hydraulic pump. This signal controls pump flow. The steering load sense signal in the load control valve, provides priority to steering by utilizing compensator valves in each loader function. The compensator will restrict flow to any loader function that has a work load pressure less than the steering work load pressure.

An optional secondary steering system is used to provide temporary steering flow in the event of a flow loss in the steering hydraulic system. The secondary steering gear type pump, is driven by an electric motor. The secondary steering inlet manifold is a valve connected to the steering valve inlet. The manifold contains two check valves which isolate secondary steering flow and a pressure switch which controls operation of the secondary steering motor.

TX,9025,ME318 –19–28AUG96–1/1

Steering Valve Operation



T106786

A—Neutral
B—Steering Cylinders
C—Anti-Cavitation Valves
D—Load Sense Port To Loader Control Valve
E—Gerotor
F—From Hydraulic Pump
G—Return
H—Sleeve
I—Spool
J—Steering Shaft
K—System Pressure Oil
L—Work Pressure Oil
M—Trapped Oil
N—Return Pressure Oil
O—Steering Valve Operation

The steering valve (O) consists of a spool (I) inside a sleeve (H) within a housing. When steering wheel is not moving, the valve is in the neutral (A) position. In neutral, the spool and sleeve are aligned so that oil flow through the valve is blocked. The steering cylinders (B) are held stationary by trapped oil in the left and right workports.

When the steering valve is turned to the right, the spool rotates relative to the sleeve, and opens passages which allow pump flow through the spool and sleeve assembly. Oil flows to the gerotor (E) causing the gerotor gear to rotate. Oil flow from the gerotor flows back into the valve where it is directed out the right workport to the respective ends of the steering cylinders.

A bypass orifice is machined into the spool and sleeve assembly. It is a variable orifice that introduces a small leak into the pressure side of the steering valve. Its purpose is to dampen the initial pressure surge when the steering wheel is partially turned. When the steering wheel is fully turned, the leak is closed off.

Return oil flows back in through the left workport through the spool and sleeve assembly to return. The load-sensing orifice is located between the sleeve and the gerotor. This orifice feeds the load-sensing pressure to loader control valve.

Continued on next page

TX,05,SS3714 –19–28AUG96–1/2

When the rotation of the steering wheel stops, the gerotor gear continues to move, turning the sleeve, until the sleeve stops the flow to the gerotor. At this point, the valve is back in the neutral position and will remain there until the steering wheel is moved again.

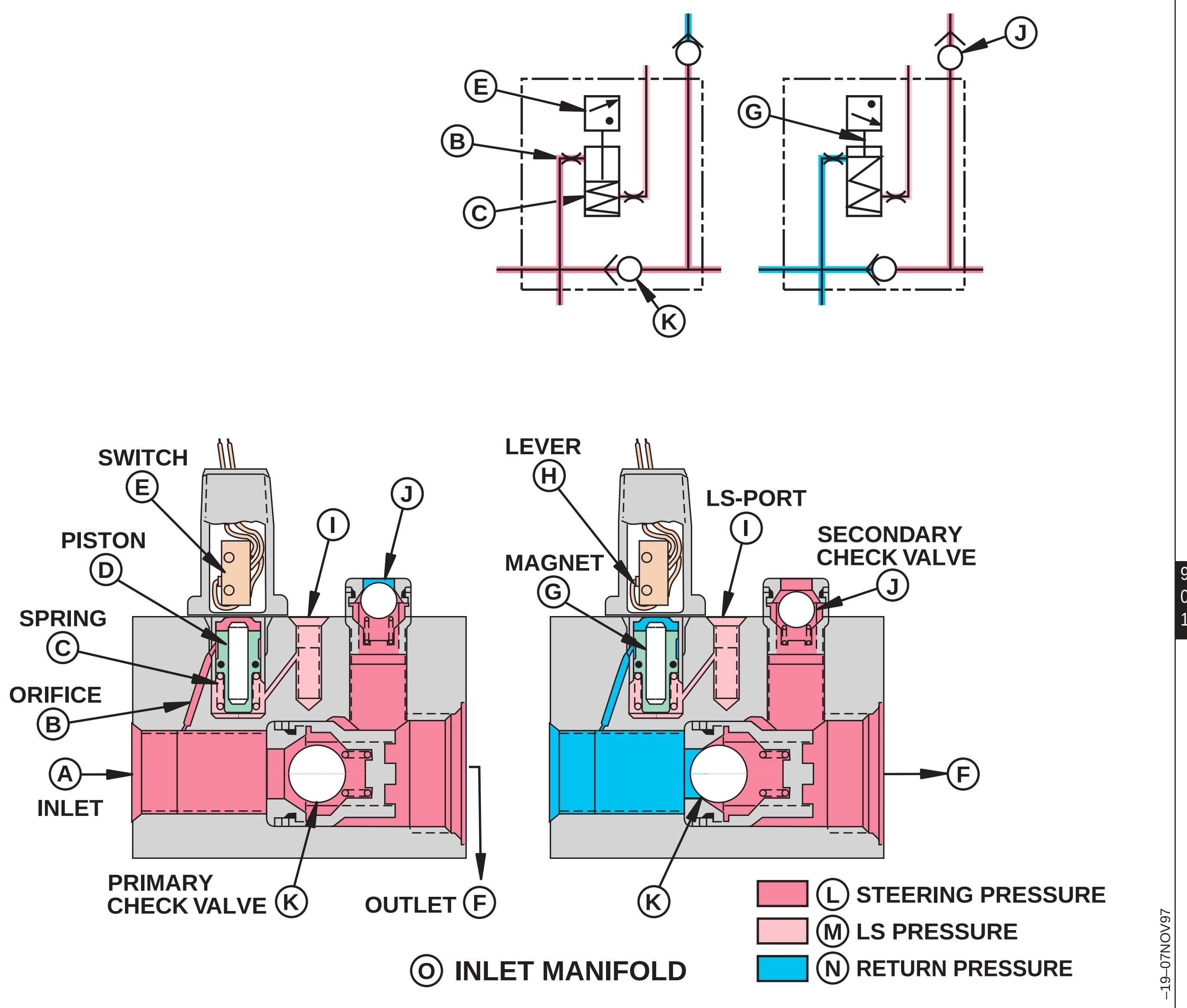
The valve has a variable steering rate which is proportional to the speed the steering wheel is rotated.

A variable orifice bypasses oil around the gerotor. Turning the steering wheel slowly takes approximately seven turns (variable orifice small) stop-to-stop versus three turns (variable orifice large) when turning the steering wheel quickly.

Four anti-cavitation balls are located inside the spool. (Not shown.)

TX,05,SS3714 –19–28AUG96–2/2

Secondary Steering Inlet Manifold Operation



T6567OL

A—Inlet
B—Orifice
C—Spring
D—Piston
E—Switch
F—Outlet
G—Magnet
H—Lever
I—LS-Port
J—Secondary Check Valve
K—Primary Check Valve
L—Steering Pressure
M—LS-Pressure
N—Return Pressure
O—Inlet Manifold

The secondary steering inlet manifold isolates the main steering system and provides a signal to the controller to warn of low steering pressure.

Continued on next page

TX,05,SS3716 –19–28AUG96–1/2

During normal steering operation, pump flow enters from the hydraulic pump through the inlet (A), unseats the primary check valve (K), and flows to the steering valve through the outlet (F). Inlet pressure is sensed on top of the piston (D) through the orifice (B) to move the piston down against the spring (C) and load-sensing pressure. With the main hydraulic pump supplying flow, the steering inlet pressure is higher than load-sensing pressure. This pressure difference keeps the switch (E) in the open position.

If main pump flow is lost, the primary check valve seats. The pilot pressure in the loader control valve drops, causing pressure through the orifice to drop, causing the spring, plus load-sensing pressure through the LS-port (I), to move the piston up. The magnet (G) pulls lever (H), which closes the switch.

When the switch opens, the chassis controller unit (CCU) energizes the secondary steering relay. The relay energizes the secondary steering motor which drives the pump. Pump flow unseats the secondary check valve (J) providing temporary steering flow.

TX,05,SS3716 –19–28AUG96–2/2

Secondary Steering System Operation

NOTE: See Service Brakes & Steering Hydraulic System Component Location (S.N. —571404) and Service Brakes & Steering Hydraulic System Component Location (S.N. 571405—). (Go to Group 9025—15.)

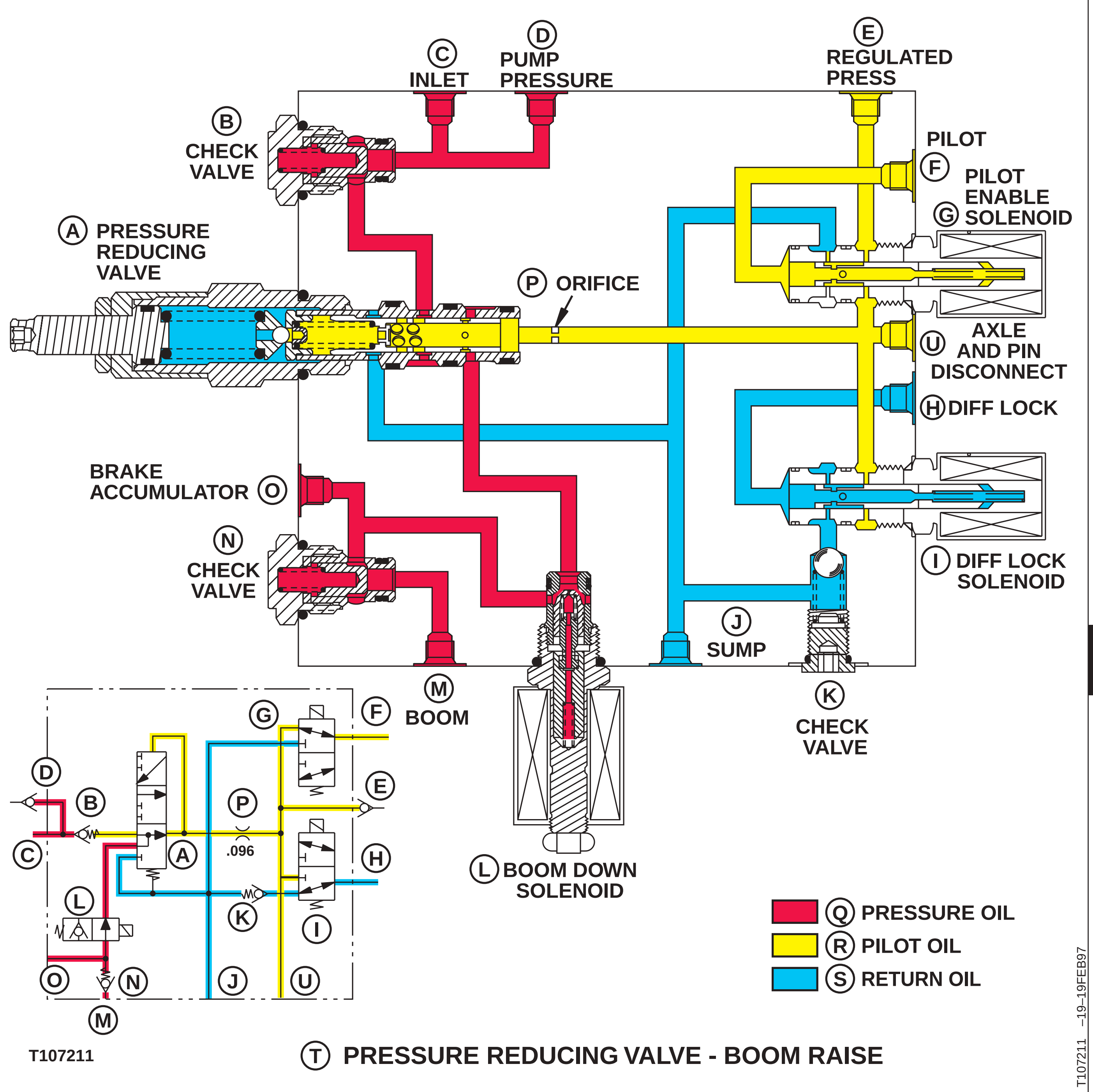
The secondary steering system provides temporary flow in the event of a loss of main pump flow.

The key switch provides a power source to the controller. The controller contains the electronic circuitry to control the operation of the secondary steering system. When the machine is started, the start switch button is depressed, sending a signal to the controller that the machine is in use.

If pump flow is lost, the decrease in system pressure closes a pressure switch in the inlet manifold. The closed pressure switch signals the chassis control unit (CCU) to energize the relay. The relay energizes the electric pump which provides flow through the inlet manifold. The dash mounted indicator is also energized, indicating the system is operating. Two check valves in the inlet manifold isolate the secondary steering pump flow from the rest of the system.

TX,9025,ME321 –19–28AUG96–1/1

Pressure Reducing Valve—Boom Raise Operation (S.N. —571404)



A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Pilot Oil
S—Return Oil
T—Pressure Reducing Valve—Boom Raise
U—Axle and Pin Disconnect

Continued on next page

TX,9025,ME323 –19–10AUG96–1/2

9025
05
19

The pressure reducing manifold contains several components which are part of the hydraulic and the pilot control systems. These components are:

- Combination source valve/pressure reducing valve
- Pilot enable solenoid valve
- Differential lock solenoid valve (If equipped)
- Boom down solenoid valve

Oil flow from the hydraulic pump is supplied to the pressure reducing manifold from two sources. The first source is directly from the pump and enters through inlet (C). The second source is supplied through the brake accumulator, across the boom down solenoid valve and enters through port (O). Oil from the brake accumulator is available whenever the boom down solenoid valve is activated. The boom down solenoid is electrically in parallel with the pilot enable solenoid. Whenever the pilot enable solenoid is activated the boom down solenoid is also energized.

The combination source valve/pressure reducing valve has two functions. The first function is to select the source of oil supply with the highest pressure. Upon start-up, the spring has the source valve held up and oil is available from both the hydraulic pump and the brake accumulator. As pressure builds between the source valve and the orifice (P), the valve will move down and oil will be supplied from the hydraulic pump only. In the event of a loss of flow from the hydraulic pump, check valve (B) will seat, the source valve will move up and the brake accumulator will provide flow for the pilot circuit.

The second function of the combination source valve/pressure reducing valve is to regulate pump flow to maintain pilot circuit pressure. Pilot circuit pressure is available through orifice (P) to the inlet of the differential lock solenoid valve, the pilot controllers through the pilot enable solenoid valve and to the axle and pin disconnect solenoid.

When the pilot enable solenoid valve is energized the spool shifts up in the sleeve. Pilot oil enters the sleeve and flows through the spool. The oil flows to the pilot controllers through passage (F).

When the pilot enable solenoid valve is de-energized, pilot circuit flow is blocked and passage (F) is open to return.

When the differential lock solenoid valve is energized the spool shifts up in the sleeve. Pilot oil enters the sleeve and flows through the spool to passage (H). Passage (H) routes flow to the differential clutch(es) to engage the differential lock. When the differential lock solenoid valve is de-energized, differential lock flow is blocked and passage (H) is open to return.

If a pressure spike is encountered in either the differential lock or the pilot circuit, the pressure source valve/pressure reducing valve will shift down against the spring, blocking pump flow. With the spool shifted down far enough against the spring, the excess pressure in the pilot circuit will be bled to return.

The differential lock return check valve (K) prevents oil from the reservoir return passage from draining back into the differentials which are at a lower point on the machine.

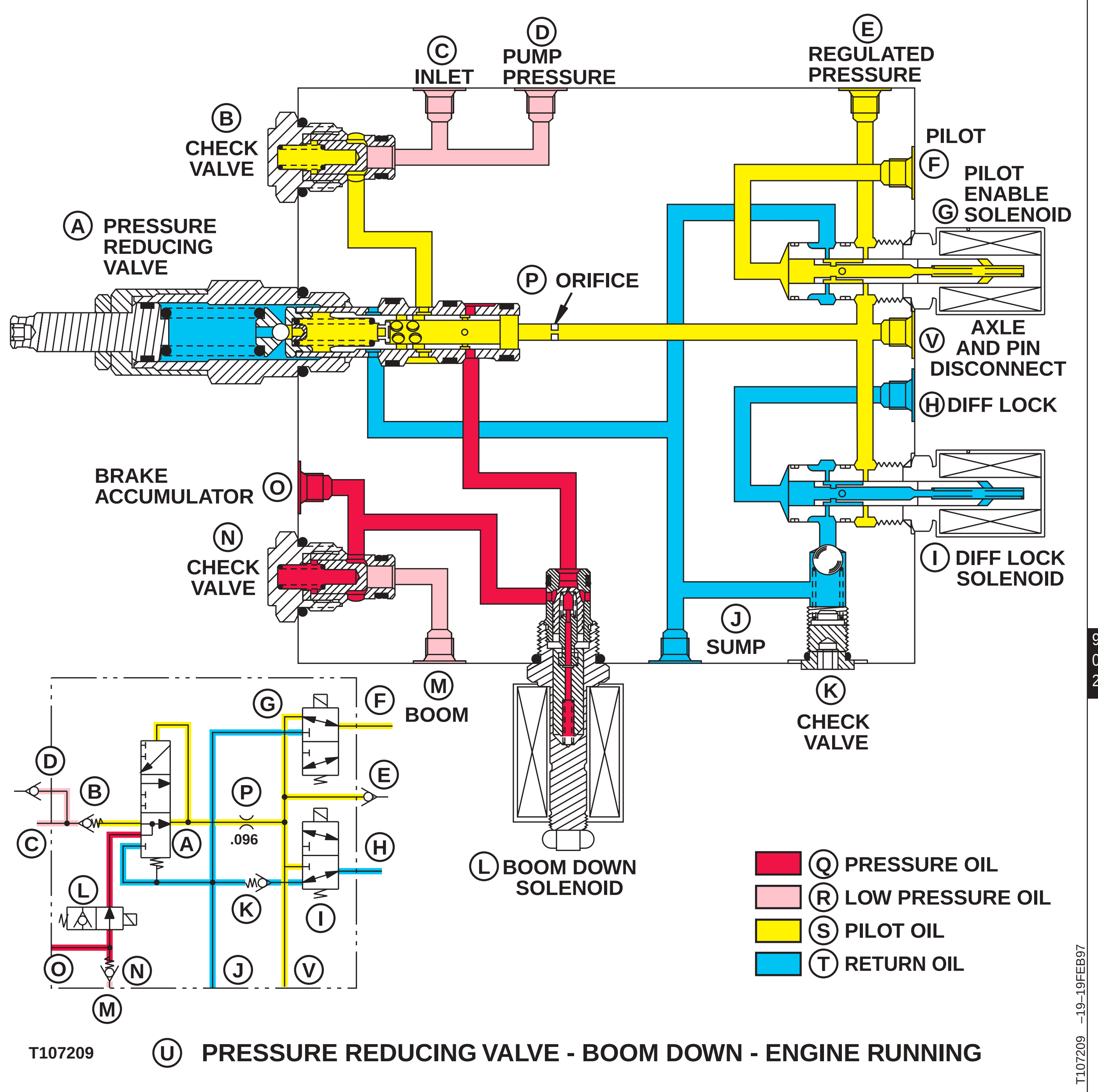
There are three operating conditions: neutral, high pressure function and low pressure function.

In neutral, the pressure reducing valve is supplied low standby pressure both from the pump and from the brake accumulator. Since standby pressure is above the setting of the pressure reducing valve, operation is normal.

When a high pressure function is being operated, example boom raise, high pressure will be supplied from the pump and brake accumulator. The pressure reducing valve will reduce this pressure to its specified setting and operation is normal.

TX,9025,ME323 –19–10AUG96–2/2

Pressure Reducing Valve—Boom Down—Engine Running Operation (S.N. — 571404)



A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Low Pressure Oil
S—Pilot Oil
T—Return Oil
U—Pressure Reducing Valve—Boom Down—Engine Running
V—Axle and Pin Disconnect

Continued on next page

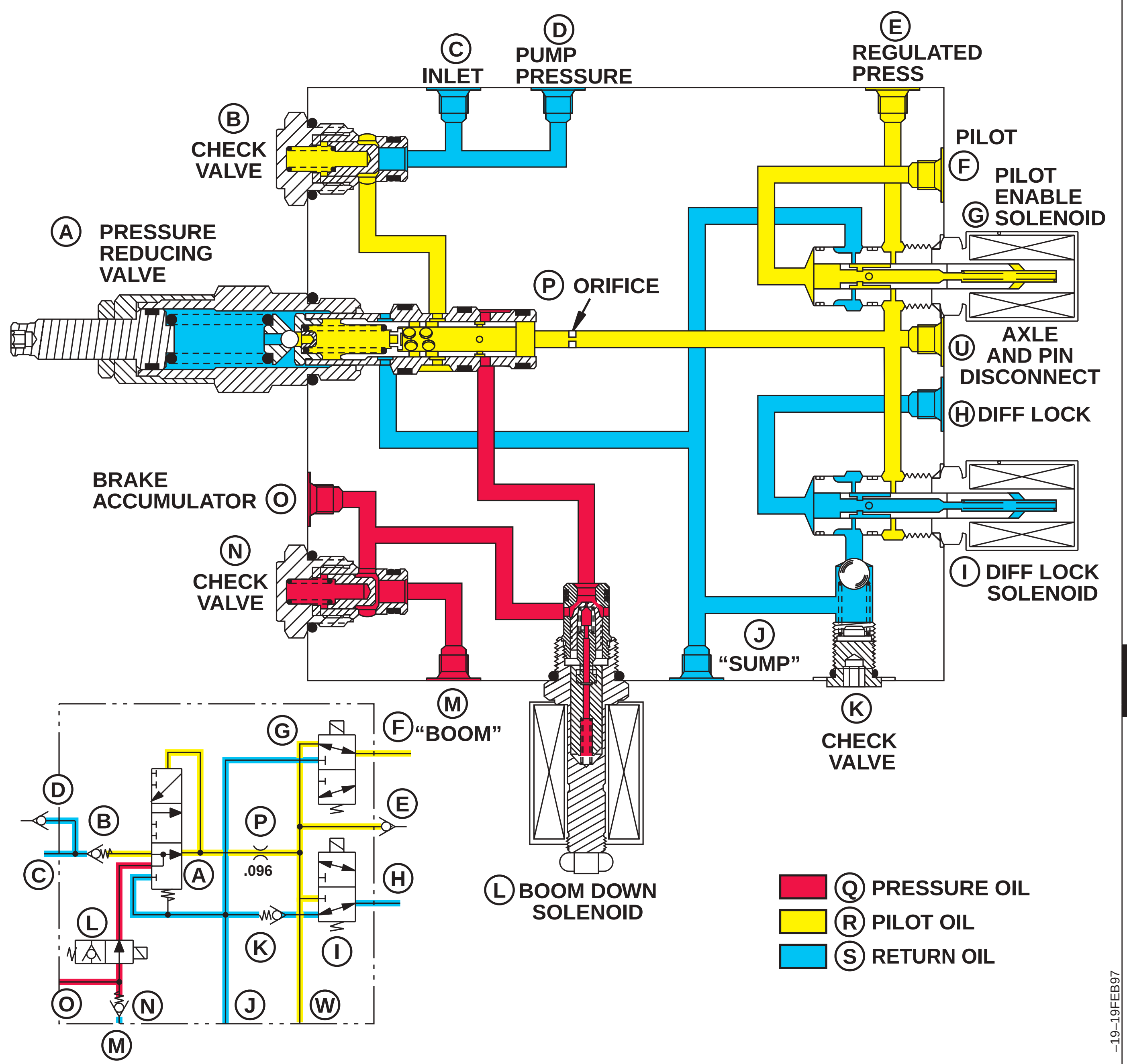
TX,9025,ME324 –19–10AUG96–1/2

9025
05
21

During a low pressure condition, (example: boom down) the pump outlet pressure could drop to a very low level. In this condition check valves (B) and (N) will close. This allows the brake accumulator to momentarily supply the pressure reducing valve and thereby maintain normal pressure to the pilot and differential lock circuits.

TX,9025,ME324 –19–10AUG96–2/2

Pressure Reducing Valve—Boom Down—Engine OFF Operation (S.N — 571404)



T PRESSURE REDUCING VALVE - BOOM DOWN - ENGINE OFF

A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Pilot Oil
S—Return Oil
T—Pressure Reducing Valve—Boom Down—Engine OFF
U—Axle and Pin Disconnect

Continued on next page

TX,9025,ME325 –19–28AUG96–1/2

9025
05
23

The secondary boom lower circuit is a solenoid operated circuit which allows the operator to lower the boom with the engine off. With the engine off, the secondary boom lower circuit has the possibility of receiving oil flow from two sources.

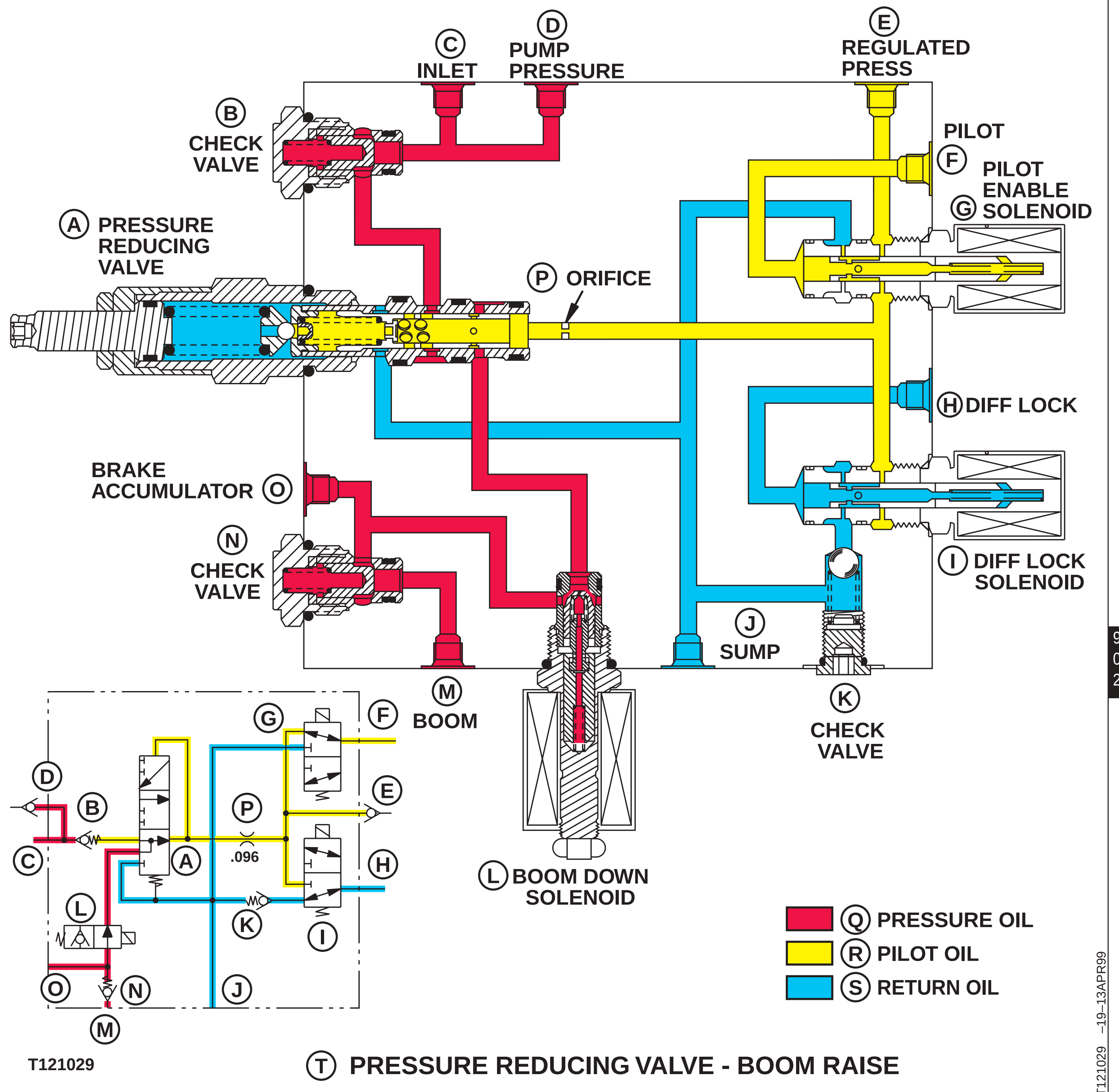
With the boom off the ground, trapped oil in the head end of the boom cylinders is one source of oil. The second source of oil is from one of the brake accumulator.

The boom down solenoid and the pilot enable solenoid are both activated at the same time. Both solenoids are energized by activating the pilot enable boom down switch to the momentary position. This connects unswitched power to both solenoids.

When the boom down solenoid is energized, the spool will shift allowing trapped oil to flow through the sleeve to the pressure reducing valve. The pressure reducing valve meters the flow to the pilot controller(s) to maintain pilot pressure at the controller(s) so the control valve spool can be moved to lower the boom or dump the bucket.

TX,9025,ME325 –19–28AUG96–2/2

Pressure Reducing Valve—Boom Raise Operation (S.N. 571405 —)



A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Pilot Oil
S—Return Oil
T—Pressure Reducing Valve—Boom Raise

Continued on next page

CED,TX17994,360 –19–27JUL00–1/2

The pressure reducing manifold contains several components which are part of the hydraulic and the pilot control systems. These components are:

- Combination source valve/pressure reducing valve
- Pilot enable solenoid valve
- Differential lock solenoid valve (If equipped)
- Boom down solenoid valve

Oil flow from the hydraulic pump is supplied to the pressure reducing manifold from two sources. The first source is directly from the pump and enters through inlet (C). The second source is supplied through the brake accumulator, across the boom down solenoid valve and enters through port (O). Oil from the brake accumulator is available whenever the boom down solenoid valve is activated. The boom down solenoid is electrically in parallel with the pilot enable solenoid. Whenever the pilot enable solenoid is activated the boom down solenoid is also energized.

The combination source valve/pressure reducing valve has two functions. The first function is to select the source of oil supply with the highest pressure. Upon start-up, the spring has the source valve held up and oil is available from both the hydraulic pump and the brake accumulator. As pressure builds between the source valve and the orifice (P), the valve will move down and oil will be supplied from the hydraulic pump only. In the event of a loss of flow from the hydraulic pump, check valve (B) will seat, the source valve will move up and the brake accumulator will provide flow for the pilot circuit.

The second function of the combination source valve/pressure reducing valve is to regulate pump flow to maintain pilot circuit pressure. Pilot circuit pressure is available through orifice (P) to the inlet of the differential lock solenoid valve and the pilot controllers through the pilot enable solenoid valve.

When the pilot enable solenoid valve is energized the spool shifts up in the sleeve. Pilot oil enters the sleeve and flows through the spool. The oil flows to the pilot controllers through passage (F).

When the pilot enable solenoid valve is de-energized, pilot circuit flow is blocked and passage (F) is open to return.

When the differential lock solenoid valve is energized the spool shifts up in the sleeve. Pilot oil enters the sleeve and flows through the spool to passage (H). Passage (H) routes flow to the differential clutch(es) to engage the differential lock. When the differential lock solenoid valve is de-energized, differential lock flow is blocked and passage (H) is open to return.

If a pressure spike is encountered in either the differential lock or the pilot circuit, the pressure source valve/pressure reducing valve will shift down against the spring, blocking pump flow. With the spool shifted down far enough against the spring, the excess pressure in the pilot circuit will be bled to return.

The differential lock return check valve (K) prevents oil from the reservoir return passage from draining back into the differentials which are at a lower point on the machine.

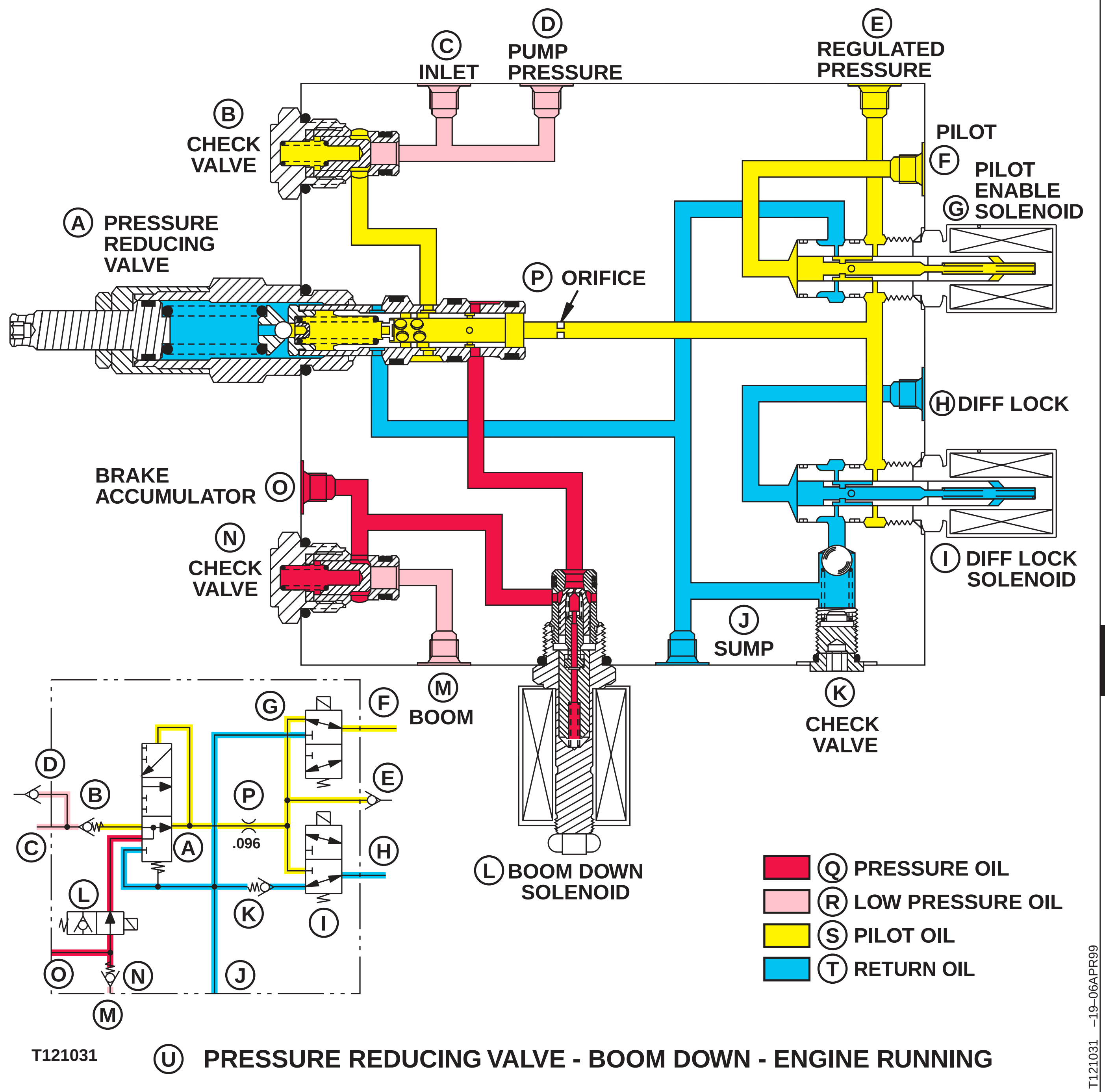
There are three operating conditions: neutral, high pressure function and low pressure function.

In neutral, the pressure reducing valve is supplied low standby pressure both from the pump and from the brake accumulator. Since standby pressure is above the setting of the pressure reducing valve, operation is normal.

When a high pressure function is being operated, example boom raise, high pressure will be supplied from the pump and brake accumulator. The pressure reducing valve will reduce this pressure to its specified setting and operation is normal.

CED,TX17994,360 –19–27JUL00–2/2

Pressure Reducing Valve—Boom Down—Engine Running Operation (S.N. 571405—)



A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Low Pressure Oil
S—Pilot Oil
T—Return Oil
U—Pressure Reducing Valve—Boom Down—Engine Running

Continued on next page

TX,9025,ME324 –19–10AUG96–1/2

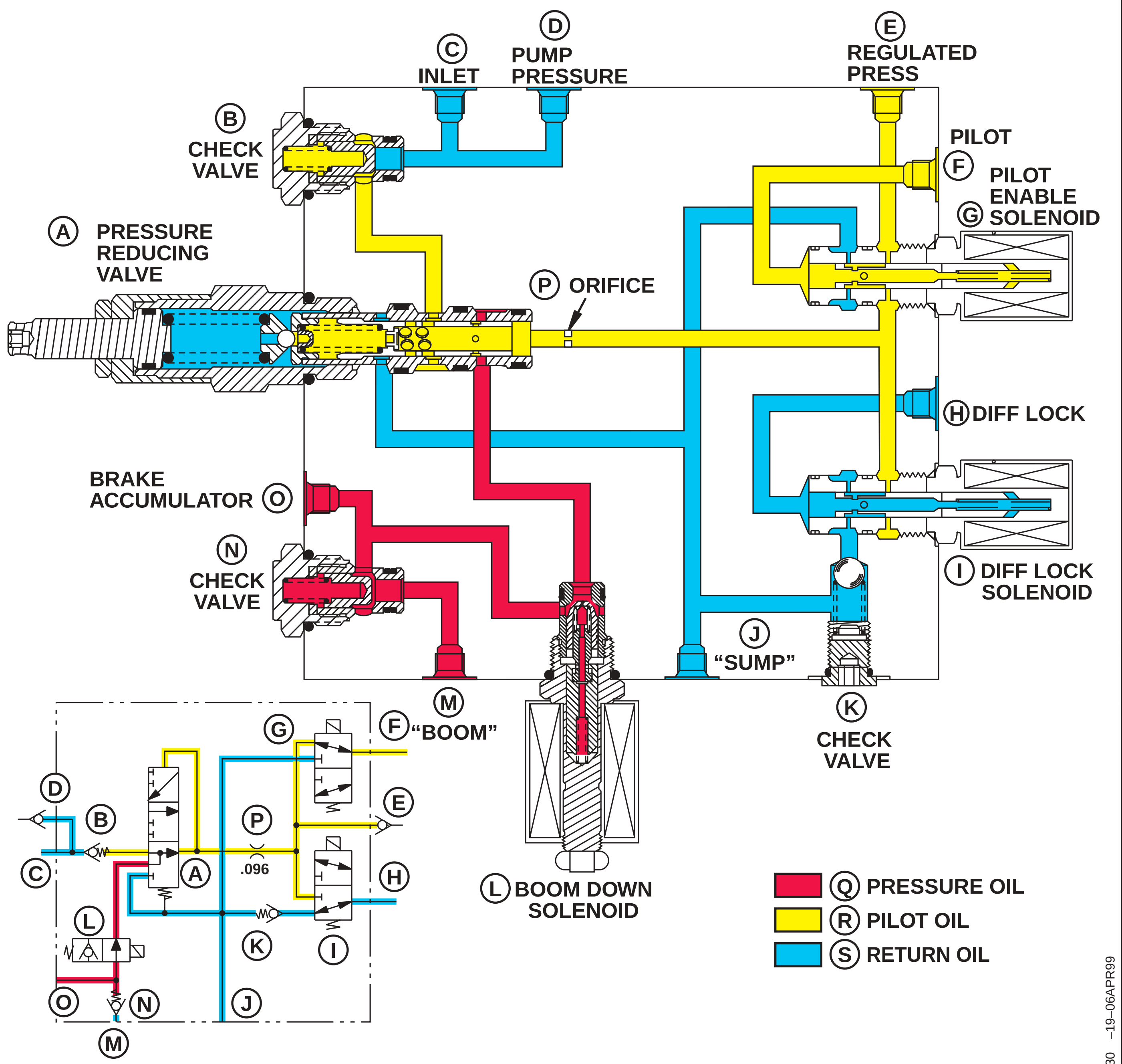
9025
05
27

https://www.truck-manuals.net/

During a low pressure condition, (example: boom down) the pump outlet pressure could drop to a very low level. In this condition check valves (B) and (N) will close. This allows the brake accumulator to momentarily supply the pressure reducing valve and thereby maintain normal pressure to the pilot and differential lock circuits.

TX,9025,ME324 –19–10AUG96–2/2

Pressure Reducing Valve—Boom Down—Engine OFF Operation (S.N. 571405—)



T121030 (T) PRESSURE REDUCING VALVE - BOOM DOWN - ENGINE OFF

A—Pressure Reducing Valve
B—Check Valve
C—Inlet
D—Pump Pressure
E—Regulated Pressure
F—Pilot
G—Pilot Enable Solenoid
H—Differential Lock
I—Differential Lock Solenoid
J—Sump
K—Check Valve
L—Boom Down Solenoid
M—Boom
N—Check Valve
O—Brake Accumulator
P—Orifice
Q—Pressure Oil
R—Pilot Oil
S—Return Oil
T—Pressure Reducing Valve—Boom Down—Engine OFF

Continued on next page

TE14778,000001A –19–04NOV03–1/2

9025
05
29

The secondary boom lower circuit is a solenoid operated circuit which allows the operator to lower the boom with the engine off. With the engine off, the secondary boom lower circuit has the possibility of receiving oil flow from two sources.

With the boom off the ground, trapped oil in the head end of the boom cylinders is one source of oil. The second source of oil is from one of the brake accumulator.

The boom down solenoid and the pilot enable solenoid are both activated at the same time. Both solenoids are energized by activating the pilot enable boom down switch to the momentary position. This connects unswitched power to both solenoids.

When the boom down solenoid is energized, the spool will shift allowing trapped oil to flow through the sleeve to the pressure reducing valve. The pressure reducing valve meters the flow to the pilot controller(s) to maintain pilot pressure at the controller(s) so the control valve spool can be moved to lower the boom or dump the bucket.

TE14778,000001A –19–04NOV03–2/2

Service Brake Hydraulic System

NOTE: See Hydraulic System Schematics (Go to Group 9025-15.)

The loader service brakes are operated by a load sense pressure compensated, closed center hydraulic system. Flow is supplied by a variable displacement, axial piston hydraulic pump.

Pressure to the brake system varies from low standby to the maximum which is controlled by the load sense relief valve in the loader control valve.

Brake System

The hydraulic pump supplies oil flow to the accumulators. The accumulators have a gas pre-charge and inlet check valves to maintain a pressurized volume of oil for reserve brake applications.

Oil from the accumulators flows through a shuttle valve to the single brake valve. A pressure switch senses pressure at the brake valve inlet. Low pressure triggers a warning signal to the monitor. The shuttle valve is used to isolate the accumulators. The brake valve is a closed center design and can be operated by pressing on either the left or right pedal. The single brake valve operates both the front and rear brakes. Brake outlet pressure flows through orifice check valves to assure that if either brake line is damaged, the brakes on the remaining axle will still function

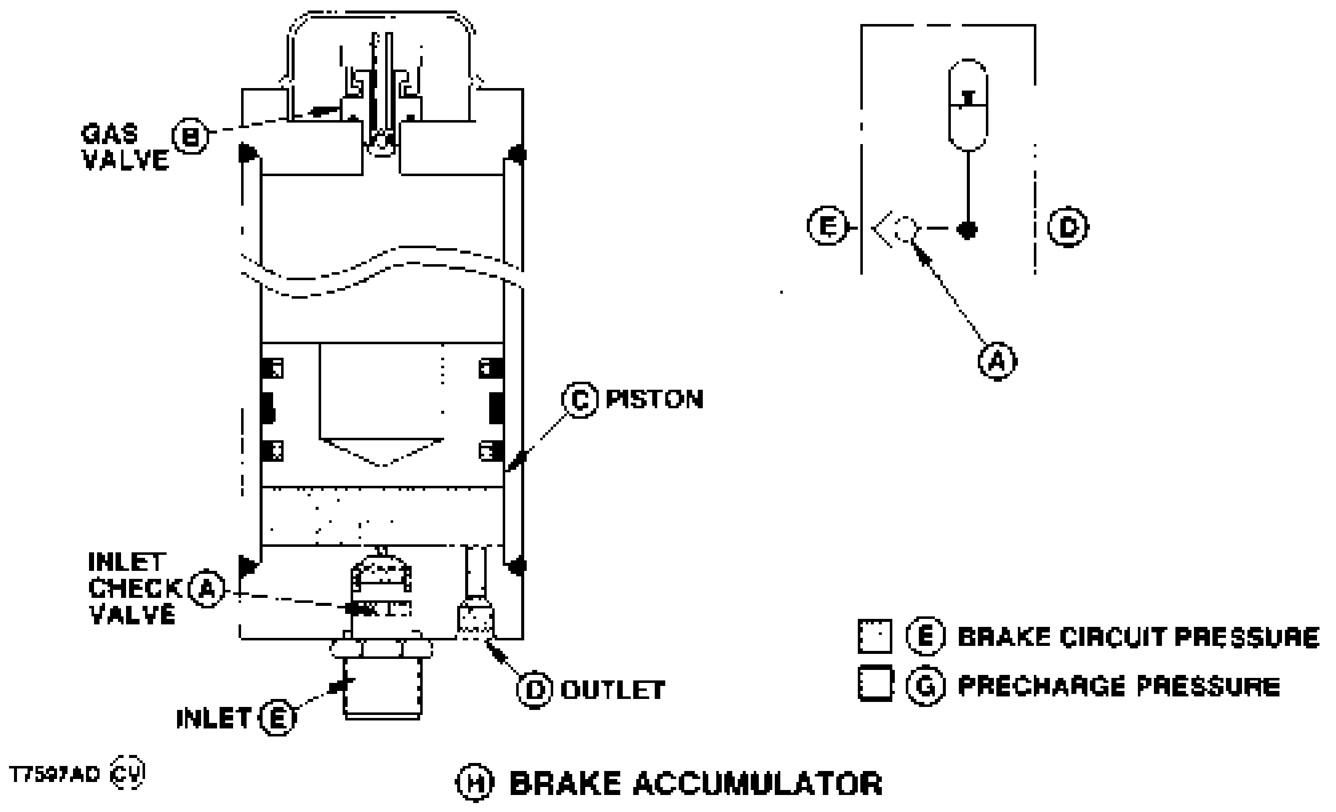
The brakes are self bleeding.

A pressure switch is used to sense the brake outlet pressure for activating the brake lights.

On early machines a pressure transducer is used to sense the brake outlet pressure for actuating the clutch cut-off feature. On later machines clutch cut-off is controlled through the Electronic Control Unit (ECU) by a potentiometer signal that is controlled by the brake pedal linkage.

TX,9025,ME326 –19–10JUL00–1/1

Service Brake Accumulator



T7597AD –19–26SEP91

9025
05
31

A—Inlet Check Valve
B—Gas Valve
C—Piston
D—Outlet
E—Brake Circuit Pressure
G—Precharge Pressure
H—Brake Accumulator

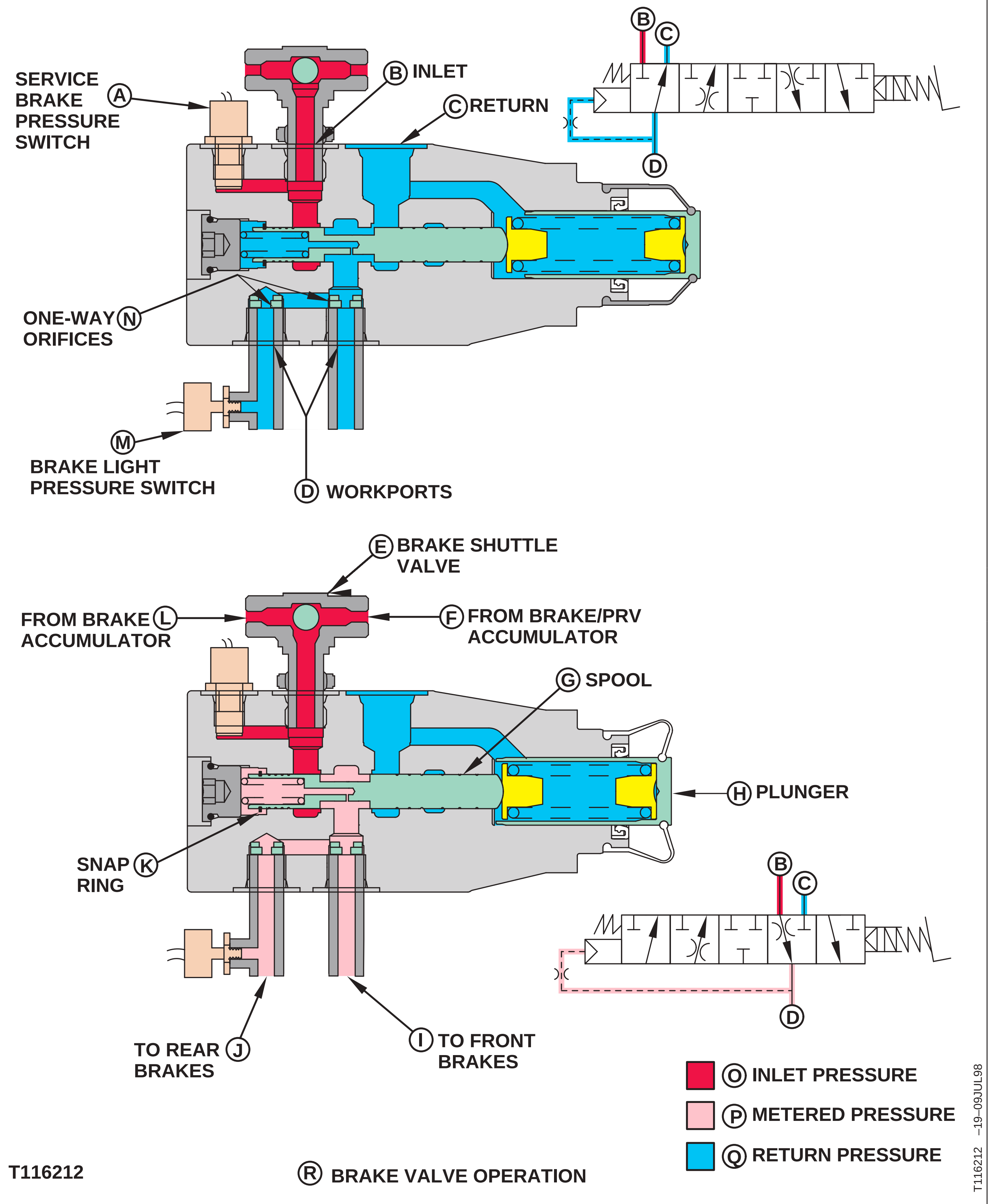
NOTE: Brake accumulator is not repairable and is serviced as a complete unit.

The accumulator is used to store pressurized oil for reserve brake application. The top of the accumulator is charged with dry nitrogen gas through valve (B). When the hydraulic system pressure exceeds the charge pressure, oil flows through the inlet (E) and inlet check valve (A). The piston (C) moves upward until gas pressure is equal to hydraulic circuit pressure.

If pump flow stops, the inlet check valve will close against inlet fitting which is machined to provide a check valve seat, keeping the accumulator charged. The accumulator will remain pressurized until the brakes are applied. The volume of the accumulator will allow several brake applications in the event of a loss of brake pump flow.

TX,9025,ME327 –19–10JUL00–1/1

Service Brake Valve



T116212

R BRAKE VALVE OPERATION

Continued on next page

TX,9025,ME417 –19–10JUL00–1/2

A—Service Brake Pressure Switch
B—Inlet
C—Return
D—Workports
E—Brake Shuttle Valve
F—From Brake/PRV Accumulator
G—Spool
H—Plunger
I—To Front Brakes
J—To Rear Brakes
K—Snap Ring
L—From Brake Accumulator
M—Brake Light Pressure Switch
N—One-Way Orifices
O—Inlet Pressure
P—Metered Pressure
Q—Return Pressure
R—Brake Valve Operation

The brake valve is a closed center, manually operated spool-type valve. One valve is used to actuate both the front and rear brakes. Orifice check valves are used in the brake lines so that if either brake line is damaged, the remaining axle brake will still function.

Brake pressure oil from the accumulators enters the inlet (B). When the valve is in neutral, oil in the workports is routed to return through passage (C). When the brakes are partially engaged, the brake pedal pushes the plunger (H) against a spring which contacts the guide. The spool has a metering notch which begins to trap the workport oil from the return passage.

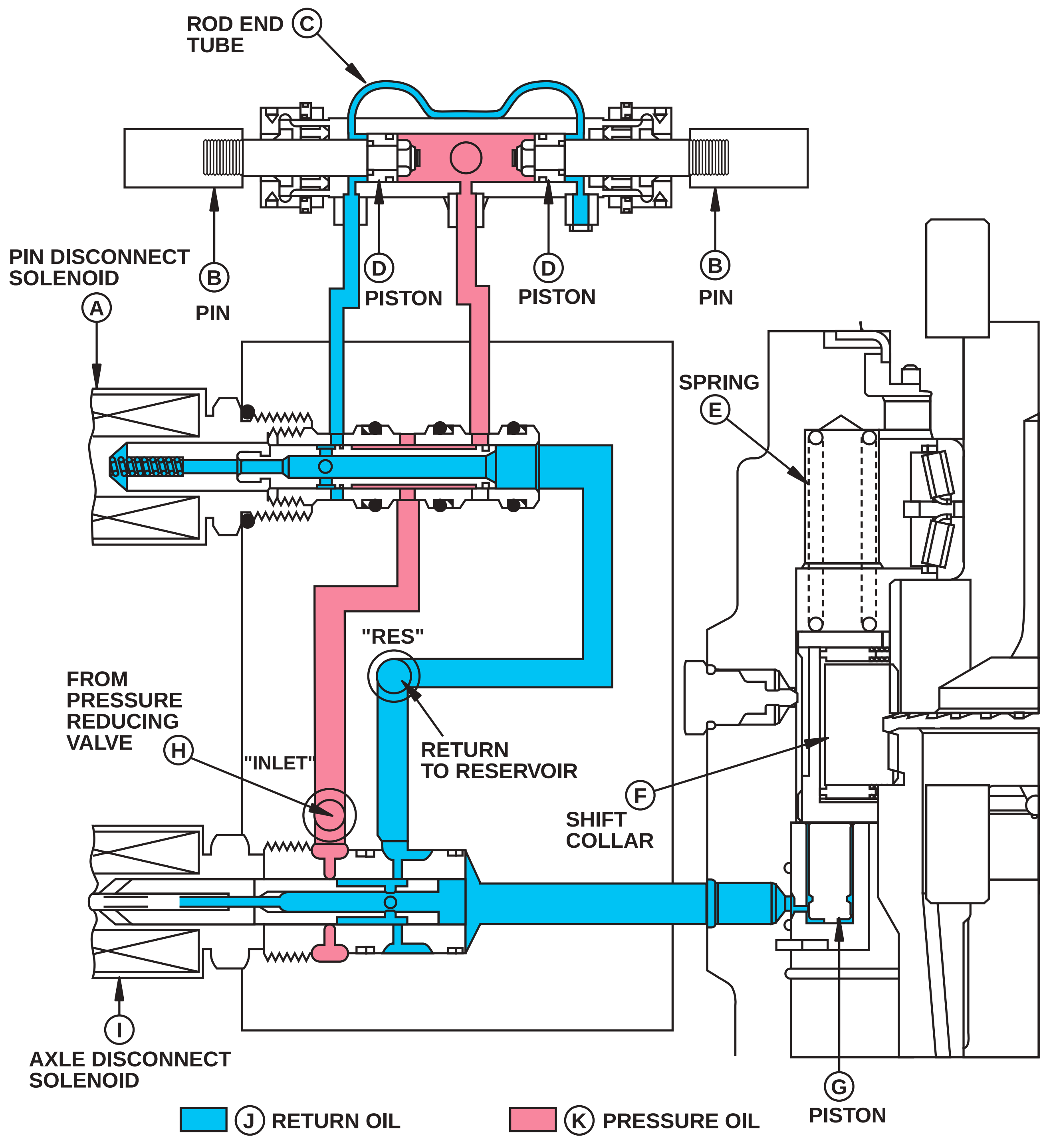
As the brake pedal is further depressed, the plunger (H) compresses the spring against the guide which moves the spool (G) further to the left. As the spool, moves to the left, the return passage (C) is blocked. A metering notch on the spool starts to open, allowing brake pressure oil from the inlet (B) to the workports (D). The brakes in the front and rear axles begin to engage.

When the brakes are fully engaged, the spool is moved to the far left position against the spring. Full inlet flow at a regulated pressure is available to the workports to engage the brakes.

The brake valve regulates brake application pressure based on brake pedal travel. When the inlet is opened to pressurize the workports, the orifice (N) allows workport pressure on the left end of the spool. The workport pressure plus spring force on the left end of the spool balance against the compressed spring force on the right end of the spool. This meters the inlet pressure oil to prevent aggressive braking or brake lock-up.

TX,9025,ME417 –19–10JUL00–2/2

Axle Disconnect And Pin Disconnect Circuit Operation (S.N. — 571404)



L—AXLE DISCONNECT AND PIN DISCONNECT CIRCUIT (S.N. -571404)

T120850

Continued on next page

TX,9025,ME415 –19–13SEP97–1/2

A—Pin Disconnect Solenoid
B—Pin
C—Rod End Tube
D—Piston
E—Spring
F—Shift Collar
G—Piston
H—Pressure From Pressure Reducing Valve
I—Axle Disconnect Solenoid
J—Return Oil
K—Pressure Oil
L—Axle Disconnect And Pin Disconnect Circuit (S.N. —571404)

NOTE: See Group 9020-05 for axle disconnect theory of operation.

Both the axle and pin disconnect solenoids are housed in one manifold block. They share a common inlet (H) from the pressure reducing valve. If a machine is equipped with only one of the options, the manifold block with both solenoids will be used. However only one of the solenoids will have electrical and hydraulic connections.

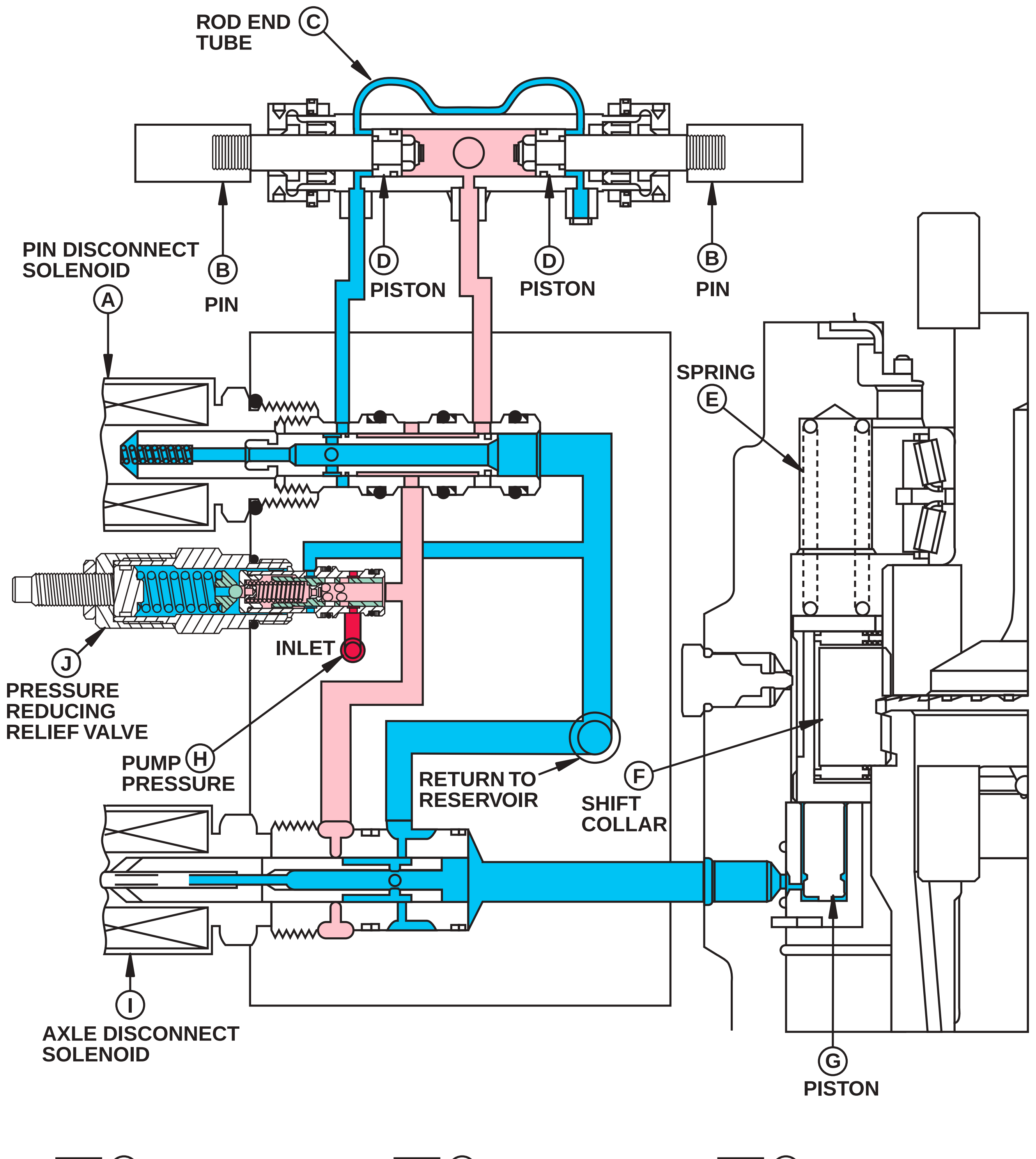
In the axle engaged mode, the solenoid (I) is de-energized and pressure oil from the “inlet” port (H) is blocked. The pistons (4 used, only one shown) (G) are connected to return, which allows the springs (E) (4 used) to hold the shift collar in the engaged position. To disengage the front axle the solenoid (I) is energized. Pressure oil is now directed to the pistons (G). The pistons extend, the springs compress and the shift collar (F) is moved to the disengaged position.

For pin disconnect operation pressure oil enters the solenoid valve through the pressure port (H). When the solenoid (A) is not energized, pressure oil flows out to the center of the cylinder holding the pins (B) in the extended position. The cylinder rod ends are joined by tube (C) to return.

When the pin disconnect switch is depressed, the solenoid coil is energized, and the spool moves to the left. This allows pressure oil to flow out to the rod ends of the cylinder, retracting the pins (B). Return oil then flows out through the solenoid to return.

TX,9025,ME415 –19–13SEP97–2/2

Axle Disconnect And Pin Disconnect Circuit Operation (S.N. 571405—)



T120851 N AXLE DISCONNECT AND PIN DISCONNECT CIRCUIT (S.N. 571405-)

Continued on next page

CED,TX17994,361 –19–15DEC00–1/2

A—Pin Disconnect Solenoid
B—Pin
C—Rod End Tube
D—Piston
E—Spring
F—Shift Collar
G—Piston
H—Pressure From Pressure Reducing Valve
I—Axle Disconnect Solenoid
J—Pressure Reducing Relief Valve
K—Return Oil
L—Low Oil Pressure
M—High Pressure Oil
N—Axle Disconnect And Pin Disconnect Circuit (S.N. 571405—)

NOTE: See Group 9020-05 for axle disconnect theory of operation.

The axle disconnect solenoid, pin disconnect solenoid and pressure reducing relief valve are housed in one manifold block. They share a common inlet from the pressure reducing relief valve (J) and port (H) which uses main system pressure. The pressure reducing relief valve is pilot operated type valve. It reduces system pressure to a specified pressure to operate both axle and pin disconnect functions. If a machine is equipped with only one of the options, the manifold block with both solenoids will be used. However only one of the solenoids will have electrical and hydraulic connections.

In the axle engaged mode, the solenoid (I) is de-energized and pressure oil from pressure reducing-relief valve and the “inlet” port (H) is blocked. The pistons (4 used, only one shown) (G) are connected to return, which allows the springs (E) (4 used) to hold the shift collar in the engaged position. To disengage the front axle the solenoid (I) is energized. Pressure oil is now directed to the pistons (G). The pistons extend, the springs compress and the shift collar (F) is moved to the disengaged position.

For pin disconnect operation pressure oil enters the solenoid valve through pressure reducing-relief valve and pressure port (H). When the solenoid (A) is not energized, pressure oil flows out to the center of the cylinder holding the pins (B) in the extended position. The cylinder rod ends are joined by tube (C) to return.

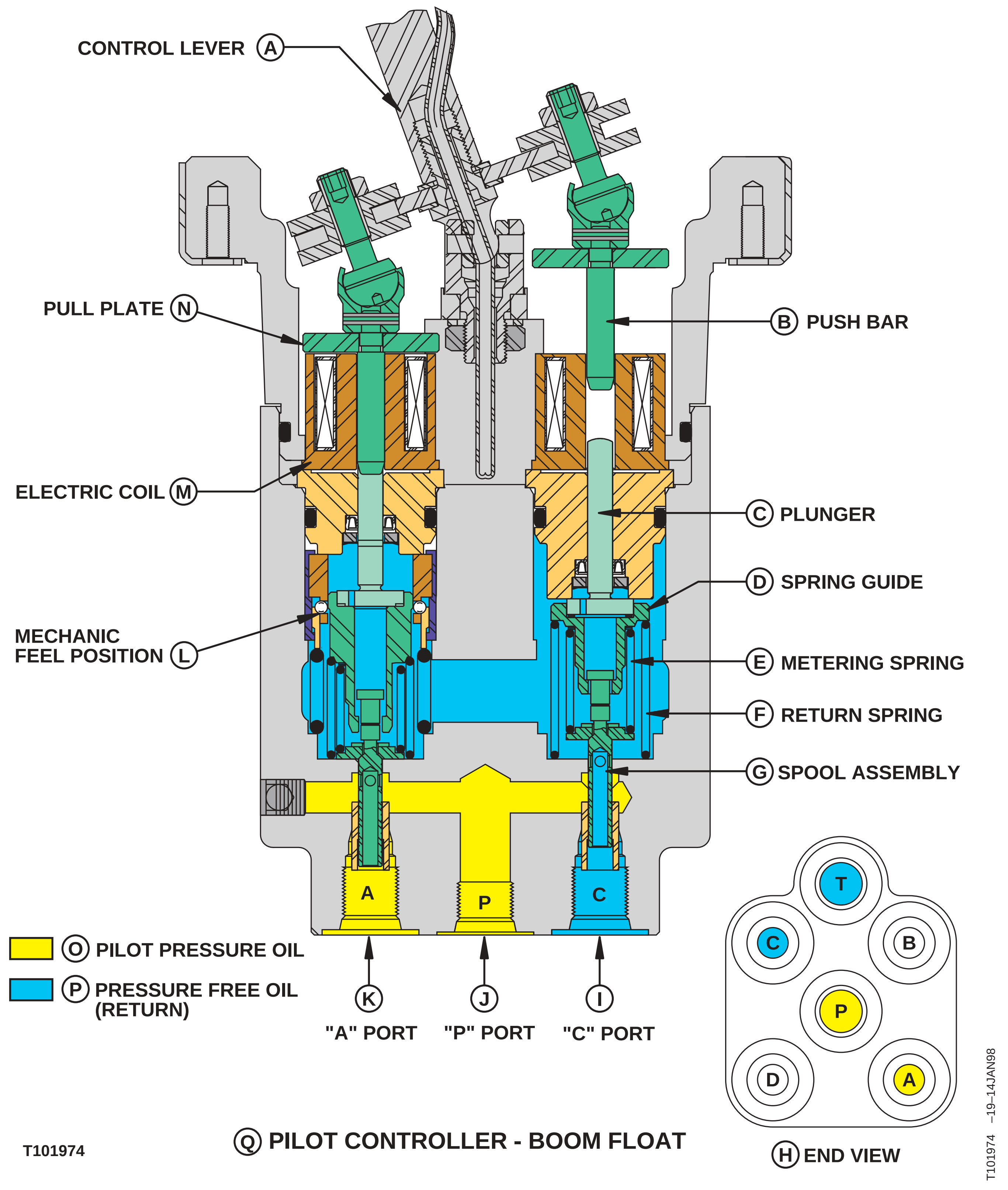
When the pin disconnect switch is depressed, the solenoid coil is energized, and the spool moves to the left. This allows pressure oil to flow out to the rod ends of the cylinder, retracting the pins (B). Return oil then flows out through the solenoid to return.

CED,TX17994,361 –19–15DEC00–2/2

Pilot Controller

Boom Float

Continued on next page TX,9025,ME330 –19–10AUG96–1/5



Continued on next page

TX,9025,ME330 –19–10AUG96–2/5

A—Control Lever
B—Push Bar
C—Plunger
D—Spring Guide
E—Metering Spring
F—Return Spring
G—Spool Assembly
H—End View
I—“C” Port
J—“P” Port
K—“A” Port
L—Mechanical Feel Position
M—Electric Coil
N—Pull Plate
O—Pilot Pressure Oil
P—Pressure Free Oil (Return)
Q—Pilot Controller—Boom Float

The pilot controller is an assembly of four, two-position, two-way, lever-operated valves. The standard controller has a single lever which moves fore and aft as well as side to side. A dual lever controller is available as an option where each lever moves fore and aft.

In neutral, the return spring (F) holds the spool assembly (G) closed, blocking flow from the P-port (J) to the C port (I). During operation, pilot pressure oil (O) from the pressure reducing valve enters the pilot controller housing at the P-port. With the control lever (A) pushed forward, the push bar (B) pushes the plunger (C) down which contacts the spring guide (D). The spring guide compresses both the return spring (F) and the metering spring (E) which moves the spool assembly (G) down, into a metering position allowing oil to flow out the A-port (K). With the spool assembly moved down all the way, full pilot pressure will be available to shift the boom control valve spool. Approximately 500 psi is needed to shift the boom spool to the float position.

The boom float function uses an electromagnetic detent. When the control lever is moved forward to the float position, the pull plate (N) comes in contact with the electric coil (M). The pull plate is held downward by the electromagnet with enough force to hold the control lever in the float position but it can be manually disengaged by pulling back on the control lever. An optional return to carry feature is also available. With return to carry activated and the pilot controller in the float position, the boom will float down until it reaches a preset height. The magnetic detent will release when the boom reaches the preset position and the return to carry switch on the boom opens.

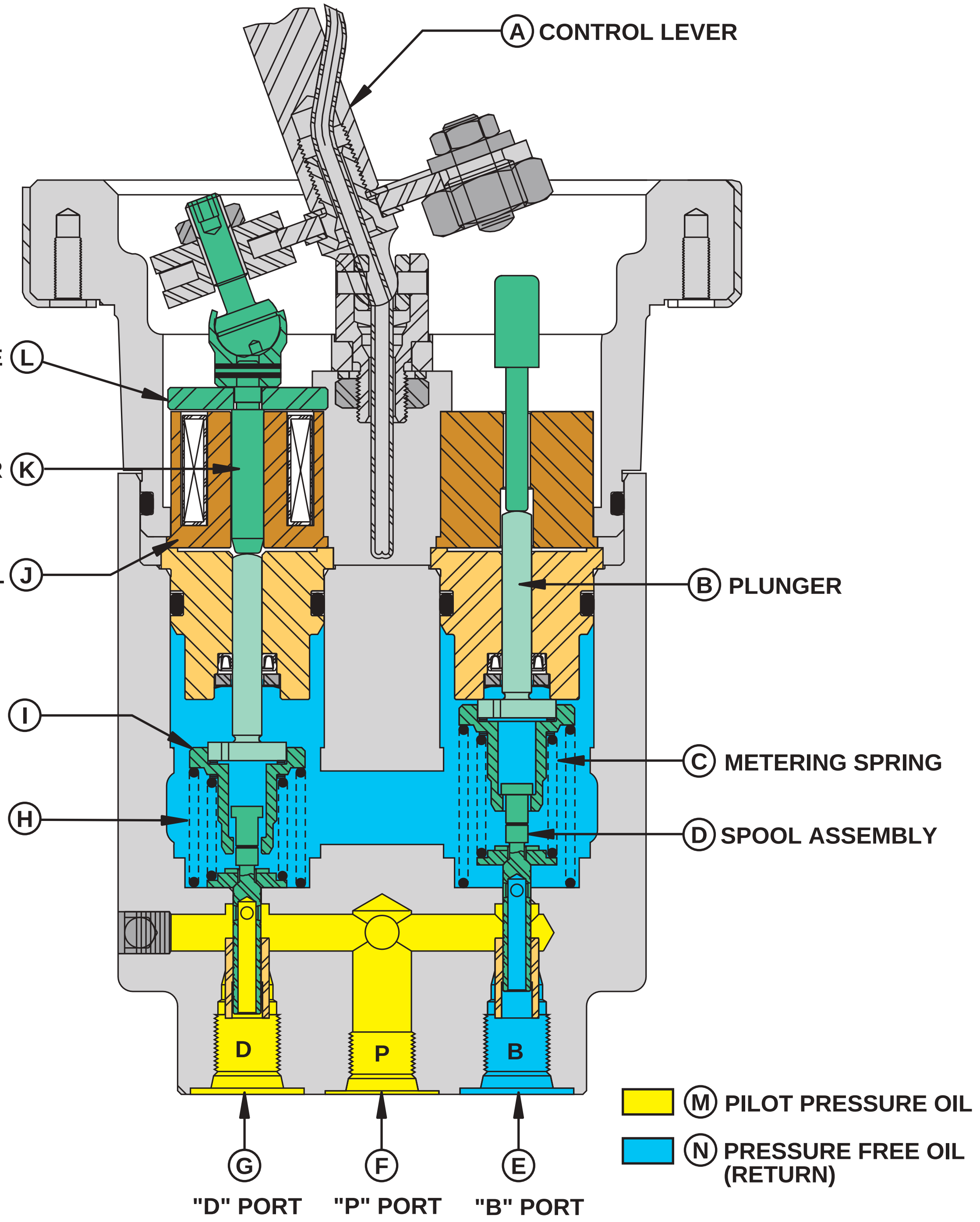
The boom lower function of the pilot controller also contains a mechanical feel position (L). The operator will feel a slight resistance in the pilot controller when going from boom lower to float.

The boom raise function also uses an electromagnetic detent. The operation of this detent is identical to the boom float detent.

The end view (H) shows the workport location of the single-lever four-function pilot controller. When the valves are in neutral, the flow is blocked from the P-port to the workports. The workports are opened to return through the spring area in the pilot controller which is connected to the T-port on the bottom of the valve.

Continued on next page

TX,9025,ME330 –19–10AUG96–3/5



A—Control Lever
B—Plunger
C—Metering Spring
D—Spool Assembly
E—“B” Port
F—“P” Port
G—“D” Port
H—Return Spring
I—Spring Guide
J—Electric Coil
K—Push Bar
L—Pull Plate
M—Pilot Pressure Oil
N—Pressure Free Oil (Return)
O—Pilot Controller—Bucket Rollback

Continued on next page

TX,9025,ME330 –19–10AUG96–4/5

https://www.truck-manuals.net/

Bucket Rollback

The pilot controller is shown in the bucket rollback position during return to dig operation.

With the control lever (A) partially held in the return-to-dig position, the push bar (K) pushes the plunger (B) down which contacts the spring guide (I). The spring guide compresses both the return spring (H) and the metering spring (C) which moves the spool assembly (D) down, into a metering position, allowing oil to flow out the "D" port (G).

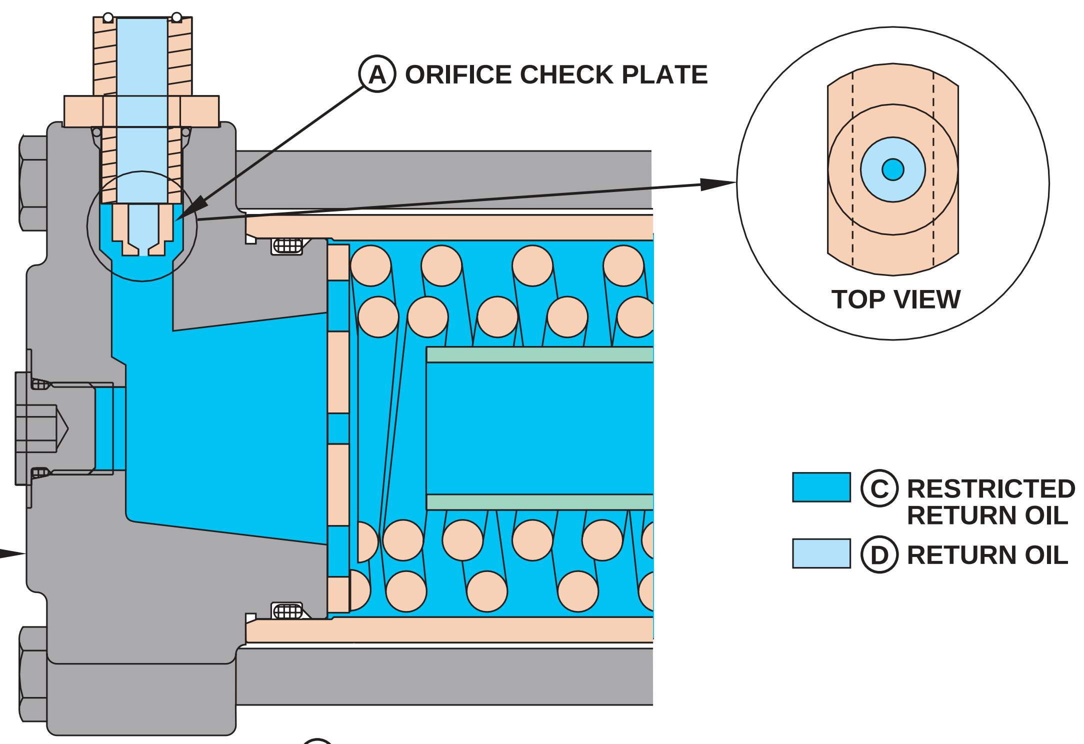
The pressure in the pilot controller workport controls the amount of stroke of the function spool in the loader control valve. As the control lever is moved further from neutral, the compression of the metering spring (C) is greater. The controller workport pressure acts on the bottom of the spool assembly (D) which pushes up on the metering spring to regulate the pressure delivered to the bucket control valve spool.

The return-to-dig function is controlled by a bucket mounted linkage which controls a switch. When the bucket is dumped, the switch closes and the return-to-dig detent is energized. When the control lever is moved to the full left position, the pull plate (L) comes in contact with the electric coil (J). The pull plate is held downward by the electromagnet with enough force to hold the control lever in the bucket rollback position. The detent will release when the bucket reaches the pre-set position and the switch on the bucket linkage opens. The detent can also be manually released by moving the control lever to the right.

The optional two-lever controller is designed and operated the same as the single lever controller.

TX,9025,ME330 –19–10AUG96–5/5

Pilot Orifice Check Valve For All Control Valve Sections

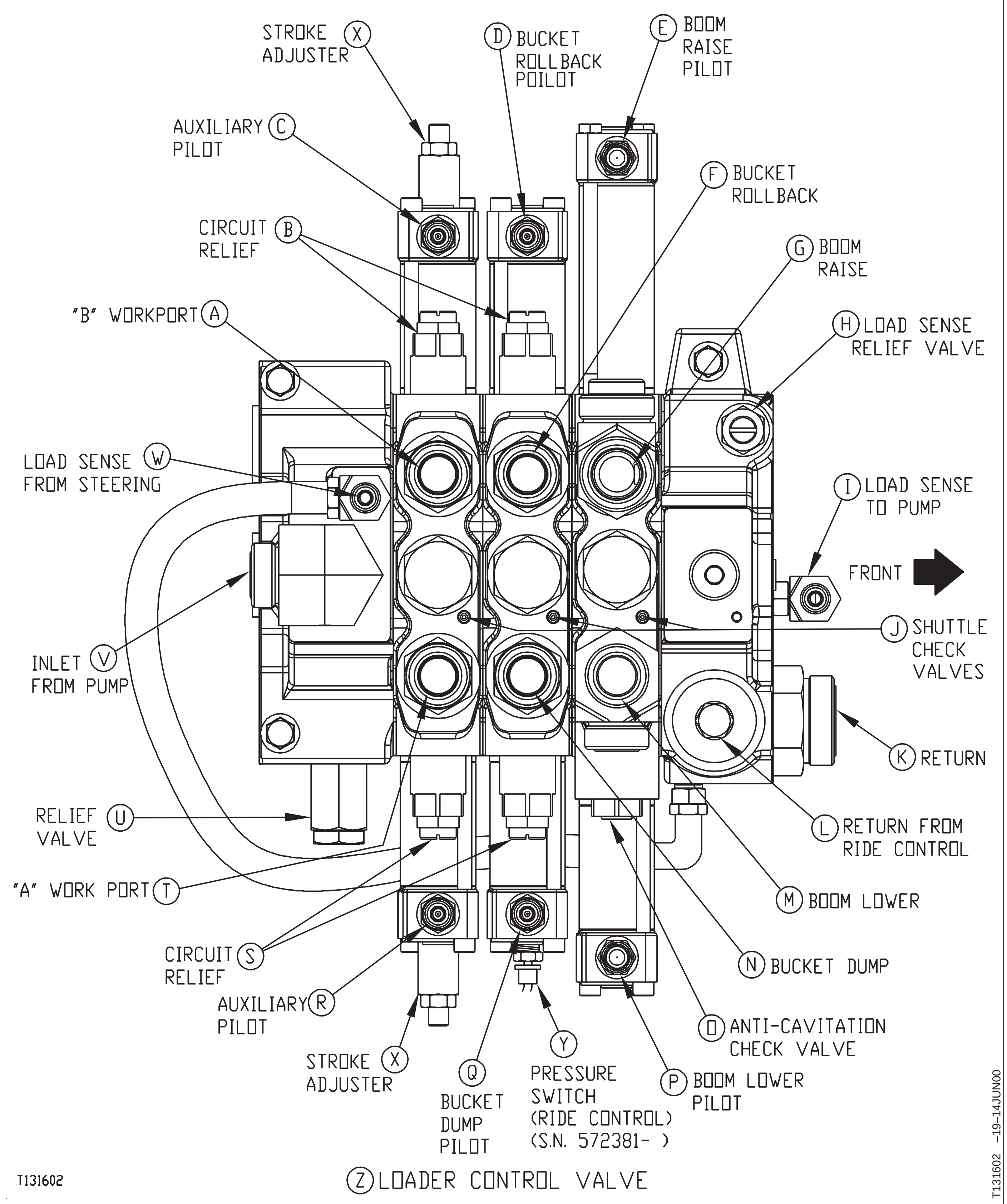


A—Orifice Check Plate
B—Control Valve End Cap
C—Restricted Return Oil
D—Return Oil
E—Pilot Oil Return Restricted

Orifice check plate is installed in control valve pilot cap of all control valve sections. Orifice check Plate (A) dampens the control valve spool movement to stop unwanted bucket or boom movement when the pilot controller lever is centering itself. It also stops unwanted bucket or boom correction in other direction as the lever kicks out of bucket return-to-dig, or boom height kick out function.

TX,9025,ME332 –19–28AUG96–1/1

Loader Control Valve



Continued on next page

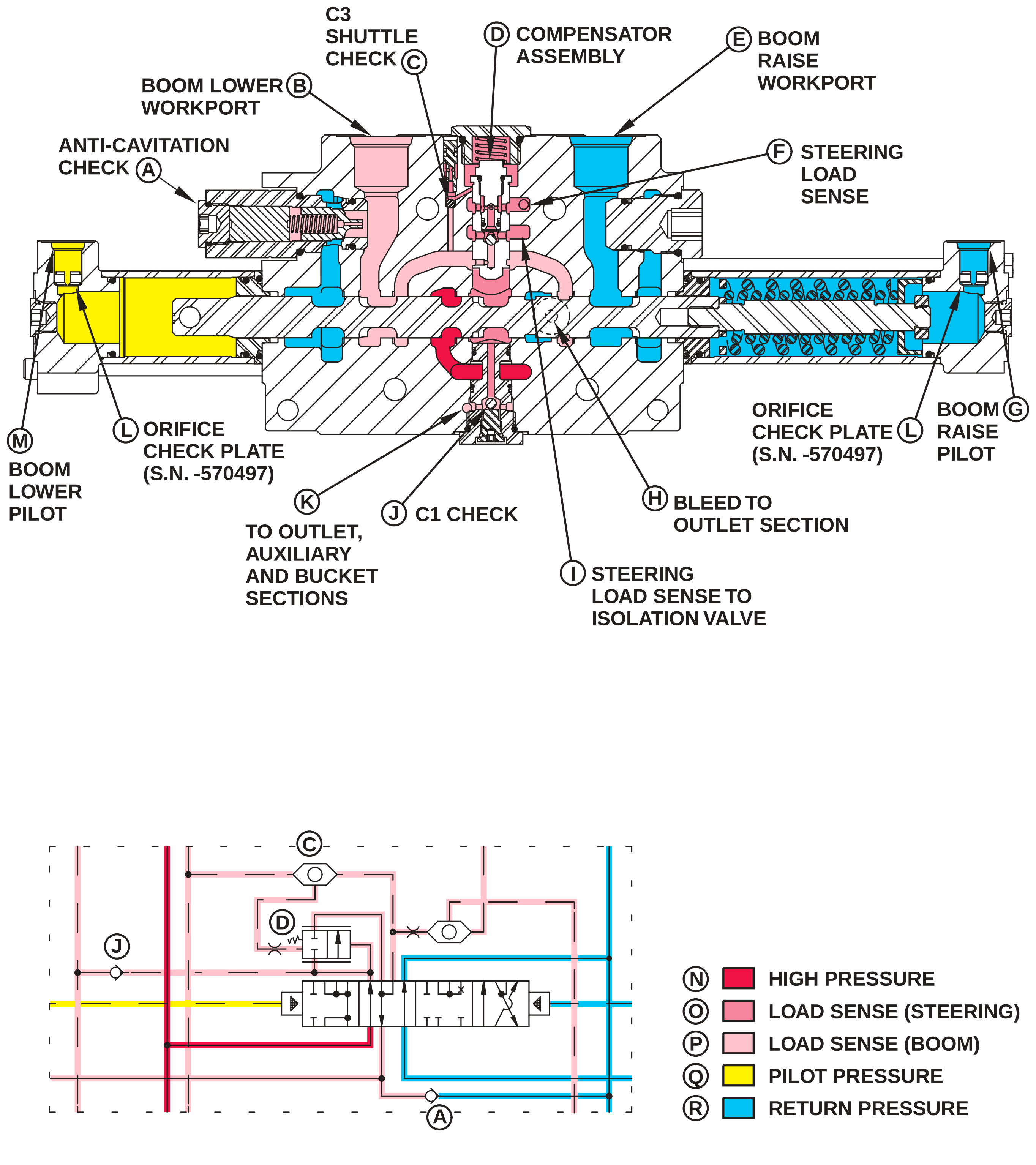
TX,9025,ME333 –19–14FEB97–1/2

9025
05
44

A—“B” Auxiliary Workport
B—Circuit Relief
C—Auxiliary Pilot
D—Bucket Rollback Pilot
E—Boom Raise Pilot
F—Bucket Rollback Relief Valve
G—Boom Raise Valve
H—Load Sense Relief Valve—Maximum System Pressure
I—Load Sense to Pump
J—Shuttle Check Valves
K—Return Port—With Orifice
L—Return from Ride Control
M—Boom Lower Workport
N—Bucket Dump Workport
O—Anti-Cavitation
P—Boom Lower Pilot
Q—Bucket Dump Pilot
R—Auxiliary Pilot
S—Circuit Relief
T—“A” Auxiliary Workport
U—Loader Relief Valve (Clipper)
V—Inlet from Pump
W—Load Sense from Steering
X—Stroke Adjuster
Y—Pressure Switch (Ride Control) (S.N. 572381—)
Z—Loader Control Valve

TX,9025,ME333 –19–14FEB97–2/2

Boom Section—Boom Down And Steering



T132440

S BOOM SECTION - BOOM DOWN AND STEERING

Continued on next page

TX,9025,ME334 –19–14FEB97–1/2

A—Anti-Cavitation Check
B—Boom Lower Workport
C—C3 Shuttle Check
D—Compensator Assembly
E—Boom Raise Workport
F—Steering Load Sense
G—Boom Raise Pilot
H—Bleed to Outlet Section
I—Steering Load Sense to Isolation Valve
J—C1 Check
K—To Outlet Auxiliary and Bucket Sections
L—Orifice Check Plate (S.N. —570497)
M—Boom Lower Pilot
N—High Pressure
O—Load Sense (Steering)
P—Load Sense (Boom)
Q—Pilot Pressure
R—Return Pressure
S—Boom Section—Boom Down and Steering

NOTE: Orifice check plate (L) is replaced with an external orifice check valve fitting located between the pilot port and hose effective (S.N. 570497—).

The boom lower workport has an anti-cavitation check, the boom raise is plugged. There are no circuit relief valves.

Two load sense pressures are generated. There are several connection to the load sense circuit. There is a compensator assembly that is controlled by the load sense circuit.

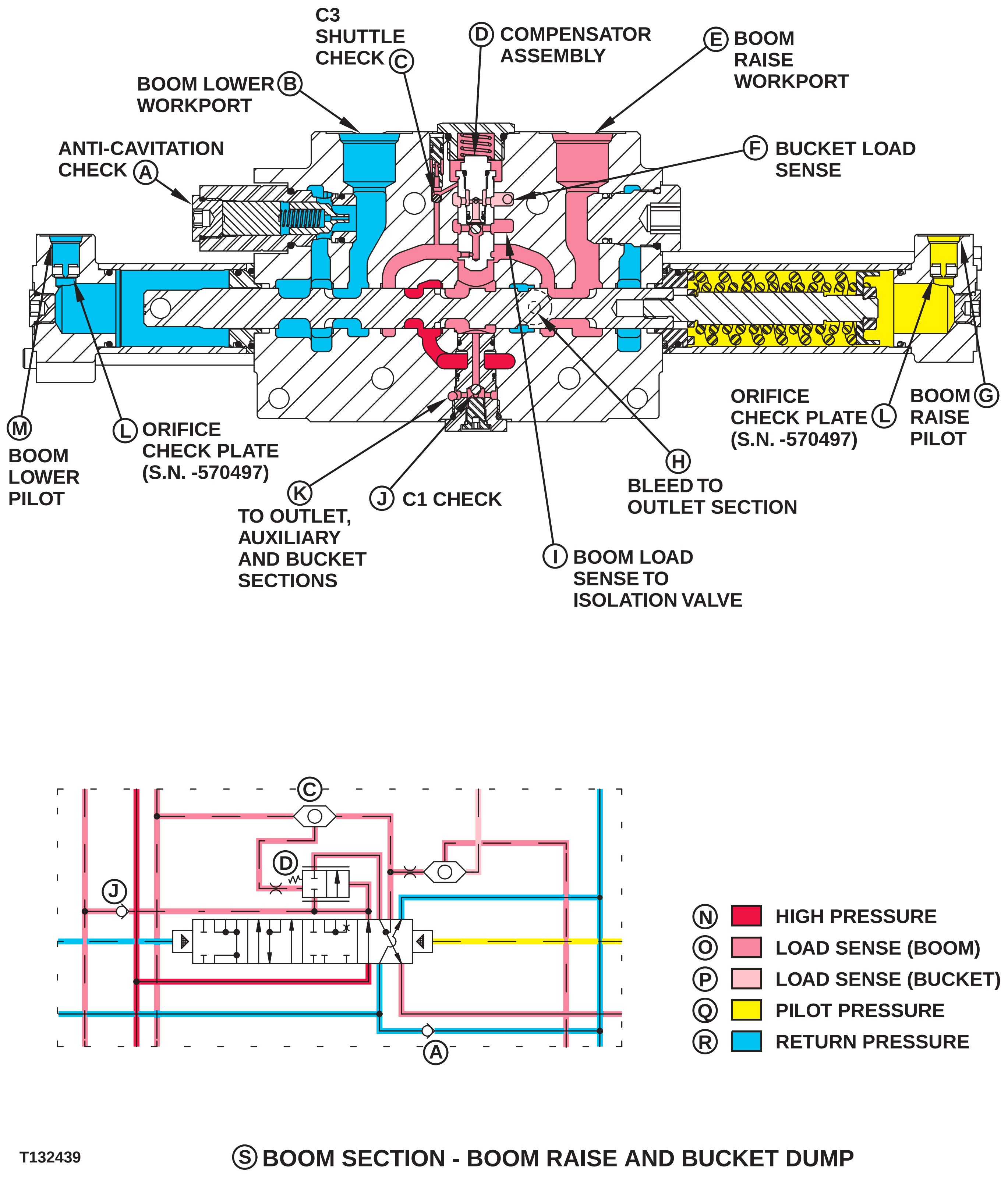
During a boom down and steering operation the following will occur. Pilot oil shifts the spool to the right. Oil flow from the pump is directed to the spool center. Metered load sense flows past C1 check (J) to the outlet (K) section. It also exerts an upward force on the compensator. Steering load sense (F) comes from the steering valve through the inlet section to the center area of the compensator. It is then directed out to the isolation valve in the outlet section. This pressure comes back from the isolation valve to C3 and the spring area of the compensator.

Since the steering load sense pressure is much greater than the boom workport load sense pressure, the compensator restricts oil flow to boom down. This provides priority to steering.

The bleed to outlet section (H) provides a bleed of the “bridge” passage when the spool is in neutral. This insures that there is no trapped load sense pressure in the “bridge” passage in neutral. This passage is blocked when the spool is moved in either direction.

TX,9025,ME334 –19–14FEB97–2/2

Boom Section—Boom Raise And Bucket Dump



T132439

S BOOM SECTION - BOOM RAISE AND BUCKET DUMP

Continued on next page

TX,9025,ME335 –19–13FEB97–1/2

A—Anti-Cavitation Check
B—Boom Lower Workport
C—C3 Shuttle Check
D—Compensator Assembly
E—Boom Raise Workport
F—Bucket Load Sense
G—Boom Raise Pilot
H—Bleed to Outlet Section
I—Boom Load Sense to Isolation Valve
J—C1 Check
K—To Outlet Auxiliary and Bucket Sections
L—Orifice Check Plate (S.N. —570497)
M—Boom Lower Pilot
N—High Pressure
O—Load Sense (Boom)
P—Load Sense (Bucket)
Q—Pilot Pressure
R—Return Pressure
S—Boom Section—Boom Raise and Bucket Dump

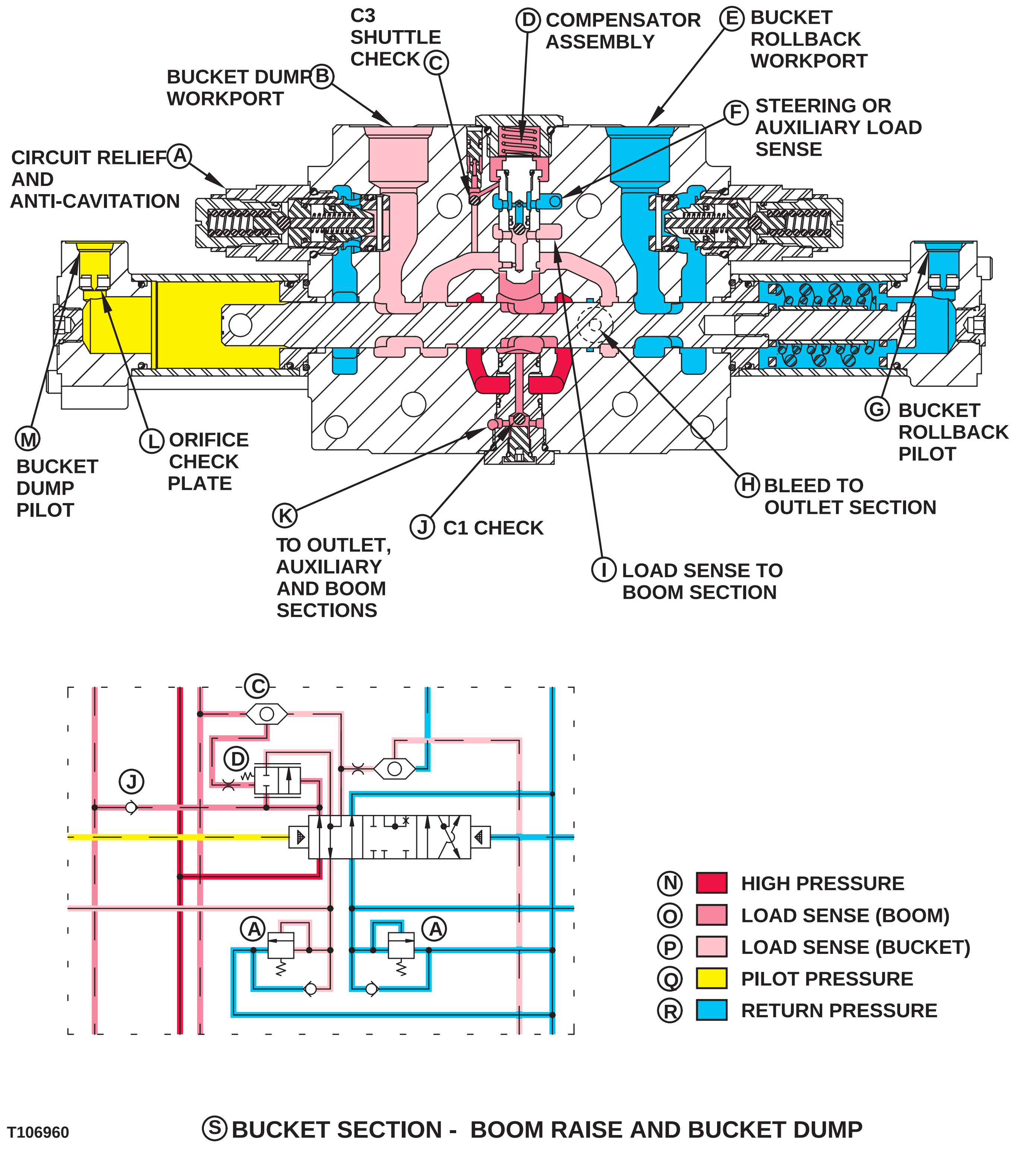
NOTE: *Orifice check plate (L) is replaced with an external orifice check valve fitting located between the pilot port and hose effective (S.N. 570497—).*

During boom raise and bucket dump oil flow to these two functions will be equal even though there is a large difference in workport pressures. This is accomplished by the load sense pressure control of the boom and bucket compensators.

During boom raise the workport and load sense pressures will be high. Metered load sense flows past C1 check (J) to the outlet section and back to the hydraulic pump. Regulated load sense flows from the bridge passage to the compensator center, seats the ball check to up position and flows out to the isolation valve in the outlet section. The isolation valve directs high load sense pressure back to C3 and to the spring area of the compensator. This identical high load sense pressure is also directed to the bucket compensator spring area. With both compensators having the same spring pressure the same hydraulic force will be required to lift or open both valves. Thus the flow to both functions will be the same. Even though the bucket workport pressure is quite low.

TX,9025,ME335 –19–13FEB97–2/2

Bucket Section—Boom Raise And Bucket Dump



T106960 S BUCKET SECTION - BOOM RAISE AND BUCKET DUMP

Continued on next page

TX,9025,ME336 –19–13FEB97–1/2

https://www.truck-manuals.net/

A—Circuit Relief and Anti-Cavitation
B—Bucket Dump Workport
C—C3 Shuttle Check
D—Compensator Assembly
E—Bucket Rollback Workport
F—Steering or Auxiliary Load Sense
G—Bucket Rollback Pilot
H—Bleed to Outlet Section
I—Load Sense to Boom Section
J—C1 Check
K—To Outlet Auxiliary and Boom Sections
L—Orifice Check Plate
M—Bucket Dump Pilot
N—High Pressure
O—Load Sense (Boom)
P—Load Sense (Bucket)
Q—Pilot Pressure
R—Return Pressure
S—Bucket Section—Boom Raise and Bucket Dump

The bucket section of the loader control valve is a closed center, pilot-operated, four-position, four-way spool type valve. Both workports are equipped with screw adjustable circuit relief valves with anti-cavitation protection. Several check valves in the valve section route the highest load sense signal to the spring cavity of the compensator assembly. The compensator assembly meters pump flow during combined operation so that all functions will move at the same time. It also serves as the lift check.

The four positions of the Bucket control valve are:

- Neutral
- Bucket Curl (Cylinder Retraction)
- Bucket Dump (Cylinder Extension)

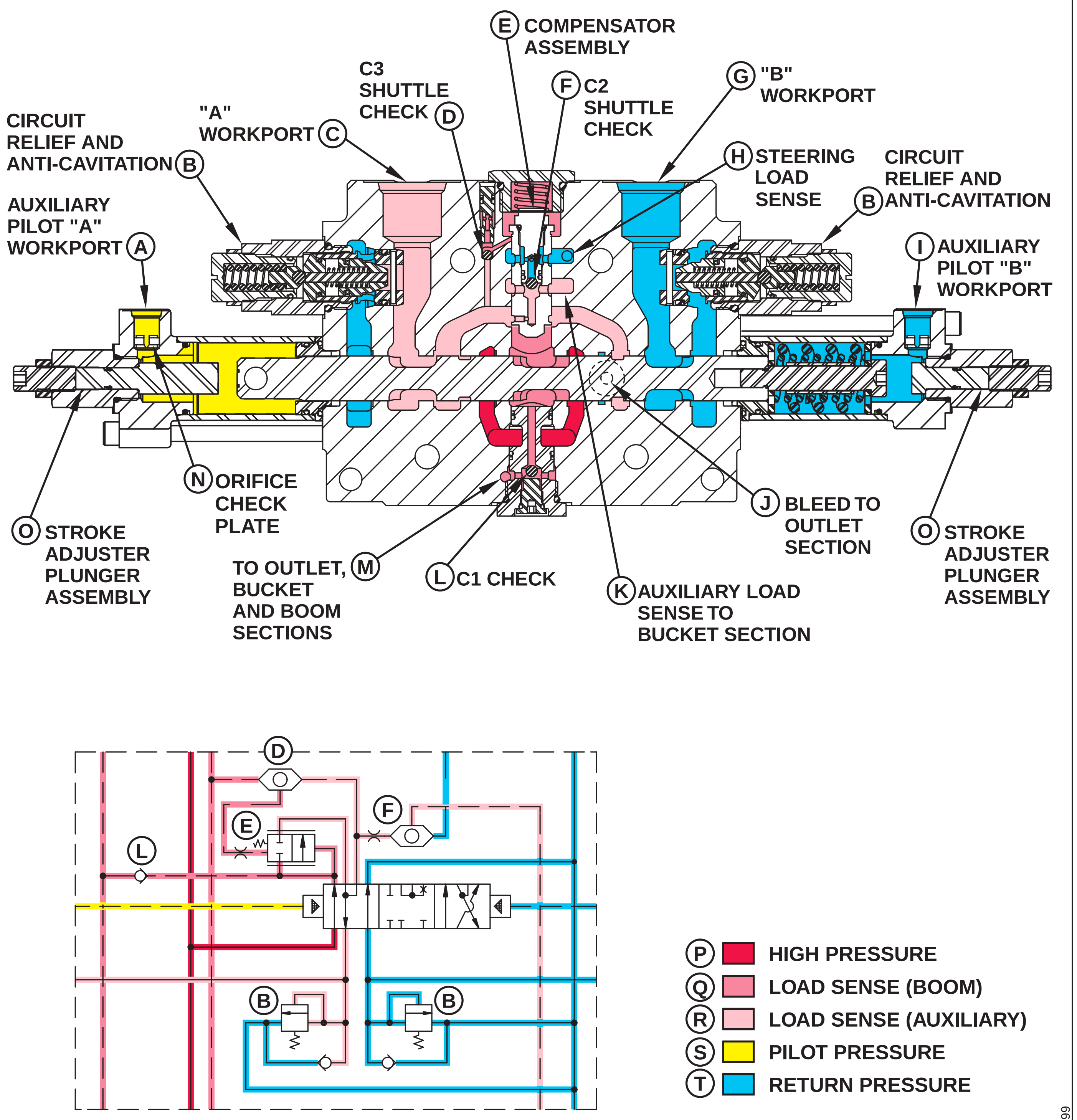
When the bucket dump function is activated, pilot oil enters the end cap through bucket dump pilot passage (M) and shifts the spool to the right against the centering springs. The greater the pilot pressure, the farther the spool will shift to the right. With the bucket spool shifted a load sense signal is immediately generated which unseats the C1 check valve (J) and is routed to the load sense valve which brings the pump into stroke. With the spool shifted, trapped oil in the bucket dump work port (B) will unseat the C3 shuttle check (C) and is routed to the spring cavity of the compensator assembly (D). At this point the compensator assembly is serving as the lift check, pump discharge pressure has to build to a pressure that is slightly higher than workport pressure to open the compensator valve. As pump discharge pressure increases the compensator assembly will lift up and allow oil to flow into the bridge passage to the head end of the bucket cylinders through the bucket dump workport (B). As the bucket cylinder extends, return oil from the rod end of the cylinder flows through the bucket rollback workport (E), across the bucket spool metering notches into the return passage. The metering notches control the oil flow across the bucket spool to regulate the function speed. In combined operation with the boom valve some of the pressure conditions will be determined by what’s happening in the boom valve. The metered load sense is essentially blocked at C1 check (J) by the metered load sense from the boom valve. The regulated load sense in bridge passage flows up through the compensator, is blocked by the ball check and goes to the boom compensator. It is also blocked at that point by the compensator check valve because of the much higher boom regulated load sense pressure at that point.

The pressure on the top (spring side of the compensator) is essentially boom load sense pressure, the same pressure that is acting on the boom compensator. Therefore, the flow to bucket dump which requires very little pressure will be the same as the boom which requires high pressure.

TX,9025,ME336 –19–13FEB97–2/2

9025
05
51

Auxiliary Section—Operating And Boom Raise



T121086

U AUXILIARY SECTION - FUNCTION OPERATING AND BOOM RAISE

Continued on next page

CED,TX04577,844 –19–08APR99–1/2

A—Auxiliary Pilot (“A” Workport)
B—Circuit Relief and Anti-Cavitation
C—“A” Workport
D—C3 Shuttle Check
E—Compensator Assembly
F—C2 Shuttle Check
G—“B” Workport
H—Steering Load Sense
I—Auxiliary Pilot (“B’ Workport)
J—Bleed to Outlet Section
K—Auxiliary Load Sense to Bucket Section
L—C1 Check
M—To Outlet Bucket and Boom Sections
N—Orifice Check Plate
O—Stroke Adjuster Plunger Assembly
P—High Pressure
Q—Load Sense (Boom)
R—Load Sense (Auxiliary)
S—Pilot Pressure
T—Return Pressure
U—Auxiliary Section—Operation and Boom Raise

The auxiliary section of the loader control valve is a closed center, pilot-operated, four-position, four-way spool type valve. Both workports are equipped with screw adjustable circuit relief valves with anti-cavitation protection (B). Several check valves in the valve section route the highest load sense signal to the spring cavity of the compensator assembly. The compensator assembly (E) meters pump flow during combined operation so that all functions will move at the same time. It also serves as the lift check.

The auxiliary section of the loader control valve are equipped (on later models S.N. 569075—) with spool stroke adjusters (O) in each end cap. This allows the maximum auxiliary section flow to be set anywhere from a few gallons per minute (gpm) to full pump flow. This is accomplished by controlling the maximum travel of the spool. Adjusting the spool travel regulates the amount of flow area opened by the spool. Since the hydraulic system is load sensing, there is a set differential pressure across the opened inlet area. As a result, a flow proportional to this area will be delivered to the implement. The stroke adjusters are set at full flow at the factory. Earlier models can add stroke adjusters for auxiliary valve sections by ordering through parts system.

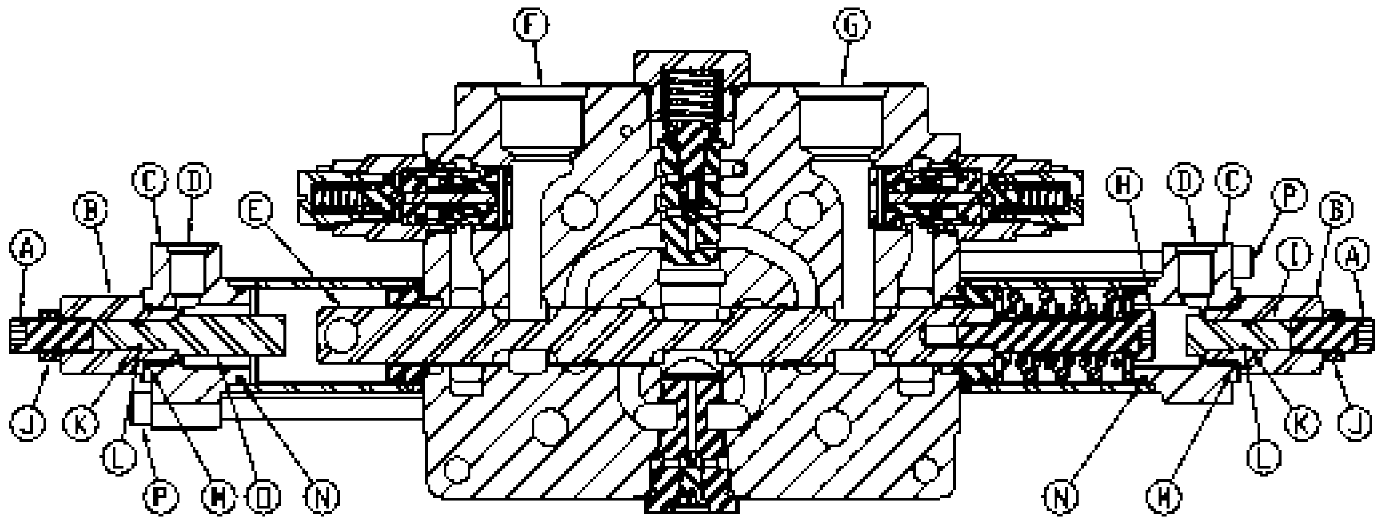
When the auxiliary workport “A” function is activated, pilot oil enters the end cap through auxiliary pilot passage (A) and shifts the spool to the right against the centering springs. The greater the pilot pressure, the farther the spool will shift to the right. With the auxiliary spool shifted a load sense signal is immediately generated which unseats the C1 check valve (L) and is routed to the load sense valve which brings the pump into stroke. With the spool shifted, trapped oil in the workport (B) will unseat the C3 shuttle check (D) and is routed to the spring cavity of the compensator assembly (E). At this point the compensator assembly is serving as the lift check, pump discharge pressure has to build to a pressure that is slightly higher than workport pressure to open the compensator valve. As pump discharge pressure increases the compensator assembly will lift up and allow oil to flow into the bridge passage to the head end of the workport cylinders through the workport “A”. As the workport “A” cylinder extends, return oil from the rod end of the cylinder flows through the workport “B”across the auxiliary spool metering notches into the return passage. The metering notches control the oil flow across the auxiliary spool to regulate the function speed. In combined operation with the boom valve some of the pressure conditions will be determined by what is happening in the boom valve. The metered load sense is essentially blocked at C1 check (L) by the metered load sense from the boom valve. The regulated load sense in bridge passage flows up through the compensator, is blocked by the ball check and goes to the boom compensator. It is also blocked at that point by the compensator C2 shuttle check valve (F) because of the much higher boom regulated load sense pressure at that point.

The pressure on the top (spring side of the compensator) is essentially boom load sense pressure, the same pressure that is acting on the boom compensator. Therefore, the flow to workport “B” which requires very little pressure will be the same as the boom which requires high pressure.

CED,TX04577,844 –19–08APR99–2/2

9025
05
53

Auxiliary Sections—Stroke Adjusters (If Equipped)



T121124 Q AUXILIARY SECTION - STROKE ADJUSTER ASSEMBLY

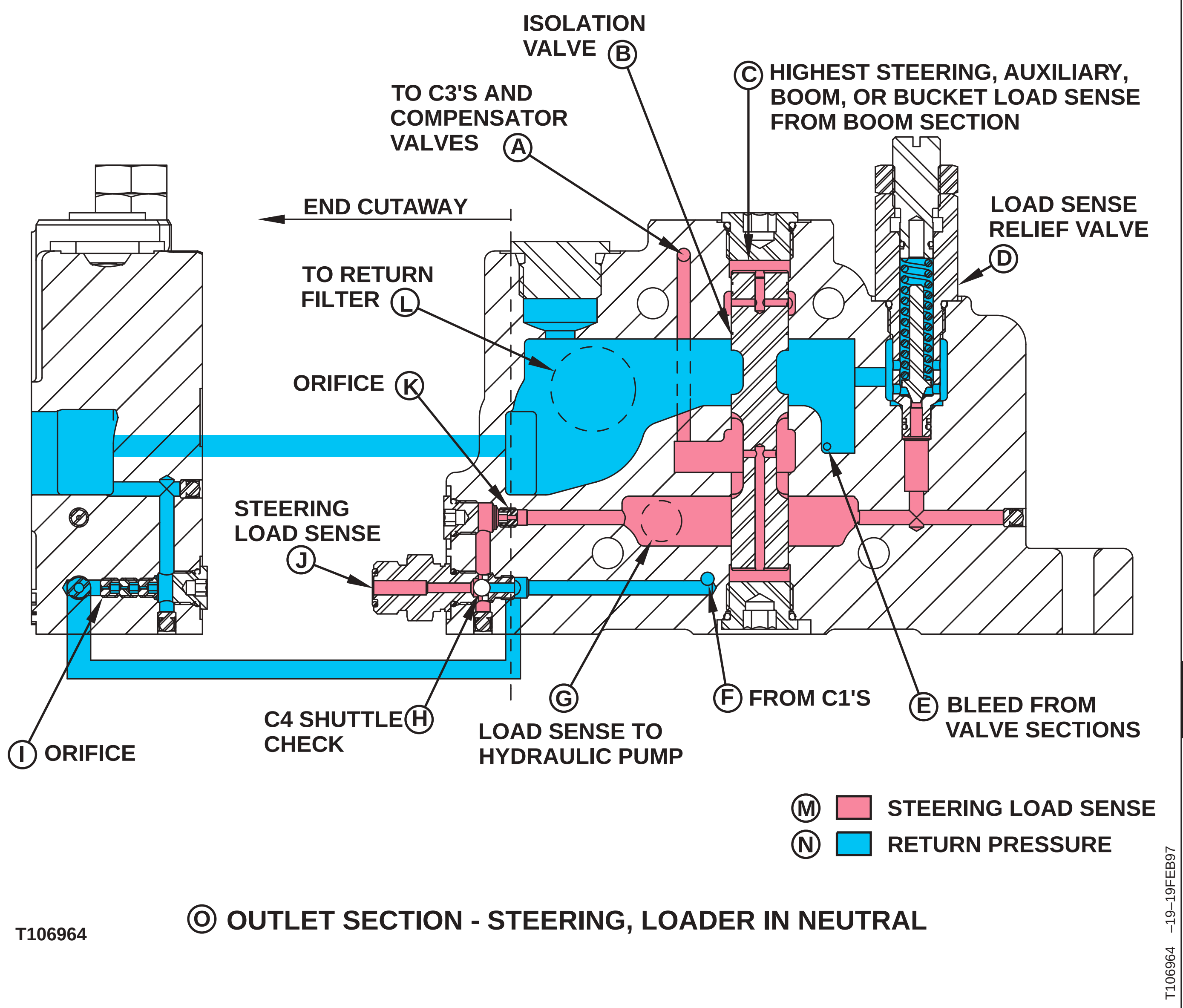
A—Set Screw (2 used)
B—Cartridge (2 used)
C—End Cap (2 used)
D—Pilot Ports
E—Spool
F—"A" Workport
G—"B" Workport
H—Stripper Bolt
I—Plunger— "B" Workport
J—Locking Hex Nut (2 used)
K—Back-Up Ring (2 used)
L—O-Ring (2 used)
M—O-Ring (2 used)
N—O-Ring (2 used)
O—Plunger— "A" Workport
P—Cap Screw (4 used)
Q—Auxiliary Section—Stroke Adjuster Assembly

The auxiliary section of the loader control valve (on later models S.N. 569075—) is equipped with spool stroke adjuster assembly (Q) in each end cap. Earlier models can add stroke adjusters for auxiliary valve sections by ordering through parts system and replacing the end caps.

The adjusters allow the maximum auxiliary section flow to be set anywhere from a few gallons per minute (gpm) to full pump flow. This is accomplished by controlling the maximum travel of the spool (E) by adjusting the plunger position in the end cap assembly with setscrew (A) and hex nut (J). Adjusting the spool travel regulates the amount of flow area opened by the spool. Since the hydraulic system is load sensing, there is a set differential pressure across the opened inlet area. As a result, a flow proportional to this area will be delivered to the implement. The stroke adjusters are set at full flow at the factory.

CED,TX04577,849 –19–14APR99–1/1

Outlet Section—Steering, Loader In Neutral



A—To C3's and Compensator Valves
B—Isolation Valve
C—Highest Steering, Auxiliary, Boom, or Bucket Load Sense From Boom Section
D—Load Sense Relief Valve—Maximum System Pressure
E—Bleed From Valve Sections
F—From C1's
G—Load Sense to Hydraulic Pump
H—C4 Shuttle Check
I—Orifice
J—Steering Load Sense
K—Orifice
L—To Return Filter
M—Steering Load Sense
N—Return Pressure
O—Outlet Section—Steering, Loader in Neutral

The outlet section functions as a control center for the load sense system. It also provides an outlet for the loader system return oil.

The outlet section contains:

- Load Sense Relief Valve—Maximum System Pressure (D)
- Isolation Valve (B)
- Shuttle Check Valve (H)
- Three Orifice Assembly (I)

Continued on next page

TX,9025,ME337 –19–13FEB97–1/2

9025
05
55

- Single Orifice (K)

The load sense relief valve limits load sense pressure thereby limiting maximum hydraulic system pressure. When the pressure setting is reached, there is oil flow through orifice (K) and on through the relief valve to return. The flow through orifice (K) causes a pressure difference between the load sense port (G) to the pump and the steering (J) or C1 (F) load sense coming from work load pressure. This pressure difference is sensed at the pump control assembly relief valve. When the difference reaches the margin pressure of the load sense valve the pump destrokes to a point that maintains maximum system pressure. The maximum hydraulic system pressure is set by the load sense relief valve (D) adjustment.

The isolation valve is a free floating spool that senses the highest of the regulated load sense pressures form the hydraulic system components on the top area. The bottom area senses the pressure going to section C3's and compensator valves. The highest metered load sense from orifice (K) flows to the center area and through a drilled passage to the bottom area. When bottom area pressure is equal to or slightly higher the spool shifts up until the center area just reaches into the return area. At this point the spool will shuttle slightly and maintain the center are pressure equal to that on the top area.

The isolation spool also functions as an anti-drift valve by blocking high induced pressures from any of the loader functions that could otherwise bleed off through the load sense relief valve. Thus preventing a drift condition in the loader that could result from high induced pressures.

The three orifice assemblies provides a bleed path for the load sense system when in neutral. This insures that there will be no residual pressure build-up, consequent pump pressure, and flow increase in neutral.

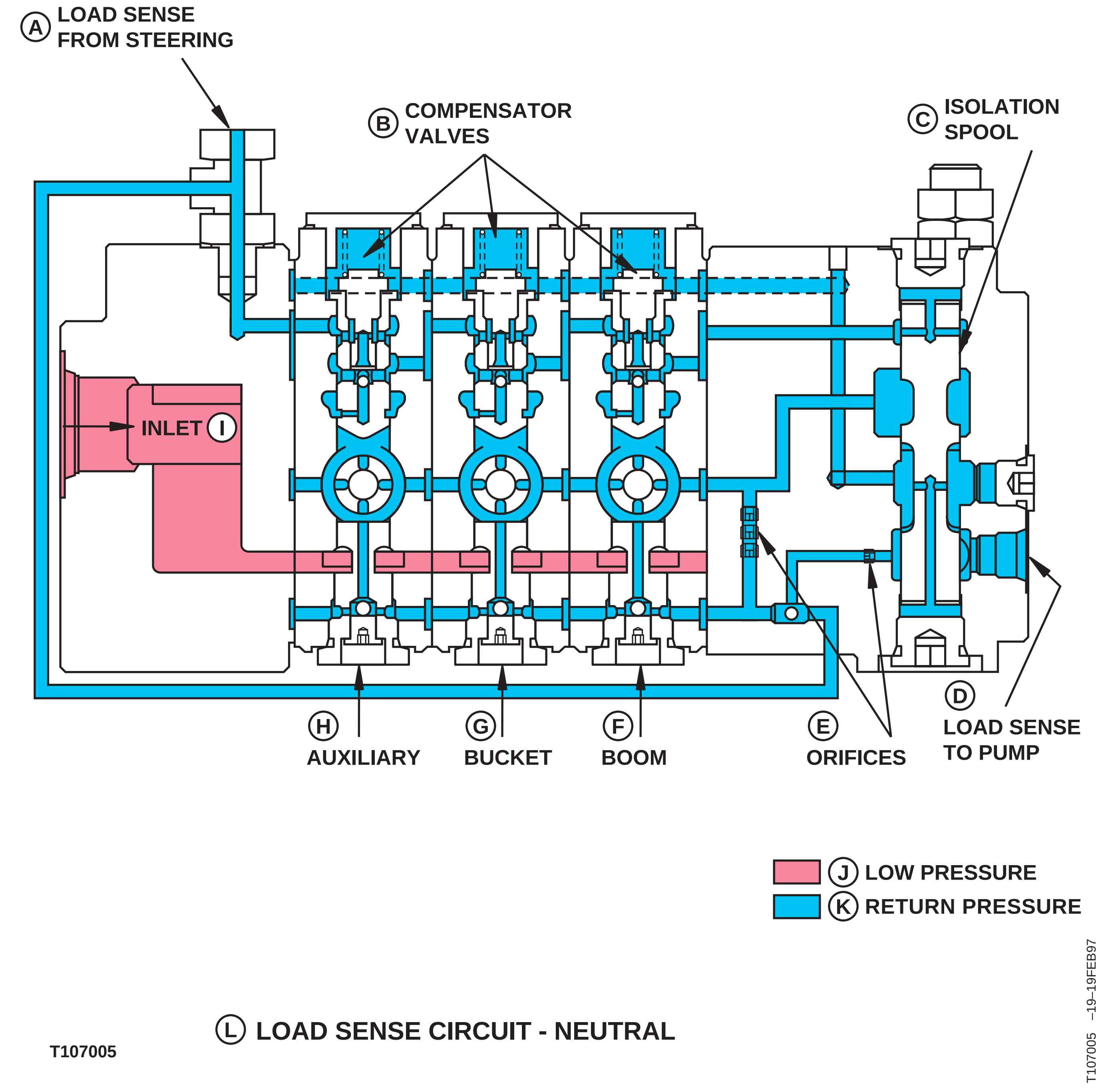
In a steering-loader-in-neutral operation, steering load sense flows to C4 shuttle check (H) and seats it, and goes through orifice (K) to the isolation valve. It is directed out port (G) to the hydraulic pump. Steering load sense also flows into the control valve inlet section. From there it flows through a passage to each valve section into the top area of the isolation spool (C) in the isolation valve. The isolation valve will now shuttle and send a signal to all the compensators (A).

Should any of the loader functions be operated, load sense from the C1's (F) will seat C4 (H) in the opposite direction if higher than steering load sense, and have no affect if lower. The highest load sense pressure will always be in control both at the hydraulic and in the loader control valve.

A orifice is used in the return-to-filter line (644H only) to help reduce cavitation in the boom down function. The orifice is a in-line washer type and is located between the return line and fitting on the control valve return-to-filter port (L).

TX,9025,ME337 –19–13FEB97–2/2

Load Sense Circuit Operation—Neutral



A—Load Sense from Steering
B—Compensator Valves
C—Isolation Spool
D—Load Sense to Pump
E—Orifices
F—Boom
G—Bucket
H—Auxiliary
I—Inlet
J—Low Pressure
K—Return Pressure
L—Load Sense Circuit—Neutral

The function of the load sense circuit is to:

- Control pump output
- Limit maximum system pressure
- Provide priority to the steering circuit
- Provide proportional flow to all functions with varying pressures

Continued on next page

TX,9025,ME338 –19–13FEB97–1/2

9025 05 57

https://www.truck-manuals.net/

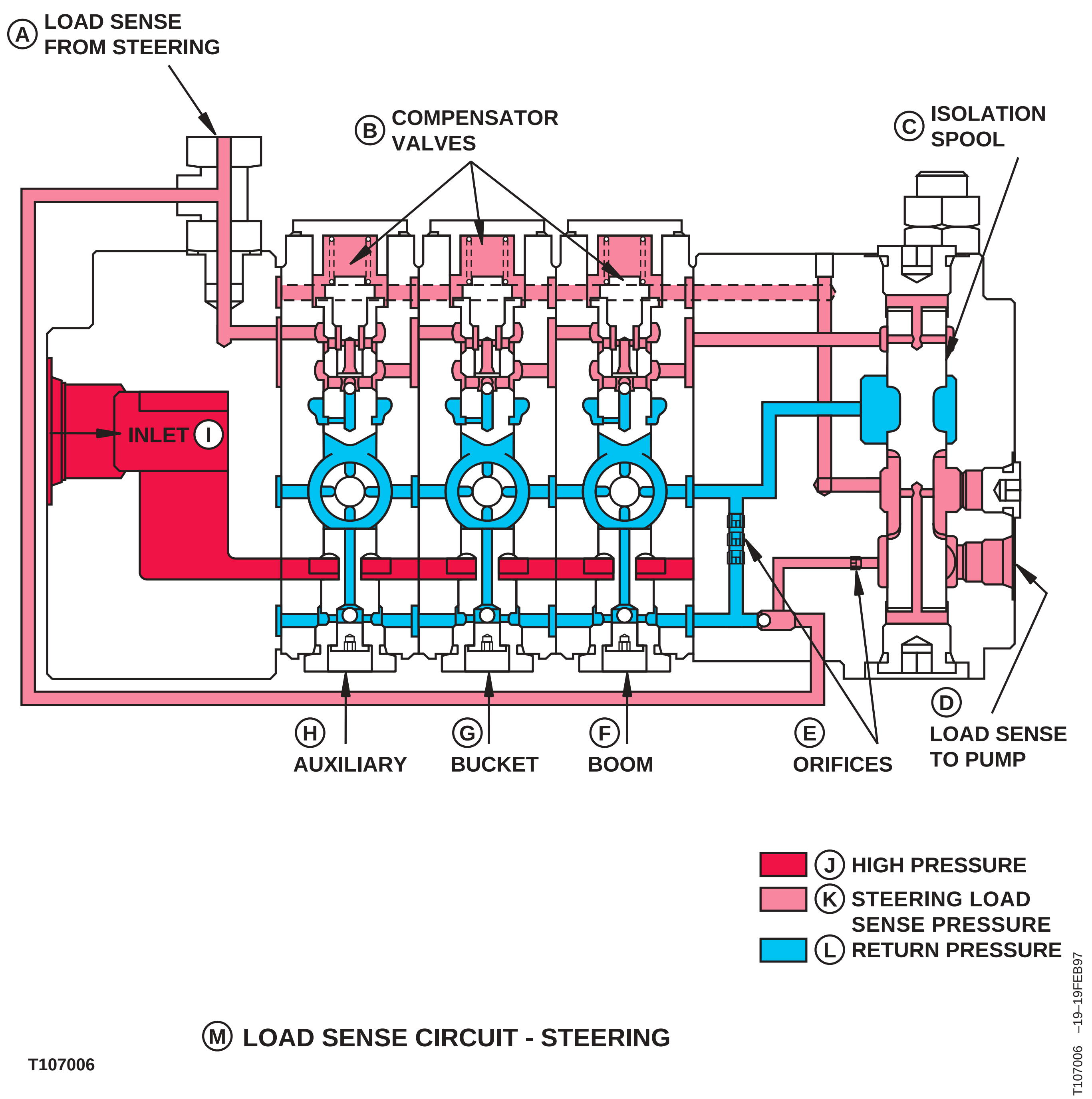
The load sense circuit consists of:

- All loader control valve sections
- Steering valve
- Hydraulic pump control assembly

In neutral it is very important that the entire load sense circuit be pressure free. This is accomplished by a number of bleed orifices and passages. In the steering valve there is a small passage directly to return. In the loader control valve each spool (only in neutral) opens the bridge passage (the trapped area between the compensator and the work port) to return.

TX,9025,ME338 –19–13FEB97–2/2

Load Sense Circuit—Steering



A—Load Sense from Steering
B—Compensator Valves
C—Isolation Spool
D—Load Sense to Pump
E—Orifices
F—Boom
G—Bucket
H—Auxiliary
I—Inlet
J—High Pressure
K—Steering Load Sense Pressure
L—Return Pressure
M—Load Sense Circuit—Steering

Continued on next page

TX,9025,ME339 –19–13FEB97–1/2

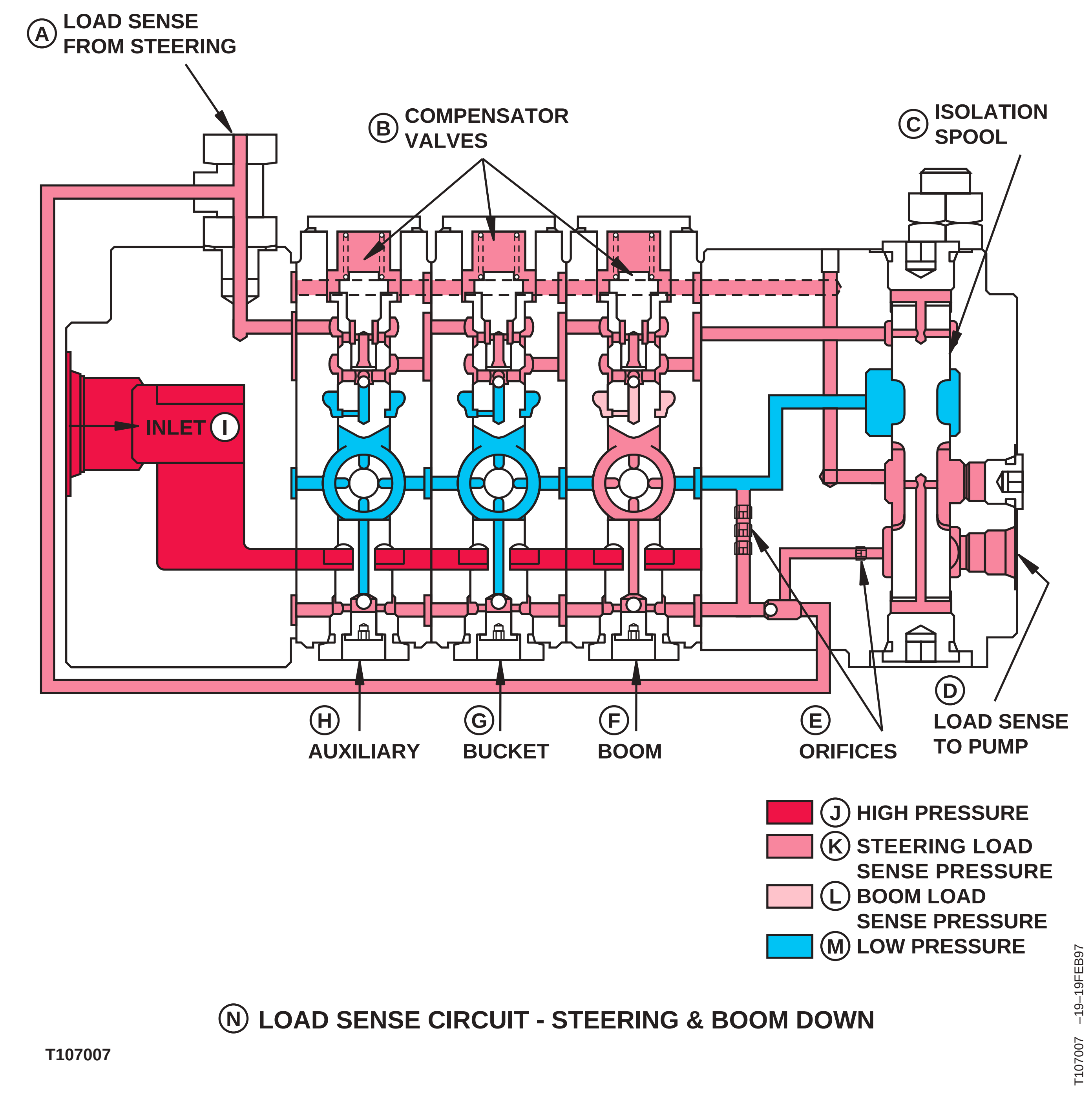
9025
05
59

https://www.truck-manuals.net/

The load sense pressure signal (A) enters the loader control at two points; the inlet section and the outlet section. From the inlet section it is channeled to the compensator valve (B) in each section and then on to the top area of the isolation spool (C). In the outlet section it seats the ball shuttle and flows through the single orifice (E) to the isolation spool. It goes around the spool, out the port (D) to the hydraulic pump as a pump output control signal. At the isolation spool it also flows to the bottom area. The isolation spool shuttles and sends load sense to the spring side area of each compensator. With all the loader functions in neutral, there is no effect on any of the loader circuits.

TX,9025,ME339 –19–13FEB97–2/2

Load Sense Circuit—Steering And Boom Down



A—Load Sense from Steering
B—Compensator Valves
C—Isolation Spool
D—Load Sense to Pump
E—Orifices
F—Boom
G—Bucket
H—Auxiliary
I—Inlet
J—High Pressure
K—Steering Load Sense Pressure
L—Boom Load Sense Pressure
M—Low (Return) Pressure
N—Load Sense Circuit—Steering and Boom Down

Continued on next page

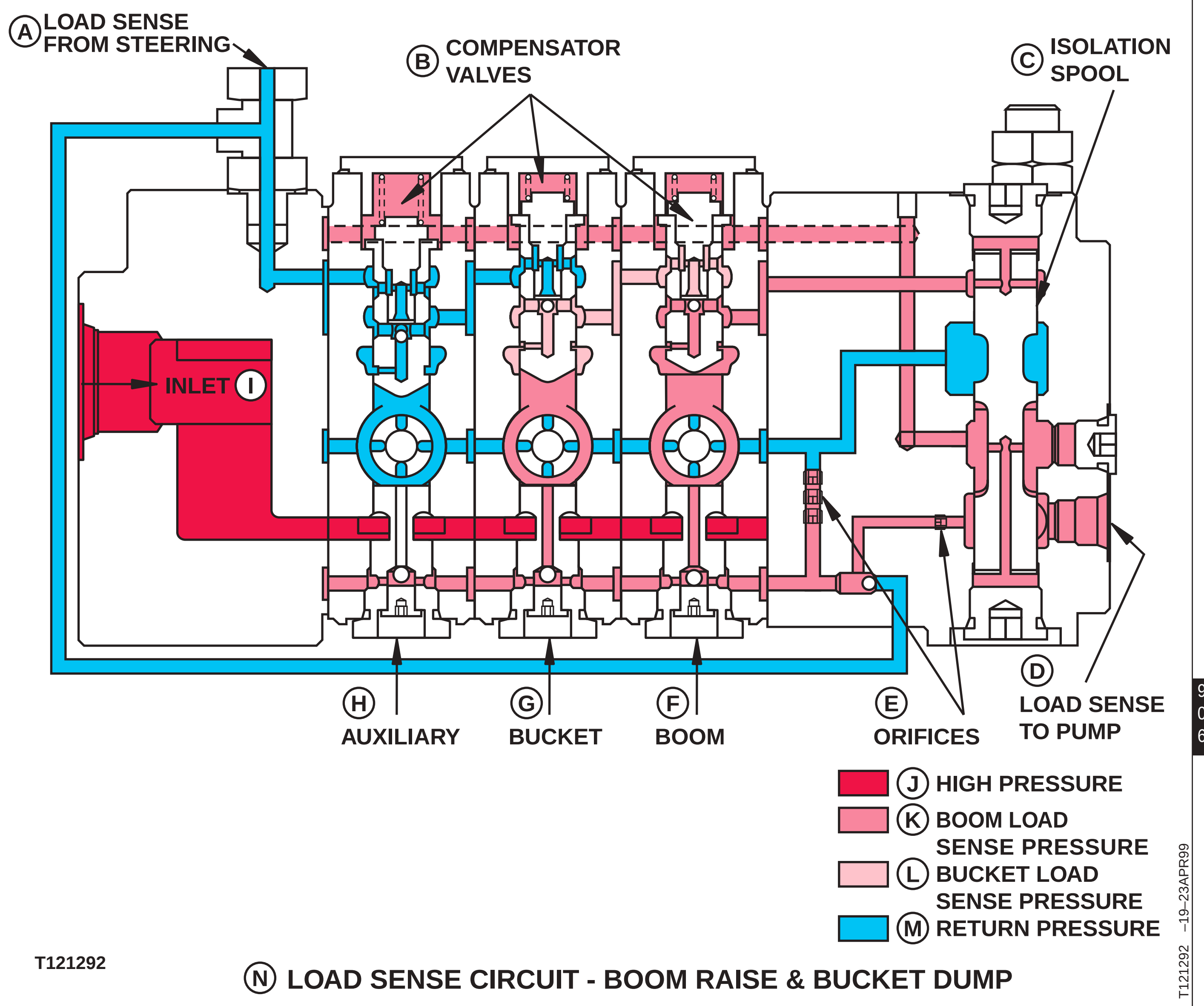
TX,9025,ME340 –19–13FEB97–1/2

The steering load sense signal enters the load control valve in the same way as with steering only activated. With a compensator in the boom circuit steering load sense pressure is directed to the top spring area of the compensator (B). The boom compensator will now restrict oil flow out the boom down work port, thereby providing priority oil flow to steering.

If for example, boom raise was operated while steering and boom pressures were higher than steering, then load sense from the boom check ball to the shuttle check will seat the shuttle check to the right and the higher load sense pressure will be used at the isolation spool. The highest load sense pressure will be utilized by both the hydraulic pump control unit and the compensator valves (B).

TX,9025,ME340 –19–13FEB97–2/2

Load Sense Circuit—Boom Raise And Bucket Dump



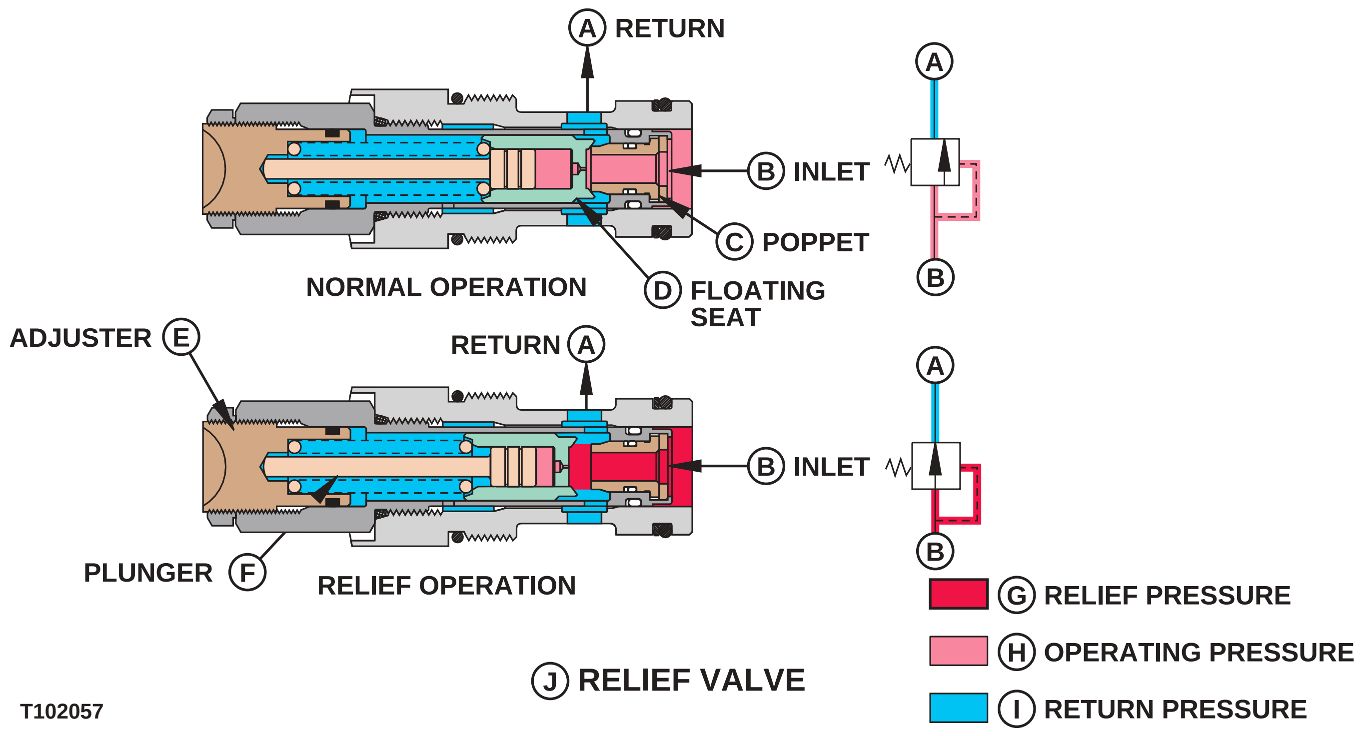
A—Load Sense from Steering
B—Compensator Valves
C—Isolation Spool
D—Load Sense to Pump
E—Orifices
F—Boom
G—Bucket
H—Auxiliary
I—Inlet
J—High Pressure
K—Boom Load Sense Pressure
L—Bucket Load Sense Pressure
M—Return Pressure
N—Load Sense Circuit—Boom Raise and Bucket Dump

Without any flow control when operating boom raise and bucket dump, all of the pump output would go to the bucket dump circuit. With compensators in the loader circuits, the bucket compensator will restrict flow so that equal flow will go to boom raise and bucket dump. This is accomplished by sending the higher boom load sense pressure to the top side of the bucket compensator. Now both bucket and boom compensators have the same spring side pressure. Thus, the flow past each compensator is the same though the bucket dump workport pressure is very low.

TX,9025,ME341 –19–13FEB97–1/1

9025
05
63

Relief Valve Operation



A—Return
B—Inlet
C—Poppet
D—Floating Seat
E—Adjuster
F—Plunger
G—Relief Pressure
H—Operating Pressure
I—Return Pressure
J—Relief Valve

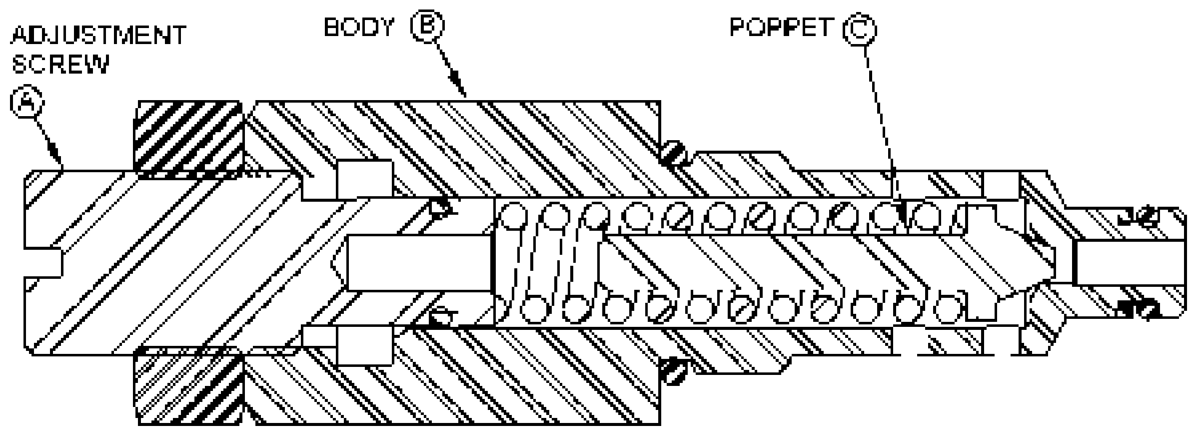
The loader hydraulic system uses a direct-acting relief valve located in the inlet port plate of the loader control valve assembly. Its function is to relieve pressure spikes that result from abrupt flow changes.

During normal operation, loader pressures are below the relief pressure of the relief valve. The floating seat (D) and snubber remain seated against the poppet (C), sealing inlet (B) oil from the return (A) passage.

When a pressure spike occurs and exceeds the relief setting, pressure oil in the inlet forces the snubber and floating seat open against the spring. The plunger remains stationary where it maintains a volume of oil on the right of the snubber orifice. The snubber orifice dampens the movement of the floating seat. The relief pressure is adjusted by the position of the adjuster (E).

TX,9025,ME342 –19–28AUG96–1/1

Load Sense Relief Valve Operation



T106959 –19–12FEB97

A—Adjustment Screw B—Body C—Poppet

The load sense relief valve is a direct acting poppet type (C) design located in the loader control valve outlet section.

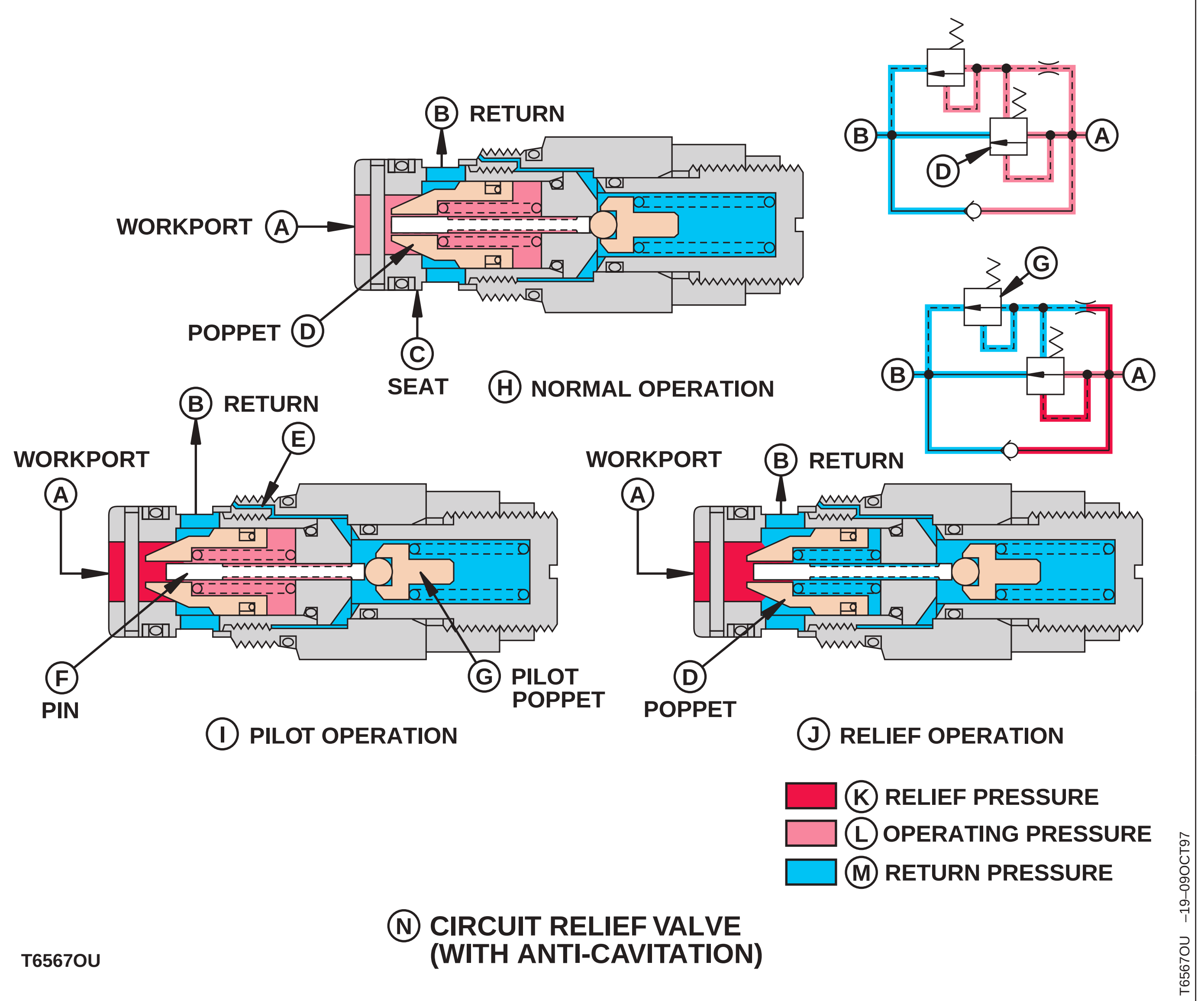
Its function is to limit the maximum pressure in the hydraulic system. It actually senses and limits load sense pressure. Setting a limit on load sense pressure also sets a limit on pump output or system pressure.

This pressure level will normally be margin pressure plus the setting of the load sense relief valve.

To adjust, a hydraulic function is bottomed, the pump output pressure is monitored and the adjustment screw (A) is turned to set the pressure reading to the specified maximum value. Turn adjustment screw IN to increase pressure and OUT to decrease.

TX,9025,ME343 –19–14FEB97–1/1

Circuit Relief Valve Operation



A—Workport
B—Return
C—Seat
D—Poppet
E—Return Passage
F—Pin
G—Pilot Poppet
H—Normal Operation
I—Pilot Operation
J—Relief Operation
K—Relief Pressure
L—Operating Pressure
M—Return Pressure

The bucket rollback and dump, and both auxiliary workports of the loader control valve use a pilot-operated circuit relief with an anti-cavitation feature.

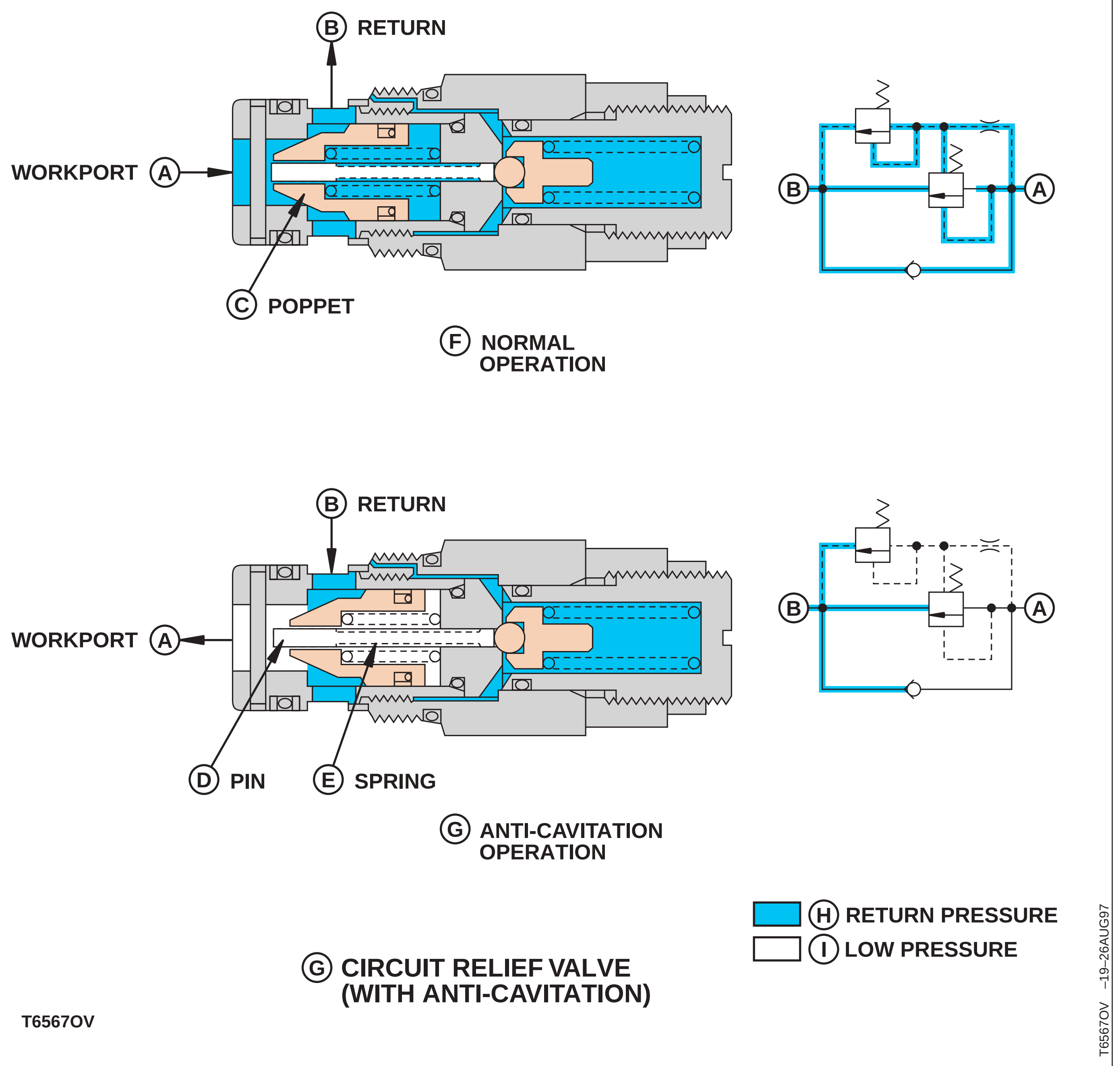
During normal operation (H), the poppet (D) is positioned against the seat (C) to seal the workport (A) oil from the return (B) passage.

As the circuit pressures approach the relief pressure setting, the pin (F) forces the pilot poppet (G) off its seat. Grooves cut into the pin, bleed oil on the right side of the poppet to return through the pilot poppet.

Continued on next page

During relief operation (J), oil on the right side of the poppet is drained to return causing pressure in the workport to overcome the poppet spring force. Relief pressure oil flows from the workport to return across the poppet.

Continued on next page TX,9025,ME344 –19–24JUN96–2/4



A—Workport
B—Return
C—Poppet
D—Pin
E—Spring
F—Normal Operation
G—Anti-Cavitation Operation
H—Return Pressure
I—Low Pressure

If the workport pressure in the circuit drops below return pressure, the anti-cavitation feature of the circuit relief valve activates.

During normal operation (F), the poppet (C) remains closed against its seat causing the workport (A) to be sealed from the return (B) passage.

Continued on next page

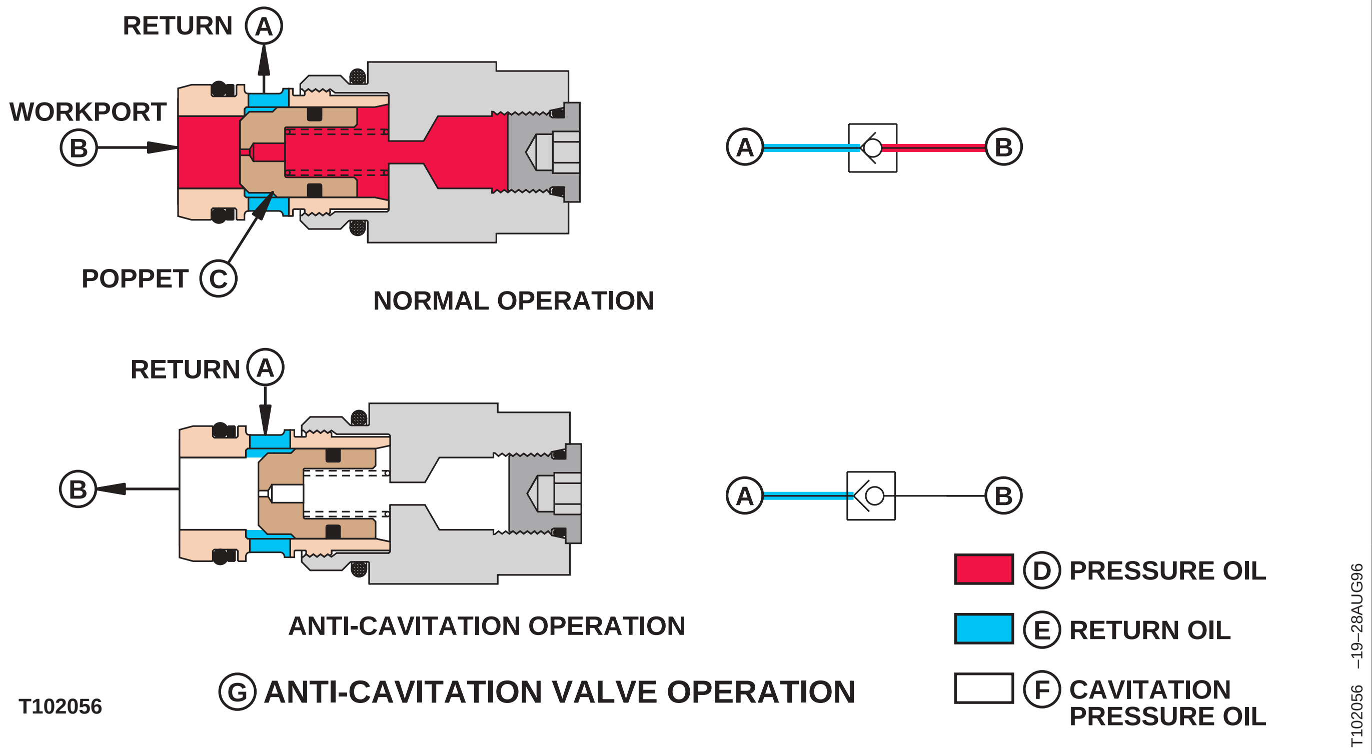
TX,9025,ME344 –19–24JUN96–3/4

https://www.truck-manuals.net/

If cavitation occurs, the oil pressure in the workport and in the spring (E) area of the poppet drops below return pressure. Return pressure oil works against the shoulder of the poppet to force it open against the spring.

TX,9025,ME344 –19–24JUN96–4/4

Anti-Cavitation Valve Operation



A—Return
B—Workport
C—Poppet
D—Pressure Oil
E—Return Oil
F—Cavitation Pressure Oil
G—Anti-Cavitation Valve Operation

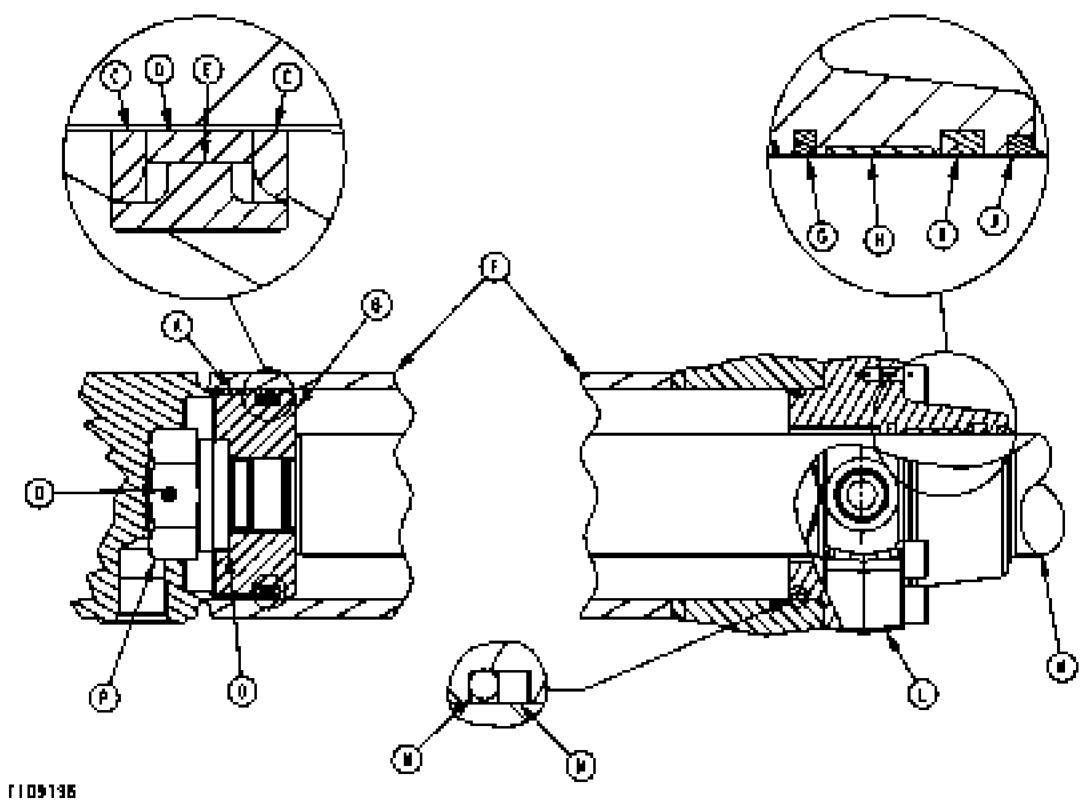
The boom section of the loader control valve contains an anti-cavitation valve in boom down and a plug in the boom raise workport. If workport pressure in the circuit drops below return pressure, the anti-cavitation valve will open and return pressure oil will flow into the workport.

During normal operation, the poppet (C) is held against the seat by spring force plus workport pressure acting on the backside of the poppet. With the poppet seated, the workport (B) is sealed from the return passage.

If cavitation occurs, the oil pressure in the workport (B) and in the spring area on the backside of the poppet will drop. With workport pressure below return pressure, the return pressure works against the shoulder area of the poppet (C) causing it to open against the spring. Return pressure oil flows into the workport to prevent cylinder cavitation.

TX,9025,ME345 –19–10AUG96–1/1

Cylinder Operation—Bucket (185 Series)



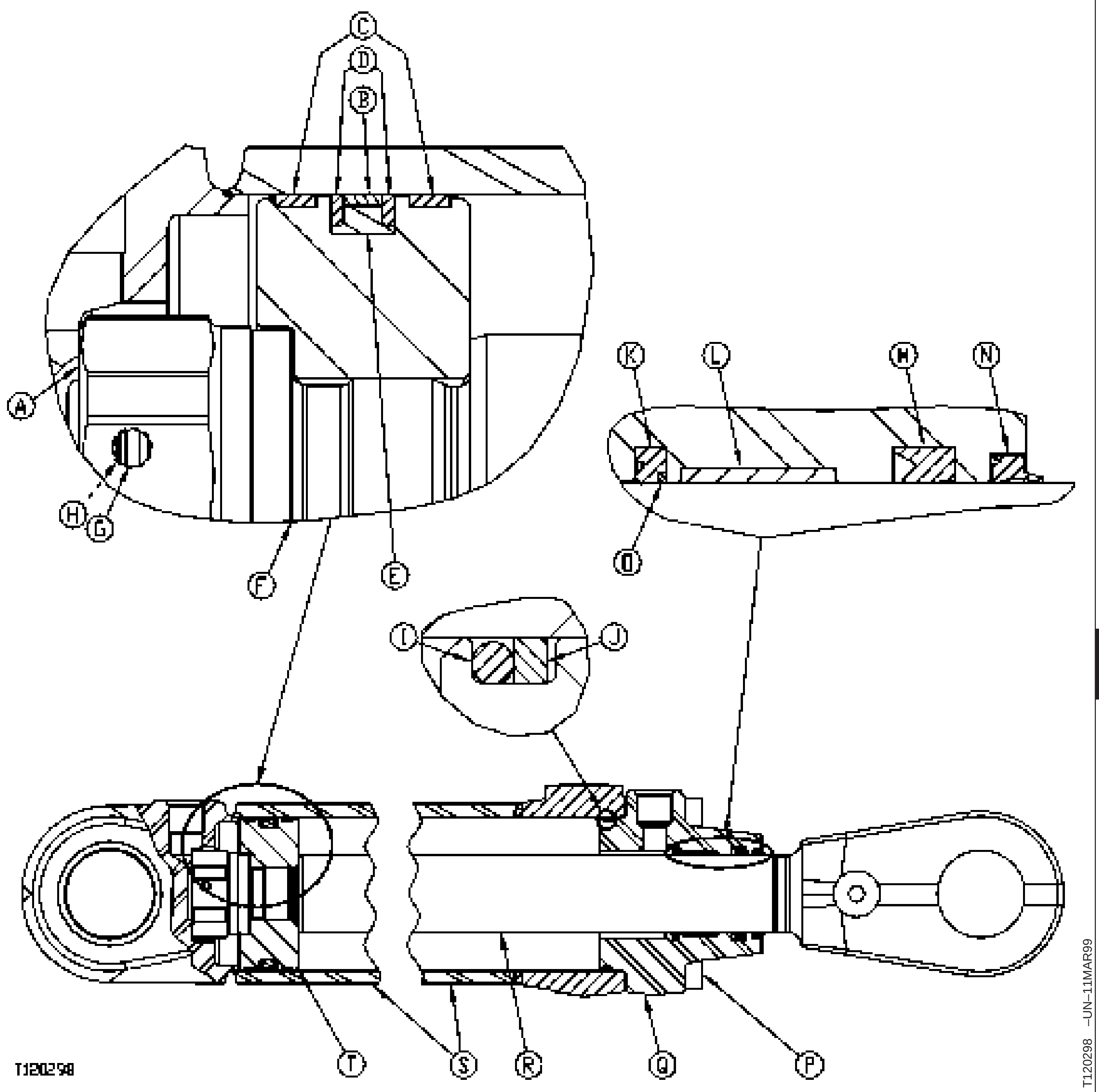
185 Series Cylinder Design

A—Wear Ring
B—Piston
C—Back-Up Ring
D—Cap Seal
E—Expander Seal
F—Barrel
G—Buffer Seal
H—Rod Bearing
I—U-Cup Seal
J—Wiper Seal
K—Rod
L—Rod Guide
M—Back-Up Ring
N—O-Ring
O—Shim
P—Nut
Q—Set Screw

The cylinder uses eight socket head screws to retain the rod guide (L) to the barrel (F). The piston (B) is fastened to the rod (K) with nut (P). The nut is locked in place with a steel ball and set screw (Q) which is screws into the nut.

The piston uses a single wear ring (A) with a cap seal (D) and expander seal (E) to seal between the piston and barrel. The rod guide seals against the barrel with an O-ring (N) and back-up ring (M). The rod is sealed against the rod guide with buffer seal (G) and U-cup seal (I).

Cylinder Operation—Boom (185 Series)



Boom Cylinder—185 Series

A—Nut
B— Seal, Piston Cap
C—Wear Ring (2 used)
D—Back-Up Ring (2 used)
E—Expander Seal
F—Shim
G—Set Screw
H—Steel Ball
I—O-ring
J—Back-Up Ring
K—Seal
L—Wear Ring
M—U-Cup Seal
N—Wiper Seal
O—Back-Up Ring
P— Socket Head Hex Screw
Q—Rod Guide
R—Rod
S—Barrel
T—Piston

Continued on next page

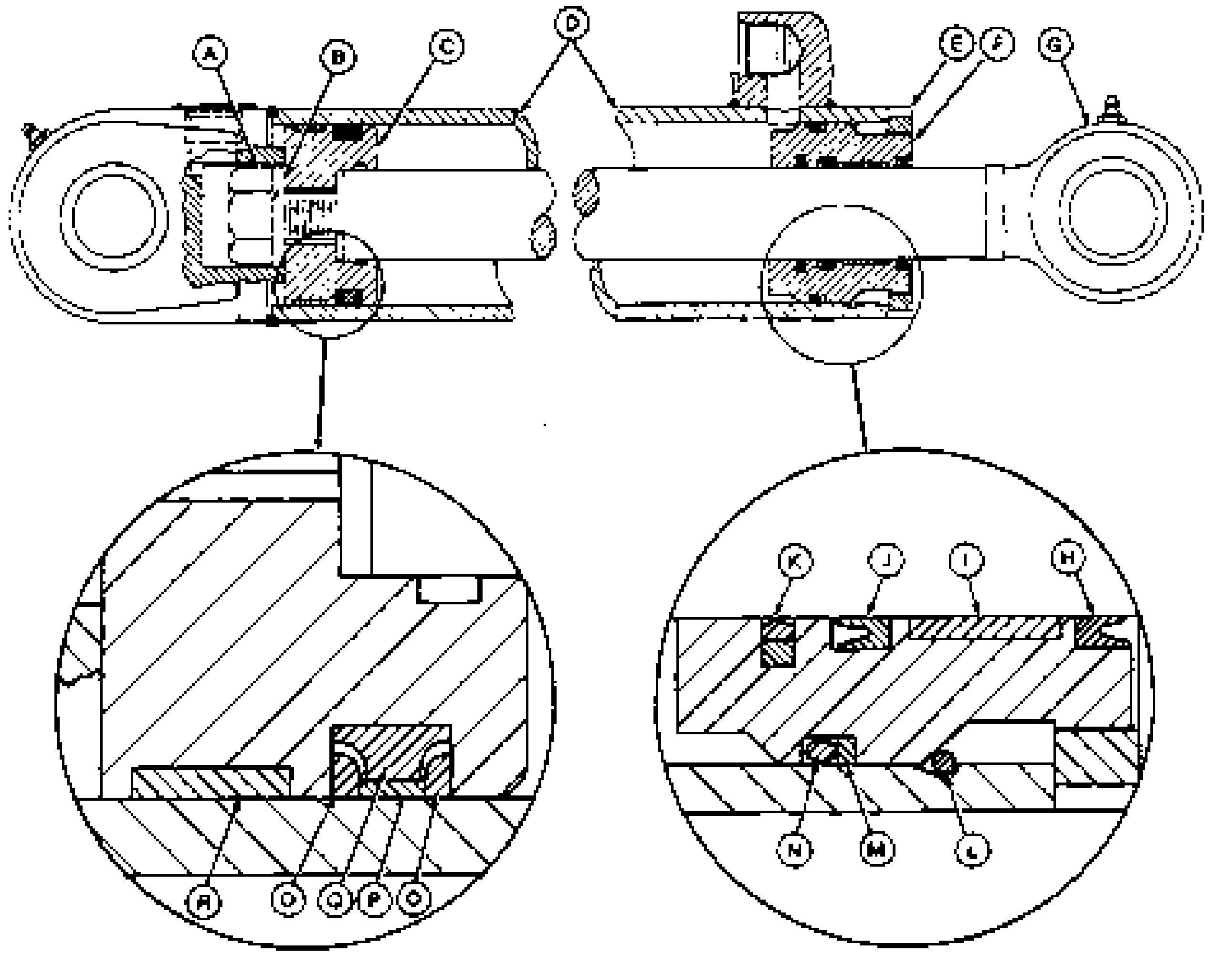
CED,TX04577,511 –19–02OCT02–1/2

The cylinder uses eight socket head screws to retain the rod guide (Q) to the barrel (S). The piston (T) is fastened to the rod (R) with nut (A). The nut is locked in place with a steel ball (H) and set screw (G) which threads into the nut.

The piston uses two wear rings (C) with a cap seal (B), back-up rings (D) and expander seal (E) to seal between the piston and barrel. The rod guide seals against the barrel with an O-ring (I) and back-up ring (J). The rod is sealed against the rod guide with buffer seal (K), back-up ring (0), U-cup seal (M) and wiper seal (N).

CED,TX04577,511 –19–02OCT02–2/2

Cylinder Operation—Steering (120 Series)



120 Series Design With Spanner Nut

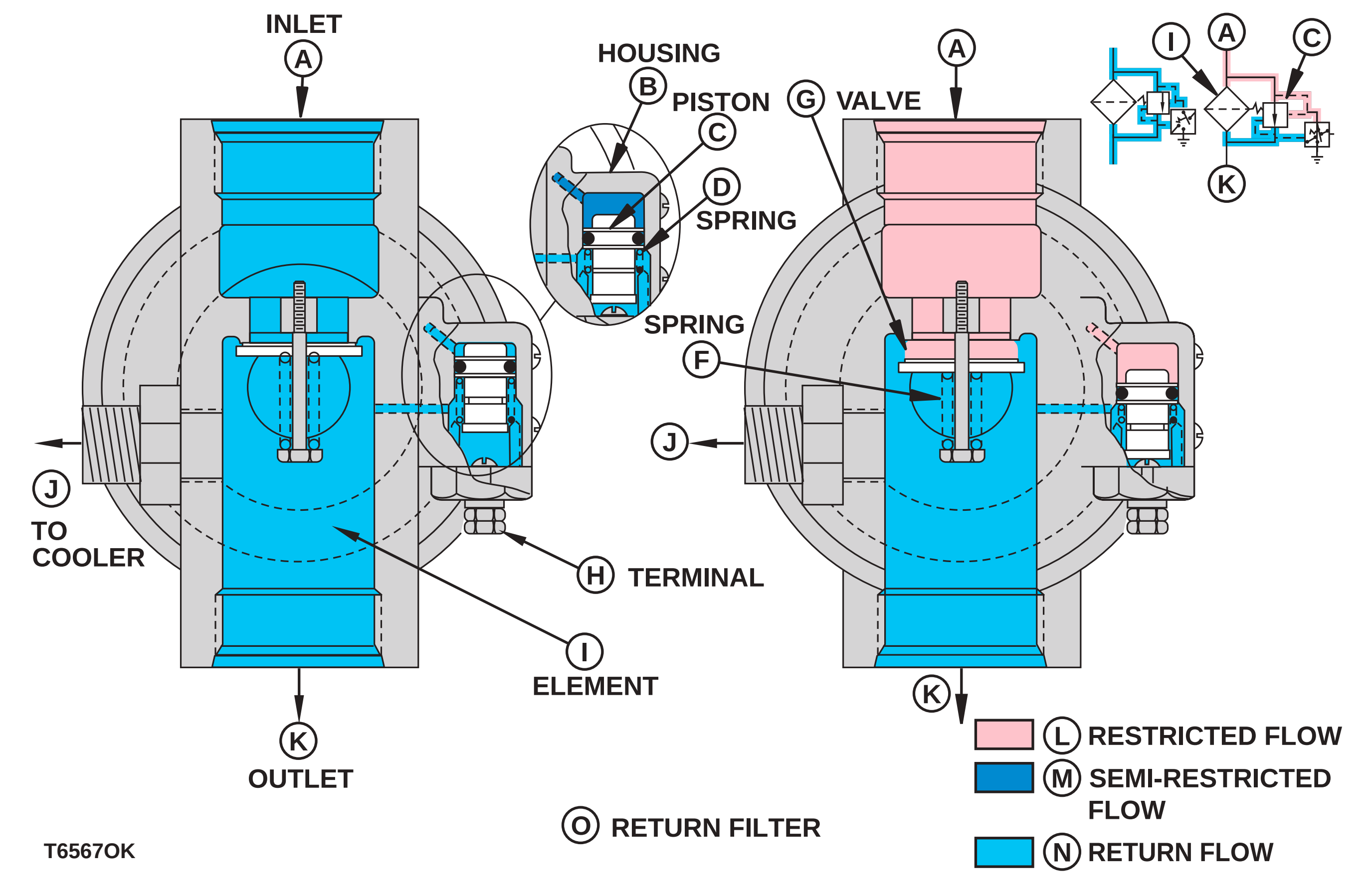
A—Nut
B—Washer
C—Piston
D—Barrel
E—Nut (spanner)
F—Rod Guide
G—Rod
H—Wiper Seal
I—Wear Ring
J—Rod Seal (outer)
K—Buffer Seal
L—Snap Ring
M—Backup Ring
N—O-Ring
O—Backup Ring (2 used)
P—Cap Seal
Q—Expander Seal
R—Wear Ring

The cylinders use a snap ring (L) and threaded retainer (E) to retain the rod guide (F) to the barrel (D). The piston (C) is fastened to the rod (G) by a nut (A).

The piston uses a single wear ring (R) with a cap seal (P) to seal between the piston and barrel. The rod guide seals against the barrel with an O-ring. The rod is sealed against the rod guide with a lip-type buffer seal (K) and a U-cup outer seal (J).

CED,TX04577,510 –19–02OCT02–1/1

Return Filter Operation



A—Inlet
B—Housing
C—Piston
D—Spring
F—Spring
H—Terminal
I—Element
J—To Cooler
K—Outlet
L—Restricted Flow
M—Semi-Restricted Flow
N—Return Flow
O—Return Filter

Return Filter Operation—Normal and Restricted (S.N. —585560)

The hydraulic return filters removes contaminants from the hydraulic system oil. The filter housing contains a bypass valve and a filter restriction switch.

Under normal operation, return flow from the steering and loader enters the inlet (A), flows through the filter elements (I), up through the filter canister and out the outlet (K).

If the pressure differential between the inlet and outlet increases past a set level due to cold oil or a partially restricted filter element, inlet pressure in the housing (B) increases, moving the piston (C) down against spring (D) force and outlet pressure. The piston contacts the terminal (H), completing a circuit which causes the filter restriction indicator light to glow.

As the filter element becomes plugged, the pressure differential between the inlet and outlet increases. Inlet pressure is sensed on one side of the valve (G) which opens against spring (F) force and outlet pressure. The return oil then bypasses the filter while the restriction indicator light glows.

Continued on next page

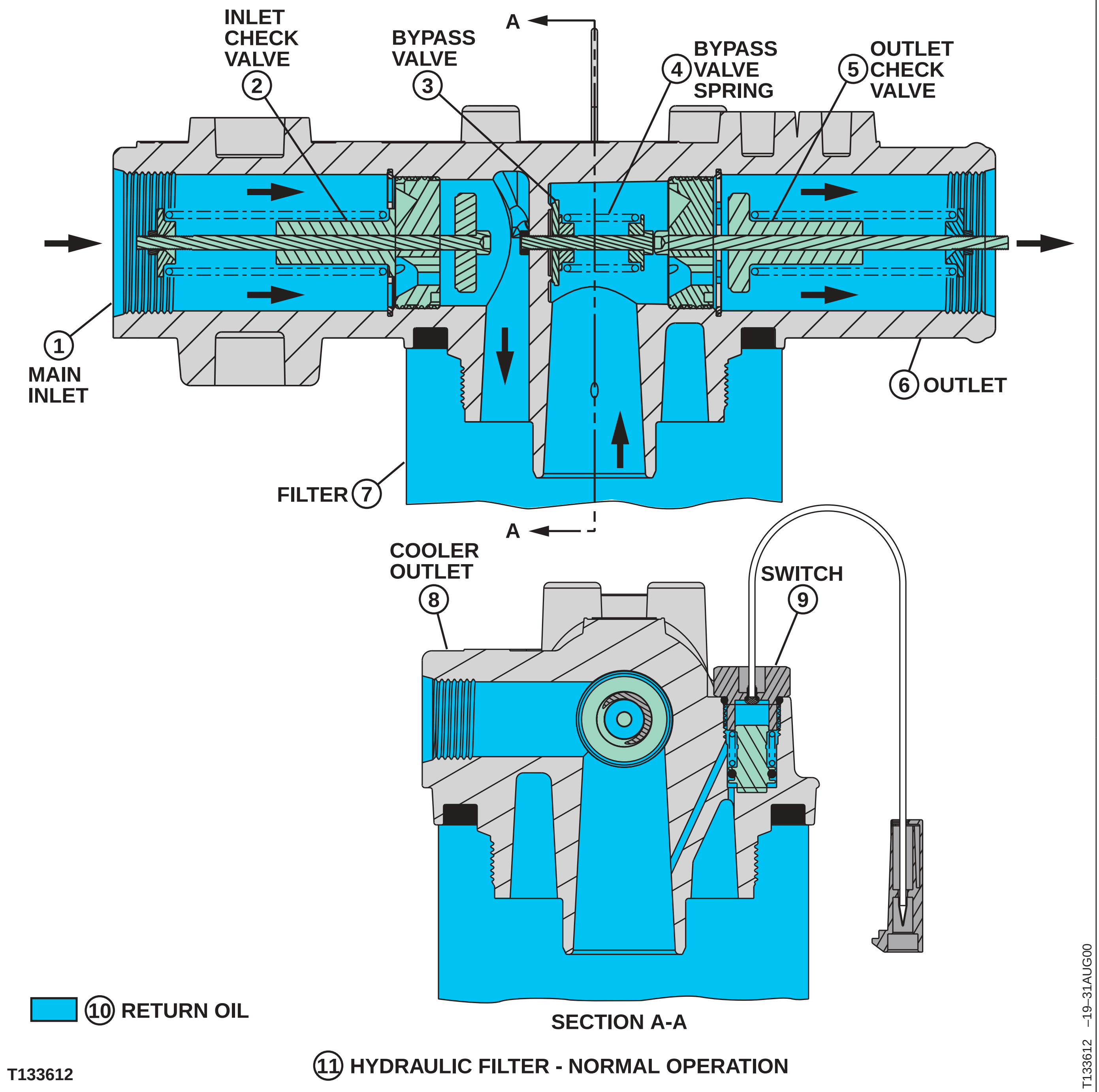
TX04577,0000436 –19–02OCT02–1/6

Under normal operation, the restriction indicator light will glow when operating the hydraulic functions with cold oil. However, if the restriction indicator light continues to glow after the oil reaches operating temperature, the return filter is being bypassed. Extended operation in the bypass mode will cause damage to the hydraulic system.

An inline check valve is located between return manifold and filter housing outlet (K). This prevents back flow from reservoir when changing the filter elements.

Continued on next page

TX04577,0000436 –19–02OCT02–2/6



1—Main Inlet
2—Inlet Check Valve (Optional)
3—Bypass Valve
4—Bypass Valve Spring
5—Outlet Check Valve
6—Outlet
7—Filter
8—Cooler Outlet
9—Switch
10—Return Oil
11—Hydraulic Filter-Normal Operation

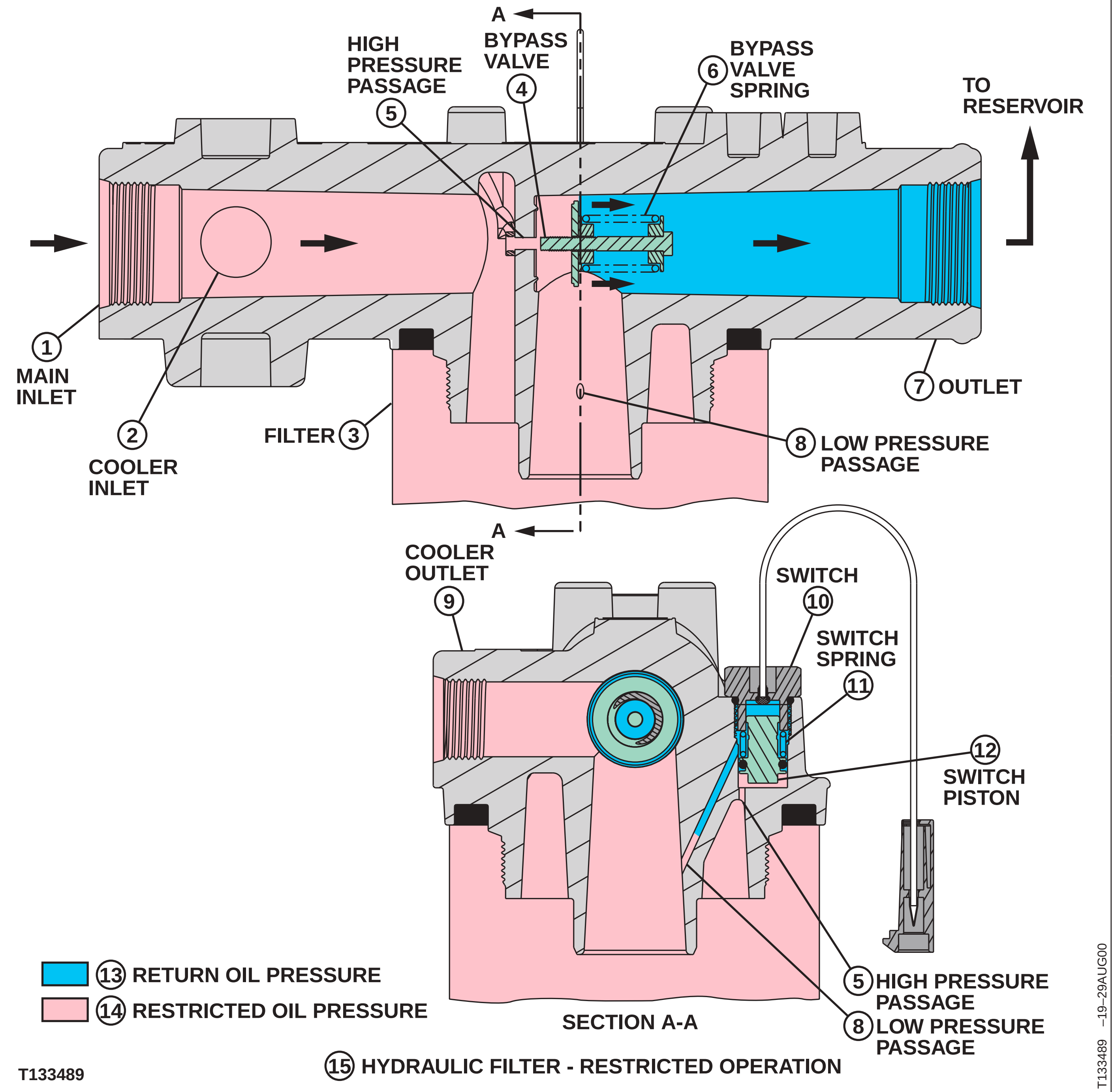
Continued on next page

TX04577,0000436 –19–02OCT02–3/6

Return Filter Operation—Normal (S.N. 585561—)

The hydraulic filter assembly removes contaminants from the hydraulic system return oil (10), produces inlet back-pressure, and regulates outlet back-pressure which forces flow through the hydraulic oil cooler. The filter housing contains an (optional) inlet check valve (2), bypass valve (3), filter restriction switch (9), and an outlet pressure check valve (5). Return oil (10) flows from the loader valve, steering valve and fan drive motor into the main and auxiliary inlet (1). The oil then flows through the inlet check valve (2), through the filter element (7), through the auxiliary outlet (8) to the cooler, or through the outlet check valve (5), and then through the main outlet (6) to the reservoir. Pressure on the inlet side of the filter assembly is sensed on the left side of the inlet valve (2). The valve opens when the pressure increases enough to overcome the force of the inlet check valve spring. The oil flows into the filter element (7) then to the outlet pressure check valve (5). The outlet pressure check valve forces flow through the cooler outlet (8) port to the oil cooler. When the restriction in the oil cooler becomes high enough to overcome outlet pressure plus the set spring force of the outlet check valve (5), the outlet valve opens and allows oil to return to the reservoir. Pressure on the inlet side of the filter element is sensed on the left side of the bypass valve (3). Any pressure at the filter outlet due to line restriction is sensed on the right side of the bypass valve (3). Pressure in the outlet passage and the by-pass spring (4) force, hold the bypass valve closed unless there is a restriction in the oil filter due to being clogged.

Continued on next page TX04577,0000436 –19–02OCT02–4/6



1—Main Inlet
2—Cooler Inlet
3—Filter
4—Bypass Valve
5—High Pressure Passage
6—Bypass Valve Spring
7—Outlet
8—Low Pressure Passage
9—Cooler Outlet
10—Switch
11—Switch Spring
12—Switch Piston
13—Return Oil
14—Restricted Oil Pressure
15—Hydraulic Return Filter Operation—Restricted Operation

Continued on next page

TX04577,0000436 –19–02OCT02–5/6

Return Filter Operation—Restricted (S.N. 585561—)

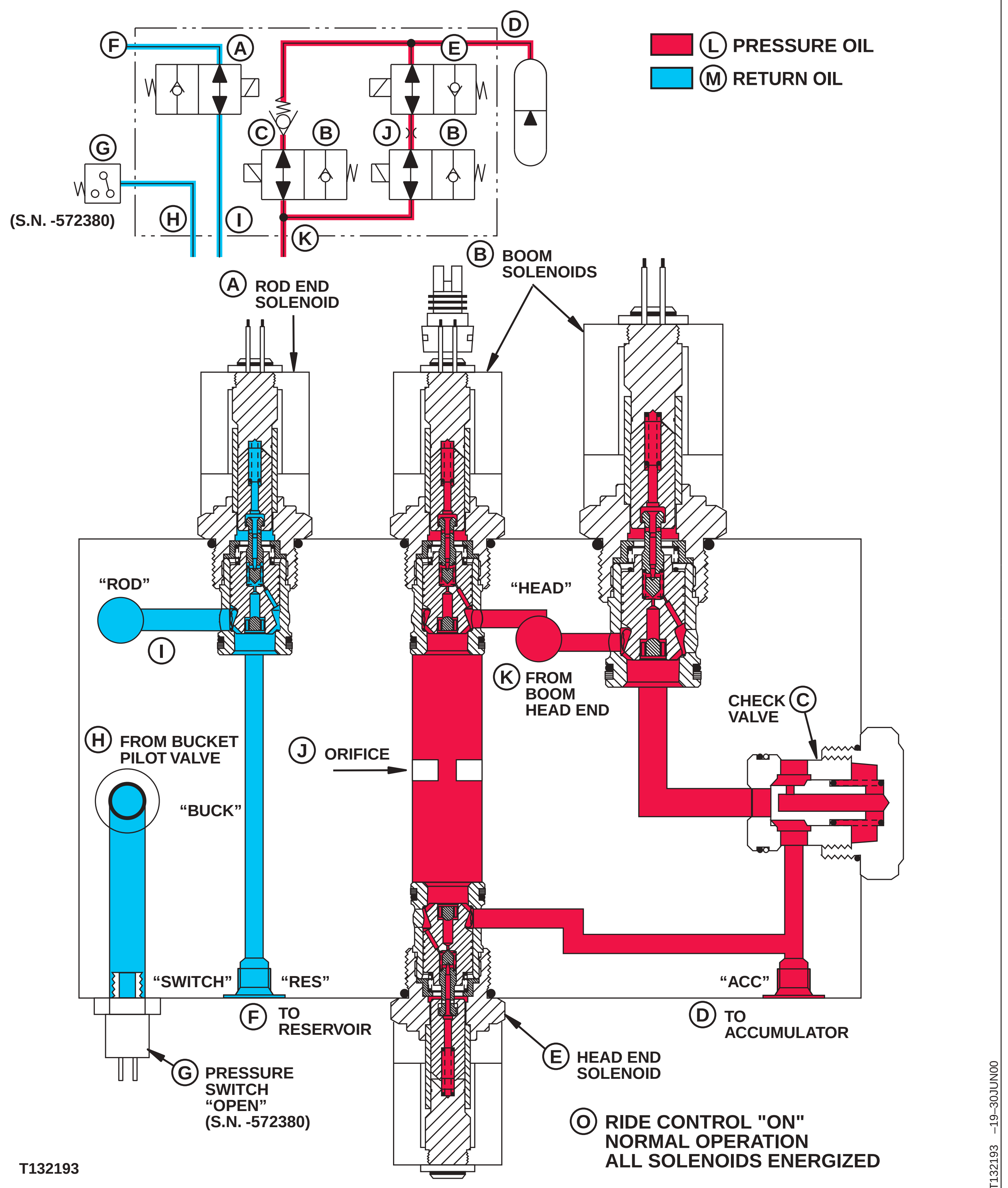
As the filter starts to plug or when the oil is cold, pressure at the inlet side of the filter element increases. When the filter becomes restricted to the point where pressure at the filter element inlet increases enough to overcome outlet pressure plus a set spring force (6), the bypass valve opens allowing unfiltered oil to flow to the oil cooler or to the reservoir.

The filter restriction indicator switch (10) works on the same principle as the filter bypass valve.
High-pressure oil is sensed through the high-pressure passage (1). Restricted oil (14) caused by a clogged filter or cold oil will create higher oil pressure on the inlet side of the filter element. When this inlet pressure overcomes the outlet pressure, sensed by the low-pressure passage (8), plus a set spring (11) force in the switch, the piston (12) moves up (closes) providing a ground for the filter restriction indicator. The switch will cause the filter restriction indicator light to illuminate. The indicator switch is set to close 10 psi before the bypass valve (4) opens allowing the operator to perform maintenance on the hydraulic system before the unclean oil passes through the hydraulic oil system.

Under normal operation, the restriction indicator light will glow when operating the hydraulic functions with cold oil. If the restriction indicator light continues to glow after the oil reaches operating temperature, the return filter is being bypassed. Extended operation in the bypass mode will cause damage to the hydraulic system.

TX04577,0000436 –19–02OCT02–6/6

Ride Control Operation—In The “On” Position (S.N — 582302)



Continued on next page

CED,TX04577,512 –19–17JUN02–1/2

9025
05
80

https://www.truck-manuals.net/

A—Rod End Solenoid
B—Boom Solenoids
C—Check Valve
D—To Accumulator
E—Head End Solenoid
F—To Reservoir
G—Pressure Switch "Open"
H—From Bucket Pilot Valve
I—Rod
J—Orifice
K—From Boom Head End
L—Pressure Oil
M—Return Oil
O—Ride Control "ON" Normal Operation—All Solenoids Energized

NOTE: Ride Control Pressure Switch (G) is no longer located in ride control valve ending with (S.N. —572380). The pressure switch is relocated to the pilot (bucket dump—right side) port of the bucket valve section on the main control valve.

The ride control system consists of four pilot operated solenoid valves which allow oil flow to and from the boom cylinder head end into a gas charged, piston type accumulator. Whenever ride control is activated head end solenoid (E) and rod end solenoid (A) are energized. The boom solenoids (B) are energized at all times except during bucket dump.

When traveling over rough terrain at high speed with a loaded or empty bucket, the bucket produces a pitching motion which is common to wheel loaders. Ride control allows oil from the boom cylinder head end to travel into an accumulator and the oil coming out of the accumulator is orificed to reduce rebounding. This cushion action reduces the pitching motion and improves machine ride and reduces tire flexing.

The boom cylinder rod end solenoid valve is open to return and oil is free to flow in and out of the rod end.

Ride control has two modes of operation, Manual and Automatic. The components of the ride control system are:

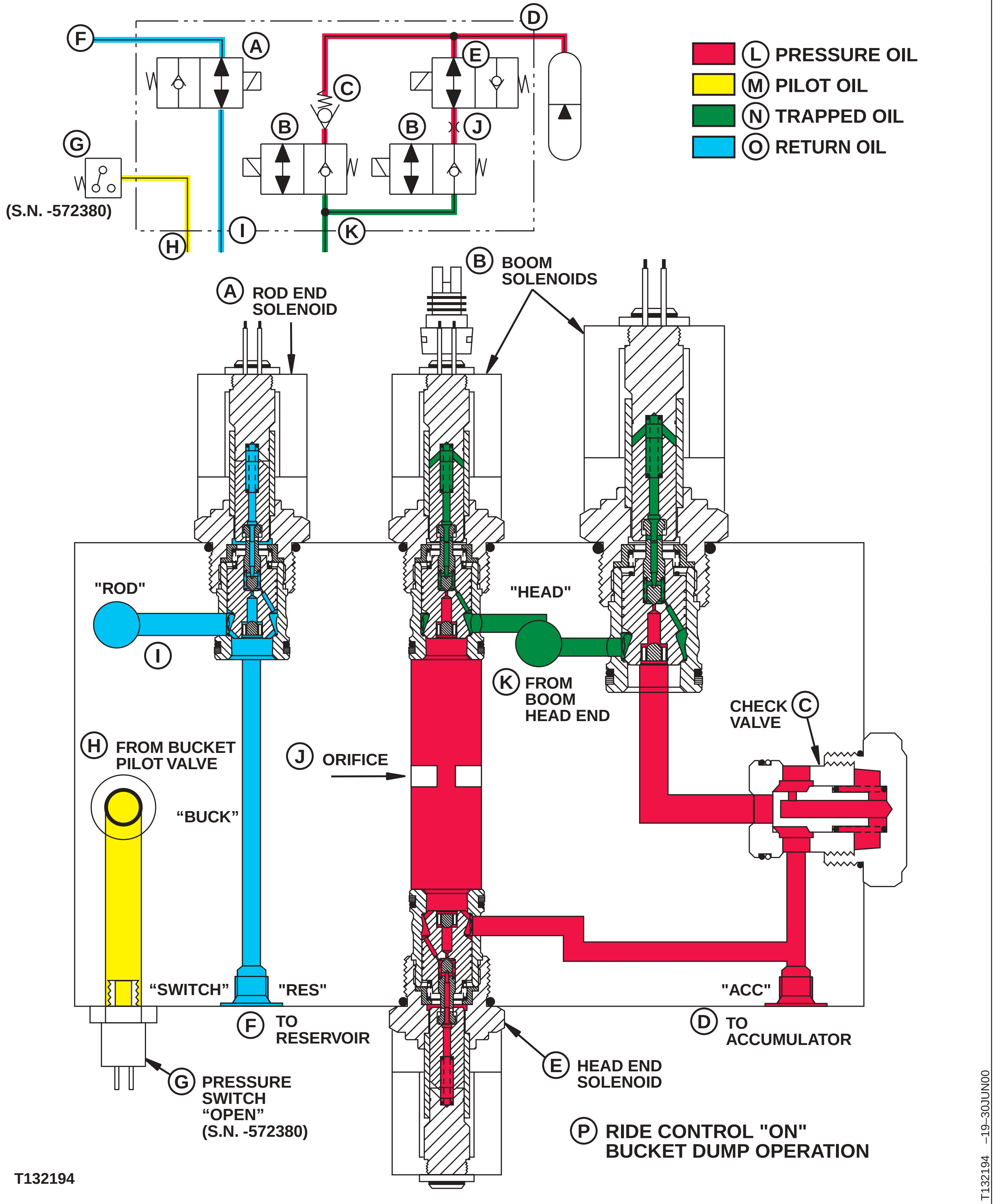
- Ride Control Valve (located inside the loader frame)
- Ride Control Accumulator
- Off/On/Automatic Switch (located on the right side console)
- Two Relays (located in the right side console on the fuse block)
- Pressure Switch (G) (monitors bucket dump pilot pressure)
- Chassis Control Unit (CCU)

NOTE: (S.N. —581778) If the ride control switch is in the On or Auto position when the key is turned On, the ride control will not be On. The Ride Control Switch must be cycled to the Off position before ride control will function according to the switch positions.

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

CED,TX04577,512 –19–17JUN02–2/2

Ride Control Operation—In The “On” Position—Bucket Dump (S.N — 582302)



Continued on next page

CED,TX04577,513 –19–17JUN02–1/2

9025
05
82

A—Rod End Solenoid
B—Boom Solenoids
C—Check Valve
D—To Accumulator
E—Head End Solenoid
F—To Reservoir
G—Pressure Switch “Open”
H—From Bucket Pilot Valve
I—Rod
J—Orifice
K—From Boom Head End
L—Pressure Oil
M—Pilot Oil
N—Trapped Oil
O—Return Oil
P—Ride Control “ON” Bucket Dump Operation

NOTE: Ride Control Pressure Switch (G) is no longer located in ride control valve ending with (S.N. —572380). The pressure switch is relocated to the pilot (bucket dump—right side) port of the bucket valve section on the main control valve.

In the On position all solenoids are activated. Pressure spikes from the boom cylinder head end can flow into the accumulator two ways, through head end solenoid (E) and the check valve (C).

When pressure in the accumulator is greater than pressure in the boom cylinder head end, check valve (C) is held on its seat by accumulator pressure and flow is through solenoids (E and B) and orifice (J).

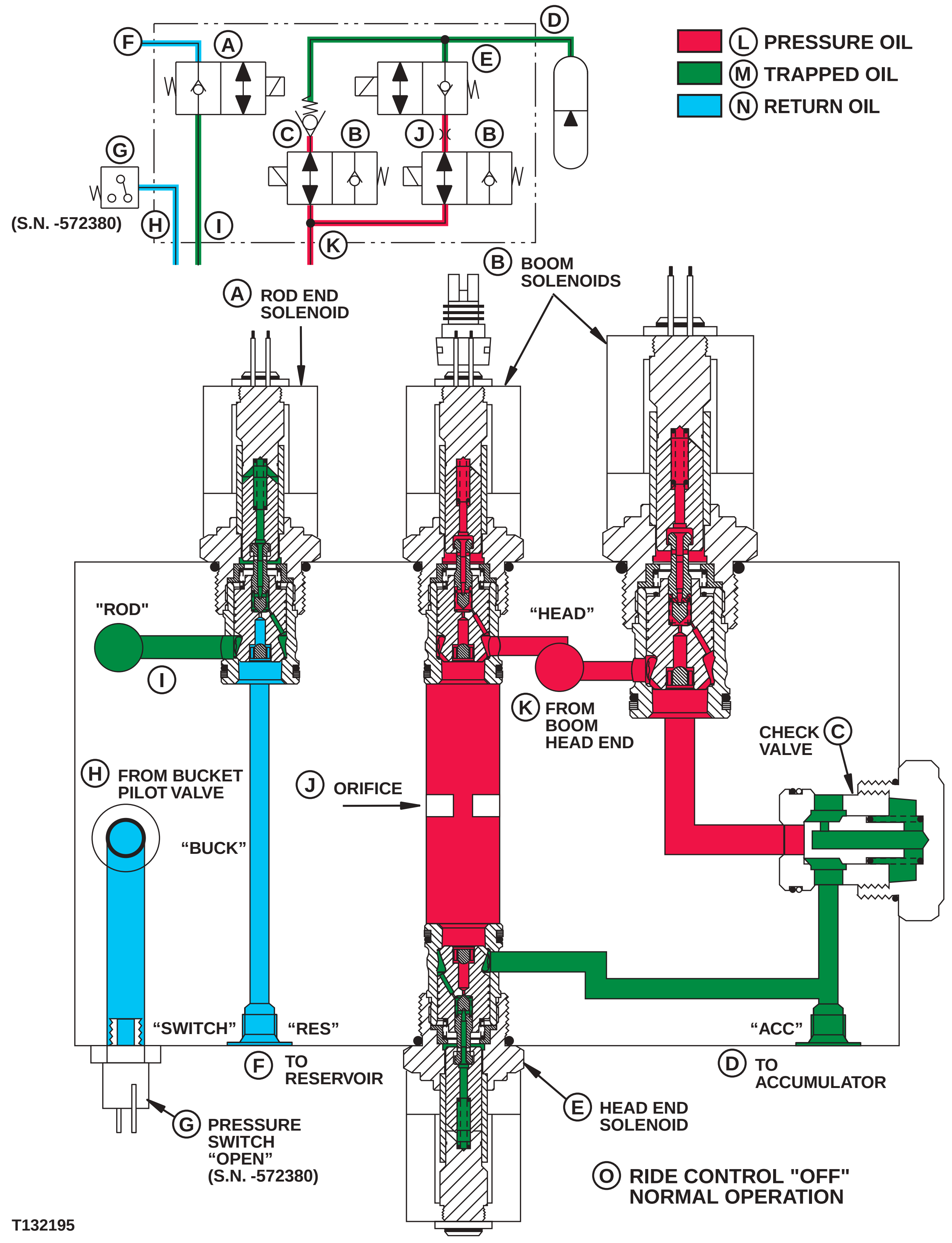
In the on position, the boom cylinder rod end (I) is open to return. Oil is free to flow in and out of the rod end, therefore the boom cannot be powered down while ride control is on. Ride control can be left engaged during bucket loading, but may be turned "OFF" if a more rigid operation is desired.

While in the on position, if the bucket dump function is activated, ride control will momentarily be shut off. A pressure switch in the bucket pilot circuit opens and drops power to solenoids (B). When these two solenoids are off, oil in the boom cylinder head end can not flow into the accumulator. When the bucket is in the fully dumped position, the bucket cylinder transmits forces through the Z-Bar linkage which can cause the boom cylinders to partially retract. This is common to wheel loaders with the Z-Bar linkage. With ride control either on or off while dumping the bucket, the partial lowering of the boom cylinders is reduced.

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

CED,TX04577,513 –19–17JUN02–2/2

Ride Control Operation—In The “Off” Position (S.N — 582302)



T132195

T132195 –19–30JUN00

Continued on next page

CED,TX04577,514 –19–17JUN02–1/2

A—Rod End Solenoid
B—Boom Solenoids
C—Check Valve
D—To Accumulator
E—Head End Solenoid
F—To Reservoir
G—Pressure Switch "Open"
H—From Bucket Pilot Valve
I—Rod
J—Orifice
K—From Boom Head End
L—Pressure Oil
M—Trapped Oil
N—Return Oil
O—Ride Control "OFF" Normal Operation

NOTE: Ride Control Pressure Switch (G) is no longer located in ride control valve ending with (S.N. —572380). The pressure switch is relocated to the pilot (bucket dump—right side) port of the bucket valve section on the main control valve.

In the automatic position, ride control functions the same as the "ON" position with one exception. When ground speed is approximately 3 1/2 mph (6 km/h) or less, ride control is turned off.

Specification

Ride Control Is "OFF" When—Ground Speed	3 1/2 mph (6 km/h) or less

When ground speed is 3 1/2 mph (6 km/h) or less, the chassis control unit (CCU) de-energizes solenoid valves (A and E). When these two solenoids are off, oil is trapped in the accumulator. This allows for rigid operation at very low ground speeds. When ground speed is approximately 3 1/2 mph (6 km/h) or greater the chassis control unit (CCU) will reactivate ride control by energizing solenoids (A and E) and operation will be the same as the "ON" position.

Specification

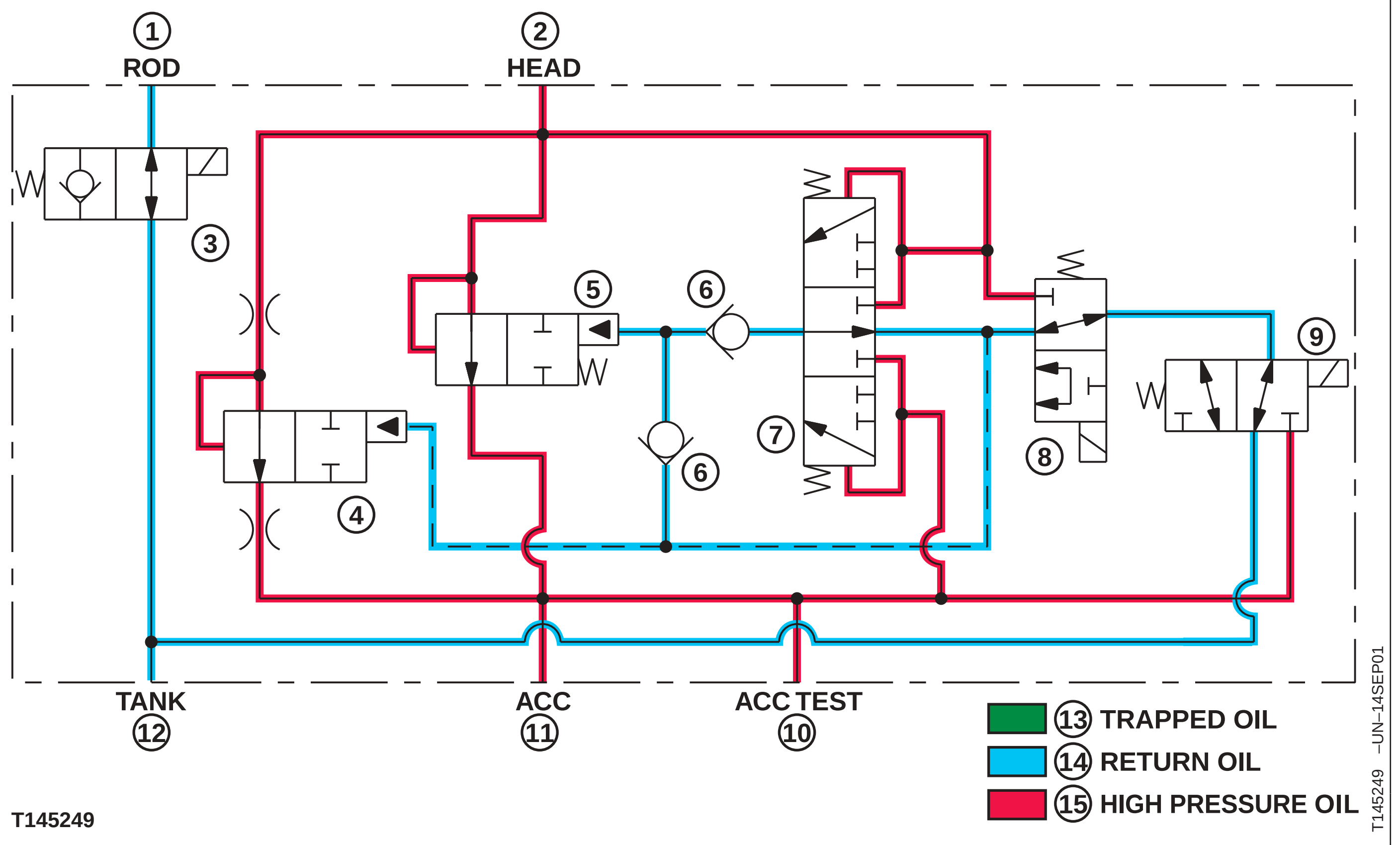
Chassis Control Unit De-Energizes Solenoid Valves—Speed	3 1/2 mph (6 km/h) or less
Chassis Control Unit Will Reactivate Ride Control By Energizing Solenoids—Speed	3 1/2 mph (6 km/h) or greater

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

CED,TX04577,514 –19–17JUN02–2/2

9025
05
85

Ride Control “ON” Normal Operation (S.N 582303 —)



T145249

9025
05
86

1—Rod Port
2—Head Port
3—Solenoid Valve (ON—OFF) (Y18)
4—Low Flow Valve
5—High Flow Valve
6—Check Valve (2 used)
7—Shuttle Valve
8—Bucket Dump Solenoid Valve (Y17)
9—Solenoid Valve (ON—OFF) (Y32)
10—Accumulator Test Port
11—Accumulator Port
12—Tank Port
13—Trapped Oil
14—Return Oil
15—High Pressure Oil

The ride control hydraulic circuit consists of a manifold block containing three solenoid valves, low flow valve, high flow valve and shuttle valve. They allow oil flow to and from the boom cylinder head end into a gas charged, piston type accumulator. The On—Off solenoids (3 & 9) are energized whenever the ride control switch or automatic option is turned ON. Whenever ride control is activated the On—Off solenoids are energized. Also, the bucket dump solenoid (8) is de-energized until ride control is turned on and the bucket dump function is used.

With solenoids (3 & 9) energized oil is allowed to flow through the pilot operated low flow valve (4) and then high flow valve (5). The pilot oil is routed to tank via solenoid (9) and bucket dump solenoid (8). Solenoid (3) allows the rod (1) end of cylinder to be open to tank port (12). Shuttle valve (7) controls when the high flow valve opens due to signaling the differential pressures supplied from the accumulator or head end port which controls pilot pressure to the shuttle valve.

When traveling over rough terrain at high speed with a loaded or empty bucket, the bucket produces a pitching motion which is common to wheel loaders. Ride control allows oil from the boom cylinder head end to travel in and out of the accumulator. This cushion action reduces the pitching motion and improves machine ride and reduces tire flexing.

Continued on next page

TX04577,0000425 –19–04SEP03–1/2

Ride control has two modes of operation, Manual and Automatic. In Automatic mode, ride control is “On” whenever the machine speed is above 6 km/h (3-1/2 mph). In Manual “On” ride control is activated at all times except during bucket dump. The components of the ride control system are:

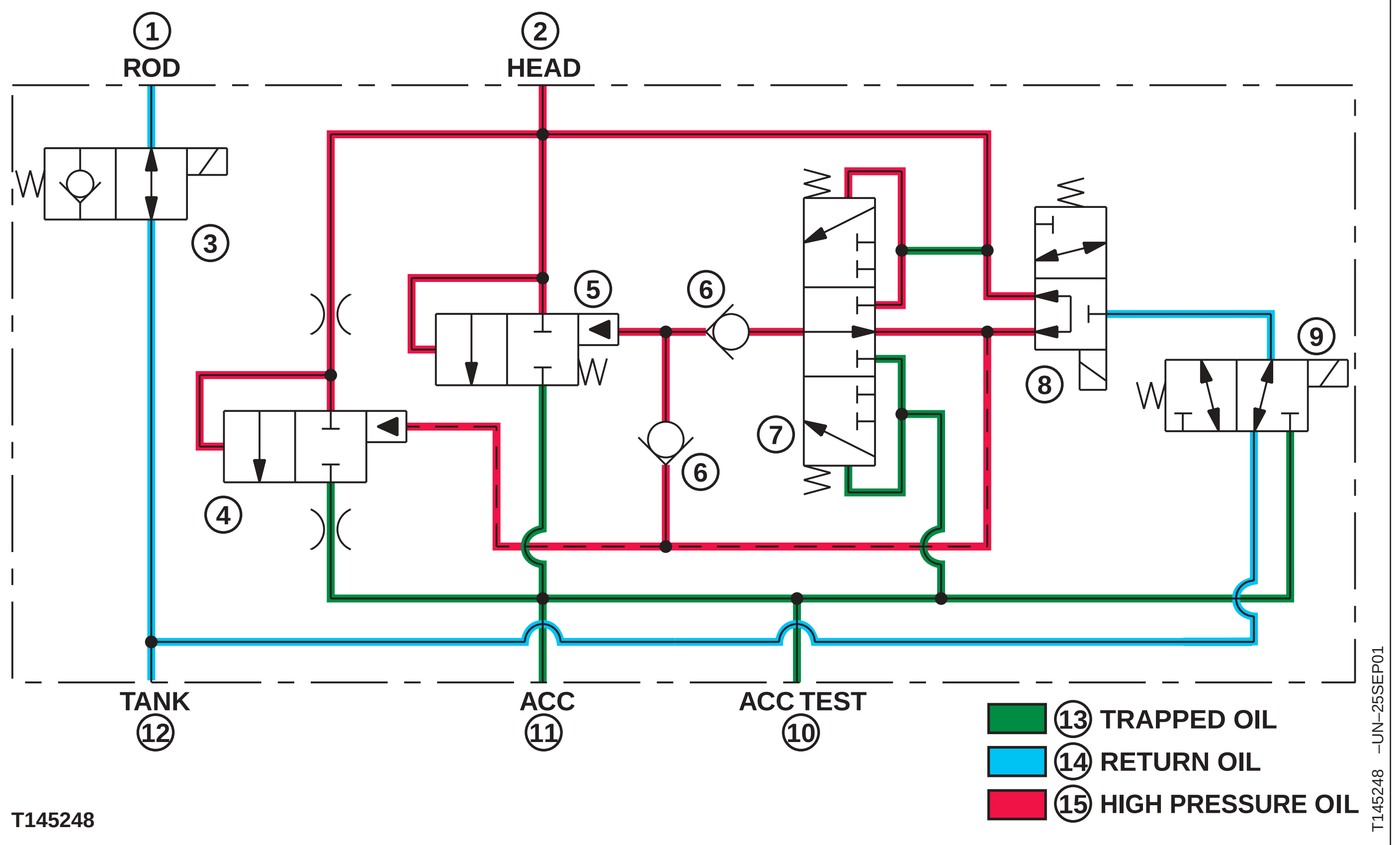
- Ride Control Valve (located inside the loader frame)
- Ride Control Accumulator
- Off/On/Automatic Switch (located on the right side console)
- Two Relays (located in the right side console on the fuse block)
- Pressure Switch located on the bucket dump pilot assembly on the loader control valve
- Chassis Control Unit (CCU)

A accumulator test port (diagnostic coupler) (10) is provided on the ride control valve for service.

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

TX04577,0000425 –19–04SEP03–2/2

Ride Control Operation—In The "ON" Position—Bucket Dump (S.N 582303 —)



T145248

1—Rod Port
2—Head Port
3—Solenoid Valve (ON—OFF) (Y18)
4—Low Flow Valve
5—High Flow Valve
6—Check Valve (2 used)
7—Shuttle Valve
8—Bucket Dump Solenoid Valve (Y17)
9—Solenoid Valve (ON—OFF) (Y32)
10—Accumulator Test Port
11—Accumulator Port
12—Tank Port
13—Trapped Oil
14—Return Oil
15—High Pressure Oil

In the “On” position with the engine running, the On—Off solenoids (3 & 9) are activated. Pressure spikes from the boom cylinder head end can flow into the accumulator two ways, through the low flow valve (4)) and the high flow valve (5). This provides a smooth engagement when ride control is turned ON.

When pressure oil in the accumulator is greater than pressure in the boom cylinder head end, check valves (6) are held on there seat by accumulator pressure. Then flow is through the shuttle valve (7). When head pressure overcomes accumulator pressure the shuttle shifts to allow pilot operated low flow valve (4) and high flow valve (5) are open and allow flow to and from the accumulator (11).

In the “On” position, the boom cylinder rod end (1) is open to return. Oil is free to flow in and out of the rod end, therefore the boom cannot be powered down while ride control is on. Ride control can be left engaged during bucket loading, but may be turned "OFF" if a more rigid operation is desired.

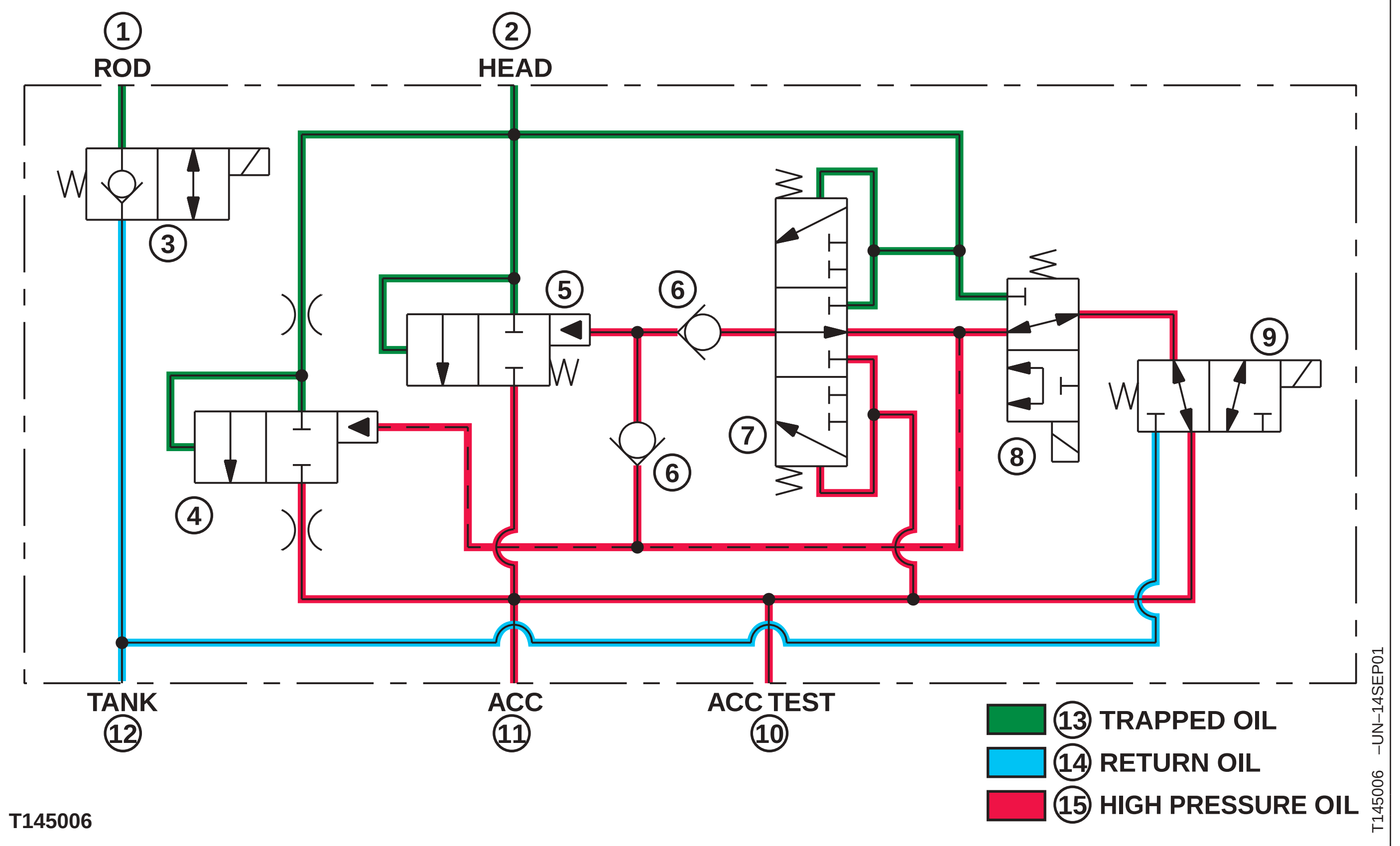
Continued on next page TX04577,0000427 –19–17JUN02–1/2

While in the “On” position, if the bucket dump function is activated, ride control will momentarily be shut off. A pressure switch in the bucket dump pilot circuit closes and powers the bucket dump solenoid (8). When this solenoid is on, oil in the boom cylinder head end can not flow into the accumulator. When the bucket is in the fully dumped position, the bucket cylinder transmits forces through the Z-Bar linkage which can cause the boom cylinders to partially retract. This is common to wheel loaders with the Z-Bar linkage. With ride control either on or off while dumping the bucket, the partial lowering of the boom cylinders is reduced.

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

TX04577,0000427 –19–17JUN02–2/2

Ride Control Operation—In The “Off” Position (S.N 582303 —)



T145006

1—Rod Port
2—Head Port
3—Solenoid Valve (ON—OFF) (Y18)
4—Low Flow Valve
5—High Flow Valve
6—Check Valve (2 used)
7—Shuttle Valve
8—Bucket Dump Solenoid Valve (Y17)
9—Solenoid Valve (ON—OFF) (Y32)
10—Accumulator Test Port
11—Accumulator Port
12—Tank Port
13—Trapped Oil
14—Return Oil
15—High Pressure Oil

In the “OFF” position the On/Off solenoids (3 & 9) are de-energized.

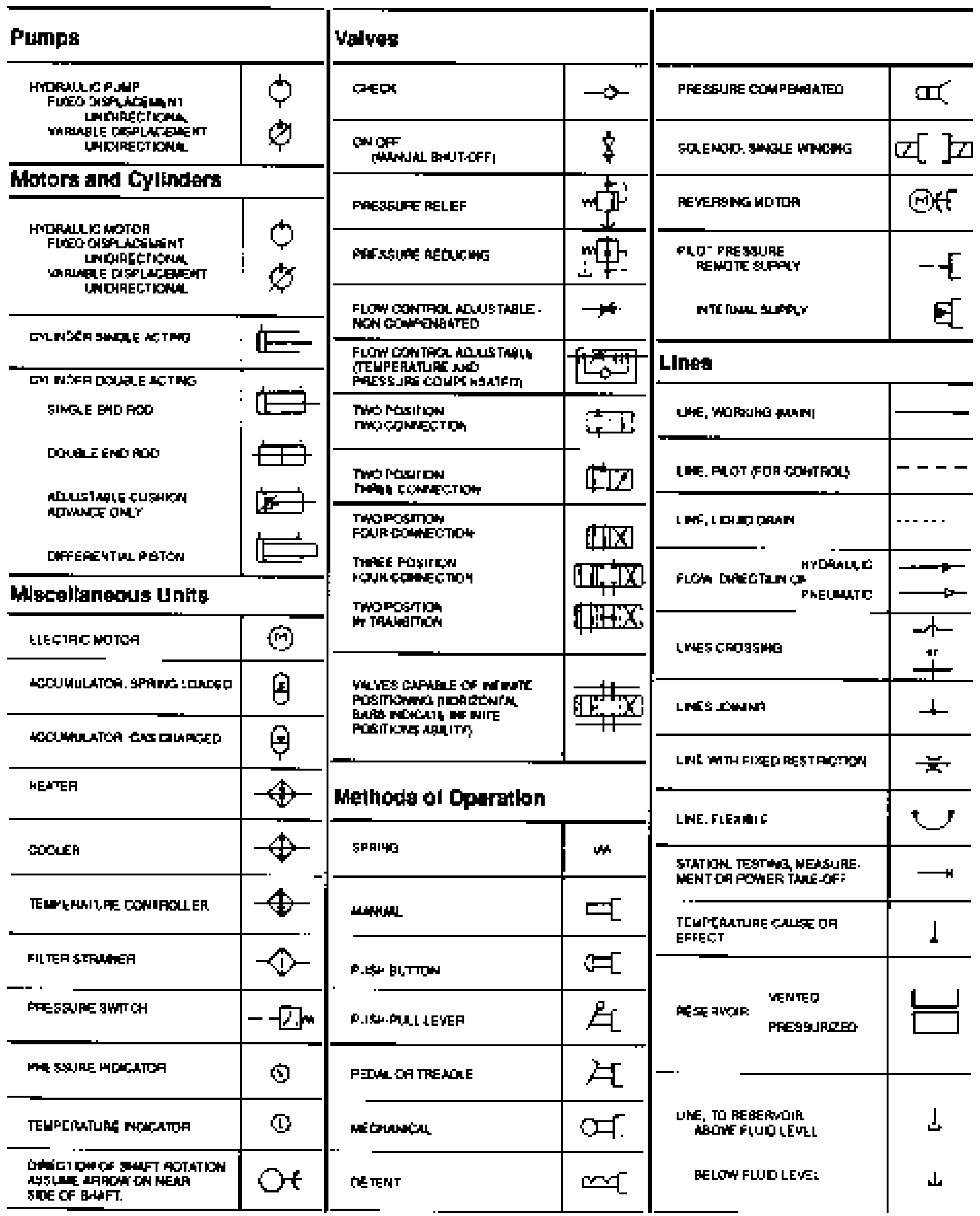
In this mode the accumulator will charge to the highest boom raise pressure. Oil flow will be through the low flow valve (4) and high flow valve (5) whenever head pressure is more than accumulator pressure. Check valves (6) will trap the oil in the pilot circuit to the high flow valve (5) from the signal received from the shuttle valve (7) that reads the highest pressure differential.

See Ride Control Circuit Theory Of Operation for electrical circuit information. (Group 9015-15.)

TX04577,0000426 –19–02OCT02–1/1

Hydraulic Circuit Symbols

These are ISO and ANSI standard hydraulic symbols for use in reading circuit diagrams.



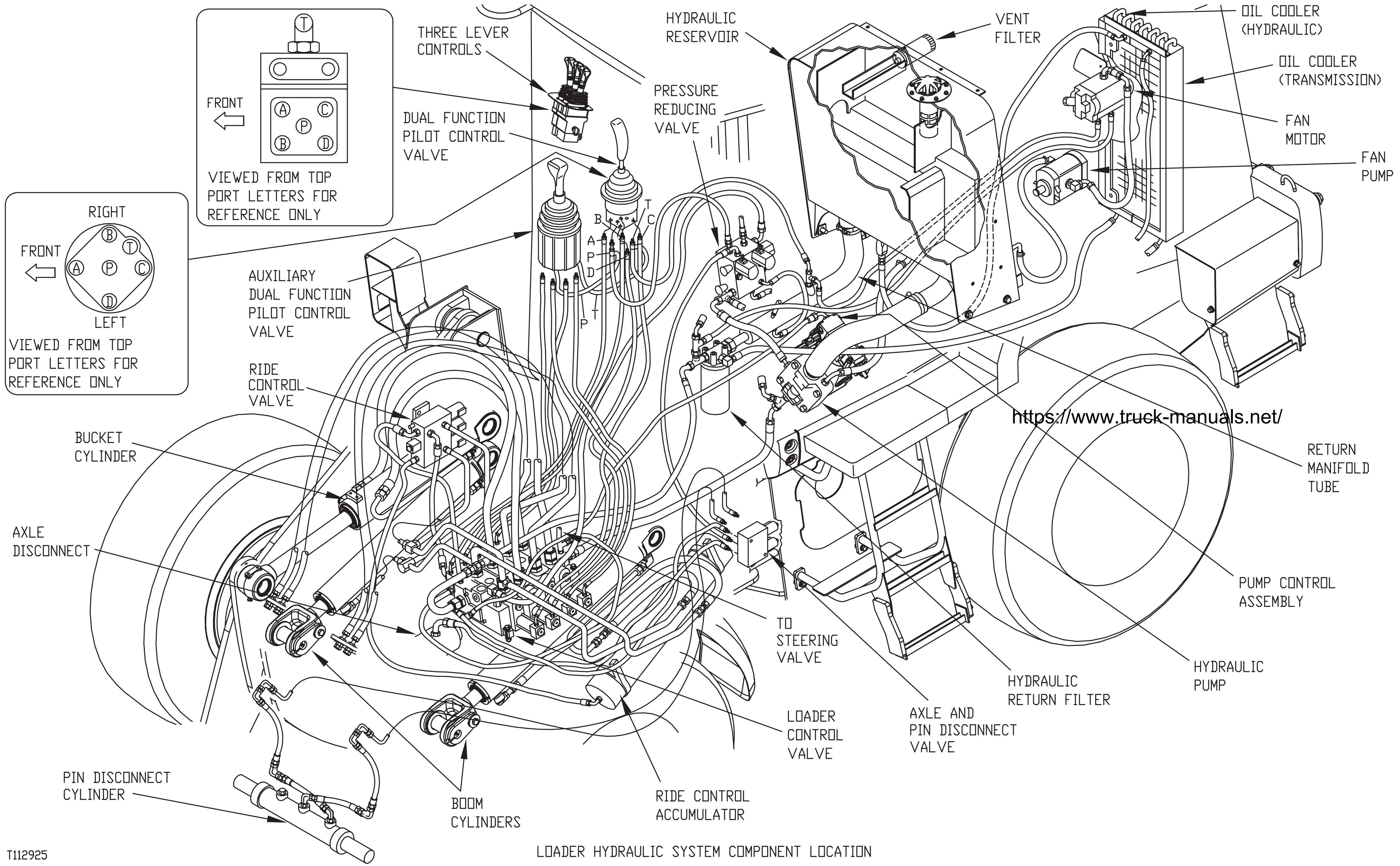
TS700 –19–28SEP89

TX,15,WW2279 –19–20AUG96–1/1

https://www.truck-manuals.net/

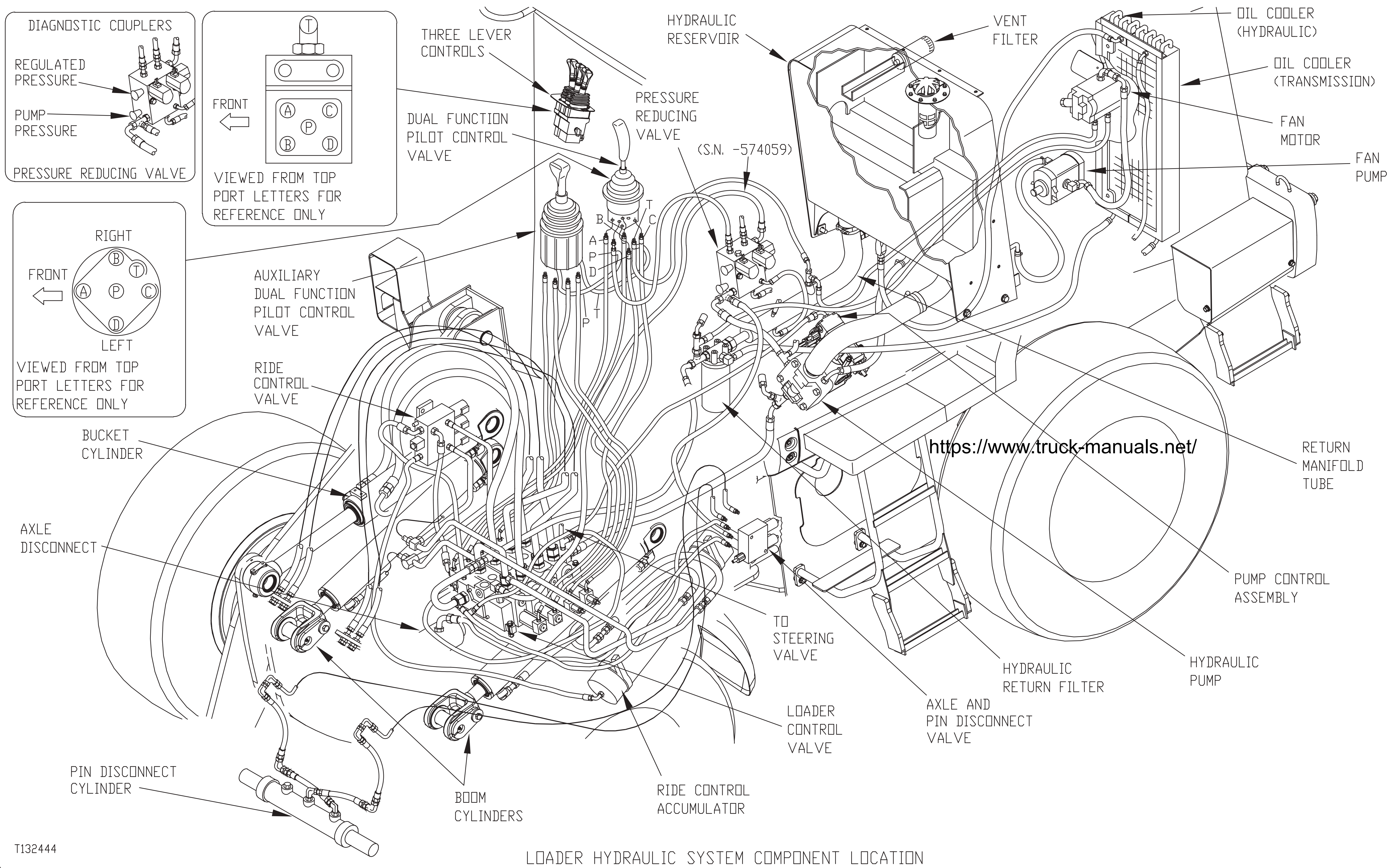
Loader Hydraulic System Component Location

T112925 –19–16MAR98



TX,9025,HH182 –19–28OCT02–1/5

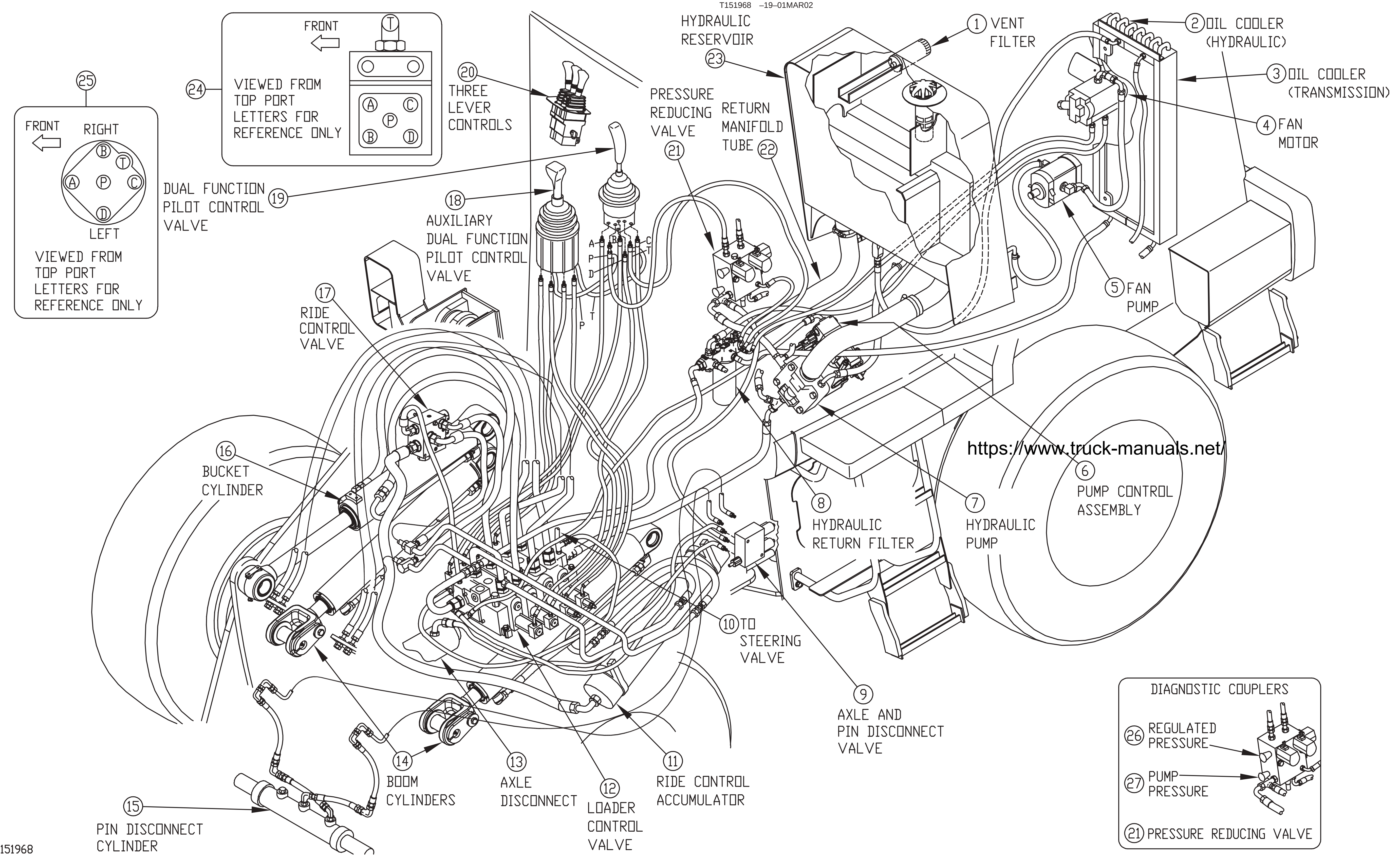
T132444 –19–21JUL00



LOADER HYDRAULIC SYSTEM COMPONENT LOCATION

TX,9025,HH182 –19–28OCT02–2/5

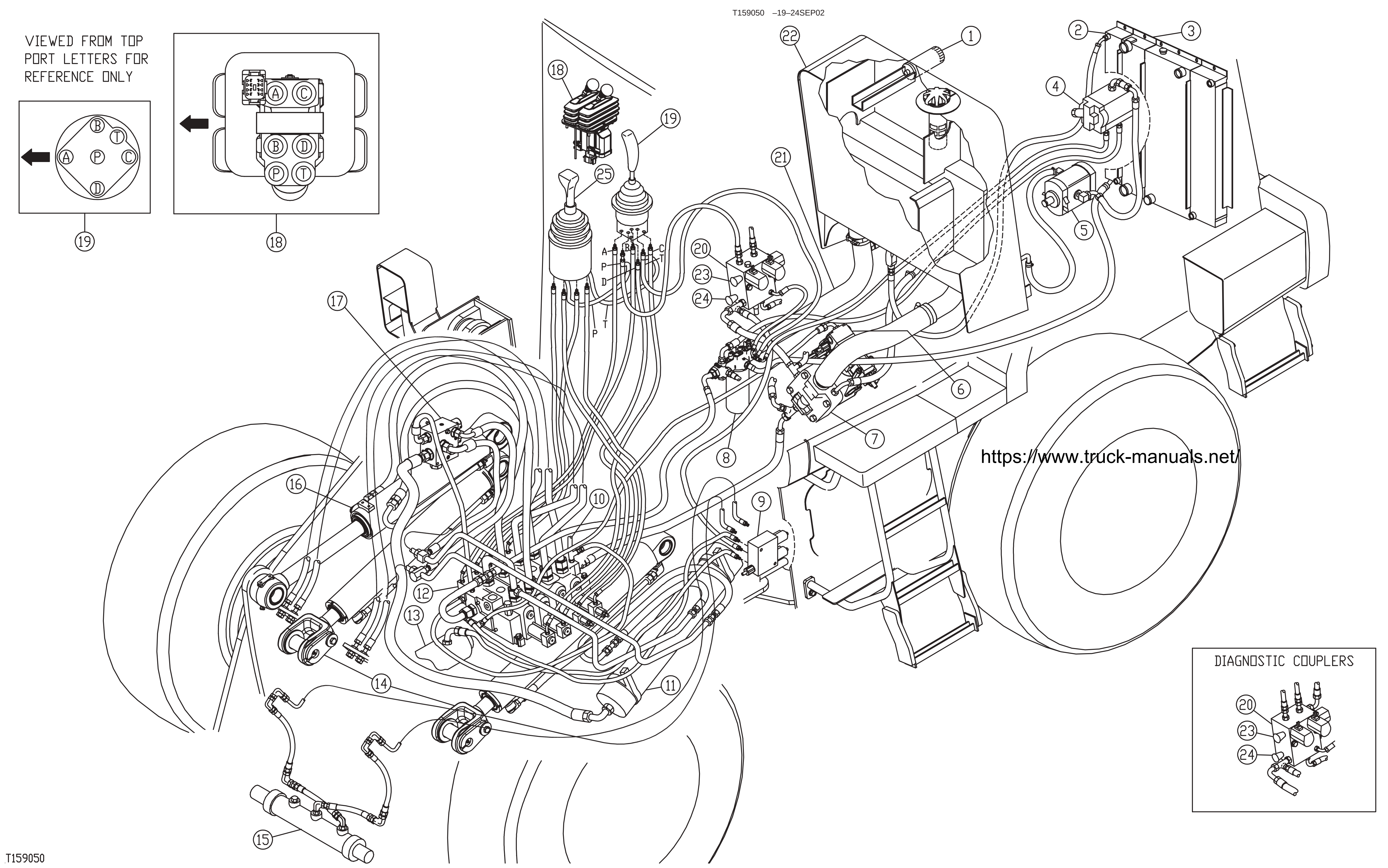
T151968 –19–01MAR02



T151968

9025
15
5

T159050 –19–24SEP02



Loader Hydraulic System (S.N. 585561—)

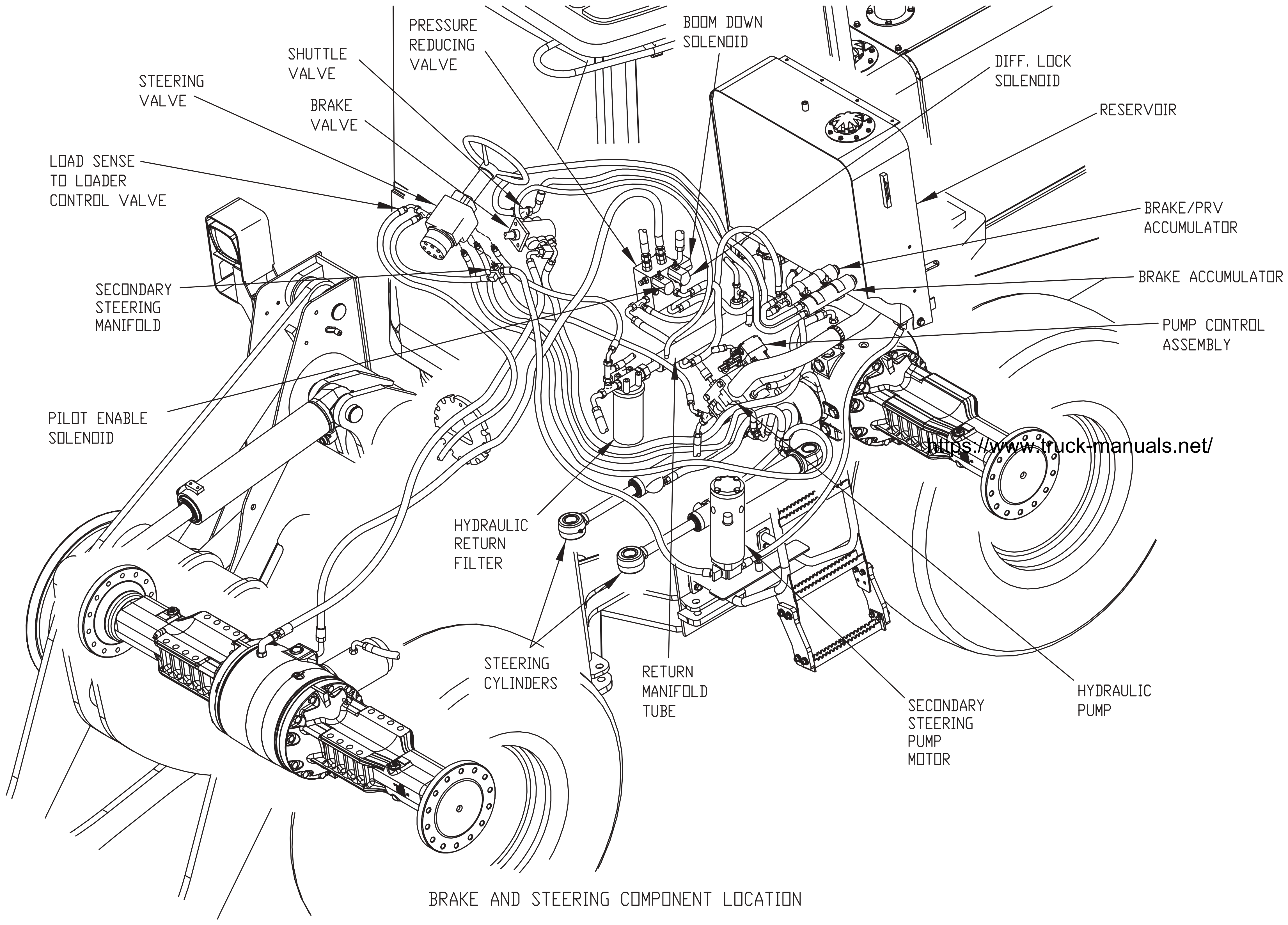
TX,9025,HH182 –19–28OCT02–4/5

1—Hydraulic Reservoir Filter Vent
2—Hydraulic Oil Cooler
3—Transmission Oil Cooler
4—Fan Motor
5—Fan Pump
6—Hydraulic Pump Control Assembly
7—Main Hydraulic Pump
8—Hydraulic Return Filter
9—Axle and Pin Disconnect Valve
10—To Steering Valve
11—Ride Control Accumulator
12—Loader Control Valve
13—Axle Disconnect
14—Boom Cylinders
15—Pin Disconnect Cylinder
16—Bucket Cylinder
17—Ride Control Valve
18—Joystick Pilot Controller
19—Dual Function Pilot Controller
20—Pressure Reducing Valve
21—Return Tube
22—Hydraulic Reservoir
23—Regulated Pressure
24—Pump Pressure
25—Auxiliary Dual Function Pilot Controller

TX,9025,HH182 –19–28OCT02–5/5

Service Brakes & Steering Hydraulic System Component Location (S.N. — 571404)

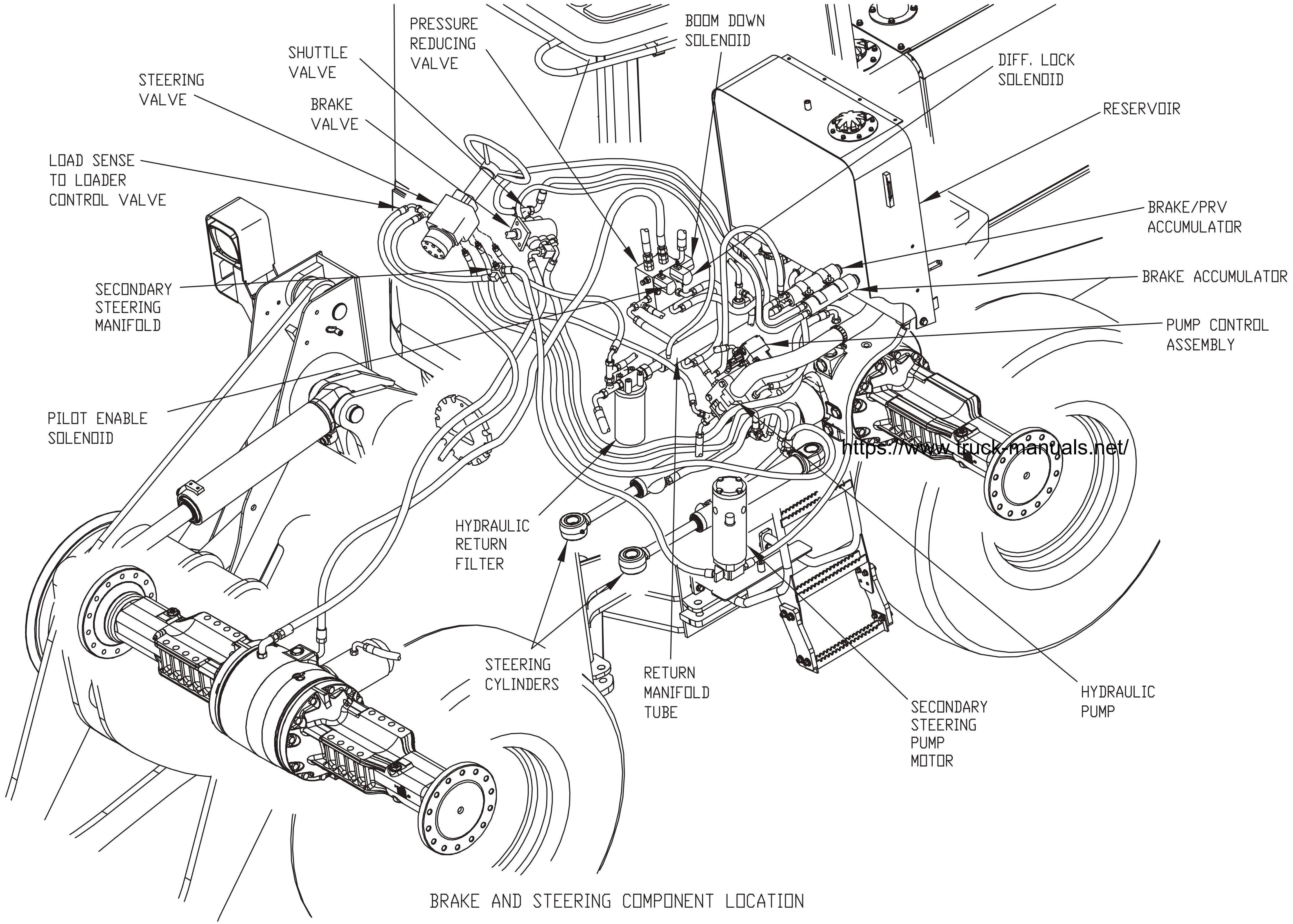
T112926 –19–16MAR98



TX,9025,HH183 –19–10JUL00–1/1

Service Brakes & Steering Hydraulic System Component Location (S.N. 571405 —)

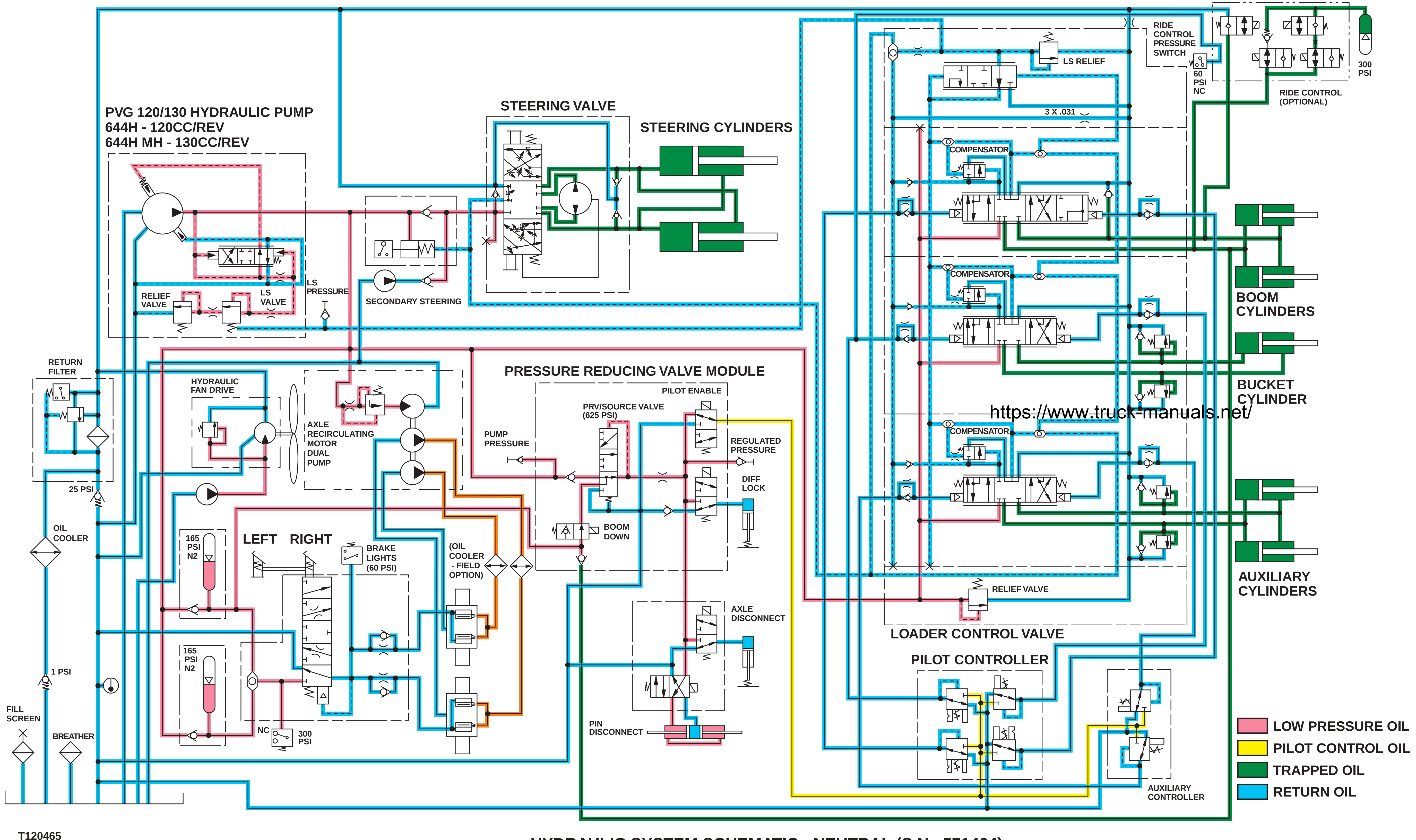
T121006 –19–07APR99



CED,TX04577,846 –19–10JUL00–1/1

Hydraulic System Schematic—Neutral

T120465 –19–29MAR99

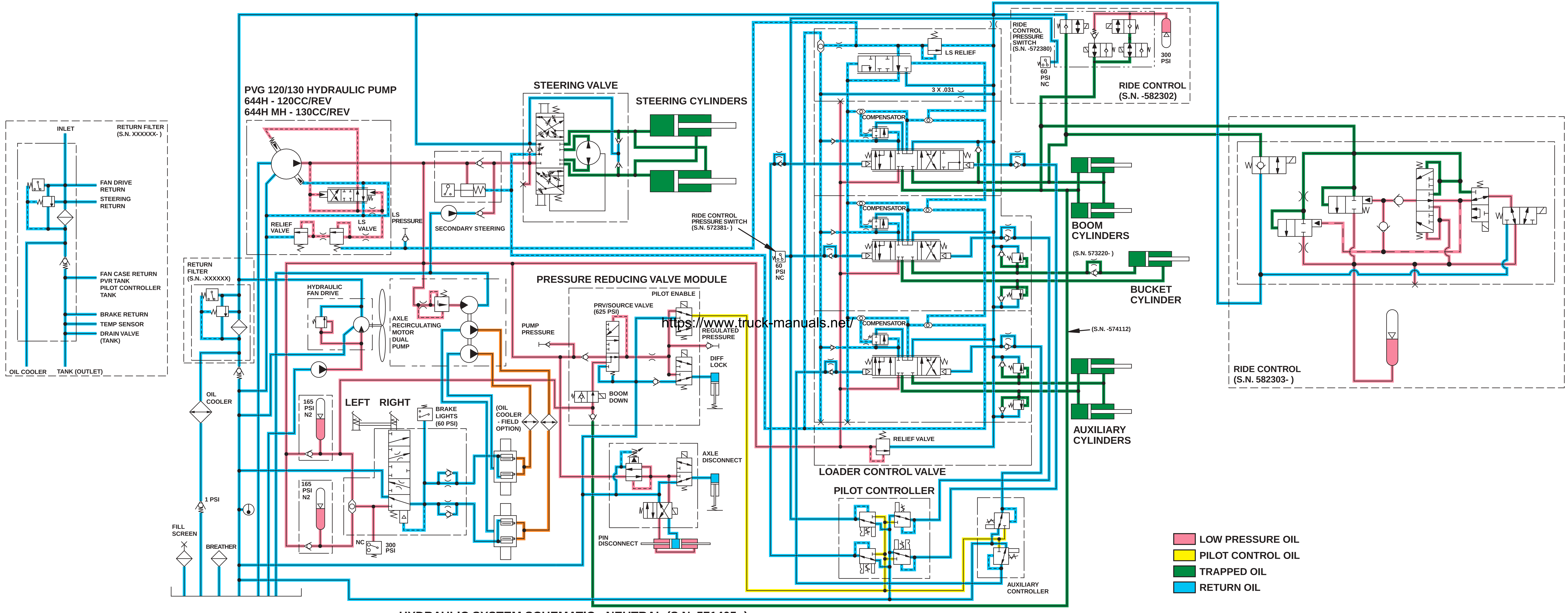


HYDRAULIC SYSTEM SCHEMATIC - NEUTRAL (S.N. -571404)

Hydraulic System Schematic—Neutral (S.N. —571404)

TX,9025,HH184 –19–06FEB02–1/2

T150571 –19–11FEB02



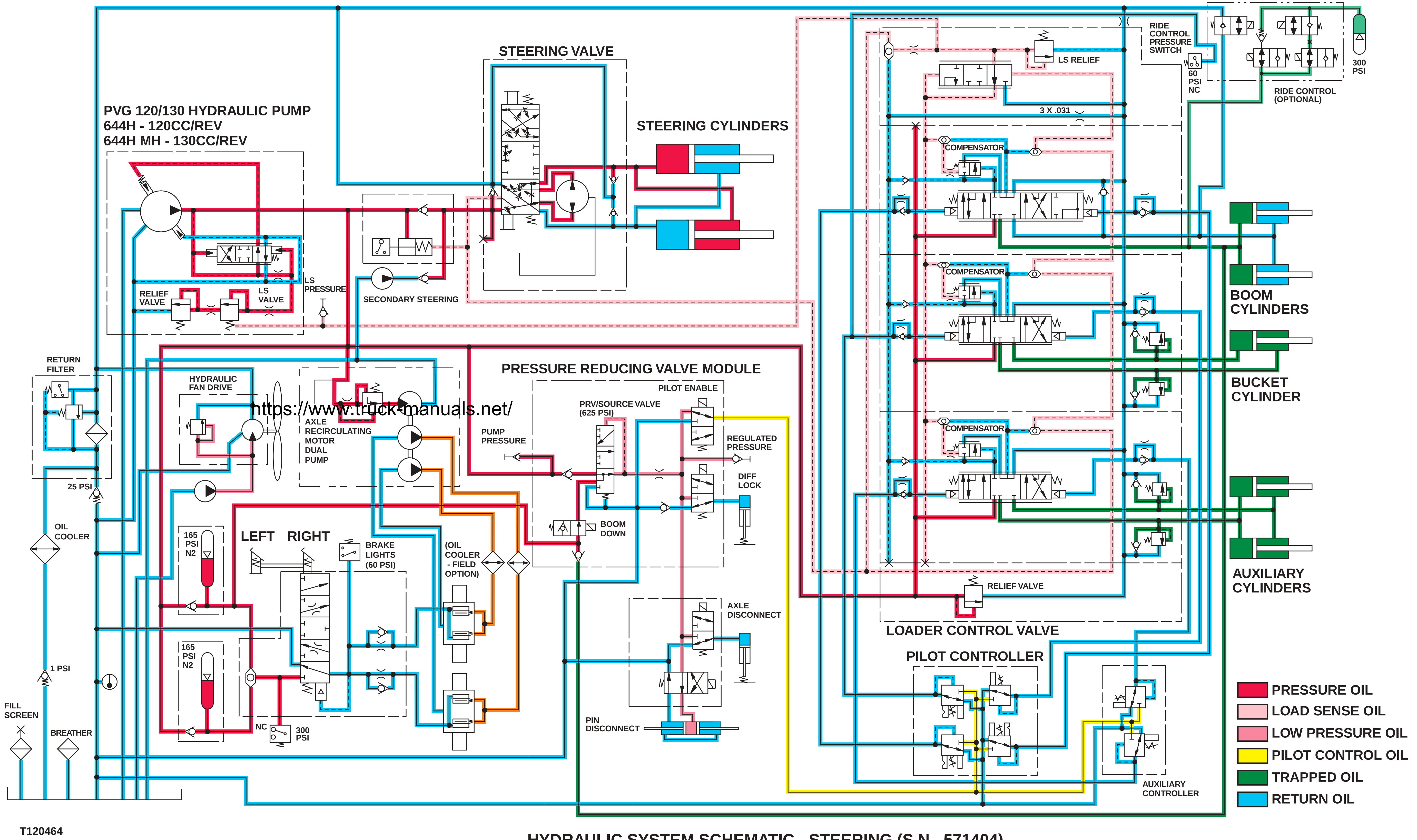
Hydraulic System Schematic—Neutral (S.N. 571405—)

See Hydraulic Circuit Symbols.

TX,9025,HH184 –19–06FEB02–2/2

Hydraulic System Schematic—Steering

T120464 –19–29MAR99

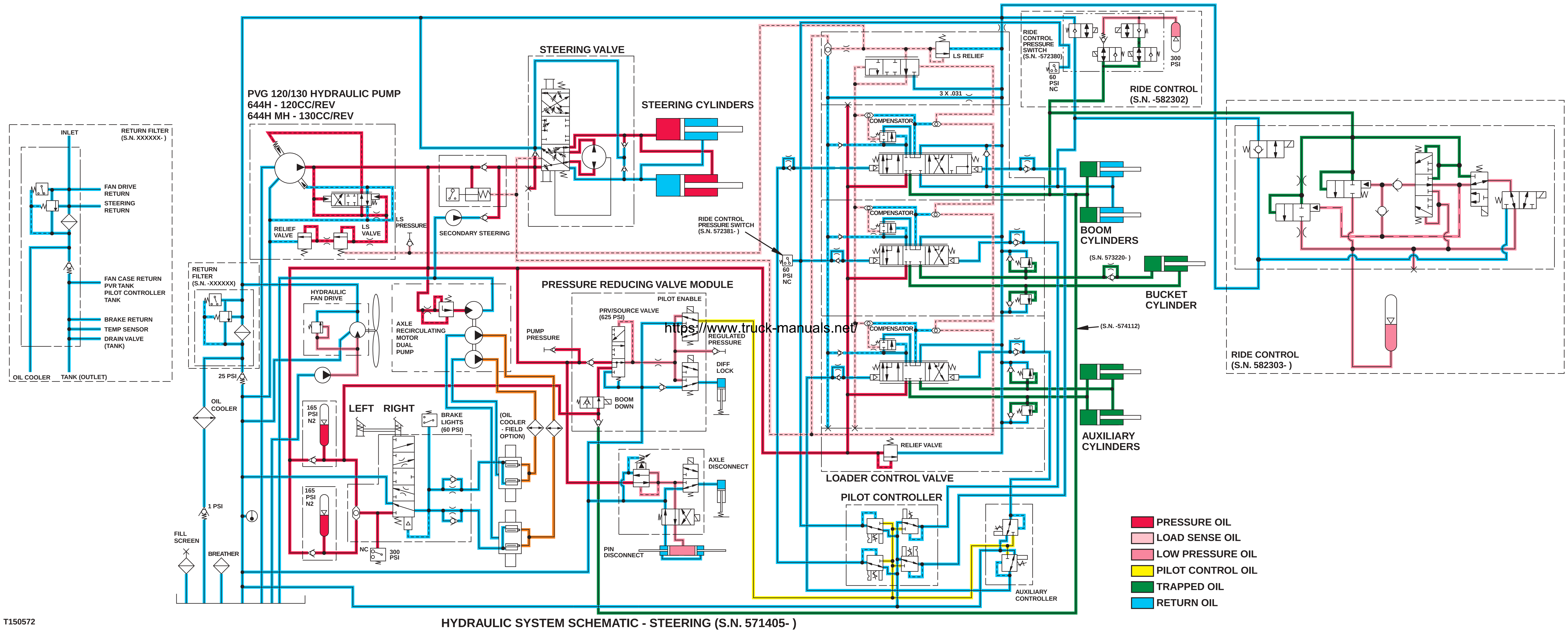


HYDRAULIC SYSTEM SCHEMATIC - STEERING (S.N. -571404)

Hydraulic System Schematic—Steering (S.N. —571404)

TX,15,SS3747 –19–06FEB02–1/2

T150572 –19–11FEB02

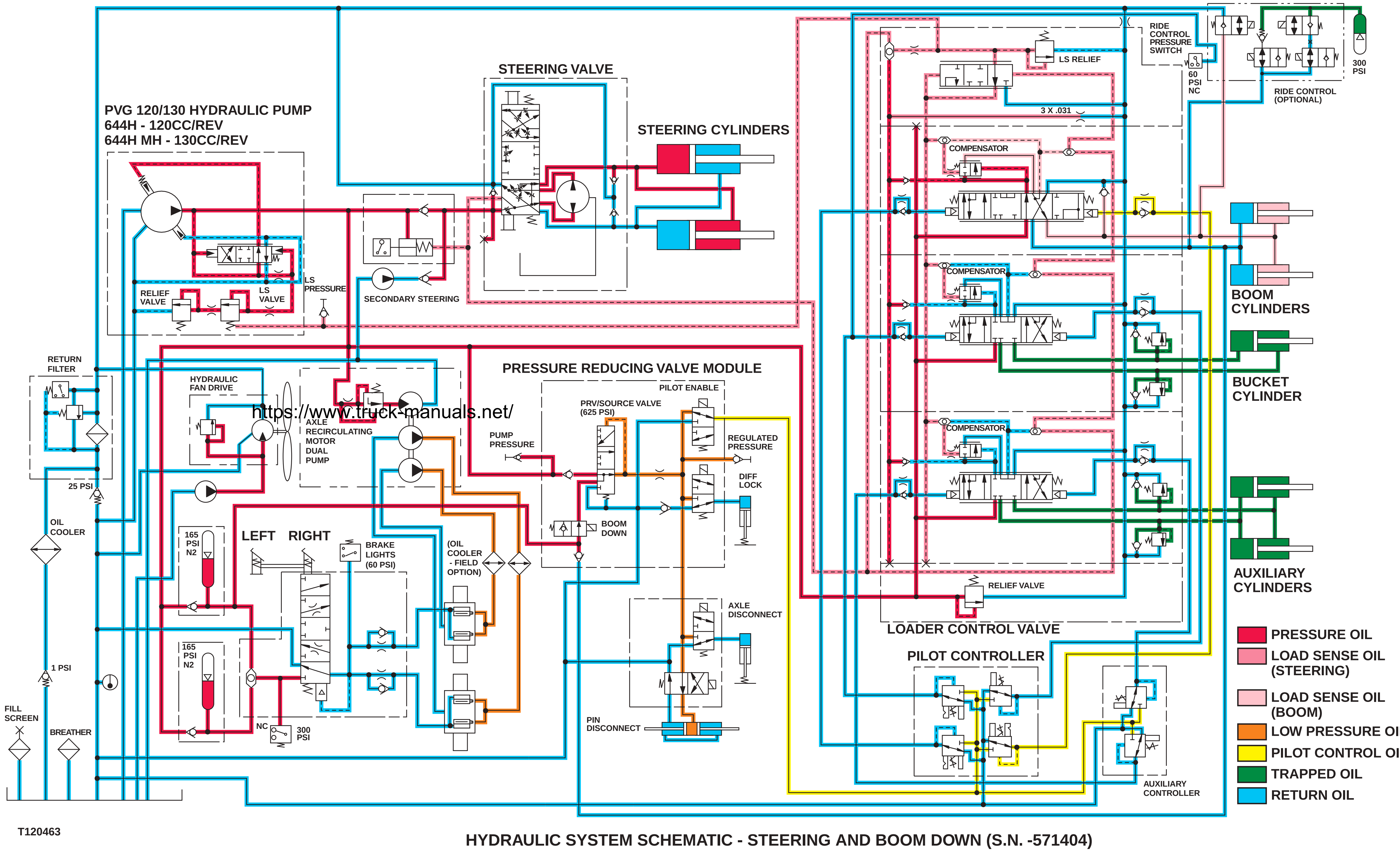


Hydraulic System Schematic—Steering (S.N. 571405—)

See Hydraulic Circuit Symbols.

Hydraulic System Schematic—Steering And Boom Down

T120463 –19–29MAR99

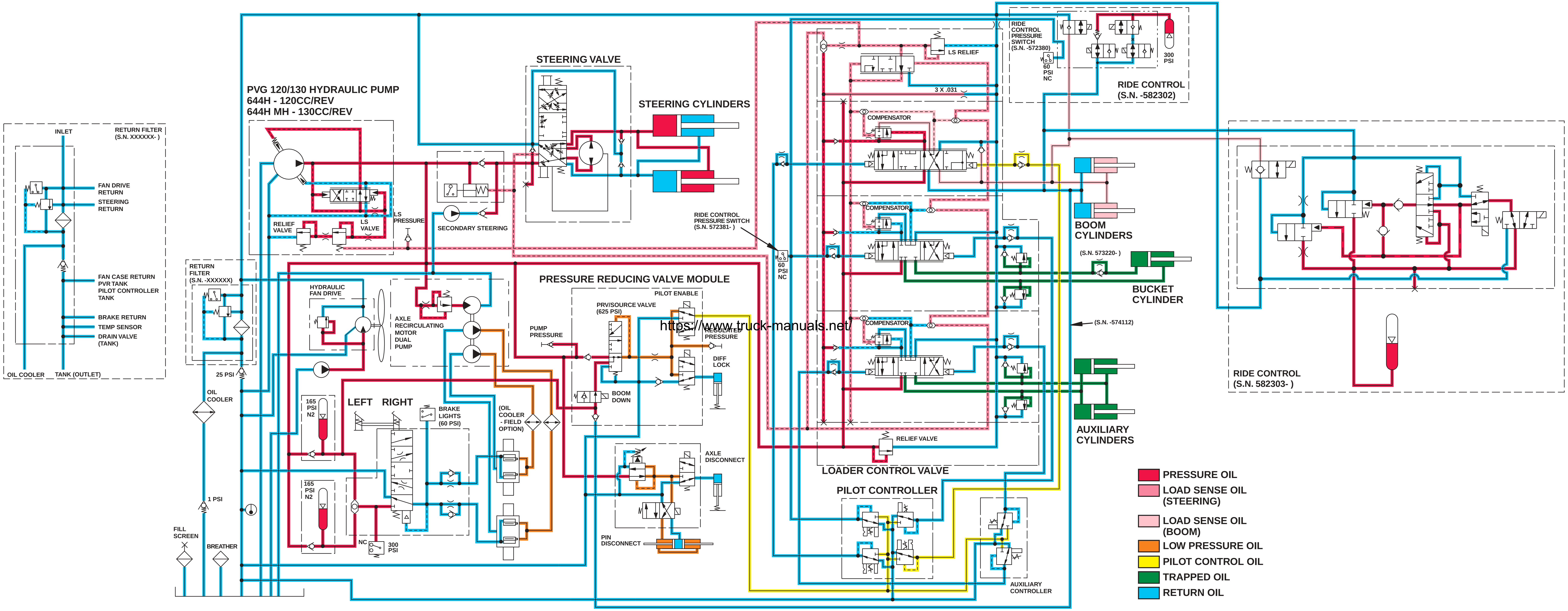


HYDRAULIC SYSTEM SCHEMATIC - STEERING AND BOOM DOWN (S.N. -571404)

Hydraulic System Schematic—Steering And Boom Down (S.N. —571404)

TX,9025,HH185 –19–06FEB02–1/2

T150573 –19–11FEB02

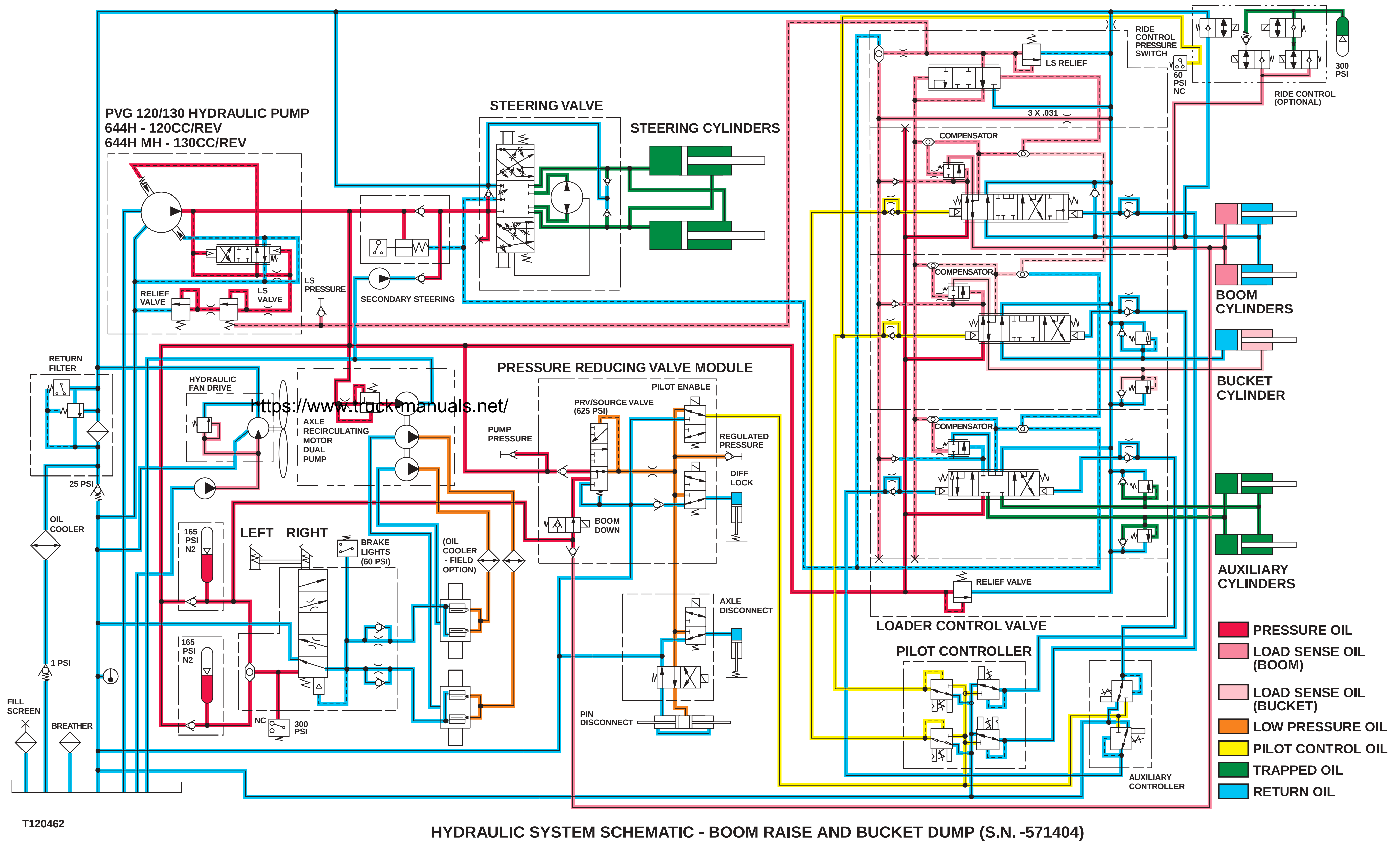


Hydraulic System Schematic—Steering And Boom Down (S.N. 571405—)

See Hydraulic Circuit Symbols.

Hydraulic System Schematic—Boom Raise And Bucket Dump

T120462 –19–29MAR99

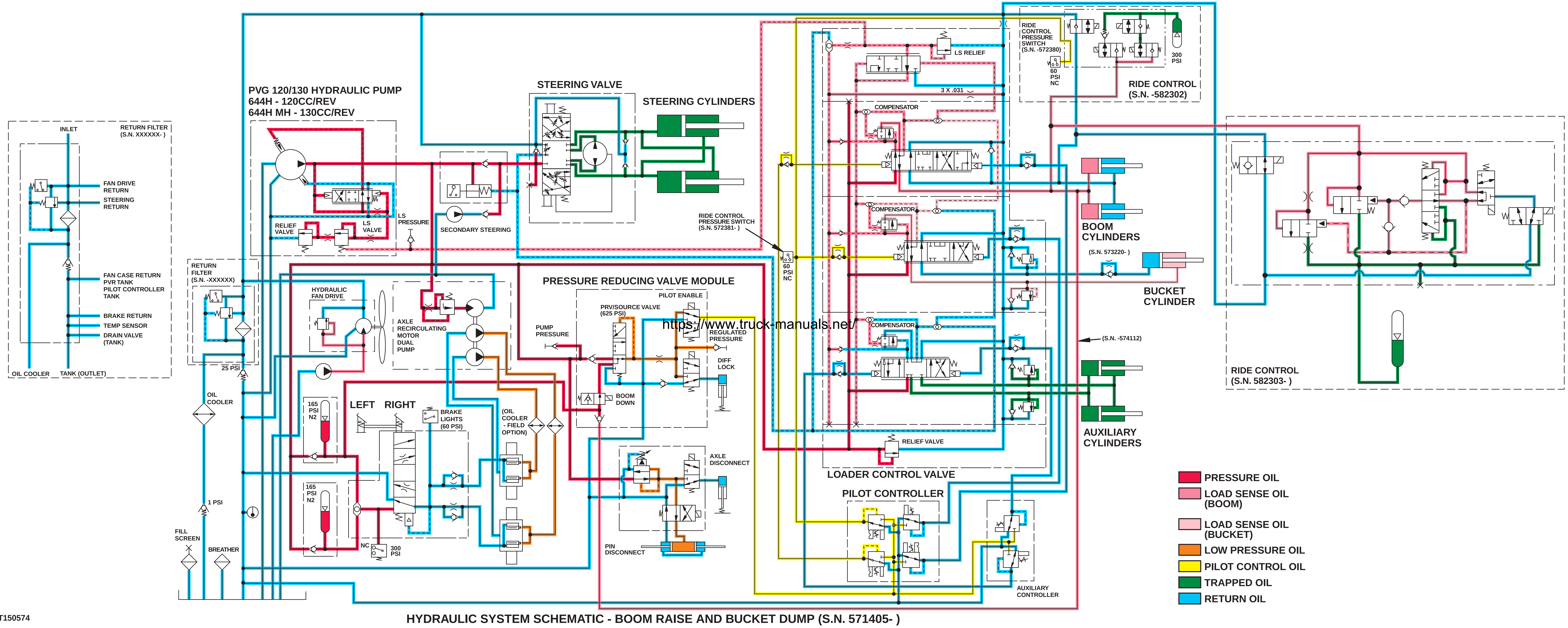


HYDRAULIC SYSTEM SCHEMATIC - BOOM RAISE AND BUCKET DUMP (S.N. -571404)

Hydraulic System Schematic—Boom Raise And Bucket Dump (S.N. —571404)

TX,15,SS3746 –19–06FEB02–1/2

T150574 –19–11FEB02



Hydraulic System Schematic—Boom Raise And Bucket Dump (S.N. 571405—)

See Hydraulic Circuit Symbols.

TX,15,SS3746 –19–06FEB02–2/2

Diagnose Loader Hydraulic System Malfunctions

NOTE: Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Components should be suspected based on observations for each situation, not necessarily the order listed below. Failure must be verified before component is repaired.

Symptom	Problem	Solution
No Hydraulic Functions	Pilot enable switch OFF	Turn switch ON
	Pilot enable switch failed	Test Pilot Enable Switch. See System Functional Schematic, section SE25 for terminal information. See Group 9015-10.
	Faulty or misadjusted pressure reducing valve	See Pressure Reducing Valve Pressure Test in Group 9025-25.
	Faulty or misadjusted load sense valve	See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test in Group 9025-25.
	Faulty or misadjusted hydraulic pump control relief valve	See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test in Group 9025-25.
	Pressure compensator valve stuck or damaged	Remove and inspect.See Group 9025-05. Replace if needed. See Disassemble And Assemble Hydraulic Pump Control Valve in Repair Manual, Group 3160.
	Loader relief valve faulty or misadjusted	See Loader Relief Valve Test Group 9025-25. Replace relief valve. See Disassemble And Assemble Relief Valve in Repair Manual, Group 3160.
	Hydraulic pump control failure	See Hydraulic System Maximum Pressure Test in Group 9025-25.

Continued on next page TX,15,SS3744 –19–17FEB97–1/7

Symptom	Problem	Solution
	Hydraulic pump failure	See Hydraulic Pump Case Drain Test in Group 9025-25.
Slow Hydraulic Functions	Cold oil	Warm oil up.
	Slow engine speed	See check high idle speed in Group 9010-20.
	Suction line air leak	Check for foamy oil.
	Low oil supply	Add recommended oil.
	Wrong oil viscosity	Use recommended oil.
	Relief valve	See Loader Relief And Circuit Relief Valve Pressure Test. (Group 9025-25.)
	Oil leaking past cylinders or control valve	See Loader Cylinder Drift Test and See Boom, Bucket, and Steering Cylinder Leakage Test. (Group 9025-25.)
	Load sense relief valve	Load sense relief valve may be held partially open due to contamination. Newer relief valves have a screen that may be plugged. See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test (Group 9025-25.) **Observations if load sense relief valve is root cause:** Pump load sense pressure will be below specifications.
	Pump regulator out of adjustment	See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test. (Group 9025-25.)
	Blocked or damaged line	Inspect lines.
	Faulty or misadjusted pressure reducing valve	See Pressure Reducing Valve Pressure Test. (Group 9025-25.)

Continued on next page

TX,15,SS3744 –19–17FEB97–2/7

Symptom	Problem	Solution
	Pilot control valve pressure low	See Pilot Control Valve Pressure Test. (Group 9025-25.)
	Faulty pilot control valve	See Pressure Reducing Valve Pressure Test. (Group 9025-25.)
	Binding loader control valve spool	Inspect valve.
	Leaking secondary steering secondary check valve	See Secondary Steering Manifold Block Secondary Check Valve Leakage Test. (Group 9025-25.)
	Leaking steering valve	See Steering Valve Neutral Leakage Test. (Group 9025-25.)
Noisy Hydraulic Pump	Low oil supply or wrong viscosity	Fill reservoir with recommended oil.
	Plugged or pinched suction line	Clean or replace line.
	Air in oil	Check for foamy oil. Tighten connections. Replace O-rings and/or lines.
	Loose or missing hydraulic line clamps	Tighten or replace clamps.
	Hydraulic lines in contact with frame	Inspect and repair.
	Worn or damaged pump	See Hydraulic Pump Flow Test. (Group 9025-25.)
Boom Float Function Does Not Work	Return-To-Carry switch ON	Turn switch OFF.
	Low pilot control pressure	See Pressure Reducing Valve Pressure Test. (Group 9025-25.)
	Faulty detent in controller	Test controller solenoid. Group 9015.
	Faulty pilot control valve	See Pilot Control Valve Pressure Test. Group 9025-25.
	Loader control valve spool binding in bore	Inspect and repair valve. See Disassemble And Assemble Loader Control Valve. (Repair Manual, Group 3160.)

Continued on next page

TX,15,SS3744 –19–17FEB97–3/7

Symptom	Problem	Solution
One Hydraulic Function Does Not Work	Faulty pilot control valve	See Pilot Control Valve Pressure Test. (Group 9025-25.)
	Stuck open circuit relief valve	Replace valve. See Disassemble And Assemble Bucket Circuit Relief Valve. (Repair Manual, Group 3160.)
	Anti-cavitation valve open	Inspect and repair valve. See Disassemble And Assemble Boom Valve Section. (Repair Manual, Group 3160.)
	Oil leaking past cylinder packings	See Boom, Bucket, and Steering Cylinder Leakage Test. Group 9025-25.
	Blockage in oil lines or valve	Inspect lines for damage. Disconnect and inspect lines for internal blockage.
	Loader control valve spool stuck in bore	Inspect and repair valve. See Disassemble And Assemble Loader Control Valve. (Repair Manual, Group 3160)
Low Hydraulic Power	Low relief valve setting	See Loader Relief And Circuit Relief Valve Pressure Test. (Group 9025-25)
	Pump control adjustment	See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test. (Group 9025-25)
	Low circuit relief valve setting	See Loader Relief And Circuit Relief Valve Pressure Test. (Group 9025-25)
	Faulty or misadjusted pressure reducing valve	See Pressure Reducing Valve Pressure Test. (Group 9025-25)
	Leaking relief valve	Remove and inspect valve. See Disassemble And Assemble Relief Valve. (Repair Manual, Group 3160)
	Worn hydraulic pump	See Hydraulic Pump Flow Test. (Group 9025-25)

Continued on next page

TX,15,SS3744 –19–17FEB97–4/7

Symptom	Problem	Solution
	Faulty pilot control valve	See Pilot Control Valve Pressure Test. (Group 9025-25)
Function Drifts Down	Leaking cylinders	Cap off boom cylinder to isolate if leakage is in cylinder or in circuit before doing cylinder leakage checks. See Boom, Bucket, and Steering Cylinder Leakage Test. (Group 9025-25)
	Leaking seals in circuit relief valve or valve stuck open	Inspect seals. Replace relief valve. See Disassemble And Assemble Relief Valve. (Repair Manual, Group 3160)
	Boom lower solenoid valve	Check Solenoid. See Pilot Enable/Boom Down Solenoid (Key ON) Check. (Group 9015-15)
	Pressure reducing valve	See Pressure Reducing Valve Pressure Test. (Group 9025-25.)
	Leakage in ride control circuit.	See Ride Control Check. (Group 9005-10.)
	Leaking loader control valve	Replace valve section. See Disassemble And Assemble Loader Control Valve. (Repair Manual, Group 3160.)
Boom Drifts Up	Pressure Reducing Valve check valve leakage	Inspect check valve. See Disassemble And Assemble Ride Control Valve. (Repair Manual, Group 3160.)
Boom Down Does Not Work (Engine Off)	Pilot enable/boom down switch not held down	Push and hold pilot enable/boom down switch as loader control lever is moved.
	Unswitched boom down, radio and dome light fuse failed	Replace fuse.
	Boom down solenoid failed	Replace solenoid.
	Pilot enable/boom down switch failed.	Replace switch.

Continued on next page

TX,15,SS3744 –19–17FEB97–5/7

Symptom	Problem	Solution
Oil Overheats	Low oil viscosity in hot weather	Use recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Excessive load	Reduce load.
	Cylinder Leakage	See Boom, Bucket, and Steering Cylinder Leakage Test. (Group 9025-25.)
	Incorrect loader relief or circuit relief valve setting	See Loader Relief And Circuit Relief Valve Pressure Test. (Group 9025-25.)
	Restriction in oil lines or loader valve	Inspect for dented or kinked lines.
	Leaking relief valve	Remove and inspect valve and seals. See Disassemble And Assemble Relief Valve. (Repair Manual, Group 3160.)
	Worn hydraulic pump (internal leakage)	See Hydraulic Pump Flow Test. (Group 9025-25.)
Boom or Bucket Drops Before Raising When Valve Is Activated	Compensator valve stuck open	See Control Valve Lift Check in Group 9005-10.
Hydraulic Oil Foams	Low oil level	Add recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Wrong oil	Change to recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Water in oil	Drain oil from reservoir and cylinders. Fill with recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Loose or faulty suction lines (air leak in system)	Tighten or install new lines.

Continued on next page
TX,15,SS3744 –19–17FEB97–6/7

Symptom	Problem	Solution
Pilot Control Valve Leaking	Leaking seals	Remove, inspect and replace seals. See Remove And Install Pilot Controller Valve (Two Lever Controller) or See Remove And Install Pilot Controller Valve (Single Lever Controller) in Repair Manual.
Pin Disconnect Cylinders Will Not Retract	Electrical circuit failure	Hold a screwdriver against end of pin disconnect solenoid valve and check for magnetism with switch pushed. If problem is electrical, See Differential Lock, Pin Disconnect, and Axle Disconnect Circuit Functional Schematic. (Group 9015-15.)
	Solenoid valve failure	Remove and inspect
	Cylinder binding	Inspect cylinder and adjust loads.

TX,15,SS3744 –19–17FEB97–7/7

9025
15
24

Diagnose Steering Malfunctions

Symptom	Problem	Solution

Continued on next page TX,9020,RP3330 –19–08SEP97–1/6

NOTE: Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Components should be suspected based on observations for each situation, not necessarily the order listed below. Failure must be verified before component is repaired.

No Steering Functions	Frame locking bar in place	Pin locking bar in unused position.
	Low oil level	Add recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	No load sense signal (Secondary Steering Only)	See Checking And Clearing Diagnostic Service Codes From Monitor. (Group 9005-10.) See Diagnostic Trouble Code Interpretation. (Group 9015-20.)
	Pinched steering line	Inspect and repair line.
	Steering valve malfunction	See Steering Valve Leakage Test. (Group 9025-25.)
	Hydraulic pump malfunction	Remove and inspect return filter for metal pump particles.
	Pump drive malfunction	See Hydraulic Pump Flow Test in Group 9025-25. Remove hydraulic pump and inspect drive gear. See Remove And Install Loader Hydraulic Pump in Repair Manual, Group 3160.

Continued on next page TX,9020,RP3330 –19–08SEP97–2/6

Symptom	Problem	Solution
Constant Steering To Maintain Straight Travel	Air in system	Check for foamy oil.
	Leakage in steering system	See Steering Valve Drift Test (Group 9025-25.)
		See Steering Valve Leakage Test (Group 9025-25.)
	Leaking cylinder packings	See Steering Valve Drift Test (Group 9025-25.)
		See Steering Valve Leakage Test (Group 9025-25.)
	Worn steering valve	See Steering Valve Leakage Test (Group 9025-25.)
Slow Steering Wheel Movement Will Not Cause Any Frame Movement	Leakage in steering system	See Steering Valve Leakage Test (Group 9025-25.)
	Worn steering valve	See Steering Valve Leakage Test (Group 9025-25.)
Steering Wheel Turns With No Resistance and Causes No Frame Movement	Broken steering column or splined coupling	Remove and inspect. See Remove And Install Steering Column in Repair Manual, Group 0960.
	Leakage in steering system	See Steering Valve Leakage Test (Group 9025-25.)
	Sticking steering inlet manifold primary check valve (machines with secondary steering only)	Remove and inspect. See Secondary Steering Manifold Primary Check Valve Leakage Test in Group 9025-25. Replace secondary steering inlet manifold if necessary.
	Steering valve malfunction	Remove and inspect. See Remove And Install Steering Valve in Repair Manual, Group 0960.

Continued on next page

TX,9020,RP3330 –19–08SEP97–3/6

Symptom	Problem	Solution
Erratic Steering	Air in oil	Check for foamy oil.
	Low oil level	Add recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
	Loose cylinder piston	Remove rod to inspect piston. See Disassemble Cylinder. (120 Series Hydraulic Cylinders Manual, TM-H120A, Group 01.)
	Damaged steering valve	Remove and inspect. See Remove And Install Steering Valve. (Repair Manual, Group 0960.)
Spongy or Soft Steering	Air in oil	Check for foamy oil.
	Low oil level	Add recommended oil. See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)
Free Play at Steering Wheel	Loose steering wheel nut	Tighten. See Remove And Install Steering Column in Repair Manual, Group 0960.
	Worn or damaged splines on steering column or valve	Inspect. See Remove And Install Steering Column in Repair Manual, Group 0960.
Steering Valve Binding or Steering Wheel Does Not Immediately Return to Neutral When Released	Binding in steering column or misalignment of column	Inspect. See Remove And Install Steering Column in Repair Manual, Group 0960.
	High return pressure	Check for a pinched or damaged return line.
	Contamination in steering valve	Inspect hydraulic filter for contamination. Repair cause of contamination. Flush hydraulic system.

Continued on next page

TX,9020,RP3330 –19–08SEP97–4/6

9025
15
27

Symptom	Problem	Solution
Steering Valve Locks Up	Large particles of contamination in steering valve	See Hydraulic Oil Filter Inspection Procedure. (Group 9025-25) Repair cause of contamination. Flush hydraulic system. See Hydraulic Oil Clean Up. (Group 9025-20)
	Worn or damaged steering valve	Repair or replace valve. See Remove And Install Steering Valve. (Repair Manual, Group 0960.)
Abrupt Steering Wheel Oscillation	Improperly timed gerotor gear in steering valve	Time gerotor gear. See Disassemble Steering Valve. (Repair Manual, Group 0960.)
Steering Wheel Turns By Itself	Lines connected to wrong port	Reconnect lines. See Service Brakes & Steering Hydraulic System Component Location (S.N. —571404) and See Service Brakes & Steering Hydraulic System Component Location (S.N. 571405—) in this group.
Machine Turns in Opposite Direction	Lines to cylinders connected to wrong ports at steering valve.	Connect lines to correct ports. See Service Brakes & Steering Hydraulic System Component Location (S.N. —571404) and Service Brakes & Steering Hydraulic System Component Location (S.N. 571405—) in this group.
Machine Turns When Steering Valve is in Neutral	Leakage in steering valve	See Steering Valve Leakage Test (Group 9025-25.)
Steering Wheel Kickback	Failed check valve in secondary steering manifold block	On machines without secondary steering, if both steering and loader are held bottomed at the same time and then the loader lever is released, steering wheel kickback is normal. On machines with secondary steering, a failed check valve is indicated. See Secondary Steering Primary Check Valve Leakage Test. (Group 9025-25)
Jerky Steering	LS port orifice missing	Inspect orifice.

Continued on next page

TX,9020,RP3330 –19–08SEP97–5/6

Symptom	Problem	Solution
Secondary Steering Motor Will Not Run	Electrical malfunction.	See Secondary Steering System Check. (Group 9015-20)
	Seized pump	Remove and inspect.
Secondary Steering Pump Runs But Will Not Steer Machine	Stuck open secondary steering manifold block primary check valve	See Secondary Steering Manifold Block Primary Check Valve Leakage Test. (Group 9025-25)
	Low relief valve setting	See Secondary Steering Relief Valve Pressure Test. (Group 9025-25)
	Failed pump or pump coupling	Replace.

TX,9020,RP3330 –19–08SEP97–6/6

Diagnose Hydraulic Fan Motor Malfunctions

NOTE: Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Components should be suspected based on observations for each situation, not necessarily the order listed below. Failure must be verified before component is repaired.

Symptom	Problem	Solution
Fan Speed Low (at High Idle only)	Faulty relief valve in fan motor	Inspect for contamination and seal leakage. Replace valve.
	Fan motor defective.	See Fan Motor Case Drain Test. (Group 9025-25)
Fan Speed Low (at High and Low Idle)	Fan pump defective	See Fan Pump Flow Test. (Group 9025-25)
	Faulty relief valve in fan motor	Inspect for contamination and seal leakage. Replace valve.

TX,9020,RP3330 –19–08SEP97–1/1

Diagnose Hydraulic Fan Pump Malfunctions

NOTE: *Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Components should be suspected based on observations for each situation, not necessarily the order listed below. Failure must be verified before component is repaired.*

Symptom	Problem	Solution
Fan Speed Low (at High Idle only)	Faulty relief valve in fan motor	Inspect for contamination and seal leakage. Replace valve.
	Fan motor defective.	See Fan Motor Case Drain Test. (Group 9025-25)
Fan Speed Low (at High and Low Idle)	Fan pump defective	See Fan Pump Flow Test. (Group 9025-25)
	Faulty relief valve in fan motor	Inspect for contamination and seal leakage. Replace valve.

TX,9020,RP3330 –19–08SEP97–1/1

Hydraulic Oil Clean-Up Procedure Using Portable Filter Caddy

Portable Filter Caddy. JT05746

Wash Out Reservoir

Hoses with 3/4 M NPT Ends (2) 3658 mm (12 ft) x 3/4 in. I.D. 100R1

Connect Filter Caddy

Quick Disconnect Fittings

Connect Filter Caddy

Discharge Wand. JT05750

Discharge to Reservoir Filler Hole

Connector (1-1/16 M ORB x 3/4 M NPT) JT03297

Connect Filter Caddy

Continued on next page TX,20,SS3658 –19–05AUG96–1/2

IMPORTANT: Brake system uses oil from hydraulic reservoir. Flush all lines in the brake, pilot, differential lock, and clutch cut-off system. Disassemble and clean pressure reducing valve and pilot controller. Remove and clean pilot caps from main control valve. Brake components may fail if brake system is not cleaned after hydraulic reservoir contamination.

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

NOTE: For a failure that creates a lot of debris, remove access cover from reservoir. Drain reservoir and connect filter caddy suction line to drain port. Add a minimum of 19 L (5 gal) of oil to reservoir. Operate filter caddy and wash out the reservoir.

2. Install new return filter element.

IMPORTANT: To prevent cavitation of filter caddy pump, the minimum I.D. of connector is 1/2 in.

9025
20
2

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

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

5. Start the filter caddy. Check to be sure oil is flowing through the filters.

   Operate filter caddy approximately 15 minutes so oil in reservoir is circulated through filter a minimum of four times.

   Leave filter caddy operating for the next steps.

NOTE: Filtering time for reservoir is 0.089 minute x number of liters (0.33 minute x number of gallons). Reservoir capacity is 159 L (42 gal).

6. Start the engine and run it at high idle.

IMPORTANT: For the most effective results, cleaning procedure must start with the smallest capacity circuit then proceed to the next largest capacity circuit.

7. Operate all functions, one at a time, through a complete cycle in the following order: auxiliary, steering, bucket, and boom.

   Repeat procedure until the total system capacity has circulated through filter caddy seven times, approximately 30 minutes. Each function must go through a minimum of three complete cycles for a thorough cleaning of oil.

NOTE: Filtering time for complete hydraulic system is 0.158 minute x number of liters (0.6 minute x number of gallons). Complete hydraulic system capacity is approximately 256 L (67 gal). Filtering time for machines with auxiliary hydraulic functions must be increased because system capacity is larger.

8. Stop the engine. Remove the filter caddy.

9. Install new return filter elements.

10. Check oil level in reservoir; add oil if necessary.See Transmission, Hydraulic System, Park Brake, And Differential Oil. (Operator's Manual Group 45)

TX,20,SS3658 –19–05AUG96–2/2

Hydraulic Pump—Stroke Limiter Adjustment

SPECIFICATIONS	
Stroke Limiter Adjustment	1 Turn (644H 120cc/rev)

NOTE: 644H MH uses 130 cc/rev displacement hydraulic pump. 644H uses 120 cc/rev displacement hydraulic pump.

IMPORTANT: Maximum theoretical pump displacement is 130 cc/rev. Pump displacement after adjustment is 120 cc/rev. Turning the adjusting screw one turn changes pump displacement by approximately 10%. Adjustment other than as specified will reduce machine productivity or economy.

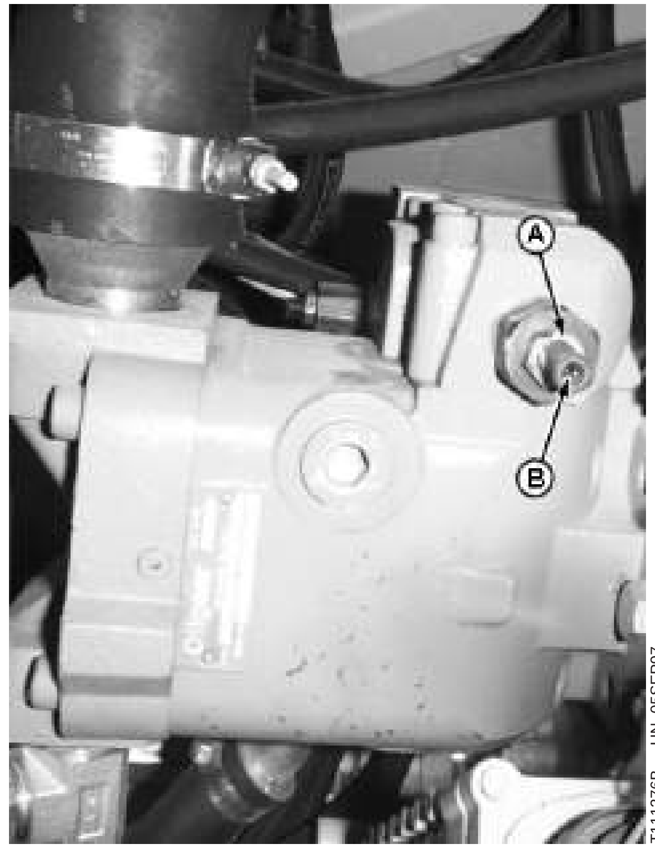
1. Loosen lock nut (A) and turn adjusting screw (B) counter clockwise until no resistance is felt.

2. Turn adjusting screw (B) clockwise until it just contacts internal control piston. Then turn adjusting screw IN an additional 3.5 turns.

Specification

644H (120 cc/rev) - Stroke Limiter—Adjustment .... 1 Turn (644H 120 cc/rev)

3. Tighten lock nut (A).



T112776B –UN–05SEP97

A—Lock Nut
B—Adjusting Screw

CED,TX04577,518 –19–01APR98–1/1

Pilot Controller Adjustment (Two Lever) (S.N. 585561—)

1. Turn engine off.

2. Lift up pilot controller boot.

Continued on next page

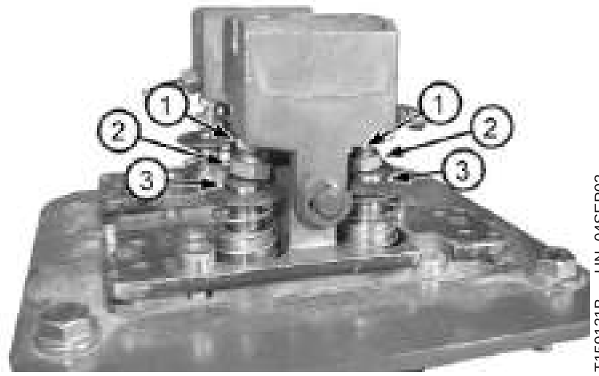
LS10960,0000026 –19–12AUG02–1/2

3. Turn adjustment screws (2) up to lock nuts (1).

4. Back off each adjustment screw an equal number of turns, until contact is made with push pins (3).

5. Check adjustment. Make sure levers have no play and are straight.

6. Pull boot down over levers.



1—Lock nut
2—Adjustment screws
3—Push pin

LS10960,0000026 –19–12AUG02–2/2

Auxiliary Valve Section—Stroke Adjustment (If Equipped)

NOTE: The auxiliary sections (3rd and 4th) of the loader control valve (S.N. 569075—) are equipped with spool stroke adjusters in each end cap. Earlier models can add stroke adjusters for auxiliary valve sections by ordering through parts system. The adjusters allow the maximum auxiliary section flow to be set anywhere from a few gallons per minute (gpm) to full pump flow. This is done by limiting spool travel in the valve section and in turn limiting flow. They are set at full flow at the factory.

1. Release hydraulic oil pressure from system.

2. Install flow meter in implement circuit to be tested to check flow

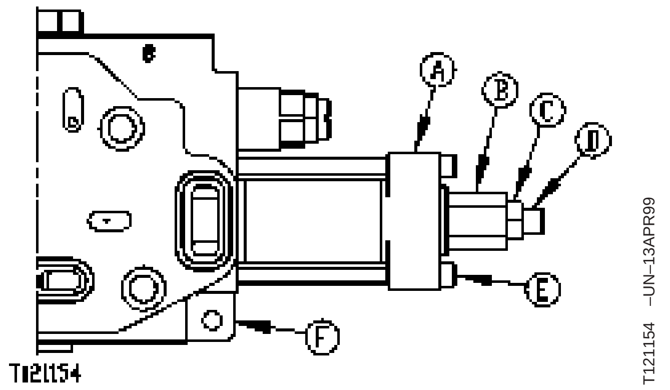
3.

Specification

Hydraulic Oil—Temperature	50 ± 6°C (120 ± 10°F)

Heat oil to specifications. See Hydraulic Oil Warm-up Procedure in this group.

4. Loosen hex nut (C) and adjust set screw (D) in the end cap of the auxiliary valve section of main control valve. Adjust flow to specification for implement desired.



A—End Cap
B—Cartridge
C—Hex Nut
D—Set Screw
E—Cap Screw
F—Auxiliary Valve Section

CED,TX04577,847 –19–12APR99–1/1

9025
20
5

Ride Control Accumulator Hydraulic Discharge

SPECIFICATIONS	
Hydraulic Oil Temperature	38°C (100°F)

SERVICE EQUIPMENT AND TOOLS
JT02156A Service Guard Digital Pressure And Temperature Metering Kit

CAUTION: Hydraulic oil may escape at pressure high enough to penetrate skin from components in the Ride Control solenoid circuit if components are removed without discharging this accumulator. Hydraulic oil in accumulator can be stored at pressures equal to or above system relief pressures.

This test will make sure there is no hydraulic pressure left in the ride control accumulator prior to charging accumulator.

1. Heat hydraulic oil to specification. See Hydraulic Oil Warm-Up Procedure in this group.

2. Stop engine.

3. Turn key switch on.

CAUTION: Boom will jump upward during this check. Make sure area around boom and bucket is clear.

4. Cycle ride control switch from off to on.

5. Hold boom enable switch and move control lever to boom float position for 20 seconds.

Continued on next page LS10960,00000B4 –19–24JAN03–1/2

IMPORTANT: Use a 345 bar (5000 psi) transducer.

6. Connect pressure gauge to test port.

7. Start engine.

8. Raise boom and hold over relief for 10 seconds.

9. Lower boom to ground.

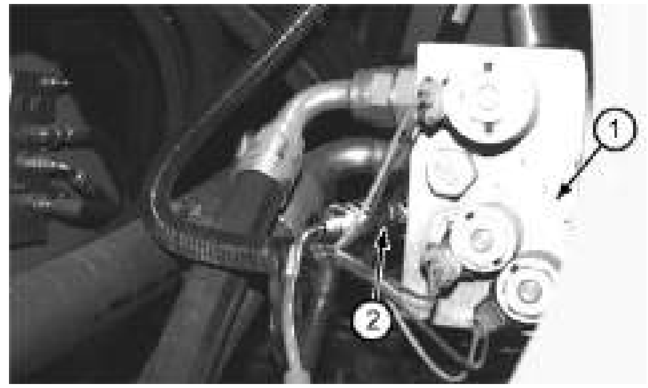
10. Turn off engine.

11. Turn key switch on.

CAUTION: Boom will jump upward during this check. Make sure area around boom and bucket is clear.

12. Cycle ride control switch to the off position than back to the on position.

13. Hold boom enable switch and move control lever to the boom float position until digital pressure gauge reads zero.



Ride Control Valve

1—Ride Control Valve
2—Test port with digital pressure gauge attached

LS10960,00000B4 –19–24JAN03–2/2

Charge Ride Control Accumulator

SPECIFICATIONS	
Hydraulic Oil Temperature	40°C (104°F)
Charge Ride Control Accumulator Charge Pressure	2068 ± 138 kPa (20 ± 1 bar) (300 ± 20 psi)

SERVICE EQUIPMENT AND TOOLS
JT01735 Gas Cock

Continued on next page CED,TX13067,61 –19–05AUG96–1/3

9025 20 7

CAUTION: Hydraulic oil may escape at pressure high enough to penetrate skin from components in the Ride Control solenoid circuit if components are removed without discharging this accumulator. Hydraulic oil in accumulator can be stored at pressures equal to or above system relief pressures. See Ride Control Accumulator Hydraulic Discharge. (Group 9025-20.)

1. Warm hydraulic oil to specification.

Specification

Hydraulic Oil—Temperature .... 40°C (104°F)

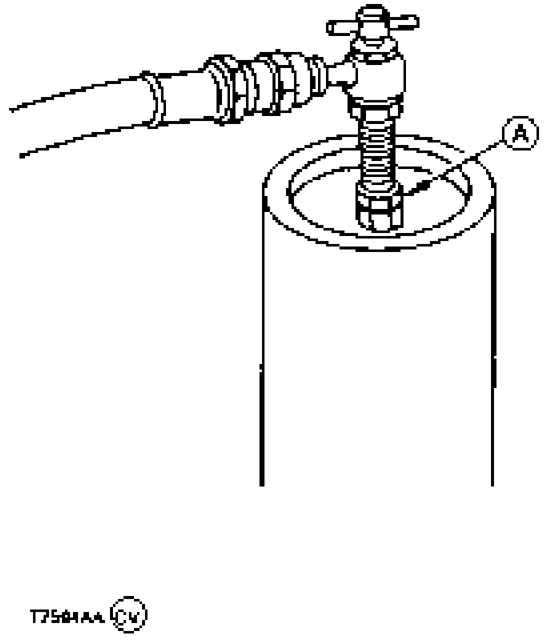
IMPORTANT: Charge accumulator using only dry nitrogen. Dry nitrogen does not mix with oil and is non-combustible. It will not cause oxidation or condensation inside accumulator and is not harmful to piston seal. DO NOT use air or any combustible gas as these can cause oxidation and condensation. Oxidation and condensation are harmful to piston seal and accumulator.

NOTE: Ride control can not be discharged if switch is in automatic position unless machine is moving above 5 kmph (3 mph), use ON position to discharge accumulator during this procedure.

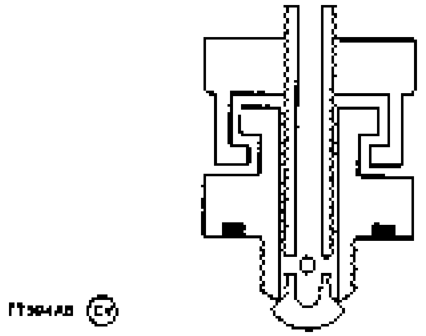
2. If accumulator is to be charged on machine and has some nitrogen pressure left. With boom raised slightly, turn ignition switch to ON position. Cycle the ride control switch from OFF to ON (center position). Boom will jump up unexpectedly if ride control accumulator is energized. Press boom enable switch and move the control lever into the float position and hold for 5 seconds.

3. Remove cover and cap from top of accumulator.

4. Turn handle on gas cock fully counterclockwise. Attach gas cock, hose, and regulator to accumulator.



T7594AA –UN–10SEP91



T7594AB –UN–10SEP91

Cross Section Of Gas Valve Fitting

A—Special Nut

Continued on next page CED,TX13067,61 –19–05AUG96–2/3

9025 20 8

CAUTION: Loosen only the top special nut. The bottom "nut" is actually the accumulator gas valve fitting. Do Not loosen bottom fitting. Loose fitting under pressure can cause injury.

5. Loosen special nut (A) (counterclockwise) 2 1/2 turns to open gas valve in accumulator. (Resistance may be felt at approximately 1 1/2 turns.)

6. Slowly open regulator valve to pressurize accumulator to specification.

7. If accumulator is to be charged on machine and has NO nitrogen pressure left. With boom raised slightly, turn ignition switch to ON position. Cycle the ride control switch from OFF to ON (center position). Boom will jump up unexpectedly if ride control accumulator is energized. Press boom enable switch and move the control lever into the float position and hold for 5 seconds.

8. Check that accumulator is pressurized to specifications. Adjust regulator as required.

Specification	
Charge Ride Control Accumulator—Charge Pressure	2068 ± 138 kPa (20 ± 1 bar) (300 ± 20 psi)

9. Tighten nut until snug to close gas valve.

10. Close the valve handle on the nitrogen tank.

11. Slowly loosen the connector at pressure regulator valve to release pressure from hose.

12. Remove gas cock from accumulator. Install cap.

CED,TX13067,61 –19–05AUG96–3/3

Hydraulic Oil Warm-Up Procedure

NOTE: Use the monitor or SERVICE ADVISOR™ system to read hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

Or access Hydraulic Oil Tests SERVICE ADVISOR system template. The temperature sensor is located in the return oil manifold tube on the reservoir. Return oil temperature is sensed.

1. To display hydraulic temperature in Basic Display window of monitor, start engine:

   a. Press MENU to get Diagnostic Mode (d) displayed Start engine.

   b. Press SELECT to get (d 01) displayed, then press NEXT until (d 06) is displayed.

SERVICE ADVISOR is a trademark of Deere & Company

TX,25,SS3763 –19–05AUG96–1/2

c. Press SELECT to get d 061 displayed to activate hydraulic system oil temperature

2. Run engine at high idle.

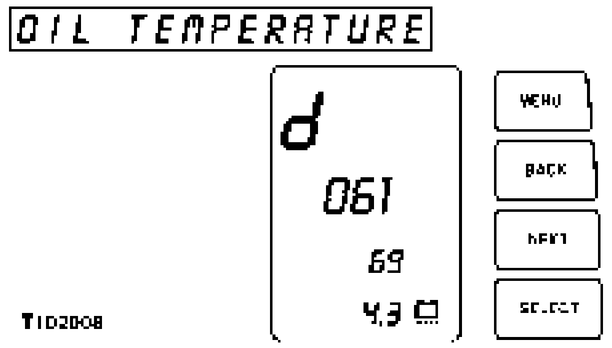
3. Hold bucket rollback lever and raise and lower the boom.

4. Periodically cycle all hydraulic functions to distribute warm oil.

5. Heat oil to test specification.

NOTE: The monitor can remain in this mode during testing and adjustment or return to normal mode.

6. Press MENU once to return to normal mode.



T102008 –19–15AUG96

TX,25,SS3763 –19–05AUG96–2/2

9025
25
1

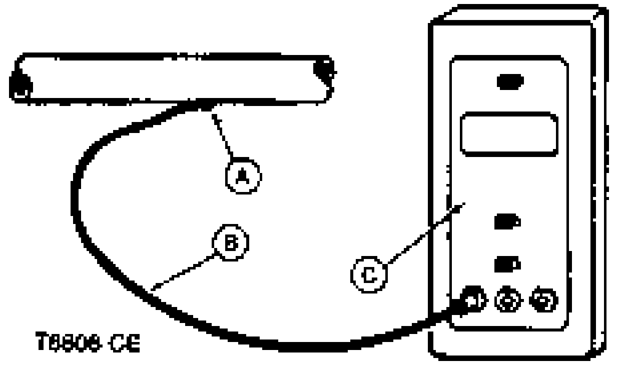
https://www.truck-manuals.net/

JT05800 Digital Thermometer Installation

SERVICE EQUIPMENT AND TOOLS
JT05800 Digital Thermometer

1. Fasten temperature probe (A) to a bare metal hydraulic line using a tie band.

2. Wrap temperature probe and line with a shop towel.



T6808CE –UN–28FEB89

A—Temperature Probe
B—Cable
C—JT05800 Digital Thermometer

CED,TX08227,2895 –19–19NOV97–1/1

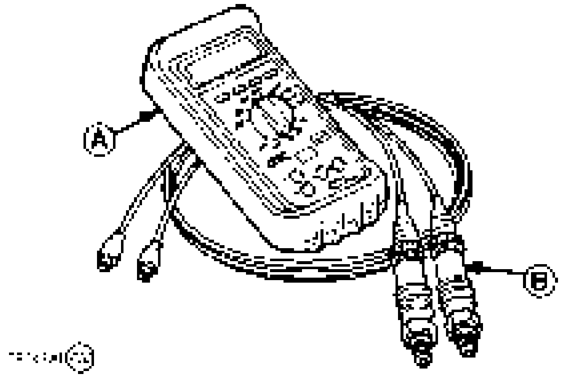
JT02156A Digital Pressure/Temperature Analyzer Installation

SERVICE EQUIPMENT AND TOOLS
JT02156A Digital Pressure/Temperature Analyzer
JT02158 Digital Pressure/Temperature Analyzer
JT02159 20 ft Cable with Couplers
JT02161 500 psi Transducer
JT02162 5000 psi Transducer
JT05969 Thermo-Coupler
312883 Carry Case
JT02160 10,000 psi Transducer (Optional, Order Separately)

Use the digital pressure/temperature analyzer (A), and transducers (B) in place of analog gauges and a separate temperature reader.

Transducers are temperature sensitive. Allow transducer to warm to system temperature. After transducer is warmed and no pressure applied, push sensor zero button for one second to set the true zero point.

When using for different pressures, turn selector to OFF for two seconds and then to the pressure range. Readings are inaccurate if proper range for transducer is not used.



T8543AI –UN–25AUG95

A—Digital Pressure/Temperature Analyzer
B—3 400 kPa (35 bar) (500 psi) Transducer
—34 000 kPa (350 bar) (5000 psi) Transducer
—70 000 kPa (700 bar) (10,000 psi Transducer

CED,TX08227,2896 –19–02JUL01–1/1

9025
25
2

Fan Pump Pressure Test

IMPORTANT: If equipped with high ambient cooling system, unplug solenoid on back side of fan motor before running test.

SPECIFICATIONS (S.N. —585560)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Fan Pump Pressure — Standard Cooling System	
Engine Speed—High idle Pressure	14480—15858 kPa (145—159 bar) (2100—2300 psi)
Engine Speed—Low Idle Pressure (Minimum)	2413 kPa (24 bar) (350 psi)
Fan Pump Pressure — High Ambient Cooling System	
Engine Speed—High idle Pressure	15858—17237 kPa (144—172 bar) 2300—2500psi)
Engine Speed—Low Idle Pressure (Minimum)	3241 kPa (32 bar) (470 psi)

SPECIFICATIONS (S.N. 585561—)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Fan Pump Pressure — Standard Cooling System	
Engine Speed—High idle Pressure	14823—16512 kPa (148—165 bar) (2150—2400 psi)
Engine Speed—Low Idle Pressure (Minimum)	3240 kPa (32 bar) (470 psi)
Fan Pump Pressure — High Ambient Cooling System	
Engine Speed—High idle Pressure	18443—19133 kPa (184—191 bar) 2675—2775 psi)
Engine Speed—Low Idle Pressure (Minimum)	1999 kPa (20 bar) (290 psi)

ESSENTIAL TOOLS
38H1031 (—8 M x —8 F x —8 M ORFS) Tee
JT03457 (7/16—20 M x —8 F ORFS) Adaptor

SERVICE EQUIPMENT AND TOOLS
20 000 kPa (200 bar) (3000 psi) Gauge

Continued on next page CED,TX04577,519 –19–02OCT02–1/3

NOTE: This test checks the hydraulic fan pump output pressure. This can also be accomplished by doing the Fan Motor RPM Test. The fan motor rpm method checks pump pressure by checking Fan Motor RPM. This is the preferred test if a digital hand held tachometer (JT05719) is available. See Fan Pump RPM Test in this Group.

1. Install frame locking bar.

2. Make test connections as shown with tee (A), adapter (B) at fan pump outlet using existing hose (C). Pump is located on left side rear of engine.

3. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

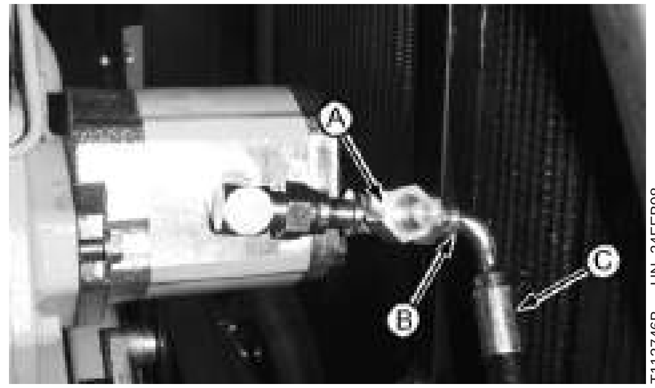
Oil—Temperature .... 65 ± 6°C (150 ± 10°F)

9025
25
4

4. Run engine at proper specification and record pressure.

Specification

Fan Pump Pressure—Standard Cooling System, Engine Speed—High Idle (S.N. —585560)—Pressure .... 14479—15858 kPa (145—159 bar) (2100—2300 psi)
Engine Speed—Slow Idle—Pressure .... 2413 kPa (24 bar) (350 psi) (Minimum)
Fan Pump Pressure—High Ambient Cooling System, Engine Speed—High Idle—Pressure .... 15858—17237 kPa (144—172 bar) (2300—2500 psi)
Engine Speed—Slow Idle—Pressure .... 3241 kPa (32 bar) (470 psi) (Minimum)



A—JT03457 Adaptor (7/16—20 M x —8 F ORFS)
B—38H1031 Tee (—8 M x —8 F x —8 M ORFS)
C—Existing Hose

Continued on next page

Specification

Fan Pump Pressure—Standard Cooling System, Engine Speed—High Idle (S.N. 585561—)—Pressure .... 14823—16512 kPa (148—165 bar) (2150—2400 psi)
Engine Speed—Slow Idle—Pressure .... 3240 kPa (32 bar) (470 psi) (Minimum)
Fan Pump Pressure—High Ambient Cooling System, Engine Speed—High Idle—Pressure .... 18443—19133 kPa (184—191 bar) (2675—2775 psi)
Engine Speed—Slow Idle—Pressure .... 1999 kPa (20 bar) (290 psi) (Minimum)

If Fan Pump Pressure Is Out Of Specification At High Idle:

IMPORTANT: If relief valve is adjusted DO NOT Exceed High Idle Pressure or Fan Motor RPM specification.

- Inspect relief valve in fan motor for contamination or seal leakage. Replace if necessary.

If Fan Pump Pressure Is Out Of Specification At Slow & High Idle:

- See Fan Pump Flow Test in this Group.
- Inspect relief valve in fan motor for contamination or seal leakage. Replace if necessary.

CED,TX04577,519 –19–02OCT02–3/3

9025
25
5

Fan Motor RPM Test

IMPORTANT: If equipped with High Ambient cooling system, unplug solenoid on back side of fan motor before running test.

NOTE: This test can be done in place of the Fan Pump Pressure Test in this Group. It will help determine if the relief valve in the motor is working properly or if the pump itself is defective.

SPECIFICATIONS (S.N. —585560)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Standard Cooling System:	
Fan Motor RPM, Engine Speed—High Idle RPM	1475 - 1525 RPM
Engine Speed—Slow Idle RPM (Minimum)	550 RPM
High Ambient Cooling System:	
Fan Motor RPM, Engine Speed—High Idle RPM	1595 - 1645 RPM
Engine Speed—Slow Idle RPM (Minimum)	620 RPM

SPECIFICATIONS (S.N. 585561—)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Standard Cooling System:	
Fan Motor RPM, Engine Speed—High Idle RPM	1400 - 1500 RPM
Engine Speed—Slow Idle RPM (Minimum)	510 RPM
High Ambient Cooling System:	
Fan Motor RPM, Engine Speed—High Idle RPM	1550 - 1650 RPM
Engine Speed—Slow Idle RPM (Minimum)	475 RPM

SERVICE EQUIPMENT AND TOOLS
JT05709 Reflective Tape
JT05719 Hand Held Digital Tachometer

NOTE: This test requires two people to complete. One in operator station and other to hold the digital held tachometer for reading the fan speed.

1. Place piece of reflective tape on fan hub.

2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

3. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this group.

Specification

Oil—Temperature .... 65 ± 6°C (150 ± 10°F)

4. Run engine at proper specification and record RPM.

Specification

Fan Motor RPM—Standard Cooling System, Engine Speed—High Idle (S.N. —585560)—RPM .... 1475 - 1525 RPM
Engine Speed—Slow Idle—RPM (Minimum)... 550 RPM
Fan Motor RPM—High Ambient Cooling System, Engine Speed—High Idle—RPM .... 1595—1645 RPM
Engine Speed—Slow Idle—RPM (Minimum)... 620 RPM

Specification

Fan Motor RPM—Standard Cooling System, Engine Speed—High Idle (S.N. 585561—)—RPM... 1400 - 1500 RPM
Engine Speed—Slow Idle—RPM (Minimum)... 510 RPM

9025
25
6

https://www.truck-manuals.net/

Continued on next page

CED,TX04577,520 –19–02OCT02–1/2

Specification

Fan Motor RPM—High Ambient Cooling System, Engine Speed—High Idle—RPM	1550 - 1650 RPM
Engine Speed—Slow Idle—RPM (Minimum)	475 RPM

If Fan RPM Is Out Of Specification At High Idle:

- Inspect relief valve in fan motor for contamination or seal leakage. Replace if necessary.

IMPORTANT: **If relief valve is adjusted DO NOT Exceed High Idle Pressure or Fan Motor RPM specification.**

If Fan RPM Is Out Of Specification At Slow Idle And High Idle:

- See Fan Pump Flow Test in this Group.
- Inspect relief valve in fan motor for contamination or seal leakage. Replace if necessary.

IMPORTANT: **If relief valve is adjusted DO NOT Exceed High Idle Pressure or Fan Motor RPM specification.**

CED,TX04577,520 –19–02OCT02–2/2

Fan Pump Flow Test

SPECIFICATIONS (S.N. —585560)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Engine Speed	High Idle
Test Pressure	16616 kPa (166 bar) (2410 psi)
Standard Cooling System: New Pump Flow (Minimum)	54.8 L/min (14.5 gpm)
Used Pump Flow (Minimum)	49.6 L/min (13.1 gpm)
High Ambient Cooling System: New Pump Flow (Minimum)	47.4 L/min (16.7 gpm)
Used Pump Flow (Minimum)	56.8 L/min (15.0 gpm)

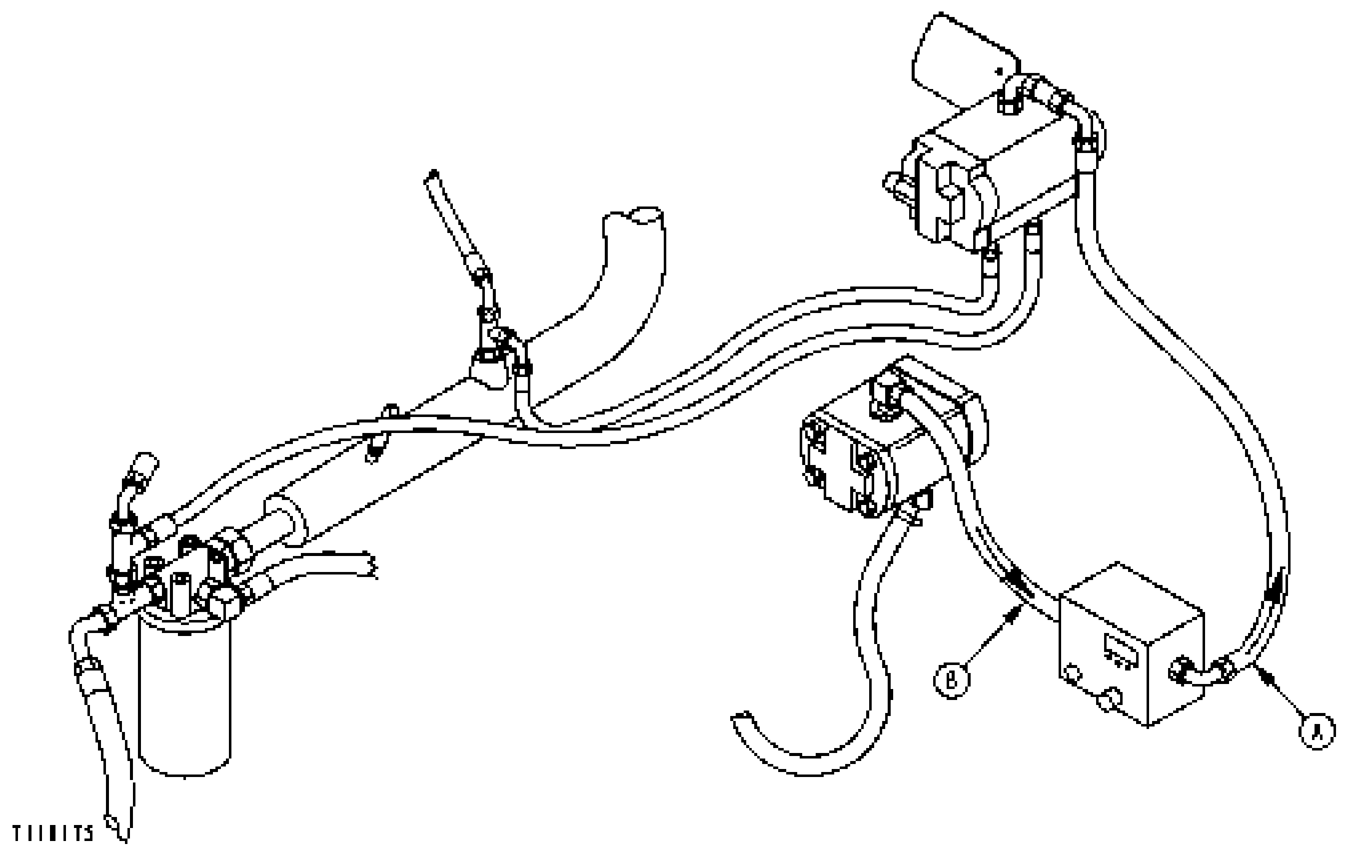
SPECIFICATIONS (S.N. 585561—)	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Engine Speed	High Idle
Test Pressure	16616 kPa (166 bar) (2410 psi)
Standard Cooling System: New Pump Flow (Minimum)	47.3 L/min (12.5 gpm)
Used Pump Flow (Minimum)	42.4 L/min (11.2 gpm)
High Ambient Cooling System: New Pump Flow (Minimum)	56.8 L/min (15 gpm)
Used Pump Flow (Minimum)	53.0 L/min (14.0 gpm)

ESSENTIAL TOOLS
—8 F ORFS Ends —8 Test Hose

SERVICE EQUIPMENT AND TOOLS
JT07148 Flow Meter

This test will determine if pump outlet flow is within proper specification.

Continued on next page CED,TX04577,521 –19–02OCT02–1/3



T111175 –UN–12SEP97

A—Existing Hose B—Test Hose

NOTE: This test is recommended only after the Fan Pump Pressure Test or Fan Motor RPM Test in this Group has been done and failed to meet specification.

1. Install frame locking bar.

2. Make test connections as shown using existing hose (A) to flow meter and test hose (B) at fan pump outlet. Pump is located on left side rear of engine.

3. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

4. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this Group.

Specification

Oil—Temperature	65 ± 6°C (150 ± 10°F)

5. Run engine at proper specification and record pump flow.

Specification

Engine—Speed	High Idle
Test—Pressure	16616 kPa (166 bar) (2410 psi)
Standard Cooling System: New (S.N. —585560)—Pump Flow (Minimum)	54.8 L/min (14.5 gpm)
Used—Pump Flow (Minimum)	49.6 L/min (13.1 gpm)

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX04577,521 –19–02OCT02–2/3

Specification

High Ambient Cooling System
New—Pump Flow (Minimum).......................... 47.4 L/min (16.7 gpm)
Used—Pump Flow (Minimum)......................... 56.8 L/min (15.0 gpm)

Specification

Engine—Speed... High Idle
Test—Pressure................................ 16616 kPa (166 bar) (2410 psi)
Standard Cooling System: New
(S.N. 585561—)—Pump Flow
(Minimum)... 47.3 L/min (12.5 gpm)
Used—Pump Flow (Minimum)......................... 42.4 L/min (11.2 gpm)

High Ambient Cooling System
New—Pump Flow (Minimum).......................... 56.8 L/min (15.0 gpm)
Used—Pump Flow (Minimum)......................... 53.0 L/min (14.0 gpm)

If Pump Flow Is Low:

- Disassemble and inspect pump.

If Pump Flow Is Ok:

- Do Fan Motor Case Drain Test in this Group.

CED,TX04577,521 –19–02OCT02–3/3

Fan Motor Case Drain Test

NOTE: This test determines if case drain leakage is within specification.

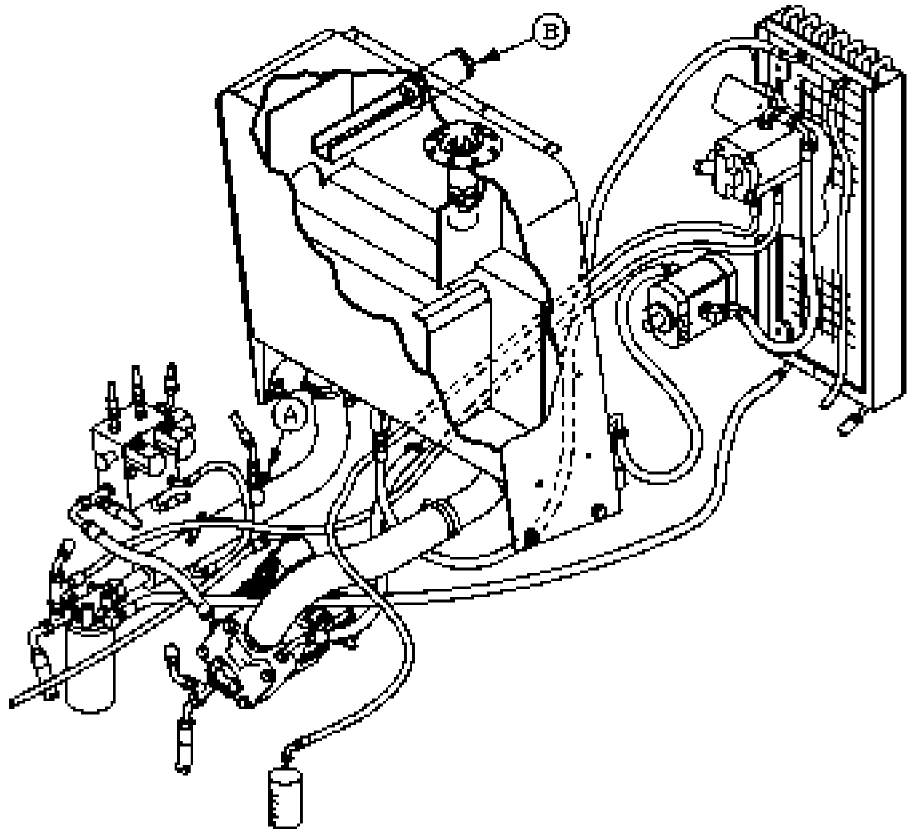
9025
25
10

SPECIFICATIONS	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Engine Speed	Slow Idle
Case Drain Leakage (maximum)	75 mL (2.5 oz) per minute

ESSENTIAL TOOLS
38H1415 Cap (—6 F ORFS)

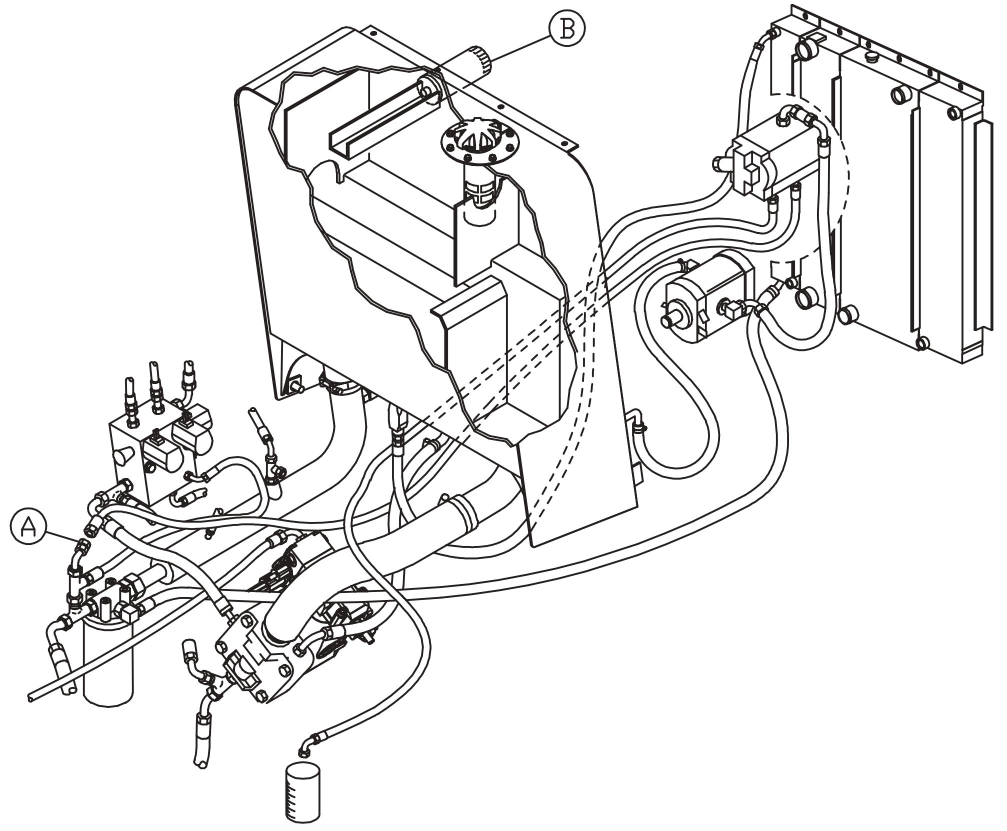
SERVICE EQUIPMENT AND TOOLS
Vacuum Pump
Measured Container Approximately Pint

Continued on next page CED,TX04577,522 –19–02OCT02–1/3



T113801

T113801 –UN–09MAR98



T156207

T156207 –UN–19JUN02

Continued on next page

CED,TX04577,522 –19–02OCT02–2/3

A—Cap

B—Hydraulic Reservoir Breather Filter

1. Install frame locking bar.

2. Remove hydraulic reservoir breather filter (B). Connect vacuum pump to the reservoir breather filter adapter (3/4 - 16 UNF male thread).

3. Remove case drain hose going to reservoir manifold. Cap port on return manifold with (A), located under right side of cab.

4. Place hose in container approximately 475 mL (16oz).

5. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

6. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this Group.

Specification

Oil—Temperature .... 65 ± 6°C (150 ± 10°F)

7. Run engine at proper specification and record case drain flow.

Specification

Engine—Speed .... Slow Idle
Case Drain—Leakage
(maximum) .... 75 mL (2.5 oz) per minute

If Case Drain Flow Is High:

- Disassemble and inspect fan motor.

If Case Drain Flow Is OK:

- Inspect relief valve for contamination or seal leakage. Replace if necessary.

CED,TX04577,522 –19–02OCT02–3/3

9025
25
14

Hydraulic Pump Margin And Low Standby Pressure Adjustment Test

SPECIFICATIONS	
Oil Temperature	50 ± 6°C (120 ± 10°F)
Engine Speed	Slow Idle
Margin Pressure	1862 ± 103 kPa (18.62 ± 1 bar) (270 ± 15 psi)
Low Standby Pressure	4826 ± 172 kPa (48.2 ± 1.7 bar) (700 ± 25 psi)

SERVICE EQUIPMENT AND TOOLS
Gauge 7000 kPa (70 bar) (1000 psi)
JT02156A Digital Pressure and Temperature Analyzer Kit, or Switching Valve, Differential Pressure Gauge

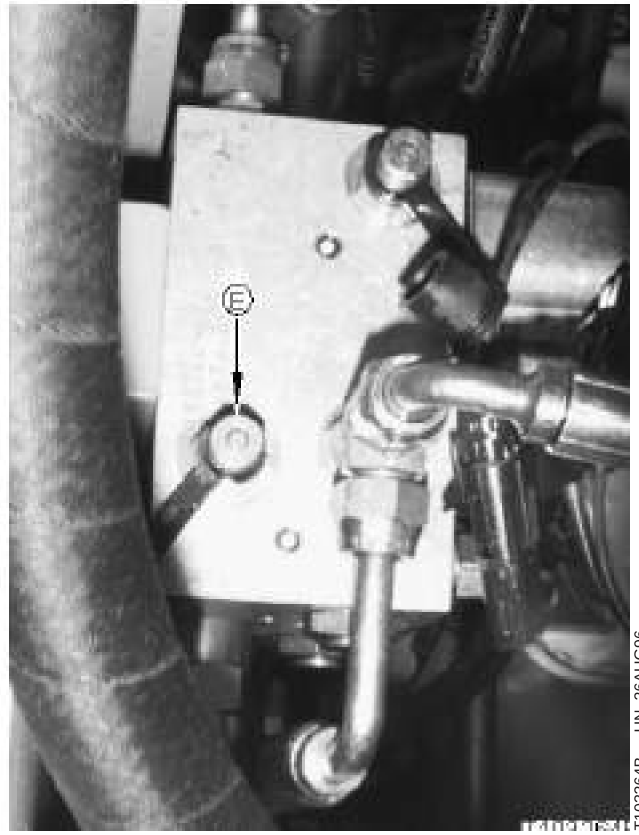
IMPORTANT: This test consists of two adjustments. The margin pressure must be adjusted first because a margin pressure adjustment will also affect the low standby pressure setting. Since margin pressure is the difference between pump output and load sense pressures, either a differential pressure gauge or switching valve or Digital Pressure Temperature Analyzer (JT02156A) should be used. Do not use two separate gauges.

NOTE: This test should be performed with a bucket installed on loader boom to help increase system pressure when adjusting margin and low standby pressure specification.

1. Install frame locking bar.

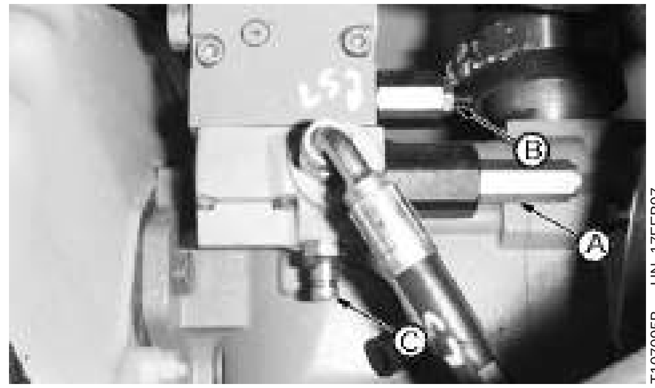
2. Make test connections:

- Connect one inlet of the switching valve to diagnostic coupler (E) on the pressure reducing module and the other to (C) on the pump.
- Connect gauge to switching valve.
- If using a differential pressure gauge, connect to (C and E).



T103264B –UN–26AUG96

Diagnostic Coupler



T107095B –UN–17FEB97

Hydraulic Pump Control Relief Valve Adjustments

A—Load Sense Valve—Margin Pressure
B—Relief Valve—Low Standby Pressure
C—Diagnostic Coupler—Hydraulic Pump Control (Margin Pressure)
D—Not Used
E—Diagnostic Coupler—Pressure Reducing Valve (System Pressure)

Continued on next page

CED,TX04577,523 –19–01APR98–1/3

3. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 50 ± 6°C (120 ± 10°F)

IMPORTANT: Do not raise system pressure higher than maximum pressure rating of the gauge used in this test.

NOTE: Raise boom as SLOW as possible to get this pressure.

4. With engine at slow idle, raise the boom as slowly as possible. This is very important.

Specification

Engine—Speed .... Slow Idle

5. Determine the pressure difference between pump output and load sense. This is the margin pressure.

Specification

Margin—Pressure.................................... 1862 ± 103 kPa (18.62 ± 1 bar) (270± 15 psi)

6. If not within specifications, adjust load sense valve (A) IN to increase and OUT to decrease pressure.

7. Disconnect the test hoses from the diagnostic couplers. Cycle the bucket against the rollback stop several times to insure that the valve spools and springs move and reseat.

8. Reconnect the test hoses and repeat steps 5 and 6 to confirm that margin pressure is still within specification.

Continued on next page

9. With engine at slow idle and margin pressure within specifications, check pump output pressure at diagnostic coupler (E) on the pressure reducing valve. This is the neutral standby pressure.

Specification

Low Standby—Pressure........................ 4826 ± 172 kPa (48.2 ± 1.7 bar)
(700 ± 25 psi)

10. If not within specifications, adjust relief valve (B) on the pump. If adjustment is made, disconnect gauge and cycle bucket as in step 7. Recheck pressure to insure it has not changed.

TEST RESULTS	
Pump Output Pressure	
Load Sense Pressure	
Margin Pressure (Difference)	
Neutral Standby Pressure	

CED,TX04577,523 –19–01APR98–3/3

Hydraulic System Maximum Pressure Test And Adjustment

SPECIFICATIONS	
Oil Temperature	50 ± 6°C (120 ± 10°F)
Engine Speed	Slow Idle
System Pressure (Maximum)—Load Sense Relief	24821 ± 345 kPa (248 ± 3.5 bar) (3600 ± 50 psi)

SERVICE EQUIPMENT AND TOOLS
Gauge 0—35 000 kPa (0—350 bar) (0—5000 psi)

1. Connect gauge to diagnostic coupler (E) on the pressure reducing module.

2. Heat oil to specifications, See Hydraulic Oil Warm-up Procedure in this group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

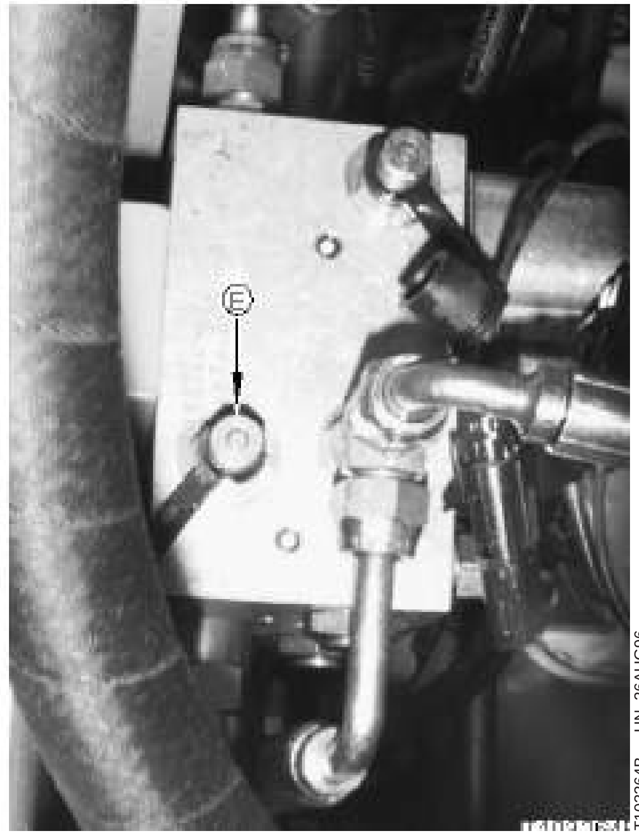
Specification
Oil—Temperature .... 50 ± 6°C (120 ± 10°F)

3. Run engine at slow idle and bottom boom raise function. There should be little or no load on the engine. If engine is loading the loader relief valve maybe leaking or relieving, perform the Loader Relief Valve Test in this group.

Specification
Engine—Speed .... Slow Idle

4. If pressure is not within specifications, adjust the Load Sense Relief Valve (A) on the left front side of the loader control valve.

Specification
System—Pressure (Maximum)—
Load Sense Relief .... 24821 ± 345 kPa (248 ± 3.5 bar) (3600 ± 50 psi)



T103264B –UN–26AUG96

T107168B –UN–17FEB97

E—Diagnostic Coupler (System Pressure)
A—Load Sense Relief Valve—Maximum System Pressure

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX04577,524 –19–01APR98–1/2

9025
25
17

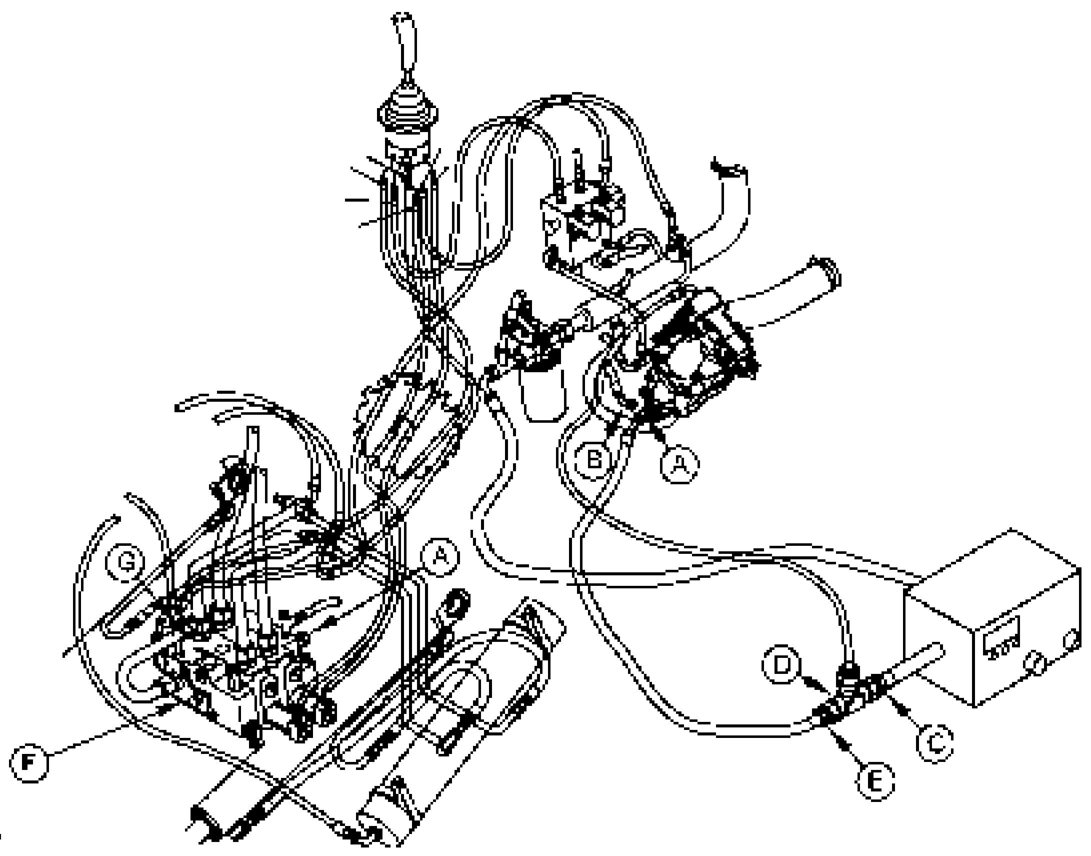
Test

5. Cycle the bucket against the rollback stop several times to insure that the poppet and spring are re-seated. Confirm the pressure setting in Step 4.

CED,TX04577,524 –19–01APR98–2/2

9025
25
18

Hydraulic Pump Flow Test



T107085 —UN—19FEB97

A—38H1419 Cap (—16 F ORFS) (2 used)
B—38H1150 Plug (—16 M ORFS)
C—38H1475 Reducer (—16 F x —8 M ORFS)
D—38H1481 Reducer (—8 F x —6 M ORFS)
E—38H1002 Tee (—16 M x —16 M x —16 F ORFS)
F—38H1415 Cap (—6 F ORFS)
G—38H1420 cap —20 F ORFS)

SPECIFICATIONS	
Oil Temperature	50 ± 6°C (120 ± 10°F)
Engine Speed	2000 ± 25 rpm
Test Pressure	13,790 kPa (138 bar) (2000 psi)
644H Minimum New Pump: Flow Rate	208 L/min (55 gpm)
644H Minimum Used Pump: Flow Rate	185 L/min (49 gpm)
644H MH Minimum New Pump: Flow Rate	208 L/min (59 gpm)
644H MH Minimum Used Pump: Flow Rate	185 L/min (53 gpm)

ESSENTIAL TOOLS
38H1419 (—16 F ORFS) (2 used) Cap
38H1150 (—16 M ORFS) Plug
38H1475 (—16 F x —8 M ORFS) Reducer
38H1481 (—8 F x —6 M ORFS) Reducer
38H1002 (—16 M x —16 M x —16 F ORFS) Tee
38H1415 (—6 F ORFS) Cap
38H1420 (—20 F ORFS) Cap

SERVICE EQUIPMENT AND TOOLS
JT07148 Flow Meter

Continued on next page

CED,TX04577,525 –19–28NOV00–1/2

IMPORTANT: For the test, the flow meter is connected directly to the pump. Since the load sensing relief valve is located in the loader control valve and not in this test circuit, there is no high pressure protection. Therefore it is extremely important that the flow meter control valve be left open at all times, except during the warm-up and test procedure.

1. Make test connections.

   Install tee and reducers (C, D and E) at the flow meter inlet.

   Disconnect and cap (A, F and G) inlet, return and load sense-to-pump hoses at the loader control valve and connect to flow meter.

2. Heat hydraulic oil to specifications by restricting flow through flow meter. Run engine at a constant mid-range speed. DO NOT increase speed when flow meter is restricting flow. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 50 ± 6°C (120 ± 10°F)

3. Open flow meter control valve. Run engine at specified speed.

Specification

Engine—Speed .... 2000 ± 25 rpm

4. Slowly close the flow meter control valve until the specified pressure is indicated. Recheck engine speed and take the flow reading.

Specification

Test—Pressure .... 13 790 kPa (138 bar) (2000 psi)
644H Minimum New Pump:—
Flow Rate... 208 L/min (55 gpm)
644H Minimum Used Pump:—
Flow Rate... 185 L/min (49 gpm)
644H MH Minimum New
Pump:—Flow Rate.. 208 L/min (59 gpm)
644H MH Minimum Used
Pump:—Flow Rate.. 185 L/min (53 gpm)

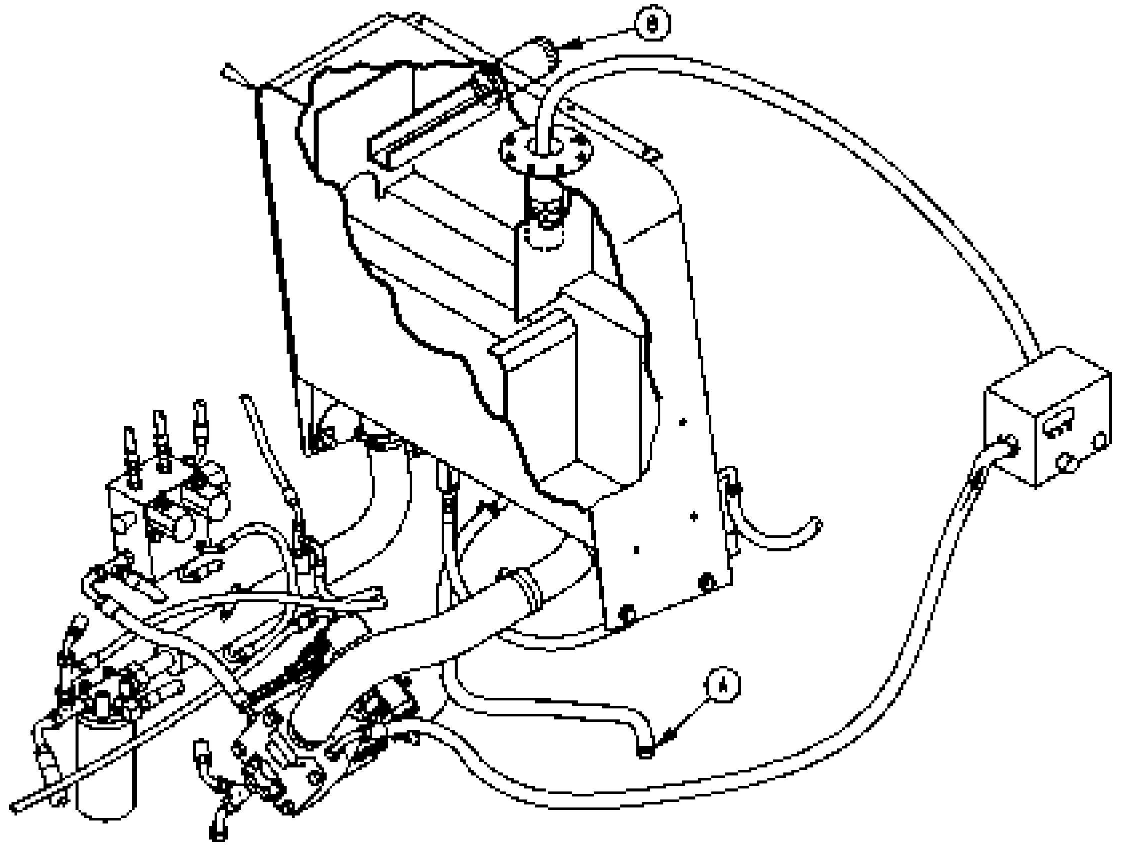
5. If flow is below specifications check hydraulic reservoir suction hose for restriction. If hose is not restricted, check steering system leakage before replacing pump by disconnecting the pressure hose to the steering valve at the pump outlet tee (B). Cap or plug hose and steering valve.

6. Rerun pump flow test. If flow is below specifications replace pump.

7. If pump is replaced perform Hydraulic Pump Margin And Low Standby Pressure Adjustment Test(see procedure in this group) before returning machine to service.

CED,TX04577,525 –19–28NOV00–2/2

Hydraulic Pump Case Drain Test



T111298 –UN–11SEP97

A—Plug—38H1150 (—16 ORFS)
B—Vent Filter—Hydraulic Reservoir

NOTE: *This test determines the efficiency of the pump rotating group by measuring the amount of case drain with the pump at maximum pressure. Normally this test will help isolate a pump performance problem to either the rotating group or the pump control. This test should be performed before removing the pump for repair.*

SPECIFICATIONS	
Oil Temperature	49 ± 6°C (120 ± 10°F)
Engine Speed	2000 ± 25 rpm
System Pressure	Maximum with function bottomed
Case Drain (container) Leakage (Maximum)	15 L (4 gal) in 15 sec.
Case Drain (Flow Meter) Leakage (Maximum)	60.6 L/min (16 gpm)

SERVICE EQUIPMENT AND TOOLS
Vacuum Pump
Measured Container Approximately 19 L (5 gal) or Flow Meter
38H1150 (—16 Plug ORFS)
JT07148 Flow Meter

1. Heat hydraulic oil to specification. See Hydraulic Oil Warm-up Procedure in this group. Before stopping the engine, roll back bucket all the way.

Continued on next page

CED,TX04577,526 –19–01APR98–1/2

Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 49 ± 6°C (120 ± 10°F)

2. Remove vent filter from hydraulic reservoir at (B) and connect vacuum pump to vent filter connector to minimize leakage when pump case drain hose is disconnected.

3. If using a measured container; Disconnect pump case drain hose at pump. Secure the drain hose so it's end is higher than the pump to prevent draining the pump case.

4. Stop vacuum pump and release vacuum in reservoir.

5. Use a measured container to catch the oil flow from the drain hose.

6. If using a flow meter; Install flow meter between pump case drain hose and reservoir fill inlet. Plug case drain hose removed from pump with plug (A).

7. Start engine, run at specified speed. As soon as there is flow from the case drain hose, hold bucket control lever in rollback position.

Specification

Engine—Speed... 2000 ± 25 rpm

8. Direct oil into the container for 15 seconds, or record flow meter reading. Monitor Display Unit may be used to time this test. See Monitor Display Unit—Accessory Menu—Stop Watch Mode (A 05). (Group 9015-15)

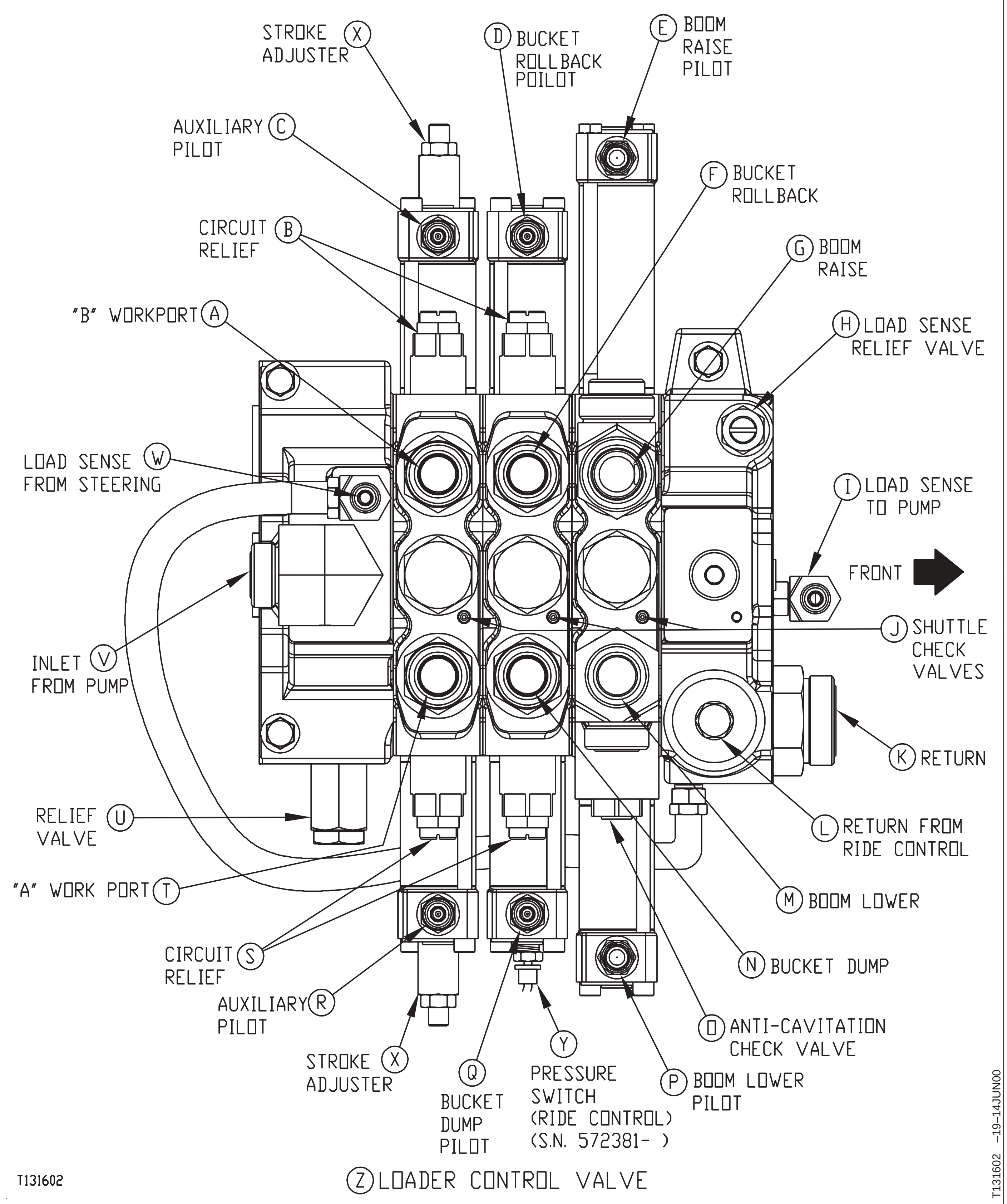
9. Measure oil quantity in the container and observe flow meter reading. If above specification, the rotating group has excessive leakage and the pump must be replaced. Pump cannot be repaired.

Specification

System—Pressure .... Maximum with function bottomed
Case Drain (container)—
Leakage (Maximum) .... 15 L (4 gal) in 15 sec.
Case Drain (Flow Meter)—
Leakage (Maximum) .... 60.6 L/min (16 gpm)

CED,TX04577,526 –19–01APR98–2/2

Loader Relief And Circuit Relief Valve Pressure Test



Continued on next page

CED,TX04577,527 –19–01APR98–1/5

A—“B” Auxiliary Workport
B—Circuit Relief
C—Auxiliary Pilot
D—Bucket Rollback Pilot
E—Boom Raise Pilot
F—Bucket Rollback Relief Valve
G—Boom Raise Valve
H—Load Sense Relief Valve—Maximum System Pressure
I—Load Sense to Pump
J—Shuttle Check Valves
K—Return Port—With Orifice
L—Return from Ride Control
M—Boom Lower Workport
N—Bucket Dump Workport
O—Anti-Cavitation
P—Boom Lower Pilot
Q—Bucket Dump Pilot
R—Auxiliary Pilot
S—Circuit Relief (Clipper)
T—“A” Auxiliary Workport
U—Loader Relief Valve
V—Inlet from Pump
W—Load Sense from Steering
X—Stroke Adjuster
Y—Pressure Switch (Ride Control) (S.N. 572381—)
Z—Loader Control Valve

SPECIFICATIONS	
Oil Temperature	21 ± 5°C (70 ± 10° F)
Loader Relief Valve Pressure (Clipper)	27 924 ± 690 kPa (279 ± 6.90 bar) (4050 ± 100 psi)
Bucket Rollback Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)
Bucket Dump Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)
Auxiliary (A and B) Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)

ESSENTIAL TOOLS
38H1150 (—16 M ORFS) (used on loader control valve hose) Plug
JT03460 (—16 F x 7/16 JIC) ORFS) (used on loader control valve) Reducer
38H1419 (—16 F ORFS) (used on bucket) Cap
38H1418 (—12 F ORFS) (used on auxiliary) Cap
JT03459 (—12 F x 7/16 JIC) ORFS) (used on auxiliary) Reducer
JT03460 (—16 F x 7/16 JIC) ORFS) (used on bucket) Reducer
38H1272 (—12 M x 12 M ORFS) (used on auxiliary) Union
38H1281 (—16 M x —16 M ORFS) (used on bucket) Union

SERVICE EQUIPMENT AND TOOLS
JT07192 Relief Valve Tester
0-35 000 kPa (0-350 bar) (0-5000 psi) Gauge

Loader Relief Valve (Clipper) Test

1. Heat hydraulic oil to specification. See Hydraulic Oil Warm-up Procedure in this group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 21 ± 5°C (70 ± 10° F)

2. Raise boom and install boom lock device.

Continued on next page

CED,TX04577,527 –19–01APR98–2/5

9025
25
25

3. Disconnect the inlet pressure hose at the loader control valve. Install plug in existing hose.

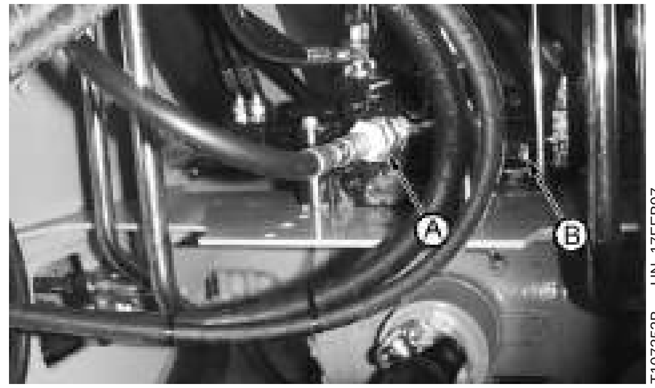
4. Connect the relief valve tester hose to the control valve inlet using reducer (A). Connect pressure gauge to tester.

5. Run tester until pressure reaches a maximum. If not within specifications adjust the relief valve (B) to obtain specified pressure. Cycle the tester several times to insure that the spring and poppet are properly seated.

Specification

Loader Relief Valve (Clipper)—
Pressure .... 27 924 ± 690 kPa (279 ± 6.90 bar) (4050 ± 100 psi)

A—JT03460 Reducer (—16 F x 7/16 JIC) ORFS)
B—Relief Valve (Clipper)



T107352B –UN–17FEB97

T107354B –UN–17FEB97

JT07192 Hydraulic Relief Valve Tester

Continued on next page

CED,TX04577,527 –19–01APR98–3/5

9025
25
26

Circuit Relief Valve Test (Bucket And Auxiliary Sections)

1. Raise boom and install boom lock. Position the bucket or auxiliary function so that there is no pressure load on the circuit to be tested.

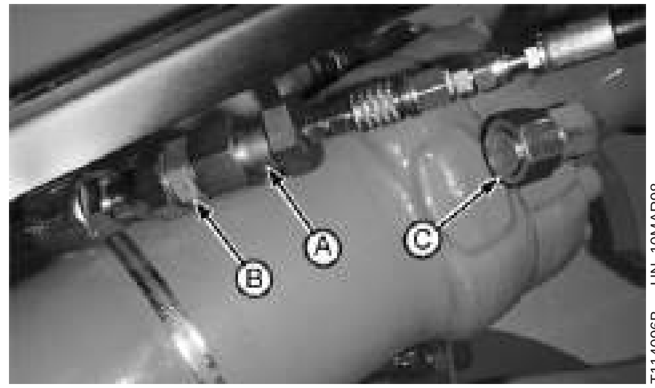
2. Disconnect the hose for the circuit to be tested at the cylinder (bucket dump shown). Install cap (D) on the cylinder fitting.

3. Install union (B) and reducer (A) on bucket cylinder hoses. Install reducer on auxiliary hoses, if equipped. Connect to tester hose. Install gauge on test hose. Connect to tester.

4. Run tester until pressure reaches maximum. Check if pressure in specification.

Specification

Bucket Rollback—Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)
Bucket Dump—Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)
Auxiliary (A and B)—Pressure	29 303 ± 690 kPa (293 ± 6.90 bar) (4250 ± 100 psi)



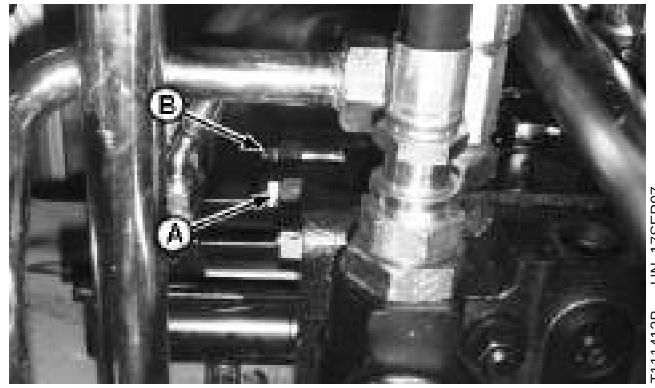
T114096B –UN–10MAR98

A—JT03460 Reducer (—16 F x 7/16 JIC) ORFS)
B—38H1281 Union (—16 M x —16 M ORFS)
C—38H1419 Cap (—16 F ORFS)

CED,TX04577,527 –19–01APR98–4/5

5. If pressure is not within specification, adjust the appropriate circuit relief valve accordingly. Cycle the tester several times to insure that the spring and poppet are properly seated.

A—Bucket Section Circuit Relief (one shown)
B—Auxiliary Section Circuit Relief (one shown)



T111413B –UN–17SEP97

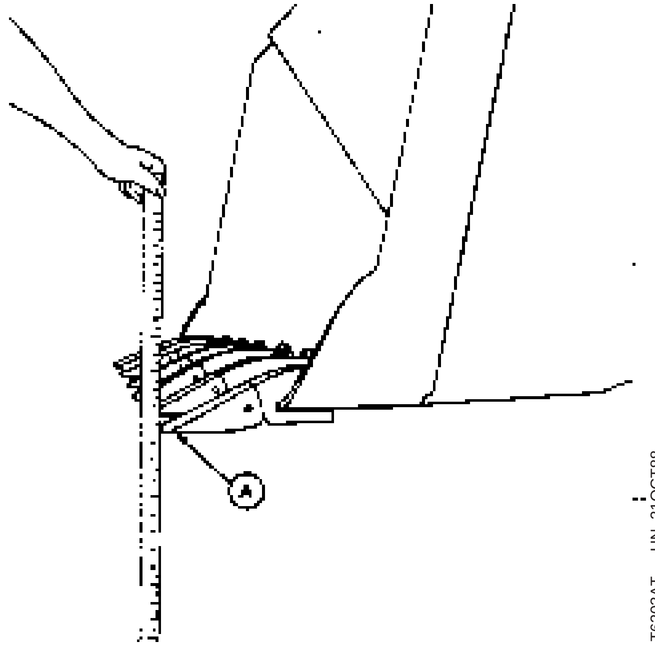
CED,TX04577,527 –19–01APR98–5/5

9025
25
27

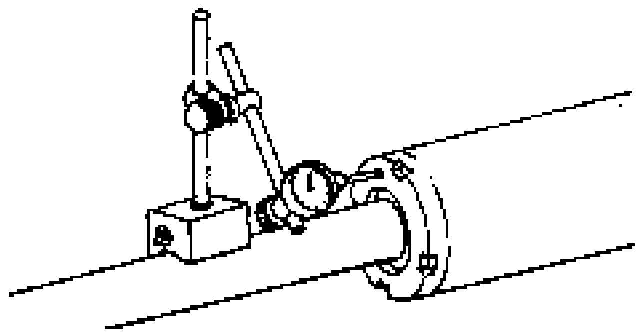
Loader Cylinder Drift Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 10°F)
Maximum Allowable Drift (engine-OFF): Overall drift down measured at bucket cutting edge Speed	51 mm/min. (2.00 in./min.)
Boom cylinder drift Speed	2 mm/min. (0.08 in./min.)
Bucket cylinder drift Speed	6 mm/min. (0.24 in./min.)
Maximum Allowable Drift (engine-ON): Boom cylinder drift up (Boom lower solenoid valve leakage check) Speed	6 mm (0.24 in.) in 2 minutes
Maximum Allowable Drift (engine-ON): Boom cylinder drift up (Boom lower solenoid valve leakage check) Speed	6 mm (0.24 in.) in 2 minutes

SERVICE EQUIPMENT AND TOOLS
Stop Watch or Monitor Display Unit.
Temperature Reader—Use Monitor Display Unit
Magnetic Base Dial Indicator



T6203AT –UN–21OCT88



T6222AN –UN–26OCT88

9025
25
28

1. Heat hydraulic oil to specifications. (See Hydraulic Oil Warm-up Procedure in this group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 40 ± 6°C (100 10°F)

2. Stop engine.

3. To check boom and bucket overall drift rate, measure drift down at tooth tip (A) for 1 minute using monitor for time.

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3771 –19–23AUG96–1/2

If drift rate is excessive, measure individual cylinder (bucket or boom) drift with a dial indicator to determine which circuit is leaking

Specification

Maximum Allowable Drift (engine-OFF): Overall drift down measured at bucket cutting edge—Speed .... 51 mm/min. (2.00 in./min.)
Boom cylinder drift—Speed .... 2 mm/min. (0.08 in./min.)
Bucket cylinder drift—Speed .... 6 mm/min. (0.24 in./min.)
Maximum Allowable Drift (engine-ON): Boom cylinder drift up (Boom lower solenoid valve leakage check)—Speed .... 6 mm (0.24 in.) in 2 minutes

4. If drift is excessive, See Boom, Bucket, and Steering Cylinder Leakage Test in Group 9025-25 to determine if leakage is in the cylinder or control valve.

NOTE: Boom lower solenoid valve leakage can cause boom to drift up with engine running.

Stop engine. Install and zero dial indicator. Start engine.

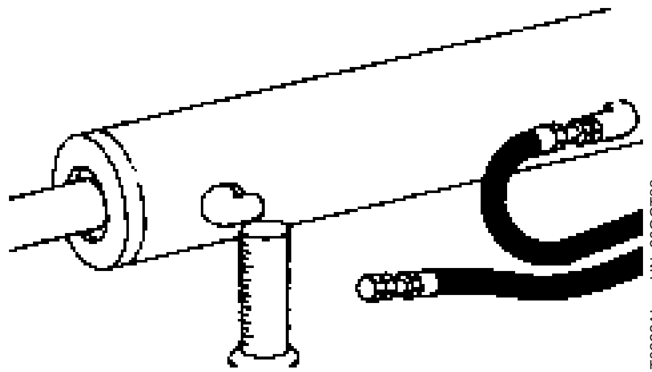
If cylinder drifts up more than specification, remove solenoid valve and check seals.

Specification

Maximum Allowable Drift (engine-ON): Boom cylinder drift up (Boom lower solenoid valve leakage check)—Speed .... 6 mm (0.24 in.) in 2 minutes

TX,25,SS3771 –19–23AUG96–2/2

Boom, Bucket And Steering Cylinder Leakage Test



SPECIFICATIONS	
Oil Temperature	49 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Maximum Leakage	15 mL/min. (1/2 oz/min.)

ESSENTIAL TOOLS
38H1151 Boom Plug (-20 ORFS) (Parker No. 20 PNLO-S) Head End
38H1149 Boom Plug (-12 ORFS) (Parker No. 12 PNLO-S) Rod End
38H1150 Bucket Plug (-16 ORFS) (Parker No. 16 PNLO-S) Rod End

SERVICE EQUIPMENT AND TOOLS
Measuring Container

1. Heat hydraulic oil to specification. (See Hydraulic Oil Warm-up Procedure in this group). Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

9025
25
30

Specification

Oil—Temperature .... 49 ± 6°C (120 ± 10°F)

CAUTION: Never work under raised equipment unless it is supported with a hoist or support stands.

2. Fully extend the cylinder to be tested. If testing the boom cylinders, restrain boom in the fully raised position using a hoist or a stand.

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3770 –19–23AUG96–1/2

NOTE: Check cylinders for leakage in the fully extended position only. In the retracted position the piston contacts the end of the cylinder and seals off piston seal leakage.

3. Remove and plug cylinder rod and head end hose or line.

4. Run engine at slow idle. Activate control lever to extend cylinder for 1 minute at maximum pressure while measuring leakage from open port. Monitor Display Unit may be used to time this test.

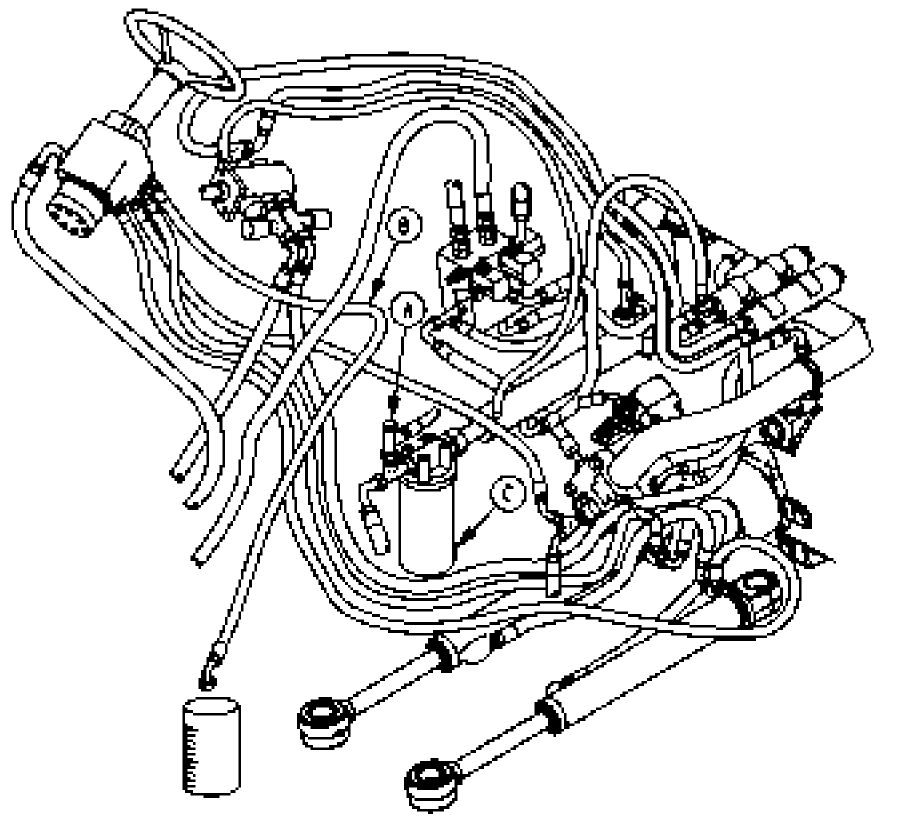
Specification	
Engine—Speed	Slow idle
Maximum Leakage—Leakage	15 mL/min. (1/2 oz/min.)

If leakage is within specification, excessive cylinder drift is caused by leakage in the loader control valve or circuit relief valve.

See Monitor Display Unit—Accessory Menu—Stop Watch Mode (A 05). (Group 9015-15)

TX,25,SS3770 –19–23AUG96–2/2

Steering Valve Leakage Test



T111278 –UN–11SEP97

9025
25
32

A—38H1418 Cap (—12 F ORFS)   B—Return Hose   C—Return Filter

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	Slow idle
In Measuring Container Leakage (Maximum)	11.4 L (3 gal)
Flow Rate (Maximum)	11.4 L/min. (3 gpm)

ESSENTIAL TOOLS
38H1418 Cap (—12 F ORFS)
38H1418 Cap (—12 F ORFS)

SERVICE EQUIPMENT AND TOOLS
Measuring Container (approximately 5 gal)
Measuring Container (approximately 5 gal)

1. Install frame locking bar to prevent machine from turning.

2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

3. Heat hydraulic oil to specifications. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

Continued on next page

TX,25,SS3769 –19–23AUG96–1/2

4. If using measured container; Disconnect return hose (B) from loader return filter (C). Install cap (A) on tee.

5. If using a flow meter; Connect flow meter between return hose (B) and tee on return filter.

6. Run engine at specifications.

Specification

Engine—Speed .... Slow idle

7. Quickly turn steering wheel against locking bar to seat internal check balls in steering valve.

8. Apply 11 N•m (8 lb-ft) torque to steering shaft to turn valve.

Specification

Steering Shaft—Torque .... 11 N•m (8 lb-ft)

9. Measure oil flow from return hose for 1 minute.

Specification

Steering Valve—Maximum Leakage .... 11.4 L/min. (3 gpm)

If leakage is greater than specifications, repair or replace steering valve. See Remove And Install Steering Valve. (Repair Manual, Group 0960.)

TX,25,SS3769 –19–23AUG96–2/2

Steering Valve Drift Test

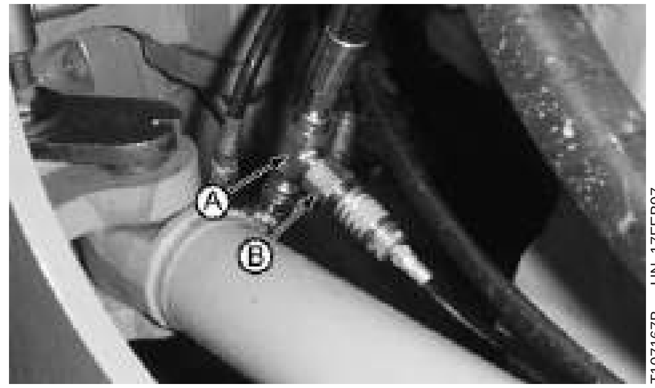
1. Install frame locking bar. Install tee and adapter in head end of steering cylinder, Attach gauge. Remove the locking bar.

2. Heat hydraulic oil to specifications. (See Hydraulic Oil Warm-up Procedure in this group). Steer machine back and forth to make sure steering cylinders contain heated oil.

Specification

Oil—Temperature .... 65 ± 6°C (150 ± 10°F)

3. Align machine so bucket corner is against a immovable object such as a loading dock. Engage park brake.



T107167B –UN–17FEB97

A—8H1032 Tee (—10 M x —10 F x —10 M ORFS)
B—JT03458 Adaptor (7/16—20 M x —10F ORFS)

Continued on next page

TX,25,SS3772 –19–23AUG96–1/2

4. Adjust steering angle to get measurement dimension (A) to equal 254 mm (10 inch) on cylinder with pressure gauge on it.

5. Press MENU to get Accessory Mode A, Press SELECT then press NEXT until (A 05) is displayed. Then Press SELECT to active Stopwatch function of Monitor.

NOTE: Do test with hands off of steering wheel if wheel rotates, then move wheel back and forth slightly to center wheel.

6. Release park brake. Put machine in 2nd gear forward and apply power to maintain 6895 kPa (7.0 bar) (1000 psi).

7. Measure distance (A) at end of test, subtract from original setting and compare to specifications.

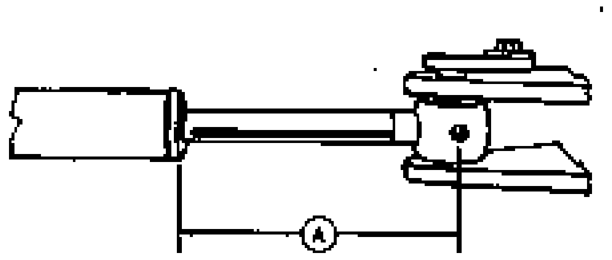
Specification

Maximum Steering Cylinder
Drift:—Speed .... 64 mm (2.5 in.) at 6895 kPa (69 bar) (1000 psi) for one minute

If drift is less than specifications, steering drift is normal.

9025
25
34
If drift is more than specifications, See Boom, Bucket, and Steering Cylinder Leakage Test in this group before repairing or replacing the steering valve. See Remove And Install Steering Valve.

8. Install locking bar and remove test equipment.



A—Measurement Distance—Drift Test

TX,25,SS3772 –19–23AUG96–2/2

Secondary Steering Pump Relief Valve Pressure Test

SPECIFICATIONS	
Oil Temperature	65 ± 6°C (150 ± 10°F)
Engine Speed	stopped
Relief Pressure	5,516 ± 344 kPa (55 ± 3.4 bar) (800 ± 50 psi)

ESSENTIAL TOOLS
38H1031 (—8M x —8Fx —8M ORFS) Tee
JT03457 (7/16—20M x —8F ORFS) Adapter

SERVICE EQUIPMENT AND TOOLS
0—7000 kPa (0—70 bar) (0—1000 psi) Gauge

1. Heat hydraulic oil to specification. (See Hydraulic Oil Warm-up Procedure in this group). Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

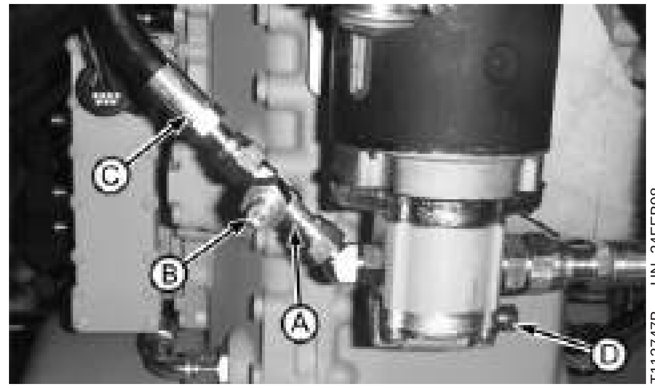
Oil—Temperature .... 65 ± 6°C (150 ± 10°F)

2. Remove outlet hose (C) coming from secondary steering pump at elbow.

3. Install tee (A) and adapter (B) to hose and connect to elbow in pump. Connect pressure gauge.

IMPORTANT: DO NOT operate secondary steering pump and motor for more than 15 seconds with the steering in neutral or damage to the pump and motor can occur.

4. Start engine. Remove engine controller fuse. Engine will stop. Emergency steering will activate after a short momentary delay. Read pressure gauge.



A—38H1031 Tee (—8M x —8Fx —8M ORFS)
B—JT03457 Adapter (7/16 —20M x —8F ORFS)
C—Existing Outlet Hose
D—Adjusting Screw

Continued on next page

Test

If pressure is not to specification, remove cover (D) and turn adjusting screw to adjust pressure.

Specification

Engine—Speed	stopped
Relief—Pressure	5,516 ± 344 kPa (55 ± 3.4 bar) (800 ± 50 psi)

If pressure is low and cannot be adjusted to specifications:

- See Secondary Steering Valve Primary Check Valve Leakage Test in this group.
- See Steering Valve Leakage Test in this group.
- Replace secondary steering pump.

TX,25,SS3773 –19–16SEP92–2/2

Secondary Steering Manifold Primary Check Valve Leakage Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	Stopped
Maximum Leakage—Per Minute Leakage	5 ml (80 drops)

ESSENTIAL TOOLS
38H1418 (-12 F ORFS) Cap
(-12 F ORFS) (Parker No12 FNL-S.) Cap

Primary check valve leakage will allow oil to flow from the secondary steering circuit into the main hydraulic system during secondary steering operation. This leakage can cause slow secondary steering.

1. Heat hydraulic oil to specification. (See Hydraulic Oil Warm-up Procedure in this group). Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

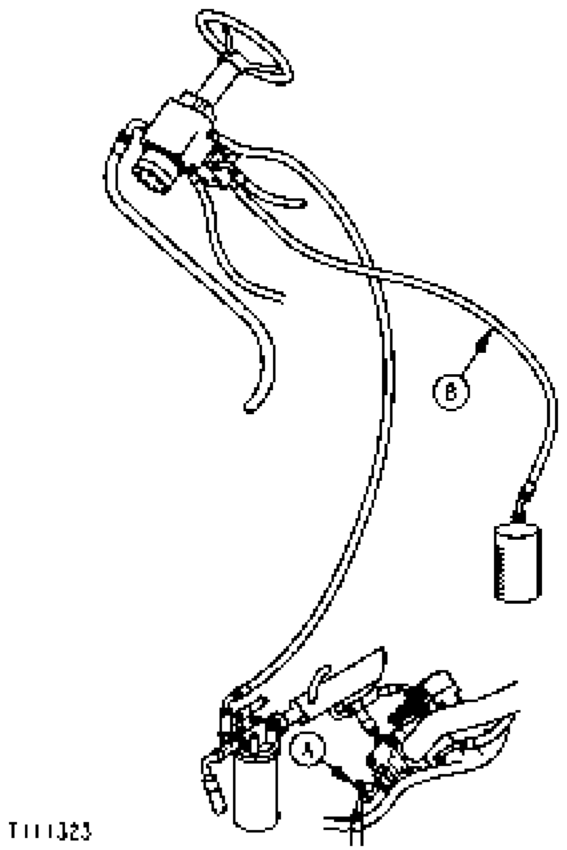
   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification
Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

2. Disconnect line (B) from main hydraulic pump. Install cap (A) to pump outlet fitting.

IMPORTANT: DO NOT operate secondary steering pump and motor for more than 15 seconds with the steering in neutral or damage to the pump and motor can occur.

3. Start engine. Remove engine controller fuse. Engine will stop. Emergency steering will activate after short momentary delay.



T111323 –UN–16SEP97

A—38H1418 Cap (-12 F ORFS) (Parker No. 12 FNL-S)
B—Hose—Main Pump-To-Steering Valve

9025
25
37

https://www.truck-manuals.net/

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3774 –19–17SEP93–1/2

Test

4. Observe leakage from hose (B).

Specification

Engine—Speed	Stopped
Maximum Leakage—Per Minute—Leakage	5 ml (80 drops)

If leakage is more than specification, replace manifold block. See Repair Manual.

TX,25,SS3774 –19–17SEP93–2/2

Secondary Steering Manifold Check Valve Leakage Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	slow idle
Maximum Leakage—Per Minute Leakage	5 mL (80 drops)

ESSENTIAL TOOLS
38H1147 (—8 M ORFS) (Parker No. 8 PNLO-S) Plug

Secondary check valve leakage will allow oil to flow from the main hydraulic system to the reservoir through the secondary steering pump. This leakage can cause slow cycle times.

1. Heat hydraulic oil to specification. (See Hydraulic Oil Warm-up Procedure in this group). Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9025-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

2. Stop engine.

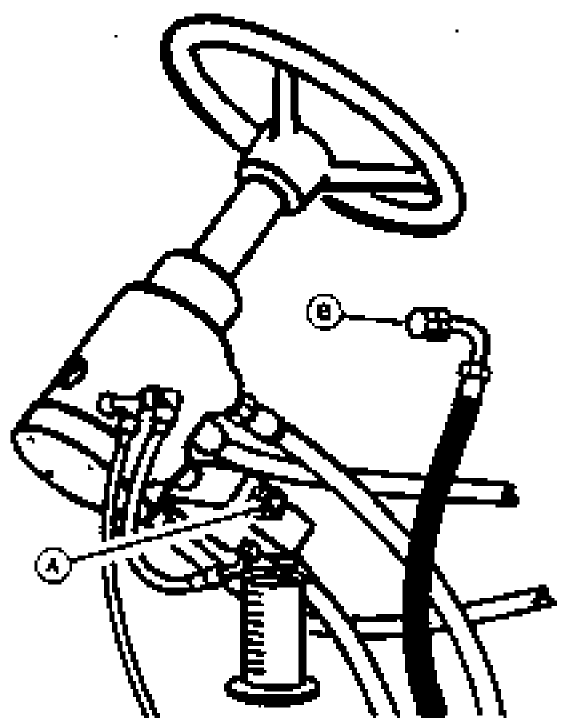
3. Remove line from check valve (A) on secondary steering valve.

4. Install plug (B) in secondary steering pump line.

5. Run engine at specification.

Specification

Engine—Speed .... slow idle



T6569AJ –UN–21OCT88

A—Check Valve
B—38H1147 Plug (—8 M ORFS) (Parker No. 8 PNLO-S)

9025
25
39

https://www.truck-manuals.net/

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3775 –19–16SEP92–1/2

6. Observe leakage from check valve (A).

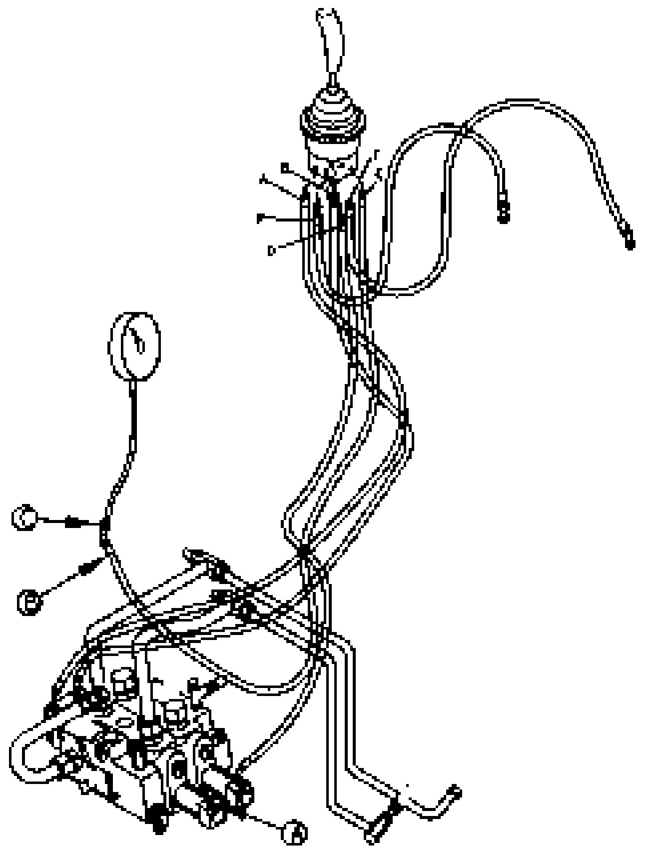
Specification

Maximum Leakage—Per
Minute—Leakage.. 5 mL (80 drops)

If leakage is more than specification, clean or replace check valve.

TX,25,SS3775 –19–16SEP92–2/2

Pilot Control Valve Pressure Test



A—38H1415 Cap (11/16 —16 F ORFS)
B—38H1278 Union (11/16 -18 M 37° x 11/16 —18 M ORFS)
C—JT03456 Adapter (7/16 -20 M 37° x 11/16 —16 F ORFS)

Continued on next page TX,25,SS3776 –19–23AUG96–1/6

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	Slow idle
Begin Metering Distance	3/8—5/8 in. of lever travel (Measured at top end of lever.)
Boom Float Detent Pressure	4137—4480 kPa (41—45 bar) (600—650 psi)
At Feel Position: Pressure	As the control lever is moved from neutral, the pilot pressure will suddenly jump up to approximately 90 psi at 3/8—5/8 in. travel. The pressure should then increase smoothly to the specification at the FEEL position (or 75% lever travel), and then jump up to 600—650 psi as the lever is moved into detent.
Boom Power Down Pressure	1860—2082 kPa (19—21 bar) (270—302 psi)
Boom Raise Pressure	1882—2227 kPa (19—22 bar) (275—325 psi)
Bucket Rollback Pressure	2110—2455 kPa (21—25 bar) (306—356 psi)
Bucket Dump and Auxiliary Valve Pressure	Pressure must increase smoothly to 2110—2455 kPa (21—25 bar) (306—356 psi) at 3/4 lever travel and then increase to 4140—4480 kPa (41.4—44.8 bar) (600—650 psi) as the lever is moved past 80—90% travel

ESSENTIAL TOOLS
38H1415 (11/16 —16 F ORFS) Cap
38H1278 (11/16 -18 M 37° x 11/16 —18 M ORFS) Union
JT03456 (7/16 -20 M 37° x 11/16 —16 F ORFS) Adapter

SERVICE EQUIPMENT AND TOOLS
0-6895 kPa (0-69 bar) (0-1000 psi) Gauge

This test will determine if adequate pilot pressure is available to move the loader control valve spools.

NOTE: The FEEL position is when lever is moved to feel the ramp of the detent before lever passes into detent position.

1. Lower boom to ground.

2. Connect test fittings and gauge to the pilot pressure hose of function to be checked. Cap port on valve

3. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

4. Heat hydraulic oil to specification. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

5. Run engine at specification. Activate function to be checked and record pressure reading.

Specification

Engine—Speed .... Slow idle
Begin Metering—Distance .... 3/8—5/8 in. of lever travel (Measured at top end of lever.)
Boom Float Detent—Pressure............ 4137—4480 kPa (41—45 bar) (600—650 psi)
At Feel Position:—Pressure .... As the control lever is moved from neutral, the pilot pressure will suddenly jump up to approximately 90 psi at 3/8—5/8 in. travel. The pressure should then increase smoothly to the specification at the FEEL position (or 75% lever travel), and then jump up to 600—650 psi as the lever is moved into detent.
Boom Power Down—Pressure........... 1860—2082 kPa (19—21 bar) (270—302 psi)
Boom Raise—Pressure .... 1882—2227 kPa (19—22 bar) (275—325 psi)

9025
25
41

Continued on next page

TX,25,SS3776 –19–23AUG96–2/6

Specification

Bucket Rollback—Pressure .... 2110—2455 kPa (21—25 bar) (306—356 psi)

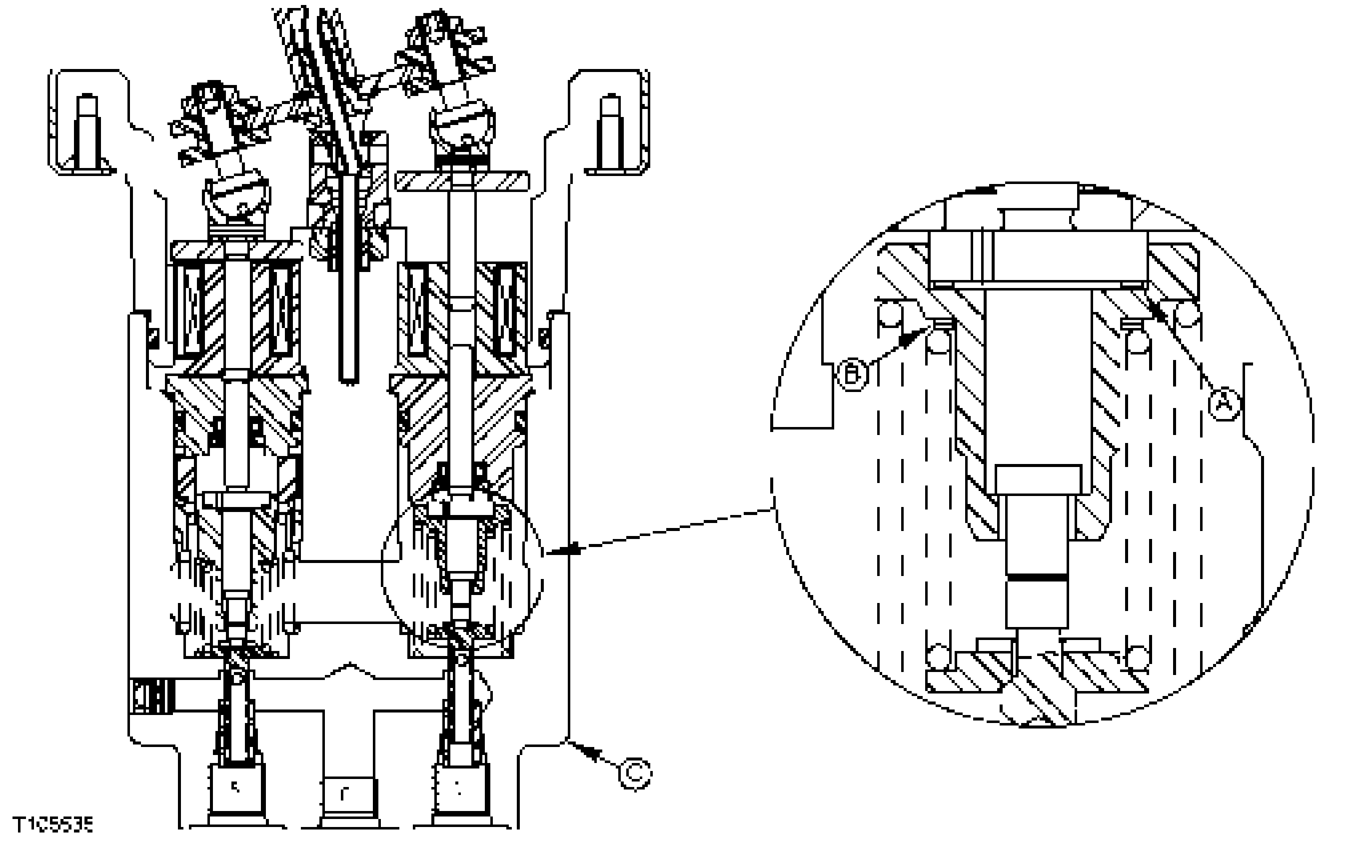
Bucket Dump and Auxiliary Valve—Pressure .... Pressure must increase smoothly to 2110—2455 kPa (21—25 bar) (306—356 psi) at 3/4 lever travel and then increase to 4140—4480 kPa (41.4—44.8 bar) (600—650 psi) as the lever is moved past 80—90% travel

6. If pressure is still not to specification, See Pressure Reducing Valve Pressure Test in this group.

7. If pressure reducing valve pressure is to specification and pilot control pressure is still not to specification, See Remove And Install Pilot Controller Valve (Single Lever Controller) in Repair Manual, Group 3160.

Continued on next page

TX,25,SS3776 –19–23AUG96–3/6



A—Shim—Spool Position B—Shim—Spool Metering C—Housing

8. If pressure reducing valve is to specification, add or remove shims to reach the correct pilot pressure as follows:

   To adjust lever travel specification to begin metering add or remove spool position shims (A).

   To adjust pressure to specification for feel positions and pressure at 3/4 level travel, add or remove spool metering shims (B).

Shims are available in following sizes (0.004 in, 0.007 in and 0.015 in). If service is required, See Disassemble And Assemble Pilot Controller Valve (Single Lever Controller) in Repair Manual, Group 3160.

Continued on next page TX,25,SS3776 –19–23AUG96–4/6

TEST RESULTS	
Function / Specification	Pressure
Boom Down:	
Begin Metering / 620 kPa (90 psi)	
Float Detent / 4137—4480 kPa (600—650 psi)	
Boom Power Down / 1860—2082 kPa (270—302 psi)	
Boom Raise:	
Begin Metering / 620 kPa (90 psi)	
Boom Raise 3/4 Travel / 1882—2227 kPa (273—323 psi)	
Boom Raise Full Travel / 4137—4480 kPa (600—650 psi)	
Bucket Dump:	
Begin Metering / 620 kPa (90 psi)	
Bucket Dump 3/4 Travel / 2110—2455 kPa (306—356 psi)	
Bucket Dump Full Travel / 4137—4480 kPa (600—650 psi)	
Bucket Rollback:	
Begin Metering / 620 kPa (90 psi)	
Bucket Rollback 3/4 Travel / 2110—2455 kPa (306—356 psi)	
Bucket Rollback Full Travel / 4137—4480 kPa (600—650 psi)	
Auxiliary Valve:	
Lever Forward;	
Begin Metering / 620 kPa (90 psi)	
Lever 3/4 Travel / 2110—2455 kPa (306—356 psi)	
Lever Full Travel / 4137—4480 kPa (600—650 psi)	
Lever Rearward;	
Begin Metering / 620 kPa (90 psi)	

Continued on next page

TX,25,SS3776 –19–23AUG96–5/6

TEST RESULTS	
Lever 3/4 Travel / 2110—2455 kPa (306—356 psi)	
Lever Full Travel / 4137—4480 kPa (600—650 psi)	

TX,25,SS3776 –19–23AUG96–6/6

Pressure Reducing Valve Pressure Test

NOTE: This test verifies that the PRV pressures are within specification.

SPECIFICATIONS	
Oil Temperature	49 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Pilot Pressure Setting (Pressure reducing valve) Pressure	4140—4480 kPa (41.4—44.8 bar) (600—650 psi)

SERVICE EQUIPMENT AND TOOLS
Gauge 0-6895 kPa (0-69 bar) (0-1000 psi)

The pressure reducing valve regulates pressure to the pilot control circuit and differential lock.

This valve is located on right side of engine frame, just inside the top rear corner of transmission opening of frame.

Continued on next page TX,25,SS3777 –19–02OCT02–1/2

1. Connect test fitting and gauge to test port (A), marked "REG TEST" on the pressure reducing valve.

2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

3. Heat hydraulic oil to specifications. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Oil—Temperature .... 49 ± 6°C (120 ± 10°F)

4. Run engine at specification with service brakes Not applied, differential lock off and pilot controller in neutral and read pressure gauge. This reading is the pressure reducing valve pilot pressure.

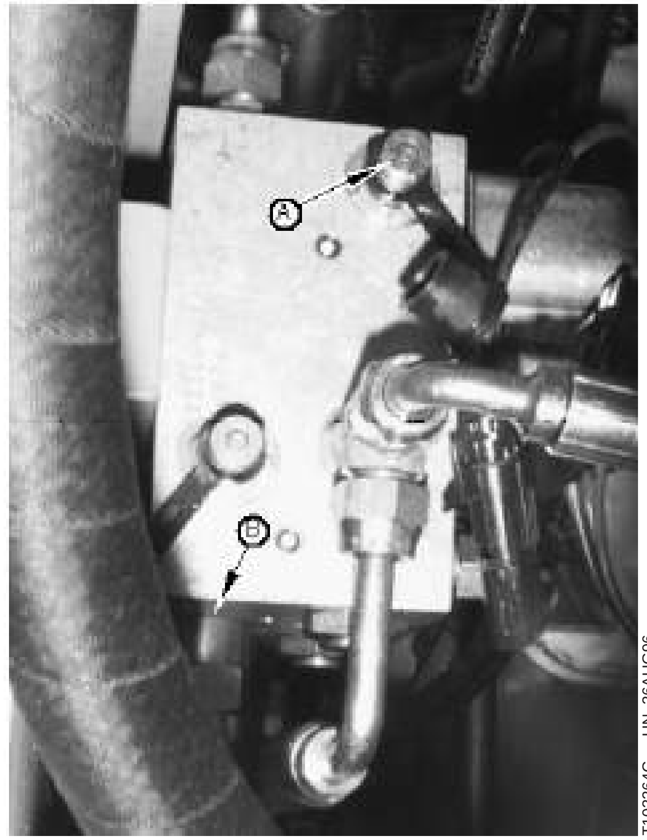
Specification

Engine—Speed .... Slow idle

5. If pressure is not within specifications, adjust valve (B). Loosen lock hex nut (3/4 in.) and turn 3/16 in. hex key screw. One fourth (1/4) turn equals approximately 207 kPa (2.07 bar) (30.0 psi). If pressure cannot be adjusted high enough to meet specification, check margin and low pressure standby pressure. See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test in this Group.

Specification

Pilot Pressure Setting (Pressure reducing valve)—Pressure .... 4140—4480 kPa (41.4—44.8 bar) (600—650 psi)



A—Diagnostic Coupler
B—Pressure Reducing Adjustment Valve

SERVICE ADVISOR is a trademark of Deere & Company

TX,25,SS3777 –19–02OCT02–2/2

Cycle Time Test

Specification

Hydraulic Oil— Temperature .... 50 ± 6°C (120 ± 10°F)

Specification

Engine High Idle—Speed .... 2350 ± 25 rpm

Specification

644H Boom Raise (Bucket flat on ground to full height)—Cycle Time .... 6.8 seconds maximum

Specification

644H MH Boom Raise (Bucket flat on ground to full height)—Cycle Time .... 6.6 seconds maximum

Specification

644H & 644H MH Boom Lower (Full height to ground in float position)—Cycle Time..................................... 3.5 seconds maximum

Specification

644H Bucket Dump (Bucket at full height)—Cycle Time .... 1.7 seconds maximum

Specification

644H MH Bucket Dump (Bucket at full height)—Cycle Time .... 1.4 seconds maximum

Specification

Steering (Frame stop to stop)—Cycle Time .... 2.7 seconds maximum

Specification

Steering Wheel (Frame stop to stop)—Turns .... 3—4 revolutions

CED,TX04577,528 –19–02OCT02–1/1

Service Brake Valve Pressure Test

NOTE: Both brake pedals operate the same brake valve with a mechanical linkage between them. Pressing either brake pedal will give you the same system brake pressure. Brakes are self-bleeding.

SPECIFICATIONS	
Oil Temperature	50 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Brakes Applied Pressure (Maximum)	(3923—4923 kPa) (39—49 bar) (569—714 psi)
Brakes Released Pressure (Maximum)	0 kPa (0 bar) (0 psi)

ESSENTIAL TOOLS
JT05491 Connector (7/16—20 M 37° x 14 M x 1.5 M ORB)

SERVICE EQUIPMENT AND TOOLS
Gauge 0—7 000 kPa (0—70 bar) (0—1000 psi)

1. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

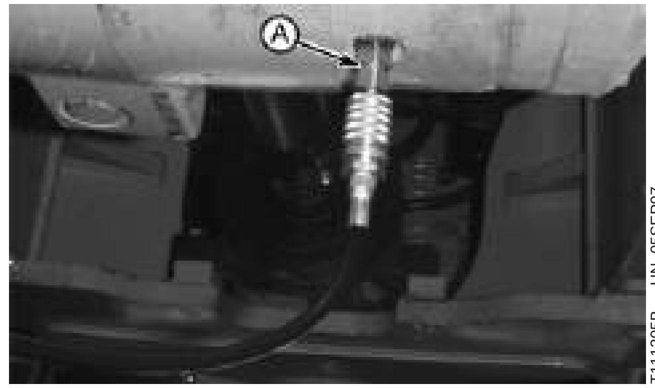
2. Install test fitting and gauge in port (A) located on the **underside** of the front or rear axle.

NOTE: Both brake pedals operate the same brake valve with a mechanical linkage between them. Pressing either brake must give you the same system brake pressure.

3. Heat brake oil to test specifications by warming hydraulic oil. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Oil—Temperature .... 50 ± 6°C (120 ± 10°F)



A—JT05491 Connector (7/16—20 M 37° x 14 M x 1.5 M ORB)

9025
25
48

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3779 –19–10JUL00–1/2

4. Start engine. Slowly apply brake pedal and observe pressure gauge.

Specification	
Engine—Speed	Slow idle

Pressure should slowly increase as pedal is depressed. Record pressure when pedal is at the end of travel.

5. Compare reading to specifications. If specification pressure can not be reached inspect pedal linkage for full travel.

Specification	
Brakes Applied—Pressure (Maximum)	(3923—4923 kPa) (39—49 bar) (569—714 psi)
Brakes Released—Pressure (Maximum)	0 kPa (0 bar) (0 psi)

IMPORTANT: After brake pedal valve test is completed and brake pedal is released pressure must go to a zero reading. If not, excess heat and damage to brakes may occur.

NOTE: If brake pressure can not be modulated or does not meet specifications, See Hydraulic Pump Margin And Low Standby Pressure Adjustment Test in this group. If neutral standby pressure is to specification, replace brake valve.

6. Remove test fittings.

TX,25,SS3779 –19–10JUL00–2/2

Service Brake Accumulator And Brake/PRV Accumulator Precharge Test

NOTE: Both brake pedals operate the same brake valve with a mechanical linkage between them. Pressing either brake pedal will give you the same system brake pressure. Brakes are self-bleeding.

SPECIFICATIONS	
Oil Temperature	50 ± 6°C (120 ± 10°F)
Brakes Accumulator Precharge Pressure (Maximum)	(1138 ± 206 kPa) (11.4 ± 2 bar) (165 ± 30 psi)

ESSENTIAL TOOLS
JT05491 Connector (7/16 -20 M JIC x 14M x 1.5 M ORB)

SERVICE EQUIPMENT AND TOOLS
Gauge 0—7000 kPa (0—70 bar) (0—1000 psi)

This test uses the brake pressure to check accumulator precharge.

The approximate accumulator charge is the gauge pressure reading before a pressure drop of an increment of 345 kPa (3.4 bar) (50 psi) or more.

Continued on next page

CED,TX04577,529 –19–02OCT02–1/4

1. Connect gauge to quick coupler (B) on Pressure Reducing Valve to check precharge pressure in Brake/PRV accumulator.

2. Heat Hydraulic Oil to specification. See Hydraulic Oil Warm-up Procedure in the Group. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 50 ± 6°C (120 ± 10°F)

3. Turn Ride Control and Return to Carry to Dig switches “OFF”.

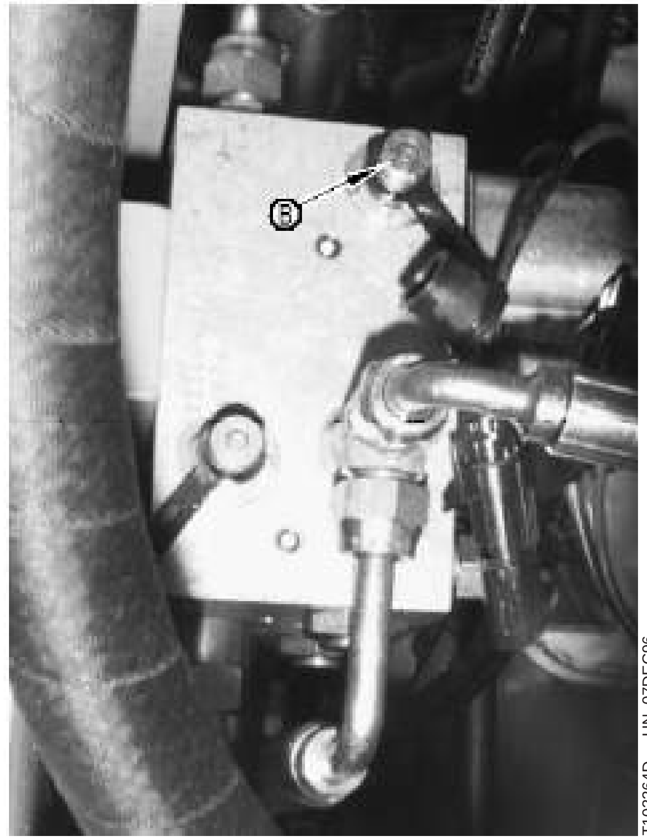
NOTE: Loader bucket must be at rest on ground, boom cylinders will supply a unlimited amount of oil and pressure to brakes if boom is off of ground and accumulator can not be checked.

4. Run engine at slow idle. Operate boom in float. Bucket must be level and resting on the ground. Stop engine.

5. Place boom in float position. Place bucket level on ground.

NOTE: The approximate accumulator charge is the gauge pressure reading before a pressure drop of an increment of 345 kPa (3.4 bar) (50 psi) or more.

6. Hold the boom down switch in the ON position while cycling the boom lever. The pressure will gradually drop at approximately 138 kPa (1.4 bar) (20 psi) per cycle until the accumulator balances pressure between oil and gas which is at approximately 1172 kPa (11.7 bar) (170 psi), it will hold that pressure for a certain amount of time, then drops suddenly to zero.



T103264D –UN–07DEC96

B —Diagnostic Coupler

9025
25
51

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

7. Record this pressure.

Specification

Brakes Accumulator Precharge
Pressure—Pressure (Maximum) .... (1138 ± 206 kPa) (11.4 ± 2 bar)
(165 ± 30 psi)

CED,TX04577,529 –19–02OCT02–3/4

8. Connect gauge to brake pressure test port (A) on **underside** of the front or rear axle.

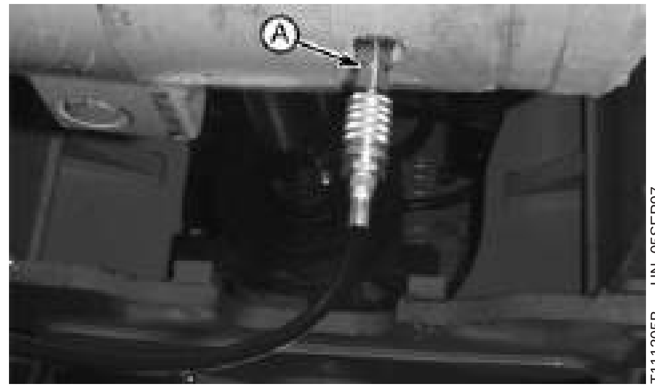
NOTE: When the brake applied pressure drops below 2068 kPa (20 bar) (300 psi) the brake pressure indicator light should come on. The brake applied pressure should gradually drop until the accumulator is discharged.

9. Press brake pedal until maximum pressure is reached, release and apply brake pedal multiple times watching for a pressure drop of 276 kPa (2.8 bar) (40 psi) per pedal cycle. This drop will occur at approximately 1138 kPa (11.4 bar) (165 psi) and hold steady pressure for several pedal cycles, Then drop suddenly to zero.

10. Record pressure.

11. If either accumulator precharge is not to specification Do Brake Accumulator Inlet Test. If okay replace the accumulator. The accumulator can not be recharged.

12. Disconnect pressure gauge. Check axle oil level and adjust as needed. See Check Front and Rear Differential Oil Level in Operators Manual.



T113058 –UN–05SEP97

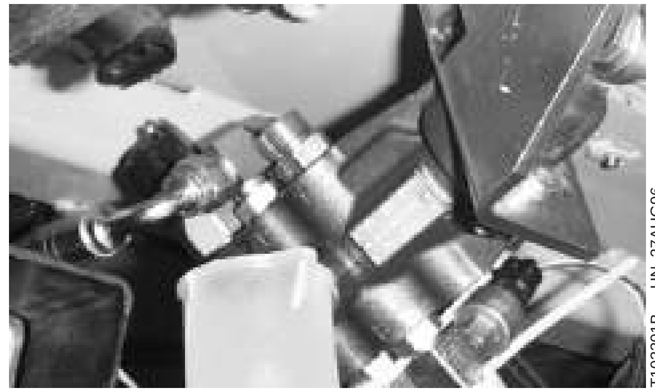
A—JT05491 Connector (7/16 -20 M JIC x 14M x 1.5 M ORB)

CED,TX04577,529 –19–02OCT02–4/4

9025
25
52

https://www.truck-manuals.net/

Service Brake Valve Leakage Test



SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Brake Leakage Flow (Maximum) Released Leakage	14 ml/min (1/2 oz/min) (Maximum)
Brake Leakage Flow (Maximum) Applied Leakage	22 ml/min (3/4 oz/min) (Maximum)

ESSENTIAL TOOLS
38H1146 (-6 M ORFS) (Parker No. 6 PNLO-S) Plug

SERVICE EQUIPMENT AND TOOLS
Approximately 12 oz Measuring Container

1. Heat brake oil to test specifications. (See Hydraulic Oil Warm-up Procedure this group.) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

Specification

Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

2. Stop engine. DO NOT depress brake pedal to discharge accumulator.

3. Disconnect the brake valve return line. Install plug in line.

4. Measure leakage from brake valve return port.

   If leakage is greater than specification, replace brake valve. See Remove And Install Brake Valve in Repair Manual, Group 1060.

Continued on next page

TX,25,SS3780 –19–02OCT02–1/2

Specification

Brake Leakage Flow (Maximum)
Released—Leakage .... 14 ml/min (1/2 oz/min) (Maximum)

Brake Leakage Flow (Maximum)
Applied—Leakage .... 22 ml/min (3/4 oz/min) (Maximum)

TX,25,SS3780 –19–02OCT02–2/2

Brake Accumulator Inlet Check Valve Leakage Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Leakage per minute Leakage	1 mL (16 drops) maximum

ESSENTIAL TOOLS
38H1146 Plug (-6 M ORFS)

SERVICE EQUIPMENT AND TOOLS
Measuring Container
Stop Watch

9025
25
54

1. Heat hydraulic oil up to test specifications. (See Hydraulic Oil Warm-up Procedure this group.) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

   Specification

   Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

2. Loosen accumulator from brackets to allow access to lines.

3. Stop engine. DO NOT depress brake pedal to discharge accumulator.

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,SS3781 –19–02OCT02–1/2

CAUTION: Accumulator inlet check valve is located between inlet fitting and base inlet port. Only remove inlet line from inlet fitting. Removing inlet fitting from base inlet port will cause high pressure oil to be released out accumulator inlet port. To avoid injury from escaping fluid under pressure, stop engine, and relieve the pressure in the system before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

X9811 –UN–23AUG88

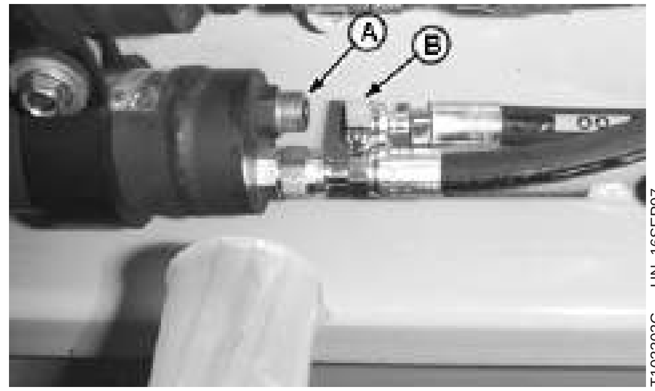
4. Disconnect inlet line (B) from accumulator inlet fitting (A) and plug line.

5. Measure leakage.

Specification

Leakage (maximum) per minute—
Leakage .... 1 mL (16 drops) maximum

If leakage is greater than specification, replace accumulator. See Remove And Install Brake Accumulator in Repair Manual, Group 1060.



T103302C –UN–16SEP97

A—Inlet Fitting
B—Inlet Line

TX,25,SS3781 –19–02OCT02–2/2

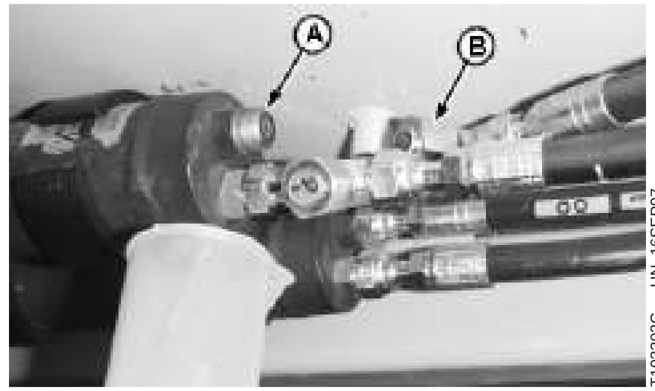
Brake And Pressure Reducing Valve Accumulator Inlet Check Valve Leakage Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Leakage Per minute Leakage	1 mL (16 drops) maximum

ESSENTIAL TOOLS
38H1146 (-6 M ORFS) Plug

SERVICE EQUIPMENT AND TOOLS
Measuring Container
Stop Watch

X9811 –UN–23AUG88



T103303C –UN–16SEP97

A—Inlet Fitting
B—Inlet Line

1. Heat hydraulic oil up to test specifications. (See Hydraulic Oil Warm-up Procedure this group.) Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

   Specification
   Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

2. Stop engine. DO NOT depress brake pedal to discharge accumulator.

3. Loosen accumulator from brackets to allow access to fittings.

9025
25
56

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX04577,530 –19–02OCT02–1/2

CAUTION: Accumulator inlet check valve is located between inlet fitting and base inlet port. Only remove inlet line from inlet fitting. Removing inlet fitting from base inlet port will cause high pressure oil to be released out accumulator inlet port.

To avoid injury from escaping fluid under pressure, stop engine, and relieve the pressure in the system before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

4. Disconnect inlet line (B) from accumulator inlet fitting (A) and plug line.

5. Measure leakage.

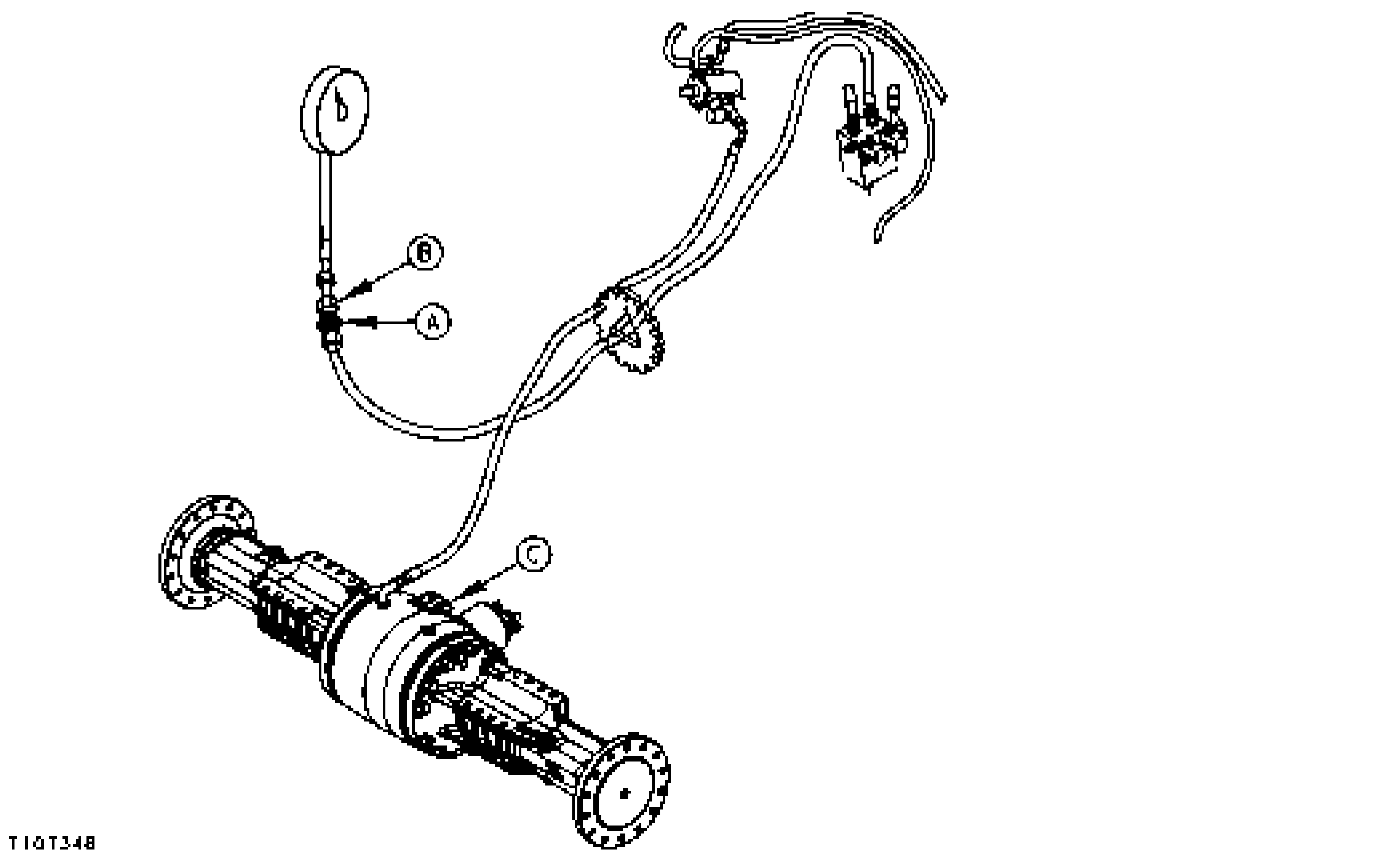
Specification

Leakage Per minute—Leakage .... 1 mL (16 drops) maximum

If leakage is greater than specification, replace accumulator. See Remove And Install Brake Accumulator in Repair Manual, Group 1060.

CED,TX04577,530 –19–02OCT02–2/2

Differential Lock Pressure Test



A—38H1273 Union (—4M ORFS) (Parker No. 4HLO-S)
B—JT03456 Adapter (7/16-20 M JIC X —6 F ORFS)
C—38H1415 Cap (—6F ORFS) (Parker No. 4FNL-S)

SPECIFICATIONS	
Oil Temperature	65 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Differential Lock Pressure	4102—4516 kPa (41—45 bar) (595—655 psi)

ESSENTIAL TOOLS
38H127 Union (—4M ORFS) (Parker No. 34HLO-S)
JT03456 Adapter (7/16-20 M JIC X —6 F ORFS)
38H1415 Cap (—6F ORFS) (Parker No. 4FNL-S)

SERVICE EQUIPMENT AND TOOLS
Gauge 6900 kPa (69 bar) (1000 psi)

NOTE: The differential lock uses pressure oil from the pilot control circuit.

There is no differential lock leakage test. Any internal leakage will flow into the axle sump and increase the oil level until there is leakage at the axle vent. Oil coming out of the vent is the result of differential lock and (or) brake leakage.

1. Connect test gauge to differential lock line at axle.
2. Make test connections.
3. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature.See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

TX,25,WW2320 –19–26AUG96–1/2

Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

4. Heat hydraulic system oil to test specifications. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Oil—Temperature .... 65 ± 6°C (120 ± 10°F)

5. Run engine at slow idle and actuate differential lock.

Specification

Engine—Speed.. Slow idle

6. Pressure must reach test specifications.

Specification

Differential Lock—Pressure .... 4102—4516 kPa (41—45 bar) (595—655 psi)

- If pressure is not to specifications and machine is equipped with differential locks on front and rear axles, install gauge in rear axle and repeat steps 4 and 5 to determine which axle has internal leakage.
- If pressure is not to specification, See Pressure Reducing Valve Pressure Test in this group.

TX,25,WW2320 –19–26AUG96–2/2

Axle And Pin Disconnect Pressure Test (S.N. —571404)

SPECIFICATIONS	
Hydraulic Oil Temperature	65 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Axle & Pin Disconnect Pressure	4102—4516 kPa (41—45 bar) (600—650 psi)

ESSENTIAL TOOLS
JT03456 Adapter (7/16-20 M JIC X —6 F ORFS)
38H1030 Tee (—6 M x —6 F x —6 M ORFS)

SERVICE EQUIPMENT AND TOOLS
Gauge 6900 kPa (69 bar) (1000 psi)

NOTE: Axle and pin disconnect uses pressure oil from the pilot control circuit.

There is no axle disconnect leakage test. Any internal leakage will flow into the axle sump and increase the oil level until there is leakage at the axle vent. Oil coming out of the vent is the result of axle disconnect, differential lock or brake leakage.

9025
25
60

1. Connect test gauge to axle disconnect line at axle or pin disconnect line at loader boom.

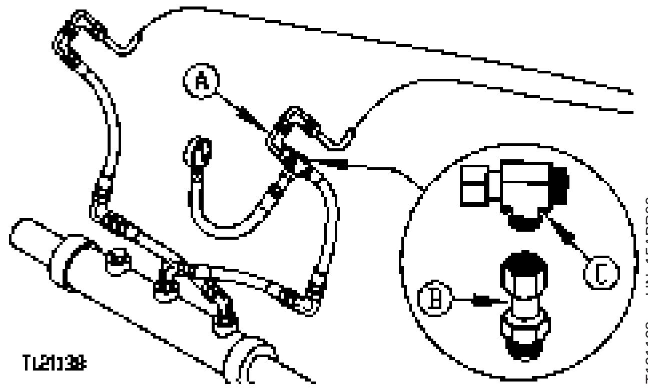
2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

3. Heat hydraulic system oil to test specifications. (See Hydraulic Oil Warm-up Procedure in this group).

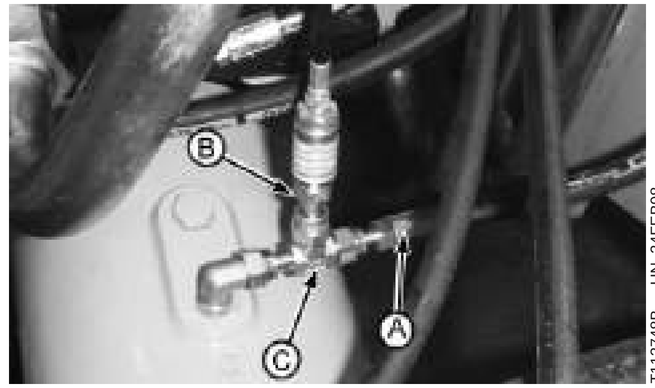
Specification

Hydraulic Oil—Temperature .... 65 ± 6°C (120 ± 10°F)



T121138 –UN–15APR99

Pin Disconnect Pressure Test



T113748B –UN–24FEB98

Axle Disconnect Pressure Test

A—Existing Hydraulic Hose or Line
B—JT03456 Adaptor (7/16—20 M x —6F ORFS)
C—38H1030 Tee (—6 M x —6 F x —6 M ORFS)

https://www.truck-manuals.net/

SERVICE ADVISOR is a trademark of Deere & Company

Continued on next page

CED,TX04577,531 –19–01APR98–1/2

4. Run engine at slow idle and actuate axle disconnect.

Specification

Engine—Speed .... Slow idle

5. Pressure must reach test specifications.

Specification

Axle And Pin Disconnect
Pressure—Pressure .... 4102—4516 kPa (41—45 bar)
(600—650 psi)

If pressure is not to specification, See Pressure Reducing Valve Pressure Test in this group.

CED,TX04577,531 –19–01APR98–2/2

Axle And Pin Disconnect Pressure Test (S.N. 571405—)

SPECIFICATIONS	
Hydraulic Oil Temperature	65 ± 6°C (120 ± 10°F)
Engine Speed	Slow idle
Axle & Pin Disconnect Pressure	6205 ± 34 kPa (62 ± 3.4 bar) (900 ± 50 psi)

ESSENTIAL TOOLS
JT03456 (7/16-20 M JIC X —6 F ORFS) Adapter
38H1030 (—6 M x —6 F x —6 M ORFS) Tee

SERVICE EQUIPMENT AND TOOLS
34 474 kPa (345 bar) (5000 psi) Gauge

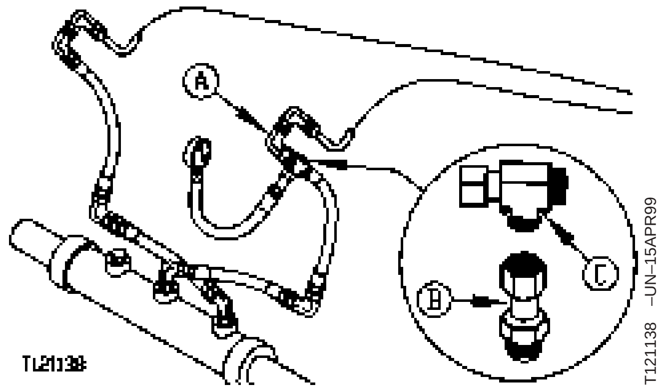
NOTE: The Axle and Pin disconnect circuit operates with reduced pressure oil from the axle and pin disconnect valve block. The valve is located on the left inside of the loader frame. It controls pressure by using an adjustable pressure reducing relief valve. The valve block is sourced with full system pressure from the main pump.

The same valve block is used for both axle disconnect and pin disconnect options. It uses individual solenoids to control desired option.

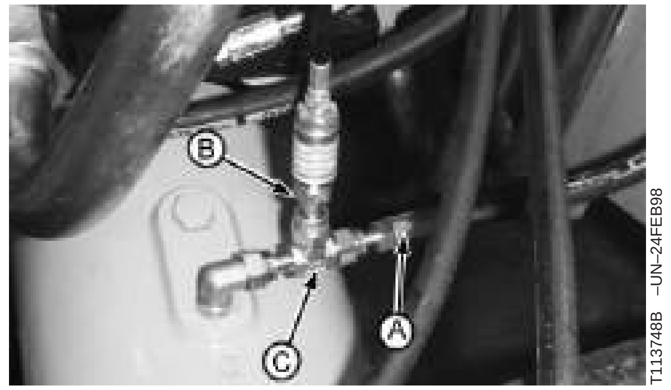
There is no axle disconnect leakage test. Any internal leakage will flow into the axle sump and increase the oil level until there is leakage at the axle vent. Oil coming out of the vent is the result of axle disconnect, differential lock or brake leakage.

1. Connect test gauge to axle disconnect line at axle or pin disconnect line at loader boom.

2. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)



Pin Disconnect Pressure Test



Axle Disconnect Pressure Test

A—Existing Hydraulic Hose
B—JT03456 Adaptor (7/16—20 M x —6F ORFS)
C—38H1030 Tee (—6 M x —6 F x —6 M ORFS)

9025
25
62

Continued on next page

CED,TX04577,531 –19–01APR98–1/3

Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

3. Heat hydraulic system oil to test specifications. (See Hydraulic Oil Warm-up Procedure in this group).

Specification

Hydraulic Oil—Temperature .... 65 ± 6°C (120 ± 10°F)

NOTE: When this test is performed it is important to have system pressure higher than low standby for checking pin and axle disconnect pressure reducing relief valve setting which is higher than low standby specification. Boom or bucket function may have to be operated to increase system pressure which sources the axle and pin disconnect valve.

4. Run engine at slow idle. Operate boom or bucket function while actuating axle disconnect.

Specification

Engine—Speed .... Slow idle

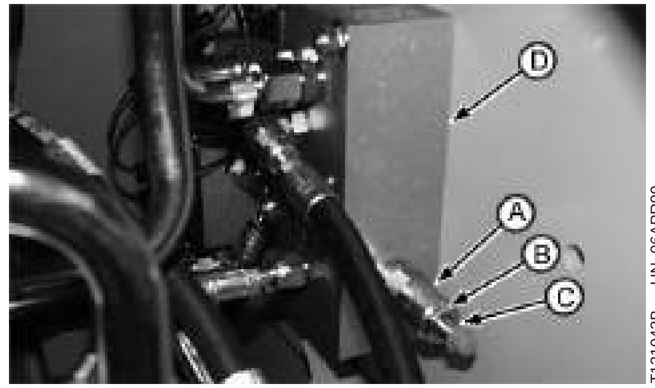
CED,TX04577,531 –19–01APR98–2/3

5. Pressure must reach test specifications.

Specification

Axle And Pin Disconnect
Pressure—Pressure .... 6205 ± 345 kPa (62 ± 3.4 bar)
(900 ± 50 psi)

If not to specification, adjust pressure reducing relief valve (A) by loosening hex nut (B) and turning adjusting screw (C). This valve is located in the Axle and Pin Disconnect Valve Block (D) on left inside of loader frame.



T121042B –UN–06APR99

Axle And Pin Disconnect Valve

A—Pressure Reducing Relief Valve Cartridge
B—Hex Nut
C—Adjustment Screw
D—Axle and Pin Disconnect Valve Block

CED,TX04577,531 –19–01APR98–3/3

Pressure Reducing Valve Manifold Leakage Test

SPECIFICATIONS	
Oil Temperature	40 ± 6°C (100 ± 10°F)
Engine Speed	Slow idle
Leakage (Maximum)	3785 mL/min (1 gal/min)

ESSENTIAL TOOLS
38H1146 Plug (—6 M ORFS)
38H1146 Plug (—6 M ORFS)

SERVICE EQUIPMENT AND TOOLS
Measuring Container
Stop Watch
Measuring Container
Stop Watch

This test will check for excessive leakage in the pressure reducing valve manifold.

Continued on next page TX,9020,UU1255 –19–02OCT02–1/2

1. Use the monitor or SERVICE ADVISOR™ system to read engine rpm and hydraulic oil temperature. See Monitor Display Unit—Diagnostics Menu—Hydraulic Sensors (d 06). (Group 9015-15)

   Or access Hydraulic Oil Tests SERVICE ADVISOR system template. (See SERVICE ADVISOR system Computer Connection (S.N. —573732) or (S.N. 573733—) in PDM kit instructions)

2. Heat oil to test specification. (See Hydraulic Oil Warm-up Procedure in this group.)

Specification

Oil—Temperature .... 40 ± 6°C (100 ± 10°F)

3. Disconnect pressure regulating manifold-to-reservoir return line. Install plug (A) in line.

4. Run engine at specification.

Specification

Engine—Speed .... Slow idle

   a. With differential lock ON.

   b. With differential lock OFF.

   c. Observe flow with differential lock ON, then OFF.

   d. With Pilot Enable ON.

   e. With Pilot Enable OFF.

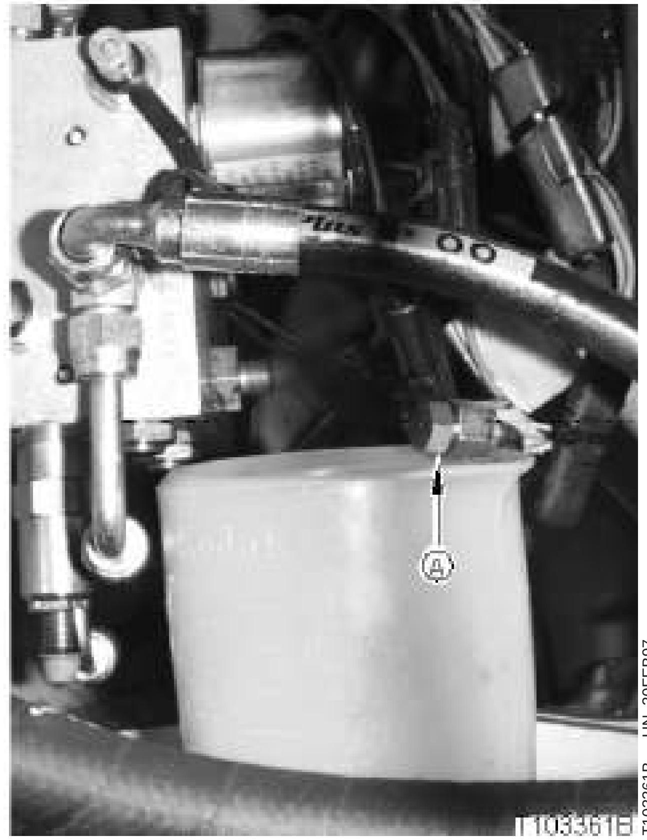
Measure flow from valve for 1 minute in each switch position.

In following positions:

If flow from valve exceeds specification, pressure reducing valve or seals may be damaged. If flow changes when differential lock is turned ON then OFF, differential lock solenoid valve or seals may be damaged. Replace as necessary.

Specification

Differential Lock Solenoid Valve—
Leakage (Maximum)... 3785 mL/min (1 gal/min)



T103361B –UN–20FEB97

A—38H1146 Plug (—6 M ORFS)

9025
25
65

SERVICE ADVISOR is a trademark of Deere & Company

TX,9020,UU1255 –19–02OCT02–2/2

Hydraulic Oil Filter Inspection Procedure

T6238AK –UN–13MAR89

1. Remove filter.

2. Pour oil out of filter to inspect for water contamination.

3. Use an oil filter cutting tool to cut top off filter.

4. Remove element and inspect for metal particles and debris in bottom of filter can.

5. Excessive amounts of brass and steel particles can indicate a failed hydraulic pump or a pump failure in process. A rubber type of material can indicate cylinder packing failure.

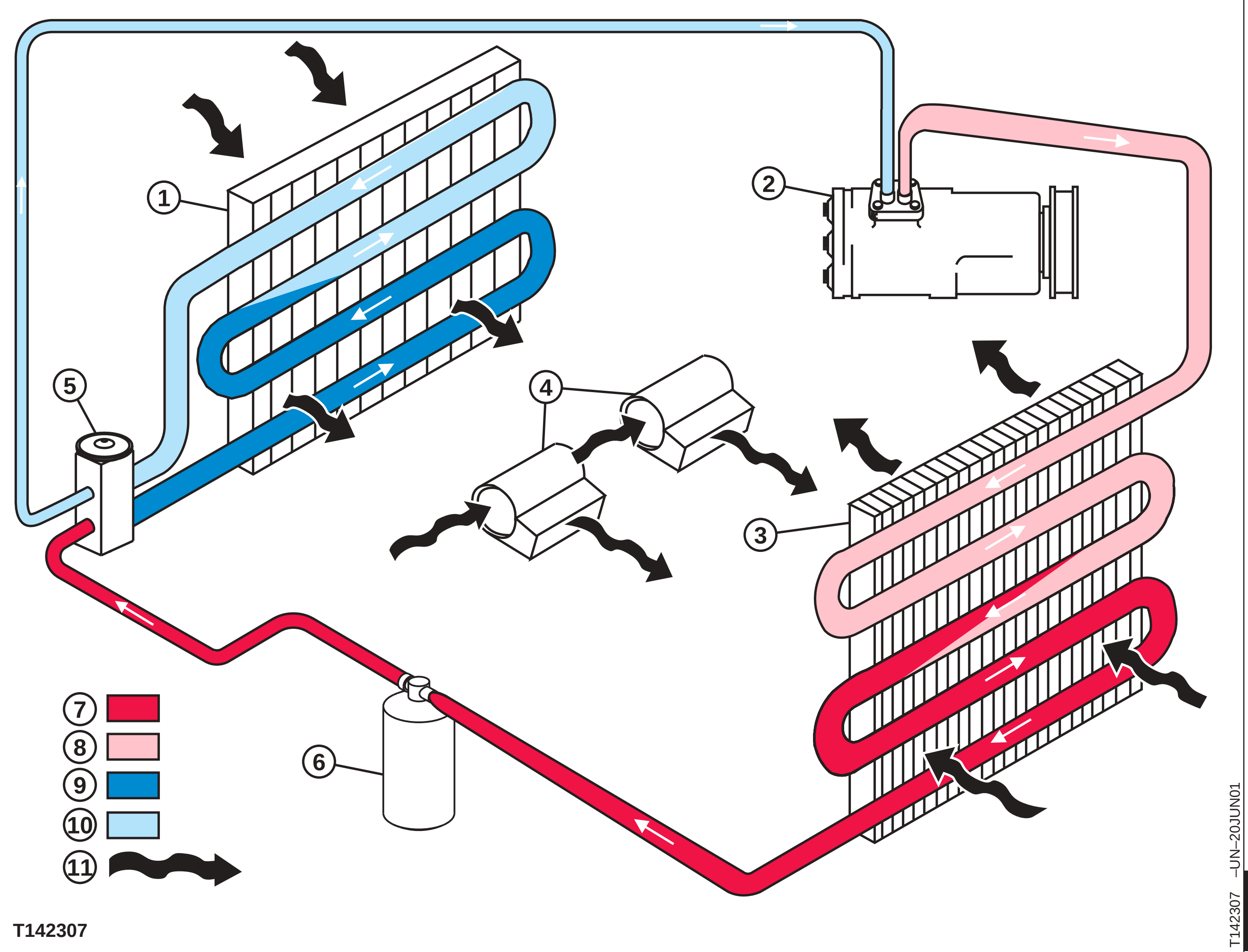
TX,902525,EE25 –19–16SEP92–1/1

Section 9031
Heating And A/C

Contents

9031

Air Conditioning System Cycle Of Operation



T142307

1—Evaporator Core
2—Compressor
3—Condenser Core
4—Circulation Blower Motor
5—Expansion Valve
6—Receiver-drier
7—High Pressure Liquid
8—High Pressure Gas
9—Low Pressure Liquid
10—Low Pressure Gas
11—Air Flow

The compressor is belt driven and engaged by an electro-magnetic clutch. The air conditioning circuit automatically controls compressor engagement or disengagement when system is in operation. See System Functional Schematic, SE17. (Group 9015-10.)

Compressor draws low pressure gas from evaporator and compresses it into high pressure gas. This causes temperature of refrigerant to rise higher than that of outside air.

High pressure gas leaves compressor and flows through condenser where heat is removed and transferred to outside air being drawn through condenser core by fan. Cooling refrigerant causes it to condense and refrigerant leaves condenser as high pressure liquid.

Continued on next page

OUO1065,0000531 –19–14MAY01–1/2

High pressure liquid flows into receiver-drier where moisture and contaminants (acid, solids, etc.) are removed. Receiver-drier may contain a color moisture indicator. (Blue) indicates no moisture is present. (Pink) indicates moisture is present. Should moisture be combined with refrigerant, hydrofluoric and hydrochloric acids are formed. These acids are very corrosive to metal surfaces and leakage will eventually develop. Receiver-drier also stores refrigerant allowing a longer period of time before additional refrigerant is needed. Refrigerant hoses allow a small amount of refrigerant to migrate through their walls.

Refrigerant flows from receiver-drier through expansion valve to evaporator. Expansion valve senses refrigerant temperature and pressure to modulate refrigerant flow. Expansion valve changes refrigerant to low pressure liquid entering evaporator. Actual cooling and drying of cab air takes place at evaporator. Heat absorbed by evaporator and transferred to refrigerant causes refrigerant to vaporize into low pressure gas. Low pressure gas is drawn from evaporator by compressor and cycle is repeated.

A freeze control switch senses temperature of evaporator coil through a capillary tube. This prevents the evaporator from becoming cold enough to freeze moisture that condenses on evaporator coil. Condensed moisture is drained away through drain tubes connected to drain pan under evaporator.

System pressure is monitored by high and low pressure switch(es), located on high pressure side of expansion valve. If pressure becomes too high or too low the switch opens and stops compressor, interrupting the cycle.

Accumulator (if equipped) is located between evaporator and compressor in low pressure gas hose to retain a quantity of oil to protect compressor from a dry start after long periods of not being used.

See Blower And A/C Harness (W20) Component Location. (Group 9015-10.) for location of machine heater and A/C components.

OUO1065,0000531 –19–14MAY01–2/2

Diagnose Air Conditioning System Malfunctions

NOTE: 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 Checkout to verify symptom.

Step 2. Diagnose Malfunctions Chart for possible problems of symptoms.

Step 3. Electrical Operational Checkout to verify problem.

Step 4. Tests

Symptom	Problem	Solution
Air Conditioning System Does Not Operate	Blower Motor 25A Fuse (F19)	Replace fuse. See Fuse and Relay Specifications. (Group 9015-10.)
	Pressurizer Motor 7.5A Fuse (F20)	Replace fuse. See Fuse and Relay Specifications. (Group 9015-10.)
	Blower/Pressurizer Motor Relay (K19)	Check Blower/Pressurizer Motor Relay. See Fuse and Relay Specifications. (Group 9015-10.)
	Blower Speed Switch (S21)	Check Blower Speed Switch. See System Functional Schematic. (Group 9015-10.)
	Blower Speed Resistor (R3)	Check Blower Speed Resistor. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Main Blower Motor (M6)	Check Main Blower Motor. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Pressurizer Blower Motor (M7)	Check Pressurizer Blower Motor. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)

Continued on next page
CED,OUOE012,234 –19–02AUG99–1/3

9031
15
1

Symptom	Problem	Solution
	A/C On/Off Switch (S22)	Check A/C On/Off Switch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Freeze Control Switch (B35)	Check Freeze Control Switch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	A/C Low Pressure Switch (B36)	Check Air Conditioner Low Pressure Switch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	A/C High Pressure Switch (B37)	Check Air Conditioner High Pressure Switch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	A/C Compressor Clutch (Y16)	Check Air Conditioner Clutch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	A/C Clutch 1A Diode (V11)	See Air Conditioning Compressor Clutch Diode. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Wiring harness	See Connectors For Blower And A/C Harness (W20). (Group 9015-10.)
Air Conditioner Does Not Cool Interior of Cab	Fresh air filter clogged	Clean or replace filter
	Condenser fins clogged with debris	Clean condenser fins
	Recirculating air filter clogged	Clean or replace filter
	Refrigerant hose kinked, pinched or collapsed	Re-route or re-index hoses, replace kinked or collapsed hoses
	Heater or evaporator core fins clogged with dirt or dust	Clean heater or evaporator core fins

Continued on next page CED,OUOE012,234 –19–02AUG99–2/3

Symptom	Problem	Solution
	Blower motor failed or operating too slowly	Check Pressurizer Blower Motor. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Compressor belt slipping or failed	Inspect and/or replace compressor clutch
	Warm outside air leaking into cab	Inspect, repair or replace door and window seals
	Heater valve remaining open	Inspect, repair, adjust or replace heater valve or cable
	System refrigerant (R134a) charge low	Inspect system for leaks, then recharge. See Charge R134a System. (Go to Group 18-1830 in Repair Manual.)
	Evaporator fins frosting or freezing	Thermostat switch capillary tube not positioned correctly in evaporator core
Air Conditioner Runs Constantly, Too Cold	A/C Thermostat Switch capillary tube not positioned in evaporator properly	Reposition capillary tube in evaporator core
	Compressor clutch engaged constantly	See Freeze Control Switch. (Go to Group 9031-10.)
Interior Windows Continue To Fog	Fresh air filter clogged	Clean or replace filter
	A/C system off	Turn A/C ON/OFF switch ON

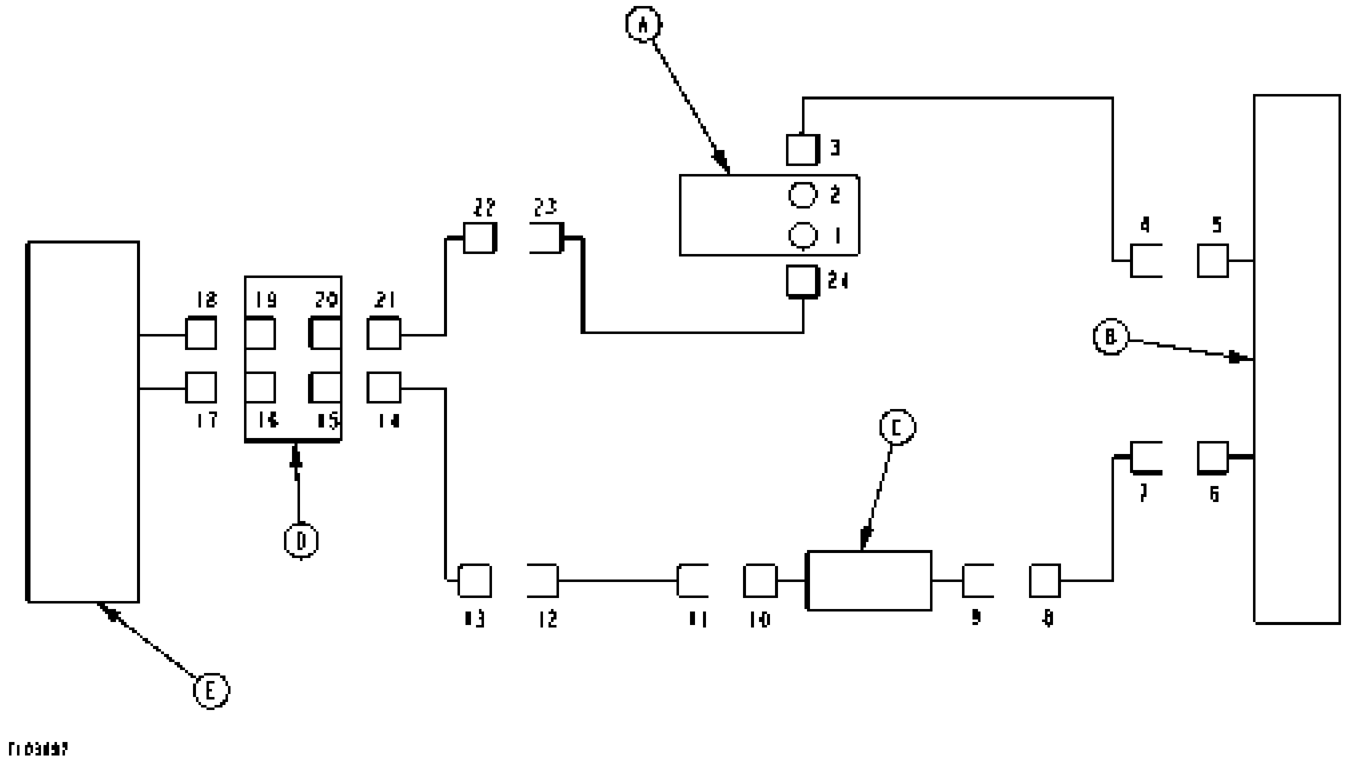
CED,OUOE012.234 –19–02AUG99–3/3

Diagnose Heater System Malfunctions

Symptom	Problem	Solution
Heater System Does Not Operate	Blower motor fuse	Replace circuit breaker. See Fuse and Relay Specifications. (Group 9015-10.)
	Blower speed switch	Check Blower Speed Switch. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Wiring harness	Check wiring harness
Heater Does Not Warm Interior Of Cab	Fresh air filter clogged	Clean or replace filter
	Recirculating air filter clogged	Clean or replace filter
	Heater hose kinked, pinched or collapsed	Re-route or re-index hoses, replace collapsed hoses
	Heater core fins clogged with dirt or dust	Clean heater fins
	Main blower motor failed or operating too slowly	Check Main Blower Motor. See Blower And A/C Harness (W20) Component Location. (Group 9015-10.)
	Heater valve remaining closed	Inspect, repair, adjust or replace heater valve or cable
Interior Windows Continue To Fog	Fresh air filter clogged	Clean or replace filter
	A/C system off (if equipped)	Turn A/C ON/OFF switch ON (if equipped)

TX,15,JC1693 –19–11NOV96–1/1

Air Conditioning System Fittings Reference Chart



T103692 –UN–16SEP96

A—Compressor
B—Condenser
C—Receiver-Dryer
D—Expansion Valve
E—Evaporator

SERVICE EQUIPMENT AND TOOLS
JT02098 Flush Fitting Kit

The JT02098 Flush Fitting Kit contains fittings for flushing or leak testing sections or individual components to the air conditioning system. Following chart lists service fittings used at each specific location.

Continued on next page CED,OUOE012,235 –19–02AUG99–1/2

Location	Size	ServiceGard Number	O-Ring Number
Compressor Manifold:			
1. Suction Port (F)	7/8—18	JT02099	R113050
2. Discharge Port (F)	3/4—18	JT02100	
Compressor Discharge Hose:			
3. Inlet End (M)	3/4—18	JT02102	R113050
4. Outlet End (F)	3/4—18	JT02100	R113050
Condenser:			
5. Inlet Port (M)	3/4—18	JT02102	
6. Outlet Port (M)	5/8—18	JT03183	
Condenser to Receiver-Dryer Hose:			
7. Inlet End (F)	5/8—18	JT03188	R10093
8. Outlet End (M)	5/8—18	JT03197	R10093
Receiver-Dryer:			
9. Inlet Port (F)	5/8—18	JT03196 or JT02110	
10. Outlet Port (M)	5/8—18	JT03183	
Receiver-Dryer to Evaporator Hose:			
11. Inlet End (F)	5/8—18	JT03188	R10093
12. Outlet End (M)	5/8—18	JT03183	
A/C Inlet Tube			
13. Inlet End (F)	5/8—18	JT03188	R10093
14. Outlet End (M)	3/8	JT02106 and JT02104	R10093
Expansion Valve:			
15. Liquid Inlet (F)	3/8	JT02103	
16. Liquid Outlet (F)	1/2	JT02104	
19. Gas Inlet (F)	5/8	JT02105	
20. Gas Outlet (F)	3/4	JT02147	
Evaporator Core:			
17. Inlet Tube (M)	1/2	JT02106 and JT02103	R113050
18. Outlet Tube (M)	5/8	JT02106 and JT02105	R33259
A/C Outlet Tube:			
21. Inlet End (M)	3/4	TEV and JT02105	T143169
22. Outlet End (F)	1-1/16—14	Not Available	T143169
Evaporator to Compressor Hose			
23. Inlet End (M)	1-1/16—14	Not Available	
24. Outlet End (M)	7/8—18	JT02101	R33259

9031
25
2

CED,OUOE012,235 –19–02AUG99–2/2

Proper Refrigerant Handling

The U.S. Environmental Protection Agency prohibits discharge of any refrigerant into the atmosphere, and requires that refrigerant be recovered using the approved recovery equipment.

IMPORTANT: Use correct refrigerant recovery, recycling and charging stations. DO NOT use refrigerant, hoses, fittings, components or refrigerant oils intended for use with R12 refrigerant.

Recovery, recycling and charging stations for R12 and R134a refrigerants MUST NOT be interchanged. Systems containing R12 refrigerant use a different oil than systems using R134a. Certain seals are not compatible with both types of refrigerants.

MODTX9031QQ2009 –19–19AUG94–1/1

R134a Refrigerant Cautions

SPECIFICATIONS	
Maximum Amount To Heat Refrigerant In Closed Container Temperature	52°C (125°F)

CAUTION: DO NOT allow liquid refrigerant to contact eyes or skin. Liquid refrigerant will freeze eyes or skin on contact. Wear goggles, gloves and protective clothing.

If liquid refrigerant contacts eyes or skin, DO NOT rub the area. Splash large amounts of COOL water on affected area. Go to a physician or hospital immediately for treatment.

DO NOT allow refrigerant to contact open flames or very hot surfaces such as electric welding arc, electric heating element and lighted smoking materials.

DO NOT heat refrigerant over 52°C (125°F) in a closed container. Heated refrigerant will develop high pressure which can burst the container.

Specification
Maximum Amount To Heat Refrigerant In Closed Container—Temperature .... 52°C (125°F)

Keep refrigerant containers away from heat sources. Store refrigerant in a cool place.

DO NOT handle damp refrigerant container with your bare hands. Skin may freeze to container. Wear gloves.

If skin freezes to container, pour COOL water over container to free the skin. Go to a physician or hospital immediately for treatment.

TX,9031,JC1705 –19–12NOV96–1/1

Refrigerant Hoses And Tubing Inspection

When a component is disconnected from the system, special care should be given to inspecting hoses and tubing for moisture, grease, dirt, rust, or other foreign material. If such contamination is present in hoses, tubing, or fittings and cannot be removed by cleaning, then replace parts.

Fittings that have grease or dirt on them should be wiped clean with a cloth dampened with alcohol. Chlorinated solvents (such as trichloroethylene) are contaminants, and must not be used for cleaning.

To assist in making leak-proof joints, use a small amount of clean correct viscosity refrigerant oil on all hose and tube connections. Dip O-rings in correct viscosity oil before assembling.

IMPORTANT: Hose used for air conditioning systems contains special barriers in its walls to prevent migration of refrigerant gas.

DO NOT use hydraulic hoses as replacement hoses in the air conditioning system. Use ONLY certified hose meeting SAE J51B requirements.

MODTX9031QQ1882 –19–17JUN94–1/1

R134a Air Conditioning System Test

SPECIFICATIONS	
Cab Position	Open
Engine rpm	2000 rpm
Temperature Control Switch Position	Maximum
Blower Speed	High
Run Unit Time	At least 5 minutes

ESSENTIAL TOOLS
JT02045 R134a Refrigerant Recovery/Recycling and Charging Station

Ambient Temperature	Air Duct Temperature	Low Pressure Gauge	High Pressure Gauge
15.6—21.1°C (60—70°F)	10°C (50°F)	48.3—103 kPa	655—862 kPa
(0.48—1.03 bar)	(6.55—8.62 bar)		
(7—15 psi)	(95—125 psi)		
21.1—26.7°C (70—80°F)	11°C (52°F)	68.9—124 kPa	724—1275 kPa
(0.69—1.24 bar)	(7.24—12.76 bar)		
(10—18 psi)	(105—185 psi)		
26.7—32.2°C (80—90°F)	12.8°C (55°F)	82.7—138 kPa	827—1620 kPa
(0.83—1.38 bar)	(8.27—16.20 bar)		
(12—20 psi)	(120—235 psi)		
32.2—37.8°C (90—100°F)	15.6°C (60°F)	103—152 kPa	1241—1861 kPa
1.03—1.52 bar)	12.41—18.62 bar)		
(15—22 psi)	(180—270 psi)		
37.8—43.4°C (100—110°F)	18.3°C (65°F)	117—172 kPa	1586—1999 kPa
(1.17—1.72 bar)	(15.86—19.99 bar)		
(17—25 psi)	(340—290 psi)		

NOTE: JTO2046 and JTO2050 Recovery and Charging Stations can be substituted for the JTO2045 station.

IMPORTANT: Use correct refrigerant recovery, recycling and charging stations. DO NOT use refrigerant, hoses, fittings, components or refrigerant oils intended for R12 refrigerant.

1. Connect refrigerant recovery, recycling and charging station. See R134a Refrigerant Recovery, Recycling And Charging Station Installation Procedure. (Go to this group.)

Continued on next page

TX,9031,JC1706 –19–12NOV96–1/3

2. Close both low and high pressure valves on refrigerant recovery, recycling and charging station.

3. Open cab doors and windows.

Specification

Cab—Position .... Open

TX,9031,JC1706 –19–12NOV96–2/3

4. Start engine and run at rated engine speed.

Specification

Engine—rpm .... 2000 rpm

5. Turn temperature control switch to the maximum cooling position.

Specification

Temperature Control Switch—
Position .... Maximum

6. Turn blower switch to high speed.

Specification

Blower—Speed .... High

7. Check sight glass in receiver-dryer to condenser line.

8. Run unit for at least 5 minutes.

Specification

Run Unit—Time .... At least 5 minutes

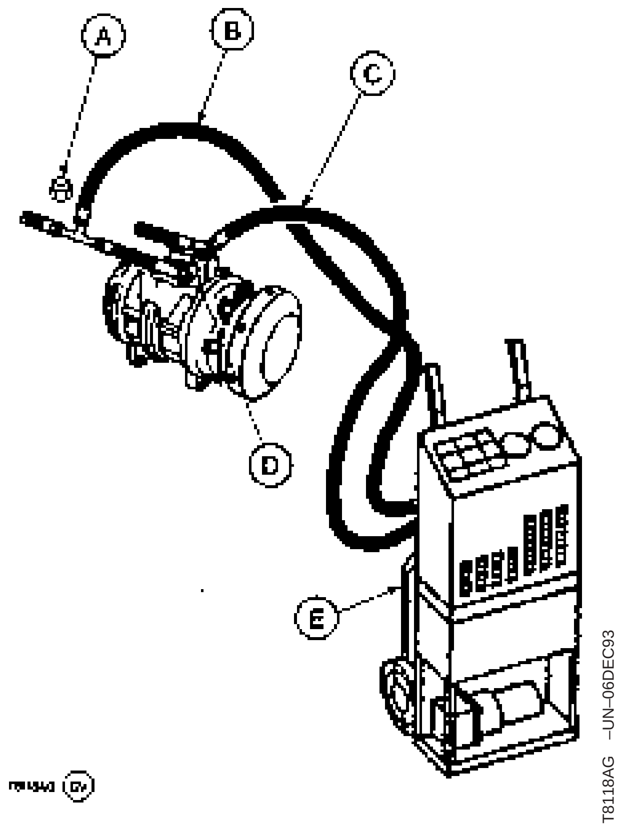
9. Measure air temperature at condenser air inlet and at air ducts in air conditioning unit.

10. Compare air duct temperature reading to the temperatures shown in the specifications.

11. Observe low-side pressure (C) and high-side pressure (B) on gauges.

12. Compare pressure readings to the pressure shown in specifications.

See Operating Pressure Diagnostic Chart. (This Group.)



A—High Pressure Hose Charge Port Cap
B—Red Hose (High Pressure)
C—Blue Hose (Low Pressure)
D—High Pressure Relief Valve
E—Refrigerant Recovery/Recycling and Charging System

TX,9031,JC1706 –19–12NOV96–3/3

Operating Pressure Diagnostic Chart

NOTE: Inspection of the sight glass will not give proper indicators of air conditioning concerns on R134a systems.

OPERATING PRESSURE DIAGNOSTIC CHART			
Low Side Pressure	**High Side Pressure**	**Problem**	**Solution**
Low	Low or Normal	Loss of refrigerant.	Leak in system. Do leak test. Add refrigerant. Normal migration through hoses. Add refrigerant.
Low	Low or Normal	Loss of refrigerant.	Leak in system. Do leak test. Repair leak. Add refrigerant in this group.
Low	Low or Normal	Loss of refrigerant.	Normal migration through hoses. Add refrigerant in this group
Low	Low or Normal	Restriction in system: 1. Between compressor and condenser. 2. Inside condenser. 3. Between condenser and receiver/dryer. 4. Inside receiver/dryer.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
Low	Low or Normal	Blower motor running too slow.	Check for motor shaft binding or defective electrical connections.
Low	Low or Normal	Evaporator core dirty or air flow through evaporator restricted.	Clean evaporator and straighten fins.
Low	Low or Normal	Expansion valve malfunction.	Replace expansion valve.
Low	Low or Normal	Restriction in system: 1. Between receiver/dryer and expansion valve. 2. Between expansion valve and evaporator. 3. Between evaporator and compressor.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
Low	Low or Normal	Moisture in system.	Remove refrigerant using recovery method, evacuate and charge the system. See Recover R134a System.See Evacuate R134a System. See Charge R134a System. (Go to Group 1830 in Repair Manual.)
Low	High	Restriction in system: 1. Between compressor and condenser. 2. Inside condenser. 3. Between condenser and receiver/dryer. 4. Inside receiver/dryer. 5. Between receiver/dryer and expansion valve.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
Normal	Normal	Heater valve not closing.	Close heater shut-off valve on engine block or clamp heater hoses shut

Continued on next page

TX,9031,SS3610 –19–07JUL00–1/3

9031
25
7

OPERATING PRESSURE DIAGNOSTIC CHART			
Low Side Pressure	**High Side Pressure**	**Problem**	**Solution**
Normal	Normal	Expansion valve malfunction.	Replace expansion valve.
Normal	Normal	Moisture in system (intermittent cooling below 27°C [80°F] ambient).	Remove refrigerant using recovery method, evacuate and charge the system. See Recover R134a System. See Evacuate R134a System. See Charge R134a System. (Go to Group 1830 in Repair Manual.)
Normal	Normal	Loss of refrigerant.	Leak in system. Do leak test. Repair leak. Add refrigerant.
Normal	Normal	Loss of refrigerant	Normal migration through hoses. Add refrigerant in this group.
Normal	Normal	Air is system.	Remove refrigerant using recovery method, evacuate and charge the system. See Recover R134a System. See Evacuate R134a System. See Charge R134a System. (Go to Group 1830 in Repair Manual.)
Normal	High	Restricted air flow through condenser or radiator.	Inspect for debris. Straighten fins.
Normal	High	Overcharge of refrigerant.	Start engine and run at fast idle. Operate air conditioner at maximum cooling. Remove refrigerant from low-side of system using recovery operation until bubbles appear in sight glass. Add 0.7 kg (1.5 lb) of refrigerant through low-side valve.
Normal	High	Expansion valve malfunction.	Replace expansion valve.
Normal	High	Restriction in system: 1. Between compressor and condenser. 2. Inside condenser. 3. Between condenser and receiver/dryer. 4. Inside receiver/dryer.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
Normal	High	Restriction in system: 1. Between compressor and condenser. 2. Inside condenser. 3. Between condenser and receiver/dryer. 4. Inside receiver/dryer.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
High	Low	Compressor belt loose.	Tighten belt.
High	Low	Compressor clutch slipping.	Check for battery voltage at compressor clutch with clutch engaged. Clean electrical connections or replace relay.
High	Low	Compressor clutch slipping.	Inspect and repair clutch.
High	Low	Compressor failure.	Test compressor efficiency. (See procedure in Group 1830 of Repair Manual.)
High	Normal	Expansion valve malfunction.	Replace expansion valve.
High	High	Restricted air flow through condenser or radiator.	Inspect for debris. Straighten fins.

9031
25
8

Continued on next page TX,9031,SS3610 –19–07JUL00–2/3

OPERATING PRESSURE DIAGNOSTIC CHART			
Low Side Pressure	**High Side Pressure**	**Problem**	**Solution**
High	High	Expansion valve malfunction.	Replace expansion valve.
High	High	Overcharge of refrigerant.	Start engine and run at fast idle. Operate air conditioner at maximum cooling. Remove refrigerant from low-side of system using refrigerant recovery method until bubbles appear in sight glass. Add 0.7 kg (1.5 lb) of refrigerant through low-side valve.
High	High	Restriction in system:	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.
High	High	Air in system.	Remove refrigerant using recovery method, evacuate and charge the system. See Recover R134a System.See Evacuate R134a System. See Charge R134a System. (Go to Group 1830 in Repair Manual.)
High	High	Restriction in system: 1. Between compressor and condenser. 2. Inside condenser. 3. Between condenser and receiver/dryer. 4. Inside receiver/dryer.	Inspect for bent, kinked, or dented lines. Feel lines for a temperature change. Remove refrigerant by recovery method. Inspect and clean each component.

TX,9031,SS3610 –19–07JUL00–3/3

Low Pressure Switch Test

SPECIFICATIONS	
Low Pressure Switch Opening Pressure	173 ± 35 kPa (1.73 ± 0.3 bar) (25 ± 5 psi)
Low Pressure Switch (Normally Open) Closing Pressure	345 ± 35 kPa (3.45 ± 0.3 bar) (50 ± 5 psi)

ESSENTIAL TOOLS
JT02148 Straight Connector

SERVICE EQUIPMENT AND TOOLS
Multimeter

NOTE: *Low pressure switch is normally open when removed from machine. When installed the switch becomes closed because of normal system pressure.*

- Turn key switch ON but DO NOT start engine. Turn blower switch ON. Turn temperature control switch to the maximum cooling position.
- Disconnect and connect low pressure switch at harness connector. Compressor clutch must engage and disengage (click).

NOTE: *The line that attaches the low pressure switch has a valve to prevent discharging the air conditioning system when switch is removed.*

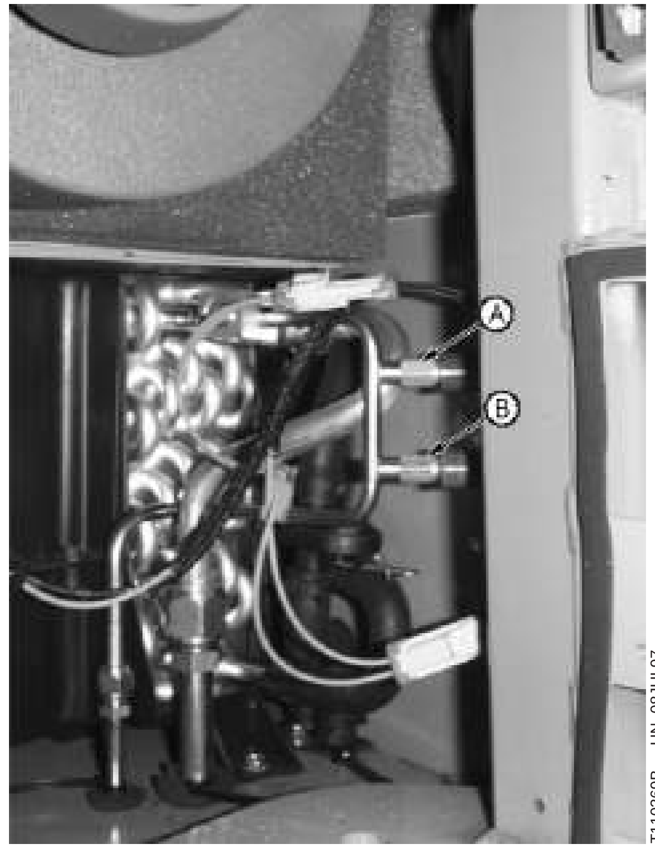
- Disconnect harness from switch and remove switch from line. Connect low pressure switch to harness.

9031
25
10

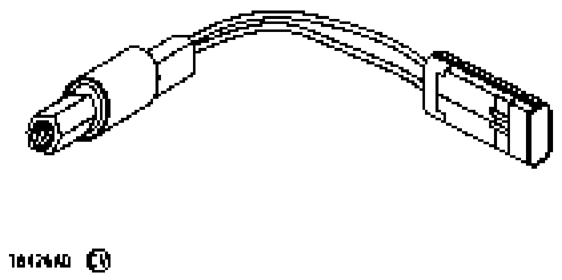
Specification
Low Pressure Switch—Opening Pressure .... 173 ± 35 kPa (1.73 ± 0.3 bar) (25 ± 5 psi)
Low Pressure Switch (Normally Open)—Closing Pressure.................... 345 ± 35 kPa (3.45 ± 0.3 bar) (50 ± 5 psi)

Compressor clutch must not engage (click).

- The actual pressure setting of switch can be checked by connecting it to a pressure source such as a regulated air supply or dry nitrogen.



T110369B –UN–08JUL97



T8426AD –UN–06MAR95

A—Low Pressure Switch
B—High Pressure Switch

Continued on next page TX18076,0000014 –19–14NOV00–1/2

- Switch must not have continuity between terminals until pressure increases to switch closing pressure specification. Slowly release pressure. Switch must have continuity until pressure decreases to switch opening pressure specification.

TX18076,0000014 –19–14NOV00–2/2

High Pressure Switch Test

SPECIFICATIONS	
High Pressure Switch Opening Pressure	2760 ± 138 kPa (27.6 ± 1.38 bar) (400 ± 20 psi)
High Pressure Switch (Normally Closed) Closing Pressure	1310 ± 138 kPa (13.11 ± 1.38 bar) (190 ± 20 psi)

ESSENTIAL TOOLS
JT02148 Straight Connector For Switch Testing

SERVICE EQUIPMENT AND TOOLS
Multimeter

ESSENTIAL TOOLS
JT02148 Straight Connector For Switch Testing

SERVICE EQUIPMENT AND TOOLS
Multimeter

NOTE: The line that attaches the high pressure switch has a valve installed to prevent discharging the air conditioning system when switch is removed. The high pressure switch is normally closed when removed from the machine. It does not open when installed in the A/C system until pressure exceeds specification.

- Remove high pressure switch.
- Connect a portable pressure source, such as dry nitrogen, to high pressure switch.

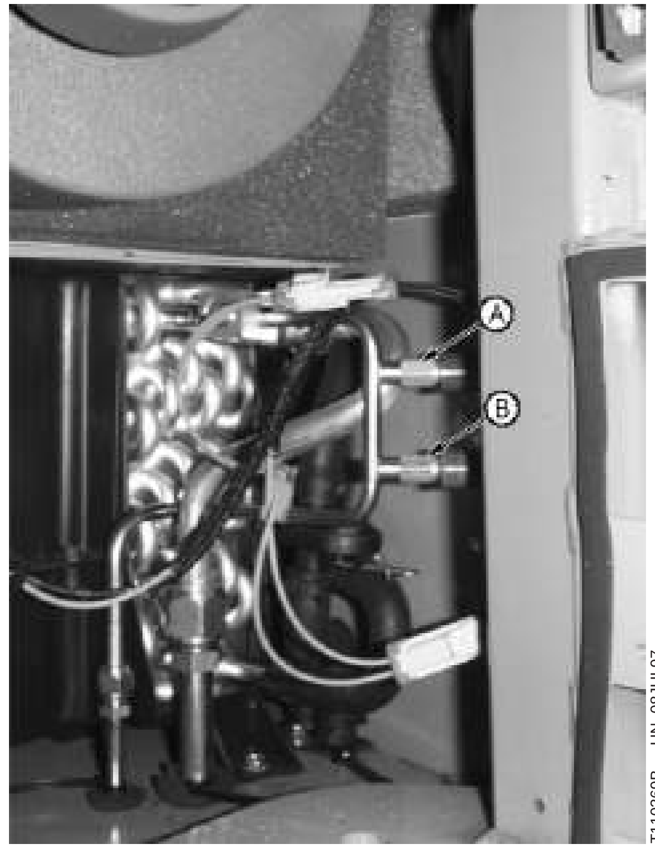
9031
25
12

Specification

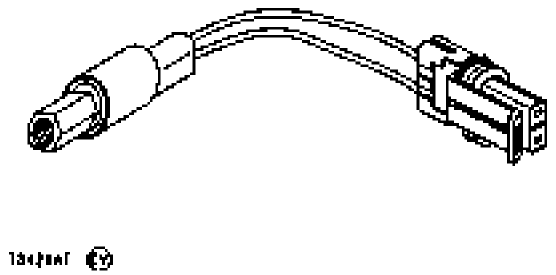
High Pressure Switch—Opening Pressure .... 2760 ± 138 kPa (27.6 ± 1.38 bar) (400 ± 20 psi)

High Pressure Switch (Normally Closed)—Closing Pressure .... 1310 ± 138 kPa (13.11 ± 1.38 bar) (190 ± 20 psi)

- Switch must have continuity between terminals until pressure increases to switch opening pressure specification.
- Slowly release pressure. Switch must not have continuity until pressure decreases to switch closing pressure specification.



T110369B –UN–08JUL97



T8426AE –UN–06MAR95

A—Low Pressure Switch
B—High Pressure Switch

Continued on next page

TX18076,0000015 –19–14NOV00–1/2

- The switch can also be checked when installed in air conditioning system, however, pressure is slow to increase to test specification.
  Connect an air conditioning gauge set to service fittings at compressor. Cover condenser with paper or plastic to stop air flow. Operate air conditioner on maximum cooling. Note high-side pressure when high pressure switch opens and then closes.

TX18076,0000015 –19–14NOV00–2/2

Freeze Control Switch

T7199EZ –UN–13NOV90

SPECIFICATIONS	
Freeze Control Switch (Normally Closed) Opens As Temperature Drops Opening Temperature	-0.56 ± 0.84°C (31 ± 1.5°F)
Freeze Control Switch (Normally Closed) Closes as Temperature rises Closing Temperature	2.22 ± 0.84°C (36 ± 1.5°F)

- Remove freeze control switch from evaporator.
- Connect ohmmeter to switch terminals. Switch must be closed at room temperature.
- Put switch into a freezer (temperature must be below -0.56 ± 0.84°C [31 ± 1.5°F]). Switch must open, and continuity must not be read.

Specification
Freeze Control Switch (Normally Closed) Opens As Temperature Drops—Opening Temperature .... -0.56 ± 0.84°C (31 ± 1.5°F)

- Remove switch from freezer. Put sensing tube into a glass of warm water. Switch must close, and continuity must be read.

Specification
Freeze Control Switch (Normally Closed) Closes As Temperature Rises—Closing Temperature .... 2.22 ± 0.84°C (36 ± 1.5°F)

- If switch does not open and close during testing, install new switch.

TX18076,0000016 –19–14NOV00–1/1

Leak Testing

SPECIFICATIONS	
Move Leak Detector Speed	25 mm (1 in.) per second

- Inspect all lines, fittings, and components for oily or dusty spots. When refrigerant leaks from the system, a small amount of oil is carried out with it.
- A soap and water solution can be sprayed on the components in the system to form bubbles at the source of the leak.
- If a leak detector is used, move the leak detector probe under the hoses and around the connections at a rate of 25 mm (1 in.) per second.

Specification

Move Leak Detector—Speed .... 25 mm (1 in.) per second

- Some refrigerant manufacturers add dye to refrigerant to aid in leak detection.

MODTX9031QQ1881 –19–19AUG94–1/1

Index