PART NO. TONFB50-EN-01

HITACHI

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Technical Manual
Operational Principle

ZW310-6
Wheel Loader

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TONFB50-EN
Technical Manual (Troubleshooting)	: Vol. No.TTNFB50-EN
Workshop Manual	: Vol. No.WNFB50-EN

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Engine

Manufacturer	Cummins Inc.
Model	QSL9
Type	Diesel, 4-cycle, water-cooled, direct injection type with turbo charged, and air-cooled Intercooler
Dry Weight	708 kg (1561 lb)
Dimensions (L x W x H)	1128 x 943 x 1163 mm (44.4 x 37.1 x 45.8 in)
No. of Cylinders - Bore × Stroke	6 - 114 × 145 mm (4.5 × 5.71 in)
Piston Displacement	8.90 L (2.35 gal)
Rated Output / Rated RPM (Net)	203 kW/2000 min^{-1} (272 HS/2000 rpm)
Compression Ratio	17.8
Firing Order	1-5-3-6-2-4
Rotation Direction	Clockwise (Viewed from fan side)

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Pump Control

The pump control consists of the following items.

- Base Torque Control
- Torque Decrease Control While Dumping Bucket
- Lift Arm Speed Multiplication Control

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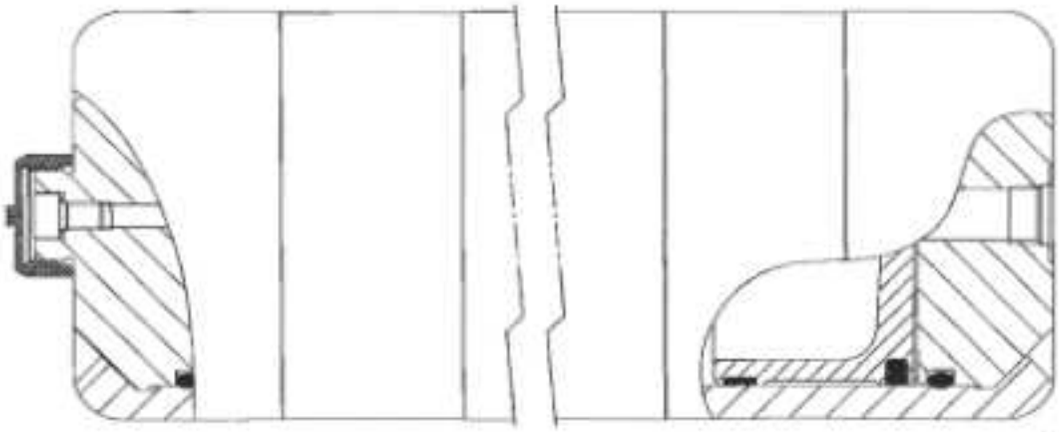
Service Brake Accumulator

The service brake accumulators are installed in the accumulator oil circuit of the brake charge valve. High-pressure nitrogen gas is contained in the accumulator, and pressurized oil from the accessory pump compresses the nitrogen gas through the piston. The brake circuit oil pressure is stored by compression of the nitrogen gas.

Service Brake Accumulator Specifications

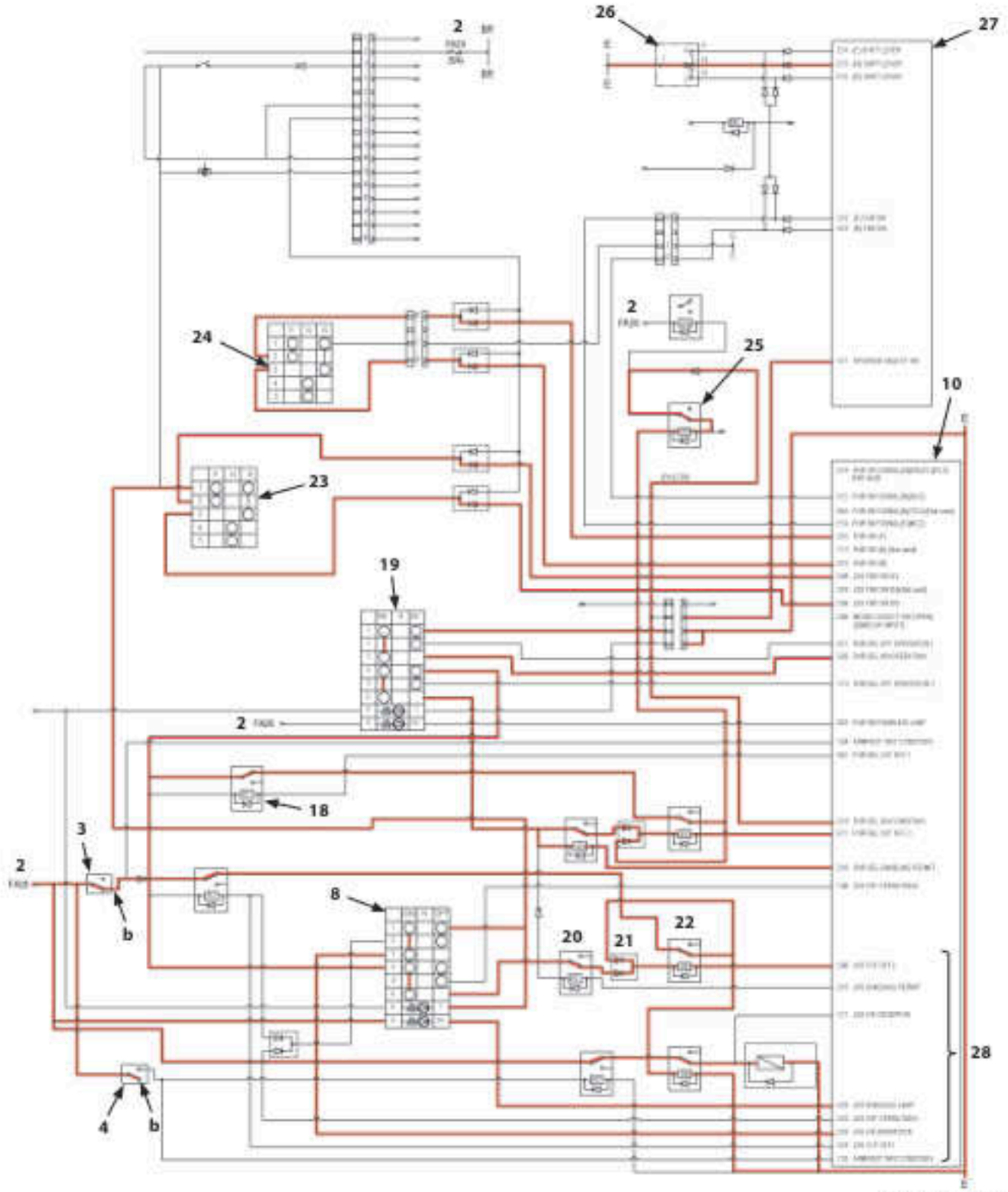
N_2 gas charging pressure	MPa (PSI)	4.2±1 (610±15)
N_2 gas capacity	L (in^3)	2.5 (153)

CAUTION: Use only dry Nitrogen gas [N_2] to charge accumulators.
Any other gas will not function correctly.
Never use oxygen to charge the brake accumulator.



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b- Left Console: Operation Position

2- Fuse #20 (Fuse Box A)
3- Armrest Switch 1
4- Armrest Switch 2
8- Joystick Steering Selector Switch
10- JCU
18- FNR OFF Relay
19- Forward/Reverse Selector Switch
20- FNR ON Relay
21- Diode C
22- FNR Hold Relay
23- Forward/Reverse Switch (Left)
24- Forward/Reverse Switch
25- 24 V/GND Conversion Relay
26- Forward/Reverse Lever
27- MC
28- Joystick Steering Electrical Circuit

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Torque Converter (Lock-Up)

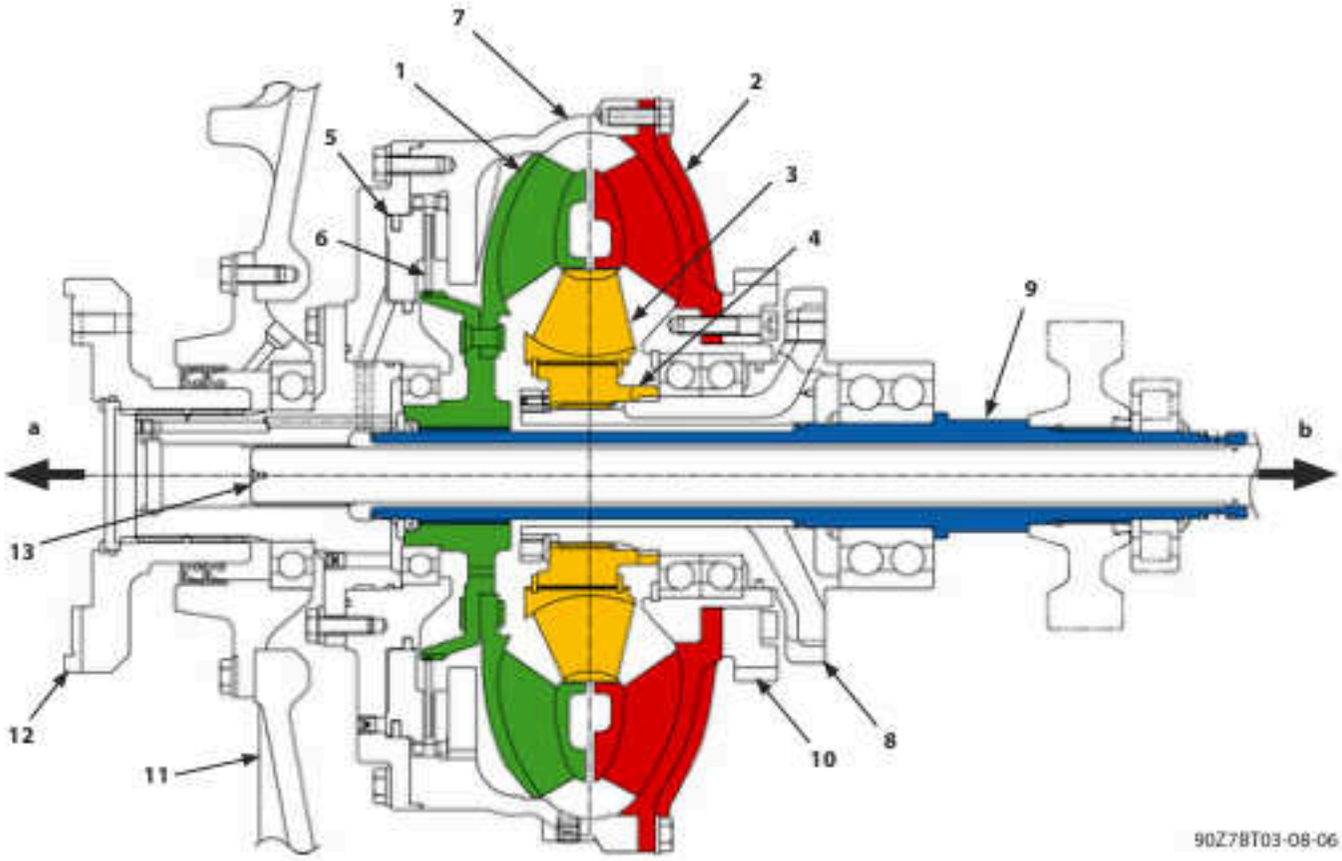
The torque converter is between the first propeller shaft and transmission.

The torque converter consists of turbine impeller (1), pump impeller (2), and stator (3), all in torque converter case (11) filled with oil.

The pump is connected to the first propeller shaft, and rotates together with the shaft. The turbine is connected to the torque converter output shaft to transmit the power to the transmission.

1. Hydraulic oil is supplied from the charging pump to torque converter drive cover (7).
2. The area of the impellers is filled with oil. When the engine is started, pump impeller (2) rotates, therefore the oil will circulate to rotate turbine impeller (1) (circulation order: pump --> turbine --> stator --> pump).
3. Oil is redirected by fixed stator impeller (3) back to pump impeller (2).
4. When turbine impeller (1) rotates, the power will be transmitted to the output shaft (9).

NOTE: If the engine speed/pump impeller speed stays the same, the turbine impeller speed is reduced due to the transmission load, output torque is increased. This is "torque multiplication".



a- First Propeller Shaft Side
b- Main Pump Side

1- Turbine Impeller Assy
2- Pump Impeller
3- Stator
4- Stator Hub
5- Lock-Up Piston
6- Friction Plate
7- Drive Cover
8- Stator Shaft
9- Turbine Shaft
10- PTO Drive Gear
11- Torque Converter Case
12- Flange (for First Propeller Shaft)
13- Main Pump Drive Shaft

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