31200262

CATERPILLAR®

# Service Manual

## TH220B & TH330B Telehandlers

S/N TBF00100 & After
S/N TBG00100 & After

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Table 13

| Clutch | Disengaged | Engaged |
|---|---|---|
| | Low Idle 950 RPM | Low Idle 950 RPM |
| Forward Clutch | 10 ± 10 kPa (1.5 ± 1.5 psi) | 1350 ± 100 kPa(195± 15 psi) |
| Reverse Clutch | 10 ± 10 kPa (1.5 ± 1.5 psi) | 1350 ± 100 kPa(195± 15 psi) |

Table 13 is for both the power shuttle transmission and the powersynchro transmission.

Cycle through the first gear, the second gear, the third gear, the fourth gear and fifth gears for this test on the powersynchro transmission.

Table 14

| Synchronizer | Disengaged | Engaged |
|---|---|---|
| | Low Idle 950 RPM | Low Idle 950 RPM |
| Synchronizer for the First Speed | 1350 ± 100 kPa(195± 15 psi) | 10 ± 10 kPa (1.5 ± 1.5 psi) |
| Synchronizer for the Second Speed | 1350 ± 100 kPa(195± 15 psi) | 10 ± 10 kPa (1.5 ± 1.5 psi) |
| Synchronizer for the Third Speed | 1350 ± 100 kPa(195± 15 psi) | 10 ± 10 kPa (1.5 ± 1.5 psi) |
| Synchronizer for the Fourth Speed | 1350 ± 100 kPa(195± 15 psi) | 10 ± 10 kPa (1.5 ± 1.5 psi) |
| Synchronizer for the Fifth Speed (if equipped) | 10 ± 10 kPa (1.5 ± 1.5 psi) | 1350 ± 100 kPa(195± 15 psi) |

Table 14 pertains to the powersyncro transmission.

13. Remove the fittings and install the plug that was removed from the test point.

# Differential Pinion Bearing - Adjust

Use the procedure that follows in order to adjust the depth of the pinion gear. Use the same procedure for both axles.

## Introduction

The following procedures describe adjustments to the pinion gear which are necessary when you are assembling the bevel gear set.

NOTICE

The bevel gear and the pinion gear are a matched set. If either part is worn or damaged, both parts must be replaced with a matched set.

**Note:** If you are reinstalling the old bevel gear set into the old axle, the thickness of the shim will not need to be changed. The following procedure is necessary when you are replacing the bevel gear set or when you are replacing the center housing.

**Reference:** For further information regarding the removal and the installation of the bevel gear and the pinion gear, refer to Disassembly and Assembly, "Power Train".

**Reference:** For additional information about differential backlash, refer to the Systems Operation, Testing and Adjusting, "Differential Backlash and Bearings - Adjust".

## Required Tools

Table 15 provides a list of the tools that are required to carry out the adjustment of the differential pinion bearing.

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The calibration procedure for the thumb wheel was successful. A window will appear if a failure occurs. Data in the window will include an error code for the failure. The error code is provided in order to explain the failure. The error codes are listed in table 6. After correcting the problem, the calibration is repeated by pressing the "Restart" button. Complete the process by clicking on the "Finish" button.

**Note:** Turn off the ignition key, after the calibration procedure is finished. Leave the key off for fifteen seconds. The new parameters are then stored in the ECM.

Table 6

| Joystick Control Calibration Error Codes | | | |
|---|---|---|---|
| **Error Code** | **Description** | **Cause** | **Corrective Action** |
| **0002** | Active diagnostic | A diagnostic fault in the system is related to the inputs used for the calibration. Such as the joystick sensor inputs, the parking brake inputs, and the engine speed input. | Troubleshoot and clear the fault. |
| **0006** | Aborted by user | The user clicked the "Cancel" button during the calibration process. | Restart the calibration. |
| **0103** | Calibration value/s out of range | The duty cycle from the joystick is less than 5% or greater than 30% at the bottom end of the PWM range. The duty cycle from the joystick is less than 70% or greater than 95% at the top end of the PWM range. The duty cycle from the joystick is less than 40% or greater than 60% at the center of the PWM range. | Ensure the joystick is moved to the position indicated by the instructions in the calibration procedure. If the movement is correct, check the PWM output on the joystick sensor in order to verify the duty cycle percentages are correct. |

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E. Check for moisture, dirt, or corrosion.

F. Check the pin/socket for a proper fit.

G. Disconnect the machine harness connectors from module 3 and the J2.

H. At the machine harness connector, measure the resistance from module 3 contact 2 (Y760-PU) to J2 - 55 (Y760-PU).

**Expected Result:**

The resistance should be less than 5 ohms.

**Results:**

- OK - The resistance is less than 5 ohms. The machine harness is correct. Proceed to test step 3.
- NOT OK - The resistance is greater than 5 ohms. There is an open in the machine harness. The open is between the modules for the address out (wire Y760-PU).

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

### Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.

A. Clean the contacts of the harness connectors.

B. Reconnect all harness connectors.

C. Observe the status of the diagnostic code.

D. Operate the machine.

E. Observe the status of the diagnostic code.

**Expected Result:**

The diagnostic code is NO longer active.

**Results:**

- YES - The diagnostic code is NO longer active. The diagnostic code does not exist at this time. The initial diagnostic code was probably caused by a poor electrical connection and/or a short at one of the harness connectors that was disconnected and then reconnected. Resume normal machine operation.

STOP.

- NO - The diagnostic code has not been corrected. The PHS SSV4 module has failed.

**Repair:** Replace the PHS Valve SSV4 control if the cause of the diagnostic code is not found. See Testing and Adjusting, "Electronic Control Module (ECM) - Flash Program".

STOP.

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| WIRE GROUP COLOR DESCRIPTIONS |
|---|
| WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF. |
| WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON. |
| STARTING CIRCUIT |
| GROUND CIRCUIT |
| STARTING AID CIRCUIT |
| CAT DATA LINK - |
| CAN DATA LINK A |
| CAN DATA LINK B |
| ENGINE CONTROL CIRCUIT (MASTER) |
| MACHINE CONTROL |
| PRODUCT LINK |
| MACHINE SECURITY CONTROL CIRCUIT |
| HEATER AND AIR CONDITIONER CIRCUIT |
| TURN SIGNAL/WIPER/WASHER CIRCUIT |

| COLOR ABBREVIATIONS | |
|---|---|
| ABBREV | COLOR |
| RD | RED |
| WH | WHITE |
| OR | ORANGE |
| YL | YELLOW |
| PK | PINK |
| BK | BLACK |
| GY | GRAY |
| PU | PURPLE |
| BR | BROWN |
| GN | GREEN |
| BU | BLUE |

| SYMBOL | DESCRIPTION |
|---|---|
| + | CIRCUIT CONNECTED |
| | CIRCUIT NOT CONNECTED |
| + | ELECTRICAL CONNECTION TO MACHINE GROUND. CONNECTION TO MACHINE GROUND. CONNECTION TO ENGINE GROUND. CONNECTION TO ALTERNATOR GROUND. |
| +60+ | CONNECTOR |
| +GR | CIRCUIT CREATING DEGRADATION |
| | WORK WIRE, CABLE, COMPONENT |
| +C+ | CIRCUIT CONNECTED |
| | SHIELDED TWISTED WIRE OR SHIELDED CABLE |
| + | SPLICE |

CAB ROOF
SERVICE PORT
REAR/ROOF WIPERS-ATCH
RELAY BLOCK
FUSE BLOCK
BLOWER-UNDER SEAT-ATCH
SHUTTLE XMSN-ATCH
SYNCHRO XMSN-ATCH
MACHINE GROUNDS STRAPS
CHASSIS GROUND
DASH
RH CONSOLE
CAB GROUND
AUX COMPRESSOR
ENGINE GROUND
ENGINE
MACHINE SECURITY SYS-ATCH



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