PART NO. TT97C5-E-02

HITACHI

Reliable solutions

Technical Manual
Troubleshooting

ZW370
Wheel Loader

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TO97C5-E
Technical Manual (Troubleshooting)	: Vol. No.TT97C5-E
Workshop Manual	: Vol. No.W97C5-E

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Symbols

For safe and effective service work, the following symbols are used for notes and useful information in this manual.

Symbol	Item	Description
	Reference	Shows the condition or procedure that will be useful or efficient in doing service work.
	Weight	Shows the weight of a part or unit. The weight should be considered in selecting wire rope or cable for slinging work or determining the working posture.
	Tightening torque	Shows the tightening torque of a section that should be carefully tightened during assembly work.
	Coating	Shows the type of coating or adhesive and the coating section.
	Oil or water supply	Shows the oil or water supply port and the refill amount.
	Drainage	Shows the oil or water drain port and the drain amount.

IMPORTANT

If the specified conditions are not satisfied or the specified procedure is not observed, there is a strong possibility that the product will be damaged or the performance of the product will be reduced.
The message shows the preventive measures.

Abbreviation

To save space, abbreviations are used in sentences. To understand the contents of this manual, refer to the following abbreviation list.

E/G ..... Engine
T/C ..... Torque converter
T/M ..... Transmission
SOL ..... Solenoid valve
SW ..... Switch
F ..... Front or Forward
A/M ..... Auto/Manual
B ..... Battery
R ..... Rear or Reverse

RH ..... Right hand side
LH ..... Left hand side
H ..... High
L ..... Low
GND ..... Ground
OPT ..... Option
Assy ..... Assembly
1st ..... 1st speed
2nd ..... 2nd speed

3rd .....3rd speed
4th .....4th speed
M/C .....Machine
min^{-1}.....RPM
ELS .....Efficient loading system
MODM .....Machine operation diagnostic module
MCU.....Machine control unit

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Cautions Regarding Troubleshooting

Important points

The important points for troubleshooting is to carefully read the operation manual and shop manual to get enough information on the operation, circuits, structure, and function of each component. If you have enough knowledge of each component and system, you can easily determine the cause of the problem.

There may be various causes for each problem, therefore experience will be needed to determine which is the actual cause of the problem.

It is necessary to know the normal operation of each component. In addition, it is also important to know the abnormal condition when a problem occurs. This chapter shows various examples of past problems, and describes possible causes and remedies for each problem.

Before starting troubleshooting

To prevent incorrect diagnosis, talk with the persons concerned, particularly with the operator, to get enough information on the problem. If possible, check the machine by repeating the symptom.

If the problem cannot be repeated, do not provide any repair service.

For instance, assume that the operator complains that the boom power is low, and the rim-pull is also low. In this case, there are two possible causes; low hydraulic power and low rim-pull. The remedies against both causes are much different from each other.

If you hastily determine the wrong cause without checking the actual condition of the problem, it will take too much time and expense to solve the problem. As a result, you will not be trusted by the user.

The following questions will be helpful in determining of the cause. Answer the questions to prevent an incorrect diagnosis.

1. Did the problem occur suddenly?
2. When did the operator notice the problem?
3. Is there any past problem that may be the cause of this problem?
4. When the problem occurred, what kind of work was the operator doing?
5. Has the machine had the same kind of problem before?
6. Has the machine been repaired or inspected recently?
7. Does the machine have any other problem?

Troubleshooting

- Check before determination of cause
  A problem may be caused by poor daily maintenance, such as lack of grease, low or improper oil or a clogged filter. Be sure to check the machine for oil level, appearance, unpleasant odor, etc. to prevent time loss due to other unnecessary tests.

- Inspection procedure
  As a rule, check the easy-to-be-repaired system first (excluding the cases where the cause can be easily determined based on the past experiences).

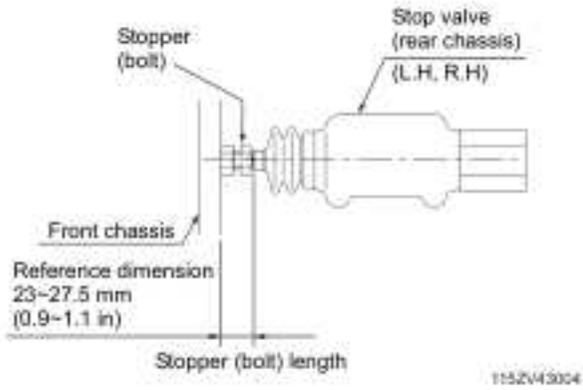
  This machine is controlled by electrical, hydraulic, and mechanical systems. The most easy-to-be-repaired system is the electrical system. Check the electrical system first. If no problem is detected in the electrical system, check the hydraulic system, and then the mechanical system.

Note
Check the error code on the MODM at first !

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Stop Valve

Stop valve adjustment procedure



⚠ WARNING

When the machine turns, the clearance in the articulation area closes. As a result, people may be caught, leading to a severe accident. To prevent such an accident, observe the following items strictly when adjusting the steering stopper.

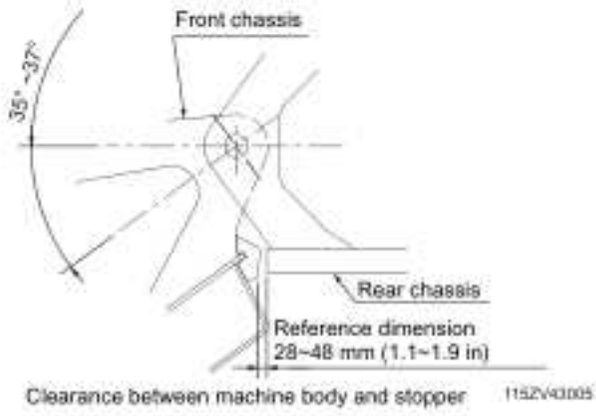
- Stop the engine before starting adjustment of the stopper bolt.
- When confirming the operation after setup, keep proper distance from the articulation area of the machine.

The stop valve works when the spool is pushed in 3 mm (0.118 in).

Adjust the stopper bolt by using the following procedure.

- Adjust the stopper (bolt) length so that the clearance between the machine body and the stopper becomes the reference dimension "28~48 mm (1.102~1.890 in)" shown in the table below.

Reference dimension



Articulation angle (°)	37	36	35
Clearance between machine body and stopper (mm) (in)	28 (1.102)	38 (1.496)	48 (1.890)
Stopper (bolt) length (mm) (in)	23 (0.906)	25 (0.984)	27.5 (1.083)

*The target value should be the articulation angle "36°".

- After adjustment, turn the steering wheel slowly at a rate of 5 sec or more per turn, and confirm the clearance between the machine body and the stopper.
- When adjustment is completed, tighten the lock nut of the stopper (bolt).

: 90 N-m (9.2 kgf-m) (67 lb-ft)

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Standard measurement valve (sec)

Engine speed : Low idle

Unloader valve pressure			
3.9 MPa (40 kgf/cm^2) (569 psi)	→	11.8 MPa (120 kgf/cm^2) (1,706 psi)	16

Measurement procedure

1. Lower the boom to the lowest limit, and tilt down the bucket to the ground.
2. Set the parking brake switch to the "ON" position.
3. Stop the engine. Repeatedly depress and release the brake pedal to discharge accumulator pressure.
4. Attach the pressure gauge to the valve assembly ACF port.
5. Start the engine, and keep the engine speed at low idle speed.
6. Measure and record the time from the low pressure alarm is turned off 3.9±0.5 MPa (40±5 kgf/cm^2) (569±71 psi) till the pointer of the pressure gauge stops rising 11.8±0.5 MPa (120±5 kgf/cm^2) (1,706±71 psi).

Possible causes of extremely high measurement value and solution

The accumulator charging time is too long.

Possible cause	Solution
Defective unloader valve	Disassembly & repair
Oil leakage from pipe	Check & repair
Defective pilot pump	Disassembly & repair

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