No. M-016AE

TCM®

INSPECTION MANUAL

– W. TROUBLESHOOTING GUIDE –

WHEEL LOADER

L20-2
(Serial No. 02101 and after)

L27
(Serial No. 01101 and after)

L32-2
(Serial No. 01101 and after)

L35
(Serial No. 04101 and after)

L40
(Serial No. 02101 and after)

L50
(Serial No. 01102 and after)

TCM CORPORATION

System	No.	Check item \ Loader model		Unit	L20-2, LX110-7		L27, LX130-7		L32-2, LX160-7		L35, LX190-7		L40, LX230-7		L50, LX300-7		L32-2, LX160-7		L40, LX230-7	
					Fwd	Rev	Fwd	Rev	Fwd	Rev	Fwd	Rev	Fwd	Rev	Fwd	Rev	Fwd	Rev	Fwd	Rev
Traveling and brake system	34	Traveling speed	1st speed	km/h [mph]	8.0 [5.0]	8.5 [5.3]	7.5 [4.7]	8.0 [5.0]	7.5 [4.7]	8.5 [5.3]	7.5 [4.7]	8.5 [5.3]	7.5 [4.7]	8.5 [5.3]	6.5 [4.0]	7.0 [4.3]	7.0 [4.3]	7.5 [4.7]	7.0 [4.3]	7.5 [4.7]
			2nd speed	km/h [mph]	13.5 [8.4]	14.5 [9.0]	12.0 [7.5]	13.5 [8.4]	12.5 [7.8]	14.0 [8.7]	13.0 [8.1]	14.5 [9.0]	13.0 [8.1]	14.5 [9.0]	11.5 [7.1]	12.5 [7.8]	11.5 [7.1]	13.0 [8.1]	12.5 [7.8]	13.5 [8.4]
			3rd speed	km/h [mph]	21.5 [13.4]	23.0 [14.3]	22.0 [13.7]	24.0 [14.9]	22.5 [14.0]	24.5 [15.2]	21.0 [13.0]	23.0 [14.3]	21.0 [13.0]	23.0 [14.3]	19.0 [11.8]	20.5 [12.7]	20.5 [12.7]	22.5 [14.0]	20.0 [12.4]	21.5 [13.4]
			4th speed	km/h [mph]	34.5 [21.4]	35.0 [21.8]	34.5 [21.4]	37.0 [23.0]	34.5 [21.4]	37.0 [23.0]	34.5 [21.4]	37.0 [23.0]	34.5 [21.4]	36.5 [22.7]	33.5 [20.8]	34.5 [21.4]	32.5 [20.2]	35.0 [21.7]	32.5 [20.2]	35.0 [21.7]
	35	Braking performance	Service brake	m [ft]	3.8 [12.5]		3.6 [11.8]		←		←		←		4.8 [15.4]		Tire size: 20.5-25-16PR Option		Tire size: 23.5-25-20PR Option	
			Parking brake	°	27		20		27		22		18		22					
Operating force	36	Boom lever (up)		N {kgf} [lbf]	24.5 {2.5} [5.5]		13.7 {1.4} [3.1]		←		←		←		12.7 {1.3} [2.9]					
	37	Boom lever (up detent/detent released)		N {kgf} [lbf]	–		22.5 {2.3} [5.1]		←		←		←		←					
	38	Boom lever (down)		N {kgf} [lbf]	24.5 {2.5} [5.5]		13.7 {1.4} [3.1]		←		←		←		10.8 {1.1} [2.4]					
	39	Boom lever (down float/float released)		N {kgf} [lbf]	38.2 {3.9} [8.6]		22.5 {2.3} [5.1]		←		←		←		19.6 {2.0} [4.4]					
	40	Bucket lever (digging)		N {kgf} [lbf]	20.6 {2.1} [4.6]		13.7 {1.4} [3.1]		←		←		←		12.7 {1.3} [2.9]					
	41	Bucket lever (digging detent/detent released)		N {kgf} [lbf]	21.6 {2.2} [4.9]		22.5 {2.3} [5.1]		←		←		←		←					
	42	Bucket lever (dump)		N {kgf} [lbf]	20.6 {2.1} [4.6]		13.7 {1.4} [3.1]		←		←		←		←					
	43	F/R lever		N {kgf} [lbf]	12.7 {1.3} [2.9]		13.7 {1.4} [3.1]		←		←		←		←					
	44	Accelerator pedal		N {kgf} [lbf]	49.0 {5.0} [11.0]		←		←		40.2 {4.0} [8.8]		←		←					
	45	Brake pedal		N {kgf} [lbf]	24.5 {2.5} [5.5]		40.2 {4.0} [8.8]		←		←		←		49.0 {5.0} [11.0]					
	46	Steering wheel		N {kgf} [lbf]	13.7 {1.4} [3.1]		←		←		9.8 {1.0} [2.2]		←		13.7 {1.4} [3.1]					
Stroke	47	Boom lever		mm [in.]	185 [7.28]		100 [3.94]		←		←		←		←					
	48	Boom lever (float)		mm [in.]	240 [9.45]		125 [4.92]		←		←		←		115 [4.53]					
	49	Bucket lever		mm [in.]	210 [8.27]		130 [5.12]		←		←		←		100 [3.94]					
	50	F/R lever		mm [in.]	80 [3.15]		←		←		←		←		←					
	51	Accelerator pedal		°	18		←		←		←		←		←					
	52	Brake pedal		°	15		←		←		←		←		←					

2.1.3 COMPRESSION

Warm up the engine before measuring compression.

Measure two or three times for each cylinder and average the results.

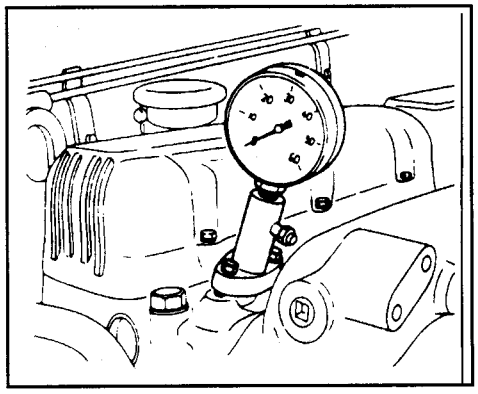
(1) Remove the fuel pipe and nozzle holder of each of all cylinders.

Note: Cover the nozzle holes to prevent the entrance of dust into the system.

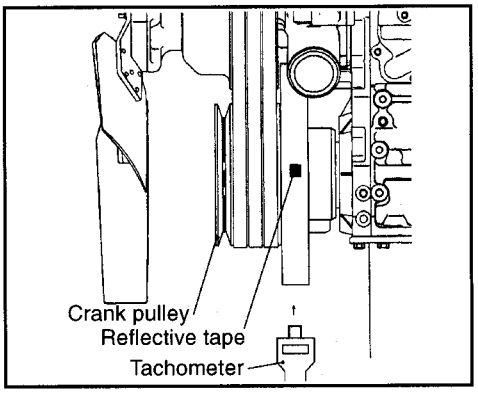
(2) Install a compression gauge on the cylinder you are about to measure its compression.

(3) Place the engine stop cable or link in the non-injection position.

(4) Using a non-contact type tachometer, measure the engine speed at the top of the crankshaft.
(or read the LED of the ATC unit.)



(Measuring compression)



(Measuring engine speed)

(5) Crank the engine with the starting motor and measure compression pressure. Record the engine speed as well.

(6) The length of time during which the engine is run at idle is until the compression gauge pointer completely rises, or about 5 second.

(7) After measurement, reassemble in the reverse order of disassembly.

Compression gauge

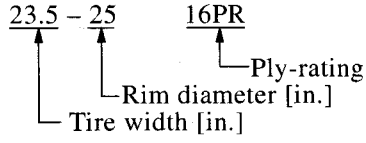
Tachometer

(2) Standard specifications of tires and wheels

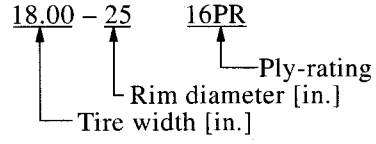
Loader model	Designation of tire	Wheel	Type	Inflation pressure kPa {kgf/cm²} [psi]
L20-2 LX110-7	17.5-25-12PR	13.00 x 25DC	Tubeless	343^{+50}_{0} {$3.50^{+0.5}_{0}$} [$49.8^{+7.1}_{0}$]
L27 LX130-7	20.5-25-12PR	25 x 17.00/1.7 -0-22FTL	Tubeless	330^{0}_{-50} {$3.30^{0}_{-0.5}$} [$46.9^{0}_{-7.1}$]
L32-2 LX160-7	23.5-25-16PR	19.5 x 25WTB -0-19DTL	Tubeless	375^{0}_{-50} {$3.75^{0}_{-0.5}$} [$53.3^{0}_{-7.1}$]
(Option) L32-2 LX160-7	20.5-25-16PR	25 x 17.00/1.7 -25-19DTL	Tubeless	400^{0}_{-50} {$4.00^{0}_{-0.5}$} [$56.9^{0}_{-7.1}$]
L35 LX190-7	23.5-25-16PR	19.50 x 25WTB -0-25FTL	Tubeless	375^{0}_{-50} {$3.75^{0}_{-0.5}$} [$53.3^{0}_{-7.1}$]
L40 LX230-7	26.5-25-16PR	22.00 x 25WTB -0-25FTL	Tubeless	325^{0}_{-50} {$3.30^{0}_{-0.5}$} [$46.9^{0}_{-7.1}$]
(Option) L40 LX230-7	23.5-25-20PR	19.50 x 25WTB -0-25-FTL	Tubeless	450^{0}_{-50} {$4.50^{0}_{-0.5}$} [$64.0^{0}_{-7.1}$]
L50 LX300-7	26.5-25-24PR	22.00 x 25WTB -220-25FTL	Tubeless	450^{0}_{-50} {$4.50^{0}_{-0.5}$} [$64.0^{0}_{-7.1}$]

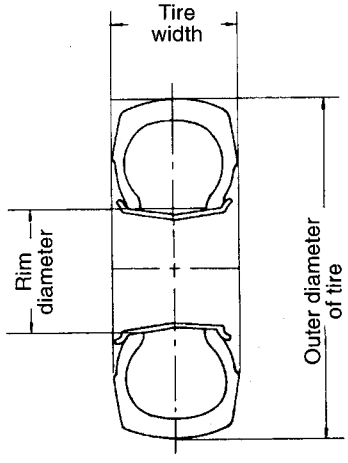
Designation of tire

(Example: Standard)



(Example: Wide)





2.1.19 LOAD HANDLING SYSTEM (BOOM AND BUCKET OPERATION, NATURAL DROP)

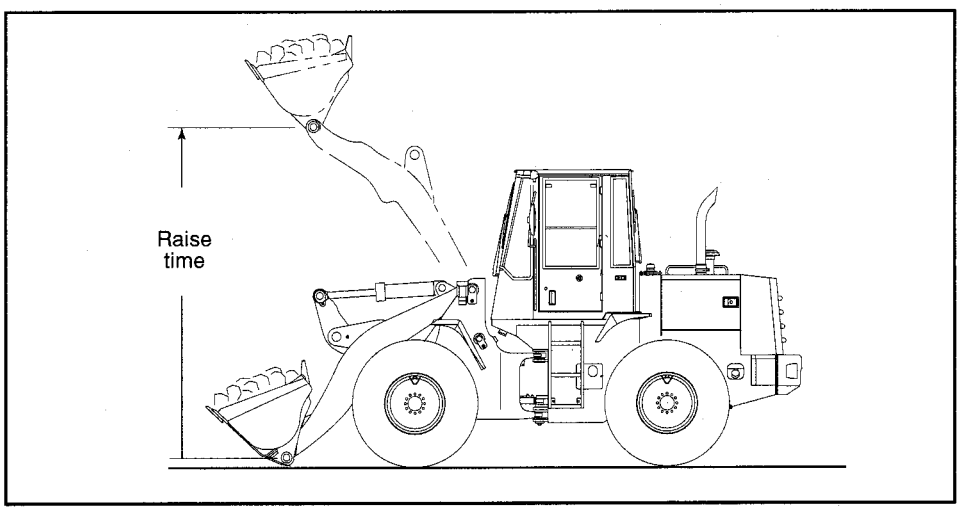
Stopwatch

Check the load handling system for operation when the hydraulic oil temperature is at 60 ± 10°C or 140 ± 18°F.

Thermometer

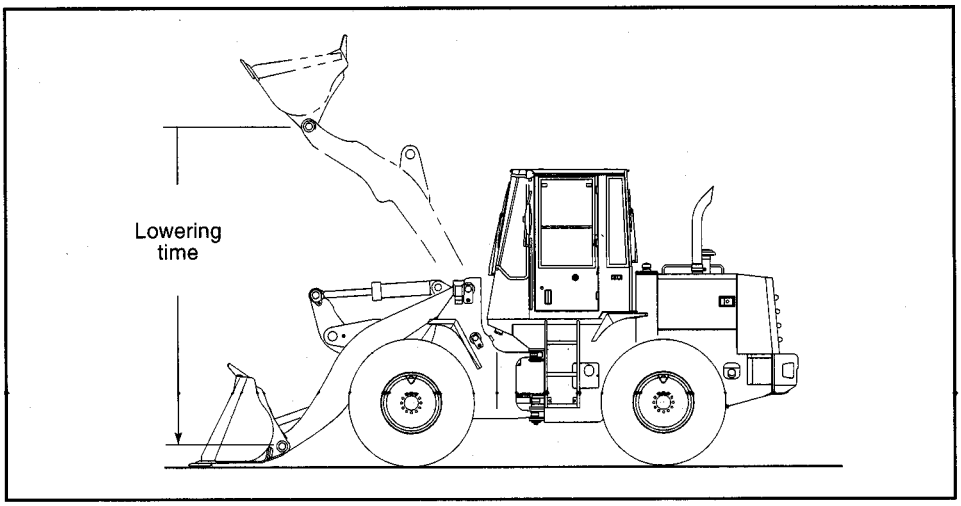
(1) Boom raise time

Put the rated load at the center of gravity position of the bucket. Run the engine at Hi idle rpm and raise the bucket (fully rolled-back) from the lowest position to the highest position and measure the time required.



(2) Boom lowering time

With the bucket horizontally on the ground, raise the booms to the bucket highest position. Then, lower the booms from the highest position to the ground and measure the time required.



3. TROUBLESHOOTING GUIDE

Section	System	Cause	Check item
Drive unit	**① The loader won't travel in either forward or reverse.**		
	Electric system	• Transmission fuse blown • Clutch cut-off switch broken • Parking brake switch broken • ATC malfunctioning • F/R solenoid defective • Brake oil pressure switch defective • Transmission control switch defective • Transmission control wiring broken or connector in poor connection	• Check fuses. • Check switch. • Change ATC. • Check solenoid for operation. • Check transmission control switch for continuity. • Check wiring for continuity.
	Transmission	• Transmission control valve or F/R selector spool stuck • Regulator spring broken • Transmission F/R solenoid spool stuck (port open)	• Check F/R selector spool for operation. • Check regulator pressure. • Check torque converter oil for contamination. • Check clutch oil pressure.
	Torque converter	• Torque converter internal components damaged (impeller, turbine or stator) • Torque converter internal components damaged (bearing or others) • Charging pump sleeve damaged • Input plate or mounting bolts damaged (L20-2, LX110-7 · L27, LX130-7) • Coupling gear or mounting bolts damaged (L32-2, LX160-7 · L35, LX190-7 · L40, LX230-7 · L50, LX300-7)	• Check torque converter Out pressure. • Check torque converter oil for foreign matter or contamination. • Check torque converter oil In pressure. • Disassemble and check.
	Pump	• Charging pump broken	• Check torque converter In pressure. • Disassemble and check charging pump.
	Torque converter oil	• Torque converter (transmission) oil level low	• Check oil level.
	Brake	• Service brake dragging • Parking brake valve spool stuck	• Check brake valve spool for operation. • Check parking brake valve spool for operation.
	② The loader won't travel in forward or reverse.		
	Transmission	• Transmission internal components broken (bearing or gear) • Broken return spring of forward or reverse clutch • Forward or reverse solenoid valve spool stuck. • Oil leaks from seal ring of clutch oil gallery • Froward or reverse clutch seized	• Check torque converter Out pressure. • Check torque converter oil for foreign matter or contamination. • Check solenoid valve for operation. • Check transmission clutch pressure.
	Electric system	• Forward or reverse solenoid valve not energized properly (drain port open) • Transmission control switch continuity is improper (in forward or reverse) • Malfunction of ATC	• Check wiring for input and solenoid valve for operation. • Check wiring for input and transmission control switch for continuity. • Replace ATC.