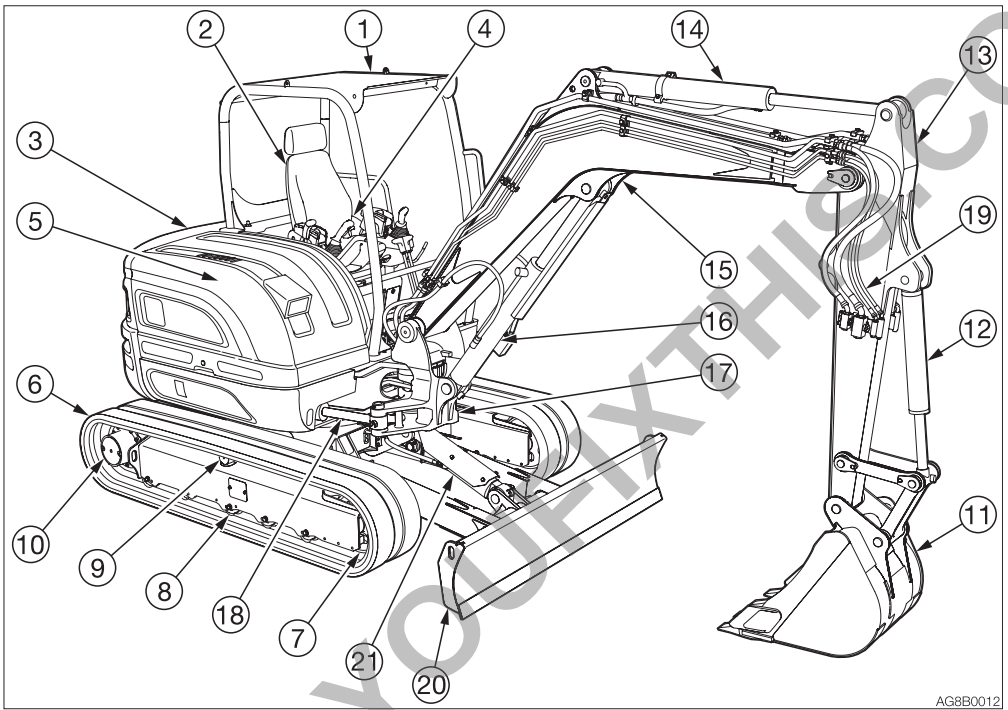
NAMES OF COMPONENTS (CANOPY)



Upperstructure
1. Canopy
2. Seat
3. Engine hood
4. Fuel tank
5. Hydraulic oil tank

Undercarriage
6. Crawler belt
7. Idler
8. Track roller
9. Carrier roller
10. Travel motor

Working equipment
11. Bucket
12. Bucket cylinder
13. Arm
14. Arm cylinder
15. Boom
16. Boom cylinder
17. Boom bracket
18. Swing cylinder
19. Auxiliary hydraulic lines
20. Dozer blade
21. Blade cylinder

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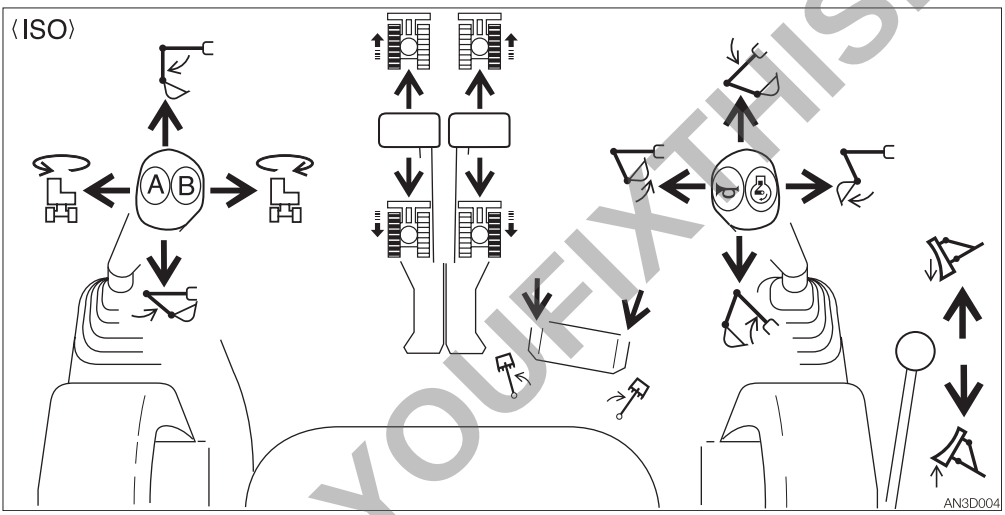
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OPERATING THE MACHINE

LEVER PATTERN (ISO PATTERN)

⚠ WARNING

- Before starting operation, carefully check which lever pattern you are going to use.
- It is described using the ISO pattern in this manual.



	Left crawler forward		Right crawler forward
	Left crawler reverse		Right crawler reverse
	Arm out		Boom lower
	Arm in		Boom raise
	Upperstructure slew left		Bucket load
	Upperstructure slew right		Bucket dump
	Boom swing left		Dozer blade lower
	Boom swing right		Dozer blade raise

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MAINTENANCE LIST

Inspection and maintenance item	Page
Walk-around inspection	
Inspecting by opening the engine hood and covers	5-16
Inspecting by walking around the machine	5-17
Inspecting while sitting in the operator's seat	5-17
Daily inspection (every 10 hours)	
Inspecting and replenishing the coolant	5-18
Inspecting and replenishing the engine oil	5-19
Inspecting the water separator	5-20
Inspecting the fuel level	5-21
Inspecting the hydraulic oil tank level and replenishing	5-22
Lubricating the working equipment	5-23
After the initial 50 hours (only for new machines)	
Replacing the engine oil and the oil filter	5-24
Inspecting and adjusting the fan belt	5-26
Inspecting and adjusting the compressor belt (AC)	5-27
Every 50 hours	
Inspecting and adjusting the crawler tension	5-28
Lubricating the slew bearing	5-30
Draining the water from the fuel tank	5-31
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Every 100 hours	
Cleaning the water separator <Applicable machine models 124100002 or later>	5-33
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Replacing the hydraulic oil return filter	5-34
Replacing the pilot line filter	5-35
Replacing the travel motor gear oil*	5-36
Every 250 hours	
Replacing the engine oil and the oil filter	5-37
Inspecting and adjusting the fan belt	5-37
Inspecting and adjusting the compressor belt (AC)	5-37
Cleaning the air cleaner	5-38
Cleaning the radiator fins and the oil cooler fins	5-39
Cleaning the air filters (AC)	5-40
Cleaning the condenser (AC)	5-41
Inspecting the refrigerant (gas) level (AC)	5-42
Every 500 hours	
Replacing the fuel filter	5-44
Replacing the water separator filter <Applicable machine models 124000003 or later>	5-45

*: If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.
(AC): Air conditioner

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BASIC SPECIFICATIONS

<Applicable machine models 124000003 or later>

Type				Canopy	Cab
MASS					
Operating mass	kg (lb)	Rubber crawlers		3880 (8555)	4070 (8975)
		Steel crawlers		3985 (8785)	4175 (9205)
PERFORMANCE					
Bucket capacity (Standard bucket)	m^3 (cu. ft.)	Heaped		0.12 (4.24)	
		Struck		0.09 (3.18)	
Slew speed	min^{-1} (rpm)			9.6 (9.6)	
Travel speed	km/h (mph)	Rubber crawlers	1st	2.9 (1.8)	
			2nd	5.3 (3.29)	
		Steel crawlers	1st	2.6 (1.62)	
			2nd	4.8 (2.98)	
Gradeability	(degrees)			30	
Ground pressure	kPa (psi)	Rubber crawlers		30.1 (4.63)	31.6 (4.58)
		Steel crawlers		31.4 (4.55)	32.9 (4.77)
Noise level	dB (A)	Sound power level		L_{WA} 96	
		Sound pressure level		L_{pA} —	
ENGINE					
Manufacturer and model				Yanmar 4TNV88C-STB I	Yanmar 4TNV88C-STB
Rated output	Net (ISO 14396)	kW/min^{-1} (hp/rpm)		26.7/2200 (36.3/2200)	
	Net (ISO 9249/ SAEJ1349)	kW/min^{-1} (hp/rpm)		25.3/2200 (34.4/2200)	
Displacement		ml (cu.in.)		2189 (133.6)	
Starter		V-kW		12-2.3	
Alternator		V-kW		12-0.66	
Battery (IEC 60095-1)		V-A·h		12-90	

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Error code		Error details	DTC
SPN	FMI		
3250	3	DPF intermediate temperature sensor fault (High voltage)	P1434
	4	DPF intermediate temperature sensor fault (Low voltage)	P1435
	1	DPF intermediate temperature sensor temperature abnormal low temperature	P0420
	0	DPF intermediate temperature sensor temperature abnormal high (Post-injection failure)	P1426
108	3	Atmospheric pressure sensor fault (High voltage)	P2229
	4	Atmospheric pressure sensor fault (Low voltage)	P2228
	10	Atmospheric pressure sensor characteristic fault	P1231
412	3	EGR gas temperature sensor fault (High voltage)	P041D
	4	EGR gas temperature sensor fault (Low voltage)	P041C
105	3	Intake manifold temperature sensor fault (High voltage)	P040D
	4	Intake manifold temperature sensor fault (Low voltage)	P040C
173	3	Exhaust manifold temperature sensor fault (High voltage)	P0546
	4	Exhaust manifold temperature sensor fault (Low voltage)	P0545
1485	7	Main relay contact stuck	P068B
	2	Main relay early opening	P068A
522243	5	Startup assist relay interrupted	P0543
	6	Startup assist relay GND interrupted	P0541
651 (4TNV), 652 (3TNV)	5	Injector 1 open circuit (Inherent location of the injector)	P0204 (4TNV), P0203 (3TNV)
	6	Injector 1 coil short circuit	P0271 (4TNV), P0268 (3TNV)
	3	Injector 1 short circuit	P1271 (4TNV), P1262 (3TNV)

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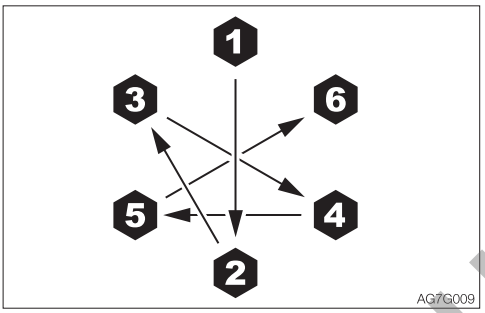
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LIST OF TIGHTENING TORQUES

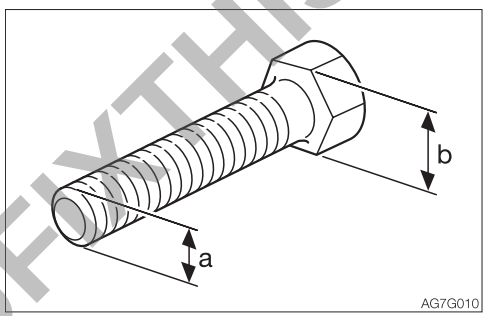
Nuts and Bolts (for ISO strength category 10.9)

Tighten nuts and bolts at the torques shown on the table below, unless otherwise specified.

- The tightening torques used for the mounted plastic covers are not listed in the table below. Consult your sales or service dealer for details. They will be damaged if over tightened.
- When replacing nuts and bolts, replace them with nuts and bolts of the same size and standards.
- Tighten nuts and bolts alternately (top, bottom, left then right) or in 2 or 3 times so that they are evenly tightened.



AG7G009



AG7G010

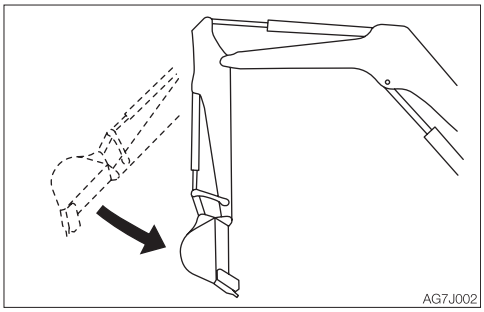
Classification	Head width (b)	Size (a) x pitch	Tightening torque	
			General connection points	
	mm	mm	N·m	ft-lb.
Coarse	10	M6 x 1.0	9.8±0.5	7.2±0.4
	12, 13	M8 x 1.25	22.6±1.1	16.6±0.8
	14, 17	M10 x 1.5	47.1±2.4	34.7±1.7
	17, 19	M12 x 1.75	83.4±4.1	61.5±3.0
	19, 22	M14 x 2.0	134.4±6.7	99.1±4.9
	22, 24	M16 x 2.0	207.9±10.4	153.3±7.7
	27, 30	M20 x 2.5	410.9±20.5	303.1±15.1
Fine	12, 13	M8 x 1.0	24.5±1.2	18.1±0.9
	14, 17	M10 x 1.25	50±2.5	36.9±1.8
	17, 19	M12 x 1.5	87.3±4.3	64.4±3.2
	19, 22	M14 x 1.5	135.3±6.8	99.8±5.0
	22, 24	M16 x 1.5	220.6±11	162.7±8.1
	27, 30	M20 x 1.5	452.1±22.6	333.4±16.6

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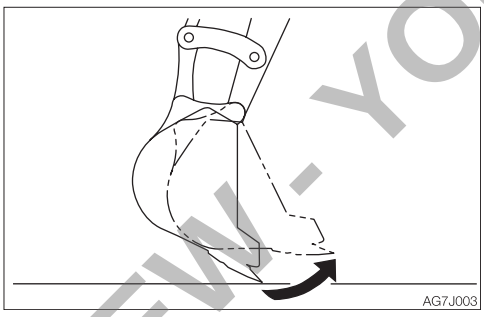
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SYMPTOMS THAT ARE NOT MALFUNCTIONS

The symptoms listed below are not malfunctions.



- The arm retracting speed momentarily slows down when it reaches an almost vertical position while the engine is running at low speed.



- The bucket teeth moving speed momentarily slows down when it reaches an almost horizontal position while the engine is running at low speed.
- The slew motor produces noise at the beginning and end of the slewing.
- The travel motor produces noise when stopped suddenly from its high speed traveling.
- The control valve produces noise if excessive force is applied to the working equipment or when it moved to the stroke end.
- It becomes less easy to operate the machine when an attachment weighing more than a standard arm or bucket is installed.

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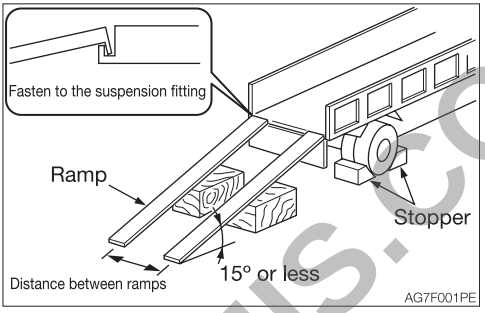
LOADING AND UNLOADING

⚠ WARNING

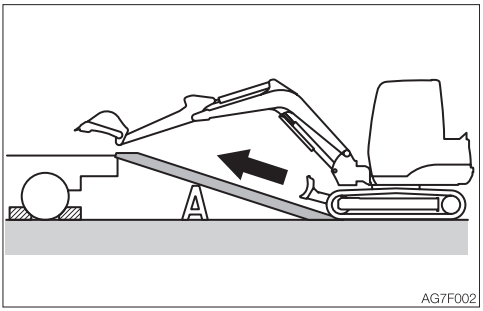
The machine may roll or tip over or fall while being loaded or unloaded. Take the following precautions:

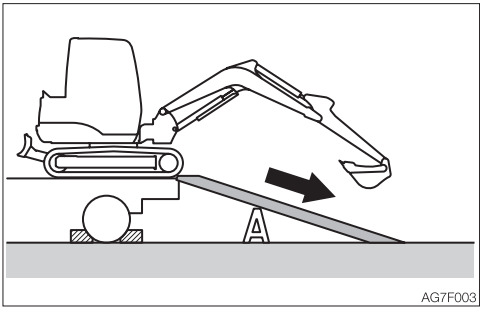
- **Select a firm, level surface and keep sufficient distance from road shoulders.**
- **Secure the ramps of adequate strength and size to the truck bed. The slope of the ramps must not exceed 15°. If the rumps are bowed down too low, support them with poles or blocks.**
- **Never use the working equipment to load or unload the machine. Doing so may result in tipping over or falling down of the machine.**
- **Keep the truck bed and loading ramps clean of oil, soil, ice, snow, and other materials to prevent the machine from sliding sideways. Clean the crawlers.**
- **Chock the transporter wheels to prevent movement.**
- **Turn off the deceleration switch and auto-deceleration switch. Otherwise, the engine speed may suddenly increase to cause troubles.**
- **When being loaded or unloaded, travel slowly in 1st (low) gear by following the signal from the signal person.**
- **Never change courses on the ramps.**
- **Do not slew/swing on the ramps. The machine may tip over.**
- **When slewing/swinging on the truck bed, do it slowly as the footing should be unstable.**
- **Lock the cab door after being loaded, if applicable. Otherwise, the door may open during transport.**
- **Chock the tracks and secure the machine to the truck bed with wire rope or chain.**

When loading or unloading the machine, be sure to use ramps or a platform and follow the procedure below.



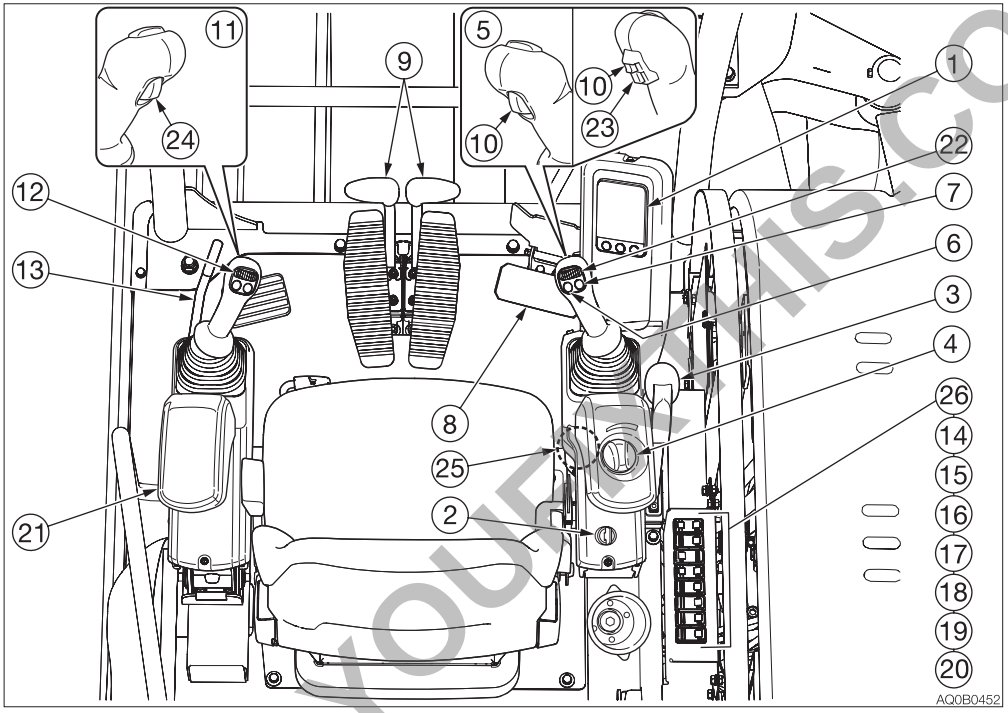
1. Set the parking brake on the transporter and chock the wheels.
2. Fix the ramps securely to the truck bed. The slope of the ramps must not exceed 15°.
3. Align the center of the truck bed with the center of the machine, and of the ramp with the center of the crawler.
4. Make sure the dozer blade does not hit the ramps.
5. Lower the hoe attachment as far as possible without letting it touch the transporter.
6. Decrease the engine speed.





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1. Instrument cluster
2. Starter switch
3. Blade lever
4. Throttle controller
5. Right operating lever*
6. Horn button
7. Deceleration button
8. Boom swing pedal
9. Travel levers/pedals
10. Travel speed button
11. Left operating lever
12. Auxiliary 1st switches
13. Safety lock lever
14. Light switch
15. Automatic deceleration switch
16. Power/Highland mode switch
17. Detent mode switch
18. Auxiliary 1st auto tank switch*
19. Lift overload warning switch*
20. Beacon lamp switch*
21. Engine shutdown switch*
22. Auxiliary 2nd/4th switch*
23. Auxiliary 2/4 select button*
24. Third auxiliary hydraulic button*
25. Third auxiliary hydraulic switch*
26. DPF manual regeneration/inhibit select switch
    <Applicable machine models 124000003 or later>

*: Subject to the specifications or optional products selected

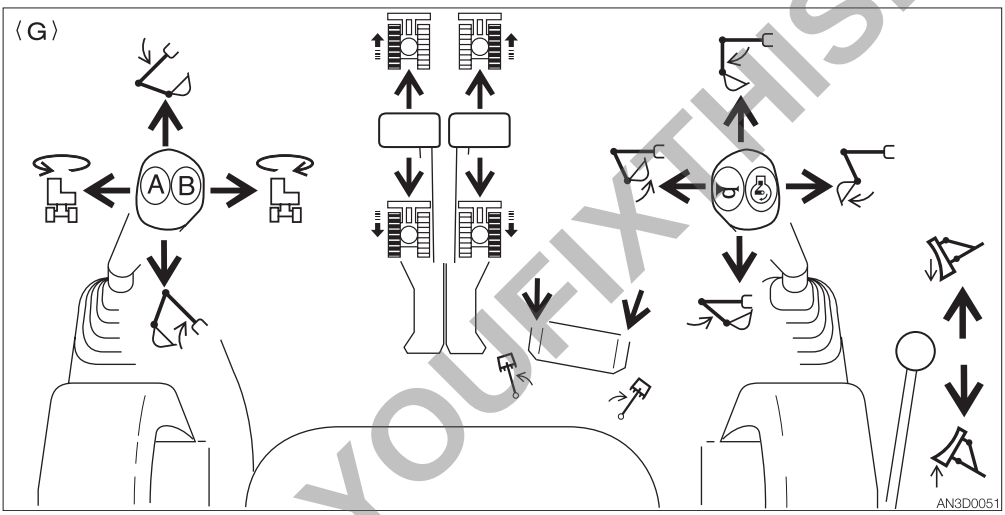
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LEVER PATTERN (G PATTERN) (IF EQUIPPED)

⚠ WARNING

- **Before starting operation, carefully check which lever pattern you are going to use.**
- **It is described using the ISO pattern in this manual.**



	Left crawler forward		Right crawler forward
	Left crawler reverse		Right crawler reverse
	Boom lower		Arm out
	Boom raise		Arm in
	Upperstructure slew left		Bucket load
	Upperstructure slew right		Bucket dump
	Boom swing left		Dozer blade lower
	Boom swing right		Dozer blade raise

Refer to “Selecting a lever pattern” on page 8-5.

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Inspection and maintenance item	Page
Every 1000 hours	
Replacing the hydraulic oil return filter	5-46
Replacing the pilot line filter	5-46
Replacing the travel motor gear oil *	5-46
Cleaning the engine cooling system	5-46
Replacing the air cleaner element	5-48
Replacing the air breather filter	5-49
Inspecting and adjusting the engine valve clearance	5-49
Every 1500 hours	
Inspecting, cleaning and checking operation of the engine fuel injectors <Applicable machine models 124000003 or later>	5-50
Inspecting the crankcase breather system	5-50
Cleaning the EGR cooler (cleaning the water side and exhaust air passage blower) <Applicable machine models 124000003 or later>	5-50
Every 2000 hours	
Lapping the engine valve seats (If necessary)	5-51
Every 3000 hours	
Inspecting the turbocharger (blow wash as necessary)	5-52
Inspecting, cleaning and checking operation of the EGR valve <Applicable machine models 124000003 or later>	5-52
Cleaning the EGR lead valve <Applicable machine models 124000003 or later>	5-52
Inspecting and cleaning the DPF soot filter <Applicable machine models 124000003 or later>	5-52
Inspecting the operation of the air intake throttle valve <Applicable machine models 124000003 or later>	5-52
Inspecting and cleaning the fuel injector <Applicable machine models 124000003 or later>	5-52
Every 4000 hours	
Replacing the hydraulic oil and cleaning the suction strainer	5-53
When required	
Replacing the bucket teeth and the side cutters	5-56
Replacing the bucket	5-59
Adjusting the gap between the bucket and arm (If equipped)	5-61
Inspecting and replenishing the windshield washer fluid	5-62
Draining the water from the water separator	5-63
Lubricating the levers and pedals	5-64
Inspecting the rubber crawlers	5-65
Replacing the rubber crawlers	5-66
Every 2 years	
Replacing the receiver dryer	5-68

*: If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.

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<Applicable machine models 124100002 or later>

Type				Canopy	Cab
MASS					
Operating mass	kg (lb)	Rubber crawlers		3825 (8433)	4015 (8851)
		Steel crawlers		3930 (8664)	4120 (9083)
PERFORMANCE					
Bucket capacity (Standard bucket)	m^3 (cu. ft.)	Heaped		0.12 (4.24)	
		Struck		0.09 (3.18)	
Slew speed	min^{-1} (rpm)			9.6 (9.6)	
Travel speed	km/h (mph)	Rubber crawlers	1st	2.9 (1.8)	
			2nd	5.3 (3.29)	
		Steel crawlers	1st	2.6 (1.62)	
			2nd	4.8 (2.98)	
Gradeability	(degrees)			30	
Ground pressure	kPa (psi)	Rubber crawlers		29.7 (4.31)	31.1 (4.51)
		Steel crawlers		31.2 (4.52)	32.7 (4.74)
Noise level	dB (A)	Sound power level		L_{WA} 96	
		Sound pressure level		L_{pA} 76	L_{pA} —
ENGINE					
Manufacturer and model				Yanmar 4TNV88-ZSTB1	Yanmar 4TNV88-ZSTB
Rated output	Net (ISO 14396)	kW/min^{-1} (hp/rpm)		27.2/2200 (37.0/2200)	
	Net (ISO 9249/ SAEJ1349)	kW/min^{-1} (hp/rpm)		26.0/2200 (35.4/2200)	
Displacement		ml (cu.in.)		2189 (133.6)	
Starter		V-kW		12-2.3	
Alternator		V-kW		12-0.66	
Battery (IEC 60095-1)		V-A·h		12-90	

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ENGINE ERROR CODE LIST

If an error code appears on the display, consult your sales or service dealer.

<Applicable machine models 124000003 or later>

Error code		Error details	DTC
SPN	FMI		
522400	2	Crank speed sensor (Crank signal malfunction)	P0336
	5	Crank speed sensor (No crank signal)	P0337
522401	2	Cam speed sensor (Cam signal malfunction)	P0341
	5	Cam speed sensor (No cam signal)	P0342
	7	Cam speed sensor (Angle offset failure)	P1341
523249	5	No signal on both crank and cam speed sensor	P0008
91	3	Accelerator sensor 1 (Excessive sensor output)	P0123
	4	Accelerator sensor 1 (Insufficient sensor output)	P0122
28	3	Accelerator sensor 2 (Excessive sensor output)	P0223
	4	Accelerator sensor 2 (Insufficient sensor output)	P0222
522624	7	Dual accelerator sensor (closed position) failure	P1646
522623	7	Dual accelerator sensor (open position) failure	P1647
29	3	Accelerator sensor 3 (Excessive sensor output)	P0228
	4	Accelerator sensor 3 (Insufficient sensor output)	P0227
	8	Pulse sensor failure (Pulse communication)	P1227
28	0	Accelerator sensor 3 failure (Foot pedal in open positon)	P1126
	1	Accelerator sensor 3 failure (Foot pedal in closed positon)	P1125
51	3	Intake throttle opening sensor fault (High voltage)	P02E9
	4	Intake throttle opening sensor fault (Low voltage)	P02E8

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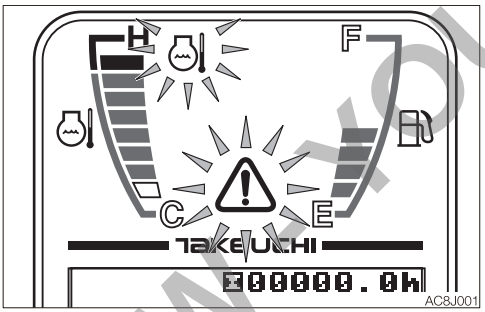
IF THE ENGINE OVERHEATS

⚠ WARNING

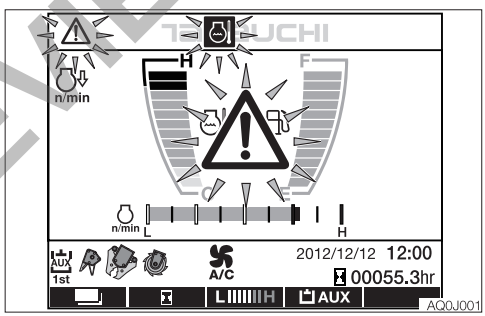
- **Do not open the engine hood when steam is coming from it. The steam or hot water may spurt out and cause burns.**
- **Do not try to remove the radiator cap or the drain plug when the cooling water is hot. Stop the engine, wait until the engine and the radiator cool, and then slowly loosen the radiator cap to release the internal pressure.**
- **Before performing maintenance, stop the engine and allow the machine to cool down.**

The symptoms listed below indicate overheating.

< Canopy >



< Cab >



- An alarm is sounded and the engine emergency lamp and the coolant temperature warning lamp start flashing.
- The water temperature gauge level is in the red zone.
- The engine slows down and the engine power decreases.
- Steam comes from the engine room.

Remedy procedure

1. Park the machine in a safe place.
2. Check if steam is coming out of the closed engine hood.
3. If there is steam, stop the engine immediately and contact your sales or service dealer for repair. If steam, is not coming out run the engine at low idle and let the water temperature cool down.
4. When the water temperature gauge level drops in the green zone, stop the engine.
5. Perform the inspections and the remedies listed below once the engine cools down.
   - Fan belt slack..... Adjust
     Refer to page 5-26.
   - Coolant level ..... Add
     Refer to page 5-18.
   - Water leakage..... Repair
   - Radiator fins..... Clean
     Refer to page 5-39.
   - Sediment in cooling system
     ..... Clean
     Refer to page 5-46.

If the problem persists after the above remedies, contact your sales or service dealer for repair.

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7. Drive the machine straight toward the ramps and travel up or down the ramps at 1st (low) speed, by following the signal from the signal person.
8. Load the machine at the specified position on the transporter.
   Refer to “Transporting posture” on page 4-6.

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Error code		Error details	DTC
SPN	FMI		
102	3	EGR low pressure side sensor fault (High voltage)	P0238
	4	EGR low pressure side sensor fault (Low voltage)	P0237
	13	EGR low pressure side sensor fault (Abnormal learning value)	P0236
1209	3	EGR high pressure side sensor fault (High voltage)	P0473
	4	EGR high pressure side sensor fault (Low voltage)	P0472
	13	EGR high pressure side sensor (Abnormal learning value)	P0471
110	3	Cooling water temperature sensor fault (High voltage)	P0118
	4	Cooling water temperature sensor fault (Low voltage)	P0117
	0	Cooling water temperature sensor temperature abnormal high (Overheat)	P0217
172	3	New air temperature sensor fault (High voltage)	P0113
	4	New air temperature sensor fault (Low voltage)	P0112
174	3	Fuel temperature sensor fault (High voltage)	P0183
	4	Fuel temperature sensor fault (Low voltage)	P0182
	0	Fuel temperature sensor temperature abnormal high	P0168
157	3	Rail pressure sensor fault (High voltage)	P0193
	4	Rail pressure sensor fault (Low voltage)	P0192
3251	3	DPF differential pressure sensor fault (High voltage)	P2455
	4	DPF differential pressure sensor fault (Low voltage)	P2454
	0	DPF differential pressure sensor differential pressure abnormal high	P2452
	13	DPF differential pressure sensor (Abnormal learning value)	P2453
3609	3	DPF high pressure side sensor fault (High voltage)	P1455
	4	DPF high pressure side sensor fault (Low voltage)	P1454
3242	3	DPF inlet temperature sensor fault (High voltage)	P1428
	4	DPF inlet temperature sensor fault (Low voltage)	P1427
	0	DPF inlet temperature sensor temperature abnormal high	P1436

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GENERAL PRECAUTIONS

It is your responsibility to observe all pertinent laws and regulations and to follow the manufacture's instructions on machine operation, inspection and maintenance.

Virtually all accidents occur as the result of a failure to observe basic safety rules and precautions.
Most accidents can be prevented by identifying the potentially hazardous situations beforehand.
Read and understand all safety messages which describe how to prevent accidents.
Do not operate the machine until you are sure that you have gained a proper understanding of its operation, inspection and maintenance.

Observe all safety rules

- Operation, inspection and maintenance of this machine must be performed only by a trained and qualified person.
- All rules, regulations, precautions and safety procedures must be understood and followed when performing operation, inspection and maintenance of this machine.
- Do not perform any operation, inspection and maintenance of this machine when under the adverse influence of alcohol, drugs, medication, fatigue, or insufficient sleep.

When a problem is found on the machine

If any problem (noise, vibration, smell, disorder of instrument, smoke, oil leak, wrong indication of alarm or unusual indication in the instrument cluster, etc.) is detected during the operation or inspection and maintenance of the machine, immediately inform your sales or service dealer and take proper actions. Do not operate the machine until the trouble is cleared.

Operating temperature range

To maintain the performance of machine and to prevent it from early wear, observe the following operating conditions.

- Do not operate the machine if the ambient temperature is higher than +45°C (+113°F) or lower than –15°C (+5°F).
  - If operated at an ambient temperature of higher than +45°C (+113°F), the engine may overheat and cause the engine oil to degrade. Also, the hydraulic oil may become very hot, causing damage to the hydraulic equipment.
  - If operated at an ambient temperature of lower than –15°C (+5°F), the parts made of rubber such as gaskets may get hardened to cause an early wear or damage to the machine.
  - If the machine is to be used outside the ambient temperature range described above, consult your sales or a service dealer.

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