



INSTRUCTION MANUAL

Applicable serial No. : IC110R : 33H01001~

CRAWLER CARRIER

IC110R

WARNING

- Be sure to read and understand this manual fully before operating or servicing this product.
Serious accidents including fatal accidents may occur if you perform operation or service without understanding the contents of this manual.
- Store this manual on the machine so that all persons who work on the machine can read it at any time. Check its contents periodically and repeatedly.
- Consult our distributor if you need a manual in another language.

0988596EN-00

1. Introduction (01E0-0001-1E)

Thank you for choosing KATO.

Correct operation and handling of this machine is essential for maximum safety and performance and will help to improve working efficiency and work rate.

We have prepared this manual to help you to do just that. Do not start using this machine before you have read this manual thoroughly and understood its contents.

WARNING

(1) Using this machine

The country in which you are using this machine may require alterations to its specifications or to the safety devices fitted.

Be sure to investigate the standards and regulations in the country concerned before you start to use the machine.

If alteration is required before you can use the machine, you should use it according to the standards and regulations.

(2) Modifications

If you modify the machine from the state in which it left our factory, you may impair its safety or performance.

If you wish to make modifications, we urge you to consult your authorised KATO dealer.

KATO bears no responsibility for accidents or malfunctions which arise as a result of unauthorised modifications.

(3) Optional parts and attachments

Refer to the instruction manuals provided when you install genuine optional parts.

Attachments not designated by KATO may impair safety or performance. They may cause tip-over accidents or have an adverse effect on the lifespan of the machine.

KATO bears no responsibility for accidents or malfunctions which arise as a result of the fitting of unauthorised attachments.

(T0988596-310-0E)

2. Designated operations for this machine (T0988566-001-0E)

Use this machine for the following main type of work.

- Transporting

3. How to use this manual (T0988552-079-1E)

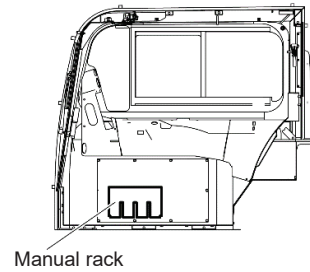
- You must read this manual fully and understand its contents before you operate, inspect or service this machine.

This manual is intended to be a guide to safe operation and regular servicing, so it should be kept in the manual rack on the foot of the operation cab available to all those who use the machine.

- The sections in this manual and safety signs on this machine include safety information.

The labels "  DANGER", "  WARNING" and "  CAUTION" are used in this manual and safety signs on this machine so that you can understand the important items for safety operations and procedures fully.

Read them fully and understand them before you operate, inspect or service this machine.



10988596-260-0E



DANGER

Indicates warnings concerning direct risks of serious injury or death.

(01E0-0005-0E)



WARNING

Indicates warnings concerning potential risks of serious injury or death.

(01E0-0006-0E)



CAUTION

Indicates warnings concerning potential risks of injury or major damage to the machine.

(01E0-0007-0E)

- If this manual is lost or seriously damaged, order a replacement immediately from your authorised KATO dealer.
- When the user changes through resale or other circumstances, the instruction manuals must be transferred together with the machine.
- This manual has been written as a standard for general handling in specified operations.

It is not intended to cover its handling under special conditions and unusual circumstances. Before attempting any operations not covered by this manual or when you are unsure of any aspect of its contents, contact your authorised KATO dealer.

- We are unable to predict every hazard which may accompany traveling, operation, inspection and servicing in any kind of environment.

Therefore the danger, warning and other safety labels which appear in this manual and on the machine itself do not cover every eventuality.

If you travel, operate, inspect or service this machine in ways not covered in this manual, you are fully responsible for all safety considerations.

If you have any questions about traveling, operation, inspection and servicing, or if any points are unclear, contact your authorised KATO dealer.

- The illustrations in this manual are intended to attract attention and supplement the main text. They do not give a full and detailed account of the content of the text.

- Any operations which do not conform to the contents of this manual are at the operator's own risk and responsibility. KATO will bear no responsibility for any accident or damage which occurs as a result.
- If you intend to use the machine in operations or conditions other than those designated, consult your authorised KATO dealer.
- In addition to the contents of this manual, further safety information and requirements are to be found on the safety signs on the machine and are contained in laws, regulations, ordinances, insurance conditions and other sources. You must also adhere to these conditions.
Further observe the safety regulations and laws of the country where the machine is used.
- Please also refer to the separate engine instruction manuals.

4. Inspection and servicing (T218081-208-0E)

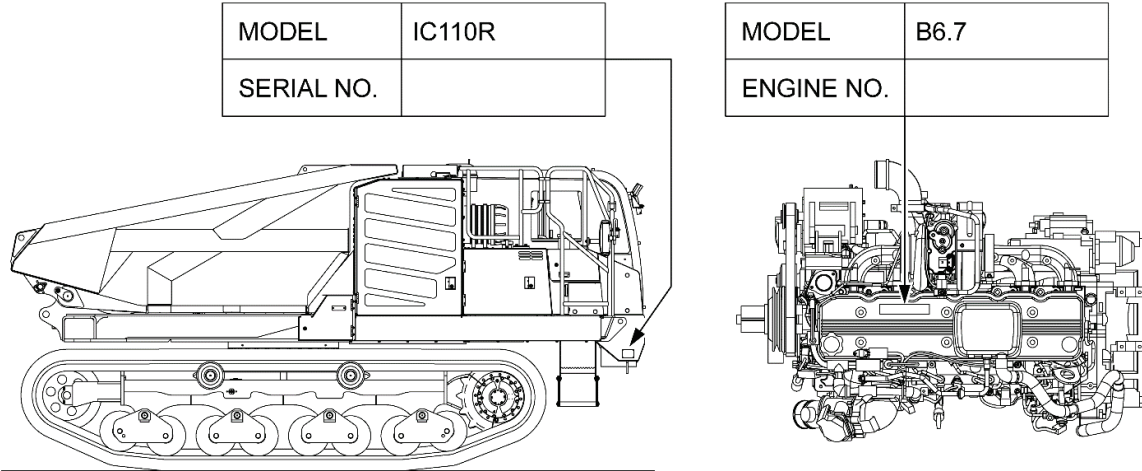
The inspection and servicing operations listed in this manual are a guide for extending the lifespan of the machine, improving its work rate and running it safely. Carry out the regular inspection and servicing tasks on the basis of this manual and regulations of the country where the machine is used without fail.

This manual details the procedures for preoperational, monthly and yearly inspection and servicing. Record the results of each inspection and servicing measures taken in the "Inspection Sheet".

Refer to the separate "Service Manual" for servicing procedures for breakdowns and disassembly.

5. Product identification number and engine serial number (01E0-0009-1E)

The product identification number and engine serial number will assist in smooth administrative processing of orders for parts and servicing from your authorised KATO dealer, so please provide these numbers when ordering.

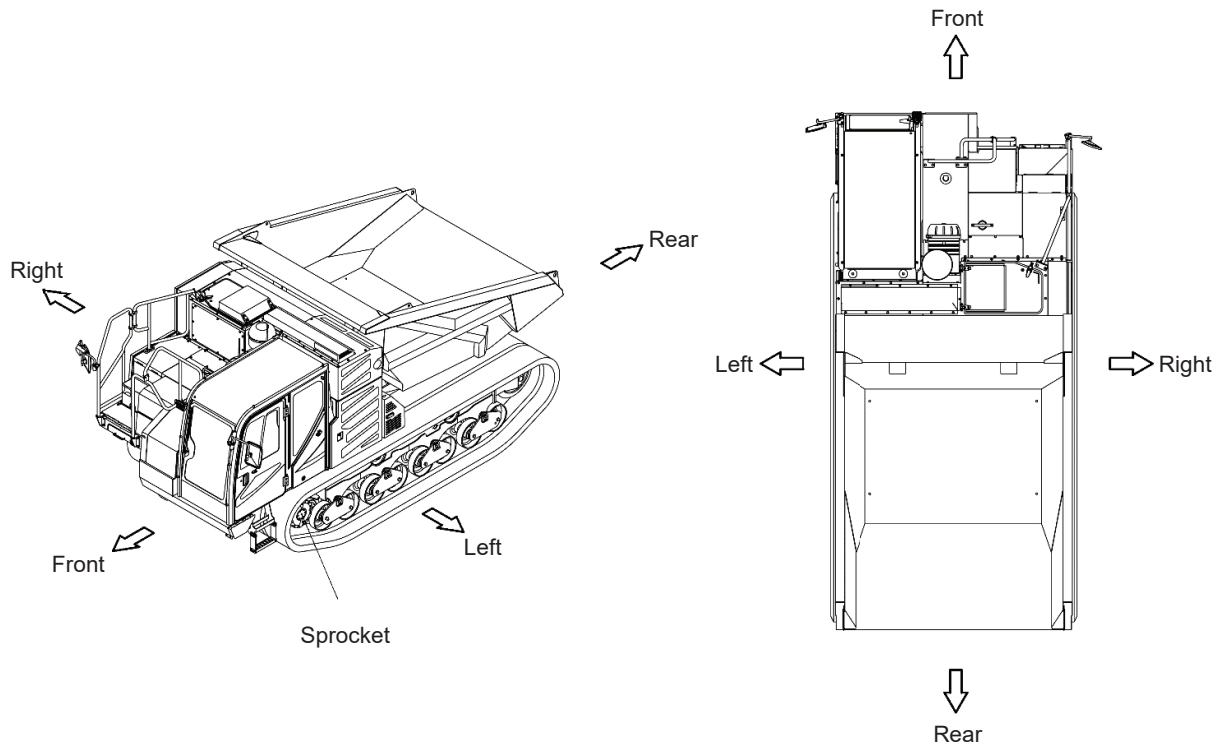


I0988596-001-0

6. Machine orientation (T0988585-102-0E)

(1) Reference position of machine

The reference position of the machine for front, rear, right and left indicates the status in which the orientation of the operator seat in the upper structure is front and the sprocket in the lower traveling body faces the front.



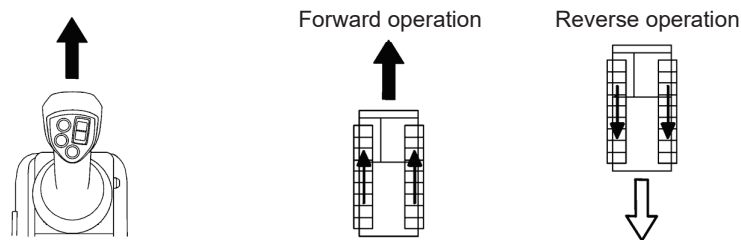
I0988596-002-0E

(2) Joystick lever operation: Forward operation and reverse operation

In this instruction manual, the terms "forward operation" and "reverse operation" for joystick lever operation direction are as explained as follows.

Forward operation: Operation where pushing the joystick lever forward moves the machine forward

Reverse operation: Operation where pushing the joystick lever forward moves the machine backward.



I0988585-113-0E



CAUTION

Swing operation changes or reverses the orientation of the upper structure and lower traveling body on this machine.

Incorrect forward and backward movement operation could lead to a serious accident.

Before carrying out travel operation, be sure to make sure that the travel direction based on lever operation matches the intention of the operator.

Whether current status is forward or reverse operation ⇒ Travel operation direction indicator P34 3 (1)

Switching forward/reverse operation ⇒ Travel operation changeover switch ... P49 3 (14)

(T0988596-100-0E)

7. Operation qualifications (T0988566-161-0E)

WARNING

- Indicates warnings concerning potential risks of serious injury or death.
- You must not operate without these qualifications.

(01E0-0012-0E)

8. Safety parts for periodic replacement (T0988566-003-0E)

For the long-term safe operation of the machine, we ask you to inspect and service it regularly. However it is difficult to evaluate the lifespan of parts by external visual inspection, so certain important parts such as the parts related to a fire should be replaced at set intervals regardless of their apparent condition. If inspection and servicing reveals any abnormality whatever in these parts, replace them even before their regulation time.

Ask your authorised KATO dealer to carry out the replacement of these safety parts.

Fuel system

Periodic replacement parts	Quantity	Replacement interval
Fuel hose (Fuel tank - Water separator)	2	Every 2 years or 4000 hours
Fuel hose (Water separator - Electromagnetic fuel pump)	1	
Fuel hose (Electromagnetic fuel pump - Fuel filter)	1	
Fuel hose (Fuel filter - Engine)	1	
Fuel hose (Engine - Fuel cooler)	1	
Fuel hose (Fuel cooler - Fuel tank)	1	

(T0988596-230-0E)

Hydraulic system

Periodic replacement parts	Quantity	Replacement interval
Hydraulic hose (Pump - Right-side travel motor / Main line)	4	Every 2 years or 4000 hours
Hydraulic hose (Pump - Left-side travel motor / Main line)	4	
Hydraulic hose (Pump - C/V - Dump cylinder - Stop valve)	8	
Hydraulic hose (Pump - Right-side / Pump - Left-side)	2	
Hydraulic hose (CV - Swing motor)	2	

(T0988596-002-0E)

You must also inspect hydraulic hoses and fuel hoses during the following regular inspections.

Inspection interval	Inspection item
Preoperational inspection	• Oil leakage from the joints and caulked sections of fuel or hydraulic hoses
Monthly inspection	• Oil leakage from the joints and caulked sections of fuel or hydraulic hoses • Damage to fuel or hydraulic hoses (cracks, wear, tearing)
Yearly inspection	• Oil leakage from the joints and caulked sections of fuel or hydraulic hoses • Interference, collapse, deterioration, twisting, damage (cracks, wear, tearing) to fuel or hydraulic hoses

(01E0-0018-0E)

CAUTION

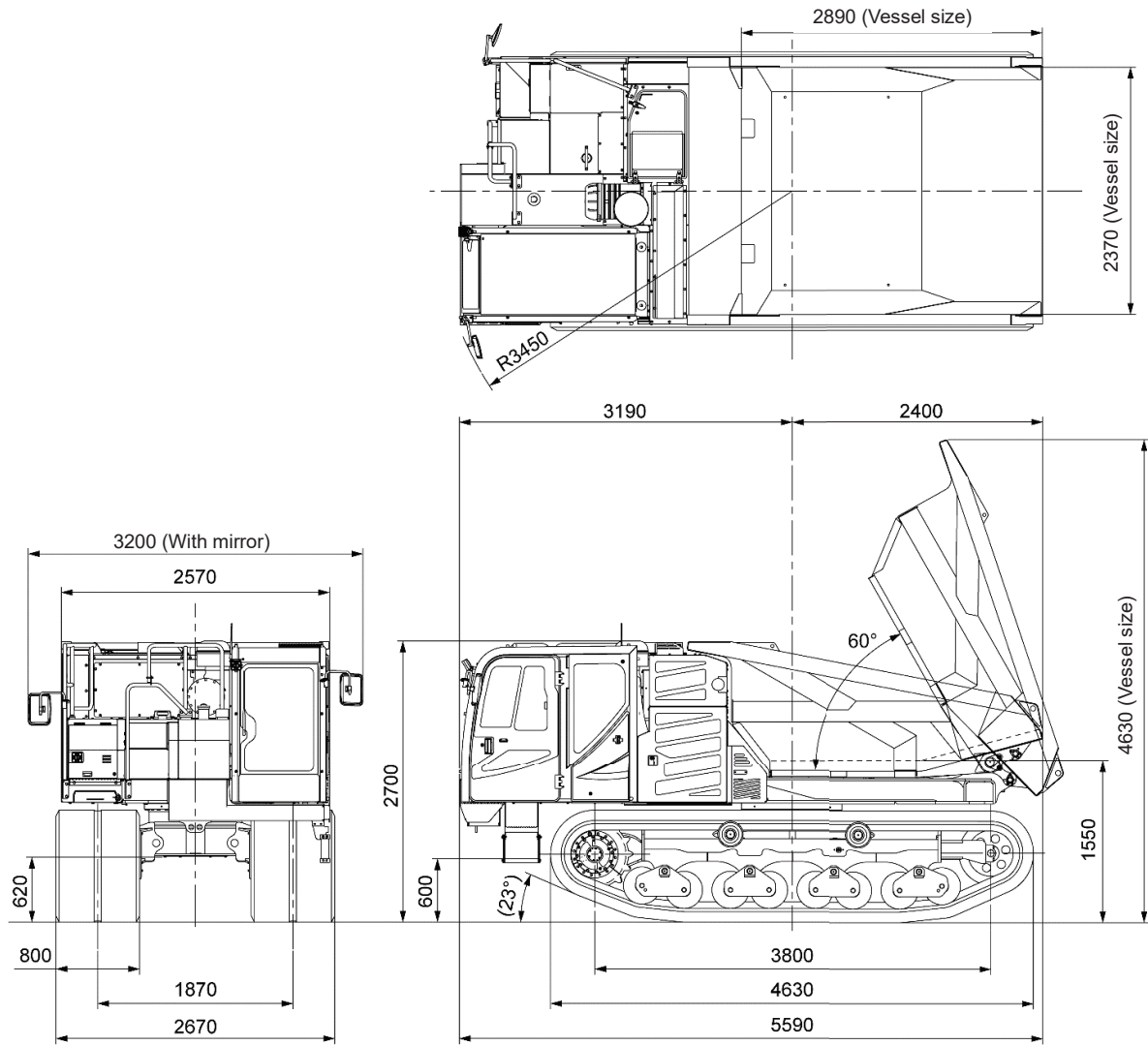
1. Replace O-rings, gaskets etc. at the same time as you replace hoses.
2. If you find deformation or cracking of hose clamps when you inspect or replace hoses, you should also replace the affected clamps.

(01E0-0019-0E)

9. Specifications (08E0-0003-0E)

9-1 External views and working range (T0988566-200-0E)

9-1-1 IC110R (T0988596-003-0E)



10988596-003-0E

9. Specifications

9-2 General data (T218971-004-0E)

9-2-1 IC110R (T0988585-100-0E)

Model	IC110R
Specification	Scoop end
Loading capacity	11,000 kg
Machine weight	16,610 kg

■Engine

Model	Cummins B6.7
Applicable regulation	EU Stage V, EPA Tier 4 Final Non-road emission standards
Rated output	191 kW/2,000 min ⁻¹ (maximum engine speed, with the engine installed to the machine)
Max torque	1,288 N·m (131.3 kgf·m)/1,500 min ⁻¹
After-treatment device	DPF (Diesel Particulate Filter) SCR (Selective Catalytic Reduction)

■Key dimensions

Overall length (as shipped)	5,590 mm
Overall height (as shipped)	2,700 mm
Overall width	2,670 mm
Minimum ground clearance	620 mm
Crawler width	2,670 mm
Crawler length	4,630 mm
Shoe width	800 mm
Upper structure Swing radius	3,450 mm

■Traveling & swing performance

Travel speed	6.2/11.8 km/h (Low/High)
Grade ability	36%
Ground pressure	35.3 kPa (0.36 kgf/cm ²) non load 58.9 kPa (0.60 kgf/cm ²) maximum load

■Hydraulic system

Hydraulic pump	Variable capacity plunger (travel × 2), Gear (vessel and swing)
Set pressure	Travel: 40.0 MPa, Vessel: 20.6 MPa, swing: 15.7 MPa
Discharge volume	Travel: 260 L/min, Vessel and swing: 97.4 L/min
Traveling motor	Variable capacity plunger
Swing motor	Constant capacity piston motor

■Tank

Hydraulic oil tank	135 L [Total oil volume]
Fuel tank	320 L
DEF tank	49.2 L (Total volume)

■Battery

Starting motor	24 V - 7.8 kW
Battery	12 V - 120 Ah × 2 (145G51×2)
Generator	24 V - 70 A

(Note) Units are displayed in the international unit system (SI). The values in parentheses () are reference values displayed in conventional units (non-SI units).

10. Residual risk map where protective measures required by machine users

■ Noise level

Sound power level (Measured)	LwA 107 dB
Sound pressure level at the operator's ear	LpA 74 dB

■ Vibration exposure level (DIRECTIVE 2002/44/EC)

Unit: m/sec²

	Whole body	Hand/arm
Exposure value per day (action)	0.5	2.5

Unit: m/sec²

Declared vibration emission value in accordance with EN 12096

Vibration	Action	Vibration Level	Uncertainty
Whole body	Low speed	0.43	0.11
	High speed	0.49	0.12
Hand/arm	Low speed	2.22	0.35
	High speed	2.10	0.46

(Note) These values are measured under specific operating and environmental conditions.

The values may vary depending on the actual operating conditions.

Estimated values should be obtained taking into account the effects caused by the actual operating environment.

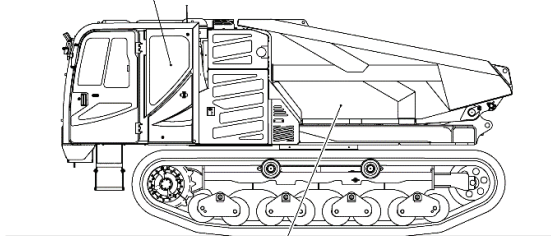
10988585-003-1E

10. Residual risk map where protective measures required by machine users (T218081-006-0E)

The symbols and numbers for the locations shown in the figure are the same as the symbols and numbers in the "Residual Risk Table". For details on specific residual risks, see the "Residual Risk Table". The definitions for ⚠ DANGER, ⚠ WARNING, and ⚠ CAUTION are based on the information in "Using This Manual".

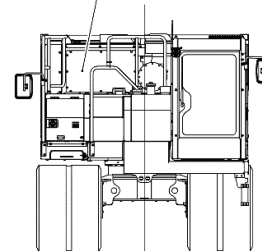
10-1 IC110R (T0988596-004-0E)

Location A	⚠ WARNING	No. 103,104,108,111 201,301
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Location B	⚠ DANGER	No. 109
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Location C	⚠ WARNING	No. 208
Location D	⚠ WARNING	No. 403
	⚠ CAUTION	No. 404
Location E	⚠ WARNING	No. 407,408



Residual risks with no specific location on machine		
⚠ DANGER	No.	205,401,412
⚠ WARNING	No.	101,102,105,106,107,110, 202,204,209,302,303,409,410
⚠ CAUTION	No.	402,405,406,411

10988596-006-0E

10. Residual risk map where protective measures required by machine users

Residual Risk Table *DANGER, WARNING, and CAUTION are defined on page [2] of this manual.

No.	Applicable stage	Work	Required qualifications for work	Location on machine	Residual risk	Hazard description	Protective measures implemented by machine user	Page in instruction manual
101	Before work	Pre-operation inspection and maintenance	Skill training course for operation of crawler carrier	No specific location	WARNING	Incorrect operation or maintenance could lead to a serious injury, death, or other accident.	(1) Be sure to always read the instruction manual before starting operation and work.	P1
102	Before work	Pre-operation inspection and maintenance	Skill training course for operation of crawler carrier	No specific location	WARNING	Failing to follow the instructions and warning required for safe operation could lead to a serious injury, death, or other accident.	(1) Be sure to always check the safety signs before starting operation and work.	P1 P13
103	Before work	Pre-operation inspection and maintenance	Skill training course for operation of crawler carrier	A	WARNING	Entanglement in engine rotating parts or an out-of-control machine could lead to a serious injury, death, or other accident.	(1) Do not start the engine when a warning tag is attached indicating that inspection or maintenance is in progress.	P10 P18
104	Before work	Inspection of area around operator seat	Skill training course for operation of crawler carrier	A	WARNING	The machine could run out of control, leading to a serious injury, death, or other accident.	(1) Before starting work, be sure to perform walk-around inspection. Do not perform inspection on slopes. (2) Remove any mud, oil, and snow from the bottom of the shoes before entering the operator's cabin. Carefully wipe off any mud, oil, or snow on the floorboards, levers, handrails, and other locations.	P2
105	Before work	Inspection before starting work	Skill training course for operation of crawler carrier	No specific location	WARNING	The user could fail to notice a problem in the machine, leading to a serious injury, death, or other accident.	(1) Be sure to fully conduct the inspection before starting work, and immediately take corrective action if any problems are found.	P2 P56 P107
106	Before work	Getting in and out of the machine	Skill training course for operation of crawler carrier	No specific location	WARNING	A serious accident could occur if the user falls from an elevated location.	(1) Do not jump onto or jump off the machine. (2) When getting in and out of the machine, support your body in three or more locations, such as by using the handrail, step, and crawler shoe.	P19
107	Before work	Before operation	Skill training course for operation of crawler carrier	No specific location	WARNING	Incorrect operation could lead to a serious accident.	(1) Inspect the device activation states and operation vessel travel, and rotation.	P63
108	Before work	Before operation	Skill training course for operation of crawler carrier	A	WARNING	Incorrect operation could lead to a serious accident.	(1) Check that machine movement from the lever follows the operation pattern in the displayed plate.	P63
109	Before work	Before operation	Skill training course for operation of crawler carrier	B	DANGER	The fall of vessel could lead to a serious accident.	(1) Lock the safety pin when the vessel is raised fully.	P11 P67
110	Before work	Before operation	Skill training course for operation of crawler carrier	No specific location	WARNING	Electrical shock from electrical wires could lead to a serious injury, death, or other accident.	(1) Keep the machine at a safe distance from electrical wires. (2) When performing work near electrical wires, do not allow people to come near the machine.	P17
111	Before work	Engine starting	Skill training course for operation of crawler carrier	A	WARNING	Entanglement in engine rotating parts or an out-of-control machine could lead to a serious injury, death, or other accident.	(1) Check that no objects are blocking the area inside or around the machine and that no people are around. (2) Check that warning tags, such as "Operation Prohibited" or "Under Maintenance", are attached. (3) Always operate while sitting in the operator seat. (4) Check that the levers, pedals, and other controls are in the proper operation positions. (5) Check that the safety lock lever is in the lock position. (6) Before starting operation, sound the horn to signal and warn those in the area.	P4 P14 P18
201	During work	General operation	Skill training course for operation of crawler carrier	A	WARNING	The user could be thrown from the operator seat, leading to a serious injury, death, or other accident.	(1) During operation, sit in the operator seat and always wear a seat belt.	P4 P17
202	During work	General operation	Skill training course for operation of crawler carrier	No specific location	WARNING	Contact or entanglement with the machine could lead to a serious injury, death, or other accident.	(1) Do not go near the machine. (2) Always pay careful attention to your surroundings while doing your work.	P1 P18
204	During work	Traveling	Skill training course for operation of crawler carrier	No specific location	WARNING	Tipping over or side slipping of the machine could lead to a serious injury, death, or other accident.	(1) Do not perform sudden operations (sudden starts, sudden stops, or switching levers back and forth). (2) Travel at low speed. (3) Do not get on or off so that the machine tilts too far to the right or left direction. (4) Confirm forward operation and reverse operation.	P6 P7 P8

10. Residual risk map where protective measures required by machine users

No.	Applicable stage	Work	Required qualifications for work	Location on machine	Residual risk	Hazard description	Protective measures implemented by machine user	Page in instruction manual
205	During work	Traveling on slopes	Skill training course for operation of crawler carrier	No specific location	DANGER	Tipping over or side slipping of the machine could lead to a serious injury, death, or other accident.	(1) Travel straight along the slope at low speed. (2) Do not travel on slopes where boards or iron plates without anti-slip traction are laid. (3) On sloping surfaces, do not change direction or travel by cutting across the area. (4) Select the 1st gear and travel straight. Do not meander. (5) Be careful not to overrun.	P7 P79
208	During work	Swing	Skill training course for operation of crawler carrier	C	WARNING	Contact with and getting trapped in the upper structure while swinging could lead to a serious injury, death, or other accident.	(1) Do not stand in the swing range. (2) Before swinging, sound the horn to signal and warn those in the area. (3) Use mirror of each part and rear check monitor to always check the surrounding state.	P8 P18 P76
209	During work	Swing	Skill training course for operation of crawler carrier	No specific location	WARNING	Tipping over of the machine could lead to a serious injury, death, or other accident.	(1) Be aware that the state where the vessel is loaded with Soil and sand likely to lose balance in swinging. (2) Do not swing and dump on slopes.	P8 P18 P67 P76
301	After work	Parking	Skill training course for operation of crawler carrier	A	WARNING	Unintended operation of the machine could lead to a serious injury, death, or other accident.	(1) When leaving the operator seat, stop at a flat, stable location. (2) Lower the vessel fully. (3) Set the safety lock lever to the lock position. (4) Stop the engine, and remove the starter key. (5) Use all keys to lock so that no one other than authorized users can operate the machine.	P77
302	After work	Transporting	Skill training course for operation of crawler carrier	No specific location	WARNING	Tipping over of the machine could lead to a serious injury, death, or other accident.	(1) Load and unload on a level ground surface. (2) Use a ramp that has sufficient strength, width, length, and thickness. (3) Remove ice, snow, or slippery material from the ramp and truck deck before loading. (4) NEVER change direction on a ramp.	P9 P15 P94
303	After work	Transporting	Skill training course for operation of crawler carrier	No specific location	WARNING	Unintended operation of the machine could lead to a serious injury, death, or other accident.	(1) Apply wheel block in front of and behind the crawler to fix the machine. (2) Securely fix the lower frame and upper structure to the vessel using a wire rope.	P9 P95
402	Inspection and maintenance	General maintenance	None in particular	No specific location	CAUTION	Touching hot locations of the machine could result in a burn.	(1) The engine, exhaust pipes, radiator, hydraulic oil tank, hydraulic piping, and other parts can become extremely hot. Check that these parts have cooled down before starting maintenance.	P16 P105 P123
403	Inspection and maintenance	General maintenance (Engine)	None in particular	D	WARNING	Entanglement in fans, belts, and other engine rotating parts could lead to a serious injury, death, or other accident.	(1) Always stop the engine before starting work. (2) Display warning tags in easily visible locations indicating that inspection and maintenance are in progress. (3) The worker holds onto the starter key.	P10 P11 P18 P101 P104
404	Inspection and maintenance	General maintenance (Radiator)	None in particular	D	CAUTION	Heated cooling water could spray out, resulting in a burn.	(1) Wait until the cooling water has cooled down, and then gradually loosen the pressure cap to reduce the pressure.	P102 P141
405	Inspection and maintenance	General maintenance (Hydraulic system)	None in particular	No specific location	CAUTION	High-temperature, high-pressure hydraulic oil could spray out, resulting in a burn or other injury.	(1) Use the oil temperature gauge to check that the hydraulic oil has cooled down. (2) Be sure to always release the hydraulic pressure before starting work.	P10 P145
406	Inspection and maintenance	Opening and closing covers	None in particular	No specific location	CAUTION	Strong winds or falling could cause the worker to get trapped in the cover, resulting in an injury.	(1) When the cover is opened, mount the stopper and firmly lock in place. Be sure that the engine hood and toolbox are fully opened. (2) After the work is completed, return the cover to its original position.	P56 P106 P123
407	Inspection and maintenance	Battery handling	None in particular	E	WARNING	Battery fluid (dilute sulfuric acid) could contact the skin and get in the eyes, resulting in a burn or blindness.	(1) Wear safety goggles, long-sleeve work clothes, and safety gloves, and use caution when handling the battery.	P1 P12 P15 P101 P154

10. Residual risk map where protective measures required by machine users

No.	Applicable stage	Work	Required qualifications for work	Location on machine	Residual risk	Hazard description	Protective measures implemented by machine user	Page in instruction manual
408	Inspection and maintenance	Battery handling	None in particular	E	WARNING	The hydrogen gas generated from the battery could explode, resulting in a severe accident.	(1) Do not bring the battery near an open flame. (2) Inspect the battery fluid level, and refill if it is low. (3) When charging, remove the battery from the machine, and charge it in a well-ventilated location.	P17 P105 P155
409	Inspection and maintenance	Handling of accumulator and gas damper	None in particular	No specific location	WARNING	The sealed high-pressure nitrogen gas could cause a rupture, resulting in a severe accident.	(1) Do not attempt to repair or disassemble. (2) Do not bring near an open flame. (3) Before disposing, remove the sealed gas.	P56
410	Inspection and maintenance	General maintenance	None in particular	No specific location	WARNING	Be sure to use the safety pin during inspection.	Read the instruction manual. Be aware of hazard prediction.	P11 P67 P120
411	Inspection and maintenance	Vessel lowering	None in particular	No specific location	CAUTION	Emergency lowering	Do not perform two-person operation. Operate with caution. Make sure to perform opening and closing check.	P15 P70
412	Inspection and maintenance	General maintenance (Fuel system)	None in particular	No specific location	DANGER	Erroneous handling of fuel could cause fire and lead to a serious accident.	Keep any ignition source away from fuel and check that the fuel system is normal.	P21

(T0988596-005-0E)

10. Residual risk map where protective measures required by machine users

Please fill in newly added residual risks here.

No.	Applicable stage	Work	Required qualifications for work	Location on machine	Residual risk	Hazard description	Protective measures implemented by machine user	Page in instruction manual

(T218081-009-1E)

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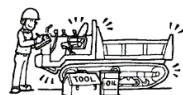
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10988566-007-0

Operation

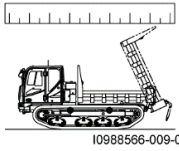
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1. For safe operation (T0988585-013-0E)

- This section lists precautions you should observe when operating this machine.
- Make sure you fully understand these points before you start operation and observe them to operate safely.
- In this section, pictures which illustrate dangerous situations or working practices are marked with a large "X".
- The illustrations in this section are intended to attract attention and supplement the main text. They do not give a full and detailed account of the content of the text.

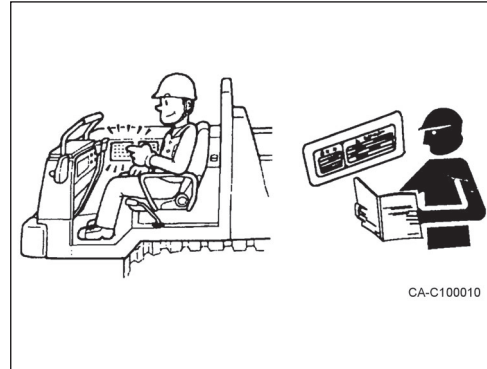
1-1 Precautions before operation (T0988585-103-0E)

(1) Read and understand the warnings signs and labels

- 1) There are several specific safety signs on your machine.
Please take the time to familiarize yourself with these safety signs.

Make sure that you can read all safety signs.

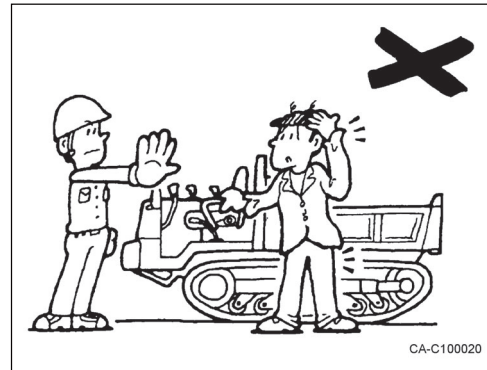
- 2) You must replace a label if it is damaged, missing or cannot be read. If a label is on a part that is replaced, make sure a new label is installed on the replaced part.



(2) Operation should be in good health

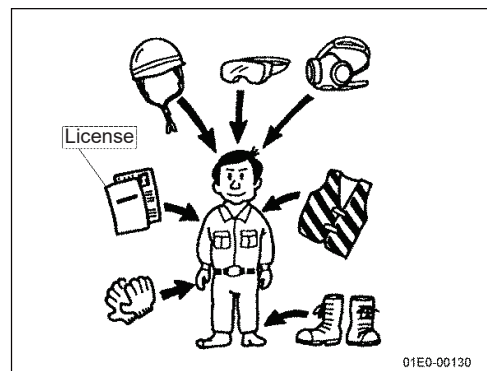
Operator should be physically and mentally alert, which is one of the best insurance against an accident.

NEVER operate the machine under the influence of alcohol, medication, or intoxication.



(3) Wear proper working clothes

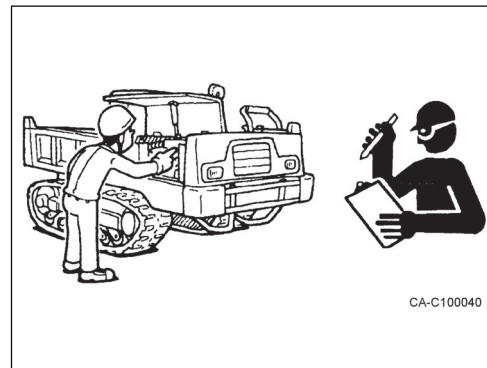
- 1) For the sake of safety during driving, wear clothes that match your body. The sleeves of sloppy clothes can get caught in the machine and can cause unforeseen accidents.
- 2) Wearing a hard hat and safety boots is recommended.
Wear a hard hat, protective goggles and other protective equipment as required by job conditions.



(4) Perform "walk-around" inspection

Walk around the machine to check safety guards, plates, and other related parts are set in place. Do not attempt to operate the machine when any unsafe condition is detected.

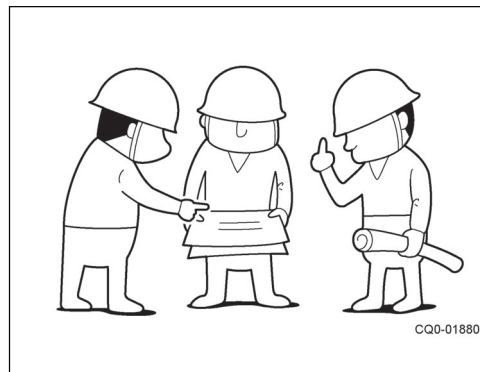
- 1) Perform inspection on a level place.
- 2) Clean the floor board, lever, and hand grips of the cab.
- 3) Clean the cab windows, wipers, and mirrors to ensure for good visibility.



WARNING 1. For safe operation

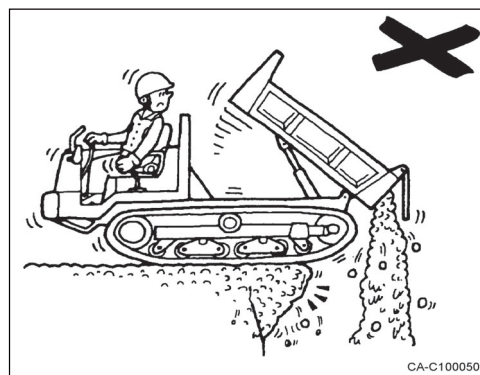
(5) Make a work plan

- 1) Start the work only after discussing with the person in charge at the site the rules and precautions inside the work place as well as the work procedure.
- 2) When working together with other persons, determine the signals and who is to give those signals.



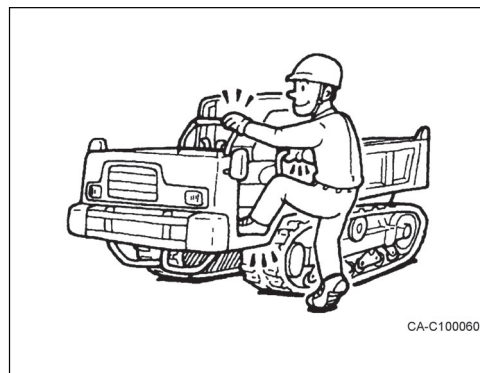
(6) Check the job site

- 1) Confirm in advance if there are any dangerous locations where the land collapses or where machine can fall off a cliff, etc.
- 2) Take measures necessary for safety in dangerous locations.



(7) Carefully get on and off the machine

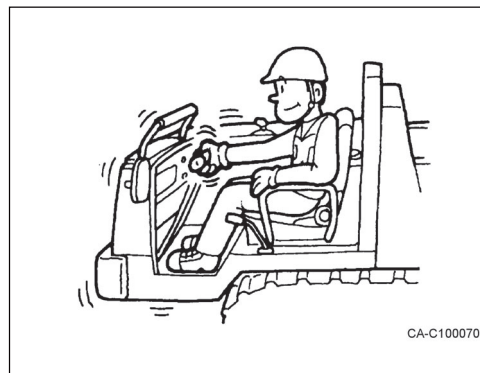
- 1) Maintain a three point contact (Two feet and one hand or one foot and two hands contact) with the steps and hand grips.
- 2) Do not use any controls as hand grips when entering or leaving the operator's station.
- 3) When any oil or other slippery substance has got adhered to hand grips or steps, wipe them off clean.



(8) Start the engine while sitting in the operator seat

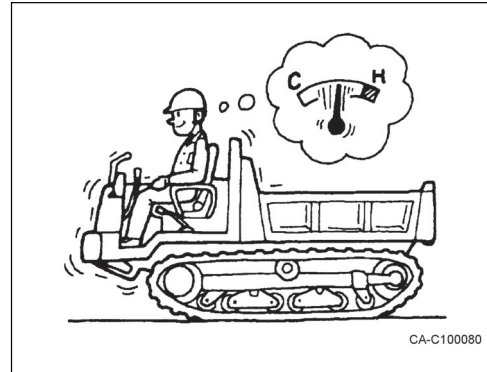
If the engine is started from a position other than sitting in the operator seat, there is the danger that the machine starts moving suddenly.

Start the engine only after carrying out checks while sitting in the operator seat.



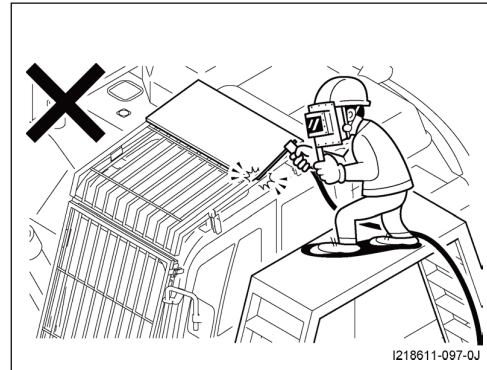
(9) Conduct warm-up before operation

If the machine is operated without carrying out sufficient warming up operation, it can lead to movements not intended by the operator, and can lead to accidents. Always carry out sufficient warming up operation.



(10) Operator protective structure

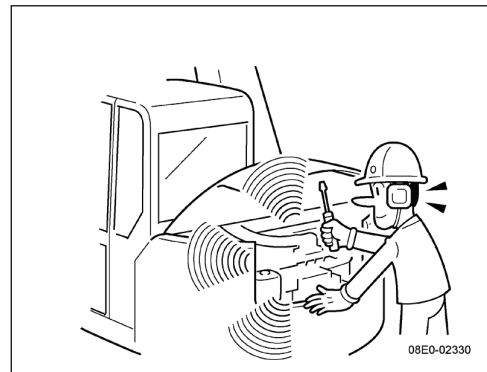
The cab and cab guard have an operator protective structure. Alteration of them such as welding, drilling, etc. will deteriorate the function for a protective structure, so never alter them. Damage or deformation may also impair functionality, so replace it immediately.



(11) Noise hazard

Working for extended periods in the vicinity of loud noise can cause hearing damage.

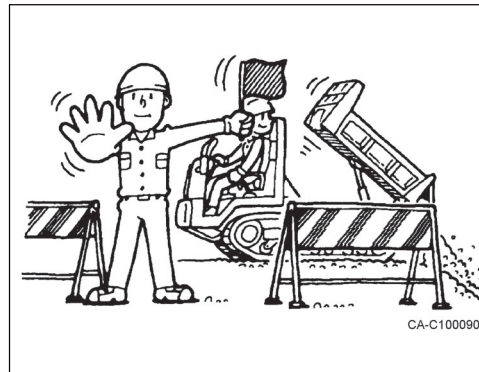
- Wear earplugs or ear protection before working on the engine or otherwise being exposed to loud noises for long periods.



1-2 Precautions during operation (T0988585-007-0E)

- (1) Clear all personnel from the machine and area

Be sure to barricade the job site to prevent entry of the unauthorized. Confirm that there is no one around the machine before starting the engine or operating the machine.



- (2) Maintain good ventilation

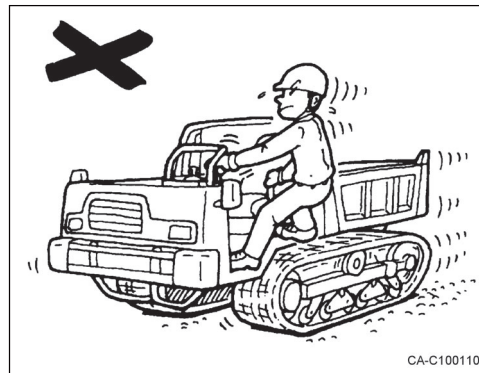
Diesel engine exhaust contains products of combustion which may be harmful to your health. Always start and operate the engine in a well ventilated area. If in an enclosed area, vent the exhaust to the outside.



- (3) Stay seated while operating

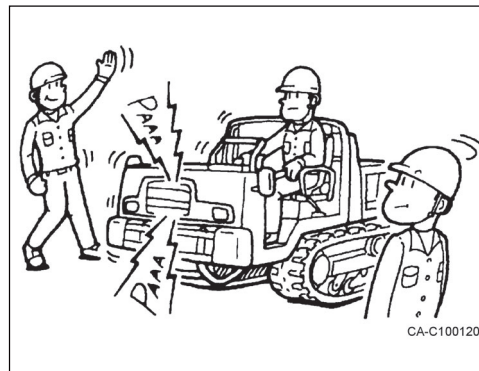
There is the danger of making wrong operations if the operating is done from a position other than the operator seat or while standing.

Operate the machine only while seated and with the seat belt fastened.



- (4) Prevent accidents while moving

- 1) Always sound the horn to signal others nearby that you are moving the machine. Check that no one is within the working area of the machine before attempting to move it.
- 2) Position a guiding person to guide and check when necessary or when the field of view is bad.
- 3) Be careful not to stand in the swinging range of the upper structure.

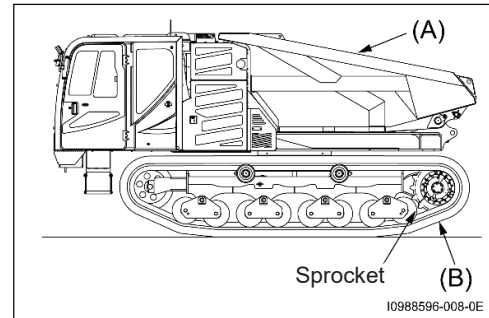
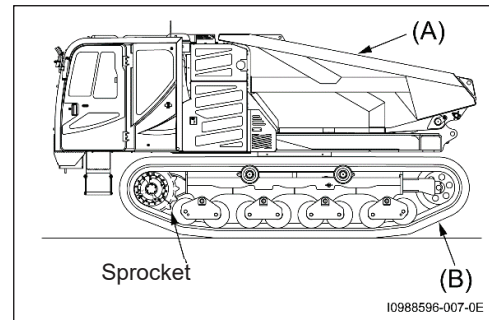


(5) Check the front and rear of the upper structure.

Before moving the machine, be sure to place the upper structure (A) parallel to the lower traveling body (B).

Otherwise, traveling curve becomes large even if the operator intends to travel straight.

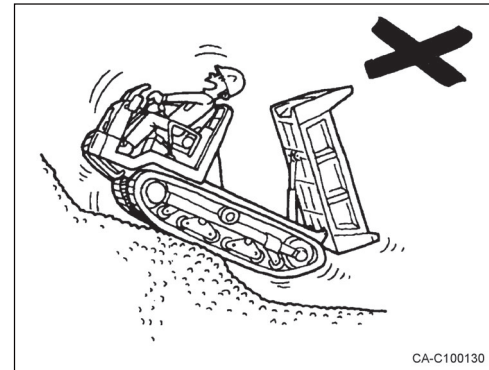
- The right figure shows the state in which the upper structure (A) and lower traveling body (B) are placed parallel.



(6) Do not travel with the vessel in dump position

Traveling with the vessel in dump position not only makes the machine unstable but limits operator visibility causing hazardous situations.

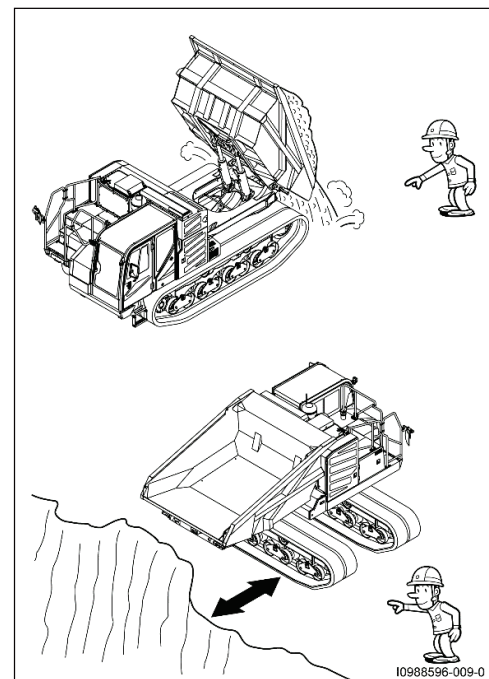
Never attempt to travel with the vessel in dump position.



(7) Prevent accident when operating the vessel during swinging

When swinging the upper structure for dump work, note the following points in addition to precaution during normal dump operation.

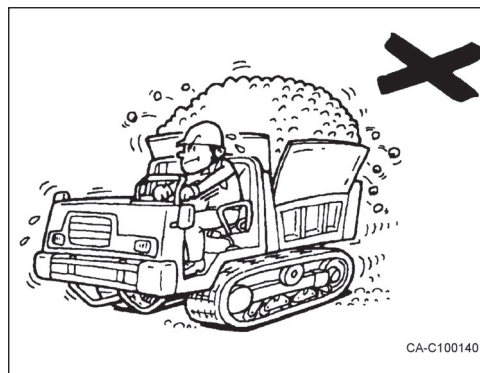
- Swing operation with the upper structure swung in reverse direction reverses the travel direction of the machine. After unloading, in particular, operate the joystick level correctly. Otherwise, falling off and collision could result.
- If it is necessary to unload with the upper structure swung 90 degrees, check the condition of the unloading site and keep a sufficient distance between the machine and unloading destination and road shoulder beforehand.
After the machine arrives at the unloading site, swing the upper structure. After unloading, lower the vessel, swing the upper structure to the original position, and then move the machine.
- Do not perform dumping operation with the upper structure swung 90 degrees on slopes.
- Operating the vessel while sediment is stuck or frozen inside due to ambient temperatures may cause the vehicle to tip over. Do not use the bed for loads that are likely to stick or freeze.



! WARNING 1. For safe operation

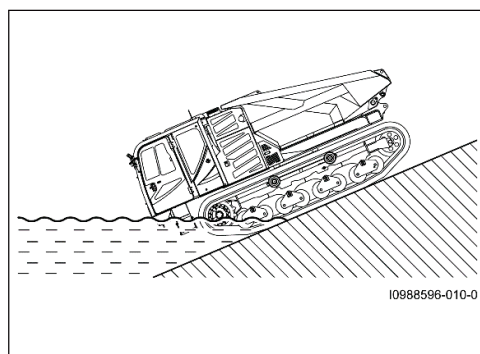
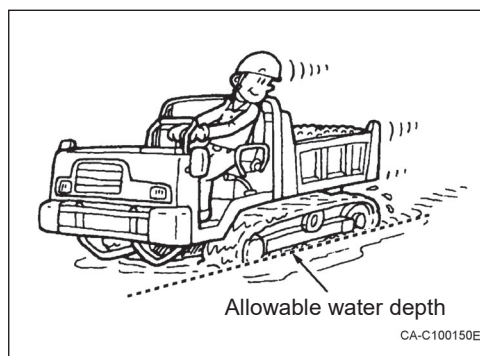
(8) Do not overload

- 1) Working with loads exceeding the performance of the machine can cause loss of safety or reduction in the functionality or life of the machine.
- 2) Never exceed the maximum load limits.
- 3) Never place a load onto the sideracks.



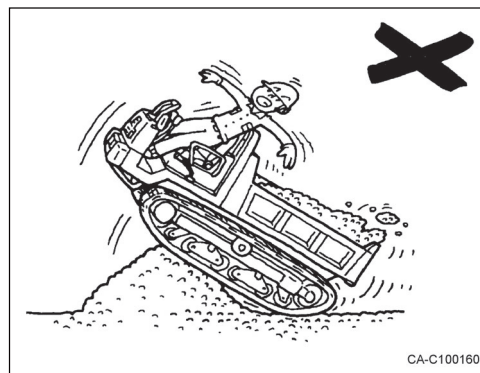
(9) Do not exceed the water depth limit

- 1) The acceptable water limit is up to the lower roller.
Check the water depth, foundation and strength of water current and other safety factors before operating. Do not place the machine in locations exceeding the lower frame of the machine.
- 2) If the machine goes into water in a descending posture on a steep slope, water may splash on the electric components, resulting in damages of the electric components. Be careful.



(10) Do not try to travel over obstructions

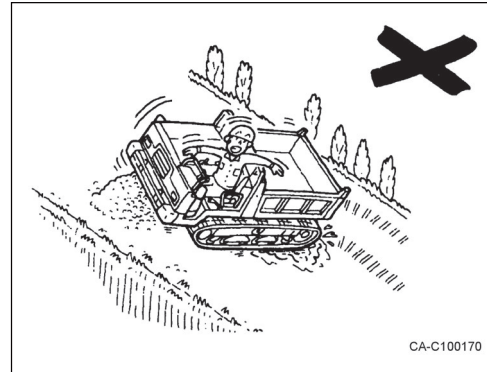
Trying to travel over obstacles could cause the machine to lose its balance and topple over.
Avoid potential obstacles in your path.



(11) Do not change directions while on a slope

Avoid changing the direction of travel on a slope, which could result in tipping or side slipping of the machine.

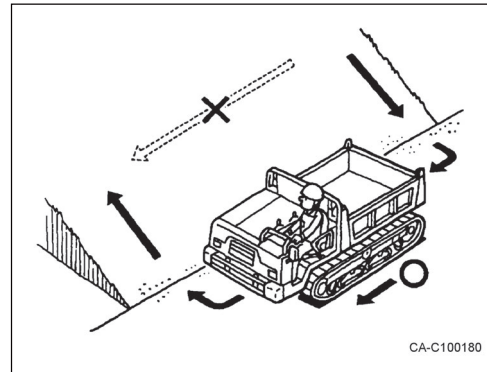
When it is inevitable to change the direction, carry it out in a hard ground where the slope is gradual.



(12) Move up and down slopes directly not sideways

Moving sideways or parallel to the slope while on it may cause the machine to slide and fall over.

To prevent such accidents, only move up and down slopes at a direct angle.



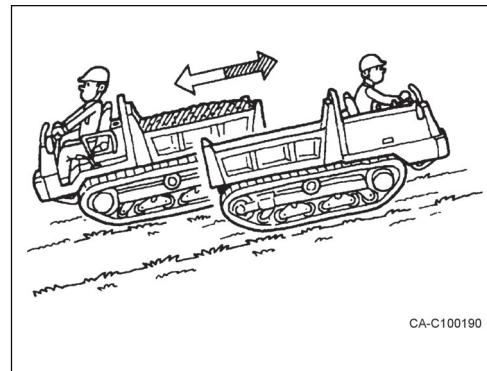
(13) Watch the machine position while traveling on slopes

The machine center of gravity tends to quickly change while traveling on sloping surfaces.

This can create hazardous situations where the machine may tip over. Do not travel on slopes over 15 degrees.

Observe the following points regarding machine position:

- 1) Go forward up the hill and back down the hill WHEN NO CARRYING A LOAD.
- 2) Reverse up the hill and go forward down the hill WHEN CARRYING A LOAD.



(14) Never allow personnel ride on the machine other than operator

Any person riding as a passenger can fall off and suffer injury. In addition, such a passenger also obstructs the driving by the Operator.

Only operator is authorized to be on the machine during operation. Never let unauthorized personnel ride on the machine.

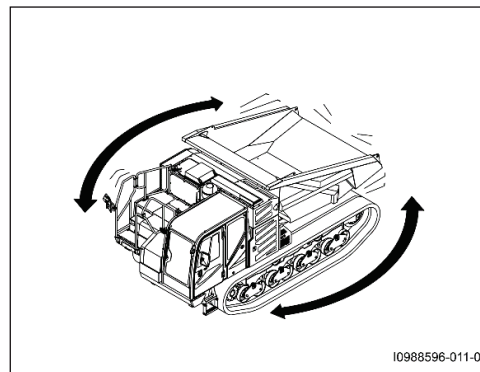


WARNING 1. For safe operation

(15) Notes during swinging

When swinging the upper structure, check the surrounding status.

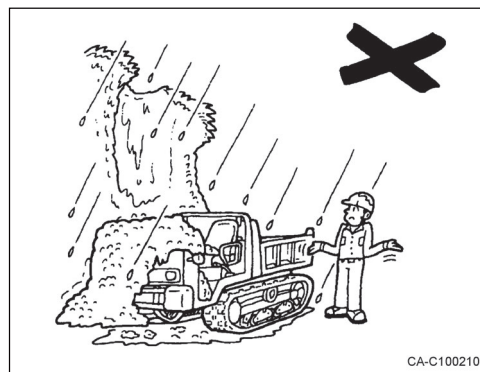
- When swinging the upper structure, be sure to stop the machine on a level place, and then perform the operation. Swinging on a slope could cause an unexpected accident due to a deteriorated stability and a sudden change in swing speed.
- If there is other person or an obstacle around the machine, post a guide, pay attention to the safety around the machine and observe instructions of the guide to perform swing operation.
- Operate the swing lever slowly. Swinging the loaded upper structure in particular at high speed or stopping it abruptly could cause tipping over and failure of the machine, which may impair the safety around the machine.



1-3 Precautions after operation (T0988585-104-0E)

(1) Park in a safe place

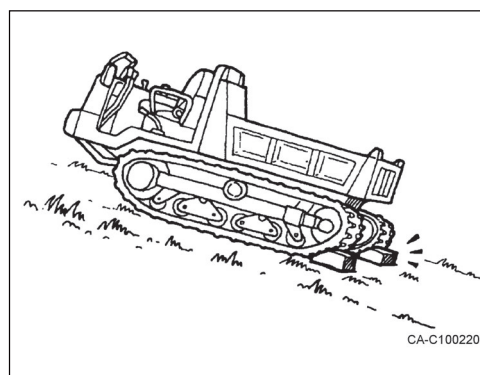
For parking, select a flat ground with good foothold and where there is no danger of land or mud slides, and also, near a river, select a place which is safe even if the river water level becomes high.



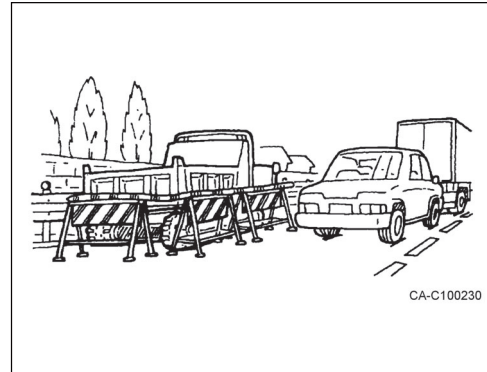
(2) Do not park the machine on a slope

There is the danger of the machine running off wild when stopped or parked on a sloping land.

When it is unavoidable to stop or park on a sloping land, Place stopper blocks on the downhill side under both crawlers.

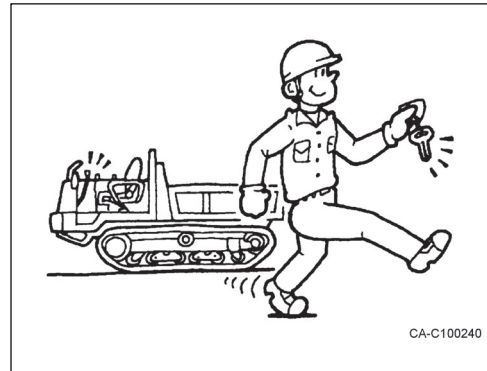


- (3) Observe precautions when parking the machine on the road
If you have to park the machine on the road, use appropriate flags, barriers, flares, and warning signals.



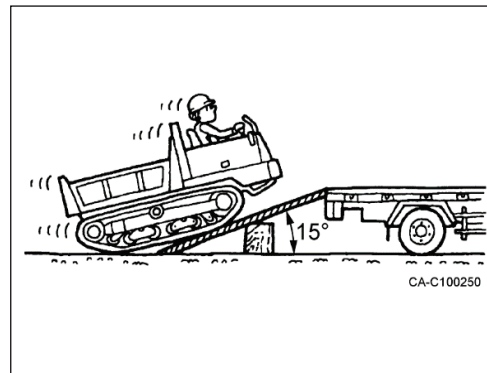
- (4) Operator leaving machine
- 1) Lower the vessel completely.
 - 2) Apply the parking brake.
 - 3) Set the upper structure in place to the machine front.
 - 4) Set the left lever unit to the lock position.
 - 5) Stop the engine and take out the ignition key.
 - 6) Lock the cover and all other lockable parts.

Leave the operator's seat after taking the above measures.

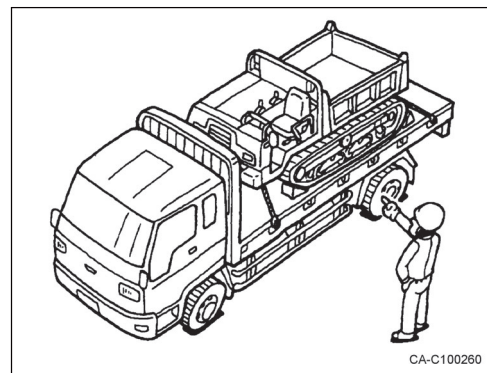


1-4 Precautions at transporting (T0988585-105-0E)

- (1) Carefully load and unload the machine
- 1) ALWAYS load and unload the machine on the level ground.
 - 2) Use a ramp that has sufficient strength, width, length, and thickness at uphill angle of 15° or less.
 - 3) Remove ice, snow, or slippery material from the ramp and truck deck before loading.
 - 4) Set the upper structure in place to the machine front.
 - 5) NEVER make a turn on a ramp.



- (2) Observe precautions on transportation
- 1) Blocks tracks and secure the machine to the truck before transporting.
 - 2) Securely fix the machine to the platform using a wire rope, etc. When fixing the machine, fix the front and rear of the upper structure from right to left to prevent swinging during transportation.
 - 3) Transport safely strictly following the concerned laws.

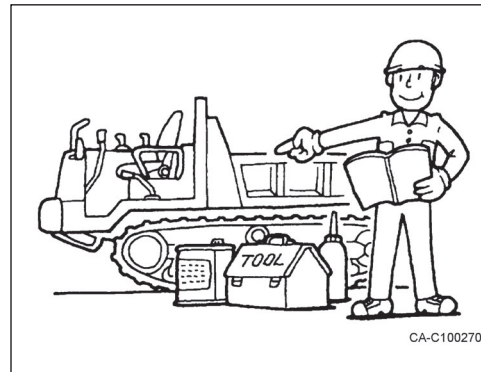


WARNING 1. For safe operation

1-5 Precautions at maintenance (T0988596-008-0E)

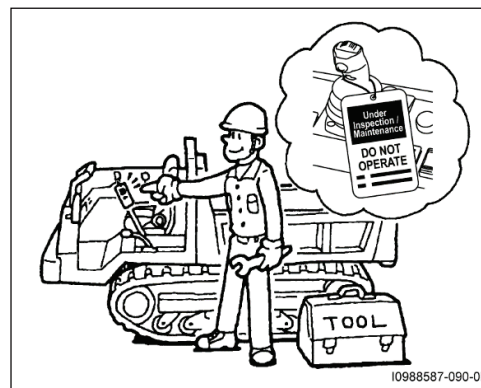
(1) Keep routine maintenance

- 1) Wrong maintenance not only causes damage to the machine but also has the danger of causing accidents that involve injury to humans.
- 2) You must read and understand the warnings and instructions contained in this manual, before performing any operation or maintenance procedures.



(2) Indications during inspection and maintenance

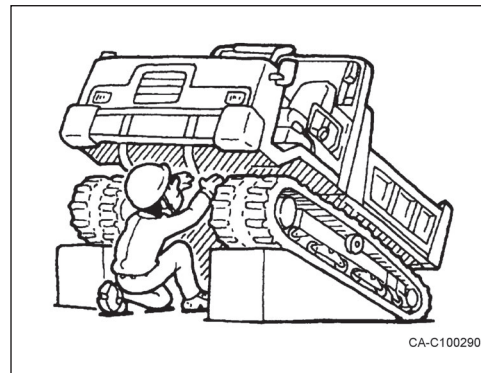
Hang a warning board saying "Under Inspection / Maintenance" at an easy to see location of the operation lever so that novessel other than the concerned persons touches it.



(3) When working under tracks

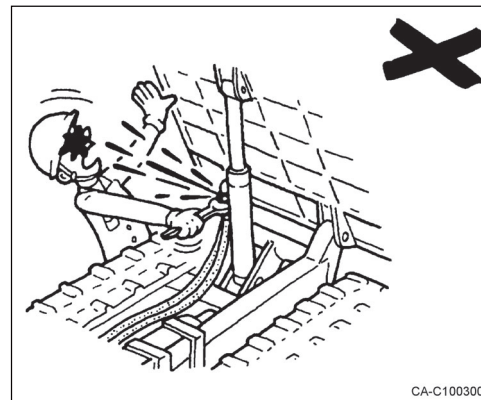
There is the danger of an accident of being caught under the machine if the machine comes down.

Place supporting pillars or blocks under the crawler and make sure that it is supported firmly.



(4) Always release pressure before disconnecting hydraulic lines

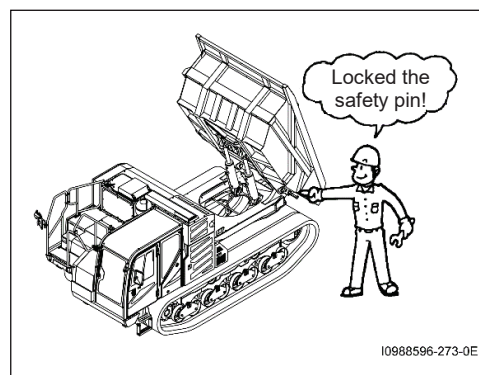
There is the danger of high pressure oil jetting out if a piping or a hose is removed without releasing the internal pressure of the hydraulic system. Start the work only after completely releasing the internal pressure.



(5) Supporting the vessel

If replacement or repair of couplings or hoses is made with the vessel in the raised condition, there is the possibility that the vessel drops down.

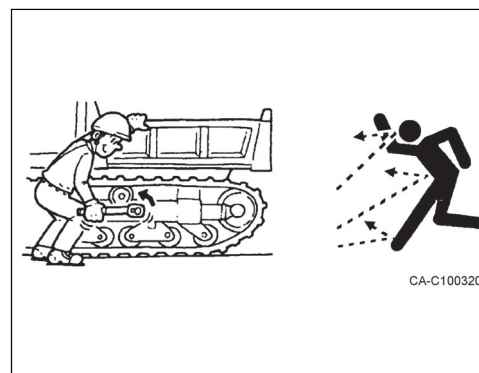
Be sure to support the vessel by locking the safety pin.



(6) Do not watch the check valve when adjusting tracks

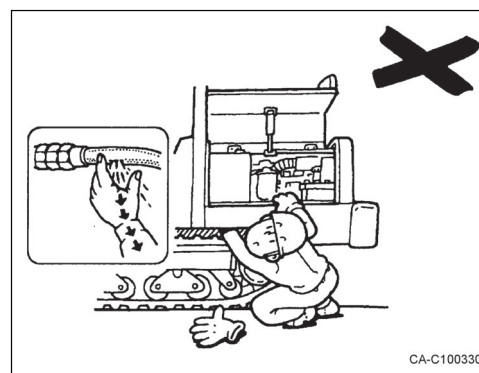
1) Track adjusting grease is under high pressure. Grease coming out of the check valve under pressure can penetrate the body causing injury or death.

- Watch the track or track adjustment cylinder to see if the track is being loosened. Loosen the check valve one turn only.
- Do not put your face, hand, foot, or body in front of the check valve.



(7) Precautions against high pressure oil

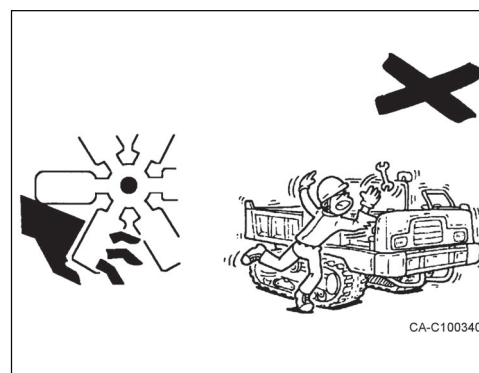
- 1) It is very dangerous if the high pressure oil enters your skin or eyes.
- 2) Use a thick sheet of paper or a wooden piece to test for the leakage of high pressure oil, and never test with your hands. Wear protective goggles for protecting your eyes.
- 3) If oil enters your skin or eye, immediately go to a doctor and get medical attention.



(8) Never carry out maintenance with the engine running

Touching a rotating or moving part such as the fan belt, etc., can get your hand crushed by the machine and there is the danger of your hand being cut off.

Always carry out maintenance work with the engine switched off.

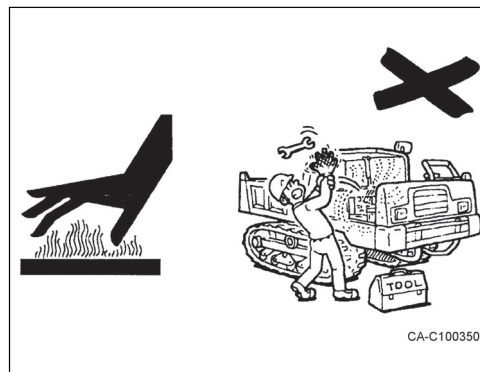


WARNING 1. For safe operation

(9) Be careful to hot engine after the machine stops

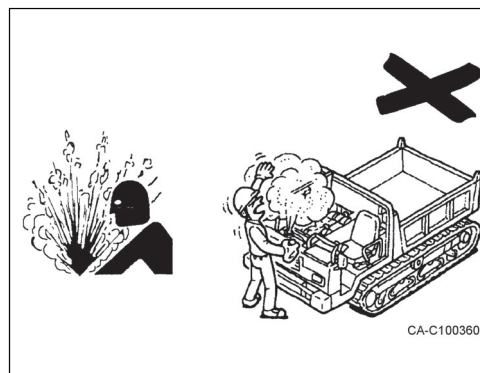
Do not touch the engine or muffler right after the machine is stopped. It is very hot and causes burns.

Start inspection and maintenance only after the temperatures of the different parts have gone down sufficiently,



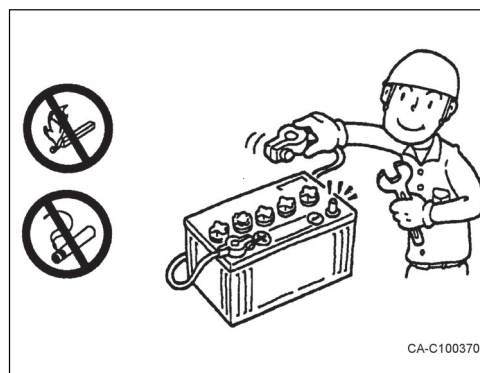
(10) Never open the pressure cap when they are hot

Removing the pressure cap when the temperature of the coolant is high can cause high temperature steam to spurt out, resulting in burns. After the coolant temperature has gone down, gradually loosen the cap to release the pressure.



(11) Handling battery

- 1) When maintaining the electrical system or when carrying out welding, remove the lead connected to the negative terminal (-) of the battery.
- 2) A battery can generate flammable gases and there is the danger of the gases catching fire and exploding. Also, dilute sulfuric acid is being used for the battery liquid. Take sufficient care while handling.



(12) Fire prevention

- 1) Do not leave burnable items such as oily rags, dry leaves, paper, etc., near the engine. Since these can cause fire hazards, constantly check and remove them.
- 2) Stop the engine during refueling, and take care not to bring sparks or fire near the fuel.
- 3) Inspect for leakage of fuel, oil, and hydraulic oil and repair if there is any defect, and wipe off all oil that has leaked.
- 4) Make sure where a fire extinguisher is placed and know how to use it.



1-6 Safety signs (T0988596-009-0E)

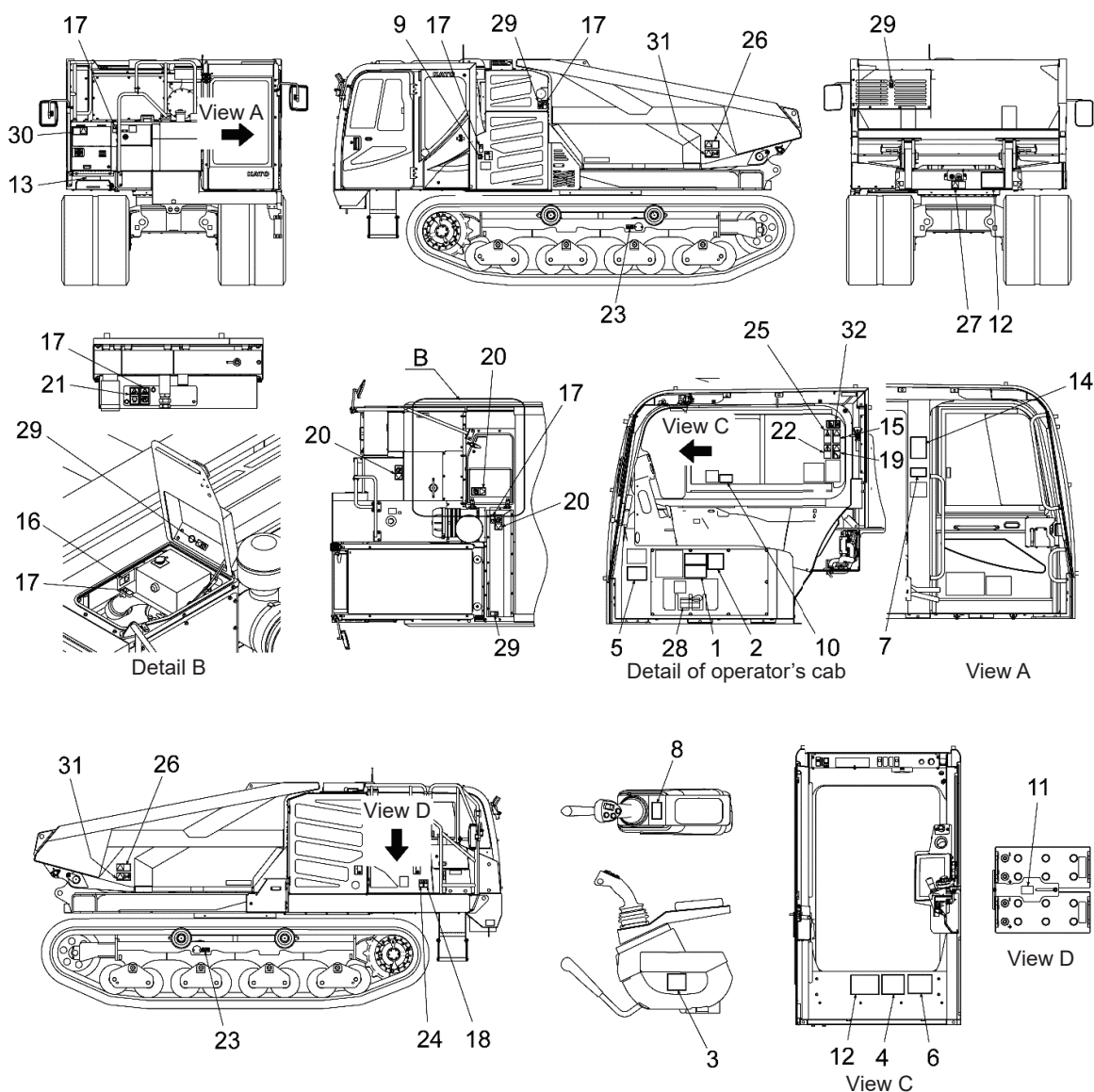
The safety signs are stuck on in the places shown in the diagram. Check all of them before you start to travel or operate the machine.

Keep the safety signs clean at all times so that they are clearly visible and easy to read.

! CAUTION

- If a safety sign is dirty, use water or a neutral cleaner to remove the dirt. Do not use gasoline or organic solvents.
- If it is not possible to remove the dirt, or if a safety sign is damaged or peeling, replace the safety sign with new.
Refer to this section and parts list on the machine and order a new sign from your authorised KATO dealer to replace the safety sign.
- When you replace a safety sign, always check that it is identical to the original.

(01E0-0040-1E)



I0988596-012-0E

⚠ WARNING 1. For safe operation

1. Precautions on safety
(D409 871 00) (D409 908 00)



WARNING

Precautions on safety

1. When getting off the operator seat, always be sure to turn ON the travel parking switch and stop the engine.
2. Never exceed the maximum load limits.
3. Dump at a level and stable place.
4. Do not put any part of your body under the dump body. If you cannot avoid it, always use the safety bar.
5. Observe instructions on caution labels to travel up and down on a slope. If this is ignored, the machine may over turn.
6. Avoid sudden start, sudden stop or sudden slewing. This may cause the crawlers to slip off or falling accident.

D40987100



CAUTION

Precautions on safety

1. Read and understand the operation manual before operation to secure safe and correct operation and maintenance.
2. Observe instructions and warnings on the operation manual and warning labels when operating or servicing the machine.
3. Before starting the engine, make sure that there is no personnel on and around the machine. Always sit in the operator's seat before starting the engine.
4. Sound the horn to alert the people around the machine.
5. Avoid parking the machine on a slope. If you cannot avoid it, be sure to lock the crawler shoe.
6. For transportation, be sure to put blocks at both sides of the crawler shoe and fix the machine with wire and chain.

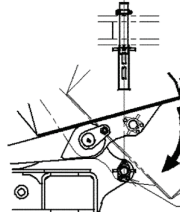
D40990800

2. Precaution for working under the raised vessel
(D412 070 00)



WARNING

For working under the raised vessel, be sure to use the safety pin to prevent the vessel from falling.



Safety Pin

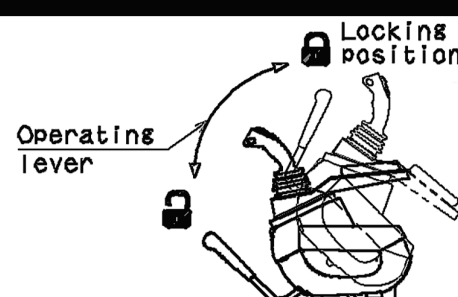
If you fail to use the safety pin to remove the dump cylinders and hoses, the raised vessel may fall and cause serious accident.

D41207000

3. Setting the left lever unit in the lock position
(D409 626 00)



WARNING



Locking position

Operating lever

Accidentally touching the operation lever without being locked can cause unexpected movement of the machine, which incurs danger. When getting off the operator seat, always be sure to move the operation lever to the locking position.

D40962600

4. Traveling on a slope
(D409 867 00)



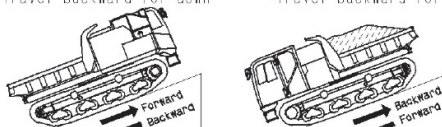
WARNING

Note when travelling steep

Because there is a risk of serious injury due to falling on slopes. Please comply with the following.

- Do not turn while driving.
- On a slope of 9 degrees or more, turn off the 2nd speed switch. And engine revolution at a half, travel straight and do not travel sideways or diagonally (includes zigzag driving).
- Observe the following items on slopes of 15 degrees or more.
- Please do not running.
- Do not dump, load, rotate.

1. Travelling up/down the steep when unloaded - Travel forward for up - Travel backward for down	2. Travelling up/down the steep when fully loaded - Travel forward for up - Travel backward for down
--	--



D40986700

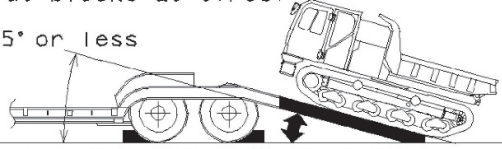
5. Loading and unloading the machine
(D409 910 00)

! CAUTION

Loading and unloading the machine

Be sure to apply the parking brake of a track.
Put blocks at tires.

15° or less



1. Set ramp angle 15° or less.
2. Securely attach ramps to the track.
3. Keep the same height of both ramps.
4. Fix the machine on the track with wire or chain.

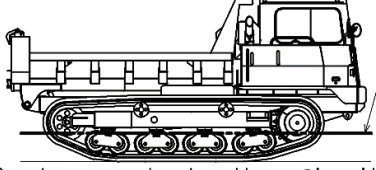
D40991000

6. Under-water works
(D406 189 00)

! CAUTION

Note when working in the water

Do not operate the machine where the water comes above the water allowing level



If water or mud enter the engine it will cause the engine trouble. Keep the water allowing level when travelling in the water and slow down to avoid the water from entering.

D40618900

7. Safety alarm
(D409 629 00)

! WARNING

Slope Alarm

When going down a slope, when the front of the machine tilts by more than 9°, the slope indicator flashes, and the buzzer sounds for 5 seconds.

The machine will start overrunning if you do not reduce travel speed. Reduce the travel speed by the following operations.

(1. Return the travel lever to the neutral position.)
(2. Change the 2-speed switch to the low speed.)

For details, read the operation manual.

D40962900

8. Vessel operation warning
(D408 906 00)

Caution about dump bed operation

! Do not travel while the dump bed is in the air

! When a load has been placed on the dump bed, take care so that the lowering is not intermittent.

D40890600

9. How to lower vessel in case of emergency
(D409 904 00)

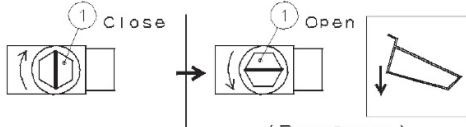
! CAUTION

If the raised body cannot be lowered due to a trouble of engine or pump, do the following item to lower the body.

1. Please slowly open the plug ① of the stop valve.
2. After the body was down, please return to its original state by close the plug.

Fast and open the plug ①, the body rapidly down. It is dangerous. Please be careful.

When you operate the machine with the plug ① is open, will lead to any accidents.



(Emergency)

D40990400

11. Battery handling warning
(D412 089 00)

! DANGER

- If battery fluid (dilute sulfuric acid) comes in contact with skin or eyes, burns or blinding can result. If contact occurs, rinse with large quantities of water and consult a doctor.
- The battery may catch fire or blow up if mishandling.
- Don't expose to naked flame or bring into contact with metal objects.
- Recharge in a well ventilated area.
- Take care to connect booster cables to the correct terminals. If wrongly connected the battery may explode.

D41208900

10. Precautions on swing operation
(D412 062 00)

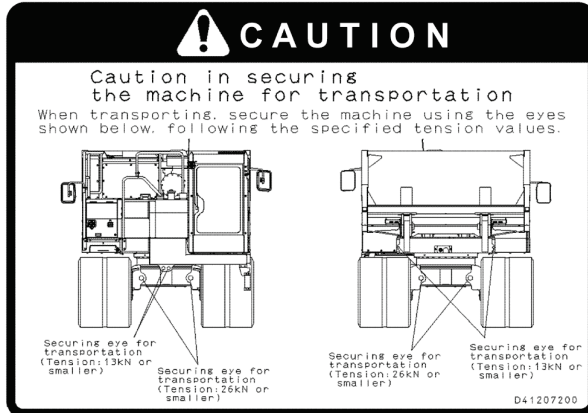
! WARNING

1. Before swing the upper unit of machine, check the safety therearound.
2. Check the operation changeover switch and reverse travel icon before operating the operation lever. When the travel operation changeover switch and the reverse travel icon, the travel operation is reversed, and the machine travel backward when the joystick lever is moved forward. Always make sure that the lamp is off before operation.
3. Dump and swing operations should be performed on a level and firm ground.
4. If swinging operation are performed on a slope of 9° or more, a buzzer sound while swinging.

D41206200

! WARNING 1. For safe operation

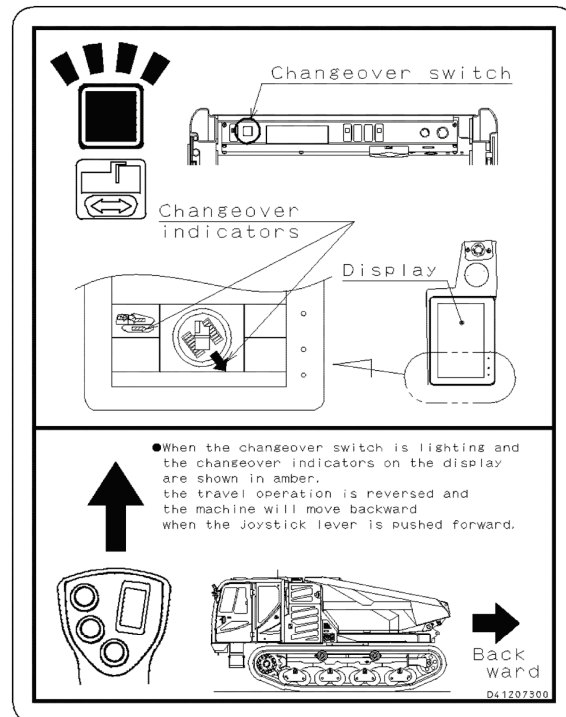
12. Caution in securing the machine for transportation (D412 072 00)



13. Step pulling-in reminder (D412 077 00)

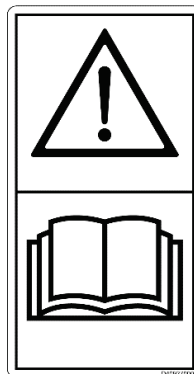


14. Caution in reverse operation (D412 073 00)

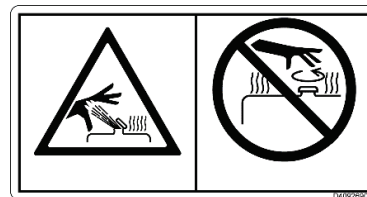


15. Read manual! (D409 270 00)

Read manual before operation, maintenance, disassembly, assembly and transportation.



16. Burn hazard (D409 269 00)



Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot. Allow radiator or hydraulic tank to cool before removing cap.

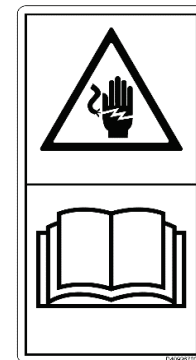
17. Burn hazard (D409 293 00)

Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation. Never touch when hot.

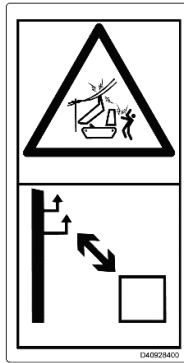


18. Electrical hazard (D409 267 00)

Sign indicates an electrical hazard from handling the cable. Read manual for safe and proper handling.



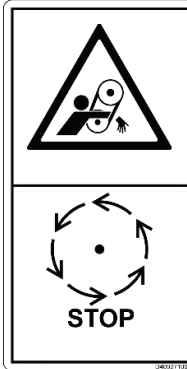
19. Electrical hazard
(D409 284 00)
Sign indicates an electrocution hazard if machine is brought too near electric power lines. Keep a safe distance from electric power lines.



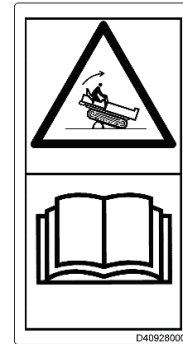
20. Fall hazard
(D409 283 00)
Sign indicates a hazard of falling. Do not stand on this place.



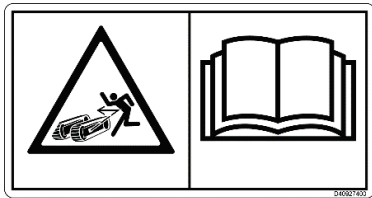
21. Hazard of rotating parts
(D409 271 00)
Sign indicates a hazard of rotating parts, such as belt. Turn off before inspection and maintenance.



22. Hazard of falling out
(D409 280 00)
Sign indicates a hazard of falling out when machine goes over an obstacle. Read manual and follow instructions for safe and proper operation.

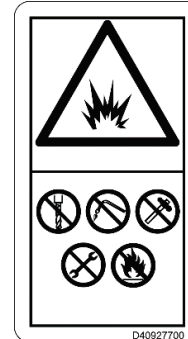


23. Warning for track adjuster
(D409 274 00)

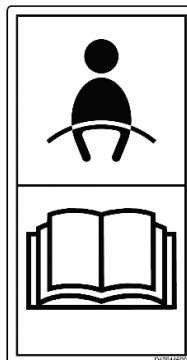


Sign indicates a hazard of a flying plug from track adjuster that could cause injury. Read manual before adjusting track for safe and proper handling.

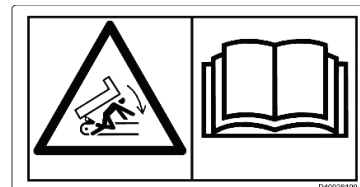
24. Hazard of explosion
(D409 277 00)
Sign indicates an explosion hazard. Never drill, cut with gas, hit or disassemble. Also, keep open flame away.



25. Fasten seat belt
(D409 446 00)
Sign indicates the necessity of fastening the seat belt. Always keep the seat belt fastened while operating the machine to minimize danger caused by accidents such as falling down.



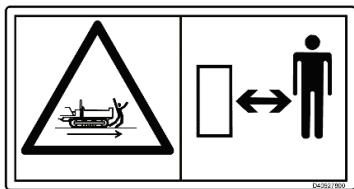
26. Hazard of vessel falling
(D409 281 00)



The vessel may drop. When performing maintenance with the vessel raised, read the instruction manual for safe and proper handling.

⚠ WARNING 1. For safe operation

27. Hazard of run over
(D409 278 00)



Keep away from equipment when it is moving.

28. DANGER! DO NOT OPERATE.
(D405 323 00)



D40532300

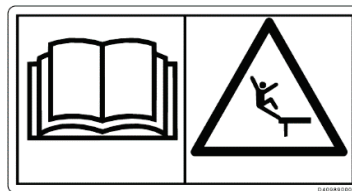
Attach a DO NOT OPERATE warning tag to start switch or controls before servicing or repairing the machine.
Do not start the engine or move any of the controls if there is DO NOT OPERATE or similar warning tag attached to the start switch or controls.

29. Do not high pressure washing
(D409 643 00)
(D412 076 00)
Do not perform high pressure cleaning
Electric components may become faulty.
Be careful not to splash water on electric components.



D40964300

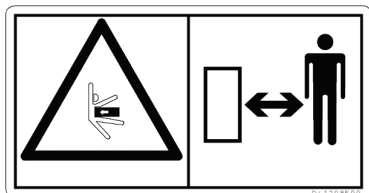
30. Read instruction manual to prevent fall
(D409 891 00)



D40989100

The user may fall.
When going up to the upper part of the machine, read instruction manual for safe and proper handling.

31. Keep away from swing area
(D412 085 00)



D41208500

Sign indicates a crush hazard by swinging of upper structure of the machine.
Keep away from swinging area of machine.

32. Emergency exit position
(D412 012 00)



D41201200

This symbol is affixed to the right window of the cab.
In the event of an emergency, use the hammer provided inside the cab to break the window glass and escape.

1-7 Accessing the machine

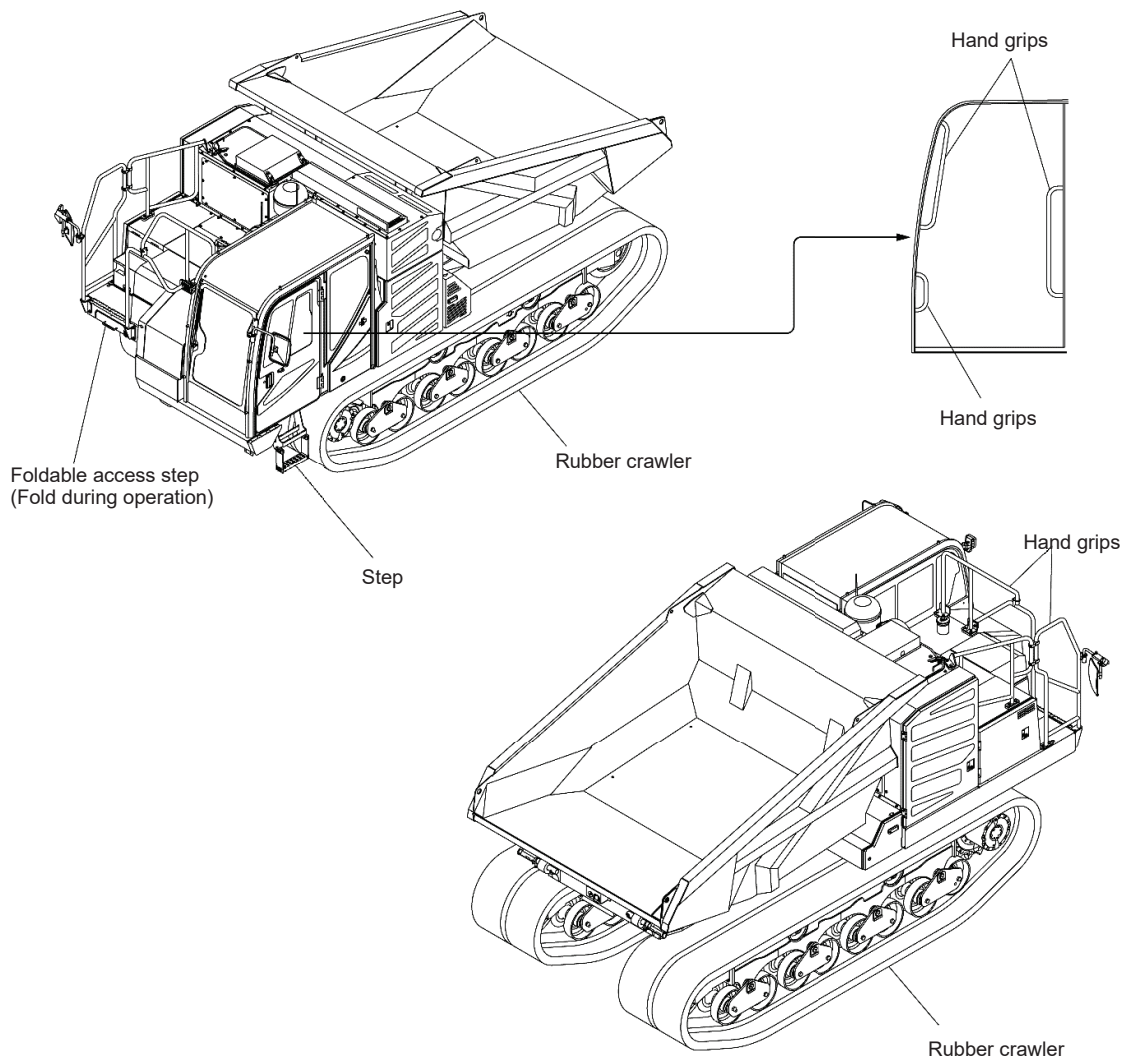
1-7-1 Precautions on getting on and off the machine



CAUTION

- When you get on and off the machine, face toward it and use the hand grips and steps to support yourself. Keep at least three points of support at all times on the hand grips and steps. Do not use any other than the hand grips to hold on to.
- Do not jump onto or off the machine.
Do not get on or off the machine while it is in motion.
- The floor, hand grips, steps, etc. are slippery when they have mud, oil or snow on them, so wipe them clean before you get on or off the machine.
- If the hand grips or steps are damaged, repair them. If the attachment bolts are loose, tighten them securely before you get on or off the machine.
- Operate the machine after folding the machine front step.

(T0988596-010-0E)



I0988596-013-0E

⚠ WARNING 1. For safe operation

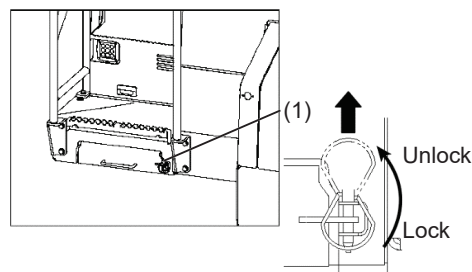
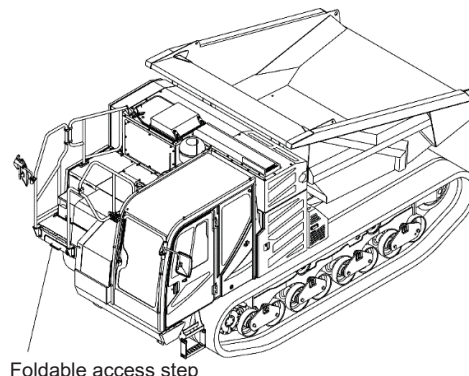
1-7-2 Procedure of unfolding/folding the foldable access step

- This machine is equipped with a foldable access step on the front right side.

Use the foldable access step when climbing onto the machine for filling with fuel or other purposes.

(1) Procedure for unfolding the step

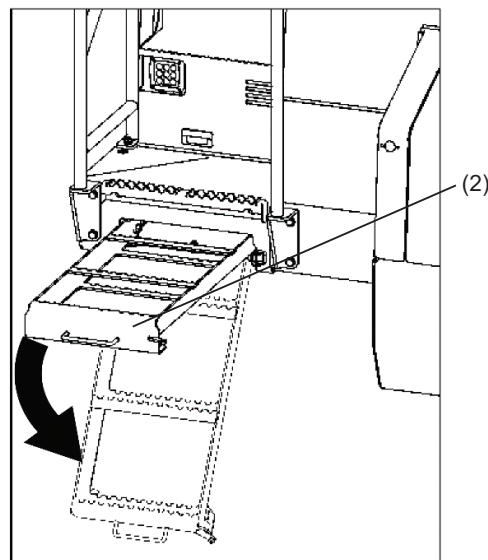
- 1) Unlock the folded position locking pin (1) and remove it from the step.



- 2) Slowly pull the step towards you.
- 3) Slowly lower the step.

(2) Procedure for folding the step

- 1) Slowly lift the step (2).
- 2) Slowly push the step in.
- 3) Align the hole on the step with the hole on the frame, insert the folded position locking pin (1) into the hole, and lock the pin.



CAUTION

- Do not lower the step forcefully.
Doing so may damage the step or the frame.
- Do not allow the machine to travel with the step unfolded.
- Keep hands and fingers clear of the pivoting areas and frame when deploying or stowing the step to avoid pinch injuries.
- Ensure the locking pin (1) is fully inserted and secured before using the step.
An unsecured step may move unexpectedly, leading to a fall and serious injury.

1-8 Precautions when filling with fuel (T0988585-009-0E)

Strictly observe the following precautions when filling with fuel.



CAUTION

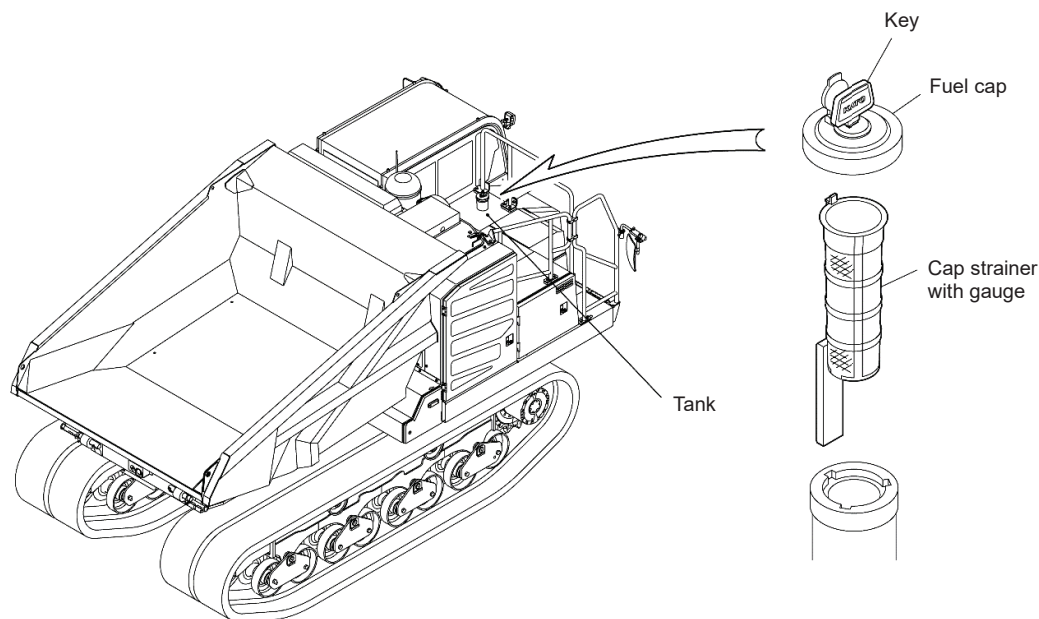
- Always fill with fuel of the designated type and grade. If you use a non-recommended fuel, performance will be impaired and a major accident could result.
- Stop the engine and turn the engine key switch to OFF before you start filling.
- Park the machine in a well-ventilated place and check that there is nobody inside before you start filling.
- Do not allow any fire or source of ignition nearby.
- Take care not to spill fuel on hot areas. If any fuel spills, wipe it up immediately.
- Take care to ensure that no dirt or water gets into the fuel tank when you fill with fuel.
- Watch the level gauge of the fuel tank while you fill with fuel so that the fuel does not replenish out of the filler port on the fuel tank.
- Clean the cap strainer when you fill with fuel.
- After filling with oil, refasten the oil cap.
- Extra caution is required when inspecting or servicing the fuel system.
- Fuel leakage from fuel hoses, the injection pump, fuel filter, or connections can cause a fire. If any fuel leakage is discovered, repair it immediately.
- Do not use alternative fuels, which may reduce performance or cause a fire.

(01E0-0044-1E)

NOTE

Fuel for filling Diesel fuel

Fuel tank capacity 320 L



I0988596-014-0E

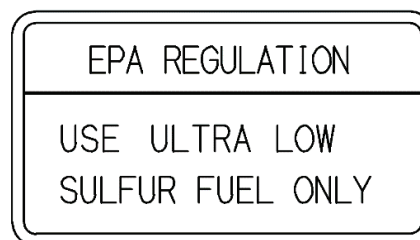
WARNING 1. For safe operation

(1) Fuel

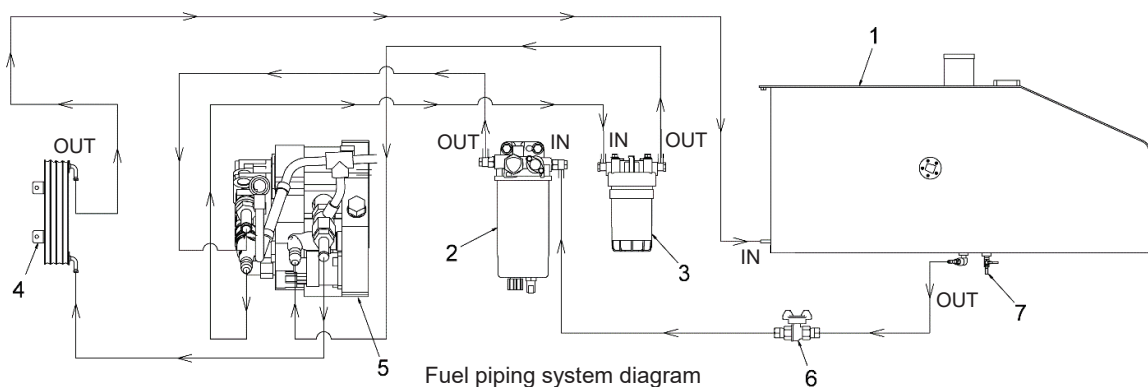
Diesel engine fuel should satisfy the following criteria.

- 1) Does not contain even fine dust
- 2) Has adequate viscosity
- 3) Has a high cetane number
- 4) Has good low-temperature flowability
- 5) Has low sulfur content
- 6) Has low carbon residue

Use standard automotive diesel fuels that meet the requirements above.



No.	Name
1	Fuel tank
2	Water separator
3	Fuel filter
4	Fuel cooler
5	Fuel pump
6	Fuel cock
7	Drain cock



10988596-015-0E

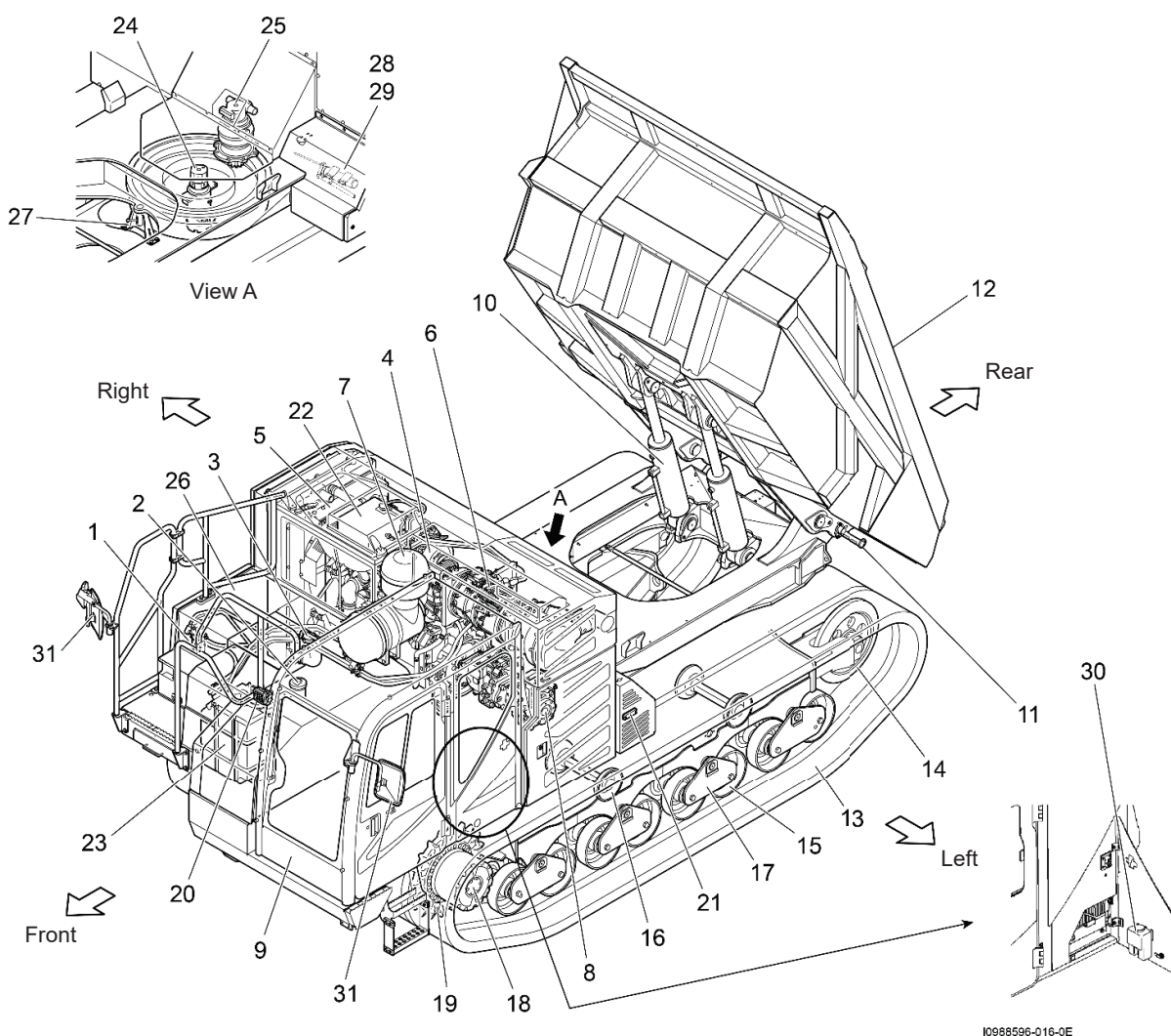
WARNING

Never use diesel fuel that does not meet the requirements. Doing so may prevent maximizing the functionality and performance of the fuel injection system and the engine and may cause engine malfunction or failure.

Any malfunction or failure resulting from using non-specified fuel is not covered by the warranty.

(T0988566-015-0E)

2. Names of components (T0988596-011-0E)



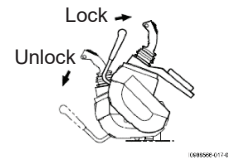
No.	Name	No.	Name	No.	Name
1	Battery	12	Vessel	23	DEF tank
2	Fuel tank	13	Rubber crawler	24	Rotary seal
3	Hydraulic oil tank	14	Idle tumbler	25	Swing motor
4	Engine	15	Lower roller	26	Battery disconnect switch
5	Radiator, oil cooler	16	Upper roller	27	Swing lock (optional)
6	After-treatment device	17	Oscillating link	28	Grease gun holder (optional)
7	Air cleaner	18	Travel device	29	Tool storage
8	Hydraulic pump	19	Drive sprocket	30	Washer fluid tank
9	Cab	20	Headlight	31	Rear view mirrors
10	Dump cylinder	21	Direction indicator lamp		
11	Safety pin	22	Coolant tank		

3. Explanation of the operation devices (01E0-0086-0E)

WARNING

Always set the lever lock switch to the LOCK position when handling any device other than for machine operation.

If you touch any control lever while the lever lock switch is not locked, the machine may move unexpectedly, which could cause a serious accident. For details on the safety lock lever, refer to the "Lever lock switch" section.



3-1 Door

(1) Door

Opening the Door

- From outside: Pull the door lever to unlock.
- From inside: Turn the inner handle to unlock.

Holding the Door Open

- Push the door firmly into the door catch to secure it.

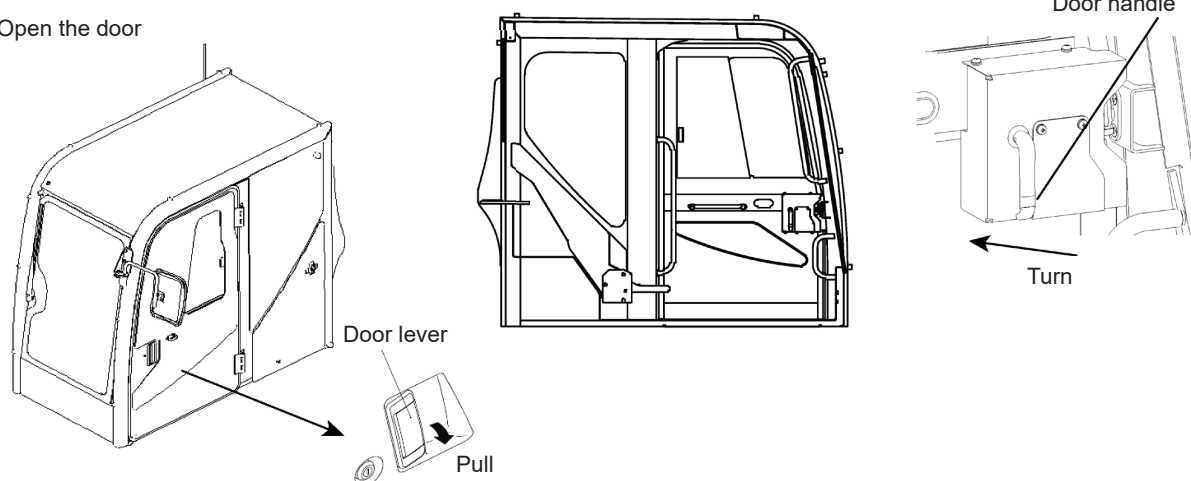
Closing the Door

- Pull the release lever to disengage the catch, then close the door until it latches.

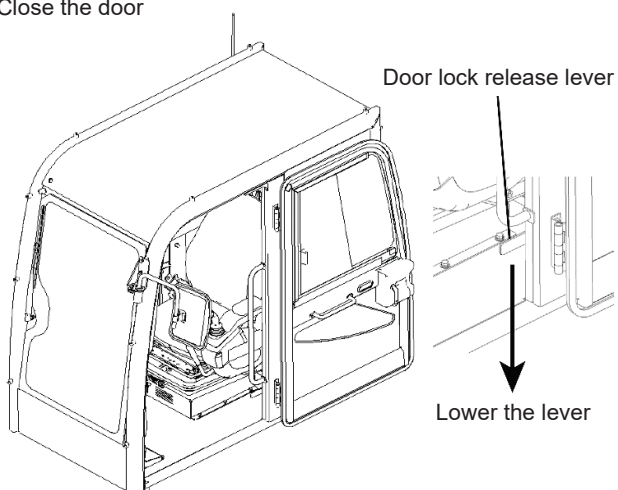
Locking

- Use the key to lock or unlock from the outside.

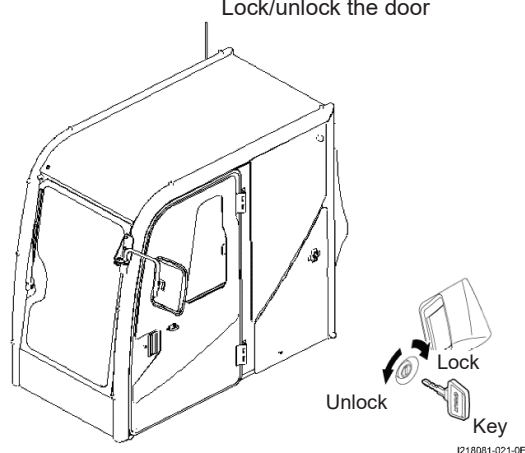
Open the door



Close the door



Lock/unlock the door



I218081-021-0E



CAUTION

The cab is pressurized to prevent dust from entering. Therefore, when closing the door, close it with a little force and ensure it is not left ajar.

3. Explanation of the operation devices

WARNING

- To keep the door open, ensure it is securely fixed to the door lock. If not fixed, the door may close suddenly due to strong winds, swinging, or slopes.
- Operate the door lock release lever only on level ground. If you push the door lock release lever down on a slope, the door may close suddenly, posing a risk of your hands being caught between the handrail and the door.
- Do not put your hands or face out of the door or window while opening or closing the door.
- Before putting your hands or face out of the door or window, ensure the surrounding area is safe and set the safety lock lever to the LOCK position. At this time, pay close attention to falling objects.

(T218081-016-1E)

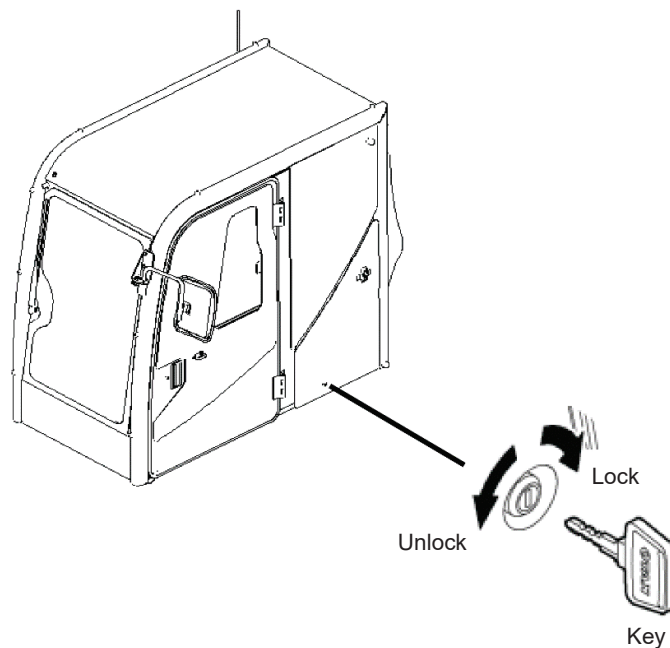
CAUTION

- If you close the door while the door key is in the LOCK position, the door will be locked. Be careful not to leave the key inside the cab when closing the door while the door key is in the LOCK position.
- A half-lock position is provided for closing the door to ensure safety. Since the door is not completely sealed in this position, it cannot prevent rainwater from entering. Ensure the door is securely locked when it is raining.

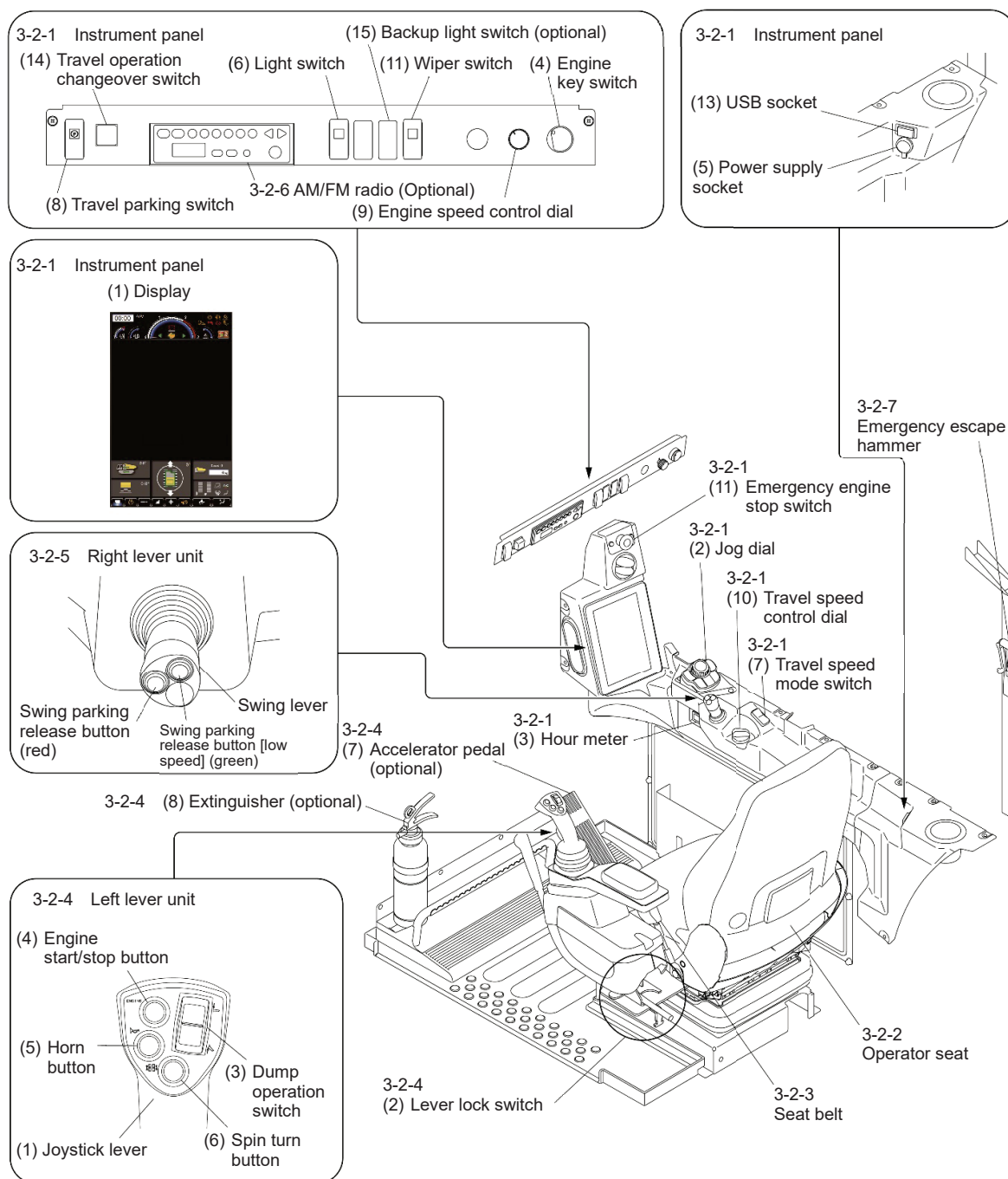
(01E0-0090-0E)

(2) Maintenance door

To open the maintenance door, use the key to unlock the door and open it while holding the edge of the door. To close the maintenance door, push the door lightly and use the key to lock it.



3-2 Inside the cab (T0988585-101-0E)



10988596-017-0E

No.	Name	No.	Name	No.	Name
3-2-1	Instrument panel	(9)	Engine speed control dial	3-2-4	Left lever unit
(1)	Display	(10)	Travel speed control dial	(1)	Joystick lever
(2)	Jog dial	(11)	Wiper switch	(2)	Lever lock switch
(3)	Hour meter	(12)	Emergency engine stop switch	(3)	Dump operation switch
(4)	Engine key switch	(13)	USB socket	(4)	Engine start/stop button
(5)	Power supply socket (24 V)	(14)	Travel operation changeover switch	(5)	Horn button
(6)	Light switch	(15)	Backup light switch (optional)	(6)	Spin turn button
(7)	Travel speed mode switch			(7)	Accelerator pedal (optional)
(8)	Travel parking switch			(8)	Extinguisher (optional)

3. Explanation of the operation devices

3-2-1 Instrument panel (T0988596-013-0E)



CAUTION

Precautions on using the monitor

- Press the switches and touch panel display with the pad of the fingers. Do not use fingernails, a ballpoint pen, or other pointed object to press them.
- When you clean the touch panel display, use a soft cloth moistened with water or an anti-static cleaner to wipe it gently. Do not use organic solvents, thinners, etc.
If wiping causes static electrical build-up in the touch panel display, it will not function correctly.
- When you clean the periphery of the switches, use diluted neutral detergent.
Do not use high-concentration alcohol.
- The monitor is accurately adjusted.
Humidity or dust may cause a malfunction, so never take it apart or otherwise open the case.
- If the display section shows a warning message indicating a malfunction during work or the preoperational checks, follow the instructions and, if necessary, contact your authorised KATO dealer for advice on how to proceed.
- The display is not intended to guarantee the condition of the machine. If you notice anything abnormal, investigate the cause and contact your authorised KATO dealer if necessary.
- If you ignore the above precautions, your warranty will not cover any breakdowns or accidents which result.
- Electrical components may not function properly due to external radio interference.
In that case, the monitor screen may not be displayed correctly or an error message may be displayed.

(T219771-043-0E)

(1) Display

This machine features a touch screen display and supports jog dial operation, allowing the operator to make selections and confirmations.

When the engine key switch is turned to the ON position, the Start screen appears.

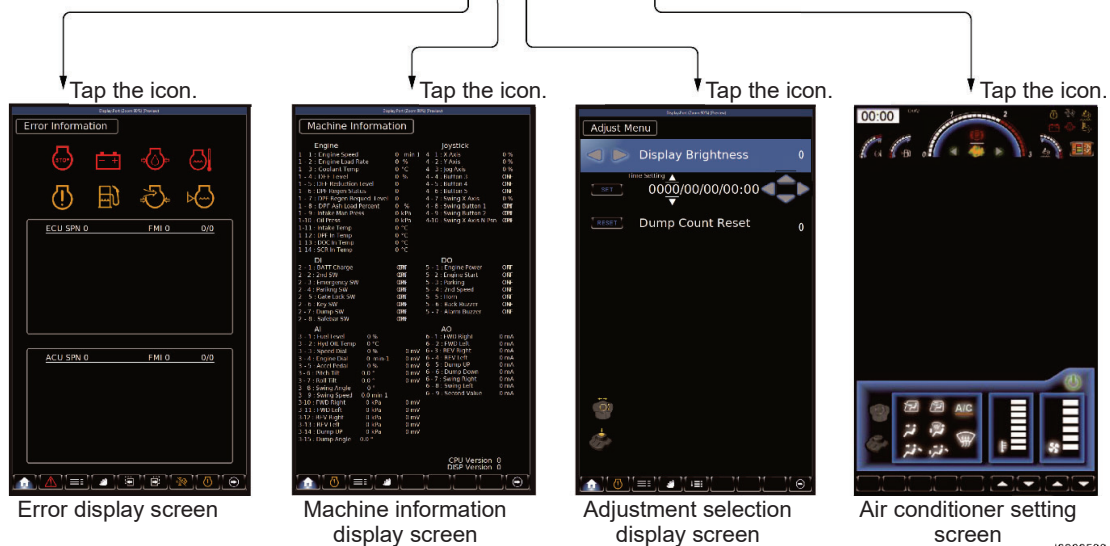
Initial screen



Operation screen



The Start screen is switched to the Operation screen 3 seconds later.



The "Error display screen", "Machine information display screen" and "Adjustment selection display screen" are used by our serviceman when a trouble occurs in the machine or engine.

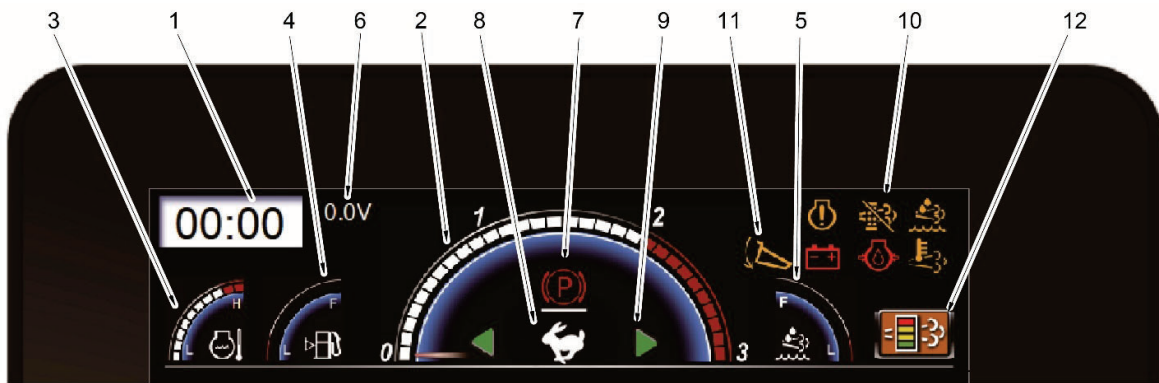
The screen returns to the "Operation screen" when the icon is tapped.

10988596-018-0E

3. Explanation of the operation devices

Explanation of screen displays

[Upper section]



I0988596-159-0

1) Clock

Indicates the current time. When an adjustment is needed, perform the setting on the machine adjustment screen.

2) Tachometer

Indicates the engine rotation speed.



I0988596-160-0

3) Coolant thermometer

Indicates the coolant temperature.

If the coolant temperature rises high, stop the machine to cool down the engine.

In addition, perform maintenance of the engine and cooling system as needed.



I0988566-165-0



CAUTION

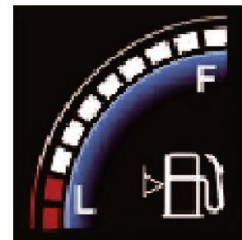
If the coolant temperature stays high, the yellow LED indicator lamp illuminates and a trouble code is displayed. If this state continues, the red LED indicator lamp illuminates and the engine protection function is activated to stop the engine.

(T0988566-153-0E)

4) Fuel gauge

Indicates the fuel level.

Be sure to fill up with fuel before the fuel gauge indication falls below the red zone.



I0988566-165-0



CAUTION

The fuel level may change if the machine is tilted. Be sure to measure the fuel level in the non-tilted position.

(T0988566-076-0E)

5) DEF gauge

Indicates the DEF (Diesel Exhaust Fluid) level.

Replenish DEF before the DEF level falls into the red zone on the DEF gauge.



I0988566-165-0



CAUTION

If the DFE level gets too low, the yellow LED indicator lamp illuminates and a trouble code is displayed. If this state continues, the red LED indicator lamp illuminates and the engine protection function is activated to stop the engine.

(T0988566-075-0E)

6) Battery voltage

Indicates the current battery voltage.

0.0 V

FM-C300900

7) Parking brake indicator

This indicator comes on when the parking brake is activated.

It flashes when the parking brake is activated while the parking brake switch is OFF.

For details, refer to P. 47.



FM-C300970

8) Travel speed mode and preheat indicator

Indicates the machine speed state.

• Preheat indicator

The preheat indicator comes on when the engine key switch is turned on.

The water temperature sensor senses the water temperature, the engine is preheated automatically, and the indicator lamp goes off when preheating is completed. Do not start the engine while the preheat indicator lamp is on.

Only the preheat indicator comes on during engine preheating.



FM-C300850

• High speed mode

Comes on when the high speed mode is selected.



CA-C201200

• Low speed mode

Comes on when the low speed mode is selected.



CA-C201210

9) Turn signal

Flashes green when the turn signal icon on the display is tapped or the turn signal button on the jog dial is pressed.

Flashing

Not in operation



I0988596-165-0E

3. Explanation of the operation devices

10) Warning display



I0988596-166-0

- Engine check indicator

This indicator comes on when an abnormality is detected in the after-treatment device or the engine when the engine is running. Stop the engine and inspect it.

Also, please report the contents of the trouble code display to our sales service dealer.



I0988566-207-0

- Battery charge warning indicator

This indicator comes on when an abnormality is found in the charge system while the engine is running. If this indicator comes on while the engine is running, the drive belt may be loose. Stop the engine and check the belt tension.



I0988585-502-0J

- DPF regeneration disable indicator

This indicator comes on when regeneration of the after-treatment device has inhibited.

For DPF handling, refer to the "DPF handling" section in the "Operation" chapter.

For manual regenerating of DPF, refer to the section "DPF manual regenerating" in the "Operation" chapter.



CA-C201250

- Engine oil pressure warning indicator

This indicator comes on when the pressure of the lubricating oil that lubricates inside the engine drops while the engine is running. If this indicator comes on while the engine is running, stop the engine and check for oil leak and oil levels of the lubricating oil system.



FM-C300940

- DEF level warning indicator

This indicator comes on when the DEF (diesel exhaust fluid) level becomes low.



CA-C201220

- HEST (High Exhaust System Temperature) indicator

This indicator comes on during after-treatment device regeneration or when the exhaust temperature is high.



CA-C201230

11) Vessel warning indicator

This indicator blinks when travel operation is carried out with the vessel raised.

While the indicator is blinking, the buzzer sounds intermittently.



I0988585-128-0

12) Soot level monitor

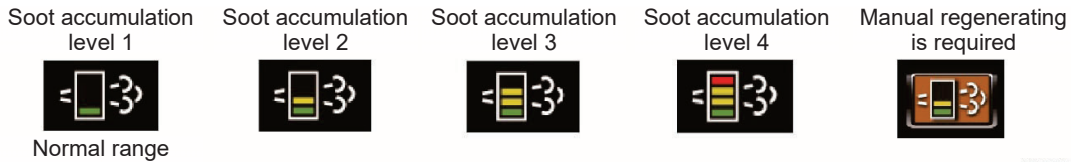
The soot level monitor normally indicates the soot accumulation level 1.

In the cases of the soot accumulation levels 2 and 3, regeneration is not completed via automatic regenerating, and manual regenerating is required.

When regeneration is required, the icon is highlighted with an amber background and border and the background lights up.

While the background is flashing, pressing and holding the icon activates the DPF regeneration function.

If the soot accumulation level 4 is reached and the regeneration range is exceeded, the engine stop indicator comes on, manual regenerating becomes impossible, and engine power reduction or automatic engine shutdown occurs.



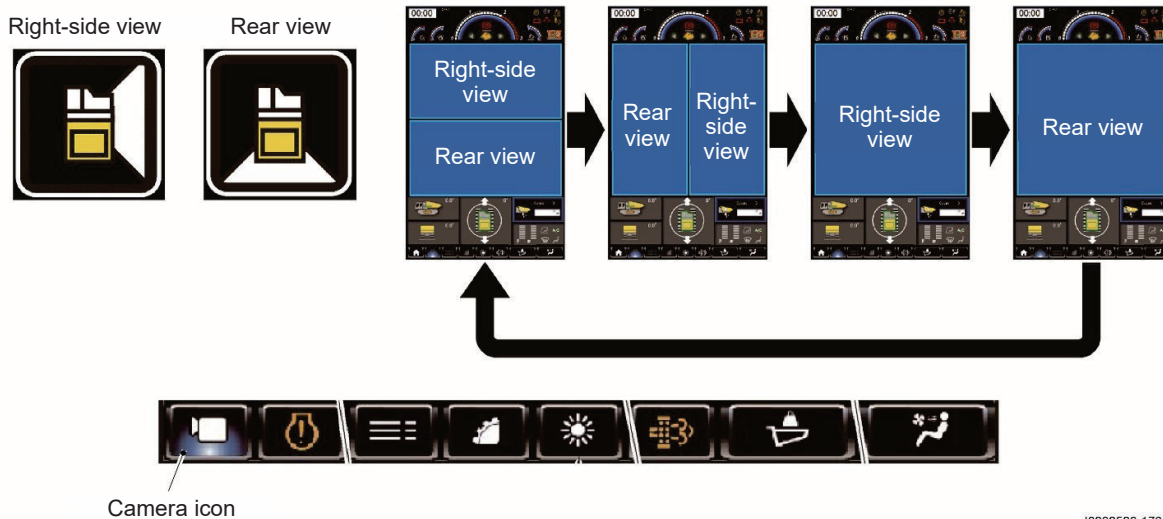
I0988596-174-0E

[Middle section]

This section displays the rear and right-side camera views.

Tapping the camera icon or the camera view area switches the screen display.

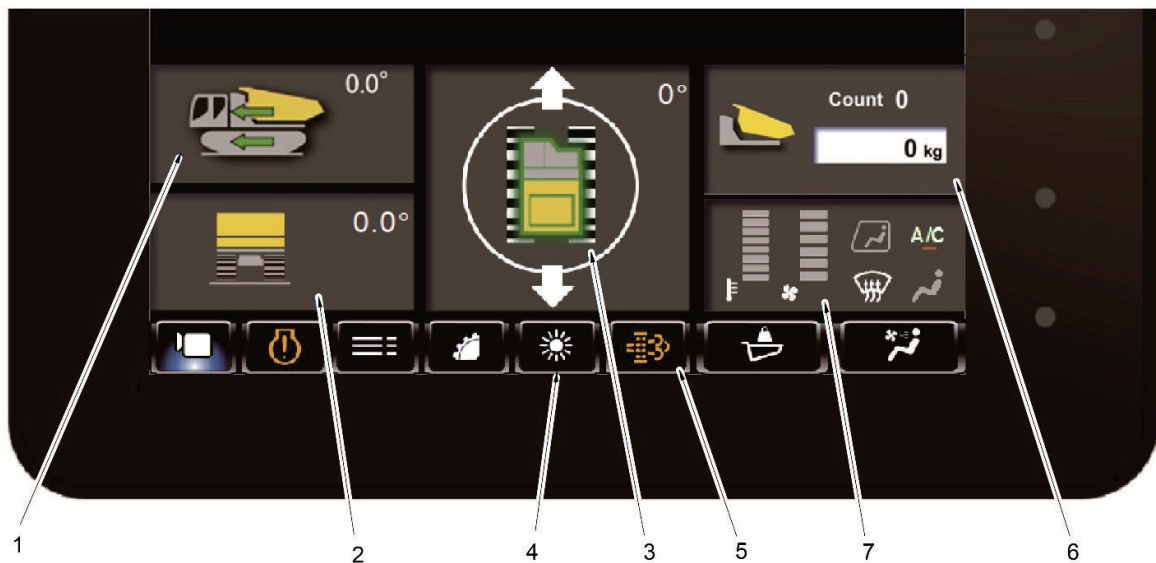
An icon indicating the direction of the view is placed in the upper left corner of each camera view.



I0988596-176-0E

3. Explanation of the operation devices

[Lower section]



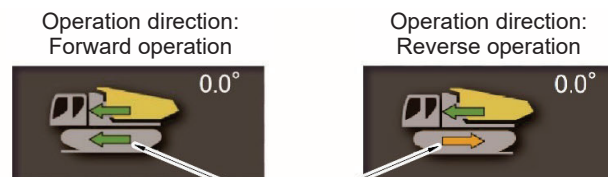
10988596-178-0

1) Machine inclination angle (slope) indicator and travel operation direction indicator

This indicates the inclination (slope) of the machine.

The travel operation direction indicator placed on the illustration of lower travel body indicates whether the operation direction is forward operation or reverse operation.

When the operation direction is reverse operation, the arrow lights up amber.



Travel operation direction indicator

10988596-179-0E

2) Machine inclination angle (roll) indicator

This indicates the inclination (roll) of the machine.

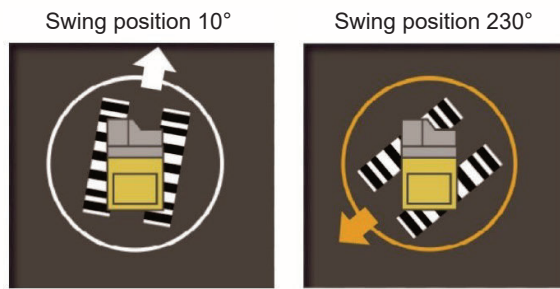
- If swing operation is carried out on inclined ground at a certain swing speed or higher, the swing speed is restricted.
- If swing operation is carried out when the inclination angle is 9 degrees or more, the buzzer sounds during swing operation.
- If swing operation is carried out when the inclination angle is 15 degrees or more, the buzzer sounds during swing operation and the swing speed is restricted.

SWING SPEED LIMITED "SLOPE" : While the swing speed is restricted, the message flashes on the display.

10988596-062-0

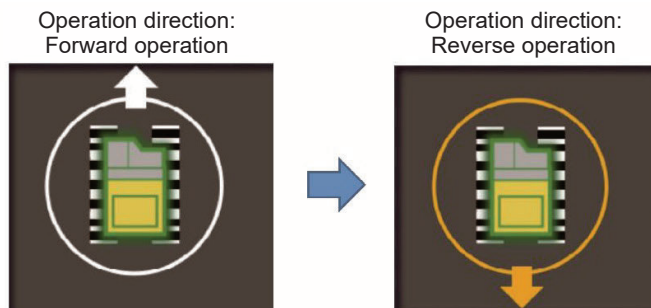
3) Swing position indicator

The arrow and lower travelling body illustration rotates according to the swing angle.



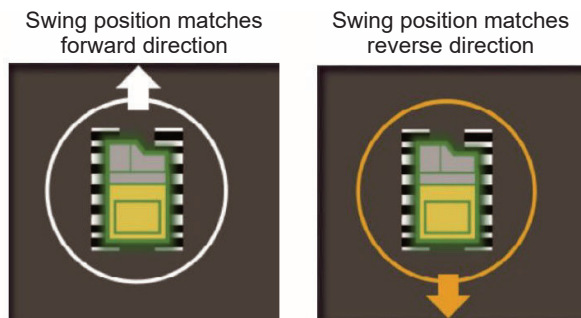
10988596-182-0E

When the travel operation changeover switch is pressed, the travel operation direction indicator lights up amber and the travel operation direction reverses 180 degrees.



10988596-183-0E

When the swing position matches the machine travel direction, the upper structure illustration lights up green.



10988596-184-0E

3. Explanation of the operation devices

4) Screen brightness adjustment

The screen brightness can be adjusted from this section.

Screen brightness
adjustment icon



Screen brightness
adjustment



I0988596-186-0E

5) DPF regeneration indicator

When the engine ECU requires DPF regeneration, the icon lights up amber.

While the icon is flashing, pressing and holding the icon (DPF regeneration indicator) activates the DPF regeneration function.

DPF regeneration is required (lighting up)

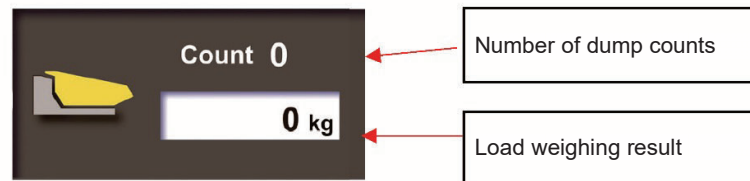


I0988596-202-0E

6) Vessel state indicator

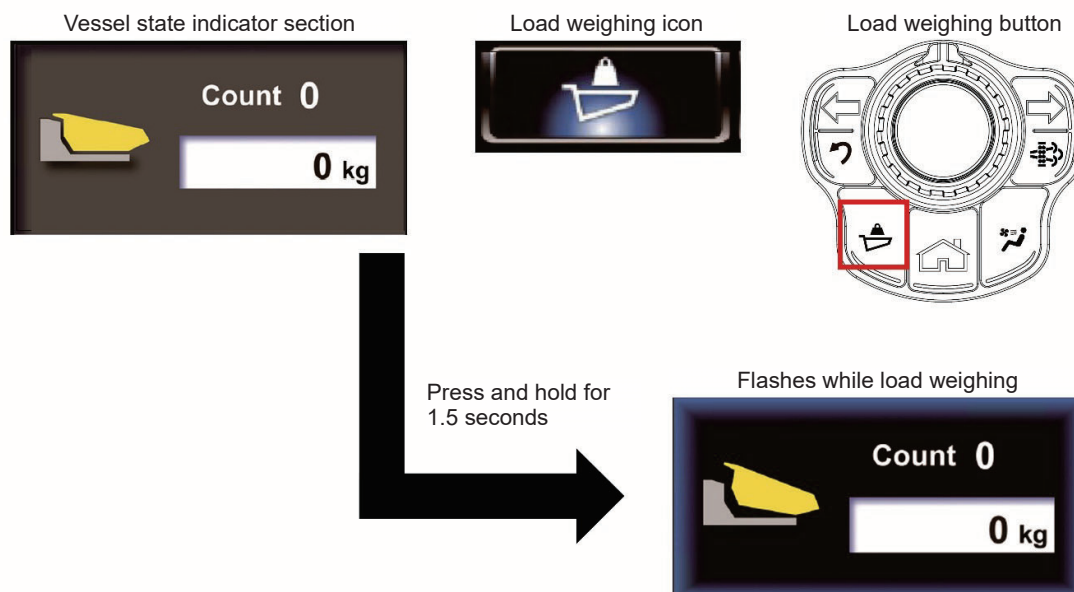
This indicator indicates the number of dump counts and the loading weight.

The use of load weighing function and its result are also indicated.



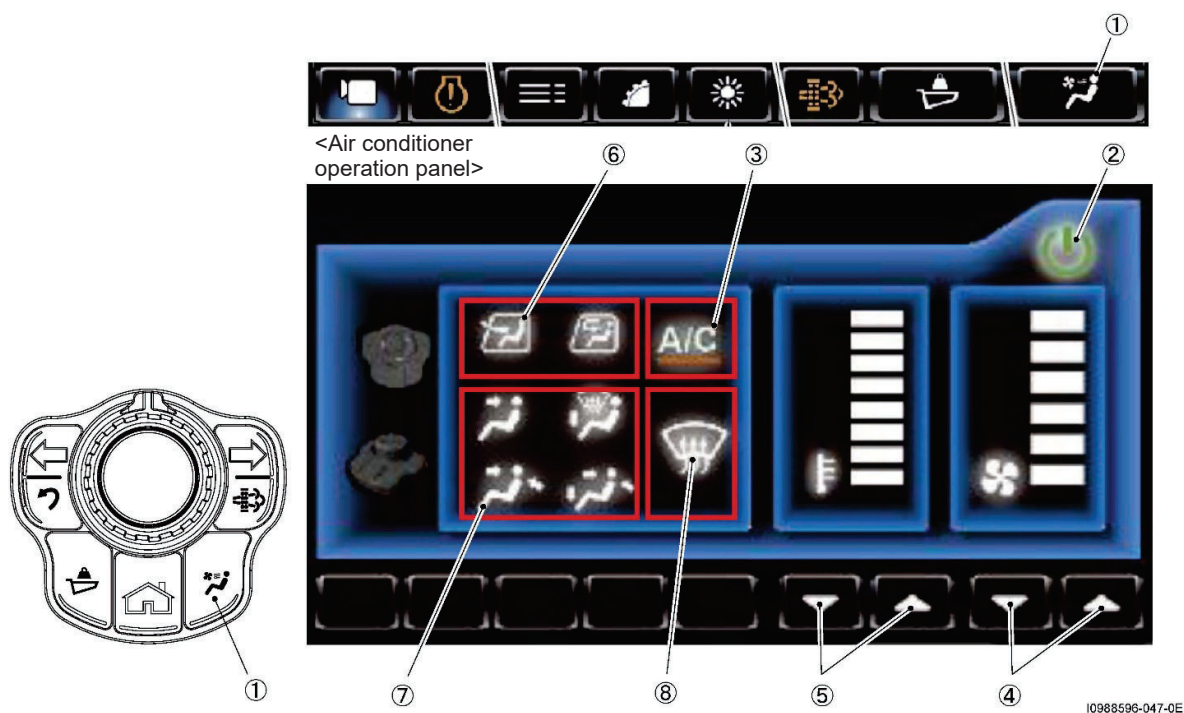
I0988596-189-0E

Pressing and holding for 1.5 seconds either the vessel state indicator section, the load weighing icon, or the load weighing button on the jog dial activates the load weighing function.



I0988596-191-0E

7) Air conditioner



Names and functions of the operation panel components

① Air conditioner operation panel activation button/icon

Pressing this button displays the air conditioner operation panel at the bottom of the screen.

② Power icon

Pressing this icon starts/stops the air conditioner operation.

The air conditioner starts with the operation settings at the time when it was turned off last time.

③ A/C icon

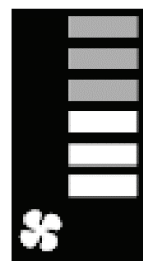
Pressing this icon toggles the cooling function ON or OFF. When the cooling function is ON, the **A/C** icon lights up.

④ Airflow switching icon

When this icon is pressed while the air conditioner is operating, the airflow changes and the newly set airflow state lights up on the display.

Pressing ▲ increases the airflow.

Pressing ▼ decreases the airflow.



10988566-194-0

3. Explanation of the operation devices

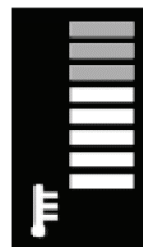
⑤ Temperature settign icon

To set the temperature inside the cabin, press this icon while the air conditioner is operating.

Pressing ▲ increases the temperature setting (spurting temperature).

Pressing ▼ decreases the temperature setting (spurting temperature).

The newly set temperature state is indicated on the display.



10988596-193-0

⑥ Recirculation/Fresh air switch icon

Pressing this icon toggles the recirculation mode or fresh air mode. The newly selected mode icon  or  is indicated on the display.

.....Recirculation

.....Fresh air

⑦ Air outlet switch icon

Pressing this icon switches the air outlet in the order of Face → Vent → Vent & foot → Foot → Face and so on. The selected air outlet icon lights up.

LCD screen display				
Air outlet	Face	Face & vent	Face, vent & foot	Foot & Def (gentle breeze)
Air outlet direction	Front of upper body	Front and back of upper body	Front and back of upper body Underfoot	Underfoot Front glass

10988596-049-0E

⑧ Defroster icon

Pressing this icon switches the air outlet to the defroster and the  icon lights up on the display.

Use this to clear condensation on the inside of the front glass and thaw frost from the outside of the front glass.

LCD screen display	
Air outlet	Def & foot (gentle breeze)
Air outlet direction	Front glass Underfoot

10988596-050-0E

Operating procedure

To start and stop the air conditioner

Press the power switch.

To cool

- ① Press the A/C switch.
- ② Using the temperature setting icon, set the temperature indicator low.
- ③ Using the airflow switches, select the desired airflow.
- ④ Using the MODE switch, select Vent  as the air outlet position. (It is the recommended position, but you can change Vent as desired.)
- ⑤ Using the R/F switch, select Recycle  (recommended setting).

If it gets too cold, raise the temperature with the TEMP Up switch, decrease the airflow with the Lo airflow switch, or adjust to the desired temperature using both.



CAUTION

- When the A/C switch is not pressed, air conditioning does not take effect and the air ventilation mode is automatically set.
- When Vent is selected as the air outlet, air also blows out of the face vents.
- While clearing condensation on the front glass, do not set the temperature close to the maximum cooling temperature.
- If cool air blows onto the front glass, the outside of the front glass may condensate, interfering with visibility.

(T0988596-200-0E)

To warm

- ① Using the temperature setting icon, set the temperature indicator high.
- ② Using the airflow switches, select the desired airflow.
- ③ Using the MODE switch, select Foot  as the air outlet. (It is the recommended position, but you can change the foot position as desired.)
- ④ Using the R/F switch, select Recycle  (recommended setting).

If it gets too hot, lower the temperature with the TEMP Down switch, decrease the airflow with the Lo airflow switch, or adjust to the desired temperature using both.



CAUTION

- When the A/C switch is pressed, dehumidification heating takes effect.
- When Foot is selected as the air outlet, air also blows out of the defroster.

(T0988596-201-0E)

3. Explanation of the operation devices

To defrost from the front glass

- ① Using the temperature setting icon, set the temperature indicator high.
- ② Using the airflow switches, select the desired airflow.
- ③ Using the DEF switch, set the air outlet as the defroster .
- ④ Using the R/F switch, select Recycle .



CAUTION

- By pressing the MODE switch, the setting before the DEF switch was pressed is restored.
- When DEF is selected as the air outlet, air also blows out of the foot vents.

(T0988596-202-0E)

To defog

- ① Using the airflow switches, select the desired airflow.
- ② Using the DEF switch, set the air outlet as the defroster .
- ③ Using the R/F switch, select Fresh Air .



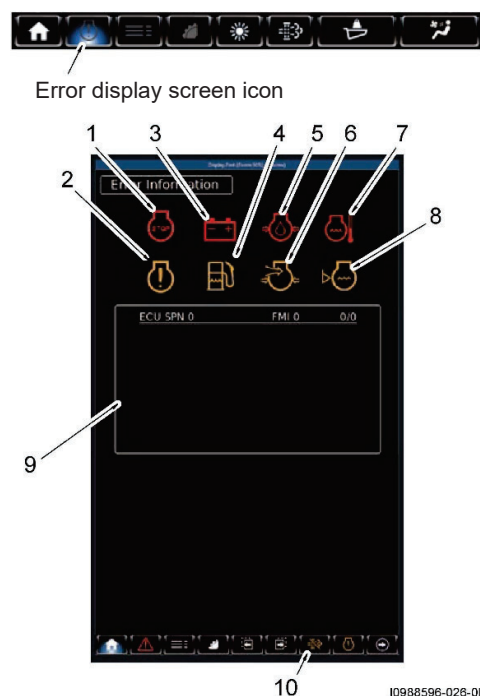
CAUTION

- To quickly clear condensation, select the maximum airflow using the Hi airflow switch.
- By pressing the MODE switch, the setting before the DEF switch was pressed is restored.

(T0988596-203-0E)

Error display screen

No.	Name
1	Engine stop indicator
2	Engine check indicator
3	Battery charge warning indicator
4	Water separator warning indicator
5	Engine oil pressure warning indicator
6	Air cleaner clogging warning indicator
7	Coolant temperature warning indicator
8	Coolant level warning indicator
9	Trouble code display
10	DPF regeneration disable indicator



1) Engine stop indicator

- This indicator flashes when an imminent abnormality is detected and the engine automatically stops.
- This indicator comes on when an after-treatment device or engine failure is detected while the engine is running. When the engine stop indicator flashes comes on or flashes, move to a safe area and stop the engine immediately. Repair is required once the engine is stopped. Please contact our sales service dealer.



I0988566-206-0

2) Engine check indicator

This indicator comes on when an abnormality is detected in the after-treatment device or the engine when the engine is running. Stop the engine and inspect it. Also, please report the contents of the trouble code display to our sales service dealer.



I0988566-207-0

3) Battery charge warning indicator

This indicator comes on when an abnormality is found in the charge system while the engine is running. If this indicator comes on while the engine is running, loose fan belt may be the cause. Stop the engine and check the fan belt tension.



I0988585-502-0J

3. Explanation of the operation devices

4) Water separator warning indicator

This indicator comes on when water is accumulated to a prescribed position in the water separator. When it comes on, stop the engine and drain water from the water separator.



I0988585-202-0J

5) Engine oil pressure warning indicator

This indicator comes on when the pressure of the lubricating oil that lubricates inside the engine drops while the engine is running. If this indicator comes on while the engine is running, stop the engine and check for oil leak and oil levels of the lubricating oil system.



FM-C300940

6) Air cleaner clogging warning indicator

This indicator comes on when the air cleaner is clogged while the engine is running. If this indicator comes on while the engine is running, stop the engine and clean or change the air cleaner elements.



CA-C201300

7) Coolant temperature warning indicator

This indicator comes on when the coolant's temperature rises abnormally. If this indicator turns on while the engine is running, stop traveling or other operations, operate the engine at the idling speed for at least 5 minutes to allow it to cool down gradually, and then stop the engine to check it.



CA-C201310

8) Coolant level warning indicator

This indicator comes on when the coolant level becomes too low. When this comes on, stop the engine and replenish the coolant tank with coolant.



CA-C201320

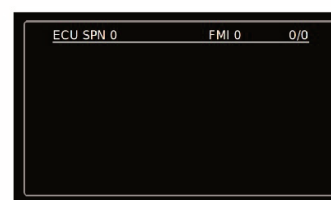
9) Error code display

Shows the error code.

It indicates the contents of the engine trouble.

When multiple error codes exist, the previous and next errors can be checked by pressing the error page back and error page forward icons in the menu bar.

For details on the contents of the engine trouble that appears on the display, contact KATO sales and service dealer.



Error page back

Error page forward



I0988596-026-0E

3. Explanation of the operation devices

10) DPF regeneration disable indicator

Pressing this icon disables the DPF automatic regenerating function.

Pressing this icon again enables the DPF automatic regenerating function.

When the DPF regenerating function is disabled, the DPF regeneration cancel indicator (1) is displayed.



10988596-170-0

Adjustment selection display screen

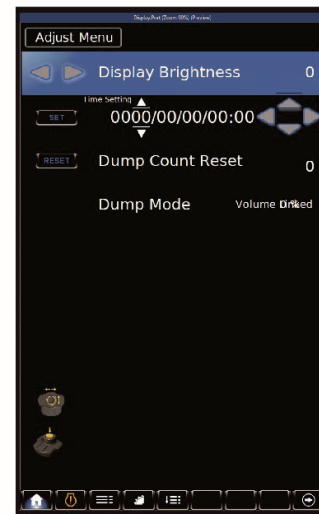
This screen is used to adjust the travel speed, the inclination angle of the machine, the brightness of screen display, etc.

Adjust the value of the desired item by tapping.



Adjustment selection display screen icon

Display Brightness	Adjusts the brightness of the display.
Time Setting	Adjusts the time shown on the main screen.
Dump Count Reset	Resets the vessel dump count.
Dump Mode	Do not change this item.



10988596-032-0E

Display Brightness

Adjusts the brightness of the screen.

Time Setting

Adjusts the clock shown on the display.

Dump Count Reset

Resets the dump count.

Safety warning devices

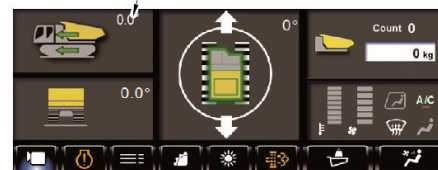
Slope warning

The slope angle of the machine is indicated on the display.

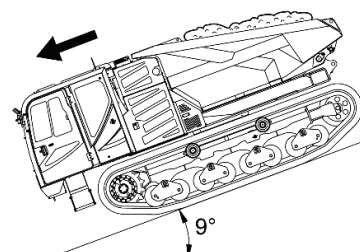
When the machine travels on a slope of 9 degrees or more, the alarm buzzer sounds for 5 seconds.

If swing operation is carried out on a slope of 9 degrees or more, the buzzer continues to sound during swing operation.

Slope angle display



10988596-038-0E



The posture at which the safety warning devices are activated

10988596-039-0E

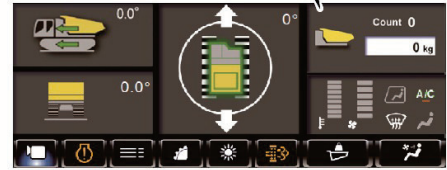
3. Explanation of the operation devices

Load weighing function

This machine has a load weighing function.

When the load weighing function is enabled, loading can be performed while monitoring the loading weight.

Load weighing function display position



I0988596-042-0E



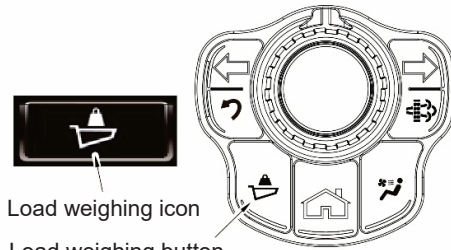
CAUTION

The weighing weight is a reference value.

(T0988575-150-0E)

Enabling the load weighing function

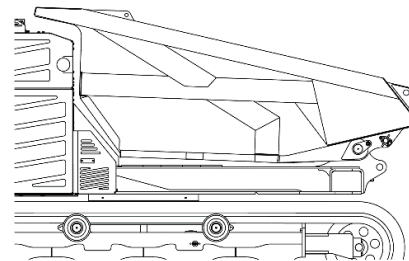
- (1) Press the vessel state indicator section of the display, the load weighing icon, or the load weighing button on the jog dial in the home screen.
- (2) Automatically the vessel rises slightly and the current loading weight is displayed.



Load weighing icon

Load weighing button

I0988566-043-0E



Vessel position in load weighing

I0988596-044-0E



CAUTION

The vessel moves. Be careful of the periphery of the machine.

If one of the following operations is carried out during weighing, load weighing finishes and the vessel automatically lowers. Be fully careful.

[Lever lock release] [Travel operation] [Vessel operation] [Pressing the weighing button]

(T0988585-106-0E)

- (3) When loading is performed and the measured loading weight reaches the rated value, the horn sounds, the vessel automatically lowers and load weighing finishes.



CAUTION

- When loading with the vessel raised, do not drop soil and sand from a height or pound it in using a hydraulic excavator.
- Do not perform additional loading after the rated loading weight has been reached and the load weighing has finished. Otherwise, overloading would be resulted, which impairs safety and causes deterioration of the function and service life of the machine.

(T0988585-118-0E)

Dump counting function

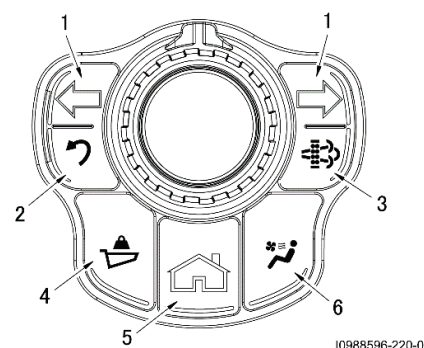
This function counts the number of times earth and sand is discharged from the vessel.

DumpCount: Count value since the last reset

(2) Jog dial

Button layout and explanation

No.	Name
1	Turn signal button
2	Return button
3	DPF regenerating button
4	Load weighing button
5	Home button
6	AC button



1) Turn signal button

This button can be used when the engine key switch is in the ON position.

Press the button to operate the direction indicator lamps.

➡ : The right direction indicator lamps flash. When the button is pressed again, the lamps go OFF.

⬅ : The left direction indicator lamps flash. When the button is pressed again, the lamps go OFF.

Pressing the two simultaneously: Both right and left direction indicator lamps flash. When the button is pressed again, the lamps go OFF.

2) Return button

Returns to the previous screen.

3) DPF regeneration button

DPF regeneration is performed manually.

Operate this button when the DPF warning indicator (3) blinks.

Refer to "[Lower section] 5) DPF regeneration indicator" described above.

4) Load weighing button

Refer to "[Lower section] 6) Vessel state indicator" described above.

5) Home button

Returns to the main screen.

6) AC button

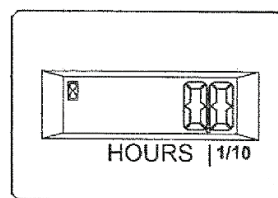
Refer to "[Lower section] 6) Air conditioner" described above.

3. Explanation of the operation devices

(3) Hour meter

Hour meter

This meter indicates the accumulative running time in increments of 1/10 hours (6 minutes). The meter advances as long as the engine is running even if the machine does not move.



I0988535-035-0

(4) Engine key switch

Use this switch to start and stop the engine.

OFF (Stop)

The key can be inserted and removed. All power to the electrical system turns OFF and the running engine stops.

ACC

While the engine is stopped, the radio, USB socket and room lamp can be used.

ON (Run)

The power to the electrical system turns ON.

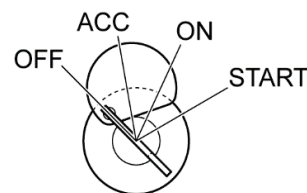
START

This is the engine start position.

After checking that the preheat indicator lamp on the display is off, turn the key to the start position.

When the engine starts, immediately release your hand from the key.

The key returns to the ON position automatically.



I098857500-047-0

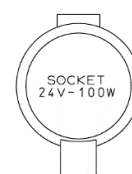
(5) Power outlet

This power outlet can be used when the engine key switch is turned on.

Use this power outlet as a spare power outlet within the following capacity.

When this power outlet is not used, be sure to close the cap.

Capacity: 24 V - 100 W



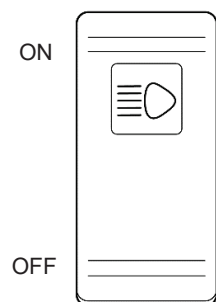
I0988566-019-0

(6) Headlight switch

This switch can be used when the engine key switch is at the ON position.

This switch is used to turn on/off the headlights.

- Turning on: Press the ON side.
- Turning off: Press the OFF side.



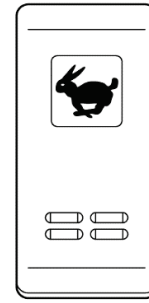
I0988596-271-0E

(7) Travel speed mode switch

This switch changes the travel speed mode.

High speed travel: Press the  mark side. The mark indicator lamp goes on and the high speed mode is set.

Low speed travel: Press the side without the mark. The mark indicator lamp goes off and the low speed mode is set.



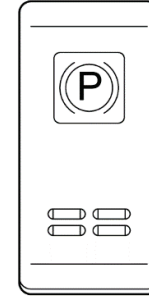
IC55C200180

(8) Travel parking switch

This switch activates/deactivates the parking brake.

Brake ON: Press the P mark side. The mark indicator lamp goes on.

Brake OFF: Press the side without the mark. The mark indicator lamp goes off.



IC55C200190

The parking brake safety function is provided to prevent erroneous travel after the engine key switch is turned ON.

When the travel parking switch is in OFF position, the brake is applied even if the key is turned ON.

To release the parking brake in such a case, turn the travel parking switch to the brake on position, and then turn it to the brake off position.

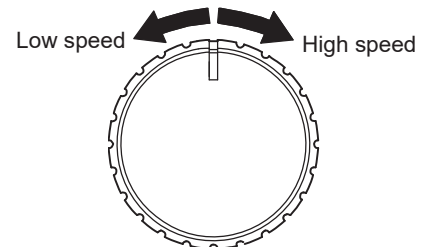
(9) Engine speed control dial

Adjust the minimum engine speed.

High speed: Rotate the dial clockwise.

Low speed: Rotate the dial counterclockwise.

Normally, operate the machine with this dial set to the lowest engine speed.



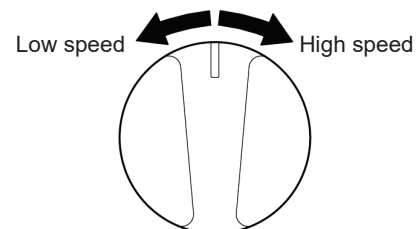
CA-C201040

(10) Travel speed control dial

This mode adjusts the travel speed of the machine.

High speed: Rotate the dial clockwise.

Low speed: Rotate the dial counterclockwise.



CA-C201050

3. Explanation of the operation devices

(11) Wiper switch

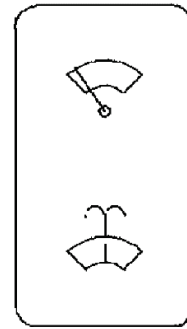
This switch can be used when the engine key switch is at the ON position.

- Wiper

 : Operate the wiper.

 : Spray the washer fluid.

Neutral (OFF): Stop the wiper.

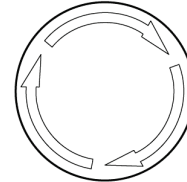


I0988535-036-0

(12) Emergency engine stop switch

Use this switch to activate emergency engine stop.

For precautions during emergency stops, refer to Section 4-11.



Stop: When this switch is pressed, the engine stops. The engine cannot be started while this switch is locked. When the switch is pressed, the message blinks on the display.

Release: When this switch is turned clockwise, the lock is released and the engine can be started.

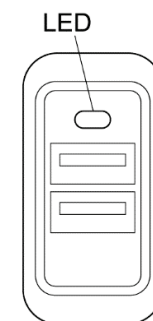


I0988596-040-0

(13) USB socket

These sockets supply 5 V USB power (1.2 A × 2 ports).

The power output is available when the LED is lit.



I0988566-205-0



CAUTION

- Only A-type USB terminals can be connected. Do not use other types.
- The allowable maximum current is 1.2 A for each port, 2.4 A in total. Check the power consumption in the instruction manual of the device to be used before use.
- No warranty repair will be provided for failure of the device connected or its data corruption or loss.

(T218081-148-0E)

(14) Travel operation changeover switch

Each time the travel operation changeover switch is pressed, travel operation direction based on the joystick lever is switched.

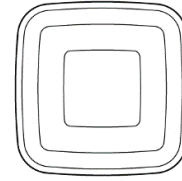
The travel operation direction can be checked according to the Light ON/Light OFF state of the switch and travel operation indicator on the (1) display.

Light OFF: The joystick lever is in forward operation position.

Light ON: The joystick lever is in backward operation position.

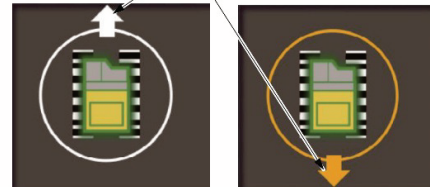
The travel operation direction is switched when the machine swings beyond 90 degrees right and left with respect to the longitudinal direction of the machine.

The light ON/light OFF state of the switch and the reverse travel indicator on the (1) display is also switched at the same time.



I0988585-013-0

Travel operation indicator



Forward operation

Reverse operation

I0988596-275-0E

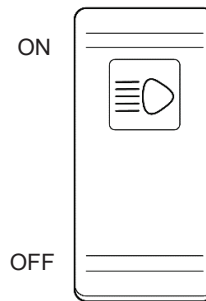
(15) Backup light switch (optional)

This switch can be used when the engine key switch is in the ON position.

Use this switch to turn on/off the backup light.

To turn on the backup light, press the ON side.

To turn off the backup light, press the OFF side.



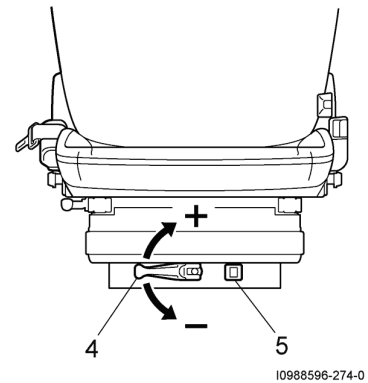
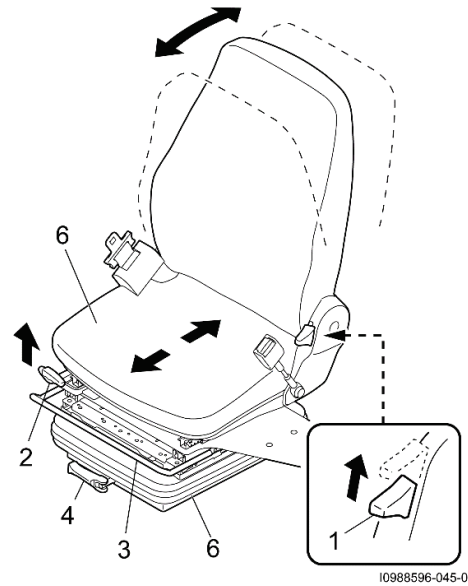
I0988596-271-0E

3. Explanation of the operation devices

3-2-2 Operator seat (T0988596-014-0E)

Sit on the seat and adjust it to allow free lever operations.

- Adjusting tilt
Move the seat back while pulling the lever (1) to adjust the angle of the seat back.
- Adjusting the back-and-forth position (upper rail)
Move the seat forward or backward while pulling the lever (2) upward.
- Adjusting the back-and-forth position (lower rail)
Move the seat forward or backward while pulling the lever (3) upward.
- Adjusting suspension
Raise the lever (4) and turn it to adjust suspension. The appropriate body weight is displayed on the display (5).
- Adjusting the seat height
When the seat is lifted from the bottom of the seat (6), the seat height is raised by 30 mm (a maximum of 60 mm).
To return the seat to the original height, lift the seat from the bottom of the seat to the maximum height, lift it again and then lower it.



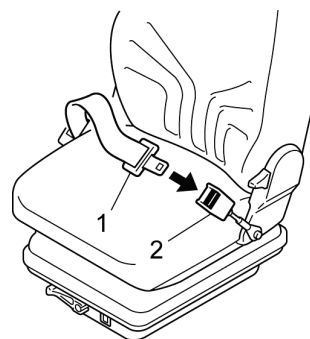
CAUTION

The operator seat should be adjusted with the engine stopped.

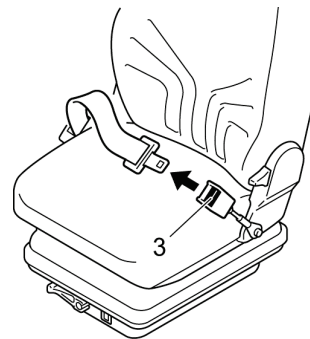
(T0988566-154-0E)

3-2-3 Seat belt (T0988566-020-1E)

- (1) Adjust the seat belt length according to your body size.
- (2) Confirm that the seat belt is not twisted and put the plate (1) into the buckle (2) securely.
- (3) Slightly pull the belt and confirm the belt is locked.
- (4) Press the button (3) of the buckle to unfasten seat belt.



CA-C200401



CA-C200411



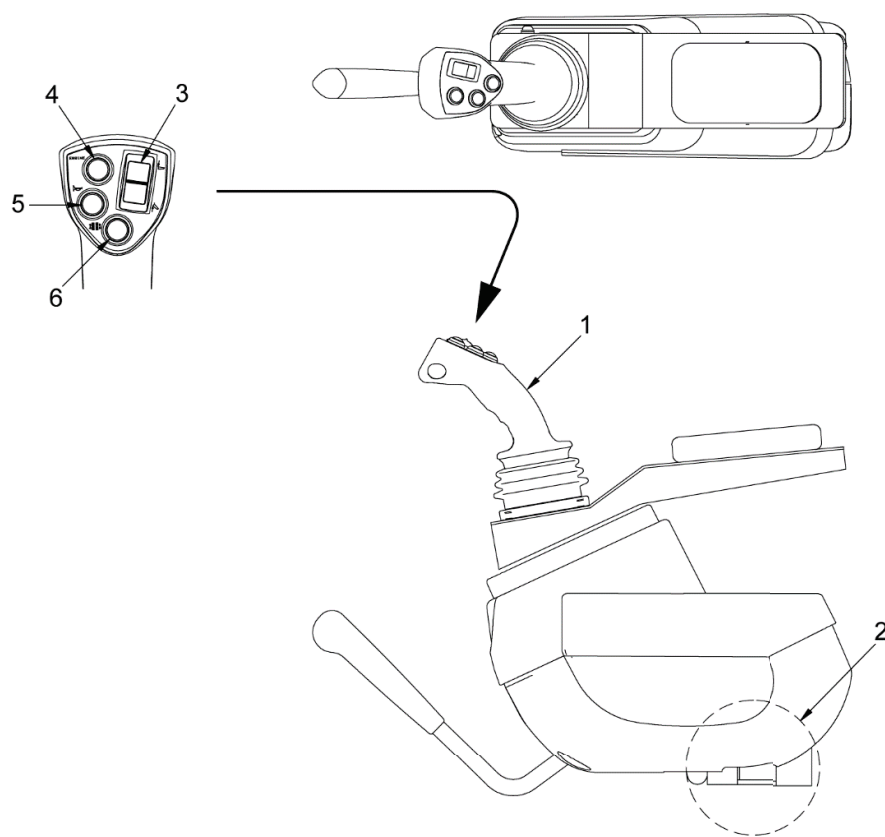
CAUTION

- ALWAYS fasten the seat belt while operating the machine.
- ALWAYS check the condition of the seat belt and mounting hardware before operating the machine. Replace the seat belt at least once every three years, regardless of appearance.

(T0988566-078-0E)

3. Explanation of the operation devices

3-2-4 Left lever unit (T0988585-107-0E)



IC55C201080

No.	Name	No.	Name
1	Joystick lever	4	Engine start/stop button
2	Lever lock switch	5	Horn button
3	Dump operation switch	6	Spin turn button

3. Explanation of the operation devices

(1) Joystick lever

Use this lever to control the travel operation of the machine.

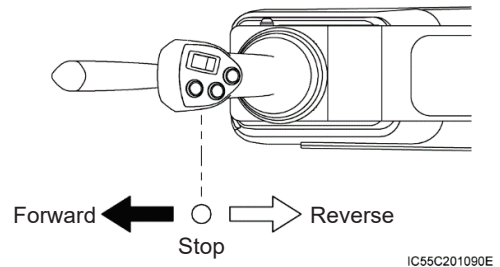
○ During forward operation

Forward: Push the lever forward.

Stop: Return the lever to the neutral position.

Backward: Pull the lever backward.

○ During reverse operation, the above operation method is reversed.



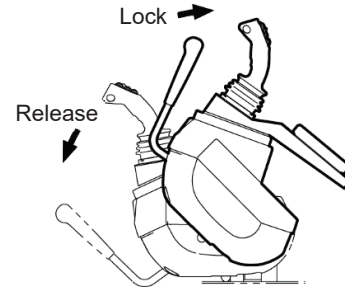
(2) Lever lock switch

This switch is used to prevent erroneous operation if you accidentally touch the joystick when getting on or off the operator seat.

The lever lock switch can be operated by pulling up and down the left lever unit.

Lock: Pull up the left lever unit. The joystick is disabled at the lock position.

Release: Pull down the left lever unit to the operation position.



(3) Dump operation switch

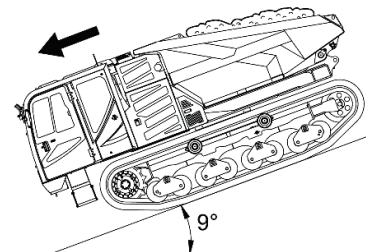
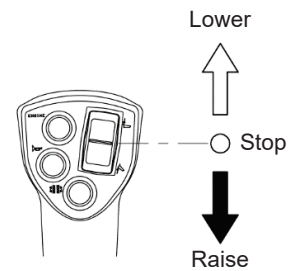
Press the right switch on the joystick lever to start dump operation.

Raise: Push the lower part of the switch to raise the vessel.

Stop: Release the switch to stop the vessel.

Lower: Push the upper part of the switch to lower the vessel.

On a slope of 9 degrees or more, operation is restricted so that dumping can be performed only the state in which the operator seat is in the lower side with respect to the slope.



Machine state in which dumping can be performed (cabin is facing downward).

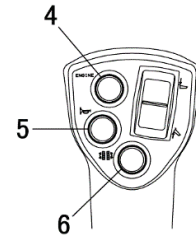
I0988596-046-0E

3. Explanation of the operation devices

(4) Engine start/stop button

The engine can be started by pressing the switch button (4) while the engine key switch is at the ON position.

The engine can be stopped by holding down this button while the engine is running.



10988566-175-0

(5) Horn button

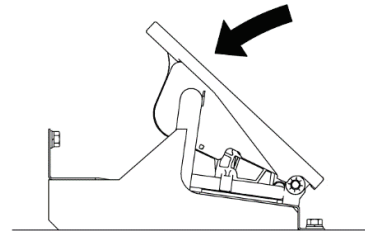
You can sound the horn by pressing the horn button (5).

(6) Spin turn button

Spin turn operation can be performed by operating the joystick laterally while holding down the switch button (6).

Turning ON the engine key switch while holding down the spin turn button switches the mode to the spin turn mode.

For details, see pages of Steering control in Basic operation.



10988566-023-0

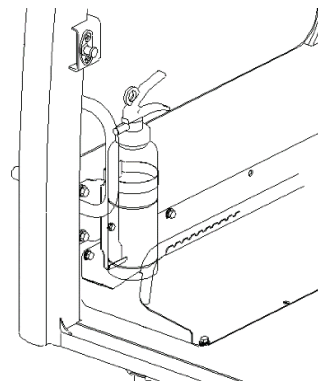
(7) Accelerator pedal (optional)

Travel speed can be adjusted by depressing this pedal.

(8) Fire extinguisher (optional)

A fire extinguisher can be installed in the front of the cab.

When installing it, contact an authorized KATO dealer.



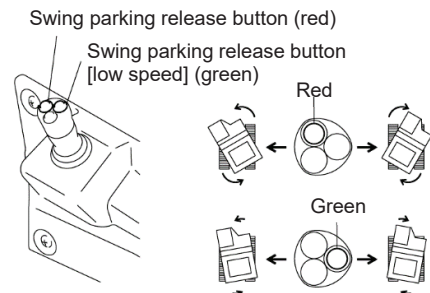
3-2-5 Right lever unit (T0988596-015-0E)

Use the right lever unit to control swing operation of the upper structure.

When the swing lever in the neutral position is operated while pushing down the swing parking release button, the upper structure swings to the direction which the lever is pushed.

The swing speed changes according to the parking release button to be operated.

- Swing parking release button (red): Normal swing
- Swing parking release button [low speed] (green): Low-speed swing



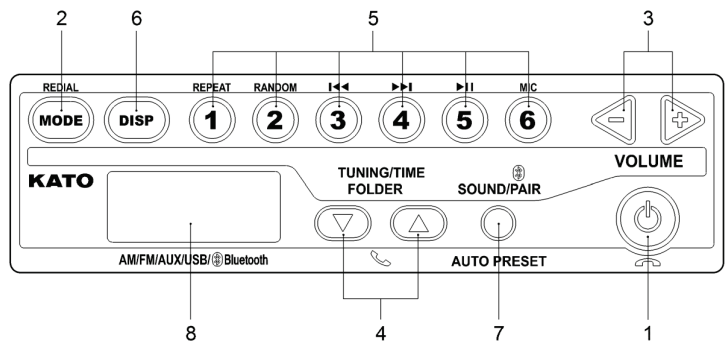
10988585-016-0E

When the swing parking release button is released during swinging, swinging stops.

Be sure to return the swing lever to the neutral position and then perform swing operation again.

3-2-6 AM/FM radio (optional) (T0988585-016-0E)

(1) Names of keys and other components



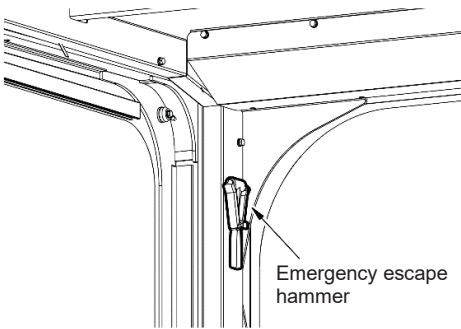
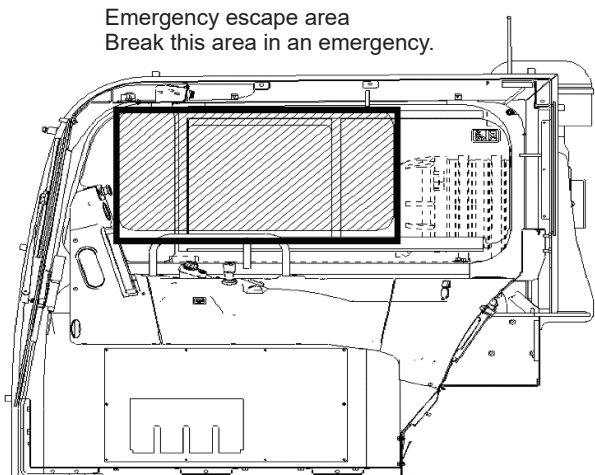
10988566-223-0

	Name	Function
1	[PWR] key	Turns ON/OFF the radio.
2	[MODE] key	Changes between radio bands (AM/FM1/FM2) and switches between radio (AM/FM1/FM2), AUX, USB, and BT. Pressing and holding the key performs redial.
3	[VOL+] [VOL-] key	Adjusts the sound volume.
4	[UP] [DOWN] key	Used in frequency tuning, sound step adjusting, and clock setting.
5	[PRESET] key (1-6)	Calls up or registers preset frequencies. In the BT or USB mode, used for repeat, shuffle, next/previous track, and play/pause function.
6	[DISP] key	Switches the display (between the frequency and clock).
7	[SOUND/PAIR] key	Used in sound adjusting (balance/bass/treble) and pairing.
8	LCD	Displays the frequency, clock, and other information.

(T218931-083-0E)

3-2-7 Emergency escape hammer (T0988596-311-0E)

In an emergency, such as when the door cannot be opened, use the emergency escape hammer placed on the right rear to break the right window and escape.



10988596-278-0E



CAUTION

- When breaking the window with the hammer, be extremely careful of flying shards.
- When escaping, be careful of glass shards.

(T0988596-312-0E)

3. Explanation of the operation devices

3-3 Outside the cab (T0988566-022-0E)

(1) Cover

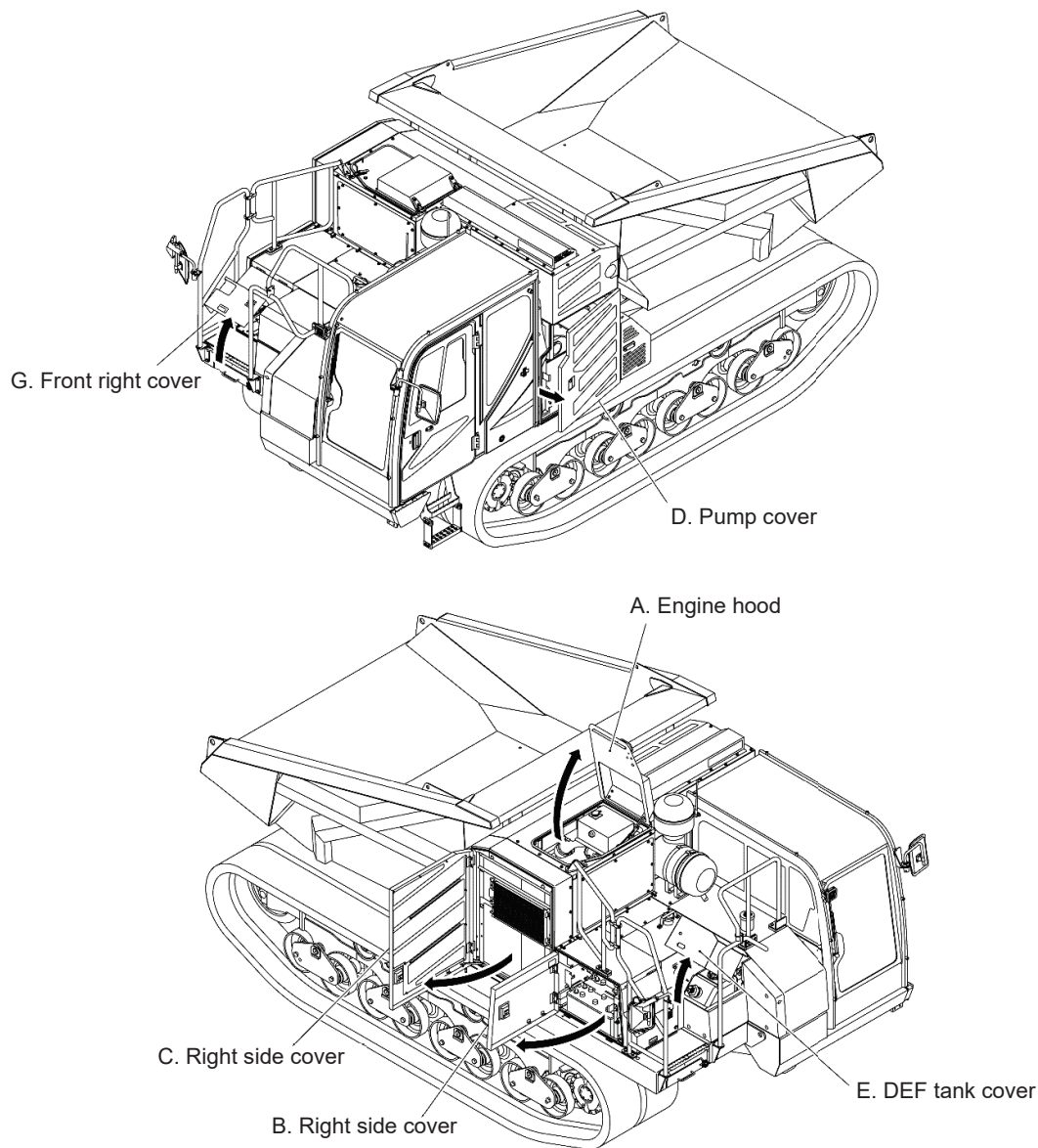
For inspection and servicing, park the machine on the level ground. Open each cover and engage the stopper securely.



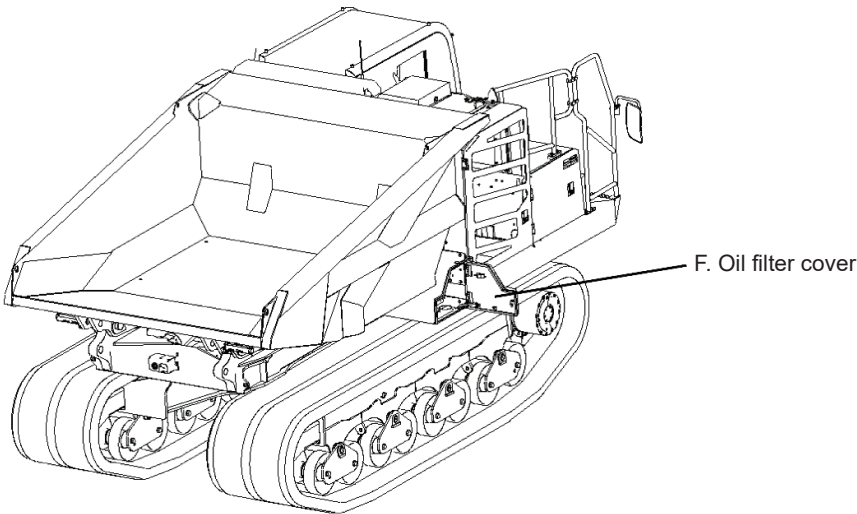
CAUTION

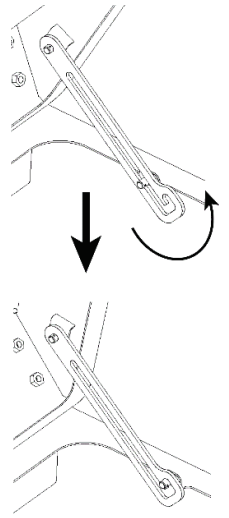
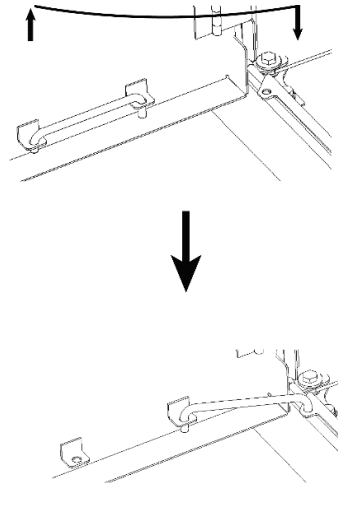
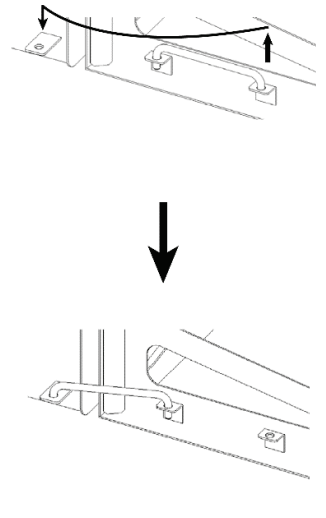
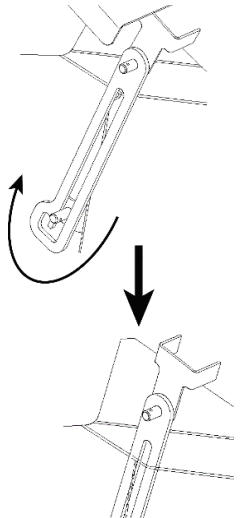
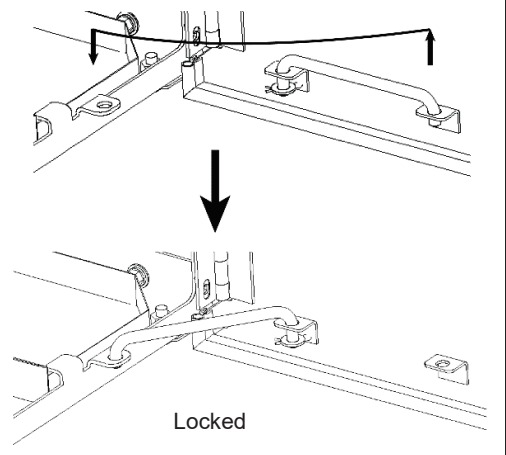
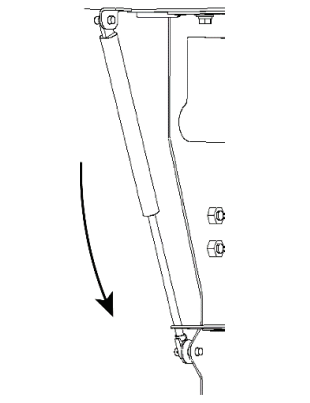
- If you open the cover of the machine on a slope or in a strong wind, the cover could close unexpectedly, causing injury.
- Be sure to close all covers and lock them before you start to travel or operate the machine.
- Never travel or operate the machine with the cover open.
- Be sure to close the engine hood before lowering the vessel after maintenance.

(T0988596-017-0E)



INQ88596_051_0E



Setting the stoppers			
A. Engine hood  Locked	B. Right side cover C. Right side cover  Locked	D. Pump cover  Locked	E. DEF tank cover  Locked
F. Oil filter cover  Locked		Releasing the stopper G. Front right cover 	

3. Explanation of the operation devices

(2) Grease gun holder (optional)

A grease gun can be stowed inside the oil filter cover.

(3) Tool storage

Tool storage space is provided inside the oil filter cover. Since the inside of the oil filter cover is not dust-proof or waterproof, do not stow items that should not get wet or dirty.

(4) Washer fluid tank

The washer fluid tank is installed inside the cab maintenance door and has a capacity of 1.5 L.

Use automotive washer fluid.

(5) Battery disconnect switch

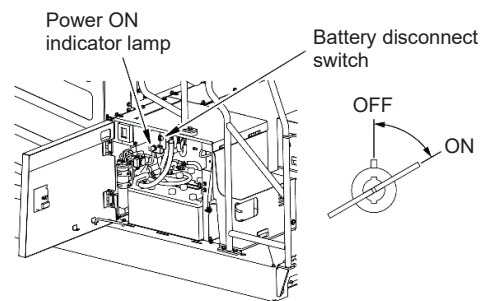
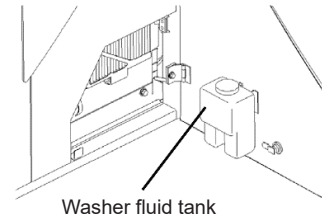
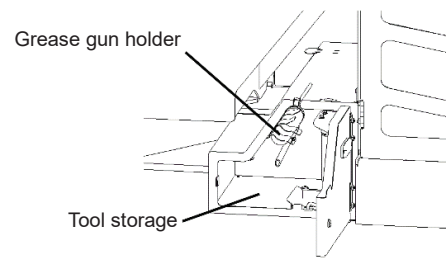
Keep this switch at the ON position except during long-term storage or when servicing the electrical system. If you turn it to the OFF position, all electrical circuits will be cut off, and stored data such as the clock and radio presets will be lost.

The switch can be operated only when the power ON indicator lamp next to the switch is OFF.

While the engine is running or immediately after it stops, the power ON indicator lamp is lit and the switch cannot be operated.

NOTE

The red indicator lamp may stay lit for about 10 minutes after the engine stops so as to protect the exhaust gas after-treatment system (Urea SCR system).



10988596-245-0E



CAUTION

- Ensure the switch is at the ON position before starting the engine.
- Never turn the switch to the OFF position while the engine is running. Doing so may damage the electrical system.
- Never turn the switch to the OFF position while the red indicator lamp is lit, even if the engine is stopped. Doing so may damage the exhaust gas after-treatment system.

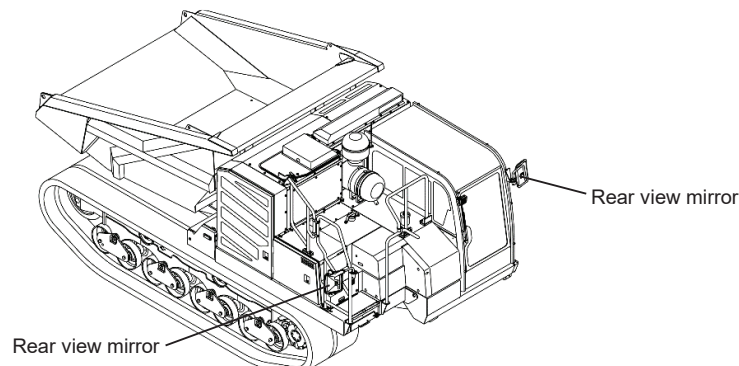
(6) Rear view mirrors

After sitting in the operator's seat, adjust the rear view mirrors to ensure safety to the left, right side, and rear.



CAUTION

Retract the rear view mirrors during transport.

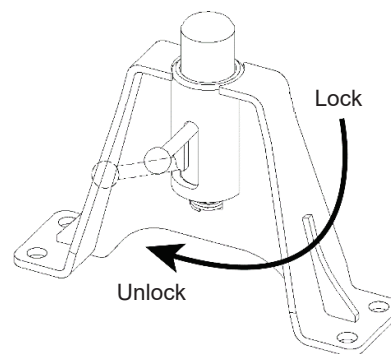


(7) Swing lock (optional)

To fix the upper structure during transport or in other situation, use the swing lock.

NOTE

The lock engages when the upper structure and the lower traveling body are parallel.



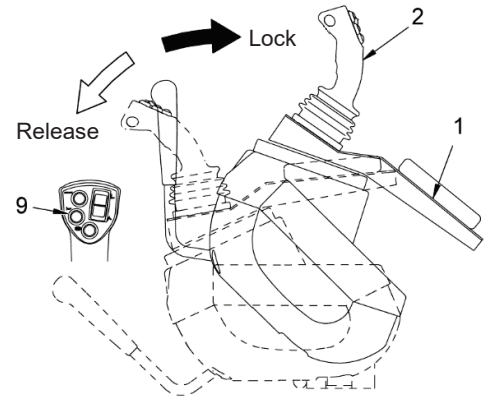
WARNING

- Stop the engine before operating the swing lock.
- Do not operate the swing lock on a slope.
- To align the hole position of the upper structure, always perform the swing operation to adjust the position.

4. Explanation of operation (T0988566-023-0E)

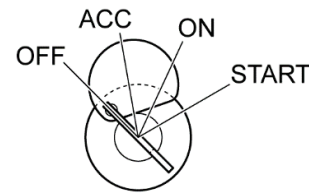
4-1 Before starting the engine (T0988596-018-0E)

- (1) Sit on the seat, adjust it to allow free lever operations, and fasten the seat belt.
- (2) Make sure that the left lever unit (1) is set at the lock position.
- (3) Make sure that the joystick lever (2) is set at the neutral positions.
- (4) Insert the key into the engine key switch (3), turn it to the ON position, and check the following:



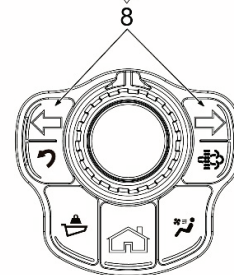
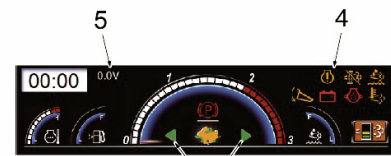
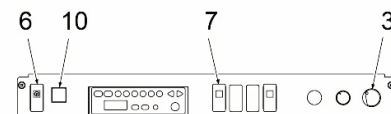
10988566-103-0E

- 1) The display turns on. Make sure that the model name is correct.
- 2) When the coolant temperature is low, engine preheating starts automatically. Make sure that the preheat lamp (4) is lit and goes out then.
The lighting time of the preheat lamp varies with the coolant temperature.

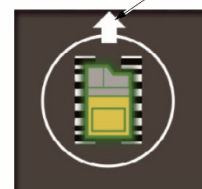


1098857500-047-0

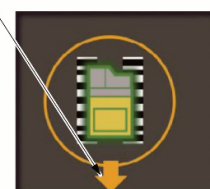
- 3) Make sure that the battery voltage display (5) is normal (approximately 24 V).
- 4) Turn on the travel parking switch (6) and make sure that the mark lamp of the parking switch is on.
- 5) Operate the headlight switch (7) and make sure that the headlights go on.
- 6) Operate the direction indicator lamps by using the turn signal icon or the turn signal buttons (8) of jog dial and make sure that the direction indicator lamps flash.
- 7) Push down the horn button (9) of the joystick and make sure that the horn sounds.
- 8) Make sure that the upper structure is in machine front state. Check that changeover to the reverse operation is performed properly by pressing the travel operation changeover switch (10) and making sure that the travel operation changeover switch lights up amber and that the travel operation indicator on the display indicates reverse operation and lights up amber. Then press the travel operation changeover switch again to change back to the forward operation and make sure that the travel operation changeover switch and the travel operation indicator go out.



Travel operation indicator



Forward operation



Reverse operation

Ask our sales service dealer for repair services, if some abnormalities are found in above check.

10988596-052-0E

4-2 Engine starting (T0988566-025-1E)



CAUTION

- Make sure that there are no persons or obstacles around the machine and sound the horn before starting the engine.
- Be sure to sit on the seat when starting the engine.
- If the engine is stopped with the left lever unit at the operation position, set the left lever unit to the lock position and restart the engine.

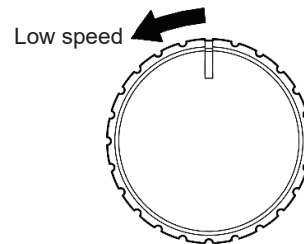
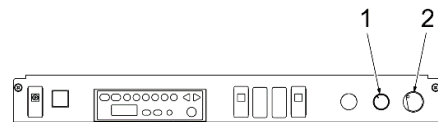
(T0988585-108-0E)

NOTICE

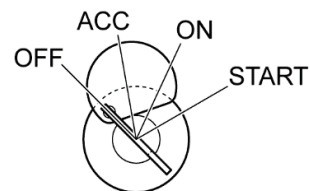
Do not turn on the starter motor for 30 seconds or more. If the engine does not start, return the key switch to OFF, wait for at least 2 minutes and restart the engine.

(T0988566-080-0E)

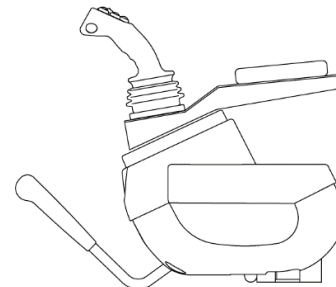
- (1) To provide against unexpected behavior of the machine, set the engine speed control dial (1) to the low position.
- (2) Make sure that the preheat lamp on the display is off. Turn the key (2) to the START position. The engine starts.
- (3) Release the hand from the key when the engine starts.
The key returns to the ON position automatically.
- (4) Set the left lever unit to the operation position when starting operation.



I0988596-053-0E



I098857500-047-0



Operation position with
the lever lock released

I0988566-217-0E

4. Explanation of operation

4-3 After starting the engine (T0988585-018-0E)

NOTICE

- Never race the engine immediately after starting it. Racing after starting may cause breakdown of the engine.
- Do not accelerate the engine quickly or apply loads to it when the engine water temperature gauge (1) shows low temperature.
- If abnormalities are found, stop the engine immediately, find the cause and repair the defective part.

(T0988566-081-1E)

- (1) Make sure that all alarm lamps on the display are off.
- (2) Check if engine exhaust color, sound and vibrations are not abnormal.
- (3) After the engine has started, perform a warm-up operation (described later).
- (4) Make sure that the upper structure is in machine front state and that the travel operation changeover switch is off.
 - * If the switch is on, turn off the switch and change joystick operation to forward operation.



I0988596-054-0

4-4 Basic operation (T0988566-027-0E)

4-4-1 Start-travel-stop (T0988596-021-0E)

WARNING

- When traveling, lower the vessel completely.
If a travel operation is performed while the vessel is in a raised position, the buzzer sounds and the travel speed is restricted.
- If the vessel has the three-way opening or rear opening structure, lock the rear gate and side gate securely.
- Place the upper structure and lower travel body parallel.
If travel operation is performed when the bodies are not parallel (centers are deviated), the buzzer sounds and the travel speed is restricted.
SPEED LIMITED "SWING CENTER" : The message blinks on the display during travel operation.
I0988596-264-0
- Avoid performing travel operation and swing operation simultaneously. The machine could curve, which impairs the safety around it.
If simultaneous operation is performed, the buzzer sounds and the travel speed is restricted.
SPEED LIMITED "TRAVEL&SWING" : The message blinks on the display during simultaneous operation.
I0988596-265-0
- Make sure that no persons are around the machine. Sound the horn before starting.

(T0988585-109-0E)

4. Explanation of operation

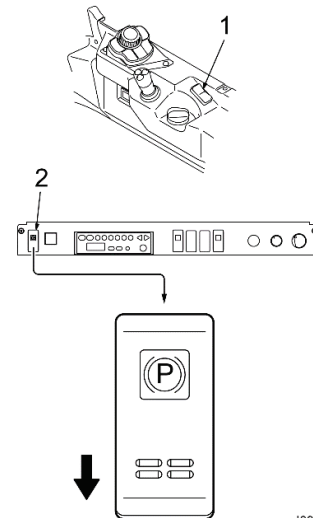
- (1) Adjust the travel speed properly with the travel speed select switch (1).

- (2) Push down on the no-mark position of the travel parking switch (2) to deactivate the brake.

Make sure that the mark lamp of travel parking switch (2) and parking mark on the display are off.

The travel parking switch (2) is equipped with the parking brake safety function for preventing erroneous travel after turning ON the engine key switch.

After the engine key switch is turned ON, the machine cannot travel unless the travel parking switch (2) is turned ON once and then OFF to release the function.



10988596-055-0

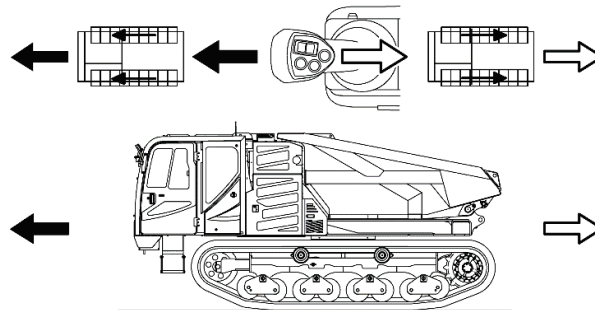
1) Joystick lever operation procedure (during forward operation)

Use the joystick lever as shown below.

Forward: Push the joystick forward.

Stop: Set the travel joystick lever to the neutral position.

Backward: Pull the joystick lever backward.



10988596-056-0

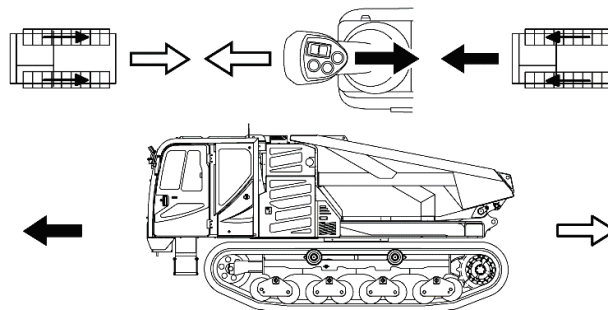
2) Joystick lever operation procedure (during reverse operation)

Use the joystick lever as shown below.

Forward: Pull the joystick lever backward.

Stop: Set the travel joystick lever to the neutral position.

Backward: Push the joystick forward.

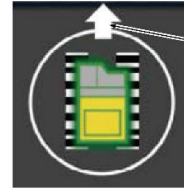
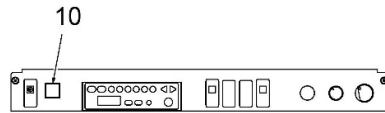


10988596-057-0

4. Explanation of operation

When the travel operation changeover switch (10) light up amber and the travel operation indicator on the display indicates the reverse operation and lights up amber, joystick operation will be reversed.

For safety, be sure to push the travel operation changeover switch to make sure that the travel operation changeover switch (10) goes out and that the travel operation indicator on the display indicates the forward operation before performing travel operation.



Travel operation indicator

Operation direction:
Forward operation

10988596-058-0E



CAUTION

- If the joystick lever or pedal is largely operated, it leads to sudden start. Operate the joystick lever or pedal gradually to avoid sudden start.
- When traveling backward, be careful with the bouncing of the left lever unit.
- Avoid traveling at other than swing center position that could cause a risk of accident.
If it is necessary to perform such traveling, make sure that there is no contact object in the travel direction.
- Check the travel operation changeover switch and the travel operation indicator on the display and understand the operation direction, and then perform operation slowly.

(T0988596-023-0E)

4-4-2 Steering control (T0988585-021-0E)

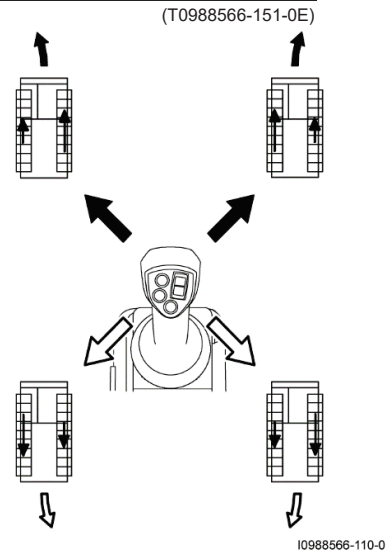
⚠ WARNING

Never change the travel direction quickly on a slope. Quick direction change may cause turnover or slip.
If it is necessary to change the travel direction quickly, move to a solid ground with a gentle slope and change the direction.

(1) Turn

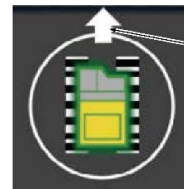
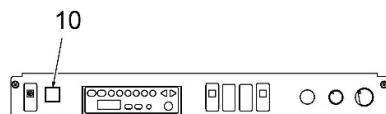
○ During forward operation

- Left turn and forward: Push the joystick lever in the left forward direction.
Right turn and forward: Push the joystick lever in the right forward direction.
Left turn and backward: Pull the joystick lever in the right backward direction.
Right turn and backward: Pull the joystick lever in the left backward direction.



When the travel operation changeover switch (10) light up amber and the travel operation indicator on the display indicates the reverse operation and lights up amber, joystick operation will be reversed.

For safety, be sure to push the travel operation changeover switch to make sure that the travel operation changeover switch (10) goes out and that the travel operation indicator on the display indicates the forward operation before performing travel operation.

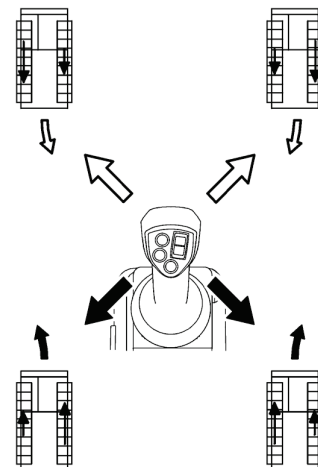


Travel operation indicator

Operation direction:
Forward operation

IO988596-058-0E

- During reverse operation, the above operation is reversed.
(Do not perform travel operation during reverse operation unless it is necessary to perform the operation.)



IO988585-118-0

4. Explanation of operation

(2) Spin turn

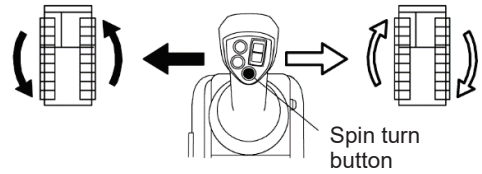
Normal mode

Operate the joystick while holding down the spin turn button.

Left spin turn: Turn the joystick lever to the left.

Right spin turn: Turn the joystick lever to the right.

* Operation is the same during both forward operation and reverse operation.



I0988566-111-0E



CAUTION

Pressing the spin turn button with the lever operated under light or no load should be avoided, or a risk of over-spin turn may be caused.

The spin turn button should be pressed with the joystick lever in the neutral position. Then operate the joystick lever.

(T0988566-152-0E)

Spin turn mode

Turning ON the engine key switch while holding down the spin turn button switches the mode to the "spin turn mode."

Once the "spin turn mode" is activated, spin turn operation is enabled without pressing the spin turn button.

When the key switch is turned off, the spin turn mode is canceled.

4-4-3 Dump operation (T0988596-025-0E)



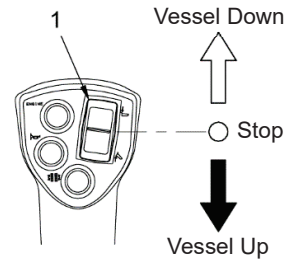
DANGER

Safety pins must be locked before working with vessel raised.

(T0988596-024-0E)

(1) Procedure of dump operation

- 1) Stop the machine and confirm safety of a dumping place.
- 2) Raise or lower the vessel with the dump operation switch (1).
 - Vessel Up: Slide the switch backward.
 - Stop: Return the switch to the neutral position.
 - Vessel Down: Slide the switch forward.
- 3) Adjust the dumping speed by the amount of sliding the dump operation switch.



I0988596-112-0E

(2) Caution of dump operation

- 1) If dumping is carried out on a slope, uneven ground or soft ground, the center of gravity may move and the machine may turn over.
 - Carry out dumping on flat and solid grounds where the machine may be maintained as horizontally as possible.
- 2) Avoid dumping on cliffs or near ditches in danger of falling.
 - If it is necessary to carry out dumping in such places, use buffers or post a guide as the necessity requires. Be sure to observe instructions of the guide.

When dumping with the upper structure swung, note the following in addition to the caution of normal dumping operation.

- During dumping operation with the upper structure swung in reverse direction, the travel direction of machine after unloading becomes reverse.

Do not make a mistake of the operation direction of the joystick lever. Otherwise, there could be a risk of falling and collision.

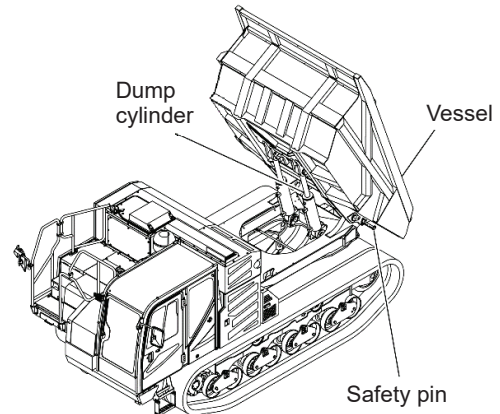
- If it is necessary to unload with the upper structure swung 90 degrees, check the status of the unloading site and keep a sufficient distance between the machine and unloading destination and road shoulder beforehand. After the machine arrives at the unloading site, swing the upper structure. After unloading, lower the vessel, swing the upper structure to the original position, and then move the machine.

- Do not perform dumping operation with the upper structure swung 90 degrees on a slope.

- 3) When dumping bigger stones, operate dumping slowly.
- 4) When lowering the vessel, make sure that the safety pins are removed.
- 5) Make sure that the vessel has lowered completely before starting the machine.
- 6) While the vessel is in a raised position, the buzzer sounds and the travel speed is restricted. The buzzer sounds continuously for travel operation conducted in this state.

Raise or lower the vessel only when the machine is stopped.

Failure to do so will cause machine malfunction or damage.



Dump at a level and stable place.

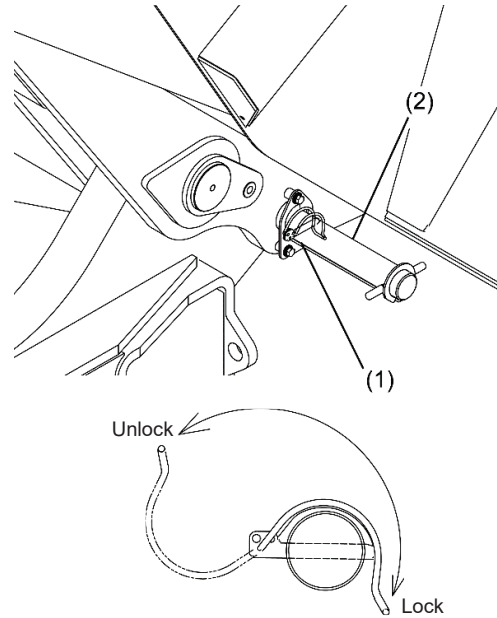
I0988596-060-0E

4. Explanation of operation

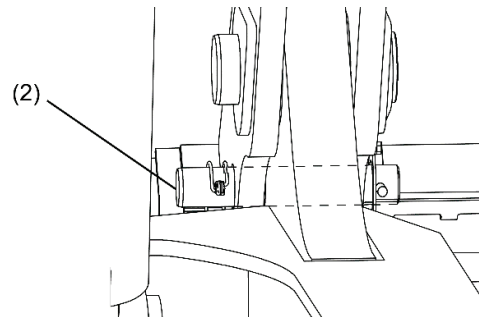
(3) Procedure for operating the safety pin

When raising the vessel for purposes other than dumping, use the safety pin to prevent the vessel from falling.

- 1) Unlock and remove the locking pin (1).



- 2) Push the safety pin (2) in all the way.



- 3) Insert and lock the locking pin (1).

To unlock the safety pin, perform the above procedure in reverse.

If the vessel has lowered and the pin cannot be removed, operate the vessel.



DANGER

To align the hole position of the vessel and the frame, always operate the vessel to adjust the hole position.

Do not put your fingers into the holes. Doing so poses a risk of your fingers being caught between the vessel and the frame.

4-4-4 Swing operation (T0988585-120-0E)

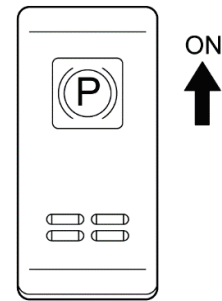
⚠ WARNING

- Be sure to swing the upper structure after stopping the machine at a level place.
Swinging on a slope could cause an unexpected accident due to a deteriorated stability and a sudden change in swing speed.
- If there are many persons or obstacles around the machine, post a guide, pay attention to the safety around the machine and observe instructions of the guide to perform swing operation.
- Operate the swing lever slowly. Swinging the loaded upper structure in particular at high speed or stopping it abruptly could cause failure as well as accident, which may impair the safety around the machine.
- When leaving the operator seat, be sure to stop the engine and set the left lever unit at the "Lock" position.

(T0988585-022-0E)

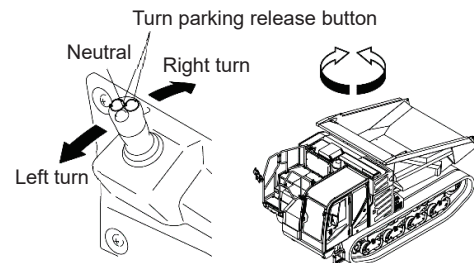
Perform swing operation of the upper structure as follows.

- 1) Push the "ON" side (parking) of the parking brake switch to apply parking brake.
Make sure that "P" is displayed on the monitor display.



I0988585-026-0

- 2) Operate the swing lever to the right or left direction slowly while holding down the swing parking release button of the swing lever.
 - Left swing: The upper structure swings to the left direction (counterclockwise).
 - Neutral: The upper structure stops at the position and holds its state.
 - Right swing: The upper structure swings to the right direction (clockwise).



I0988596-255-0E

- ★ The swing lever automatically returns to the "Neutral" position when released.

When the swing parking release button is released, swing operation stops.

Return the swing lever to the "Neutral" position, hold down the swing parking release button, and perform lever operation.

When the swing speed exceeds a certain level on slopes, the speed will be restricted.

- If swing operation is performed on a slope of 9 degrees or more, the buzzer sounds during swing operation.
- If swing operation is performed on a slope of 15 degrees or more, the buzzer sounds during swing operation and the swing speed is restricted.

SWING SPEED LIMITED "SLOPE" : The message blinks on the display during swing speed is restricted.

I0988596-266-0

4. Explanation of operation

4-4-5 How to lower vessel in case of emergency (T0988596-026-0E)



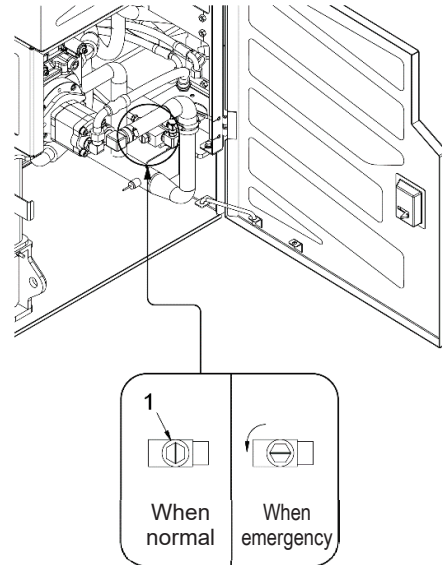
CAUTION

- Use the method of lowering the vessel by loosening the stop valve handle only when a trouble occurs.
- If the handle is loosened quickly, the vessel moves down at speed, which is very dangerous. Loosen the handle slowly.
- Tighten the handle completely after lowering the vessel.

(T0988596-027-0E)

If a trouble occurs in the engine or pump with the vessel raised and it cannot be lowered, it is possible to lower the vessel by loosening the stop valve handle (1) behind the cab.

- (1) Make sure that there are no persons under or around the vessel.
- (2) Use the included tool to loosen the handle.
- (3) When the handle is rotated to the direction for emergency vessel lowering shown in the right, the vessel starts lowering.
- (4) Tighten the handle firmly after vessel has lowered completely.



I0988596-063-0E

4-4-6 Engine start/stop button (T0988566-032-0E)

The engine can be started or stopped by operating the engine start/stop button on the joystick lever.

- (1) Holding down the engine start/stop button (1) while the engine is running stops the engine and the engine key switch is turned ON.
- (2) Pressing the engine start/stop button while the engine key switch is ON starts the engine.



I0988535-018-0

The use of the engine start/stop button on the joystick lever is for temporary operation.

When the engine is stopped by this method, the engine key switch is in ON position and the battery is consumed. Therefore, when away from the machine for an extended period of time, be sure to stop the engine using the engine key switch (described later).

4-5 Warming up the machine (T0988566-033-0E)

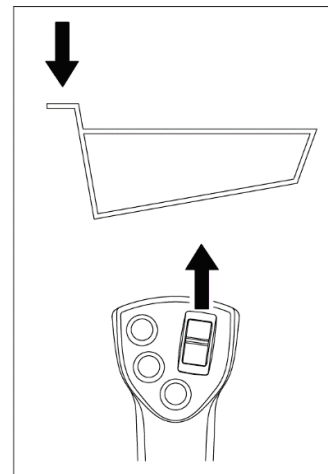
NOTICE

Do not increase the engine speed quickly when hydraulic oil is cold (below 20°).

The proper hydraulic oil temperature is approximately 50°C to 80°C. If you should carry out operation at low temperature, warm up until the hydraulic oil temperature rises to approximately 20°C before starting operation.

(T0988596-028-0E)

- (1) When the temperature of the engine cooling water is low, the warm-up mode is activated. While in the warm-up mode, the idling engine speed increases; however, when the water temperature rises, the warm-up mode is automatically deactivated.
- (2) Run the engine at low idling for approximately 5 minutes to warm it up after starting it.
- (3) If the hydraulic oil temperature is low, continue warming up for approximately 3 to 5 minutes with the dump lever to the "Lower" position to increase the hydraulic oil temperature.



I0988566-220-0

- (4) Move the machine forward and backward and raise and lower the vessel several times to warm up the mechanisms.

4. Explanation of operation

4-6 "Break-in" operation (T0988596-029-0E)

NOTICE

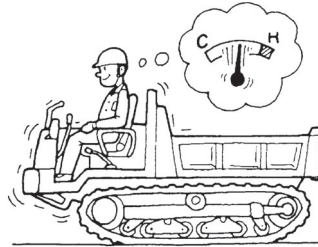
If a new machine is used in severe conditions, its performances are deteriorated early and the service life becomes shorter. Break in a new machine for about 100 hours first.

(T0988566-089-0E)

(1) Pay attention to the following when breaking in a new machine.

- Warm up the machine sufficiently.

Warm-up operation



CA-C300130

- Do not start or accelerate quickly or stop unnecessarily. Do not change the direction quickly.

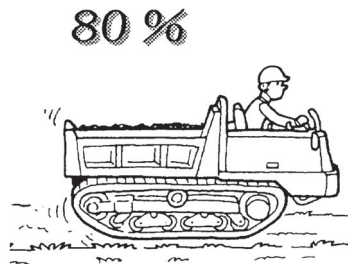


CA-C300150

- Do not apply heavy loads to the machine or run it at high speed.

Set the travel speed control dial to approximately 80% of the maximum speed and operate.

Limit the load to approximately 80% of the maximum load capacity.



CA-C300140

4-7 Characteristics of travel operation (T0988596-030-0E)

The operations of the joystick and the accelerator pedal (option) are linked with the engine speed and the hydraulic pump; thereby automatically controlling the oil pressure and the amount of discharge, stable travel speeds are achieved even with varied ground condition and loads.

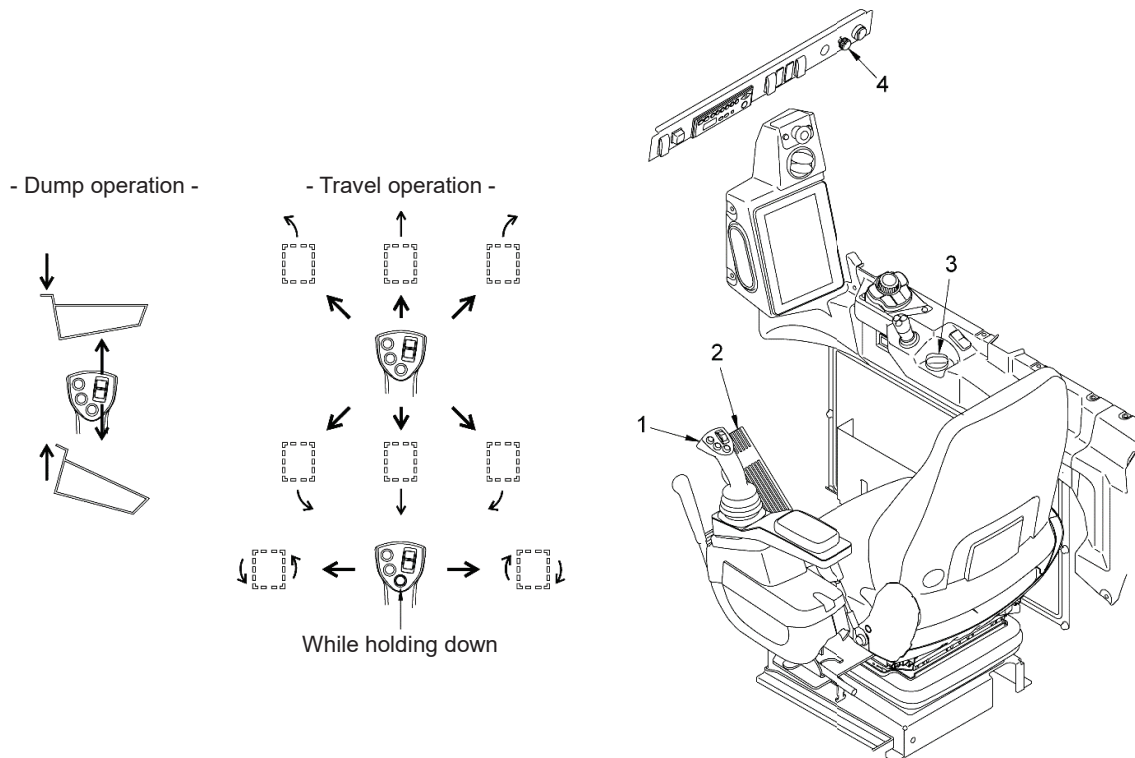
In automatic mode, the operator can concentrate on steering operation and drive feeling similar to driving an automobile.

(1) Joystick

The joystick is used to perform travel operation and dump operation.

The engine speed is automatically linked according to the amount of each operation.

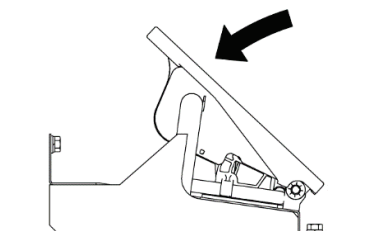
If the travel operation changeover switch on and the travel operation indicator on the display illuminates in amber, the operation direction of the joystick lever and the travel direction of the machine become reverse (reverse operation state).



I0988596-064-0E

(2) Accelerator pedal (option)

Combined with the joystick, the accelerator pedal adjusts the travel speed of the machine.



I0988566-023-0

4. Explanation of operation

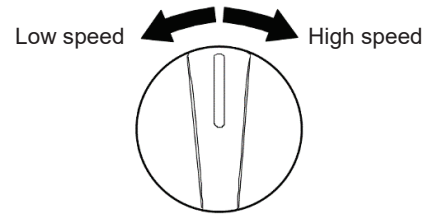
(3) Travel speed control dial

This adjusts the speed of travel operated with the joystick.

When this dial is set to the low speed side, the travel speed can be controlled by the joystick from 0 to very low speed.

When this dial is set to the high speed side, the travel speed can be controlled by the joystick from 0 to the maximum speed.

When you want to travel a narrow course, for instance, setting the dial at the low speed side makes it easier to travel.

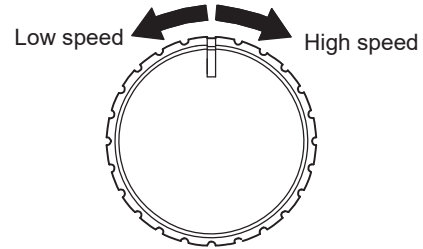


I0988566-118-0E

(4) Engine speed control dial

This dial is used to adjust the lowest engine speed.

The engine speed is controlled automatically according to lever operation, and usually the engine speed control dial is not used.



CA-C201040

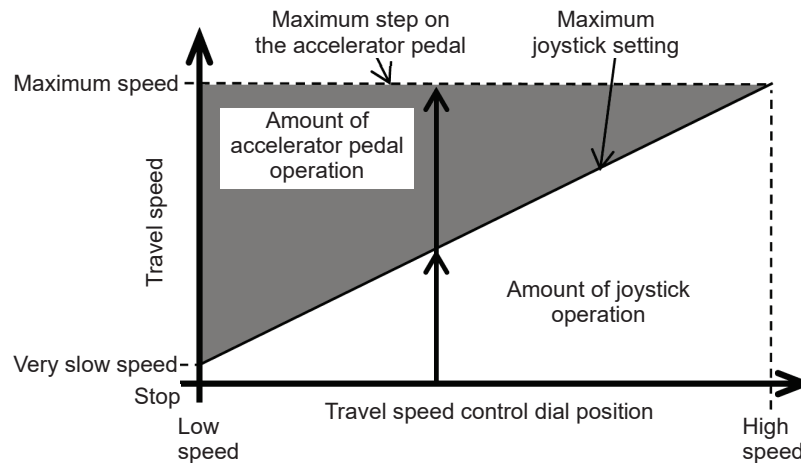
(5) Details of travel operation

The travel speed of the machine is determined by the engine speed and the hydraulic pump discharge amount (pump tilt angle), which is also affected by ground condition such as uphill and downhill, road surface conditions, load of travel such as the presence of loads on the vessel.

Stable travel speeds are achieved by linked control of the engine speed and the hydraulic pump according to the travel speed command entered using the joystick and also by changing them automatically according to travel load.

- Relationships between the joystick and the accelerator pedal (option)

The machine can be operated like an automobile by controlling the travel speed using the accelerator pedal with the joystick operated fully toward the travel direction. (Refer to P. 65 and P. 66.)

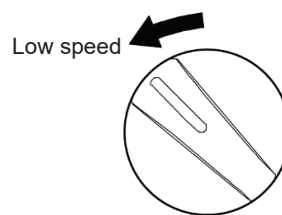


CA-C301390

4. Explanation of operation

(6) When the travel speed control dial is at the lowest speed position

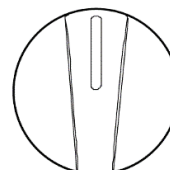
- Operating the joystick travels the machine at a speed range from stop to very slow.
- Operating the accelerator pedal (option) can adjust the speed of travel from very slow to the maximum.



I0988566-121-0E

(7) When the travel speed control dial is at the intermediate speed position

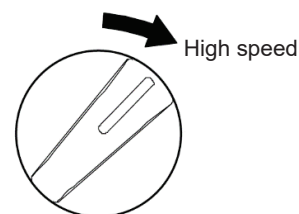
- In addition to the travel speed range that can be adjusted with the joystick, the accelerator pedal (option) can be used to adjust to the maximum speed.



I0988566-224-0

(8) When the travel speed control dial is at the highest speed position

- Operating the joystick adjusts the travel speed in a range from stop to the maximum.
- The operation of the accelerator pedal (option) is disabled.



I0988566-123-0E

4. Explanation of operation

4-8 Characteristics of swing body (T0988596-031-0E)

The swing lever is provided on the right side of the operator seat.

The grip tip of the swing lever is equipped with the swing parking release button (red) and swing parking release button [low speed] (green).

(1) Swing operation (operation to right and left directions)

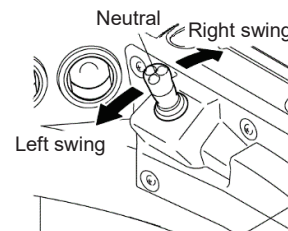
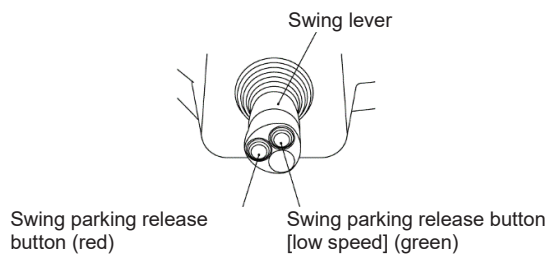
WARNING

- Be sure to swing the upper structure after stopping the machine on a level place. Swinging on a slope could cause an unexpected accident due to a deteriorated stability and a sudden change in swing speed.
- If there are many persons or obstacles around the machine, post a guide, pay attention to the safety around the machine and observe instructions of the guide to perform swing operation.
- Operate the swing lever slowly. Swinging the loaded upper structure in particular at high speed or stopping it abruptly could cause failure as well as accident, which may impair the safety around the machine.
- When leaving the operator seat, be sure to stop the engine and set the left lever unit at the "Lock" position.

(T0988585-028-0E)

The swing lever has three operation positions: "Left swing," "Neutral," and "Right swing."

- Operate the "swing parking release button" and the swing lever simultaneously to swing.
 - Left swing: The swing body swings to the left direction (counterclockwise).
 - Neutral: The upper structure stops at the position and holds its state.
 - Right swing: The upper structure swings to the right direction (clockwise).
- The swing lever automatically returns to the "Neutral" position when released.
- When the "swing parking release button" is released during swing operation, swing operation stops.
- During swing operation, the direction indicators on both sides of the machine blink simultaneously.



10988585-033-0E

4-9 Stopping the engine (T0988585-119-0E)

⚠ WARNING

- Be sure to move down the vessel, stop the engine and pull out the key before leaving the operator seat.
- Do not park the machine on a slope. If it is necessary to park on a slope, use buffers on the lower side of the crawler.

(T0988566-090-0E)

(1) Stopping the machine

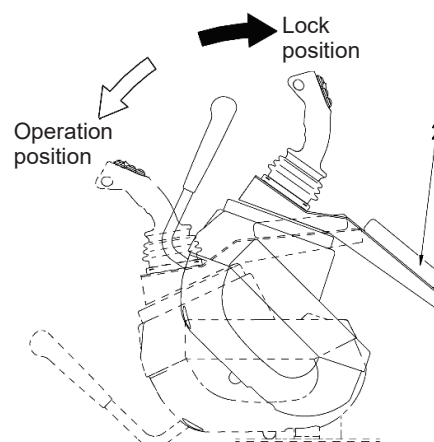
- 1) Stop the machine on a flat and rigid ground.
- 2) Set the travel parking switch (1) to the brake ON position.
- 3) Make sure that the vessel is lowered completely.
- 4) Check if the left lever unit (2) is set to the lock position.



I0988596-065-0

(2) Stopping the engine

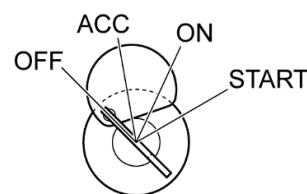
- 1) Keep the engine idling for approximately 5 minutes to lower the temperature of the engine.
- 2) Set the engine key switch (3) to the OFF position to stop the engine.
- 3) Pull out the key from the engine key switch.



I0988566-123-0E

(3) Inspection and locking after stopping the engine

- 1) Check necessary parts for oil leak and damages.
Repair defective parts if oil leak or damages are found.
- 2) Fill the fuel tank with fuel and DEF.
- 3) Remove soil and sand from the vessel and traveling mechanisms, in particular.
- 4) Lock the fuel filling port, engine hood and all other lockable parts.



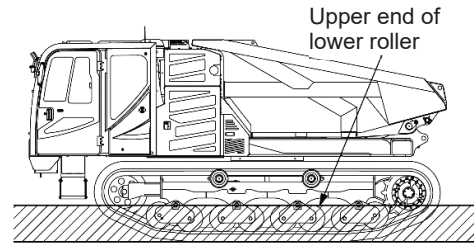
I098857500-047-0

4. Explanation of operation

4-10 Do not exceed the water depth limit (T0988585-029-0E)

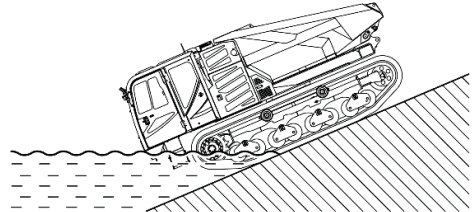
- (1) The acceptable water limit is up to the lower roller.

Check the water depth, foundation and strength of water current and other safety factors before operating. Do not place the machine in locations exceeding the lower frame of the machine.



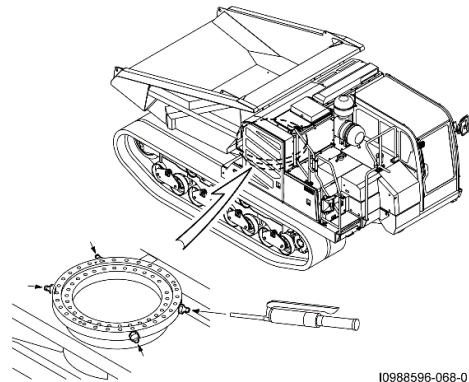
I0988596-066-0E

- (2) If the machine goes into water in a descending posture on a steep slope, water may splash on electric components and peripheral parts, resulting in damages to the electric components. Be careful.



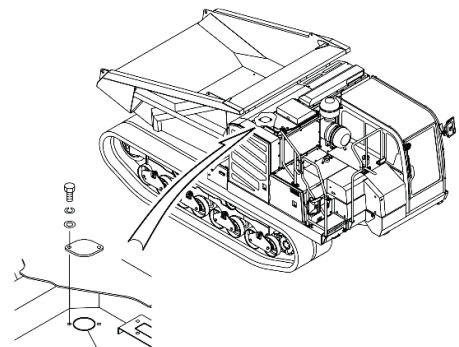
I0988596-067-0

- (3) If water adheres to the bearing part of the swing bearing, grease the bearing part of the swing bearing until old grease protrudes to the outer periphery of the bearing part.



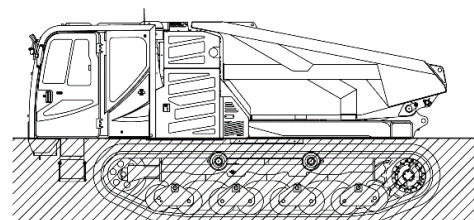
I0988596-068-0

- (4) Check the internal tooth of the swing bearing from the inspection window, and replace the whole amount by a new grease if water adheres to it.



I0988596-069-0E

- (5) When the swing bearing is immersed in water completely, replace the whole amount by a new grease.



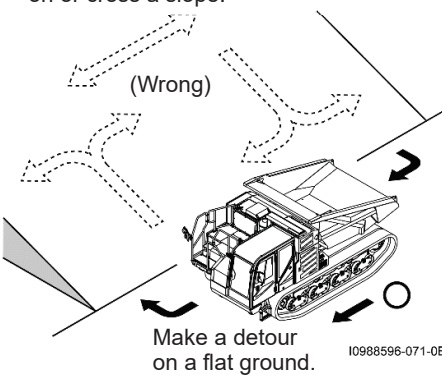
I0988596-070-0

4-11 Caution of travel on a steep slope (T0988585-030-0E)


DANGER

- Do not travel on slopes over 15° in order to avoid turnover.
- On steep slopes over 9°, travel the machine at low travel speed.
- Never change the travel direction on steep slopes or cross such slopes. Such operation may cause turnover or slip. Move down to a flat ground once and make a detour. Be sure to drive safely.

Never change the travel direction on or cross a slope.



(Wrong)

Make a detour on a flat ground.

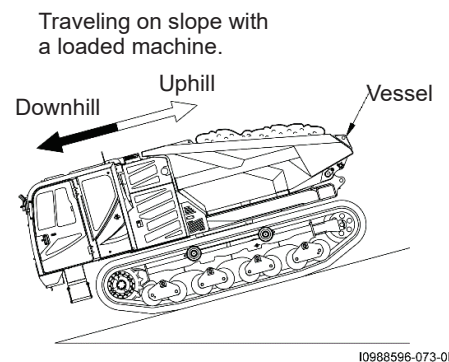
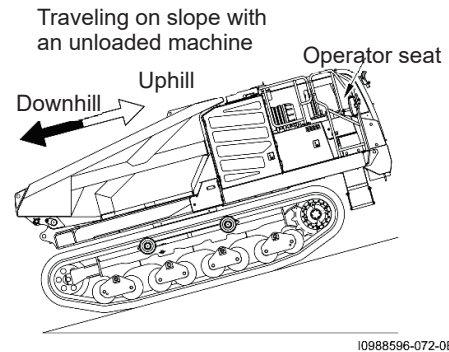
I0988596-071-0E

(T0988585-110-0E)

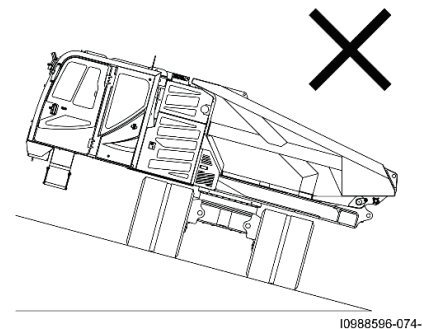
(1) Cautions

Travel in the proper postures shown below.

- Drive the machine with the cabin upper side of a slope when the vessel is empty. This posture ensures stable driving, since the center of gravity is located on the cabin side.
- Drive the machine with the vessel upper side of a slope when the vessel is full. This posture ensures stable driving, since the center of gravity is located on the vessel side.
- When driving over an obstacle, reduce the speed and drive safely with care not to turn over.
- Do not accelerate or decelerate the speed or stop suddenly.



- Do not swing the upper structure on a slope. Otherwise, the machine could tip over.

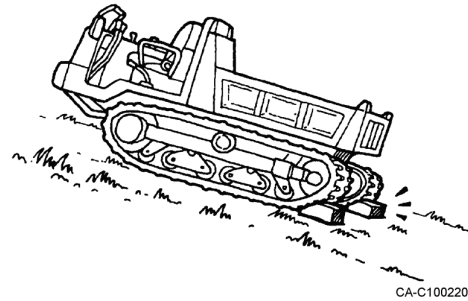


4. Explanation of operation

- (2) Do not park or stop the machine on a slope.

There is a danger of the machine running uncontrollably if stopped or parked on a slope.

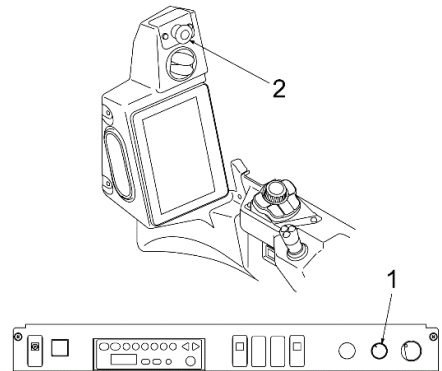
When it is unavoidable to stop or park the machine on a slope, place stopper blocks under both crawlers at the lower end of the machine.



Overrun avoidance operation

Carry out the following operations immediately to reduce the speed:

- 1) Return the joystick lever to the neutral position.
- 2) Reduce the engine speed control dial (1) down to the low speed.



WARNING

The cause of overrun is over-loading. Never over-load the machine.

(T0988566-209-0E)

Emergency engine stop switch

The engine can be stopped forcibly by pressing the emergency engine stop switch (2).

WARNING

- When the emergency engine stop switch is pressed while traveling, the machine stops immediately as the travel driving unit is locked.
When using the emergency engine stop switch, be prepared for shock to your body.
- Avoid using the emergency engine stop switch while traveling at high speed.
Otherwise, it will not only cause the machine to turn over and/or malfunction, but also become dangerous to the operator.
- If the emergency stop switch is pressed when the upper structure is swinging, the swing brake is applied and the rotation of the upper structure urgently stops.
In this case, the inertial forces of the machine and vessel could cause the machine to tip over or malfunction, which may also impair the safety of the surrounding area.

(T0988596-032-0E)

4-12 Precaution on use of rubber crawler shoe (T0988566-039-1E)



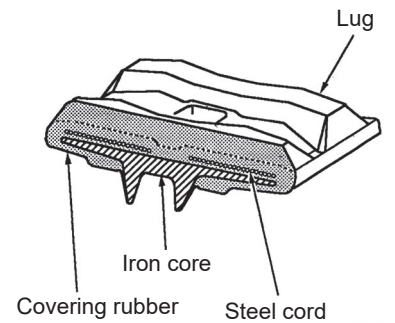
CAUTION

The rubber crawler shoe may be damaged or worn faster depending on working conditions. Perform working operation properly according to working site conditions and machine operation. Be sure to observe the prohibitions and instructions shown below.

(T0988566-092-0E)

4-12-1 Structure of rubber crawler shoe (T0988566-040-0E)

As shown in the right figure, the rubber crawler shoe consists of steel cord to sustain tension, iron core to support it, and covering rubber to cover them.



NOTICE

If a crack reaches the steel cord, it may be rusted and cut off by moisture.

(T0988566-093-0E)

4-12-2 Prohibitions while working and traveling (T0988596-033-0E)

- (1) Do not travel or work on stone foundations or sharp rocks

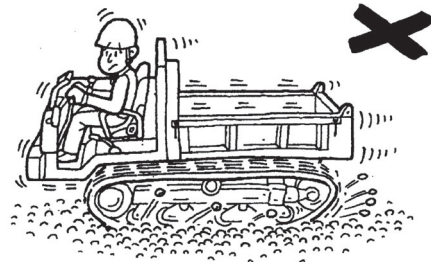
This wears down the lug and causes the steel cord to break.



CA-C300450

- (2) Do not travel or work on surfaces with many stones such as river beds

This causes damage or wear on the rubber crawler and they may slip off.



CA-C300460

4. Explanation of operation

(3) Do not travel or work on steel or scrap material

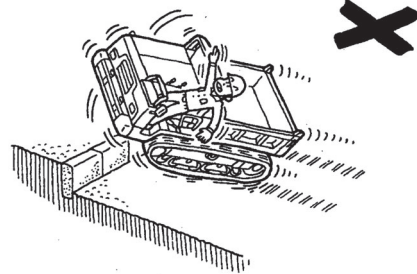
This wears down the lug and causes the steel cord to break.



CA-C300470

(4) Do not travel or work on large steps such as stone stairs

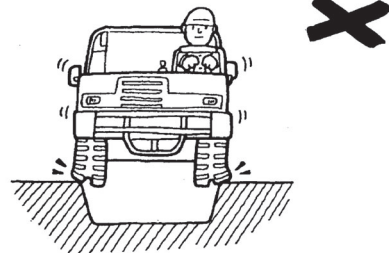
- Move slowly directly up steps.
- While moving up the steps, avoid places where the road surface changes.



CA-C300480

(5) Do not travel or work while spanning a ditch etc.

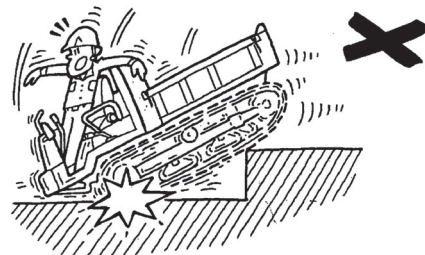
- This wears down the lug and breaks the iron core and lower roller.
- The carrier might fall or topple over.



CA-C300490

(6) Avoid locations where the carrier might fall

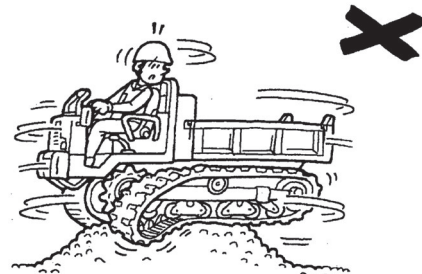
Do not let the carrier fall from locations like large stone steps.
This might damage or break the iron core.



CA-C300500

(7) Avoid traveling over large ruts or protrusions on the road

- Travel slowly and take care not to let the crawlers come off the rollers.
- Do not change directions when the crawlers may have lost tension at the high and low parts of ruts and protrusions. This may cause the crawlers to come off.



CA-C300510

(8) Avoid sudden changes in direction when steering

- Make direction changes in several smaller steering movements.
- Avoid sudden changes in direction.

This causes early wear on the lug and may cause the crawlers to slip off.

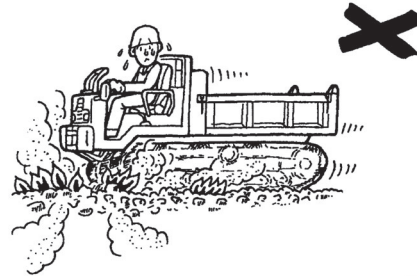


CA-C300520

(9) Do not travel over high heat locations

Do not try to travel over place subjected to high heat such as steel plate that was placed in bonfires or under scorching heat, asphalt or floorboards etc.

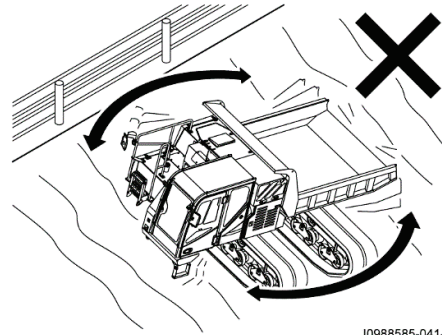
This causes serious abrasion or damage and breakage of the lug.



CA-C300530

(10) Do not swing the upper structure on a slope

Do not swing the upper structure on a slope. Otherwise, the machine could tip over.

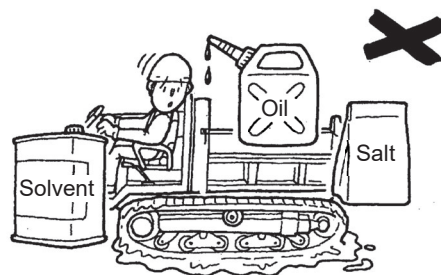


I0988585-041-0

4-12-3 Other items for caution (T0988596-034-0E)

(1) Do not let oil – solvents or salt adhere to the rubber crawlers

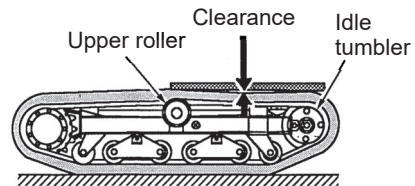
- If fuel, hydraulic oil, DEF or paint should adhere to the rubber crawlers wipe it away quickly.
- Wash away with water after working in locations with a large salt content. Salt can cause the iron core to rust or peel.



CA-C300540

(2) Always use correct tension on the shoe

Attempting to change directions on terrain with different levels or steps while the rubber crawler is still slack may damage the rubber crawlers or cause them to come off the rollers.



CA-C300550

5. Operation_(01E0-0155-0E)

5-1 Before starting operation_(T0988566-040-1E)

The operator of the machine must carry out these inspections before starting the engine at the beginning of daily works.

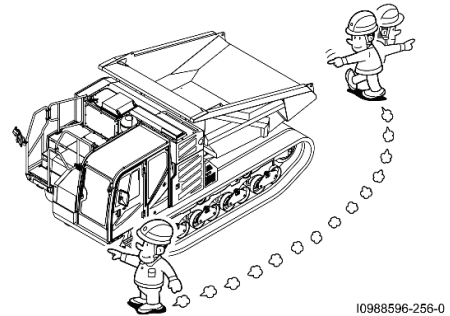
Be sure to carry out them to prevent accidents in advance.

(1) Walk-around inspection

Look around and under the machine and check the items shown below.

Repair defective parts before starting operation.

- Check oil leak from the hydraulic devices, hydraulic oil tank, hose, joints, etc.
 - Check damages of the fuel line and hose.
 - Check damages, cracks, wear, backlash and loose bolts of the shoes, idle tumblers and sprockets.
 - Check oil leak and water leak from the engine.
 - Remove dust and foreign matters from the engine, radiator and peripheral parts.
 - Check for leaks from and damages to the intake and exhaust pipes around the air cleaner and the after-treatment device.
- If flammable objects touch the exhaust pipe or the like, a fire may break out. Make sure that there is no withered grass, paper trash or other flammable objects near the exhaust pipe.
- Check loose terminals of the electrical cables.



I0988596-256-0

(2) Start-up inspection

Refer to [MAINTENANCE] for details.

- Check the coolant level. Refill if necessary.
- Check the engine oil level. Refill if necessary.
- Check the fuel level. Refill if necessary.
- Check the hydraulic oil level. Refill if necessary.
- Check the DEF level. Refill if necessary.

For details of operation, refer to the sections 4-1 to 4-8 of "4. Explanation of operation".

6. Handling under special conditions (01E0-0247-0E)

6-1 Handling in cold conditions (01E0-0248-0E)

6-1-1 Preparations for low temperatures (T0988596-035-0E)

When the outside air temperature in winter drops to 0°C or below, the ability of the engine to start and the performance of lubrication in all parts deteriorates and falling air temperatures bring a variety of other ill effects, so adequate advance preparation is necessary.

Refer to the sections below and make adequate preparations for winter.

(1) Fuel

Use a diesel fuel with a fluidity point 5°C lower than the outside temperature. For example, if the outside air temperature falls to -15°C, use diesel fuel which remains fluid at -20°C.



WARNING

Using a non-specified fuel can not only adversely affect performance, but could also cause a serious accident. Such problems are not subject to guarantee.

(01E0-0251-1E)

(2) Engine oil

Use the engine oil recommended by KATO. Using an oil other than the type recommended by KATO could cause engine malfunction/failure.

Engine oil softens (lower viscosity) at higher temperatures and becomes thicker (higher viscosity) at lower temperatures. Therefore, use an oil with a viscosity appropriate for the given air temperature conditions. Contact your authorised KATO dealer before operating the engine at the outside air temperature below -20°C.

Grade	Temp. & application (°C)								Qty required
	-30	-20	-10	0	10	20	30	40	
API CJ-4, CK-4									Hi: 16.1 L Lo: 14.1 L

* Factory default: 15W-40

(T0988596-036-0E)

NOTE

- Use engine oil classified to or API classification CJ-4 or CK-4 only.
- Use the appropriate engine oil according to the ambient temperature.

(3) Lubricant

Replace the lubricant used in respective equipment with low viscosity lubricant.

Refer to "3-2 Recommended lubrication table" in the inspection and servicing section regarding specified viscosities.

6. Handling under special conditions

(4) Battery

Normally battery electrolyte does not freeze in cold weather, but if the battery charge is low, some freezing is possible.

A battery which has frozen is permanently unusable, so take precautions to maintain the battery temperature.

6-1-2 Checking the coolant level and replenishing the coolant (T0988566-060-1E)



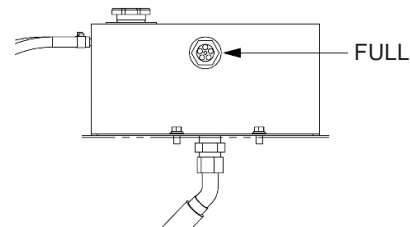
CAUTION

Do not open the pressure cap normally. Check coolant in the coolant tank when the engine is cool.

(T0988596-038-0E)

- (1) Open the engine hood and check whether the coolant level in the coolant tank is at the FULL level. If it is insufficient, replenish the coolant to the FULL level.

- (2) When the coolant tank is empty, stop the engine, check for coolant leaks, then check the radiator coolant level and replenish the coolant in both the radiator and the coolant tank.



1098857500-007-0E

6-1-3 Changing the coolant (T0988596-150-0E)



WARNING

- Immediately after the engine stops, coolant is hot. If coolant is discharged in this state, you may get burnt. Change coolant after the engine cools down.
- Do not remove the pressure cap when the radiator coolant is hot. After the coolant temperature lowers, rotate the cap slowly to relieve the pressure, and remove it.

(T0988596-39-0E)

(1) Coolant

- A new machine is filled with coolant containing long life coolant (LLC). This coolant has anti-freezing effect and corrosion resistant effect.

The long life coolant has long-term effects and may be used in all seasons.

- Replace coolant annually (every autumn).
- Be sure to use long life coolant when replacing coolant.



WARNING

- The long life coolant is toxic.
- If someone shallows it by mistake, make him/her vomit it immediately and consult a doctor.
- If long life coolant gets into eyes, immediately rinse with water sufficiently and consult a doctor.
- When storing long life coolant, use a container with an antifreeze solution label, cap the container and keep it out of the reach of children.

(T0988566-109-0E)

(2) Coolant mixing ratio

The freezing temperature of long life coolant depends on mixing ratio with water.

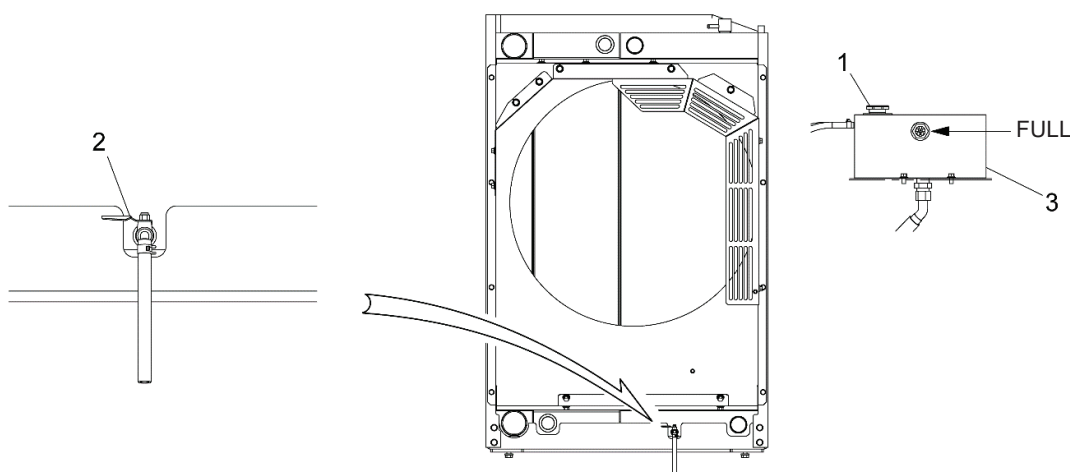
This machine is filled with 50% long life coolant at the time of shipment in order to protect the cooling system from rust regardless of the outside air temperature.

The mixing ratio of long life coolant should be 50% in all areas throughout the year.

Use pre-mixed 50/50 coolant or a mixture of coolant and distilled water.

Lowest outside air temperature (°C)		-35
Mixing ratio (%)		50
Mixing volume (L)	LLC volume (L)	19.3
	Water volume (L)	19.3
Coolant 38.6 L in total		Engine: 9.5 L Radiator hose: 15.4 L Coolant tank: 13.7 L

(3) Coolant change procedure



I0988596-076-0E

- 1) Stop the engine.
- 2) After the engine has cooled down, remove the pressure cap (1).
- 3) Open the drain cock (2) at the bottom of the radiator to drain the coolant.
- 4) Close the drain cock. Pour distilled water and cooling agent (radiator cleaner). Start the engine and keep it running at a speed slightly higher than the low idling speed for about 10 minutes.
- 5) Stop the engine. Open the drain cock to drain the content.
- 6) Rinse the inside of the coolant tank (3) with distilled water until the water coming out becomes clean.
- 7) Close the drain cock. Pour mixture of distilled water and long life coolant into the coolant tank until its level reaches just below the filling port.
- 8) Start the engine and keep it running at the low idling speed for 5 minutes. Then stop the engine.
This allows internal air to be released and the coolant level lowers. Pour coolant until its level reaches the FULL level.

6. Handling under special conditions

6-1-4 Precautions after operation (T0988596-040-0E)

- (1) Remove mud and water from the body and park the machine on concrete or hard dry ground. This is to avoid trouble the following day from the travel system such as the crawler shoes etc. freezing to the ground.
- (2) Thoroughly wipe away drops of water or mud from the piston rod surfaces of the hydraulic cylinders. Frozen water drops can damage the seals.
- (3) Open the drain cock of the fuel tank and drain plug of the water separator to drain out accumulated water from them. Water in fuel pipes can freeze and create blockages.
- (4) If use of tap water as the radiator coolant is unavoidable, drain completely the coolant from the engine and the radiator after the work. In such a case, attach a tag indicating "No coolant" in order to prevent a trouble in the next day.
- (5) Moisture at the key entry of the tool box etc. may freeze at night and make it impossible to turn the key. Wipe off the moisture well.
- (6) Do not leave any materials that may freeze or become stuck inside the vessel.
If such materials are left inside, the center of gravity may shift, making the machine unstable and increasing the risk of an accident.
For this reason, avoid using the machine in environments where freezing or sticking of the materials inside the vessel may occur.

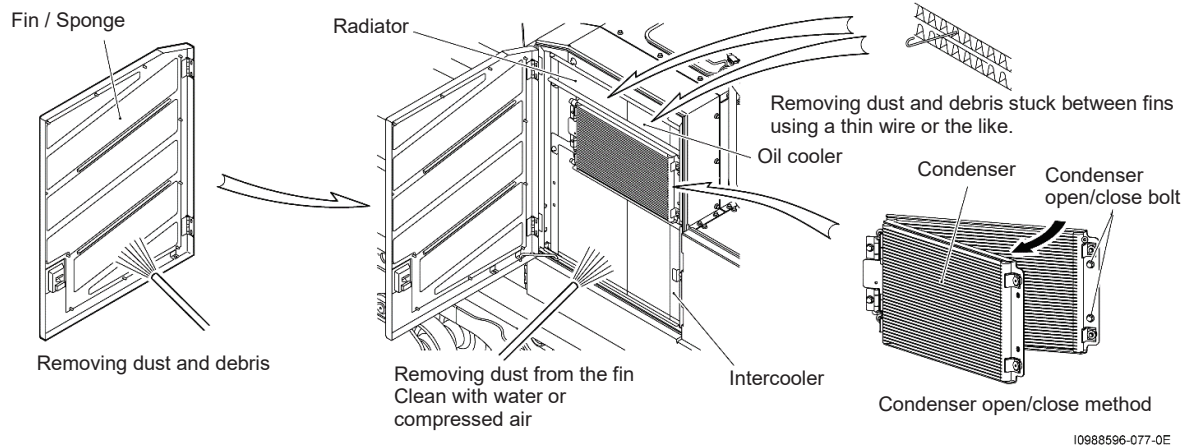
6-2 Handling under extreme heat (T0988548-093-1E)

When using this machine under extreme heat, inspect and monitor the cooling system with great care to avoid any reduction of cooling efficiency.

(1) Always keep the coolant up to the rated level and check that the cooling system is not leaking.

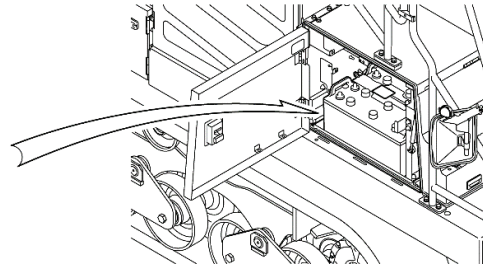
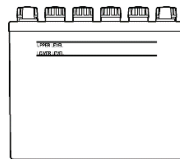
(2) Check for blockages in the cooling fins of the oil cooler and the radiator.

1) Check that nothing is clogging the cooling fins of the radiator and the intercooler.



(3) Check the battery electrolyte level before you start the engine.

If the level is low, add it and measure the specific gravity. (Refer to P. 155.)



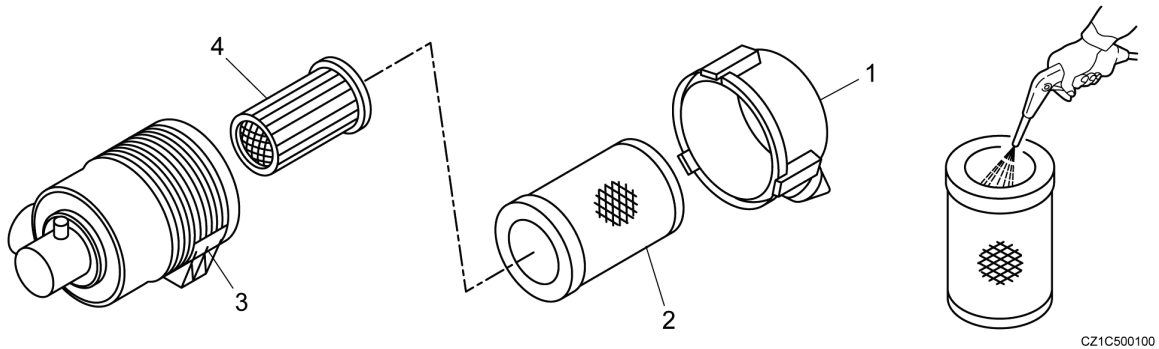
I0988596-078-0E

(4) Watch the water temperature gauge while you work. If the coolant temperature warning indicator turns on, stop the work and inspect the cooling system.

6. Handling under special conditions

6-3 Handling under a dusty or sandy environment (T217451-022-0E)

(1) Inspect and clean air cleaner element



- 1) Stop the engine.
- 2) Remove the cover (1), and take out the outer element (2).
Do not remove the inner element (4).
- 3) Clean the inside of the cover and the body (3).
- 4) From the inside of the element, directly blow dry compressed air (0.2 MPa (2 kgf/cm²)) above and below along the crimp of the filter. Maintain an appropriate spacing (50 mm or more) between the tip of the nozzle and the filter.
- 5) Emit light (white light) from the inside of the element and inspect for damage to the filter.
Do not use the filter if the filter is damaged, or has pin holes, or has particularly thin portions, or if the seal portion is damaged.
- 6) After the cleaning is completed, affix the element again.
- 7) Attach with the arrow mark (↑) is towards the up direction, and fix with a fixing metal catch.

NOTICE

- Replace the element with a new one, regardless of the replacement interval, if it is dirty with lamp soot, soot or oil.
- Do not pat, hit or drop the element.

(T0988548-091-0E)

(2) Replace air cleaner element

Disassemble the air cleaner in the same manner as inspection and cleaning procedures and replace the element with a new one.



CAUTION

- Be sure to stop the engine when carrying out maintenance of the air cleaner.
If it is carried out while the engine is running, dust is sucked and the engine may be damaged.
- Put on protective goggles when cleaning the element using compressed air. Otherwise, dust may be put in your eyes, which is dangerous.

(T0988548-092-0E)

6-4 Handling near the seashore (08E0-0041-0E)

(1) Preparations for operation

Check that all plugs, cocks, caps and bolts etc. are correctly tightened so that salt cannot enter.

(2) Treatment after operation

After work, wash the machine carefully to remove salt, paying particular attention to the care of electrical devices and hydraulic cylinders, to prevent corrosion. Also grease with care.

6-5 Handling in mud, rain, snow, zones of high humidity, on soft ground (01E0-0257-1E)

Humidity and mud attack paint, wiring and metal parts causing corrosion. When working under site conditions such as these, keep the machine as dry as possible and grease it thoroughly and carefully.

6-6 Handling in rocky ground (T0988548-094-1E)

(1) Be alert for cracks, wear, breakage and loose bolts in the travel system such as the crawler shoes etc. Adjust the crawler shoes to be slacker than usual.

(2) Since the rubber shoes are likely to be damaged, use them with care.

6-7 ICE HAZARD (T0988585-128-0E)

Snow and ice can be slippery for rubber tracks. Be careful on these surfaces and avoid lateral slopes as much as possible.

WARNING

Drowning hazard

The vehicle is very heavy. It could break the ice on a frozen body of water and sink. Never drive on frozen bodies of water.

(T0988585-129-0E)

Keep a safe distance with frozen bodies of water.

WARNING

Accident hazard

Rubber tracks may provide low grip on a smooth slippery surface such as an icy patch, a metal sloped ramp, etc. Drive with care on such surfaces.

(T0988585-130-0E)

7. Long-term storage (T0988596-042-0E)

(1) Before storage

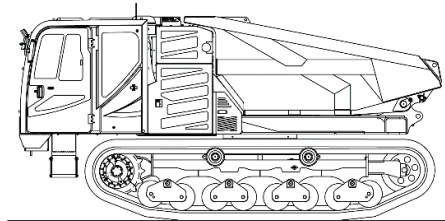
NOTICE

Move the vessel down to the lowest position before storing the machine as shown in the figure below in order to protect the cylinder rod from rust.

(T0988596-043-0E)

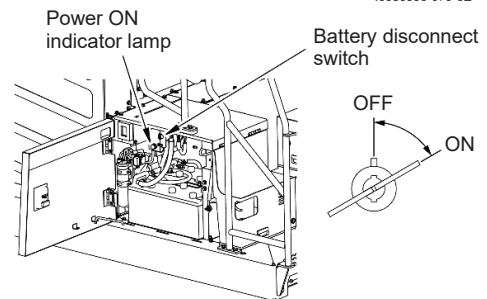
To store the machine for long periods of time, follow the next procedures.

- 1) Clean parts of the machine.
- 2) Lubricate parts of the machine.
- 3) Select a well-drained, dry and well-ventilated flat place, and put plates on the ground.
- 4) Make sure that the power ON indicator lamp is off and then turn the battery disconnect switch to the OFF position. As necessary, disconnect the battery negative terminal connection and put a cover on the battery, or dismount the battery from the machine and store it separately.



Posture for long-term storage

I0988596-079-0E



I0988596-245-0E

DEF storage

1) Precautions for DEF storage

A DEF container should always be stored below 30°C.

At 40°C, DEF life is 4 months, and a rise in temperature will greatly reduce the life. DEF should be stored in a sealed container and in a well-ventilated place out of direct sunlight.

Since DEF crystallizes at -11°C, the liquid temperature in the container should be kept above -10°C.

When storing for an extended period, drain the DEF.

(2) During storage



CAUTION

If you have to operate the machine indoors, keep good ventilation by opening windows or entrances to prevent gas poisoning.

(T0988566-111-0E)

- 1) During storage, operate the machine once a month to maintain oil films at the lubrication sections and charge the battery as well.
- 2) Before starting the engine, be sure to crank the engine with the starter and check that the engine oil pressure warning lamp goes out on the Error display screen of the display.
- 3) After starting the engine, keep it running at the idling speed for about 5 minutes.

(3) After storage

Before using the machine after long-term storage, lubricate or grease every necessary parts, check the coolant and DEF levels, and replenish them if necessary.

8. Towing (T0988596-044-0E)

WARNING

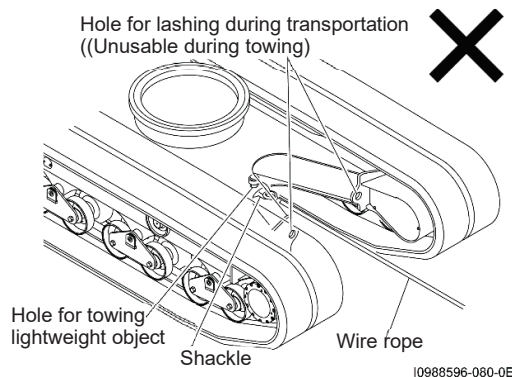
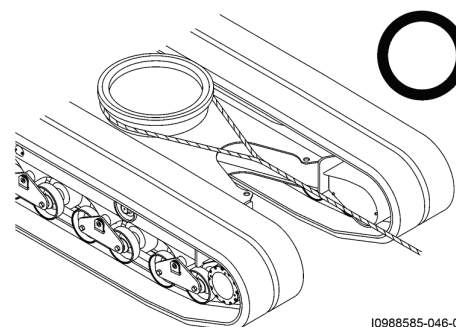
- Use wire ropes and shackles for towing that are strong enough for the towing weight.
- It is very dangerous if the wire rope is disentangled during towing. Do not stand between the towing machine and the towed machine.
- The lower traveling body is provided with the hole through which the shackle for towing a lightweight object is passed.
Do not tow the machine using this hole for towing a lightweight object. Otherwise, the towing hole could be damaged.

(T0988566-112-0E)

(1) Towing the carrier

When the carrier gets stuck such as in mud and cannot escape under its own power, it must be towed by another machine. In such cases, attach a wire rope as shown in the right and tow the carrier by another machine.

- 1) Start the engine.
- 2) Select the low speed mode with the Travel speed mode switch.
- 3) Set the travel parking switch to the brake OFF position.
- 4) Confirm the travel operation direction. Move the joystick lever in the travel direction slowly when towing starts.



NOTICE

When the engine is broken and will not start, the parking brake will not release. The parking brake will prevent the crawler shoe from rotating so the carrier cannot be towed.

(T0988566-113-0E)

9. Transport (T0988566-114-0E)

Observe the loading and unloading methods and the anchoring method for transportation as well as the laws and regulations concerned when transporting the machine.

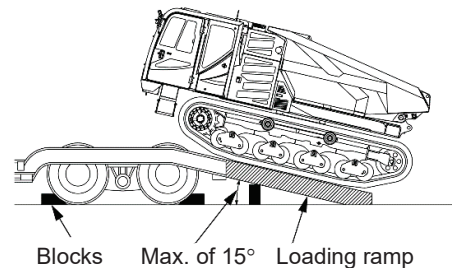
9-1 Loading and unloading the machine (T0988566-115-1E)

WARNING

- Move the machine forward when loading. Move it back when unloading.
- Be sure to select Low speed travel with the Travel speed mode switch to reduce the engine speed before loading or unloading.
- Be sure to use loading ramps or loading tables for loading or unloading.
- Use loading ramps of adequate width, length and thickness that allow safe loading and unloading.
- Carry out loading or unloading on a flat and solid ground.
- Remove dirt and soil from the crawlers to prevent slippage. Remove grease, oil, water and other adherent matters from the loading ramps.
- Never make a turn on the loading ramps to avoid turnover. To make a turn, return to the load carrying platform or road.
- Warm up the machine sufficiently before load or unload it in cold weather.
- Carry out loading when the upper structure is at the front or swung 180 degrees from the front.
- When swinging the upper structure on the trailer, be fully careful not to allow the machine to tip over.
- Retract the right and left side mirrors to the inside, and make sure that they fit in the trailer width.

(T0988596-045-0E)

- (1) Apply the trailer brake firmly. Fix the trailer wheels with blocks to prevent them from moving.
- (2) Adjust the center line of the machine to the center line of the trailer. Adjust the loading ramp interval to the crawler width.
- (3) Maintain the slope of loading ramps within 15°.
- (4) Drive the machine slowly at low speed.
- (5) Maintain the machine balance point while traveling over the loading ramp joint areas.
- (6) Load the machine properly at the specified position on the trailer.



10988596-257-0E

9-2 Fixation at transport (T0988585-115-0E)



CAUTION

It is very dangerous if the machine moves during transportation.

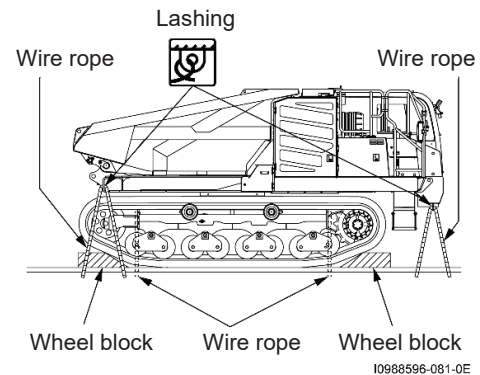
Fix it firmly on the load carrying platform of the trailer with wheel blocks and wire ropes.

Set the tension of the fixing part of the upper structure to 13 kN or less and set the tension of the fixing part of the lower traveling body to 26 kN or less.

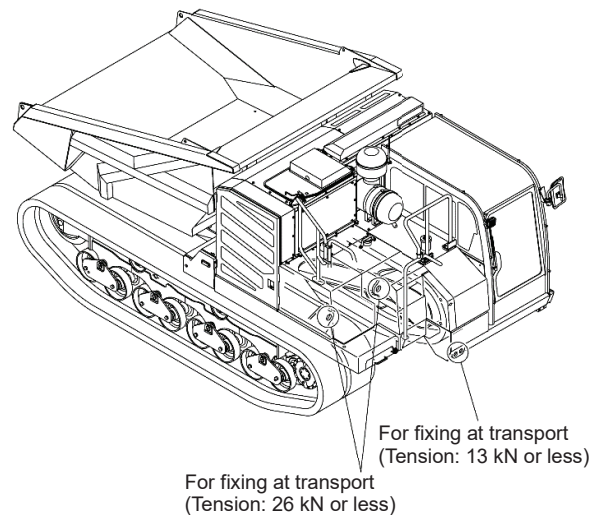
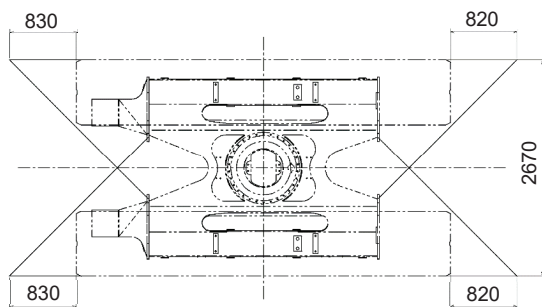
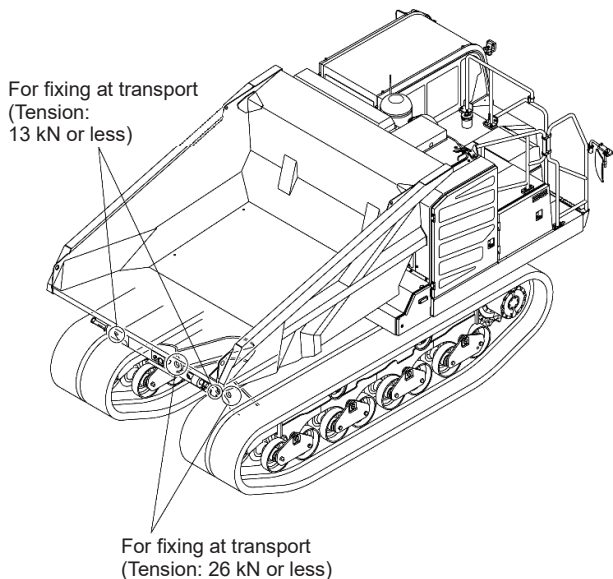
(T0988596-046-0E)

Apply wheel blocks in front of and behind the rubber crawlers to fix the machine.

Finally, make sure that the machine is loaded properly and fixed completely.



At transport, use the following suspension rings. Allow the upper structure to face forward. Also, fold the mirrors.



10988596-082-0E

10. Handlings (T0988566-220-0E)

10-1 DPF handling (T0988596-047-0E)

⚠ WARNING

- Perform adequate ventilation, when performing the DPF regenerating under poor ventilation such as in a building.
- Take away flammable waste, etc., from around the DPF before performing the DPF regenerating.
- The DPF is hot during a regenerating operation and immediately after that. Do not touch it to avoid possible burns.

The DPF system collects soot (particulate matter) in exhaust gas on a filter in the muffler. When the soot collects more than a level, an automatic regenerating (removal by combustion) is performed (DPF automatic regenerating) during the machine is operating.

The automatic regenerating may not be completed when the rotation speed of the engine is low such as in a light-load work.

In such a case, it is necessary to stop the machine and perform the regenerating manually (DPF manual regenerating).

The DPF warning indicator (1) on the display blinks when the manual regenerating is necessary.

Stop the machine at a safe place and perform a manual regenerating, if the DPF warning indicator is blinking.



(1) When the DPF warning indicator is displayed

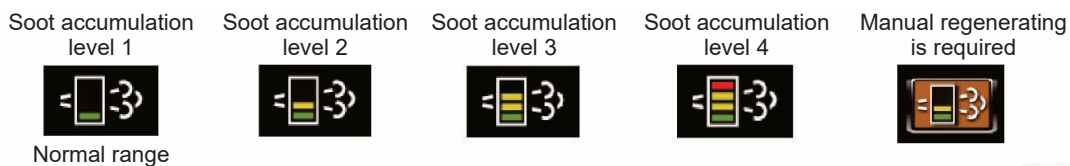
Perform the manual regenerating at your earliest convenience.

In the cases of the soot accumulation levels 2 and 3, regeneration is not completed via automatic regenerating, and manual regenerating is required.

When regeneration is required, the icon is highlighted with an amber background and border and the background lights up.

While the background is flashing, pressing and holding the icon activates the DPF regeneration function.

If the soot accumulation level 4 is reached and the regeneration range is exceeded, the engine stop indicator comes on, manual regenerating becomes impossible, and engine power reduction or automatic engine shutdown occurs.



(2) When the DPF warning indicator lights up and the engine system warning is indicated in the error display screen

Stop your work and immediately perform the manual regenerating. If you still continue your work in this state, manual regeneration becomes impossible to perform.

If the DPF regenerating indication (2) does not appear even when the manual regeneration is performed according to the next page, contact KATO sales and service dealer.

When the engine stop indication appears on the error display screen

The manual regenerating cannot be performed. Or you have some engine trouble not related to the DPF.

The engine stops.

The engine becomes impossible to be restarted.

Contact our sales and service shop.



10-2 DPF manual regenerating (T0988596-048-0E)

⚠ WARNING

- Perform adequate ventilation, when performing the DPF regenerating under poor ventilation such as in a building.
- Take away flammable waste, etc., from around the DPF before performing the DPF regenerating.
- The DPF is hot during a regenerating operation and immediately after that. Do not touch it to avoid possible burns.

(T0988566-184-0E)

Perform the DPF manual regenerating when the DPF warning indicator on the display lights up.

(1) Stopping the machine

Stop the machine at a safe place. Make sure no flammable material exists around the muffler, as the exhaust gas becomes hot during the regenerating.

(2) When the water temperature is low, perform the warming up operation till the water temperature gauge points around the middle position.

(3) Run the engine in the idling mode.

(4) Set the control lock lever to the lock position.

(5) Tap the DPF regeneration indicator (1) on the display or press the DPF regeneration button (2) on the jog dial.

(6) DPF regenerating starts and the DPF regenerating indication appears.

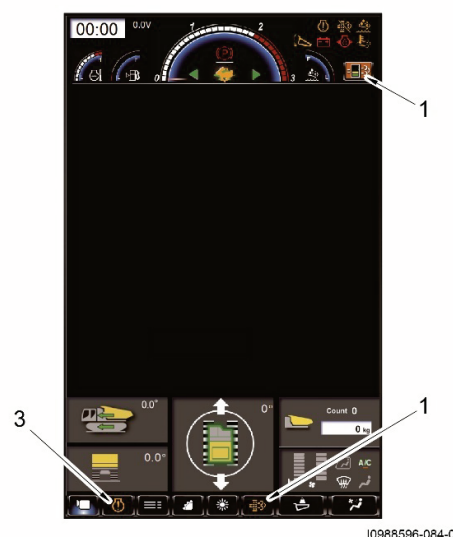
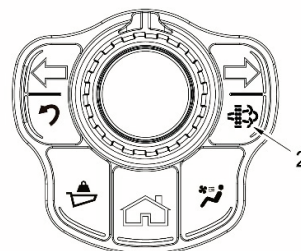
The period of the manual regenerating is 30 to 40 minutes, becoming longer or shorter depending on the temperature of the manual regenerating and the accumulated amount of soot. The DPF warning indicator turns off when the manual regenerating is completed.

(7) Do not stop the engine immediately after manual regenerating is completed. Keep the engine running at the idling speed for 10 minutes.

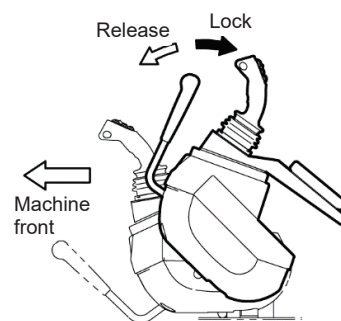
• Stopping the manual regenerating halfway

(1) The manual regenerating will stop when the engine is stopped, the icon (3) on the error display screen is tapped to enter the error display screen and the DPF regeneration disable icon (4) is operated, or the lever lock is released and the lever is operated.

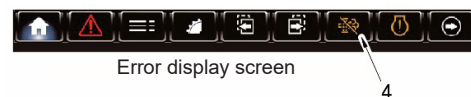
(2) The regenerating is not completed when the regenerating is stopped halfway. The DPF regeneration indicator (1) will light up. Perform the manual regenerating again.



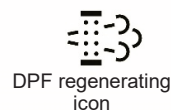
10988596-084-0



10988566-192-0E



Error display screen



DPF regenerating icon



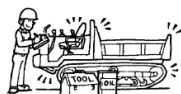
DPF regeneration disable icon

10988596-267-0E

10. Handlings

10-3 Starting with booster cables (T0988566-118-1E)

For details of starting with jumper cables, refer to "4-4-2 How to start the engine using the booster cables" in Inspection and servicing part.



I0988566-008-0

Inspection and servicing

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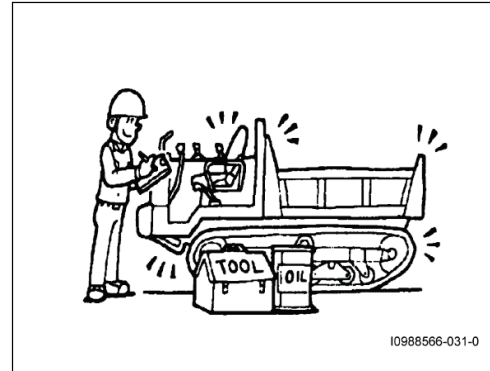
1. Precautions on inspection and servicing (T0988596-050-0E)

Inspection and servicing are as important as lubrication as they have a great influence on the lifespan of the machine and are highly significant in maintaining safety. Inspect and service the machine regularly to keep yourself aware of its condition and preserve its safety and economic performance.

Refer to the inspection and servicing points and methods described below and observe them correctly.

(1) Regular independent inspection

Draw up an inspection and servicing schedule and implement it.



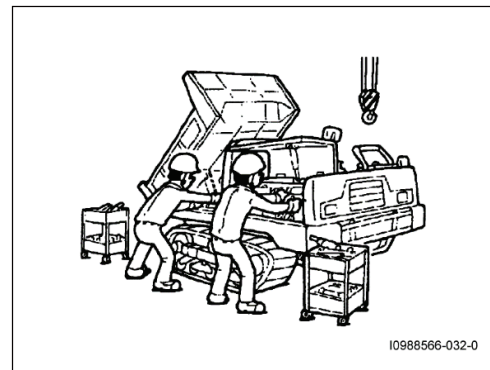
(2) Keeping independent inspection records

The regular independent inspection must be carried out, the results recorded and preserved.



(3) Repair of broken or malfunctioning parts

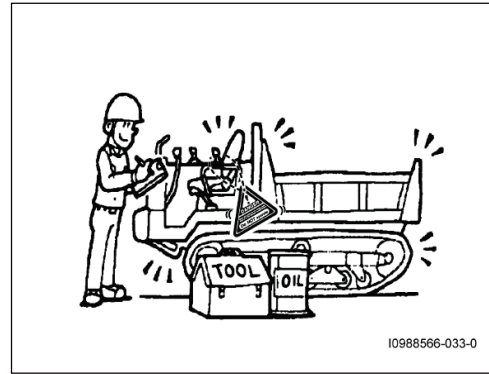
- If you discover a breakdown or malfunction during an independent inspection or preoperational check, it must be repaired immediately.
- Operation with such problems unrepaired is highly dangerous. Never start work before all repairs are complete.



1. Precautions on inspection and servicing

(4) Park the machine on level ground for inspection and servicing

- Choose a work site which is firm, level and free of hazards.
- Always lower the vessel to rest on the ground.
- Stop the engine and remove the key.
- Put the warning tag.
- Place chocks to immobilize the crawler shoes.

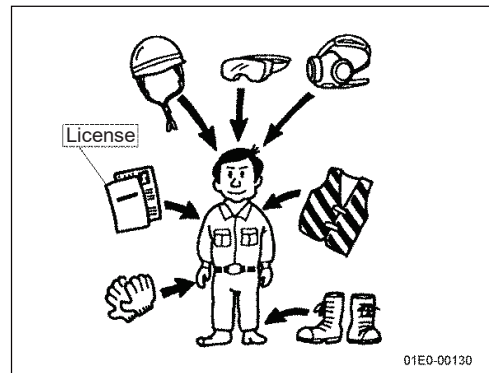


(5) Each piece of equipment is rigorously tested and tuned before shipping. Tuning outside your authorised KATO dealer is forbidden.



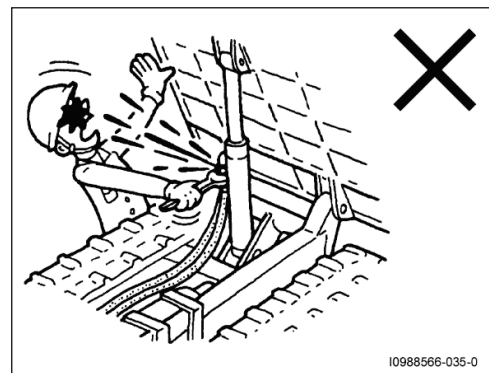
(6) Wear protective clothing and equipment

- Wear a hard hat, protective goggles, safety boots, gloves etc. when inspecting and servicing the machine.
- Metal splinters can fly off when you are using a hammer or grinder, so always wear proper protective clothing and equipment when using these tools.



(7) Relieve hydraulic pressure

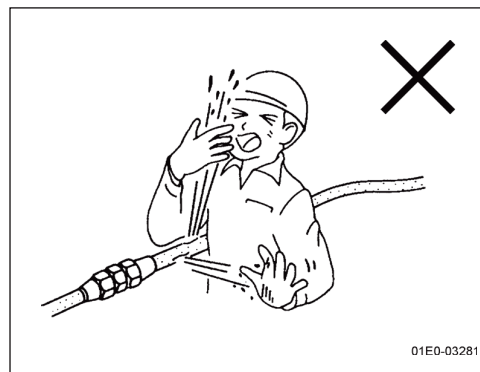
It is dangerous to replace or repair hydraulic hoses, joints and equipment without relieving pressure first.



1. Precautions on inspection and servicing

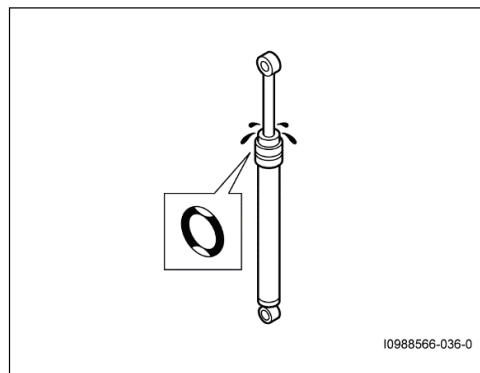
(8) Beware of highly pressurized oil

- Hydraulic oil or reduction gear oil at high pressure can cause serious skin and eye injuries.
Before cutting or opening a hydraulic pipe, always relieve the pressure inside it.
- Oil leakage may not be visible to the eye, so check with thick paper or wood-shavings. Do not detect oil leakage by naked hand or finger.
- Wear protective goggles to protect your eyes.
- If oil penetrates your skin, consult a doctor well experienced immediately.



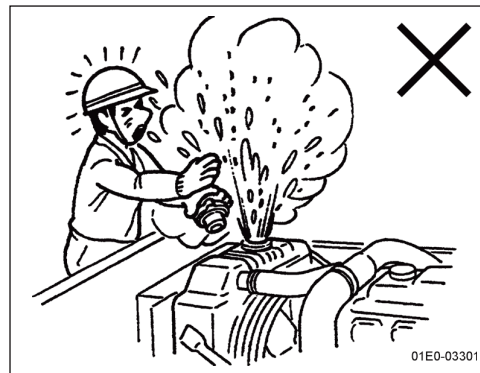
(9) Precautions on replacing seals etc.

- After you remove an O-ring or other seal, wash the surfaces on which it was fitted before you fit the replacement.
- Before you fit an O-ring or other seal, check that it is undamaged and cover it with a film of oil. If you find a defective seal of any kind, do not use it because it could cause oil leakage.



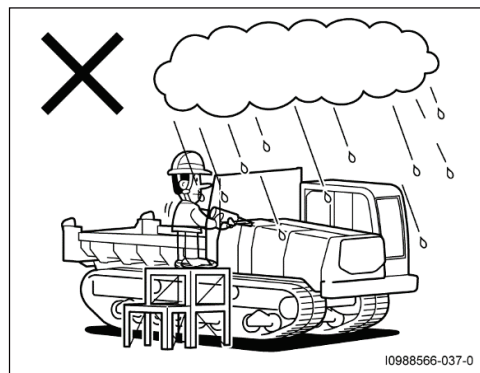
(10) Be careful when you open the pressure cap

- When the radiator coolant is hot, it could spray out dangerously when you take the pressure cap off, possibly causing burns.
- If you have to take the pressure cap off, wait until the coolant has had time to cool and slowly loosen the cap to allow pressure to dissipate before you remove it. Check the coolant level and replenish the coolant from the coolant tank.



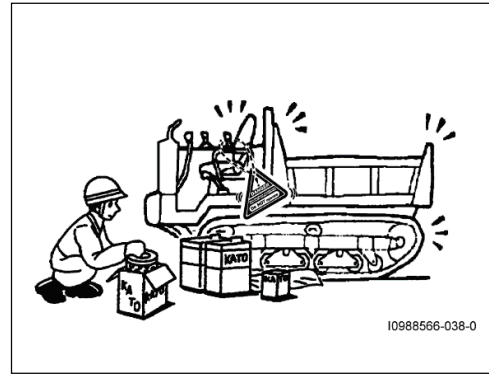
(11) Do not allow water to enter when you top up with oil

When you replenish fuel or DEF/AdBlue® or replenish or replace hydraulic oil or coolant, take care to avoid the entry of water or dust. If water gets in, it will cause corrosion and breakdowns.



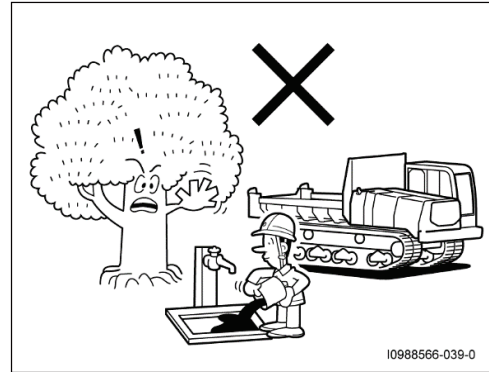
(12) Use genuine KATO or KATO-approved lubricants and filters

- When you add or replace lubricants or replace parts such as filters etc., always use genuine KATO or KATO-approved products.
- If you use any products which are not made or approved by KATO, we will not be in any way liable for resultant accidents or breakdowns.



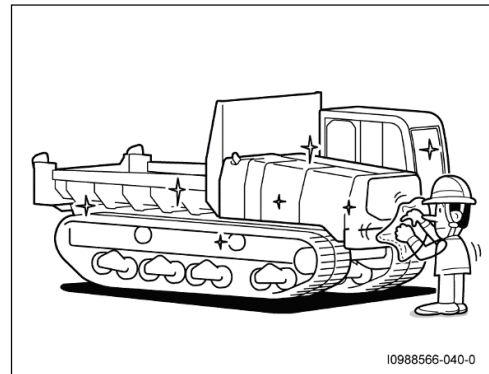
(13) Dispose of waste oil carefully

- If you dispose of waste oil, used filters and other waste products of the machine carelessly, you will cause environmental pollution.
- When you drain waste oil from the hydraulic equipment or oil reservoir, catch it in a proper container. Waste oil is environmentally harmful. Dispose of it thoughtfully.
- Never allow it to pour onto the ground or dump it in streams, rivers or wetlands.
- Follow the relevant regulations when you dispose of oil, fuel, DEF/AdBlue® , coolant, solvents, filters, batteries, or any other hazardous or potentially hazardous materials.



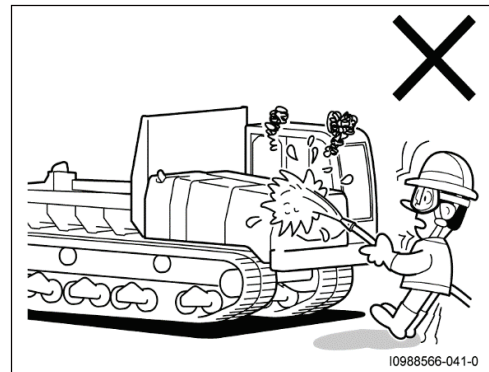
(14) Always keep cleanliness in mind when you handle the hydraulic equipment, engine or electrical parts.

The hydraulic equipment, engine and electrical parts are precisely adjusted. Always do your best to work cleanly.



(15) Precautions when washing the machine

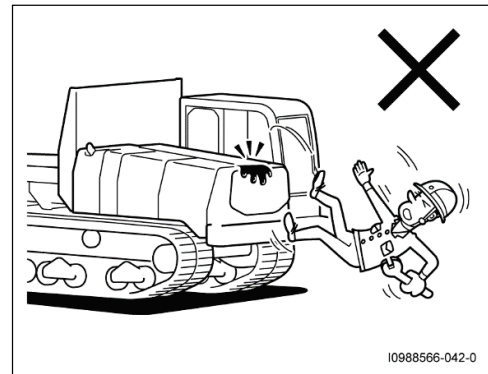
- While washing the machine, you may lose your footing and fall down, so wear slip-resistant boots while washing the machine. If you are using high-pressure steam for cleaning, the jet can cut your skin and mud etc. can splash back into your eyes. Therefore, whenever washing the machine, with high-pressure steam or otherwise, always wear protective wear. Coming in contact with the steam or high pressure water could cause burns or other injury.
- If you spray water on electrical equipment during washing, it could break down or malfunction, so work carefully to avoid wetting the electrical equipment.



1. Precautions on inspection and servicing

(16) Precautions when working in high places

- When you are working in high places, take precautions to avoid falling off.
Keep the area you are standing on tidy (no tools scattered around) and clean (wipe off any spilled oil or grease), and walk carefully to avoid slipping.
- When climbing and descending, use the hand grips and platforms and always keep yourself adequately supported on at least three points at any time. Wear a safety harness and other safety equipment as necessary.



(17) Stop the engine before inspection and servicing

- It is dangerous to inspect and service the machine while it is moving.
- Always stop the engine before you start work unless the task you are about to perform needs the machine to be moving.



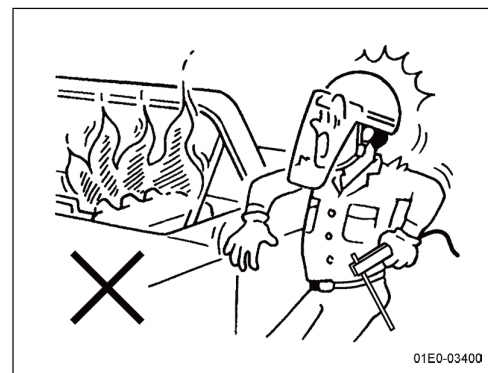
(18) Servicing with the engine running is a job for two people

- Avoid servicing the machine while it is working if at all possible.
- If it is unavoidable, work with at least two people. One of you must be in the operator's seat to be able to stop the engine at any time and all those involved must be in constant contact.
- If you work near rotating parts, take care not to be trapped or dragged in.



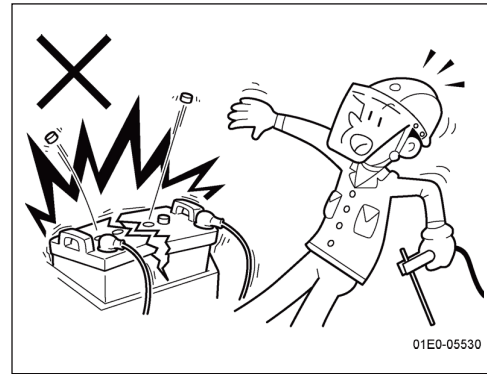
(19) Precautions when welding

- There is a risk of fire when welding due to possible damage to electrical equipment or generation of gas from hot paint.
- Employ a qualified welder for the job and carry it out in a properly equipped place.



(20) Basic precautions before welding

- Turn the engine key switch to OFF.
- Make sure that the power ON indicator lamp is off and then turn the battery disconnect switch to the OFF position.
- Cut away the paint from the area to be welded so that it cannot produce gas.
- Attach an earth connection within one meter of the weld point with no O-rings or bearings between the weld and earth points.
- Always wear protective equipment and make sure the ventilation is adequate.
- Remove flammable materials and place a fire extinguisher nearby.
- Failing to follow the instruction to "turn the engine key switch to OFF, make sure that the power ON indicator lamp is off and then turn the battery disconnect switch to the OFF position" before welding could result in malfunction of the electrical and electronic equipment or battery explosion.



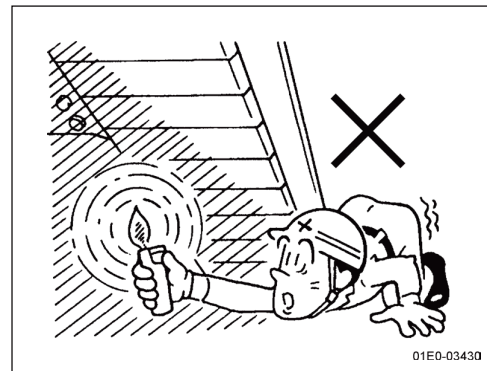
(21) The equipment are hot immediately after the engine stops

- The equipment are hot immediately after the engine stops, so you could be burned if you touch them. In particular the engine, silencer, oil reservoir, coolant, radiator, sliding parts, hydraulic equipment, pipes etc. will be very hot.
- Wait for all parts to cool before you begin inspection and servicing.



(22) Illumination

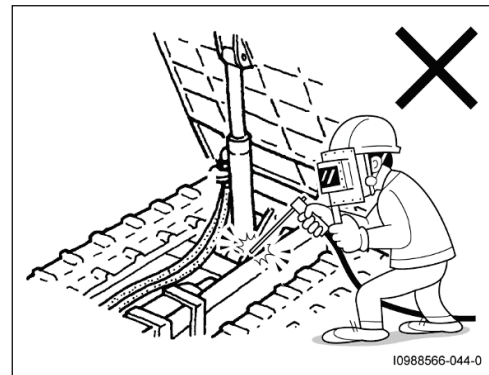
- If you are working in poor light, you cannot see well enough what you are doing, so you could injure yourself. Before operation, prepare illumination enough to light the working place.
- Do not use a lighter or other flame in place of a lamp to light dark places. You could start a fire or cause an explosion by igniting gas generated by the battery.
- Use an explosion-preventive type of lamp when looking at the battery or fuel.
- The power socket for the lighter on the dashboard in the cab can be used as the 24V power source for up to 100 W.



1. Precautions on inspection and servicing

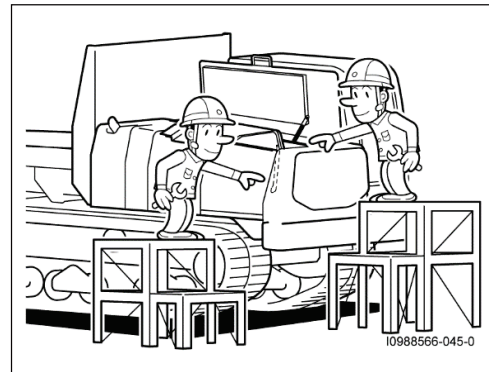
(23) Do not heat hydraulic equipment or pipes

- If you heat hydraulic equipment or pipes or areas near them, it could generate and ignite flammable vapour or smoke. Avoid welding, soldering or heating with a torch near hydraulic equipment or pipes.
- If you directly heat pressurized pipes or rubber hoses, they may rupture suddenly.



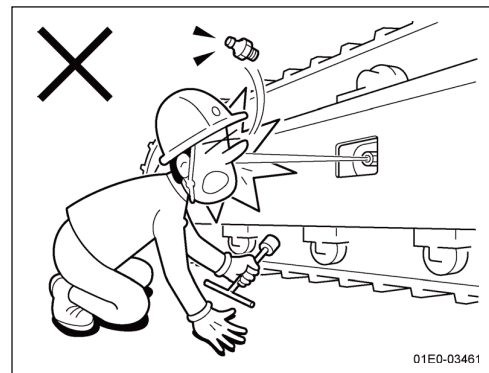
(24) Lock all inspection covers

- If you leave the inspection covers open, they can swing shut suddenly when the wind blows and trap fingers etc.
- When you open an inspection cover or cab door, always use the stopper to lock it securely in the fully open position. When there is a strong wind, do not open the door or covers.



(25) Prevent flying parts

- The grease inside the adjuster cylinder is under high pressure. Ignoring the following precautions could cause serious injury or death.
- Do not remove the drain plug.
- Keep your face and other body parts away from the plug, which could be ejected.



2. Inspection and servicing table (T0988566-211-0E)

Follow the "Inspection and servicing table" to carry out the correct inspection and appropriate servicing necessary for safe and efficient work.



CAUTION

- The intervals stated in the inspection and servicing table are based on the elapsed time indicated by the hour meter.

Follow both the passage of dates and of hours of operation and carry out each inspection item when one of the times is reached, whichever occurs sooner.

- If you discover any damage, breakdown or malfunction, repair it immediately. Do not leave it for later and do not start work before it is repaired.
- For the inspection and replacement methods for the engine, refer to the separate engine manual.
- The inspection intervals for this machine are based on standard operations and working conditions.

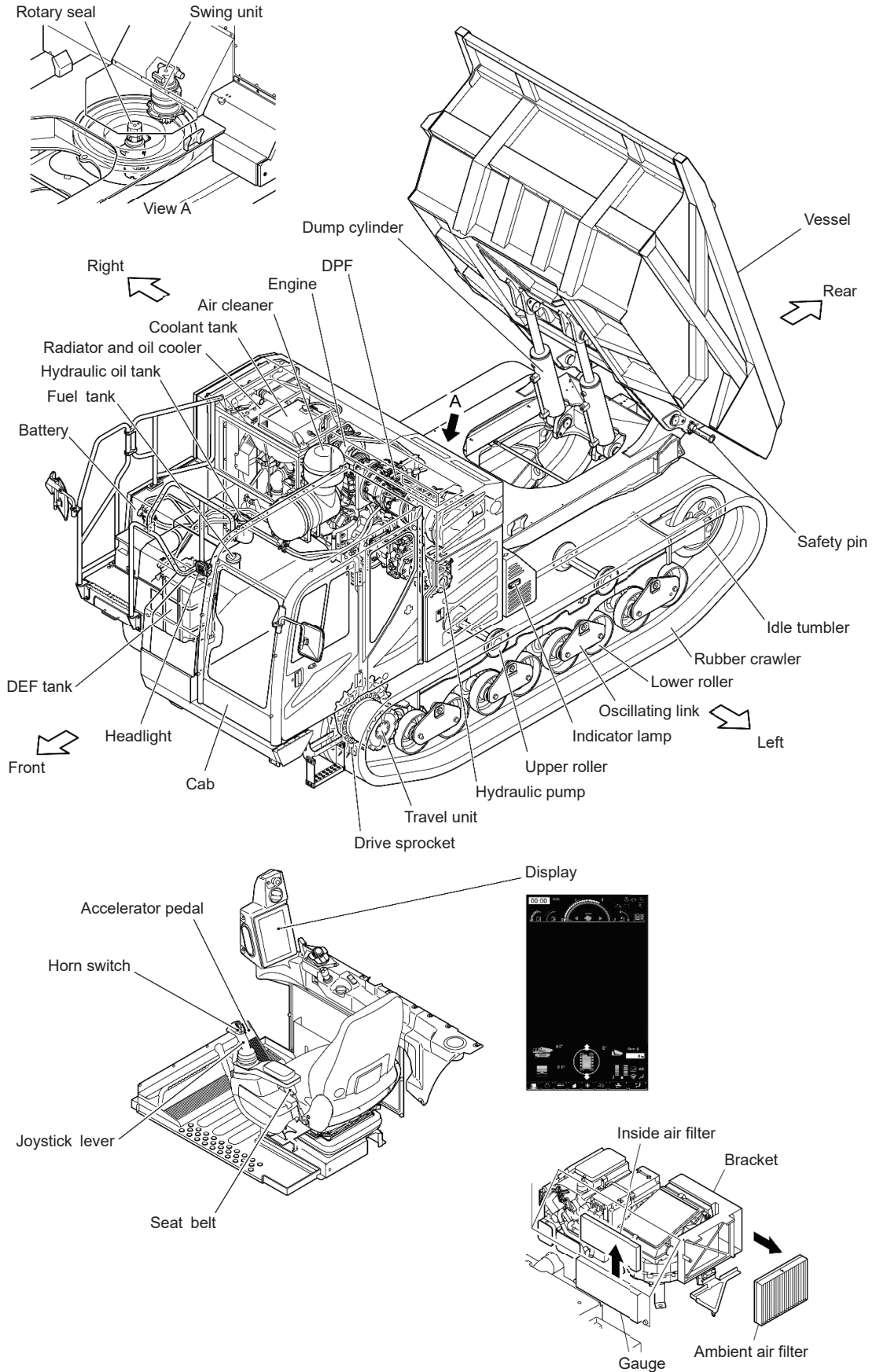
Under severe conditions, the inspection and replacement intervals should be shortened accordingly.

- If any method or interval of inspection and servicing is unclear, contact your authorised KATO dealer.

(T218081-152-0E)

2. Inspection and servicing table

(1) Part names for inspection and servicing



10988596-085-0E

2. Inspection and servicing table

- ☆ First oiling/inspection/replacement after delivery of a new machine
- Normal operation
- *1 Every 2 years or every 2,000 hours
- *2 When using KATO recommended hydraulic oil:
Every 2000 hours of operation
ENEOS Highland Wide
- *3 When replacing the hydraulic oil
- *4 Every 5 years
- *5 Every 3 years or every 4,500 hours
- *6 First 50 hours of operation after delivery of a new machine
- *7 150 hours after delivery of a new machine
- *8 250 hours depending on fuel control status
- *9 Every 3,000 hours
- *10 Every 1,500 hours
- *11 Every 9,000 hours
- *12 Every 50 hours
- EO Engine oil
- EG Extreme-pressure bearing grease
- SG Chassis grease

	Part	Inspection location and service task	Task	When defective	Daily	Weekly or 60 h	Monthly or 100 h	Every 250 h	Every 6 months or 500 h	Yearly or 1000 h	Oil Part to change	Reference section	
					Pre-operation							Operation section	Inspection and servicing section
General appearance	External dents or damage		Inspect	○							—	—	4
	External damage of devices and equipment		Inspect	○							—	—	4
	Looseness of bolts and nuts		Inspect	○							—	—	4
	Looseness, short circuit, or damage of the wiring		Inspect	○							—	—	4
Engine-related	Engine and engine mounting	Does the engine start well?	Inspect		○						—	4-2	—
		Idling and acceleration (rated) status	Inspect			○					—	4-3	—
		Exhaust gas color	Inspect		○						—	Separate engine manual	
		Exhaust status	Inspect		○						—	Separate engine manual	
		Abnormal noise on starting, running or stopping	Inspect		○						—	4-3	—
		Stopping behavior	Inspect		○						—	4-3	—
		Slack in the exhaust pipe or muffler	Inspect		○						—	—	4-1-9
		Loose wires, short circuits, breakage	Inspect		○						—	—	4
		Loose or missing attachment bolts	Inspect		○						—	—	4
		Alternator electricity generation	Inspect		○						—	4-1	—
		Rotation status of the turbocharger	Inspect							*5	—	Separate engine manual	
	Lubrication system	Engine oil	Check for dirt and check oil level		○						—	—	4-1-2
			Replace			*6		○			EO	—	4-1-2
		Oil leakage from parts (including checking hose for damage and deterioration)	Inspect		○						—	—	4-1-2
		Oil filter	Replace			*6		○			Filter element	—	4-1-3

2. Inspection and servicing table

	Part	Inspection location and service task	Task	When defective	Daily	Weekly or 60 h	Monthly or 100 h	Every 250 h	Every 6 months or 500 h	Yearly or 1000 h	Oil Part to change	Reference section	
					Pre-operation							Operation section	Inspection and servicing section
Engine-related	Cooling system	Looseness, tension, crack and damage of fan belt	Inspect		○						—	—	4-5-4
			Replace							*9	V-belt	Separate engine manual	
		Radiator, intercooler core, fin, expansion tank, and coolant tank	Inspect and clean		○						—	—	4-1-13
		Coolant	Check for dirt and check oil level		○						—	—	4-1-13
			Replace							*1	Coolant	—	4-1-13
		Pressure cap function	Inspect						○		—	—	4-1-13
		Water leakage from each part (including check for damage or deterioration to hoses)	Inspect		○						—	—	4-1-13
		Fan damage and attachment status	Inspect						○		—	—	2
	Air intake system	Air cleaner element (outer)	Inspect		○						—	—	4-1-12
			Clean					○			—	—	4-1-12
			Replace						○		Element	—	4-1-12
		Air cleaner element (inner)	Replace	○							Element	—	4-1-12
	Fuel system	Fuel tank	Check oil level		○						—	1-8 3	2
			Drain water and settled particles					○			—	—	4-1-8
			Clean the cap strainer		During oil feeding						—	1-8	—
		Main fuel filter	Replace					*8	○		Cartridge	—	4-1-4 4-1-5
		Fuel prefilter	Inspect		○						—	—	4-1-7
			Drain water and settled particles	○							—	—	4-1-7
			Replace					*8	○		Element	—	4-1-7
	SCR system	DEF/AdBlue®	Check DEF level		○						—	1-7 7-1	4-1-10
		DEF/AdBlue® or cooling water leakage from each part (including check for damage or deterioration to hoses)	Inspect		○						—	—	4-1-9
		DEF pump filter	Replace							*5	Element	—	4-1-11
		DEF tank suction filter	Replace							*1	Filter		4-1-11
		Muffler and related sensor actuator	Inspect							*5	—	Separate engine manual	
	Exhaust system	Device to prevent diversion of carbon monoxide and other gases	DPF soot filter	Inspect and clean						*5	—	Separate engine manual	

2. Inspection and servicing table

	Part	Inspection location and service task	Task	When defective	Daily	Weekly or 60 h	Monthly or 100 h	Every 250 h	Every 6 months or 500 h	Yearly or 1000 h	Oil Part to change	Reference section	
					Pre-operation							Operation section	Inspection and servicing section
Hydraulic system-related	Oil reservoir	Hydraulic oil	Check for contamination				○				–	–	4-2-1 4-2-5
			Check oil level		○						–	–	4-2-1 4-2-3
			Replace							○	Hydraulic oil	–	4-2-5
		Suction strainer	Clean							○	–	–	4-2-6
			Replace	○							Strainer, O-ring	–	4-2-6
		Return filter	Replace			☆			○		Cartridge	–	4-2-7
	Pipe and hose	Oil leakage, swelling, perishing, injuries	Inspect		○						–	–	4-2-1
	Line filter		Replace			☆			○		Element	–	4-2-7
	Cylinder	Oil leakage	Inspect		○						–	–	4-2-1
		Responsivity	Inspect		○						–	–	4-2-1
		Internal leakage	Measure						○		–	–	4-2-1
	Hydraulic pump	Oil leakage	Inspect		○						–	–	4-2-1
		Abnormal noise or heat	Inspect		○						–	–	4-2-1
		Attachment bolt	Inspect			○					–	–	4-2-1
		Air extraction	Inspect	○							–	–	4-2-2
	Oil cooler	Oil leakage	Inspect		○						–	–	4-2-1
	Rotary seal	Oil leakage	Inspect		○						–	–	4-2-1
	Hydraulic valve	Oil leakage	Inspect		○						–	–	4-2-1
		Relief valve and brake valve function	Inspect				○				–	–	2
		Control valve function	Inspect				○				–	–	2
Travel-related	Upper roller	Wear, deformation	Inspect		○						–	–	2
		Attachment bolt	Inspect		○						–	–	2
		Oil leakage	Inspect		○						–	–	2
	Lower roller	Wear, deformation	Inspect		○						–	–	2
		Attachment bolt	Inspect		○						–	–	2
		Oil leakage	Inspect		○						–	–	2
		Oscillating link pin	Grease			*12					EG	–	3-4

2. Inspection and servicing table

	Part		Inspection location and service task	Task	When defective	Daily	Weekly or 60 h	Monthly or 100 h	Every 250 h	Every 6 months or 500 h	Yearly or 1000 h	Oil Part to change	Reference section	
						Pre-operation							Operation section	Inspection and servicing section
Travel-related	Sprocket		Wear, deformation	Inspect		○						—	—	2
			Attachment bolt	Inspect		○						—	—	2
	Rubber crawler		Tension	Inspect and adjust		○						SG	—	4-3-2
			Wear and cracks	Inspect				○				—	—	2
	Traveling motor reduction gear		Abnormal noise on traveling	Inspect		○						—	—	4-2-1
			Oil leakage	Inspect		○						—	—	4-2-1
			Reduction gear oil	Check oil level					○			—	—	4-3-3
				Replace				*7		☆	○	GO	—	4-3-3
	Front idler		Wear	Inspect				○				—	—	2
			Oil leakage	Inspect		○						—	—	4-3-1
				Oil	○							EO	—	4-3-1
	Brake action		While traveling	Inspect		○						—	—	—
			While parked	Inspect		○						—	—	—
	Traveling frame		Cracks and damage	Inspect				○				—	—	2
Swing-related *13	Swing bearing	Bearing	Abnormal noise on swinging	Inspect		○						—	—	2
			Ball contact surface	Grease				○				EG	—	3-4
		Ring gear tooth	Wear, damage	Inspect						○		—	—	3-4-1
			Pinion	Grease						○		EG	—	3-4-1
	Swing brake action			Inspect		○						—	4-4-4	—
Vessel system	Vessel		Bending, cracks	Inspect		○						—	—	2
			Dump cylinder pin (rod and bottom sides)	Grease			*12					EG	—	3-4
	Damage or loss of the bolts and nuts which stop the pins			Inspect				○			—	—	3-4	
	Vessel joint pin			Grease			*12					EG	—	3-4
Electrical system-related	Battery			Check electrolyte volume		○						Battery electrolyte	—	4-4-1
				Measure specific gravity					○			—	—	4-4-1
				Clean terminals					○			—	—	4-4-1

2. Inspection and servicing table

	Part	Inspection location and service task		Task	When defective	Daily	Weekly or 60 h	Monthly or 100 h	Every 250 h	Every 6 months or 500 h	Yearly or 1000 h	Oil Part to change	Reference section		
						Pre-operation							Operation section	Inspection and servicing section	
Electrical system-related	Inside the cab	Horn		Inspect		○						—	3-1	—	
		Working lamp	Inspect			○						—	3-1	—	
			Replace		○							LED	—	4-4-4	
		Interior lamp	Inspect			○						—	—	4-4-4	
			Replace		○							LED	—	4-4-4	
		Wiper	Inspect			○						—	3-1	—	
			Replace		○							Blade	—	4-4-7	
	Electrical wiring	Condition of insulation and slack		Inspect		○							—	—	—
	Fuse		Replace	○								Fuse	3-1	4-4-5	
	Fusible link		Replace	○								High current fusible link	—	4-4-6	
Cab control system	Joystick lever and swing lever		Inspect		○							—	3-1-4 3-1-5	—	
	Display indicator		Inspect		○							—	3-1-1	—	
	Meter etc.		Check action		○							—	3-1-1	—	
	Seatbelt	Inspect			○							—	3-1-3	—	
		Replace								Every 3 years	Belt	3-1-3	—		
Air conditioner and heater-related	Air conditioner	Cooling and heating		Inspect		○						—	7	—	
		Defroster		Inspect		○						—	7	—	
		Simple inspection	Refrigerant volume	Inspect				Every 3 months				—	—	4-6-3	
			Looseness and damage of parts and gas leakage	Inspect				Every 3 months				—	—	4-6-5	
		Crack or damage of the compressor belt		Inspect		○						—	—	4-6-4	
		Condenser	Inspect			○						—	—	4-6-5	
			Clean					○				—	—	4-6-5	
		Internal air filter and outside air filter	Clean and inspect			○						—	—	4-6-2	
			Replace								*1	Filter	—	4-6-2	
		Receiver drier		Replace								*1	Receiver drier	—	4-6-3

(0988596-500-0E)

- For more information about the engine, also refer to the Engine Operation Manual.

*13 The swing reduction gear does not require oiling because it is lubricated with hydraulic oil.

3. Lubrication (01E0-0277-1E)

Lubrication is essential to ensure safety operation and to increase the lifespan of the machine.

Regular lubrication, done properly, preserves the safety and economic performance of hydraulic equipment, smooth operation of each part and reduces wear on rotating and sliding parts.

3-1 Precautions on lubrication (T0988548-280-0E)

The value of lubrication is greatly reduced if it is not applied correctly. Observe the following precautions strictly and use correct procedure.

- (1) Always follow KATO's instructions and specifications for lubrication. The interval for lubrication is based on the length of time the machine has been in use or the actual hours of operation as indicated by the hour meter inside the cab, whichever interval elapses sooner.

However, the lubrication interval specified by KATO is a guideline based on standard crawler carrier operating conditions. If the machine is used in harsh conditions, consult your authorised KATO dealer to determine a suitably-reduced lubrication interval.

- (2) Correct lubrication requires application of the right lubricant in the right quantity for each point that requires lubrication. Choose the lubricant you are going to use from among the types and brands recommended by KATO for each point and make sure the oil number you select agrees with our selection criteria for the outside temperatures common in the operating region.
- (3) Before filling/injecting with any lubricant, clean around the grease nipple, filler hole etc. to avoid the entry of dirt, moisture, etc. with the lubricant.
- (4) Work in a clean, dry workplace so that dirt, moisture, etc. do not enter the machine during the lubrication process.
- (5) Always add the same brand of lubricant. Mixing different brands could be detrimental, due to chemical reactions or other effects.

For various reasons, the recommended lubricants listed in this manual are subject to change without notice. Before using a product not listed in this manual, contact your authorised KATO dealer.

- (6) If you use lubricants which have not been recommended by KATO or which do not match the selection criteria, or if you do not observe the lubrication intervals, KATO will not bear any responsibility whatsoever for any resulting failures.

3-1-1 Precautions on greasing (T0988566-168-1E)

Greasing reduces wear to sliding and rotating parts, thus prolonging the lifespan of the machine, and it is also essential for their smooth action.

Correctly grease each point as necessary, following the precautions listed below.

Refer to the relevant instruction manuals for details of how to grease the engine-related and attachment-related parts.

- (1) When greasing bushes and bearings, expel the old grease and fill completely with new grease.
- (2) After greasing the pin sections, operate each part several times to spread the grease evenly over the entire surface of the pins.
- (3) Grease each part with the type of grease specified by KATO for that part.
- (4) The specified greasing intervals only apply where the grease types specified by KATO are applied in the appropriate locations correctly. If you have no choice but to use a non-recommended grease, consult your authorised KATO dealer to determine a suitably-reduced greasing interval.

3-1-2 Precautions on oiling (T0988566-169-0E)

Observe the following precautions when oiling.

- (1) Replace the oil in each device which requires oiling at the interval specified for each device.

The first oil replacement is particularly important when the machine is new and if this oil change is missed, the lifespan of the device will be drastically reduced. Even more serious consequences such as rapid breakdowns could also result.

- (2) Check the oil level in each device which requires oiling at the interval specified by KATO.

If any oil level is too low, top it up with oil of the same type as that currently in use.

- (3) When hydraulic oil has been replaced, extract the air from the pump and wait until all bubbles have disappeared from the oil reservoir then run the pump unladen at low speed to expel the air from inside the pipes. If there are air bubbles mixed with the hydraulic oil when you operate the machine, damage to the pump and various other problems will result.

- (4) Replace the cap with breather and clean the strainer of the suction strainer at the same time as you change the hydraulic oil. If the element or strainer is dirty, the hydraulic equipment will be damaged.

- (5) When you have changed or added oil, always wipe away any spilled oil or other residues, then test run the engine and look for any fresh oil leakage.

- (6) Order disposal of old oil from a reputable waste disposal company.

3-2 Lubricants added at the factory (T0988566-170-0E)

- (1) Recommended lubrication table

Lubrication points	Oil type	Temp. & application (°C)								Qty required	
		-30	-20	-10	0	10	20	30	40		
Engine oil pan	Engine oil			SAE5W-30							H: 16.1 L L: 14.1 L
			*	SAE15W-40							
Hydraulic oil tank	Hydraulic oil				*	ISO-VG46					System: 135 L Tank level: 93 L
				ISO-VG32							
Travel reduction gear	Gear oil		*	ISO-VG220							3.1 L
Fuel tank	Diesel fuel										System: 320 L
Cooling system	Coolant	Long-life coolant (LLC) 50% added									38.6 L
DEF system	DEF	Use DEF conforming to ISO standards only.									49.2 L
Greasing points	Grease	Shell GADUS S2 VG220J 2 (EP)									Appropriate amount

(T0988596-051-0E)

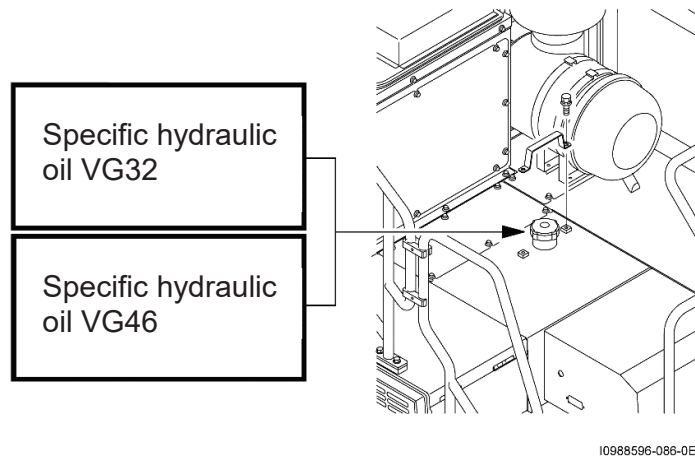
- The oil with the * marks is used for the machine before shipment.
- The swing reduction gear does not require oiling because it is lubricated with hydraulic oil.

3. Lubrication

3-2-1 Lubricants added at the factory (T218341-035-0E)

(1) Hydraulic oil

The type of hydraulic oil added at the factory is determined by contractual agreement.



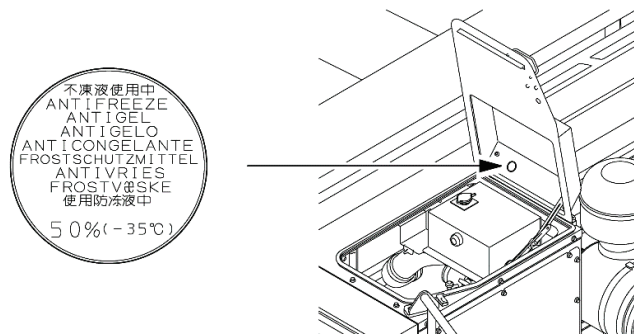
(2) Engine oil

The type of engine oil added at the factory is determined by contractual agreement.

Name	Code	Type added at the factory	Standard
Engine	EO	Cummins Premium Blue	SAE: 15W-40

(T0988596-052-0E)

(3) Long Life Coolant



(4) Gear oil

The following gear oil is added at the factory, as determined by contractual agreement.

1) Lower structure

Name	Code	Type added at the factory	Standard
Traveling reduction gear	GO	Shell Omala S2G220	ISOVG220

(T0988596-054-0E)

(5) Grease

The following greases are applied at the factory.

Greasing location	Process	Code	Type added at the factory
Vessel joint pin	Grease	EG	Shell GADUS S2 VG220J 2
Vessel cylinder pin (rod side)	Grease	EG	Shell GADUS S2 VG220J 2
Vessel cylinder pin (bottom side)	Grease	EG	Shell GADUS S2 VG220J 2
Swing bearing (ring gear tooth)	Grease	EG	Shell GADUS S2 VG220J 2
Swing bearing (bearing)	Grease	EG	Shell GADUS S2 VG220J 2
Lower roller oscillating link pin	Grease	EG	Shell GADUS S2 VG220J 2

(T0988596-055-0E)

3. Lubrication

3-3 Recommended lubricants table (T0988596-056-0E)

(1) Hydraulic oil (HO)

Selection of hydraulic oil

Select the hydraulic oil based on the local outside temperature and the rated maximum operating temperature of the hydraulic oil itself, where the upper limit is determined by the maximum operating temperature and the lower limit by the minimum outside temperature (see table below).

Note that even if a hydraulic oil with a ISO VG number appropriate for the outside temperature is selected, the operating temperature could exceed the upper operating temperature limit, depending on the operation. In such cases, select a hydraulic oil with a higher VG number.

Oil	Standard	Appropriate outside temperature	Max. appropriate operating Temperature (Upper limit of hydraulic oil temperature)	Specification
Hydraulic oil (HO)	ISO VG 32	-20°C to +20°C	70°C	Cold district
	ISO VG 46	-10°C to +30°C	80°C	Standard

(T219541-042-0E)

(2) Gear oil (GO)

Use the following gear oil.

Oil	API service grade classification
Gear oil	ISOVG220

(T0988596-057-0E)

(3) Grease (EG/SG)

Always select the type of grease specified for each location.

- EG EP (extreme-pressure) bearing grease (lithium type)
- SG Chassis grease (lithium type)

(4) Engine oil (EO)

Use engine oil that complies with Cummins technical standard CES20081 or CES20086.

(Factory-filled engine oil: Cummins Premium Blue)

Using oil other than that specified by Cummins or KATO could cause malfunction.

Engine oil softens (lower viscosity) at higher temperatures and becomes thicker (higher viscosity) at lower temperatures. Therefore, use an oil with a viscosity appropriate for the given air temperature conditions. Contact an authorised KATO service factory before operating the engine at the outside air temperature below -25°C.

Engine oil recommended by KATO

Part number	Oil amount	Oil viscosity	Outside air temperature during startup
779-71000910	200 L	SAE 15W-40	-15°C to +40°C
779-71000920	20 L		
779-71010210	208 L	SAE 5W-30	-25°C to +35°C
779-71010220	20 L		

(T0988596-058-0E)

3. Lubrication

3-4 Greasing chart (01E0-0289-0E)



CAUTION

- Grease all parts of the dump cylinder pin every 10 hours or every day until 50 hours are reached for a new car.
- If digging in water, after finishing operations each day, grease all parts that were under water.

(T218081-192-1E)



WARNING

When greasing the machine with the vessel raised, be sure to lock the safety pin.

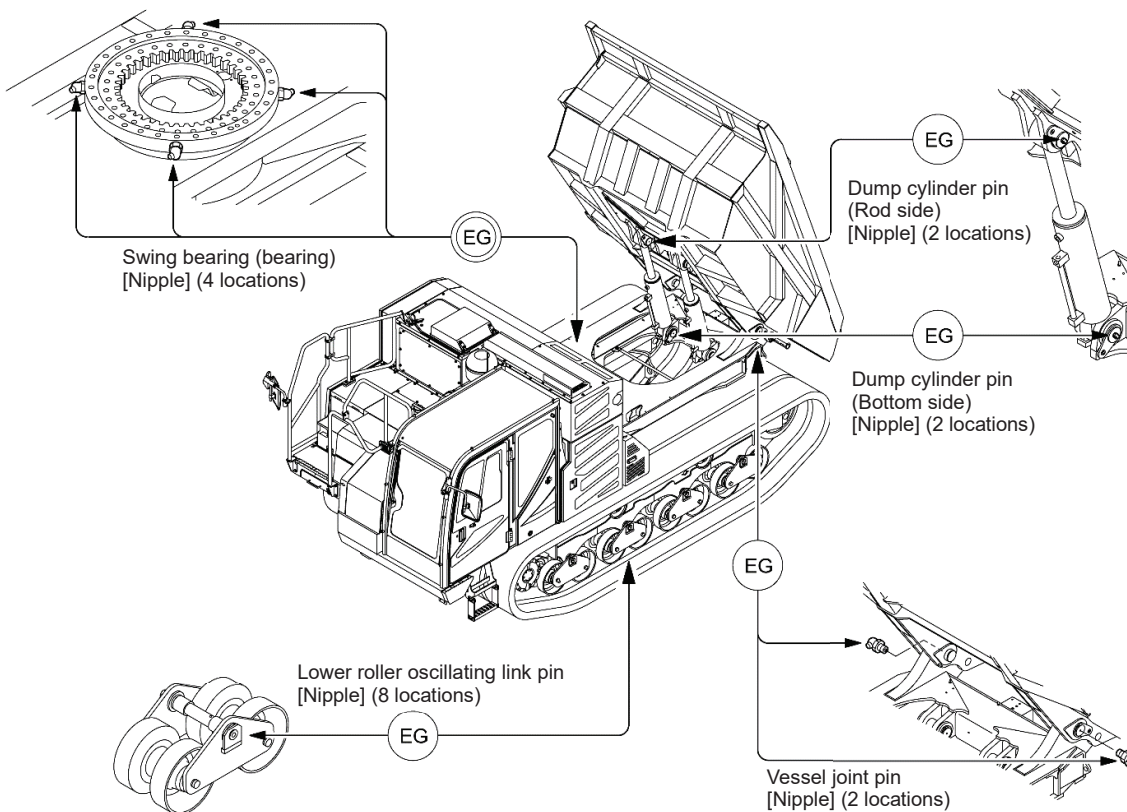
(T0988596-059-0E)

NOTICE

Grease the link pins every day before starting works if the machine is used on damp grounds or in mud.

(T0988566-158-0E)

-Every 50 hours
●Every 100 hours



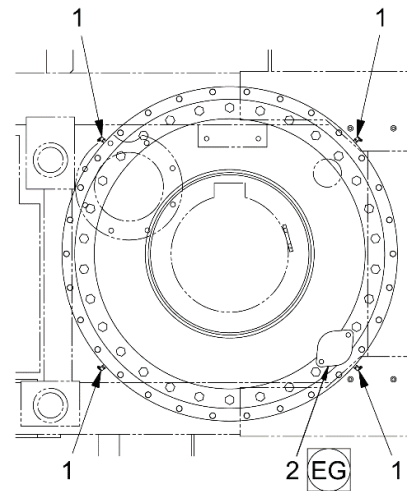
10988596-088-0E

3-4-1 Procedure of greasing swing bearing (bearing) (T0988596-060-0E)

- (1) Lower the vessel completely or raise the vessel, keep the vessel with the safety pins, and then stop the engine.
- (2) Refill swing bearing grease nipple (1) with grease from four locations in 3 to 5 strokes using a grease gun.
- (3) Allow the upper structure to swing by one round.

□... Every 500 hours

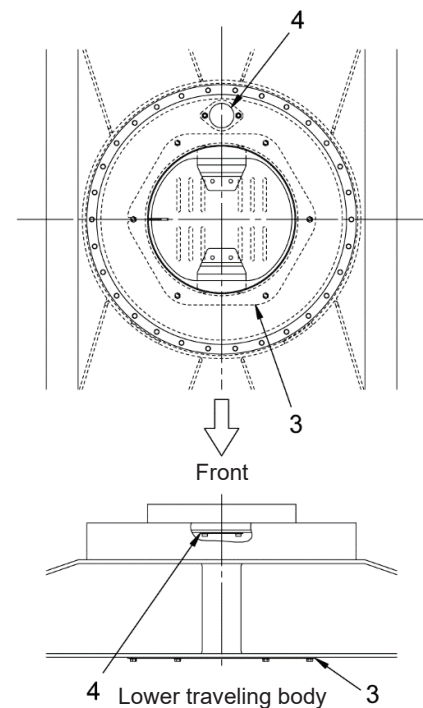
EG: Shell GADUS S2 VG220J 2 (EP)



10988596-262-0

3-4-2 Procedure of greasing swing bearing (ring gear) (T0988596-061-0E)

- (1) Raise the vessel, keep the vessel with the safety pins, and then stop the engine.
- (2) Remove the fill port cover (2) of the upper structure, and check whether grease spreads enough in the swing ring gear tooth. When grease is insufficient, replenish grease about 0.5 kg.
- (3) If water or mud intrudes into grease and it is cloudy, replace the whole amount by a new grease.
When replacing grease, remove the lower traveling body cover (3) and discharge port cover (4) and discharge an old grease.
- (4) Attach the discharge port cover and replenish a new grease from the fill port of the upper structure. (Total amount of grease: 12 kg)
- (5) After swinging two to three times, check that grease spreads enough in the ring gear, and attach the lower traveling body cover and the fill port cover of the upper structure.



10988585-055-0E

⚠ WARNING

Greasing while swinging could cause a catch. Before greasing, stop swinging.

(T0988548-126-0E)

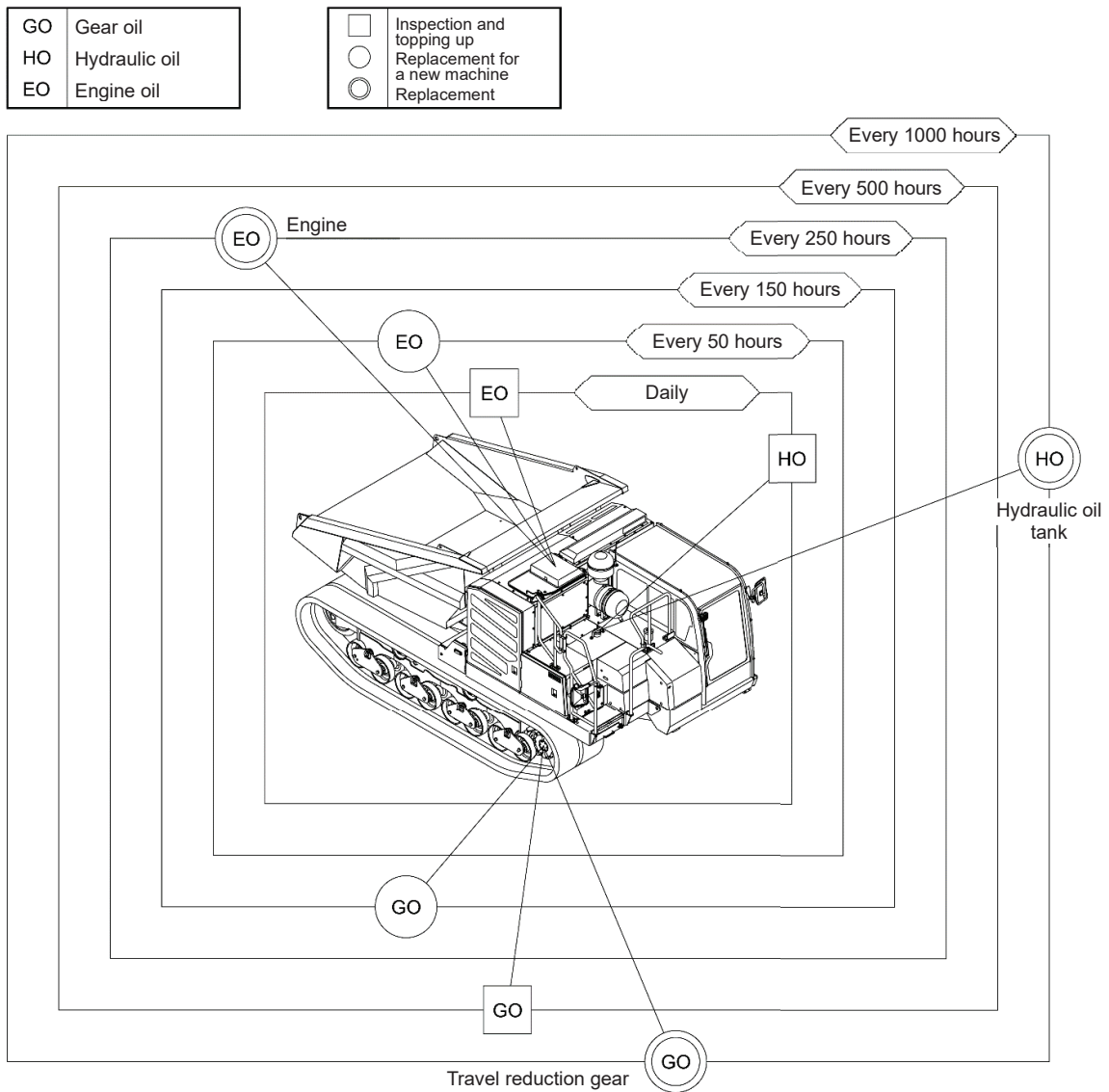
NOTICE

If the swing bearing is greased from the same position, grease does not spread in the entire bearing. Refill grease while swinging about 90 degrees at a time and changing the position.

(T0988548-127-1E)

3. Lubrication

3-5 Oiling chart (01E0-0293-0E)



10988596-089-0E

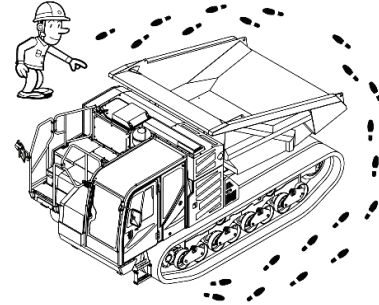
4. Inspection and servicing of each part (T218971-043-0E)

Before starting the day's work, make a habit of looking all over the crawler carrier to inspect the exterior.

Start the engine according to the correct procedure then make another exterior inspection to check for leaks of oil or water.

(1) Inspection of the exterior

- 1) Dents or damage of covers etc.
- 2) External damage of devices and equipment
- 3) Looseness of bolts and nuts
- 4) Looseness, short circuit, or damage of the wiring



I0988596-090-0



CAUTION

- If you notice abnormal noise or vibration from any covers etc., stop the engine immediately and investigate the cause.
- If you notice a smell of burning, scorching or fuel after starting the engine, stop the engine immediately and investigate the cause.

(T218081-154-0E)

4-1 Engine-related (01E0-0295-0E)

4-1-1 Engine inspection and servicing (01E0-0296-1E)

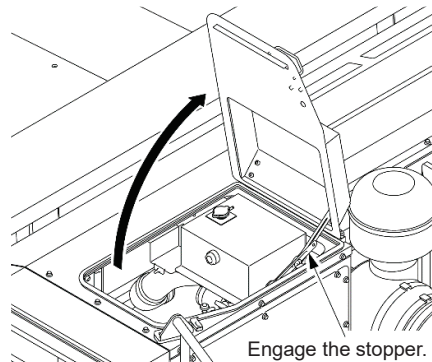
- (1) Take the engine inspection points from the "Inspection and servicing table".
- (2) Take the engine inspection methods from the separate engine manual.
- (3) Consumable part number

Refer to the "Data file, Parts list".



WARNING

- Always stop the engine before inspecting it.
If you inspect and service the engine while it is running, you risk severe injury by trapping your hands etc. in the cooling fan or fan belt.
- The engine hood can be engaged with the stopper.
Before lowering the vessel, be sure to close the engine hood.
- Immediately after the engine stops each part will be very hot and you risk burns if you touch it. If you are going to open the engine hood to inspect the engine, check that it has cooled sufficiently.



I0988596-091-0E

(T0988596-062-0E)

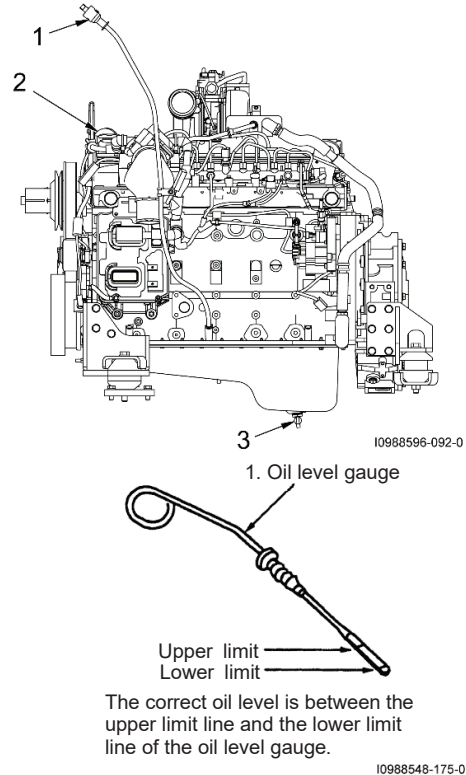
4. Inspection and servicing of each part

4-1-2 Engine oil (T0988596-063-0E)

Set the machine body on the level when checking the oil level.

(1) Inspection procedure

- 1) Pull out the oil level gauge and wipe off the oil by using a cloth.
- 2) Reinsert the gauge all the way in and then gently pull it out.
- 3) If the oil level on the gauge is below the lower limit as in the figure refill the engine with engine oil through the oil filler port (2).
Be careful not to replenish oil exceeding the upper limit.
- 4) Discharge excess oil through the drain cock (3) if the oil level is over the upper limit. Check the oil level again.
- 5) If the oil on the gauge is dirty, replace the engine oil.
- 6) Insert the oil level gauge securely after inspection.
- 7) If the machine is operated under the condition that the engine oil level is above the appropriate oil level, engine failure or engine stop may be caused.



WARNING

After the engine has been running for a long time, the engine oil will be extremely hot, so allow the engine to cool adequately.

(01E0-0299-1E)

CAUTION

- If the engine oil is extremely dirty or if the machine is working under severe conditions, shorten the oil replacement interval appropriately.
- The machine should be on level ground when you check the oil level.
- Clean around the oil filler port before you add oil so that no dirt etc. will enter with the oil.
- Choose the right engine oil for the outside air temperature in the region.
- After adding oil, wait for five or six minutes before checking the oil level. If you check the oil level immediately after adding, it may show a misleadingly low level, leading to overfilling.
- Spilled engine oil can cause fire, so wipe it away immediately.

(01E0-0300-0E)

4. Inspection and servicing of each part

(2) Engine oil specifications

Use a specified-grade of engine oil shown below. Using an oil other than the type specified could cause engine malfunction/failure.

Engine oil softens (lower viscosity) at higher temperatures and becomes thicker (higher viscosity) at lower temperatures. Therefore, use an oil with a viscosity appropriate for the given air temperature conditions. Contact your authorised KATO dealer before operating the engine at the outside air temperature below -25°C.

Engine oil

Standard/grade	Oil viscosity	Outside air temperature during startup
API-CJ-4 ACEA E9	SAE 15W-40	-15°C to +40°C
	SAE 5W-30	-25°C to +35°C

(T0988596-180-0E)

(3) Inspection and replacement intervals for the engine oil

Inspection interval:.....At the time of preoperational checks

Replacement interval:....Every 250 hours of operation (50 hours at first time)

NOTE

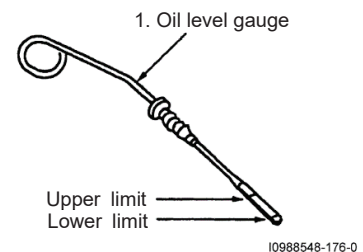
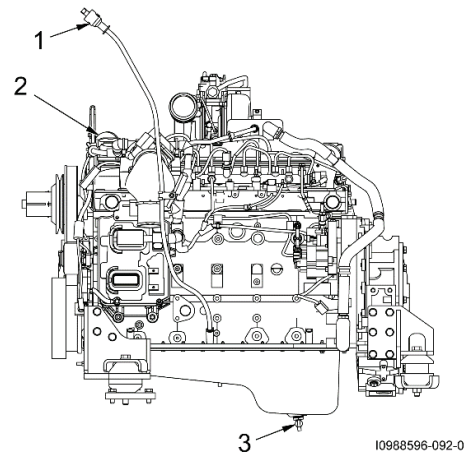
For oil replacement and replenishment procedures, refer to the separate engine manual.

NOTE

Engine oil capacityHi: 16.1 L
Lo: 14.1 L
(including filter)

(4) Engine oil change procedure

- 1) Place the container just under the drain port (3) of the engine.
- 2) Clean the oil filler cap (2) and around it in order not to let in foreign matters. Remove the oil filler cap.
- 3) Slowly open the drain cock (3) to drain the oil safely and avoid contact.
- 4) Check waste oil. If you find a lot of metallic powder, foreign matters, etc., contact your authorised KATO dealer.
- 5) Close the drain cock.
- 6) Fill the engine with engine oil until the oil level becomes between the upper limit and lower limit of the level gauge (1).
- 7) Idle the engine for several minutes, stop the engine, and check the level of engine oil 20 minutes later. Refill the engine with engine oil up to the specified level if the oil level is low.



4. Inspection and servicing of each part

4-1-3 Engine oil filter (T0988596-064-0E)

(1) Replacement procedure

WARNING

- Be sure to stop the engine before replacing the oil filter cartridge.
- Oil is hot and may cause burns. Start replacement work after the engine has cooled sufficiently.

(T0988566-173-0E)

CAUTION

- Do not replace the oil filter element immediately after operating the machine. Doing so when the engine oil is hot could cause a burn injury. Wait until the oil has cooled adequately before replacing the oil.
- Be careful not to spill any engine oil on the exhaust pipe or other potentially hot surfaces when replacing the engine oil filter. Doing so could cause a fire. If engine oil is spilled, wipe it up thoroughly.

(T218081-156-0E)

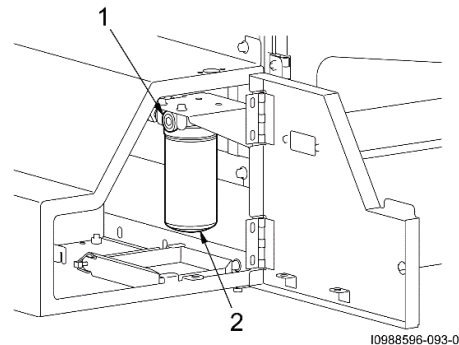
NOTICE

Before replacing the oil filter cartridge (2), stop the engine and loosen the cartridge bolt (1). This allows air to enter the cartridge and all oil flow out of the cartridge. As a result, oil dripping when removing the cartridge can be minimized.

Replace the oil filter cartridge (2).

The oil filter cartridge (2) should be replaced every 250 hours of operation.

- 1) Remove the old oil filter cartridge (2) by using a filter wrench.
- 2) Apply a thin layer of oil to the packing of the cartridge.
- 3) Screw in the cartridge by hand. When the packing contacts the sealing surface, tighten the cartridge sufficiently by hand, not by using a filter wrench. Use of a filter wrench results in over tightening.



CAUTION

- Use the O-ring provided with the new element.
- Do not reuse the element.
- Be careful not to damage the O-ring by twisting it when installing the oil filter cap.
- Only replace the element with a new genuine part from KATO. Also, do not use the element beyond the specified replacement interval.
- When replacing the element, be careful not to let any foreign matter enter the oil.

(T218081-157-1E)

NOTE

Be sure to dispose of the element in accordance with local laws and regulation where the machine is used. If it cannot be disposed of properly on your own, consult a service provider for the engine manufacturer.

(2) Replacement interval

Every time the engine oil is replaced. (Every 250 hours of operation)

(3) Consumable part number

Refer to the "Data file, Parts list".

4. Inspection and servicing of each part

4-1-4 Fuel filter (T0988548-134-1E)

WARNING

Due to risk of fire, never smoke, use a cigarette lighter, or use any other ignition source while replacing the element. Always shut off the engine as well.

(T218081-163-0E)

CAUTION

- Do not replace the fuel filter immediately after stopping operation. The fuel is hot enough to cause burns, so perform work after the temperature has been allowed to drop.
- Be careful not to spill any fuel. If fuel is spilled, thoroughly wipe it up.

(T0988548-135-1E)

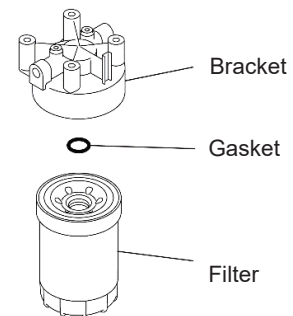
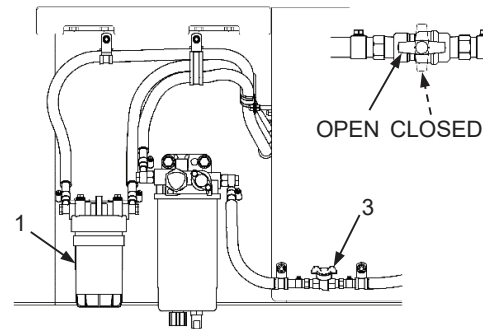
NOTE

- If water flows into the fuel pump, extensive damage will occur.
- Be sure to discharge the fuel system of air before operating the engine.

4-1-5 Replace fuel filter (T0988596-065-0E)

(1) Replacement procedure

- 1) Close the fuel cock (3).
- 2) Turn the filter (1) counterclockwise with the filter wrench to detach it.
- 3) Apply fuel slightly to the gasket of the new filter and tighten it thoroughly by hand, not by using a filter wrench.
- 4) After opening the fuel cock (3), perform air discharge and make sure that there is no fuel leak. (Perform the same procedures as 4-1-6.)
- 5) When air discharge is complete, start the engine and check for fuel leaks.



Fuel filter

I098857500-012-0E

If the fuel moisture sensor is incompatible or disconnected, the engine system warning indicator lights up.

WARNING

Do not open the high-pressure fuel system while the engine is running, or high-pressure fuel could spurt out and cause serious personal injury or death.

(T0988566-185-0E)



CAUTION

- Do not reuse the element.
- Only replace each element with a new genuine part from KATO. Also, do not use the element beyond the specified replacement interval. Doing so could cause the fuel injection system to malfunction.
- When replacing the element, be careful not to let any foreign matter enter the fuel system. Doing so could the fuel injection system to malfunction.

(T0988566-175-0E)

NOTE

Always dispose of the filter in accordance with local laws and regulations.

(2) Replacement interval

- Element..... Every 500 hours

(3) Consumable part number

Refer to the "Data file, Parts list".



CAUTION

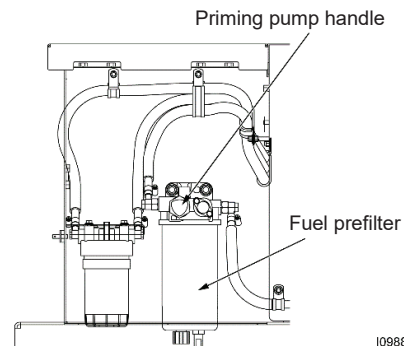
When fuel dirt is visible in the water separator, you should replace the filter even if it is not yet the scheduled time.

(T0988548-303-1E)

4-1-6 How to discharge air (T0988548-137-0E)

Discharge air after maintenance of the fuel filter or water separator is carried out or the fuel tank is emptied.

- (1) Fill the fuel tank full with fuel.
- (2) Use the priming pump on top of the fuel prefilter to discharge air. Turn the handle counterclockwise, then pull and push the handle repeatedly until you feel a stiffening resistance. After completing the air discharge, tighten the handle clockwise to secure it firmly.



I0988596-261-0E



CAUTION

- Fuel is hot immediately after stopping the engine. Carry out the work after the fuel temperature has become lower.
- Do not bring fire close to the engine.
- Wipe off spilt fuel completely. If it is left as is, it may cause a fire.

(T0988548-138-0E)

4. Inspection and servicing of each part

4-1-7 Check fuel prefilter and replace element (T0988596-066-0E)

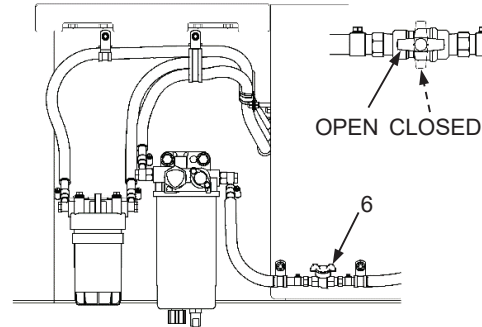
- (1) Check, cleaning, and replacement

Check and discharge

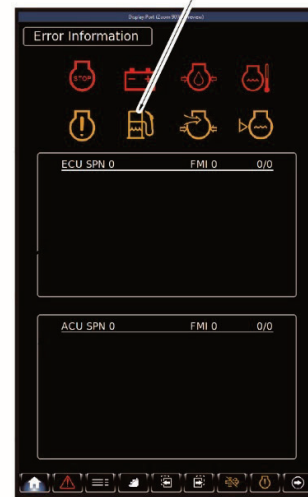
When the water separator warning indicator on the display turns on, the fuel prefilter contains more water than allowable amount.

Discharge the water.

- 1) Close the fuel cock (6).
- 2) Clean the area around the filter head.
- 3) Disconnect the harness from the fuel moisture sensor (2).
- 4) Loosen the discharge plug by turning it counterclockwise to start discharge.
- 5) Discharge water and sediment until clean fuel appears.
- 6) When clean fuel appears, tighten the water drain plug (5).
- 7) After opening the fuel cock (6), perform air discharge and make sure that there is no fuel leak. (Perform the same procedures as 4-1-6.)



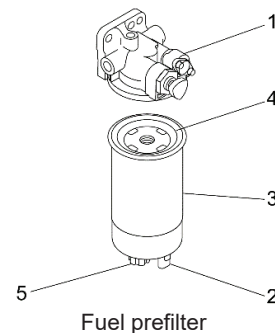
Water separator warning indicator



I0988596-096-0E

Replacement

- 1) Close the fuel cock (6).
Clean the area around the filter head.
- 2) Disconnect the harness from the fuel moisture sensor (2).
- 3) Turn the filter (3) counterclockwise to remove it using a filter wrench.
- 4) Apply fuel slightly to the gasket (4) of a new filter.
- 5) Tighten the filter by hand, not by using a filter wrench.
- 6) Connect the harness to the fuel moisture sensor.
- 7) After opening the fuel cock (6), perform air discharge and make sure that there is no fuel leak. (Perform the same procedures as 4-1-6.)



I0988596-097-0E

- (2) Intervals for inspection and drainage of water and sediment
- Inspection interval..... At the time of preoperational checks
- Drainage interval..... Every 50 hours of operation



CAUTION

Some fuel will be drained along with the water or precipitate. To avoid the risk of fire, thoroughly wipe off any spilled fuel from surrounding surfaces.

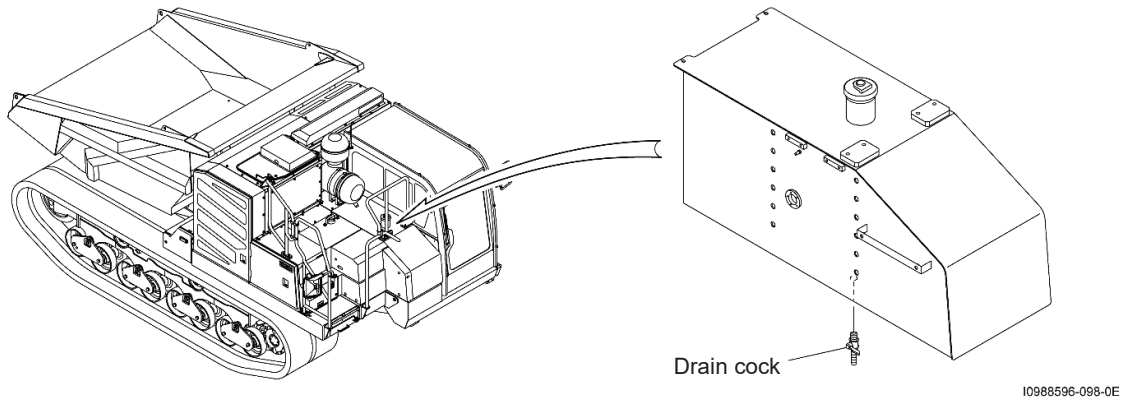
(T218081-198-0E)

4-1-8 Drain water from fuel tank (T0988596-067-0E)

(1) Drain procedure

Open the drain cock under the fuel tank to discharge water.

After drain finishes, close the drain cock.



(2) Discharge interval

Discharge interval Every 250 hours

⚠ WARNING

Diesel fuel is used for fuel of this machine. It is easy to ignite and very dangerous.
Be fully careful to handle it.

(01E0-0314-0E)

⚠ WARNING

Due to risk of fire, never smoke, use a cigarette lighter, or use any other ignition source while discharging the fuel system of air. Always shut off the engine as well.

(T218081-169-0E)

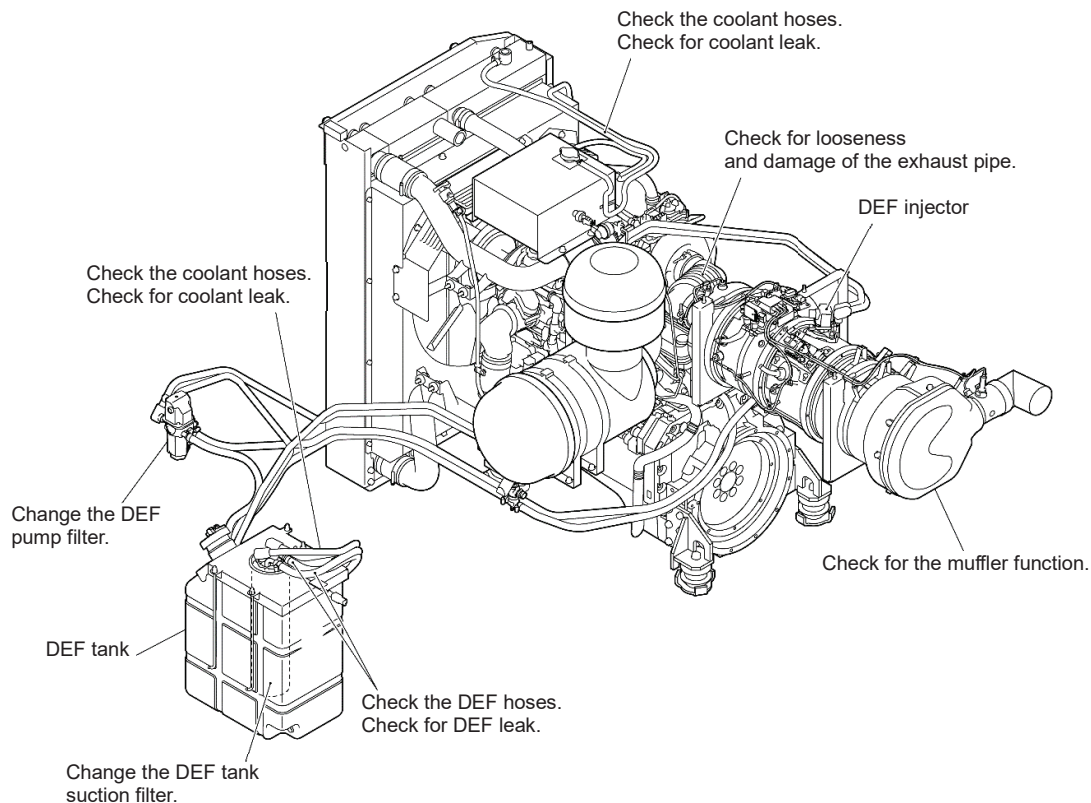
⚠ CAUTION

- Be careful not to spill any fuel. Doing so could cause a fire due to heat. If fuel is spilled, thoroughly wipe it up.
- Do not use a parts cleaner or alcohol-based water remover. If such agents contact plastic parts, they can cause cracking that could lead to fuel leakage.

(T0988566-204-0E)

4. Inspection and servicing of each part

4-1-9 Inspection of exhaust pipe, muffler, and urea SCR system (T0988596-068-0E)



10988596-099-0E

(1) Inspection intervals for the exhaust pipe

- 1) Looseness or damages on the installation section At the time of preoperational checks
- 2) Color and status of exhaust At the time of preoperational checks
- 3) Function of the muffler..... Every 4,500 hours of operation or 3 years

NOTE

For the color and status of exhaust, refer to the separate engine instruction manual.

(2) Inspection of the urea SCR system

Check that the DEF hoses and coolant hoses are connected securely and that they are not damaged by cracking, bending, etc.

Check that there are no leaks of DEF (AdBlue®) and coolant from the DEF tank, the DEF pump, the DEF injector, the DEF hoses, and the coolant hoses.

- 1) Inspection of the DEF hoses and coolant hoses At the time of preoperational checks
- 2) Inspection of leaks of DEF (AdBlue®) and coolant At the time of preoperational checks

WARNING

Immediately after stopping operation, the exhaust pipe, muffler, and coolant are very hot. They can cause burns, so perform the inspection and servicing after the temperature has dropped.

(T218081-196-0E)

4-1-10 Inspection of DEF level and replenishment (T0988566-185-1E)

Regarding the urea SCR system

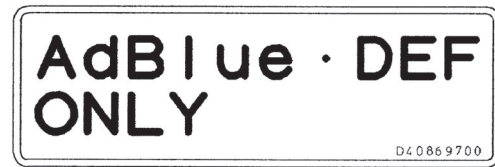
- The urea SCR (Selective Catalytic Reduction) system reduces the amount of toxic nitrogen oxides (NOx) present in exhaust gas by decomposing NOx into water and nitrogen inside the after-treatment device by means of the emission of DEF into exhaust gas.

Regarding DEF

- The fluids that are effective in reducing NOx present inside the after-treatment device are collectively referred to as DEF (Diesel Exhaust Fluid).
- DEF is an aqueous urea and is commonly referred to as AdBlue® mainly in Europe.
AdBlue® is a registered trade mark of the German Association of the Automotive Industry (VDA: Verband der Automobilindustrie).

Regarding specified DEF

- As for DEF, use the one that conforms to the International Organization for Standardization (ISO 22241-4).
Never replenish other fluids than the specified DEF. Also, never replenish DEF diluted with water.



D40869700

- DEF must be stored in an airtight container in a well-ventilated location not exposed to direct sunlight.



CAUTION

DEF freezes at -11°C. If DEF freezes inside a container, it may rupture the container by volume expansion.

(T218081-198-1E)

- If a fluid other than DEF (AdBlue®) or DEF diluted with water is replenished into the tank, it may cause the DEF pump and/or the DEF injector to fail. If a fluid other than the specified DEF is replenished into the tank by mistake, do not turn the starter key to the "ON" position and immediately contact our sales service dealer for proper instructions.



CAUTION

In the urea SCR system, the pump returns DEF to the tank even after the engine has stopped. After the engine has stopped, never disconnect the battery or remove connectors of the harness and other components until the urea SCR system operation has stopped completely. Similarly, never remove the DEF pipe immediately after the machine has stopped. When conducting maintenance and other related work, be sure to allocate ample time before starting such work.

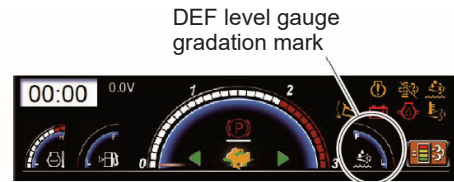
(T10988596-499-0E)

4. Inspection and servicing of each part

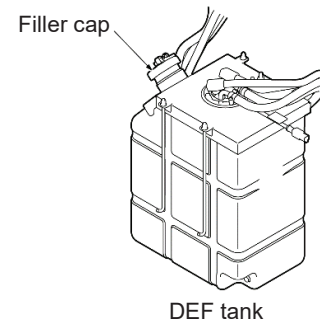
4-1-11 Replenishment of DEF (T0988596-069-0E)

When the DEF level on the display gets low or the DEF mark flashes (replenishment of DEF required), replenish DEF.
Replenish DEF with the key switch turned OFF.

- (1) Remove the filler cap.
- (2) Slowly replenish the specified DEF. (The tank capacity of this machine is 49.2 liters.)
- (3) Securely close the filler cap.



I0988596-100-0E



I0988596-101-0E



CAUTION

- If there is DEF leak, wipe off with a dry cloth or similar object. If DEF is not wiped off, it will crystallize and whiten.
- When replenishing, be careful not to introduce dust and other foreign objects into the DEF tank. They will cause clogging in the DEF pump, DEF pipe and DEF injector.

(T0988566-205-0E)

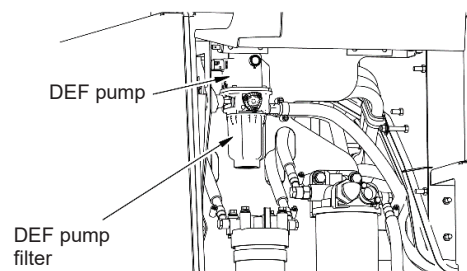
Changing the DEF pump filter

(1) Changing the DEF pump filter

The DEF pump filter is designed to prevent foreign matter from entering the AdBlue® (DEF) in the urea SCR system. Foreign matter could damage the urea SCR system and cause malfunctions.

The DEF pump filter is installed on the DEF pump, which is located at the rear left of the machine.

- 1) Change interval 3 years or 4,500 hours
- 2) Consumable part number Refer to "Parts list".



I0988596-279-0E

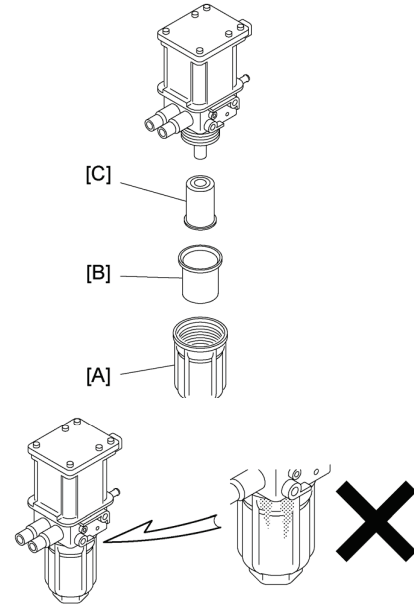
3) Changing procedure

- ① The DEF pump filter consists of the following parts.

[A]: Filter cover

[B]: Anti-freeze membrane

[C]: Filter



I219161-067-0E

- ② Before changing the DEF pump filter, check the exterior of the DEF pump.

- Check the area around the filter cover [A] for signs of leakage. White residue would remain where DEF (AdBlue®) is leaking.

If such residue is found, refer to ⑦ Cleaning and inspection of the DEF pump in this procedure.

- ③ Be sure to turn the battery disconnect switch to the OFF position.

- For battery handling procedure, refer to “4-4-1 Battery handling”.

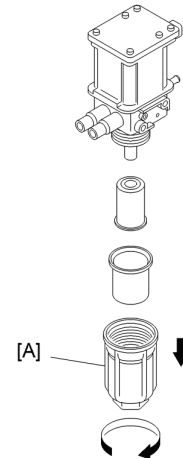
WARNING

The system continues to recirculate and depressurize the DEF (AdBlue®) even after turning the battery disconnect switch is turned to the OFF position, so first confirm that the power ON indicator lamp has turned OFF, and then turn the battery disconnect switch to the OFF position.

(T219161-231-0E)

- ④ Remove the filter cover [A].

- Turn the filter cover [A] counterclockwise to remove it from the DEF pump.



I219161-068-0J

WARNING

Never remove the filter cover [A] while the engine is running or while the DEF pump is operating.

(T218951-107-0E)

4. Inspection and servicing of each part



CAUTION

- Use a 46 mm 12-point socket wrench.
- When removing the filter cover [A], DEF (AdBlue®) will spill out. Use a container and waste clothes to catch the spilled DEF.

(T218951-108-0E)

- ⑤ Remove the frost protection membrane [B] from the DEF pump.
- ⑥ Pull the DEF pump filter [C] out of the DEF pump while twisting it to remove it.

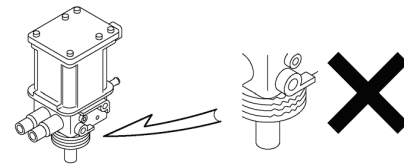


CAUTION

- When removed from the DEF pump, the filter cover [A], anti-freeze membrane [B], and filter [C] must be replaced regardless of their condition. Do not reuse them.
- Protect the DEF pump filter housing of the DEF pump from contamination.
- Always keep the sealing surface of the DEF pump filter housing clean and free of dirt or debris.
- If adhesion of foreign matters to the removed filter [C] is found, check the DEF tank filter and the inlet-side connector of the DEF pump.

(T219161-233-0E)

- ⑦ Clean and check the DEF pump.
 - Check the condition of the DEF pump filter cover [A] mounting threads.If the threads are damaged, replace the DEF pump.
 - Clean the threads of the DEF pump with warm water and a clean cloth.



I219161-069-0E

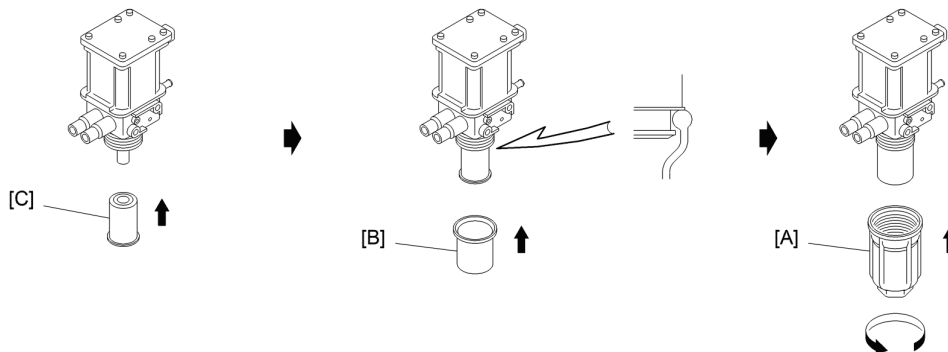


CAUTION

Never start the engine with the filter cover [A] removed.

(T218951-110-0E)

- ⑧ Install a new filter kit onto the DEF pump.
 - Install the new filter [C] onto the DEF pump.
 - Install the new anti-freeze membrane [B] onto the DEF pump. Make sure that it is securely seated in the groove on the DEF pump side.
 - Install the new filter cover [A].Filter cover [A] tightening torque: 80 N·m

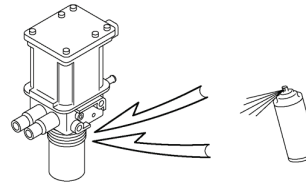


I219161-070-0J



CAUTION

When installing the anti-freeze membrane [B] and filter cover [A], spray the lubricant included with the filter kit onto the groove for the anti-freeze membrane [B] and the threads of the DEF pump.



I219161-071-0E

(T219691-234-0E)

⑨ Check for the proper installation.

- Connect the battery cable.

For battery handling procedure, refer to “4-4-1 Battery handling”.

- Start the engine and check for leaks.



CAUTION

- The urea SCR system does not operate until the operating temperature is reached. To check for DEF (AdBlue®) leaks, operate the machine for at least 15 minutes to bring the urea SCR system up to the operating temperature.
- Never use the “Diesel Exhaust Fluid Doser Pump Override Test” function in the INSITE engine service tool to check for leaks. This function sprays DEF (AdBlue®) at temperatures too low for evaporation, causing deposits to form.

(T219691-235-0E)

(2) Check for DEF and coolant leaks

- 1) Check if AdBlue® (DEF) is leaking from the DEF tank, DEF pump, DEF injector, or DEF piping. (refer to the inspection before starting work).
- 2) Check if coolant is leaking from the DEF tank, DEF pump, or DEF injector (refer to the inspection before starting work).

* If a leak is found, have the machine inspected and serviced at the nearest authorised KATO service facility.



WARNING

- Never check for DEF or coolant leaks immediately after an operation. The exhaust pipe, muffler, and coolant are very hot and may cause burns.
- Never use the “Diesel Exhaust Fluid Doser Pump Override Test” function in the INSITE engine service tool to check for leaks. This function sprays DEF (AdBlue®) at temperatures too low for evaporation, causing deposits to form.

(T219691-236-0E)

4. Inspection and servicing of each part

(3) Check the DEF tank strainer

1) Checking interval At the time of DEF replenishment

- ① Make sure that no foreign matter is adhering to or accumulating on the strainer when replenishing DEF.
- ② If foreign matter is adhering to or accumulating on the strainer, DEF may spray back from the inlet during replenishment.
- ③ If foreign matter is adhering to or accumulating on the strainer, consult your nearest KATO authorised service factory.
- ④ The DEF tank strainer of this machine is firmly installed in the tank.
Forcible removal of the DEF tank strainer may damage the strainer or tank.
- ⑤ Replenishing DEF with the strainer removed may allow debris to enter the DEF tank through the inlet, potentially causing malfunctions in the urea SCR system.
Do not remove the strainer except when cleaning it.

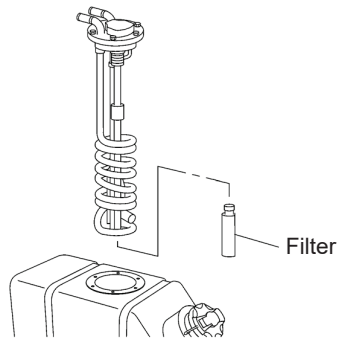
(4) Replace the DEF tank filter

The DEF tank filter is attached to the DEF tank unit, which is mounted on top of the DEF tank.

1) Replacement interval Every 2 years or every 2,000 hours

2) Consumable part number:

Refer to "Parts list".

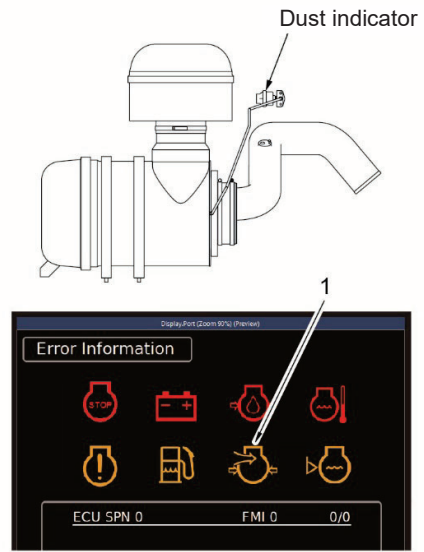


I221111-020-0E

4-1-12 Intake air system (T0988596-070-0E)

(1) Air cleaner clogging warning indicator

- 1) When the air cleaner is clogged, the dust indicator detects the clogging and the air cleaner clogging warning indicator (1) lights up.
- 2) When the air cleaner clogging warning indicator (1) lights up, clean or change the air cleaner.
- 3) After the clogging is eliminated, the air cleaner clogging warning indicator (1) goes out automatically.



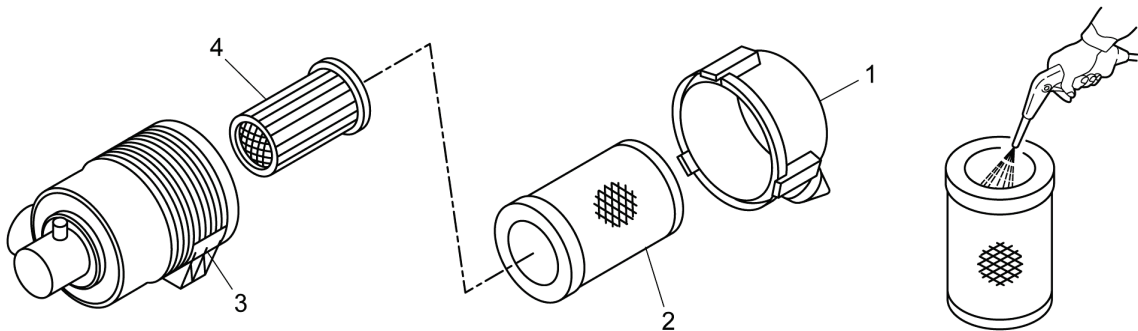
I0988596-102-0E

NOTICE

Clean or replace the element of the air cleaner if the air cleaner clogging warning indicator is found in daily inspection, regardless of the maintenance interval.

(T0988596-375-0E)

(2) Inspect and clean air cleaner element



CZ1C500100

- 1) Stop the engine.
- 2) Remove the cover (1), and take out the outer element (2).
Do not remove the inner element (4).
- 3) Clean the inside of the cover and the body (3).
- 4) From the inside of the element, directly blow dry compressed air (0.2 MPa (2 kgf/cm²)) above and below along the crimp of the filter. Maintain an appropriate spacing (50 mm or more) between the tip of the nozzle and the filter.

4. Inspection and servicing of each part

- 5) Emit light (white light) from the inside of the element and inspect for damage to the filter.

Do not use the filter if the filter is damaged, or has pin holes, or has particularly thin portions, or if the seal portion is damaged.

- 6) After the cleaning is completed, affix the element again.

- 7) Attach with the arrow mark (↑) is towards the up direction, and fix with a fixing metal catch.

NOTICE

- Replace the element with a new one, regardless of the replacement interval, if it is dirty with lamp soot, soot or oil.
- Do not pat, hit or drop the element.

(T0988548-142-0E)

- (3) Replace air cleaner element

Disassemble the air cleaner in the same manner as inspection and cleaning procedures and replace the element with a new one.



CAUTION

- Be sure to stop the engine when carrying out maintenance of the air cleaner.
If it is carried out while the engine is running, dust is sucked and the engine may be damaged.
- Put on protective goggles when cleaning the element using compressed air. Otherwise, dust may be put in your eyes, which is dangerous.

(T0988548-143-0E)

- (4) Cleaning and replacement intervals

Cleaning intervalEvery 250 hours or when the air cleaner clogging warning indicator appears on the display.

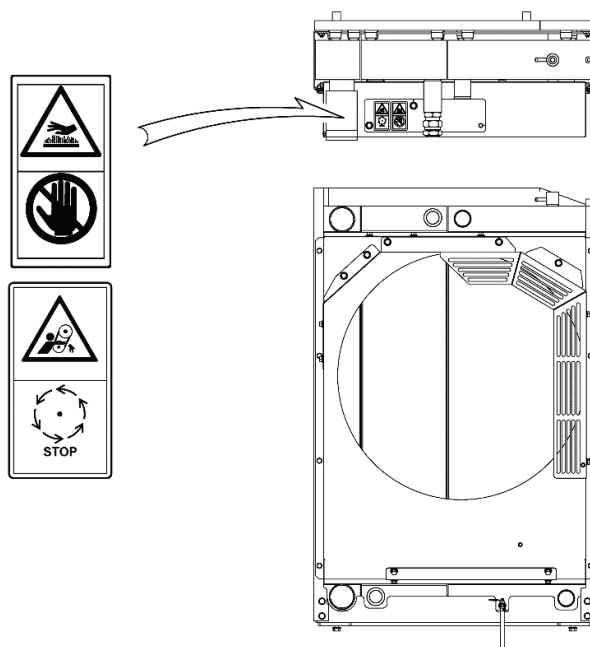
Replacement intervalEvery 500 hours of operation or yearly

- (5) Consumable part number

Refer to the "Data file, Parts list".

4-1-13 Cooling system (T0988596-072-0E)

As the engine runs, corrosion and water scale build up in the water jacket and the radiator, reducing their cooling efficiency and leading to overheating problems etc. It can also reduce the antifreeze effect of the Long Life Coolant added to the coolant, risking engine damage due to freezing. It is very important to regularly clean the cooling system and replace the coolant using the procedure described below.



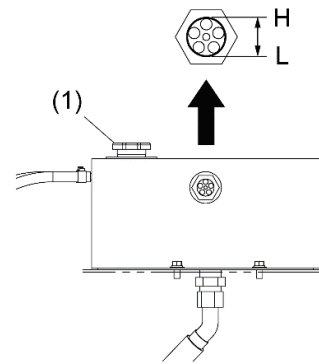
I0988596-103-0E

- (1) Intervals for inspection and cleaning of the cooling system and replacement of the coolant
 - 1) Water leakage, damage on the hoses, or looseness on the bands ... At the time of preoperational checks
 - 2) Coolant level inspection At the time of preoperational checks
 - 3) Coolant replacement Every 2 years
 - 4) Cooling system cleaning Every time the coolant is replaced.
 - 5) Long Life Coolant (LLC) KATO Diesel Long Life Coolant (non-amine)
 - 6) Long Life Coolant replenishment amount Adjust the concentration of KATO Diesel Long Life Coolant to 50%.
 - 7) Coolant adding Replenish coolant through the pressure cap on the top of the coolant tank.
 - 8) Water for coolant Distilled water is preferred; deionized or analyzed tap water is also acceptable.
 Tap Water Quality Requirements:
 Calcium/Magnesium: 170 ppm max
 (as $\text{CaCO}_3 + \text{MgCO}_3$)
 Chloride: 40 ppm max (as Cl)
 Sulfur: 100 ppm max (as SO_4)
 - 9) Radiator core cleaning Every 1 month or 100 hours of operation
 - 10) Inspection of the Long Life Coolant concentration Every 500 hours of operation or 1 year

4. Inspection and servicing of each part

(2) Inspecting and replenishing the coolant

Set the machine body on the level when checking the coolant level. Before starting the engine, be sure to check that the coolant level in the coolant tank is between the L and H marks on the sight glass. If the coolant level is low, open the pressure cap (1) of the coolant tank and replenish coolant.



I0988596-270-0

WARNING

When you inspect or replenish the coolant, check that it has cooled sufficiently.

(T218081-174-0E)

CAUTION

Be sure to measure the Long Life Coolant concentration when replenishing the coolant after the level inspection or when repairing coolant leakage. An inappropriate concentration of Long Life Coolant could cause damage to the engine.

(T0988548-142-1E)

(3) Addition of Long Life Coolant and calculation of its concentration

Coolant freezing temperature against addition volume of the Long Life Coolant (LLC)

Minimum outside temperature (°C)		-35
Mixing rate (%)		50
Mixing volume (L)	LLC volume (L)	19.3
	Water volume (L)	19.3
Coolant Total volume: 38.6 L		Engine: 9.5 L Radiator hose: 15.4 L Coolant tank: 13.7 L

(KATO Diesel Long Life Coolant)

(T0988596-073-0E)

Once you have finished adjusting the Long Life Coolant concentration, start the engine and allow it to mix the coolant fully, then use a hydrometer or concentration gauge to check the actual concentration.

(4) Precautions on handling Long Life Coolant

1) No fire near Long Life Coolant

Long Life Coolant is a hazardous substance and must not be handled near fire or other source of ignition.

CAUTION

Long Life Coolant is flammable, so beware of fire.

(T0988548-282-0E)

2) Do not drink Long Life Coolant

Ingestion of long-life coolant is harmful or fatal. Keep out of reach of children and pets.

FIRST AID: If swallowed, do NOT induce vomiting. Rinse mouth with water. Immediately call a POISON CENTER or doctor.

4. Inspection and servicing of each part

3) Never leave Long Life Coolant unattended or improperly stored

If you decant Long Life Coolant into smaller containers for storage, seal the container and clearly label the lid "COOLANT" respectively. Store them out of direct sunlight and out of the reach of children.

WARNING

- If you accidentally get Long Life Coolant in your eye, wash the affected area immediately in large amounts of clean water and consult a doctor.
- When you add or replace the coolant, check that it has cooled sufficiently.

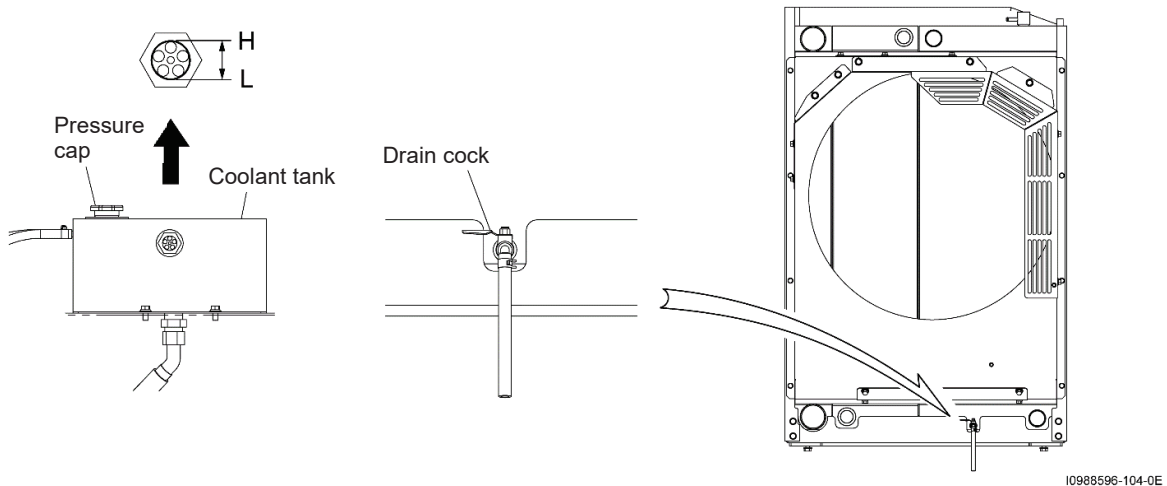
(T0988548-283-2E)

(5) Draining the coolant

WARNING

- When the radiator coolant is hot, it could spray out dangerously when you take the pressure cap off, possibly causing burns.
- If you have to take the pressure cap off, wait until the coolant has had time to cool and slowly loosen the cap to allow pressure to dissipate before you remove it.

(T0988596-074-0E)



- 1) Place a container under the radiator drain cock to catch any coolant spillage.
- 2) Remove the pressure cap.
- 3) Remove the cover from the bottom of the radiator.
- 4) Open the drain cock to drain the coolant from inside the radiator.
- 5) Once all coolant has drained out, close the drain cock.

(6) Cleaning the coolant flow lines

- 1) Drain the coolant from inside the radiator.
- 2) Fill the radiator with tap water up to the specified level.
- 3) Check and clean the pressure cap of the coolant tank. If there is any problem with the cap, replace it.
- 4) Tighten the pressure cap of the coolant tank securely.
- 5) Start up the engine and let it idle for 20 minutes. Then shut off the engine and wait until the engine has cooled adequately before draining the water.
- 6) Repeat the above steps until the drained water becomes clean.

4. Inspection and servicing of each part

(7) Adding the coolant

- 1) Check that the radiator drain cock is securely tightened.
- 2) Fill the radiator with the coolant up to the specified level. Add the coolant slowly to prevent inclusion of air.
 - Total coolant volume: About 38.6 L
- 3) Push on the upper radiator hose by hand several times to bleed the hose of air. If the coolant level decreases, add more coolant to raise the level. Repeat the above steps until the coolant level no longer decreases.
- 4) Tighten the pressure cap securely.
- 5) Start up the engine and let it idle for 5 minutes. Then shut off the engine.
- 6) Check that the coolant has cooled. If the coolant level has decreased, add coolant up to the specified level.
- 7) Run the engine at a slightly higher speed than the idling speed to bleed the cooling system of air.
- 8) If the water temperature indicator is stabilized, shut off the engine.
- 9) Check that the coolant has cooled. If the coolant level has decreased, add coolant up to the specified level.
- 10) Tighten the pressure cap securely.
- 11) Start up the engine and check that there is no coolant leakage.

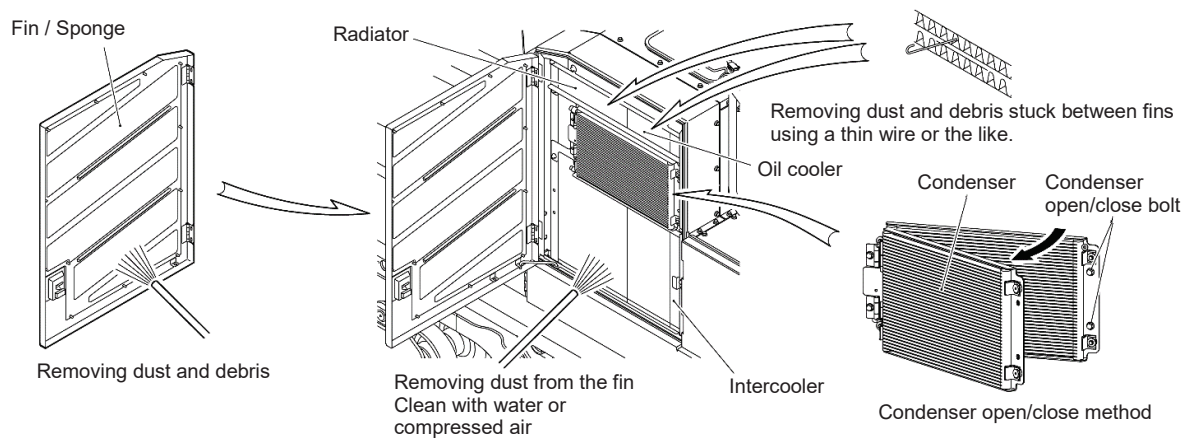
(8) Consumable part number

Refer to the "Data file, Parts list".

(9) Radiator core cleaning procedure

Dust and withered grass on the radiator core, oil cooler core, and intercooler core will impair the cooling effect and cause overheating.

- 1) To remove dust, open the cover, and perform blowing against the core with 0.2 MPa (2 kgf/cm²) or less of water or compressed air from a distance of 20 to 30 mm from the front surface and perpendicularly to it as far as possible.
- 2) If withered grass or other debris is stuck between the fins of the core, use a thin wire to remove it so as not to damage the fins. Remove dust and debris also from the protector net.



10988596-077-0E



CAUTION

- Be sure to put on protective goggles when cleaning the radiator core.
- Using too-high pressure of water or compressed air for cleaning may cause deformation of the radiator fins, which obstructs air flow and results in adverse effects. Take care to keep a sufficient distance between the blow nozzle and the core.

(01E0-0311-1E)

4-2 Hydraulic system-related (01E0-0315-0E)

4-2-1 Maintenance of hydraulic devices (01E0-0316-1E)

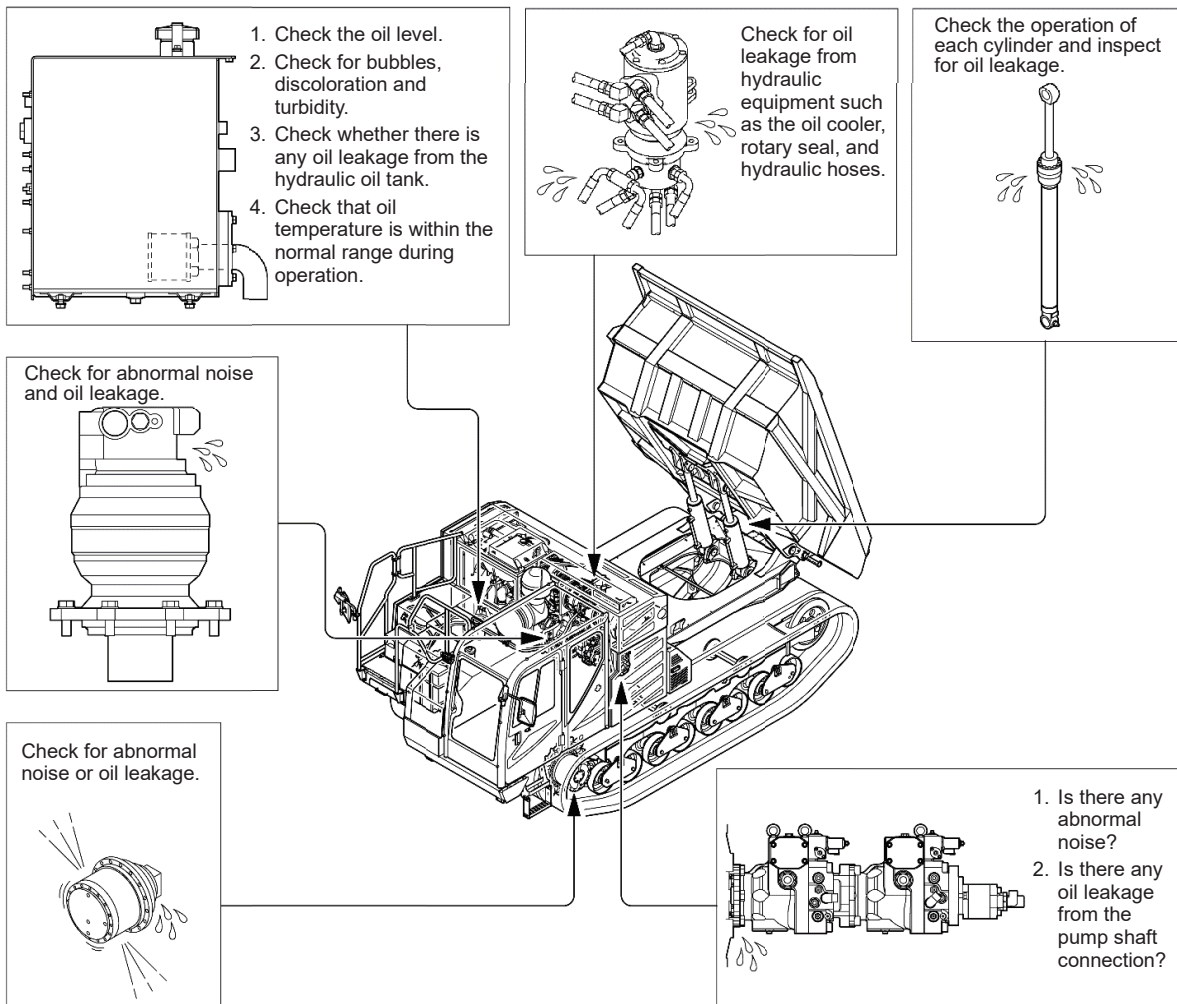
This machine is hydraulically powered and uses high-precision hydraulic equipment. Therefore if it is not operated and maintained correctly, its performance will be reduced and its lifespan shortened with an increased risk of malfunction. Always carry out the following daily inspections.

WARNING

- Never interfere with the pump regulator setting and relief settings of the control valve and brake valve.
- The bolts holding hydraulic equipment in place are under an extremely high force, so they are tightened to the right torque. In case of trouble, contact your authorised KATO dealer. Special bolts are used for attachment of hydraulic equipment, so you should not use normal commercially available ones which might cause breakdowns.
- If the hydraulic oil is hot, wait for it to cool before carrying out inspection and servicing. If you start work while the oil is hot, you may suffer severe burns.
- When you have replaced the hydraulic device, return filter or hydraulic oil, you should allow a running-in period of approximately 10 minutes at engine low speed with the control levers in their neutral positions (with no load applied).

(T0988596-160-0E)

(1) Daily inspection of hydraulic devices



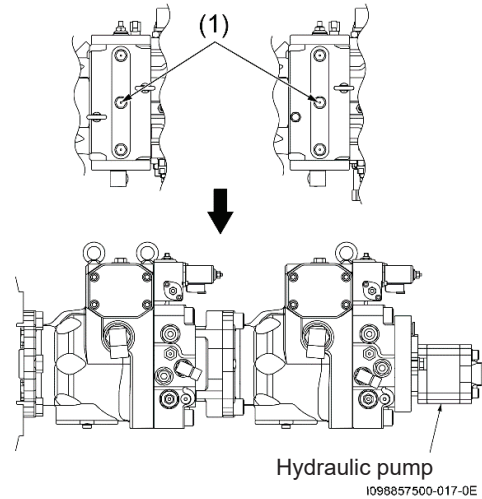
10988596-105-0E

4. Inspection and servicing of each part

4-2-2 Discharge air from the hydraulic pump (T0988548-155-0E)

- (1) Discharge air from the hydraulic pump.

Remove the air vent plugs (1) and make sure that air is discharged and oil flows out through the plug hole.



NOTICE

The hydraulic pump may be broken unless air is discharged.

Be sure to discharge air from the hydraulic pump after changing hydraulic oil or replacing the hydraulic pump.

(T0988548-156-0E)

- (2) Idle the engine for approximately two to three minutes at low speed. Bring the machine into the level checking posture and check the oil level. Refill hydraulic oil if insufficient.

4-2-3 Hydraulic oil level and refilling (T0988566-125-1E)

(1) Place the machine on a flat and rigid ground and bring it into the posture for checking the hydraulic oil. Stop the engine.

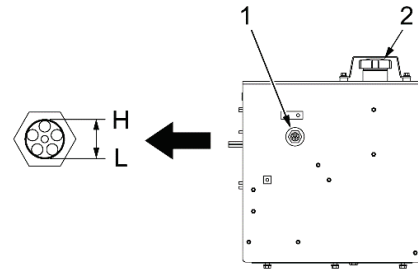
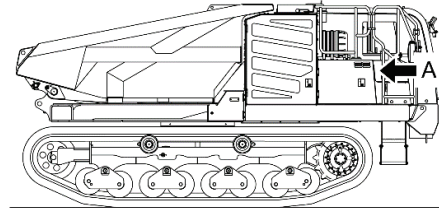
(2) Check the oil sight glass (1). If the oil level is between H and L, it is proper.

The oil level differs with the oil temperature. The following shows the standard.

- Near the L level before starting operation
(Oil temperature: 10°C to 30°C)
- Near the H level during operation
(Oil temperature: 50°C to 80°C)

(3) If the oil level is below the L level, refill hydraulic oil through the filler port (2).

Posture for checking the hydraulic oil



Detail A

T0988566-106-0E

4-2-4 Water drain from hydraulic oil tank (T0988566-126-0E)

WARNING

Oil is hot immediately after operation. You may get burnt if you touch oil.
Start work after oil has cooled down.

(T0988566-127-0E)

- (1) Loosen the drain plug under the hydraulic oil tank to drain water and sediment into a container.
- (2) Close the drain plug when clean hydraulic oil is only drained.
- (3) Check the hydraulic oil level. Refill oil if insufficient.

4. Inspection and servicing of each part

4-2-5 Change the hydraulic oil (T0988596-075-0E)

WARNING

- Safety pins must be locked before working with vessel raised.
- Oil is hot immediately after operation. You may get burnt if you touch oil. Start work after oil has cooled down.

(T0988596-076-0E)

(1) Place the machine on a flat and rigid ground and bring it into the posture for changing hydraulic oil. Stop the engine.

(2) Discharge hydraulic oil through the filler port (1) into an empty drum with an oil pump.

(3) Put the container under the drain plug (2) at the bottom of the hydraulic oil tank, and remove the drain plug to discharge residual oil.

Tighten the drain plug after discharging oil.

(4) Disconnect the hose from the tube (3). Remove the bolt (4) and take out the strainer (5).

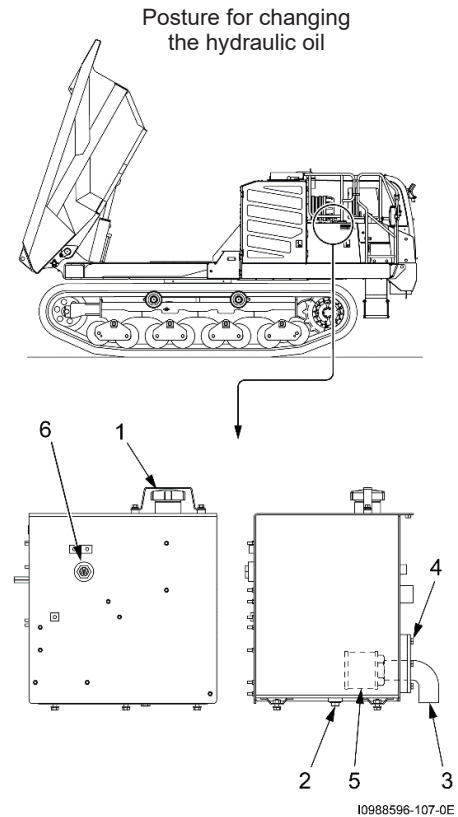
(5) Clean the strainer (5) to remove dust and foreign matters.

(6) Attach the strainer in the reverse order to step 4.

(7) Fill the tank with hydraulic oil through the filler port up to the L level of the level gauge (6). Tighten the filler port plug.

(8) Store the safety pins and start the engine. Keep the engine running with no load for approximately 5 minutes. Travel the machine and move the dump cylinder slowly several times. Bring the machine into the posture for checking the hydraulic oil level. Stop the engine.

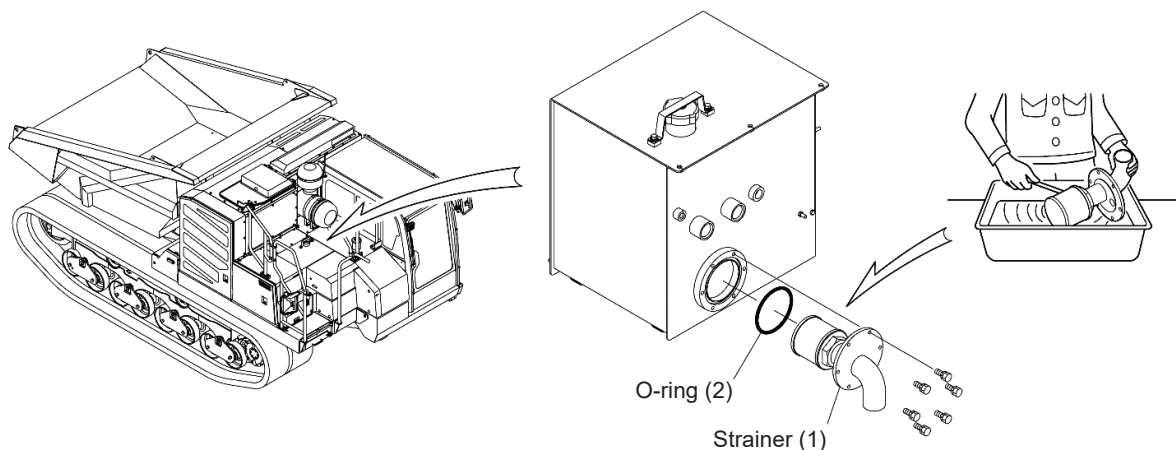
(9) Make sure that the hydraulic oil level is within the proper range. Refill hydraulic oil if insufficient.



4-2-6 Cleaning and replacement of the suction strainer (T0988585-125-0E)

(1) Cleaning and replacement procedure

- 1) Take out the strainer (1) from inside of the hydraulic oil tank.
- 2) Clean the strainer (1) with a clean, non-flammable solvent and dry it thoroughly.
- 3) Inspect the strainer and O-ring (2) and replace them if they are damaged.



10988596-108-0E

(2) Cleaning and replacement intervals

Cleaning interval When you change the hydraulic oil

Replacement interval When defective

(3) Consumable part number

Refer to "Data file, Parts list".

4. Inspection and servicing of each part

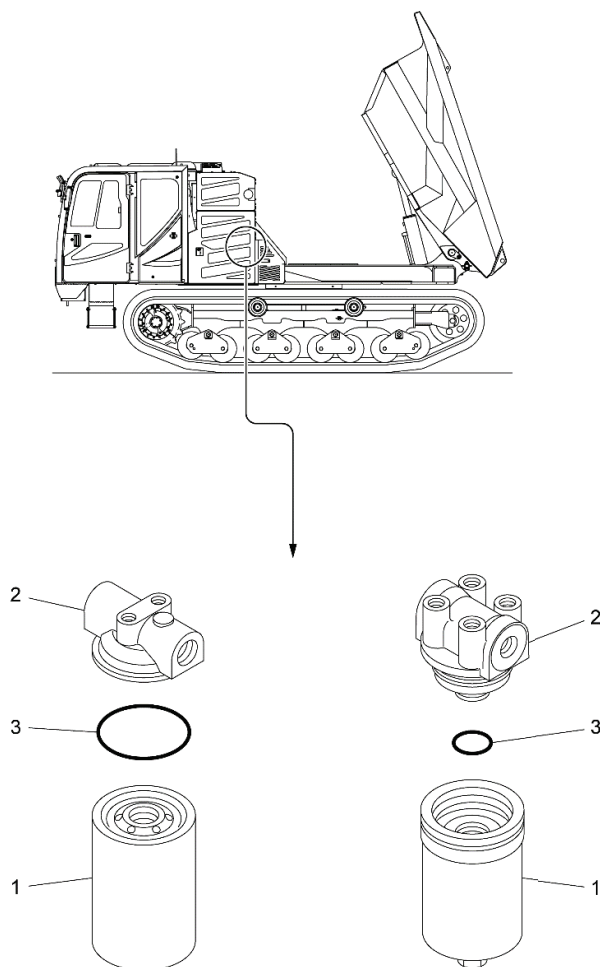
4-2-7 Replace the line filter cartridge and return filter cartridge (T0988596-077-0E)

WARNING

- Safety pins must be locked before working with vessel raised.
- Oil is hot immediately after operation. You may get burnt if you touch oil. Start work after oil has cooled down.

(T0988596-078-0E)

- (1) Remove the filter cartridge (1) with the filter wrench.
- (2) Clean the filter mounting position of the filter head (2). Apply hydraulic oil to the O ring (3) of a new filter cartridge.
- (3) Attach the filter cartridge and tighten it with the filter wrench.
Tighten it until the O ring is crushed and the top of the cartridge is brought into contact with the head.
Tightening torque of line filter cartridge: 49 N·m (5.0 kgf·m)
Tightening torque of return filter cartridge: 13.7 to 16.7 N·m (1.4 to 1.7 kgf·m)
- (4) Start the engine. Make sure that no oil leaks from the mounting position of the filter cartridge.
- (5) Store the safety pins, lower the vessel and check the oil level in the hydraulic oil tank.
It is OK if the oil level is between the H and L positions of the level gauge.
Refill hydraulic oil if insufficient.

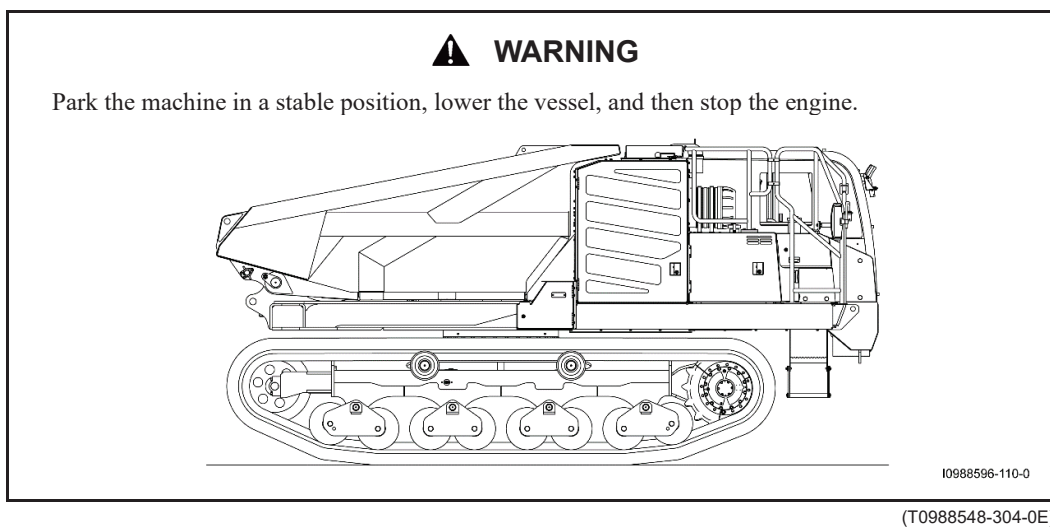


Return filter

Line filter

10988596-109-0E

4-3 Travel-related (01E0-0344-0E)



4-3-1 Oiling the idlers (T0988566-132-0E)

Make sure no oil is leaking from the plugs of the idlers. If any oil is leaking, please inspect and add oil at your authorised KATO dealer. Operating the machine with oil leaking from the front idler could damage the travel system.

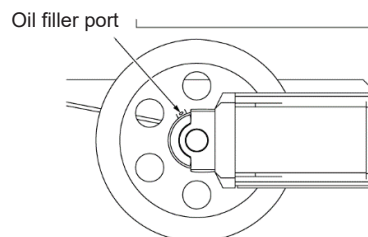
(1) Inspection and oiling intervals

Inspection interval At the time of preoperational checks

Oiling interval When defective

Oil volume (per front idler) 0.3 L

Oil for oiling Engine oil SAE#30 API-CD or higher grade



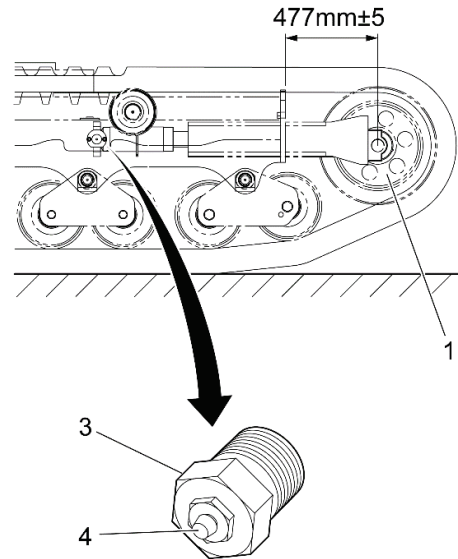
10988566-069-0E

4. Inspection and servicing of each part

4-3-2 Inspection and adjustment of tension of rubber crawlers (T0988596-079-0E)

(1) Checking tension of the rubber crawlers

- 1) Place the carrier on a flat and rigid ground.
- 2) Set the distance between the idler tumbler (1) and the crawler frame end according to the set dimension below.
Set dimension: 477 ± 5 mm



I0988596-111-0

NOTICE

- Adjust the right and left rubber crawlers evenly.
- If the rubber crawlers are not tensioned properly, the cylinders may be defective. Ask our sales service dealer for repair services.

(T0988566-134-0E)

(3) Loosening the rubber crawlers

- 1) Remove dirt and soil from around the idle tumblers.
- 2) Loosen the check valve until grease is discharged (by a maximum of one turn) little by little. Do not loosen it when grease is discharged.
- 3) Rotate the rubber crawlers forward and backward slightly if grease is hardly discharged.
- 4) Tighten the check valve when the rubber crawlers are tensioned properly.
Tightening torque: 59 to 69 N·m (6 to 7 kgf·m)

NOTICE

Be careful not to over-tighten the check valve.

(T0988566-135-0E)

- 5) Rotate the rubber crawlers forward and backward and check tension. Re-adjust it if necessary.

WARNING

- When the rubber crawlers are tensioned intensely, the internal pressure in the grease cylinder is very high. Do not remove any parts before the pressure is zeroed.
- To relief the pressure, loosen the check valve gradually. Do not loosen it when grease is discharged. (It should be loosened by a maximum of one turn.)
- Grease may spout out at high pressure. Never loosen the grease nipple.
- Do not bring your face or hand close to the check valve during adjustment.

(T0988566-136-1E)

4-3-3 Travel reduction gear (T0988596-080-0E)

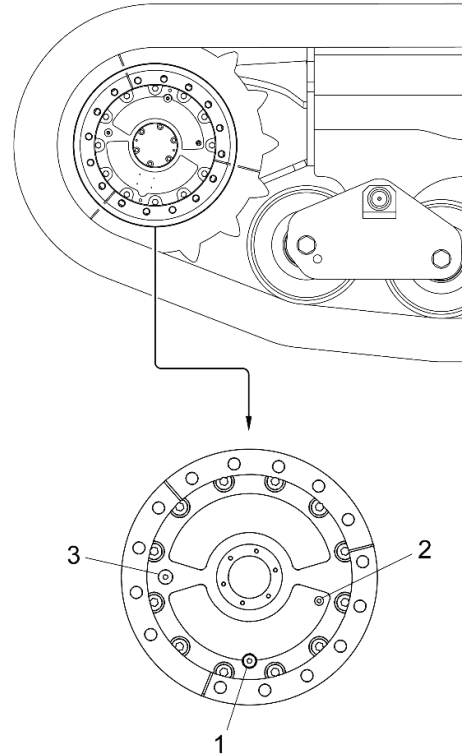
(1) Check the travel reduction oil level

⚠ WARNING

- Immediately after traveling, the gear case, oil, etc. are hot. Start work after they have cooled down.
- If pressure remains in the case, oil or plug may jump out. Loosen the plug slowly to reduce the pressure.

(T0988566-138-0E)

- 1) Position the drain port (1) at the lowest point.
- 2) Remove the plug from the level port (2). The appropriate oil level is where the oil reaches near the bottom of the plug hole.
- 3) Refill oil through the filler port (3) if oil is insufficient.
- 4) After check and refilling, clean the plugs and attach them.
Tightening torque:
Oil level port: 30 N·m (M10×1.0)
Oil filler port and drain port: 140 N·m (M18×1.5)



I0988596-112-0

(2) Change the travel reduction oil

- 1) Position the drain port (1) at the lowest point.
- 2) Put the container under the drain port.
- 3) Remove the oil filler plug and level plug, and then remove the drain plug to discharge oil.
- 4) Attach the drain plug.
- 5) Fill the specified quantity of gear oil through the filler port.
Oil volume (per 1 travel reduction gear): 3.1 L
Gear oil: ISO-VG220
- 6) Attach the level plug when oil is discharged through the level port.

4. Inspection and servicing of each part

4-4 Electrical system-related (01E0-0363-0E)

4-4-1 Battery handling (T0988585-041-0E)

This machine uses a 24 V (12 V+12 V) battery with a negative earth. Observe the following precautions when handling the battery.

WARNING

- 1) When handling the battery system, wear a protective eyewear, protective gloves, and long-sleeved working clothes.
- 2) The battery electrolyte used is dilute sulfuric acid, so keep it away from your eyes, skin, clothing and any metal components. If it comes into contact with any of them, wash it away with large amounts of water. (In case of personal contact, consult a doctor after washing.)
- 3) The batteries generate flammable hydrogen, so do not use flame or other source of ignition near the batteries.
In particular take care when welding.
- 4) Before inspecting/servicing the battery or servicing the electric system, turn OFF the engine key switch, make sure that the power ON indicator lamp is off, and then turn the battery disconnect switch to the OFF position for safety operation. As necessary, disconnect the battery negative terminal connection.
- 5) Before welding, turn OFF the engine key switch, make sure that the power ON indicator lamp is off, and then turn the battery disconnect switch to the OFF position for safety operation. As necessary, disconnect the battery negative terminal connection. If you first disconnect the battery cable from the negative terminal, the electronic device could malfunction.
- 6) When detaching the battery cable, always begin with the negative terminal and when reattaching the battery cable, begin with the positive terminal. Take care to connect the terminals correctly.
- 7) Handle the batteries with care. In particular do not charge them near flame or a source of ignition and do not dispose of them in fire as an explosion could result.
- 8) Never take the batteries apart or make holes in the casing.
Any resulting leakage could cause dangerous corrosion and personal injury.
- 9) When recharging the batteries, dismount them from the machine, remove all bungs and place them in a well-ventilated area.

(T0988596-081-0E)

4. Inspection and servicing of each part

(1) Battery electrolyte level inspection



CAUTION

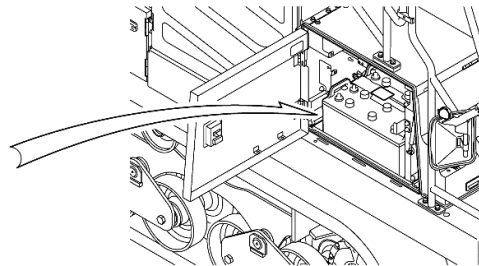
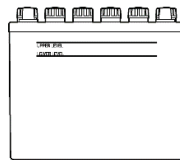
When performing the preoperational checks, be sure to check the batteries for the electrolyte level and refill if they are insufficient. If the electrolyte level is below "LOWER", the battery could explode when starting the engine.

(01E0-0366-0E)

The battery electrolyte level should be between the "UPPER" and "LOWER" level lines.

If it is below the "LOWER" level, top it up with battery electrolyte or distilled water to the "UPPER" level. Do not top up beyond the UPPER level.

Check the indicator, and if <Insufficient electrolyte> indicator appears, replenish the electrolyte.



10988596-078-0E

(2) Battery terminal inspection

Check for loose terminals and clean away dirt and corrosion.

- 1) If the terminals are covered with whitish powdery corrosion, wash it with away with boiling water.

If corrosion is severe, use a wire brush or sandpaper to scrape it away.

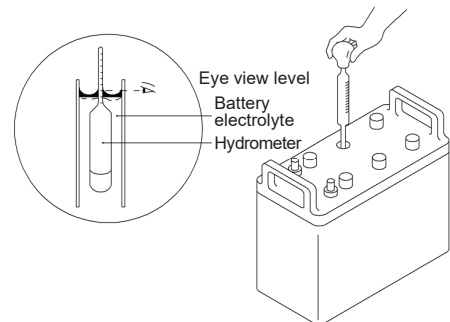
- 2) After cleaning the terminals, coat them in a thin layer of grease.

3) Specific gravity inspection

Full charge 1.28 (at 20°C)

Half charge 1.22

You must recharge the battery if the specific gravity is at or below 1.22.



01E0-04080E

(3) Battery inspection and cleaning intervals

Inspection of electrolyte volumeInspection before starting work

Inspection of specific gravityEvery 250 hours

Cleaning of terminal.....Every 250 hours

4. Inspection and servicing of each part

4-4-2 How to start the engine using the booster cables (T218081-084-0E)

WARNING

Precautions to observe when using the booster cables to start the engine

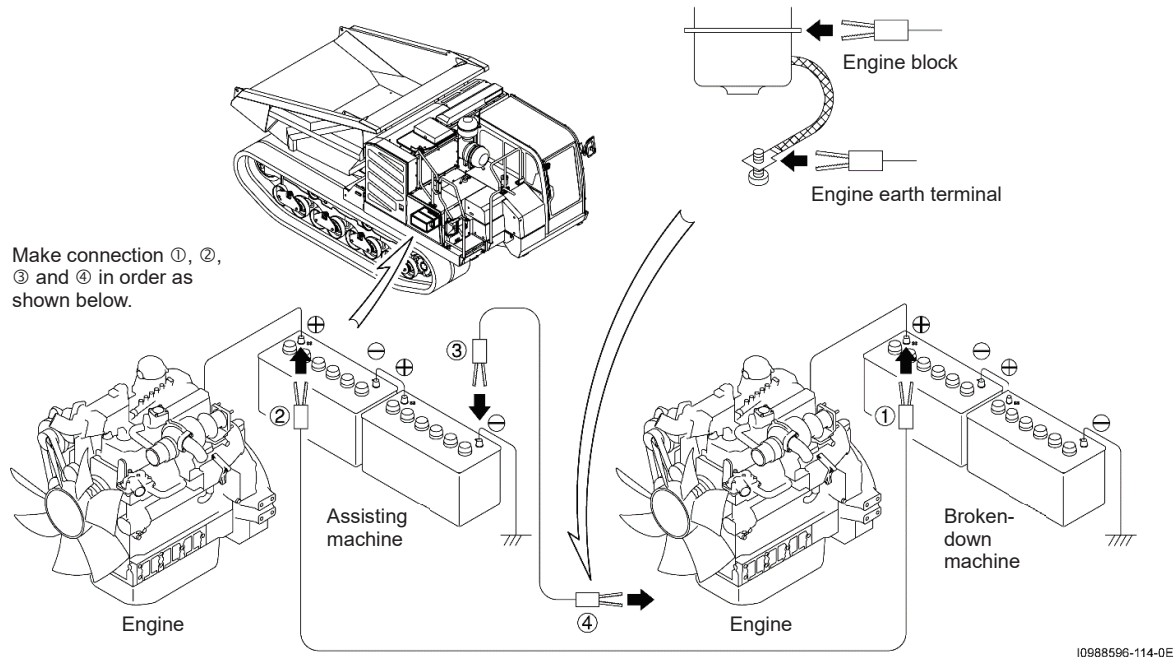
- When you are going to start the engine, refer to the section "Battery handling" in order to handle the battery correctly.
- Always wear protective goggles when you start the engine.
- Confirm the procedure for attaching the booster cables.
Incorrect booster cable attachment can cause accidents and breakdowns such as battery explosion or shorting in the electrical system.
- When you connect the booster cables, never connect the positive and negative terminals to each other.
- This machine uses 24 V battery capacity. The assisting machine should have the same specifications of the battery (voltage, capacity) as the broken-down machine has. Also use the right booster cables and clips for the battery capacity. If you use high-voltage sources such as those for welding equipment, or if you use a battery of a different voltage, you will damage the electrical equipment.
- When you are trying to start the engine, switch off all lights and accessories on the machine which has failed to start.
It is dangerous to operate any accessories while the outside power supply is connected.
- Park the assisting machine so it is not in contact with the broken-down machine. If they do touch, a short circuit will result, possibly damaging electrical equipment.
- In order to prevent the electrical components of the failed machine from getting damaged, turn the battery disconnect switch to the OFF position "⊖" before installing the booster cable.
- When you detach the booster cables, do not allow the clips to touch each other or the machine.

(T0988548-183-1E)

4-4-3 Starting engine with booster cables (T0988566-139-1E)

(1) How to start the engine using booster cables

- 1) Stop the engines of the assisting machine.
- 2) Connect one end ① of the red booster cable to the positive battery terminal of the broken-down machine and the other end ② to the positive battery terminal of the assisting machine.



- 3) Connect one end ③ of the black booster cable to the negative battery terminal of the assisting machine. Connect the other end ④ of the booster cable to the engine block or engine earth terminal of the broken-down machine.
- 4) Check the connections of the booster cables then start the engine of the assisting machine and increase its speed.
- 5) Start the engine of the broken-down machine. If it does not start, wait at least two minutes and try again.

(2) Booster cable disconnection procedure

- 1) Disconnect one end ④ of the black booster cable from the engine block or the engine earth terminal of the broken-down machine. Disconnect the other end ③ from the negative battery terminal of the assisting machine.
- 2) Disconnect one end ② of the red booster cable from the positive battery terminal of the assisting machine. Disconnect the other end ① from the positive battery terminal of the broken-down machine.
- (3) If anything abnormal occurs during or after starting the engine, turn the starter key to the "OFF" position to stop the engine and contact your authorised KATO dealer.

4. Inspection and servicing of each part

4-4-4 Replacement of bulbs (T0988548-187-0E)

Always switch the engine key switch and lamp switches "OFF" before you start to replace the bulb.

Only use bulbs of the correct rated voltage and wattage.



CAUTION

Always replace the bulb with that of the specified capacity. If you use the bulb or LED light in excess of the rated capacity, the excess power consumption will cause accidents by blowing the fuse, burning to damage the relay or igniting electrical insulation.

(T0988552-051-0E)

(1) Consumable part number

Refer to the "Data file, Parts list".

4-4-5 Replace the fuses (T0988548-188-0E)

NOTICE

- Be sure to turn the battery disconnect switch to the OFF position before replacing fuses.
- Do not use wires, silver foils, etc. instead of fuses.
If such materials are used, the wires may overheat and burn, resulting in a fire.

(T09885966-180-0E)

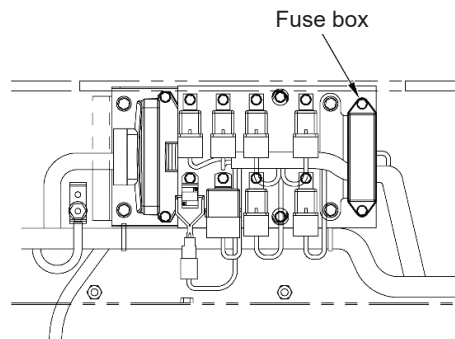
(1) Set the engine key switch key to the OFF position.

(2) Take off the fuse cover.

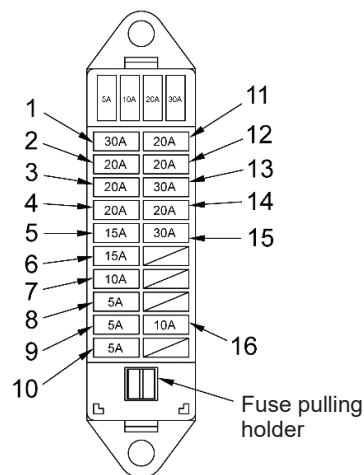
(3) Replace the blown fuse with a new fuse of the same capacity by using the fuse pulling holder installed in the fuse box.

	Fuse capacity	Circuit name
1	30 A	ENGINE ECU
2	20 A	BACK UP
3	20 A	DEF HEATER
4	20 A	RESERVE
5	15 A	AFTER TREATMENT
6	15 A	DEF PUMP
7	10 A	SERVICE TOOL
8	5 A	RESERVE
9	5 A	ENGINE IGN
10	5 A	RESERVE
11	20 A	TRAVEL SPEED, PARKING, LEVER LOCK
12	20 A	A/C
13	30 A	LIGHT UNIT
14	20 A	ACCESSORY POWER SOCKET
15	30 A	WORKING LIGHT (OPT)
16	10 A	RADIO,USB

(T0988596-181-0E)



10988566-071-0E



10988596-115-0E

4-4-6 Replace the fusible link (T0988548-190-0E)



CAUTION

- When the fuse has blown, investigate the cause carefully and repair the problem completely before attaching the fuse.
- Be sure to use the fuse with the designated ampere.

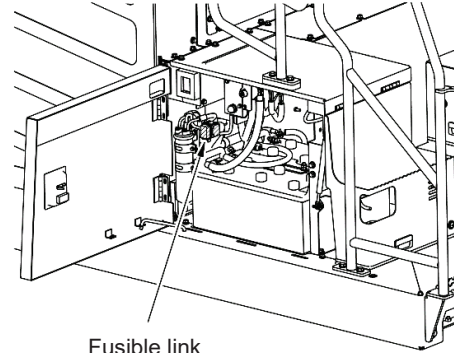
(T0988548-191-0E)

High current fuses are placed to blow and protect the circuit if a large current flows in the circuit between the batteries and the fuse box due to a short circuit or other problem.

If there are no abnormalities in the fuses and a problem occurs in the electrical system, the fusible link has blown. Contact your authorised KATO dealer and replace the fusible link after the problem has been repaired.

- (1) Consumable part number

Refer to the "Data file, Parts list".



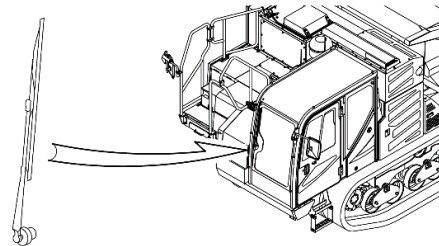
10988596-116-0E

4-4-7 Inspection and replacement of the wiper blade (T218081-203-0E)

Operate the wiper switch to check that the wiper works and that the wiper blade is not damaged. Replace the wiper blade if it is worn or damaged.

- (1) Consumable part number

Refer to the "Data file, Parts list".



10988596-258-0

4. Inspection and servicing of each part

4-5 Travel-related (T0988548-192-0E)

4-5-1 Rubber shoe maintenance (T0988548-193-1E)

Rubber shoe should be repaired or exchanged if goes into any of the conditions described below.

If it is necessary to repair or replace it, contact our dealer.

(1) Height of lug

The rubber shoe can be used even if it is worn, however, if it is excessively worn, the rubber shoe is likely to be slippery and more travel force is required. If the remaining lug is less than 5 mm high, exchange it with brand-new one.

(2) Exposure of steel cord

If steel cord is exposed because of weary rubber or damage, exchange it with brand-new one.

(3) Cutting of steel cord

Replace immediately if more than half of the steel cord layer on one side has been cut.

If this is left as it is, the rubber shoes breaks suddenly during operation, thereby leading to a serious accident.

(4) Crack of covering rubber

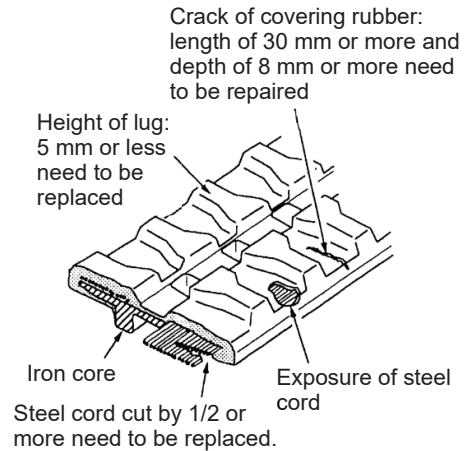
If a crack is 30 mm or more long and 8 mm or more deep, repair the covering rubber immediately. If steel cord appears even if a crack is small, repair it immediately. Otherwise, water may come into a crack, which rusts steel cords and cuts off the rubber shoe.

(5) Dislocation of the iron core

Exchange the rubber shoe with a new one if one or more iron cores are dislocated from it.

(6) Adjustment procedure

Refer to the "4-3-2 Inspection and adjustment of tension of rubber crawlers".



Damages of rubber shoe

WC-C300630J

4-6 Air conditioner-related (01E0-0376-0E)

Have the air conditioner inspected and serviced regularly to maintain it at full performance.



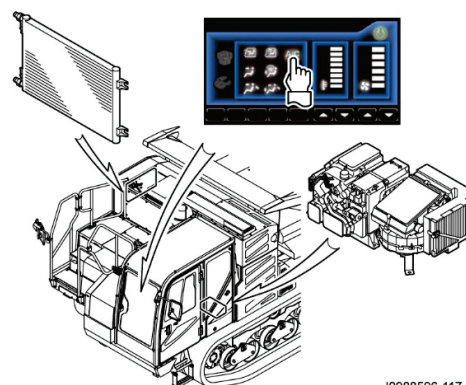
CAUTION

- If the air conditioner malfunctions, switch it OFF and contact your authorised KATO dealer.
 - Filling with refrigerant (gas) and other service tasks require special tools and instruments and should only be attempted in a properly equipped KATO dealer.
 - The refrigerant used for this air conditioner is HFC-134a. The classification number of the refrigerant (chlorofluorocarbon) and the amount of refrigerant filled in at the time of factory shipment are shown on the label attached on the cover behind the operator's seat.
- Always have air conditioner repairs performed by your authorised KATO dealer. Always have it disposed of by a reputable waste disposal company.

(T0988596-083-0E)

NOTE

Even in seasons when the air conditioner is not used, run it with the automatic control switch turned OFF (manual control) and compressor switch turned ON for a few minutes two or three times per month to circulate oil to all parts of the compressor and maintain their oil coating.



10988596-117-0

4-6-1 Inspection and servicing list (T0988566-208-0E)

(1) Intervals for inspection, cleaning, and replacement

- 1) Inspection of the internal air filter and outside air filter At the time of preoperational checks
- 2) Replacement of the internal air filter and outside air filter..... Every 2,000 hours of operation or 2 years
- 3) Inspection of the condenser..... At the time of preoperational checks
- 4) Cleaning of the condenser..... Every 100 hours of operation or 1 month
- 5) Crack or damage on the compressor belt..... At the time of preoperational checks
- 6) Inspection of the refrigerant volume..... Every 500 hours of operation or 6 months
- 7) Looseness, damage, or gas leakage of the connection piping Every 500 hours of operation or 6 months
- 8) Replacement of the receiver drier Every 2,000 hours of operation or 2 years
- 9) Replacement of the air conditioner compressor belt Every 3,000 hours



CAUTION

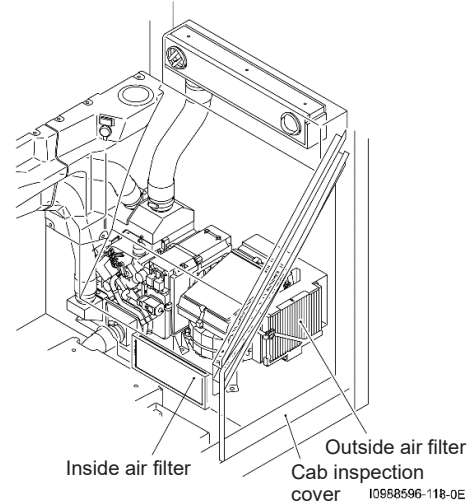
For refilling the refrigerant, refer to a separate servicing manual to check for refilling the volume and method.

(01E0-0380-0E)

4. Inspection and servicing of each part

4-6-2 Filter inspection, cleaning, and replacement (T0988566-182-1E)

The air conditioner unit includes filters to prevent dust, debris, or other matter from accumulating on the evaporator or heater core. Periodically remove the filters to inspect them and clean them by lightly hitting them, to the extent it does not damage the plastic frame. If filter blockage is not resolved by cleaning or there is significant deterioration or damage, install a new replacement filter.



(1) Removing and installing filters

1) Internal air filter (location: behind the operator seat)

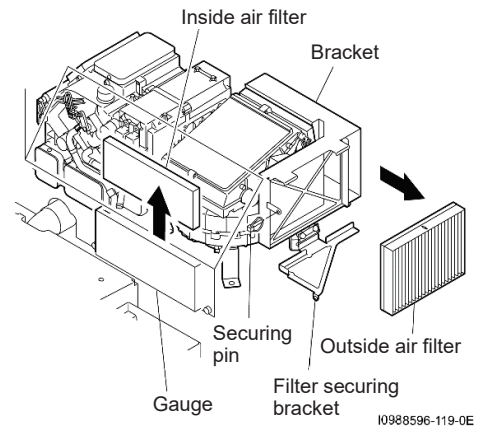
Removal: Pull the filter out from the above.

Installation: Install the filter by reversing the removal steps.

2) Outside air filter (location: cab rear side)

Removal: Open the cab inspection cover and remove the filter fixing pin. Then, open the filter fixing bracket and remove the filter.

Installation: Install the filter by reversing the removal steps. Make sure that the filter is held by the bracket claws.



(2) Consumable part number

Refer to the "Data file, Parts list".

4-6-3 Inspection of refrigerant (gas) volume (T218081-204-0E)

The refrigerant for this air conditioner is HFC-134a. Never fill the air conditioner with any other refrigerant.

1) Conditions for evaluating refrigerant volume

Engine speed: Low idling
 Air volume switch: Strong
 Temperature setting switch: Maximum cooling
 Pressure on high-pressure side: 1.41 to 1.61 MPa
 (14.4 to 16.4 kgf/cm²)
 (Block the front of the condenser by the right amount to produce a pressure in this range.)

Door: Fully open

Windows: Fully open

2) Evaluation guidelines

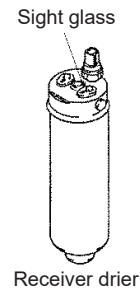
Compare the state of bubbling visible through the sight glass with the diagrams below.

Refrigerant volume	Status seen from the sight glass	Action
○ Correct	After the air conditioner is turned on, a very small amount of bubble is visible, becoming transparent. 	
✕ Incorrect	After the air conditioner is turned on, bubbles are continuously visible. 	Have your authorized KATO dealer check and refill with refrigerant.

(Explanation of refrigerant flow illustrations)

 Bubbling: Refrigerant is liquid with extensive mixing of vapour and liquid phases.

○ Bubbles have disappeared: As all the refrigerant becomes liquid, it turns transparent.

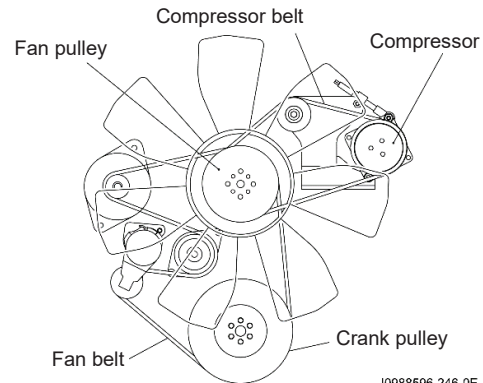


01E0-04170

4-6-4 Belt inspection (01E0-0383-0E)

Check that the compressor belt and fan belt are not loose or worn.

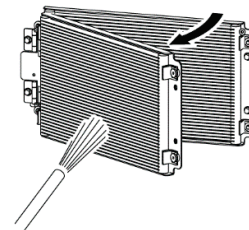
A loose compressor belt may slip and reduce the cooling effect. A loose fan belt may cause overheating and a dead battery.



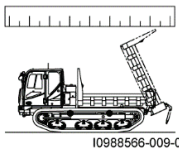
10988596-246-0E

4-6-5 Inspection for blockage in the radiator and condenser (T218341-116-0E)

If the radiator and condenser are clogged with mud, insects etc., the passage of air will be obstructed, causing overheating and reduced cooling performance. Clean them regularly according to the section "4-1-13 Cooling system, (9) Radiator core cleaning procedure".



10988585-081-0



Data file

- 1. Tighten bolts 165
 - 1-1 Special tightening positions..... 165
 - 1-2 Tightening torque for meter screw standard bolt..... 168
 - 1-3 Tightening torque for joint related to hydraulic and pneumatic equipment..... 168

- 2. Parts list 173

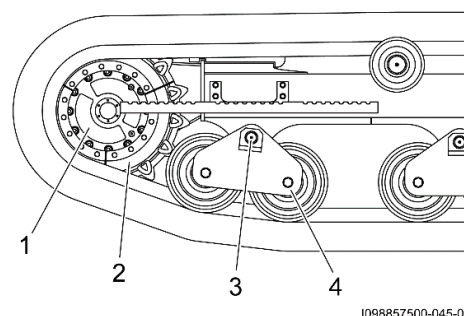
1. Tighten bolts (T0988566-144-0E)

Retighten loose bolts in daily inspection. Be sure to make up for lacking bolts. Check and retighten the bolts after the first 50 hours if a new machine is used.

1-1 Special tightening positions (T0988566-145-0E)

The bolts shown below bear large forces. Tighten them at the torque shown in the table below.

When these bolts and nuts are replaced, apply a high-strength threadlocker to the threads and tighten to the specified torque in the table below to prevent loosening from vibration.



(1) Travel unit

No.	Tightening position	Bolt size	Width across flat (mm)	Tightening torque	
				(N·m)	(kgf·m)
1	Travel reduction gear	M20	30	621	63.3
2	Drive sprocket	M20	17 (Socket screw)	621	63.3
3	Oscillating link	M30 Castle nut	46	476	48.6
4	Lower roller	M24	36	1073	109.4

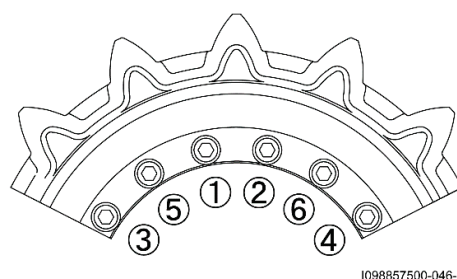
(T0988596-004-0E)

- Precautions in attaching the drive sprocket.

Observe the following procedures when attaching the drive sprocket.

- 1) Bring the inner surface of the sprocket into close contact with the motor spigot when attaching the sprocket.
- 2) Tighten all of six bolts with the threadlocker applied at a torque of 245 to 295 N·m first.
- 3) Then, tighten the bolts in the order shown in the figure at the specified torque of 621 N·m.

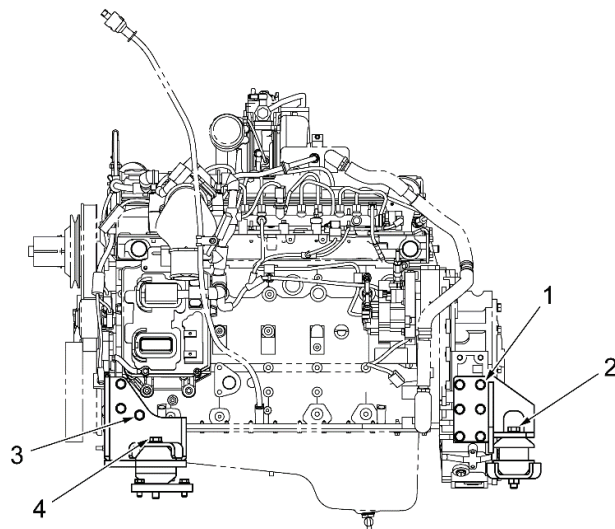
Tighten the bolts quickly since threadlocker is applied to them.



1098857500-046-0

1. Tighten bolts

(2) Engine

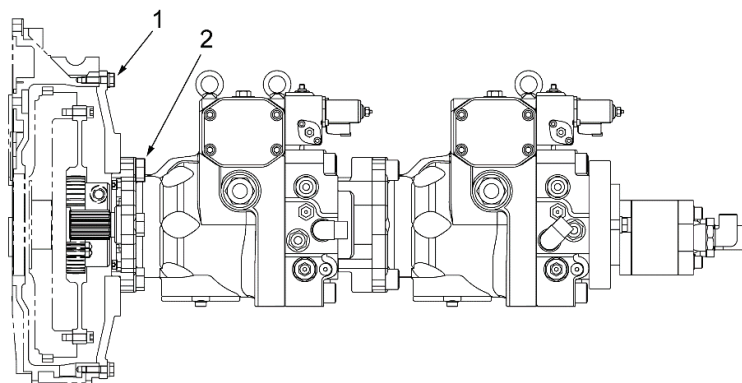


I0988596-120-0

No.	Tightening position	Bolt size	Wrench size (mm)	Tightening torque	
				(N·m)	(kgf·m)
1	Engine and bracket (rear)	M12	19	87	8.9
2	Bracket and frame (rear)	M16	24	241	24.6
3	Engine and bracket (front)	M12	19	87	8.9
4	Bracket and frame (front)	M16	24	241	24.6

(T0988566-146-0E)

(3) Hydraulic pump

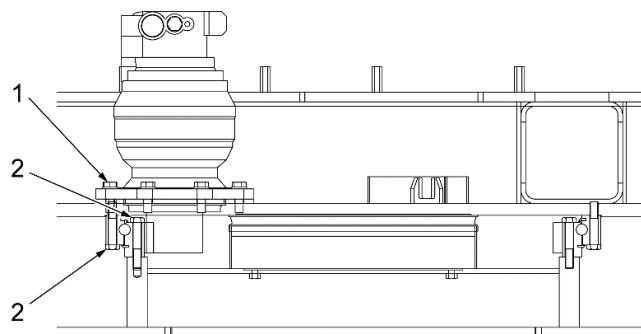


I0988596-121-0

No.	Tightening position	Bolt size	Wrench size (mm)	Tightening torque	
				(N·m)	(kgf·m)
1	Engine and pump housing	M10	17	73	7.4
2	Pump housing and hydraulic pump	M20	30	476	48.5

(T0988575-005-0E)

(4) Swing unit



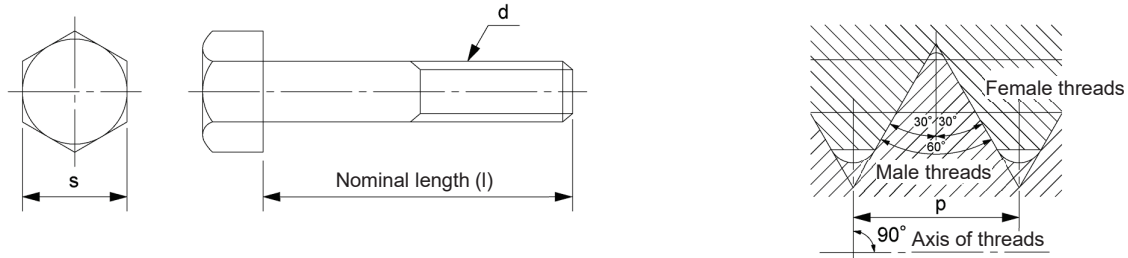
I0988596-122-0

No.	Tightening position	Bolt size	Wrench size (mm)	Tightening torque	
				(N·m)	(kgf·m)
1	Swing motor	M16	24	318	32.4
2	Swing bearing	M16	24	318	32.4

(T0988585-045-0E)

1. Tighten bolts

1-2 Tightening torque for meter screw standard bolt (0099-0238-0E)



0099-02130E

[Standard]

Units: N·m

Nominal thread size (d)	Standard dimension (s)	Pitch (p)	Strength classification				
			4.6	7T (reference)	8.8	10.9	12.9
M6	10	1.00	4	8	10	15	17
M8	13	1.25	9	18	24	35	41
M10	17	1.50	18	37	48	73	85
M12	19	1.75	31	67	87	127	149
M14	22	2.00	52	106	139	204	238
M16	24	2.00	81	166	217	318	371
M18	27	2.50	112	228	298	438	512
M20	30	2.50	159	324	423	621	725
M24	36	3.00	274	560	731	1073	1254
M27	41	3.00	404	824	1076	1580	1846
M30	46	3.50	546	1116	1456	2139	2498

[Fine]

Units: N·m

Nominal thread size (d)	Standard dimension (s)	Pitch (p)	Strength classification	
			7T (reference)	8.8
-	-	-	-	-
M8	13	1.00	20	26
M10	17	1.25	38	54
M12	19	1.25	74	96
M14	22	1.50	116	151
M16	24	1.50	179	233
M18	27	1.50	260	339
M20	30	1.50	363	474
M24	36	2.00	617	805
M27	41	2.00	896	1169
M30	46	2.00	1248	1629

(T218951-087-0E)

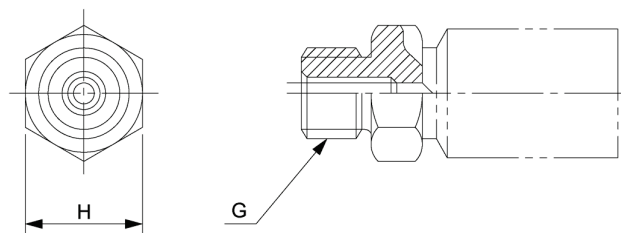
1-3 Tightening torque for joint related to hydraulic and pneumatic equipment

(T218951-088-0E)

- (1) The tolerance for the torque values is $\pm 10\%$.
- (2) The unit for the torque values is N·m (kgf·m).
- (3) Never allow oil to adhere on the threads or the rotating section of the nut.
- (4) When tightening, secure the socket with a spanner so that it does not rotate along with the joint with the female thread.

The torque values are based on the screw sizes regardless of difference in the width across faces.

- (5) Joint with O-ring (made of steel)



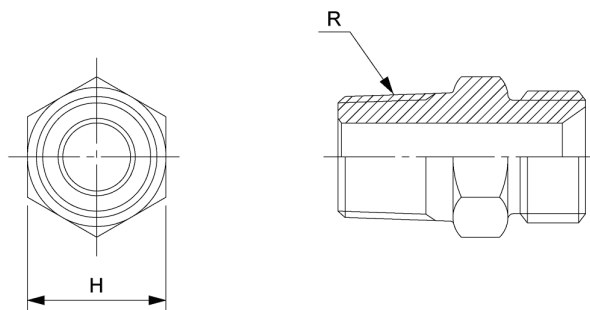
0099-02140

Units: N·m

Screw size (G)		1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Width across faces (H) (mm)		14	19 (17)	22	27	36 (32)	41	50	55 (60)	70
Tightening torque (Seating surface material)	Steel	25	39	64	98	167	206	255	294	588
	Aluminum	15	25	49	59	118	137	153	176	352

(T218951-119-0E)

(6) Taper pipe screw (reference values)



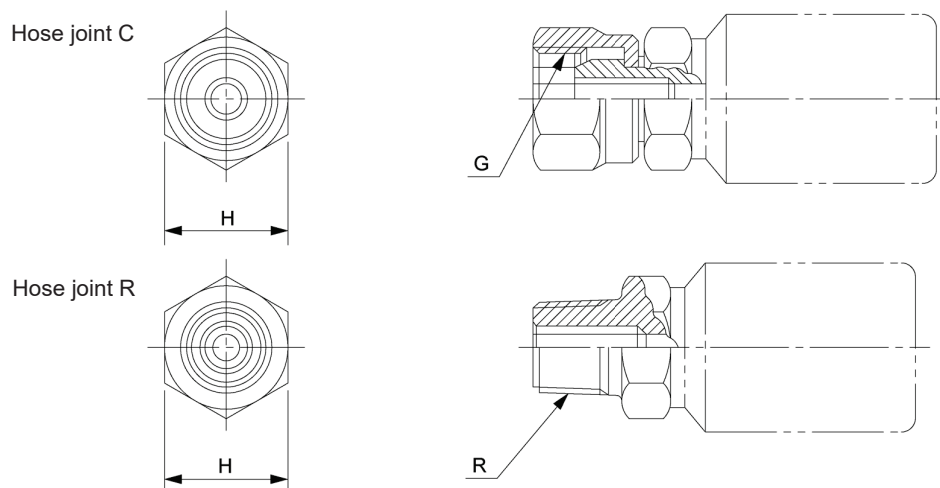
0099-02150

Units: N·m

Screw size (G)		1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	-
Width across faces (H) (mm)		14	19	22	27	36	41	50	55 (60)	-
Tightening torque (Seating surface material)	Steel	22	36	59	88	157	196	225	255	-
	Aluminum	15	25	49	59	118	137	146	165	-

(T218951-089-0E)

(7) Hose joint (Type C, R)



0099-02160E

Units: N·m

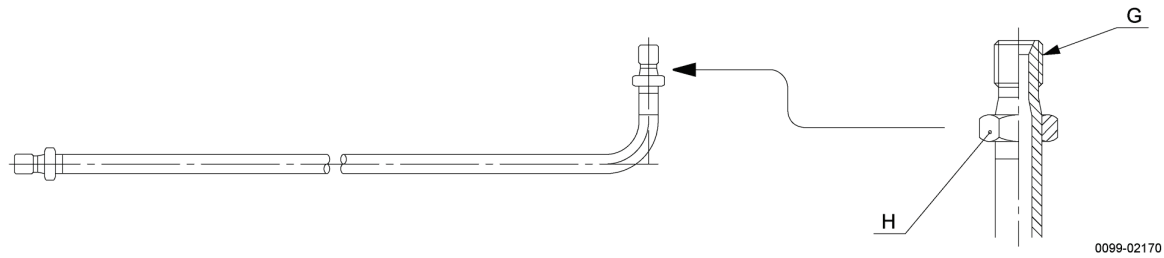
Screw size (G)			1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Width across faces (H) (mm)			14	19	22	27	36	41	50	55 (60)	70
Tightening torque (Seating surface material)	Steel	Note	15	25	34	64	132	196	225	255	316
					49		157				412
	Brass		9	13	21	33	-	-	-	-	-

[Note] The values in the lower row indicate the torque values stipulated for HD models (corresponding to the maximum pressure to be used 34.5 MPa).

(T218951-090-0E)

1. Tighten bolts

(8) Adapterless piping (rolled screw type)

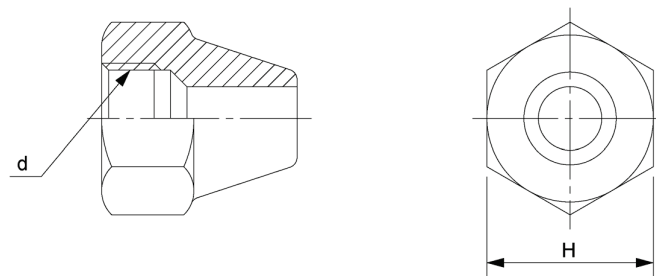


Units: N·m

Screw size (G)		1/4	3/8	1/2	3/4	1
Width across faces (H) (mm)		12	15	19	24	30
Tightening torque	Schedule 80	25	49	59	118	137
	Schedule 40	23	44	54	108	137

(T218951-091-0E)

(9) Flare nut (made of steel)



0099-02180

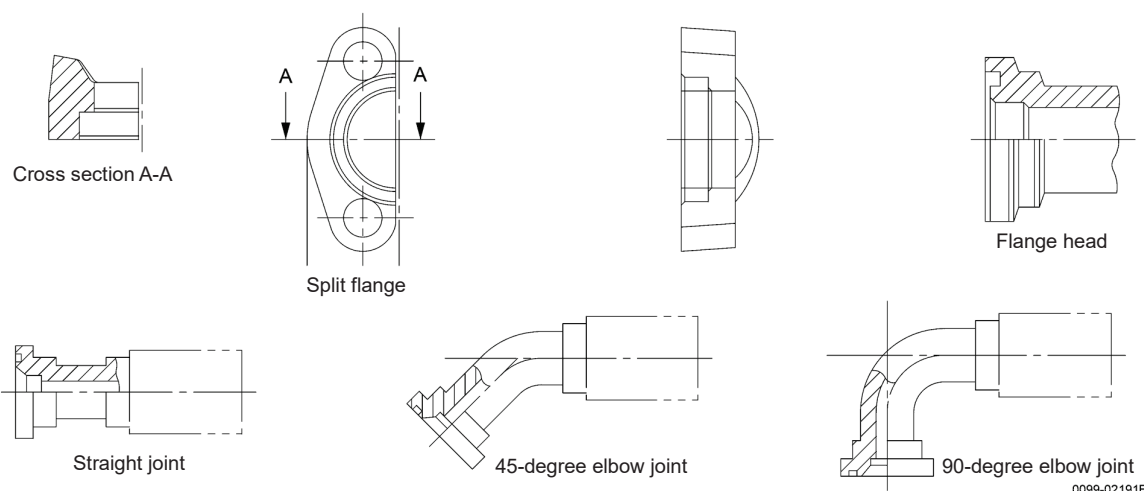
Units: N·m

Outer diameter of tube (mm)		4.76	6.35	8.0	10.0	12.0
Screw size (G)		M10×1.0	M12×1.0	M14×1.5	M16×1.5	M20×1.5
Width across faces (H) (mm)		14	17	19	22	27
Tightening torque (Seating surface material)	Steel	16	20	34	44	69
	Brass	9	12	25	33	52

(T218951-092-0E)

(10) Split flange (flange head joint)

1) SAE standard (Type I)

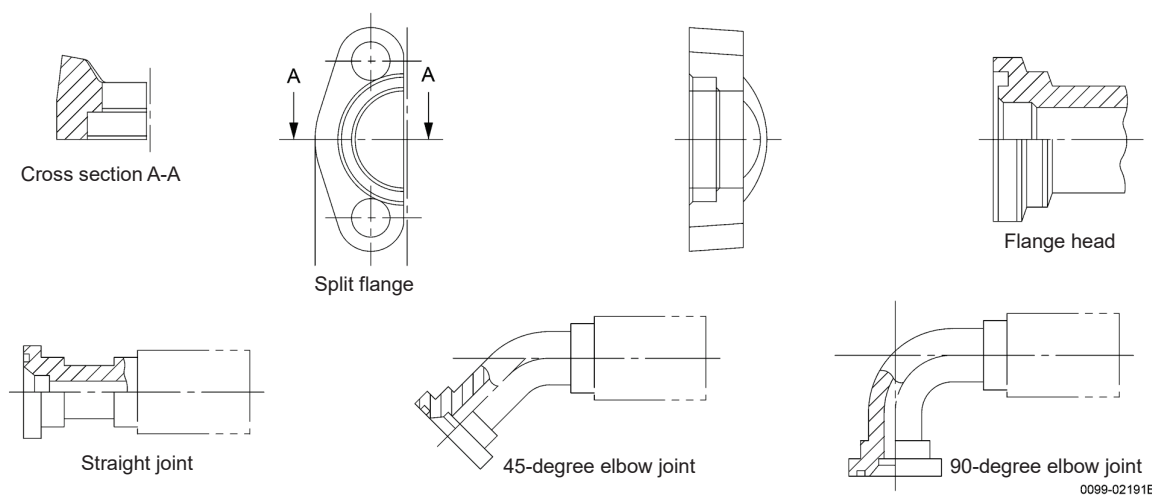


Units: N·m

Inner diameter indication	08	12	16	20	24	32
Hose size	1/2	3/4	1	1 1/4	1 1/2	2
Inner diameter of hose (mm)	12.7	19.0	25.4	31.8	38.1	50.8
Recommendable pressure to be used (MPa)	Type I	34.5		24.0	20.5	
Tightening torque (N·m)	24	48	48	48	87	87
Bolt to be used (001-105)	M8×1.25	M10×1.5	M10×1.5	M10×1.5	M12×1.75	M12×1.75

(T219951-100-0E)

2) SAE high pressure (Type II, III)



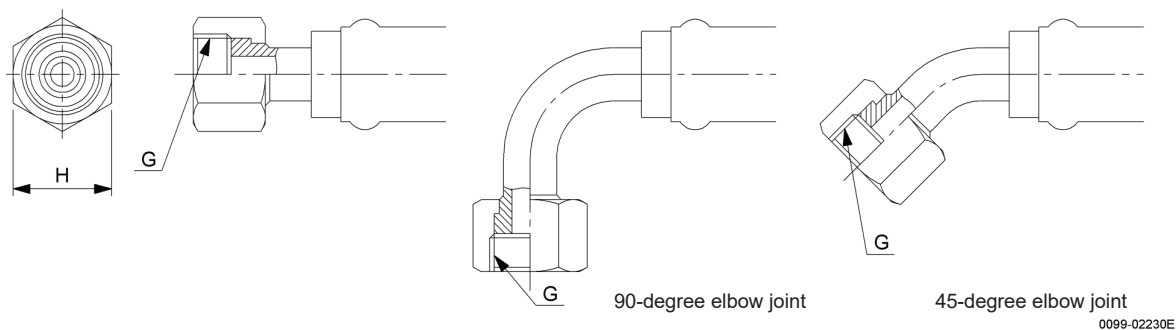
Units: N·m

Inner diameter indication	08	12	16	20	24	32
Hose size	1/2	3/4	1	1 1/4	1 1/2	2
Inner diameter of hose (mm)	12.7	19.0	25.4	31.8	38.1	50.8
Recommendable pressure to be used (MPa)	Type II	34.5		-	-	-
	Type III	-	-	-	34.5	
Tightening torque (N·m)	24	48	48	87	217	298
Bolt to be used (001-105)	M8×1.25	M10×1.5	M10×1.5	M12×1.75	M16×2.0	M18×2.5

(T219951-101-0E)

1. Tighten bolts

(11) Type ORS



Units: N·m

Screw unification	9/16-18	11/16-16	13/16-16	1-14	1 12/16-12	1 7/16-12	1 11/16-12	2-12
Support size (G)	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2
Width across faces (H) (mm)	19	22	27	30/32	36	41	50	60
Tightening torque	Applicable pressure	34.5 MPa					27.5 MPa	20.5 MPa
	ORS	25	34	64	118	132	196	225

(T218951-095-1E)

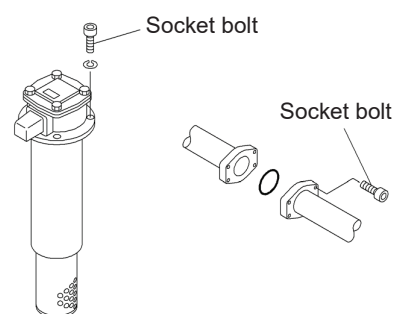
(12) Piping flange

Units: N·m

Bolt to be used (001-105)		M8×1.25	M10×1.5	M12×1.75	M16×2.0
Tightening torque (Seating surface material)	Steel	23	59	88	167
	Aluminum Note 1	-	-	34	-

[Note 1] Refers to the attachment flange of the return filter.

(T218951-096-0E)



0099-02200E

(13) Attachment for hydraulic and pneumatic equipment

Conform to "1-2 Tightening torque for meter screw standard bolt" for the tightening torques of hydraulic and pneumatic equipment.

The applicable nominal thread sizes are M5 to M20. Use the torque value of strength classification 8.8 as the upper limit, regardless of the tensile strength rank of the bolt.



CAUTION

- After the first 50 hours of use of a new machine and every month thereafter inspect and retighten the bolts.
- When tightening, clean off any corrosion, soil and debris.

(0099-0250-0E)

2. Parts list (T0988566-149-0E)

This parts list contains the consumable parts of the main vessel and engine of the machine.

Regarding parts not listed in this parts list, please contact our sales service dealer.

When ordering any of the parts listed below, please notify the model, serial number, part name and quantity.

(1) Consumable parts list

Part Name	Part No.	Quantity/Unit	Remarks
Fuel filter cartridge	FF63054NN	1	Cummins
Water separator cartridge	FS20121	1	Cummins
Engine oil filter cartridge	LF3970	1	Cummins
Air cleaner filter (outer)	AF2612400	1	Cummins
Air cleaner filter (inner)	AF2612500	1	Cummins
Hydraulic oil return filter cartridge	075911603	1	
Hydraulic oil line filter element	078740103	1	
Suction strainer	0759106UA	1	
O-ring	076071130	1	
Fuse 5 A	0830 107 12	4	
Fuse 10 A	0830 107 06	3	
Fuse 15 A	0830 107 07	2	
Fuse 20 A	0830 107 08	7	
Fuse 30 A	0830 107 10	4	
Fusible link 60A	0830 106 00	1	
Fusible link 140A	0830 106 03	1	
Drive belt	3972261	1	Cummins
Air compressor belt	091010123	1	
DEF pump filter ASSY	5417706	1	Cummins
Wiper blade	085020310	1	
Air conditioner filter (for recirculation mode)	0745144UA	1	
Air conditioner filter (for fresh air mode)	0745146UA	1	
DEF tank suction filter	4353889	1	Cummins

(T0988596-089-0E)

KATO WORKS CO.,LTD.

9-37, Higashi-ohi 1-chome, Shinagawa-ku, Tokyo 140-0011 Japan.

Tel. : Head Office Tokyo +81(0)3 3458-1111

Overseas Marketing Department Tokyo +81(0)3 3458-1115

Fax. : Tokyo +81(0)3 3458-1163

URL <https://www.kato-works.co.jp>

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