OPERATION MANUAL IC120-2

0988477EN-00

OPERATION MANUAL

IC120-2

KATO

SERIAL NUMBER
CB004001 ~

0988477EN-00

KATO HEAVY INDUSTRIES CONSTRUCTION MACHINERY CO.,LTD.

CONTENTS

FOREWORD

This manual contains safety, operation, maintenance, and adjustment information.
The procedures are designed to provide the best performance of the machine in an effective and economical way. In order to obtain it, remember the next basic rules.

- This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area.

- Before inspection, maintenance or operating the machine, read and understand this manual completely.

- Since all of the explanations in this manual may not be thoroughly understood at first, repeat reading it until abilities as an operator are obtained and developed for proper operation.

- Further abilities as an operator outside of descriptions in this manual can be obtained from the experience during normal operations and under proper supervision.

- The illustrations in this manual are used first of all to let you pay attention. They do not show all of illustrations in this manual. Because of continuing improvement and advancement of product design, the shape of machine in the illustrations may be partly different from your machine. Please understand it. Whenever a question arises regarding your machine, or this publication, please consult our distributor for the latest available information.

SAFETY INFORMATION

Read and understand the operation manual, safety signs and labels before using or maintaining this machine.

The safety alert symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
The signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard. All are used as attention-getting devices throughout this manual as well as on labels fixed to the machine to assist in potential hazard recognition and prevention.

⚠ DANGER	This safety alert symbol and signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	This safety alert symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	This safety alert symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or serious damages of the machine.
NOTICE	This signal word indicates a potentially hazardous situation which, if not avoided, could result in damages of the machine or reduction of the service life.

We have made every effort for you to prevent accidents during operation; however, we cannot be held responsible for predicting every kind of danger in all operating conditions.
It is the owner or user of the machine who is responsible for always paying attention to operate the machine, as well as reading and understanding this manual enough to obtain the essential knowledge and skills fundamental to correct machine operation.

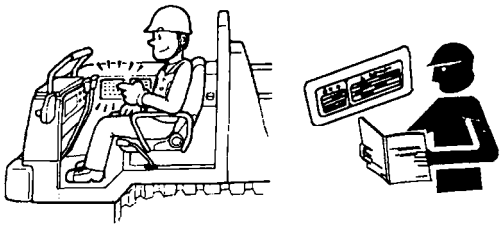
SAFETY

Read the SAFETY section without fail. It describes the basic instructions about safety.

Most accidents occur during works when preventive measures against danger are neglected or basic safety instructions are not observed.
Such accidents may be avoided by paying careful attention in advance.
This manual describes the basic safety instructions to be observed in daily operation, inspection and maintenance of the machine.
Observe these instructions carefully for safety.
Check the safety with great care for any other matters not described in this manual.

PRECAUTIONS BEFORE OPERATION

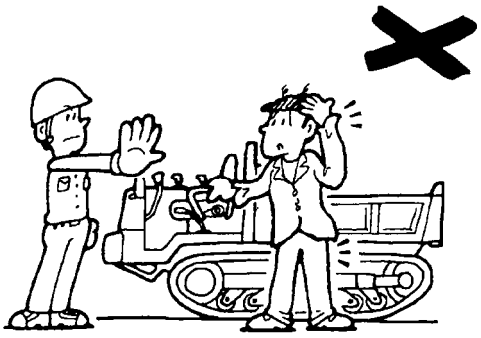
READ AND UNDERSTAND THE WARNINGS SIGNS AND LABELS


CA-C100010

- 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.
- 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.

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.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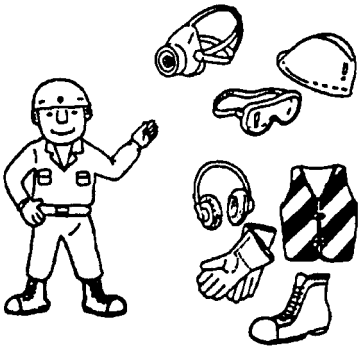
WEAR PROPER WORKING CLOTHES

- 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.
- Always wear protective cap and safety boots.
  Wear a hard hat, protective glasses and other protective equipment as required by job conditions.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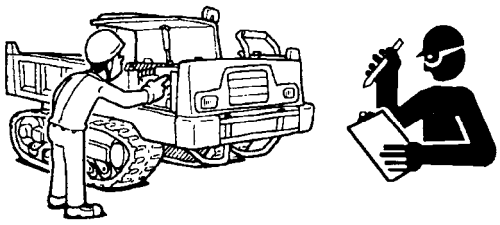
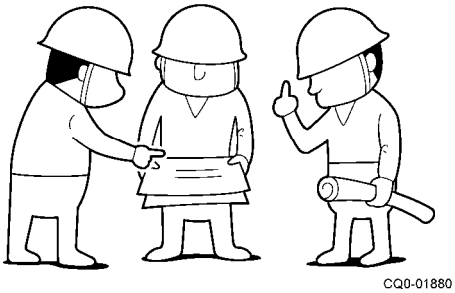
PERFORM “WALK-AROUND” INSPECTION

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.


CA-C100040

MAKE A WORK PLAN

- 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.
- When working together with other persons, determine the signals and who is to give those signals.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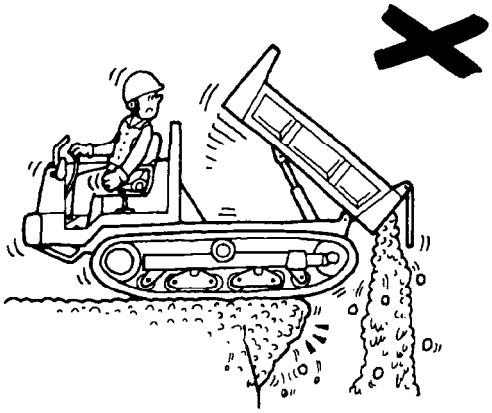
CHECK THE JOB SITE

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



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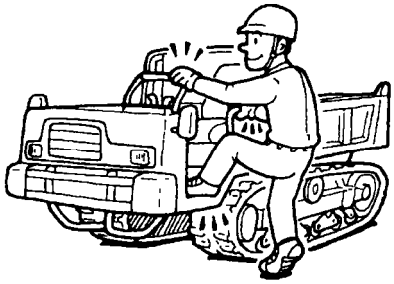
CAREFULLY GET ON AND OFF. THE MACHINE

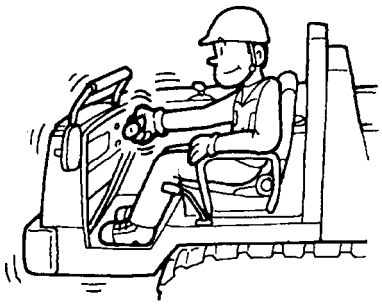
- Maintain a three point contact (Two feet and one hand or one foot and two hands contact) with the steps and handholds.
- Do not use any controls as handholds when entering or leaving the operator's station.
- When any oil or other slippery substance has got adhered to hand rails or steps, wipe them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



CA-C100060

START THE ENGINE WHILE SITTING IN THE OPERATOR SEAT

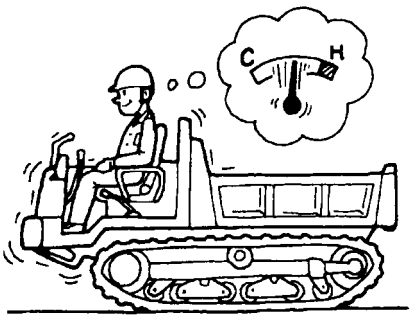
If the engine is started from a position other than sitting in the operator seat, there is the danger that the machine starts moving suddenly.
Start the engine only after carrying out checks while sitting in the operator seat.



CA-C100070

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.



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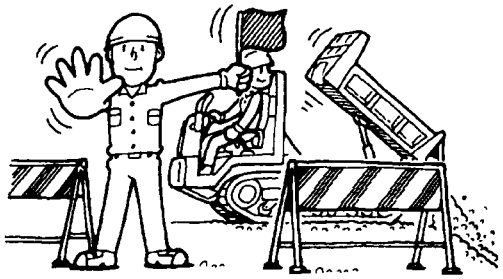
PRECAUTIONS DURING OPERATION

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.



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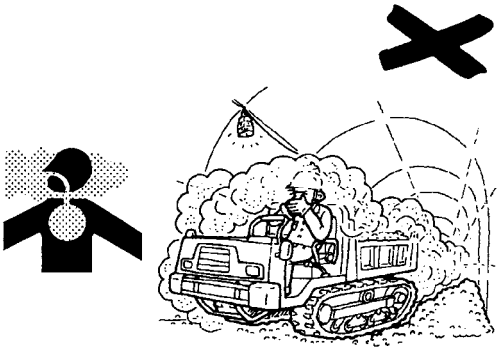
MAINTAIN GOOD VENTILATION

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.

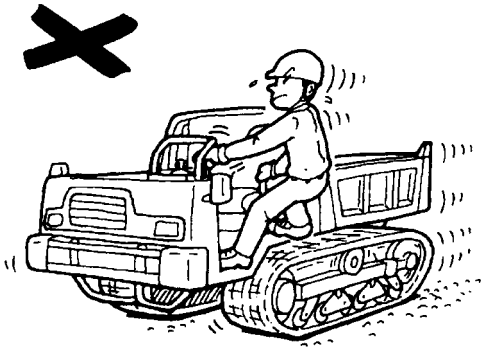


CA-C100100

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.

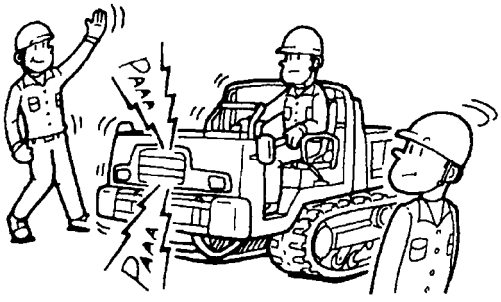
Operate the machine only while seated and with the seat belt fastened.



CA-C100110

PREVENT ACCIDENTS WHILE MOVING

- 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.
- Position a guiding person to guide and check when necessary or when the field of view is bad.

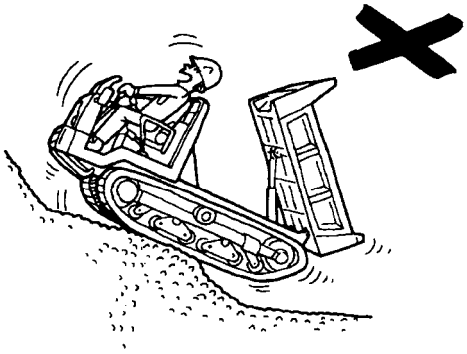


CA-C100120

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.

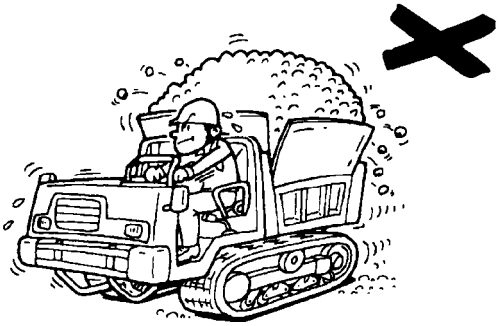
Never attempt to travel with the vessel in dump position.



CA-C100130

DO NOT OVERLOAD

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



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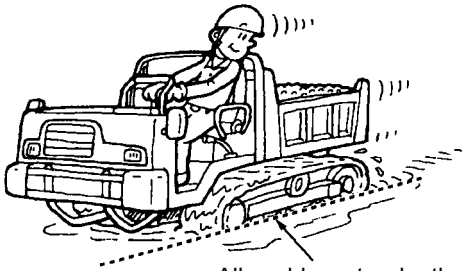
DO NOT EXCEED THE WATER DEPTH LIMIT

- 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.
- If the machine goes into water in a descending posture on a steep slope, water may splash on the radiator and peripheral parts, resulting in damages of the radiator fan. Be careful.



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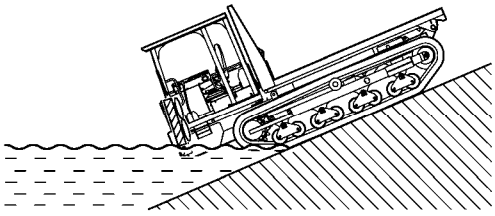

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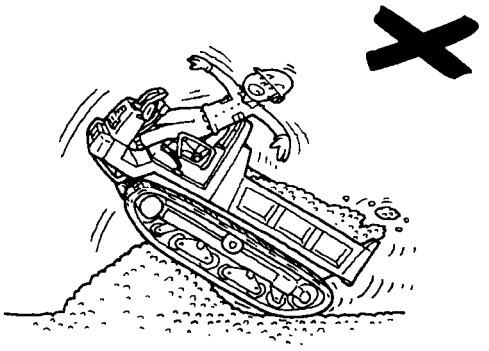
DO NOT TRY TO TRAVEL OVER OBSTRUCTIONS

Trying to travel over obstacles could cause the machine to lose its balance and topple over.

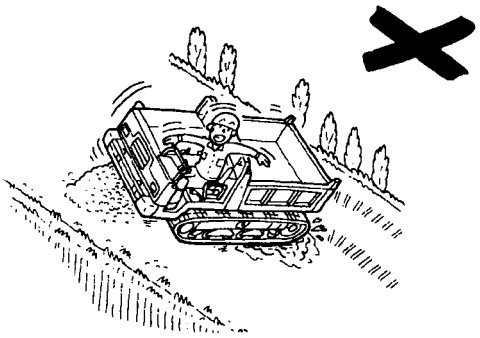
Avoid potential obstacles in your path.



CA-C100160

DO NOT CHANGE DIRECTIONS WHILE ON A SLOPE

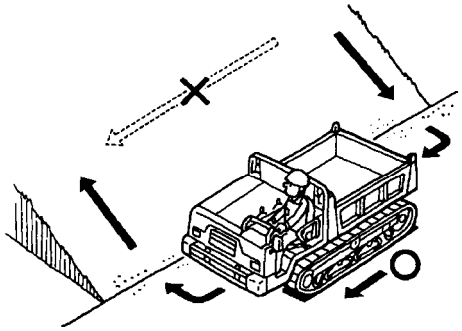
Avoid changing the direction of travel on a slope, which could result in tipping or side slipping of the machine.
When it is inevitable to change the direction, carry it out in a hard ground where the slope is gradual.



CA-C100170

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.

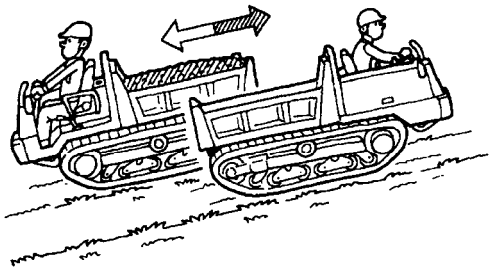


CA-C100180

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.
Observe the following points regarding machine position:

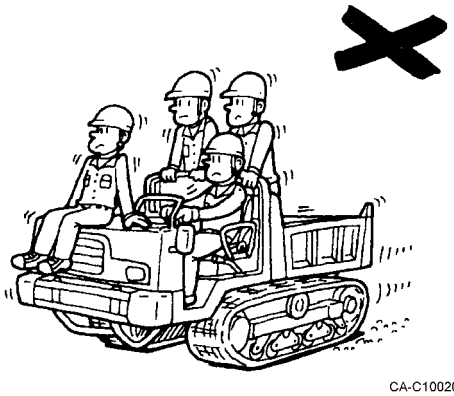
- Go forward up the hill and back down the hill WHEN NO CARRYING A LOAD.
- Reverse up the hill and go forward down the hill WHEN CARRYING A LOAD.



CA-C100190

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.



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PRECAUTIONS AFTER OPERATION

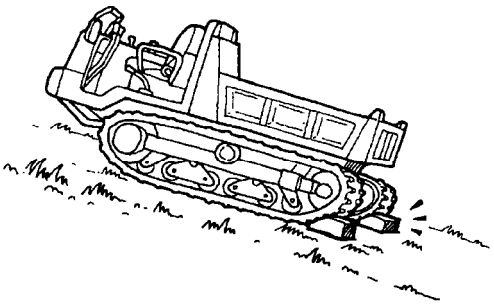
PARK IN A SAFE PLACE

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.

CA-C100210

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 slopping land, Place stopper blocks on the downhill side under both crawlers.



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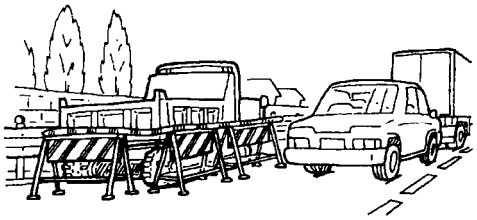
OBSERVE PRECAUTIONS WHEN PARKING THE MACHINE ON THE ROAD

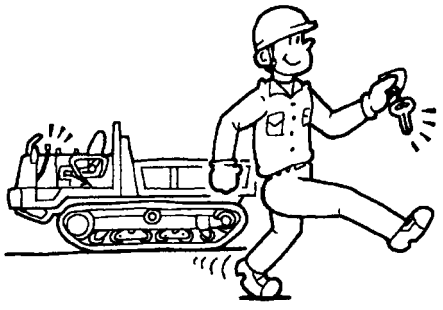
If you have to park the machine on the road, use appropriate flags, barriers, flares, and warning signals.



CA-C100230

OPERATOR LEAVING MACHINE

- Lower the vessel completely.
- Apply the parking brake.
- Set the left lever unit to the lock position.
- Stop the engine and take out the ignition key.
- Lock the cover and all other lockable parts.



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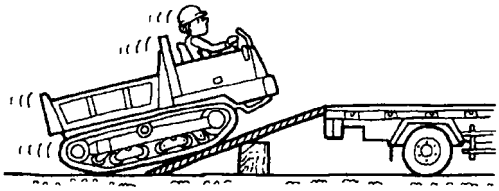
Leave the operator’s seat after taking the above measures.

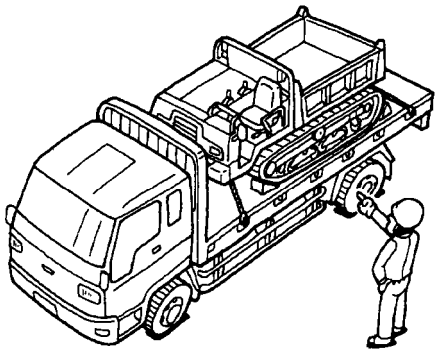
PRECAUTIONS AT TRANSPORTING

CAREFULLY LOAD AND UNLOAD THE MACHINE


CA-C100250

- ALWAYS load and unload the machine on the level ground.
- Use a ramp that has sufficient strength, width, length, and thickness.
- Remove ice, snow, or slippery material from the ramp and truck deck before loading.
- NEVER make a turn on a ramp.

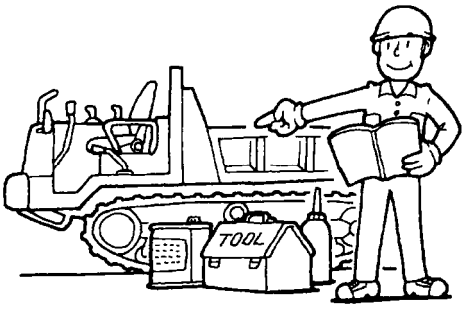
OBSERVE PRECAUTIONS ON TRANSPORTATION


CA-C100260

- Blocks tracks and secure the machine to the truck before transporting.
- Securely fix the machine to the platform using a wire rope, etc.
- Transport safely strictly following the concerned laws.

PRECAUTIONS AT MAINTENANCE

KEEP ROUTINE MAINTENANCE

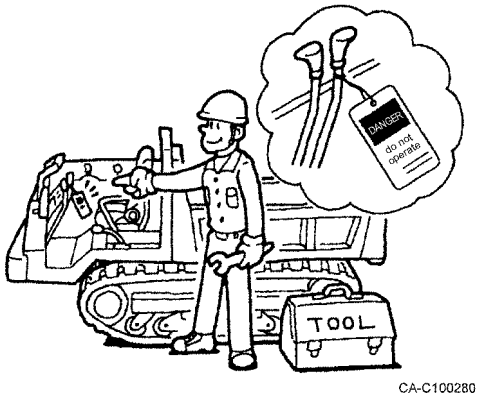


CA-C100270

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

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.



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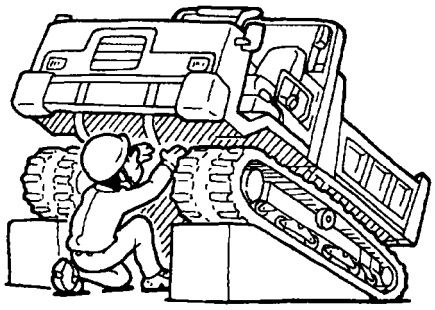
WHEN WORKING UNDER TRACKS

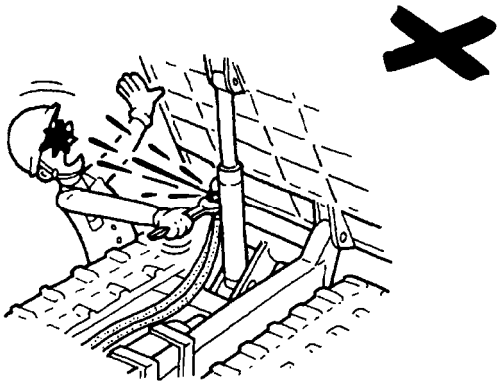
There is the danger of an accident of being caught under the machine if the machine comes down.
Place supporting pillars or blocks under the crawler and make sure that it is supported firmly.



CA-C100290

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.



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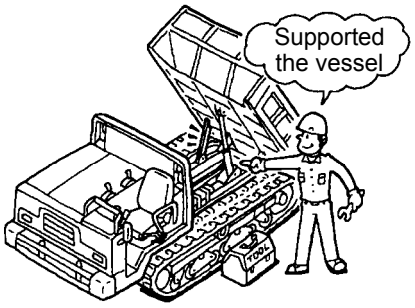
SUPPORTING THE VESSEL

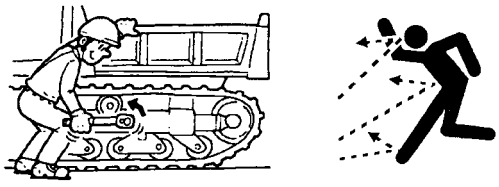
If replacement or repair of couplings or hoses is made with the vessel in the raised condition, there is the possibility that the vessel drops down.
Be sure to support the vessel using the safety bar.



CA-C100310

DO NOT WATCH THE CHECK VALVE WHEN ADJUSTING TRACKS

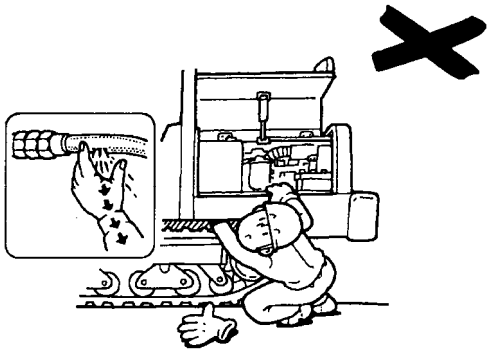
- Track adjusting grease is under high pressure. Grease coming out of the check valve under pressure can penetrate the body causing injury or death.
- Watch the track or track adjustment cylinder to see if the track is being loosened. Loosen the check valve one turn only.
- Do not put your face, hand, foot, or body in front of the check valve.



CA-C100320

PRECAUTIONS AGAINST HIGH PRESSURE OIL

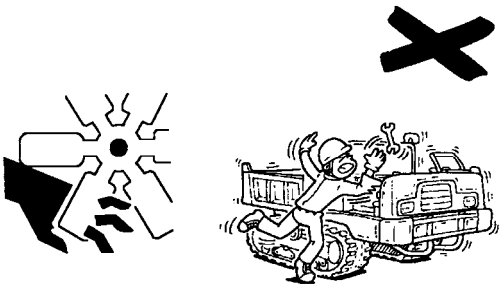
- It is very dangerous if the high pressure oil enters your skin or eyes.
- Use a thick sheet of paper or a wooden piece to test for the leakage of high pressure oil, and never test with your hands.
  Wear protective goggles for protecting your eyes.
- If oil enters your skin, immediately go to a doctor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



CA-C100330

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.



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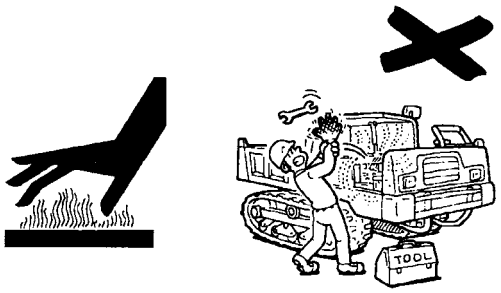
BE CAREFUL TO HOT ENGINE AFTER THE MACHINE STOPS

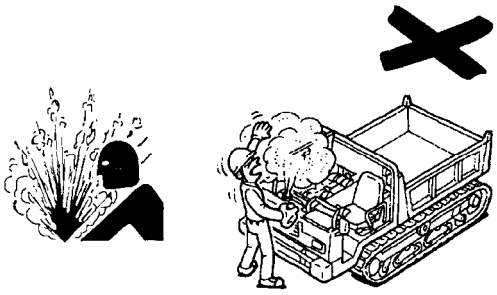
Do not touch the engine or muffler right after the machine is stopped. It is very hot and causes burns.
Start inspection and maintenance only after the temperatures of the different parts have gone down sufficiently,



CA-C100350

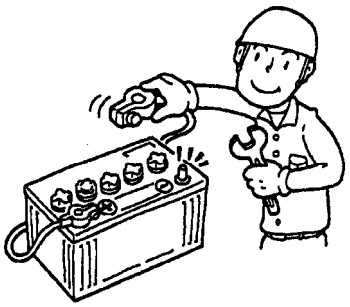
NEVER OPEN THE RADIATOR CAP OR COOLANT TANK CAP WHEN THEY ARE HOT

Removing the radiator cap or coolant tank 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.



CA-C100360

HANDLING BATTERY



CA-C100370

- When maintaining the electrical system or when carrying out welding, remove the lead connected to the negative terminal (-) of the battery.
- 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.

FIRE PREVENTION

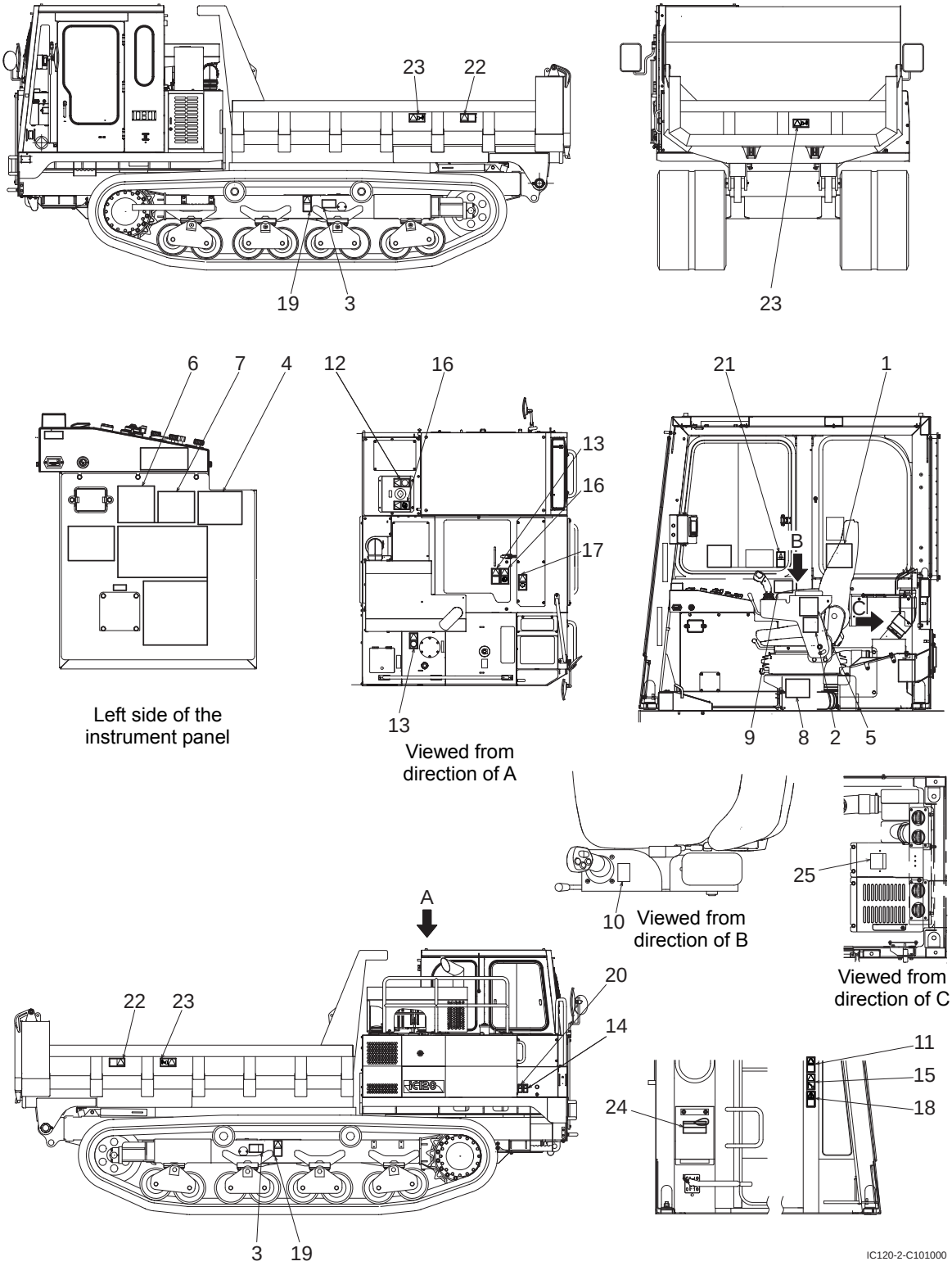
CA-C100380

- 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.
- Stop the engine during refueling, and take care not to bring sparks or fire near the fuel.
- Inspect for leakage of fuel, oil, and hydraulic oil and repair if there is any defect, and wipe off all oil that has leaked.
- Make sure where a fire extinguisher is placed and know how to use it.

WARNING SIGNS AND LABELS

There are several specific safety signs ⚠ on your machine.
Make sure that you can read all safety signs. Clean or replace these if you cannot read the words.
Check the part number for the safety sign against this manual or the actual object before placing an order.

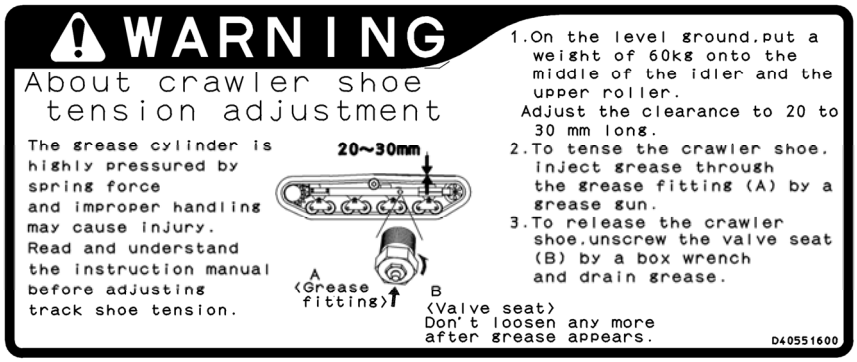
Where the warning Signs and Labels are stuck



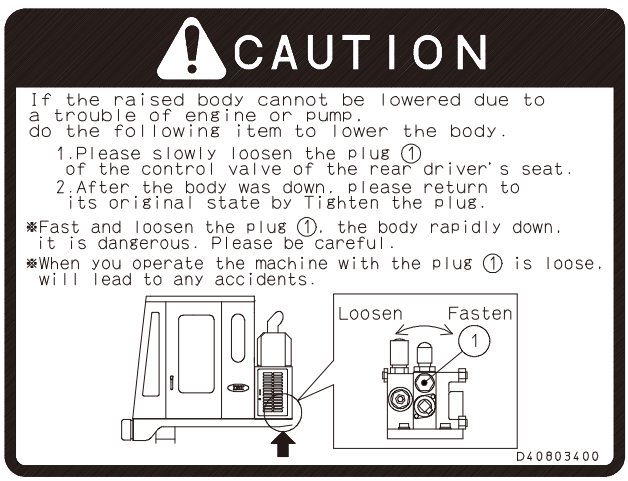
1. Precautions on safety
   (D408 704 00)

2. Precaution for working under the raised vessel
   (4448 816 00)

3. Crawler shoe tension adjustment
   (D405 516 00)

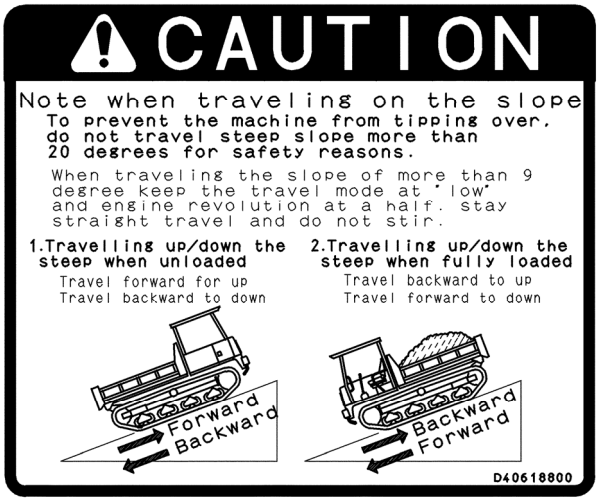


4. How to lower body in case of emergency
   (D408 034 00)

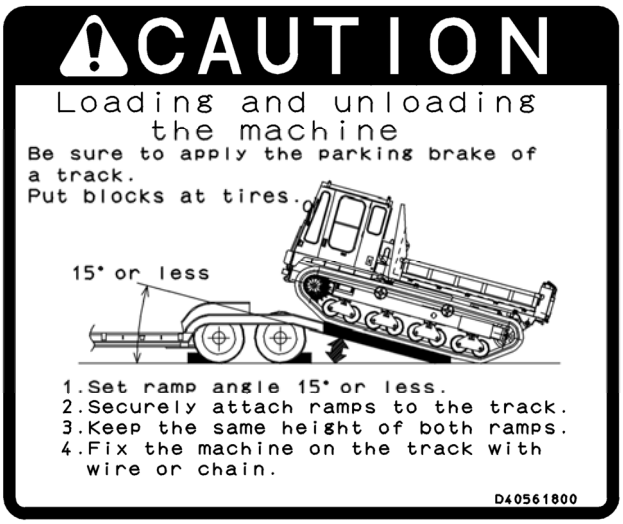


5. Gate lock lever
(D408 689 00)

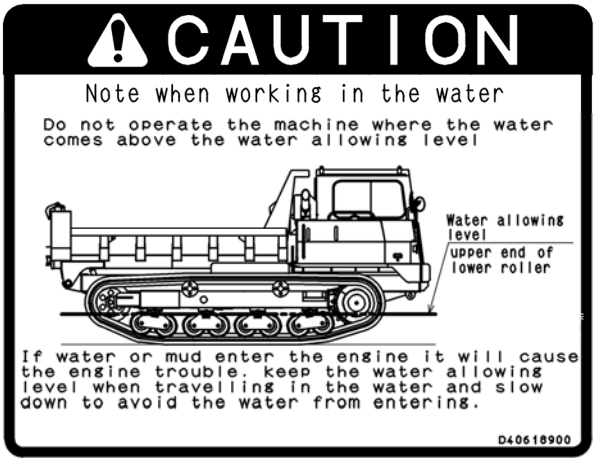
6. Traveling on a slope
(D406 188 00)



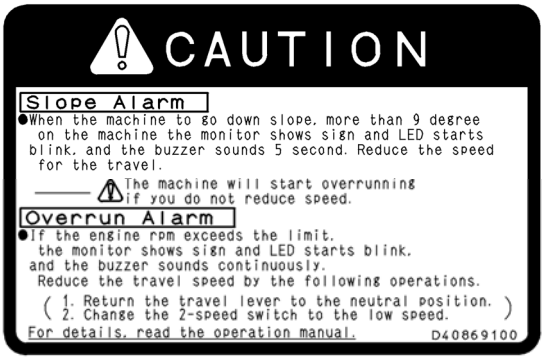
7. Loading and unloading the machine
(D405 618 00)



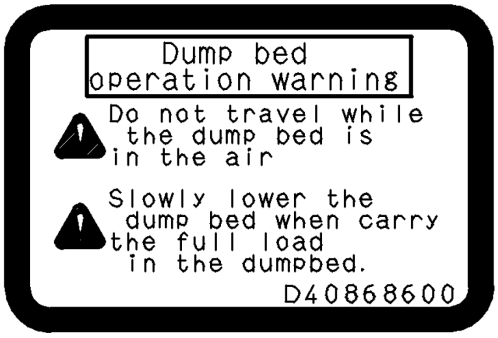
8. Under-water works
(D406 189 00)



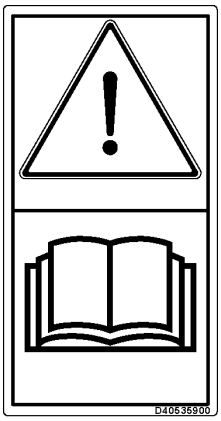
9. Safety alarm
(D408 691 00)



10. Dump bed operation warning
(D408 686 00)



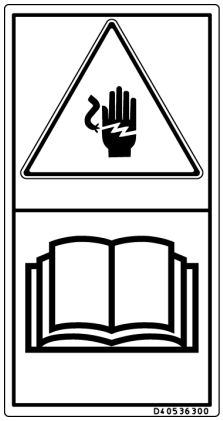
11. Warning!
    Read manual before operation, maintenance, disassembly, assembly and transportation.
    (D405 359 00)



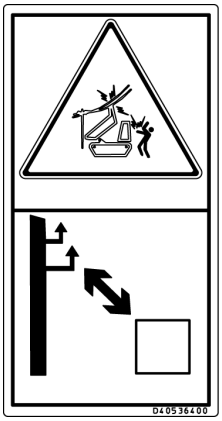
12. Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot.
    Allow radiator or hydraulic tank to cool before removing cap.
    (D405 476 00)

13. Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation. Never touch when hot.
    (D405 477 00)

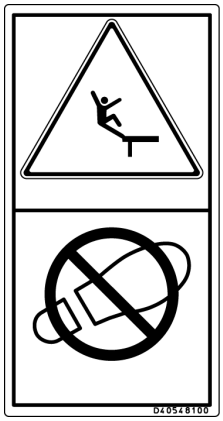
14. Sign indicates an electrical hazard from handling the cable.
    Read manual for safe and proper handling.
    (D405 363 00)



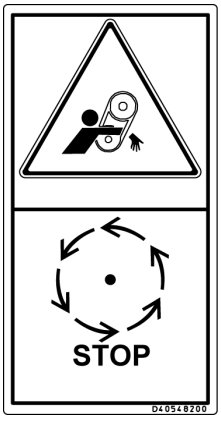
15. Sign indicates an electrocution hazard if machine is brought too near electric power lines.
    Keep a safe distance from electric power lines.
    (D405 364 00)



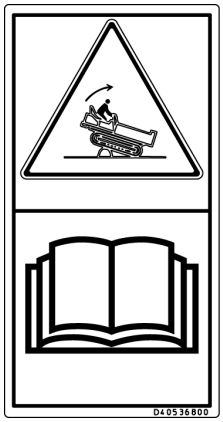
16. Sign indicates a hazard of falling.
    Do not stand on this place.
    (D405 481 00)



17. Sign indicates a hazard of rotating parts, such as belt.
    Turn off before inspection and maintenance.
    (D405 482 00)



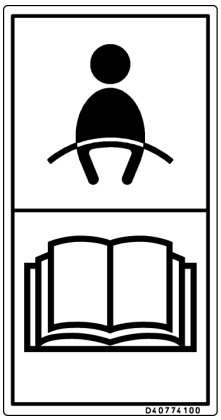
18. Sign indicates a hazard of falling out when machine goes over an obstacle.
    Read manual and follow instructions for safe and proper operation.
    (D405 368 00)



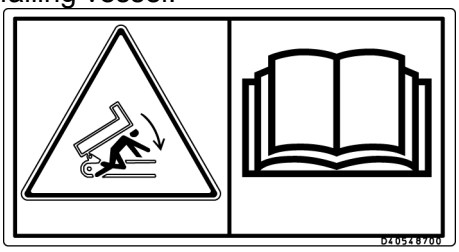
19. Sign indicates a hazard of a flying plug from track adjuster that could cause injury.
    Read manual before adjusting track for safe and proper handling.
    (D405 485 00)

20. Sign indicates an explosion hazard. Never drill, cut with gas, hit or disassemble. Also, keep open flame away.
    (D405 362 00)

21. 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.
    (D407 774 00)

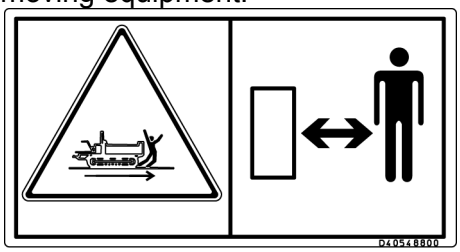


22. Sign indicates a crush hazard from falling vessel.



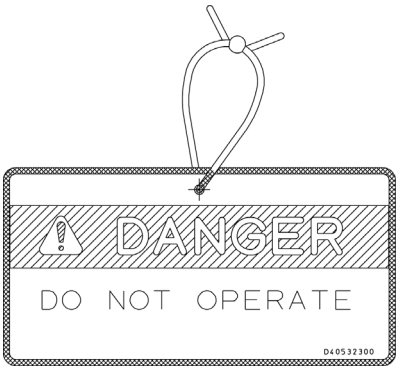
    Read manual and follow safety instructions when holding the vessel in a raised position.
    (D405 487 00)

23. Sign indicates a hazard of being run over by moving equipment.



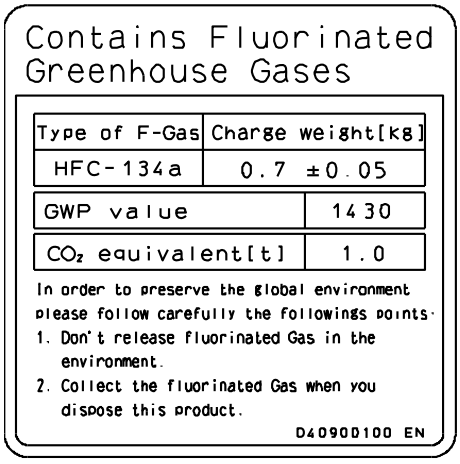
    Keep away from equipment when it is moving.
    (D405 488 00)

24.



    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.
    (D405 323 00)

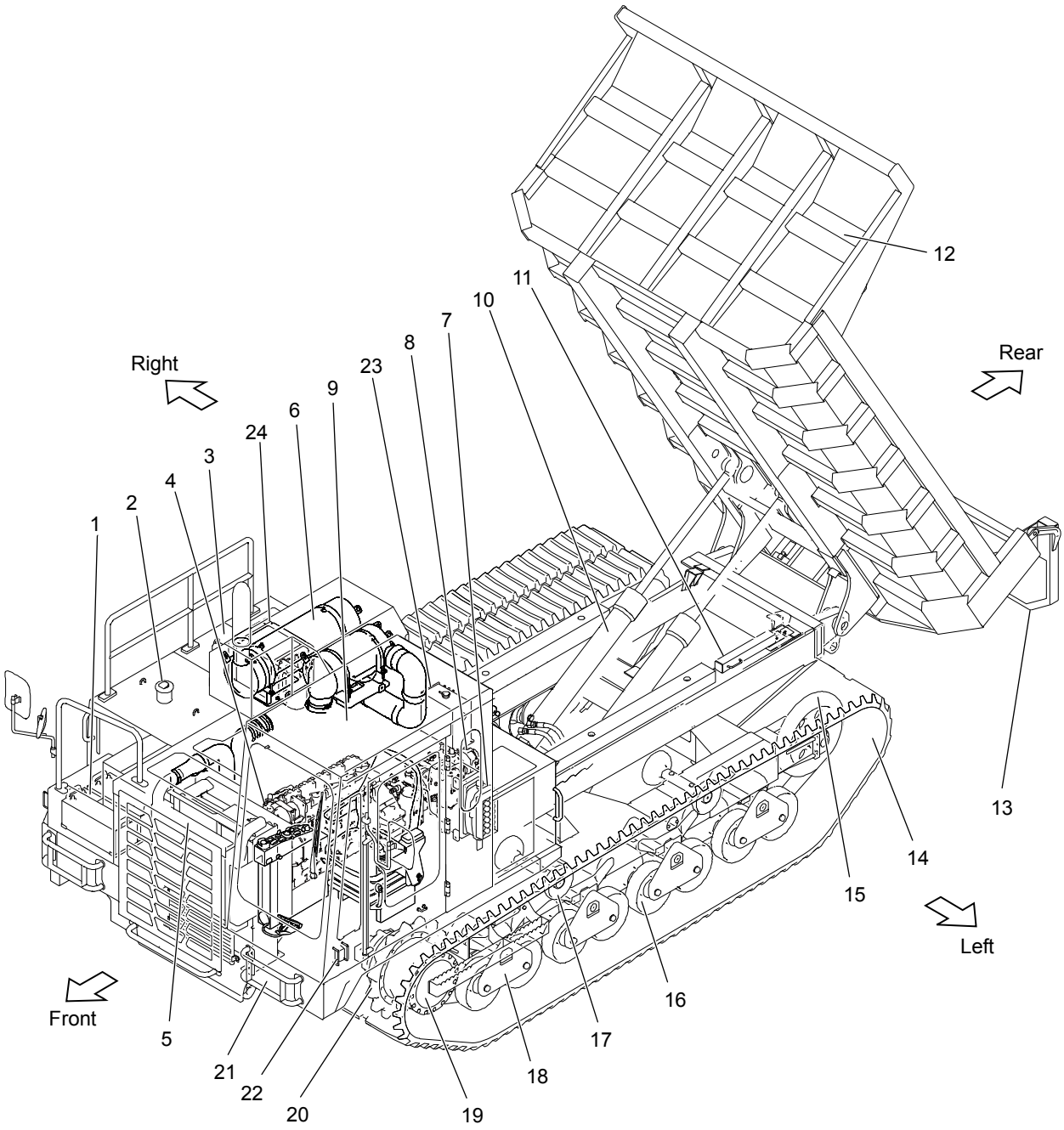
25. Contains Fluorinated Greenhouse Gases
    (Only for air conditioner equipped machine)
    (D409 001 00)



CONTROLS

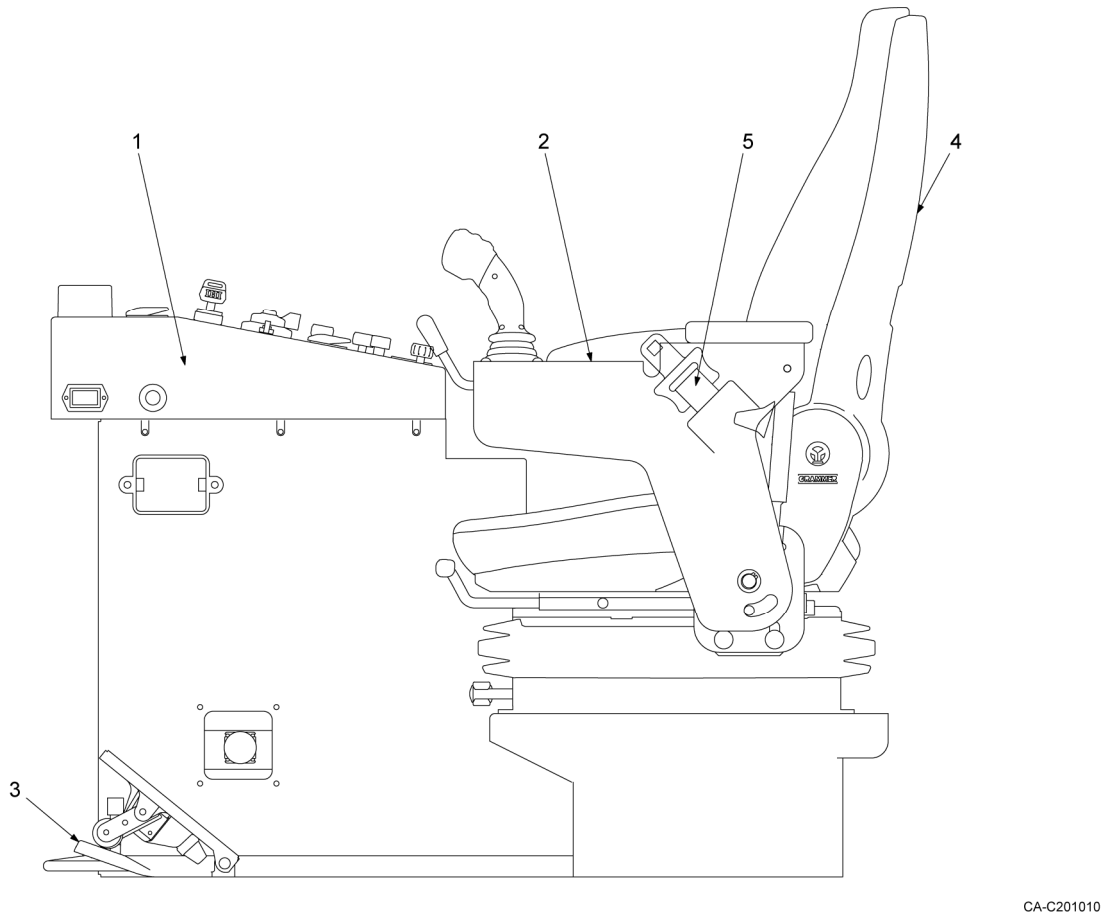
This section describes the functions of the devices needed to operate this machine and the proper operation procedures. Understand them sufficiently and operate the machine in safe.

NAMES OF COMPONENTS



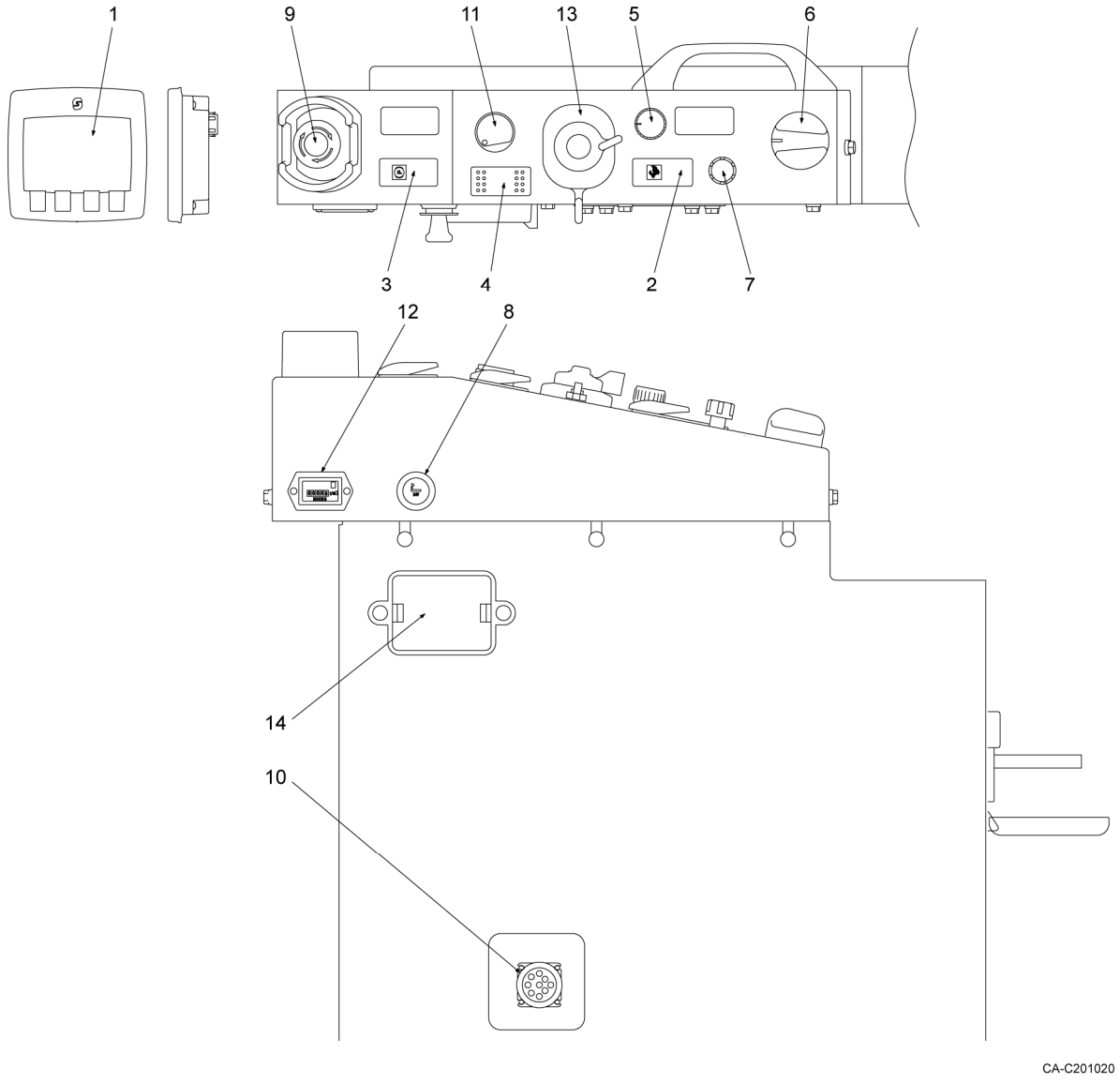
No.	Name	No.	Name	No.	Name
1	Battery	9	Cabin	17	Upper roller
2	Fuel tank	10	Dump cylinder	18	Oscillating link
3	Hydraulic tank	11	Safety bar	19	Travel device
4	Engine	12	Vessel	20	Drive sprocket
5	Radiator, oil cooler	13	Rear gate	21	Headlight
6	Post-processing unit	14	Rubber crawler	22	Direction indicator lamp
7	Air cleaner	15	Idle tumbler	23	Coolant tank
8	Hydraulic pump	16	Lower roller	24	DEF tank

CONTROLS AND INSTRUMENTS



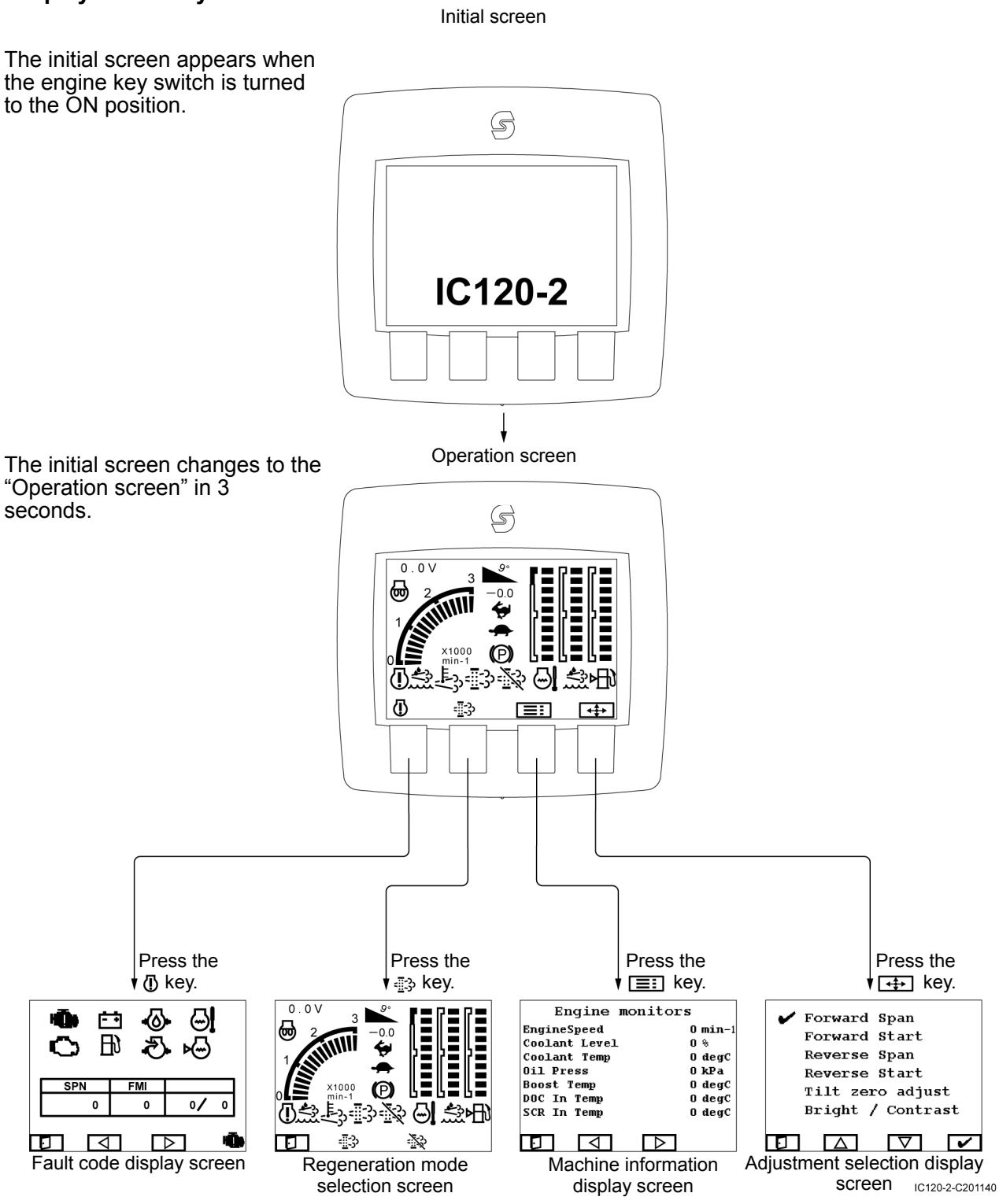
No.	Name	No.	Name
1	Instrument panel	4	Operator seat
2	Left lever unit	5	Seat belt
3	Accelerator pedal		

INSTRUMENT PANEL



No.	Name	No.	Name
1	Display	8	Cigarette lighter (24 V)
2	Travel speed select switch	9	Emergency engine stop switch
3	Parking switch	10	Engine service connector
4	Mode changeover switch	11	Engine key switch
5	Engine speed control dial	12	Hour meter
6	Travel speed control dial	13	Combination switches
7	Wiper switch	14	Fuse box

Display Screen System



The “Fault code display screen” and “Machine information 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 key is pressed.

Explanation of Screen Displays

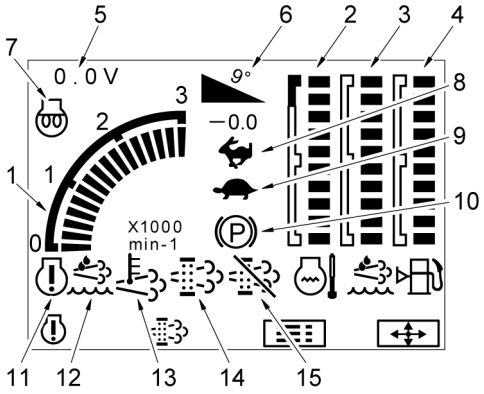
1. Display

Operation Screen

The operation screen is the basic screen displayed on the display.

To operate the machine, display this screen under normal circumstances.

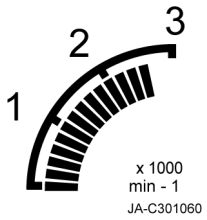
No.	Name
1	Engine tachometer
2	Coolant thermometer
3	DEF gauge
4	Fuel gauge
5	Battery voltage
6	Slope warning indicator
7	Preheat indicator
8	High speed
9	Low speed
10	Parking brake indicator
11	Engine error indicator
12	DEF indicator
13	HEST indicator
14	Regeneration indicator
15	Regeneration stop indicator



CA-C201150

1. Engine tachometer

This meter indicates the number of engine revolutions.



JA-C301060

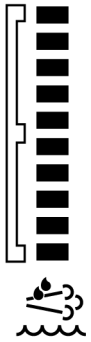
2. Coolant thermometer

Indicates the coolant temperature.


FM-C300830

3. DEF gauge

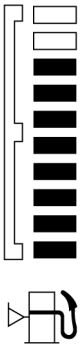
Indicates the DEF (Diesel Exhaust Fluid) level.



CA-C201450

4. Fuel gauge

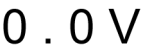
Indicates the fuel level.



FM-C300840

5. Battery voltage

Indicates the current battery voltage.



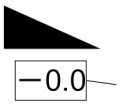
FM-C300900

6. Slope warning indicator

Indicates the inclination angle of the machine.

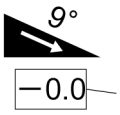
If travelling operation is carried out when the inclination angle is 9 degrees or more, the buzzer sounds for 5 seconds.

Display when the inclination angle is less than 9°



FM-C300811

Display when the inclination angle is 9° or more



FM-C301070

7. 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.

FM-C300850

8. High speed

CA-C201200

This is displayed when the high speed mode is selected.

9. Low speed

CA-C201210

This is displayed when the low speed mode is selected.
Also, if the low speed mode is activated automatically by the Automatic Low speed function when the load of travel gets large while in the high speed mode, this indicator flashes and the buzzer sounds.

10. Parking brake indicator

FM-C300970

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.

11. Engine error indicator

FM-C300930

This indicator comes on when some kind of engine problem occurs.
When an engine error is indicated, immediately contact our service dealer.

12. DEF indicator

CA-C201220

This indicator comes on when the DEF (Diesel Exhaust Fluid) level gets low.

13. HEST indicator

CA-C201230

This indicator comes on during post-processing unit regeneration or when the exhaust temperature is high.

14. Regeneration indicator

CA-C201240

This indicator comes on when regeneration of the post-processing unit is required.
When the engine is started, the post-processing unit is in the regeneration state.

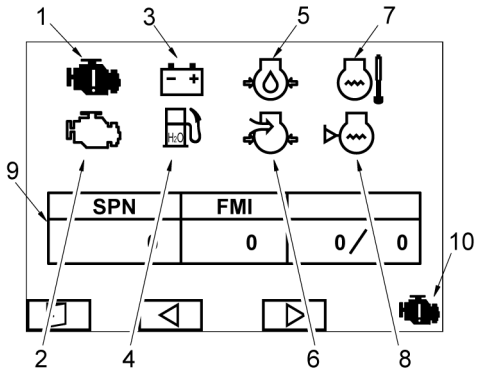
15. Regeneration stop indicator

CA-C201250

This indicator comes on when regeneration of the post-processing unit has stopped.
Stop regeneration when you do not want to regenerate the post-processing unit for some reason.

Trouble Code Display Screen

No.	Name
1	Engine stop indicator
2	Engine system warning 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	Engine stop extension key



CA-C201160

1. Engine stop indicator


CA-C201260

- This indicator comes on when a post-processing unit or engine failure is detected while the engine is running.
- This indicator flashes when an imminent abnormality is detected and the engine automatically stops 30 seconds later.

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 service dealer.

2. Engine system warning indicator


CA-C201270

This indicator comes on when an abnormality is detected in the post-processing unit 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 service dealer.

3. Battery charge warning indicator

FM-C300890

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.

4. Water separator warning indicator

CA-C201290

This indicator comes on when water accumulates up to the designated level of the water separator. When this comes on, stop the engine and drain the water from the water separator.

5. Engine oil pressure warning indicator

FM-C300940

This indicator comes on when the engine oil pressure goes down while engine 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.

6. Air cleaner clogging warning indicator

CA-C201300

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.
After changing the elements, press the reset button of the indicator. Warning indication disappears.

7. Coolant temperature warning indicator

CA-C201310

This indicator comes on when the coolant's temperature rises abnormally. If this indicator comes on while the engine is running, stop the engine and check.

8. Coolant level warning indicator

CA-C201320

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.

9. Trouble code display

SPN	FMI	
0	0	0 / 0

CA-C201330

The display shows the trouble code.
It indicates the contents of the engine trouble.
For details on the contents of the engine trouble that appears on the display, contact our service dealer.

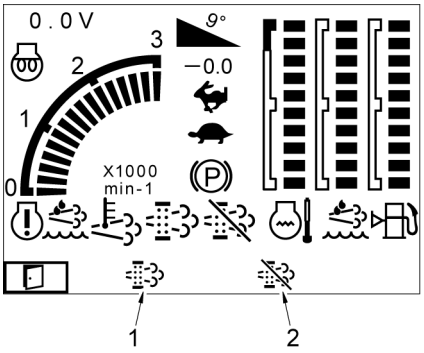
10. Engine stop extension key

CA-C201260

Use this if, when the engine stop indicator (1) starts flashing or you must extend the forced engine stop time such as when you are unable to move the machine to a safe place within 30 seconds. When the engine stop indicator starts flashing, the engine stops 30 seconds later. When this key is pressed while the engine stop indicator is flashing, you can extend the time until the stop of the engine for 30 seconds.

Regeneration Mode Selection Screen

This screen display is used to select the regeneration operation of the post-processing unit.



CA-C201170

No.	Name
1	Post-processing unit regeneration indicator
2	Post-processing unit regeneration disabled indicator

1. Post-processing unit regeneration indicator

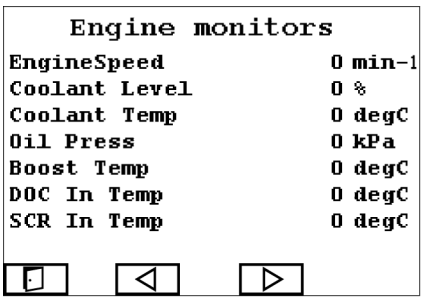
The post-processing unit is regenerated manually.

2. Post-processing unit regeneration disabled indicator

The automatic regeneration function of the post-processing unit is disabled. The automatic regeneration function is enabled by pressing this indicator again.
(Please refer to CUMMINS MANUAL QSL9CM2350L102)

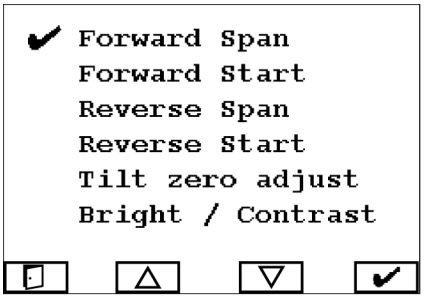
Machine Information Display Screen

This screen is used by our serviceman to check the status of the machine.



CA-C201180

Adjustment Selection Display Screen



CA-C201190

This screen is used to adjust the travel speed, the inclination angle of the machine, the brightness of screen display, etc.
Using [△] and [▽], select an item you want to adjust and confirm with [✓].

Forward Span: Adjusts the zigzag travel and travel speeds when the joystick is operated to the maximum in the forward direction.

Forward Start: Adjusts the diagonal travel and the sensitivity of the joystick when starting to travel in the forward direction.

Reverse Span: Adjusts the zigzag travel and travel speeds when the joystick is operated to the maximum in the reverse direction.

Reverse Start: Adjusts the diagonal travel and the sensitivity of the joystick when starting to travel in the reverse direction.

Tilt zero adjust: Adjusts the inclination angle of the machine.

Bright / Contrast: Adjusts the brightness and contrast of the display.

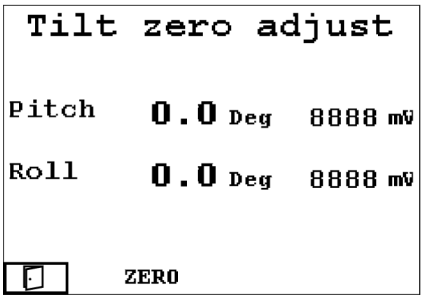
⚠ CAUTION

These screen display items have already been adjusted at the time of shipment. Especially, adjust the four items from "Forward Span" through "Reverse Start" whenever changes occur to the devices related to foot including the replacements of the hydraulic pump, travel motor and rubber crawler. For details of the setting procedure, contact our service dealer.

Tilt zero adjust

(Tilt Zero Adjust Screen)

Install the IC120-2 on a level place and then press the [ZERO] button to adjust.



CA-C201390

Bright/Contrast

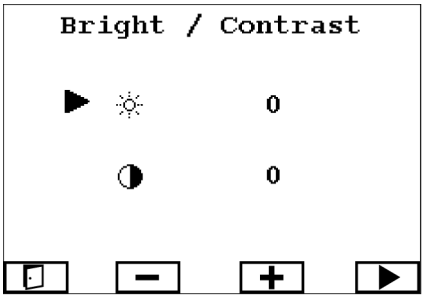
(Brightness and Contrast Adjustment Screen)

Bright (Brightness)

Pressing the [+] key makes the screen display brighter and pressing the [-] key makes it darker.

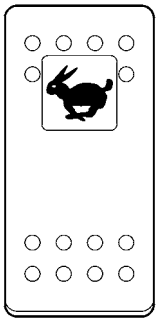
Contrast

Pressing the [+] key makes the contrast higher and pressing the [-] key makes it lower.



CA-C201400

2. Travel Speed Select Switch


CA-C200180

This switch changes the travel speed between two modes.

Automatic mode

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

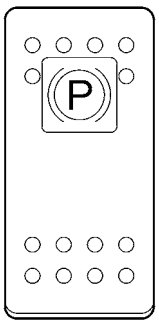
Low speed travel: Press the side without the mark. The mark indicator lamp goes off and the low speed mode is set.

Manual mode

High speed travel: Press the mark side. The mark indicator lamp goes on.

Low speed travel: Press the side without the mark. The mark indicator lamp goes off.

3. Parking switch



CA-C200190

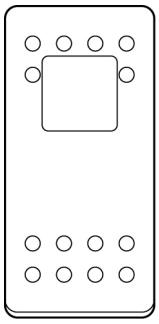
This switch activates/deactivates the parking brake.

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.

The parking brake safety function is provided to prevent erroneous travel after the engine key switch is turned ON. After the engine key switch is turned ON, the machine cannot travel unless the parking brake is turned ON once and then released.

4. Mode changeover switch

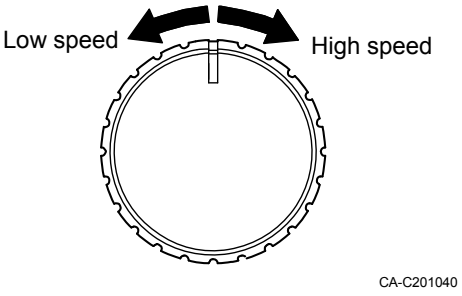

CA-C201030

This makes switching between the automatic mode and the manual mode.

Automatic mode: Press the side without the mark. The mark indicator lamp goes off.
Manual mode: Press the indicator lamp side. The indicator lamp goes on.

For more information about travel modes, see the OPERATION section, page 3-11.

5. Engine speed control dial



CA-C201040

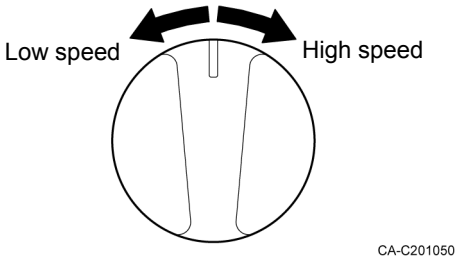
- Automatic mode:
  Adjust the minimum engine speed.

High speed: Rotate the dial clockwise.
Low speed: Rotate the dial counterclockwise.

- Manual mode:
  This mode adjusts the number of engine revolutions.

High speed: Rotate the dial clockwise.
Low speed: Rotate the dial counterclockwise.

6. Travel speed control dial



CA-C201050

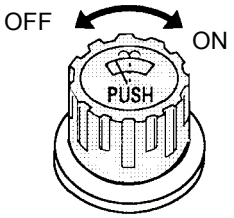
- Automatic mode:
  This mode adjusts the travel speed of the machine.

High speed: Rotate the dial clockwise.
Low speed: Rotate the dial counterclockwise.

- Manual mode:
  This mode is not used.

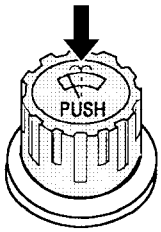
7. Wiper switch

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



CA-C200230

- Wiper
  Rotate the dial. OFF: Stop
  ON: Operate

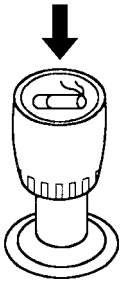


CA-C200240

- Window washer
  Push down the knob.
  Washer fluid jets out from the nozzle while the knob is pushed down.

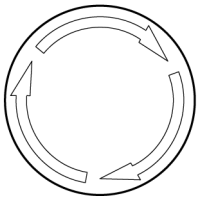
8. Cigarette lighter (24 V)

The switch is automatically turns ON when this knob is pushed down. It pushes up after several seconds; use the cigarette lighter by pulling it out.


CA-C200220

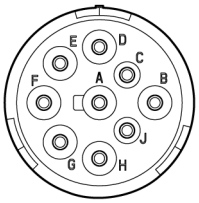
9. Emergency engine stop switch

Use this switch to activate emergency engine stop.
Stop: When this switch is pressed, the engine stops.
Release: When this switch is turned clockwise, the lock is released and the engine can be started.


CA-C201060

10. Engine service connector

Connect the engine service tool to this connector when diagnosing engine troubles.

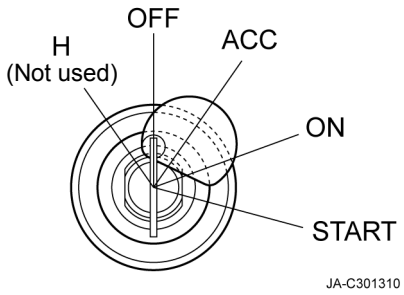


CA-C201070

11. Engine key switch

Use this switch to start and stop the engine.

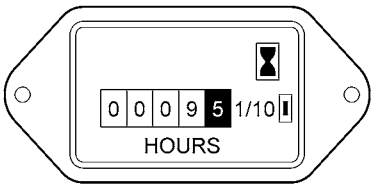
- OFF (Stop)
  The key can be inserted and removed. All power to the electrical system turns OFF and the running engine stops.
- ACC
  While the engine is stopped, the radio and the room light can be used.
- ON (Run)
  The power to the electrical system turns ON.
- START
  This is the engine start position.
  When the engine starts, immediately release your hand from the key.
  The key returns to the ON position automatically.



JA-C301310

12. Hour meter

- This meter indicates the total operating hours of the machine.
  The smallest digit shows 1/10 of an hour (6 minutes).
- The meter advances as long as the engine is running even if the machine does not move.
- The total operating hours are used as the guideline for inspection and maintenance time.



CJ-C200081

13. Combination switches

Turn signal switch

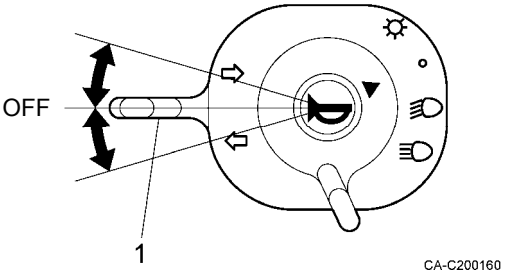
This switch can be used when the engine key switch is at the ON position.

Use the lever (1) to operate the direction indicator lamps.

⇨: The right direction indicator lamp flashes.

OFF: The direction indicator lamps go OFF.

⇦: The left direction indicator lamp flashes.



Head light switch

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

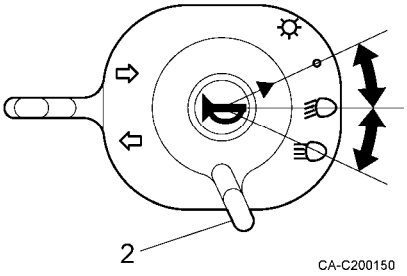
Use the lever (2) to operate the head lights.

Turn the lever to point the mark (►) to a head light symbol.

○: OFF

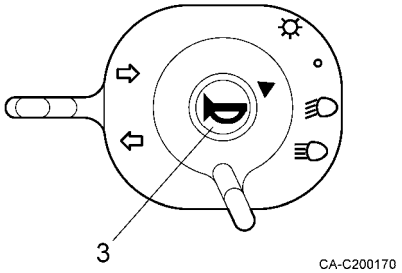
≣○: (ON) The head light goes on downward.

≣○: (ON) The head light goes on upward.



Horn switch

Press the button (3) of this switch to sound the horn.

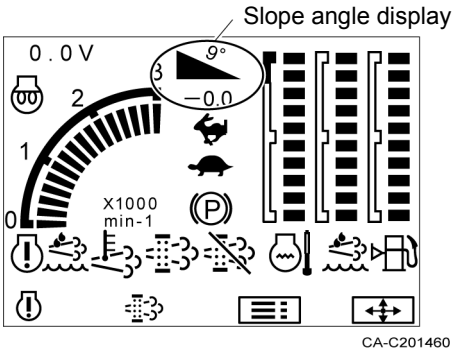


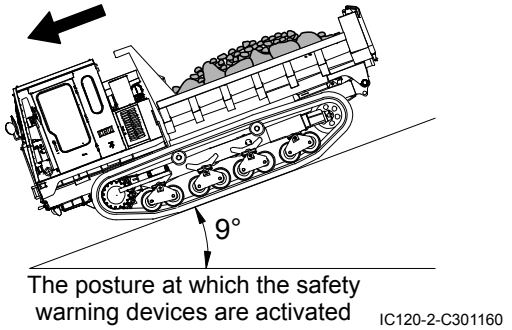
Safety Warning Devices

Slope warning indicator

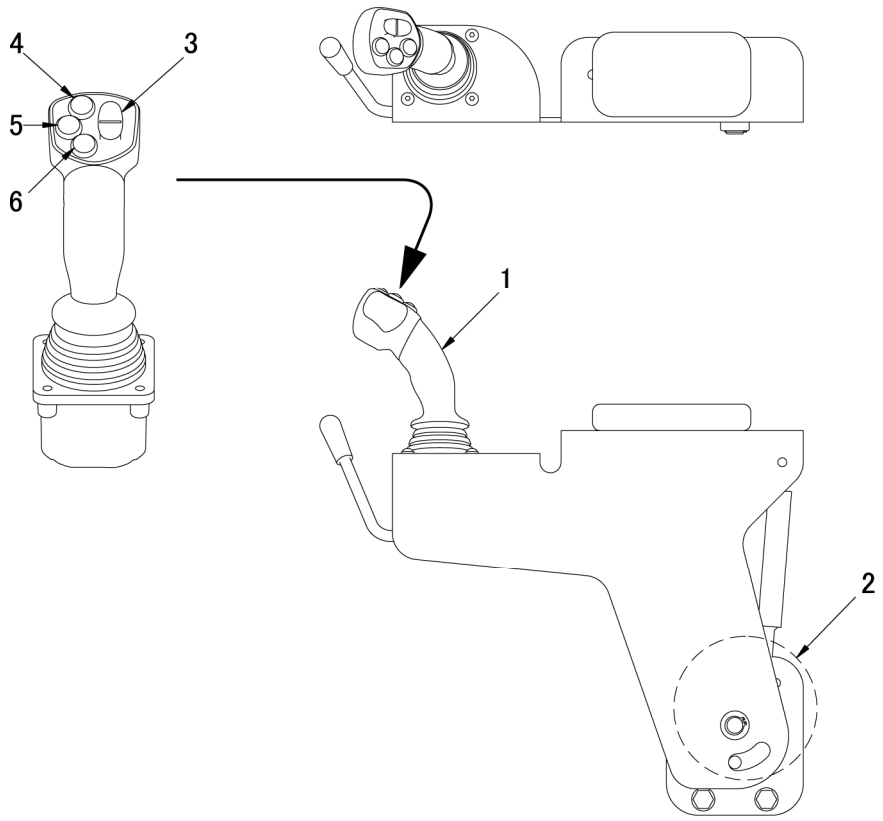
The slope angle of the machine is indicated on the display.

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





LEFT LEVER UNIT



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

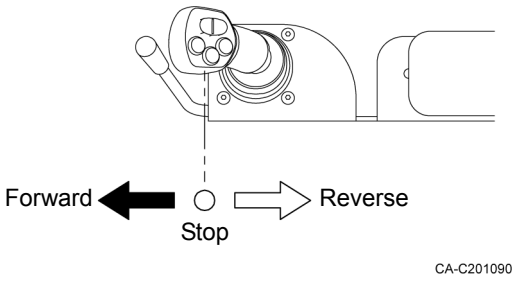
Joystick lever

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

Forward: Push the lever forward.

Stop: Return the lever to the neutral position.

Backward: Pull the lever backward.



For more information about travel operation, see the article on "Start-Travel-Stop" (page 3-4) in the OPERATION section.

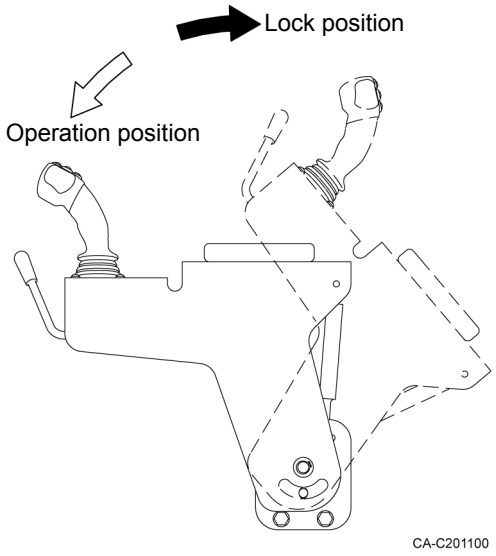
Lever lock switch

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.



To start the engine, set the left lever unit at the lock position.

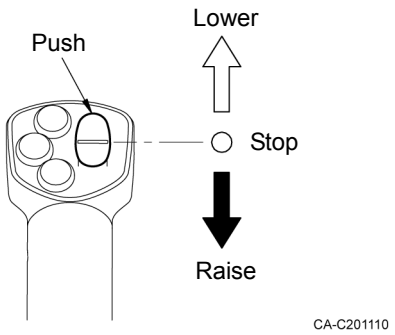
Dump operation switch

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.

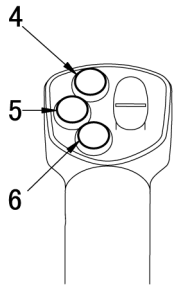
Lower: Push the upper part of the switch to lower the vessel.



For more information about dump operation, see the article on "Dump Operation" (page 3-6) in the OPERATION section.

Engine start/stop button (4)

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.



CA-C201120

Horn button (5)

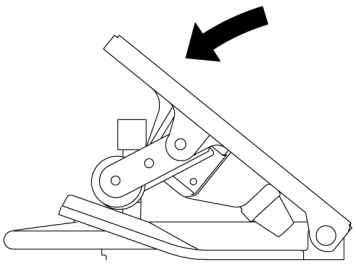
You can sound the horn by pressing the horn button (5).

Spin turn button (6)

Spin turn operation can be performed by operating the joystick laterally while holding down the switch button (6).
For more information about spin turn operation, see the article on "Steering Control" (page 3-5) in the OPERATION section.
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.

Accelerator pedal

- Automatic mode:
  This mode adjusts the travel speed of the machine.
- Manual mode:
  This mode adjusts the number of engine revolutions.

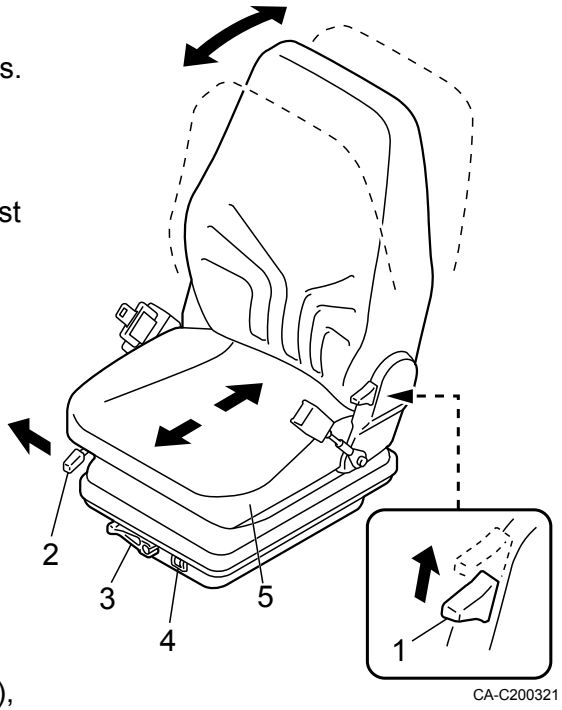

CA-C201130

For more information about accelerator pedal operation, see the article on "TRAVEL MODES" (page 3-11) in the OPERATION section.

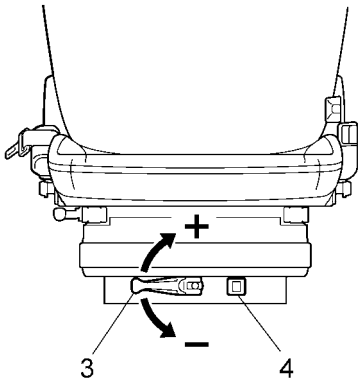
OPERATOR SEAT

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
  Move the seat forward or backward while pulling the lever (2) to adjust the back-and-forth position.
- Adjusting suspension
  Raise the lever (3) and turn it to adjust suspension. The appropriate body weight is displayed on the display (4).
- Adjusting the seat height
  When the seat is lifted from the bottom of the seat (5), 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.



CA-C200321



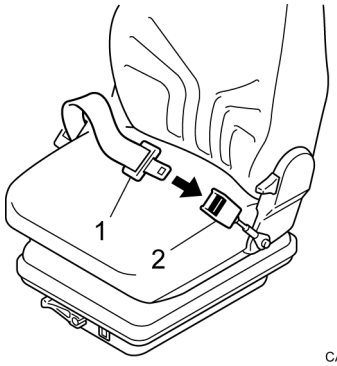
CA-C200340

⚠ CAUTION

- Do not adjust the seat while driving. Sudden seat movement can cause operating errors or unforeseen accidents.
- Shake the seat back and forth lightly and check if the seat is fixed firmly after adjusting it. If the seat is not fixed, it may move suddenly and cause unforeseen accidents.

SEAT BELT

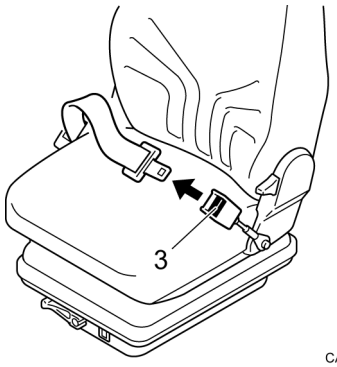
1. Adjust the seat belt length according to your body size.
2. Confirm that the seat belt is not twisted and put the plate (1) into the buckle (2) securely.
3. Slightly pull the belt and confirm the belt is locked.
4. Press the button (3) of the buckle to unfasten seat belt.



CA-C200401

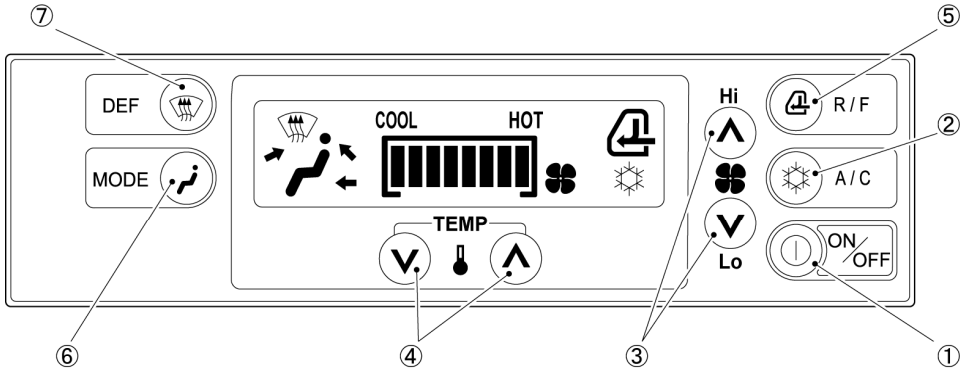
⚠ CAUTION

- 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.



CA-C200411

AIR CONDITIONER



CA-C201410

Names and Functions of the Operation Panel Components

① ON/OFF switch (power switch)
Use this switch to start and stop the air conditioner.
When this switch is pressed, the air conditioning operation starts with the settings used when the air conditioner was turned OFF previously.
When the ON/OFF switch is pressed for the first time, the operation starts with the factory settings.

② A/C switch (air conditioner switch)
Each time this switch is pressed, the compressor is switched ON and OFF. When ON, ❄ lights up on the LCD unit.

③ FAN switches (airflow switches)
When one of these switch is pressed while the air conditioner is operating, the airflow changes and the newly set airflow status lights up on the LCD screen.
Pressing ⌃ increases the airflow.
Pressing ⌄ decreases the airflow.

LCD screen display				
Airflow	Weak	Medium	Strong	Super strong

CA-C201420

④ TEMP switches (temperature setting switches)
To set the temperature inside the cabin, press this switch 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 displayed on the LCD screen.

⑤ R/F switch (REC/FRESH switch)
Each time this switch is pressed, the air circulation mode changes between recycle air and fresh air and either ⟲ or ⟳ is displayed on the LCD screen.
⟲……Recycle ⟳……Fresh air

⑥ MODE switch (air outlet switch)
Each time this switch is pressed, the air outlet changes in the order of Face → Vent → Bi-level → Foot → Face and so on, and the selected air outlet is displayed on the LCD screen.

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

CA-C201430

⑦ DEF switch (defroster switch)
When this switch is pressed, the air outlet changes to the defroster and ⌇ is displayed on the LCD screen.
Use this switch 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

CA-C201440

Operating Procedure

To start and stop the air conditioner

Press the power switch.

To cool

① Press the A/C switch.
② Using the TEMP switches, set the temperature setting to COOL HOT on the LCD screen.
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.

To heat

① Using the TEMP switches, set the temperature setting to COOL HOT on the LCD screen.
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.

To thaw frost from the front glass

① Using the TEMP switches, set the temperature setting to COOL HOT on the LCD screen.
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.

To clear condensation on the front glass

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.

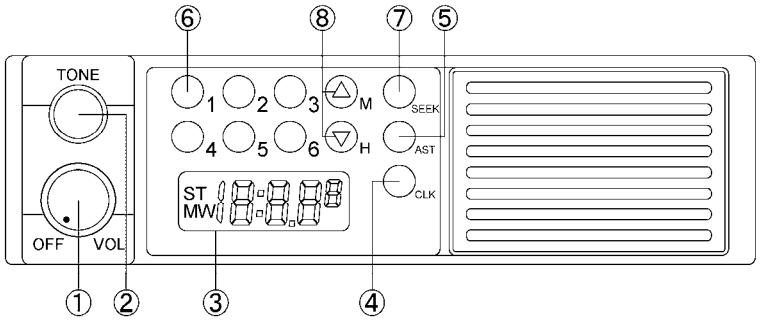
⚠ CAUTION

- 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.

AM RADIO (OPTION)

⚠ CAUTION

- If water enters the speaker case and/or the radio, unexpected accidents may occur, so be careful not to expose these units to water. Close the windows especially when raining and washing the machine.
- Do not wipe the scale panel and the knobs with benzene, thinner and similar solvent.
- Wipe with a soft dry cloth.
- Do not disassemble the radio.



CA-C200370

① Power switch/VOL control
When this knob is rotated clockwise, you will hear a clicking sound and the power is turned ON. Rotating this knob further clockwise adjusts the speaker volume.

② TONE control knob
Rotating this know clockwise emphasizes high-pitched tone. Rotating this know counterclockwise attenuates high-pitched tone.

③ Display
The clock, radio reception frequency and operation mode are displayed.

④ CLK (clock button)
Pressing this button changes the display to show the clock. Pressing it one more time shows the frequency.

⑤ AST
Pressing this button calls up preset stations in sequence. Press this button again when the desired broadcasting station appears on the display; the station display stops. When this button is held down for the duration of 2 seconds, auto memory is activated.

⑥ Preset buttons
One AM station can be preset to each button. (For the preset procedure, see the item on "How to Preset.")

⑦ Seek
When the SEEK switch is pressed, songs that can be received will automatically be sought and the seeking will stop when a song is received.

⑧ Tuning buttons
When the tuning ▲ button is pressed, the broadcasting station frequency increases. Pressing the ▼ button lowers the frequency. When this button is held down continuously, frequencies change in succession.

To listen to the radio
(1) Turn ON the starter switch to turn ON the power to the radio.
(2) Select a station using the preset buttons or the tuning buttons.
(3) Adjust the volume and sound quality as desired.
  • Be sure to listen to the radio at an appropriate volume level in order to secure safe operation.
(4) To turn OFF the radio, rotate the VOL know counterclockwise until you hear a clicking sound.

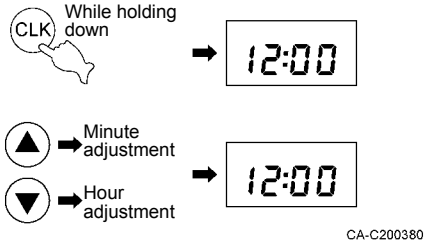
Regarding seek (automatic) station selection
When the SEEK switch is pressed, station selection starts toward higher frequency broadcasting stations. When a receivable broadcasting station is sought, the seeking stops automatically.

Regarding manual station selection
When the tuning ▲ button is pressed, the broadcasting station frequency increases; when the tuning ▼ button is pressed, the broadcasting station frequency decreases. When this button is held down continuously, frequencies change in succession.

To preset broadcasting stations
(1) Select a station you want to preset.
Select the frequency of that broadcasting station with the tuning buttons.
(2) When you hold down the button to which you want to preset the broadcasting station for 2 seconds, the same number as that of the button appears on the display and preset completes.
- To store another broadcasting station to an already preset switch, repeat steps (1) and (2) above.
- If the power is turned OFF for battery change, for example, the preset settings will be erased. In such a case, preset again.
- A total of six AM (MW) stations can be stored.

Regarding auto memory
When the AST button is held down for 2 seconds, broadcasting stations that are receivable at the current location are called up in sequence and they are automatically stored in the preset memory.

To set the clock (see the figure below)
(1) Turn ON the starter switch to turn ON the power to the radio.
If the display shows the frequency, press the CLK button to change to the clock display.
(2) Pressing the ▼ button while holding down the CLK button sets the hour and the ▲ button sets the minute.



CA-C200380

OPERATION

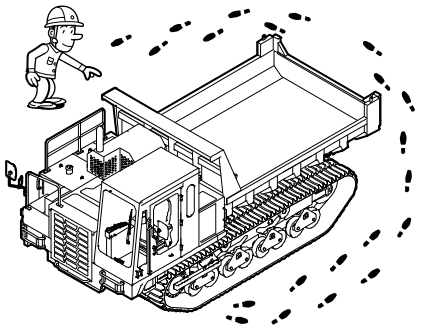
This section describes the proper operation procedures of this machine.
Always look to the safety and observe the given operation instructions and cautions to carry out works safely.

BEFORE STARTING OPERATION

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.

Walk-around inspection

Look around and under the machine and check the items shown below.
Repair defective parts before starting operation.



IC120-2-C301310

- 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 post-processing unit.
  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.

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.

BEFORE STARTING THE ENGINE

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:

   - The display turns on. Make sure that the model name is correct.

   - 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 water temperature.

   - Make sure that the battery voltage display is normal (approximately 24 V).

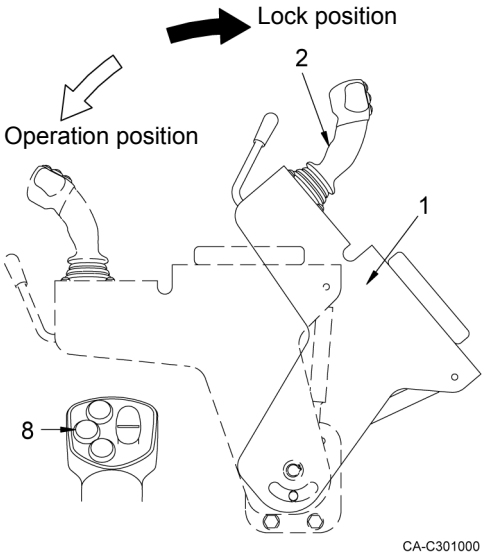
   - Make sure that the mark lamp of the parking switch (6) is on.

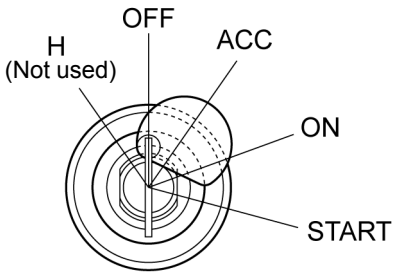
   - Turn the headlight switch of the combination switch (7) and make sure that the headlights go on.

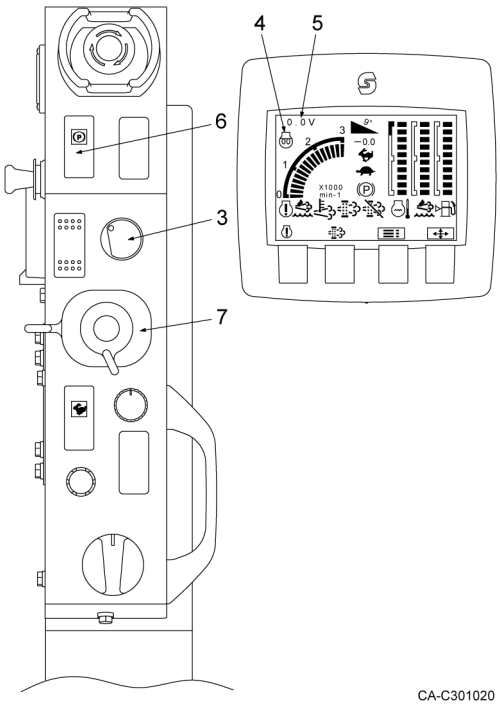
   - Turn the turn signal switch of the combination switch (7) and make sure that the turn signal lamps flashes.

   - Push down the combination switch (7) and the horn button (8) of the joystick and make sure that the horn sounds.

Ask our service dealer for repair services, if some abnormality is found in the above check.







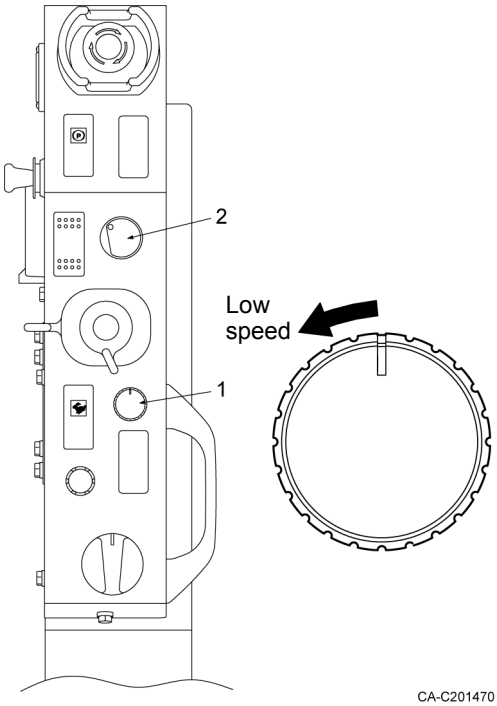
ENGINE STARTING

⚠ CAUTION

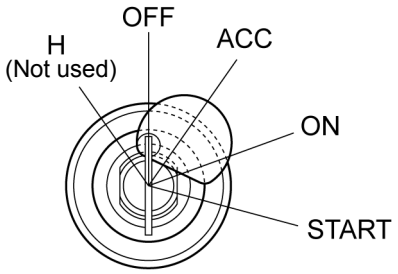
- Make sure that there are no persons or obstacles around the machine and sound the horn before starting the engine.
- Be sure to sit on the seat when starting the engine.

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.



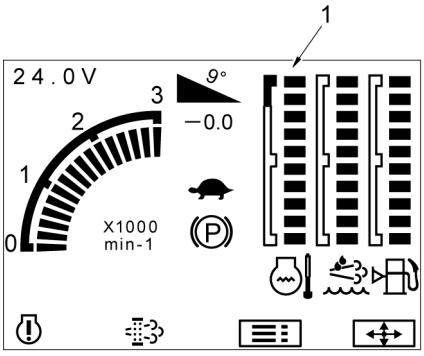
1. To provide against unexpected behavior of the machine, set the engine speed control dial (1) to the low position.
2. Make sure that the preheat lamp on the display is off. Turn the key (2) to the START position. The engine starts.
3. Release the hand from the key when the engine starts. The key returns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



AFTER STARTING THE ENGINE

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 some abnormality is found, stop the engine immediately, find the cause and repair the defective part.



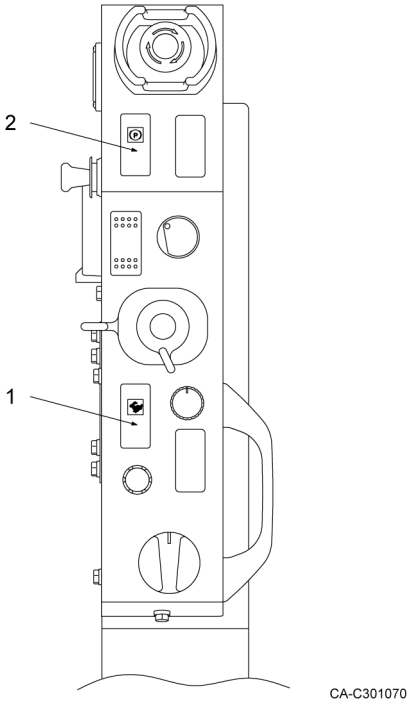
1. Make sure that all alarm lamps on the display are off.
2. Check if engine exhaust color, sound and vibrations are not abnormal.
3. After the engine has started, perform a warm-up operation (described later).

BASIC OPERATION

Start-Travel-Stop

⚠ WARNING

- When traveling, lower the vessel completely.
- Lock the rear gate and side gates firmly.
- Make sure that no persons are around the machine. Sound the horn before starting.



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

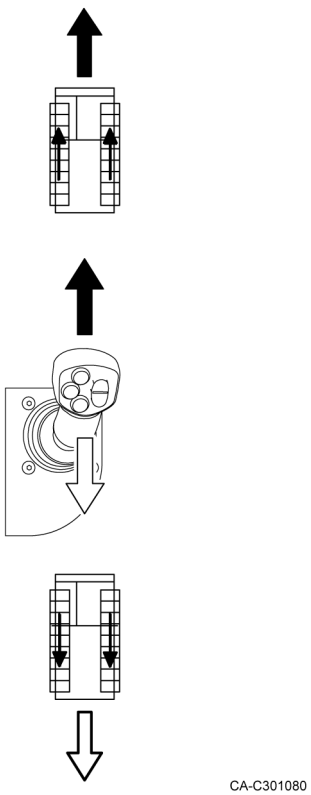
2. Push down on the no-mark position of the parking switch (2) to deactivate the brake.
   Make sure that the mark lamp is off.

   The 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 parking switch (2) is turned ON once and then OFF.

Joystick Lever Operation Procedure

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.



Steering Control

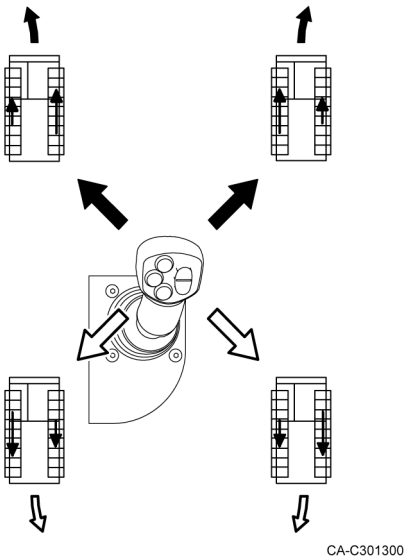
⚠ WARNING

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.

Turn

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.

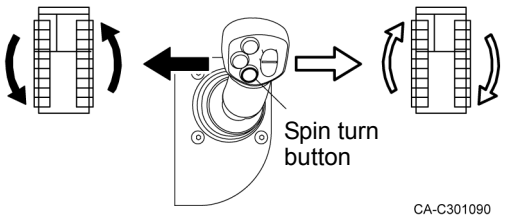


Spin Turn

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.



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.

Dump Operation

⚠ DANGER

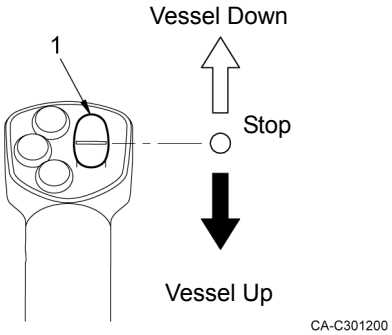
Never go under the raised vessel.

Keep the vessel with the safety bar.

If you touch the dump lever with the vessel raised, the vessel moves down even though the engine is stopping.

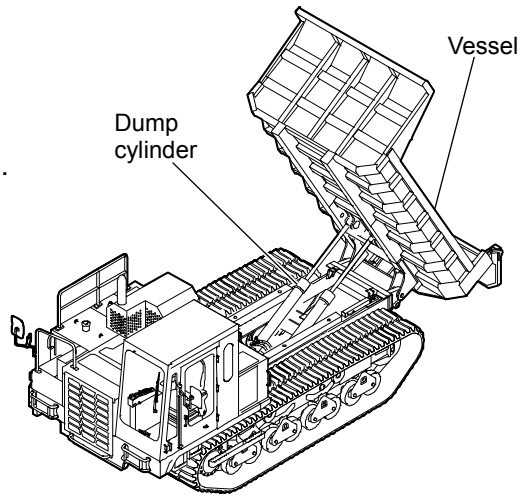
Procedure of dump operation

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 engine revolution and the amount of sliding the dump operation switch.
4. The rear gate of the vessel opens or closes automatically as the vessel moves up or down.



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 as far as possible.
   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.
3. When dumping bigger stones, operate dumping slowly. If there is a too big object to be dumped through the rear gate, remove the gate in advance.
4. Make sure that the vessel has lowered completely before starting the machine.
5. Do not travel while the vessel is raised. ALWAYS travel keeping the vessel lowered.
   Failure to do so will cause machine malfunction or damage.
6. The vessel cannot be raised while traveling.
   The travel speed is restricted during travel operation while the vessel is being raised or lowered.
   As a rule, raise or lower the vessel only when the machine is stopped.



Dump at a level and stable place.

IC120-2-C301210

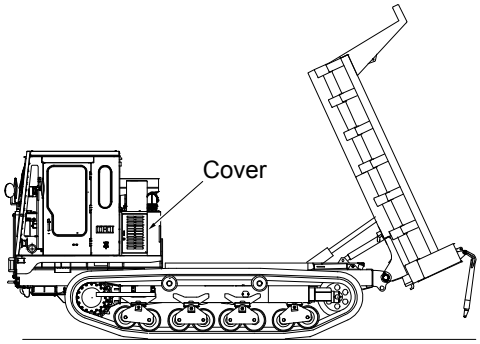
How to Lower Body in Case of Emergency

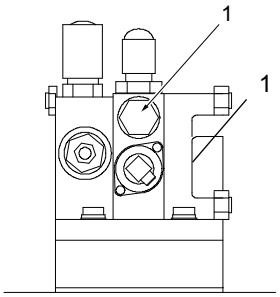
⚠ CAUTION

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

If a trouble occurs in the engine or pump in the condition where the body is raised and it cannot be lowered, it is possible to lower the body by loosening the control valve plug (1) behind the operator's cabin.

1. Make sure that there are no persons under or around the body.
2. Open the cover.
3. Loosen the plug slowly until the body begins to lower.
4. Tighten the plug firmly after body has lowered completely.





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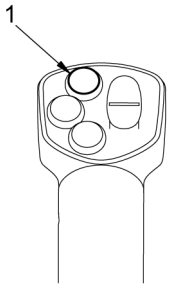
Engine Start/Stop Button

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.



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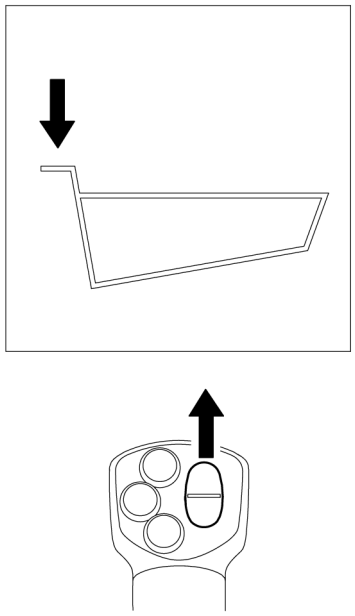
The use of the engine start/stop button on the joystick lever is for temporary operation.
When the engine is stopped by this method, the engine key switch is in ON position and the battery is consumed. Therefore, when away from the machine for an extended period of time, be sure to stop the engine using the engine key switch (described later).

WARMING UP THE MACHINE

NOTICE
Do not increase the engine speed quickly when hydraulic oil is cool (below 20°). The proper hydraulic oil temperature is approximately 50°C to 80°C. If you should carry out works at low temperature, warm up the engine until the hydraulic oil temperature rises to approximately 20°C before starting works.



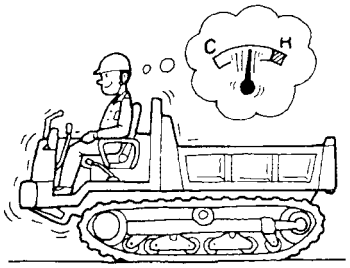
CA-C301060

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. Idle the engine 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, when it is low.
4. Move the machine forward and backward and raise and lower the vessel several times to warm up the mechanisms.

"BREAK-IN" OPERATION

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.

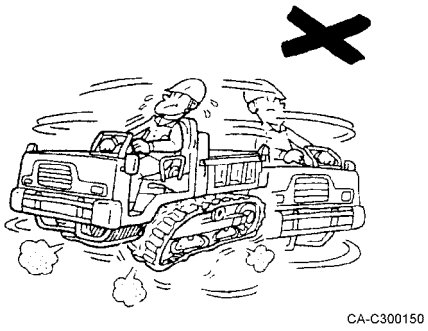
Warm-up operation



CA-C300130

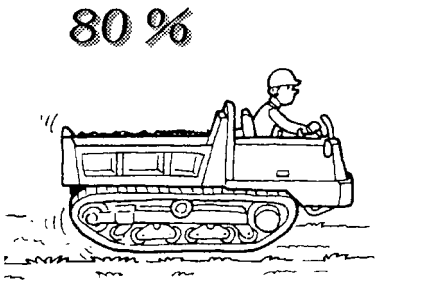
Pay attention to the following when breaking in a new machine.

- Warm up the machine sufficiently.
- 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.
  Run the machine at approximately 80% of the maximum engine speed.
  Place loads of approximately 80% of the maximum loading capacity.



CA-C300140

TRAVEL MODES

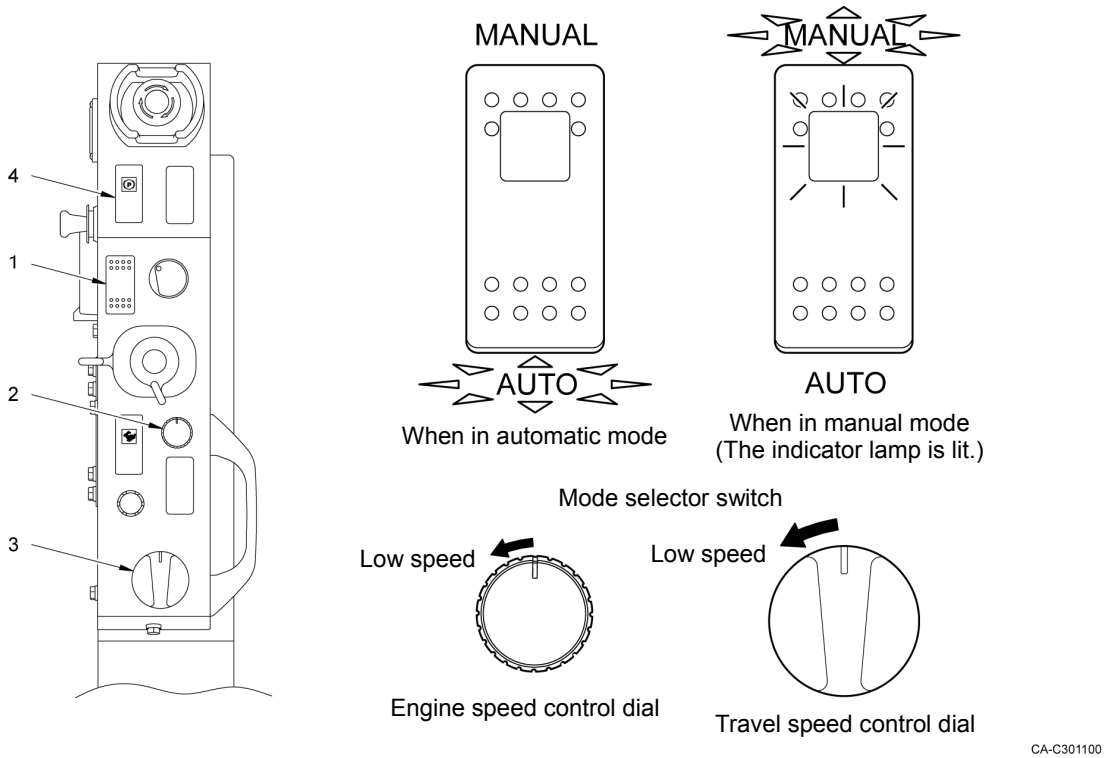
The following travel modes are available for selection for this machine.

- **Automatic mode**
  The operations of the joystick and the accelerator pedal are linked with the engine revolutions 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.

- **Manual mode**
  The operator sets the desired engine revolutions and operates the hydraulic pump with the joystick lever to adjust the travel speed.
  The engine revolutions can also be set with the accelerator pedal.
  This mode allows the operator to feel as if the operator operates the machine in a manner close to the conventional operating method. The manual mode is normally used to manually operate the machine to fit varied ground condition and loads.

Travel Mode Switching

The travel mode can be changed using the mode selector switch (1).
Before changing the travel mode, be sure to turn the engine speed control dial (2) and the travel speed control dial (3) full counterclockwise to the lowest setting and turn ON the parking switch (4).

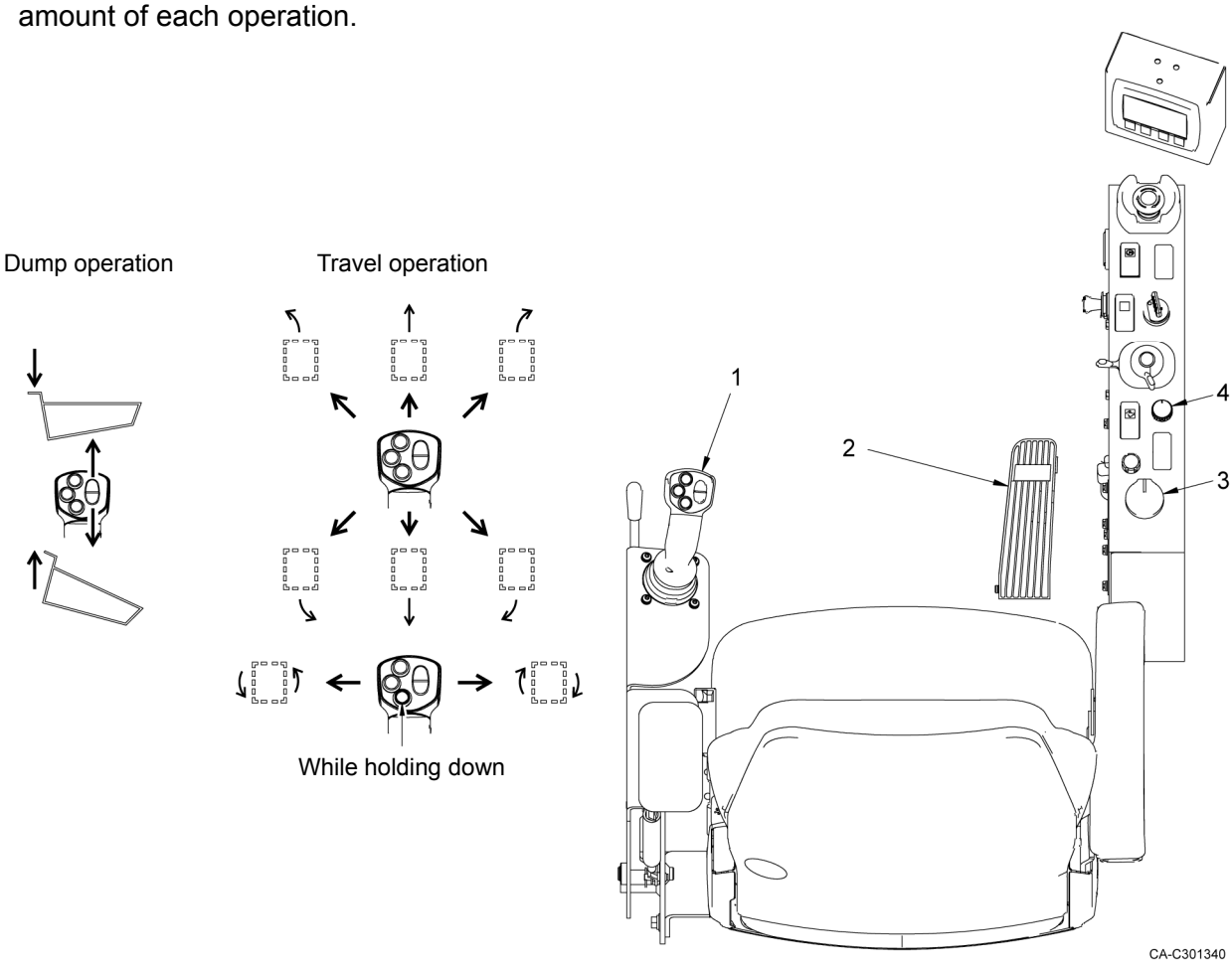


Automatic Mode

In the automatic mode, the travel speed is controlled mainly using the joystick.
Because the engine revolutions are linked automatically, the operator can concentrate on the travel operation.

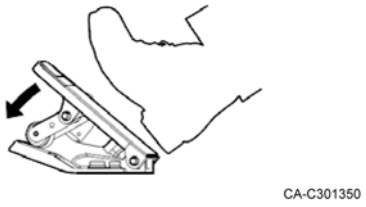
1. Joystick

The joystick is used to perform travel operation and dump operation.
In the automatic mode, the engine revolutions are automatically linked according to the amount of each operation.



2. Accelerator pedal

Combined with the joystick, the accelerator pedal adjusts the travel speed of the machine.
When using the accelerator pedal, tilt the joystick lever all the way toward the direction of travel and adjust the travel speed with the amount of step on the accelerator pedal; thereby the operator can operate the machine with the feeling of driving an automobile.



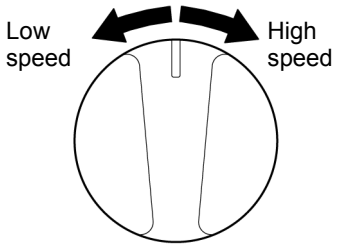
3. Travel speed control dial

This adjusts the speed of travel operated with the joystick.

Low speed End : 0 ~ Very slow speed

High speed End ：0 ~ 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.



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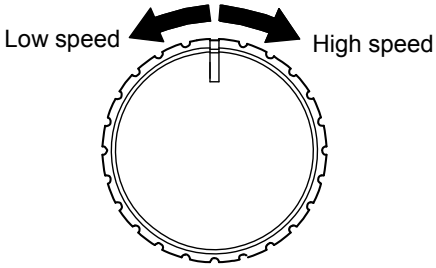
4. Engine speed control dial

This adjusts the idling speed of the engine.

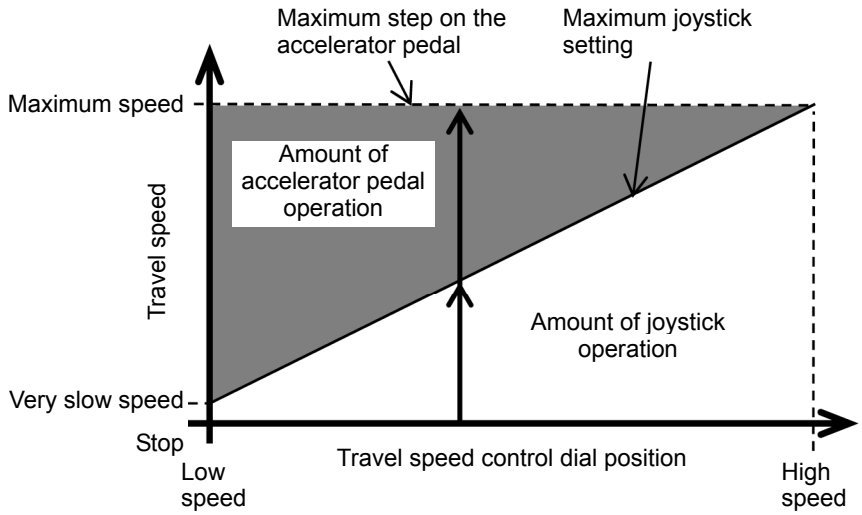


CA-C201040

Details of the Automatic Mode

The travel speed of the machine is determined by the engine revolutions 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.
In the automatic mode, the linked control of engine revolutions and hydraulic pump are performed in response to travel speed commands input by joystick, and, by changing these automatically according to load of travel, stable travel speeds are achieved.

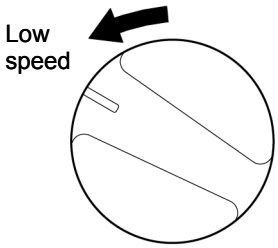
- **Relationships between the joystick and the accelerator pedal in the automatic mode**



CA-C301390

When the travel speed control dial is at the lowest speed position

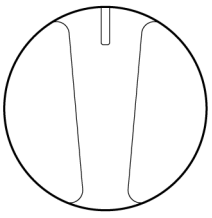
- Operating the joystick travels the machine at a speed range from stop to very slow.
- Operating the accelerator pedal can adjust the speed of travel from very slow to the maximum.



CA-C301360

When the travel speed control dial is at the intermediate speed position

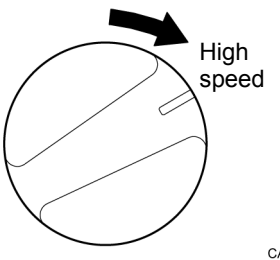
- In addition to the travel speed range that can be adjusted with the joystick, the accelerator pedal can be used to adjust to the maximum speed.



CA-C301370

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 is disabled.



CA-C301380

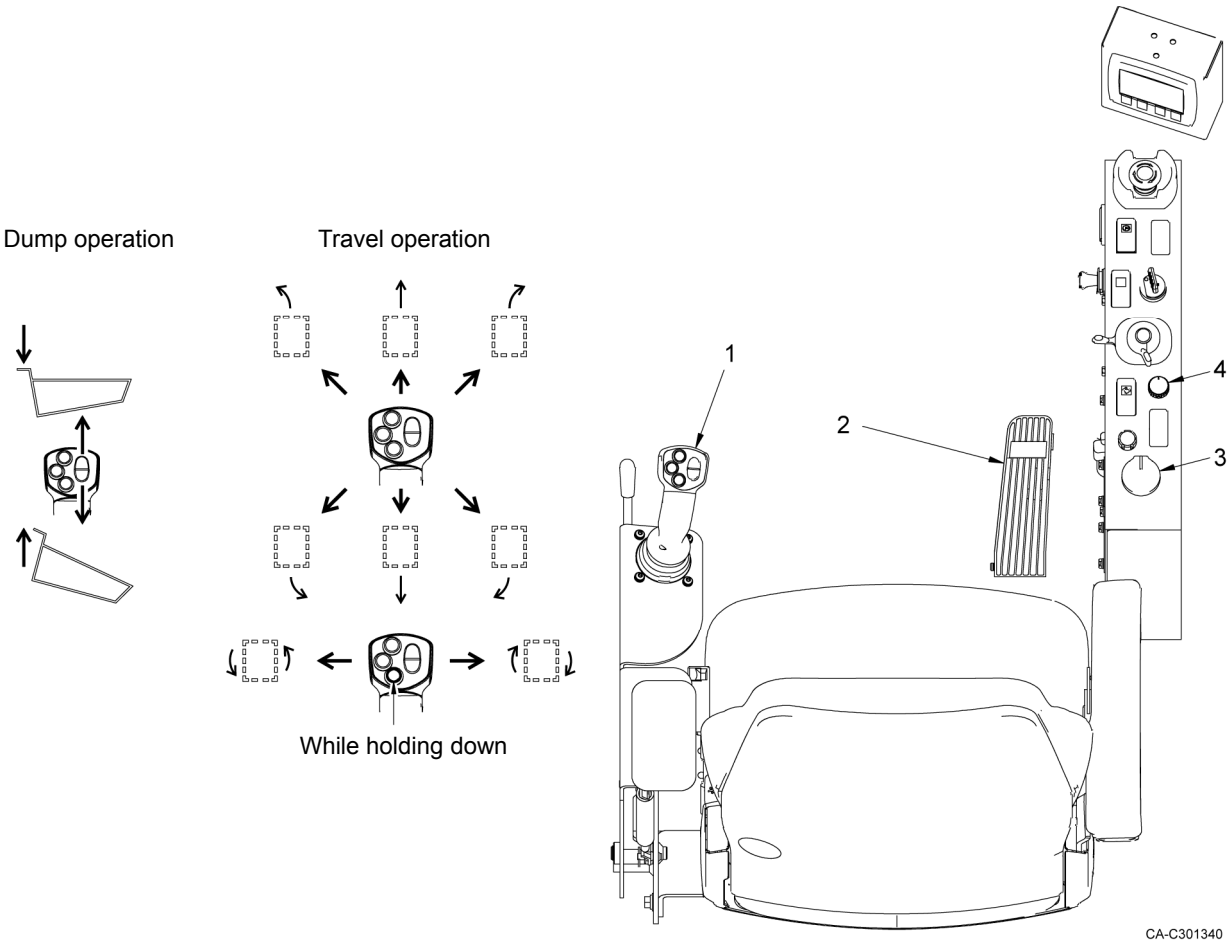
Manual Mode

The manual mode provides a travel mode which is similar to the feeling of conventional travel. The engine revolutions need to be adjusted by the operator.

1. Joystick

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

In the manual mode, the operator needs to adjust the engine revolutions.

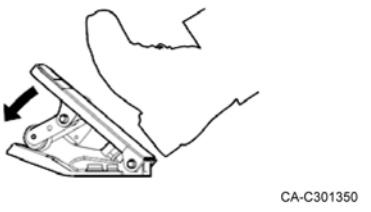


2. Accelerator pedal

In the manual mode, the accelerator pedal adjusts the engine revolutions.

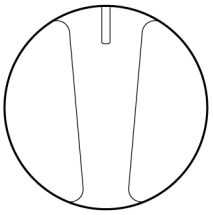
With the amount of step on the accelerator pedal, the engine revolutions can be adjusted in a range from the engine revolutions which is set with the engine speed control dial (4) to the maximum revolutions.

When the accelerator pedal is released, the engine revolutions return to the original setting of dial (4).



3. Travel speed control dial

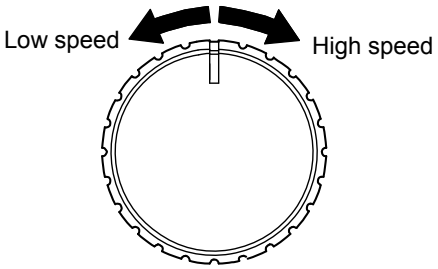
This is not used in the manual mode.



CA-C301370

4. Engine speed control dial

In the manual mode, this sets the engine revolutions.

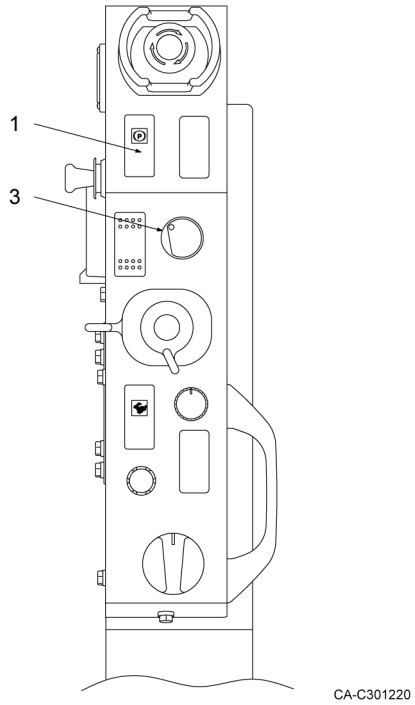


CA-C201040

STOPPING THE ENGINE

⚠ 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.

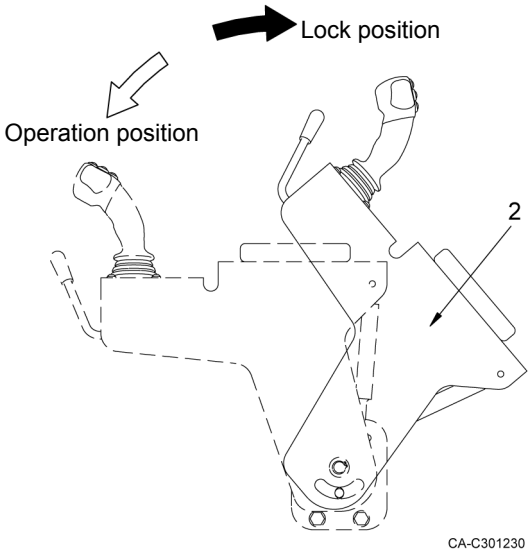


Stopping the machine

1. Stop the machine on a flat and rigid ground.
2. Set the 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.

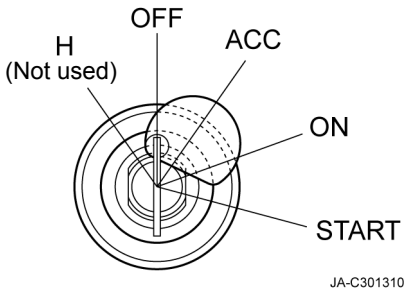
Stopping the engine

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.



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 urea aqueous solution.
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.

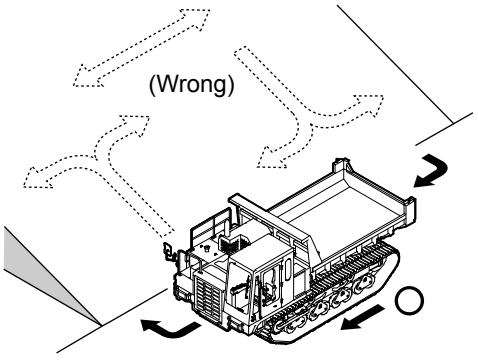


CAUTION OF TRAVEL ON A STEEP SLOPE

⚠ DANGER

- Do not travel on slopes over 20° in order to avoid turnover.
- On steep slopes over 9°, travel the machine at low travel speed and middle or lower engine 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.
- Overruns tend to occur when traveling downhill in the manual mode.
  If an overrun occurs, perform overrun avoidance operation immediately.

Never change the travel direction on or cross a slope.



Make a detour on a flat ground.

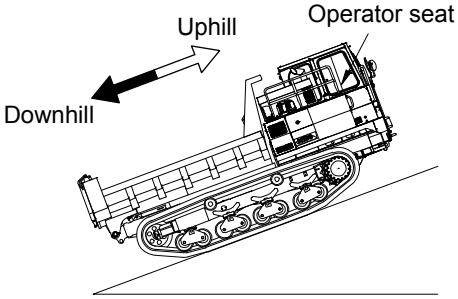
IC120-2-C301130

Cautions

Travel in the proper postures shown below.

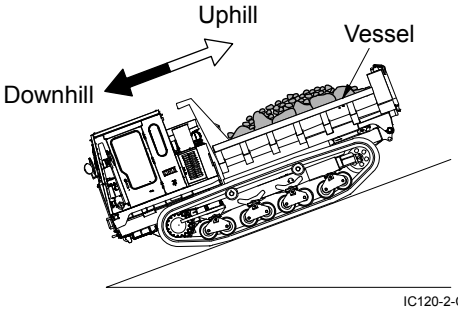
- Drive the machine with the cabin upper side of a slope when the vessel is empty. This posture ensures stable driving, since the center of gravity is located on the cabin side.
- Drive the machine with the vessel upper side of a slope when the vessel is full. This posture ensures stable driving, since 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.

Traveling on slope with an unloaded machine



IC120-2-C301140

Traveling on slope with a loaded machine.



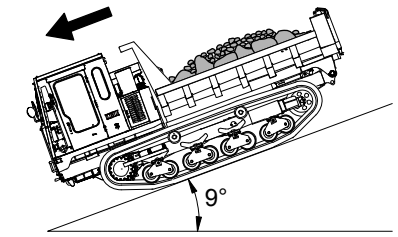
IC120-2-C301150

Slope Warning

Slope alarm mark (1) is displayed and blinks on the display if the machine inclines forward by 9° or more when it is descending on a slope.

At the same time, the buzzer sounds for five seconds.

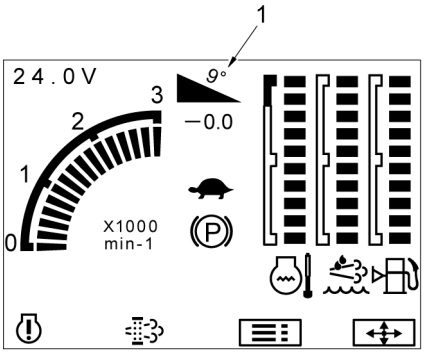
On a slope of an angle over 9°, set the travel speed select switch (2) to the Low position.



The posture at which the safety warning devices are activated IC120-2-C301160

In the manual mode, travel straight on a hilly road with engine revolutions of medium speed or lower.

If the machine travels without dropping the speed, there is a danger of overrun.



CA-C301170

Overrun avoidance operation

Carry out the following operations immediately to reduce the speed:

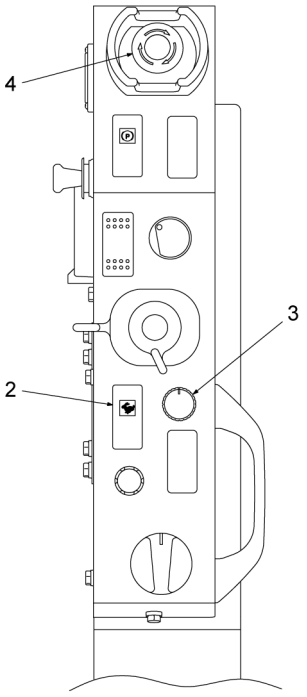
1. Return the joystick lever to the neutral position.
2. Reduce the engine speed control dial (3) down to the low speed.

⚠ WARNING

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

Emergency Engine Stop Switch

The engine can be stopped forcibly by pressing the emergency engine stop switch (4).



CA-C301180

⚠ 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.

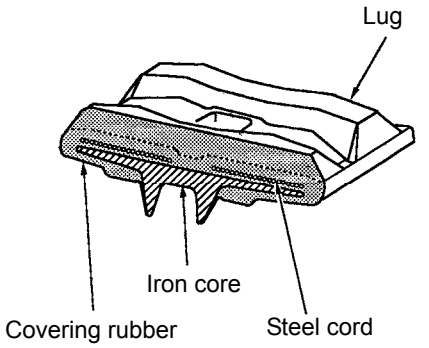
PRECAUTION ON USE OF RUBBER CRAWLER SHOE

⚠ 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.

Structure of Rubber Crawler Shoe

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.



CJ-C300440

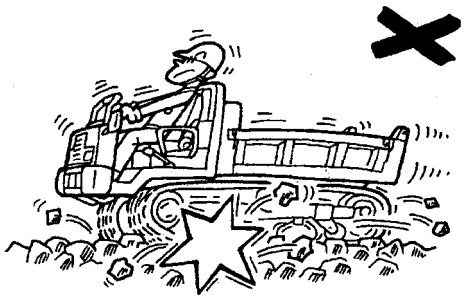
NOTICE

If a crack reaches the steel cord, it may be rusted and cut off by moisture. When any crack is detected, immediate repair is essential. Please contact our service dealer.

Cautions while working and traveling

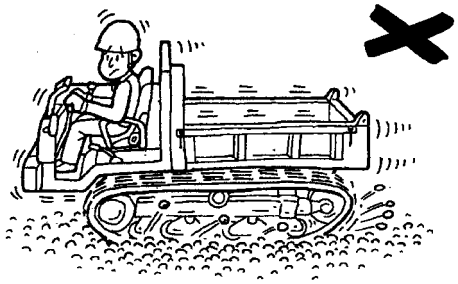
DO NOT TRAVEL OR WORK ON STONE FOUNDATIONS OR SHARP ROCKS

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


CA-C300450

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

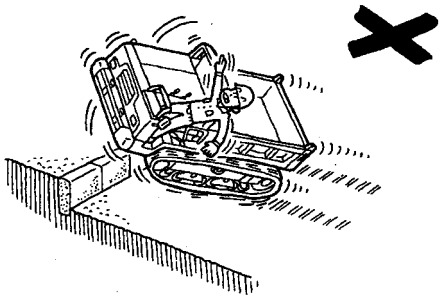
DO NOT TRAVEL OR WORK ON STEEL OR SCRAP MATERIAL

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

CA-C300470

DO NOT TRAVEL OR WORK ON LARGE STEPS SUCH AS STONE STAIRS

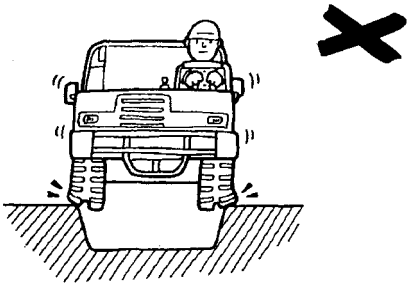
- Move slowly directly up steps.
- While moving up the steps, avoid places where the road surface changes.



CA-C300480

DO NOT TRAVEL OR WORK WHILE SPANNING A DITCH ETC

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

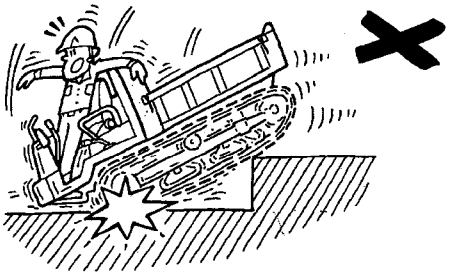


CA-C300490

AVOID LOCATIONS WHERE THE CARRIER MIGHT FALL

Do not let the carrier fall from locations like large stone steps.

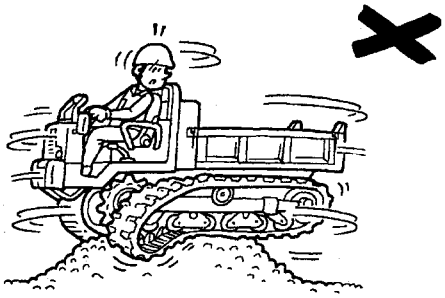
This might damage or break the iron core.



CA-C300500

AVOID TRAVELING OVER LARGE RUTS OR PROTRUSIONS ON THE ROAD

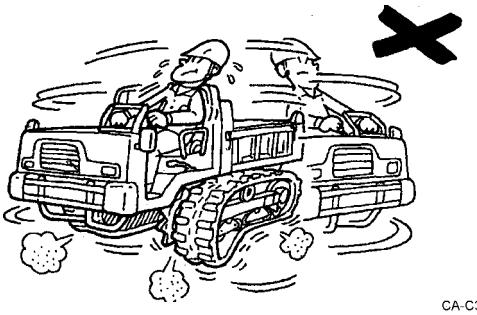
- Travel slowly and take care not to let the crawlers come off the rollers.
- Do not change directions when the crawlers may have lost tension at the high and low parts of ruts and protrusions. This may cause the crawlers to come off.



CA-C300510

AVOID SUDDEN CHANGES IN DIRECTION WHEN STEERING

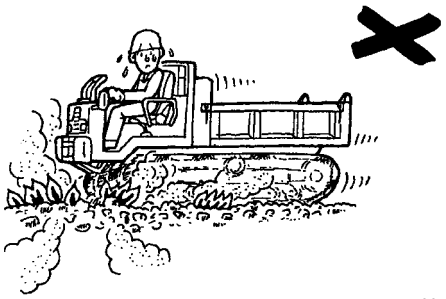
- Make direction changes in several smaller steering movements.
- Avoid sudden changes in direction.
  This causes early wear on the lug and may cause the crawlers to slip off.



CA-C300520

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.

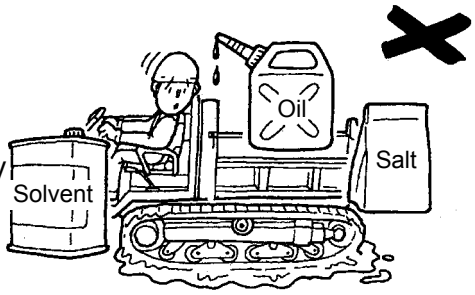


CA-C300530

OTHER ITEMS FOR CAUTION

DO NOT LET OIL – SOLVENTS OR SALT ADHERE TO THE RUBBER CRAWLERS

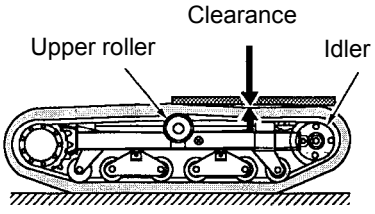
- If fuel, transmission fluid, urea aqueous solution or paint should adhere to the rubber crawlers wipe it away quickly.
- Wash away with water after working in locations with a large salt content. Salt can cause the iron core to rust or peel.



CA-C300540

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.

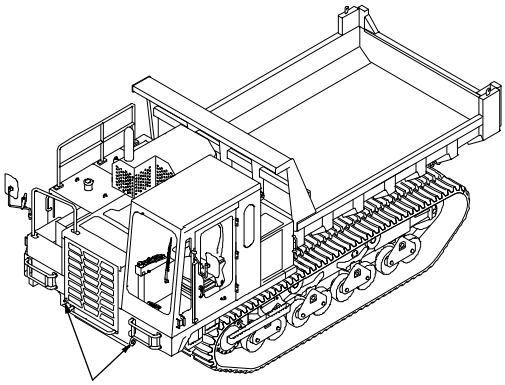


CA-C300550

TOWING

⚠ WARNING

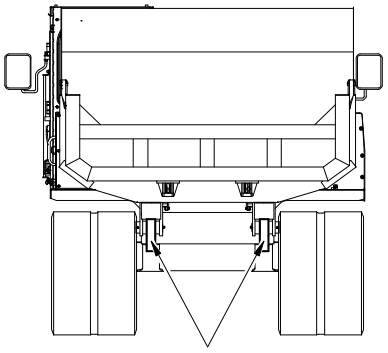
- Use wire ropes and shackles for towing that are strong enough for the towing weight.
- It is very dangerous if the wire rope is disentangled during towing. Do not stand between the towing machine and the towed machine.



IC120-2-C301250

Towing the carrier

When the carrier gets stuck for instance in mud and cannot escape under its own power it must be towed by another machine. In such cases attach a shackle to a wire rope and attach this to the front or rear hook. The carrier can now be towed.



IC120-2-C301260

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

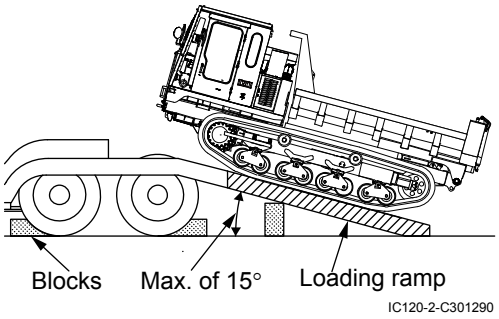
NOTICE

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.

TRANSPORT

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

Loading and Unloading the Machine



⚠ WARNING

- Move the machine forward when loading. Move it back when unloading.
- Be sure to select Low speed travel with the Travel speed select 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.

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.

Fixation at Transport

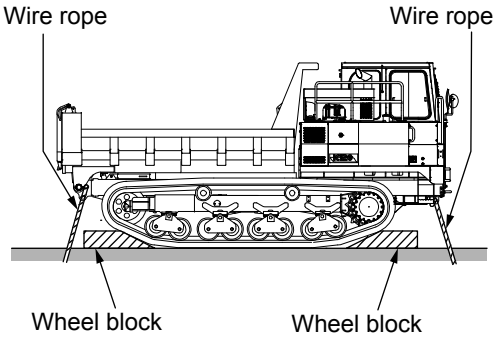
⚠ CAUTION

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.

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.



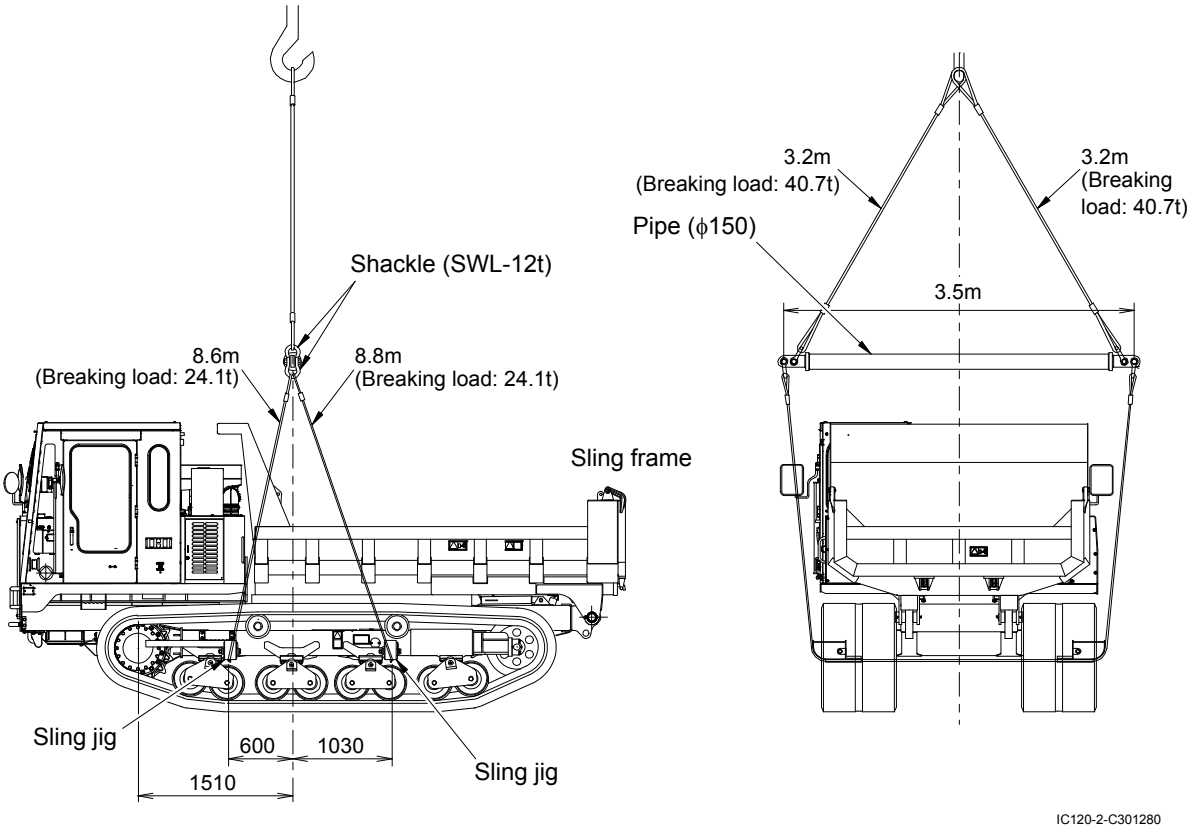
IC120-2-C301270

Lifting the Machine

⚠ WARNING

- ALWAYS lift the machine on the level ground.
- NEVER lift the machine loaded with any personnel.
- Make sure the lifting cables and other lifting devices are strong enough to support the machine.
- Use guide or tag lines to prevent the machine from swinging or turning.

Weight on lifting the machine: 14020 kg



1. Prepare strong enough wire ropes, shackles, sling frame and sling jigs.
2. Fix the sling jigs at the positions of the crawler frame shown above and pass the wire rope through them.
3. Install the wire rope to the sling frame with the shackle.
4. Install the wire rope to the crane hooks and lift upward so the crawler is a little bit above the ground, then stop lifting.
5. If the balance is good continue slowing lifting the machine.

STARTING WITH JUMPER CABLES

Follow the procedures shown below to start the engine with jumper cables, if the batteries are exhausted.

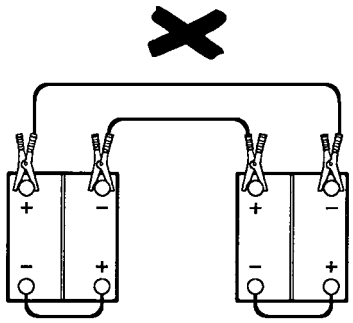
⚠ WARNING

- If the jumper cables are connected improperly, the batteries are short-circuited, resulting in a dangerous accident. Never connect the positive and negative terminals.
- The battery produces inflammable hydrogen gas. It is explosive. Never bring fire close to the battery or strike a spark near it.

NOTICE

The electrical system of this machine runs on 24 V. Use a 24 V auxiliary battery.

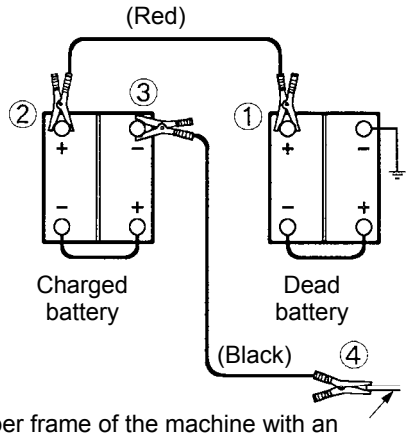
Never connect the positive and negative terminals.



CA-C300100

Connecting the jumper cables

1. Set the engine key switches of a machine with a charged battery and the machine with a dead battery.
2. Connect the clip of the (red) jumper cable to the positive terminal of the dead battery. Connect the other clip to the positive terminal of the charged battery.
3. Connect the clip of the (black) jumper cable to the negative terminal of the charged battery. Connect the other clip to the upper frame of the machine with the dead battery.



Upper frame of the machine with an exhausted battery

Order of connecting the jumper cables

① → ② → ③ → ④

CA-C300110

Starting the engine

1. Make sure that the cable clips are connected with the battery terminals and upper frame properly.
2. Start the engine of the machine with the charged battery and keep it running at high speed.
3. Start the engine of the machine with the dead battery.

Disconnecting the jumper cables

1. Disconnect the clip of the black cable from the upper frame first. Disconnect the clip from the negative terminal of the charged battery then.
2. Disconnect the clip of the red cable from the positive terminal of the charged battery first. Disconnect the clip from the positive terminal of the dead battery then.

Order of disconnecting the jumper cables

④ → ③ → ② → ①

CA-C300120

MAINTENANCE

Proper maintenance is needed to maintain the machine performances for long and prevent damages and troubles in advance.
This section describes the proper maintenance procedures of this machine. Carry out maintenance safely and properly in accordance with the maintenance procedures described below.

PRECAUTION ON MAINTENANCE

Maintenance intervals

Determine the maintenance intervals in accordance with the time of the hour meter and certain period of time.

This section shows the maintenance intervals on the assumption that the machine is used in normal running conditions. Carry out maintenance earlier if the work environments are bad or severe.

Preparation for maintenance

- Place the machine in a flat and rigid ground.
- For normal maintenance, lower the vessel completely.
  To carry out maintenance with the vessel raised, raise the vessel fully and apply the safety lever.
- Set the parking switch to the brake ON position and the left lever unit to the locked position, stop the engine, and then remove the key from the engine key switch.
- Hang a tag indicating that inspection and maintenance are in progress at an easily visible location on the engine key switch or the left lever unit.

Cautions for repair works requiring welding

- Turn off power. (Disconnect the cable from the negative terminal of the battery.)
- Do not put any seals, bearings or the like between the weld zone and GND.
- Do not connect the GND wire to the pin of the vessel or hydraulic cylinder. It is the best way to connect the GND wire at or near the object to be welded.

Use genuine parts.

Be sure to use the genuine parts.

Use oil and grease of viscosity appropriate to the temperature.

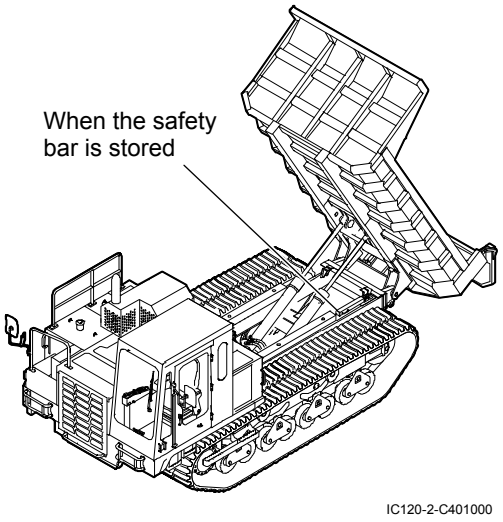
Ask our service dealer for important maintenance.

Ask our service dealer for important maintenance works such as replacement of electronic parts, adjustment of the hydraulic pressure and so forth that require professional knowledge and technique.

USE OF SAFETY BAR

⚠ DANGER

ALWAYS use the safety bar to prevent personal injury or death, when maintenance under the raised vessel. Use the safety bar when underneath the vessel which has been raised.

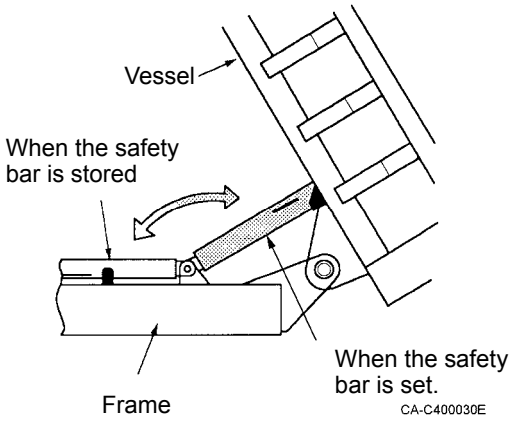


Setting the safety bar

1. Raise the vessel completely.
2. Raise the safety bar and set it to the bracket under the vessel.

⚠ CAUTION

Do not start the engine or lower the vessel while the safety bars are used.
Such an action may cause breakage of the safety bar or vessel.



Removing the safety bar

1. Raise the vessel completely.
2. Remove the safety bar from the bracket and store the bar onto the frame.

PERIODICAL REPLACEMENT OF THE IMPORTANT PARTS

Carry out periodical maintenance of the parts shown below having great concern with safety and fire, in particular.

These parts are subject to changes of materials, wear and deterioration as they are used long. It is difficult to judge the service life by checking the appearance of these parts. Replace them periodically, even though they do not have apparent defects.

Fuel Hose

Location to be replaced periodically	Q'ty	Replace interval
Fuel hose (between fuel tank and engine)	1	Every 2 years
Fuel hose (between engine and fuel cooler)	1	
Fuel hose (between fuel cooler and fuel tank)	1	

Hydraulic Hose

Location to be replaced periodically	Q'ty	Replace interval
Hydraulic hose (between pump and right travel motor, main line)	2	Every 2 years
Hydraulic hose (between pump and left travel motor, main line)	2	
Hydraulic hose (between pump, CV and dump cylinder)	5	

SCR Piping Hose

Location to be replaced periodically	Q'ty	Replace interval
DEF hose (DEF tank OUT to supply module IN)	1	Every 2 years
DEF hose (supply module BACK to DEF tank IN)	1	
DEF hose (supply module OUT to DRT)	1	

Repair or replace these parts immediately if some abnormalities or defects are found in them even before the replacement periods.

Also check the fuel hoses and hydraulic hoses in daily check, monthly check and yearly check.

MAINTENANCE INTERVALS

Inspection and maintenance location		Description of inspection and maintenance	Interval of inspection and maintenance								
			Daily	Every 50 hours	Every 150 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 2000 hours	Every 4500 hours	Irregular
Pins around vessel		Grease		○							
Oscillating link pins of lower rollers		Grease		○							
Rubber crawlers		Check for wear and cracks.	○								
		Inspect and adjust shoe tension.	○								
Bolt tightening locations		Inspect and tighten.		First time ○		○					
Travel reduction gear		Inspect lubricant level and replenish.					○				
		Change lubricant.			First time ○			○			
Hydraulic system	Hydraulic oil tank	Inspect hydraulic oil level and replenish.	○								
		Drain		○							
		Change hydraulic oil						○			
	Suction strainer	Clean						○			
	Return filter	Change cartridge		First time ○			○				
	Line filter	Change element		First time ○			○				
	Hoses, pipes	Inspect for leaks and damages.	○								
Engine oil system	Engine oil	Inspect engine oil level and replenish.	○								
		Change engine oil.					○				
	Engine oil filter	Change cartridge					○				
Cooling system	Coolant tank	Inspect coolant level and replenish.	○								
	Coolant	Inspect coolant additive concentration					○				
		Inspect antifreeze solution density.					○				
		Change coolant.							○		
	Coolant filter	Change cartridge					○				
	Fan belt	Inspect tension and for scratches.						○			
	Fan	Inspect for cracks and deformation.	○								
	Radiator hose	Inspect for leaks and damages.	○								

Inspection and maintenance location		Description of inspection and maintenance	Interval of inspection and maintenance								
			Daily	Every 50 hours	Every 150 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 2000 hours	Every 4500 hours	Irregular
Fuel system	Fuel tank	Check fuel level and replenish.	○								
		Drain		○							
	Water separator	Drain	○								
		Change cartridge					○				
	Fuel filter	Change cartridge					○				
	Fuel hose	Inspect for fuel leaks and damages.	○								
Air intake and exhaust system	Air cleaner	Inspect clogging warning lamp.	○								
		Clean and change element.				○					
	Air intake and exhaust (SCR) pipes	Inspect for leaks and damages.	○								
Electrical system	Battery	Inspect battery fluid and replenish.		○							
		Clean terminals.					○				
	Fuses	Change.									○
	Fusible link	Change.									○
Engine and others	DEF	Check DEF level and replenish.	○								
	Crack case Breather tube	Inspect.	○								
	Breather element	Change.							●		
	Vibration dumper	Inspect.							●		
	Overhead valve	Inspect.								●	
	DEF pump filter	Clean and change.								●	
	DEF dosing filter	Change.								●	

- For more information about the engine, also refer to the Engine Operation Manual.
- Inquire of our service dealer about the maintenance items with ● marks.

RECOMMENDED LUBRICATION TABLE

Lubrication points	Oil type	Grade	Temp. & application -30 -20 -10 0 10 20 30 40	Q'ty required
Engine oil pan	Engine oil	API-CJ-4 or ACEA E9	SAE10W-30 * SAE15W-40	H: 22.7 L L: 19 L
Hydraulic oil tank	Hydraulic oil	Abrasion-resistant	* ISO-VG46 * ISO-VG32	Total q'ty: 208 L Tank level: 148 L
Travel reduction gear	Gear oil	API GL-4	* SAE90	6.0 L
Fuel tank	Diesel fuel	ULSD		363 L
Cooling system	Coolant	LLC	Make a 50% addition of long-life coolant (LLC).	Total q'ty: 36.5 L
	Coolant additive	DCA4	Part No. DCA65L	When replacing coolant 1.9 L
DEF system	DEF (Diesel Exhaust Fluid)	AdBlue®	Use the product conforming to the ISO standard.	38 L

The oils and fluids marked with an asterisk (*) are used at the time of shipment from the factory.

GREASING

Refill the grease nipples with grease using a grease gun.

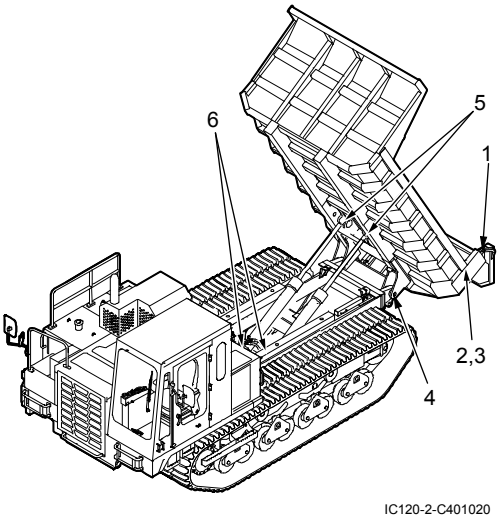
Remove oozed old grease after refilling.

Vessel

⚠ WARNING

Be sure to set the safety bars under the vessel when lubricating with the vessel raised.

- Hinge pins of the vessel rear gate (1) 2 positions
- Lock pins of the vessel rear gate (2) 2 positions
- Control springs of the vessel rear gate (3) 2 positions
- Vessel joint pins (4) 2 positions
- Dump cylinder rod pins (5) 2 positions
- Dump cylinder foot pins (6) 2 positions



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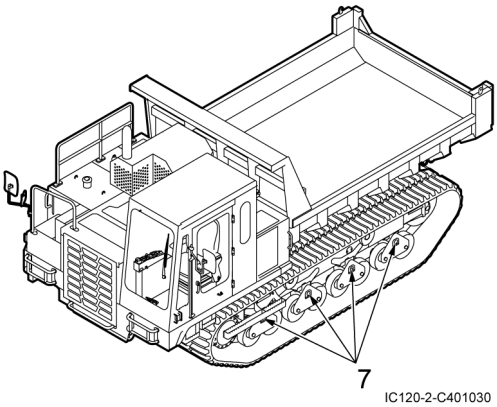
Oscillating Link

- Oscillating link pins (7) 8 positions

NOTICE

Grease the link pins everyday before starting works if the machine is used on damp grounds or in mud.



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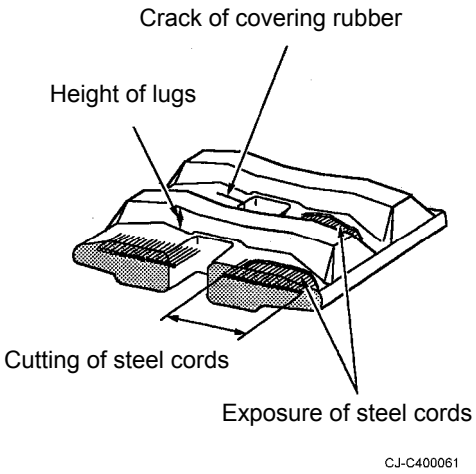
RUBBER CRAWLER

Rubber Crawler Shoe Maintenance

Rubber crawler shoe should be repaired or exchanged under the next conditions.
If it is necessary to repair or replace it, contact our service dealer.

- **Height of Lugs**

The rubber crawler can be used even if it is worn, however, if it is excessively worn, the crawler 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.



- **Exposure of Steel Cords**

If steel cord is exposed because of weary rubber or damage, exchange it with brand-new one.

- **Cutting of Steel Cords of Rubber Crawler Shoes**

When cutting of steel cord is detected, exchange it immediately. If you leave it as it is, the rubber crawler shoes can be cut off without expectation, which causes a serious accident.

- **Crack of Covering Rubber**

If a crack is 30 mm or more long and 8 mm or more deep, repair the cover 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 crawler shoe.

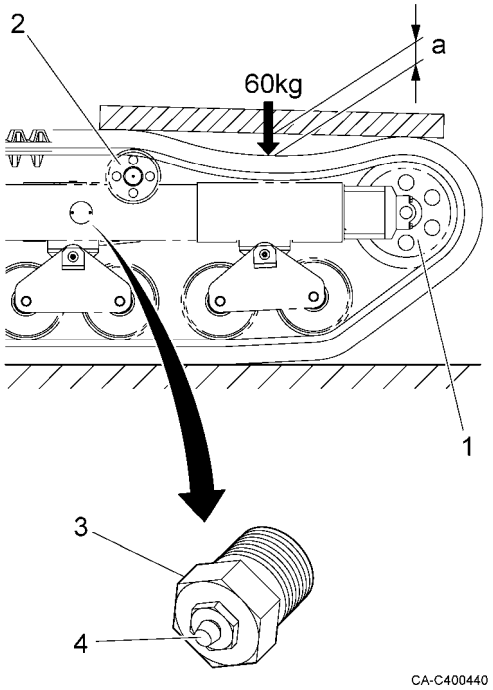
- **Dislocation of the rubber crawler cores**

Exchange the rubber crawler with a new crawler if one or more cores are dislocated from it.

Track Adjustment

Checking tension of the rubber crawlers

1. Place the carrier on a flat and rigid ground.
2. Put a timber of approximately 1.5 meters long on the rubber crawler shoe above the idle tumbler (1) and upper roller (2) and check the clearance between the timber and the crawler when a person (of 60kg in weight) gets on the center of crawler between the tumbler and the upper roller.
   The proper clearance is 20 to 30 mm.



Tensioning the rubber crawlers

1. Fill grease through the grease nipple (4) of the check valve (3) until the rubber crawler shoe are tensioned properly.
2. Rotate the rubber crawlers forward and backward and check tension. Re-adjust it if necessary.

NOTICE
• Adjust the right and left rubber crawlers evenly. • If the rubber crawlers are not tensioned properly, the cylinders may be defective. Ask our service dealer for repair services.

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.

5. Rotate the rubber crawlers forward and backward and check tension. Re-adjust it if necessary.

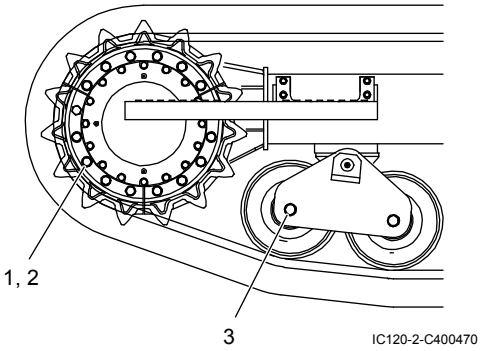
⚠ WARNING
• When the rubber crawlers are tensioned intensely, the internal pressure in the grease cylinder is very high. Do not remove any parts before the pressure is zeroed. • To relief the pressure, loosen the check valve gradually. Do not loosen it when grease is discharged. (It should be loosened 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.

FIXED BOLT TORQUE

Tighten the bolts and nuts as shown in the table below.
If loose bolts and nuts are found in daily check, tighten them. If lacking bolts and/or nuts are found, be sure to replace new parts with lacking parts.
When a new machine is used, check the bolts and nuts when first 50 hours have past. Tighten loose bolts and nuts.

Special Torque Specifications

The bolts and nuts shown in the table below bear large forces. Tighten them at the torques shown in the table. When these bolts and nuts are replaced, apply the locktite to the threads and tighten them at the specified torques.



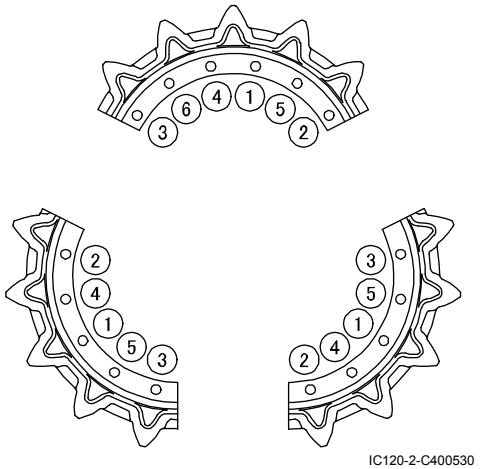
IC120-2-C400470

Traveling-rated

No.	Special tightening	Thread size	Wrench size (mm)	Tightening torque	
				N·m	kgf·m
1	Travel reduction gear	M20	30	476	48.5
2	Drive sprocket	M20	30	476	48.5
3	Oscillating link	M30 Castle nuts	46	476	48.6
4	Lower roller	M24	36	850	86.7

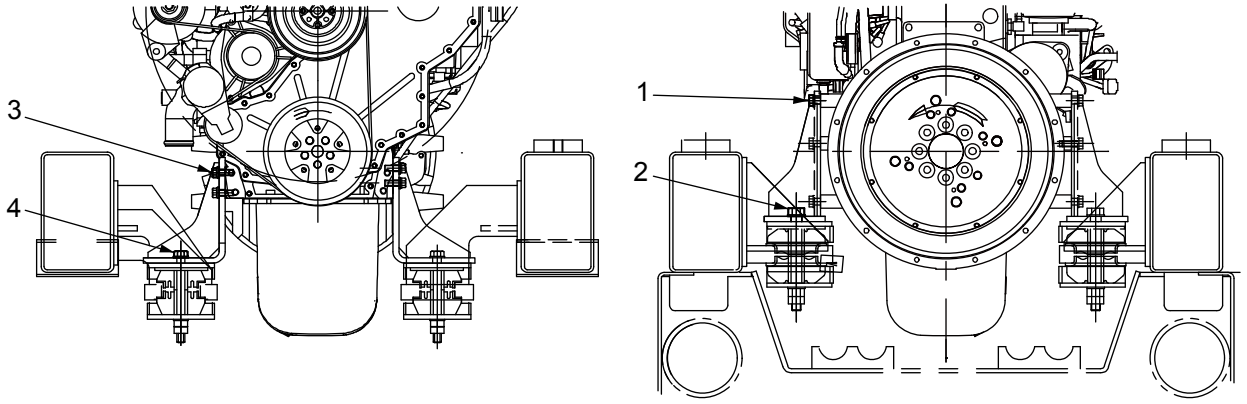
Observe the following procedures when attaching the drive sprocket.

(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 locktite applied at a torque of 245 to 295 N·m first.
(3) Then, tighten the bolts in the order shown on the right at the specified torque of 476 N·m. Tighten the bolts quickly since screw locking agent is applied to them.



IC120-2-C400530

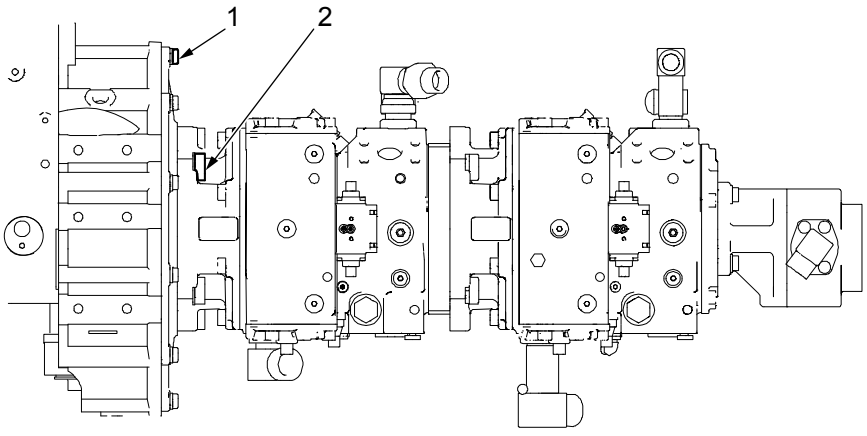
Engine



IC120-2-C401040

No.	Special tightening	Thread size	Wrench size (mm)	Tightening torque	
				N·m	kgf·m
1	Engine and bracket (rear)	M12	19	97	9.9
2	Bracket and frame (rear)	M20	30	476	48.5
3	Engine and bracket (front)	M12	19	97	9.9
4	Bracket and frame (front)	M16	24	241	24.6

Hydraulic pump



IC120-2-C401050

No.	Tightening position	Bolt size	Wrench required (mm)	Tightening torque	
				(N·m)	(kgf·m)
1	Engine and pump housing	M10	17	55	5.6
2	Pump housing and hydraulic pump	M20	30	476	48.5

General Torque Specifications (10T bolt)

Tighten bolts and nuts not shown above at the torques shown in the table below.

Bolt size	Wrench size (mm)	Tightening torque			
		Metric coarse thread heat-processed bolt		Metric fine thread heat-processed bolt	
		(N·m)	(kgf·m)	(N·m)	(kgf·m)
M8	13	23	2.3	25	2.5
M10	17	47	4.8	50	5.1
M12	19	83	8.5	91	9.3
M14	22	134	13.7	135	13.8
M16	24	208	21.2	221	22.5
M20	30	411	41.9	452	46.1
M24	36	715	72.9	811	82.7

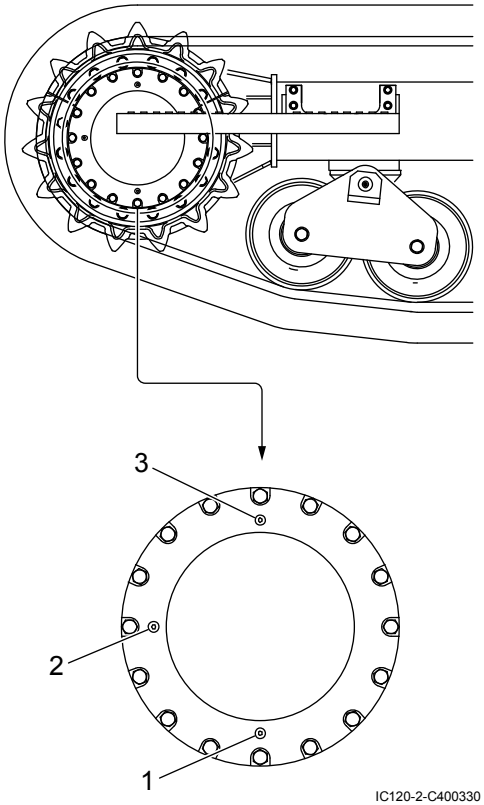
High-pressure hose union nut		
Hose size (inch)	Tightening torque	
	(N·m)	(kgf·m)
1/4"	25	2.5
3/8"	49	5.0
1/2"	59	6.0
3/4"	118	12.0
1"	137	14.0
1-1/4"	167	17.0

TRAVEL REDUCTION GEAR

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.



1. The drain port (1) must be located at the lowest position. The level port (2) must be located on the lateral side.
2. Remove the level plug. It is OK if the oil level is 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.

Change the Travel Reduction Oil

1. The drain port must be located at the lowest position. The level port must be located on the lateral side.
2. Put the container under the drain port.
3. Remove the 3 plugs to discharge oil.
4. Attach the drain plug.
5. Fill the specified quantity of gear oil through the filler port.
6. Attach the level plug when oil is discharged through the level port.

HYDRAULIC SYSTEM

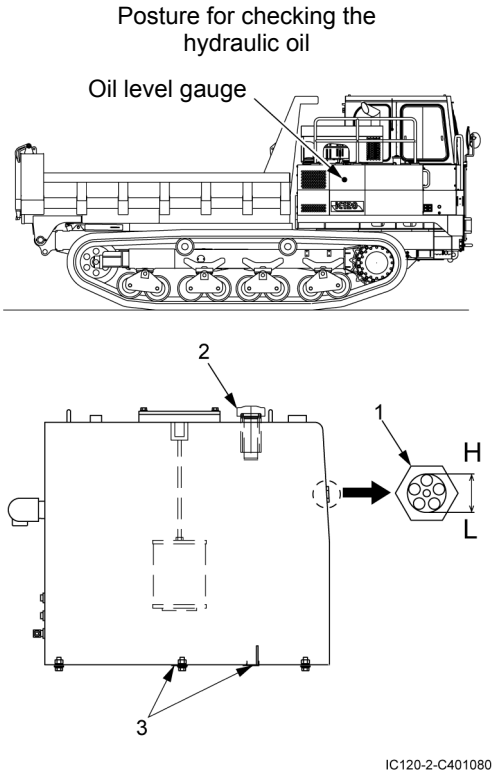
Check the Hydraulic Oil Level

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 level gauge (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 to 30°C)
   - Near the H level during operation (Oil temperature: 50 to 80°C)

3. If the oil level is below the L level, refill hydraulic oil through the filler port (2).



Drain the Hydraulic Oil Tank

⚠ WARNING

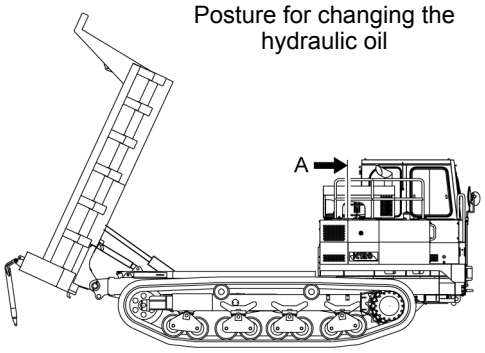
Oil is hot immediately after operation. You may get burnt if you touch oil.
Start work after oil has cooled down.

1. Loosen the drain plug (3) under the hydraulic oil tank to discharge water and sediment into the container.
2. Close the drain plug (3) when clean hydraulic oil is only discharged.
3. Check the hydraulic oil level. Refill oil if insufficient.

Change the Hydraulic Oil and Clean the Strainer

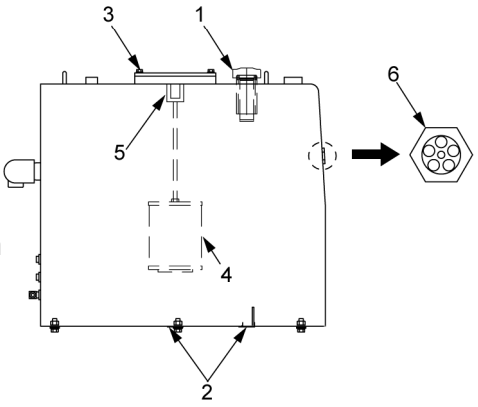
⚠ WARNING

- Be sure to set the safety bars under the vessel before starting works with the vessel raised.
- Oil is hot immediately after operation. You may get burnt if you touch oil. Start work after oil has cooled down.



Posture for changing the hydraulic oil

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. Remove the flange (3) and take out the strainer (4).
5. Remove adhered dust and foreign matters from the strainer and clean the strainer. Do not clean the O-ring with volatile solvent.
6. Insert the cleaned strainer into the suction port pipe with an attention to the O-ring.
7. Fit the guide pin of the flange to the guide holder (5) of the strainer and attach the flange.
8. 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.
9. Store the safety bars 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.
10. Make sure that the hydraulic oil level is within the proper range. Refill hydraulic oil if insufficient.



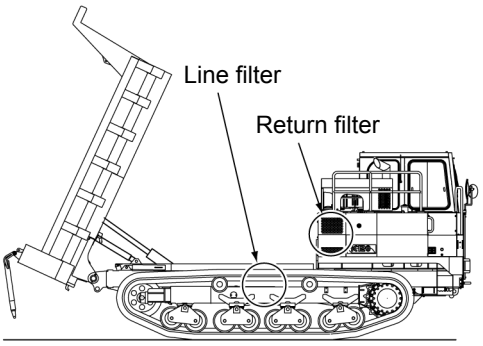
Viewed from direction of A

IC120-2-C401310

Replace the Return Filter and Line Filter

WARNING

- Be sure to set the safety bars under the body when starting work with the body raised.
- Oil is hot immediately after operation. You may get burnt if you touch oil.
  Start work after oil has cooled down.

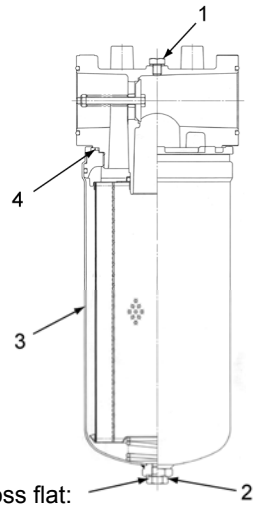


Posture for replacing the filter

Place the machine on a flat and rigid place. Bring it into the filter replacing posture and stop the engine.

Replace the return filter

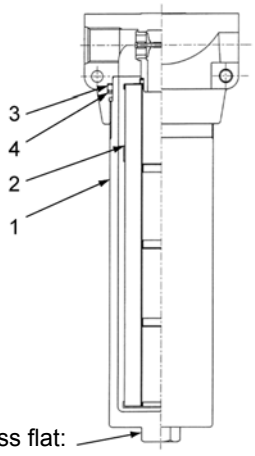
1. Loosen the air plug (1). Remove the drain plug (2) to discharge hydraulic oil from the filter cartridge (3).
2. Remove the filter cartridge with a wrench (size: 24).
3. Apply hydraulic oil to the O-ring (4) of a new filter cartridge and attach it to the filter head.
4. Tighten the filter head with the wrench.
   Tighten it until the O-ring is crushed and the top of the cartridge is brought into contact with the head.
5. Tighten the air plug.



Width across flat:
24 mm

Replace the line filter

1. Detach the case (1) with a wrench (size 32).
2. Clean the inside of the case.
3. Replace the element (2), O-ring (3) and backup ring (4).
4. Attach the case and tighten it with the wrench.



Width across flat:
32 mm

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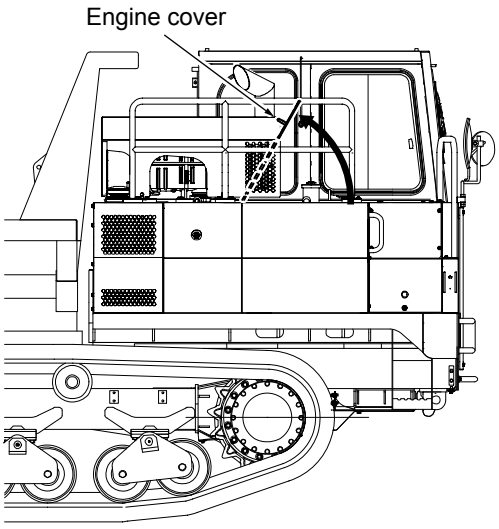
Check after replacement

1. Start the engine and make sure that no oil leaks from the filter mounting position.
2. Put in the safety bar, lower the body, and check the level of the hydraulic oil tank.
   If the oil surface is between H and L of the level gauge, the oil quantity is proper. Refill the tank with hydraulic oil if the oil level is low.

ENGINE OIL SYSTEM

Check the Engine Oil Level



1. Open the engine cover, pull out the dipstick (1), and remove oil with waste cloth.

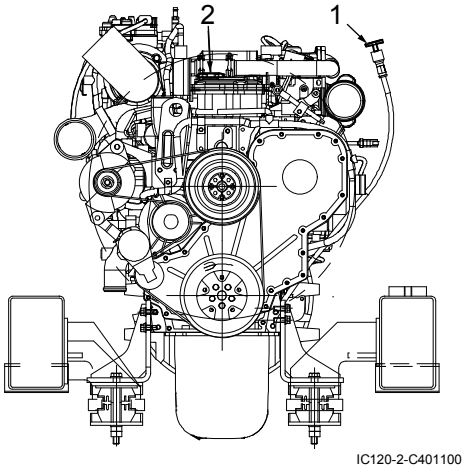
2. Insert the dipstick fully into the oil level pipe and pull it out.

3. The oil level is proper if oil on the oil level gauge reaches between the H and L positions.

4. Refill engine oil through the filler port (2) if the oil level is below the L level. Wait for approximately 15 minutes after refilling, and check the oil level.

5. If the oil level is proper, close the lubrication port firmly and close the engine cover.

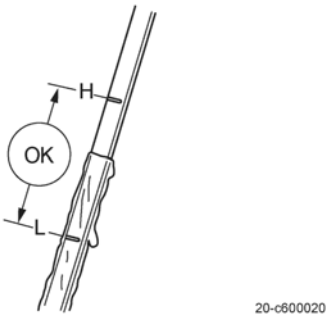
6. Too much engine oil may cause engine troubles. Be careful.



⚠ CAUTION

Using improper engine oil promotes sticking of the piston ring, seizure of the piston and cylinder, and wear of sliding parts. Furthermore, it may cause increase of oil consumption, reduction of the engine output, and damage to the engine.

Troubles and accidents caused by using improper engine oil are exempted from the warranty.

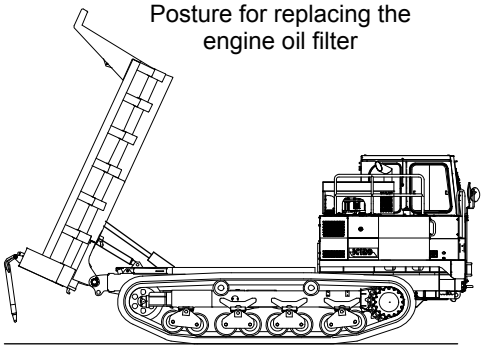


Replace the Engine Oil and Engine Oil Filter

WARNING

- Be sure to set the safety bars under the vessel before starting works with the vessel raised.
- Oil is hot immediately after operation. You may get burnt if you touch oil. Start work after oil has cooled down.

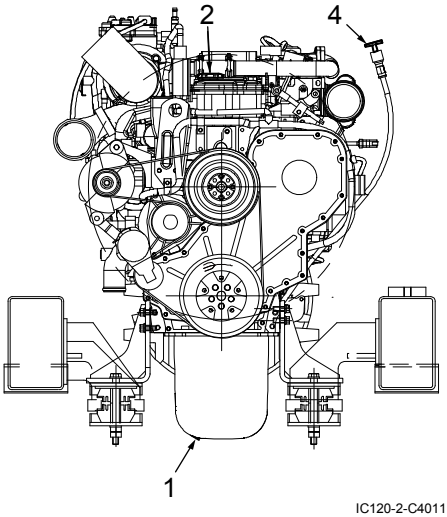
Posture for replacing the engine oil filter



Place the machine on a flat and rigid ground and bring it into the posture for replacing the engine oil filter. Stop the engine.

Discharge the engine oil

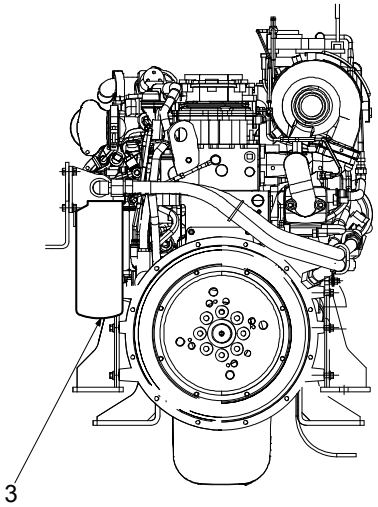
1. Put the container just under the drain plug (1) of the engine.
2. Clean the periphery of the filler port (2) to prevent foreign matters from entering. Remove the filler port cap.
3. Remove the drain plug slowly so that oil will not splash on you. Discharge oil then.
4. Check drain oil. Contact our service dealer if it contains much metallic powder, foreign matters, etc.
5. Change the packing of the drain plug with a new one.
6. Tighten the drain plug.



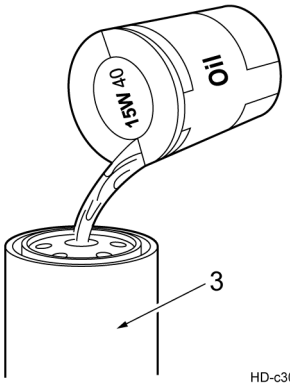
IC120-2-C401110

Replace the oil filter

1. Remove the filter cartridge (3) with the filter wrench.
2. Clean the seal surface of the filter head, and apply engine oil thinly to the gasket surface of a new filter cartridge (3).
3. Pour fresh engine oil into the new filter cartridge.
4. Screw the filter cartridge by hand until the gasket is brought into contact with the seal surface of the filter head.
5. Tighten the filter cartridge by one turn from this condition with the filter wrench.



IC120-2-C401120



HD-c300160

Fill the engine oil

1. Fill engine oil through the filler port (2) up to a point between the H and L levels of the level gauge (4).
2. Run the engine idle for a mean while and check if no oil leaks.
3. Check the oil level again after 15 minutes or more have passed since the engine stops. Refill the engine with engine oil if it is insufficient.

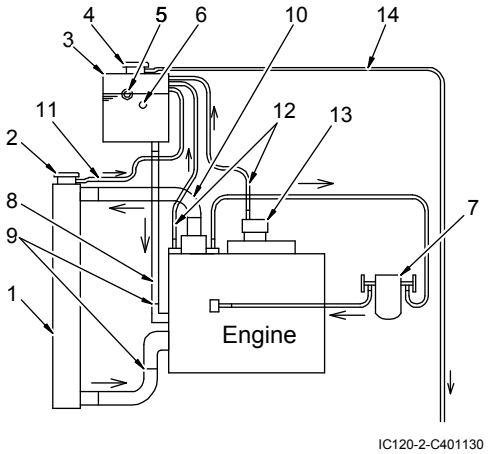
COOLING SYSTEM

Coolant

Proper control of coolant is very important for the engine, which cannot deliver its performances fully unless coolant is controlled properly.

Be sure to mix anti-freezing solution, coolant additive and water in the proper ratio, when refilling the engine with coolant, in order to avoid damages to the engine.

No.	Name
1	Radiator
2	Radiator cap
3	Coolant tank
4	Pressure cap
5	Sight glass
6	Level sensor
7	Coolant filter
8	Supply line
9	Coolant inlet
10	Coolant outlet
11	Radiator vent line
12	Engine vent line
13	Turbo
14	Outside discharge line



Coolant system diagram

Anti-freezing solution

- A new machine is filled with coolant containing 50% ethylene glycol long life coolant (LLC).
  This coolant has anti-freezing effect and corrosion resistant effect.
  It has long-term effects and may be used in all seasons.
- Replace coolant every 2000 hours or 2 years.
- Be sure to use long life coolant when replacing coolant.

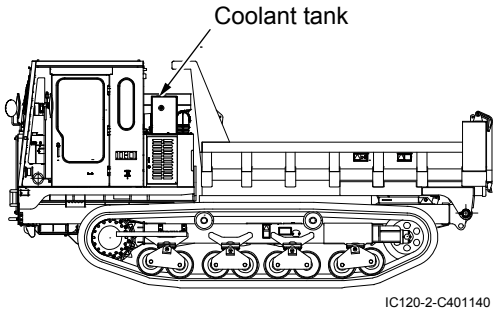
⚠ WARNING

- The Long-Life-Coolant is toxic.
- If someone should shallow it by mistake, make him/her vomit it immediately and consult a doctor.
- If it is put into eyes, wash the eyes with water sufficiently immediately and consult a doctor.
- If it is necessary to store it, use a container with an antifreeze mark, cap it and store it in a place inaccessible by children.

Check the Coolant Level and Replenish

⚠ WARNING

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



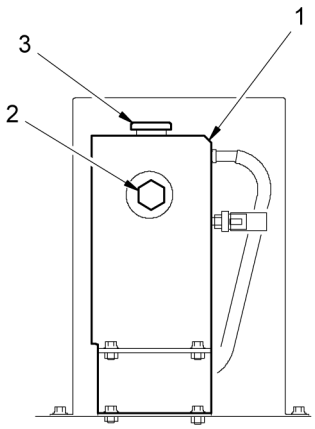
IC120-2-C401140

1. Check the coolant level everyday through the sight glass (2) of the coolant tank (1).
   Refill the tank with coolant if it is insufficient.

2. Coolant is filled up into the coolant tank. Do not remove the radiator cap.

3. Remove the pressure cap (3) on the coolant tank and then replenish coolant to the center line of the sight glass.

4. After replenishment, secure the pressure cap tightly in place.



Coolant tank

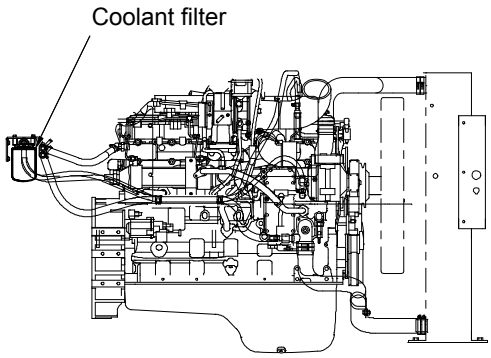
CA-C401150

When the coolant tank is empty

If the tank is empty, there is a possibility of water leak. After inspecting for water leak, remove the radiator cap and check the fluid level in the radiator. If the coolant level is too low, replenish the radiator with coolant and then fill up the coolant tank with coolant.

Replace the Coolant Filter

Replace the coolant filter every 500 hours or twice a year. The coolant filter prevents corrosion of the parts in the coolant system.

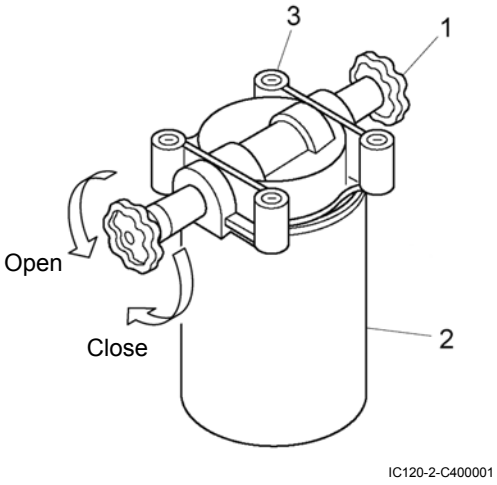


Detaching

1. Remove the radiator cap.
2. Turn the shut-off valve (1) fully clockwise to close it.
3. Remove the filter cartridge (2) with the filter wrench.

Attaching

1. Apply lubricant thinly to the gasket surface of a new filter cartridge.
2. Screw the filter cartridge until the gasket is brought into contact with the seal surface of the filter head (3). Turn the filter cartridge further by 1/2 to 3/4 turn from this condition.
3. Turn the shut-off valve counterclockwise until it stops to open it.
4. Attach the radiator cap.
5. Start the engine and check if no coolant leaks. Check the coolant level again when air is discharged from the coolant system completely.



IC120-2-C400001

⚠ WARNING

- Do not remove the radiator cap when the radiator water temperature is high. Otherwise, hot steam may spout out and you are in danger of getting burnt. Wait until the radiator water temperature lowers. Loosen the radiator cap gradually to remove it.

⚠ CAUTION

- Do not pour oil into the coolant filter. Oil may deteriorate the coolant additive.
- If the coolant filter is tightened excessively with a tool, its threads may be deformed or the filter head may be damaged.
- Set the shut-off valve to the “Open” position to avoid damages to the engine.

Check Concentration of Coolant Additive

Dry chemical additive (DCA) is mixed in coolant to protect the parts of the coolant system against corrosion. Check the DCA concentration every 500 hours or twice a year.

Controlling DCA concentration

The proper DCA concentration is 0.39 to 0.79 unit/L. (The unit means the content unit of the DCA.)

- DCA concentration of new machine

  Total coolant capacity: 36.5 L

Material containing DCA	Part No.	Number of units
Coolant filter	WF2074	12
DCA solution	DCA60L x 2	10
	Total	22

DCA concentration of new machine: 0.55 unit/L

- When replacing coolant filter every 500 hours or twice a year

  Replace the coolant filter and measure the DCA concentration then.

Material containing DCA	Part No.	Number of units
New coolant filter	WF2071	4

Make sure that the DCA concentration is 0.39 to 0.79 unit per liter.

* Use the FleetGuard coolant test kit (part No. CC2602) to check the DCA concentration. This test kit is supplied with a manual of the usage.

- When replacing coolant every 2000 hours or 2 years

  Add 1.9 liters of DCA solution to coolant when replacing coolant.

Material containing DCA	Part No.	Number of units	Capacity
New coolant filter	WF2071	4	-
DCA solution	DCA65L	20	1.9 L
	Total	24	

DCA concentration when replacing whole coolant: 0.60 unit/L

Check anti-freezing solution concentration

Check the concentration of anti-freezing solution in coolant every 500 hours or twice a year. Be sure to mix 50% water and 50% anti-freezing solution to protect the engine against the temperature of -32°C throughout the year.

The anti-freezing solution has effects of lowering the freezing point of coolant, increasing the boiling point and accordingly widening the operation temperature range. It is needed in all seasons throughout the year.

* Use the FleetGuard Refractometer (part No. C2800) to check the freezing point of coolant and the concentration of anti-freezing solution.

Change the Coolant

Replace coolant every 2000 years or once every two years.

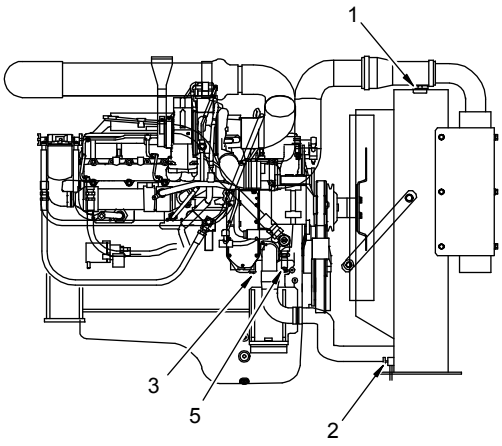
Use solution of 50% water and 50% ethylene glycol long life coolant (LLC) and DCA solution as coolant. Never use water only as coolant.

Pouring quantity when replacing coolant

Total coolant quantity	36.5 L	Engine body: 12.8 L Radiator, etc.: 13.6 L Coolant tank: 10.2 L
Mixture of LLC and water	34.6 L	LLC = 17.3 L Water = 17.3 L

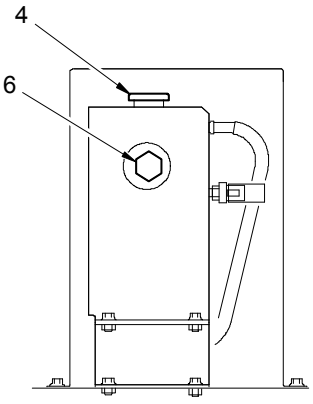
⚠ WARNING

- Immediately after the engine stops, coolant is hot. If coolant is discharged immediately, you may get burnt. Change coolant after the engine cools down.
- Do not remove the cap when the radiator coolant is hot. Hot water may spout out. Rotate the cap slowly to relief the pressure after the coolant temperature lowers.



IC120-2-C401160

1. Slowly turn the pressure cap (4) on the coolant tank to remove it.
2. Loosen the drain cock (2) in the lower part of the radiator and discharge water into a vessel.
3. Loosen the drain cock (3) of the cylinder block of the engine and discharge water into the vessel.
4. Loosen the drain cock (5) of the coolant tank and discharge water into the vessel.
5. Turn the radiator cap (1) slowly to remove it.
6. Clean the coolant tank.
7. Close the drain cocks (2), (3) and (5) after discharging water.
8. Pour fresh LLC mixture and DCA solution through the radiator cap. Keep the pressure cap of the coolant tank removed at this time. Make sure that the tank becomes full, and close the radiator cap.
9. Pour fresh LLC mixture into the coolant tank. Check the level through the sight glass (6) of the coolant tank and close the pressure cap then.
10. Run the engine five minutes and stop it then. Wait until the temperature of coolant lowers, and check the coolant level. Refill the tank with coolant if coolant is insufficient.



Coolant tank

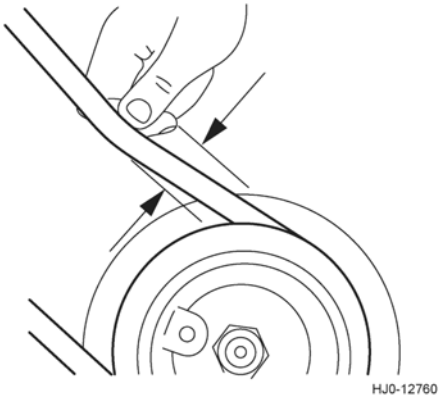
IC120-2-C401170

Check the Fan Belt

⚠ WARNING

- Never touch a rotating part such as the fan belt, etc. with the engine running. There is the danger of your finger being cut off.
- To help avoid being injury, check and adjust the fan belt tension with engine stopped.
- Parts are hot immediately after the engine stops. You may get burnt. Wait until each part cools down.

1. Inspect belt tension.
   When slackness is measured by applying a force of 110 N (11 kgf) to the pulley's intermediate position, it is necessary to adjust the belt tension if the slackness exceeds the belt thickness.



2. If there are scratches and/or cracks on the belt, change the belt.

There is a mechanism to automatically adjust the fan belt tension by the spring-loaded belt tensioner pulley.
If it is necessary to adjust the belt tension or change the belt, please contact our service dealer.

INSPECTION OF DEF LEVEL AND REPLENISHMENT

Regarding the urea SCR system

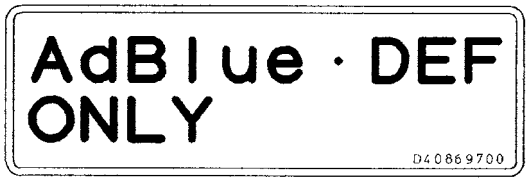
- The urea SCR (Selective Catalytic Reduction) system reduces the amount of toxic nitrogen oxides (NOx) present in exhaust gas by decomposing NOx into water and nitrogen inside the post-processing unit by means of the emission of DEF into exhaust gas.

Regarding DEF

- The fluids that are effective in reducing NOx present inside the post-processing unit 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.
  (The new machine is shipped with about 20 liters of AdBlue® in its tank.)



- 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 rapture the container by volume expansion.

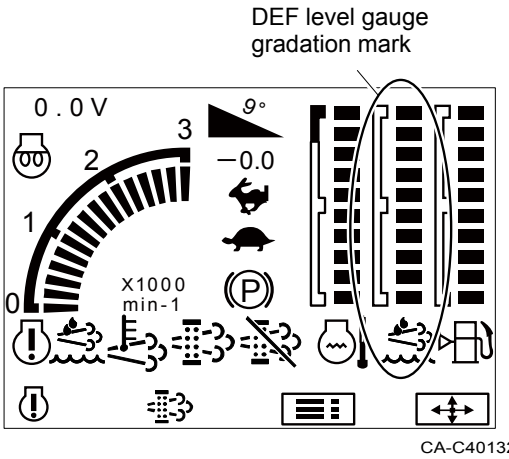
- If a fluid other than DEF (AdBlue®) or DEF diluted with water is pured into the tank, it may cause the DEF pump and/or the DEF injector to fail. If a fluid other than the specified DEF is pured into the tank by mistake, do not turn the starter key to the "ON" position and immediately contact our service dealer for proper instructions.

⚠ CAUTION

- In the urea SCR system, the pump returns DEF to the tank even after the engine has stopped. Never disconnect the battery immediately after the engine has stopped or remove the connectors including the harnesses. 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.

Replenishment of DEF

When the DEF level on the display gets low or the DEF mark flashes (replenishment of DEF required), replenish DEF.

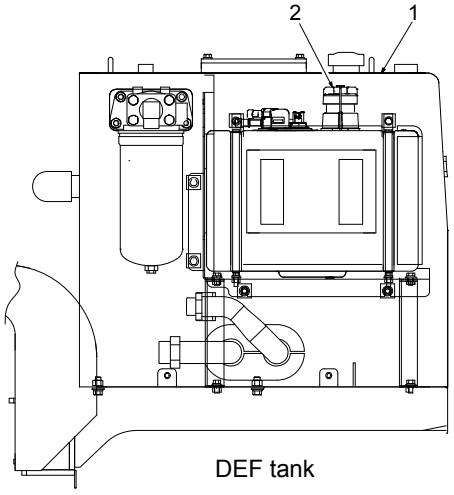


CA-C401320

1. Open the DEF tank cover (1) and remove the filler cap (2).

2. Slowly replenish the specified DEF. (The tank capacity of this machine is 38 liters.)

3. Securely close the filler cap (2).



IC120-2-C401180

⚠ 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.

Changing the DEF pump filter

As a maintenance item of the DEF pipe, it is necessary to change the DEF pump filter (post-processing DEF dosing filter).

Regarding the above filter change, please refer to the Engine Operation Manual that comes with this machine and implement it as an inspection and maintenance item of specified period. (Please refer to CUMMINS MANUAL QSL9CM2350L102.)

FUEL SYSTEM

Applicable Fuel

The following advantages are required for diesel fuel:

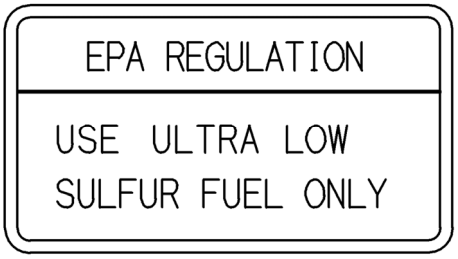
1) Must be free from minute dust particles.
2) Must have adequate viscosity.
3) Must have a high cetane number.
4) Must have high fluidity at low temperature.
5) Must have low sulfur content.
6) Must have little residual carbon.

Use light oil for normal diesel cars that meets the above requirements.

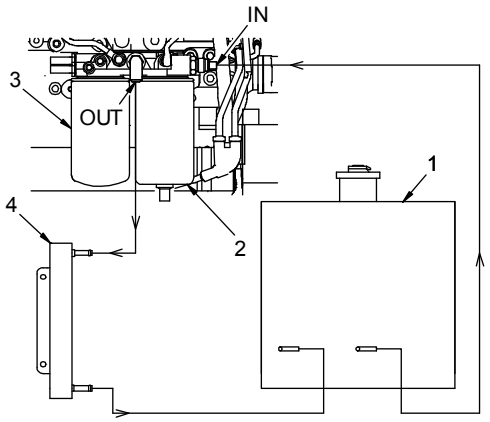
⚠ CAUTION

The functions or performance of parts of the fuel injection system or the engine may be lost or the engine may break down if any other fuel than light oil is used. Never use any other fuel than light oil.

Damages or troubles caused by using fuel other than light oil are not covered by the warranty.



No.	Name
1	Fuel tank
2	Water separator
3	Fuel filter
4	Fuel cooler



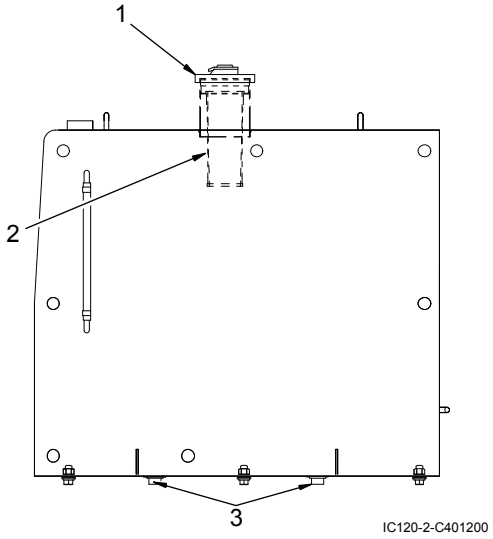
Fuel piping system diagram

IC120-2-C401190

Check the Fuel Level

1. Turn the engine key switch to the ON position and check the quantity of remaining fuel with the fuel gauge shown on the display. Refill the tank with fuel through the filler port (1) if fuel is insufficient.

2. Close the cap of the filler port firmly after refilling.



⚠ WARNING

- Overflowed or spilt fuel may cause a fire. Wipe it off completely if it overflows or spills.
- Do not replenish from a drum and plastic container. Replenish from a tank track to prevent water and impurities from being mixed.
- Removing the strainer (2) to refill fuel may cause engine troubles. Do not remove it.
- Do not fill the tank with fuel up to the top.

Drain the Fuel Tank

1. Loosen the drain plug (3) at the bottom of the fuel tank to discharge water and sediment into the container.

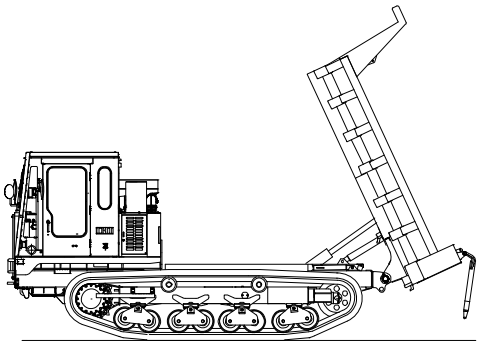
2. Close the drain plug when clean fuel is only discharged.

Water Separator and Fuel Filter

When performing the inspection and maintenance of the fuel filter, lifting the vessel will facilitate work.

⚠ WARNING

- Be sure to set the safety bars under the vessel when carrying work with the vessel raised.
- Spilt fuel may cause a fire. Wipe it off completely if it spills.



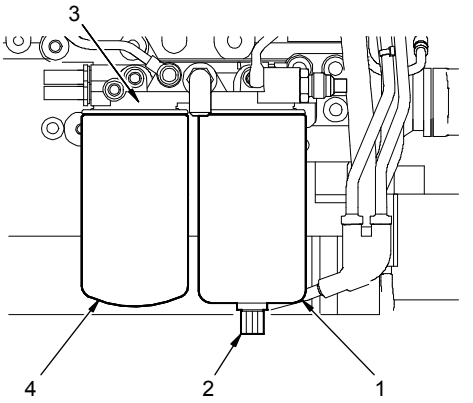
Posture for checking the fuel filter

IC120-2-C401210

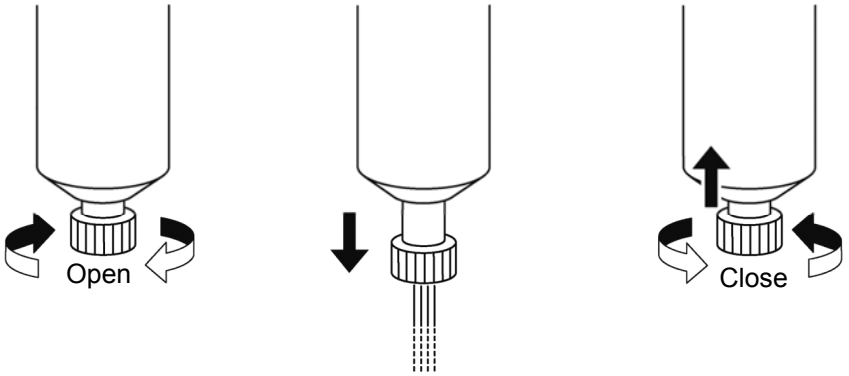
Draining water separator

Discharge water and sediment contained in fuel from the water separator (1) everyday.

1. Place the machine on a flat and firm location and then stop the engine.
2. Open the drain valve (2) of the water separator by hand. When the valve is rotated by about 3.5 turns, the valve lowers by 25.4 mm and draining starts.
3. Discharge water and sediments until clear fuel comes out.
4. Once clear fuel comes out, close the valve.



IC120-2-C401220

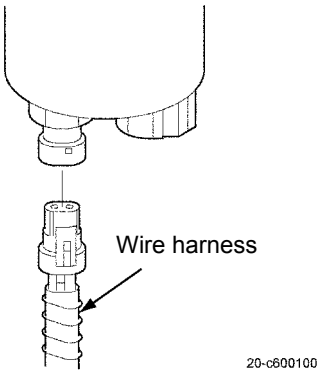


CA-C401230

Replacing Water Separator and Fuel Filter

Replace the water separator and fuel filter simultaneously.

1. Clean the periphery of the filter head (3).
2. Disconnect the wire harness from the water separator (1).
3. Loosen the water separator (1) and the filter cartridge of the fuel filter (4) with the filter wrench and detach them.
4. Pour fuel into the new water separator cartridge.
   Do not pour fuel into the fuel filter cartridge.
   Instead, prime the fuel system using a priming pump.
5. Apply fuel thinly to the gasket surfaces of both filter cartridges.



6. Screw the filter cartridge until the gasket is brought into contact with the seal surface of the filter head. Tighten it with the filter wrench.
7. Connect the wire harness of the water separator.

The Cummins fuel system checks if a proper in-fuel water sensor is used or not. If the in-fuel water sensor in use is not appropriate or disconnected, the engine alarm lamp goes on.

Priming method

1. Turn the engine key switch to the ON position to activate the priming pump for 30 seconds.
2. Turn off the engine key switch once. Then, turn it on again to activate the priming pump again.
3. Repeat this operation and activate the priming pump by three or four cycles for 30 seconds each before starting the engine.
4. Start the engine at low revolution.
5. Increase the engine revolution slowly.

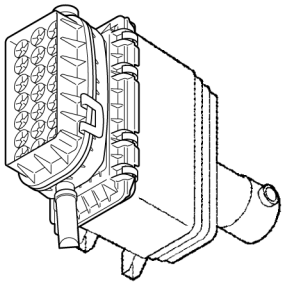
⚠ WARNING

Do not open the high-pressure engine fuel system while the engine is running. Otherwise, high-pressure fuel spouts out, resulting in serious injury or death.

AIR INTAKE AND EXHAUST SYSTEM

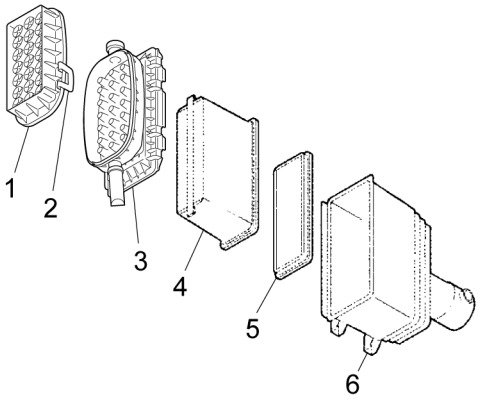
Clean and Replace Air Cleaner Element

If the air cleaner clogging lamp on the instrument panel is lit, the element is clogged.
Replace the element.



1. Disconnect the housing clip (2) of the pre-cleaner (1). Detach the pre-cleaner from the housing (6).

2. Take out the pre-cleaner sub-assembly (3) and primary element (4), and clean the inside of the housing by wringing wet cloth and remove mud or foreign substances.



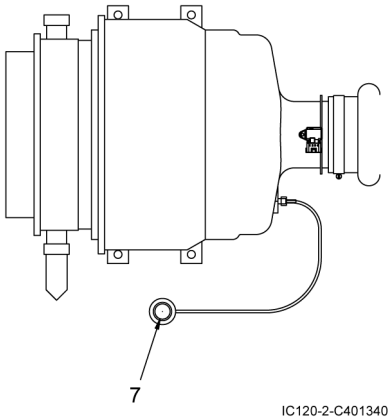
IC120-2-C400100S

3. Take out the secondary element (5) and clean the surrounding area. Mount the secondary element immediately so that foreign substances will not enter the engine.

4. Push the primary element (4) into the housing so that the O-ring will be located on the secondary element side. Apply force to two tabs on the side to ensure perfect accommodation.

5. Clean the inside of the pre-cleaner and pre-cleaner assembly, and reassemble it to the original position.

6. Press the reset switch on the top of the dust indicator (7) located in the rear of the housing.



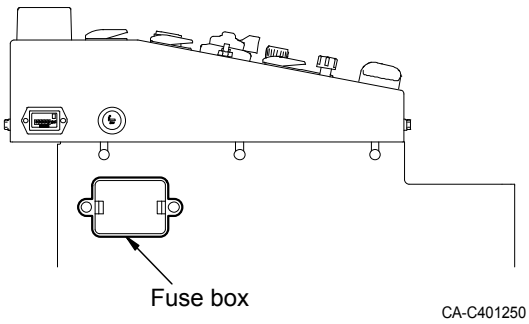
IC120-2-C401340

⚠ CAUTION

- Be sure to stop the engine before cleaning or changing the air cleaner. If it is cleaned or changed while the engine is running, dust is sucked in, causing engine damages.
- When removing the secondary element, be careful not to introduce particles and foreign objects into the air cleaner pipe.
- Primary and secondary elements are disposable. You cannot reuse them by blowing air to them and cleaning them.

ELECTRIC SYSTEM

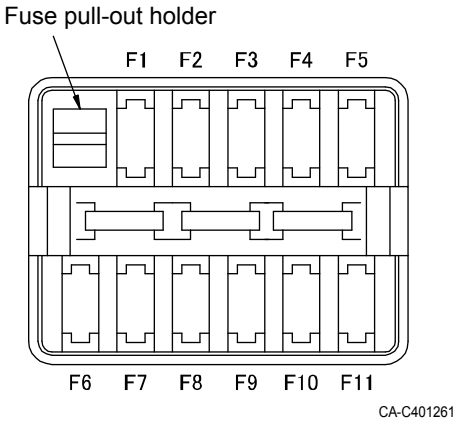
Change the Fuses



NOTICE

- Before changing fuses, be sure to always set the engine key switch at the "OFF" position and disconnect the battery terminals.
- 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.

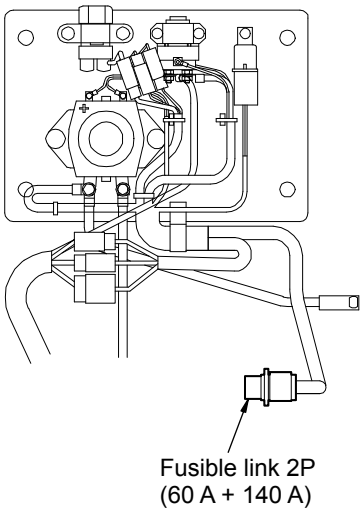
1. Set the engine key switch to the OFF position.
2. Take off the fuse cover.
3. Replace the blown fuse with a new fuse of the same capacity using the fuse pull-out holder set in the fuse box.



Code	Capacity (A)	Circuit name
F1	15 A	Engine start
F2	10 A	SCR relay
F3	10 A	Engine service tool
F4	15 A	DEF/S/M relay, DEF heater relay
F5	10 A	Back monitor, radio
F6	20 A	Solenoids, display, joystick
F7	20 A	Air conditioner
F8	20 A	Lights, direction indicator lamps
F9	20 A	Horn, cabin
F10	30 A	Working light
F11	30 A	Backup

Change the Fusible Link

If power is not turned on even though the engine key switch is set to the ON position, the fusible link between the battery and the engine key switch circuit may have blown out. Detach and check the fusible link. Replace it with a new fusible link, if it has blown out.
The fusible link is mounted in the battery cover.

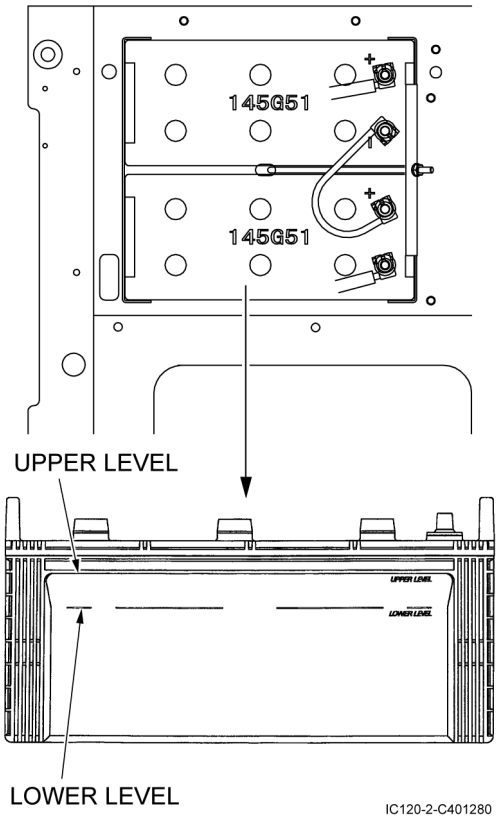


Check the Battery

Refilling battery liquid

⚠ WARNING

- The battery produces inflammable hydrogen gas. It ignites or explodes if fire is nearby. Never bring fire close to the battery or strike a spark near it.
- Never place any tool, metallic object or inflammable matter on or near the battery. The battery may possibly ignite and explode if it short-circuits.
- The battery liquid (diluted sulfuric acid) may cause loss of eyesight or burning. If it is put into the eyes or on the skin or clothes, wash with much water immediately and consult a doctor.
- Be sure to put on protective goggles when handing the battery.



Check the liquid level. Refill the battery with refill liquid up to UPPER LEVEL, if it has lowered down to LOWER LEVEL.

Cleaning the battery terminals

⚠ CAUTION

- Be sure to keep the engine stopping during work.
- Be careful during work not to short-circuit the positive and negative terminals of the battery with a tool, etc.
- Disconnect the battery cable from the negative terminal first. Connect it to the negative terminal last.
- Tighten the terminals firmly.

1. Clean the terminals if they are dirty or corroded. (Pour warm water onto the terminals and wipe them if they are corroded and white powder sticks on them.)
2. Detach the terminals and polish them with a wire brush or sandpaper if they are corroded remarkably.
3. Apply grease, etc. thinly to the terminals after cleaning and tightening.

HANDLING IN COLD REGIONS

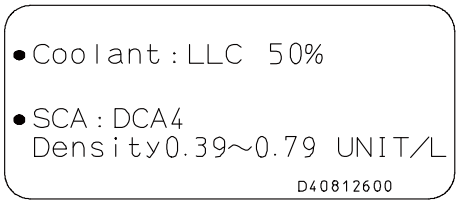
At low temperature, the engine hardly starts and coolant is subject to freezing. Make preparation for cold weather as shown below.

Fuel

In winter in cold regions, fuel may be frozen and it may be difficult to start the engine.
Use fuel (light oil) appropriate for the temperature.

Coolant

Long-Life-Coolant (LLC) has been mixed in coolant of this machine before shipment.
The ratio of mixing anti-freezing solution is 50% in all regions.
Replace the long life coolant every 2000 hours or two years.



Lubricant and grease

Exchange engine oil and hydraulic oil with proper oil having viscosity appropriate for the outer temperature. Refer to RECOMMENDED LUBRICATION TABLE for the specified viscosity.

Battery

In cold seasons, larger discharge current flows when starting the engine and the battery performance is also reduced. If the battery is almost discharged, battery liquid may be frozen. Recharge the battery almost fully and keep it warm to start the engine free from troubles next morning.

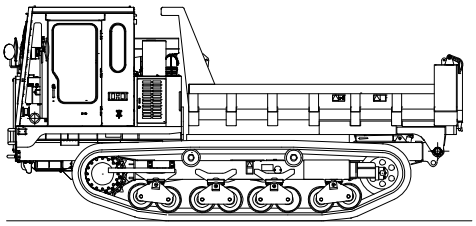
Precautions when finishing work

- Remove mud and water and water from the cylinder rod to prevent the cylinder rod seals from being damaged.
- Put plates on dry and solid ground and park the machine on them in order to prevent the crawlers and around them from freezing.
- Discharge water from the fuel tank to prevent fuel from freezing.

LONG TERM STORAGE

Before Storage

NOTICE
Move the vessel down to the lowest position while storing in order to protect the cylinder rod from rust.



Position for long term storage

IC120-2-C401290

To store the machine from long term, follow the next procedures.

1. Clean parts of the machine.
2. Be sure to perform fill the fuel, lubrication, and oil change.
3. Select a well-drained, dry and well-ventilated flat place. Put plates on the ground.
4. Store the battery after remove the negative terminal and covering it or dismounting the battery from the machine.

During Storage

⚠ WARNING
If you have to operate the machine indoors to prevent rust, keep good ventilation and gas poisoning by window or entrance.

1. During storage, operate the machine once a month to maintain films of oil at the lubrication section and charge the battery at the same time.
2. Before starting the engine, always crank the engine with the starter and check that the engine oil pressure warning lamp is OFF on the Trouble Code display.
3. After starting the engine, let it idle for about 5 minutes.

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,

TROUBLESHOOTING

Regarding to actions marked with *, contact the distributor or service personnel.

SYMPTOM	PROBABLE CAUSE	REMEDY
Machine does not travel fast and powerfully.	• Short of hydraulic oil	• Supply oil up to specified level.
	• Lowered pressure set for relief valve	• Repair or replace parts.*
	• Defect of motor or reduction gear	• Repair or replace parts.*
	• Defect of pump	• Repair or replace parts.*
	• Over-tensed crawler	• Adjust both right and left tension to regular value.
Speed does not change even if changing selectors.	• Discontinuity or disconnection of electric wires.	• Repair or replace parts.*
	• Defect of solenoid valve for speed selection	• Repair or replace parts.*
Machine curves during travel.	• Tangled obstacle	• Remove obstacle
	• Unequal tension of right and left	• Adjust tension of right and left to regular value.
	• Loose stopper bolt of travel selector lever	• Adjust and fix stopper bolts
Machine does not travel smoothly.	• Tangled stone and obstacle	• Remove obstacle.
	• Over-tensed crawler	• Adjust tension of right and left to regular value.
	• Short of hydraulic oil	• Supply oil to specified level.
	• Defect of motor or reduction gear	• Repair or replace parts.*
	• Defect of pump	• Repair or replace parts.*

PARTS LIST

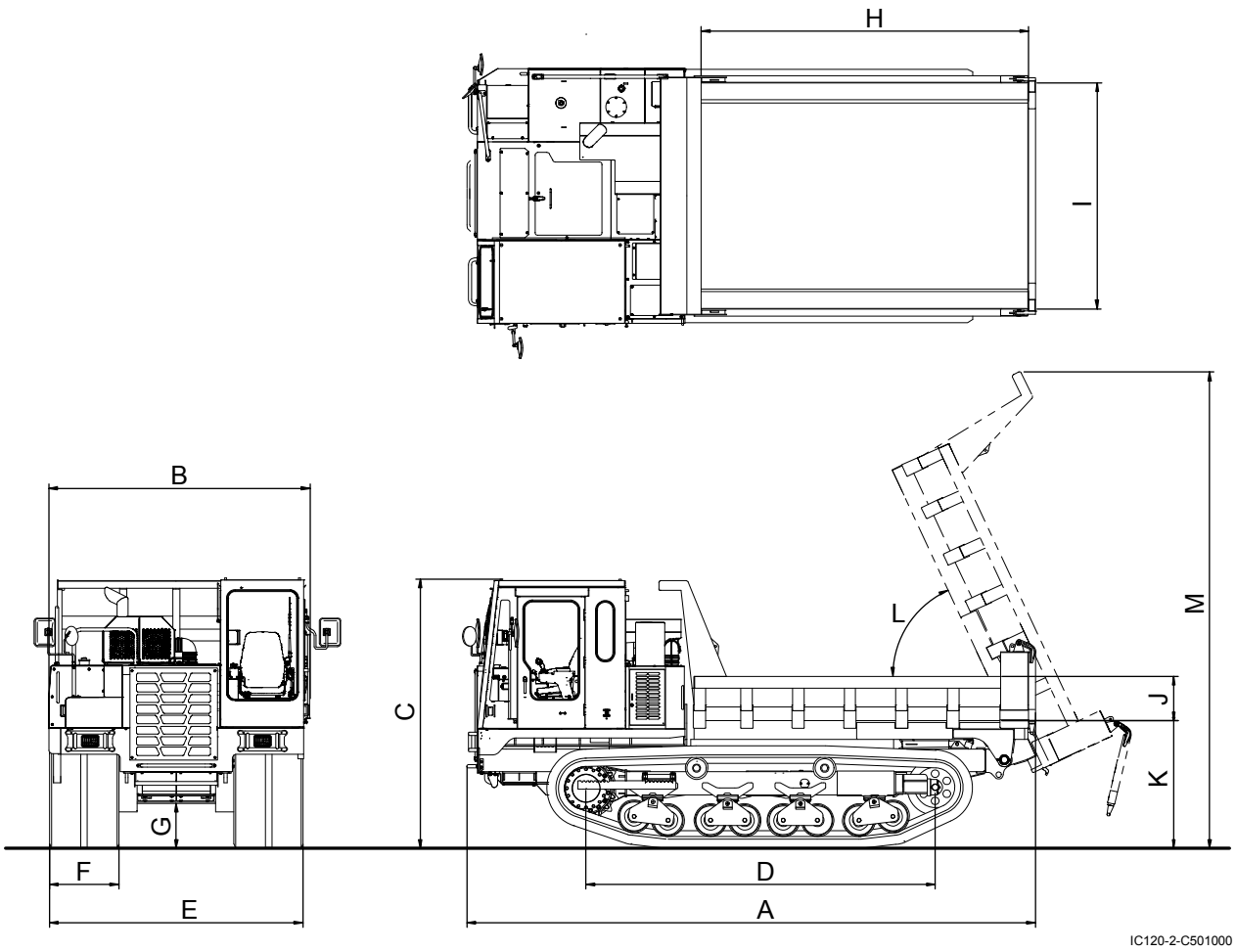
This parts list contains the consumable parts of the main vessel and engine of the machine.
Regarding parts not listed in this parts list, please contact our service dealer.
When ordering any of the parts listed below, please notify the model, serial number, part name and quantity.

Consumable Parts List

Part Name	Part No.	Quantity/Unit	Remarks
Fuel filter cartridge	3973232	1	Cummins
Water separator cartridge	3973233	1	Cummins
Engine oil filter cartridge	3401544	1	Cummins
Air cleaner element (primary)	AF55005	1	Cummins
Air cleaner element (secondary)	AF55308	1	Cummins
DEF dosing filter	5303604	1	Cummins
Coolant filter cartridge	3100307	1	Cummins
Hydraulic oil return filter cartridge	0759 142 01	1	
Hydraulic oil line filter element	0787 401 03	1	
Fuse 5A	0830 107 01	4	
Fuse 10A	0830 243 01	3	
Fuse 20A	0830 243 02	3	
Fuse 30A	0830 243 05	1	
Fusible link 60A	0830 106 00	1	
Fusible link 140A	0830 106 03	1	
Headlight bulb	0854 527 06	2	
Direction indicator lamp bulb	0854 528 02	2	

SPECIFICATIONS

SPECIFICATIONS AND DIMENSIONS



IC120-2-C501000

			STD, navicular rear open specification
Loading capacity		kg	11000
Machine weight		kg	14020
Travel speed Low/High		km/h	8/11
Engine	Model	-	Cummins QSL9
	Cylinder-total displacement	CC	6-8900
	Rated output	kW /min^{-1}	224/2200
Ground pressure	Empty	kPa	33
	Loaded	kPa	58
Vessel capacity	Fully loaded	m^3	6.3
	Flat loaded	m^3	3.9
A	Overall length	mm	6170
B	Overall width	mm	2840
C	Overall height	mm	2910
D	Tumbler center distance	mm	3790
E	Overall crawler width	mm	2750
F	Crawler width	mm	750
G	Minimum height from ground	mm	490
H	Vessel length	mm	3545
I	Inner vessel width	mm	2450
J	Vessel height	mm	475
K	Vessel floor height from ground	mm	1390
L	Maximum dumping angle	degree	65
M	Maximum height in dumping	mm	5170

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〒236-8611 神奈川県横浜市金沢区昭和町 3174
3174 Showa-machi, Kanazawa-ku, Yokohama, Kanagawa 236-8611 Japan