

Operator's Manual

ZAXIS

135US-5B

225US-5B

225USLC-5B

Hydraulic Excavator

ZX135US-5B • 225US-5B • 225USLC-5B HYDRAULIC EXCAVATOR OPERATOR'S MANUAL

 Hitachi Construction Machinery Co., Ltd.

URL:<http://www.hitachi-c-m.com>

Serial No.	
ZX135US-5B	090001 and up
ZX225US-5B	300001 and up
ZX225USLC-5B	300001 and up

INTRODUCTION

Read this manual carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or machine damage.

This standard specification machine can be operated under the following conditions without being modified.
Atmospheric Temperature: -20 °C to 40 °C (-4 °F to 104 °F)
Altitude: 0 m to 2000 m (0 ft to 6600 ft)

In case the machine is used under conditions other than described above, consult your nearest Hitachi dealer.

This manual should be considered a permanent part of your machine and should remain with the machine when you sell it.

This machine is of metric design. Measurements in this manual are metric. Use only metric hardware and tools as specified.

Right-hand and left-hand sides are determined by facing in the direction of forward travel.

Write product identification numbers in the Machine Numbers section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers when you order parts. If this manual is kept on the machine, also file the identification numbers in a secure place off the machine.

Be sure to use fuel that complies with JIS K-2204, EN-590 or ASTM D-975 which contains 15 ppm or lower sulfur. Also use fuel that complies with solid contamination level of class 18/16/13 of ISO4406-1999 (solid contamination includes dust). If the fuel specified above is not used, exhaust gas that exceeds the regulation values may be discharged, causing serious problem on the engine. Consult your nearest Hitachi dealer.

Warranty is provided as a part of Hitachi's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate which you should have received from your dealer.

This warranty provides you the assurance that Hitachi will back its products where defects appear within the warranty period. In some circumstances, Hitachi also provides field improvements, often without charge to the customer, even if the product is out of warranty.

Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied.

Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

Only qualified, experienced operators officially licensed (according to local law) should be allowed to operate the machine. Moreover, only officially licensed personnel should be allowed to inspect and service the machine.

PRIOR TO OPERATING THIS MACHINE, INCLUDING COMMUNICATION SYSTEM, IN A COUNTRY OTHER THAN A COUNTRY OF ITS INTENDED USE, IT MAY BE NECESSARY TO MAKE MODIFICATIONS TO IT SO THAT IT COMPLIES WITH THE LOCAL REGULATORY STANDARDS (INCLUDING SAFETY STANDARDS) AND LEGAL REQUIREMENTS OF THAT PARTICULAR COUNTRY. PLEASE DO NOT EXPORT OR OPERATE THIS MACHINE OUTSIDE OF THE COUNTRY OF ITS INTENDED USE UNTIL SUCH COMPLIANCE HAS BEEN CONFIRMED. PLEASE CONTACT HITACHI CONSTRUCTION MACHINERY CO., LTD. OR ANY OF OUR AUTHORIZED DISTRIBUTOR OR DEALER IF YOU HAVE ANY QUESTIONS CONCERNING COMPLIANCE.

CALIFORNIA Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

All information, illustrations and specifications in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

INDEX

MACHINE NUMBERS

SAFETY

SAFETY SIGNS

COMPONENTS NAME

GETTING ON/OFF THE MACHINE

OPERATOR'S STATION

BREAK-IN

OPERATING THE ENGINE

DRIVING THE MACHINE

OPERATING THE MACHINE

TRANSPORTING

MAINTENANCE

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

STORAGE

TROUBLESHOOTING

SPECIFICATIONS

OPTIONAL ATTACHMENTS AND DEVICES

INDEX

CONTENTS

MACHINE NUMBERS	1	Avoid Applying Heat to Lines Containing Flammable Fluids.....	S-34
SAFETY	S-1	Precautions for Handling Accumulator and Gas Damper	S-34
Recognize Safety Information	S-1	Remove Paint Before Welding or Heating	S-35
Understand Signal Words.....	S-1	Beware of Asbestos and Silicon Dust and Other Contamination.....	S-35
Follow Safety Instructions.....	S-2	Prevent Battery Explosions	S-36
Prepare for Emergencies.....	S-3	Service Air Conditioning System Safely	S-36
Wear Protective Clothing.....	S-3	Handle Chemical Products Safely.....	S-37
Protect Against Noise	S-4	Dispose of Waste Properly.....	S-37
Inspect Machine	S-4	Never Ride Attachment.....	S-38
General Precautions for Cab.....	S-5	Notes for Muffler Filter.....	S-38
Use Handholds and Steps	S-6	Precautions for Communication Terminal.....	S-38
Adjust the Operator's Seat.....	S-6	Precaution for Communication Terminal Equipment	S-39
Ensure Safety Before Rising from or Leaving Operator's Seat.....	S-7	Notes on Protection of Operator's Station When the Machine Rolls Over.....	S-41
Fasten Your Seat Belt.....	S-7	SAFETY SIGNS	S-42
Move and Operate Machine Safely.....	S-8	COMPONENTS NAME.....	1-1
Operate Only from Operator's Seat	S-8	Components Name	1-1
Jump Starting	S-9	GETTING ON/OFF THE MACHINE	1-2
Keep Riders off Machine	S-9	OPERATOR'S STATION.....	1-3
Precautions for Operations	S-10	Muffler Filter	1-3
Investigate Job Site Beforehand	S-11	Cab Features (Std. Model)	1-6
Install OPG Guard	S-12	Multi Function Monitor	1-7
Restriction of Attachment Installation	S-13	Default Setting	1-8
Provide Signals for Jobs Involving Multiple Machines....	S-13	Basic Screen.....	1-9
Confirm Direction of Machine to Be Driven.....	S-13	How to Use Screens.....	1-10
Drive Machine Safely.....	S-14	Displaying Basic Screen	1-10
Avoid Injury from Rollaway Accidents.....	S-16	Hour Meter	1-13
Avoid Injury from Back-Over and Swing Accidents	S-17	Clock.....	1-13
Keep Person Clear from Working Area.....	S-18	Fuel Gauge	1-13
Never Position Bucket Over Anyone	S-18	Coolant Temperature Gauge	1-14
Avoid Undercutting.....	S-19	Operating Status Icon Display.....	1-14
Avoid Tipping.....	S-19	Security Functions (Optional)	1-15
Never Undercut a High Bank.....	S-20	Input Password	1-15
Dig with Caution.....	S-20	Extending Password Duration Time	1-16
Operate with Caution	S-20	Alarm Occurrence Screen.....	1-17
Avoid Power Lines.....	S-21	Remedy	1-19
Precautions for Lightning.....	S-21	Muffler Filter	1-23
Object Handling	S-22	Muffler Filter Condition Display.....	1-23
Protect Against Flying Debris	S-22	Muffler Filter Manual Regeneration Request.....	1-24
Park Machine Safely.....	S-23	Manual Regeneration Procedure	1-25
Handle Fluids Safely—Avoid Fires.....	S-23	Main Menu.....	1-26
Transport Safely	S-24	Air Conditioner.....	1-27
Practice Safe Maintenance.....	S-25	Circulation Air Mode.....	1-27
Warn Others of Service Work	S-26	Air Conditioner ON/OFF	1-27
Support Machine Properly.....	S-26	Radio	1-28
Stay Clear of Moving Parts	S-27	Work Mode	1-29
Prevent Parts from Flying	S-27	Attachment Selection	1-29
Avoid Injury from Attachment Falling Accident	S-28	Mail (Optional).....	1-30
Prevent Burns.....	S-28	Setting Menu	1-32
Replace Rubber Hoses Periodically.....	S-29	Date and Time.....	1-33
Avoid High-Pressure Fluids	S-29	Time Adjustment	1-33
Prevent Fires.....	S-30		
Evacuating in Case of Fire.....	S-32		
Beware of Exhaust Fumes.....	S-32		
Precautions for Welding and Grinding	S-33		
Avoid Heating Near Pressurized Fluid Lines	S-34		

CONTENTS

Date Adjustment.....	1-35	Revolving Light Switch (Optional).....	1-96
Display Mode Setting.....	1-37	Electrical Control Main Switch (Optional).....	1-96
Attachment Adjustment.....	1-39	Key Switch.....	1-97
Flow Rate Adjustment.....	1-39	Power Boost Switch.....	1-97
Priority (arm roll-out).....	1-41	Horn Switch.....	1-97
Priority (arm roll-in).....	1-43	Electrical Control Main Switch (Optional).....	1-98
Attachment Name Input.....	1-45	Cigar Lighter.....	1-100
Auto Shut-Down.....	1-47	Using Cigar Lighter.....	1-100
Auto Shut-Down: ON/OFF.....	1-47	Using Cigar Lighter Port as External Power Source.....	1-100
Acting Time Setting.....	1-48	Cab Light Switch.....	1-101
Muffler Filter Regeneration Inhibited.....	1-49	Installing Fire Extinguisher (Optional).....	1-101
Setting Procedure.....	1-49	Pilot Control Shut-Off Lever.....	1-102
Password Change (Optional).....	1-51	Engine Stop Switch.....	1-102
Sub Meter.....	1-55	Fuse Box.....	1-103
Rear View Camera Monitor.....	1-57	Auto Air Conditioner.....	1-104
Rear View Camera ON/OFF.....	1-57	Features:.....	1-104
Brightness Adjustment.....	1-59	Components Name.....	1-105
Language Settings.....	1-61	Controller Part Name and Function.....	1-106
Lists of Display Language.....	1-63	Cab Heater Operation.....	1-108
Unit Selection.....	1-64	Cooling Operation.....	1-109
Display Item Selection (Rear View Camera OFF).....	1-66	Defroster Operation.....	1-110
Main Menu Sequence Change.....	1-68	Cool Head/Warm Feet Operation.....	1-110
Information Menu.....	1-70	Tips for Optimal Air Conditioner Usage.....	1-111
Operation.....	1-71	For Rapid Cooling.....	1-111
Fuel Consumption.....	1-71	When Windows Become Clouded.....	1-111
Breaker Operation.....	1-73	Off-Season Air Conditioner Maintenance.....	1-111
Attachment Operation.....	1-75	AM/FM Radio Operation.....	1-112
Travel Operation.....	1-77	Controls on the Radio.....	1-112
Actual Operation.....	1-79	Tuning Procedure.....	1-112
Maintenance.....	1-81	Station Presetting Procedure.....	1-113
Remaining Time and Maintenance Interval.....	1-83	Station Auto-Presetting Procedure.....	1-114
Monitoring.....	1-85	TONE Control.....	1-115
Switch Panel.....	1-87	Audio Input (Optional).....	1-116
Return to Previous Screen (Monitor).....	1-88	Side Monitor (Optional).....	1-117
Return to Basic Screen (Monitor).....	1-88	Layout.....	1-117
Select/Confirm Switch (Monitor).....	1-88	Monitor Operation.....	1-117
Temperature Control Switch/Mode Switch (Air Conditioner).....	1-88	Cab Door Release Lever.....	1-118
AUTO/OFF Switch/Fan Switch (Air Conditioner).....	1-88	Opening/Closing and Removing Cab Inside Window.....	1-119
AM/FM Selector/Tuning Switch (Radio).....	1-89	Opening Upper Front Window.....	1-120
Power Switch/Volume Control Knob (Radio).....	1-89	Removing and Storing Lower Front Window.....	1-121
Engine Control Dial.....	1-89	Opening Side Windows.....	1-122
Auto-Idle Switch.....	1-90	Opening/Closing Overhead Window (Std. Model).....	1-123
Travel Mode Switch.....	1-90	Opening/Closing Overhead Window (Clear Hatch: If Equipped).....	1-124
Power Mode Switch.....	1-91	Emergency Exit.....	1-125
Work Light Switch.....	1-91	Adjusting Operator's Seat.....	1-126
Wiper/Washer Switch.....	1-92	Seat Height and Angle Adjustment.....	1-126
Overhead Window Wiper and Washer Switch (Optional).....	1-93	Console and Seat Fore-aft Adjustment.....	1-126
Numeric Keypad.....	1-93	Seat Fore-Aft Adjustment.....	1-126
Switch Panel (for Optional Equipment).....	1-94	Suspension Adjustment.....	1-126
Travel Alarm Deactivation Switch.....	1-95	Backrest Adjustment.....	1-127
Swing Alarm Deactivation Switch (Optional).....	1-95	Armrest Adjustment.....	1-127
Rear Light Switch (Optional).....	1-95	Adjusting Operator's Seat (Optional).....	1-128
Overload Alarm Switch (Optional).....	1-95	Adjusting Seat Height.....	1-128
Seat Heater Switch.....	1-96		

CONTENTS

Console and Seat Fore-aft Adjustment.....	1-128	Do Not Strike the Ground with Bucket Teeth.....	5-22
Seat Fore-Aft Adjustment.....	1-128	Avoid Hammer Work.....	5-22
Suspension Adjustment.....	1-129	Avoid Abusive Operation.....	5-23
Fore-Aft Position Adjustment of Seat Surface.....	1-129	Avoid Side Load the Bucket.....	5-23
Angle Adjustment of Seat Surface.....	1-129	Do Not Use Wide Track Shoes on Rough Ground.....	5-24
Backrest Adjustment.....	1-129	Hydraulic Breaker, Hydraulic Crusher and	
Armrest Adjustment.....	1-129	Quick Coupler.....	5-25
Console Height Adjustment.....	1-130	Piping for Breaker and Crusher.....	5-26
Adjusting Procedures.....	1-130	Operational Procedures for Stop Valves and	
Installation and Adjustment of Mirrors.....	1-131	Selection Valve.....	5-26
Seat Belt.....	1-132	Secondary Relief Pressure Adjustment.....	5-27
Battery Disconnect Switch.....	1-133	Precautions for Breaker Operation.....	5-28
Switch Operation.....	1-133	Change Hydraulic Oil and Replace Full-Flow Filter	
BREAK-IN.....	2-1	Element.....	5-32
Observe Engine Operation Closely.....	2-1	Precautions for Crusher Operation.....	5-33
Every 8 Hours or Daily.....	2-1	Attachment.....	5-36
After the First 50 Hours.....	2-1	Attachment Connection Parts.....	5-40
After the First 100 Hours.....	2-1	Precaution for Arm Roll-In/Bucket Roll-In Combined	
OPERATING THE ENGINE.....	3-1	Operation.....	5-42
Inspect Machine Daily Before Starting.....	3-1	Shackle Hole Usage.....	5-42
Before Starting Engine.....	3-2	Pilot Accumulator Functions.....	5-43
Starting the Engine.....	3-3	How to Lower Boom in Case of Emergency and	
Check Instruments After Starting.....	3-7	When Engine Stops.....	5-44
Using Booster Batteries.....	3-8	Precautions for After Operations.....	5-45
Stopping the Engine.....	3-10	TRANSPORTING.....	6-1
Engine Auto-Stop in Extremely Low Temperature.....	3-11	Transporting by Road.....	6-1
DRIVING THE MACHINE.....	4-1	Loading/Unloading on a Trailer.....	6-2
Drive the Machine Carefully.....	4-1	Fastening Machine for Transporting.....	6-5
Steering the Machine Using Pedals.....	4-2	Unloading.....	6-5
Steering the Machine Using Levers.....	4-3	Lifting Machine.....	6-7
Travel Mode Switch.....	4-4	MAINTENANCE.....	7-1
Travel Alarm.....	4-4	Correct Maintenance and Inspection Procedures.....	7-1
Operating on Soft Ground.....	4-5	Check the Hour Meter Regularly.....	7-3
Raise One Track Using Boom and Arm.....	4-5	Preparations for Inspection and Maintenance.....	7-6
Towing Machine a Short Distance.....	4-6	Hood and Access Covers.....	7-7
Operating in Water or Mud.....	4-7	Daily Check.....	7-9
Parking the Machine on Slopes.....	4-8	Maintenance Guide.....	7-10
Parking the Machine.....	4-8	Periodic Replacement of Parts.....	7-15
OPERATING THE MACHINE.....	5-1	Kind of Oils.....	7-16
Control Lever (ISO Pattern).....	5-1	Recommended Engine Oil.....	7-16
Attachment Pedal (Hydraulic Breaker) (Optional).....	5-2	A. Greasing.....	7-19
Attachment Pedal (Hydraulic Crusher) (Optional).....	5-3	Front Joint Pins.....	7-19
Pilot Control Shut-Off Lever.....	5-4	Swing Bearing.....	7-21
Warming Up Operation.....	5-5	Swing Internal Gear.....	7-22
Engine Speed Control.....	5-6	B. Engine.....	7-23
Auto-Idle.....	5-7	Engine Oil Level.....	7-23
Auto Shut-Down.....	5-9	Change Engine Oil.....	7-25
Muffler Filter Manual Regeneration.....	5-12	Replace Engine Oil Filter.....	7-25
Work Mode.....	5-14	Check and Clean Around the Engine.....	7-27
Power Boost Switch.....	5-17	C. Transmission.....	7-28
Power Mode.....	5-18	Pump Transmission.....	7-28
Operating Backhoe.....	5-19	Swing Reduction Gear.....	7-29
Shovel.....	5-20	Travel Reduction Gear.....	7-30
Grading Operation.....	5-21	D. Hydraulic System.....	7-32
		Inspection and Maintenance of Hydraulic Equipment...	7-32

CONTENTS

Check Hydraulic Oil Level	7-36	J. Muffler Filter	7-123
Change Hydraulic Oil.....	7-37	Check and Clean Filter Element of Muffler Filter.....	7-123
Air Bleeding Procedures	7-39	Check and Clean Muffler Filter	7-123
Suction Filter Cleaning.....	7-40	HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT	8-1
Replacement of Full-Flow Filter	7-41	Hydraulic Circuit	8-1
Replace Pilot Oil Filter.....	7-44	Electrical Circuit	8-2
Replace Air Breather Element.....	7-45	MAINTENANCE UNDER SPECIAL ENVIRONMENTAL	
Check Hoses and Lines	7-46	CONDITIONS	9-1
E. Fuel System	7-50	Maintenance Under Special Environmental Conditions...	9-1
Recommended Fuel.....	7-50	STORAGE	10-1
Refueling.....	7-51	Storing the Machine.....	10-1
Drain Fuel Tank Sump.....	7-52	TROUBLESHOOTING.....	11-1
Drain Fuel Filter.....	7-53	Troubleshooting.....	11-1
Replace Fuel Main Filter Element.....	7-57	SPECIFICATIONS	12-1
Replace Fuel Pre-Filter Element.....	7-59	Specifications.....	12-1
Clean Solenoid Fuel Pump Strainer.....	7-61	ZX135US-5B.....	12-1
Check Water Separator	7-63	Working Ranges (Grouser shoe).....	12-2
Check Fuel Hoses	7-65	ZX135US-5B.....	12-2
F. Air Cleaner.....	7-66	Shoe Types and Applications	12-3
Clean and Replace Air Cleaner Element (Outer)	7-66	ZX135US-5B.....	12-3
Clean or replace the outer element.	7-66	Bucket Types and Applications	12-4
G. Cooling System	7-69	ZX135US-5B.....	12-4
Check Coolant Level	7-70	Specifications.....	12-5
Check and Adjust Fan Belt Tension	7-71	ZX225US-5B, 225USLC-5B.....	12-5
Change Coolant.....	7-73	Working Ranges (Grouser shoe).....	12-6
Clean Radiator/Oil Cooler/Inter Cooler Core.....	7-75	ZX225US-5B, 225USLC-5B.....	12-6
Clean Oil Cooler, Radiator and Inter Cooler Front		Shoe Types and Applications	12-7
Screen	7-77	ZX225US-5B.....	12-7
Clean Air Conditioner Condenser.....	7-77	ZX225USLC-5B	12-7
Clean Fuel Oil Cooler	7-77	Bucket Types and Applications	12-8
H. Electrical System.....	7-78	ZX225US-5B, 225USLC-5B.....	12-8
Battery.....	7-79	OPTIONAL ATTACHMENTS AND DEVICES.....	13-1
Replace Battery.....	7-82	Using Pad Crawler Shoe.....	13-1
Replacing Fuses.....	7-84	Traveling and Other Cautions.....	13-2
I. Miscellaneous.....	7-86	Transporting.....	13-3
Check and Replace Bucket Teeth	7-86	Precautions for Transporting Machines with	
Change Bucket.....	7-92	Pad Crawler Shoes	13-3
Convert Bucket Connection Into Face Shovel.....	7-93	Long Arm Operation --- If Equipped.....	13-8
Adjust Bucket Linkage	7-94	Blade Lever	13-9
Remove Travel Levers	7-95	Avoid Hitting Blade with Front-End Attachment.....	13-10
Check and Replace Seat Belt.....	7-95	Blade Maintenance	13-11
Check Windshield Fluid Level.....	7-96	Specifications.....	13-12
Check Track Sag.....	7-97	ZX135US-5B with Blade.....	13-12
Clean and Replace Air Conditioner Filter	7-101	Working Ranges.....	13-13
Check Air Conditioner	7-104	ZX135US-5B with Blade.....	13-13
Clean Cab Floor.....	7-106	Shoe Types and Applications	13-14
Retighten Cylinder Head Bolt.....	7-107	ZX135US-5B with Blade.....	13-14
Inspect and Adjust Valve Clearance	7-107	Specifications.....	13-15
Measure Engine Compression Pressure.....	7-107	ZX225USLC-5B with Blade	13-15
Check Starter and Alternator.....	7-107	Working Ranges (Grouser shoe).....	13-16
Check and Replace EGR Device	7-107	ZX225USLC-5B with Blade	13-16
Clean EGR Cooler	7-107	Shoe Types and Applications	13-17
Check Turbocharger.....	7-107	ZX225USLC-5B with Blade	13-17
Check Gas Damper	7-108		
Tightening and Retightening Torque of			
Nuts and Bolts.....	7-108		

CONTENTS

Bucket Teeth (Transverse-Type-Pin-Used Type)13-18

INDEX..... 14-1

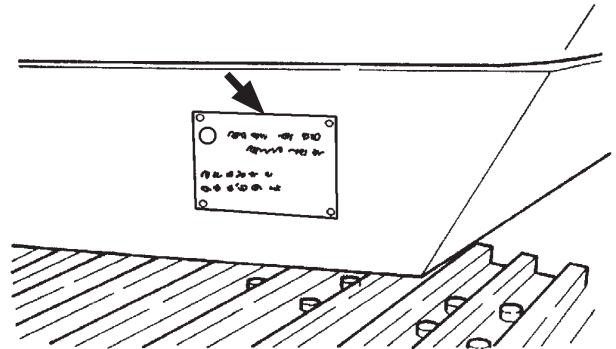
MACHINE NUMBERS

The manufacturing Nos. explained in this group is the individual number (serial No.) given to each machine and hydraulic components. These numbers are requested when inquiring any information on the machine and/or components. Fill these serial Nos. in the blank spaces in this group to immediately make them available upon request.

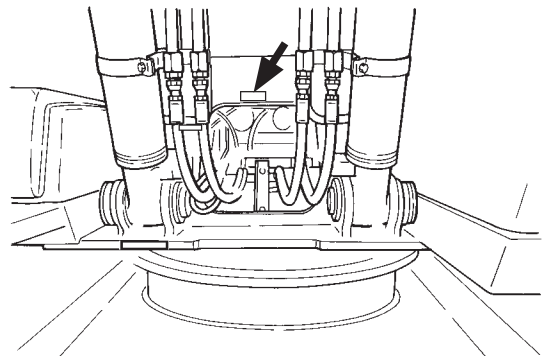
Machine

TYPE : _____

PRODUCT IDENTIFICATION NUMBER : _____



M157-00-001



M157-12-008

Product Identification Number



NOTE:

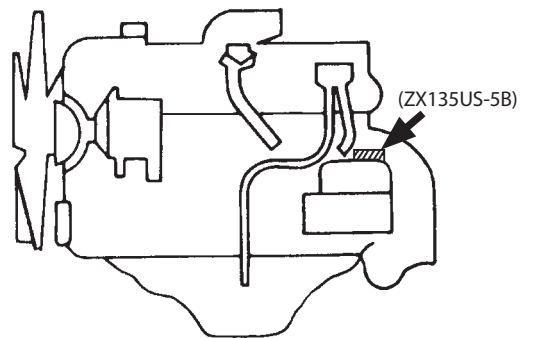
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 Marks to indicate the start and end of the PIN

 PRODUCT IDENTIFICATION NUMBER (PIN)

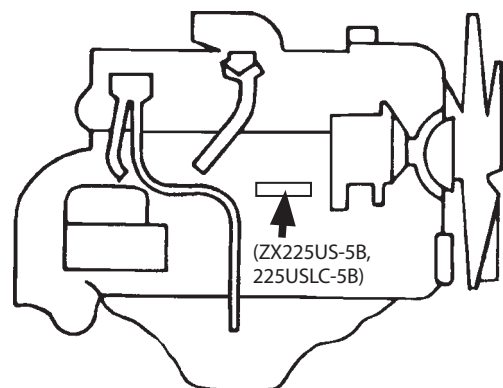
Engine

TYPE : _____

MFG. NO. : _____



M178-00-002



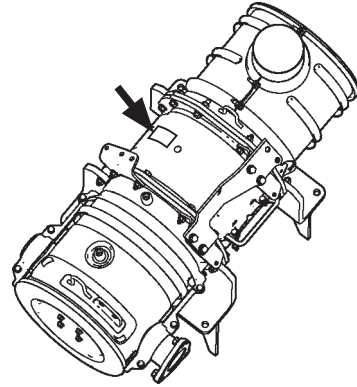
MDAA-00-001

MACHINE NUMBERS

Muffler Filter

TYPE : _____

MFG. NO. : _____

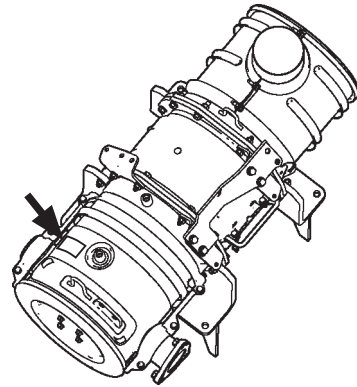


MDAA-00-002

DOC (Diesel Oxidation Catalyst)

TYPE : _____

MFG. NO. : _____

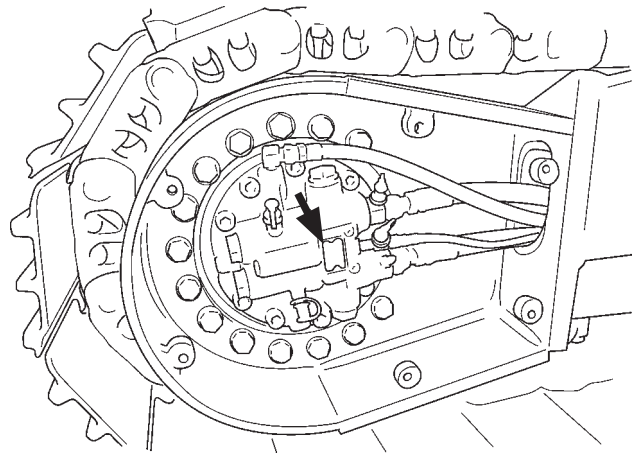


MDAA-00-002

Travel Motor

TYPE : _____

MFG. NO. : _____

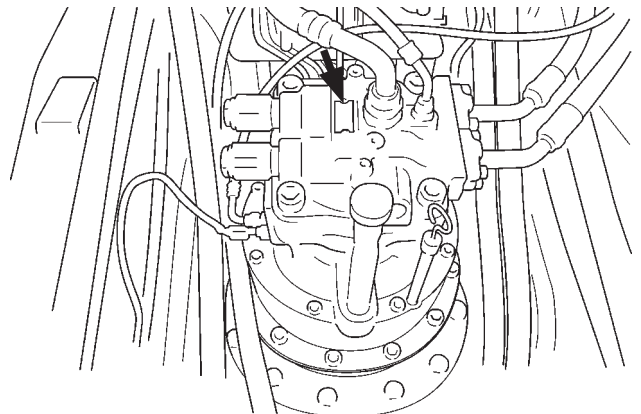


M178-07-047

Swing Motor

TYPE : _____

MFG. NO. : _____



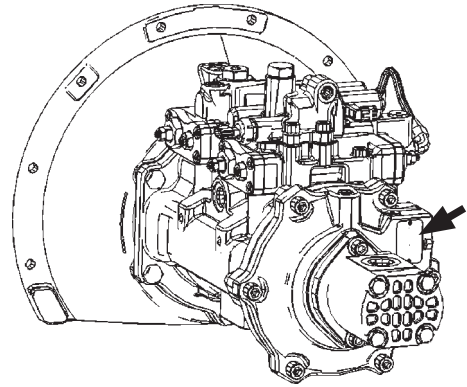
M178-07-086

MACHINE NUMBERS

Hydraulic Pump (ZX135US-5B)

TYPE : _____

MFG. NO. : _____

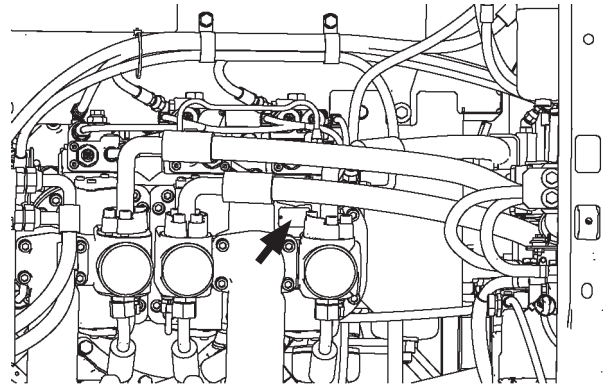


MDAA-07-072

(ZX225US-5B, 225USLC-5B)

TYPE : _____

MFG. NO. : _____



MDAA-00-003

SAFETY

Recognize Safety Information

- These are the **SAFETY ALERT SYMBOLS**.
 - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
 - Follow recommended precautions and safe operating practices.



SA-688


Understand Signal Words

- On machine safety signs, signal words designating the degree or level of hazard - **DANGER**, **WARNING**, or **CAUTION** - are used with the safety alert symbol.
 - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 - **DANGER or WARNING safety signs** are located near specific hazards. General precautions are listed on **CAUTION safety signs**.
 - Some safety signs do not use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.



IMPORTANT



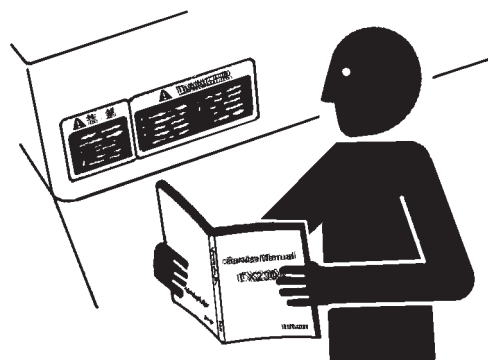
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
-  **NOTE**: indicates an additional explanation for an element of information.

SA-1223

SAFETY

Follow Safety Instructions

- Carefully read and follow all safety signs on the machine and all safety messages in this manual.
- Safety signs should be installed, maintained and replaced when necessary.
 - If a safety sign or this manual is damaged or missing, order a replacement from your authorized dealer in the same way you order other replacement parts (be sure to state machine model and serial number when ordering).
- Learn how to operate the machine and its controls correctly and safely.
- Allow only trained, qualified, authorized personnel to operate the machine.
- Keep your machine in proper working condition.
 - Unauthorized modifications of the machine may impair its function and/or safety and affect machine life.
 - Do not modify any machine parts without authorization. Failure to do so may deteriorate the part safety, function, and/or service life. In addition, personal accident, machine trouble, and/or damage to material caused by unauthorized modifications will void Hitachi Warranty Policy.
 - Never attempt to modify or disassemble the inlet/exhaust parts and the muffler filter. Avoid giving shocks on the muffler filter by striking elements with other objects or dropping the elements. Failure to do so may affect the exhaust gas purifying device, possibly damaging it or lowering its performance.
 - Do not use attachments and/or optional parts or equipment not authorized by Hitachi. Failure to do so may deteriorate the safety, function, and/or service life of the machine. In addition, personal accident, machine trouble, and/or damage to material caused by using unauthorized attachments and/or optional parts or equipment will void Hitachi Warranty Policy.
- The safety messages in this SAFETY chapter are intended to illustrate basic safety procedures of machines. However it is impossible for these safety messages to cover every hazardous situation you may encounter. If you have any questions, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.



SA-003

SAFETY

Prepare for Emergencies

- Be prepared if a fire starts or if an accident occurs.
 - Keep a first aid kit and fire extinguisher on hand.
 - Thoroughly read and understand the label attached on the fire extinguisher to use it properly.
 - To ensure that a fire extinguisher can be always used when necessary, check and service the fire extinguisher at the recommended intervals as specified in the fire extinguisher manual.
 - Establish emergency procedure guidelines to cope with fires and accidents.
 - Keep emergency numbers for doctors, ambulance service, hospital, and fire department posted near your telephone.



SA-437

Wear Protective Clothing

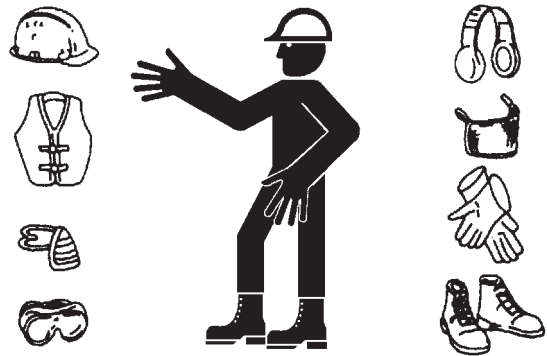
- Wear close fitting clothing and safety equipment appropriate to the job.

You may need:

- A hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask.

Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

- Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.
- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating the machine.



SA-438

SAFETY

Protect Against Noise

- Prolonged exposure to loud noise can cause impairment or loss of hearing.
- Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortably loud noises.



SA-434

Inspect Machine

- Inspect your machine carefully each day or shift by walking around it before you start it to avoid personal injury.
- In the walk-around inspection be sure to cover all points described in the "Inspect Machine Daily Before Starting" section in the operator's manual.



SA-435

SAFETY

General Precautions for Cab

- Before entering the cab, thoroughly remove all dirt and/or oil such as mud, grease, soil or stones that may mess up the cab from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots, the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Do not mess up around the operator's seat with parts, tools, soil, stones, obstacles that may fold up or turn over, cans or lunch box. The levers or pedals become inoperable if obstacle jams in operation stroke of the travel levers/pedals, pilot control shut-off lever or control levers, which may result in serious injury or death.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.
- Use proper floor mat dedicated to the machine. If another floor mat is used, it may be displaced and contact with the travel pedals during operation, resulting in serious injury or death.

SAFETY

Use Handholds and Steps

- Falling is one of the major causes of personal injury.
 - When you get on and off the machine, always face the machine and maintain a three-point contact with the steps and handrails.
 - Do not use any controls as hand-holds.
 - Never jump on or off the machine. Never mount or dismount a moving machine.
 - Before getting on or off the machine, check the condition of the steps and handrails for sticking or slippery material like grease or mud. Thoroughly remove such material if stuck. In addition, repair the damage to the steps and/or handrails. Retighten loose bolts.
 - Never get on and off the machine with tools in your hands.



SA-439

Adjust the Operator's Seat

- A poorly adjusted seat for either the operator or for the work at hand may quickly fatigue the operator leading to misoperations.
 - The seat should be adjusted whenever changing the operator for the machine.
 - The operator should be able to fully depress the pedals and to correctly operate the control levers with his back against the seat back.
 - If not, move the seat forward or backward, and check again.
 - Adjust the rear view mirror position so that the best rear visibility is obtained from the operator's seat. If the mirror is broken, immediately replace it with a new one.



SA-378

SAFETY

Ensure Safety Before Rising from or Leaving Operator's Seat

- Before rising from the operator's seat to open/close either side window or to adjust the seat position, be sure to first lower the front attachment to the ground and then move the pilot control shut-off lever to the LOCK position. Failure to do so may allow the machine to unexpectedly move when a body part unintentionally comes in contact with a control lever and/or pedal, possibly resulting in serious personal injury or death.
- Before leaving the machine, be sure to first lower the front attachment to the ground and then move the pilot control shut-off lever to the LOCK position. Turn the key switch OFF to stop the engine.
- Before leaving the machine, close all windows, doors, and access covers and lock them up.

Fasten Your Seat Belt

- If the machine should overturn, the operator may become injured and/or thrown from the cab. Additionally the operator may be crushed by the overturning machine, resulting in serious injury or death.
 - Prior to operating the machine, thoroughly examine webbing, buckle and attaching hardware. If any item is damaged or worn, replace the seat belt or component before operating the machine.
 - Be sure to remain seated with the seat belt securely fastened at all times when the machine is in operation to minimize the chance of injury from an accident.
 - We recommend that the seat belt be replaced every three years regardless of its apparent condition.



SA-237

SAFETY

Move and Operate Machine Safely

- Bystanders can be run over.
 - Take extra care not to run over bystanders. Confirm the location of bystanders before moving, swinging, or operating the machine.
 - Always keep the travel alarm and horn in working condition (if equipped). It warns people when the machine starts to move.
 - Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the machine.
 - Use appropriate illumination. Check that all lights are operable before operating the machine. If any faulty illumination is present, immediately repair it.
 - Ensure the cab door, windows, doors and covers are securely locked.
 - Check the mirrors and the monitor in the cab for problems.
If there is, replace the problem part(s) or clean the mirror, camera and the monitor.
Refer to "Rear View Monitor" section on the cleaning of the camera and the monitor.



SA-426

Operate Only from Operator's Seat

- Inappropriate engine starting procedures may cause the machine to runaway, possibly resulting in serious injury or death.
 - Start the engine only when seated in the operator's seat.
 - NEVER start the engine while standing on the track or on the ground.
 - Do not start engine by shorting across starter terminals.
 - Before starting the engine, confirm that all control levers are in neutral.
 - Before starting the engine, confirm the safety around the machine and sound the horn to alert bystanders.



SA-444

SAFETY

Jump Starting

- Battery gas can explode, resulting in serious injury.
 - If the engine must be jump started, be sure to follow the instructions shown in the “OPERATING THE ENGINE” chapter in the operator’s manual.
 - The operator must be in the operator’s seat so that the machine will be under control when the engine starts. Jump starting is a two-person operation.
 - Never use a frozen battery.
 - Failure to follow correct jump starting procedures could result in a battery explosion or a runaway machine.



SA-032

Keep Riders off Machine

- Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine.
 - Only the operator should be on the machine. Keep riders off.
 - Riders also obstruct the operator’s view, resulting in the machine being operated in an unsafe manner.



SA-379

SAFETY

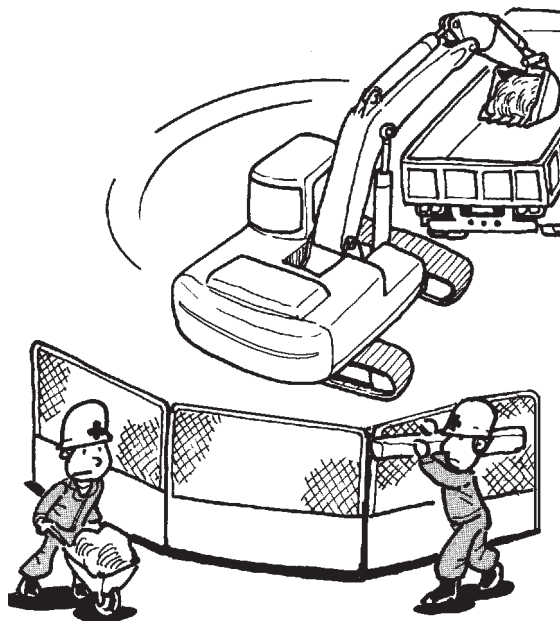
Precautions for Operations

- Investigate the work site before starting operations.
 - Be sure to wear close fitting clothing and safety equipment appropriate for the job, such as a hard hat, etc. when operating the machine.
 - Clear all persons and obstacles from the area of operation and machine movement. Do not permit persons other than the operator to enter areas where there is danger such as flying objects.

Always beware of the surroundings while operating.

When working in a small area surrounded by obstacles, take care not to hit the upperstructure against obstacles.

- When loading onto trucks, bring the bucket over the truck beds from the rear side. Take care not to swing the bucket over the cab or over any person.



M178-05-007

SAFETY

Investigate Job Site Beforehand

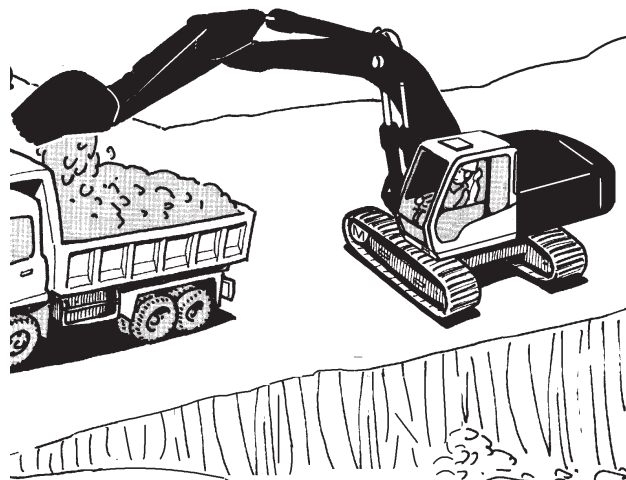
- When working at the edge of an excavation or on a road shoulder, the machine could tip over, possibly resulting in serious injury or death.
 - Investigate the configuration and ground conditions of the job site beforehand to prevent the machine from falling and to prevent the ground, stockpiles or banks from collapsing.
 - Make a work plan. Use machines appropriate to the work and job site.
 - Reinforce ground, edges and road shoulders as necessary. Keep the machine well back from the edges of excavations and road shoulders.
 - When working on an incline or on a road shoulder, employ a signal person as required.
 - Confirm that your machine is equipped with a FOPS cab before working in areas where the possibility of falling stones or debris exist.
 - When the footing is weak, reinforce the ground before starting work.
 - When working on frozen ground, be extremely alert. As ambient temperatures rise, footing becomes loose and slippery.
 - Beware the possibility of fire when operating the machine near flammable objects such as dry grass.



SA-380

SAFETY

- Make sure the worksite has sufficient strength to firmly support the machine.
When working close to an excavation or at road shoulders, operate the machine with the tracks positioned perpendicular to the cliff face with travel motors at the rear, so that the machine can more easily evacuate if the cliff face collapses.
- If working on the bottom of a cliff or a high bank is required, be sure to investigate the area first and confirm that no danger of the cliff or bank collapsing exists. If any possibility of cliff or bank collapsing exists, do not work on the area.
- Soft ground may collapse when operating the machine on it, possibly causing the machine to tip over. When working on soft ground is required, be sure to reinforce the ground first using large pieces of steel plates strong and firm enough to easily support the machine.
- Note that there is always a possibility of machine tipping over when working on rough terrain or on slopes. Prevent machine tipping over from occurring. When operating on rough terrain or on slopes:
 - Reduce the engine speed.
 - Select slow travel speed mode.
 - Operate the machine slowly and be cautious with machine movements.

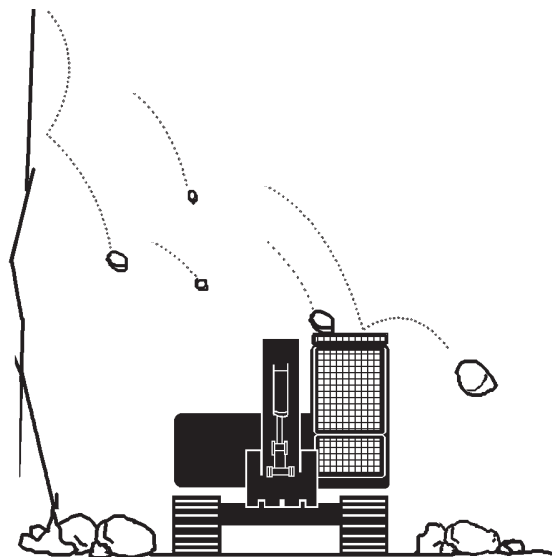


M104-05-016

Install OPG Guard

In case the machine is operated in areas where the possibilities of falling stones or debris exist, install the Hitachi OPG guard. Consult your authorized dealer for installing the OPG guard. In order not to impair operator protective structure: Replace damaged OPG guard. Never attempt to repair or modify the guard.

OPG: Operator Protective Guard



SA-490

SAFETY

Restriction of Attachment Installation

- Do not install an attachment which exceeds specified weight for the machine structure.

Provide Signals for Jobs Involving Multiple Machines

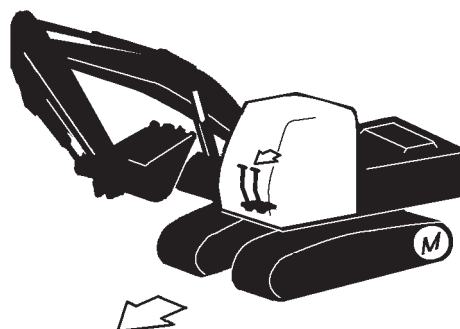
- For jobs involving multiple machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to coordinate the job site. Make sure that all personnel obey the signal person's directions.



SA-481

Confirm Direction of Machine to Be Driven

- Incorrect travel pedal/lever operation may result in serious injury or death.
 - Before driving the machine, confirm the position of the undercarriage in relation to the operator's position. If the travel motors are located in front of the cab, the machine will move in reverse when travel pedals/levers are operated to the front.

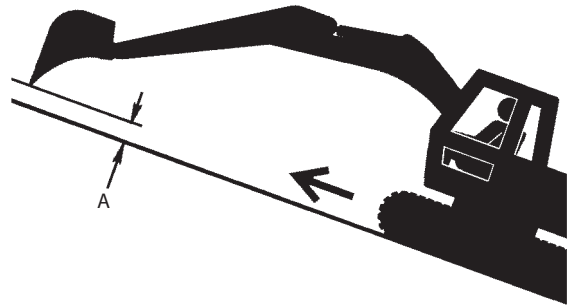


SA-491

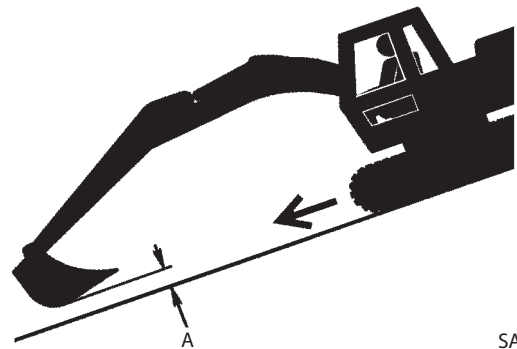
SAFETY

Drive Machine Safely

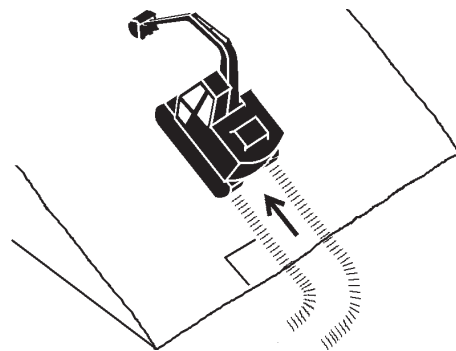
- Before driving the machine, always confirm that the travel levers/pedals direction corresponds to the direction you wish to drive.
 - Be sure to detour around any obstructions.
 - Avoid traveling over obstructions. Soil, fragments of rocks, and/or metal pieces may scatter around the machine. Do not allow personnel to stay around the machine while traveling.
- Driving on a slope may cause the machine to slip or overturn, possibly resulting in serious injury or death.
 - Never attempt to ascend or descend 35 degrees or steeper slopes. (Gradeability differ depending on the specification.)
 - Be sure to fasten the seat belt.
 - When driving up or down a slope, keep the bucket facing the direction of travel, approximately 0.2 to 0.3 m (A) above the ground.
 - If the machine starts to skid or becomes unstable, immediately lower the bucket to the ground and stop.
 - Driving across the face of a slope or steering on a slope may cause the machine to skid or turnover. If the direction must be changed, move the machine to level ground, then, change the direction to ensure safe operation.



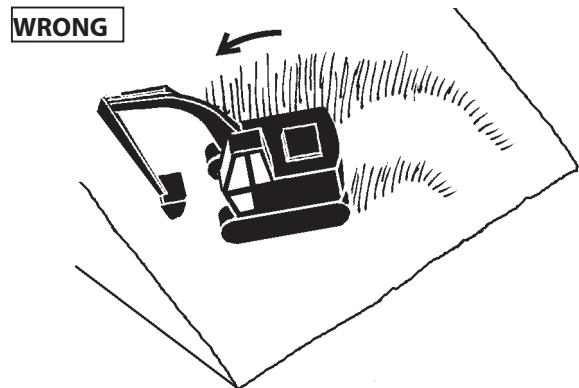
SA-657



SA-658



SA-441



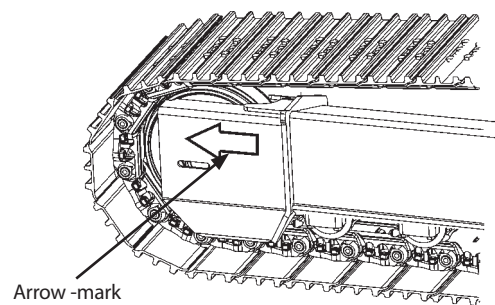
SA-590

SAFETY

- Avoid swinging the upperstructure on slopes. Never attempt to swing the upperstructure downhill. The machine may tip over. If swinging uphill is unavoidable, carefully operate the upperstructure and boom at slow speed.
- If the engine stalls on a slope, immediately lower the bucket to the ground. Return the control levers to neutral. Then, restart the engine.
- Be sure to thoroughly warm up the machine before ascending steep slopes. If hydraulic oil has not warmed up sufficiently, sufficient performance may not be obtained.
- Use a signal person when moving, swinging or operating the machine in congested areas. Coordinate hand signals before starting the machine.
- Before moving machine, determine which way to move travel pedals/levers for the direction you want to go. When the travel motors are in the rear, pushing down on the front of the travel pedals or pushing the levers forward moves the machine forward, towards the idlers. An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes in direction.
- Before traveling on them, check the strengths of bridges and road shoulders, and reinforce if necessary.
- Use wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, use wood plates in order not to damage them.
- Do not make contact with electric wires or bridges.
- When crossing a river, measure the depth of the river using the bucket, and cross slowly. Do not cross the river when the depth of the river is deeper than the upper edge of the upper roller.
- When traveling on rough terrain, reduce engine speed. Select slow travel speed. Slower speed will reduce possible damage to the machine.
- Avoid operations that may damage the track and undercarriage components.
- During freezing weather, always clean snow and ice from track shoes before loading and unloading machine, to prevent the machine from slipping.



M104-05-008



M178-03-001



SA-011

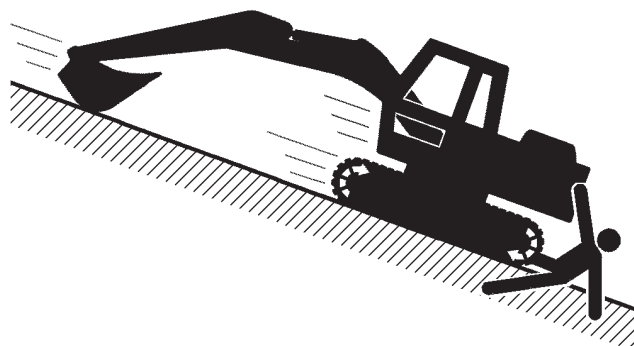
SAFETY

Avoid Injury from Rollaway Accidents

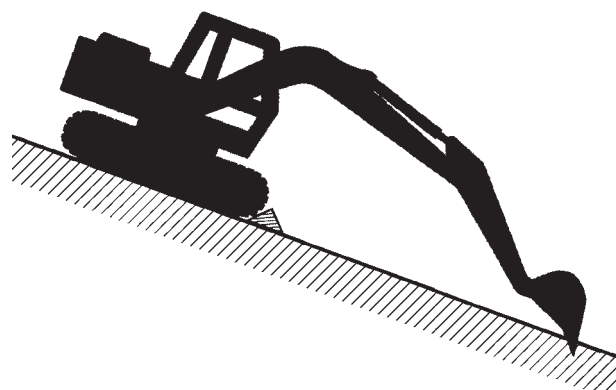
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park the machine.
- Do not park the machine on a grade.
- Lower the bucket and/or other work tools to the ground.
- Turn the auto-idle switch OFF.
- Run the engine at slow idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Pull the pilot control shut-off lever to LOCK position.
- Block both tracks and lower the bucket to the ground. Thrust the bucket teeth into the ground if you must park on a grade.
- Position the machine to prevent rolling.
- Park at a reasonable distance from other machines.



SA-391



SA-2273

SAFETY

Avoid Injury from Back-Over and Swing Accidents

- If any person is present near the machine when backing or swinging the upperstructure, the machine may hit or run over that person, resulting in serious injury or death.

To avoid back-over and swing accidents:

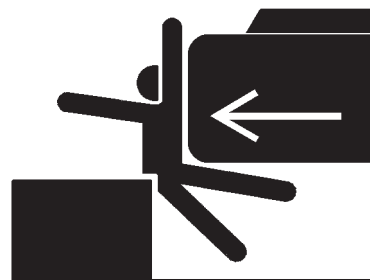
- Always look around BEFORE YOU BACK UP AND SWING THE MACHINE. BE SURE THAT ALL BYSTANDERS ARE CLEAR.
- Keep the travel alarm in working condition (if equipped). ALWAYS BE ALERT FOR BYSTANDERS MOVING INTO THE WORK AREA. USE THE HORN OR OTHER SIGNAL TO WARN BYSTANDERS BEFORE MOVING MACHINE.
- USE A SIGNAL PERSON WHEN BACKING UP IF YOUR VIEW IS OBSTRUCTED. ALWAYS KEEP THE SIGNAL PERSON IN VIEW.

Use hand signals, which conform to your local regulations, when work conditions require a signal person.

- No machine motions shall be made unless signals are clearly understood by both signalman and operator.
- Learn the meanings of all flags, signs, and markings used on the job and confirm who has the responsibility for signaling.
- Keep windows, mirrors, and lights clean and in good condition.
- Dust, heavy rain, fog, etc., can reduce visibility. As visibility decreases, reduce speed and use proper lighting.
- Read and understand all operating instructions in the operator's manual.



SA-383

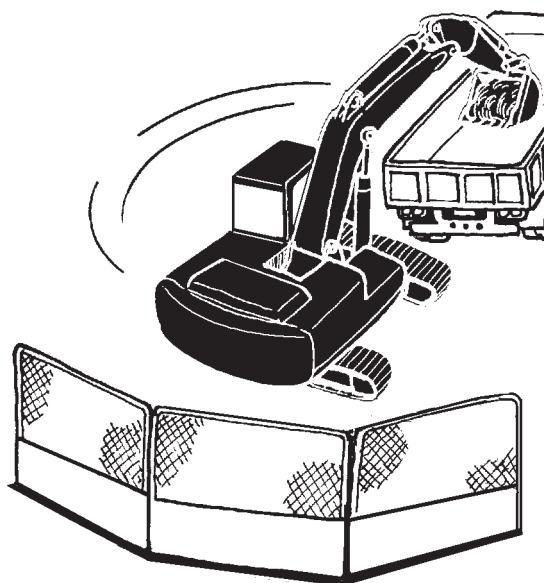


SA-384

SAFETY

Keep Person Clear from Working Area

- A person around the operating machine may be hit severely by the swinging front attachment or counterweight, be caught in other objects, and/or be struck by flying objects, resulting in serious injury or death.
- Set up barriers and/or put a NO ADMISSION sign at the machine operating site and areas exposed by flying objects to prevent anyone from entering the work area.
- Before operating the machine, confirm that there are no obstacles or person other than signal person from working area.



SA-386

Never Position Bucket Over Anyone

- Never lift, move, or swing bucket above anyone or a truck cab. Serious injury or machine damage may result due to bucket load spill or due to collision with the bucket.

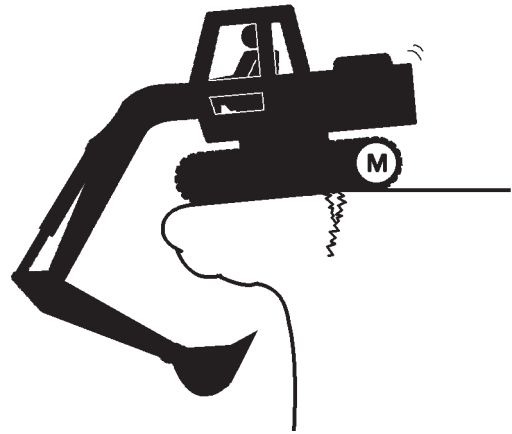


SA-487

SAFETY

Avoid Undercutting

- In order to retreat from the edge of an excavation if the footing should collapse, always position the undercarriage perpendicular to the edge of the excavation with the travel motors at the rear.
- If the footing starts to collapse and if retreat is not possible, do not panic. Often, the machine can be secured by lowering the front attachment, in such cases.



SA-488

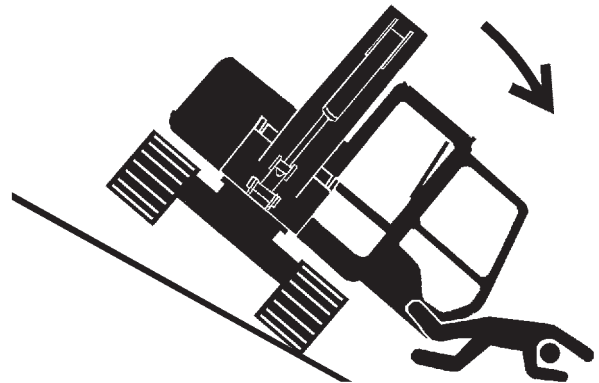
Avoid Tipping

**DO NOT ATTEMPT TO JUMP CLEAR OF TIPPING MACHINE
--- SERIOUS OR FATAL CRUSHING INJURIES WILL RESULT**

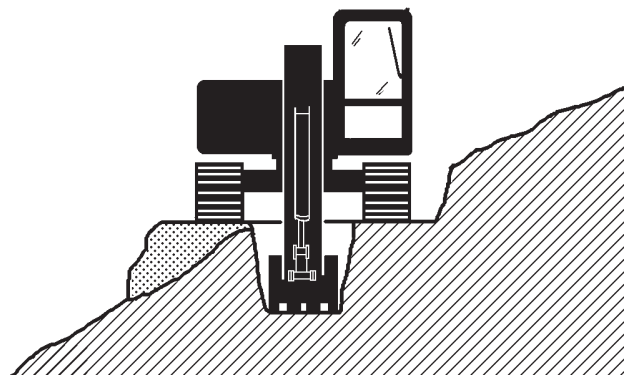
**MACHINE WILL TIP OVER FASTER THAN YOU CAN JUMP
FREE**

FASTEN YOUR SEAT BELT

- The danger of tipping is always present when operating on a grade, possibly resulting in serious injury or death. To avoid tipping:
- Be extra careful before operating on a grade.
 - Prepare machine operating area flat.
 - Keep the bucket low to the ground and close to the machine.
 - Reduce operating speeds to avoid tipping or slipping.
 - Avoid changing direction when traveling on grades.
 - NEVER attempt to travel across a grade steeper than 15 degrees if crossing the grade is unavoidable.
 - Reduce swing speed as necessary when swinging loads.
- Be careful when working on frozen ground.
 - Temperature increases will cause the ground to become soft and make ground travel unstable.



SA-012



SA-440

SAFETY

Never Undercut a High Bank

- The edges could collapse or a land slide could occur causing serious injury or death.



SA-489

Dig with Caution

- Accidental severing of underground cables or gas lines may cause an explosion and/or fire, possibly resulting in serious injury or death.
 - Before digging check the location of cables, gas lines, and water lines.
 - Keep the minimum distance required, by law, from cables, gas lines, and water lines.
 - If a fiber optic cable should be accidentally severed, do not look into the end. Doing so may result in serious eye injury.
 - Contact your local "diggers hot line" if available in your area, and/or the utility companies directly. Have them mark all underground utilities.



SA-382

Operate with Caution

- If the front attachment or any other part of the machine hits against an overhead obstacle, such as a bridge, both the machine and the overhead obstacle will be damaged, and personal injury may result as well.
 - Take care to avoid hitting overhead obstacles with the boom or arm.



SA-389

SAFETY

Avoid Power Lines

- Serious injury or death can result if the machine or front attachments are not kept a safe distance from electric lines.
- When operating near an electric line, NEVER move any part of the machine or load closer than 3 m plus twice the line insulator length.
- Check and comply with any local regulations that may apply.
- Wet ground will expand the area that could cause any person on it to be affected by electric shock. Keep all bystanders or co-workers away from the site.



SA-381

Precautions for Lightning

- Lightning may strike the machine.
If lightning comes close, immediately stop the operation, and take the following action.
- When you are around the machine or operating cab-less machine, evacuate to a safe place far away from the machine.
- When you are in the cab, stay in the cab until lightning has passed and safety is secured. Close the cab doors and windows. Lower the bucket to the ground, and stop the engine. Put your hands on your lap to avoid contact with any metal surfaces. Never go out of the cab.

If lightning strikes the machine or near the machine, check all of the machine safety devices for any failure after lightning has passed and safety is secured. If any trouble is found, operate the machine only after repairing it.

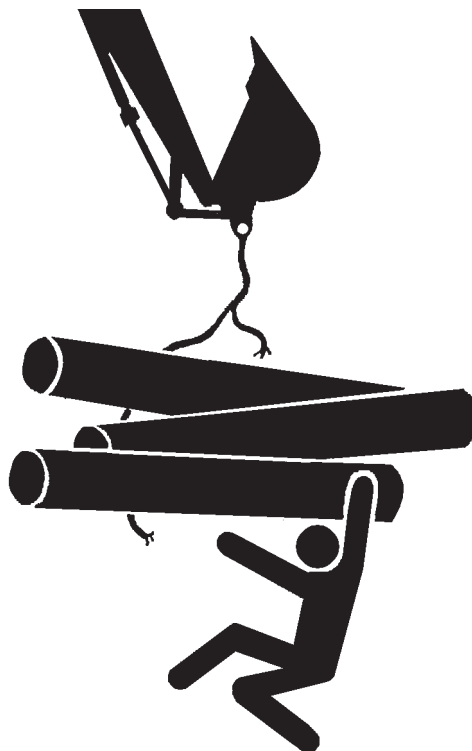


SA-1088

SAFETY

Object Handling

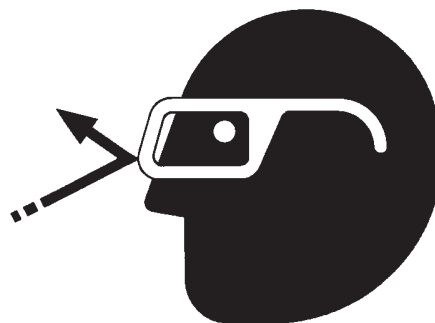
- If a lifted load should fall, any person nearby may be struck by the falling load or may be crushed underneath it, resulting in serious injury or death.
 - When using the machine for craning operations, be sure to comply with all local regulations.
 - Do not use damaged chains or frayed cables, cables, slings, or ropes.
 - Before craning, position the upperstructure with the travel motors at the rear.
 - Move the load slowly and carefully. Never move it suddenly.
 - Keep all persons well away from the load.
 - Never move a load over a person's head.
 - Do not allow anyone to approach the load until it is safely and securely situated on supporting blocks or on the ground.
 - Never attach a sling or chain to the bucket teeth. They may come off, causing the load to fall.



SA-014

Protect Against Flying Debris

- If flying debris hit eyes or any other part of the body, serious injury may result.
 - Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.
 - Keep bystanders away from the working area before striking any object.
 - Always close the front windows, doors, door windows and the overhead window when operating the machine.



SA-432

SAFETY

Park Machine Safely

To avoid accidents:

- Park machine on a firm, level surface.
- Lower bucket and blade to the ground.
- Turn auto-idle switch OFF.
- Run engine at slow idle speed without load for 5 minutes.
- Turn key switch to OFF to stop engine.
- Remove the key from the key switch.
- Pull the pilot control shut-off lever to the LOCK position.
- Close windows, roof vent, and cab door.
- Lock all access doors and compartments.



SA-2590

Handle Fluids Safely—Avoid Fires

- Handle fuel with care; it is highly flammable. If fuel ignites, an explosion and/or a fire may occur, possibly resulting in serious injury or death.
 - Do not refuel the machine while smoking or when near open flame or sparks.
 - Always stop the engine before refueling the machine.
 - Fill the fuel tank outdoors.
- All fuels, most lubricants, and some coolants are flammable.
 - Store flammable fluids well away from fire hazards.
 - Do not incinerate or puncture pressurized containers.
 - Do not store oily rags; they can ignite and burn spontaneously.
 - Securely tighten the fuel and oil filler cap.



SA-018



SA-019

SAFETY

Transport Safely

- Take care, the machine may turn over when loading or unloading the machine onto or off of a truck or trailer.
 - Observe the related regulations and rules for safe transportation.
 - Select an appropriate truck or trailer for the machine to be transported.
 - Be sure to use a signal person.
 - Always follow the following precautions for loading or unloading:
 1. Select solid and level ground.
 2. Always use a ramp or deck strong enough to support the machine weight.
 3. Turn auto-idle switch OFF.
 4. Always select the slow speed mode with the travel mode switch.
 5. Never load or unload the machine onto or off a truck or trailer using the front attachment functions when driving up or down the ramp.
 6. Never steer the machine while on the ramp. If the traveling direction must be changed while the ramp, unload the machine from the ramp, reposition the machine on the ground, then try loading again.
 7. The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it.
 8. Place blocks in front of and behind the tires. Securely hold the machine to the truck or trailer deck with wire ropes.



SA-395

Be sure to further follow the details described in the "TRANSPORTING" chapter.

SAFETY

Practice Safe Maintenance

To avoid accidents:

- Understand service procedures before starting work.
- Keep the work area clean and dry.
- Do not spray water or steam inside cab.
- Never lubricate or service the machine while it is moving.
- Keep hands, feet and clothing away from power-driven parts.

Before servicing the machine:

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.
4. Run the engine at slow idle speed without load for 5 minutes.
5. Turn the key switch to OFF to stop engine.
6. Relieve the pressure in the hydraulic system by moving the control levers several times.
7. Remove the key from the key switch.
8. Attach a "Do Not Operate" tag on the control lever.
9. Pull the pilot control shut-off lever to the LOCK position.
10. Allow the engine to cool.

- If a maintenance procedure must be performed with the engine running, do not leave the machine unattended.
- If the machine must be raised, maintain a 90 to 110° angle between the boom and arm. Securely support any machine elements that must be raised for service work.
- Inspect certain parts periodically and repair or replace as necessary. Refer to the section discussing that part in the "MAINTENANCE" chapter of this manual.
- Keep all parts in good condition and properly installed.
- Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.
- When cleaning parts, always use nonflammable detergent oil. Never use highly flammable oil such as fuel oil and gasoline to clean parts or surfaces.
- Turn the battery disconnect switch to OFF before adjusting the electrical systems or performing welding operation on the machine.



SA-028



SA-527

SAFETY

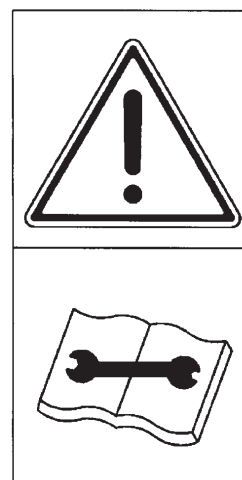
- Sufficiently illuminate the work site. Use a maintenance work light when working under or inside the machine.
- Always use a work light protected with a guard. In case the light bulb is broken, spilled fuel, oil, antifreeze fluid, or window washer fluid may catch fire.



SA-037

Warn Others of Service Work

- Unexpected machine movement can cause serious injury.
 - Before performing any work on the machine, attach a “Do Not Operate” tag on the control lever. This tag is available from your authorized dealer.



SS2045102

Support Machine Properly

- Never attempt to work on the machine without securing the machine first.
 - Always lower the attachment to the ground before you work on the machine.
 - If you must work on a lifted machine or attachment, securely support the machine or attachment. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack.

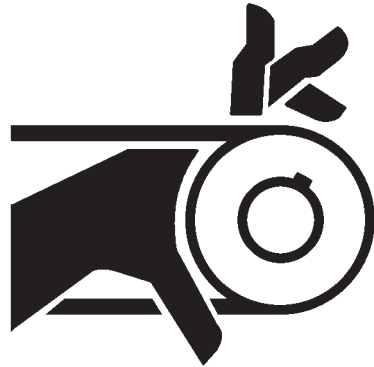


SA-527

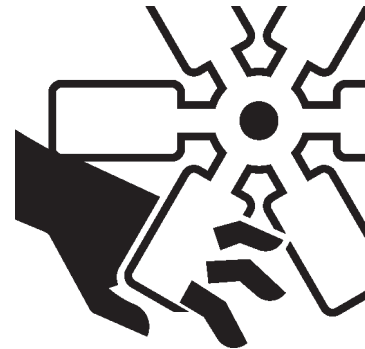
SAFETY

Stay Clear of Moving Parts

- Entanglement in moving parts can cause serious injury.
 - To prevent accidents, care should be taken to ensure that hands, feet, clothing, jewelry and hair do not become entangled when working around rotating parts.



SA-026



SA-2294

Prevent Parts from Flying

- Grease in the track adjuster is under high pressure. Failure to follow the precautions below may result in serious injury, blindness, or death.
 - Do not attempt to remove GREASE FITTING or VALVE ASSEMBLY.
 - Do not attempt to remove grease fitting securing cover.
 - As pieces may fly off, be sure to keep body and face away from valve.
 - Never attempt to disassemble the track adjuster. Inadvertent disassembling of the track adjuster may cause the parts such as a spring to fly off, possibly resulting in severe personal injury or death.
- Travel reduction gears are under pressure.
 - As pieces may fly off, be sure to keep body and face away from AIR RELEASE PLUG to avoid injury.
 - GEAR OIL is hot. Wait for GEAR OIL to cool, then gradually loosen AIR RELEASE PLUG to release pressure.

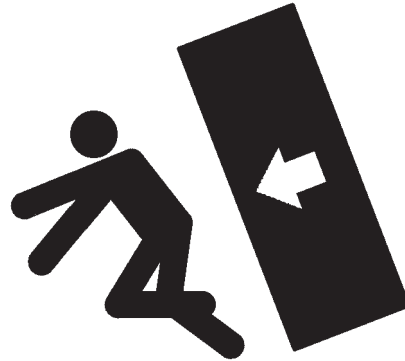


SA-344

SAFETY

Avoid Injury from Attachment Falling Accident

- Stored attachments such as buckets, hydraulic hammers, and blades can fall and cause serious injury or death.
 - To avoid possible personal injury from attachment falling accident, use a platform when replacing an attachment.
 - Securely store attachments and implements to prevent falling. Keep children and bystanders away from storage areas.



SA-034

Prevent Burns

Hot spraying fluids:

- After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines.
Skin contact with escaping hot water or steam can cause severe burns.
 - To avoid possible injury from hot spraying water. DO NOT remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
 - The hydraulic oil tank is pressurized. Again, be sure to release all pressure before removing the cap.



SA-039

Hot fluids and surfaces:

- Engine oil, gear oil and hydraulic oil also become hot during operation.
The engine, hoses, lines and other parts become hot as well.
 - Wait for the oil and components to cool before starting any maintenance or inspection work.



SA-225

SAFETY

Replace Rubber Hoses Periodically

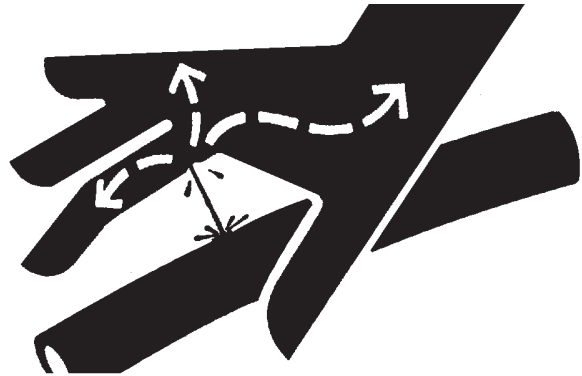
- Rubber hoses that contain flammable fluids under pressure may break due to aging, fatigue, and abrasion. It is very difficult to gauge the extent of deterioration due to aging, fatigue, and abrasion of rubber hoses by inspection alone.
 - Periodically replace the rubber hoses. (See the page of "Periodic replacement of parts" in the operator's manual.)
- Failure to periodically replace rubber hoses may cause a fire, fluid injection into skin, or the front attachment to fall on a person nearby, which may result in severe burns, gangrene, or otherwise serious injury or death.



SA-019

Avoid High-Pressure Fluids

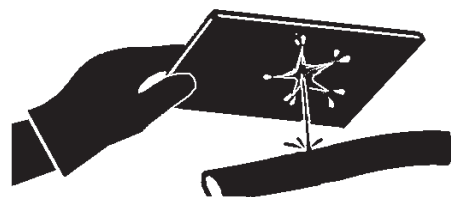
- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.
 - Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.
 - Tighten all connections before applying pressure.
 - Search for leaks with a piece of cardboard; take care to protect hands and body from high-pressure fluids. Wear a face shield or goggles for eye protection.
 - If an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



SA-031



SA-292



SA-044

SAFETY

Prevent Fires

Check for Oil Leaks:

- Fuel, hydraulic oil and lubricant leaks can lead to fires.
 - Check for oil leaks due to missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damage to the oil cooler, and loose oil cooler flange bolts.
 - Tighten, repair or replace any missing, loose or damaged clamps, lines, hoses, oil cooler and oil cooler flange bolts.
 - Do not bend or strike high-pressure lines.
 - Never install bent or damaged lines, pipes, or hoses.
 - Replace fuel hoses and hydraulic hoses periodically even if there is no abnormality in their external appearance.



SA-019

Check for Shorts:

- Short circuits can cause fires.
 - Clean and tighten all electrical connections.
 - Check before each shift or after eight (8) to ten (10) hours operation for loose, kinked, hardened or frayed electrical cables and wires.
 - Check before each shift or after eight (8) to ten (10) hours operation for missing or damaged terminal caps.
 - DO NOT OPERATE MACHINE if cable or wires are loose, kinked, etc.
 - Never attempt to modify electric wirings.

SAFETY

Clean up Flammable Materials:

- Spilled fuel and oil, and trash, grease, debris, accumulated coal dust, and other flammable materials may cause fires.
 - Prevent fires by inspecting and cleaning the machine daily, and by removing adhered oil or accumulated flammable materials immediately. Check and clean high temperature parts such as the exhaust outlet and mufflers earlier than the normal interval.
 - Do not wrap high temperature parts such as a muffler or exhaust pipe with oil absorbents.
 - Do not store oily cloths as they are vulnerable to catching fire.
 - Keep flammable materials away from open flames.
 - Do not ignite or crush a pressurized or sealed container.
 - Wire screens may be provided on openings on the engine compartment covers to prevent flammable materials such as dead leaves from entering. However, flammable materials which have passed through the wire screen may cause fires. Check and clean the machine every day and immediately remove accumulated flammable materials.

Check Key Switch:

- If a fire breaks out, failure to stop the engine will escalate the fire, hampering fire fighting.
 - Always check key switch function before operating the machine every day:
 1. Start the engine and run it at slow idle.
 2. Turn the key switch to the OFF position to confirm that the engine stops.
 - If any abnormalities are found, be sure to repair them before operating the machine.

Check Heat Shields:

- Damaged or missing heat shields may lead to fires.
 - Damaged or missing heat shields must be repaired or replaced before operating the machine.
 - If hydraulic hoses are broken while the engine cover is open, splattered oil on the high temperature parts such as mufflers may cause fire. Always close the engine cover while operating the machine.

SAFETY

Evacuating in Case of Fire

- If a fire breaks out, evacuate the machine in the following way:
 - Stop the engine by turning the key switch to the OFF position if there is time.
 - Use a fire extinguisher if there is time.
 - Exit the machine.
- In an emergency, if the cab door or front window can not be opened, break the front or rear window panes with the emergency evacuation hammer to escape from the cab. Refer to the explanation pages on the Emergency Evacuation Method.



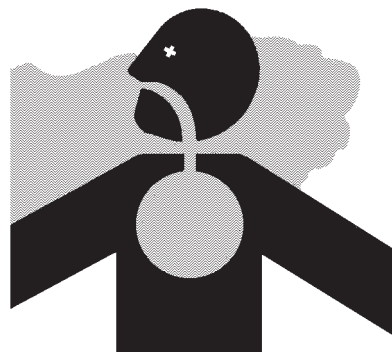
SA-393



SS-1510

Beware of Exhaust Fumes

- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
 - If you must operate in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.
 - PM (Particulate Matter) combustion may generate white smoke during muffler filter regeneration. Do not attempt to do muffler filter manual regeneration in a badly ventilated indoors.



SA-016

SAFETY

Precautions for Welding and Grinding

- Welding may generate gas and/or small fires.
 - Be sure to perform welding in a well ventilated and prepared area. Store flammable objects in a safe place before starting welding.
 - Only qualified personnel should perform welding. Never allow an unqualified person to perform welding.
 - Turn the battery disconnect switch to the OFF position before performing welding operation on the machine.
- Grinding on the machine may create fire hazards. Store flammable objects in a safe place before starting grinding.
- After finishing welding and grinding, recheck that there are no abnormalities such as the area surrounding the welded area still smoldering.



SA-818

SAFETY

Avoid Heating Near Pressurized Fluid Lines

- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
- Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
- Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire-resistant guards to protect hoses or other materials before engaging in welding, soldering, etc..



SA-030

Avoid Applying Heat to Lines Containing Flammable Fluids

- Do not weld or flame cut pipes or tubes that contain flammable fluids.
- Clean them thoroughly with nonflammable solvent before welding or flame cutting them.

Precautions for Handling Accumulator and Gas Damper

High-pressure nitrogen gas is sealed in the accumulator and the gas damper. Inappropriate handling may cause explosion, possibly resulting in serious injury or death.

Strictly comply with the following items:

- Do not disassemble the unit.
- Keep the units away from open flames and fire.
- Do not bore a hole, do not cut by torch.
- Avoid giving shocks by hitting or rolling the unit.
- Before disposing the unit, sealed gas must be released. Consult your nearest Hitachi dealer.

SAFETY

Remove Paint Before Welding or Heating

- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.
 - Avoid potentially toxic fumes and dust.
 - Do all such work outside or in a well-ventilated area. Dispose of paint and solvent properly.
 - Remove paint before welding or heating:
 1. If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
 2. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



SA-029

Beware of Asbestos and Silicon Dust and Other Contamination

- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer. Inhalation of silicon dust or other contamination may cause sickness.
 - Depending on the work site conditions, the risk of inhaling asbestos fiber, silicon dust or other contamination may exist. Spray water to prevent asbestos fibers, silicon dust or other contamination from becoming airborne. Do not use compressed air.
 - When operating the machine in a work site where asbestos fibers, silicon dust or other contamination might be present, be sure to operate the machine from the upwind side and wear a mask rated to prevent the inhalation of asbestos, silicon dust or other contamination.
 - Keep bystanders out of the work site during operation.
 - Asbestos fibers might be present in imitation parts. Use only genuine Hitachi Parts.



SA-029

SAFETY

Prevent Battery Explosions

- Battery gas can explode.
 - Keep sparks, lighted matches, and flame away from the top of battery.
 - Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
 - Do not charge a frozen battery; it may explode. Warm the battery to 16 °C (60 °F) first.
 - Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
 - Loose terminals may produce sparks. Securely tighten all terminals.
 - Connect terminals to the correct electrical poles. Failure to do so may cause damage to the electrical parts or fire.
- Battery electrolyte is poisonous. If the battery should explode, battery electrolyte may be splashed into eyes, possibly resulting in blindness.
 - Be sure to wear eye protection when checking electrolyte specific gravity.



SA-032

Service Air Conditioning System Safely

- If spilled onto skin, refrigerant may cause a cold contact burn.
 - Refer to the instructions described on the container for proper use when handling the refrigerant.
 - Use a recovery and recycling system to avoid leaking refrigerant into the atmosphere.
 - Never touch the refrigerant.



SA-405

SAFETY

Handle Chemical Products Safely

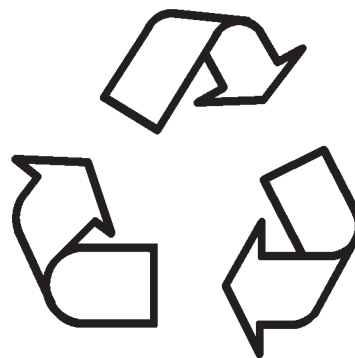
- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, coolants, paints, and adhesives.
 - Safety Data Sheet (SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
 - Check the SDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and use recommended equipment.
 - See your authorized dealer for SDS's (available only in English) on chemical products used with your machine.



SA-2579

Dispose of Waste Properly

- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.
 - Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
 - Do not pour waste onto the ground, down a drain, or into any water source.
 - Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.
 - Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your authorized dealer.



SA-226

SAFETY

Never Ride Attachment

Never allow anyone to ride attachments or load. This is an extremely dangerous practice.

Notes for Muffler Filter

Muffler Filter

The muffler filter removes particulate matters (PM) in the exhaust gas. The muffler filter traps PM, and it is automatically regenerated by burning PM when the set amount of PM is accumulated in the filter. Follow the instructions below to prevent the muffler filter from being damaged.

Exhaust gas from the muffler filter, muffler and exhaust piping becomes hot during and right after engine running and filter regeneration (burning PM). Keep away from the direction of the exhaust piping and its vicinity during the filter regeneration. Be careful not to let your skin contact with any hot gas from the exhaust piping. It may cause severe burns.

Do not directly touch water coming out of the muffler filter. The water is mildly-acidic by oxidation catalyst mounted in the muffler filter. If filter water spills on your skin, immediately flush it out with clean water.

Precautions for Communication Terminal

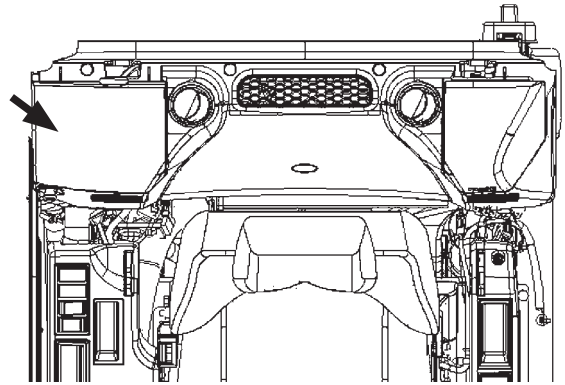
Electrical wave transmitted from the communication terminal may cause malfunction of other electronic devices. Inquire the device manufacturer for electrical wave disturbance upon using an electronic device near the communication terminal.

SAFETY

Precaution for Communication Terminal Equipment

This machine has a communication terminal equipment emitting electrical waves installed inside a rear tray which is situated at the back of the driver's seat. There is a possibility that a medical device, including an implantable device such as a cardiac pacemaker, would be affected and would malfunction by the electrical waves emitted from the communication terminal equipment.

Any person affixed with a medical device such as the above should not use this machine, unless the medical device and the rear tray are at least 22 centimeters apart at all times. If such condition cannot be met, please contact our company's nearest dealer and have the person in charge stop the communication terminal equipment from functioning completely and confirm that it is not emitting electrical waves. This machine is equipped with a communication terminal type A or type B. Consult your nearest authorized dealer for the type of communication terminal.



SA-2346

Specific Absorption Rate ("SAR") (measured by 10 g per unit) of communication terminal equipments:

	Type A	Type B
E-GSM900	0.573 W/Kg (914.8 MHz)	0.12 W/Kg (897.6 MHz)
DCS-1800	0.130 W/Kg (1710.2 MHz)	0.06 W/Kg (1748.0 MHz)
WCDMA Band I	0.271 W/Kg (1950.0 MHz)	0.05 W/Kg (1950.0 MHz)
WCDMA Band VIII	-	0.10 W/Kg (892.6 MHz)

*This data was measured by having each type of communication terminal equipment, such as the communication terminal equipment used with this machine, and a human body set apart by 3 cm.

* SAR is a measure of the amount of radio frequency energy absorbed by the body when using a wireless application such as a mobile phone.

In Japan: *Under the Japanese Radio Act and other relevant Japanese regulations, the maximum SAR value is 2 W/kg (as of March 2010).

In EU Member nation: *Under the "Council Recommendation 1999/519/EC 12 July 1999"; the maximum SAR value is 2 W/kg (as of March 2010).

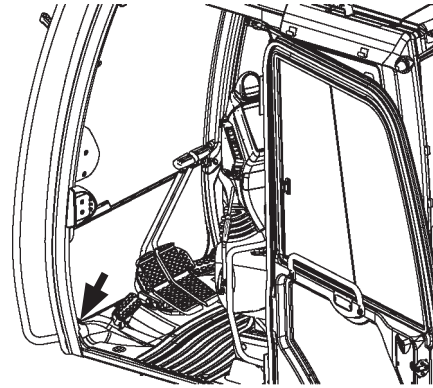
SAFETY

- Do not attempt to disassemble, repair, modify and displace of the communication terminal, antenna and cables. Failure to do so may cause damage or fire on the machine and the communication terminal. (Before removing or installing the communication terminal, consult your authorized Hitachi dealer.)
- Do not pinch or forcibly pull cables, cords and connectors. Failure to do so may cause damage or fire on the machine and the communication terminal due to short/broken circuit.

SAFETY

Notes on Protection of Operator's Station When the Machine Rolls Over

The cab corresponds to the structure to protect the operator by absorbing impact energy when the machine rolls over (Roll-Over Protective Structure (ROPS)). However, when the machine mass exceeds the maximum operating mass described in the ROPS certification by modifying the machine or installing a special attachment, the cab can not fulfill its protective function, possibly causing serious injury or death.



MDAA-01-298

In order to ensure the protective structure, follow the instructions below.

- Consult your authorized Hitachi dealer before welding parts or drilling a hole on the cab, which possibly reduces the cab strength.
- Be sure to always fasten the seat belt when operating the machine. If the machine rolls over without operator fastening the seat belt, the operator may become injured, may be thrown out from the cab and/or may become crushed under the machine even though the cab has the protective structure.

The ROPS certification is valid under the following conditions.

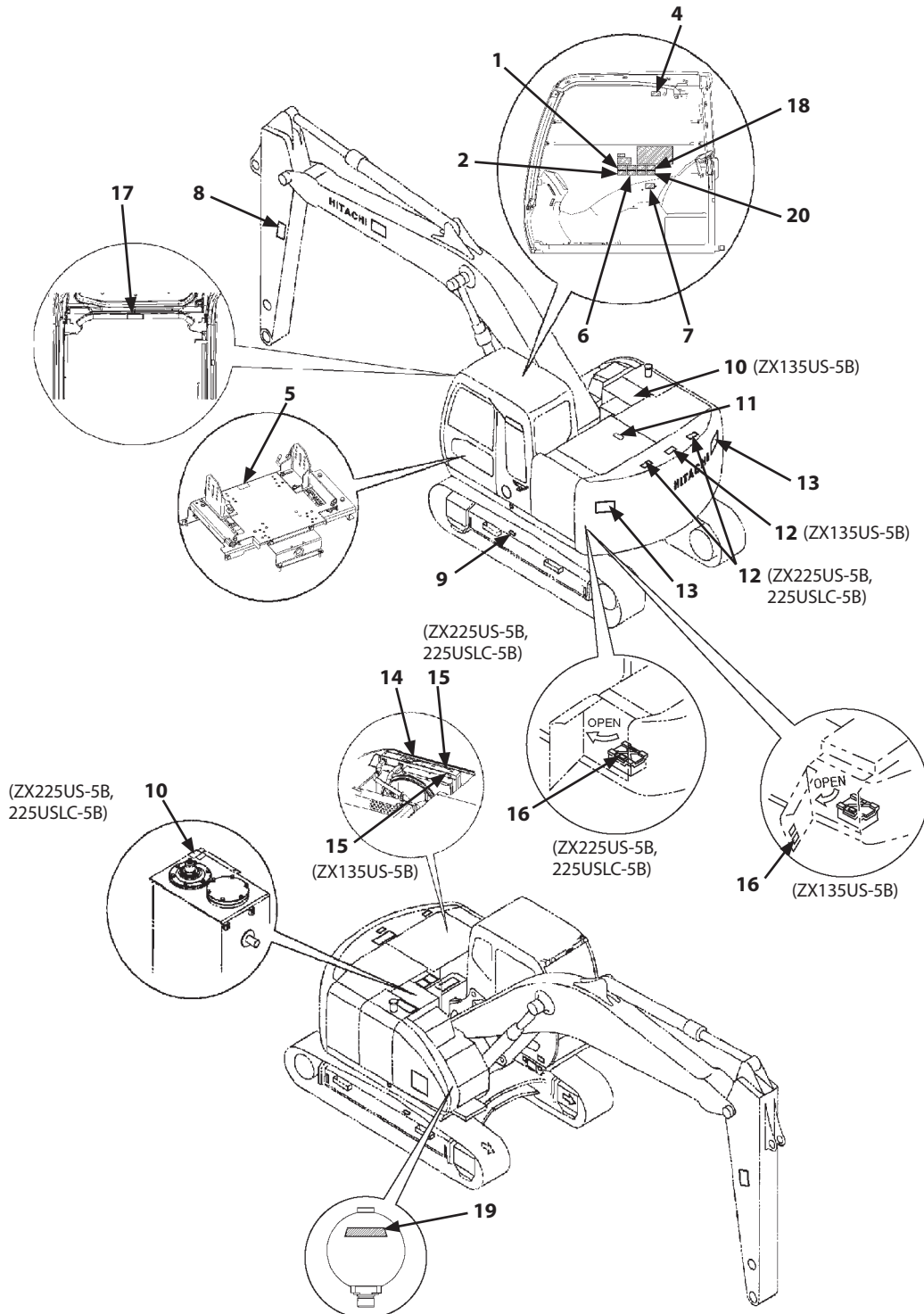
- The machine mass is lower than the maximum operating mass described in the ROPS certification.
- The ROPS is properly installed.
- No modification is made to the ROPS.
- The ROPS is free from damage.

Applicable Machine Model Number	ROPS Certification Number	ROPS Model Number	Maximum operating mass assuring the ROPS
ROPS CERTIFICATION			
MACHINE MODEL No.	CERTIFICATION No.	ROPS ISO 12117-2 : 2008	
[]	[]	ROPS MODEL No.	MAXIMUM OPERATING MASS
		[]	ROPS [] kg
<p>THIS PROTECTIVE STRUCTURE COMPLIES WITH THE STANDARD PROVIDED THAT IT IS PROPERLY EQUIPPED ON THE MACHINE AND THE MASS IS LESS THAN THE SPECIFIED MAXIMUM OPERATING MASS.</p> <p> Hitachi Construction Machinery Co., Ltd. 650, Kandatsu, Tsuchiura, Ibaraki, Japan</p>			<p>! WARNING</p> <p>• ANY ALTERATION OR MODIFICATION TO THIS STRUCTURE VOIDS THE CERTIFICATION.</p> <p>• ALWAYS WEAR SEAT BELT WHEN MOVING.</p>

SS-3474

SAFETY SIGNS

All safety signs and their locations affixed on the machine are illustrated in this group. Make sure of the contents described in the safety signs through reading actual ones affixed on the machine to ensure safe machine operation. Always keep the safety signs clean. In case a safety sign is broken or lost, immediately, obtain a new replacement and affix it again in position on the machine. Use the part No. indicated under the right corner of each safety sign illustration when placing an order of it to the Hitachi dealer.

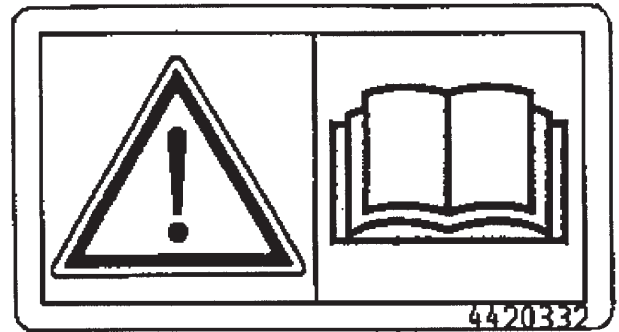


SAFETY SIGNS

1.

WARNING!

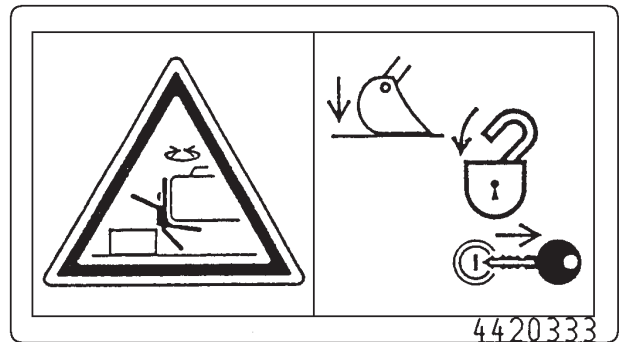
Prior to operation, maintenance, disassembling, and transportation of the machine, be sure to read and understand the Operator's Manual.



SS4420332

2.

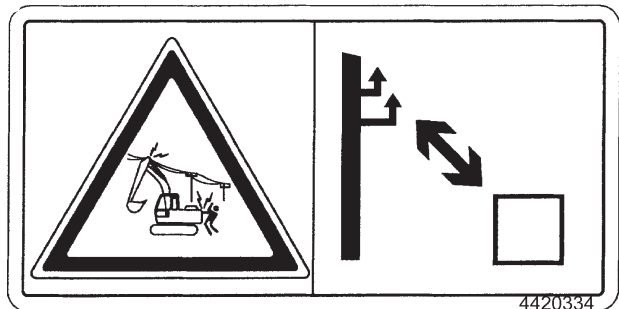
If the parked machine is unexpectedly moved, serious injury or death due to crushing may result. Be sure to lower the front attachment to the ground, lock the control levers, and remove the engine key before leaving the machine unattended.



SS4420333

3.

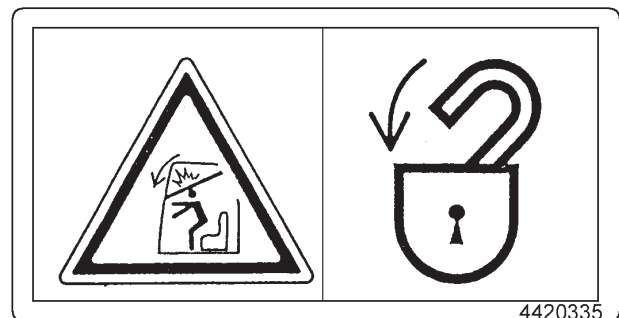
Sign indicates an electrocution hazard if machine is brought too near electric power lines. Keep a safe distance from electric power lines.



SS4420334

4.

Sign indicates a hazard from falling window. After raising window, be sure to lock it in place with lock pins.

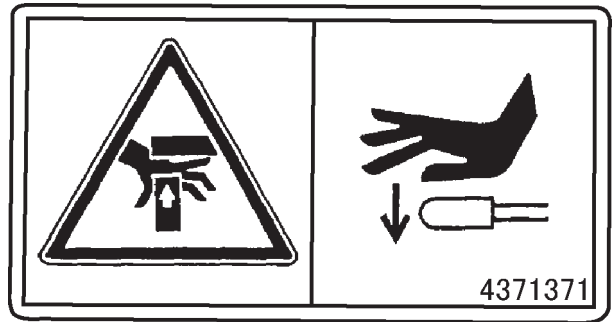


SS4420335

SAFETY SIGNS

5.

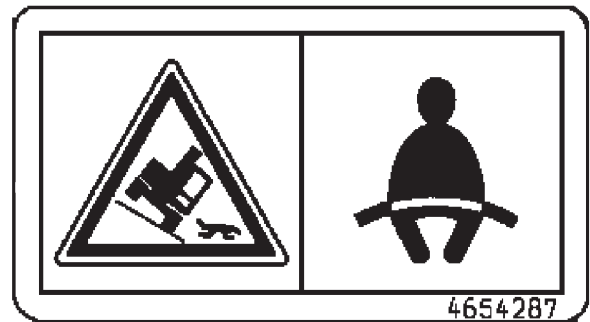
When moving the seat height/tilt lever downward, press the lever grip with a palm from the top side. Do not grasp the lever grip to operate the lever, possibly resulting in pinch of your fingers into the seat stand.



SS4371371

6.

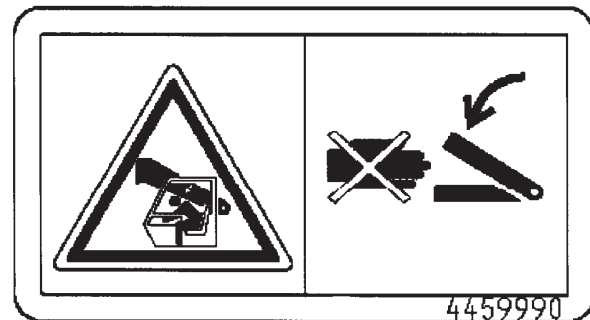
If the machine should overturn, the operator may become injured and/or throw from the cab and/or crushed by the overturning machine.



SS4654287

7.

Do not extend your hands or head from the window. Your hands or head may come in contact with the boom. Keep away from machine during operation.



SS4459990

8.

Sign indicates a hazard of being hit by the working device of the machine. Keep away from machine during operation.

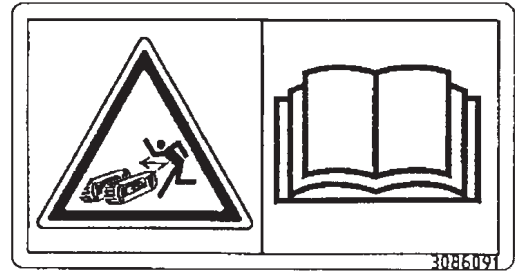


SS3089581

SAFETY SIGNS

9.

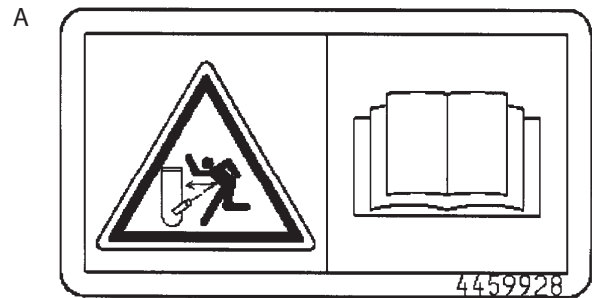
Sign indicates a hazard of a flying plug from track adjuster that could cause injury.
Read manual before adjusting track for safe and proper handling.



SS3086091

10.

Sign indicates a burn hazard from compressed air and spurting hot oil if the oil inlet is uncapped during or right after operation.
Read manual for safe and proper handling.



SS4459928

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



SS4420336

11.

Sign indicates a hazard of falling.
Do not stand on this place.



SS3092126

SAFETY SIGNS

12.

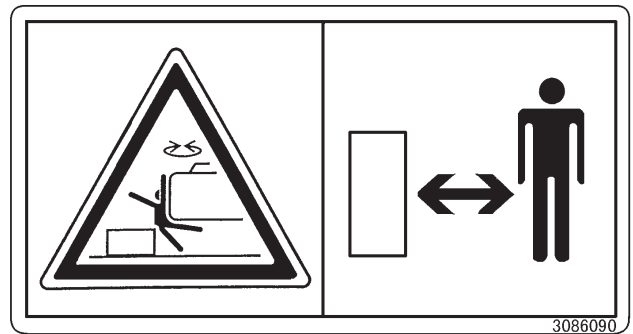
Sign indicates a hazard of falling off the fender or hood.
Never stand close to the edge.



SS3092125

13.

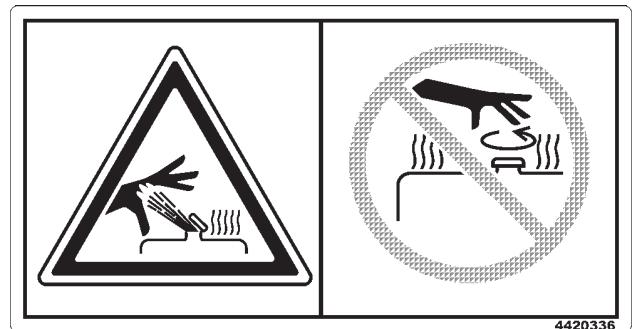
Sign indicates a crush hazard by rotation of upper structure of the machine.
Keep away from swinging area of machine.



SS3086090

14.

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

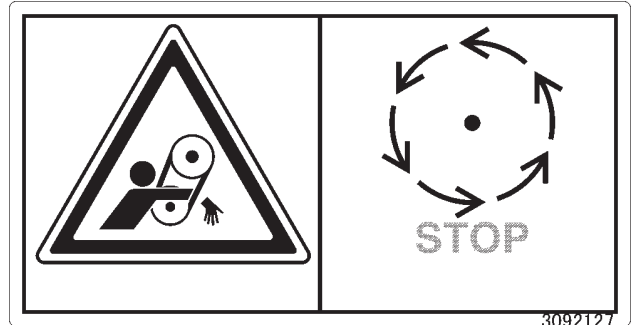


SS4420336

SAFETY SIGNS

15.

Sign indicates a hazard of rotating parts, such as belt.
Turn off before inspection and maintenance.



3092127

SS3092127



YA00008776

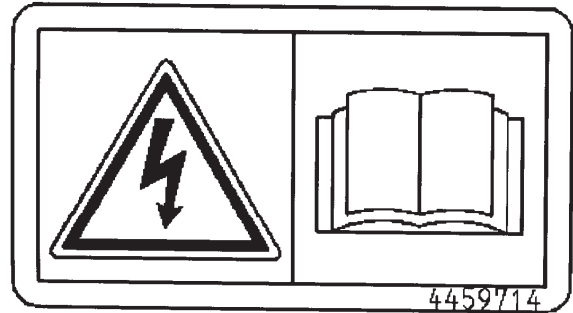
SSYA00008776

SAFETY SIGNS

16.

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

A



SS4459714

Sign indicates an explosion hazard.
Keep fire and open flames away from this area.

B



SS4460067

Skin contact with electrolyte will cause burns. Splashed electrolyte into eyes will cause blindness. Take care not to touch electrolyte.

C



SS4460056

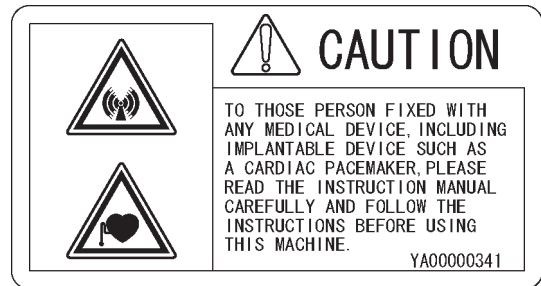
17.



SS4467093

SAFETY SIGNS

18.



SSYA00000341

19.

WARNING

IT CONTAINS NITROGEN UNDER HIGH PRESSURE.

DON'T ALLOW FIRE OR HEAT NEAR IT. DON'T TRY TO DISASSEMBLE IT.

WEAR EYE PROTECTION AND CAREFULLY DRILL A HOLE AT THE POINT MARKED \times TO RELEASE GAS PRESSURE BEFORE DISPOSAL.

WARNING

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WEAR EYE PROTECTION AND CAREFULLY DRILL A HOLE AT THE POINT MARKED \otimes TO RELEASE GAS PRESSURE BEFORE DISPOSAL.

SS-3212

20.

Communication terminal can cause accidental bombing at the blasting site. Keep the machine apart from the blasting site and an electric detonator to maintain a safe distance.

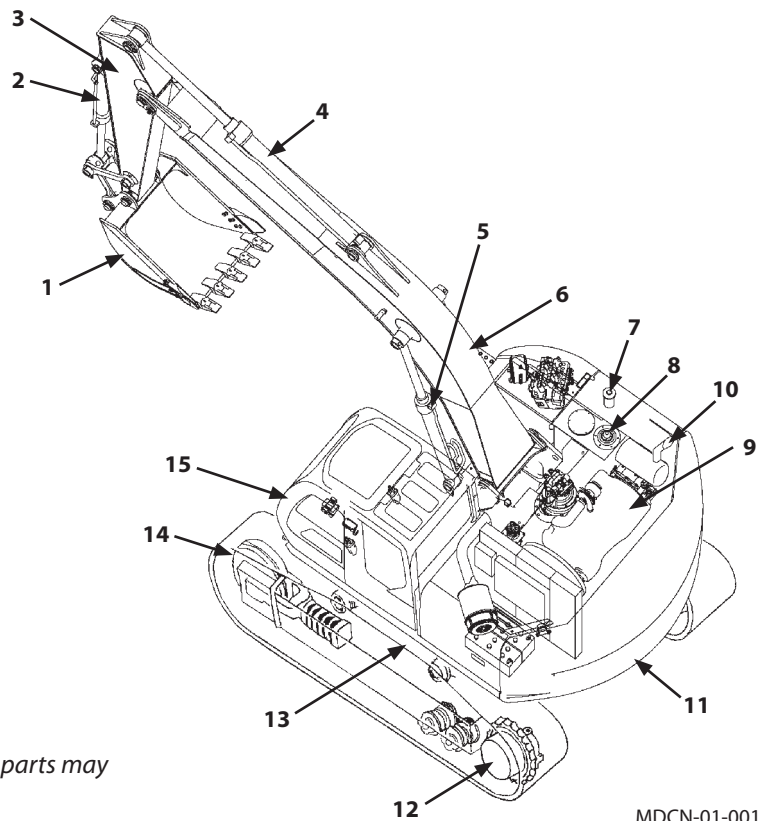



SSYA00040417

COMPONENTS NAME

Components Name

- 1- Bucket
- 2- Bucket Cylinder
- 3- Arm
- 4- Arm Cylinder
- 5- Boom Cylinder
- 6- Boom
- 7- Fuel Tank
- 8- Hydraulic Oil Tank
- 9- Engine
- 10- Muffler Filter
- 11- Counterweight
- 12- Travel Device
- 13- Track
- 14- Front Idler
- 15- Cab



 **NOTE:** A typical model is shown in the right. Some parts may differ depending on the model of the machine.

MDCN-01-001

GETTING ON/OFF THE MACHINE

Getting ON/OFF the Machine

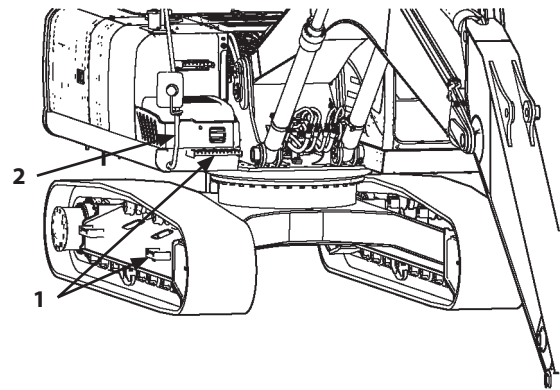
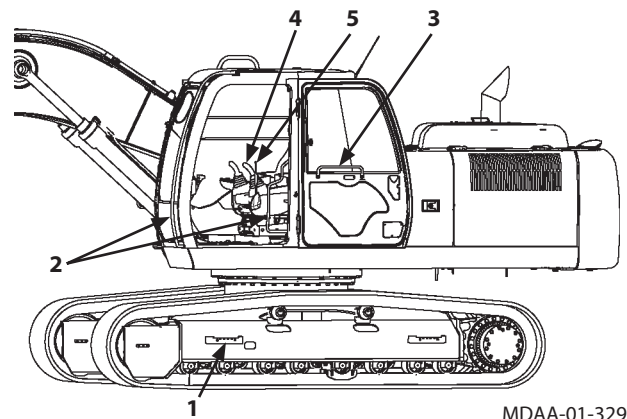
Foot holds (1) and handrails (2) are provided in and around the machine.

These are used to get on and off the cab safely as well as to do inspection and maintenance of the machine safely.

Never jump on or off the machine as it is very dangerous.

⚠ WARNING:

- **Never attach a wire on the foot holds (1) to lift the cab or main body or while transporting the machine on a truck or trailer as it is dangerous.**
- **The door handle (3) is not a handrail. Do not use the door handle (3) as a handrail when getting on and off the machine.**
- **Do not hold the control levers (4) or pilot control shut-off lever (5) when getting on and off the machine.**



OPERATOR'S STATION

Muffler Filter

The muffler filter removes particulate matter (PM) in the exhaust gas. The muffler filter traps PM, and it is automatically regenerated by burning PM when the set amount of PM is accumulated in the filter. Follow the instructions below to prevent the muffler filter from being damaged.

WARNING:

- **Exhaust gas from the muffler filter, exhaust piping and tail piping becomes hot during and right after engine running and filter regeneration (burning PM). Be careful not to let your skin contact with any hot gas from the exhaust piping. It may cause severe burns.**
- **If flammable object such as dead leaves or paper scraps is around the muffler, it may cause fire.**
- **Before maintaining the machine, stop the engine and make sure the engine has sufficiently cooled down in order to prevent burns.**
- **Be sure to use fuel that complies with JIS K-2204, EN-590 and ASTM D-975 which contents 15 ppm or lower sulfur. If the fuel described above is not used, exhaust gas that exceeds the regulation values may be discharged and serious problem may arise on the engine.**
- **Use only genuine Hitachi engine oil. Using engine oil other than the genuine Hitachi oil may shorten the muffler cleaning interval and increase the fuel consumption rate.**
- **Besides, using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine parts, leading to malfunction.**

OPERATOR'S STATION

- **Do not modify the machine without authorization. Never attempt to modify the air inlet and exhaust parts such as the air duct, muffler filter and the exhaust outlet. Also never attempt to disassemble the muffler filter. Avoid giving shocks on the muffler filter by striking elements with other objects or dropping the elements. Failure to do so may affect the exhaust gas purifying device, possibly damaging it or lowering its performance.**
- **PM combustion may generate white smoke during muffler filter regeneration. Do not attempt to do muffler filter manual regeneration in a badly ventilated indoors.**

 NOTE:

- *The muffler filter traps PM, and it is automatically regenerated by burning PM when the set amount of PM is accumulated in the filter. It is called auto-regeneration. The auto-regeneration is performed at random times depending on the machine operating condition. The auto-regeneration may start during operation of the machine; you can continue to operate the machine. (refer to 1-23)*
- *Turning the pilot control shut-off lever to LOCK position while performing auto-regeneration may change the engine sound and may increase the engine speed, this is not a malfunction.*
- *Do not stop the engine during regeneration unless absolutely necessary.*
- *The auto-regeneration may be terminated depending on the machine operating condition. At this time, the muffler filter regeneration request indicator will be lit. This mark indicates that the muffler filter manual regeneration is required. Perform manual regeneration following the specified procedure. (refer to 1-25)*
- *Usually, auto-regeneration starts 8 hours after the previous regeneration. (either auto or manual) The auto-regeneration is performed at random times depending on the machine operating condition.*

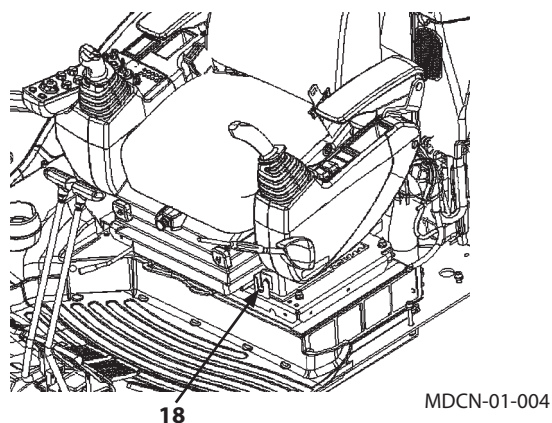
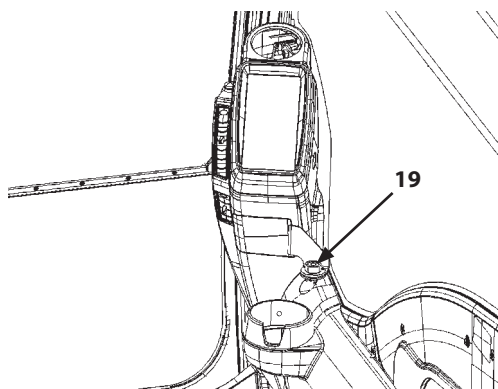
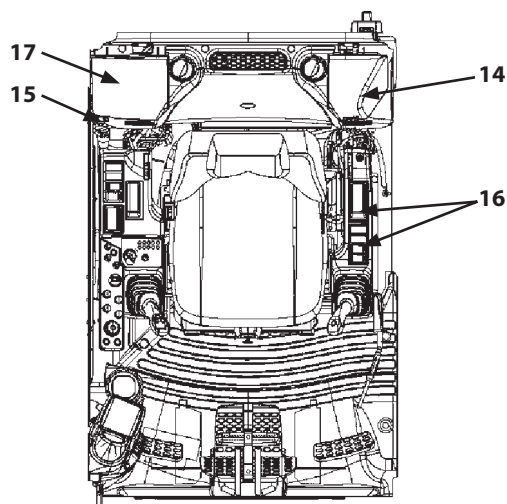
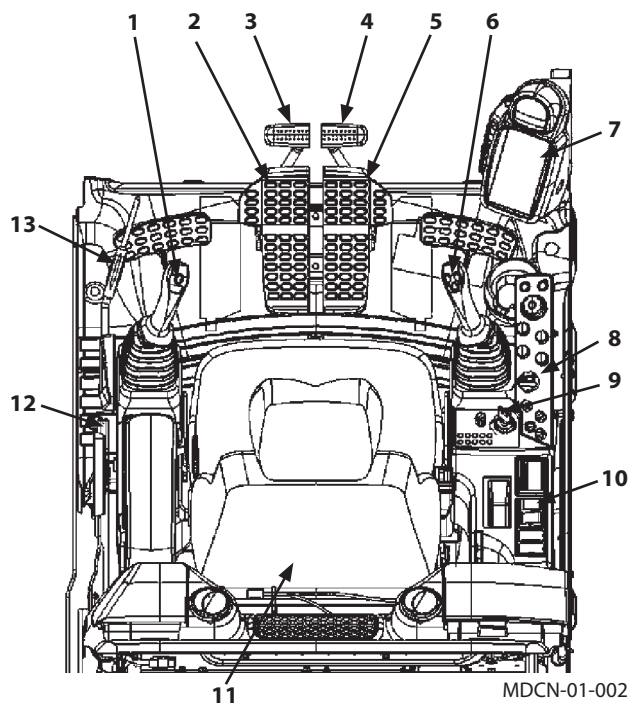
OPERATOR'S STATION

- *If the previous regeneration is not completed, the muffler filter regeneration request will be lit on the monitor after 10 hours and 30 minutes from the previous one. (refer to 1-24) 12 hours after the previous regeneration, the muffler filter regeneration request alarm flashes on the monitor (refer to 1-24), the engine power derates and the buzzer sounds interruptedly. Perform manual regeneration following the specified procedure in this case. (refer to 1-25)*
- *When the machine is operated without performing manual regeneration, the muffler filter may be damaged. Immediately move the machine to a safe area and perform manual regeneration.*
- *When approximately 13 hours has passed from the previous regeneration without manual regeneration being carried out, the muffler filter alarm and the engine trouble alarm will be displayed on the monitor, and the buzzer sounds (refer to 1-24). Consult your authorized dealer for repairing the muffler filter in this case.*
- *Both auto and manual regenerations restore muffler filter function. It is not a malfunction.*
- *If auto-regeneration interval becomes shorter, consult your authorized dealer.*
- *White smoke may occur for several minutes after the engine start, this is not a malfunction.*

OPERATOR'S STATION

Cab Features (Std. Model)

- 1- Left Control Lever/Horn Switch
- 2- Left Travel Pedal
- 3- Left Travel Lever
- 4- Right Travel Lever
- 5- Right Travel Pedal
- 6- Right Control Lever/Power Boost Switch
- 7- Multi Function Monitor Panel
- 8- Switch Panel
- 9- Key Switch
- 10- Regeneration Switch
- 11- Operator's Seat
- 12- Cab Door Release Lever
- 13- Pilot Control Shut-Off Lever
- 14- Fuse Box
- 15- Cigar Lighter
- 16- Switch Panel (for Optional Equipments)
- Glove Compartment (without Optional Equipments)
- 17- Glove Compartment (Hot and Cool Box)
- 18- Engine Stop Switch
- 19- Level Indicator



OPERATOR'S STATION

Multi Function Monitor

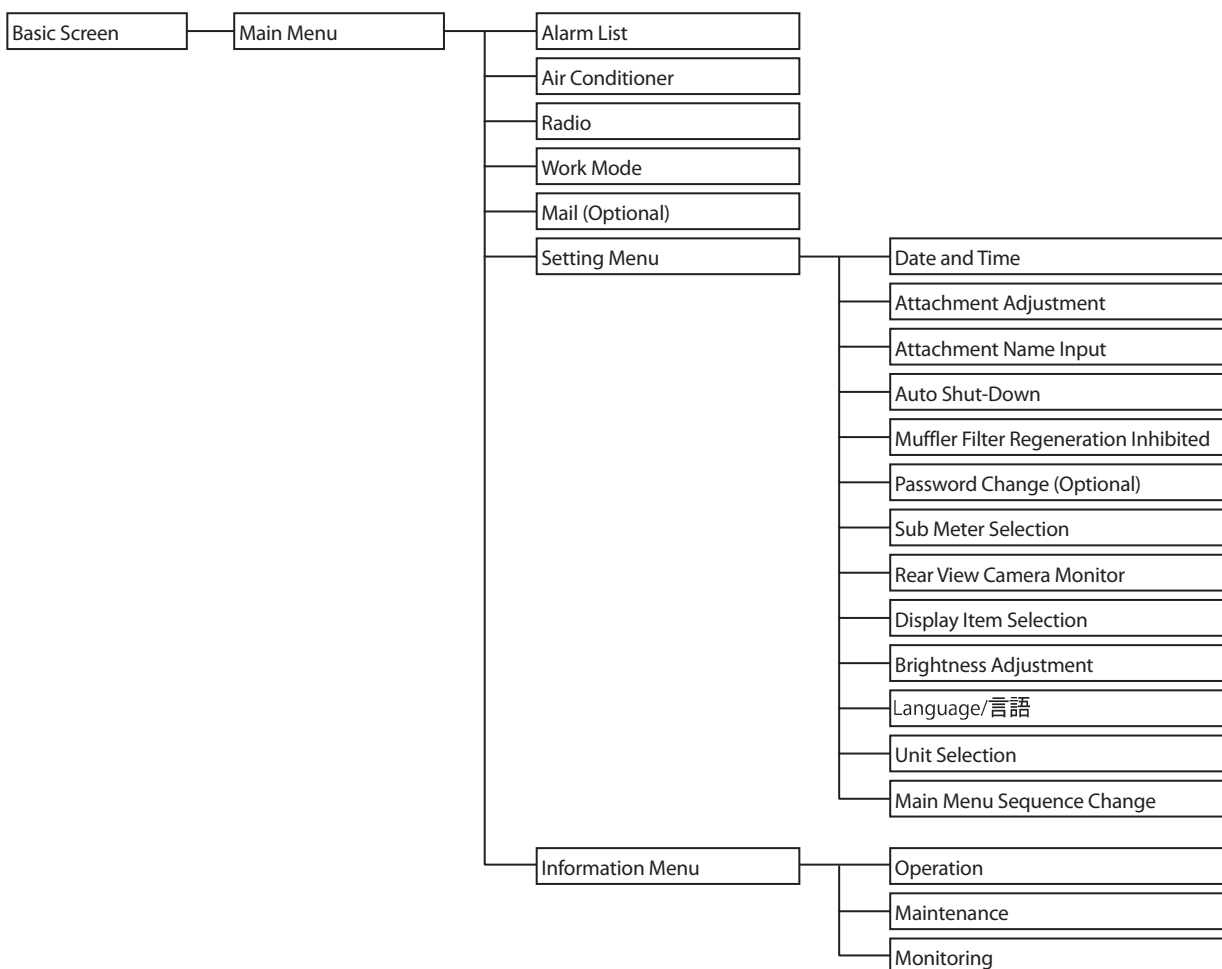
Feature

The multi function monitor displays various meters, indicators, radio and air conditioner, numeric keypad lock function, rearview camera image, work mode selection and maintenance screen.

Screen Configuration

The multi function monitor consists of the following screens.

There are 7 menus, and a further 16 sub menus.



OPERATOR'S STATION

Default Setting

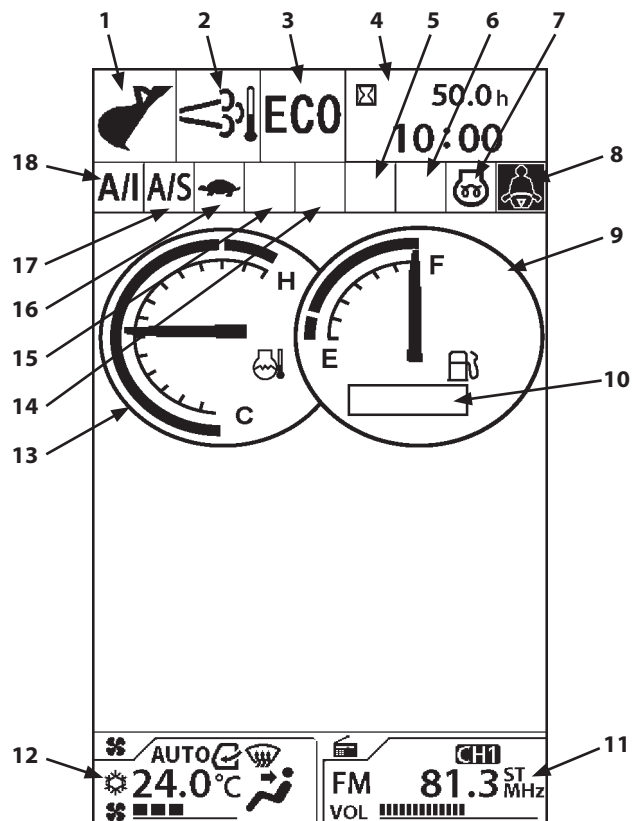
Function	Item	Default
Auto Shut-Down	ON/OFF of Auto Shut-down	OFF
	Setting Time	1 min
Muffler Filter Regeneration Inhibited	Regeneration Inhibited	OFF

 **NOTE:** Typical functions are shown in the table. Check the initial values of other functions on each monitor screen.

OPERATOR'S STATION

Basic Screen

- 1- Work Mode Display
- 2- Muffler Filter
- 3- Power Mode Display
- 4- Hour Meter, Clock
- 5- Auxiliary
- 6- Auxiliary
- 7- Preheat Display
- 8- Seat Belt Display
- 9- Fuel Gauge
- 10- Sub Meter
- 11- Radio Display
- 12- Air Conditioner Display
- 13- Coolant Temperature Gauge
- 14- Auxiliary
- 15- Overload Alarm Display (Optional)
- 16- Travel Mode Indicator
- 17- Auto Shut-Down Display
- 18- Auto-Idle Display



MDAA-01-020

OPERATOR'S STATION

How to Use Screens

Displaying Basic Screen

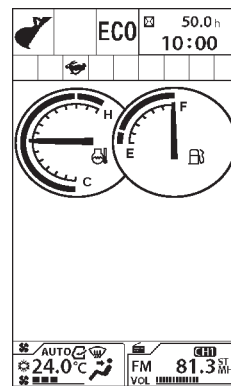
IMPORTANT: Start the engine after the basic screen is displayed.

When the key switch is turned to the ACC or ON position, the starting screen displays for about two seconds. When the key switch is kept in ACC position, only hour meter, clock and radio will be displayed. When the key switch is turned from ACC to ON position, the basic screen will be displayed.



Starting Screen

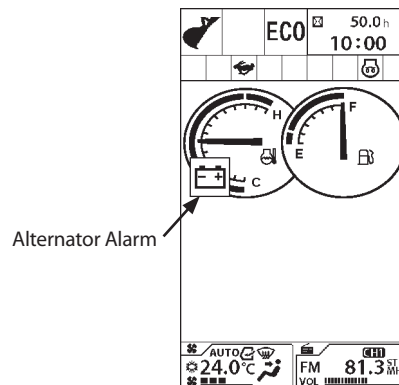
MDAA-01-003



Basic Screen

MDAA-01-001

IMPORTANT: When the key switch is turned to ON position, the alternator alarm will be displayed on the basic screen. Until the alternator starts generating power after the engine starts, the alternator alarm is displayed on the basic screen.

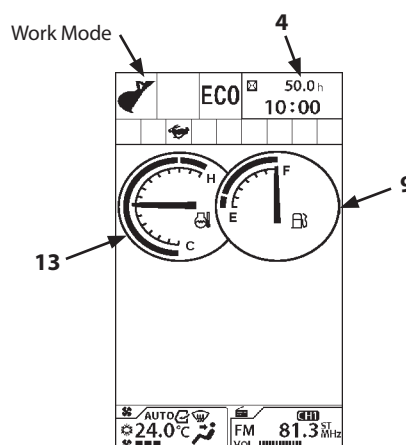


Alternator Alarm

MDAA-01-042

OPERATOR'S STATION

- Display of Meters
 - Items to be displayed
 - 4- Hour Meter, Clock
 - 9- Fuel Gauge
 - 13- Coolant Temperature Gauge
- Work Mode Display
 - The attachments being used are displayed.



MDAA-01-001

Digging Mode



Attachment Mode

Breaker



Pulverizer



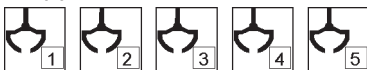
Crusher



Vibrating Hammer



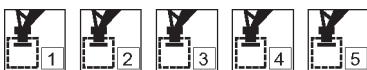
Grapple



Clamshell

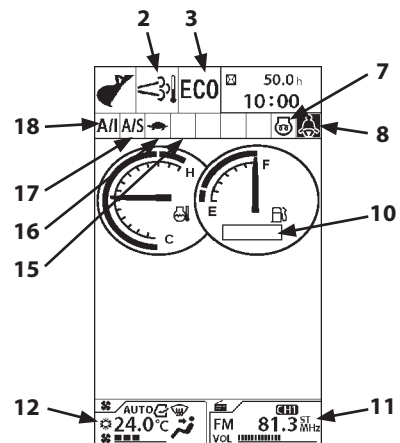


Others



OPERATOR'S STATION

- Muffler Filter Display (2)
Displays condition of the muffler filter.
- Power Mode Display (3)
Displays the power mode selected from the switch panel.
- Preheat Display (7)
While the current is being supplied to the glow plug, the indicator is displayed.
- Seat Belt Display (8)
Turns ON when the key switch is in the ON position, and turns OFF 5 seconds after the engine starts.
- Sub Meter Display (10)
Fuel consumption or breaker hour meter is displayed.
- Radio Display (11)
Displays the radio panel
- Air Conditioner Display (12)
Displays the air conditioner panel.
- Overload Alarm Display (15) (Optional)
The system measures the load of suspended load from the bottom pressure of boom cylinder. When overload is detected, an alarm is displayed.
- Travel Mode Display (16)
Displays the travel mode selected from the switch panel.
- Auto Shut-Down Display (17)
When the auto shut-down is turned ON from the menu screen, the auto shut-down display (17) displays.
When the key switch is turned ON while the auto shut-down is enabled, the auto shut-down display blinks for 10 seconds.



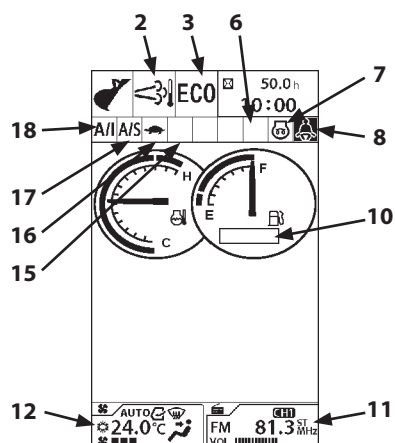
MDAA-01-286

OPERATOR'S STATION

- **Auto-Idle Display (18)**

When the auto-idle is selected from the switch panel, the auto-idle display (18) displays.

When the key switch is turned ON while the auto-idle switch is also ON, the auto-idle display blinks for 10 seconds.

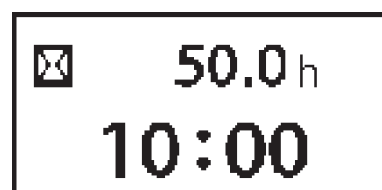


MDAA-01-286

Hour Meter

Total (accumulated) machine operation hours counted since the machine started working, are displayed in hours (h).

One digit after the decimal point indicates tenths of an hour (6 minutes).



MDAA-01-021

Clock

Indicates the present time.

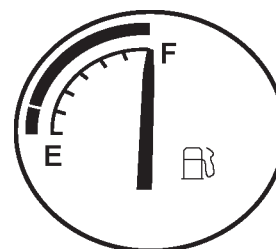
24-h/12-h display can be selected.

(Refer to "Date and Time" for switching the display mode.)

Fuel Gauge

The remaining fuel amount is indicated by the needle.

Refuel before the needle reaches "E".

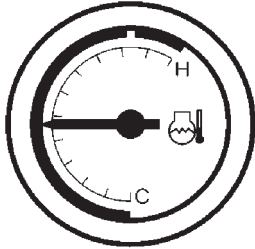


MDAA-01-276

OPERATOR'S STATION

Coolant Temperature Gauge

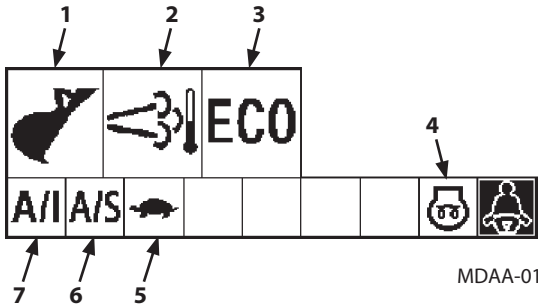
The engine coolant temperature is indicated with a needle. Normally the needle is around the center of the scale during operation.



M1U1-01-047

Operating Status Icon Display

Displays icons indicating the current status of the attachment (1) selected from the work mode selection screen, muffler filter display (2), power mode (3), preheat indicator (4), travel mode (5), auto shut-down (6) ON and auto-idle (7) ON selected from the switch panel, when these systems are activated.



MDAA-01-023

OPERATOR'S STATION


Security Functions (Optional)

Input Password

IMPORTANT:

- When required to activate the numeric keypad function, consult your nearest Hitachi dealer.
- If the password is forgotten, the machine must be modified. Be extremely careful not to forget the password.

1. Turn the key switch ON. After the starting screen is displayed, the password input screen will be displayed.
2. Input a password by using the numeric keypad.
3. The monitor unit matches the input password to the registered one. If they match, the basic screen displays. The engine is ready to run. If an incorrect password is input three times, a buzzer sounds for thirty seconds. During that time, the buzzer does not stop even if the key switch is turned ON/OFF.

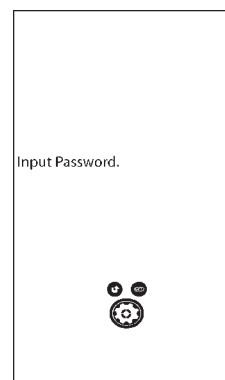
 **NOTE:** If you make a mistake while entering the password, push the CLEAR key in order to erase the entered characters.

4. After thirty seconds, if the key switch is turned to the ON position, the starting screen displays and the password input screen displays again. Then the password can be input again.
5. If an incorrect password is input again, the buzzer sounds for a further thirty seconds.



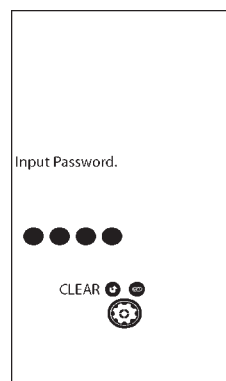
Starting Screen

MDAA-01-003

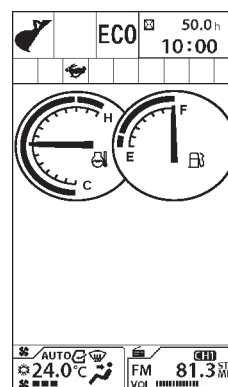


Password Input Screen

MDAA-01-085EN



MDAA-01-086EN



Basic Screen

MDAA-01-001

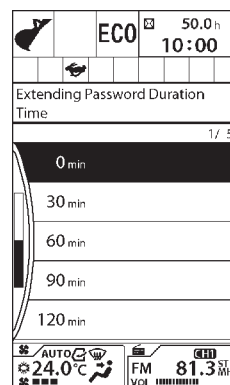
OPERATOR'S STATION

Extending Password Duration Time

IMPORTANT: This operation is applicable only to those machines that require a password.

By using the password duration screen, password duration time can be set. When restarting the machine, a password is not needed within the specified time.

1. When turning the key switch from ON to ACC position, the monitor unit displays the password duration screen for ten seconds.




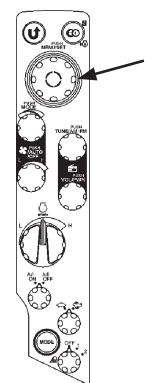
MDAA-01-087EN

Password Duration Screen (Key Switch: OFF)

2. While the password duration screen is still displayed, rotate selector knob (1) to highlight the relevant time. Pushing selector knob (1) sets the password duration time.

- Duration time 0 minute
- Duration time 30 minute
- Duration time 60 minute
- Duration time 90 minute
- Duration time 120 minute

 **NOTE:** If the password duration time is not set explicitly, a duration of 0 is assumed.



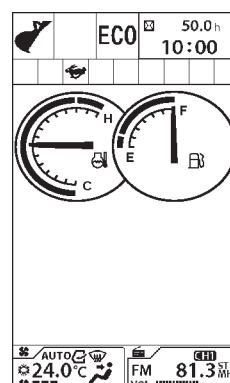
MDCD-01-026

3. If turning the key switch to the ON position within the password duration time, the monitor unit displays the basic screen after the starting screen.



Starting Screen

MDAA-01-003

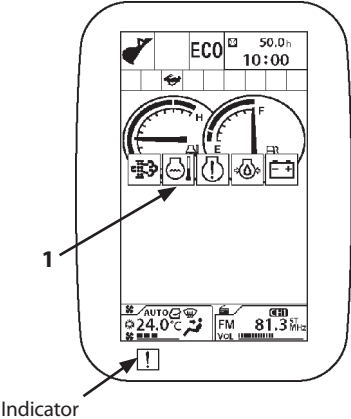


MDAA-01-001

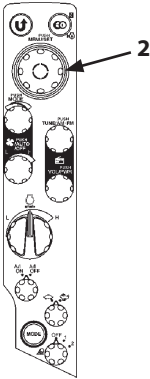
OPERATOR'S STATION

Alarm Occurrence Screen

In case any abnormality occurs, alarm marks (1) are displayed on the basic screen.
If six or more alarms are generated, the alarm marks (1) can be scrolled by rotating switch (2).



MDAA-01-316



MDCD-01-026

OPERATOR'S STATION

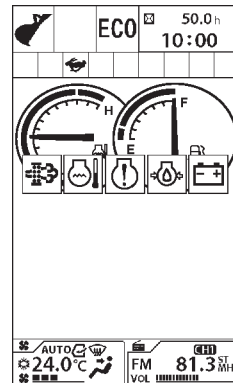
Follow the procedure below to display detailed information for an alarm.

Push selector knob (1) on the basic screen to display the main menu.

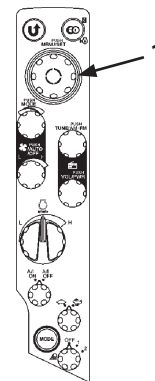
Rotate selector knob (1) to select the alarm list, and push selector knob (1).

Rotate selector knob (1) to select a required alarm from the alarm list, and push selector knob (1).

Detailed information of the selected alarm will be displayed.

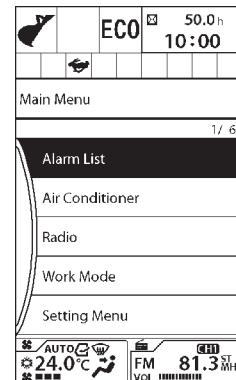


MDAA-01-004



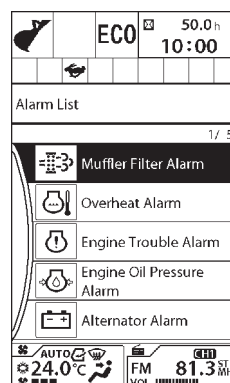
MDCD-01-026

CAUTION: The main menu displays the alarm list only when an alarm occurs.

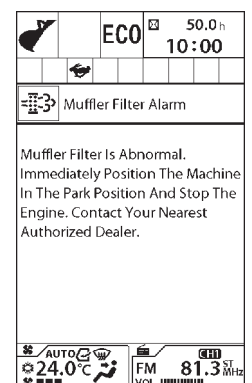


MDAA-01-077EN

CAUTION: The alarm list contains only currently generated alarms.




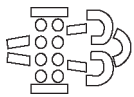
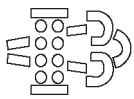
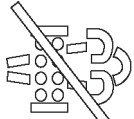
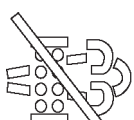


MDAA-01-078EN



MDAA-01-079EN

OPERATOR'S STATION

Remedy










Display	Contents of Alarms	Remedy
	Muffler Filter Alarm* (Blinking) (Red)	Muffler filter is abnormal. Immediately set the machine in the park position, stop the engine and contact your authorized dealer.
	Muffler Filter Regeneration Request (Blinking) (Yellow)	The muffler filter needs immediate regeneration. Otherwise damage to the filter may result. Pull the pilot control shut-off lever to the LOCK position, run the engine at slow idle speed, and turn the muffler filter switch to REGENERATION position.
	Muffler Filter Regeneration Request (Lighting) (Yellow)	The muffler filter needs regeneration. Pull the pilot control shut-off lever to the LOCK position, run the engine at slow idle speed, and turn the muffler filter switch to REGENERATION position.
	Muffler Filter Regeneration Inhibited Alarm (Lighting) (Yellow)	Regeneration is inhibited. Move the machine to a safe area, turn regeneration inhibition OFF, and perform manual regeneration.
	Muffler Filter Auto-Regeneration Inhibited Alarm (Lighting) (Yellow)	Auto-regeneration is inhibited.
	Engine Oil Level Alarm	Check engine oil level and refill oil.
	Overheat Alarm**	Engine coolant temperature has abnormally increased. Stop operation. Run the engine at slow idle speed to lower the coolant temperature.

 **NOTE:**

*Alarm mark is displayed and buzzer will sound.








**Alarm mark is displayed and buzzer will sound. Turn engine control dial to the slow idle position, and buzzer will stop.


OPERATOR'S STATION


Display	Contents of Alarms	Remedy
	Engine Trouble Alarm	Engine or engine related parts are abnormal. Contact your nearest authorized dealer.
	Engine Oil Pressure Alarm*	Engine oil pressure has decreased. Immediately stop the engine. Check the engine oil system and oil level.
	Engine Start Disabled	As the pilot control shut-off lever is lowered, the engine cannot start.
	Engine Start Disabled	As the engine emergency switch is ON, the engine cannot start.
	Boost Temperature Alarm	Engine intake air temperature has abnormally increased. Stop operation. Check intercooler for clogging and intake air piping for disconnection.
	Exhaust Temperature Alarm	Exhaust temperature is abnormally high. Stop machine operation and check the exhaust lines.
	Muffler Filter Alarm	Muffler filter is abnormal. Contact your nearest authorized dealer.
	Alternator Alarm	Electrical system is abnormal. Check alternator and battery system.
	Fuel Level Alarm	Fuel level is low. Refill fuel as soon as possible.

 NOTE: *Alarm mark is displayed and buzzer will sound.

OPERATOR'S STATION

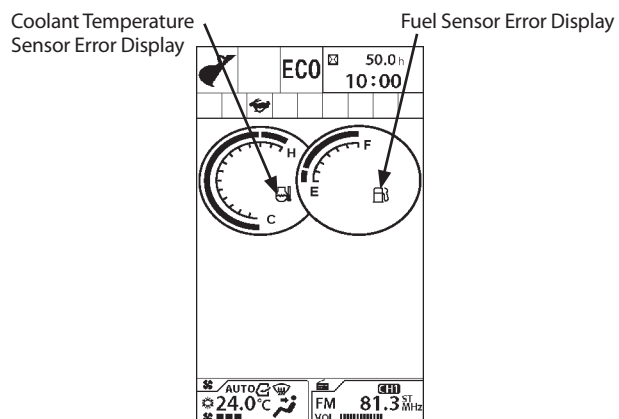
Display	Contents of Alarms	Remedy
	Fuel Temperature Alarm	Fuel temperature has abnormally increased. Stop operation. Check fuel cooler for any malfunction such as clogging.
	Hydraulic Oil Filter Restriction Alarm	The hydraulic oil filter is clogged. Replace hydraulic oil filter element.
	Air Cleaner Restriction Alarm	Air filter elements are clogged. Clean or replace air filter elements.
	Fuel Filter Restriction Alarm*	Fuel filter is clogged. Replace fuel filter element.
	System Failure Alarm	Communication system is abnormal. Contact your nearest authorized dealer.
	Pilot Control Shut-Off Lever Alarm	Pilot control shut-off lever system is abnormal. Contact your nearest authorized dealer.
	Electric Lever Alarm	Electric lever system is abnormal. Contact your nearest authorized dealer.

 **NOTE:** The hydraulic oil filter alarm lights only when the high performance element (optional) is used.

 **NOTE:** *If the indicator comes ON immediately after replacing the fuel filter, air mixed in the system during replacement may be the cause. Be sure to bleed air from the fuel system when replacing the fuel filter. (When air is bled, the indicator will go OFF.)

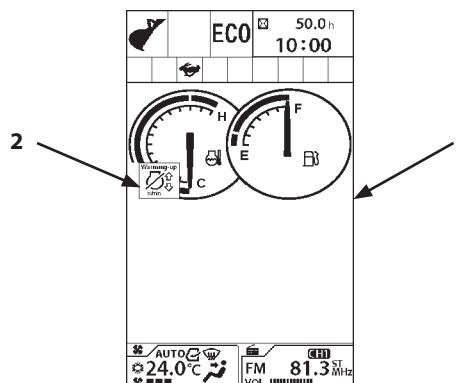
OPERATOR'S STATION

- Fuel Sensor Error Display**
 If the fuel sensor is faulty, the color of the fuel mark changes and the needle disappears. If the harness between the fuel sensor and the controller unit is broken, the needle disappears.
- Coolant Temperature Sensor Error Display**
 If the coolant temperature sensor is faulty, color of the temperature mark changes and the needle disappears. If the harness between the temperature sensor and the controller unit is broken, the needle disappears.



MDAA-01-024EN

- Engine Speed Control Display**
 Engine warming-up operation due to low coolant temperature. The engine speed can not be changed during this operation. While the time is controlling the engine speed, mark (2) is displayed on monitor (1). When the control completes, mark (2) goes OFF and the engine speed becomes adjustable.



MDAA-01-355

OPERATOR'S STATION

Muffler Filter

Muffler Filter Condition Display

Muffler Filter Display (1) displays the condition of the muffler filter.



This mark indicates that the exhaust temperature is high during the muffler filter regeneration. It lights while auto-regeneration is in process.)



NOTE:

- The auto-regeneration is performed at random times. The auto-regeneration may start during operation of the machine; you can continue to operate the machine. Turning the pilot control shut-off lever to LOCK position while performing auto-regeneration may change the engine sound and may increase the engine speed, this is not a malfunction.
- Do not stop the engine during regeneration unless absolutely necessary.

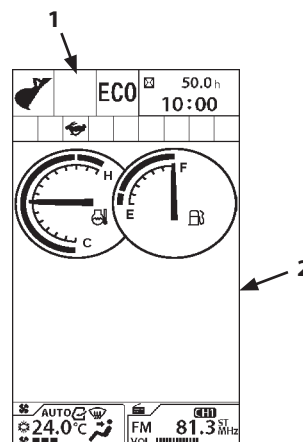
When the manual regeneration switch is pushed during the auto-regeneration process, the message "Minimal Exhaust Restriction. Exhaust Filter Cleaning Not Available." will be displayed on monitor (2).

Regeneration may not be completed according to the operating conditions of the machine. In this case, muffler filter regeneration request will be displayed on the monitor. Immediately perform manual regeneration following the procedure.



This mark indicates that the muffler filter regeneration is inhibited. Regeneration will not be performed while this mark is lit.

IMPORTANT: Set the muffler filter regeneration to inhibited while operating the machine in a flammable environment. (Refer to 1-49)



MDAA-01-001EN

OPERATOR'S STATION

Muffler Filter Manual Regeneration Request

The muffler filter needs regeneration. Usually, regeneration is performed automatically. However, manual regeneration is required depending on the conditions. In that case, marks described below may be indicated on monitor (1).



(Lighting,
Yellow)

This mark indicates that the muffler filter manual regeneration is required. Perform manual regeneration following the below procedure.



(Blinking,
Yellow)

This mark indicates that immediate muffler filter manual regeneration is required. Perform manual regeneration following the below procedure.



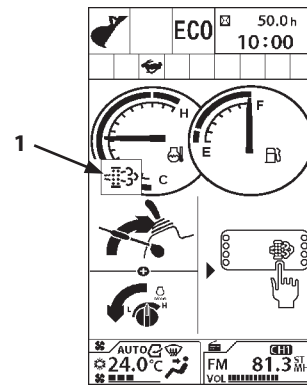
(Blinking,
Red)

This mark indicates that the muffler filter has over collected particulate matter. Immediately stop operation, park the machine in a safe location. Then, contact your nearest Hitachi dealer.



(Lighting,
Yellow)

This mark indicates that the muffler filter regeneration is inhibited. It is displayed when the manual regeneration request arises while muffler filter regeneration is inhibited. Move the machine to a safe place. Perform manual regeneration following the below procedure.



MDAA-01-005EN

IMPORTANT:

- **Manual regeneration that is performed when the muffler filter regeneration request is displayed restores muffler filter function. This is not a malfunction.**
- **If the machine is continuously operated despite the muffler filter regeneration request is displayed, muffler filter alarm and engine trouble alarm will be displayed, and the buzzer sounds. Consult your authorized dealer for repairing the muffler filter.**

OPERATOR'S STATION

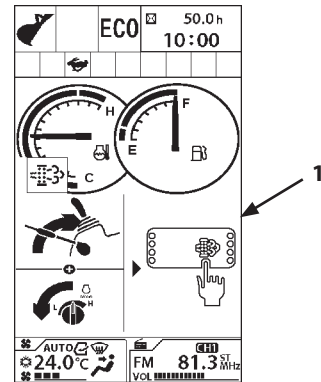
Manual Regeneration Procedure

When manual regeneration is needed, screen (1) as shown in the right will be displayed. When this screen is displayed, you need to perform manual regeneration. Before starting manual regeneration, be sure to check the following. If the rear view camera is equipped on the machine and the camera is enabled, screen (1) is displayed only when the pilot control shut-off lever is in LOCK position.

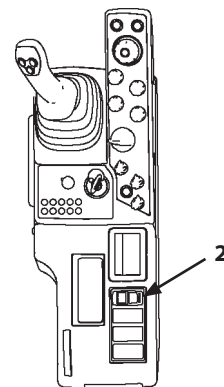
- No person is present around the machine.
 - Keep flammable objects away from the muffler.
 - Remaining fuel alarm is not lit.
1. Park the machine in a safe place. Lower the front attachment onto the ground.
 2. Pull the pilot control shut-off lever to the LOCK position.
 3. Set the engine control dial to slow idle.
 4. Push the muffler filter regeneration switch (2).
 5. When pushing the muffler filter regeneration switch, screen (3) as shown in the right will be displayed and the manual regeneration starts. Bar graph on the screen indicates progress of the regeneration process.

CAUTION: The regeneration does not start unless the pilot control shut-off lever is in the LOCK position and the engine control dial is in slow idle. When touching the pilot control shut-off lever or the engine control dial during regeneration, the regeneration process is aborted. When the process is aborted, start over again.

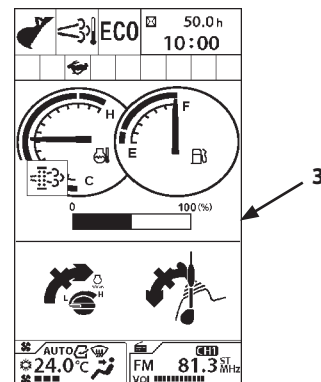
6. When the regeneration is finished, "Regeneration Has Completed." message will be displayed. If "Regeneration Has Failed." message is displayed, start over the regeneration process again. Failure of regeneration process may happen in the conditions other than above (such as malfunction of a sensor that affects regeneration at low ambient temperature).



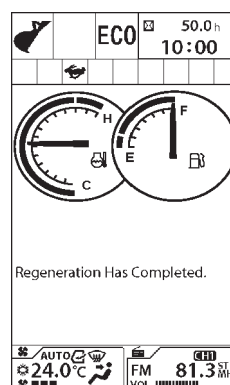
MDAA-01-005EN



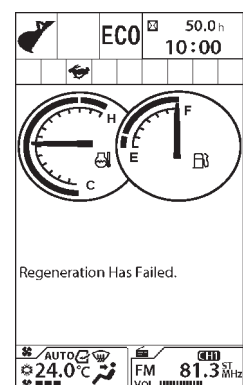
MDAA-01-330



MDAA-01-006EN



MDAA-01-083EN



MDAA-01-084EN

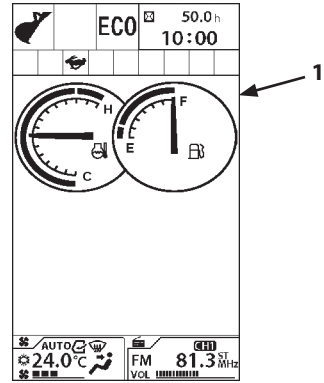
OPERATOR'S STATION

Main Menu

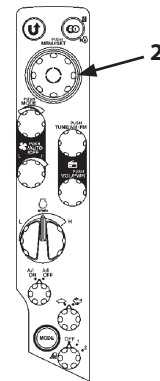
Press selector knob (2) while displaying basic screen (1) to display main menu screen (3).

The main menu screen contains the items shown in the figure to the right. The alarm list is displayed only when an alarm is generated.

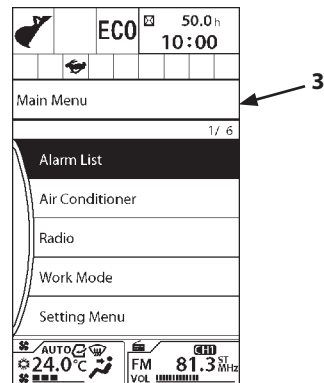
Mail (optional) menu will not be displayed unless they are set beforehand.



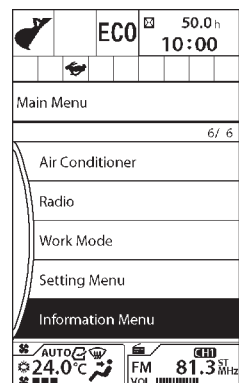
MDAA-01-001EN



MDCD-01-026



MDAA-01-077EN




MDAA-01-190EN

OPERATOR'S STATION

Air Conditioner


Most air conditioner functions are operated by using switches (3) and (4), however air vent selection and turning A/C ON and OFF are performed from the air conditioner setting screen in the menu. (Refer to the page 1-104)

Circulation Air Mode

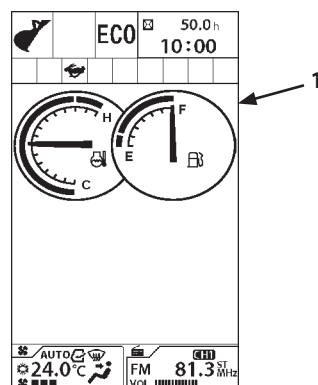
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (5).
2. Rotate selector knob (2) to highlight Air Conditioner (6).
3. Press selector knob (2) to display Air Conditioner screen (7).
Rotate selector knob (2) to highlight  (8) mark.
4. Press selector knob (2) to set the circulation mode.
5. Press selector knob (2) again to switch the fresh air mode.

Air Conditioner ON/OFF

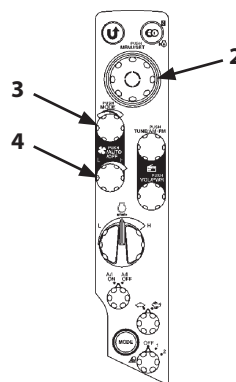
1. Rotate selector knob (2) to highlight A/C (9).
2. Press selector knob (2) to turn the air compressor ON.
3. Press selector knob (2) again to turn the air compressor OFF.

 **NOTE:** When the function is ON, the mark "■" is displayed in green. When the function is OFF, the mark "■" is displayed in gray.

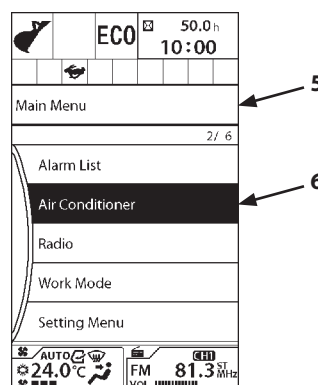
IMPORTANT: If mark (10) is displayed on the air conditioner display, communication between the air conditioner and the monitor is abnormal. Consult your nearest Hitachi dealer.



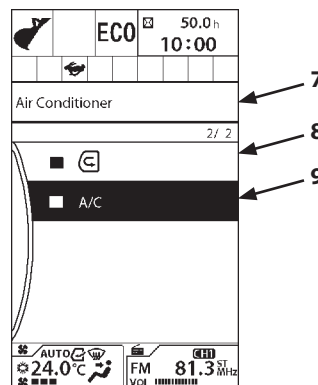
MDAA-01-001EN



MDCD-01-026



MDAA-01-089EN



MDAA-01-091EN



MDAA-01-226

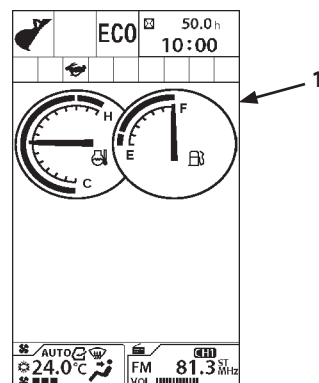
OPERATOR'S STATION

Radio

Most radio functions are operated by using switches (3) and (4), however memory channel setting, seek function, TONE adjustment, and AUTO PRESET are done at the radio screen in the main menu.

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (5).
2. Rotate selector knob (2) to highlight Radio (6).
3. Press selector knob (2) to display the radio screen.

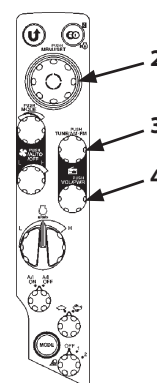
(Refer to the page 1-112)



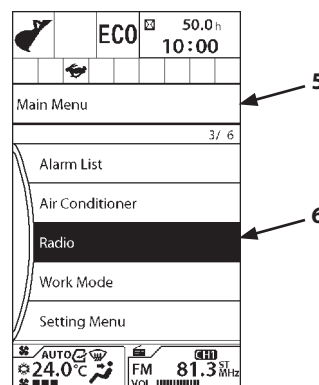
MDAA-01-001EN

IMPORTANT: If mark (7) is displayed on the radio display, communication between the radio and the monitor is abnormal. Consult your nearest Hitachi dealer.

Press the numeric keypad of 1 to 8 while the radio is ON, the radio station will switch to memorized channel of 1 to 8. (Refer to 1-93 and 1-113)



MDCD-01-026



MDAA-01-092EN



MDAA-01-227

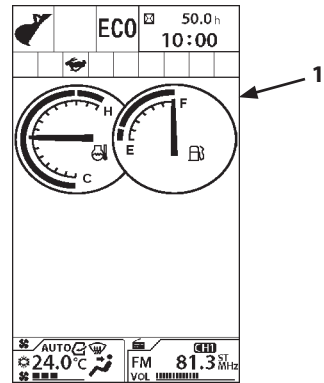
OPERATOR'S STATION

Work Mode

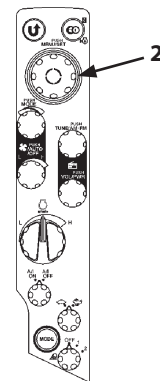
Front attachment is selected in the Work Mode screen under the Work Mode menu in the main menu.

Attachment Selection

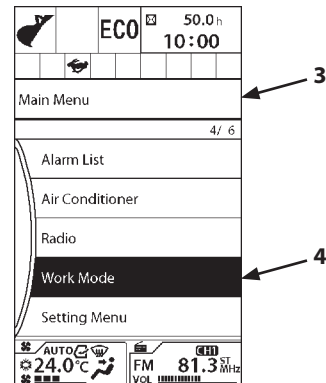
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Work Mode (4).
3. Press selector knob (2) to display Work Mode screen (5).
4. Rotate selector knob (2) to highlight the desired front attachment. (In the right example, "Bucket" is highlighted.)
5. Press selector knob (2) to enable the changes.



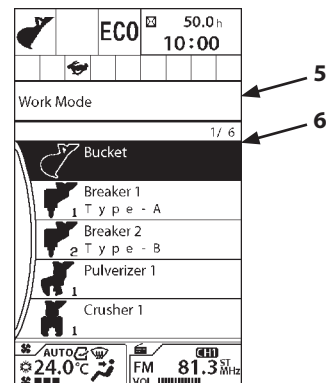
MDAA-01-001EN



MDCD-01-026



MDAA-01-100EN



MDAA-01-101EN

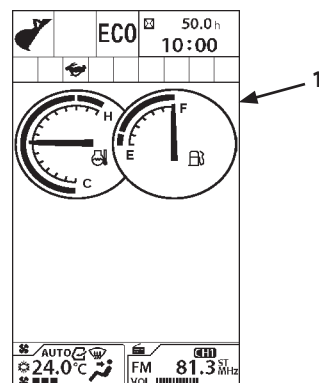
OPERATOR'S STATION

Mail (Optional)

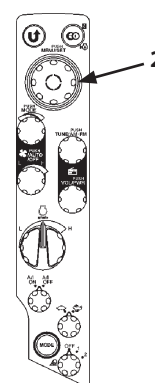
IMPORTANT: This function is available only to a machine equipped with a communication terminal. When using the mail function, consult your nearest Hitachi dealer.

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Mail (4).
3. Press selector knob (2) to display Mail screen (5).
4. Rotate selector knob (2) to highlight desired request.
5. Press selector knob (2) to send mail information to the communication terminal.

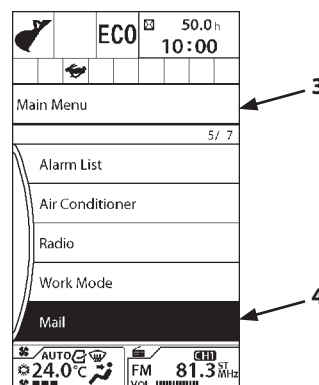
- General Request
- Fuel Replenishment Request
- Service Maintenance Request
- Forwarding Request



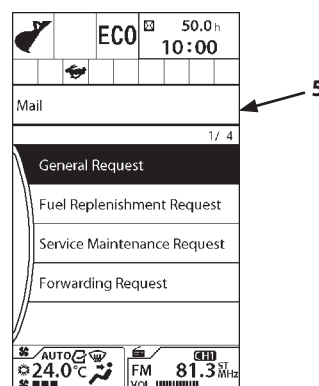
MDAA-01-001EN



MDCD-01-026



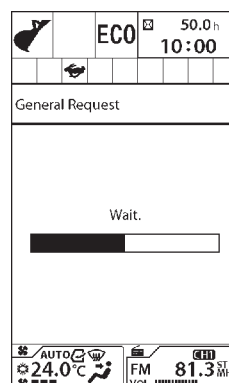
MDAA-01-109EN



MDAA-01-110EN

OPERATOR'S STATION

6. While mail information is sent to the communication terminal, the message "Wait." is displayed on the screen.

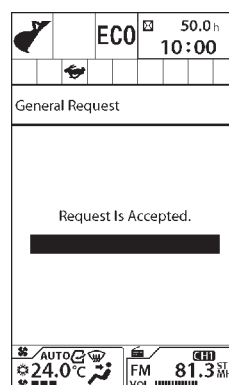


MDAA-01-111EN


7. When the communication terminal completes receiving mail information, the message "Request Is Accepted." is displayed on the screen.


Push the back key to return to the Mail screen.

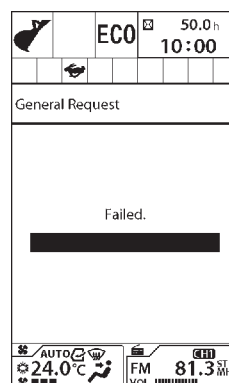
8. Then, a mail is sent from the communication terminal to the central server.



MDAA-01-112EN

 **NOTE:** Depending on the machine's operating environment, the mail may not be sent.

 **NOTE:** When the communication terminal could not receive the mail, the message "Failed." is displayed on the screen.



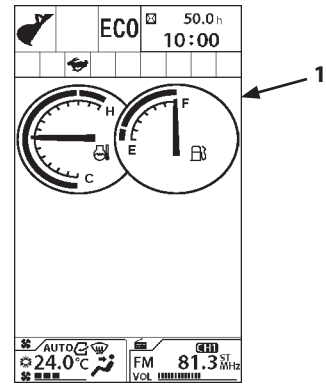
MDAA-01-113EN

OPERATOR'S STATION

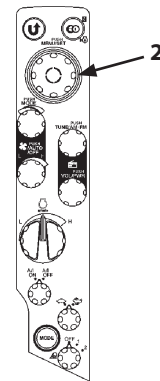
Setting Menu

Setting menu consists of date and time setting, attachment adjustment, attachment name, auto shut-down setting, change password, selecting sub meter, brightness adjustment of back monitor and screen.

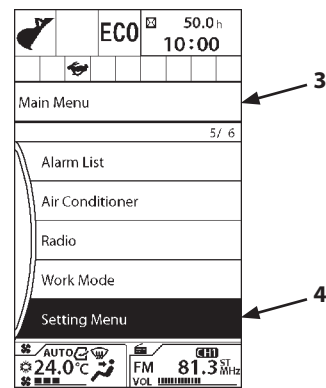
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).



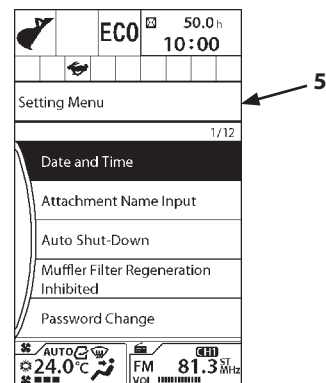
MDAA-01-001EN



MDCD-01-026



MDAA-01-114EN



MDAA-01-115EN

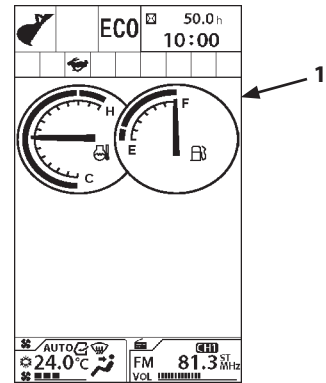
OPERATOR'S STATION

Date and Time

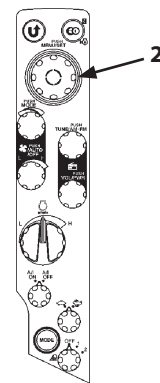
Time, date and display mode can be set on this screen. Year-month-day format and 24h/12h display mode are selected in the display setting.

Time Adjustment

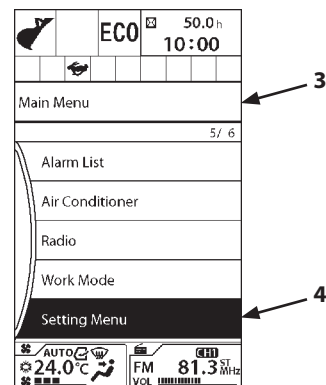
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Date and Time (6).



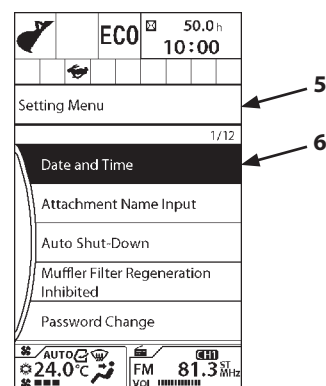
MDAA-01-001EN



MDCD-01-026



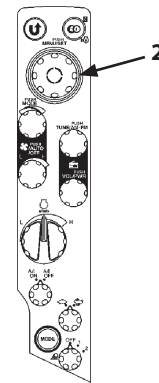
MDAA-01-114EN



MDAA-01-115EN

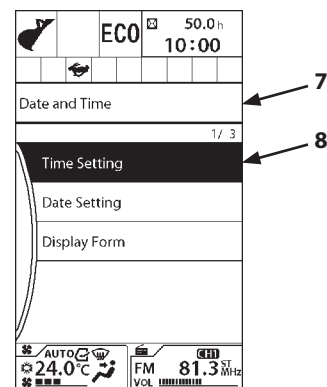
OPERATOR'S STATION

5. Press selector knob (2) to display Date and Time screen (7).



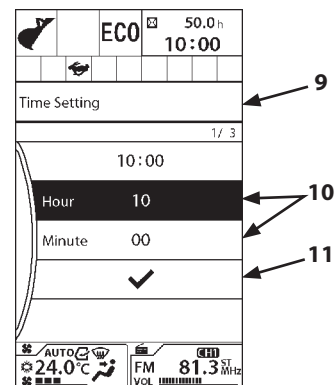
MDCD-01-026

6. Rotate selector knob (2) to highlight Time Setting (8).
7. Press selector knob (2) to display Time Setting screen (9).

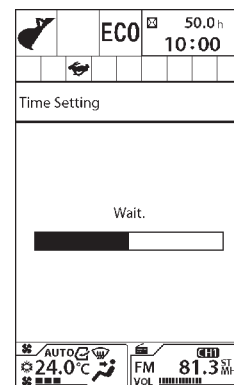


MDAA-01-117EN

8. Rotate selector knob (2) to highlight Hour or Minute and push selector knob (2).
9. Rotate selector knob (2) to adjust the clock. Rotate clockwise to adjust the number upwards, and counterclockwise to decrease it..
10. Push selector knob (2) to end the Time setting procedure.
11. Rotate selector knob (2) to highlight ✓ (11). Push selector knob (2) to make the change.



MDAA-01-118EN

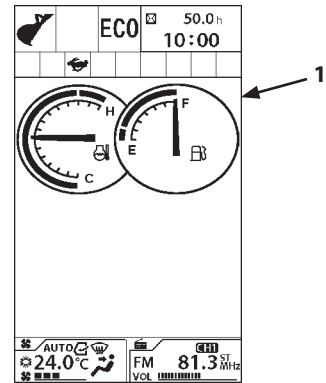


MDAA-01-121EN

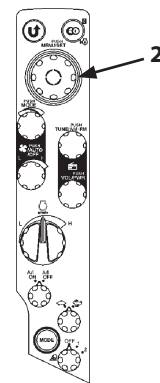
OPERATOR'S STATION

Date Adjustment

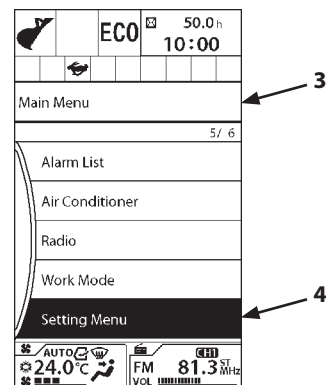
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Date and Time (6).



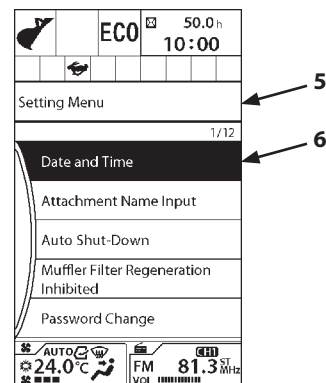
MDAA-01-001EN



MDCD-01-026



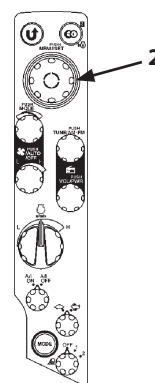
MDAA-01-114EN



MDAA-01-115EN

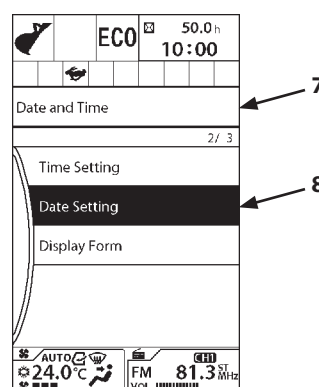
OPERATOR'S STATION

5. Press selector knob (2) to display Date and Time screen (7).



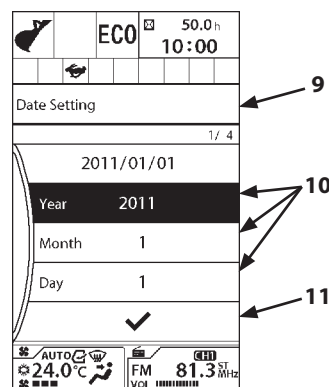
MDCD-01-026

6. Rotate selector knob (2) to highlight Date Setting (8).
7. Press selector knob (2) to display Date Setting screen (9).

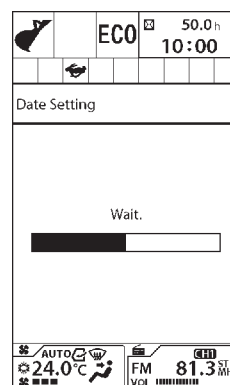


MDAA-01-122EN

8. Rotate selector knob (2) to highlight Year, Month or Day and push selector knob (2).
9. Rotate selector knob (2) to adjust the date. Rotate clockwise to adjust the number upwards, and counterclockwise to decrease it.
10. Push selector knob (2) to end the date setting procedure.
11. Rotate selector knob (2) to highlight ✓ (11). Push selector knob (2) to make the change.



MDAA-01-123EN

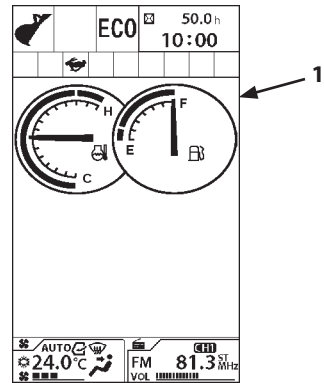


MDAA-01-127EN

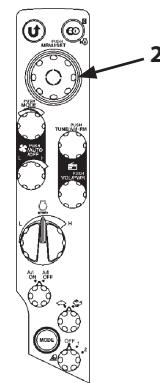
OPERATOR'S STATION

Display Mode Setting

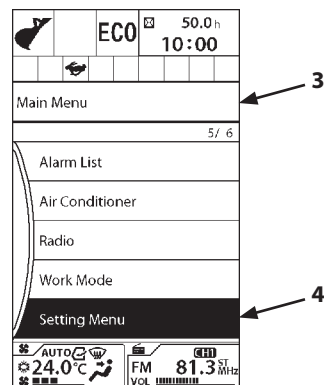
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Date and Time (6).



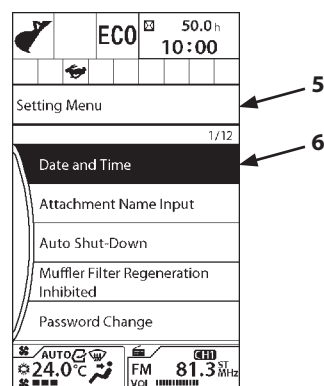
MDAA-01-001EN



MDCD-01-026



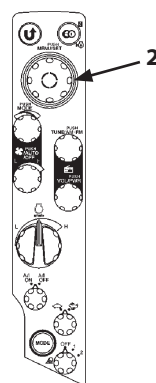
MDAA-01-114EN



MDAA-01-115EN

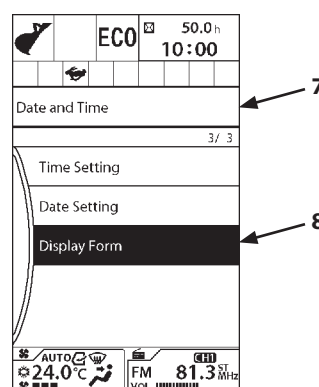
OPERATOR'S STATION

5. Press selector knob (2) to display Date and Time screen (7).



MDCD-01-026

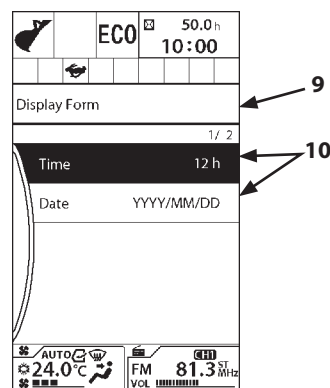
6. Rotate selector knob (2) to highlight Display Form (8).



MDAA-01-228EN

7. Press selector knob (2) to display Display Form screen (9).
8. Rotate selector knob (2) to highlight Date (10) and push selector knob (2).

Time : Each time selector knob (2) is pushed, the time format is changed as follows: 12 h → 24 h → 12 h.
 Date : Each time selector knob (2) is pushed, the date format is changed as follows: YYYY/MM/DD → MM/DD/YYYY → DD/MM/YYYY → YYYY/MM/DD.



MDAA-01-229EN



MDAA-01-230EN



MDAA-01-231EN



MDAA-01-232EN



MDAA-01-233EN



MDAA-01-234EN

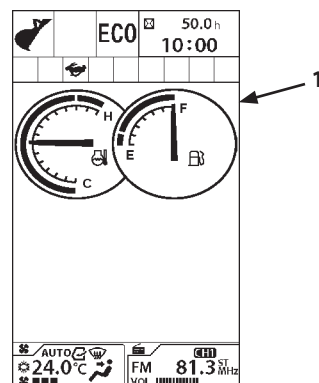
OPERATOR'S STATION

Attachment Adjustment

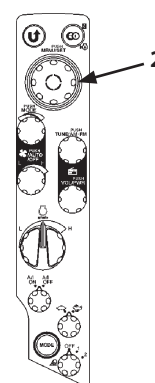
The supply flow rate to an attachment, the operational priority for combined operation of an attachment and arm roll-in/arm roll-out can be adjusted on the Attachment Adjust screen. The attachment adjustment can be done when the work mode is set to an attachment other than the bucket. Select an attachment other than the bucket on the work mode screen. (Refer to "Work Mode".)

Flow Rate Adjustment

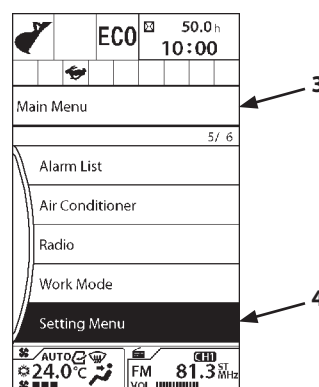
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Attachment Adjustment (6).



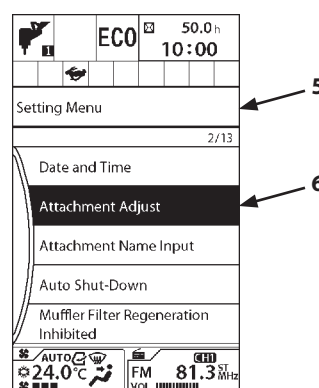
MDAA-01-001EN



MDCD-01-026



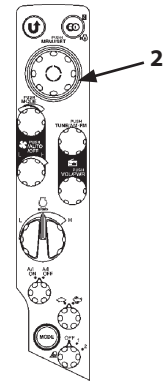
MDAA-01-114EN



MDAA-01-128EN

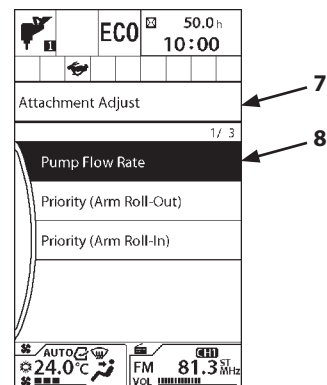
OPERATOR'S STATION

5. Press selector knob (2) to display Attachment Adjustment screen (7).



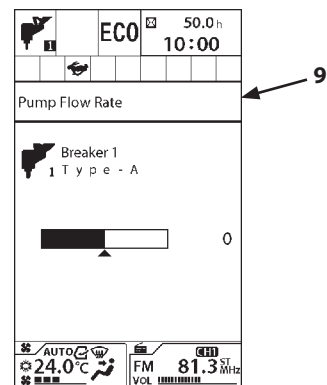
MDCD-01-026

6. Rotate selector knob (2) to highlight Pump Flow Rate (8).



MDAA-01-129EN

7. Press selector knob (2) to display Pump Flow Rate screen (9).
8. Rotate selector knob (2) clockwise or counterclockwise to adjust the pump flow rate.



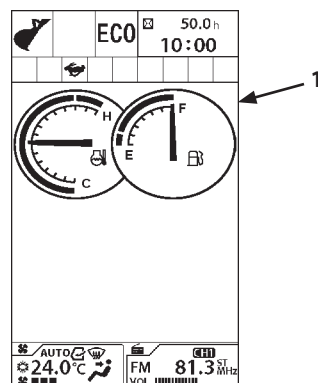
MDAA-01-130EN

OPERATOR'S STATION

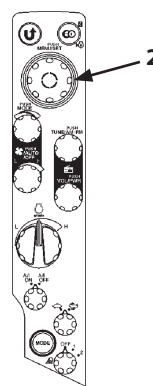
Priority (arm roll-out)

Select an attachment other than the bucket on the work mode screen. (Refer to 1-29)

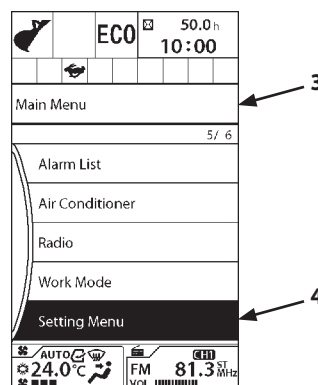
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Attachment Adjustment (6).



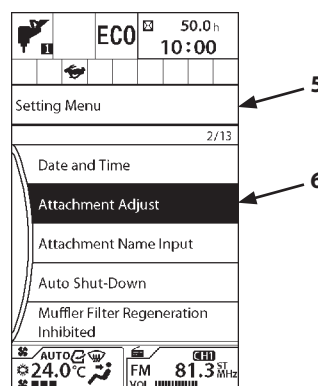
MDAA-01-001EN



MDCD-01-026



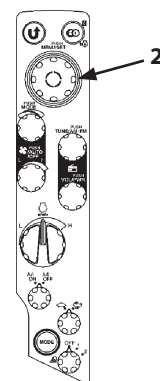
MDAA-01-114EN



MDAA-01-128EN

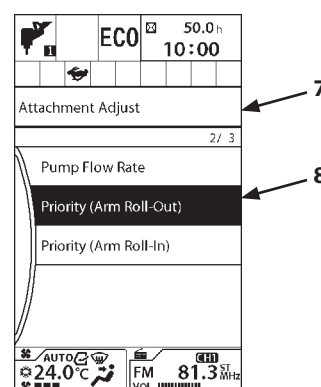
OPERATOR'S STATION

- Press selector knob (2) to display Attachment Adjustment screen (7).



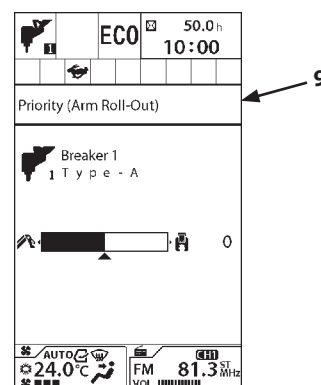
MDCD-01-026

- Rotate selector knob (2) to highlight Priority (Arm Roll-Out) (8).



MDAA-01-235EN

- Press selector knob (2) to display Priority (Arm Roll-Out) screen (9).
- Rotate selector knob (2) clockwise to increase flow rate to the attachment. Rotate selector knob (2) counterclockwise to increase flow rate to the arm roll-out circuit.



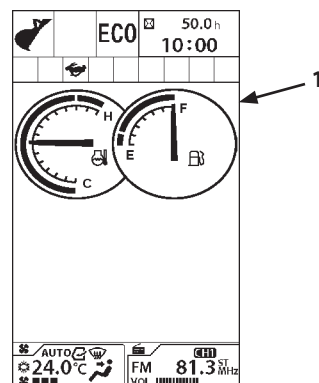
MDAA-01-132EN

OPERATOR'S STATION

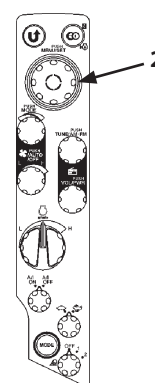
Priority (arm roll-in)

Select an attachment other than the bucket on the work mode screen. (Refer to 1-29)

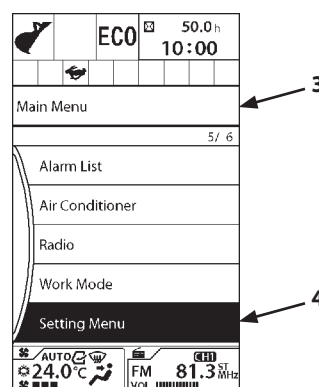
1. Press selector knob (2) while displaying basic screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Attachment Adjustment (6).



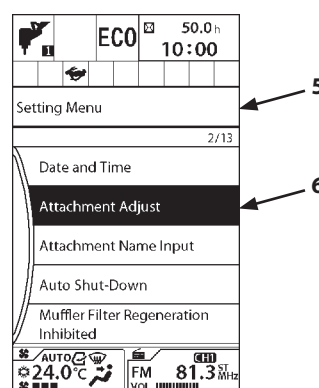
MDAA-01-001EN



MDCD-01-026



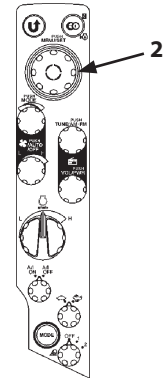
MDAA-01-114EN



MDAA-01-128EN

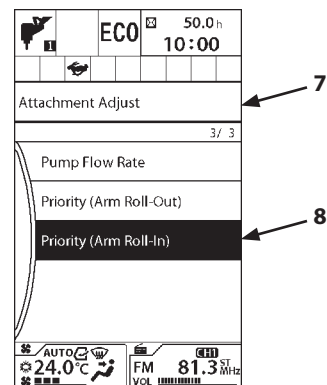
OPERATOR'S STATION

- Press selector knob (2) to display Attachment Adjustment screen (7).



- Rotate selector knob (2) to highlight Priority (Arm Roll-In) (8).

MDCD-01-026

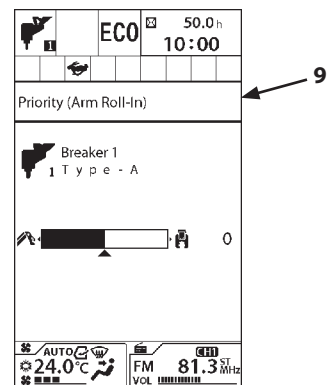


- Press selector knob (2) to display Priority (Arm Roll-In) screen (9).

MDAA-01-236EN

- Rotate selector knob (2) clockwise to increase flow rate to the attachment.

Rotate selector knob (2) counterclockwise to increase flow rate to the arm roll-in circuit.



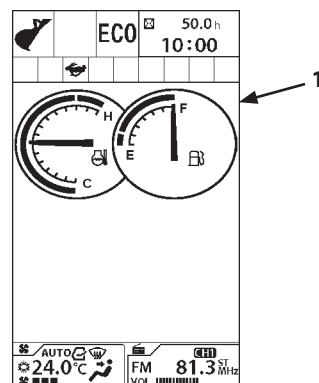
MDAA-01-131EN

OPERATOR'S STATION

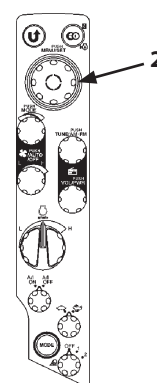
Attachment Name Input

Attachment name can be changed on this screen.

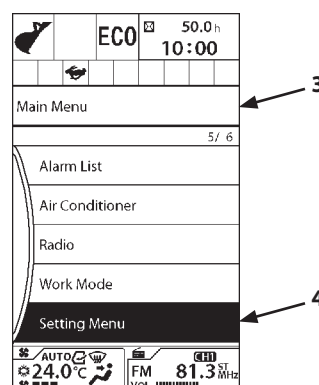
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Attachment Name Input (6).



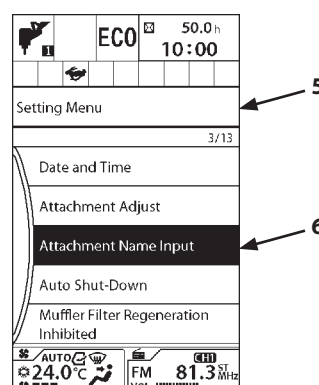
MDAA-01-001EN



MDCD-01-026



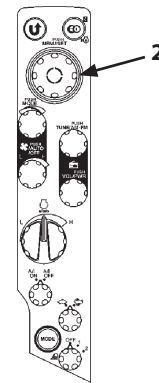
MDAA-01-114EN



MDAA-01-133EN

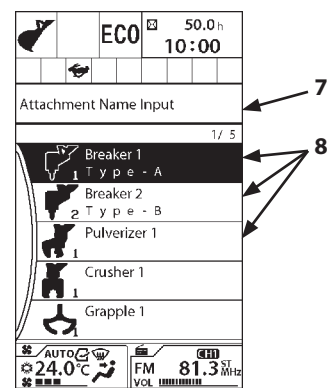
OPERATOR'S STATION

- Press selector knob (2) to display Attachment Name Input screen (7).




MDCD-01-026

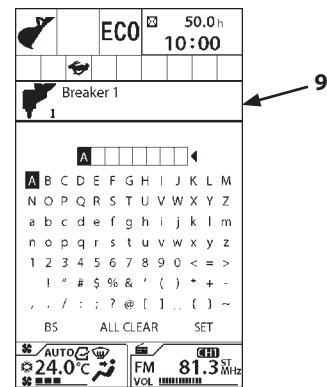
- Rotate selector knob (2) to highlight desired attachment name (8).



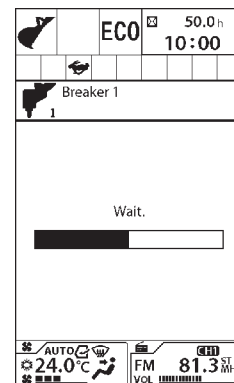
MDAA-01-134EN

- Press selector knob (2) to display Name Change screen (9).
- Rotate selector knob (2) right and left to highlight a character, and push selector knob (2).
- After inputting the new name, rotate selector knob (2) to highlight "SET". Push selector knob (2) to finalize the setting.

 **NOTE:** In order to delete the last entered character, turn selector knob (2) to highlight "BS" (Back Space), and then push selector knob (2). In order to delete all entered characters, rotate selector knob (2) to highlight "ALL CLEAR". Push selector knob (2).



MDAA-01-137EN



MDAA-01-145EN

OPERATOR'S STATION

Auto Shut-Down

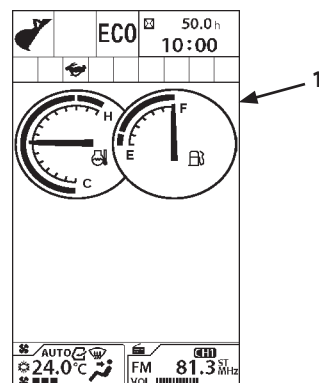
WARNING: This function automatically stops the engine. Take extra care on the work and work environment when using this function.

The auto shut-down function can be set in this screen. Set the auto shut-down time and enable (ON) the function beforehand. The engine automatically stops after the preset time at the state in which the pilot control shut-off lever is pulled. 30 seconds before the engine stop, the monitor displays a message that engine will be stopped and the indicator starts flashing. The buzzer also sounds. The buzzer sounds once at 30 seconds before, and then continuously sounds from 15 seconds. The engine speed decreases to the idling speed, and then stops after 15 seconds. When the pilot control shut-off lever is pushed before stopping the engine, the auto shut-down is disabled and the engine will not stop.

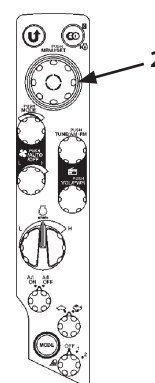
IMPORTANT: When the engine stops by the auto shut-down function, turn the key switch to ACC or OFF once and then turn it to START to restart the engine. Turn the key switch OFF after auto shut-down when leaving the machine for long period of time. Do not leave the machine after auto shut-down. Failure to do so may discharge the batteries.

Auto Shut-Down: ON/OFF

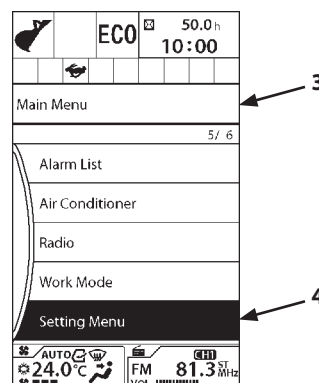
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Auto Shut-Down (6).



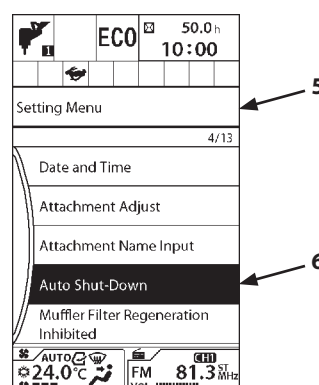
MDAA-01-001EN



MDCD-01-026



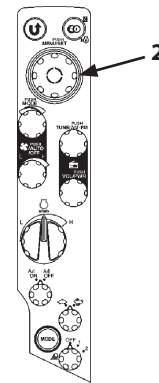
MDAA-01-114EN



MDAA-01-147EN

OPERATOR'S STATION

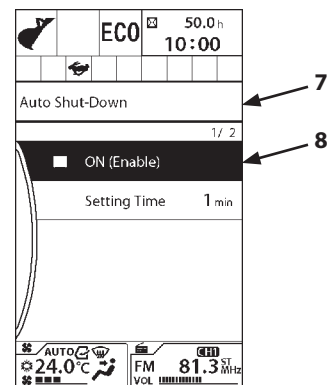
- Press selector knob (2) to display Auto Shut-Down screen (7).



MDCD-01-026

- Rotate selector knob (2) to highlight ON (8).
- Press selector knob (2) to set the auto shut-down function ON. Press selector knob (2) again to turn the auto shut-down function OFF.

NOTE: When the function is ON, the mark "■" is displayed in green. When the function is OFF, the mark "■" is displayed in gray.

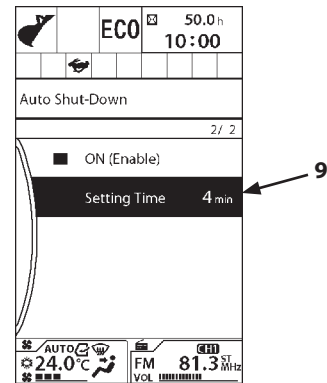


MDAA-01-148EN

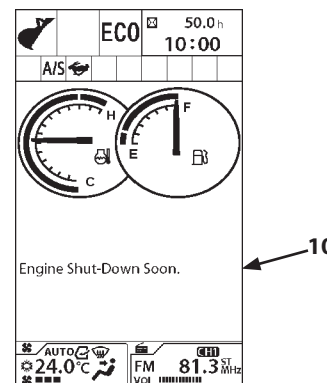
Acting Time Setting

- On the Auto Shut-Down screen, rotate selector knob (2) to highlight Setting Time (9) and push selector knob (2).
- Rotate selector knob (2) to adjust Auto Shut-Down acting time.
- Press selector knob (2) to make the change.

NOTE: 30 seconds before the engine stops, the monitor will display "Engine Shut-Down Soon." message (10).



MDAA-01-150EN



MDAA-01-146EN

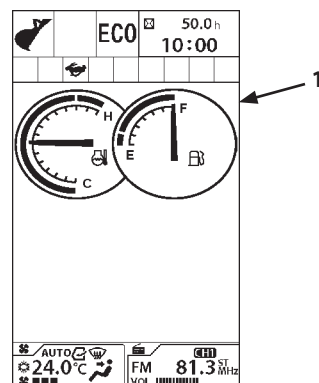
OPERATOR'S STATION

Muffler Filter Regeneration Inhibited

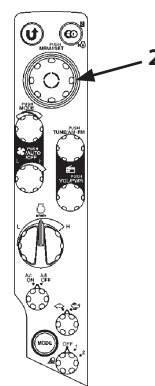
IMPORTANT: The muffler filter regeneration can be inhibited at this screen to prevent auto regeneration while operating the machine in a dusty area or indoors.

Setting Procedure

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

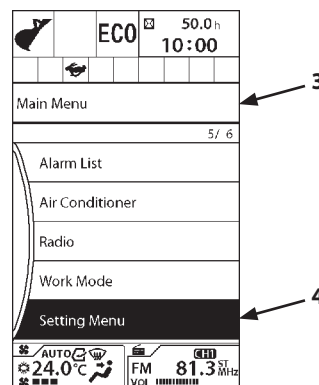


MDAA-01-001EN



MDCD-01-026


2. Rotate selector knob (2) to highlight Setting Menu (4).



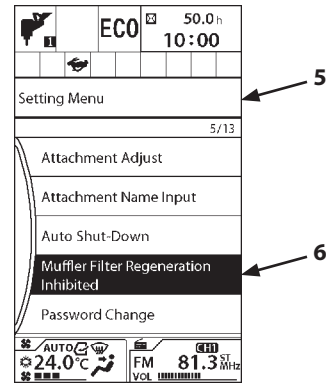
MDAA-01-114EN

OPERATOR'S STATION

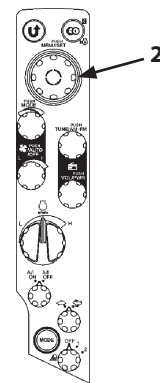
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Muffler Filter Regeneration Inhibited (6).
5. Press selector knob (2) to display Muffler Filter Regeneration Inhibited screen (7).
6. Rotate selector knob (2) to highlight ✓ (8), and press selector knob (2) to display Muffler Filter Regeneration Inhibited screen (9).
7. Rotate selector knob (2) to highlight ON (10). Confirmation screen is added.
8. Press selector knob (2) to turn Muffler Filter Regeneration Inhibited ON. Press selector knob (2) again to turn Muffler Filter Regeneration Inhibited OFF.
9. When ON is selected, the regeneration inhibited icon will be displayed on the monitor. (Refer to 1-24)

 **NOTE:** When the function is ON, the mark "■" is displayed in green. When the function is OFF, the mark "■" is displayed in gray.

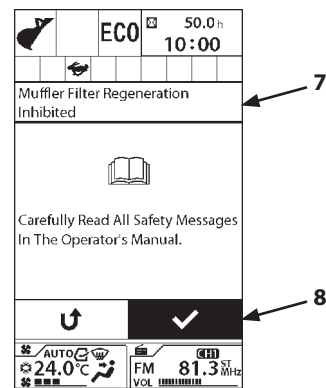
IMPORTANT: When the machine is operated with the muffler filter regeneration inhibited, the muffler filter becomes clogged. When the muffler filter regeneration request is displayed, move the machine to a safe place. Perform the manual regeneration following the specified procedure. Failure to do so may damage the muffler filter. Refer to "Muffler Filter" section (1-25, 5-12) for the manual regeneration.



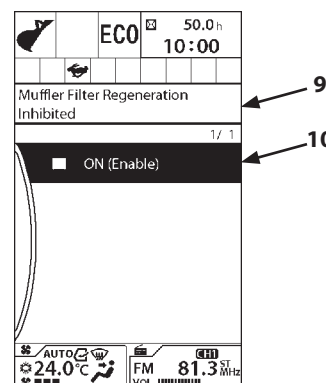
MDAA-01-283EN



MDCD-01-026



MDAA-01-325EN

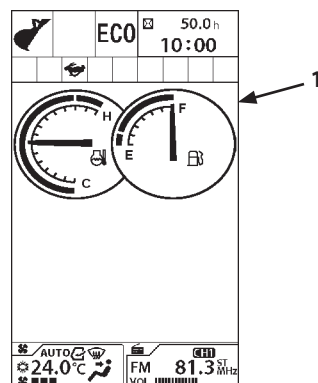


MDAA-01-284EN

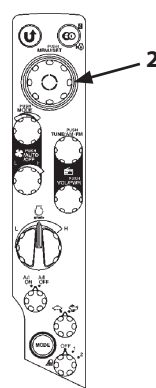
OPERATOR'S STATION

Password Change (Optional)

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

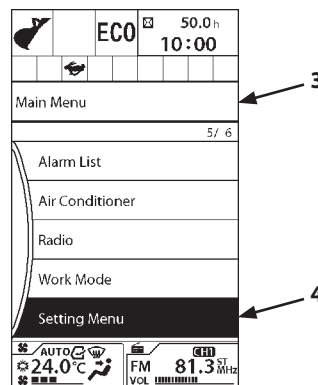


MDAA-01-001EN



MDCD-01-026

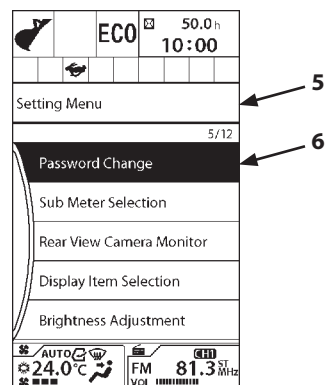
2. Rotate selector knob (2) to highlight Setting Menu (4).



MDAA-01-114EN

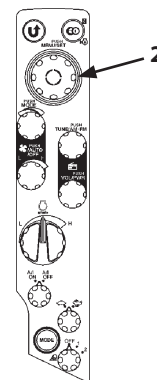
OPERATOR'S STATION

3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Password Change (6).

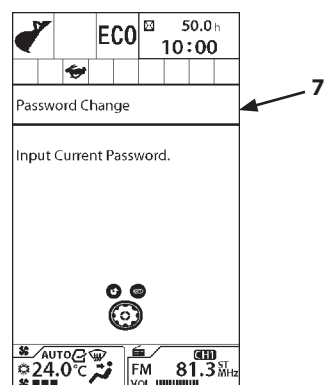


MDAA-01-156EN

5. Press selector knob (2) to display Password Change screen (7).

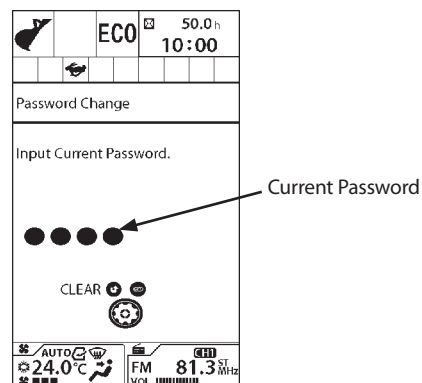


MDCD-01-026



MDAA-01-157EN

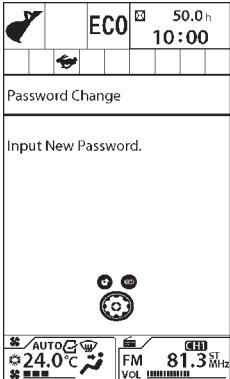
6. Input current password from the numeric keypad.



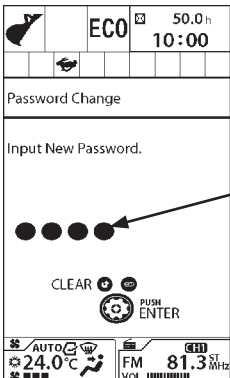
MDAA-01-158EN

OPERATOR'S STATION

- 7. Input the new password and push selector knob (2). 3 to 8 digits can be input for password.



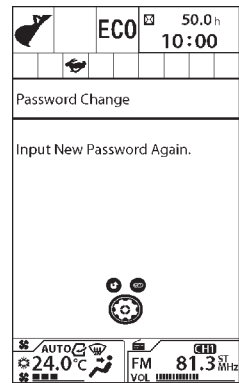
MDAA-01-159EN



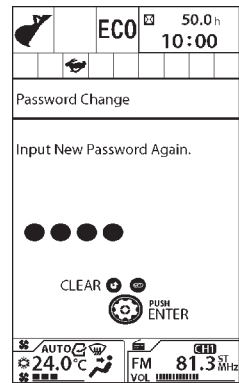
MDAA-01-160EN

OPERATOR'S STATION

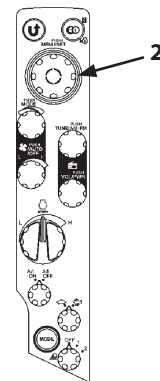
8. Input the new password again to confirm it and push selector knob (2).



MDAA-01-161EN

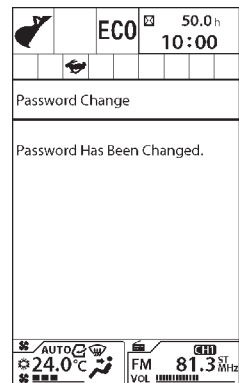


MDAA-01-162EN



MDCD-01-026

9. The password has changed.



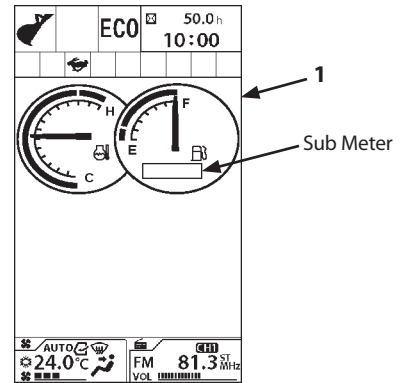
MDAA-01-163EN

OPERATOR'S STATION

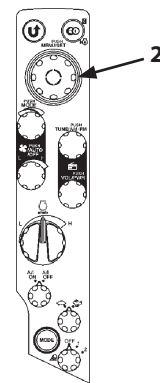
Sub Meter

A sub meter selection menu that can be added to the fuel meter is selected on this screen. OFF, Fuel Consumption Indicator and Breaker Hour Meter are provided. The breaker hour meter indicates the breaker operation time.

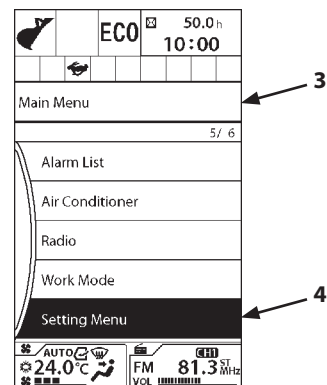
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Sub Meter Selection (6).



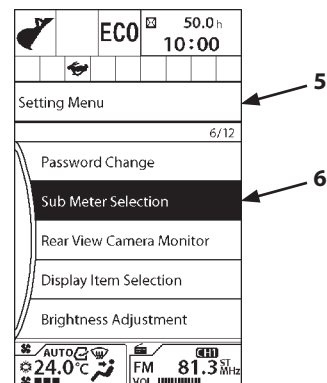
MDAA-01-315EN



MDCD-01-026



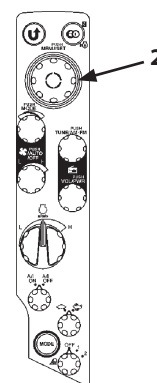
MDAA-01-114EN



MDAA-01-164EN

OPERATOR'S STATION

- Press selector knob (2) to display Sub Meter Selection screen (7).



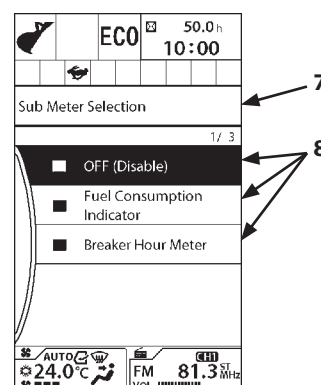
MDCD-01-026

- Rotate selector knob (2) to highlight desired sub meter (8). (Selecting OFF will not display a sub meter.)
- Press selector knob (2) to enable the changes.



NOTE:

- Only one sub meter can be selected at a time.
- When a display is selected, the mark "■" is displayed in green. When not selected, the mark "■" is displayed in gray.



MDAA-01-165EN

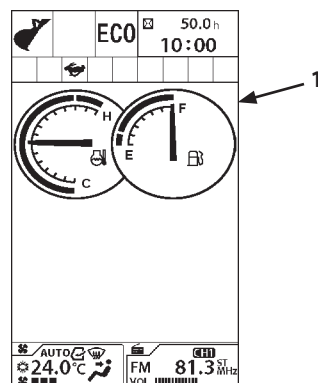
OPERATOR'S STATION

Rear View Camera Monitor

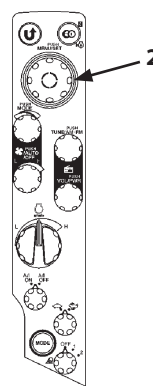
IMPORTANT: The image displayed on the rear view monitor is meant only as an aid. Actual position and distance of people and objects in the rear view monitor will be different. When operating the machine, pay thorough attention to the surrounding situation.

Rear View Camera ON/OFF

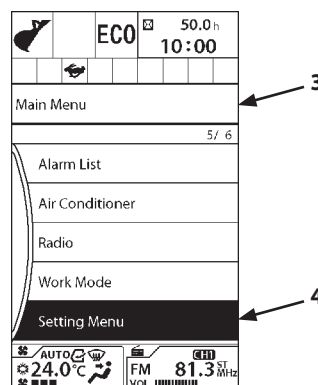
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Rear View Camera Monitor (6).



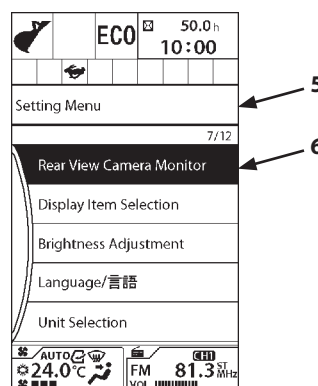
MDAA-01-001EN



MDCD-01-026



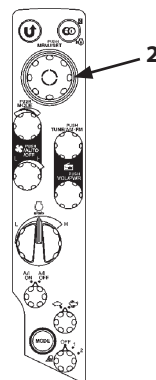
MDAA-01-114EN



MDAA-01-168EN

OPERATOR'S STATION


5. Press selector knob (2) to display Rear View Camera Monitor screen (7).

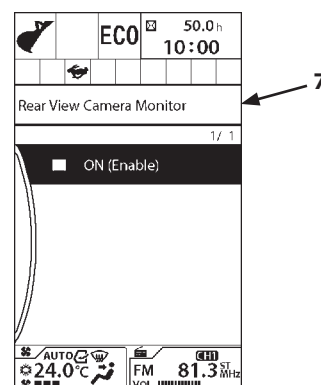


MDCD-01-026

6. Press selector knob (2) to turn the rear view camera monitor ON/OFF.
7. When the rear view camera monitor is ON, rear view image is continuously displayed on the basic screen.

IMPORTANT: In order to obtain a clear image, clean the lens and the monitor display before operating the machine.

 **NOTE:** The monitor and camera lens surface is a resin product. Lightly wipe the surface with a wet clean cloth. Never use an organic solvent.



MDAA-01-169EN

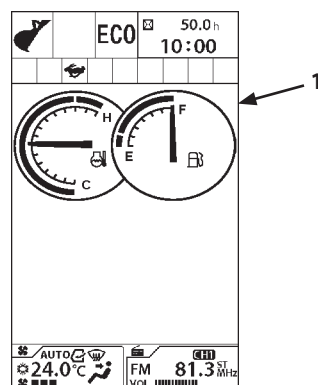
IMPORTANT:

- Never attempt to change the mounting position of the rear view camera.
- Consult your authorized dealer if any abnormality is found on the rear view image.

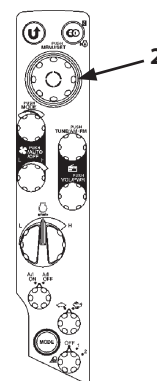
OPERATOR'S STATION

Brightness Adjustment

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

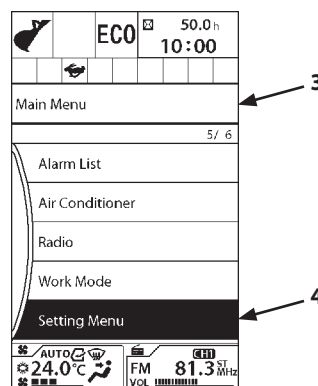


MDAA-01-001EN



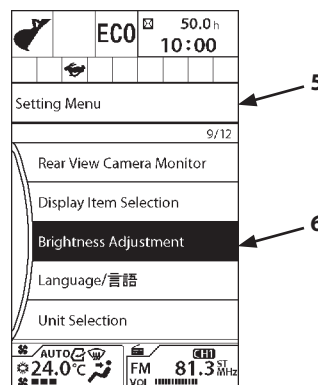
MDCD-01-026

2. Rotate selector knob (2) to highlight Setting Menu (4).



MDAA-01-114EN

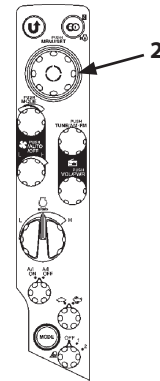
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Brightness Adjustment (6).



MDAA-01-171EN

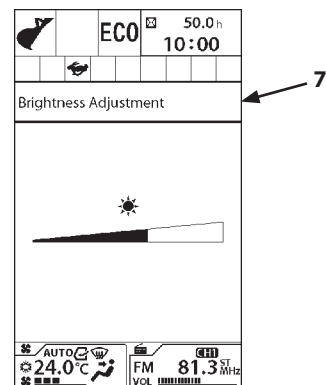
OPERATOR'S STATION

5. Press selector knob (2) to display Brightness Adjustment screen (7).




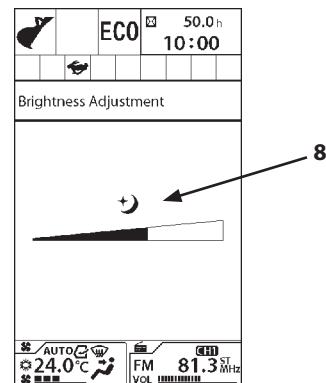
MDCD-01-026

6. Rotate selector knob (2) clockwise to make the screen brighter, counterclockwise to make the screen darker.




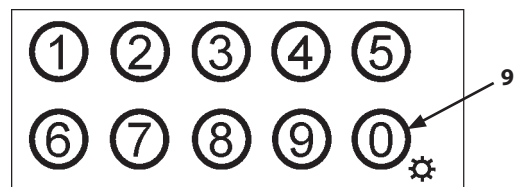
MDAA-01-172EN

 **NOTE:** When the light is turned ON, the monitor screen changes to night mode and mark (8) is displayed. Brightness can be adjusted for day mode and night mode respectively.



MDAA-01-173EN

 **NOTE:** Even if the light is turned ON during daytime, you can activate the daytime screen by pushing "0" (9) on the numeric keypad.

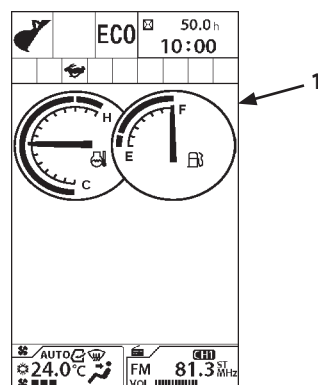


MDAA-01-018

OPERATOR'S STATION

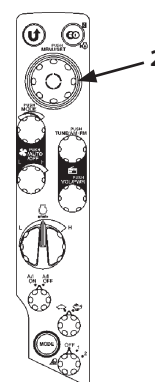
Language Settings

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).



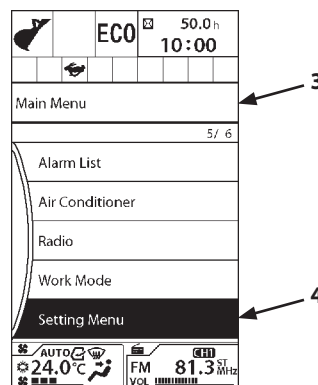
MDAA-01-001EN

2. Rotate selector knob (2) to highlight Setting Menu (4).

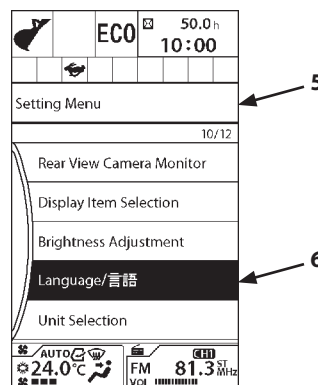


MDCD-01-026

3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Language/言語 (6).



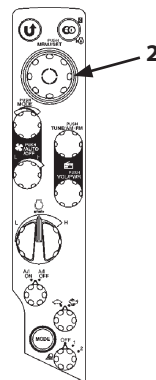
MDAA-01-114EN



MDAA-01-176EN


OPERATOR'S STATION

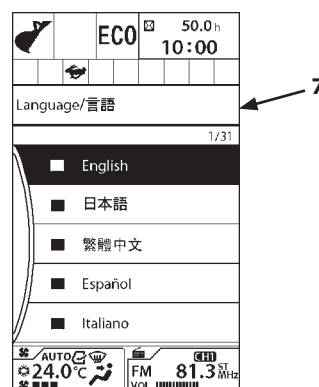
5. Press selector knob (2) to display Language/言語 screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight the desired language. Press selector knob (2) to make the change.

 **NOTE:** When a display is selected, the mark "■" is displayed in green. When not selected, the mark "■" is displayed in gray.



MDAA-01-177EN

OPERATOR'S STATION

Lists of Display Language

Language	Screen Display
Japanese	日本語
English	English
Spanish	Español
Italian	Italiano
French	Français
German	Deutsch
Dutch	Nederlands
Russian	Русский
Portuguese	Português
Finnish	Suomi
Greek	Ελληνικά
Swedish	Svenska
Norwegian	Norsk
Chinese (Simplified)	简体中文
Chinese (Traditional)	繁體中文
Korean	한국어

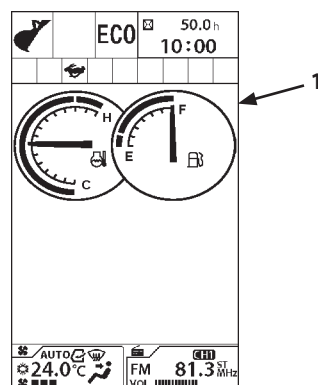
Language	Screen Display
Indonesian	Bahasa Indonesia
Thai	ภาษาไทย
Vietnamese	Tiếng Việt
Myanmarese	မြန်မာစာစကား
Arabic	اللغة العربية
Persian	زبان فارسی
Turkish	Türkçe
Danish	Dansk
Esthonian	Eesti
Polish	Polski
Icelandic	Íslenska
Croatian	Hrvatski
Slovenian	Slovenščina
Romanian	limba română
Bulgarian	Български език
Lithuanian	Lietuvių kalba

OPERATOR'S STATION

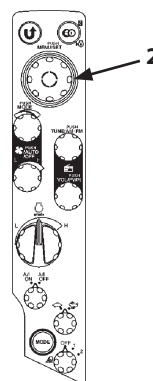
Unit Selection

Unit system displayed on the monitor can be selected in this screen.

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

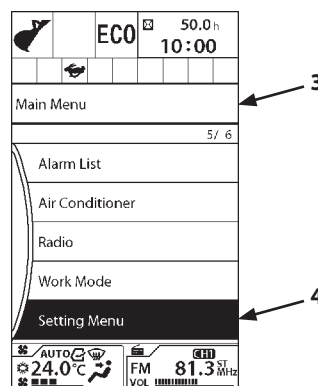


MDAA-01-001EN



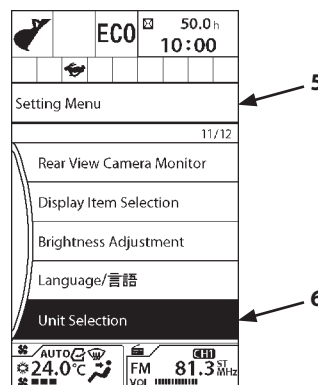
MDCD-01-026

2. Rotate selector knob (2) to highlight Setting Menu (4).



MDAA-01-114EN

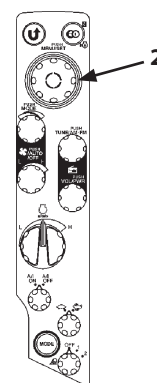
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Unit Selection (6).



MDAA-01-181EN

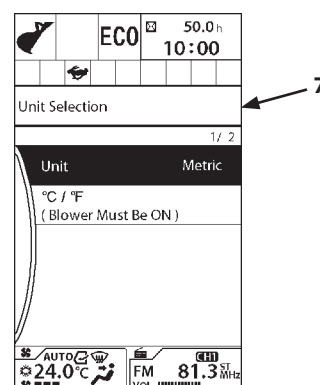
OPERATOR'S STATION

5. Press selector knob (2) to display Unit Selection screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight desired unit system. Press selector knob (2) to set the unit (Metric or US system).

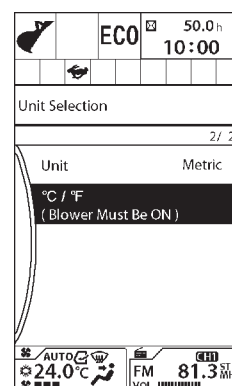


MDAA-01-182EN

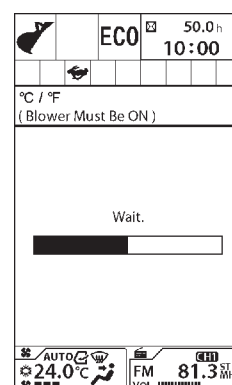
7. Before changing °C and °F, turn the blower of the air conditioner ON.

Rotate selector knob (2) to highlight desired unit system (°C or °F). Press selector knob (2) to set the unit.

When pressing selector knob (2), "Wait." will be displayed and then the change will be completed.



MDAA-01-183EN



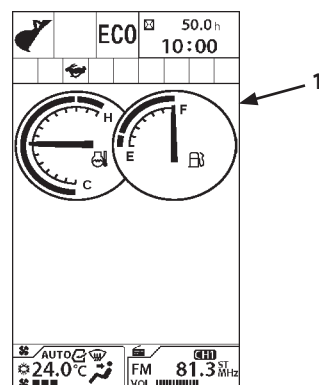
MDAA-01-184EN

OPERATOR'S STATION

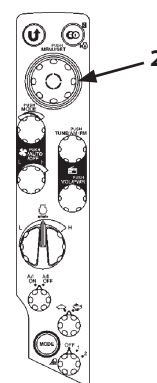
Display Item Selection (Rear View Camera OFF)

The display under the meters can be set to OFF (disable), Logo or Operational information.

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

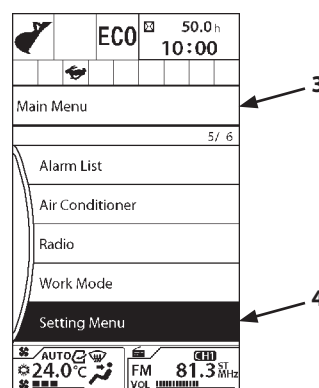


MDAA-01-001EN



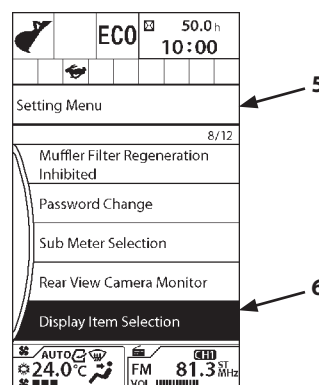
MDCD-01-026

2. Rotate selector knob (2) to highlight Setting Menu (4).



MDAA-01-114EN

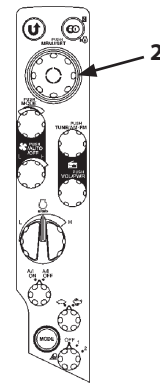
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Display Item Selection (6).




MDAA-01-237EN

OPERATOR'S STATION

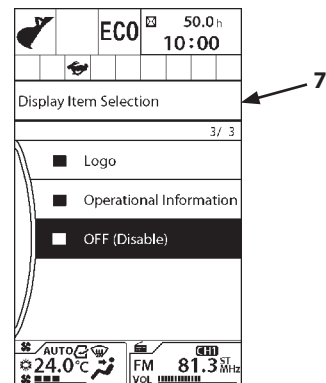
5. Press selector knob (2) to display Display Item Selection screen (7).



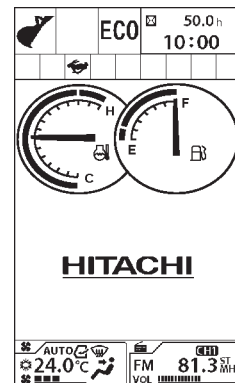
6. Rotate selector knob (2) to highlight desired display (8). Press selector knob (2) to set the image. (Selecting OFF sets non-display.)

 **NOTE:** When a display is selected, the mark "■" is displayed in green. When not selected, the mark "■" is displayed in gray.

MDCD-01-026

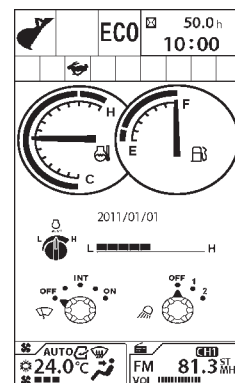


MDAA-01-238EN



Logo

MDAA-01-239EN



Operation Information

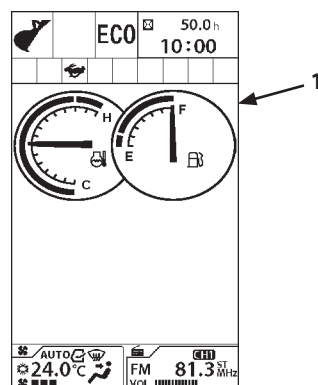
MDAA-01-222EN

OPERATOR'S STATION

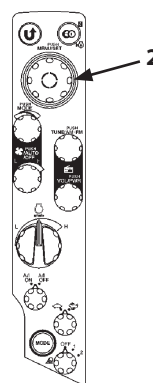
Main Menu Sequence Change

Menu sequence of Air Conditioner, Radio, Work Mode and Mail can be changed in this screen. Frequently used menu can be located on top of the screen.

1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).

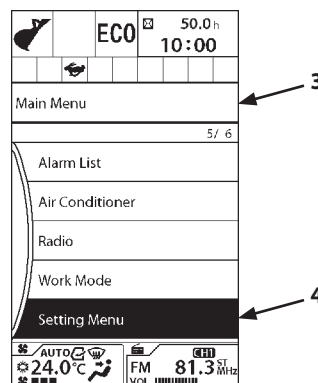


MDAA-01-001EN



MDCD-01-026

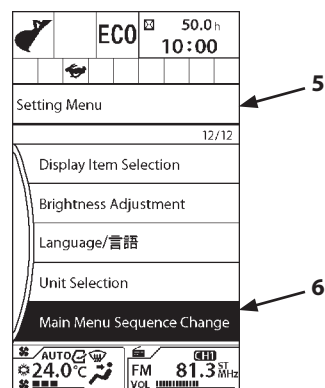
2. Rotate selector knob (2) to highlight Setting Menu (4).



MDAA-01-114EN

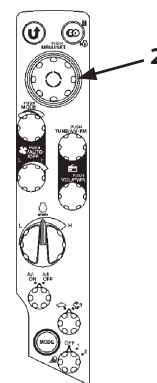
OPERATOR'S STATION

3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Main Menu Sequence Change (6).



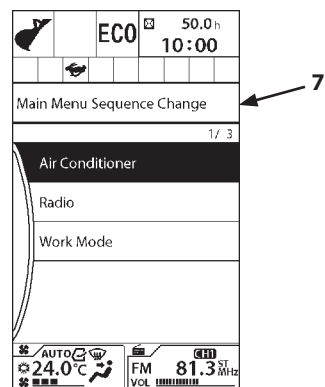
MDAA-01-186EN

5. Press selector knob (2) to display Main Menu Sequence Change screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight a menu to be on the top of the screen. Press selector knob (2) to set the menu to the top of the screen.



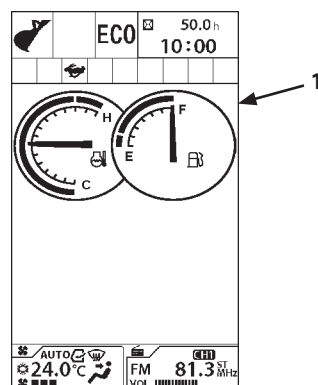
MDAA-01-187EN

OPERATOR'S STATION

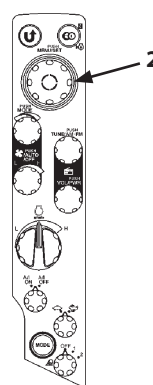
Information Menu

The information menu includes Operation, Maintenance and Monitoring.

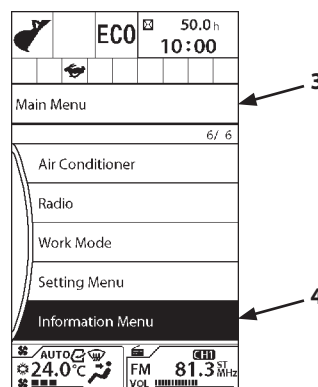
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).



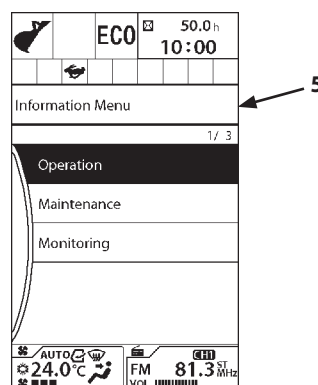
MDAA-01-001EN



MDCD-01-026



MDAA-01-190EN



MDAA-01-191EN

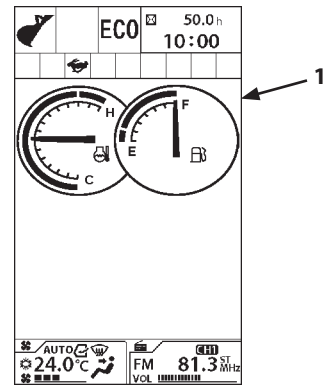
OPERATOR'S STATION

Operation

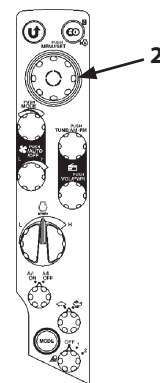
The Operation screen displays Fuel Consumption, Breaker Operation, Attachment Operation, Travel Operation, and Actual Operation menus. The Fuel Consumption screen displays fuel consumption, operating hours, and fuel consumption rate from resetting of the monitoring unit. The Breaker Operation screen displays breaker operating hours, machine operating hours and operating rate from resetting the monitoring unit. The Attachment Operation screen displays total operating hours of front attachment, travel and all operation from resetting the monitoring unit.

Fuel Consumption

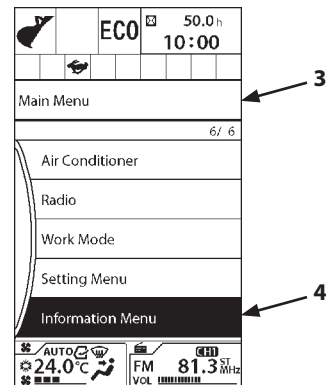
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Operation (6).



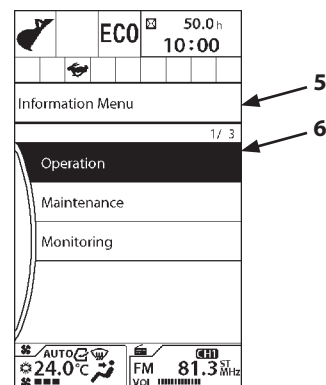
MDAA-01-001EN



MDCD-01-026



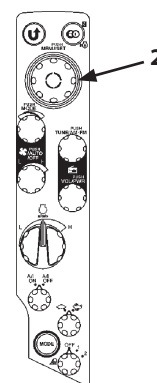
MDAA-01-190EN



MDAA-01-191EN

OPERATOR'S STATION

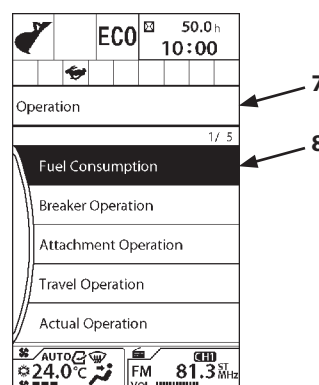
5. Press selector knob (2) to display Operation screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight Fuel Consumption (8).

7. Press selector knob (2) to display Fuel Consumption screen (9).



MDAA-01-193EN

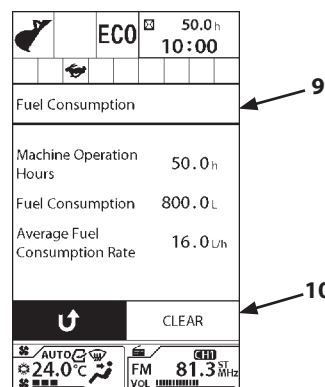
The Machine Operation Hours, Fuel consumption, and Average Fuel Consumption rate can be checked on this screen.

Pushing selector knob (2) to return to the basic screen. To clear the Fuel Consumption and Machine Operation Hours, rotate selector knob (2) to highlight CLEAR (10), and then push selector knob (2).

IMPORTANT: Total fuel consumption and fuel consumption rate depend on the operating environment and the operation method of the machine.

The values shown on the screen are just for reference.

A difference could arise between actual fuel consumption and fuel consumption as displayed on the monitor unit.

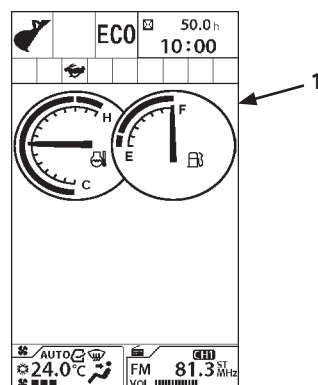


MDAA-01-194EN

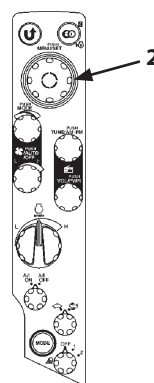
OPERATOR'S STATION

Breaker Operation

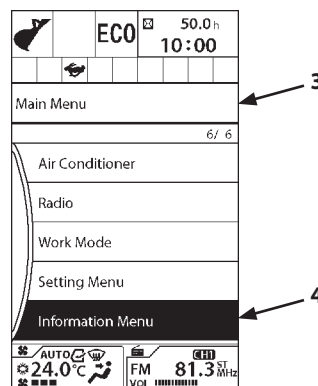
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Operation (6).



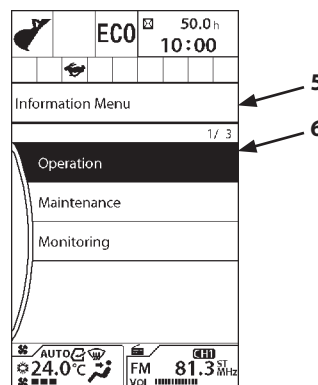
MDAA-01-001EN



MDCD-01-026



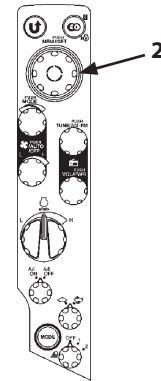
MDAA-01-190EN



MDAA-01-191EN

OPERATOR'S STATION

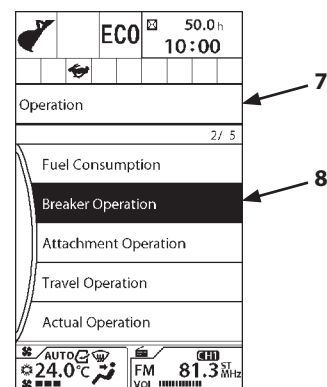
5. Press selector knob (2) to display Operation Screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight Breaker Operation (8).

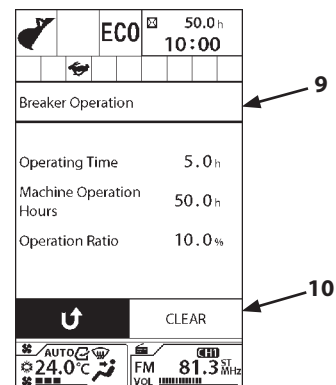
7. Press selector knob (2) to display Breaker Operation screen (9).



MDAA-01-196EN

Operating Time, Machine Operation Hours and Operation Ratio can be checked in this screen.

Pushing selector knob (2) to return to the basic screen. To reset the Operation Time and Machine Operation Hours data, rotate selector knob (2) to highlight CLEAR (10), and then push selector knob (2).

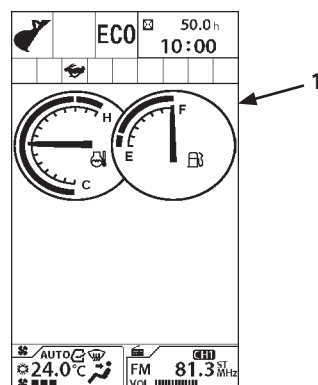


MDAA-01-197EN

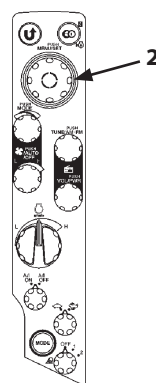
OPERATOR'S STATION

Attachment Operation

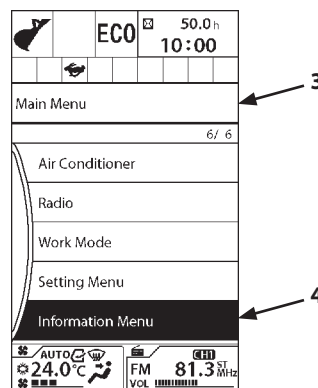
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Operation (6).



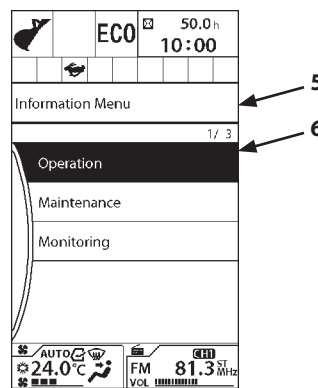
MDAA-01-001EN



MDCD-01-026



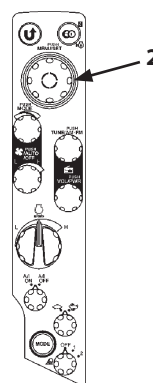
MDAA-01-190EN



MDAA-01-191EN

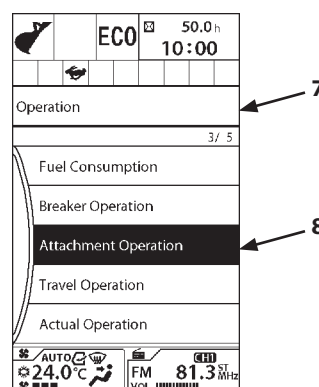
OPERATOR'S STATION

5. Press selector knob (2) to display operation screen (7).



MDCD-01-026

6. Rotate selector knob (2) to highlight Attachment Operation (8).

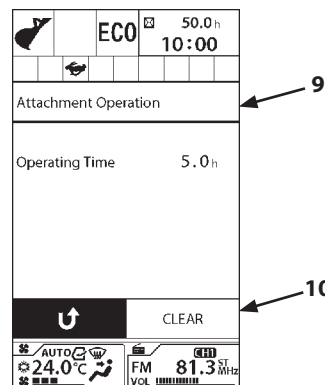


MDAA-01-199EN

7. Press selector knob (2) to display Attachment Operation screen (9).

The attachment Operating Time can be checked in this screen.

Push selector knob (2) to return to the previous screen. To reset the Operating Time data, rotate selector knob (2) to highlight CLEAR (10), and then push selector knob (2).

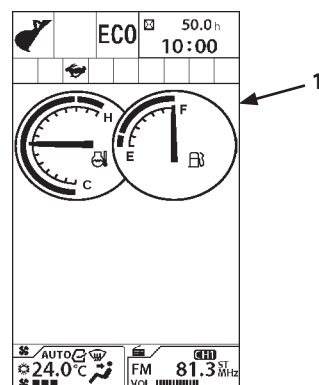


MDAA-01-200EN

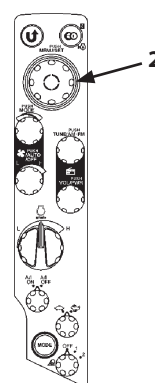
OPERATOR'S STATION

Travel Operation

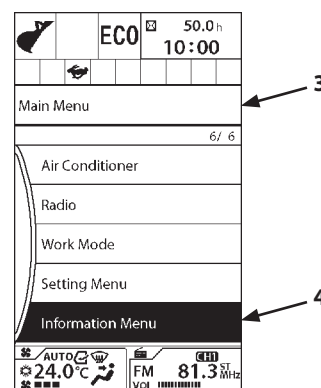
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Operation (6).



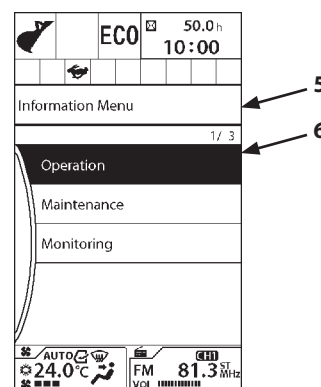
MDAA-01-001EN



MDCD-01-026



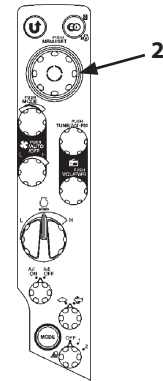
MDAA-01-190EN



MDAA-01-191EN

OPERATOR'S STATION

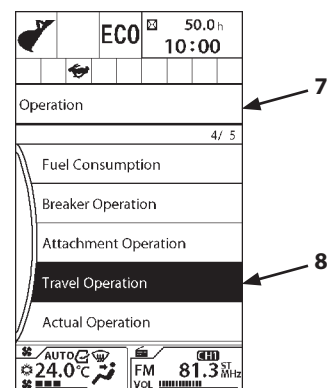
5. Press selector knob (2) to display operation screen (7).



MDCD-01-026

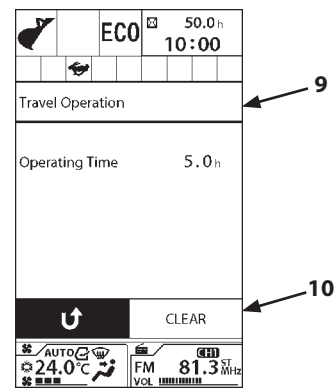
6. Rotate selector knob (2) to highlight Travel Operation (8).

7. Press selector knob (2) to display Travel Operation screen (9).



MDAA-01-202EN

Total Travel Operation Time can be checked in this screen. Push selector knob (2) to return to the previous screen. To reset the Operating Time data, rotate selector knob (2) to highlight CLEAR (10), and then push selector knob (2).

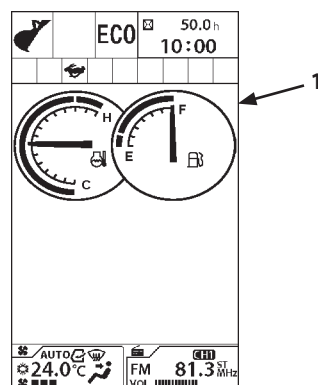


MDAA-01-203EN

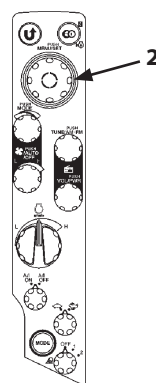
OPERATOR'S STATION

Actual Operation

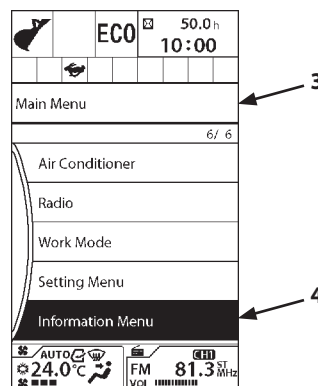
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Operation (6).



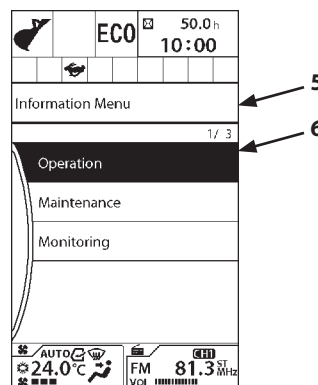
MDAA-01-001EN



MDCD-01-026



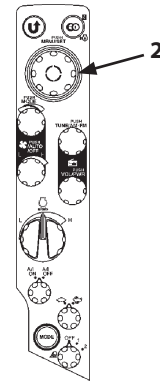
MDAA-01-190EN



MDAA-01-191EN

OPERATOR'S STATION

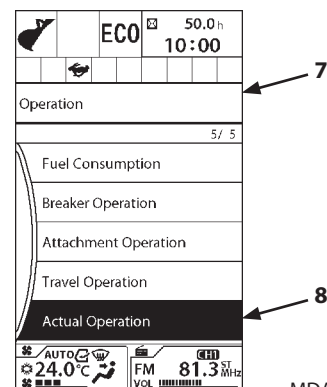
5. Press selector knob (2) to display operation screen (7).



MDCD-01-026


6. Rotate selector knob (2) to highlight Actual Operation (8).

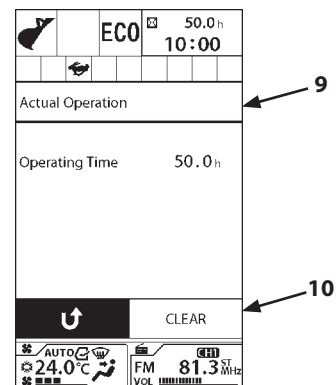
7. Press selector knob (2) to display Actual Operation screen (9).



MDAA-01-205EN

The actual Operating Time can be checked in this screen. Push selector knob (2) to return to the previous screen. To reset the Operating Time data, rotate selector knob (2) to highlight CLEAR (10), and then push selector knob (2).

 **NOTE:** The Operating Time includes travel operation hours as well as all other operations.



MDAA-01-206EN

OPERATOR'S STATION

Maintenance

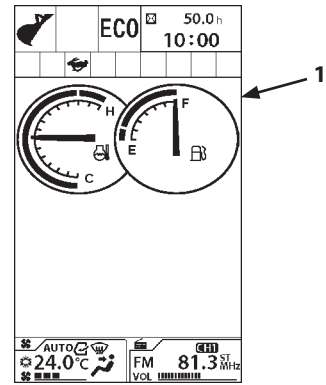
The maintenance screen includes maintenance notice, remaining hours until the next maintenance, and maintenance intervals.

Maintenance Items

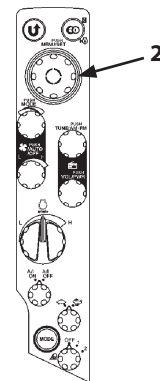
- Engine Oil
- Engine Oil Filter
- Hydraulic Oil
- Hydraulic Oil Pilot Filter
- Hydraulic Oil Full-Flow Filter
- Pump Transmission Oil
- Travel Device Oil
- Swing Device Oil
- Swing Bearing Grease
- Air Cleaner Filter
- Fuel Filter Change
- Air Conditioner Filter
- Muffler Filter
- Line Filter (Optional)
- Water Separator (Optional)
- User Setting 1
- User Setting 2

Maintenance Notice

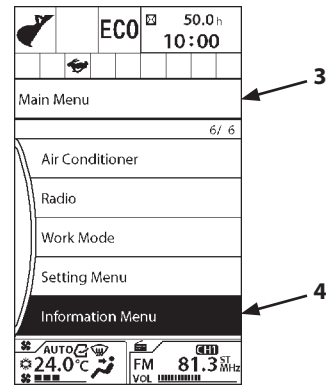
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Maintenance (6).



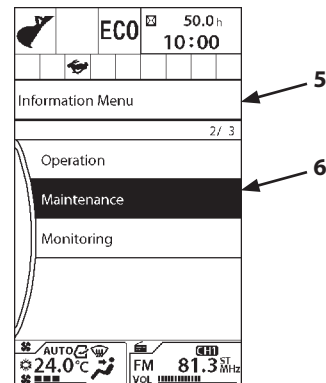
MDAA-01-001EN



MDCD-01-026



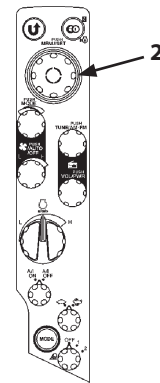
MDAA-01-190EN



MDAA-01-223EN

OPERATOR'S STATION

5. Press selector knob (2) to display Maintenance screen (7).

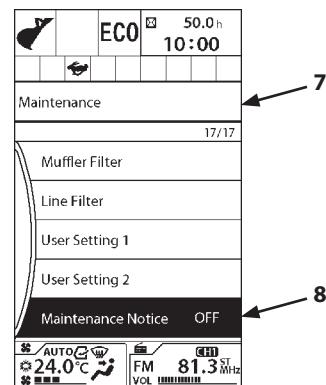


MDCD-01-026


6. Rotate selector knob (2) to highlight Maintenance Notice (8).

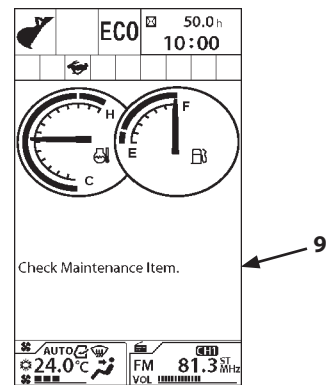
7. Press selector knob (2) to turn the Maintenance Notice ON. Press selector knob (2) again to turn the Maintenance Notice OFF.

ON : When the required interval is reached, an information message is displayed on the screen.
 OFF : No notification message is displayed.

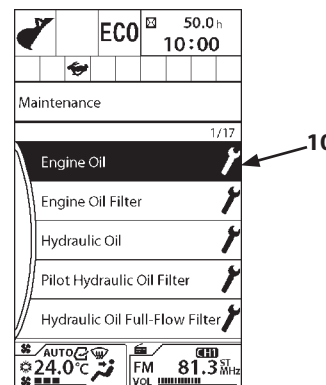


MDAA-01-208EN

 **NOTE:** When the required interval for an item is reached, screen (9) is displayed for 10 seconds when the key is switched ON. Press Return button to delete the notification. When checking the maintenance items from the menu, an item where the set time has been reached are marked with a spanner.



MDAA-01-213EN

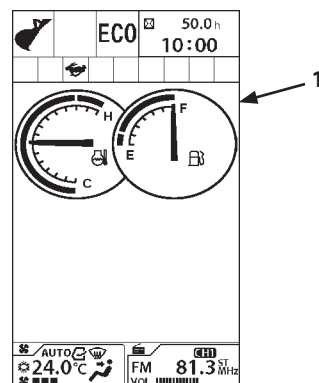


MDAA-01-214EN

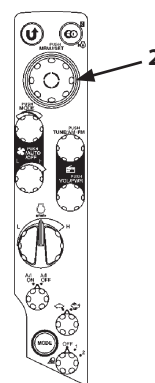
OPERATOR'S STATION

Remaining Time and Maintenance Interval

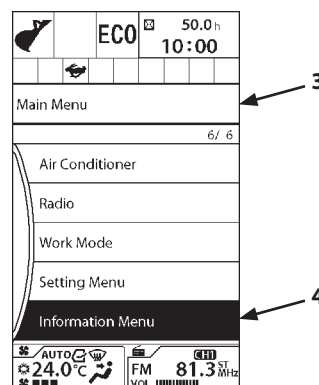
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Maintenance (6).



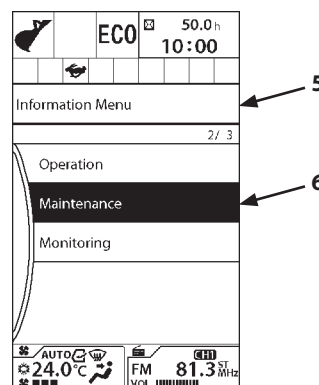
MDAA-01-001EN



MDCD-01-026



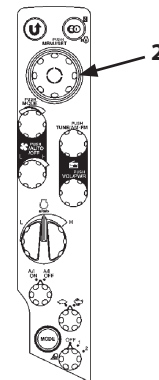
MDAA-01-190EN



MDAA-01-223EN

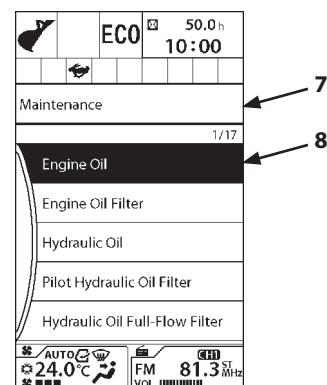
OPERATOR'S STATION

5. Press selector knob (2) to display Maintenance screen (7).



MDCD-01-026

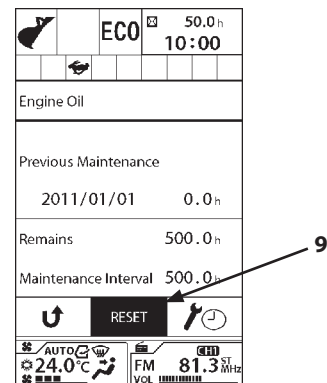
6. Rotate selector knob (2) to highlight a maintenance item to be checked (8). (In the right example, Engine Oil is selected.)
7. Press selector knob (2) to display the time remaining for the selected maintenance item.



MDAA-01-336EN


Resetting Data

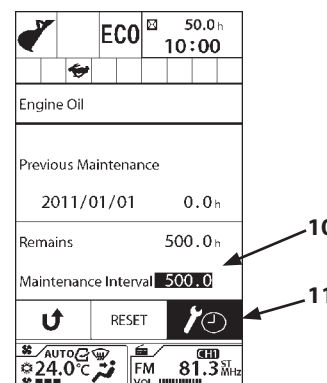
To reset the remaining time data, rotate selector knob (2) to highlight RESET (9), and then push selector knob (2). The value of the remaining hours is reset to that of the change interval. The previous change date/hour is updated with the current date and time.



MDAA-01-210EN

Maintenance Interval Setting

To change the maintenance interval, rotate selector knob (2) to highlight  (11), and then press selector knob (2). The background color of Maintenance Interval (10) changes, then turn selector knob (2) to adjust the time, and then push selector knob (2) to enable the change.



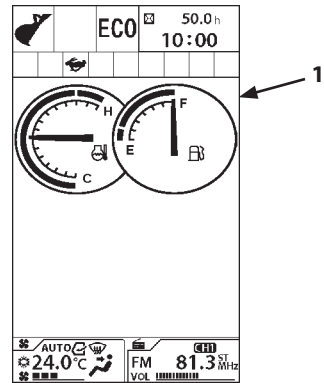
MDAA-01-212EN

OPERATOR'S STATION

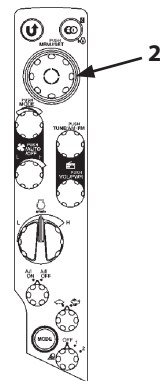
Monitoring

Engine speed and PM (particulate matter) accumulation in the muffler filter can be checked in this screen.

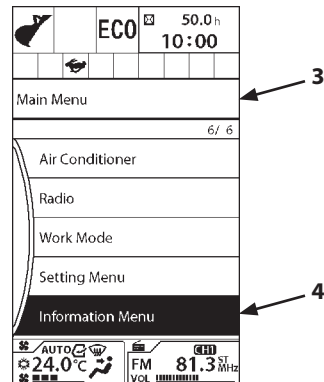
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Information Menu (4).
3. Press selector knob (2) to display Information Menu screen (5).
4. Rotate selector knob (2) to highlight Monitoring (6).



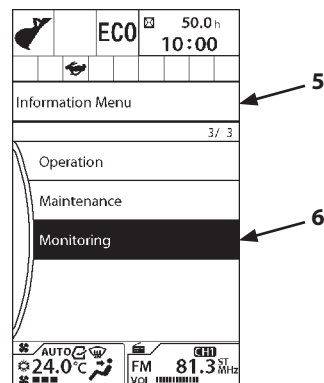
MDAA-01-001EN



MDCD-01-026



MDAA-01-190EN



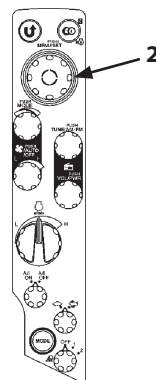
MDAA-01-220EN

OPERATOR'S STATION

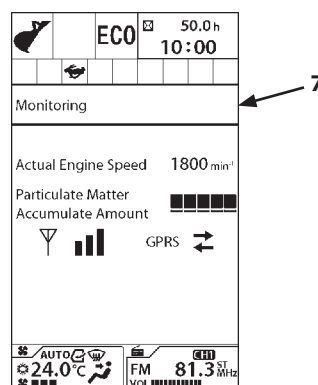
5. Press selector knob (2) to display Monitoring screen (7).

 NOTE:

- When the "PM Accumulation" bar reaches the right end, auto-regeneration takes place. However, auto-regeneration may not be performed depending on the machine condition.
- The PM Accumulation is not displayed during regeneration.



MDCD-01-026

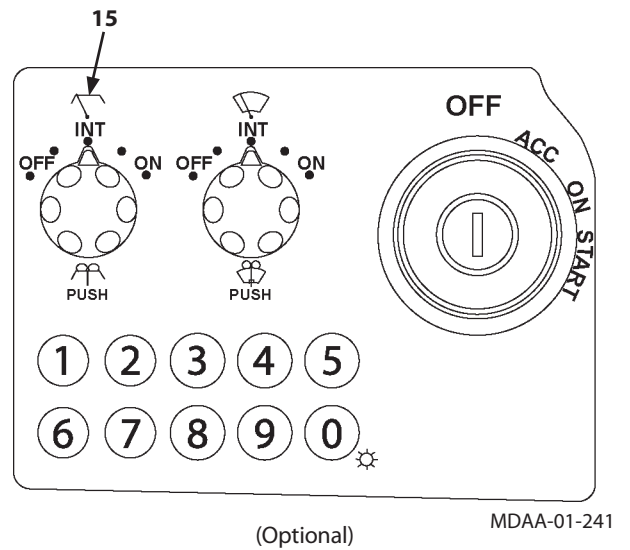
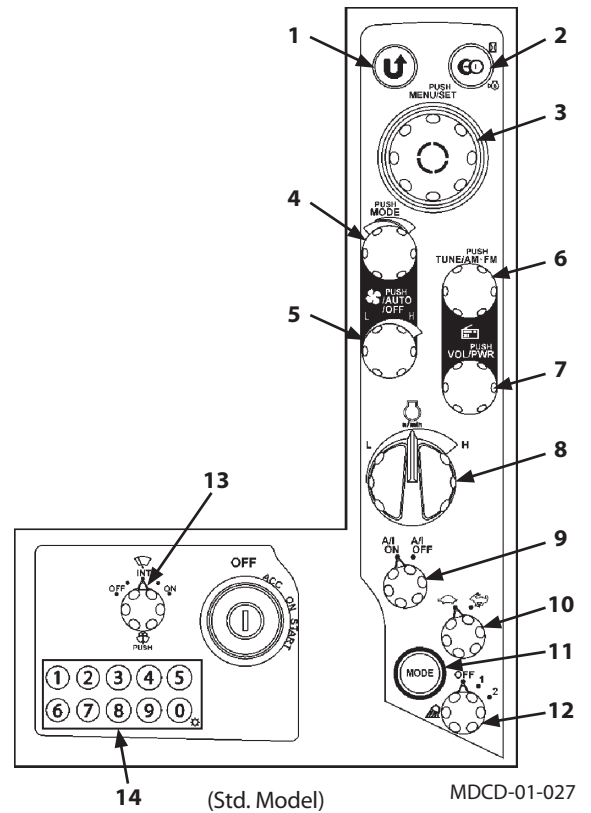


MDAA-01-221EN

OPERATOR'S STATION

Switch Panel

- 1- Return to Previous Screen
- 2- Return to Basic Screen
- 3- Selector Knob
- 4- Temperature Control Switch/Mode Switch
- 5- AUTO/OFF Switch/Fan Switch
- 6- AM/FM Selector/Tuning Switch
- 7- Power Switch/Volume Control Knob
- 8- Engine Control Dial
- 9- Auto-Idle Switch
- 10- Travel Mode Switch
- 11- Power Mode Switch
- 12- Work Light Switch
- 13- Wiper/Washer Switch
- 14- Numeric Keypad
- 15- Overhead Window Wiper/Washer Switch (Optional)



OPERATOR'S STATION

Return to Previous Screen (Monitor)

Push this switch to return to the previous screen.



MDAA-01-010

Return to Basic Screen (Monitor)

Allows to return to the basic screen from any screen.



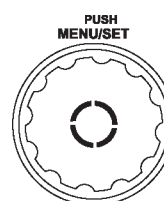
MDAA-01-011

Select/Confirm Switch (Monitor)

Push : Push this switch while the basic screen is displayed, the menu screen opens.

Push this switch after the menu screen, the action is confirmed.

Rotate : Moving the cursor.



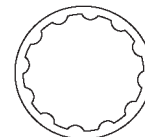
MDAA-01-012

Temperature Control Switch/Mode Switch (Air Conditioner)

Push : Air vent is selected.

Rotate : Setting the temperature.

TEMP/MODE

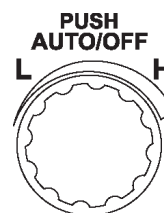


MDAA-01-013

AUTO/OFF Switch/Fan Switch (Air Conditioner)

Push : Push this switch while the air conditioner OFF, it turns AUTO. Push this switch while operating the air conditioner, it turns OFF.

Rotate : Adjusting the blower speed.



MDAA-01-015

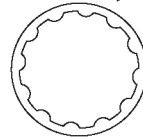
OPERATOR'S STATION

AM/FM Selector/Tuning Switch (Radio)

Push : AM/FM is selected.

Rotate : Adjusting radio frequency.

PUSH
TUNE/AM,FM



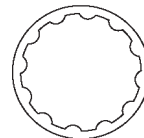
MDAA-01-014

Power Switch/Volume Control Knob (Radio)

Push : Turns power ON/OFF.

Rotate : Adjusting the volume.

PUSH
VOL/PWR



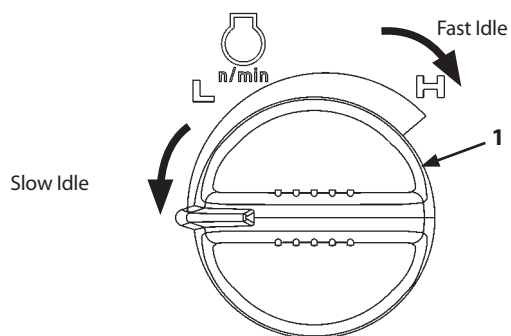
MDAA-01-016

Engine Control Dial

Use engine control dial (1) to adjust engine speed.

The fully clockwise position : Fast Idle

The fully counterclockwise position : Slow Idle



M1P1-01-068

OPERATOR'S STATION

Auto-Idle Switch


The auto-idle switch (2) sets the engine speed control mode to either Auto-Idle ON or OFF.

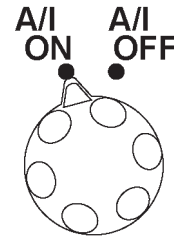
- Auto-Idle Speed

When auto-idle switch (2) is turned to ON position, the engine speed decreases to the idle after approximately 4 seconds at the state in which the work lever is turned to neutral.

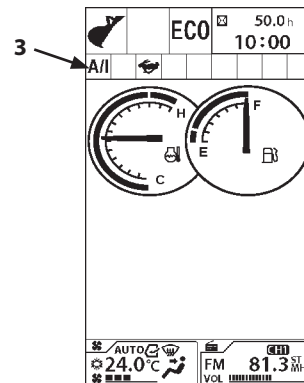
This function saves fuel consumption.

When the auto-idle mode is selected, auto-idle indicator (3) on the monitor panel lights.

 **NOTE:** Auto-idle control may not work completely until the end of the warm-up.



MDAA-01-017



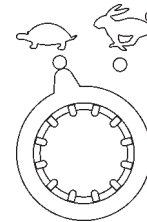
MDAA-01-314EN

Travel Mode Switch

Two travel modes, FAST and SLOW, are selected by turning the travel mode switch to either position.

 Mark (Fast Speed Mode)

 Mark (Slow Speed Mode)



MDCD-01-028

OPERATOR'S STATION

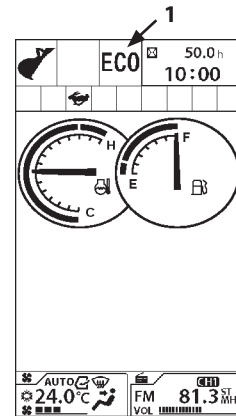
Power Mode Switch

Two engine speed modes, ECO and PWR modes are selected by operating the power mode switch.

- ECO (Economy) Mode
Operate the machine in this mode when performing normal work.
ECO is displayed on Power Mode Display (1).



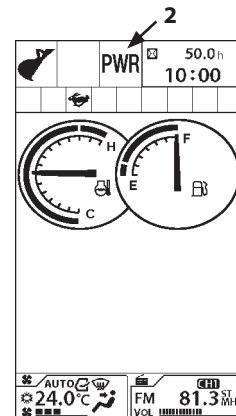
MDAA-01-274



MDAA-01-001EN

- PWR (Power) Mode
Use PWR (Power) mode when extra horsepower is needed.
PWR is displayed on Power Mode Display (2).

NOTE: ECO mode is set automatically when starting the engine. Set PWR mode if necessary.

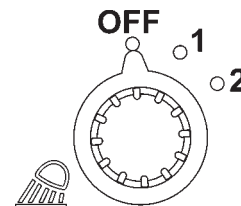


MDAA-01-353

Work Light Switch

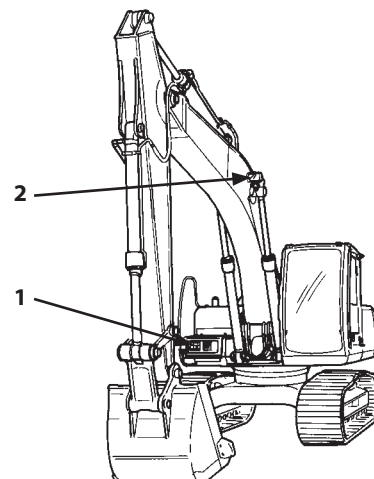
Work light switch has the following positions.

- 1 Position : Work light (1) on the base machine will light. Also, the switch panel illumination will light.
- 2 Position : Work light (2) mounted on the boom and work light (1) on the right side of the machine will light. At the same time, the switch panel illumination will light. The monitor changes to night mode.
- OFF : Work lights (1), (2), and the switch panel illumination will turn off.



MDCD-01-029

NOTE: When the key switch is turned OFF while the work light switch is in 2-position, the light turns ON for 30 seconds.



M157-01-146

OPERATOR'S STATION


Wiper/Washer Switch

The wiper and the window washer are operated using the wiper/washer switch.

- Wiper

Turn the wiper/washer switch to the specified position to operate the wiper.


OFF	The wiper stops and is retracted.
INT Position	The wiper operates intermittently at the interval selected by the switch position as described below. INT has three positions of operating speed as shown below.
INT (Slow):	The wiper operates at 8-second interval.
INT (Mid):	The wiper operates at 6-second interval.
INT (Fast):	The wiper operates at 3-second interval.
ON	The wiper operates continuously.

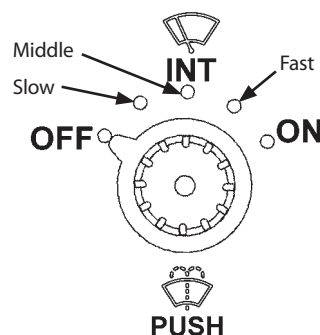
 **NOTE:** When the front window (upper) is opened, the wiper and washer will not operate. If the front window is opened while operating the wiper, the wiper stops.

- Washer

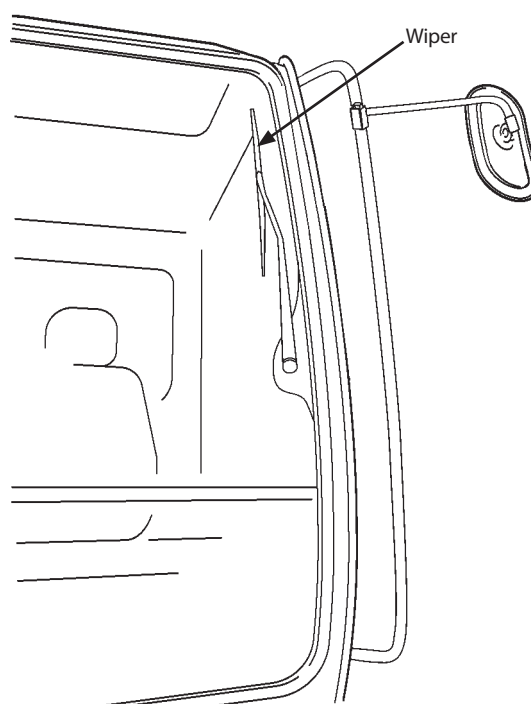
Press and hold the wiper/washer switch to squirt washer fluid onto the front window. When the wiper/washer switch is pressed for more than 2 seconds, the wiper operates until the switch is released. When the wiper/washer switch is released, the wiper automatically retracts.

While operating the wiper in the INT mode, when the wiper/washer switch is pressed, the wiper operation mode is changed to the continuous operation mode.

 **NOTE:** The wiper motor protection control stops wiper operation to prevent it from becoming immovable when it operates long period of time under high load. When the wiper stops, do not change the arm position and wait several minutes until the wiper starts operating again.



MBFM-01-005



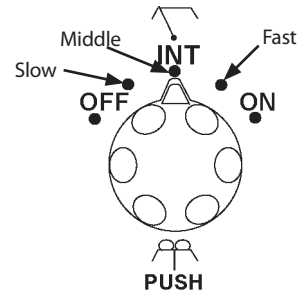
M1U1-01-018

OPERATOR'S STATION

Overhead Window Wiper and Washer Switch (Optional)

- Wiper

Turn the wiper/washer switch to the specified position to operate the wiper.

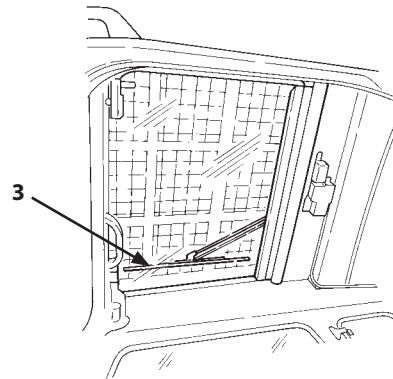


- OFF The wiper stops and is retracted.
- INT Position The wiper operates intermittently at the interval selected by the switch position as described below. INT has three positions of operating speed as shown below.
 - INT (Slow): The wiper operates at 8-second interval.
 - INT (Mid): The wiper operates at 6-second interval.
 - INT (Fast): The wiper operates at 3-second interval.
- ON The wiper operates continuously.

MDAA-01-275

- Washer

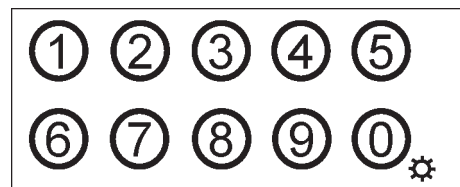
Press and hold the wiper/washer switch to squirt washer fluid onto the front window. When the wiper/washer switch is pressed for more than 2 seconds, the wiper operates until the switch is released. When the wiper/washer switch is released, the wiper automatically retracts. While operating the wiper in the INT mode, when the wiper/washer switch is pressed, the wiper operation mode is changed to the continuous operation mode.



M157-01-081

Numeric Keypad


Used for inputting password.
 Press the numeric keypad of 1 to 8 while the radio is ON, the radio station will switch to memorized channel of 1 to 8. When the light is turned ON, the monitor changes to night mode screen. Even if the light is turned ON, you can activate the daytime screen by pushing "0" on the numeric keypad.



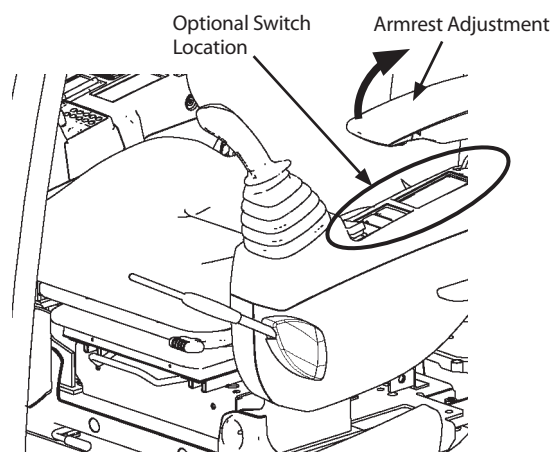
MDAA-01-018

OPERATOR'S STATION

Switch Panel (for Optional Equipment)

 **NOTE:** The optional switch locations differ depending on the kinds of optional devices are equipped. Before using the switches, make sure what kinds of optional devices are equipped. Raise the armrest when operating the optional switch. All available optional devices are shown below.


- Travel Alarm Deactivation
- Swing Alarm
- Rear Work Light
- Overload Alarm Device Switch
- Seat Heat Switch
- Rotating Lamp
- Electrical Control

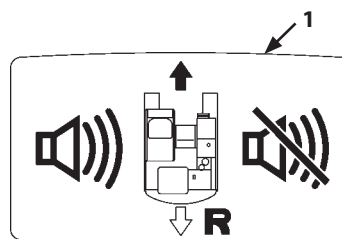


MDAA-01-327

OPERATOR'S STATION


Travel Alarm Deactivation Switch

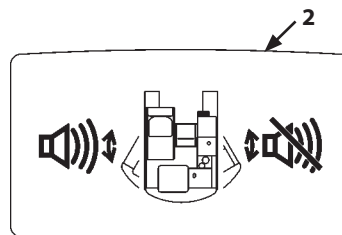
The travel alarm buzzer sounds during travel operation. When pushing the  mark of travel alarm deactivation switch (1), the travel alarm buzzer function is deactivated.



M1U1-01-035

Swing Alarm Deactivation Switch (Optional)

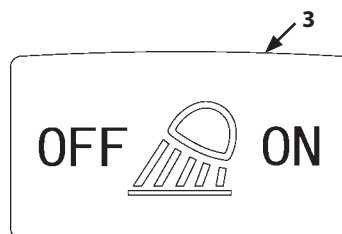
The swing alarm system sounds the buzzer and turns the beacon light ON during swing operation. When pushing the  mark of swing alarm deactivation switch (2), the swing alarm buzzer function is deactivated.



M1U1-01-036

Rear Light Switch (Optional)

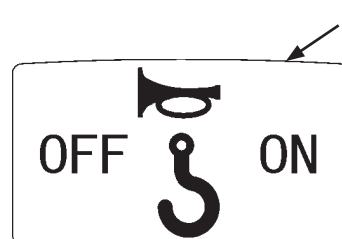
When rear light switch (3) is turned ON, the rear light at the rear of the cab roof comes ON.



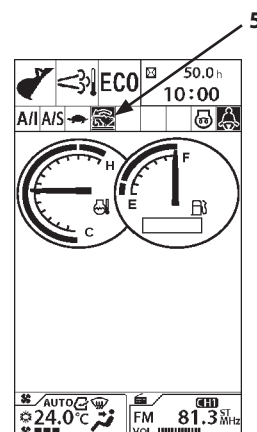
M1P1-01-070

Overload Alarm Switch (Optional)

During lifting load work with overload alarm switch (4) ON, if overloading is detected, the buzzer sounds and overload alarm indicator (5) on the multi-monitor comes ON. Turn overload alarm switch (4) OFF to deactivate the overload alarm system function.



M1U1-01-010



MDAA-01-286EN

OPERATOR'S STATION

Seat Heater Switch

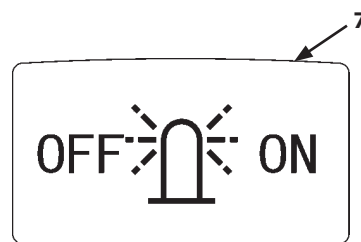
When seat heater switch (6) is turned ON, the seat surface is heated so that the seat section becomes warm. When the temperature of the seat section is raised to the specified temperature, heating is automatically stopped.



M1U1-01-011

Revolving Light Switch (Optional)

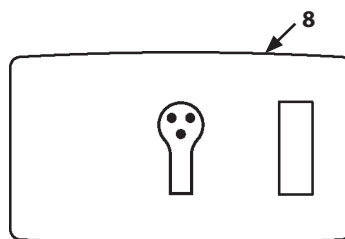
When revolving light switch (7) is turned ON, the revolving light provided at the rear on the cab roof comes ON.



M1U1-01-012

Electrical Control Main Switch (Optional)

Turn the pilot control shut-off lever to UNLOCK position. The electrical control (grip switch) system becomes operable by pushing ON of the electrical control main switch (8). It becomes OFF by pressing the switch again. It also becomes OFF when the key switch is turned OFF or the pilot control shut-off lever is turned to LOCK position.



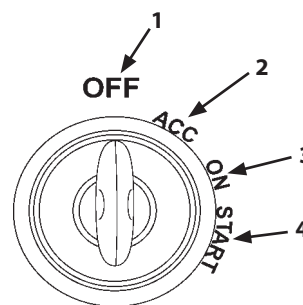
MDAA-01-311

CAUTION: When there is no need to use the electrical control (grip switch) system, turn OFF the main switch to avoid misoperation.

OPERATOR'S STATION

Key Switch

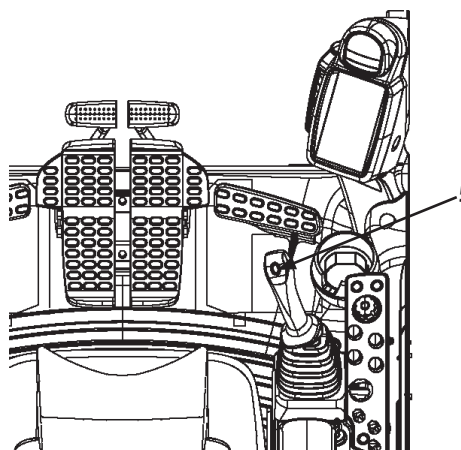
- 1- OFF (Engine Off)
- 2- ACC (Horn, Radio etc.)
- 3- ON (Engine ON)
- 4- START (Engine Start)



MDCD-01-030

Power Boost Switch

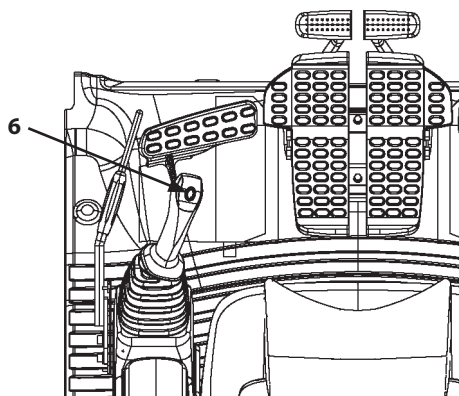
Power boost switch (5) is provided on the top of the right control lever. While pressing power boost switch (5), the maximum digging power is boosted within approximately 8 seconds to increase work capacity.



MDAA-01-292

Horn Switch

Horn switch (6) is provided on the top of the left control lever. The horn continuously sounds as long as the switch is pressed.

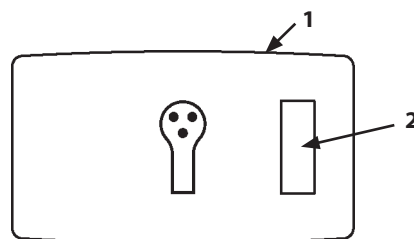


MDAA-01-293

OPERATOR'S STATION

Electrical Control Main Switch (Optional)

- Attachment Switch (Assist Operation) or (Main Operation)
This switch is mainly used for optional devices and attachments having rotary or tilt function. The attachment becomes operable when ON of electrical control main switch (1) is pushed and main switch indicator (2) is lit.

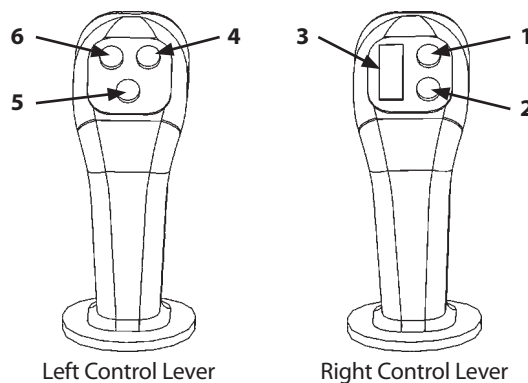


MDAA-01-311

IMPORTANT: The attachment switch is operable only when indicator (2) of electrical control main switch (1) is lit. Indicator (2) will not light unless the pilot control shut-off lever is in UNLOCK position. Besides, the indicator (2) light turns OFF and the attachment switch becomes inoperable when the pilot control shut-off lever is placed in LOCK position while indicator (2) is lit. To operate the attachment switch, place the pilot control shut-off lever in UNLOCK position, and then push ON of electrical control main switch (1) to turn on indicator (2) light.

AUX Function Lever 1

1. Auxiliary
2. Power Boost Switch
3. Attachment Switch
4. Auxiliary
5. Horn Switch
6. Auxiliary



MDAA-01-337

MCGB-01-030

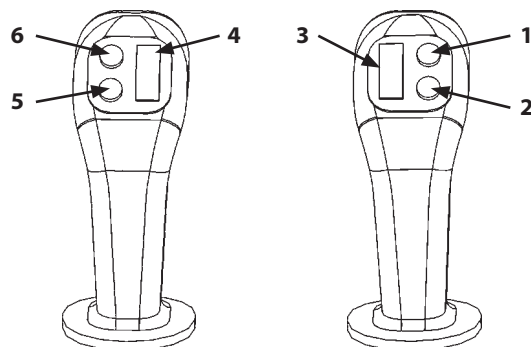
OPERATOR'S STATION

AUX Function Lever 2

1. Auxiliary
2. Power Boost Switch
3. Attachment Switch
4. Attachment Switch
5. Horn Switch
6. Auxiliary

CAUTION:

- **These switches are provided for operating attachments of this machine. HITACHI does not bear responsibility on any human injury, malfunction and/or physical loss or damage incurred by unauthorized application or use of unauthorized attachments, optional parts or modified switch, which will void Hitachi Warranty Policy.**
- **Before using this switch, thoroughly read the operation manual of the corresponding attachment and check the operation of each function in a safe area.**
- **Before operating an attachment with this switch, confirm the requirements on safe and proper mounting and operation of the attachment with its manufacturer or distributor and observe them.**



Left Control Lever

Right Control Lever

MCGB-01-029

MCGB-01-030

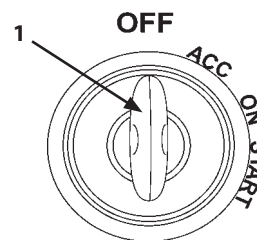
OPERATOR'S STATION

Cigar Lighter

Using Cigar Lighter

IMPORTANT: In case the cigar lighter does not pop out automatically 30 seconds after pushing the cigar lighter in, pull out the cigar lighter manually. Then, consult your nearest Hitachi dealer.

1. Turn key switch (1) to the ACC or ON position.
2. Press and release the lighter knob.
3. The cigar lighter knob will return to the original position when the lighter becomes usable. Pull the cigar lighter out to use.
4. After using the cigar lighter, insert the cigar lighter into the panel until the knob is seated in the original position.



MDCD-01-030

Using Cigar Lighter Port as External Power Source

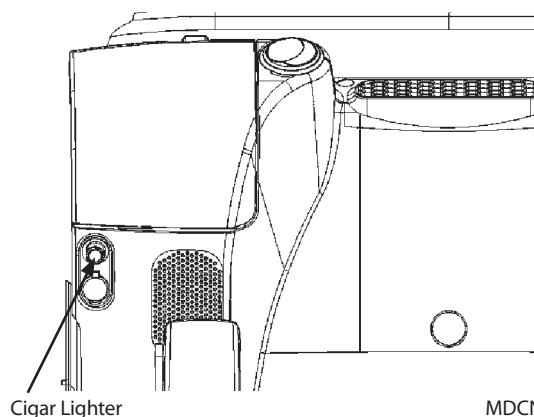
Use the cigar lighter port to supply power to lighting equipment for servicing the machine.

IMPORTANT: Only 24 V electric power is available from the cigar lighter port on this machine.

Never connect accessories that use power other than 24 V. Damage to the batteries and accessories may result.

Do not supply power to accessories for a long time without running the engine. Failure to do so may discharge the batteries.

1. Pull the lighter knob out.
2. Correctly insert the accessory socket into the cigar lighter port.
3. Turn key switch (1) to the ACC or ON position. Power is supplied to the connected accessory.
4. After using the accessory, disconnect the accessory socket and insert the cigar lighter into the port.



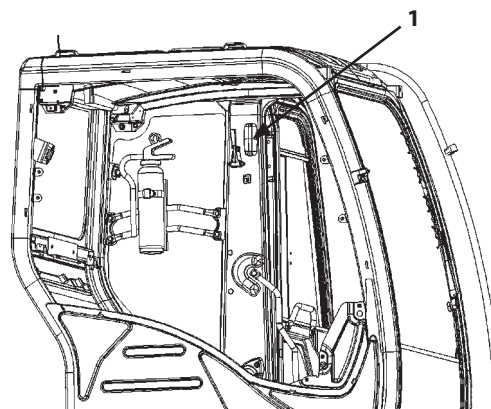
MDCN-01-006

OPERATOR'S STATION

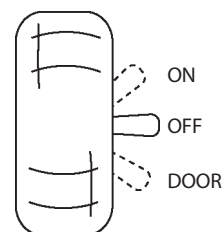
Cab Light Switch

Push switch (1) on the cab light to turn the cab light ON.

- ON : The cab light comes ON and stays ON.
(The light does not turn ON while the key is in OFF position.)
- OFF : The light goes OFF.
- DOOR : The room lamp goes ON when the cab door is opened.
The lamp automatically goes off after 30 seconds.
(The light turns ON while the key switch is OFF.)



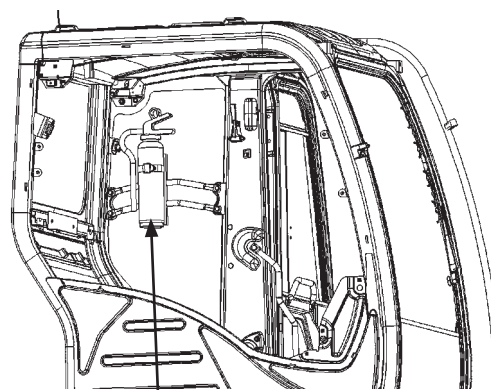
MDCN-01-007



MCGB-01-023

Installing Fire Extinguisher (Optional)

A fire extinguisher can be installed at the left rear corner inside the cab. Consult your nearest HITACHI dealer to install a fire extinguisher.



Fire Extinguisher

MDCN-01-007

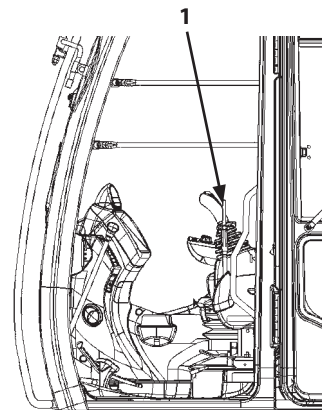
OPERATOR'S STATION

Pilot Control Shut-Off Lever

Pilot control shut-off lever (1) functions to prevent the machine from being mistakenly operated when the operator is getting on or off the machine.

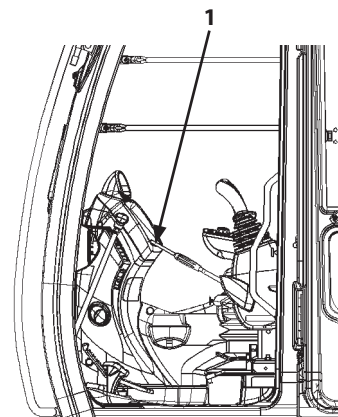
⚠ WARNING:

- **Always pull pilot control shut-off lever (1) into the full LOCK position. Unless pilot control shut-off lever (1) is fully moved to the LOCK position, the front control lever is not locked, possibly creating a hazardous situation.**
- **When leaving the machine, always stop the engine. Then, pull pilot control shut-off lever (1) up to the LOCK position.**
- **Always pull pilot control shut-off lever (1) up to the LOCK position before transporting the machine and leaving the machine.**
- **Confirm that pilot control shut-off lever (1) is in the LOCK position before starting the engine. The engine will not start in other than the LOCK position.**



LOCK position

MDCN-01-008



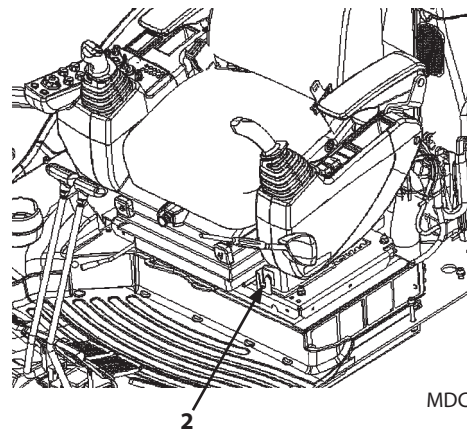
UNLOCK Position

MDCN-01-009

Engine Stop Switch

In case the engine does not stop even if the key switch is turned OFF due to failure of the machine, move switch (2) located at the front-left side of the seat stand downward to stop the engine.

After operating switch (2), be sure to return the switch back to the upward position.

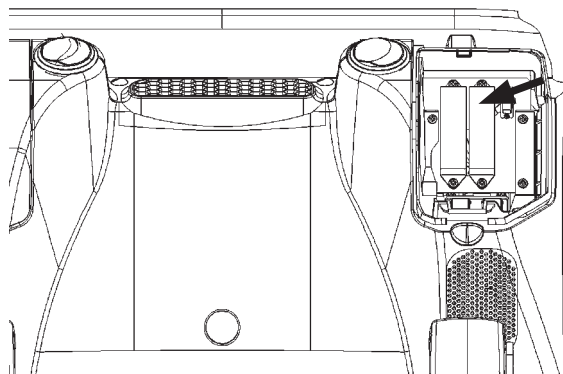


MDCN-01-004

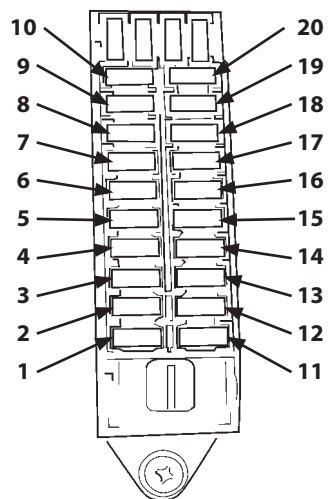
OPERATOR'S STATION

Fuse Box

- | | |
|-----------------------|-----------------------|
| 10- CONTROLLER
5 A | 20- OPTION3
5 A |
| 9- BACKUP
10 A | 19- HORN
10 A |
| 8- ECM
30 A | 18- IDLE STOP
5 A |
| 7- START
5 A | 17- POWER ON
5 A |
| 6- OPTION2
20 A | 16- GLOW. R
5 A |
| 5- OPTION1
5 A | 15- AUXILIARY
10 A |
| 4- SOLENOID
20 A | 14- MONITOR
5 A |
| 3- HEATER
20 A | 13- LIGHTER
10 A |
| 2- WIPER
10 A | 12- RADIO
5 A |
| 1- LAMP
20 A | 11- FUEL PUMP
5 A |



MDCN-01-010




M1GR-01-003

OPERATOR'S STATION

Auto Air Conditioner

Features:


- Full Auto-Temperature Control:
Automatically controls the cab temperature to maintain the temperature set by the temperature control switch regardless of outside air temperature and insolation.
- Max. Cooling and Heating:
Maximum cooling or heating can be obtained by rotating the temperature control switch clockwise (32 °C) or counterclockwise (18 °C) respectively.
- Preheating:
During preheating the cab in winter with the foot vent selected, the air volume is reduced to Low until the coolant temperature rises to prevent cool air from entering the cab.

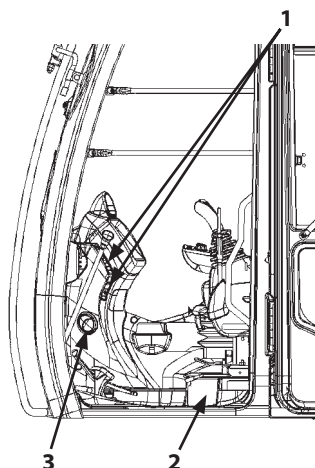
 *NOTE: Even in the summer season, the high idle speed may be higher than the normal speed due to the above control.*

OPERATOR'S STATION

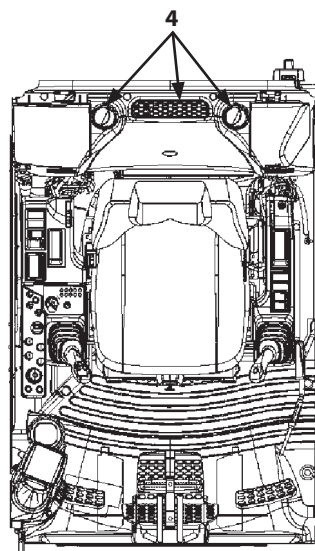
Components Name

- 1- Front Vent
- 2- Foot Vent
- 3- Defroster Vent
- 4- Rear Vent
- 5- Temperature Control Switch/Mode Switch
- 6- AUTO/OFF Switch/Fan Switch

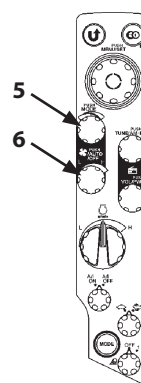
 **NOTE:** Air flow direction can be changed by controlling the louvers at all air vents except for foot vents (2). In addition, the louvers on front vent (1) and defroster vent (3) can be completely opened and closed by hand.



MDCN-01-008







MDCN-01-003

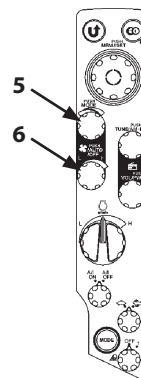


MDCD-01-026

OPERATOR'S STATION

Controller Part Name and Function

- Mode Switch (5)
Selects the air vent. The selected air vent is indicated on monitor (7).
-  Air flows out of front vent and the defroster vents.
(Including defroster vent)
 -  Air flows out of the front, rear and the defroster vents.
(Including defroster vent)
 -  Air flows out of the front, rear, foot and the defroster vents.
(Including defroster vent)
 -  Foot Vent Mode

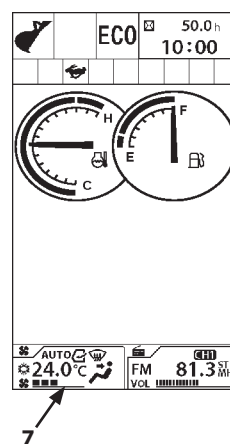


MDCD-01-026

Each time mode switch (5) is pressed, the vent location can be changed in four stages as illustrated below.



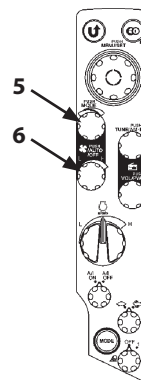
- When switch (6) is selected in AUTO:
The air vent location is automatically selected.
- Temperature Control Switch (5):
Sets temperature in the cab.
Temperature in the cab can be set from 18.0 to 32.0 °C by rotating temperature control switch (5). Temperature can be set by 0.5 °C increments.
The set temperature is displayed on monitor (7).



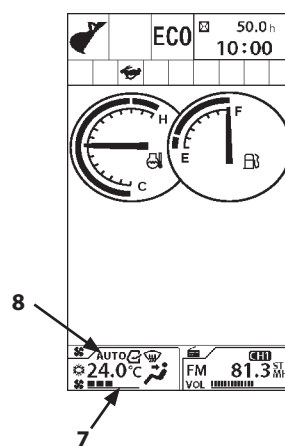
MDAA-01-001EN

OPERATOR'S STATION

- Blower Switch (6)
 - When the AUTO indicator (8) is ON, the blower speed is automatically controlled.
 - When AUTO indicator (8) is OFF, the blower speed is controlled in 6 steps. Rotate blower switch (6) clockwise to increase blower speed. Rotate blower switch (6) counterclockwise to decrease blower speed. The monitor (7) indicates the corresponding blower fan speed.
- AUTO/OFF Switch (6)
 - Push AUTO/OFF Switch (6) while the air conditioner is OFF, it turns into AUTO mode. Press AUTO/OFF switch (6) while operating the air conditioner, it stops operating.



MDCD-01-026



MDAA-01-001EN

OPERATOR'S STATION

Cab Heater Operation

1. AUTO switch (6):

According to signals sent from various sensors, the air conditioner amplifier automatically selects the air flow-in vents, air suction ports, and air flow-in temperature at the vent, and controls the blower speed.

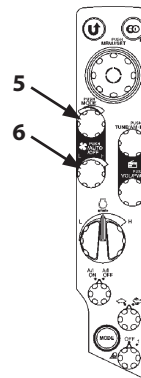
2. Temperature Control Switch (5):

Adjust temperature control switch (5) so that "25.0" is indicated on the monitor. Control air temperature inside cab using this switch as necessary.

3. As Necessary:

- Operate Mode switch (5) to manually select the air vent.
- Operate blower switch (6) to manually control the blower speed.
- Operate the air conditioner setting screen on the monitor to maintain the air vent in the fresh air mode or circulation mode.

Usually the cab heater turns the dehumidifier function OFF, however, it turns ON by switching the A/C to ON at the air conditioner setting screen.



MDCD-01-026

OPERATOR'S STATION

Cooling Operation

1. AUTO switch (6):

Press AUTO switch (6) to set the air conditioner in AUTO mode. According to signals sent from various sensors, the air conditioner amplifier automatically selects the air flow-in vents, air suction ports, and air flow-in temperature at the vent, and controls the blower speed.

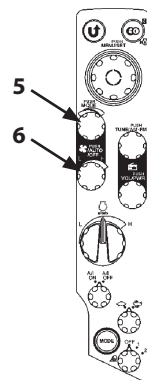
2. Temperature Control Switch (5):

Adjust temperature control switch (5) so that "25.0" is indicated on the monitor. Control air temperature inside the cab using this switch as necessary.

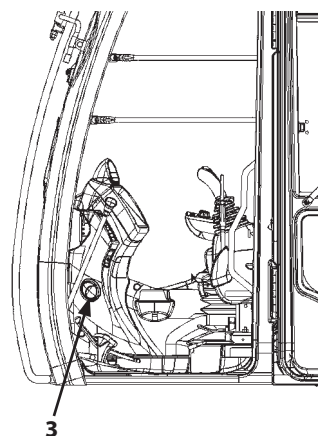
3. As Necessary:

- Operate Mode switch (5) to manually select the air vent.
- Operate blower switch (6) to manually control the blower speed.
- Operate the air conditioner setting screen on the monitor to maintain the air vent in the fresh air mode or circulation mode.

In case the front window (lower) becomes clouded, manually close the defroster vent (3). (It can be closed manually.)





MDCD-01-026



MDCN-01-008

OPERATOR'S STATION

Defroster Operation

1. Press AUTO Switch (6) to blow out temperature-controlled air. During cold weather season when starting the engine, the engine coolant temperature and air temperature in the cab are low. The Heater Start-Operation Control System controls the blow rate to the minimum (LO) in order to restrict cool air from flowing into the cab.
2. Adjust temperature control switch (5) so that "25.0" is indicated on the monitor. Set the fresh air circulation mode from air conditioner setting screen on the monitor.
3. Select the front vents  or the front and rear vents  using mode switch (5).


Control air flow direction by adjusting the louvers at the front vent (1) and the defroster vent (3).

Control air temperature in the cab by using temperature control switch (5).

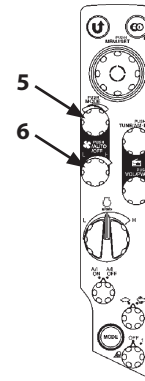
If the windowpanes become clouded in rainy season or wanted to eliminate moisture, turn A/C to ON at the air conditioner screen on the monitor.

Cool Head/Warm Feet Operation

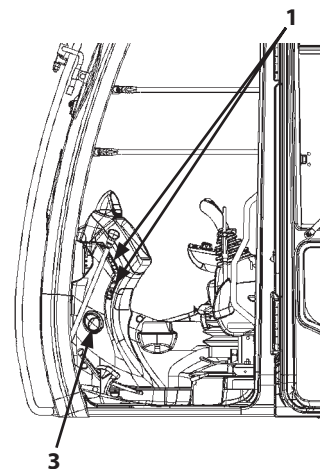
Cool and warm air is simultaneously supplied to the head vents and feet vents respectively.

1. Press blower switch (6) to adjust the blower speed.
2. Press MODE switch (5) to display the front and rear vent mark  on the monitor.
Turn A/C ON from the air conditioner setting screen on the monitor.

Control air temperature inside the cab by using temperature control switch (5).



MDCD-01-026



MDCN-01-008

OPERATOR'S STATION

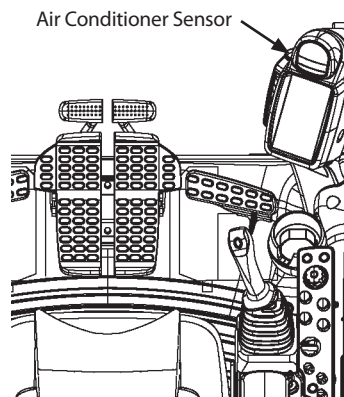
Tips for Optimal Air Conditioner Usage

For Rapid Cooling

Temperature in the cab may rise over 80 °C (176 °F) when the machine is exposed to sun light in the summer. In this case, ventilate air in the cab first by opening the windows for rapid cooling.

After starting the engine, press AUTO switch (6). Set temperature to "18.0" on the monitor by using temperature control switch (5). Turn circulation mode ON from air conditioner setting screen on the monitor.

Close the window when the cab cools down to the ambient temperature.



MDAA-01-292

When Windows Become Clouded

If the insides of the windows become clouded during rainy weather or on humid days, operate the air conditioner to aid in keeping the windows clear.

When the atmosphere is very damp, and if the air conditioner has run excessively, the outside of the windows may become clouded. If this happens, turn off the air conditioner to adjust the temperature in the cab.

Off-Season Air Conditioner Maintenance

To protect each part of the compressor from a lack of lubricant, operate the air conditioner at least once a month for several minutes with the engine running at a slow speed during off-season.

IMPORTANT:

- **Do not suddenly increase the engine speed. Failure to do so may damage the compressor.**
- **Refer to the item "Check Air Conditioner Filter" in the Maintenance Section for maintenance of the air conditioner filters.**
- **Always clean the auto air conditioner sensor for effective air conditioner performance. Avoid placing any obstructions around the sensor.**

OPERATOR'S STATION

AM/FM Radio Operation

CAUTION: Refrain from listening to the radio in the cab while operating the machine

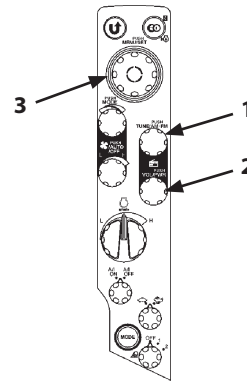
Controls on the Radio

1- AM/FM Selector/Tuning Switch

"FM" and "AM" are switched over alternately each time the switch is pressed. Rotate the tuning knob clockwise to increase frequency, counterclockwise to decrease frequency.

2- Power Switch/Volume Control Knob

Push: Turns power ON/OFF. Turn the volume control knob clockwise to increase the sound volume. Turn it counterclockwise to decrease the sound volume.



MDCD-01-026

Tuning Procedure

• Manual Tuning Procedure

Rotate tuning switch (1) until the desired station is reached.

• Automatic Search Function

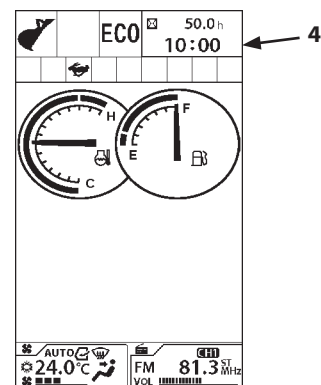
1. Press selector knob (3) while displaying basic screen (4) to display main menu screen (5).

2. Rotate selector knob (3) to highlight Radio (6).

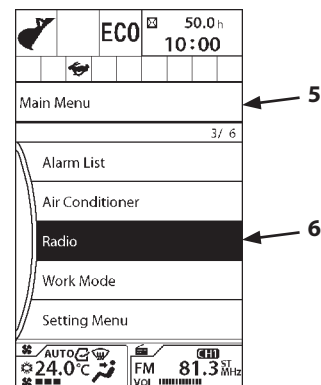
Press selector knob (3) to display the radio screen.

Rotate selector knob (3) to highlight seek (8). Push selector knob (3) to go to the next higher frequency station. Press selector knob (3).

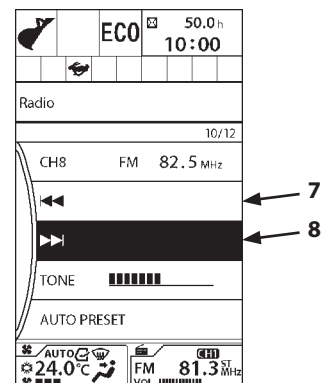
Rotate selector knob (3) to highlight seek (7). Push selector knob (3) to go to the next lower frequency station. Press selector knob (3).



MDAA-01-001EN



MDAA-01-092EN



MDAA-01-095EN

OPERATOR'S STATION

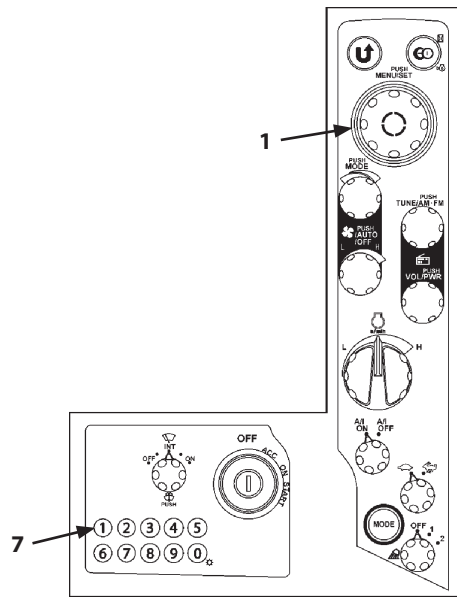
Station Presetting Procedure

Setting from Monitor

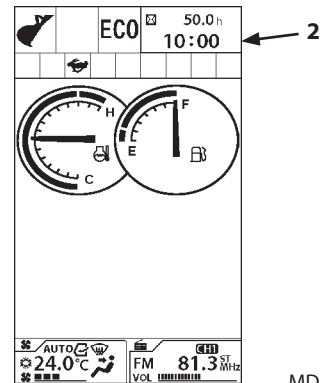
1. Select the desired station. Refer to the "Tuning Procedure" in the previous section.
2. Press selector knob (1) while displaying basic screen (2) to display main menu screen (3). Rotate selector knob (1) to highlight radio (4).
3. Press selector knob (1) to display Radio screen (5).
4. Rotate selector knob (1) to highlight a CH to preset a station. (CH1 to CH8)
5. Press and hold selector knob (1) for more than 1 second. The current station is preset to the selected CH.

Setting from numeric keypad

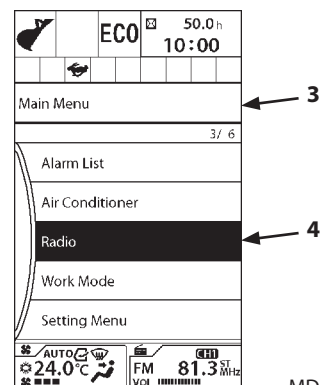
1. Select the desired station. Refer to the "Tuning Procedure" in the previous section.
2. Press and hold one numeric keypad (1 to 8) for more than 1 second. The current station is preset to the selected number of CH.



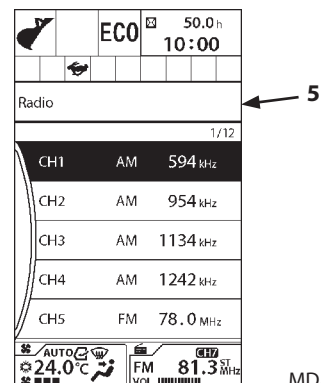
MDCD-01-027



MDAA-01-001EN



MDAA-01-092EN



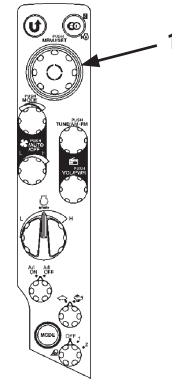
MDAA-01-093EN

OPERATOR'S STATION

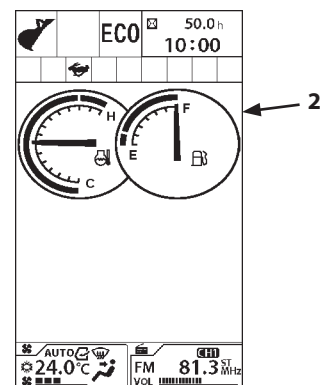
Station Auto-Presetting Procedure

Receivable stations can be automatically sought and preset to the memory.

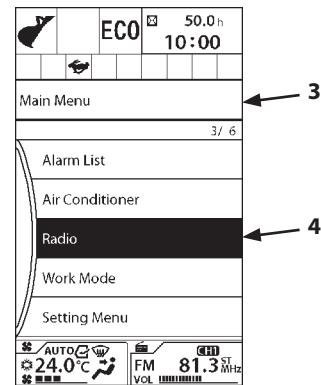
1. Press selector knob (1) while displaying basic screen (2) to display main menu screen (3).
2. Rotate selector knob (1) to highlight Radio (4).
Press selector knob (1) to display Radio screen (5).
3. Rotate selector knob (1) to highlight AUTO PRESET (6).
4. Press selector knob (1) to start AUTO PRESET process.
The AUTO PRESET scans reception frequency, allocate sought stations to CH1 to CH8 from sensitive station. AM will be preset to CH1 to 4, FM will be preset to CH5 to 8.
Operating the radio during scan stops the AUTO PRESET.



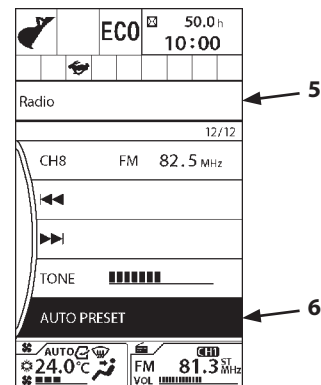
MDCD-01-026



MDAA-01-001EN



MDAA-01-092EN

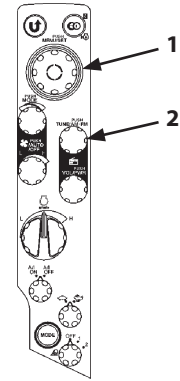


MDAA-01-099EN

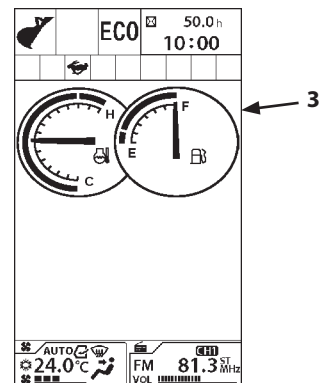
OPERATOR'S STATION

TONE Control

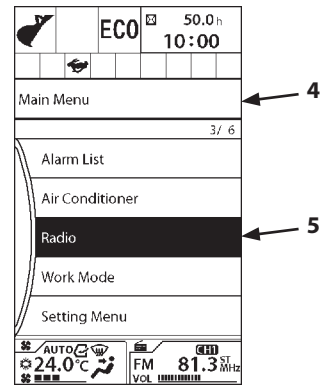
1. Press selector knob (1) while displaying basic screen (3) to display main menu screen (4).
2. Rotate selector knob (1) to highlight Radio (5).
Press selector knob (1) to display Radio screen (6).
3. Rotate selector knob (1) to highlight TONE (7).
4. Press selector knob (1) to adjust TONE control. Rotate selector knob (1) clockwise to boost treble. Rotate selector knob (1) counterclockwise to boost bass. Press selector knob (1) to enable the changes.



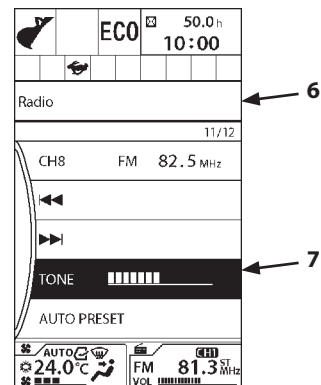
MDCD-01-026



MDAA-01-001EN



MDAA-01-092EN



MDAA-01-096EN

OPERATOR'S STATION

Audio Input (Optional)

IMPORTANT: This function is available only to a machine equipped with an audio input (optional). Use this function with proper sound volume.

Audio Input Selection

Attach the audio input (optional) device and push AM/FM Switch/Tuning Switch (1) to display AM and FM screen as well as AUX input screen (3).

Connecting audio device

By removing AUX IN Cap (4), the audio input terminal appears.

Connect your audio device to the audio input terminal of the machine with your audio cable.

IMPORTANT: Use $\Phi 3.5$ mm stereo plug for the connection of audio input terminal.

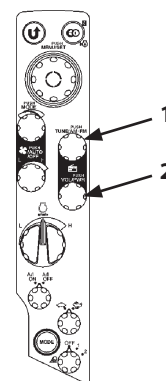
IMPORTANT: Put AUX IN cap (4) when the audio input is not in use.

Volume Control of audio device

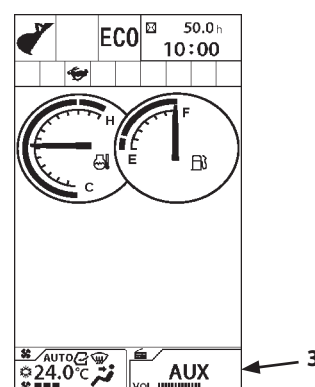
Turn the volume down to the minimum beforehand, and then turn volume control knob (2) clockwise to adjust the volume.

IMPORTANT: If volume control knob (2) has been set to the maximum, you will hear an overwhelming sound; so set the volume control knob to the minimum first and then turn it clockwise to increase it. Adjust the volume knob on the audio device if the sound is too low even volume control knob (2) is set at top.

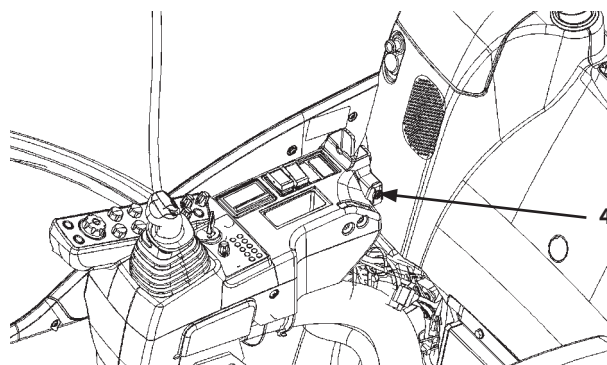
IMPORTANT: Operate your audio device to play or stop the sound.



MDCD-01-026



MDAA-01-340



MDCN-01-011

OPERATOR'S STATION

Side Monitor (Optional)

An image captured by side camera (5) or rear view camera (4) is displayed on side monitor (1) located in the cab.

IMPORTANT: Image displayed on the side monitor is of auxiliary nature at best. Actual position and distance of people and objects in the monitor will be different. When operating the machine, pay thorough attention to the surrounding situation.

Layout

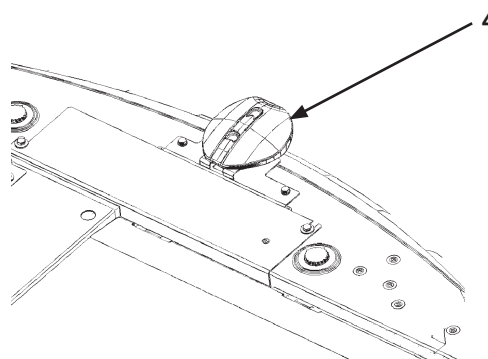
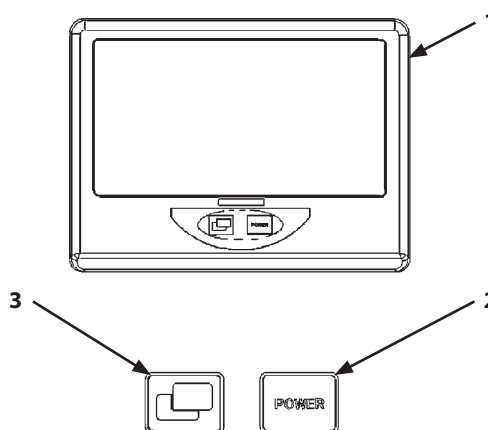
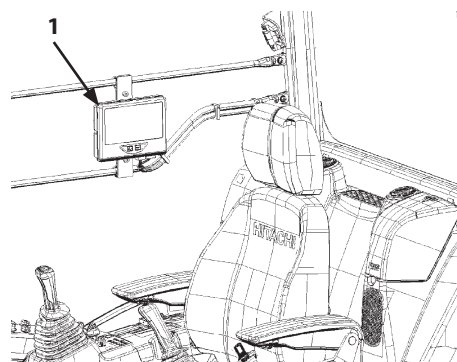
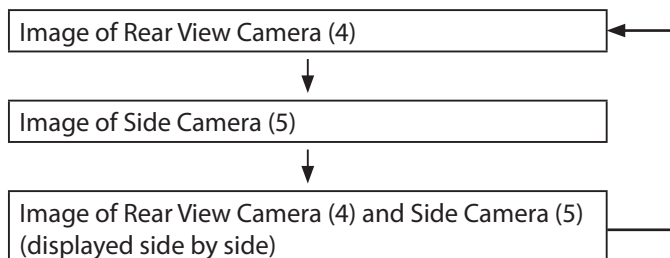
1. Side Monitor
2. Power Switch
3. Screen Changeover Switch
4. Rear View Camera
5. Side Camera

Monitor Operation


Each time power switch (2) of side monitor (1) is pressed, power of side monitor (1) turns ON/OFF. When power is ON, image will be displayed on side monitor (1).

Press screen changeover switch (2) while the side monitor is ON, image displayed on the side monitor switches.

There are three image patterns. Each time screen changeover switch (2) is pressed, the image is switched.

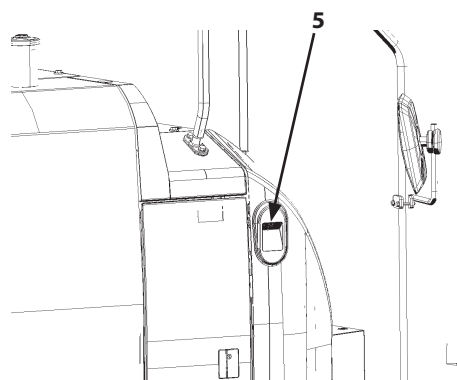


IMPORTANT: In order to obtain a clear image, clean the lens and the monitor display before operating the machine.

 **NOTE:** The monitor and camera lens surface is a resin product. Lightly wipe the surface with a wet clean cloth. Never use an organic solvent.

IMPORTANT:

- Never attempt to change mounting position of rear view camera (4) and side camera (5).
- Consult your authorized dealer if any abnormality is found on the image of monitor (1).

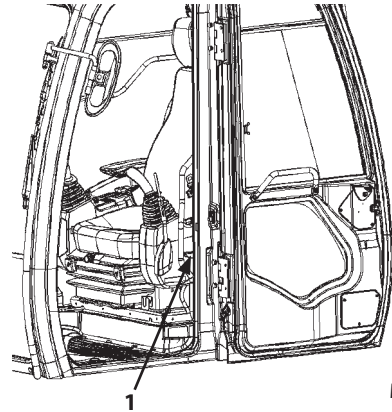


OPERATOR'S STATION

Cab Door Release Lever

CAUTION:

- **Open the cab door all the way until it securely locks in the latch on the side of the cab.**
- **Do not unlock the cab door when the machine is parked on a slope or while the wind is blowing hard. The cab door may close accidentally, possibly resulting in personal injury.**
- **When opening or closing the cab door, take extra care not to catch fingers between the base machine and the cab door.**



MDCN-01-012

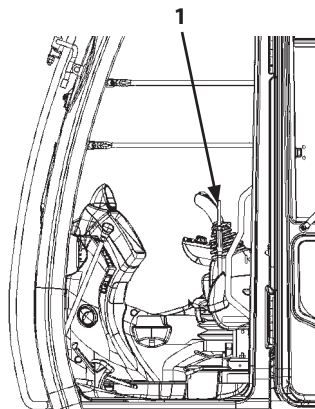
To unlock the door, push down on lever (1).

OPERATOR'S STATION

Opening/Closing and Removing Cab Inside Window

⚠ WARNING:

- Open, close or remove the upper-front cab window, overhead window, cab door window or lower-front window only after lowering the front attachment to the ground and pulling up pilot control shut-off lever (1) to the LOCK position. Failure to do so may allow the machine to move unexpectedly if a control lever or pedal is touched with a part of the body by mistake, possibly resulting in personal injury or death.
- Park the machine on a level and solid ground and stop the engine before opening and closing the upper front window.
- To open the upper front window, hold the window by hands, hold it until the window is locked.
- When closing the window, it may accidentally fall by its own weight. Hold the window by hands until it is completely closed. Since the window stops before it completely closes, do not operate the machine at the position with the window being stopped. The window is not locked at that position, having the possibility of suddenly dropping.




MDCN-01-008

OPERATOR'S STATION

Opening Upper Front Window

Opening Upper Front Window

1. Press lock release lever (1) at the upper center to release the upper front window lock.
2. Holding lock release lever (1) at the upper center and lower handle (4) on the upper front window as illustrated, pull the upper front window up and back until auto locks (3) at both sides of the upper front window securely catches into the strikers on the ceiling.
3. After confirming that the window securely catches into auto locks (3), slide lock pin (2) into the left bracket boss hole to lock the window in position.


 **NOTE:** When the upper front window is opened, the wiper and washer are inoperable.

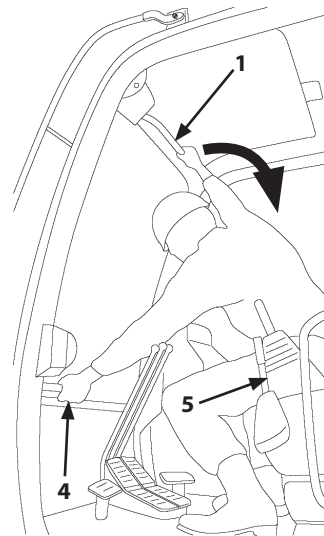
CAUTION:

- **Slowly close the upper front window so that not to catch your fingers.**
- **Always secure lock pin (2) in the lock position after the upper front window is opened.**
- **Always pull pilot control shut-off lever (5) to the LOCK position before opening or closing the upper front window.**

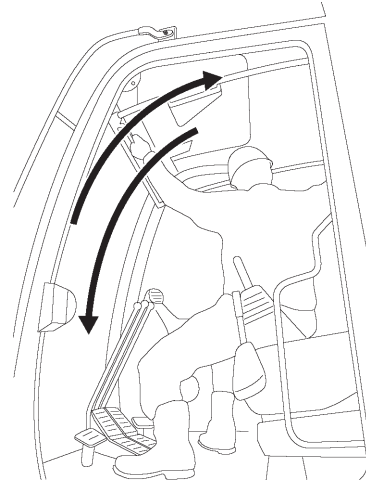
4. To close the upper front window, hold lock release lever (1) at the upper center and lower handle (4) on the upper front window as illustrated, and follow the steps 1 to 3 in the reverse order. The window stops before it completely closes, so close the front window by pushing release lever (1) upward.

Push lock release lever (1) downward to release auto lock (3).

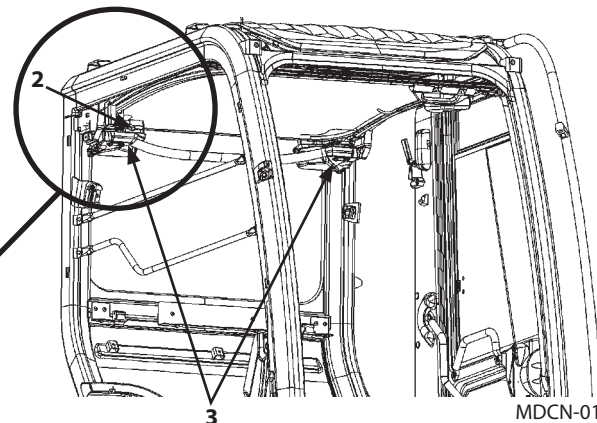
 **NOTE:** Unless the upper front window is securely closed, the wiper and washer will not operate.



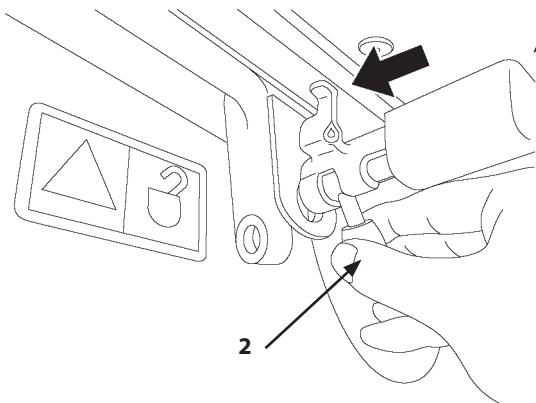
MDAA-01-358



MDAA-01-359



MDCN-01-014



MDAA-01-360

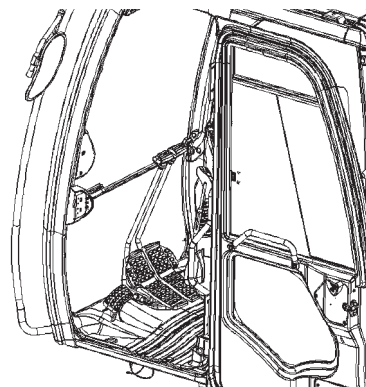
OPERATOR'S STATION

Removing and Storing Lower Front Window

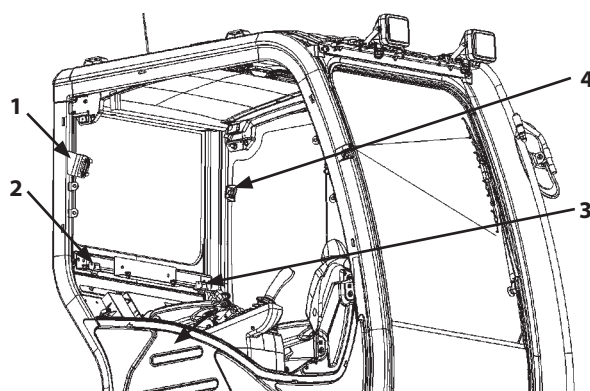
CAUTION: Take care not to pinch your fingers when handling the lower front window.

Removing and Storing Lower Front Window

1. Open the upper front window beforehand when removing the lower front window.
2. While pulling the lower front window inward, raise it to remove.
3. Store the removed windowpane in the storing position. After inserting the windowpane into rubbers (2 and 3), slide it sideways securely into rubber (4). Then, push fastener (1) to lock.



MDCN-01-015

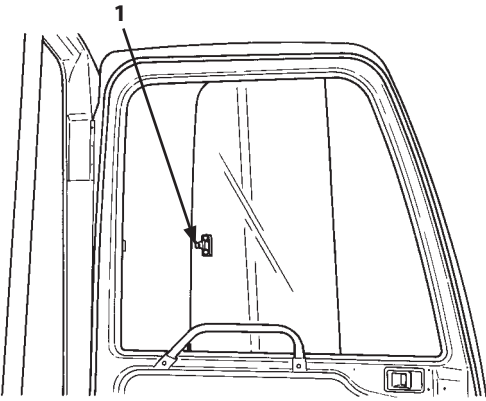


MDCN-01-016

OPERATOR'S STATION

Opening Side Windows

Hold handle (1) and slide rear pane to open the side window.



Side Window

M178-01-061

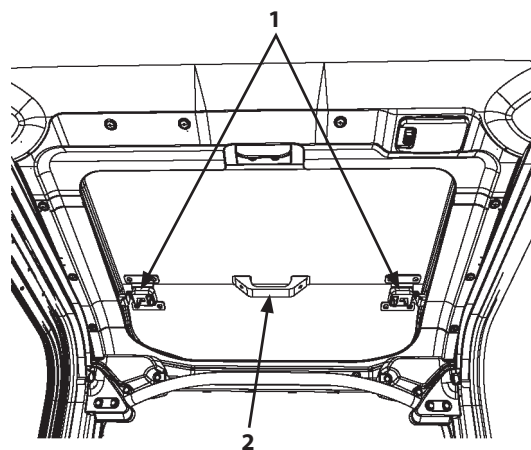
OPERATOR'S STATION

Opening/Closing Overhead Window (Std. Model)

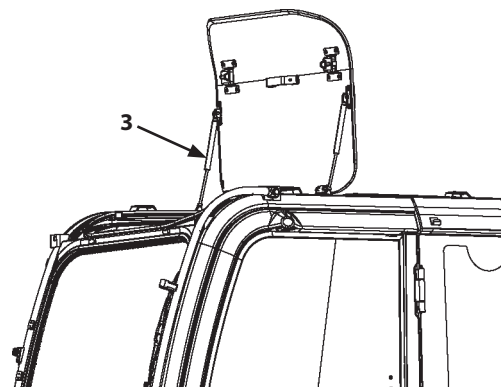
Move lock levers (1) toward center of window. Hold handle (2) and lift window until it rises upright. With the window positioned upright, it will be secured in position by dampers (3).

Hold handle (2) and pull window down until "click" sound is heard from left and right locks (1).

Note that the overhead window can be used as an emergency exit.



MDAA-01-302



MDAA-01-303

OPERATOR'S STATION

Opening/Closing Overhead Window (Clear Hatch: If Equipped)

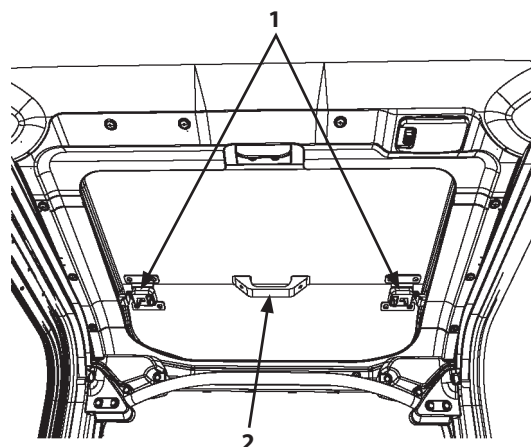
Move lock levers (1) toward center of window. Hold handle (2) and lift window until it rises upright. With the window positioned upright, it will be secured in position by dampers (3).

Hold handle (2) and pull window down until "click" sound is heard from left and right locks (1).

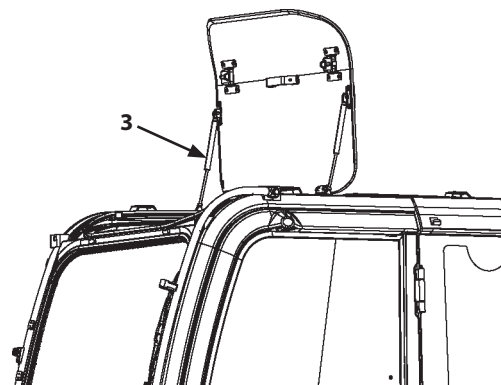
Note that the overhead window can be used as an emergency exit.

IMPORTANT:

- **Replace the clear hatch with a new one every 5 years even if undamaged. In case it was remarkably damaged or has received severe shock loads, replace it even if it has been not in use for 5 years.**
- **When cleaning the clear hatch, use a neutral detergent. If acidic or alkaline detergent is used, the clear hatch may become discolored or crack.**
- **Keep organic solvent away from the clear hatch. Failure to do so may cause the clear hatch to become discolored or crack.**



MDAA-01-302



MDAA-01-303

OPERATOR'S STATION

Emergency Exit

Escape from the cab in emergency in the following methods:

CAUTION: The danger of downfall is always present when escaping from the cab in emergency, possibly resulting in serious personal injury. Escape from the cab as safely as possible, depending on the posture of machine and the outside situation.

1. Open the cab door. Escape through the door.
2. If the cab door should be difficult to open or use, open the upper front window. Escape through the window.

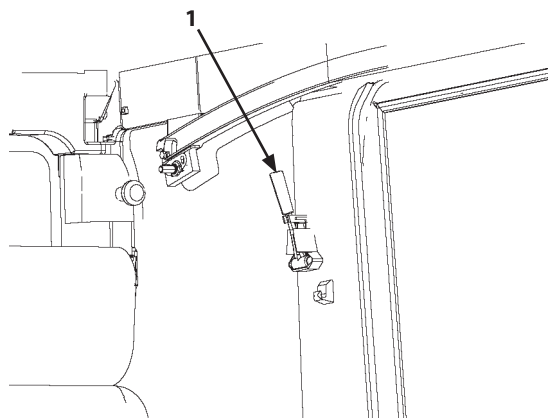
NOTE: Emergency exit decals (2) are affixed to the front and rear windows. See page "OPENING UPPER FRONT WINDOW" for the opening method of the upper front window.

CAUTION: If decal (3) is affixed to the front window glass, the glass can be broken. However if decal (3) is not affixed to the front window glass, the glass cannot be broken with emergency evacuation hammer (1). Take care not to be injured with pieces of broken glass.

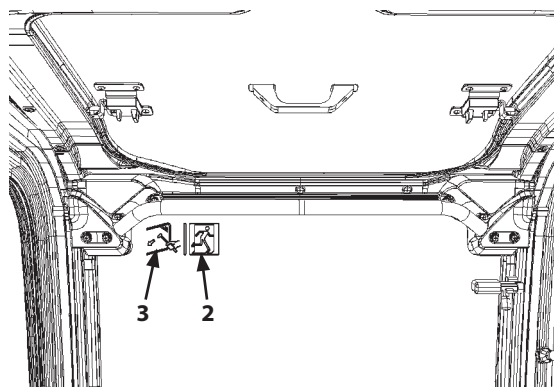
3. If upper front window should be difficult to open, check the decal (3) affixed to the window glass.

If decal (3) is affixed to the front window glass, break the front window glass using the emergency evacuation tool (1) installed the cab left side. Then escape through the broken window.

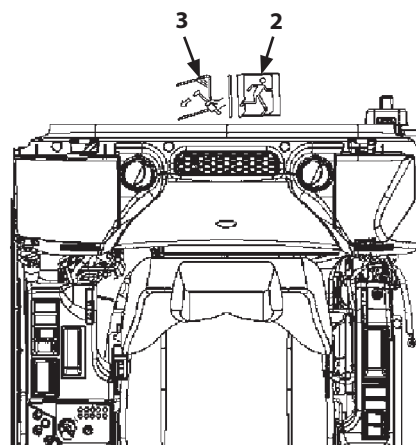
4. If decal (3) is not affixed to the front window glass, or if the front window is not available for escaping, break the rear window glass using the emergency evacuation tool (1). Then escape through the broken window.
5. If neither of front and rear windows is available for emergency exit, open the overhead window to escape from the cab.



MDAA-01-321



M1U4-01-012



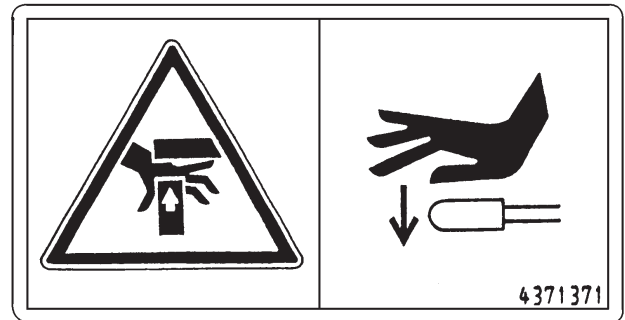
MDCN-01-017

OPERATOR'S STATION

Adjusting Operator's Seat

⚠ WARNING: Adjust the seat only after lowering the front attachment on the ground and pulling up the pilot control shut-off lever to the LOCK position. Failure to do so may allow the machine to move unexpectedly if a control lever or pedal is touched with a part of the body by mistake, possibly resulting in personal injury or death.

⚠ CAUTION: Avoid possible injury while operating height/tilt lever (1). When pushing down lever (1), do not grab it. Fingers may be pinched between lever (1) and the seat stand. Be sure to push on the upper face of lever (1) by your palm.



SS-955

Seat Height and Angle Adjustment

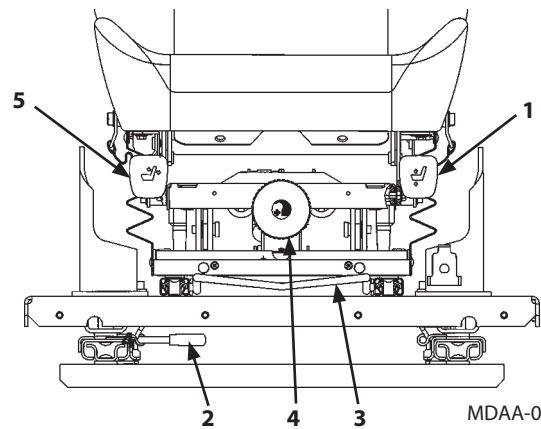
Seat height adjustment range is 60 mm with steps every 15 mm (5 positions in total).

Push down lever (1): to adjust front part of the seat.

Pull up lever (1): to adjust rear part of the seat.

Console and Seat Fore-aft Adjustment

Operate console and seat slide lever (2) to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Seat and console fore-aft adjustment range is 80 mm with steps every 20 mm.



MDAA-01-331

Seat Fore-Aft Adjustment

Operate seat slide lever (3) to adjust the seat to desired distance from the travel pedals and levers. Seat fore-aft adjustment range is 160 mm with steps every 10 mm.

Suspension Adjustment

Rotate knob (4) to adjust the suspension.

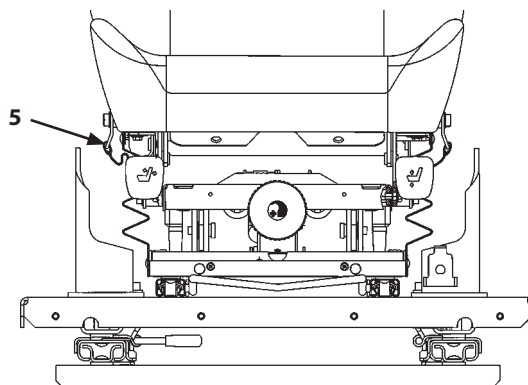
Rotate knob (4) clockwise (+ direction) to increase suspension stiffness.

Rotate knob (4) counterclockwise (- direction) to decrease suspension stiffness.

OPERATOR'S STATION

Backrest Adjustment

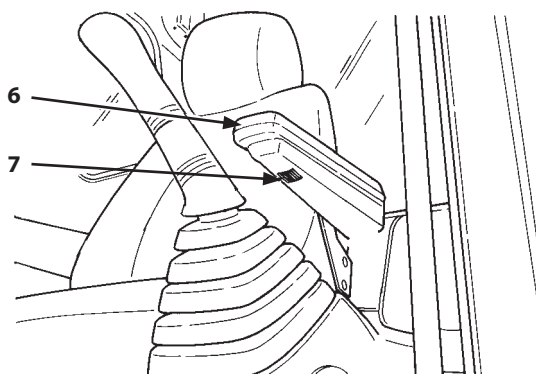
Pull up lever (5) to release backrest lock. Move backrest to the desired position and release lever (5).



MDAA-01-331

Armrest Adjustment

Armrest (6) can be pulled upright by hand 90°. Pull the armrest upright by hand to get on and off the machine easily. The angle of armrest (6) can be adjusted to the desired position by turning adjusting dial (7) located on the bottom of armrest (6).



M1G6-01-017

OPERATOR'S STATION

Adjusting Operator's Seat (Optional)

⚠ WARNING: Adjust the seat only after lowering the front attachment on the ground and pulling up the pilot control shut-off lever to the LOCK position. Failure to do so may allow the machine to move unexpectedly if a control lever or pedal is touched with a part of the body by mistake, possibly resulting in personal injury or death.

Adjusting Seat Height

IMPORTANT: The seat is an air suspension type.

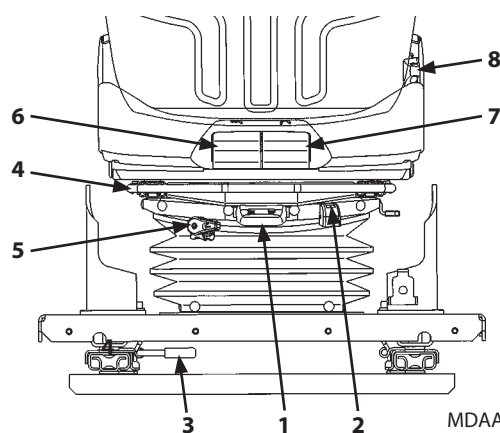
Pull lever (1) upward to fill air and raise the seat. Push lever (1) downward to release air and lower the seat. When the seat is properly adjusted for your weight, indicator (2) is in the green zone.

Console and Seat Fore-aft Adjustment

Operate console and seat slide lever (3) to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Seat and console fore-aft adjustment range is 80 mm with steps every 20 mm.

Seat Fore-Aft Adjustment

Operate seat slide lever (4) to adjust the seat to desired distance from the travel pedals and levers. Seat fore-aft adjustment range is 140 mm with steps every 10 mm.



OPERATOR'S STATION

Suspension Adjustment

Rotate knob (5) to adjust the suspension.

Rotate knob (5) clockwise to decrease suspension stiffness.

Rotate knob (5) counterclockwise to increase suspension stiffness.

Fore-Aft Position Adjustment of Seat Surface

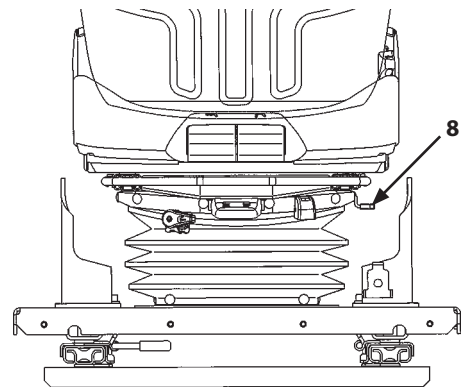
Pull lever (6) upward to adjust the seat angle. Seat and console fore-aft adjustment range is 60 mm with steps every 15 mm.

Angle Adjustment of Seat Surface

Pull lever (7) upward to adjust the seat angle. Height of the seat end is adjustable in 4 steps.

Backrest Adjustment

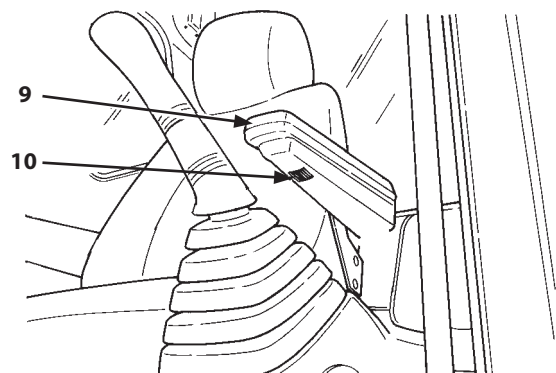
Pull up lever (8) to release backrest lock. Move backrest to the desired position. Move backrest to the desired position and release lever (8).



MDAA-01-333

Armrest Adjustment

Armrest (9) can be pulled upright by hand 90°. Pull the armrest upright by hand to get on and off the machine easily. The angle of armrest (9) can be adjusted to the desired position by turning adjusting dial (10) located on the bottom of armrest (9).



M1G6-01-017

OPERATOR'S STATION

Console Height Adjustment

Adjust the console height to the operator's comfort and/or work conditions.

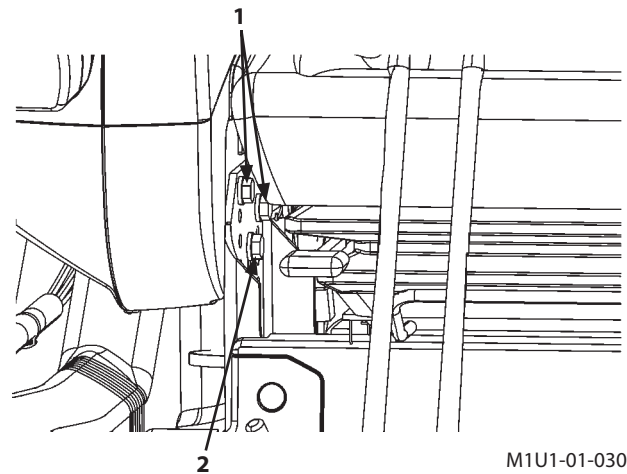
Adjusting console height can be achieved using three positions provided vertically at 20 mm intervals.

⚠ CAUTION: Before loosening the console, support the console. Otherwise, the console may suddenly drop, possibly causing personal injury.

Adjusting Procedures

1. Lower the bucket to the ground. Stop the engine.
2. Move the pilot control shut-off lever to the LOCK position.
3. Remove left and right console holding bolts (1). Loosen bolts (2) to adjust the console height.
4. After adjusting, tighten bolts (1) and (2).

Tightening Torque: 50 N·m (5 kgf·m)



M1U1-01-030

OPERATOR'S STATION

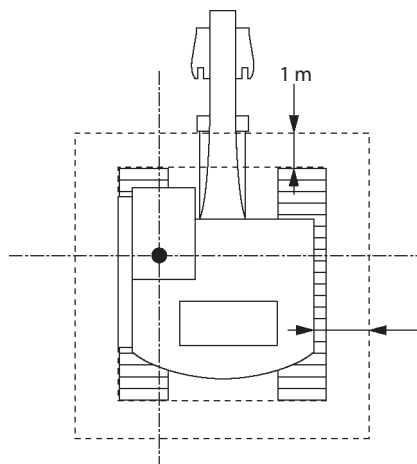
Installation and Adjustment of Mirrors

⚠ WARNING: Adjust the mirrors before operating the machine. Improper adjustment of the mirrors provides poor visibility, which may cause serious human injury or death.

IMPORTANT: The image displayed on the rear view monitor is meant only as an aid. When operating the machine, pay thorough attention to the surrounding situation.

Adjust the mirrors so that persons standing within 1 m from the machine (or object with height of 1.5 m and 30 cm in diameter) can be recognized from the operator's seat.

IMPORTANT: If a modification that may restrict operator's visibility is made, determine the operator's visual field again.



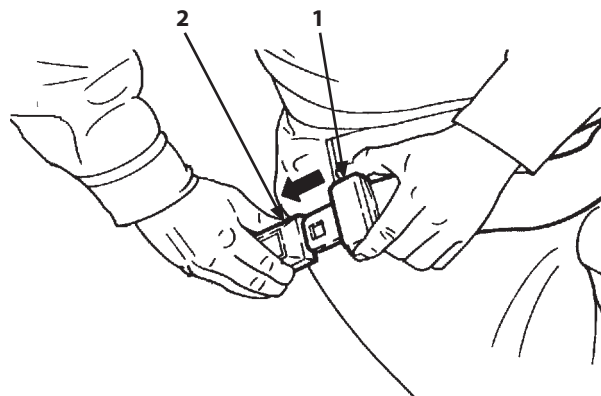
MDAA-01-334

OPERATOR'S STATION

Seat Belt

WARNING:

- Be sure to use seat belt (1) when operating the machine.
- Before operating the machine, be sure to examine seat belt (1) and attaching hardware for any failure. If any damage and/or wear are found, replace the part concerned.
- Replace seat belt (1) every 3 years regardless of appearance.

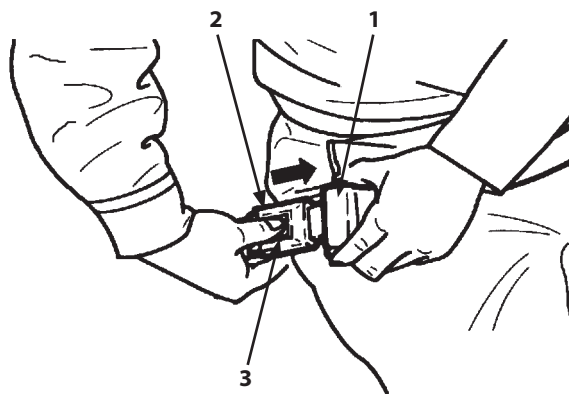


M1U1-01-031

Seat Belt

1. Confirm that seat belt (1) is not twisted. Securely insert the end of seat belt (1) into buckle (2). Lightly pull on the belt to confirm that the buckle latches securely.
2. Push button (3) on buckle (2) to unfasten seat belt (1).

Replace the seat belt if it is damaged or worn, or if the seat belt has external damage such as an accident.



M1U1-01-032

OPERATOR'S STATION

Battery Disconnect Switch

IMPORTANT: Do not turn the disconnect switch OFF while engine is running or the key switch is other than the OFF position. Failure to do so may damage the electrical system.

The disconnect switch differs from the engine start key switch. When the disconnect switch is turned OFF, the electrical system is cut off, so no electric current flows into the entire circuit.

Before turning the disconnect switch OFF, be sure to turn the key switch "OFF" and wait 1 minute or more after the engine stops. If the disconnect switch is turned OFF within 1 minute after the engine stops, it may result in malfunction of the electrical system. When the disconnect switch is turned to OFF to ON, the preset data of the radio or clock may be initialized. Set the radio and clock again.

Use the disconnect switch for the following purposes only.

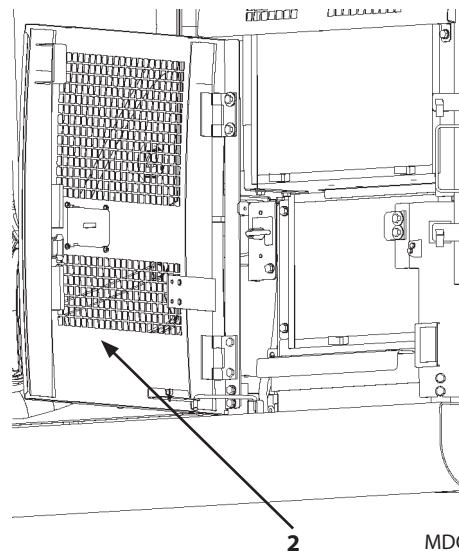
- Before maintaining or servicing the electrical system
- Before storing the machine for long period of time, preventing the battery discharge
- Before welding operation on the machine body
- Before replacement the battery

Switch Operation

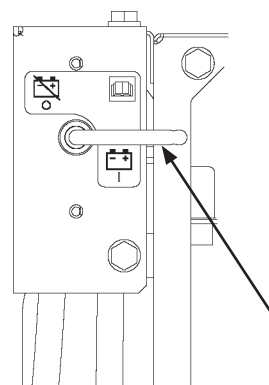
1. Open cover (2).

When lever (1) is in the horizontal direction, the disconnect switch is ON. When lever (1) is in the vertical direction, lever (1) can not be removed.

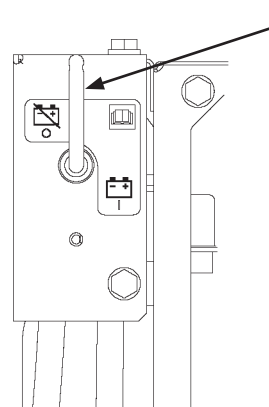
2. When lever (1) is turned counterclockwise to the vertical position, the disconnect switch turns OFF. Lever (1) can be removed from disconnect switch when it is in the OFF position.



MDCN-01-019



MDCN-01-020



MDCN-01-021

BREAK-IN

Observe Engine Operation Closely

IMPORTANT: Be extra cautious during the first 50 hours, until you become thoroughly familiar with the sound and feel of your new machine.

1. Operate the machine only in economy (ECO) mode and limit the engine horsepower up to about 80 % of full load.
2. Avoid excess engine idling.
3. Check indicator lights and gauges frequently during operation.

Every 8 Hours or Daily

1. Perform 8-hour or daily service. (See Maintenance guide -- 8 hours.)
2. Watch for fluid leaks.
3. Lubricate working tool pivots every 8 hours for the first 50 hours, and every 8 hours when working in mud and water.

After the First 50 Hours

1. Perform 50-hour service. (See Maintenance guide -- 50 hours.)
2. Check accessible hardware torque. (See Hardware Torque Specifications in Maintenance chapter.)

After the First 100 Hours

Perform 50-hour and 100-hour service. (See Maintenance Guide -- 50 hours and 100 hours.)

OPERATING THE ENGINE

Inspect Machine Daily Before Starting

Perform the required daily check before starting the engine.

- Refer to "Maintenance" chapter for detailed information.

Check Points		Check Points	
Engine	<ol style="list-style-type: none"> 1. Level and contamination of engine oil and coolant 2. Starting easiness, exhaust gas color, and noise 3. Oil and water leaks, damage to hoses and pipe lines 4. Clogging and damage to radiator, oil cooler and intercooler 	Undercarriage	<ol style="list-style-type: none"> 1. Sag, wear and break of crawler 2. Oil leaks and wear on upper/lower rollers and front idlers 3. Oil leaks from travel devices 4. Looseness and missing of mounting bolts and nuts
	<ol style="list-style-type: none"> 5. Looseness and missing of mounting bolts and nuts 		<ol style="list-style-type: none"> 1. Check cylinders, pipe lines and hoses for oil leaks and damages. 2. Wear and damage of the bucket 3. Check bucket teeth for looseness, wear and missing 4. Lubrication state of the working device 5. Check for pin anti-extraction pins, stoppers, rings and bolts for damage 6. Looseness and missing of mounting bolts and nuts
Upperstructure	<ol style="list-style-type: none"> 1. Fuel level, leaks and contamination of fuel in tank 2. Hydraulic oil level, leaks and contamination of hydraulic oil tank 3. Movement, play and operating force of all control levers 4. Operation of all hydraulic components, oil leaks and damage to pipe lines and hoses 5. Deformation, break and abnormal noise of upper structure 6. Looseness and missing of mounting bolts and nuts 7. Washer Fluid 	Working Device	<ol style="list-style-type: none"> 1. Operation of instruments, switches, lights and buzzer/horn 2. Function of parking brake 3. Deformation and break of head guard 4. Abnormal outside appearance of machine 5. Wear and damage of the seat belt
			Others

OPERATING THE ENGINE


Before Starting Engine

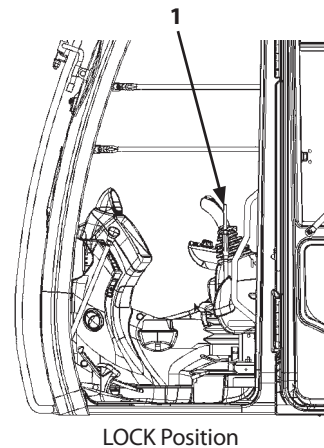
1. If the machine is equipped with the battery disconnect switch, confirm that the battery disconnect switch is ON position.
2. Confirm that pilot control shut-off lever (1) is in the LOCK position.
3. Confirm that all control levers are placed in neutral.
4. Insert key switch (2). Turn it to ON position. Press and hold switch (3) with the engine stopped.

IMPORTANT: Always check the machine on a firm, level surface. Never attempt to start the engine while checking the machine.

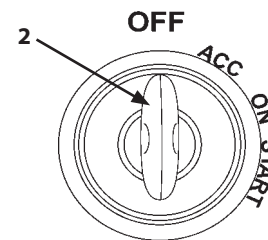
If engine oil level (4) (green) is displayed, the status is normal.

5. Adjust the seat to allow full pedal and control levers stroke with operator's back against the backrest. Fasten the seat belt.

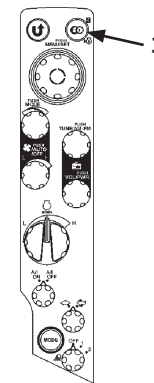
 **NOTE:** The monitor surface is a resin product. When the surface becomes dusty, lightly wipe the surface with a wet cloth. Never use an organic solvent.



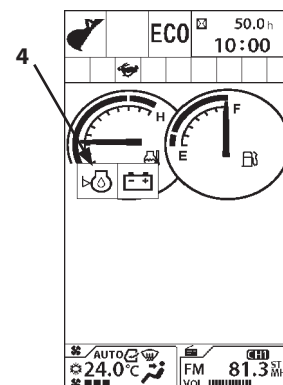
MDCN-01-008



MDCD-01-030



MDCD-01-026



MDAA-01-043

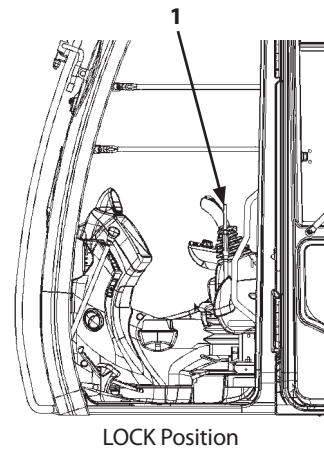
OPERATING THE ENGINE

Starting the Engine

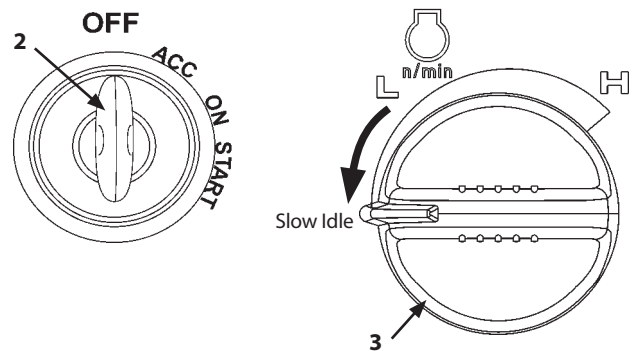
Starting the Engine in Ordinary Temperature

1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Turn engine control dial (3) to the slow idle position.
3. Sound horn to alert bystanders
4. Insert key switch (2). Turn it to ON position.
5. "Wait-screen (nothing is displayed)" is displayed on the monitor for 2 seconds. Regardless of pilot control shut-off lever (1) position, the engine can not be cranked during this moment.
6. When the password input screen is displayed on the monitor, input the password. Unless the numeric keypad function (ignition block system) is activated, this screen is not displayed.

IMPORTANT: When required to activate the numeric keypad function (ignition block system), consult your nearest Hitachi dealer.

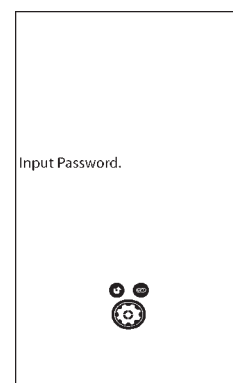


MDCN-01-008



MDCD-01-030

M1P1-01-068



Password Input Screen

MDAA-01-085EN

OPERATING THE ENGINE

NOTE: When the key switch is turned ON, the maintenance notification (4) for the item whose maintenance interval has expired displays for ten seconds. Press Return switch (5) or turn the pilot control shut-off lever to UNLOCK position while the rear view camera is enable to delete the notification.

- The basic screen will be displayed on the monitor. Check that the preheat indicator (6) is OFF at this time.
- Turn key switch (2) to START position to rotate the starter. The engine will start.

IMPORTANT: Never operate the starter for more than 10 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. Failure to do so may cause damage to the starter and/or discharging the batteries.

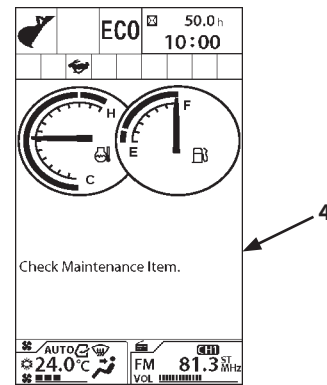
- Release key switch (2) immediately after the engine has started. Key switch (2) will automatically return to ON position.

NOTE: Because of the engine speed control function, the engine speed will be kept to slow idle speed for about 3 to 6 seconds right after the engine starts. When the coolant temperature or hydraulic oil temperature is low, the time will be longer. The engine speed will be kept to slow idle speed even if the engine control dial (3) is not set in the slow idle position.

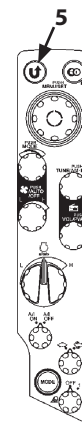
NOTE: The warm-up system automatically operates after keeping slow idle speed, and the engine speed will temporarily increase even if the engine control dial (3) is set in the slow idle position.

WARNING: Do not attempt to operate the machine for six seconds after starting the engine. The engine speed may change after the slow idle period and operation speed of work device may suddenly increase, which may cause serious accident.

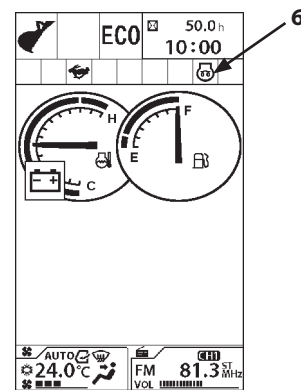
NOTE: White smoke may occur for several minutes after the engine start, this is not a malfunction.



MDAA-01-213EN



MDCD-01-026



Basic Screen

MDAA-01-042

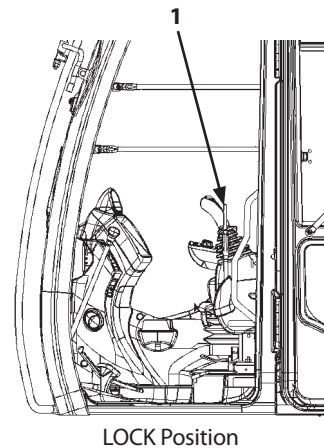
OPERATING THE ENGINE

Starting in Cold Weather

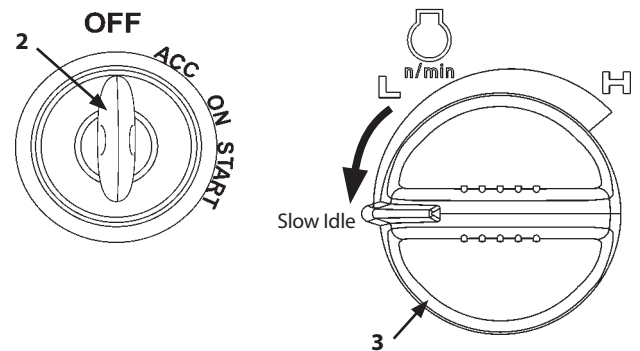
Preheating

1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Turn engine control dial (3) to the slow idle position.
3. Sound the horn to alert bystanders.
4. Insert key switch (2). Turn it to ON position.
5. "Wait-screen (nothing is displayed)" is displayed on the monitor for 2 seconds. Regardless of pilot control shut-off lever (1) position, the engine can not be cranked during this moment.
6. When the password input screen is displayed on the monitor, input the password. Unless the numeric keypad function (ignition block system) is activated, this screen is not displayed.

IMPORTANT: When required to activate the numeric keypad function (ignition block system), consult your nearest Hitachi dealer.

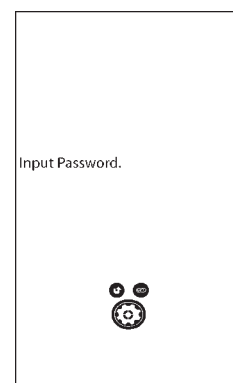


MDCN-01-008



MDCD-01-030

M1P1-01-068



Password Input Screen

MDAA-01-085EN

OPERATING THE ENGINE

NOTE: When the key switch is turned ON, the maintenance notification (4) for the item whose maintenance interval has expired displays for ten seconds. Press Return switch (5) or turn the pilot control shut-off lever to UNLOCK position while the rear view camera is enable to delete the notification.

- The basic screen will be displayed on the monitor.
The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (6) is lit for automatically.

NOTE: In case, preheat indicator (6) does not come ON, preheating is not required. Follow the "Starting the Engine in Ordinary Temperature" section.

- As soon as preheat indicator (6) goes OFF, turn key switch (2) to START position to rotate the starter.

IMPORTANT: Never operate the starter for more than 10 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. Failure to do so may cause damage to the starter and/or discharging the batteries.

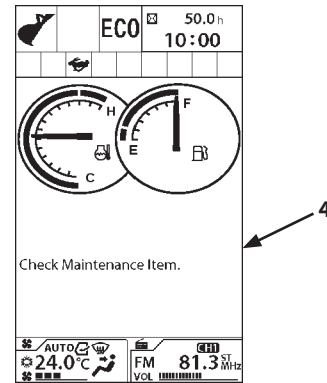
- Release key switch (2) immediately after the engine has started. Key switch (2) will automatically return to ON position.

NOTE: Because of the engine speed control function, the engine speed will be kept to slow idle speed for about 3 to 6 seconds right after the engine starts. When the coolant temperature or hydraulic oil temperature is low, the time will be longer. The engine speed will be kept to slow idle speed even if the engine control dial (3) is not set in the slow idle position.

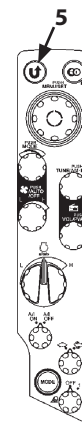
NOTE: The warm-up system automatically operates after keeping slow idle speed, and the engine speed will temporarily increase even if the engine control dial (3) is set in the slow idle position.

WARNING: Do not attempt to operate the machine for six seconds after starting the engine. The engine speed may change after the slow idle period and operation speed of work device may suddenly increase, which may cause serious accident.

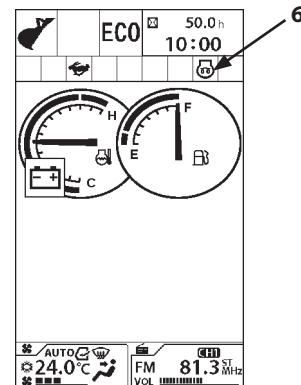
NOTE: White smoke may occur for several minutes after the engine start, this is not a malfunction.



MDAA-01-213EN



MDCD-01-026



Basic Screen

MDAA-01-042

OPERATING THE ENGINE

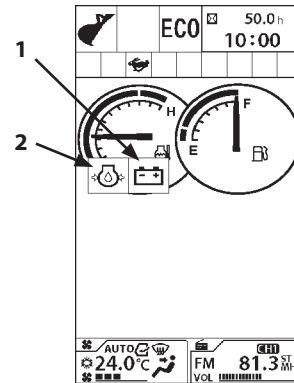
Check Instruments After Starting

Checking instruments through monitor functions

After starting the engine, check the following points through the monitor functions.

1. Check that alternator alarm indicator (1) is OFF. In case alternator alarm indicator (1) stays ON, immediately stop the engine. Inspect the alternator and battery system for any abnormality.
2. Check that low engine oil pressure indicator (2) is OFF and the alarm buzzer does not sound.

In case low engine oil pressure indicator (2) stays ON and the buzzer sounds, immediately stop the engine. Inspect the engine oil pressure system and the oil level.




MDAA-01-041

IMPORTANT: In case any abnormality is found on the monitor unit, immediately stop the engine. Inspect the cause of the trouble.

Check engine noise and exhaust gas color:


Check that the engine noise and exhaust gas color is normal.

 **NOTE:** Check the exhaust gas color as follows. (After warm-up operation, run the engine with no loads.)

Clear : Normal (Perfect combustion)

Black : Abnormal (Imperfect combustion, abnormal muffler filter, abnormal fuel system)

White : Abnormal (Oil is leaking into the combustion chamber, abnormal muffler filter, abnormal fuel system)

 **NOTE:** White smoke may occur for several minutes after the engine start, this is not a malfunction.

OPERATING THE ENGINE

Using Booster Batteries

IMPORTANT: The machine electrical system is a 24 volt negative (-) ground. Use only 24 volt booster batteries with sufficient capacity.

WARNING:

- An explosive gas is produced while batteries are in use or being charged. Keep open flames and sparks away from the battery area. Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
- Park the machine and a machine with the booster batteries on a dry or concrete surface, not on steel plates. If the machine is parked on steel plates, dangerous sparks may be unexpectedly created on the machine.
- Never connect a positive terminal to a negative terminal, as a dangerous short circuit will occur.

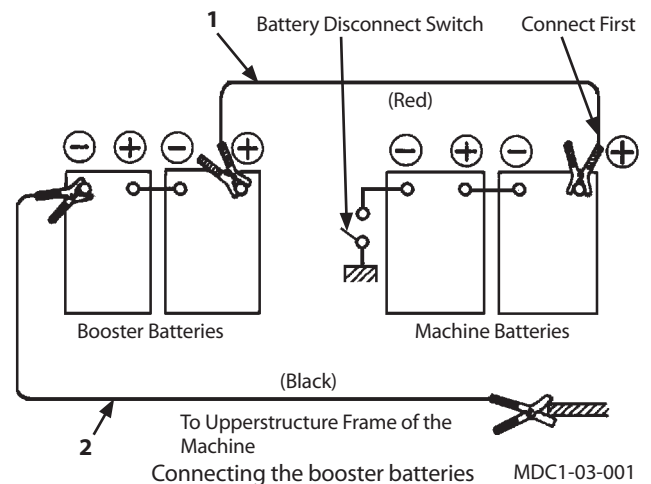


SA-032

When the machine batteries are exhausted, start the engine using booster batteries as shown below.

Connecting the booster batteries

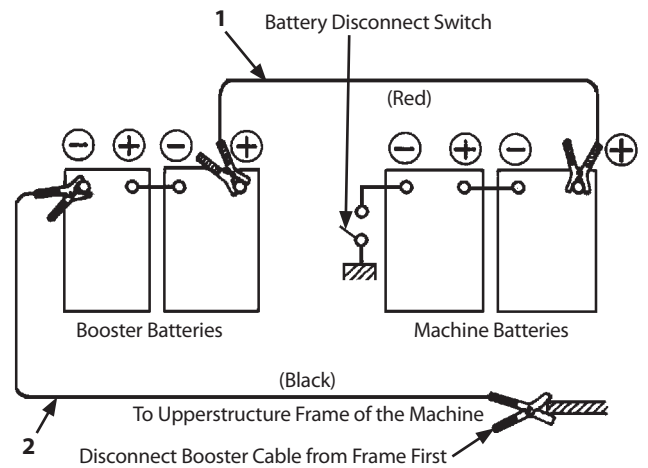
1. Stop the engine of the machine on which booster batteries are mounted.
2. Turn the battery disconnect switch to the OFF position.
3. Connect one end of red cable (1) to the positive (+) terminal of the machine batteries, and the other end to the positive (+) terminal of the booster batteries.
4. Turn the battery disconnect switch to the ON position.
5. Connect one end of black cable (2) to the negative (-) terminal of the booster batteries, and then make ground connection to the frame of the machine to be started with the other end of black (-) cable (2). In the last connection to frame, sparks may fly. Be sure to connect the cable end as far away from the machine batteries as possible.
6. After securely connecting the booster cables, start the engine of the machine on which booster batteries are mounted.
7. Start the engine of the troubling machine.
8. After the engine starts, disconnect cables (2) and (1), following the procedure below.



OPERATING THE ENGINE

Disconnecting the booster cables

1. Disconnect black negative (-) cable (2) from the machine frame first.
2. Disconnect the other end of black negative (-) cable (2) from the booster batteries.
3. Disconnect red positive (+) cable (1) from the booster batteries.
4. Disconnect red positive (+) cable (1) from the machine batteries.



Disconnecting the booster cables MDC1-03-001

OPERATING THE ENGINE

Stopping the Engine

Engine Stop Procedure

1. Except for special cases, before stopping the engine, lower the bucket to the ground.
2. Pull pilot control shut-off lever (3) to LOCK position.
3. Turn engine control dial (1) to the slow idle position and run the engine for 5 minutes to cool the engine.

IMPORTANT: If the engine equipped with a turbocharger is stopped without first performing the cool down operation, the lubricant on the turbocharger bearing surfaces may desiccate due to the intense heat present inside the turbocharger, possibly causing damage to the turbocharger.

4. Turn key switch (2) OFF to stop the engine.

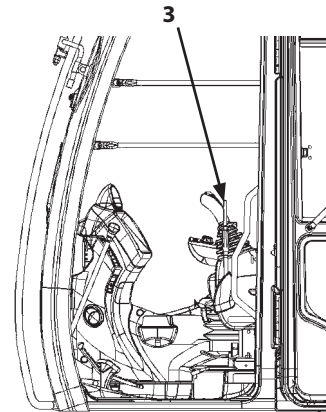
If the engine does not stop, even if the key switch is turned to the OFF position. (Emergency Stop)

In case the engine does not stop even if key switch (2) is turned OFF due to failure of the machine, move engine stop switch (4) downward to stop the engine. The engine will stop. Return engine stop switch (4) to its original position (upward).

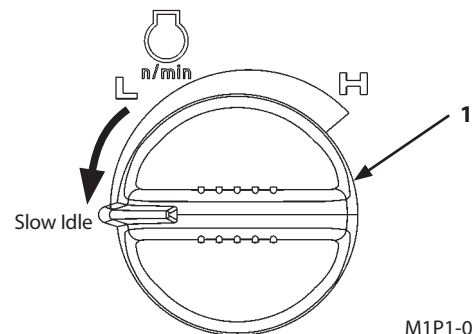
CAUTION: Do not use engine stop switch (4) unless absolutely necessary. When the machine stops due to the machine failure, do not start the machine until repair is completed.



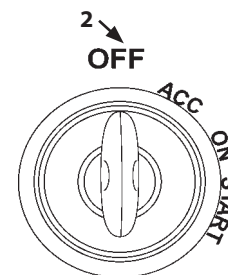
SA-390



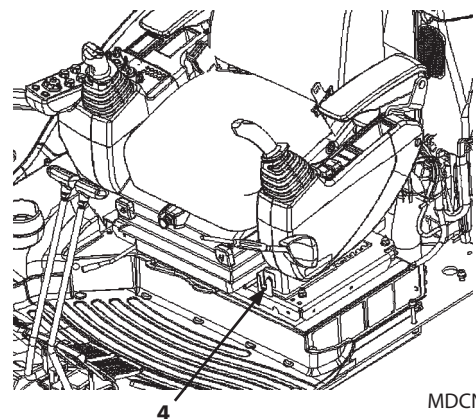
MDCN-01-008



M1P1-01-068



MDCD-01-030



MDCN-01-004

OPERATING THE ENGINE

Engine Auto-Stop in Extremely Low Temperature

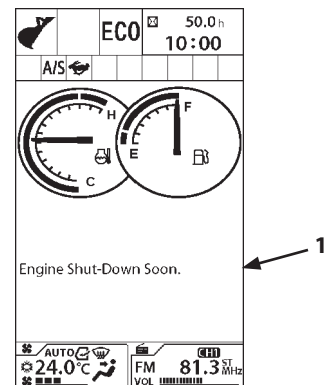
WARNING: This function automatically stops the engine. Take extra care on the work and work environment when using this function.

IMPORTANT: If the machine is left without operation under $-20\text{ }^{\circ}\text{C}$ or lower environment for long period of time, exhaust gas component may accumulate in the muffler filter, damage to the muffler filter may result.

Under $-20\text{ }^{\circ}\text{C}$ or lower environment, the engine will automatically stop 60 minutes after the pilot control shut-off lever is pulled to the LOCK position. 30 seconds before the engine stop, the monitor displays a message that engine will be stopped (1) and the indicator starts flashing. Also the buzzer sounds. The buzzer sounds once at 30 seconds before, then continuously sounds from 15 seconds. The engine speed decreases to the idling speed, and then stops after 15 seconds. When the control shut-off lever is pushed down before stopping the engine, the auto shut-down is disabled and the engine will not stop.

IMPORTANT: When the engine stops, turn the key switch to ACC or OFF once and then turn it to START to restart the engine. In the case the engine stops automatically, turn the key switch OFF before leaving the machine for long period of time. Do not leave the machine after auto shut-down. Failure to do so may discharge the batteries.

NOTE: The engine can stop automatically when related conditions are met regardless of the auto shut-down function ON or OFF.



MDAA-01-146EN

DRIVING THE MACHINE


Drive the Machine Carefully

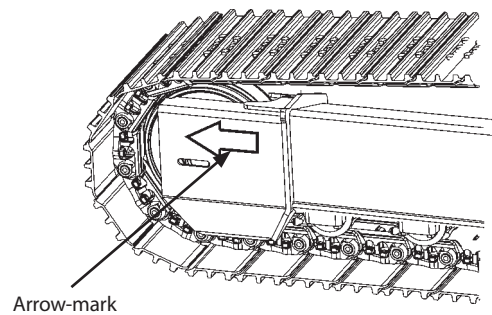
IMPORTANT: During freezing weather, park machine on a hard surface to prevent tracks from freezing to the ground. Clean debris from tracks and track frame.

If tracks are frozen to the ground, raise tracks using boom, move machine carefully to prevent damage to drive train and tracks.

Select a route that is as flat as possible. Steer machine as straight as possible making small, gradual changes in direction.

When driving over rough terrain, reduce the engine speed to lessen possibility of undercarriage damage.

 **NOTE:** An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.

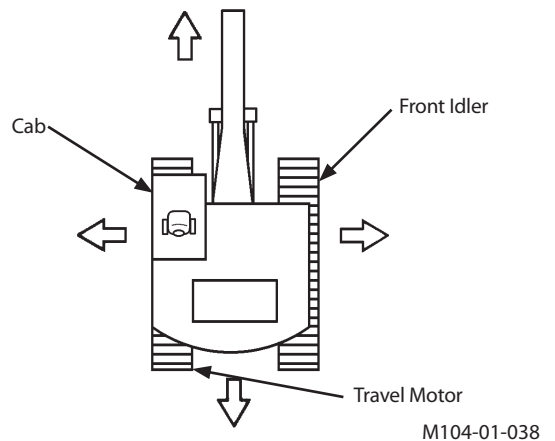


M178-03-001

DRIVING THE MACHINE

Steering the Machine Using Pedals

⚠ WARNING: In the standard travel position, the front idlers are positioned at the front of the machine and the travel motors at the rear. If the travel motors are positioned at the front of the machine, the control actions of the travel pedals will be reversed. Be sure to confirm the position of the travel motors before traveling.



- **FORWARD TRAVEL**

Push down on front (A) of both pedals.

- **REVERSE TRAVEL**

Push down on rear (B) of both pedals.

- **NEUTRAL POSITION (C)**

When the travel pedals are placed in neutral, travel brakes automatically will stop and/or hold the machine.

- **RIGHT TURN**

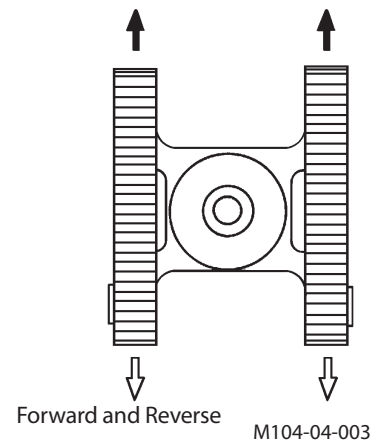
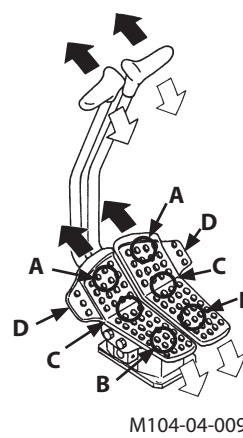
Push down on front of left pedal.

- **LEFT TURN**

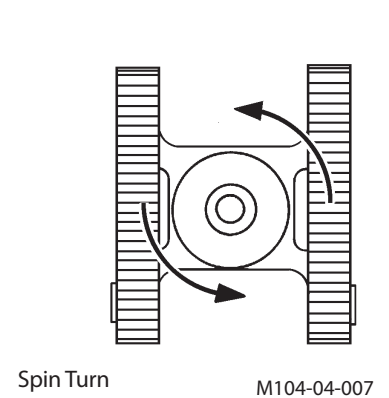
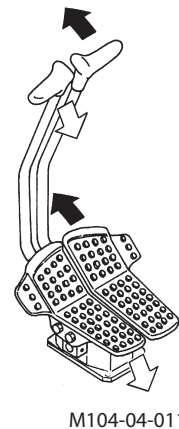
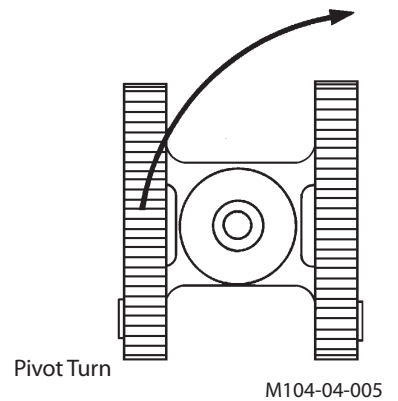
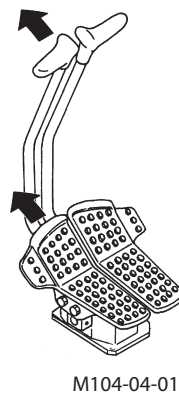
Push down on front of right pedal.

- **SHORT TURN (Spin turn)**

Push down the front of one pedal and the rear of the other.



✎ NOTE: For long-term traveling, push down on pedal tabs (D) and rest feet on the footrests.



DRIVING THE MACHINE

Steering the Machine Using Levers

⚠ WARNING: In the standard travel position, the front idlers are positioned at the front of the machine and the travel motors at the rear. If the travel motors are positioned at the front of the machine, the control actions of the travel levers will be reversed. Be sure to confirm the position of the travel motors before traveling.

- **FORWARD TRAVEL**

Push both levers forward (A).

- **REVERSE TRAVEL**

Pull both levers rearward (B).

- **NEUTRAL POSITION (C)**

When the travel levers are placed in neutral, travel brakes automatically will stop and/or hold the machine.

- **RIGHT TURN**

Push left lever forward.

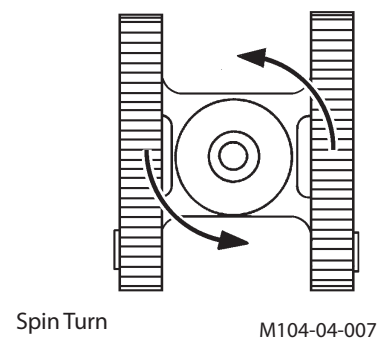
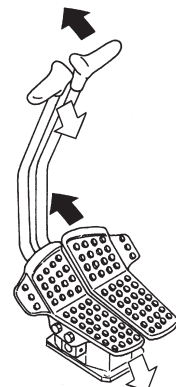
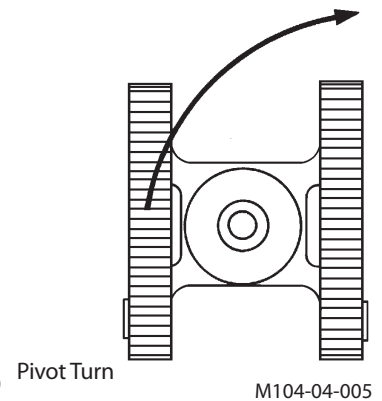
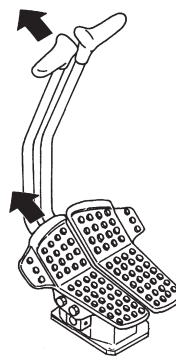
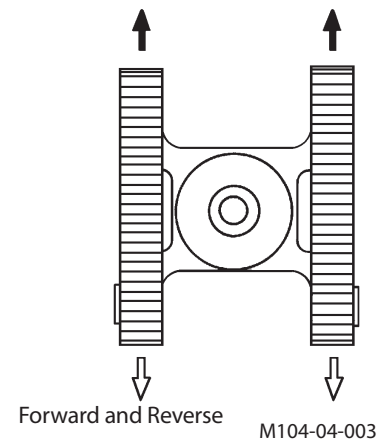
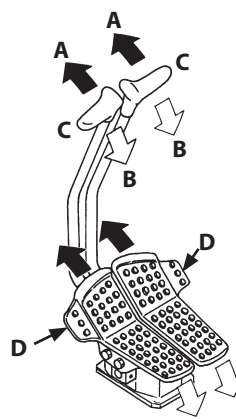
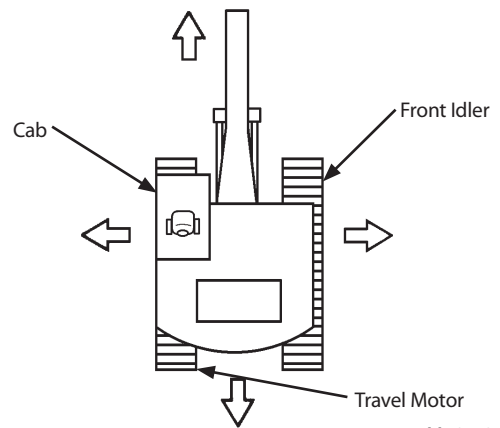
- **LEFT TURN**

Push right lever forward.

- **SHORT TURN (Spin turn)**

Push one lever forward and pull the other rearward.

✎ NOTE: For long-term traveling, push down on pedal tabs (D) and rest feet on the footrests.






DRIVING THE MACHINE

Travel Mode Switch

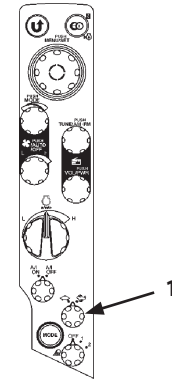
⚠ WARNING: Tipping-over accidents can cause serious personal injury. Do not change travel mode switch (1) while traveling; especially, changing to fast mode (2) when descending slopes will create a very dangerous situation. Always stop the machine before changing the travel speed mode.

Turn travel mode switch (1) on the switch panel to the specified position to select the travel mode (Fast/Slow).

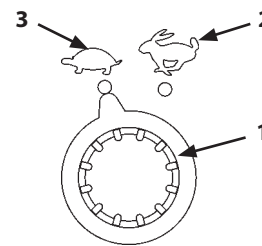
- Fast Mode: Turn travel mode switch (1) to  mark (2) position.
- Slow Mode: Turn travel mode switch (1) to  mark (3) position.

 Mark (Fast Speed Mode)

 Mark (Slow Speed Mode)



MDCD-01-026



MDCD-01-028

Travel Alarm

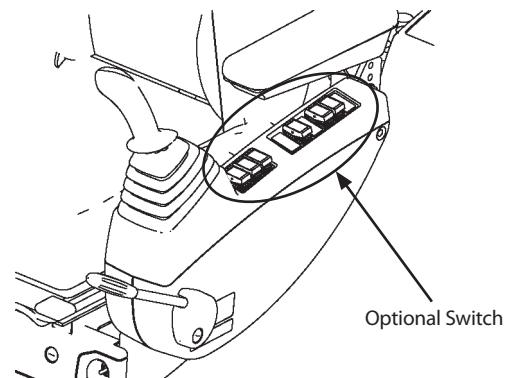
During travel operation, the travel alarm sounds to warn the people near the machine that the machine is traveling.

Deactivating Travel Alarm

More than 12 seconds after starting to travel the machine, raise the armrest and push the travel alarm deactivation switch to stop the travel alarm. (Within 12 seconds, the travel alarm deactivation switch is inoperable.)

Once the machine stops traveling and when restarting to travel, the travel alarm will sound again. If desired to stop the alarm, operate the deactivation switch once more.

✎ NOTE: The optional switch locations differ depending on what kinds of optional devices are equipped. Before using the switches, make sure what kinds of optional devices are equipped.

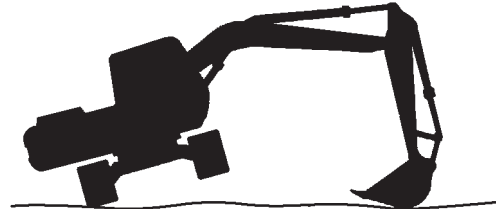


T1V1-05-02-004

DRIVING THE MACHINE

Operating on Soft Ground

- Avoid traveling on very soft ground that does not have sufficient strength to firmly support the machine.
- If the machine is operated on very soft ground or becomes stuck, it may be necessary to clean the track frame area.
- Swing the upperstructure 90 ° and lower the bucket to raise one track off the ground. Make sure to keep the angle between the boom and arm 90 to 110 ° and position the bucket's round side on the ground.
- Rotate the raised track back and forth to remove mud and dirt.
- After lowering the track to the ground, select slow travel speed. Carefully move the machine to firm ground.
- Utilize the boom and arm functions to pull the machine toward firm ground.
- Tow the machine if the machine becomes stuck but only if the engine is still operating. Be sure to attach a tow line correctly. (Refer to the "TOWING MACHINE A SHORT DISTANCE" section on the next page.)



M104-05-012

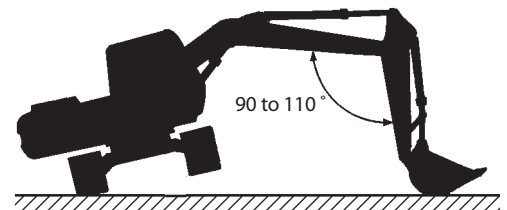
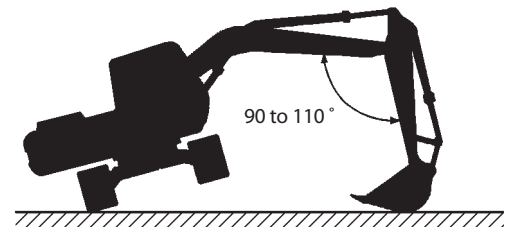
Raise One Track Using Boom and Arm

⚠ WARNING: Keep the angle between boom and arm 90 to 110 ° and position the bucket's round side on the ground.

Swing the upperstructure 90 ° and lower the bucket to raise track off ground. Do not dig bucket teeth into the ground when using the hoe bucket reversed.

Place blocks under machine frame to support the machine.

IMPORTANT: When the machine is modified as a face shovel by installing the hoe bucket in reverse, avoid raising the machine above the ground using the front attachment with the bucket cylinder fully extended. Excessive loads will be applied to the pins around the bucket and the bucket cylinder, resulting in breakage of the pins.



M104-05-013

WRONG



SA-817

DRIVING THE MACHINE

Towing Machine a Short Distance

CAUTION: Cables, straps, or ropes can break causing serious injury. Do not tow machine with damaged chains, frayed cables, slings, straps, or wire ropes. Always wear gloves when handling cable, straps or wire ropes.

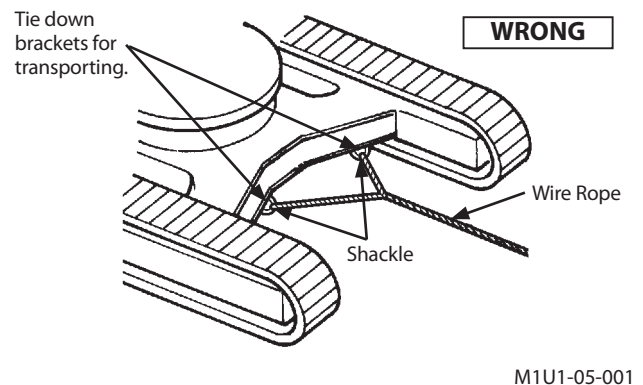
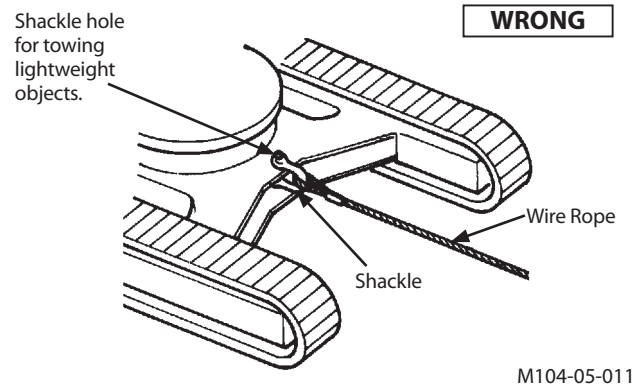
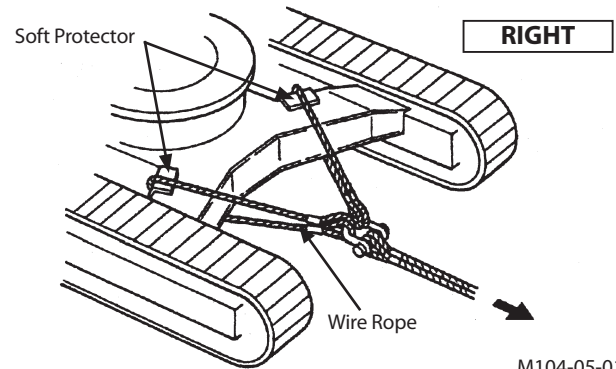
When your machine becomes stuck but the engine is still operational, attach wire ropes to the machine as illustrated at right, and slowly tow your machine to firm ground using another machine.

Be sure to attach the wire ropes around the track frames of both machines as illustrated.

To prevent the wire ropes from being damaged, place some protective material between the track frame and the wire ropes.

IMPORTANT: Do not use the shackle holes on the track frame for towing the machine.

A center shackle hole on the track frame is provided to pull only lightweight objects. The shackle holes on the bottom of the track frame are used to secure the machine for transportation. Refer to the instructions on page 5-42 for using the center shackle hole appropriately.



DRIVING THE MACHINE

Operating in Water or Mud

The machine can be operated in water up to the upper edge of the upper rollers only if worksite footing has sufficient strength to prevent the machine from sinking past the upper edge of the upper roller, and only if the water is flowing slowly.

When operating in such conditions, check the machine's position often. Reposition the machine if necessary.

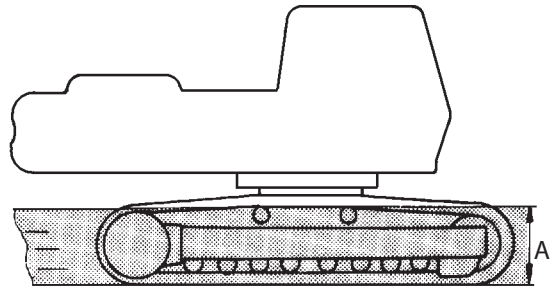
Avoid submerging the swing bearing, swing gears and center joint.

If the swing bearing, swing gears and center joint are submerged, remove the drain plug to drain mud and water. Clean swing area. Install plug. Lubricate swing internal gear and swing bearing.

Swing Internal Gear Capacity

ZX135US-5B	9 L
ZX225US-5B, 225USLC-5B	17 L

Lubricate swing bearing. (See Maintenance Guide, 500 hours)



M104-05-009

Model	A
ZX135US-5B	660 mm
ZX225US-5B, 225USLC-5B	770 mm

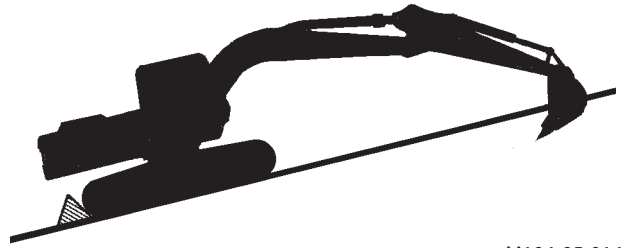
DRIVING THE MACHINE

Parking the Machine on Slopes

⚠ WARNING: Avoid parking machine on slopes. The machine may tip over, possibly resulting in personal injury.

If parking the machine on a slope is unavoidable:

- Thrust the bucket teeth into the ground.
- Return the control levers to neutral and pull pilot control shut-off lever (2) to the LOCK position.
- Block both tracks.



M104-05-014

Parking the Machine

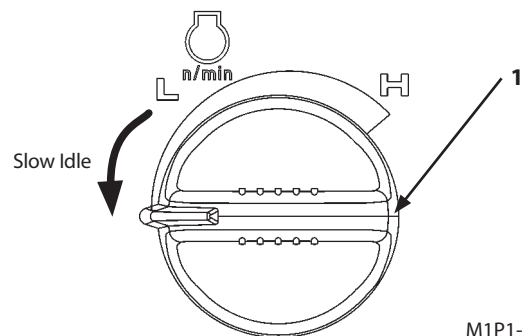
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: Turbocharger may be damaged if the engine is not properly shut down.

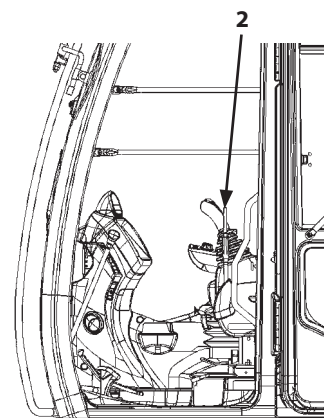
4. Turn engine control dial (1) counterclockwise to the stop (the slow idle position). Run the engine approximately 5 minutes to cool the engine.
5. Turn the key switch to OFF. Remove the key from the key switch.
6. Pull pilot control shut-off lever (2) to the LOCK position.

IMPORTANT: Protect cab electrical components from bad weather. Always close windows, roof vent and cab door when parking the machine.

7. Close windows, roof vent, and cab door.
8. Lock all access doors and compartments.



M1P1-01-068



Lock Position

MDCN-01-008

OPERATING THE MACHINE

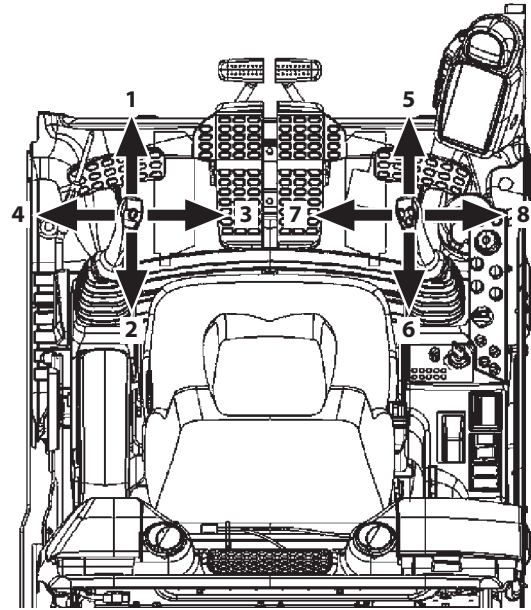
Control Lever (ISO Pattern)

⚠ WARNING:

- Never place any part of the body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. Never remove the window sash bar.
- Make sure you know the location and function of each control before operating.
- Do not change the control lever operation pattern. Failure to do so may result in operation mistake of the machine.

A label showing the control patterns of the levers and pedals is attached on the right side in the cab.

When a lever is released, it will automatically return to neutral, and that machine function will stop.



MDCN-01-003

1- Arm Roll-Out

2- Arm Roll-In

3- Swing Right

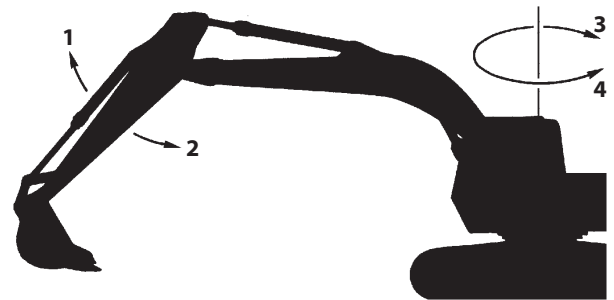
4- Swing Left

5- Boom Lower

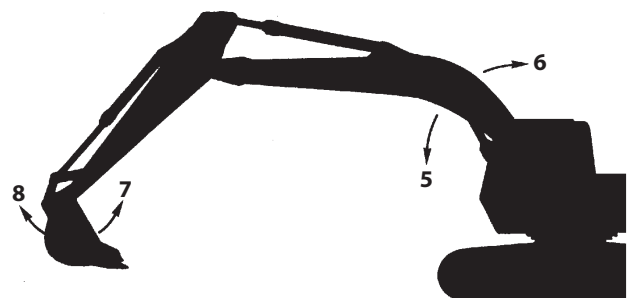
6- Boom Raise

7- Bucket Roll-In

8- Bucket Roll-Out



M104-05-001



M104-05-002

OPERATING THE MACHINE

Attachment Pedal (Hydraulic Breaker) (Optional)

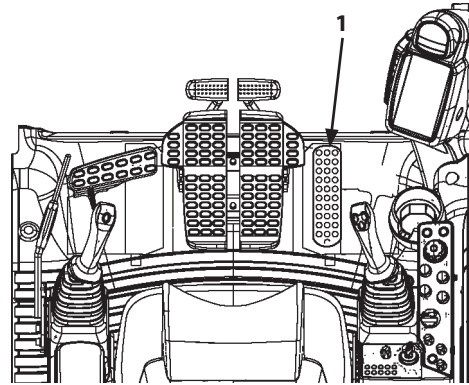
The Breaker can be operated using attachment pedal (1) located on the right front of the seat, as illustrated.

CAUTION: Be sure to lock attachment pedal (1) with pedal lock (2) when the attachment pedal is not in use. Do not allow your foot to rest on the pedal when the attachment pedal (1) is not in use. When changing pedal lock (2) position, pull the pilot control shut-off lever up to the LOCK position.

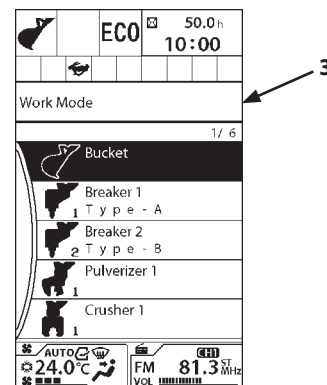
1. Select the hydraulic breaker icon on monitor work mode selection screen (3). Refer to the descriptions about the work mode on page 5-14 for work mode setting procedures.
2. Move pedal lock (2) forward to the UNLOCK position.
3. Push down on attachment pedal (1) to operate the breaker.

Loosen stopper bolt (4) until stopper bolt (4) comes in contact with the bracket in attachment pedal (1) neutral to prevent attachment pedal (1) from being stepped backward.

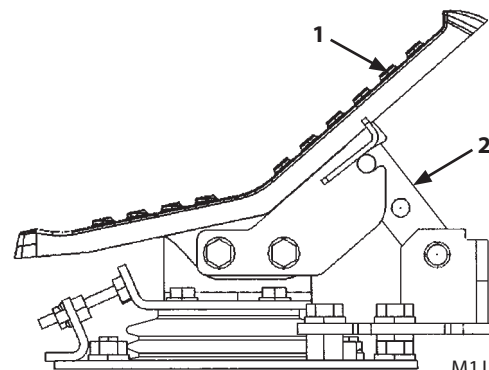
4. Remove foot from attachment pedal (1) to stop the breaker.
5. Always keep attachment pedal (1) locked with pedal lock (2) when attachment pedal (1) is not in use.



MDAA-05-001

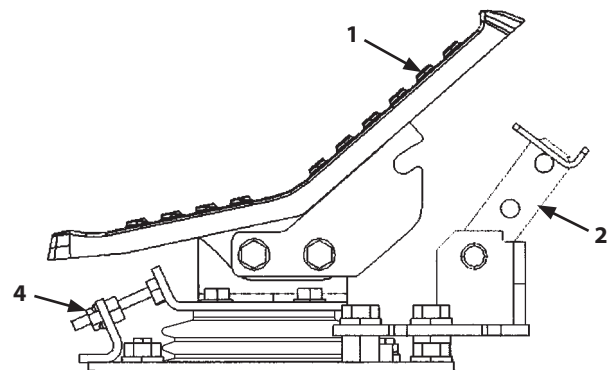


MDAA-01-101EN



Locked Attachment Pedal

M1J1-13-002



Unlocked Attachment Pedal

M1J1-13-003

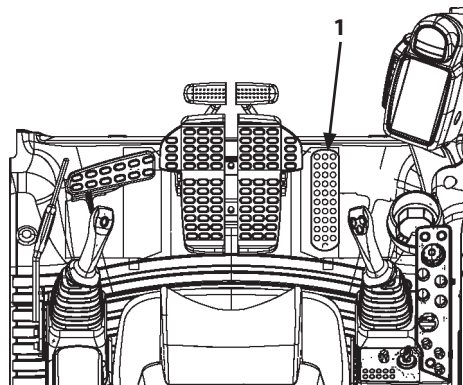
OPERATING THE MACHINE

Attachment Pedal (Hydraulic Crusher) (Optional)

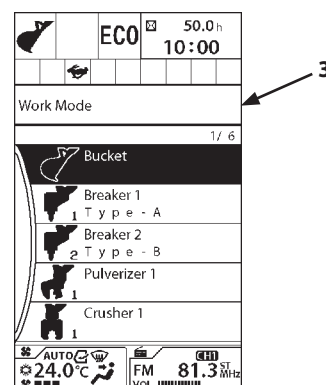
The crusher can be operated using attachment pedal (1) located on the right front of the seat, as illustrated.

CAUTION: Be sure to lock attachment pedal (1) with pedal lock (2) when the attachment pedal is not in use. Do not allow your foot to rest on the pedal when the attachment pedal (1) is not in use. When changing pedal lock (2) position, pull the pilot control shut-off lever up to the LOCK position.

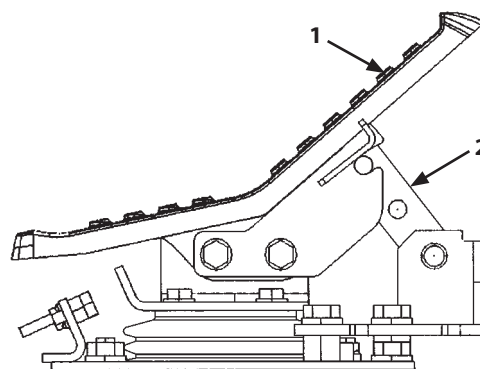
1. Select the proper hydraulic crusher icon on work mode selection screen (3). Refer to the descriptions about the work mode on page 5-14 for work mode setting procedures.
2. Move pedal lock (2) forward to the UNLOCK position.
3. Push down on attachment pedal (1) either forward or backward to open or close the crusher.
4. Remove foot from attachment pedal (1) to stop the crusher.
5. Always keep attachment pedal (1) locked with pedal lock (2) when attachment pedal (1) is not in use.



MDAA-05-001

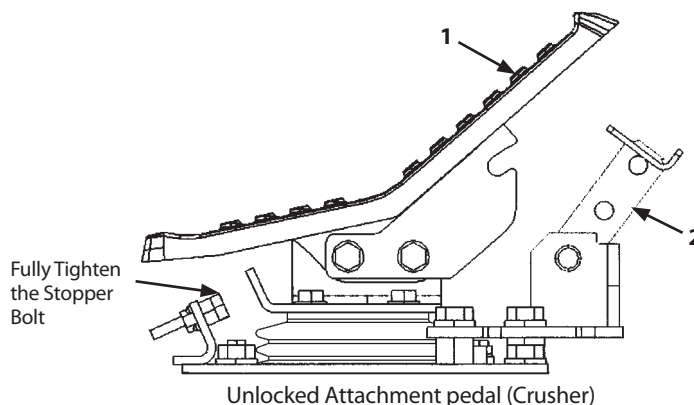


MDAA-01-101EN



Locked Attachment pedal (Crusher)

M1J1-13-012



Unlocked Attachment pedal (Crusher)

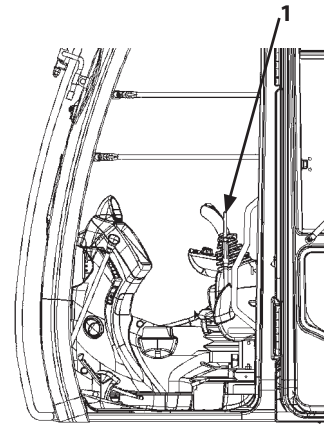
M1J1-13-006

OPERATING THE MACHINE

Pilot Control Shut-Off Lever

Pilot control shut-off lever (1) functions to prevent misoperation of the machine from occurring if the control levers are accidentally moved when leaving the operator's seat or when entering the cab.

⚠ WARNING: Always pull pilot control shut-off lever (1) into the full LOCK position. Unless pilot control shut-off lever (1) is fully moved to the LOCK position, the front control lever is not locked, possibly creating a hazardous situation. When leaving the machine, always stop the engine. Then, pull pilot control shut-off lever (1) up to the LOCK position. Always check to be sure that pilot control shut-off lever (1) is pulled up to the LOCK position before transporting the machine or leaving the machine at the end of the shift.



LOCK position

MDCN-01-008

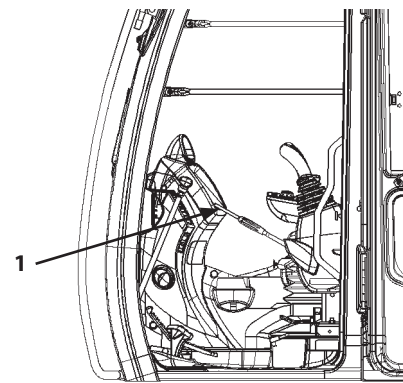
Before Leaving the Machine

1. Park the machine on a firm, level surface. Lower the bucket to the ground. Return all control levers to neutral. Properly shut down the engine.
2. Pull pilot control shut-off lever (1) up into the full LOCK position.

Before Starting Operation:

Confirm that pilot control shut-off lever (1) is pulled up to the LOCK position before starting the engine. The engine will not start in other than the LOCK position. Slowly push down pilot control shut-off lever (1) to UNLOCK position before starting operation. Confirm that all control levers and pedals are in neutral and that no part of the machine is in motion.

⚠ WARNING: If any part of the machine (any actuator) moves when pilot control shut-off lever (1) is lowered to the UNLOCK position despite the fact that all controls are placed in neutral, the machine is malfunctioning. Immediately pull pilot control shut-off lever (1) back to the LOCK position, and stop the engine. Then, see your authorized dealer.



UNLOCK Position

MDCN-01-009

OPERATING THE MACHINE


Warming Up Operation


In cold weather, warm up the machine until coolant and hydraulic oil temperature increases to the appropriate operating temperature.


IMPORTANT:

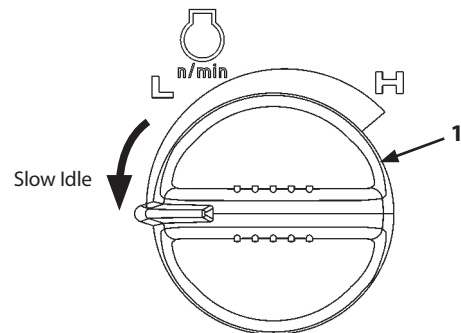
- The appropriate hydraulic oil operating temperature on this machine is 50 to 80 °C. Hydraulic components may be seriously damaged if the machine is operated with low temperature hydraulic oil. In case warming up the machine by relieving the hydraulic system, continuously relieve the relief valve for 10 to 15 seconds while taking a pause for 5 to 10 seconds.
- When the hydraulic temperature is 5 °C or lower, the pump torque is restricted to protect the engine.

1. Even after the engine starts, leave engine control dial (1) in slow idle position.
(Do not operate the machine until the needle of coolant temperature gauge (2) starts swinging.)
2. After the needle of coolant temperature gauge (2) starts swinging, turn engine control dial (1) to approx. medium position.
3. Operate the boom, arm and bucket cylinders slowly to each stroke end several times. If the machine equipped with various attachments, operate the attachment function slowly to allow hydraulic oil to circulate through the system.
4. Operate the travel and swing functions slowly to allow hydraulic oil to circulate through the systems.
5. Warming up operation ends after the above operation is completed.

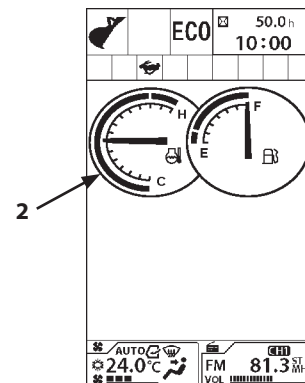
 **NOTE:** Because of the engine speed control function, the engine speed will be kept to slow idle speed for about 3 to 6 seconds right after the engine starts. When the coolant temperature or hydraulic oil temperature is low, the time will be longer. The engine speed will be kept to slow idle speed even if engine control dial (1) is not set in the slow idle position.

 **NOTE:** The warm-up system automatically operates after keeping slow idle speed, and the engine speed will temporarily increase even if engine control dial (1) is in the slow idle position.

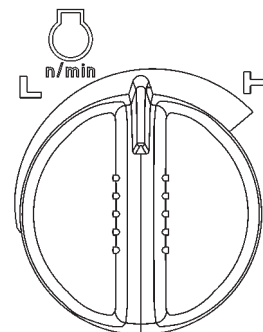
 **WARNING:** Do not attempt to operate the machine for six seconds after starting the engine. The engine speed may change after the slow idle period and operation speed of work device may suddenly increase, which may cause serious accident.



M1P1-01-068



MDAA-01-001EN




M1P1-05-003


OPERATING THE MACHINE


Engine Speed Control

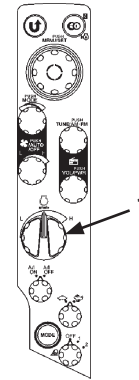
Increase and decrease the engine speed using engine control dial (1) located on the switch panel, as illustrated.

- Turn engine control dial (1) clockwise to increase the engine speed. Turn engine control dial (1) counterclockwise to decrease the engine speed.
- Note that the auto-idle function will be deactivated if engine control dial (1) is operated while the engine is running at the auto-idle setting.
- Before stopping the engine, always turn engine control dial (1) counterclockwise to the stop (to the slow idle setting). Run the engine five minutes to cool the engine. Then, turn the key switch to OFF position to stop the engine.

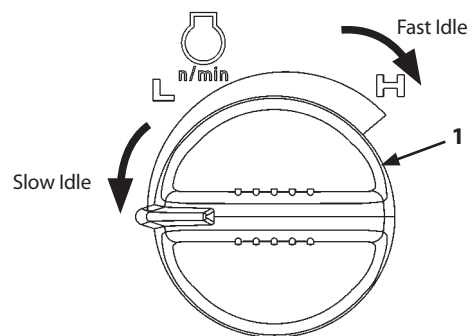
 **NOTE:** Because of the engine speed control function, the engine speed will be kept to slow idle speed for about 3 to 6 seconds right after the engine starts. When the coolant temperature or hydraulic oil temperature is low, the time will be longer. The engine speed will be kept to slow idle speed even if engine control dial (1) is not set in the slow idle position.

 **NOTE:** The warm-up system automatically operates after keeping slow idle speed, and the engine speed will temporarily increase even if engine control dial (1) is set in the slow idle position.

 **WARNING:** Do not attempt to operate the machine for six seconds after starting the engine. The engine speed may change after the slow idle period and operation speed of work device may suddenly increase, which may cause serious accident.



MDCD-01-026



M1P1-01-068

OPERATING THE MACHINE

Auto-Idle

Auto-Idle Function

With auto-idle selector (3) turned to the A/I ON position, approximately 4 seconds after all control levers are returned to neutral, the engine speed decreases to the auto-idle setting to save fuel consumption.

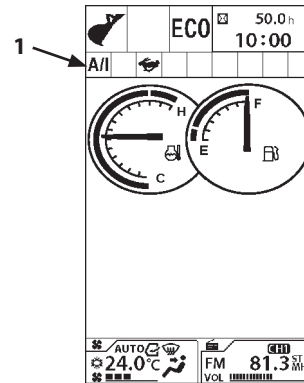
The engine speed will immediately increase to the speed set by engine control dial (2) when any control lever is operated.

IMPORTANT:

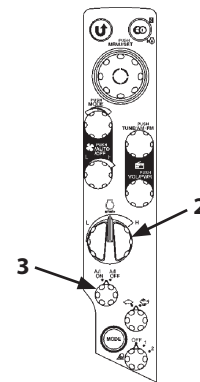
- Always check if auto-idle indicator (1) is turned ON or OFF before starting operation. If the indicator is ON, the auto-idle function will be activated.
- Always be aware of engine control dial (2) setting when auto-idle selector (3) is turned to the A/I ON position. If the engine speed is set high with engine control dial (2), and if the operator is not aware of the high engine speed setting, the engine speed will unexpectedly increase when any control lever is operated, causing unexpected machine movement, thus possibly resulting in serious personal injury.

WARNING: Prevent the machine from unexpected movement. Be sure to turn auto-idle selector (3) to the A/I OFF position when unexpected machine movement is undesirable, especially when loading/unloading the machine for transportation.

NOTE: Auto-idle control may not work completely until the end of the warm-up.



MDAA-01-314EN



MDCD-01-026

OPERATING THE MACHINE

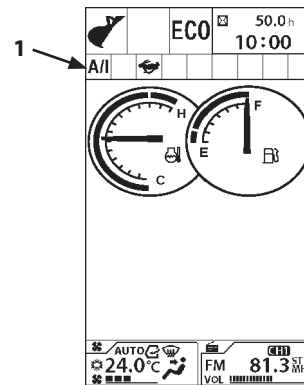
Auto-Idle ON/OFF

Note that auto-idle function can be turned ON or OFF by using auto-idle selector (3) only when the key switch is in ON position.

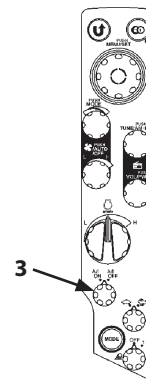
Always check if the auto-idle function is turned ON or OFF with auto-idle indicator (1).

Auto-Idle Indicator (1) ON : Auto-Idle Function ON
Auto-Idle Indicator (1) OFF : Auto-Idle Function OFF

- When auto-idle selector (3) is turned OFF with auto-idle indicator (1) ON, indicator (1) will go OFF and the auto-idle system is deactivated.
- Even if the engine is stopped by turning the key switch with auto-idle selector (3) in the A/I ON position [indicator (1) ON], the auto-idle system is not deactivated. When the engine is restarted, the auto-idle system remains activated, allowing auto-idle indicator (1) to flash for 5 seconds and stay ON later.



MDAA-01-314EN



MDCD-01-026

OPERATING THE MACHINE

Auto Shut-Down

WARNING: This function automatically stops the engine. Take extra care on the work and work environment when using this function.

When the auto shut-down function is turned ON, the engine automatically stops after the preset time at the state in which the pilot control shut-off lever is pulled. 30 seconds before the engine stop, monitor (2) displays a message that engine will be stopped and indicator (1) starts flashing. Also the buzzer sounds. The buzzer sounds once at 30 seconds before, then continuously sounds from 15 seconds. The engine speed decreases to the idling speed, and then stops after 15 seconds. When the pilot control shut-off lever is pushed before stopping the engine, the auto shut-down is disabled and the engine will not stop.

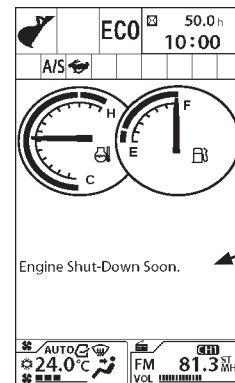
IMPORTANT: Ensure the ON or OFF status of auto shut-down indicator (1). If the indicator is ON, the auto shut-down function will be activated.

Operating Condition

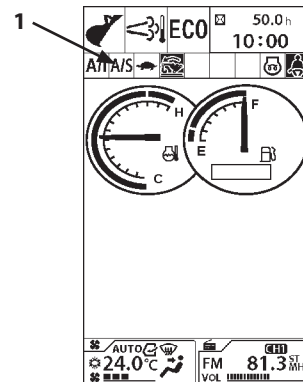
- The engine is running.
- The pilot control shut-off lever is in the LOCK position.
- Coolant and hydraulic oil temperature are not high.
- The muffler filter is not in regenerating process.

IMPORTANT:

- When the engine stops by the auto shut-down function, turn the key switch to ACC or OFF once and then turn it to START to restart the engine. Turn the key switch OFF after auto shut-down when leaving the machine for long period of time. Do not leave the machine after auto shut-down. Failure to do so may discharge the batteries.
- When the key switch is turned to OFF position while the auto shut-down function is ON, the setting will be reset. When it is required to keep the setting, consult your nearest Hitachi dealer.



MDAA-01-146EN



MDAA-01-286EN

OPERATING THE MACHINE

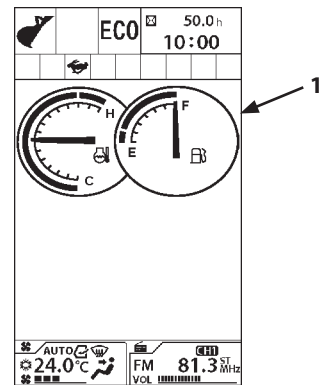
IMPORTANT:

- Even if the auto shut-down function is ON, the engine will not stop during the regeneration of the muffler filter.
- When the auto shut-down activates, the air conditioner will also stop.

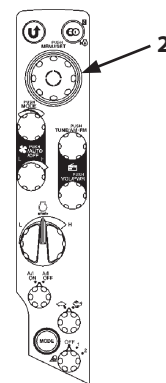
Setting the Auto Shut-Down Function

Auto Shut-Down: On/Off

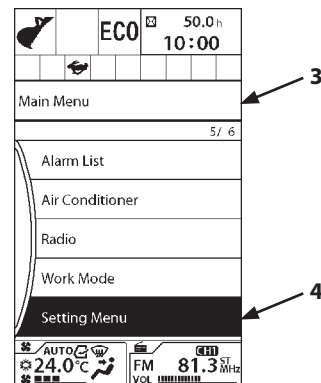
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Setting Menu (4).
3. Press selector knob (2) to display Setting Menu screen (5).
4. Rotate selector knob (2) to highlight Auto Shut-Down (6).



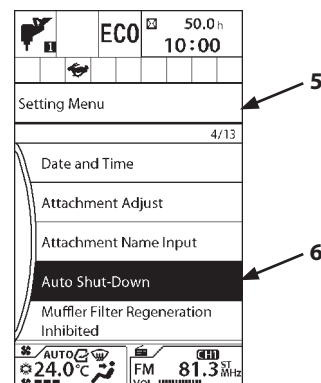
MDAA-01-001EN



MDCD-01-026



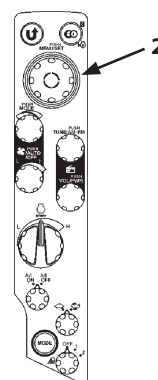
MDAA-01-114EN



MDAA-01-147EN

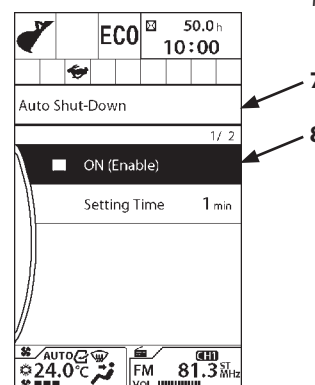
OPERATING THE MACHINE

- Press selector knob (2) to display Auto Shut-Down screen (7).



MDCD-01-026

- Rotate selector knob (2) to highlight ON (8).
- Press selector knob (2) to display Auto Shut-Down screen (7). Press selector knob (2) again to turn the auto shut-down function OFF.

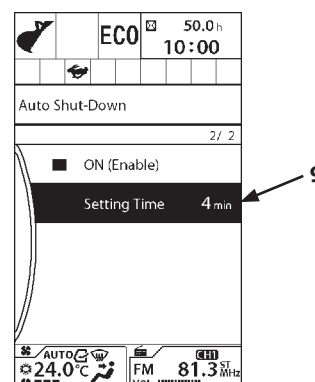


MDAA-01-148EN

NOTE: When the function is ON, the mark "■" is displayed in green. When the function is OFF, the mark "■" is displayed in gray.

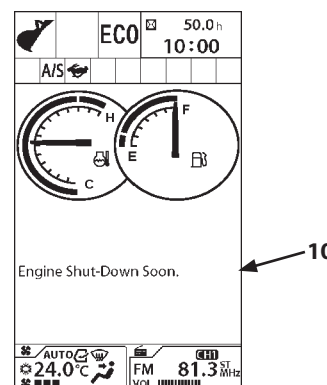
Acting Time Setting

- On the Auto Shut-Down screen, rotate selector knob (2) to highlight Setting Time (9).
- Push selector knob (2). Rotate selector knob (2) to adjust the auto shut-down acting time.
- Press selector knob (2) to make the change.



MDAA-01-150EN

NOTE: 30 seconds before the engine stop, the monitor will display "Engine Shut-Down Soon." message (10).



MDAA-01-146EN

OPERATING THE MACHINE

Muffler Filter Manual Regeneration

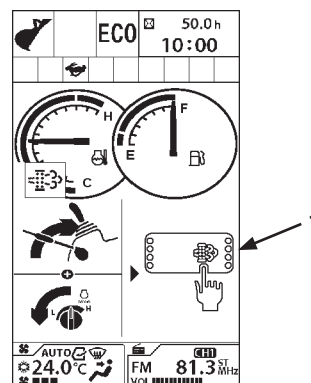
Manual Regeneration Procedure

When the manual regeneration is needed, screen (1) as shown in the right will be displayed. When this screen is displayed, you need to perform the manual regeneration. Before starting the manual regeneration, be sure to check the following.

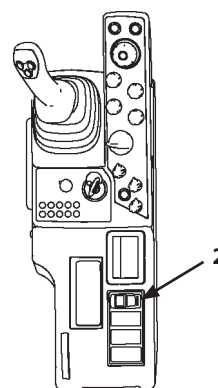
If the rear view camera is equipped on the machine and the camera is enabled, screen (1) is displayed only when the pilot control shut-off lever is in LOCK position. (Refer to 1-25)

- No person is present around the machine
 - Keep flammable objects away from the muffler.
 - Remaining fuel alarm does not light.
1. Park the machine in a safe place. Lower the front attachment onto the ground.
 2. Pull the pilot control shut-off lever to the LOCK position.
 3. Set the engine control dial to slow idle.
 4. Push the muffler filter regeneration switch (2).
 5. When pushing the muffler filter regeneration switch (2), screen (3) as shown in the right will be displayed and the manual regeneration starts. Bar graph on the screen indicates progress of the regeneration process.

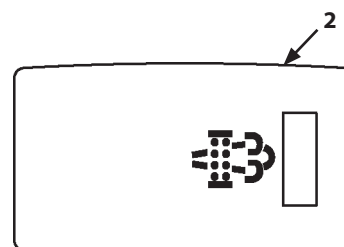
CAUTION: The regeneration does not start unless the pilot control shut-off lever is in the LOCK position and the engine control dial is in slow idle. When touching the pilot control shut-off lever or the engine control dial during regeneration, the regeneration process is aborted. When the process is aborted, start over again.



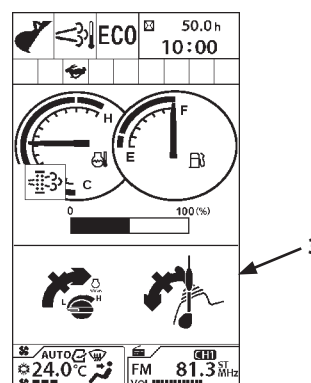
MDAA-01-005EN



MDAA-01-330



MDAA-05-002



MDAA-01-006EN

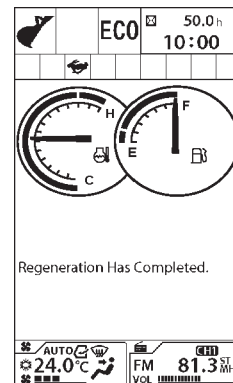
OPERATING THE MACHINE

6. When the regeneration is finished, "Regeneration Has Completed." message will be displayed. If "Regeneration Has Failed." message is displayed, start over the regeneration process again. Failure of regeneration process may happen in the conditions other than above (such as malfunction of a sensor that affects regeneration at low ambient temperature).

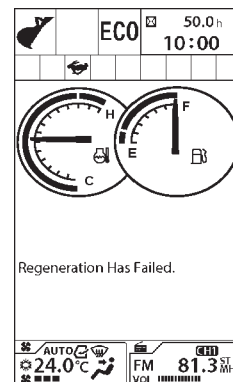
 **NOTE:**

- The engine sound may change and the engine speed may increase when the manual regeneration starts, but it is not a malfunction.
- Regeneration time varies depending on the ambient temperature.
- White smoke may temporarily be generated from the tail pipe during the regeneration process due to the burning of particulate matter (PM), but it is not a malfunction.
- Manual regeneration process completes earlier right after the engine has been running than when it is cold.
- Coolant temperature may increase during the manual regeneration.

IMPORTANT: If regeneration must be interrupted, push the muffler regeneration switch again. The message "Regeneration Has Failed." will be displayed on the monitor, but the machine becomes operable. In this case, regeneration should be performed again. Restart the manual regeneration as soon as possible.



MDAA-01-083EN



MDAA-01-084EN

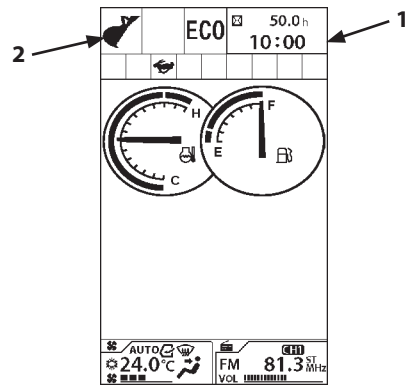
OPERATING THE MACHINE

Work Mode

Select Work Mode in the main menu, and choose the appropriate hydraulic circuit and pump flow rate for the front attachment at Work Mode screen.

When the engine is started, the digging mode is automatically set. Following six work modes can be selected from the Work Mode screen.

- Digging Mode
- Breaker 1 Mode
- Breaker 2 Mode
- Pulverizer 1 Mode
- Crusher 1 Mode
- Grapple 1 Mode












MDAA-01-001EN

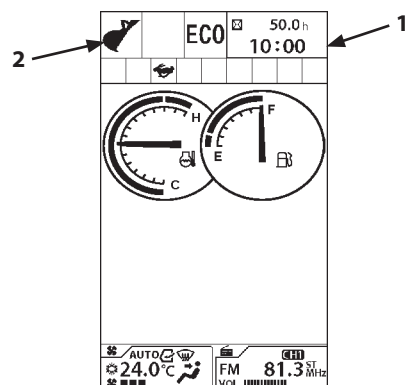
OPERATING THE MACHINE

The selected work mode is indicated by attachment mode indicator (2) of basic screen (1).

Select the work mode corresponding to the work in which the machine is engaged while referring to the table below.

	Work Mode	Description
	Digging Mode	Select this mode when using bucket.
	Breaker 1 to 5 Mode	Select this mode when using breaker.
	Pulverizer 1 to 5 Mode	Select this mode when using pulverizer.
	Crusher 1 to 5 Mode	Select this mode when using crusher.
	Vibrating Hammer 1 to 5 Mode	Select this mode when using vibrating hammer.
	Grapple 1 to 5 Mode	Select this mode when using grapple.
	Clamshell 1 to 5 Mode	Select this mode when using clamshell.
	Others 1 to 5 Mode	Select this mode when other than the above attachment is used.

 **NOTE:** 36 work modes shown above are designated as the standard specifications. Up to 11 attachment modes other than the digging mode can be designated. Consult your nearest Hitachi dealer for adding or changing the designation of the attachment modes.

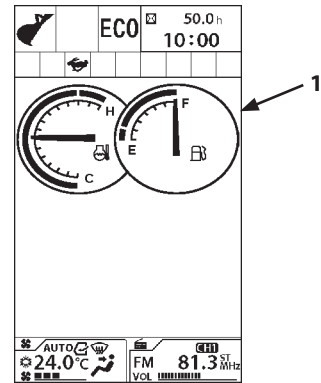


MDAA-01-001EN

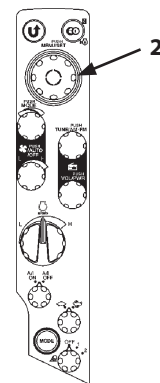
OPERATING THE MACHINE

Attachment Selection

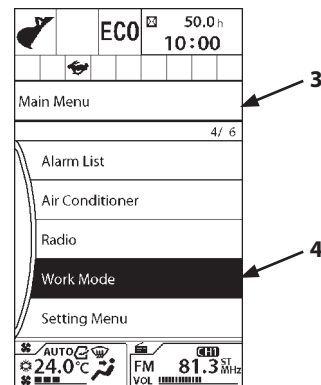
1. Press selector knob (2) while displaying Basic Screen (1) to display Main Menu screen (3).
2. Rotate selector knob (2) to highlight Work Mode (4).
3. Press selector knob (2) to display Work Mode screen (5).
4. Rotate selector knob (2) to highlight the desired front attachment.
(In the right example, "Bucket" (6) is highlighted.)
5. Press selector knob (2) to make the changes.



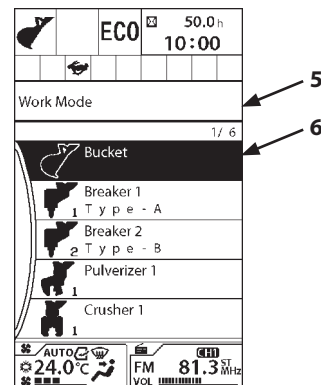
MDAA-01-001EN



MDCD-01-026



MDAA-01-100EN



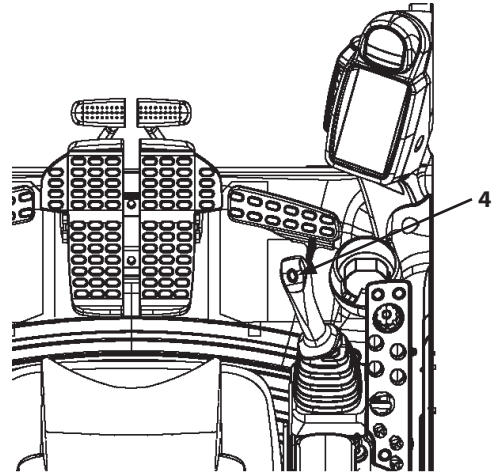
MDAA-01-101EN

OPERATING THE MACHINE

Power Boost Switch

Power boost switch (4) is located on the top of the right control lever.

When power boost switch (4) is pushed, increased front attachment power will be supplied for about 8 seconds.



MDAA-01-292

OPERATING THE MACHINE

Power Mode

Two engine speed modes, ECO and PWR modes are selected by operating the power mode switch (1).

ECO (Economy) Mode


Operate the machine in this mode when performing normal work.

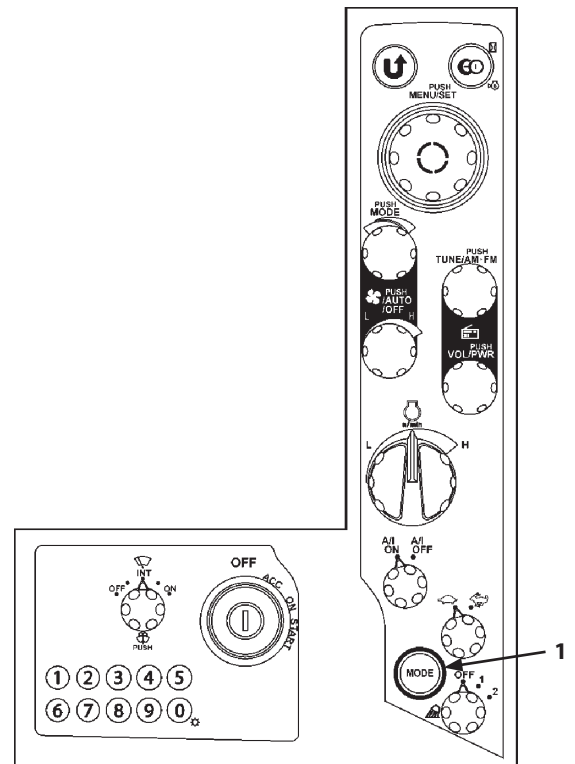
ECO is displayed on Power Mode Display (2).

PWR (Power) Mode

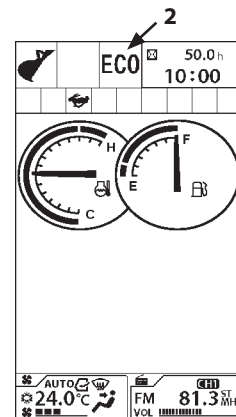
Use PWR (Power) mode when extra horsepower is needed.

PWR is displayed on Power Mode Display (3).

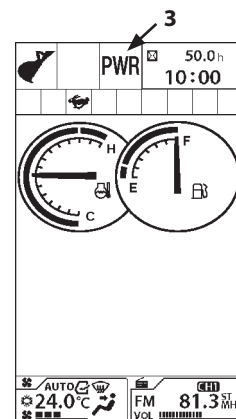
 **NOTE:** ECO mode is set automatically when starting the engine. Set PWR mode if necessary.



MDCD-01-027



MDAA-01-001EN

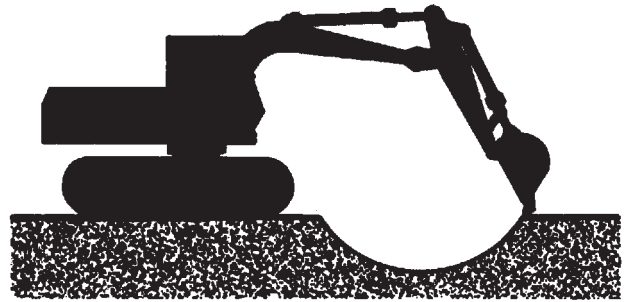


MDAA-01-353

OPERATING THE MACHINE

Operating Backhoe

- Use the appropriate arm and bucket for the work. (Refer to the "Bucket Types and Applications" in the Specifications section.)
- Pull the bucket toward the machine using the arm as the main digging force.
- When soil sticks to the bucket, remove it by moving the arm and/or bucket rapidly back and forth.
- Place the bucket teeth on the ground with the bottom of the bucket at a 45 degree angle to the ground.
- When trenching a straight line, position the tracks parallel to the trench. After digging to the desired depth, move the machine as required to continue the trench.
- When operating the arm, avoid bottoming the cylinder to prevent cylinder damage.



M107-05-037

IMPORTANT:

- **When digging at an angle, avoid striking the tracks with the bucket teeth.**
- **When lowering the boom, avoid sudden stops that may cause shock load damage to the machine.**
- **When digging a deep excavation, avoid striking the boom or bucket cylinder hoses against the ground.**
- **When operating the machine with the blade (if equipped) positioned towards the front, the bucket teeth may come in contact with the blade if you are not careful.**

OPERATING THE MACHINE

Shovel

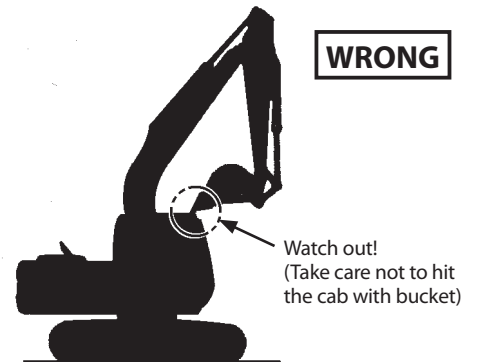
Backhoe operation digs the ground using the bucket in a roll-in motion. On the other hand, face shovel operation digs the ground using the arm cylinder in a scraping motion.

⚠ WARNING: Take care not to hit the cab when rolling in the arm with the reversed-installed bucket.

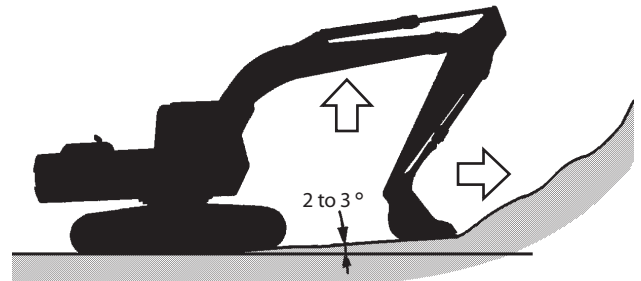
IMPORTANT: If a bucket hook is mounted, take care not to hit the arm with the hook when rolling in the bucket.

- For face shovel operation, dig the ground using the arm cylinder in a scraping motion.
- When underground water is expected, make a slope angle of 2 to 3° to drain this water as shown.

📌 NOTE: Because of the hydraulic cylinder structure, digging force of the face shovel operation is smaller than the backhoe operation.



M107-05-045



M104-05-020

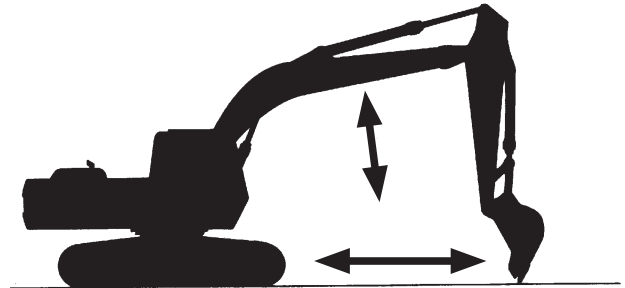
OPERATING THE MACHINE

Grading Operation

Operate the boom, arm, and the bucket in such a way so that the bucket teeth move horizontally, constantly keeping them perpendicular to the ground at the grading operation.

IMPORTANT: Do not pull or push dirt with the bucket when traveling. Excess force will be applied on each part, and the machine may be damaged.

1. Operate arm roll-in function while slowly raising the boom. Once the arm moves past the vertical position, slowly lower the boom to allow the bucket to maintain a smooth surface.
2. Arm roll-out operation is performed in the reverse way of step 1.
3. Do the slope finishing work in the same procedure as described in steps 1 and 2.



M104-05-017

OPERATING THE MACHINE

Do Not Strike the Ground with Bucket Teeth

⚠ WARNING: Forcibly striking the bucket teeth on the ground may result in personal injury by the flying debris. Also, this operation will shorten the service life of each part on the front attachment.

If the bucket teeth are forcibly struck on the ground, it shortens the service life of the front attachment parts (especially the bucket).

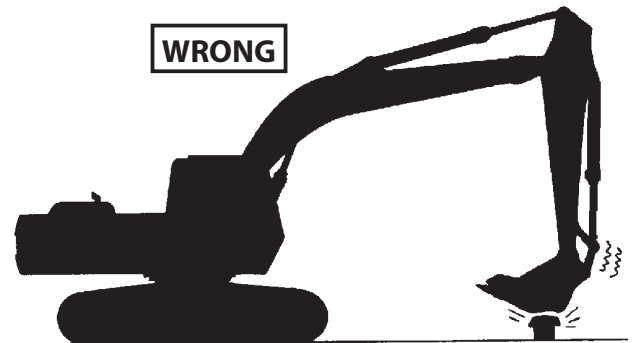
When digging a hard gravel stratum, use dig up force of the bucket. Operate the boom, arm and the bucket simultaneously so that the bucket teeth efficiently bite into the ground. Flying debris may result in personal injury.

Avoid Hammer Work

⚠ WARNING: As the bucket body has the curved surface, hammer work or piling work is very dangerous. Doing so may damage the bucket and front attachment.

Do not attempt to use the bucket for hammer work and piling work.

Doing so may damage the bucket and front attachment, causing personal injury.

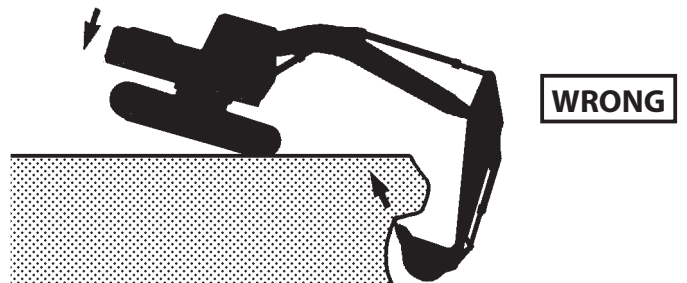
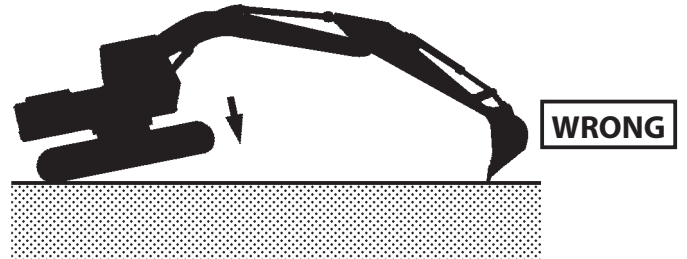
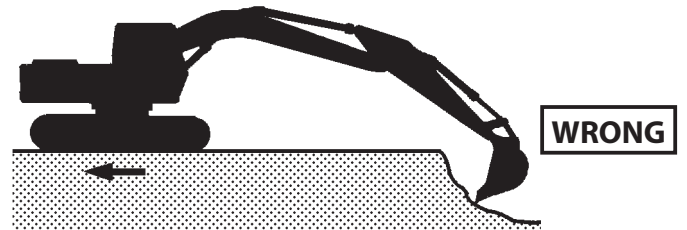


M104-05-019

OPERATING THE MACHINE

Avoid Abusive Operation

Do not use travel and do not raise rear of the machine to use the machine's weight as additional digging force. Severe machine damage may result.



M104-05-018

Avoid Side Load the Bucket

Do not side load the bucket. For example, do not swing the bucket to level material or do not strike objects from the side with the bucket. Doing so may damage the front attachment and the swing system.



M161-05-006

OPERATING THE MACHINE

Do Not Use Wide Track Shoes on Rough Ground.

Never use wide track shoes on rough ground such as rocks, sand or gravel. Wide track shoes are designed for soft ground.

Failure to do so may result in shoe bending and/or shoe bolt loosening, and may damage other undercarriage components such as track link and rollers.

(Refer to the "Shoe Types and Applications" in the Specifications section.)

OPERATING THE MACHINE

Hydraulic Breaker, Hydraulic Crusher and Quick Coupler

Selecting a Breaker or Crusher

Select a breaker, crusher or quick coupler with the correct size and weight for your machine, considering the stability of the machine, hydraulic oil pressure and flow rate of the breaker, crusher or quick coupler. See your authorized dealer for correct breaker information.

Precautions for Operation

Carefully study the operation manuals of the breaker, crusher and quick coupler.

To avoid damaging the machine, hydraulic breaker, crusher or quick coupler, follow the precautions given below.

Precautions for Connecting Breaker or Crusher Piping.

Do not allow impurities to enter into the system when switching the breaker, crusher or the quick coupler with the bucket.

When the breaker, crusher or quick coupler is not used, apply the cover to the pipe opening on the arm top and install the plug or cap into the hose end of the breaker, crusher or the quick coupler to prevent impurities from entering the system.

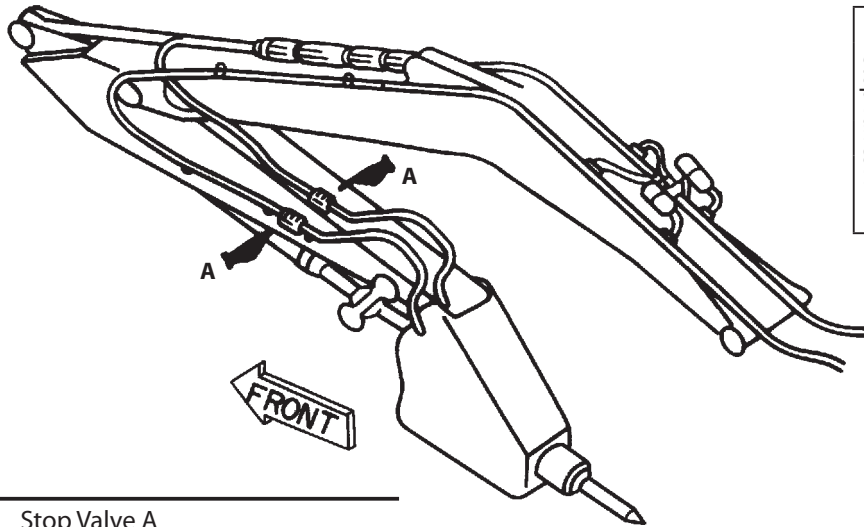
Be sure to provide spare covers and plugs in the tool box so that they will be available when needed.

After connecting, check the connecting seal fitting for oil leakage, and pipe clamp bolts for looseness.

OPERATING THE MACHINE

Piping for Breaker and Crusher

Operational Procedures for Stop Valves and Selection Valve.



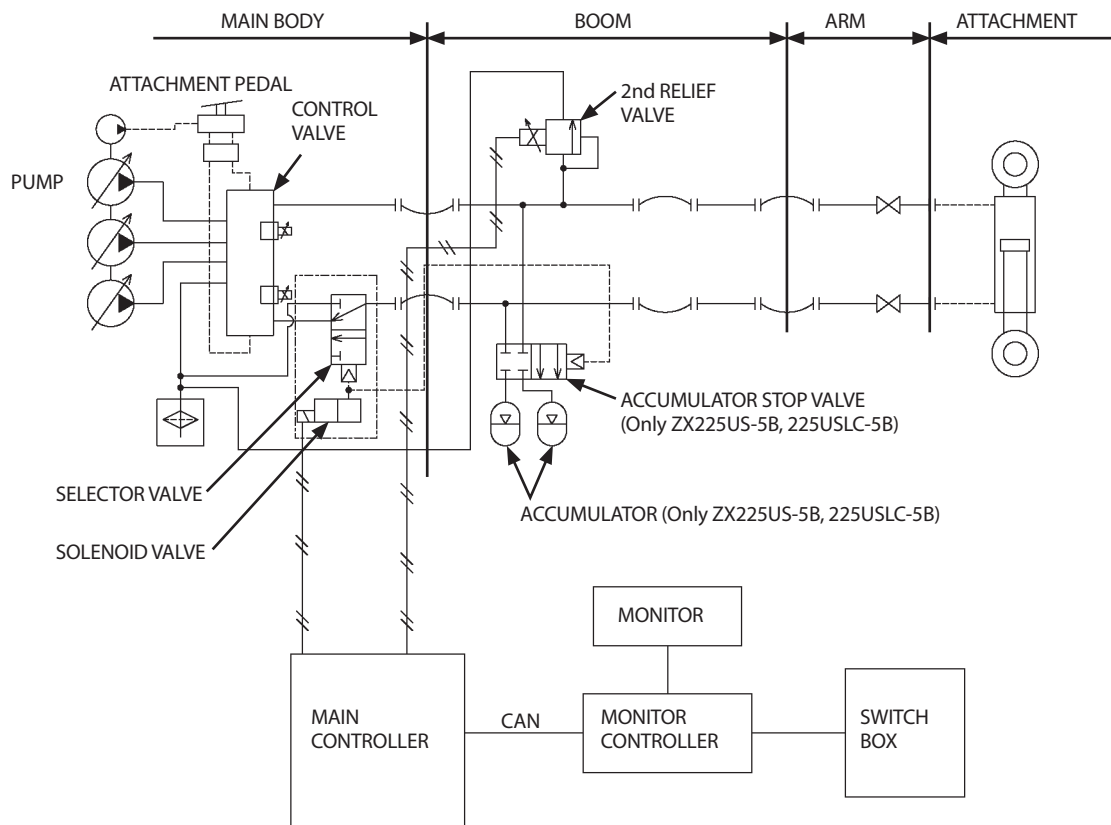
Stop Valves A	Close
Stop Valves A	Open

Stop Valve A

Close: When not using attachment or is detached.

Open: When using attachment

M1U1-05-007



MDAA-05-006

OPERATING THE MACHINE

Secondary Relief Pressure Adjustment

Depending on the breaker model, the secondary relief valve relief set pressure differs.

Consult your nearest Hitachi dealer for installing a breaker.

OPERATING THE MACHINE

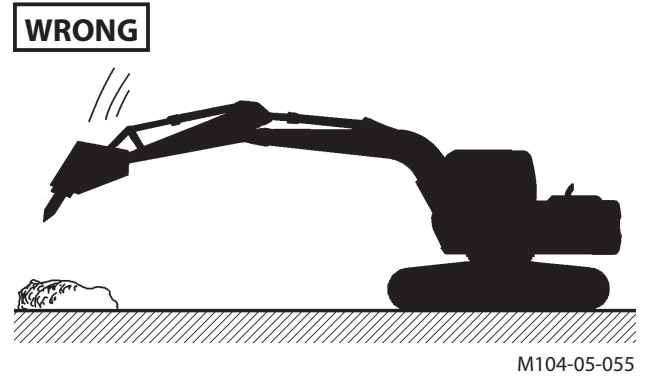
Precautions for Breaker Operation

⚠ WARNING: Machine stability is reduced as the breaker is much heavier than the bucket. When using a breaker, the machine is more apt to tip over. Also, flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.

Avoid Hitting Objects with Breaker.

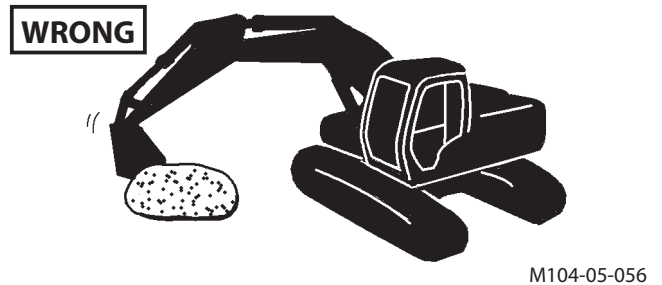
The breaker is heavier than the bucket, causing the breaker to lower faster.

Take care not to hit any objects with the breaker. Doing so will result in damage to the breaker, the front attachment, and/or the upperstructure. Always move (lower) the breaker slowly to position the tip of the chisel on the object to be broken before starting breaker operation.



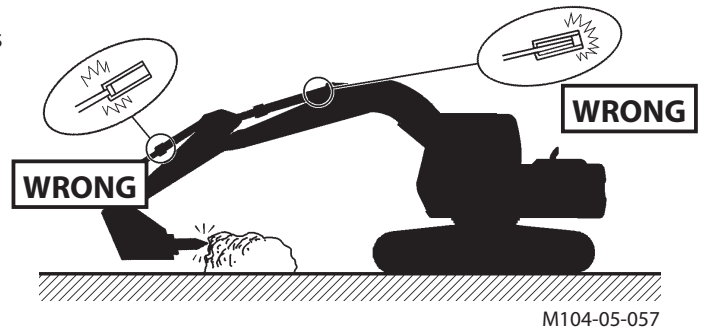
Avoid Moving Objects with Breaker.

Do not use the breaker and/or the bracket to move objects. Damage to the boom, arm, and/or breaker may result. Do not use the breaker and/or the swing function to move objects. Damage to the boom, arm, and/or breaker may result.



Avoid Operating Breaker at Cylinder Stroke End

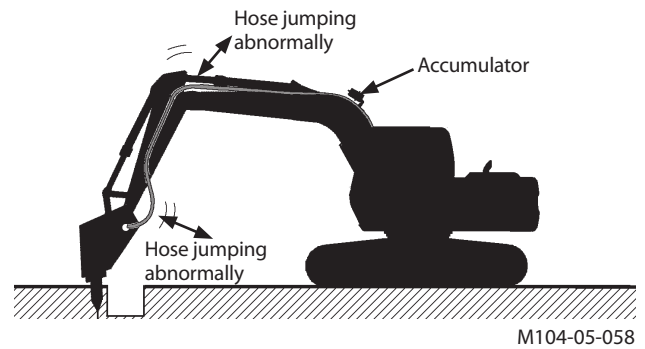
Always operate the breaker by positioning the cylinder rods 100 mm or longer before the stroke end position. When operating the breaker with cylinders fully retracted or extended, hydraulic cylinders, arm or boom may be damaged.



OPERATING THE MACHINE

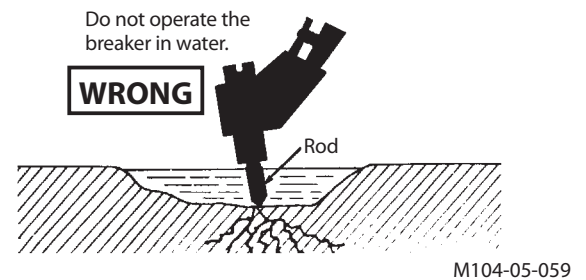
Stop Operation If Breaker Hydraulic Hoses Jump Abnormally.

Change in breaker accumulator pressure or a damaged accumulator will cause abnormal hose jumping and may cause breaker and/or machine damage. Immediately stop the machine operation. Failure to do so may result in serious failure in the hydraulic system including pumps. Contact your nearest Hitachi dealer.



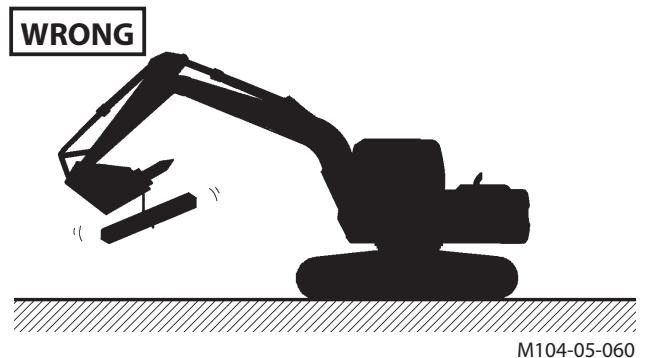
Do Not Operate the Breaker in Water.

Doing so will cause rust and seal damage, resulting in damage to the hydraulic system components. Rust, dust and water may enter into the hydraulic oil through the broken seal, damage to the hydraulic system may result.



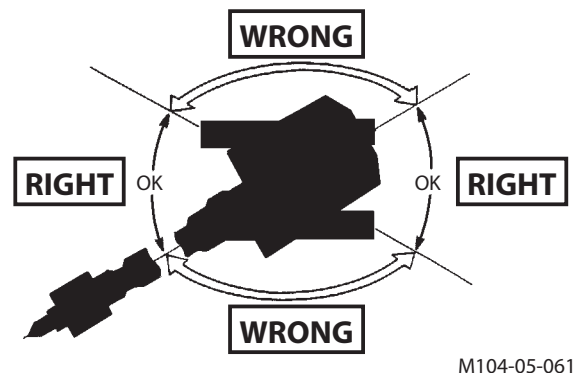
Do Not Use Breaker for Lifting Operation.

The machine tipping over and/or breaker damage may result.



Do Not Operate the Breaker to the Side of the Machine.

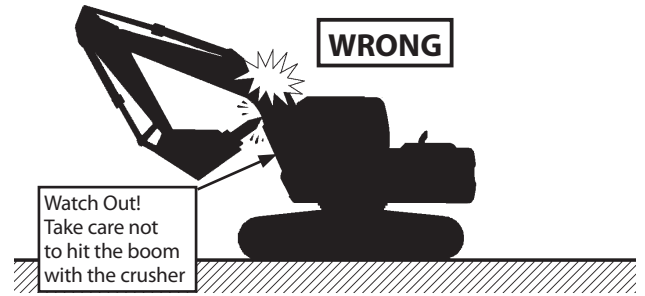
The machine may become unstable and undercarriage component life may shorten as a result from operating the breaker to the side of the machine.



OPERATING THE MACHINE

Operate the Hydraulic Excavator Carefully to Avoid Hitting the Boom.

When the arm rolled in with the breaker equipped, the chisel may come in contact with the boom.



M104-05-062

Do Not Operate Breaker with the Arm Positioned Vertically.

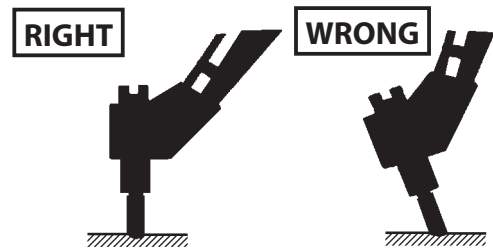
Excessive vibration to the arm cylinder will occur, causing oil leakage.



M147-05-013

Press the Breaker So That the Chisel (The Axis) Is Positioned and Thrusted Perpendicular to the Object.

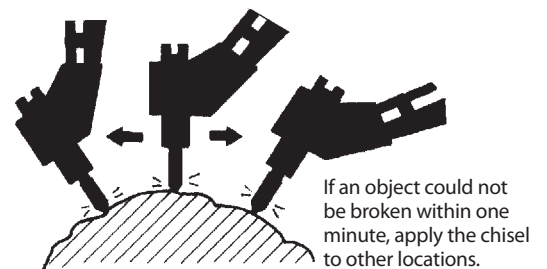
Failure to do so may damage the chisel or may cause seized piston.



M147-05-014

Do Not Operate the Breaker Continuously Longer Than One Minute.

Failure to do so may result in premature wear of the chisel. If an object could not be broken within one minute, apply the chisel to other locations, less than one minute for each location.

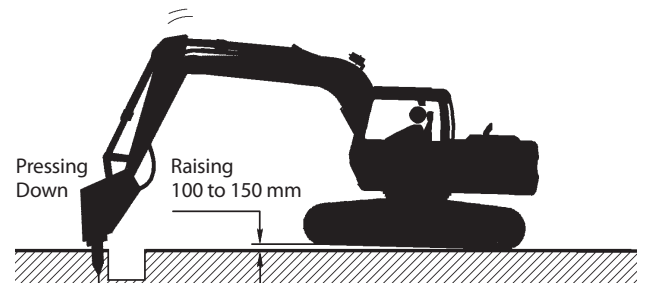


M147-05-015

OPERATING THE MACHINE

Raising the Front Part of the Undercarriage by Pressing Down the Breaker May Cause Damage to the Front Attachment.

Never raise the front edge of the undercarriage higher than 150 mm by pressing the breaker down.



M147-05-016

OPERATING THE MACHINE

Change Hydraulic Oil and Replace Full-Flow Filter Element


Hydraulic breaker operation subjects the hydraulic system to become contaminated faster and to quickly deteriorate the hydraulic oil.

Failure to adhere to proper maintenance intervals may result in damage to the base machine and the breaker.

In order to extend the service life particularly of the hydraulic pump, change the hydraulic oil and the full-flow filter element. (Refer to the "Hydraulic System" in the "MAINTENANCE" Chapter.)

Replacement intervals differ depending on the brand of hydraulic oil used. Refer to the Hydraulic System in the MAINTENANCE Chapter.

Use the high performance element (micro-glass) on excavators engaged in demolition and logging work.

 **NOTE:** Full-flow filter restriction indicator is optional. If a filter-paper element is used, this indicator does not operate. (Refer to the "Hydraulic System" in the "MAINTENANCE" Section.)

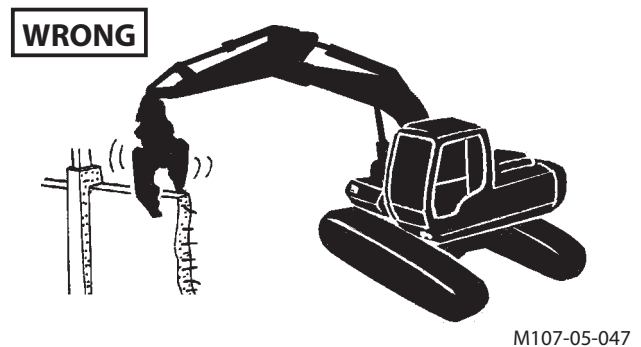
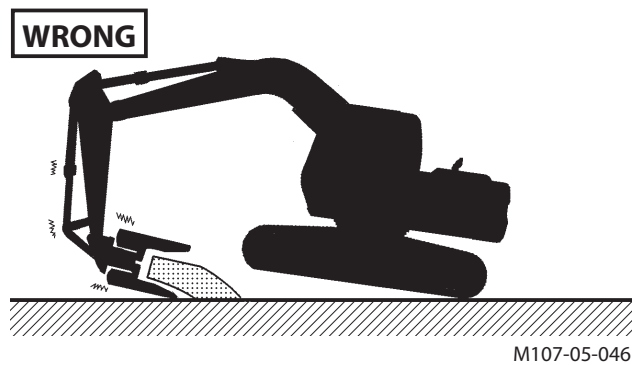
OPERATING THE MACHINE

Precautions for Crusher Operation

Prevent machine tipping over and damage to the front attachment. Observe the following precautions for crusher operation.

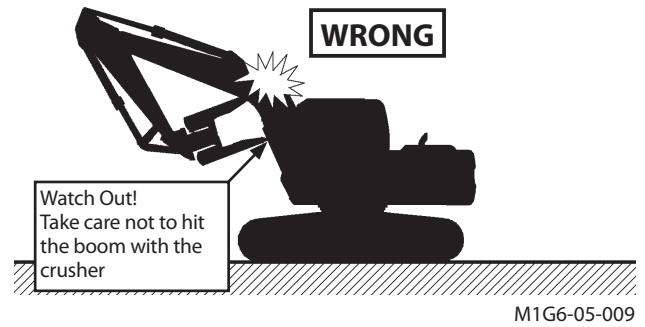
⚠ WARNING: Machine stability is reduced as a crusher is much heavier than a bucket. When operating with a crusher, the machine is more apt to tip over. Falling or flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.

- Do not allow the machine's weight to be supported by the crusher or bucket cylinder with the bucket cylinder fully extended or retracted. Failure to do so may result in damage to the front attachment. In particular, avoid doing so with the bucket cylinder fully extended, as the front attachment will be easily damaged. Take care to prevent this from happening when dismantling foundation structures using the crusher.
- Using the front attachment, do not raise the base machine off the ground with the arm cylinder fully extended. Failure to do so may result in damage to the arm cylinder.
- When a heavyweight attachment such as a crusher is installed, avoid quickly starting or stopping the front attachment. Failure to do so may result in damage to the front attachment.
- Do not attempt to perform crushing on either side of the machine. Always perform crushing operations to the fore or rear, parallel with the tracks. Otherwise, tipping over may occur.



OPERATING THE MACHINE

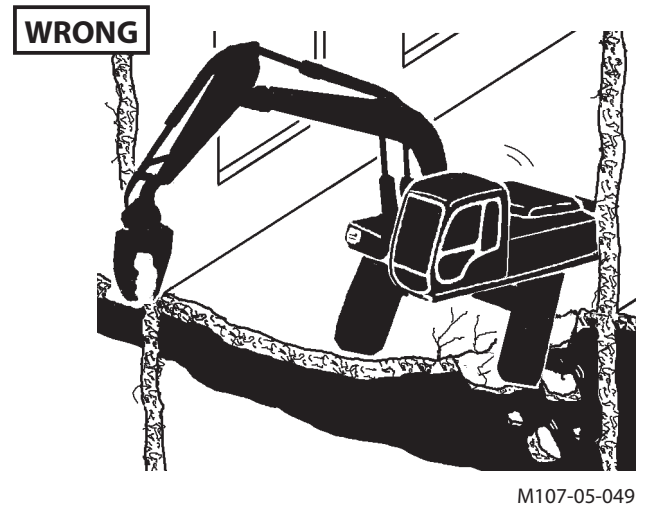
- When the arm rolled in with the crusher equipped, the crusher may come in contact with the boom.



- When operating the crusher up high with the boom fully raised, be careful of falling objects.



- When operating the crusher on a floor in a building, first confirm that the floor has sufficient strength to support the load caused by crushing, in addition to the machine weight.
The load equivalent or higher than the machine weight may be applied on the floor depending on the operation method.



OPERATING THE MACHINE

- Always operate the crusher on a stable, level surface, not on a slope or on crushed scraps.
- Do not use the crusher to haul or load crushed scraps.
- To prevent the attachment from falling accident, use a platform when replacing the attachment.
- If a multiple number of attachments, such as crusher and bucket, or crusher and breaker, are used, replacing them with each other at intervals, impurities are more apt to enter the hydraulic system and the hydraulic oil deteriorates quickly. For this reason, replace the hydraulic oil tank filter and change the hydraulic oil at the intervals specified in the breaker time sharing diagram in the previous section.
- Always remove the crusher from the excavator before transporting the machine. Do not fully extend the bucket cylinder when transporting, as this may damage the front attachment, when vibrations arise during transportation.

OPERATING THE MACHINE

Attachment

Allowable Weight Limits of Installed Attachment

⚠ WARNING

- Before installing attachments such as hydraulic breaker, crusher (concrete crusher), or pulverizer, take machine controllability into account when selecting the weight of the attachment by referring to the table below.
- When an attachment other than the standard bucket is installed on the machine, the machine stability will be different.
- According to the specifications of installed attachment and the base machine, the machine weight may exceed the allowable maximum operating weight of the ROPS, making the ROPS unable to assure the protective function for operator. Refer to the ROPS certification affixed in the cab for the allowable maximum operating weight.

If a heavy attachment is used, not only will controllability be affected but also machine stability will be reduced, possibly causing safety hazard.

(Unit: kg)

Specification	Base Machine		Breaker		Crusher/Pulverizer	
	Model	Arm	Std.Weight	Max.Weight	Std.Weight	Max.Weight
Std. Model	ZX135US-5B	Std.	1000	1100	1200	1400
	ZX225US-5B	Std.	1550	1700	1850	2150
	ZX225USLC-5B	Std.	1750	1950	2100	2450

OPERATING THE MACHINE

- Breaker operation speed is faster than crusher operation so that the recommended breaker max. weights are reduced more than those of the crushers.
- The weight is not the only factor to be considered when selecting a breaker. Select proper manufacturer's breaker models while referring to the table on the next page.
- Avoid installing an attachment with a long overall length. Damage to the front attachment may result.
- When an attachment of the max. weight is installed, always operate the attachment over the front or rear side of the machine. In addition, avoid operating the attachment at the maximum reach.
- Crushers are heavier than breakers. Slowly move the control lever when operating a crusher.

OPERATING THE MACHINE

Attachment

Example commercial attachment models (breakers and crushers) for excavators are shown in the following table. Among the crusher models, some models are heavier than the recommended weight on the previous page. Before installing them, sufficiently coordinate with the attachment manufacturer.

Always contact your nearest Hitachi dealer before installing attachments shown with this mark *.


When an attachment other than the standard bucket is installed on the machine, the machine stability will be different. If a heavy attachment is used, not only will controllability be affected but also machine stability will be reduced, possibly causing safety hazard. Thoroughly read and understand the base machine operator's manual and the attachment manual to prevent accidents.

Breaker ZX135US-5B

Maker	NPK	Okada	Furukawa	Mitsubishi	Toukuu	Matsuda	MONTABERT	STK	Ranma	GERMANYKRUPP	
Model	GH-6	OUB308	HB10G	MKB900	TNB7E	THBB801	BRH625	SIB215	E-64	HM560CS	
Weight	kg	863	810	790	870	910	740	1000	900	1000	870
Flow Rate	L/min	90 to 150	90 to 120	70 to 90	65 to 110	70 to 140	60 to 110	80 to 130	80 to 130	70 to 130	50 to 110
Operating Pressure	MPa (kgf/cm ²)	15 to 17 (153 to 173)	11.8 to 15.7 (120 to 160)	13.7 to 15.7 (140 to 160)	13.7 to 16.7 (140 to 170)	11.8 to 16.7 (120 to 170)	13.7 to 17.6 (140 to 180)	11.3 (115)	13.7 to 15.7 (140 to 160)	13.2 to 14.2 (135 to 145)	11.8 to 16.7 (120 to 170)
Secondary Relief Valve Set Pressure	MPa (kgf/cm ²)	—	17.6 (180)	20.6 (210)	17.6 (180)	17.6 (180)	19.6 (200)	11.8 (120)	17.6 (180)	15.7 (160)	16.7 (170)

Breaker ZX225US-5B, 225USLC-5B

Maker	NPK	Okada	Furukawa	Mitsubishi	Toukuu	Matsuda	MONTABERT	STK	Ranma	GERMANYKRUPP	
Model	H-10XB	OUB312B	F22	MKB1500V	TNB-14E	THBB-1401	BRH501	SIB312	E-66	HM960CS	
Weight	kg	1450	1500	1550	1530	1550	1350	1350	1310	1300	1500
Flow Rate	L/min	160 to 200	140 to 180	145 to 180	130 to 175	130 to 170	130 to 200	110 to 140	140 to 180	100 to 160	130 to 170
Operating Pressure	MPa (kgf/cm ²)	11.7 to 13.7 (120 to 140)	13.7 to 16.7 (140 to 170)	15.7 to 17.7 (160 to 180)	14.7 to 17.7 (150 to 180)	12.7 to 16.7 (130 to 170)	15.7 to 17.7 (160 to 180)	7.8 to 10.8 (80 to 110)	14.7 to 16.7 (150 to 170)	13.2 to 14.2 (135 to 145)	11.8 to 13.7 (120 to 140)
Secondary Relief Valve Set Pressure	MPa (kgf/cm ²)	—	17.6 (180)	17.6 (180)	17.6 (180)	17.6 (180)	17.6 (180)	10.8 (110)	17.6 (180)	14.2 (145)	13.7 (140)

 **NOTE:** Size change of return front piping may needed for some MONTABERT breaker. Consult your nearest Hitachi dealer.

OPERATING THE MACHINE

Crusher ZX135US-5B

Maker	Sango Jyuki	NPK*	Sakato*	Ohsumi*	STK*	
Model	TS700RCD	S-15X	SPAC70R-3	MR800	CX750	
Weight	kg	1200	1410	1300	1400	1250
Overall Length	mm	1980	2230	1620	1900	2000
Rated Pressure	MPa (kgf/cm ²)	24.5 (250)	20.6 (210)	27.4 (280)	~31.4 (~320)	27.4 (280)
Maximum Opening Width	mm	700	750	750	800	750
Swing Method		Free	Free	-	Free	Free

Crusher ZX225US-5B, 225USLC-5B

Maker	HITACHI		Sango Juki	NPK*	Sakato*	Ohsumi*		STK*	
Model	HSC100	HSC160	TS850RCD	S-22XA	SDS250 RC	MR1000L	MR1100	DX-900	
Weight	kg	2430	2300	2000	2010	2390	1900	2350	2100
Overall Length	mm	2340	2600	2400	2326	2425	2200	2250	2380
Rated Pressure	MPa (kgf/cm ²)	27.9 (285)	27.9 (285)	27.5 (280)	24.5 (250)	31.4 (320)		27.5 (280)	
Maximum Opening Width	mm	900	850	850	850	1050	1060	1060	900
Swing Method		Hydraulic	Hydraulic	Free	Free	Free	Free	Free	Free
Jaw Tip Crushing Force	kN (tf)	640 (65)	-	980 (100)	970 (99)	834 (85)	-	-	-
Jaw Center Crushing Force	kN (tf)	980 (100)	1570 (160)	1570 (160)	1470 (150)	-	1240 (126)	1540 (157)	-

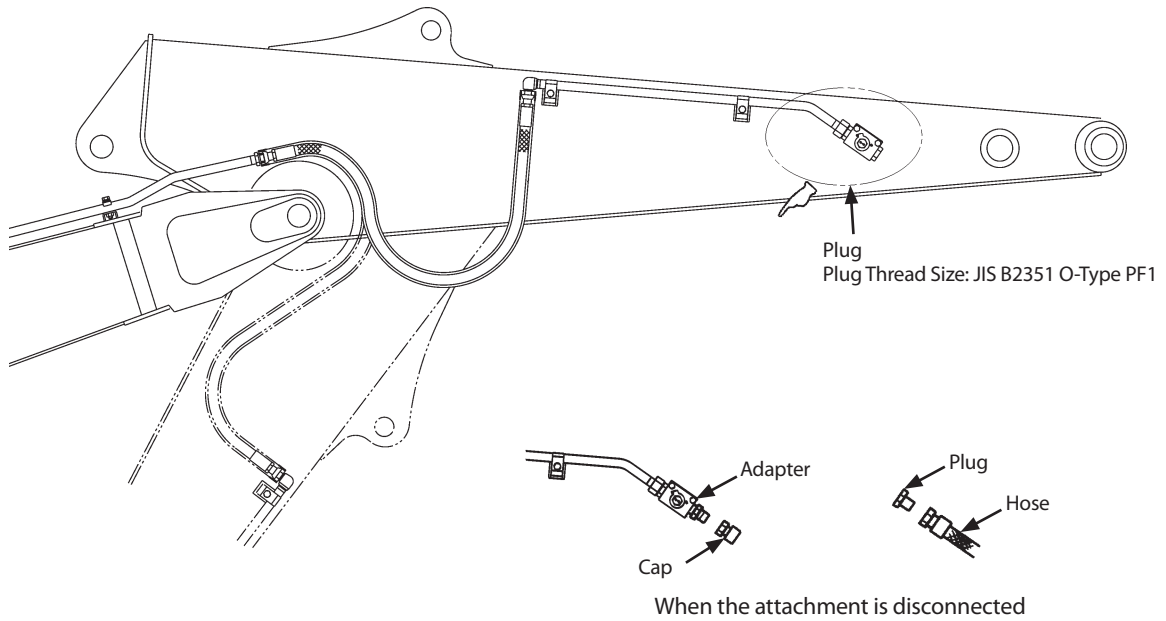
OPERATING THE MACHINE

Attachment Connection Parts

The attachment hydraulic line and connection parts are located as illustrated below.

When the attachment is disconnected, be sure to install caps or plugs to the ends of both the arm and attachment side hydraulic lines to prevent dust from entering or from sticking.

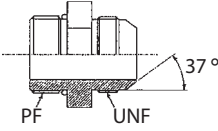
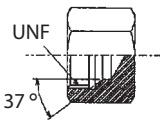
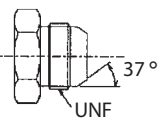
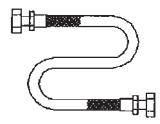
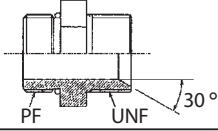
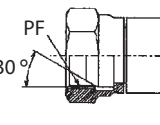
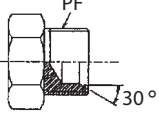
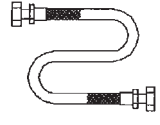
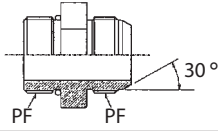
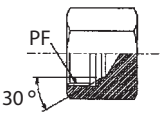
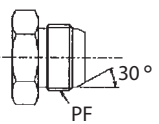
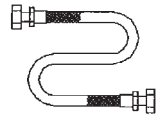
Adapter tightening torque:
PF1: 210 N·m (21 kgf·m)



M175-05-005

OPERATING THE MACHINE

Part No. List (Fill attachment manufacturer's part Nos. in the blank spaces.)

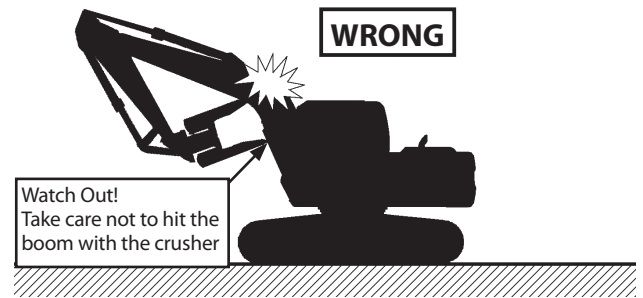
	Adapter Size	Adapter	Cap	Plug	Hose
Form / Size	PF-UNF Male-Type				
ZX135US-5B	PF1-1-1/16UN	4456399	4222711	4222264	
ZX225US-5B, 225USLC-5B left side piping	PF1X1-5/16UN	4214444	4222712	4222265	
Form / Size	PF-PF30° Female-Type				
ZX135US-5B	PF1-PF3/4	4129457	9718916	4222047	
ZX225US-5B, 225USLC-5B left side piping	PF1XPF1	4042034	9718917	4168177	
Form / Size	PF-PF30° Male-Type				
ZX135US-5B	PF1-PF3/4	4456120	4222715	4222044	
ZX225US-5B, 225USLC-5B left side piping	PF1XPF1	4456118	4222716	4222045	

OPERATING THE MACHINE

Precaution for Arm Roll-In/Bucket Roll-In Combined Operation

When Installing an Attachment Longer Than Standard Bucket

⚠ WARNING: When an attachment (such as a hydraulic breaker, crusher or quick coupler), the overall length of which is longer than that of the bucket, is installed, the attachment may come in contact with the cab and/or the boom. Operate the machine with care not to allow the tip of the front attachment to hit the cab and/or the boom while rolling in the front attachment.



M1G6-05-009

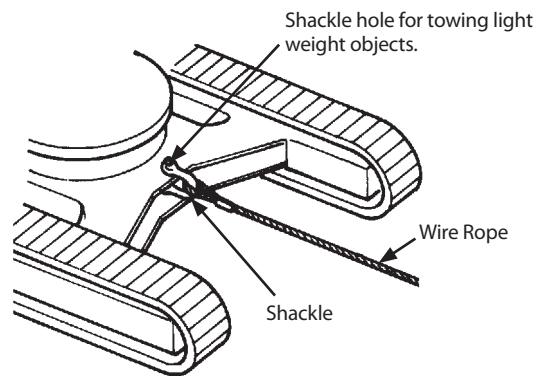
Shackle Hole Usage

A shackle hole is provided on the track frame to tow light weight objects as specified below.

IMPORTANT: Be sure to conform to the restrictions and precautions stated below when towing a light weight object using the shackle hole provided on the track frame. The track frame and/or the shackle hole may be damaged otherwise.

- The maximum drawbar pull.

Model	Maximum Drawbar Pull
ZX135US-5B	44100 N (4500 kgf) or less
ZX225US-5B, 225USLC-5B	73600 N (7500 kgf) or less



M104-05-011

- Be sure to use a shackle.
- Keep the tow line horizontal, straight, and parallel to the tracks.

Select the slow travel mode. Slowly drive the machine when towing.

OPERATING THE MACHINE

Pilot Accumulator Functions

The pilot accumulator (1) is a pressure storage reservoir of the control circuit which supplies pressure and enables to operate the control circuit even after stopping the engine. Thus, the front attachment can be lowered with its own weight by using the control lever and pressure in the hydraulic circuit can be released after stopping the engine.

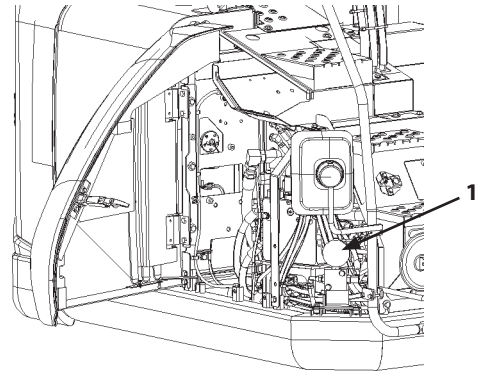
Pressure Release Procedure of Hydraulic Circuit

1. Set the machine in the parking position.
2. Pull the pilot control shut-off lever to the LOCK position.

Perform items from 3 to 5 within 15 seconds.

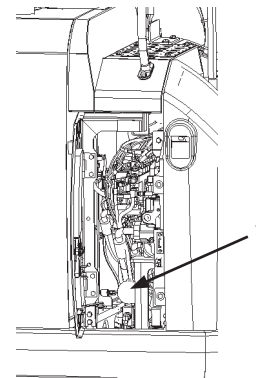
As pressure in the accumulator gradually decreases after stopping the engine, pressure in the hydraulic circuit can be released only immediately after stopping the engine.

3. Stop the engine. Turn the key switch ON.
4. Push the pilot control shut-off lever to the UNLOCK position.
5. Move the control levers and attachment pedals forward and rearward or left and right to release pressure from the hydraulic circuit.
6. Pull the pilot control shut-off lever to the LOCK position and turn the key switch OFF.



ZX135US-5B

MDCN-05-001



ZX225US-5B, 225USLC-5B

MDCN-05-002

OPERATING THE MACHINE

How to Lower Boom in Case of Emergency and When Engine Stops

(Without hose-rupture safety valve)

⚠ WARNING: Prevent personal injury. Confirm that no one is under the front attachment before starting the procedure below.

In case the engine suddenly stops and the engine cannot restart, lower the boom in the following procedures.

IMPORTANT: Never loosen screw (2) more than 2 turns. Screw (2) may come off.

1. Loosen lock nut (1) in the control valve at the right. Loosen screw (2) one half of a turn. The boom lowering speed can be somewhat adjusted by loosening screw (2) more.

IMPORTANT: Excessive leakage may result if the screw and the lock nut are tightened insufficiently. Be sure to retighten the screw and the lock nut to specifications.

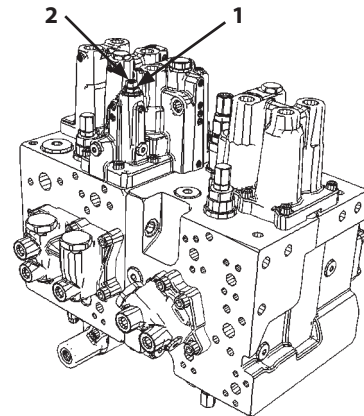
2. After the boom is lowered, tighten screw (2) and tighten lock nut (1) to the specifications below.

Locknut (1)

Tightening Torque: 13 N·m (1.3 kgf·m)

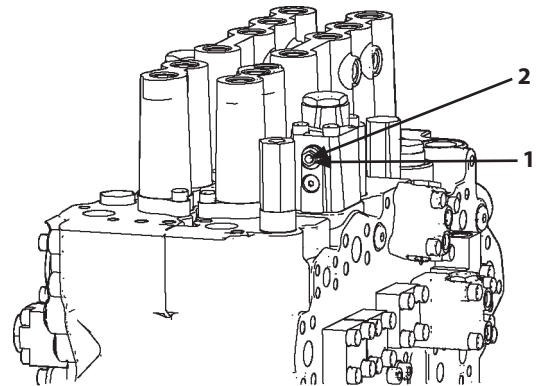
Bolt (2)

Tightening Torque: 7 N·m (0.7 kgf·m)



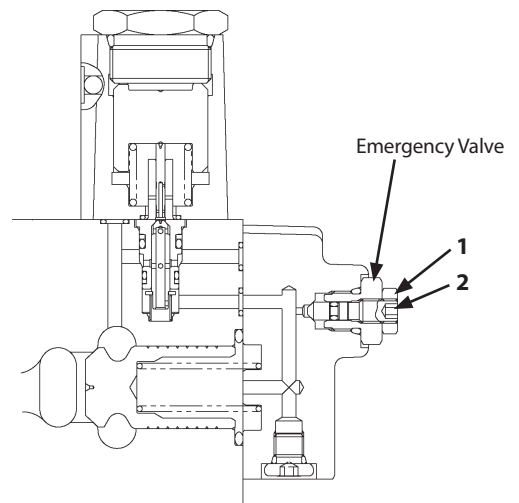
ZX135US-5B

MDAA-05-008



ZX225US-5B, 225USLC-5B

MDAA-05-003



T1V1-03-03-038

OPERATING THE MACHINE

Precautions for After Operations

- After finishing the day's operation, drive the machine to a firm, level ground where no possibility of falling stones, ground collapse, or floods is present.
(Refer to the group for "PARKING MACHINE" in the DRIVING MACHINE section.)
- Fully refill the fuel in the fuel tank.
- Clean the machine.

TRANSPORTING

Transporting by Road

When transporting the machine on public roads, be sure to first understand and follow all local regulations.

- When transporting the machine using a trailer, check the width, height, length and weight of the trailer with the machine loaded. Note that transporting weight and dimensions may vary depending on the type of shoe or front attachments installed.
- Investigate beforehand the conditions of the route to be traveled, such as dimensional limits, weight limits, and traffic regulations.

In some cases, getting the permission from the local authority concerned or disassembling the machine to bring it within dimensional limits or weight limits of local regulations may become necessary.

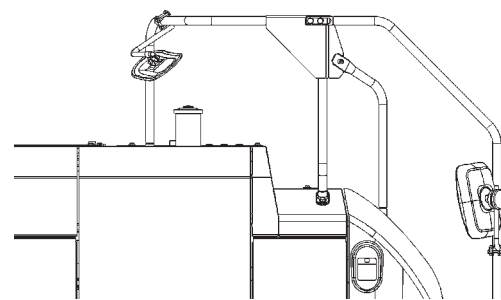
Notify the nearest dealer that you are transporting the unit.

ZX225US-5B, 225USLC-5B

IMPORTANT: Remove the auxiliary bar when transporting the machine. After transporting the machine, install the auxiliary bar in the operation position before operating the machine.

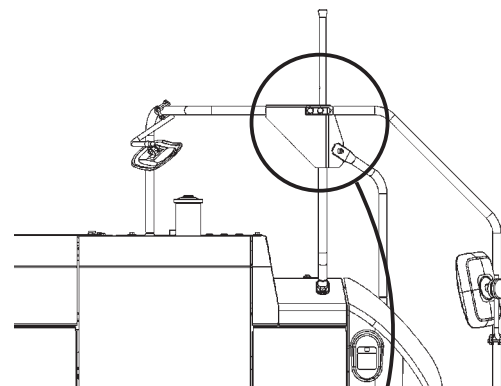


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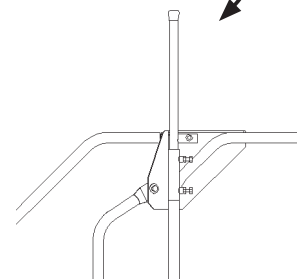
Transportation Position

MDCN-06-001



Operation Position

MDCN-06-002



MDCN-06-003

TRANSPORTING

Loading/Unloading on a Trailer

Always load and unload the machine on a firm, level surface.

⚠ WARNING: Be sure to use a loading dock or a ramp for loading/unloading. Never load or unload the machine onto or off a truck or trailer using the front attachment functions when driving up or down the ramp.

Ramp/Loading Dock:

1. Before loading, thoroughly clean the ramps, loading dock and flatbed. Dirty ramps, loading docks, and flatbeds with oil, mud, or ice on them are slippery and dangerous.
2. Place blocks against the truck and trailer wheels while using a ramp or loading dock.
3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.
4. Loading docks must be sufficient in width and strength to support the machine and have an incline of less than 15 degrees.
5. When loading the machine equipped with pat crawler or rubber pad shoes, take sufficient care not to allow the machine to slip since the surface of the rubber pad shoe is flat.

Load the machine only after removing soil or clay adhered to the machine.

6. When transporting the machine equipped with a blade, take care not to hit the blade.

TRANSPORTING

Loading/Unloading

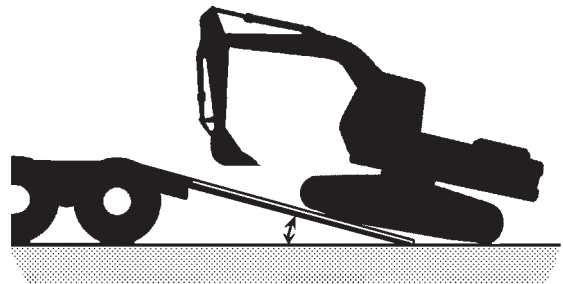
WARNING:

- Always turn the auto-idle switch OFF when loading or unloading the machine. In the auto-idle mode, speed may automatically increase.
- Always select the slow speed mode with the travel mode switch.
- Never steer while driving up or down a ramp as it is extremely dangerous and may cause the machine to turnover. NEVER attempt to change directions whilst positioned on the ramp. If repositioning is necessary, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
- The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it as the balance may be lost. If the front attachment is not fitted, reverse onto the trailer.
- Extreme care must be taken when swinging the upper structure when the machine is on the trailer flatbed. If the front attachment is fitted, swing slowly with the arm fully roll-in underneath the boom being careful not to lose the balance of the machine.

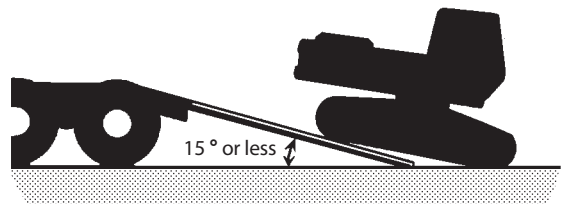
Loading

If the front attachment is fitted, load with the front faced towards the front, if the front attachment is not fitted, reverse onto the trailer.

1. Load the machine so that the centerline of the machine aligns with the centerline of the trailer flatbed.
2. Drive the machine onto the ramp slowly.



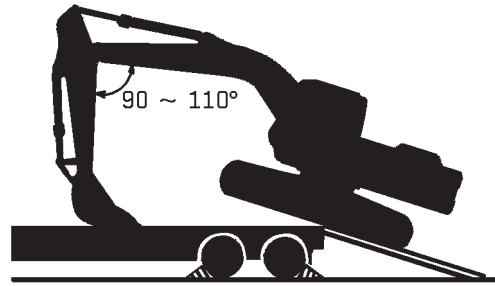
M1G6-06-002



M107-06-018

TRANSPORTING

3. When the front attachment is fitted
 - 3.1 Determine a position for the bucket in line with the trailer. Adjust the angle of the boom and the arm at 90 to 110 °.
 - 3.2 Lower the bucket onto to the deck of the trailer before the unit passes over the end of the ramp for support.
 - 3.3 Lift the bucket slightly off the deck of the trailer after the unit has moved to the designated space. With the arm lifted inwards, slowly swing the upperstructure around 180 °.
 - 3.4 Rest the front attachment on supports such as wooden blocks placed on the trailer flatbed. Also lower the blade onto the deck at this time (if fitted).
4. Stop the engine. Remove the key from the key switch.
5. Pull the pilot control shut-off lever to the LOCK position.
6. Close cab windows, roof vent and door, and cover the exhaust opening, to prevent entry of wind and water. Place a cover over the exhaust outlet. Lock all doors, covers and caps if they have a lock.
7. House all mirrors and the radio antenna away correctly.



M107-06-012



M107-06-013

⚠ CAUTION: In cold weather, be sure to warm up the machine before loading or unloading it.

TRANSPORTING

Fastening Machine for Transporting

⚠ WARNING: Fasten the machine frame to the deck securely with chains and cables. While traveling, loads may shake around, move forward or backward or to the sides.

1. Place cog stoppers or blocks in front of and behind the tracks to help secure the unit.
2. Fasten each corner of the machine and front attachment to the trailer with appropriate strength of chains or cables.



M1V1-06-001

Unloading

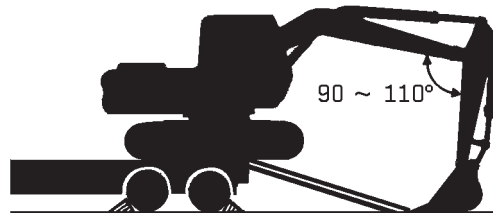
⚠ WARNING: The rear end of the flatbed where it meets the ramp is a sudden bump. Take care when traveling over it.

IMPORTANT: Make sure that the angle of the boom and the arm is kept between 90 to 110 ° when unloading the unit.

Damage to the unit is possible if the arm is kept in a suspended state during unloading.

1. Travel extremely slowly with the bucket on the ground and the angle of the arm and the boom kept at between 90 to 110 ° when moving from the edge of the trailer onto the ramp.

IMPORTANT: When driving the machine over the ramp, do not allow the machine to hit the ground too hard with the arm. Possible damage to the hydraulic cylinders may result.



M107-06-014

TRANSPORTING

2. The bucket must be on the ground before the machine begins to tip forward.
3. As the machine moves forward, raise the boom and extend the arm until the machine is completely off the ramp.



M107-06-015

TRANSPORTING

Lifting Machine



WARNING:

- **Use lifting cables and other lifting tools being free from any damage and/or aging, and having sufficient strength.**
- **Consult your nearest Hitachi dealer for correct lifting procedures, and the size and types of lifting cable and tools.**
- **Pull the pilot control shut-off lever to the LOCK position so that the machine does not accidentally move while being lifted.**
- **Incorrect lifting procedure and/or incorrect wire rope attachment will cause the machine to move (shift) while being lifted, resulting in machine damage and/or personal injury.**
- **Do not lift the machine quickly. Excessive load will be applied to the lifting wire ropes and/or lifting tools, possibly causing them to break.**
- **Do not allow anyone to come close to or under the lifted machine.**
- **The indicated gravity center is for the standard specification machine. The gravity center will vary depending on the kinds of attachments and/or optional equipment to be installed or their position to be taken. Therefore, take care not to lose the balance of the machine while lifting.**

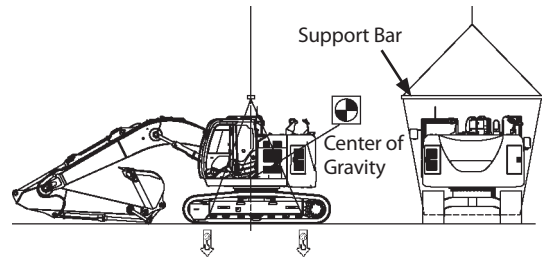
TRANSPORTING

Lifting

1. Fully extend the arm and bucket cylinders. Lower the boom until the bucket comes in contact with the ground.
2. Pull the pilot control shut-off lever to the LOCK position.
3. Stop the engine. Remove the key from the key switch.
4. Close and lock all doors and covers.
5. Use wire ropes and support bar of sufficient length so that they do not come in contact with the machine while lifting.

Wrap some protectors around wire ropes and/or support bar as required to prevent the machine from being damaged.

6. Set a crane in an appropriate position.
7. Thread the wire rope through and under both sides of the track frames as illustrated. Attach the wire ropes to the crane.



MDCN-06-004

MAINTENANCE

Correct Maintenance and Inspection Procedures

Learn how to service your machine correctly. Follow the correct maintenance and inspection procedures shown in this manual.

Inspect machine daily before starting.

- Check controls and instruments.
- Check coolant, fuel and oil levels.
- Check for leaks, kinked, frayed or damaged hoses and lines.
- Walk around machine checking general appearance, noise, heat, etc.
- Check for loose or missing parts.

If there is any problem with your machine, repair it before operating or contact your authorized dealer.

IMPORTANT:

- **Use only recommended fuel and lubricants.**
- **Be sure to use only genuine Hitachi parts. Failure to do so may result in serious injury or death and/or machine breakdown.**
- **Failure to use recommended fuel, lubricants, and genuine Hitachi parts will result in loss of Hitachi product warranty.**
- **Never adjust engine governor or hydraulic system relief valve.**
- **Protect electrical parts from water and steam.**
- **Never disassemble electrical components such as main controller, sensors, etc.**
- **Never adjust parts of engine fuel system or hydraulic equipment.**
- **Using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine and muffler filter parts, leading to malfunction.**
- **Use Hitachi genuine high performance filter.**



SA-005

MAINTENANCE

- **Body Information Controller**

This machine provides a body information controller that stores machine operation information for preventive maintenance.

When maintaining the machine, our authorized service man may download the stored information.

Consult with your nearest Hitachi dealer for detailed function of this device.

- **Communication Terminal Operation**

It is not necessary to check or operate the communication terminal however if any abnormality is found, consult your nearest Hitachi dealer.

Before installing any covering attachment such as a head guard, consult your nearest Hitachi dealer.

Never spray water on the communication terminal and the wirings.

- **Inquire on the proper way to recycle or dispose of oil, fuel, coolant, filters, batteries and other waste from your local environmental or recycling center, or from your authorized dealer.**

- Hitachi machine models described in this manual are classified as shown in the table below.

Model

Std. Model	Std. Specification	ZX135US-5B ZX225US-5B ZX225USLC-5B
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MAINTENANCE

Check the Hour Meter Regularly

Refer to the List of Check and Maintenance for information about lubricants, check and adjustment intervals. The maintenance guide table is affixed in the back of the tool box cover. Refer to the next page.

This manual recommends grouping the intervals into three categories as follows:

- Daily Check : To be conducted daily before operation
- Monthly check: : To be regularly conducted once per month
- Annual check: : To be regularly conducted once per year










Check and maintenance intervals shown in this manual are those for the machines to be operated under normal conditions. In case the machine is operated under more severe conditions, shorten the intervals.

MAINTENANCE

Maintenance Guide Table

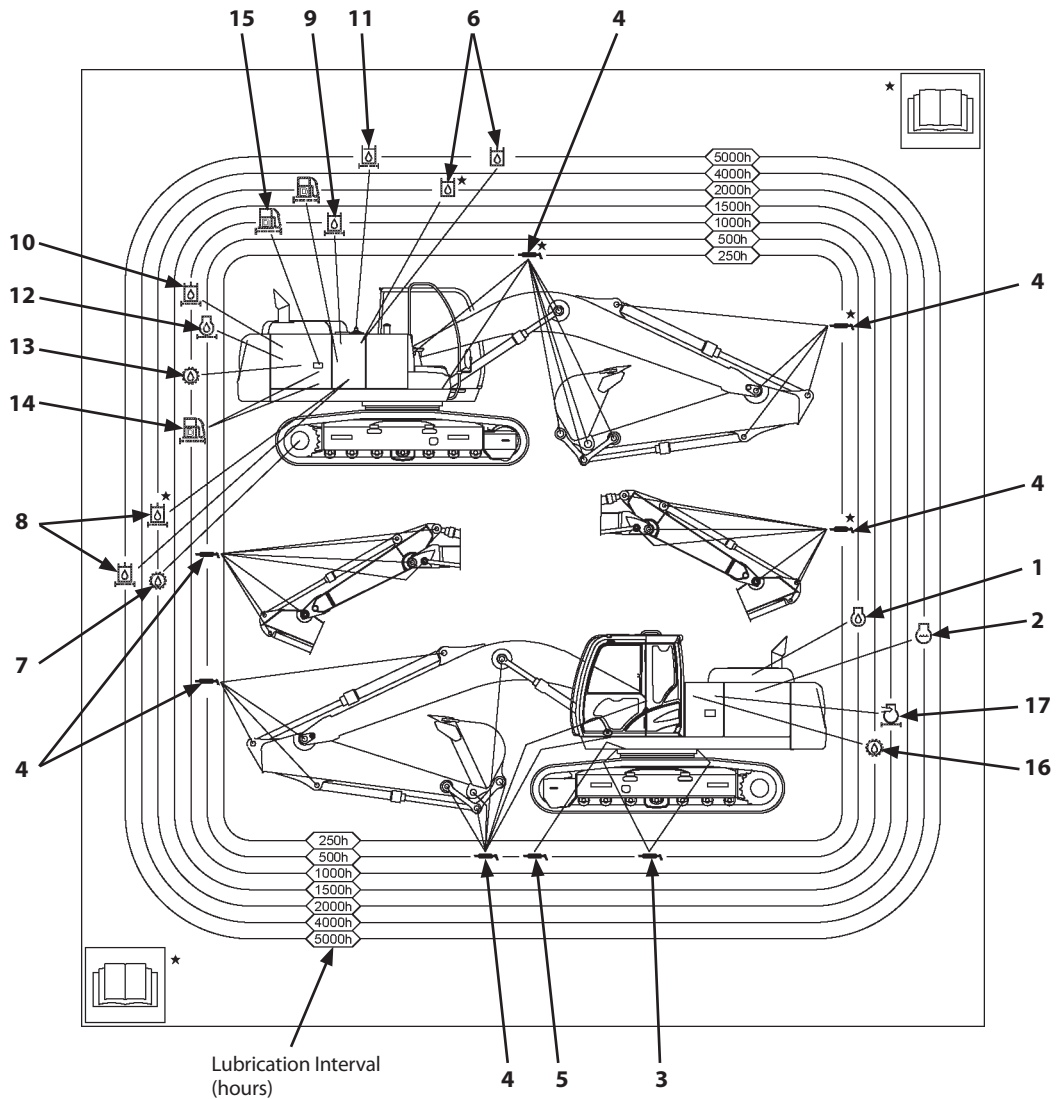
The maintenance guide table is affixed to the reverse side of the tool box cover. Lubricate and/or service the parts at the intervals as instructed in the table so that all necessary maintenance can be performed regularly.

- **Symbol Marks**
The following marks are used in the maintenance guide table.

	Grease (Front Joint Pin, Swing Bearing, Swing Gear)		Hydraulic oil filters (Pilot Filter, Hydraulic Oil Tank Filter, Suction Filter)
	Gear Oil (Pump Transmission, Travel Reduction Device, Swing Reduction Device)		Air Cleaner Element
	Engine Oil		Coolant (Long-Life Coolant)
	Engine Oil Filter		Fuel Filter (Fuel Main Filter, Pre-Filter)
	Hydraulic Oil		

MAINTENANCE

• Maintenance Guide Table



MDAA-07-049

	Item	Page		Item	Page
1	Engine Oil	7-25	10	Hydraulic Oil Filter (Pilot)	7-44
2	Coolant (Long-Life Coolant)	7-69	11	Hydraulic Oil Filter (Air Breather)	7-45
3	Grease	7-21	12	Engine Oil Filter	7-25
4	Grease (Every 500 hours. Only first time at 250 hours)	7-19	13	Gear Oil (Pump Transmission)	7-28
5	Grease	7-22	14	Fuel Filter (Main/Pre)	7-57
6	Hydraulic Oil	7-37	15	Solenoid Fuel Pump Strainer	7-61
7	Gear Oil (Travel Device)	7-31	16	Gear Oil (Swing Reduction Gear)	7-29
8	Hydraulic Oil Filter (Suction)	7-40	17	Air Cleaner Element	7-66
9	Hydraulic Oil Filter (Full Flow)	7-41			

MAINTENANCE

Preparations for Inspection and Maintenance

Except in special cases, park the machine by following the procedure before servicing the machine.

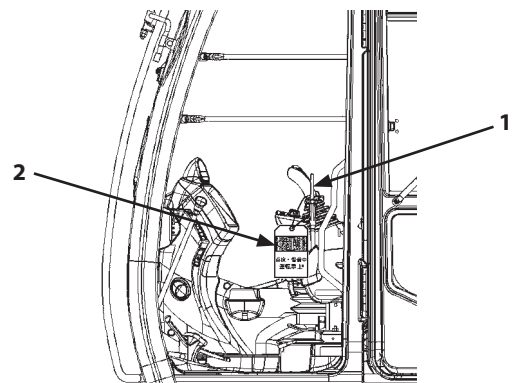
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch OFF.
4. Turn engine control dial (1) to the slow idle position and run the engine for 5 minutes to cool the engine.
5. Turn the key switch OFF to stop the engine. Remove the key. Be sure to place pilot control shut-off lever (1) to the LOCK position.
6. After putting a tag (2) for "Under Serving" on the easy-to-see cab door or control lever, begin the work.

⚠ WARNING: Never attempt to maintain the machine when the engine is running in order to prevent the accident. If maintenance work while engine running is unavoidable, strictly comply with the following items.

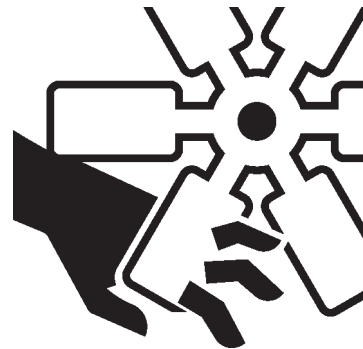
- One person should take the operator's seat to be ready to stop the engine any time while communicating with other workers.
- When working around moving parts is unavoidable, pay special attention to ensure that hands, feet, and clothing do not become entangled.
- If parts or tools are dropped or inserted into the fan or the belt, they may fly off or be cut off. Do not drop or insert parts and tools into the moving parts.
- Move pilot control shut-off lever (1) to LOCK position so that the front attachment will not move.
- Never touch the control levers and pedals. If operating the control levers or pedals is unavoidable, signal co-workers to evacuate to safer place.



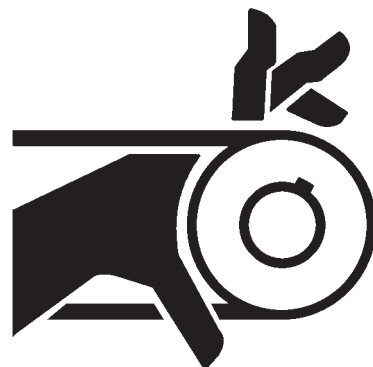
M104-07-021



MDCN-07-001



SA-2294



SA-026

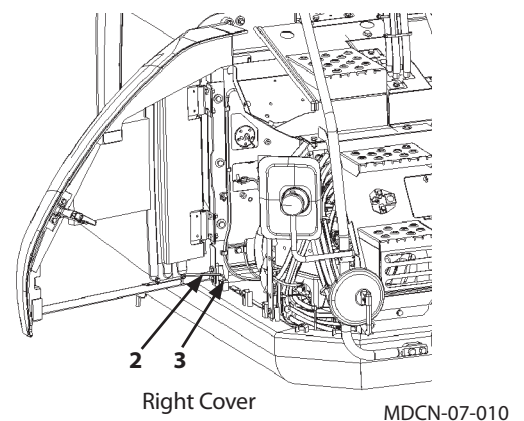
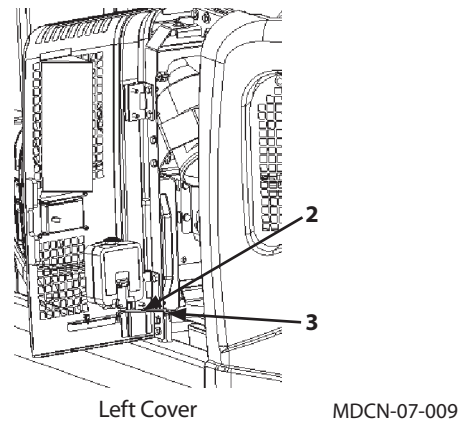
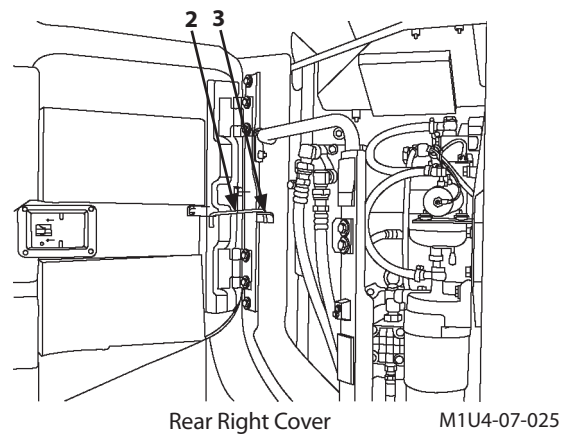
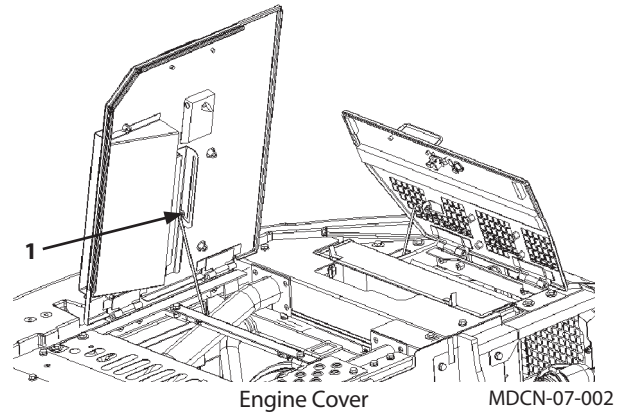
MAINTENANCE

Hood and Access Covers

ZX135US-5B

WARNING:

- Do not keep the hood and access covers open when the machine is parked on a slope, or while the wind is blowing hard. The hood or access covers may close accidentally, possibly resulting in personal injury.
 - When opening or closing the hood and access covers, take extra care not to catch fingers between the base machine and the hood or access covers.
-
- Holding the handle on the access cover, raise the cover until the cover is secured with catch (1).
 - After opening the right and/or left access cover, be sure to insert rod (2) into cover lock hole (3) to hold the cover.

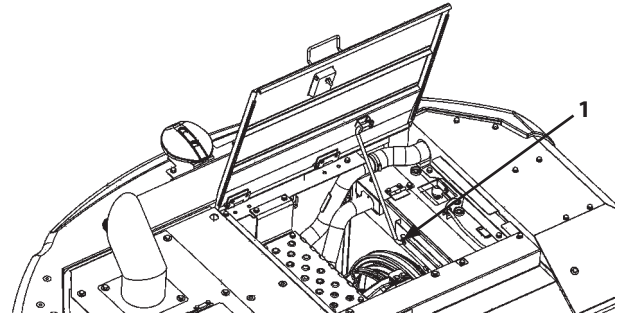


MAINTENANCE

ZX225US-5B, 225USLC-5B

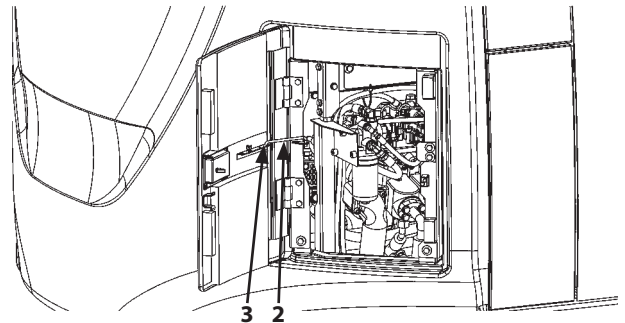
⚠ WARNING:

- Do not keep the hood and access covers open when the machine is parked on a slope, or while the wind is blowing hard. The hood or access covers may close accidentally, possibly resulting in personal injury.
 - When opening or closing the hood and access covers, take extra care not to catch fingers between the base machine and the hood or access covers.
-
- Holding the handle on the access cover, raise the cover until the cover is secured with catch (1).
 - After opening the right and/or left access cover, be sure to insert rod (2) into cover lock hole (3) to hold the cover.



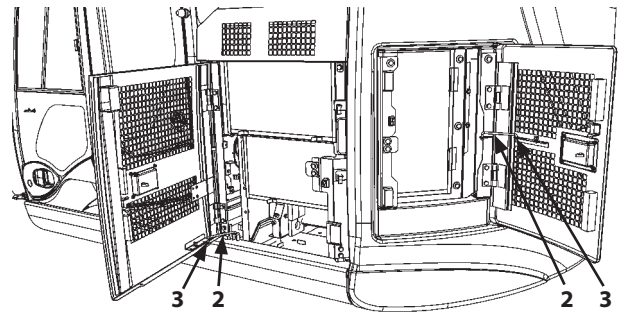
Engine Cover

MDCN-07-003



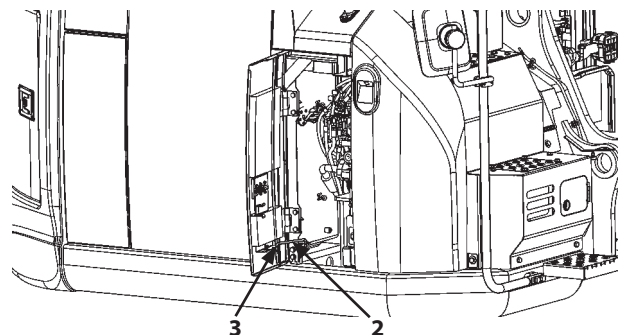
Rear Right Cover

MDCN-07-004



Left Cover

MDCN-07-006

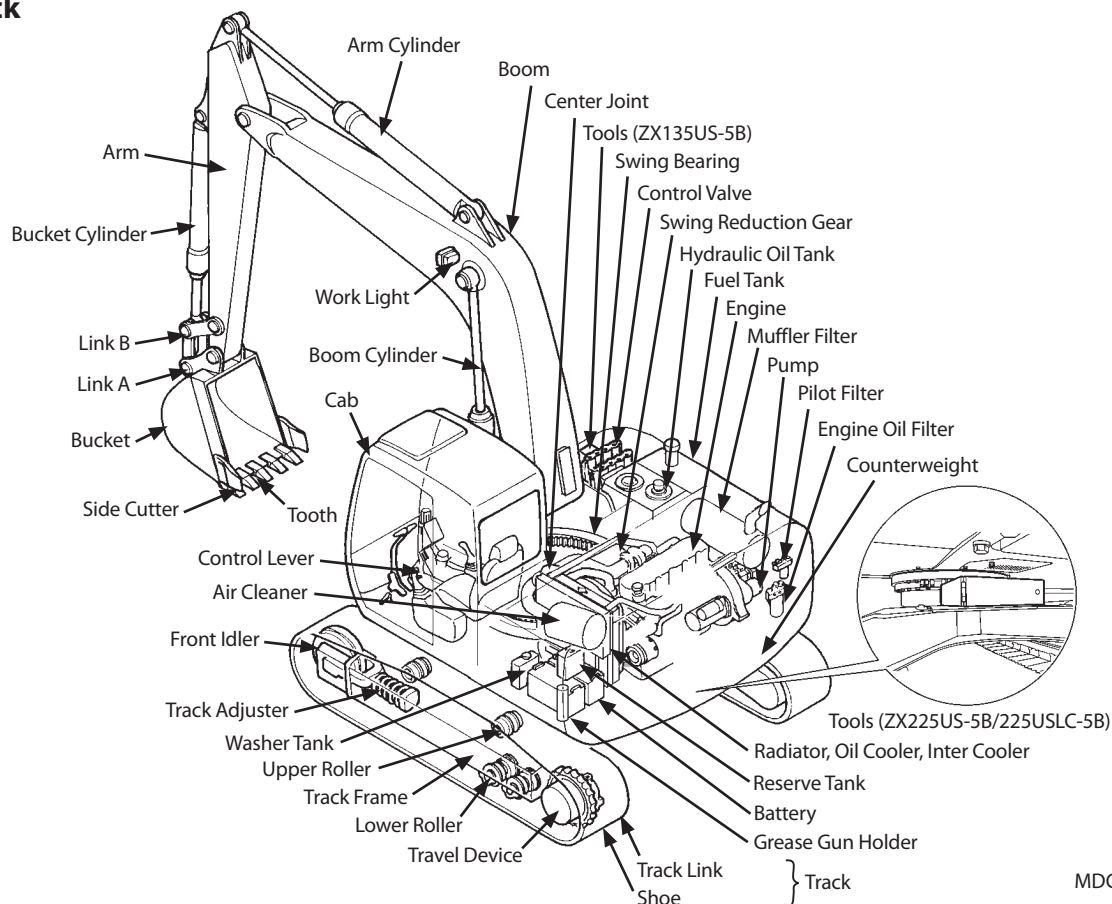


Front Right Cover

MDCN-07-008

MAINTENANCE

Daily Check



MDCN-07-079

	Check Points		Check Points
Engine	<ol style="list-style-type: none"> 1. Level of engine oil and coolant 2. Starting easiness, exhaust gas color, and noise 3. Oil and water leaks, damage to hoses and pipe lines 4. Clogging and damage to radiator, oil cooler and intercooler 5. Looseness and missing of mounting bolts and nuts 6. Drain Fuel Filter 	Undercarriage	<ol style="list-style-type: none"> 1. Sag, wear and break of crawler 2. Oil leaks and wear on upper/lower rollers and front idlers 3. Oil leaks from travel devices 4. Looseness and missing of mounting bolts and nuts
		Working Device	<ol style="list-style-type: none"> 1. Check cylinders, pipe lines and hoses for oil leaks and damages 2. Wear and damage of the bucket 3. Check bucket teeth for looseness, wear and missing 4. Lubrication state of the working device 5. Check for pin anti-extraction pins, stoppers, rings and bolts for damage 6. Looseness and missing of mounting bolts and nuts
Upperstructure	<ol style="list-style-type: none"> 1. Fuel level, leaks, contamination and drainage of fuel in tank 2. Hydraulic oil level, leaks and contamination of hydraulic oil tank 3. Movement, play and operating force of all control levers 4. Operation of all hydraulic components, oil leaks and damage to pipe lines and hoses 5. Deformation, break and abnormal noise of upper structure 6. Looseness and missing of mounting bolts and nuts 7. Washer Fluid 	Others	<ol style="list-style-type: none"> 1. Operation of instruments, switches, lights and buzzer/horn 2. Function of parking brake 3. Deformation and break of head guard 4. Abnormal outside appearance of machine 5. Wear and damage of the seat belt

- Conduct daily check before the machine is operated.

MAINTENANCE

Maintenance Guide

A. Greasing

Parts		Quantity	Interval (hours)						Page		
			8	50	100	250	500	1000		2000	
1.	Front Joint Pins	Bucket and Link Pins	9	★			★★				7-19
		Others	11	★			★★				7-19
2.	Swing Bearing		2								7-21
3.	Swing Internal Gear		1				★★★				7-22

★ : In case excavations are performed in water, grease the pin after operation is complete.

★★ : 250 hours for only first time.

★★★ : Check and add grease if necessary.

IMPORTANT:

- Grease bucket and link pivots every day until break-in operation (50 hours) is complete.
- When a bucket which does not have clearance adjustment mechanism such as slope-finishing bucket or V-type bucket, or a genuine Hitachi hoe bucket before EX-5 model, or an attachment other than genuine Hitachi bucket is used, grease two pins every 250 hours.

B. Engine

Parts		Quantity	Interval (hours)						Page		
			8	50	100	250	500	1000		2000	
1.	Engine Oil	Check Oil Level	1								7-23
2.	Engine Oil	Change	ZX135US-5B	17 L							7-25
			ZX225US-5B, 225USLC-5B	23 L							
3.	Engine Oil Filter	Replace	1								7-25
4.	Check and Clean Around the Engine		–	As required						7-27	

MAINTENANCE

C. Transmission

Parts		Quantity	Interval (hours)							Page		
			8	50	100	250	500	1000	2000			
1.	Pump	Check Oil Level	1								7-28	
	Transmission	Change ZX225US-5B, 225USLC-5B	1.6 L									7-28
		Air Breather Cleaning	1									7-28
2.	Swing Reduction Gear	Check Oil Level	1								7-29	
		Change	ZX135US-5B	3.2 L								7-29
			ZX225US-5B, 225USLC-5B	6.2 L								
3.	Travel Reduction Gear	Check Oil Level	2								7-30	
		Change	ZX135US-5B	4.0 L×2								7-31
			ZX225US-5B, 225USLC-5B	6.8 L×2								

D. Hydraulic System

Parts		Quantity	Interval (hours)									Page		
			8	50	100	250	500	1000	1500	2000	2500		5000	
1.	Check Hydraulic Oil Level	1												7-36
2.	Change Hydraulic Oil	ZX135US-5B	125 L											7-37
		ZX225US-5B, 225USLC-5B	185 L											
3.	Suction Filter Cleaning	1	Each time when hydraulic oil is changed									7-40		
4.	Replacement of full-flow filter	Std. Model	1											7-41
		Demolition and logging work	1	*									7-42	
5.	Replace Pilot Oil Filter	1												7-44
6.	Replace Air Breather Element	1												7-45
7.	Check Hoses and Lines	for leaks, loose												7-46
		for cracks, bend, etc.	–											7-46

★ : Changing interval differs according to the brand of hydraulic oil used, kind of filter element or average attachment operating availability.

Refer to the “changing intervals of hydraulic oil and full flow filter element”. See recommended oil chart.

*: Replace every 300 hours.

MAINTENANCE

E. Fuel System

Parts		Quantity	Interval (hours)						Page	
			8	50	100	250	500	1000		2000
1.	Drain Fuel Tank Sump	1								7-52
2.	Drain Fuel Filter	1								7-53
3.	Replace Fuel Main Filter Element	1								7-57
4.	Replace Fuel Pre-Filter Element	1								7-59
5.	Clean Solenoid Fuel Pump Strainer	1								7-61
6.	Check Water Separator (Optional)	Drain water								7-63
		Replace element								7-64
7.	Check Fuel Hoses	for leaks, cracks	–							7-65
		for cracks, bend, etc.	–							7-65

F. Air Cleaner

Parts			Quantity	Interval (hours)						Page
				8	50	100	250	500	1000	
1.	Air Cleaner Outer Element	Clean	1	(or when indicator lit)						7-66
		Replace	1	After cleaning 6 times or 1 year						7-66
2.	Air Cleaner Inner Element (Optional)	Replace	1	When outer element is replaced						7-68

MAINTENANCE

G. Cooling System

Parts		Quantity	Interval (hours)						Page	
			8	50	100	250	500	1000		2000
1.	Check Coolant Level	1								7-70
2.	Check and Adjust Fan Belt Tension	1								7-71
3.	Change Coolant	ZX135US-5B	20 L	Twice a year *						7-73
		ZX225US-5B, 225USLC-5B	25 L							
4.	Clean Radiator, Oil Cooler and Inter Cooler Core	Outside	1							7-75
		Inside	1	Once a year						7-75
5.	Clean Oil Cooler, Radiator and Inter Cooler Front Screen	1					★			7-77
6.	Clean Air Conditioner Condenser	1								7-77
7.	Clean Fuel Oil Cooler	1								7-77

★: Shorten the maintenance interval when the machine is operated in dusty areas.

★★: Maintenance required only during first time check.

*: When genuine Hitachi Long-Life Coolant is used, change every two years or 4000 operating hours, whichever comes first.

IMPORTANT:

- **Use soft water as a coolant. Do not use strong acid or alkaline water. Use the coolant with genuine Hitachi Long-Life Coolant (LLC) mixed by 30 to 50 %. If a coolant mixed with less than 30 % of Hitachi Long-Life Coolant is used, service life of the cooling parts may be shortened due to damage by freezing or corrosion of coolant system parts.**
- **If mineral-rich water is used for coolant, water stain or scale may build up inside the engine or radiator, causing overheat due to deterioration of coolant performance.**

H. Electrical System


Parts		Quantity	Interval (hours)						Page	
			8	50	100	250	500	1000		2000
1.	Battery	Check Electrolyte Level	2	Every month						7-81
		Check electrolyte specific gravity	2	Every month						7-83
2.	Replacing Fuses	Replace	–	As required						7-84

MAINTENANCE

I. Miscellaneous

Parts		Quantity	Interval (hours)							Page	
			8	50	100	250	500	1000	2000		4500
1.	Check and Replace Bucket Teeth	–									7-86
2.	Change Bucket	–	As required							7-92	
3.	Convert Bucket Connection Into Face Shovel	–	As required							7-93	
4.	Adjust Bucket Linkage	1	As required							7-94	
5.	Remove Travel Levers	2	As required							7-95	
6.	Check and Replace Seat Belt	1		Every 3 years						7-95	
7.	Check Windshield Fluid Level	1	As required							7-96	
8.	Check Track Sag	2									7-97
9.	Clean and Replace Air Conditioner Filter	Circulating Air Filter	Clean	1							7-101
		Replace	1	After cleaning 6 times or so						7-101	
	Fresh Air Filter	Clean	1								7-101
		Replace	1	After cleaning 6 times or so						7-101	
10.	Check Air Conditioner	–									7-104
11.	Clean Cab Floor	–	As required							7-106	
12.	Retighten Cylinder Head Bolt	–	*As required							7-107	
13.	Inspect and Adjust Valve Clearance	–						*			7-107
14.	Measure Engine Compression Pressure	–						*			7-107
15.	Check Starter and Alternator	–						*			7-107
16.	Check and Replace EGR Device	–								*	7-107
17.	Clean EGR Cooler	–								*	7-107
18.	Check Turbocharger	–								*	7-107
19.	Check and Clean Injector	–								*	7-108
20.	Check Gas Damper	–	*As required							7-108	
21.	Tightening and Retightening Torque of Nuts and Bolts	–		★★							7-108

★★: Maintenance required only during first time check.

 NOTE: * Contact your nearest Hitachi dealer for maintenance. Instruction plate for the recommended grease and lubricants is affixed inside the tool box cover.

J. Muffler Filter

Parts		Quantity	Interval (hours)							Page	
			8	50	100	250	500	1000	2000		4500
1.	Check and Clean Filter Element of Muffler Filter	1								*	7-123
2.	Check and Clean Muffler Filter	–	As required							7-123	

 NOTE: * Contact your nearest Hitachi dealer for maintenance.


MAINTENANCE

Periodic Replacement of Parts

To ensure safe operation, be sure to conduct periodic inspection of the machine. In addition, the parts listed below, if defective, may pose serious safety/fire hazards.

These parts may cause serious safety/fire hazards due to deterioration, wear, or fatigue being attributed to material aging or repeated operation. It is very difficult to gauge the extent of deterioration, fatigue, or weakening of the parts listed below simply by visual inspection alone. For this reason, replace these parts at the intervals shown in the table below. Consult your authorized dealer for correct replacement.

Periodic Replacement Parts		Replacement Intervals	
Engine	Fuel hose (Fuel tank, Filter to Engine)	Every 2 years	
	Fuel hose (Engine, Fuel cooler to Fuel tank)	Every 2 years	
	Oil filter hose (Engine to oil filter)	Every 2 years	
	Heater hose (Heater to engine)	Every 2 years	
	Differential pressure hose (Differential sensor to differential pipe)	Every 4500 hours	
Hydraulic System	Base Machine	Pump suction hose	Every 2 years or 4000 hours whichever comes first
		Pump delivery hose	Every 2 years or 4000 hours whichever comes first
		Swing hose	Every 2 years or 4000 hours whichever comes first
		Travel high pressure hose	Every 2 years or 4000 hours whichever comes first
		Tail Hose	Every 2 years or 4000 hours whichever comes first
		Attachment Line Hose	Every 2 years or 4000 hours whichever comes first
		Hydraulic Fan Suction Hose	Every 2 years or 4000 hours whichever comes first
	Hydraulic Fan Delivery Hose	Every 2 years or 4000 hours whichever comes first	
	Working Device	Boom cylinder line hose	Every 2 years or 4000 hours whichever comes first
		Arm cylinder line hose	Every 2 years or 4000 hours whichever comes first
Bucket cylinder line hose		Every 2 years or 4000 hours whichever comes first	
Seat Belt		Every 3 years	

 **NOTE:** Be sure to replace seals, such as O-rings and gaskets, when replacing hoses.

MAINTENANCE

Kind of Oils

Brand Names of Recommended Grease

Kind of Grease	Lithium Grease	
Application	Front Attachment Joint Pins, Swing Bearing, Swing Gear	
	Air Temp. -20 to 40 °C (-4 to 104 °F)	
Manufacturer		
Hitachi	Hitachi Grease SEP2 Hitachi Grease EP-2	
Idemitsu Kosan	Daphne Eponex Grease EP No.2 Daphne Eponex Grease No.2	
JX Nippon Oil & Energy Corporation	EPINOC GREASE AP(N)2 LISONIX GREASE EP2	
Shell	Alvania Grease EP2 (Shell Gadus S2 V220 2) Cartridge Grease EP2	
ExxonMobil	Mobilux EP2	
KIGNAS Oil	KIGNAS MP GREASE No.2	
COSMO Oil	COSMO GREASE DYNAMAX EP2	
BP	Energrease LS-EP2	
Castrol	Spheerol EPL2	
Chevron	Multifax EP2	

Recommended Engine Oil

IMPORTANT: Use only genuine Hitachi engine oil as shown below or engine oil equivalent to DH-2 specified in JASO. Failure to do so may deteriorate the engine and muffler filter performance and/or shorten their service life. Please be noted that all engine failures caused by using engine oil other than specified are excluded from Hitachi Warranty Policy. Consult your nearest Hitachi dealer for the unclear points.

Kind of Oil	Engine Oil	
Application	Engine Crank Case	
	Air Temp. -20 to 40 °C (-4 to 104 °F)	
Manufacturer		JASO
Hitachi	Super Wide DH-2 10W40	DH-2


MAINTENANCE

Brand Names of Recommended Oil

Application	Swing and Travel Reduction Gear	Pump Transmission
Kind of Oil	Gear Oil	Engine Oil
Air Temp.	-20 to 40 °C (-4 to 104 °F)	-20 to 40 °C (-4 to 104 °F)
Manufacturer		
Hitachi	Hitachi Gear Oil GL-4 90	Super Wide DH-1 15W40 Super Wide DH-2 15W40
Idemitsu Kosan	Apolloil Gear Oil HE90	Apolloil Super wide 15W-40
JX Nippon Oil & Energy Corporation	HYPOID GEAR 90 GEAR4 90	DIESEL CF/DH-1 15W-40 DIESEL CF4/DH-1 15W-40H
Shell	Spirax S2 G 90	Rimula D Multi 15W-40
ExxonMobil	Mobilube GX80W-90	Delvac Super DH-2 15W-40
BP	Energear EP 80W-90	Vanellus C3 Multigrade 15W-30
Castrol	Manual GL-4 80W-90	
Chevron	Thuban SAE 90	DELO 400 Multigrade 15W-30
Remarks	API GL4 Class	API CD Class, JASO DH-1, JASO DH-2

Brand Names of Recommended Hydraulic Oil

Kind of Lubricant	Hydraulic Oil	
Where to be applied	Hydraulic System	
Change Interval	5000 hours	2000 hours
Environmental Temp.	-20 to 40 °C (-4 to 104 °F)	
Manufacturer		
Hitachi	Super EX 46HN	
Idemitsu Kosan		Super Hydro 46X
JX Nippon Oil & Energy Corporation		SUPER HYRANDO WP46 HYDLUX 46H
Shell		Tellus ST 46 (Tellus S3 V 46)
ExxonMobil		Mobil DTE 10 Excel 46
BP		Bartran HV46
Castrol		Hyspin HVI 46
Chevron		RANDO Ashless 46HD
Others		Product Conforming to JCMAS HK VG46W

 **NOTE:** Consult the nearest Hitachi dealer for the conditions of use and hydraulic oil other than those described above. Refer to Japan Lubricating Oil Society (JALOS) home page for JCMAS HK qualified product.

MAINTENANCE

Recommended Oil Viscosity

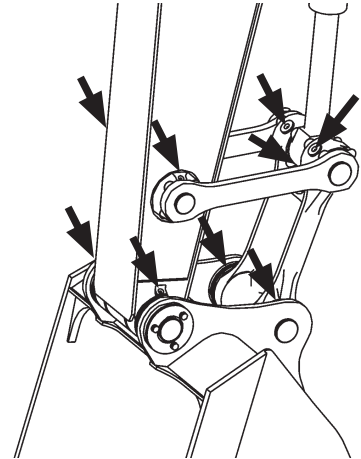
Where to be Applied	Kind of Oil	Air Temperature (degrees Celsius)								
		-30	-20	-10	0	10	20	30		40
Engine Oil Pan	Engine Oil									Super Wide DH-2 10W30
										Super Wide DH-2 10W40
										Super Wide DH-2 15W40
Pump Transmission	Engine Oil								API CD Class	
Swing Device Travel Device	Gear Oil								Hitachi Gear Oil GL-4_90	
Hydraulic System (Hydraulic Oil Tank)	Hydraulic Oil								Super EX46HN	
Fuel Tank	Diesel Fuel									EN590 Class A
										EN590 Class B
										EN590 Class C
										EN590 Class D
										EN590 Class E
										EN590 Class F
Grease fitting	Lithium Grease								SEP Grease	
Radiator	Coolant								Genuine Hitachi LLC (Long-Life Coolant)	

MAINTENANCE

A. Greasing

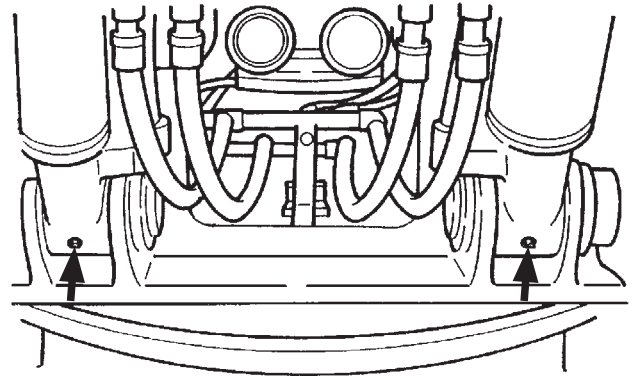
1 Front Joint Pins --- 500 hours

Lubricate all fittings shown in the figure.



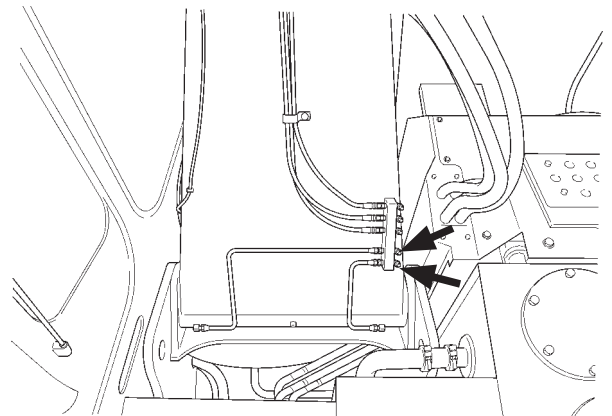
M178-07-007

- Boom Cylinder Bottom Side



M157-07-156

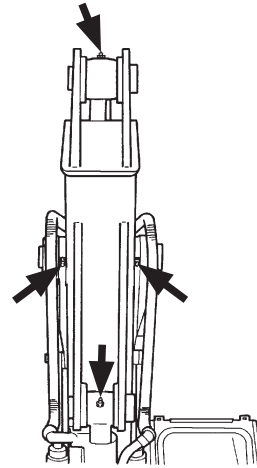
- Boom Foot



M178-07-082

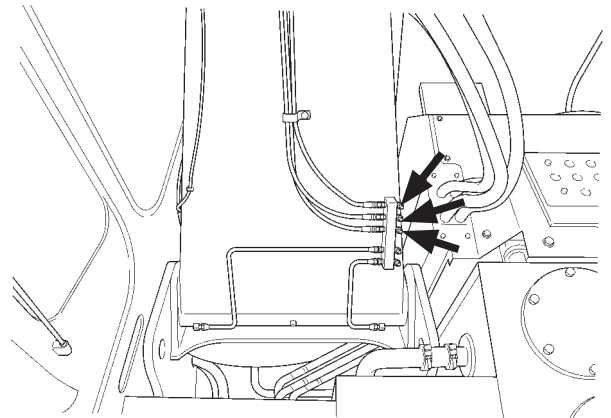
MAINTENANCE

- Boom and Arm Joint Pin, Arm Cylinder Rod Pin and Bucket Cylinder Bottom Pin.



M157-07-157

- Boom Cylinder Rod Pins and Arm Cylinder Bottom Pin.



M178-07-082

MAINTENANCE

2 Swing Bearing --- every 500 hours

CAUTION: Lubricating both the swing bearing and gear and rotating the upperstructure must be done by one person. Before you lubricate the swing bearing, clear the area of all persons.

Each time you leave the cab

- Lower the bucket to the ground.
- Stop the engine.
- Pull the pilot control shut-off lever to the LOCK position.
- Use handrails.

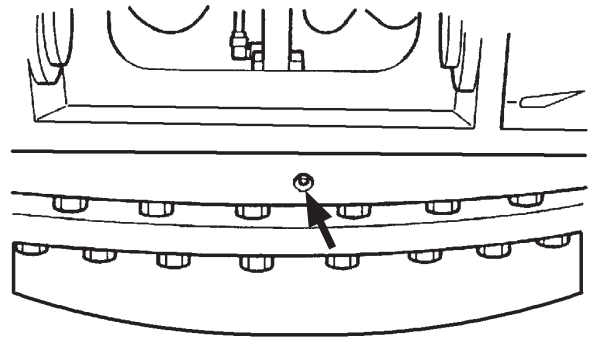
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

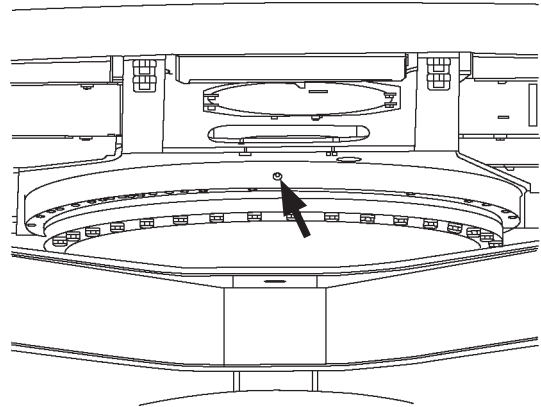
4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. With the upperstructure stationary, apply grease via the two grease fittings.
8. Start the engine. Raise the bucket several inches off the ground and rotate the upperstructure 45 ° (1/8 turn).
9. Lower the bucket to the ground.
10. Repeat the procedure three times, beginning with step 3.
11. Apply grease to the swing bearing until grease can be seen escaping from the swing bearing seals.

Model	Capacity
ZX135US-5B	0.25 L
ZX225US-5B, 225USLC-5B	0.30 L

12. Take care not to supply excessive grease.



M157-07-159



MDCR-07-015

MAINTENANCE

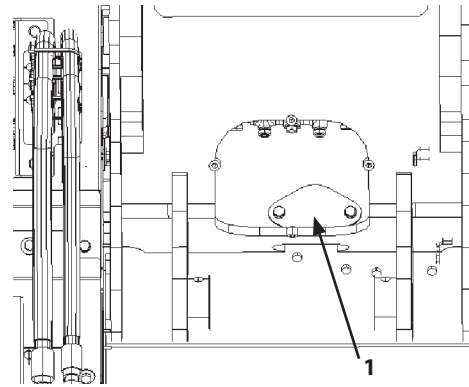
3 Swing Internal Gear --- every 500 hours

CAUTION: Before lubricating the machine, lower the bucket on the ground, stop the engine and pull the pilot control shut-off lever to the LOCK position.

1. Remove cover (1) from upperstructure. Check if the swing gear is properly lubricated by grease. Add approximately 0.5 kg of grease, if required.

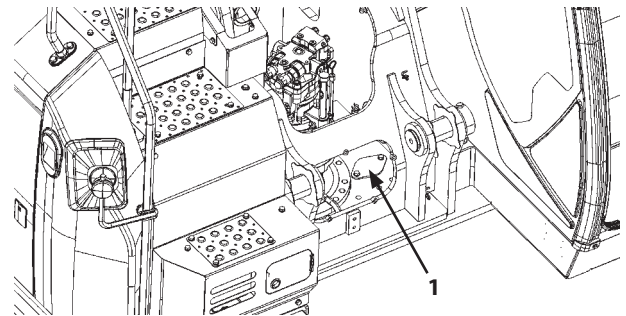
If the grease is contaminated, remove grease by opening cover (2) at the undercarriage side and replace with clean grease.

Model	Grease Capacity
ZX135US-5B	9 L
ZX225US-5B, 225USLC-5B	17 L



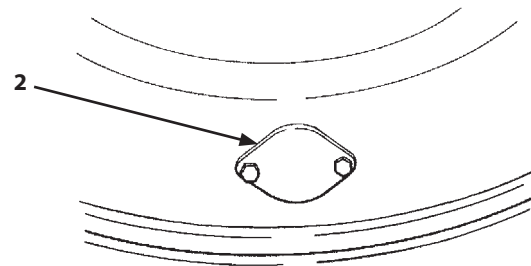
ZX135US-5B

MDCN-07-012



ZX225US-5B, 225USLC-5B

MDCN-07-013



M157-07-161

MAINTENANCE

B. Engine

1 Engine Oil Level --- check daily


1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Confirm that all control levers are placed in neutral.
3. Insert key switch (2). Turn it to ON position. Press and hold switch (3) with the engine stopped.

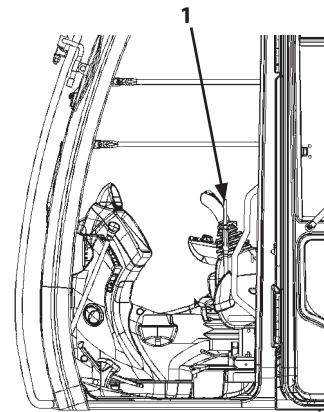
The engine oil indicator (4) must be displayed in green.

IMPORTANT: Do not rely only on the monitor display for checking the machine conditions; visually check them yourself as required such as oil level.

Always check the machine on a firm, level surface.

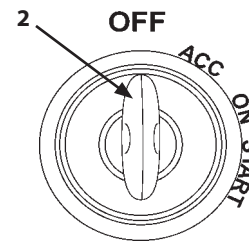
Never attempt to start the engine while checking the machine.

 **NOTE:** If the security function is enabled, a password is required.

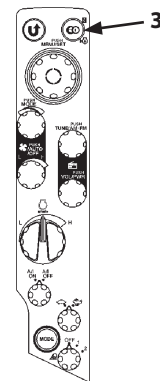


LOCK position

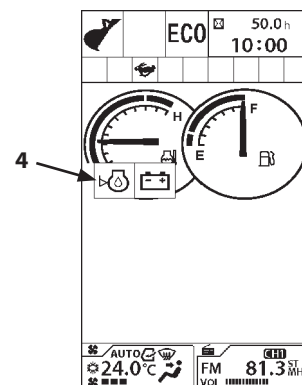
MDCN-01-008



MDCD-01-030



MDCD-01-026



MDAA-01-043

MAINTENANCE

--- Visual Inspection

IMPORTANT: An incorrect engine oil level may cause trouble on the engine (The oil level should be between the upper and lower marks on dipstick (1)).

Even if the engine oil level exceeds the upper limit, control the oil level to the proper quantity before starting the engine.

Check oil level before starting the engine.

Open the engine cover and pull out dipstick (1). Wipe dipstick (1) with cloth, re-insert it into the pipe to the end, and then pull it out again.

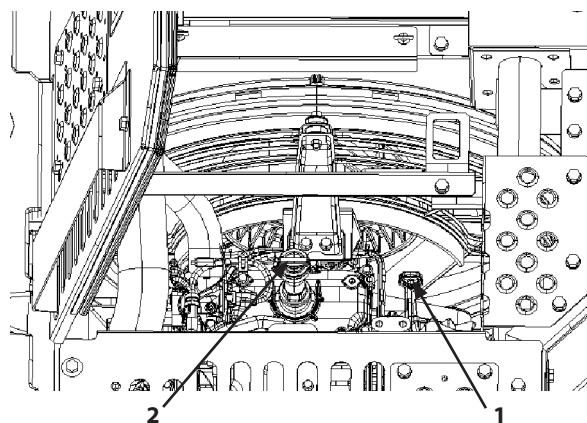
The oil level should be between the upper and lower marks on dipstick (1).

If oil level is below the lower limit mark, add the recommended engine oil via oil filler (2).

If oil level exceeds the upper limit mark, remove cap (4) of drain valve (3) at the bottom of the engine oil pan, and then open drain valve (3) by turning drainer (5) to drain oil.

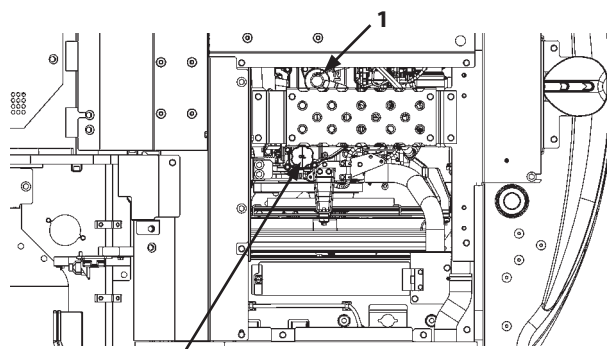
CAUTION: Do not spill oil while changing oil. Spilled fuel and oil, and trash, grease, debris, accumulated coal dust, and other flammable materials may cause fires.

IMPORTANT: Install drainer (5) to the drain valve slowly. Oil may exhaust in large quantity when tightened at once.



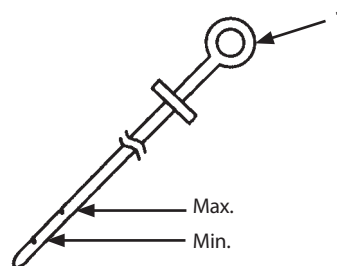
ZX135US-5B

MDCN-07-014

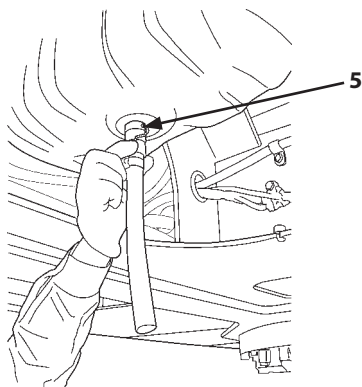


ZX225US-5B, 225USLC-5B

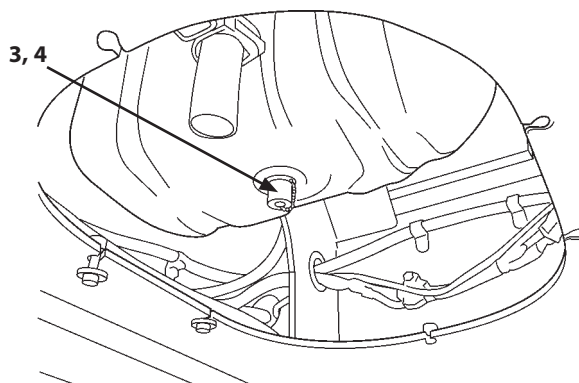
MDCN-07-015



M178-07-011



M1U1-07-046



M1U1-07-045

MAINTENANCE

2 **Change Engine Oil**
--- every 500 hours

3 **Replace Engine Oil Filter**
--- every 500 hours

1. Run the engine to warm oil.
DO NOT run the engine until oil is hot.
2. Park the machine on a level surface.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

5. Run the engine at slow idle speed without load for five minutes.
6. Turn the key switch OFF. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

⚠ CAUTION: Engine oil may be hot just after operation. Take extra care to avoid burns.

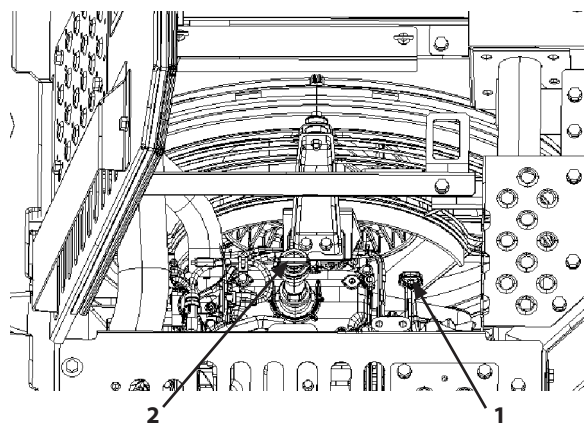
MAINTENANCE

IMPORTANT: Install drainer (5) to drain valve (3) slowly. Oil may exhaust in large quantities when suddenly tightened.

8. Remove oil filler cap (2).
9. Remove cap (4) from oil pan drain valve (3). Install drainer (5) to drain valve (3).
10. Screw drainer (5) into drain valve (3). Drain valve (3) will be opened to drain oil.
11. Remove oil filler cap (2). Then, allow oil to drain through a clean cloth into a container.

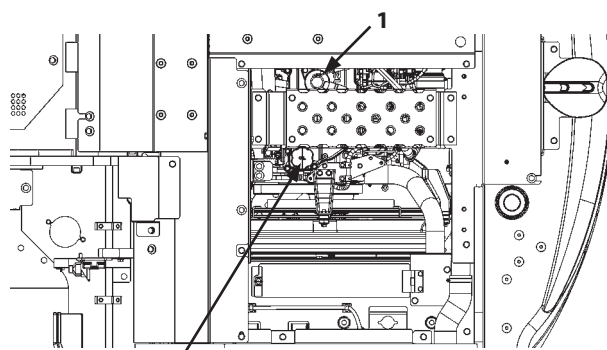
Container: 50-liter

12. After all oil has been drained, inspect the cloth for any debris such as small pieces of metal.
13. Remove drainer (5). Install cap (4) to drain valve (3).



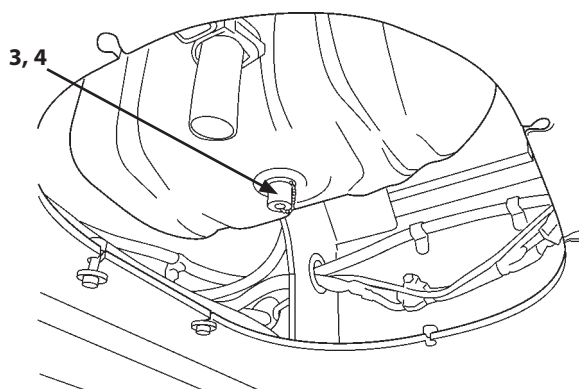
ZX135US-5B

MDCN-07-014

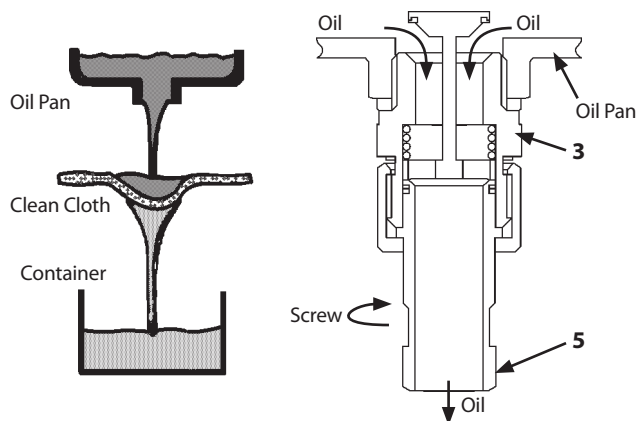


ZX225US-5B, 225USLC-5B

MDCN-07-015

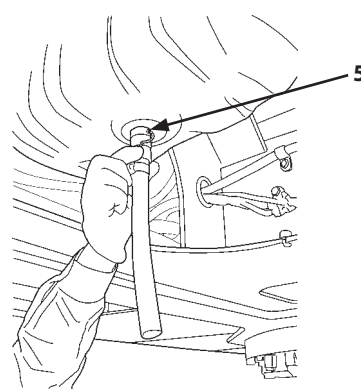


M1U1-07-045



M104-07-010

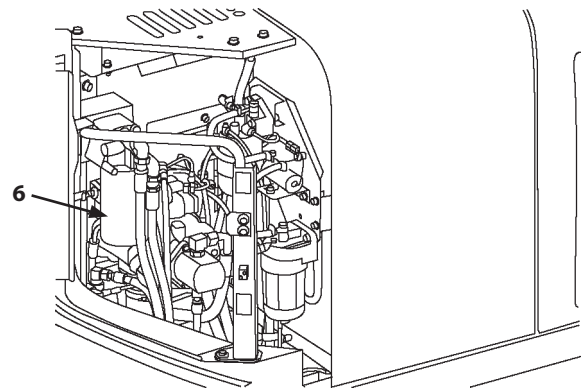
M1U1-07-002



M1U1-07-046

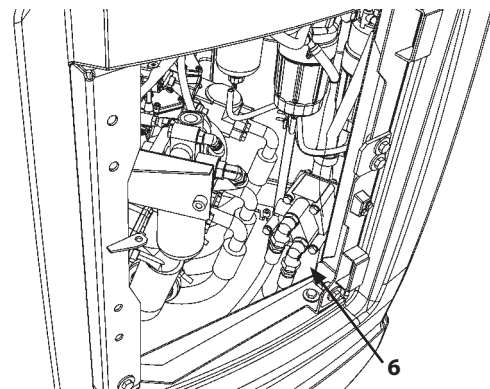
MAINTENANCE

14. Open the right access cover and secure the cover with rod.
15. Remove the filter cartridges of engine oil filter (6) by turning it counterclockwise with the filter wrench.
16. Clean the filter gasket contact area on the engine.
17. Pour new oil into the new cartridge, being careful not to let it overflow. Then, apply a thin layer of clean oil to the cartridge gasket (O-ring).
18. Install new filter (6). Turn the filter cartridge clockwise by hand until the gasket touches the contact area. Be sure not to damage the gasket when installing filter (6).
19. Tighten engine oil filter (6) 3/4 to 1 turn more using the filter wrench. Be careful not to overtighten.
20. Remove the oil filler cap. Fill the engine with recommended oil. Check that oil level is between the circle marks on the dipstick after 15 minutes.
21. Install the oil filler cap.
22. Start the engine. Run the engine at slow idle for 5 minutes.
23. Check that the engine oil pressure indicator on the monitor panel goes out immediately. If not, stop the engine immediately and find the cause.
24. Stop the engine. Remove the key from the key switch.
25. Check for any leakage at the drain plug.
26. Check oil level on the dipstick and add or drain oil to maintain proper oil level. (The oil level should be between the upper and lower limit marks on the dipstick.) (Refer to 7-24)



ZX135US-5B

M1U4-07-038



ZX225US-5B, 225USLC-5B

MDCN-07-016

IMPORTANT:

- **When filling new oil, take care not to allow foreign matter to enter the engine.**
- **Do not re-use cartridge element (6).**
- **An incorrect engine oil level may cause trouble on the engine. Even if the engine oil level exceeds the upper limit, control the oil level to the proper quantity before starting the engine.**
- **Do not overtighten the engine oil pan mounting bolts of ZX135US-5B machine. Failure to do so may damage the packing seal.**

4 Check and Clean Around the Engine

----- As required

IMPORTANT: Check for flammable objects in the area around the engine and clean that area.

When the machine is operated in dusty areas, refer to "9-1 Maintenance Under Special Environmental Conditions".

MAINTENANCE

C. Transmission

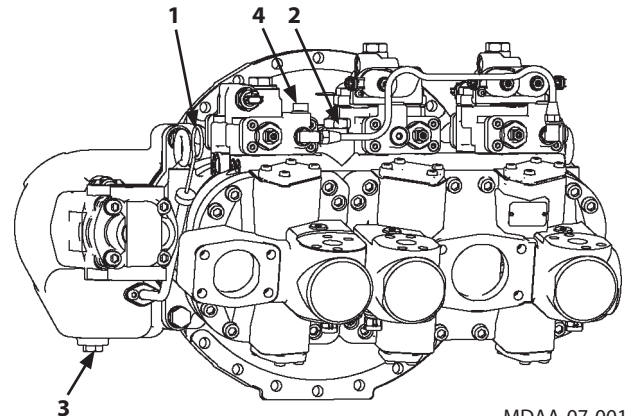
1 Pump Transmission (Except ZX135US-5B)

Check Oil Level --- every 250 hours

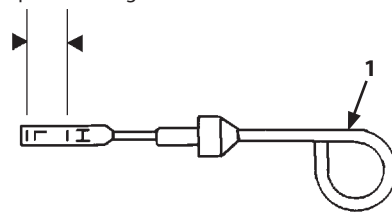
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Remove dipstick (1). Oil must be within the specified range.
8. If necessary, remove filler plug (2) and add oil. (See gear oil chart)
9. Recheck oil level.



Specified Range



M1G6-07-004

Change Oil --- every 1000 hours

Air Breather Cleaning --- every 1000 hours

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Oil may be hot just after operation. Wait for oil to cool before starting work.

7. Remove filler plug (2).
8. Remove drain plug (3). Allow oil to drain through a clean cloth into a 2-liter container.
9. After all oil has drained, inspect cloth for any debris such as small pieces of metal.
10. Reinstall drain plug (3).
11. Add oil via filler plug (2) until it is within the specified range on dipstick (1).
12. Reinstall filler plug (2).
13. Remove air breather (4) and perform cleaning. After cleaning, install air breather (4).

MAINTENANCE

2 Swing Reduction Gear

Check Oil Level --- every 500 hours

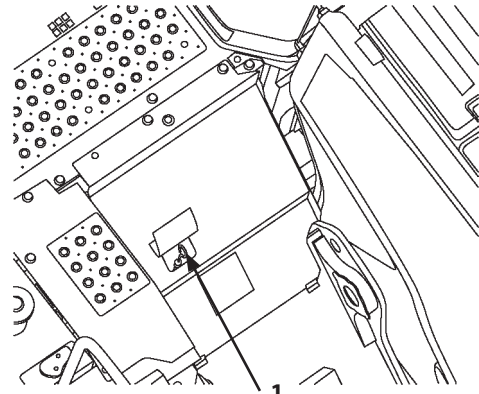
1. Park the machine on a solid level surface. Lower the bucket to the ground. Stop the engine.

ZX135US-5B

2. Turn over the level gauge rubber cover. Check level gauge (1).
3. When the oil level is correct, it can be seen between marks on level gauge (1). If necessary, remove the swing device upper cover and add oil.

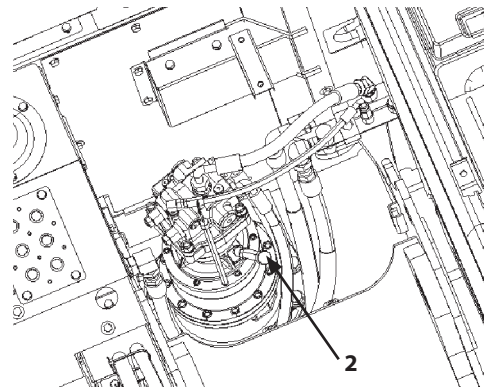
ZX225US-5B, 225USLC-5B

2. Open the swing reduction upper cover. Check level gauge (1).
3. When the oil level is correct, it can be seen between marks on level gauge (1). If necessary, open the swing device upper cover and add oil.



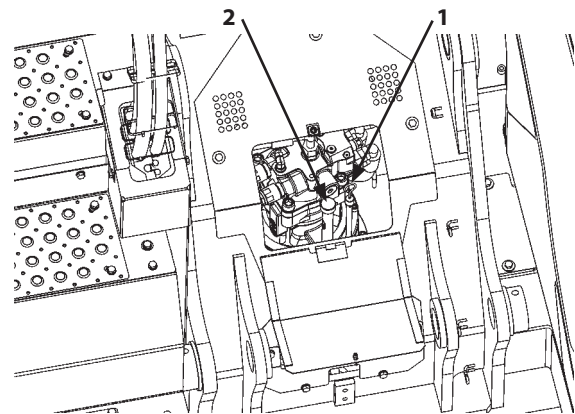
ZX135US-5B

M1U4-07-044



ZX135US-5B

MDCN-07-018



ZX225US-5B, 225USLC-5B

MDCN-07-019

Change Gear Oil --- every 1000 hours

CAUTION: Gear oil may be hot just after operation. Wait for gear oil to cool before starting work.

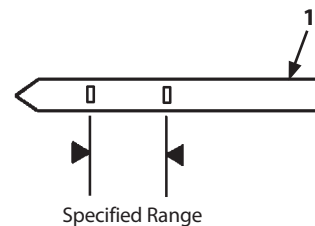
1. Park the machine on a solid level surface. Lower the bucket to the ground. Stop the engine.
2. Remove the drain plug mounted on the end of drain pipe to drain oil.

ZX135US-5B

3. Reinstall the drain plug. Remove the swing device upper cover. Remove oil filler cap (2) and add oil.

ZX225US-5B, 225USLC-5B

3. Reinstall the drain plug. Open the swing device upper cover. Remove oil filler cap (2) and add oil.
4. Check oil level with level gauge (1). The oil level should be between the upper and lower marks on level gauge (1). Refill as necessary.



Specified Range

M104-07-017

MAINTENANCE

3 Travel Reduction Gear

Check Oil Level --- every 500 hours

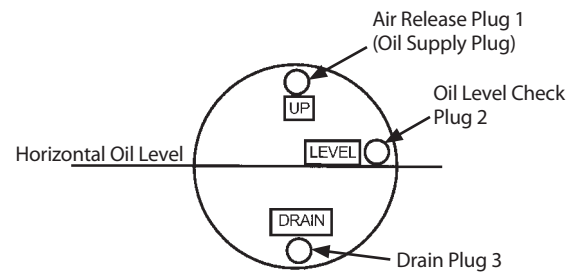
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

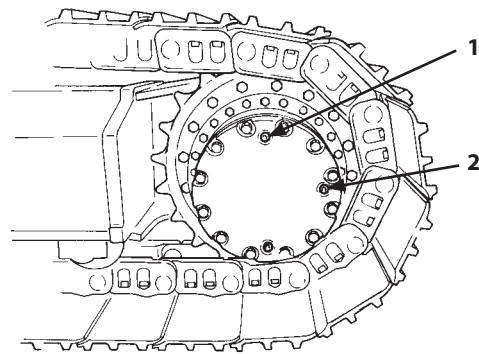
5. Run the engine at slow idle speed without load for five minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Keep body and face away from the air release plug. Gear oil may be hot just after operation. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.

8. After gear oil has cooled, slowly loosen air release plug (1) to release pressure.
9. Remove air release plug (1) and oil level check plug (2). Oil must be up to the bottom of hole.
10. If necessary, add oil until oil flows out of oil level check plug (2) hole. (See gear oil chart)
11. Wrap the plug threads with sealing-type tape. Install plugs (1) and (2).
Tighten plugs (1) and (2) to 50 N·m (5 kgf·m).
12. Check the gear oil level in the other travel reduction gear.



MDAA-07-047



M157-07-170

MAINTENANCE

Change Gear Oil --- every 2000 hours

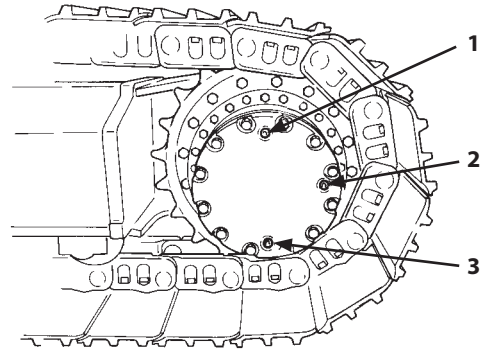
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

5. Run the engine at slow idle speed without load for five minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Keep body and face away from the air release plug. Gear oil may be hot just after operation. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.

8. After gear oil has cooled, slowly loosen air release plug (1) to release pressure, and temporarily retighten plug (1).
9. Remove drain plug (3) and plug (1), in that order, to drain oil.
10. Clean drain plug (3). Wrap the threads of drain plug (3) with sealing-type tape. Install plug (3). Tighten plug (3).
Tightening Torque: 50 N·m (5 kgf·m)
11. Remove oil level check plug (2).
12. Add oil until oil flows out of oil level check plug (2) hole.
(See gear oil chart)
13. Clean plugs (1) and (2). Wrap the threads of oil level check plug (2) and air release plug (1) with sealing-type tape. Reinstall the plugs (1) and (2). Tighten the plugs (1) and (2).
Tightening Torque: 50 N·m (5 kgf·m)
14. Repeat steps 8. to 13. for the other travel reduction gear.



M157-07-170

MAINTENANCE

D. Hydraulic System

Inspection and Maintenance of Hydraulic Equipment

IMPORTANT: Never adjust parts of engine fuel system or hydraulic equipment.

CAUTION: When checking and/or servicing the hydraulic components, pay special attention to the following points.

1. Be sure that the machine is parked on a level, firm surface before servicing hydraulic equipment.
2. Lower the bucket to the ground and stop the engine.
3. Begin servicing hydraulic components only after components, hydraulic oil and lubricants are completely cooled, and after releasing residual pressure.
 - 3.1 Before checking and/or servicing the hydraulic system, be sure to release the residual pressure from the cylinder circuits of the boom, arm and the bucket, swing piping and pilot piping. An accumulator can be installed on some models of this machine as an option to be capable of moving the front attachment for specified time (around 10 seconds) after stopping the engine.
 - 3.2 Bleed air from the hydraulic oil tank to release internal pressure.
 - 3.3 Immediately after operation, all hydraulic components and hydraulic oil or lubricants are hot and highly pressurized. Begin inspection and/or maintenance work only after the machine has cooled down.

Servicing heated and pressurized hydraulic components may cause plugs, screws and/or oil to fly off or escape suddenly, possibly resulting in personal injury. Hydraulic components may be pressurized even when cooled.

Keep body parts and face away from the front of plugs or screws when removing them.
 - 3.4 Even after air pressure in the hydraulic oil tank is released, when the machine is parked on a slope, the oil pressure in the travel motor and the swing motor circuits are maintained at high pressure as the reaction force of the machine weight is constantly applied to the travel motor. Never check and/or service the machine when it is parked on a slope.

MAINTENANCE

IMPORTANT:

- **When connecting hydraulic hoses and pipes, take special care to keep seal surfaces free from dirt and to avoid damaging them.**
- **Wash hoses, pipes, and the tank interior with a washing liquid and thoroughly wipe it out before reconnecting them.**
- **Only use O-rings that are free of damage or defects. Be careful not to damage them during reassembly. Do not allow high pressure hoses to twist when connecting them. The life of twisted hoses will be shortened considerably.**

IMPORTANT:

- **Do not use hydraulic oils other than those listed in the table "Brand names of recommended hydraulic oil".**
- **When adding hydraulic oil, always use the same brand of oil; do not mix brands of oil. When using another manufacturer's hydraulic oil, be sure to change the full amount.**
- **The new machine is filled with hydraulic oil of Super EX 46HN (change interval: every 5000 hours). When adding or changing the hydraulic oil, continue to use the Super EX 46HN.**

IMPORTANT: Never run the engine without oil in the hydraulic oil tank.

MAINTENANCE

Change Hydraulic Oil and Replace Full-Flow Filter Element

Hydraulic breaker operation subjects the hydraulic system to become contaminated faster and to quickly deteriorate the hydraulic oil.

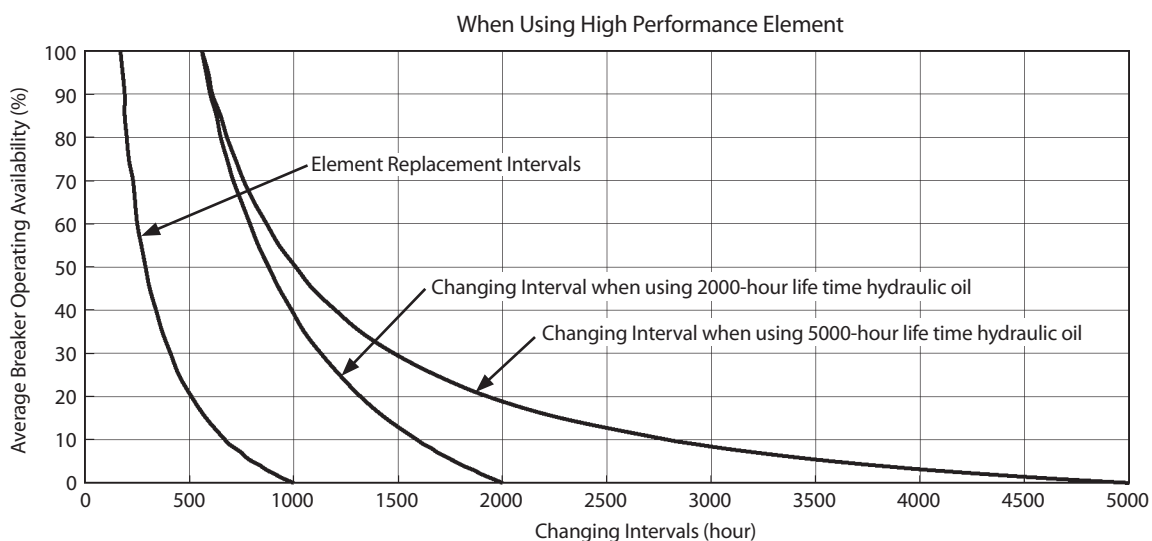
Failure to adhere to proper maintenance intervals may result in damage to the base machine and the breaker.

In order to extend the service life particularly of the hydraulic pump, change the hydraulic oil and the full-flow filter element at the specified frequency given below.

Check machine service hours by using the breaker hour meter. (Refer to the Breaker Operation in the "OPERATOR'S STATION" chapter.)

Changing intervals for the high performance element (micro-glass)

Breaker Operating Availability	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Full-Flow Filter	1000	670	510	410	340	290	250	230	200	190	170
Hydraulic oil: 2000 hours life time	2000	1590	1320	1130	990	880	790	710	650	600	560
Hydraulic oil: 5000 hours life time	5000	2790	1930	1480	1200	1010	870	760	680	610	560

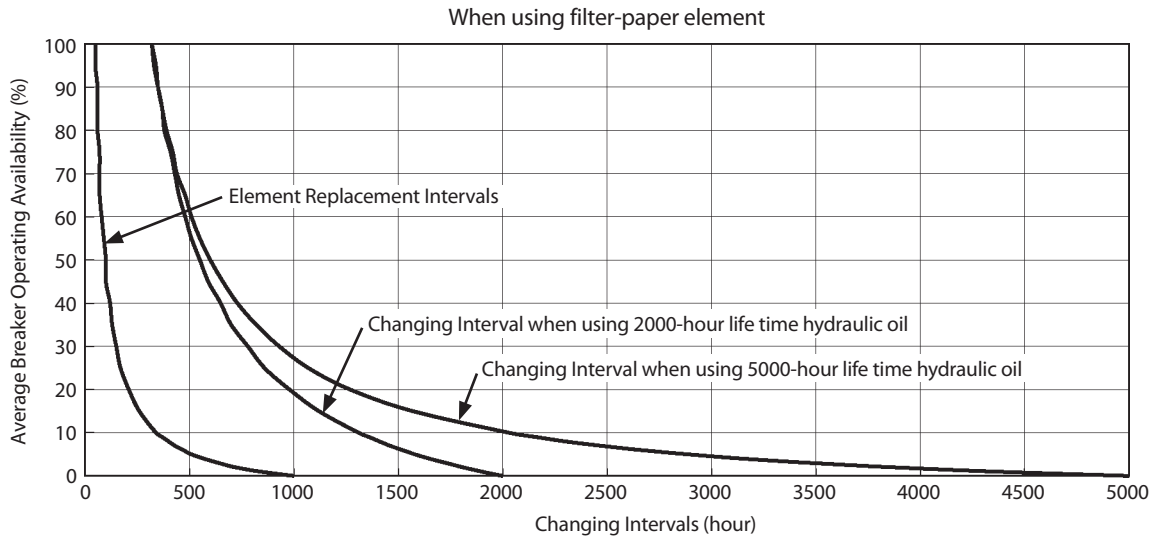


MDAA-07-050


MAINTENANCE

Changing intervals for the standard filter paper

Breaker Operating Availability	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Full-Flow Filter	1000	340	210	150	120	100	80	70	60	60	50
Hydraulic oil: 2000 hours life time	2000	1310	980	780	650	550	480	430	380	350	320
Hydraulic oil: 5000 hours life time	5000	2030	1270	930	730	600	510	440	390	350	320



MDAA-07-051

 **NOTE:** Full-flow filter restriction indicator is optional. If a filter-paper element is used, this indicator does not operate.

MAINTENANCE

1 Check Hydraulic Oil Level

--- daily

IMPORTANT: Never run the engine without oil in hydraulic oil tank.

1. Park the machine on a level surface.
2. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

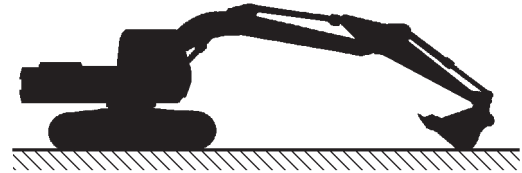
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

5. Run the engine at slow idle speed without load for five minutes.
6. Turn the key switch OFF. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Open the access door in front of the main pump. Check oil level with level gauge (1) on hydraulic oil tank. Oil must be between marks on gauge (1). If necessary, add oil.

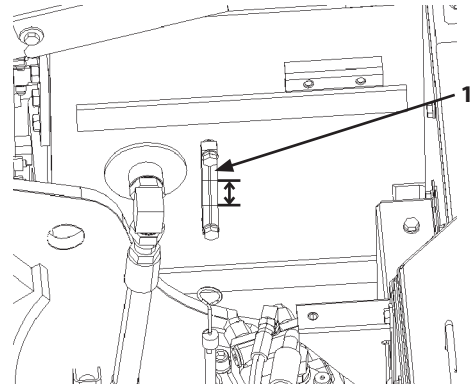
CAUTION: The hydraulic oil tank is pressurized. Push the pressure release button on the tank cap to release pressure, and carefully remove the cap.

To add oil:

9. Push the pressure release button on the air breather to release pressure. Remove the cover.
10. Add oil. Recheck oil level with level gauge (1).
11. Install the cover. Make sure the filter and rod assembly is in correct position.

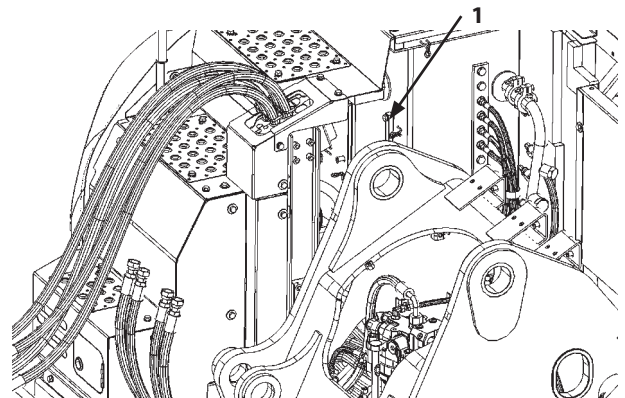


M104-07-021



ZX135US-5B

MDCN-07-020



ZX225US-5B, 225USLC-5B

MDCN-07-021

MAINTENANCE

2 Change Hydraulic Oil

CAUTION: Hydraulic oil may be hot just after operation. Wait for oil to cool before starting work.

IMPORTANT: Hydraulic oil changing intervals differ according to kind of hydraulic oils used. (See Recommended Oil Chart in this group)

1. Park the machine on a level surface with the upperstructure rotated 90 ° for easier access.
2. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

5. Run the engine at slow idle speed without load for five minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Clean the top of the hydraulic oil tank to keep dirt out of the hydraulic system.

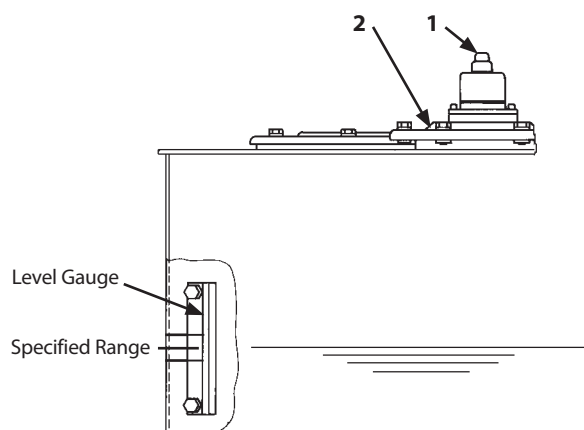
CAUTION: The hydraulic oil tank is pressurized. Push pressure release button (1) on the air breather before removing the air breather.

9. Push pressure release button (1) on the air breather.
10. Remove cover (2).
11. Remove oil using a suction pump. The hydraulic oil tank capacity, up to specified oil level, is approximately A.

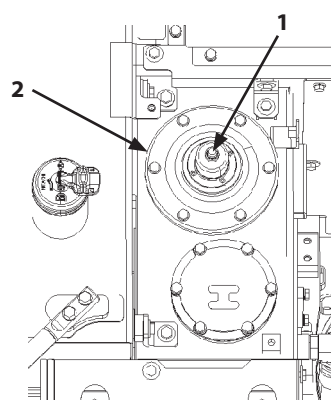
Model	A
ZX135US-5B	125 L
ZX225US-5B, 225USLC-5B	185 L



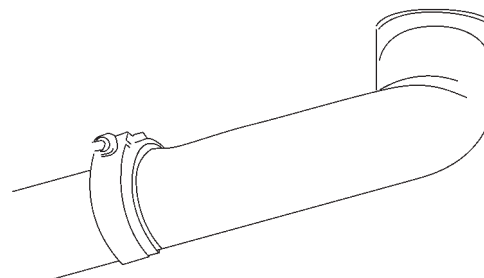
M104-07-117



M157-07-016



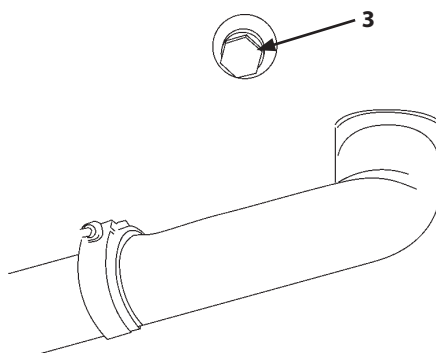
MDCN-07-022



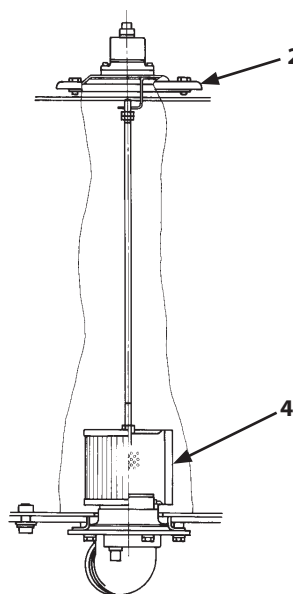
M1U1-07-047

MAINTENANCE

12. Remove drain plug (3). Allow oil to drain.
13. Clean, install and tighten drain plug (3).
14. Add oil until it is between the marks on the oil level gauge.
15. Install cover (2). Tighten the bolts to 50 N·m (5 kgf·m).
16. Be sure to bleed air from the system following the procedures shown next page.



M1U1-07-047



M157-07-062

MAINTENANCE

Air Bleeding Procedures

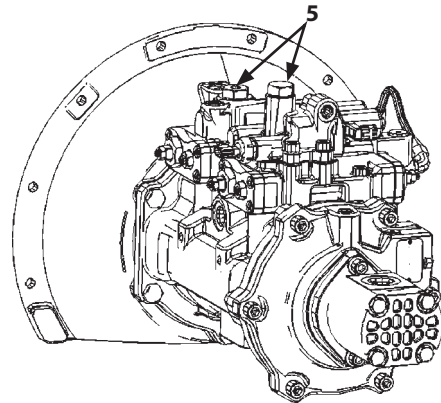
IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

The machine is equipped with two main pumps. Bleed air from these pumps after changing hydraulic oil.

1. Remove air bleed plug (5) on each pump.
2. Fill the pump with oil through air bleed plug (5) port on each pump until oil flows out of air bleed plug (5) hole.
3. Temporarily tighten air bleed plug (5) on each pump, start the engine and run at slow idle. Loosen one of air bleed plugs (5) slightly until oil flows from plug port to release trapped air completely. Tighten air bleed plug (5). Repeat this step for the rest of plugs (5).

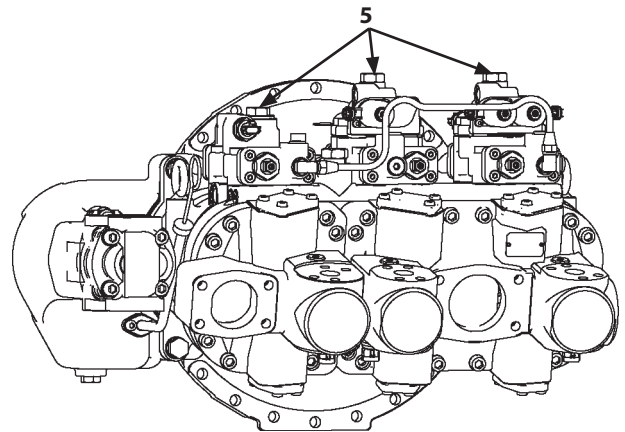
Tightening torque: 95 N·m (9.5 kgf·m)

4. Purge air from the hydraulic system by running the engine at slow idle and operating the control levers slowly and smoothly for 15 minutes.
5. Position the machine as illustrated in the oil level checking procedure.
6. Lower the bucket to the ground.
7. Turn the auto-idle switch off.
8. Stop the engine. Remove the key from the key switch.
9. Pull the pilot control shut-off lever to the LOCK position.
10. Check the hydraulic oil tank gauge. Remove cover to add oil if necessary.



ZX135US-5B

MDAA-07-072



ZX225US-5B, 225USLC-5B

MDAA-07-001

MAINTENANCE

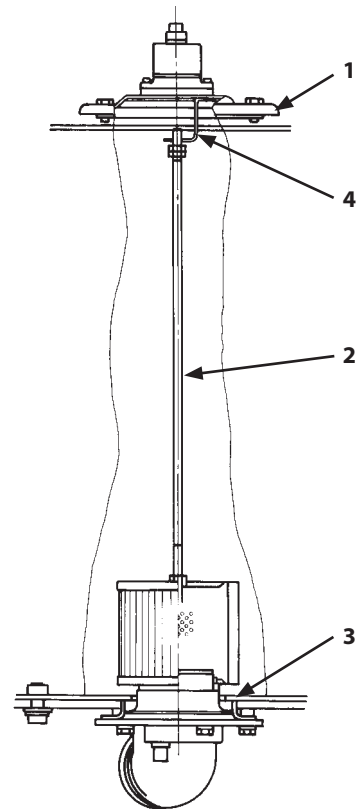
3 Suction Filter Cleaning ---each time when hydraulic oil is changed

The suction filter is located on the bottom of the hydraulic oil tank.

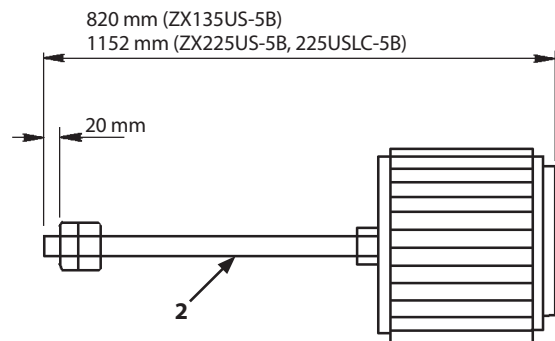
Clean the suction filter when changing hydraulic oil.

1. After removing hydraulic oil from the hydraulic oil tank, remove cover (1) and rod assembly (2).
2. Clean the inside of the hydraulic oil tank and the suction filter.
3. Before installing the suction filter, check the dimension of rod assembly (2) shown in figure right. Securely insert rod assembly (2) into pipe (3).
4. Before securing cover (1) with bolts, ensure the top edge of the rod assembly (2) is completely inserted into the hole of support (4).
5. Bleed air from the hydraulic system.

(Refer to the descriptions for " **2** Bleed air from the hydraulic system")



M157-07-062



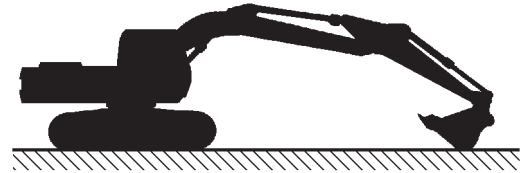
Rod Assembly

M107-07-070

MAINTENANCE

- 4** Replacement of Full-Flow Filter
--- every 1000 hours
Std. Model

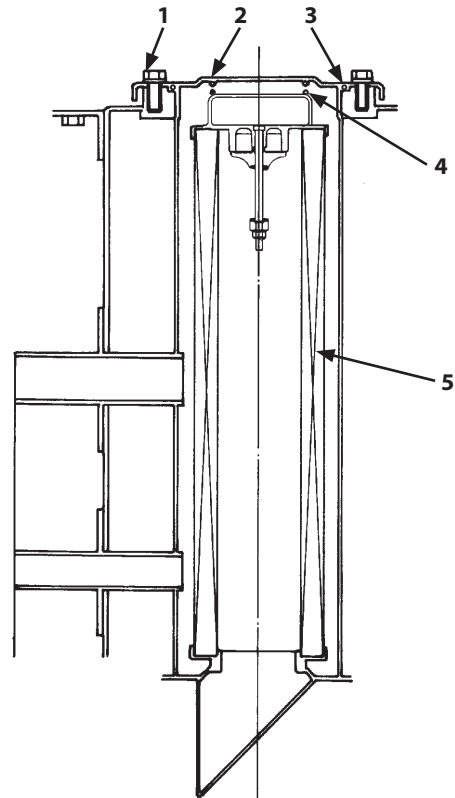
CAUTION: Hydraulic oil becomes hot and pressurized during operation. Severe burns may result if skin comes in contact with escaping hydraulic oil immediately after operation. Wait for the oil to cool before starting any maintenance work.



M104-07-021

Procedures:

1. Park the machine on solid and level ground. Fully extend the bucket cylinder, fully retract the arm cylinder, and lower the bucket to the ground as illustrated in the right. Stop the engine.
2. Before replacing the element, be sure to bleed air pressure from the hydraulic oil tank by pressing the air bleed valve on the hydraulic oil tank.
3. Loosen bolts (1) (6 used) to remove cover (2) and O-ring (3). When removing cover (2), slowly remove it while pressing the cover downward so that spring (4) does not fly out.
4. Remove the spring (4) and element (5).
5. Take extra care never to allow water or dust to enter the filter case.
6. Replace element (5) and O-ring with new ones. Install them into the hydraulic oil tank. Be careful not to damage element (5) and O-ring (3).
Broken element (5) is unusable.
7. Install cover (2) with bolt (1) (6 used).
Tightening Torque: 50 N·m (5 kgf·m)
8. Bleed air from the pump after replacing the element.
(Refer to the descriptions for "**2** Bleed air from the hydraulic system")
If the machine is operated with air mixed in the hydraulic circuit, damage to the pump may result.
9. Replace element (5) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.



M178-07-069

MAINTENANCE

4 Replacement of Full-Flow Filter

--- every 300 hours

Demolition and logging work

When the hydraulic oil filter alarm on the monitor panel is lit, immediately replace the filter element.

CAUTION: Hydraulic oil becomes hot and pressurized during operation. Severe burns may result if skin comes in contact with escaping hydraulic oil immediately after operation. Wait for the oil to cool before starting any maintenance work.

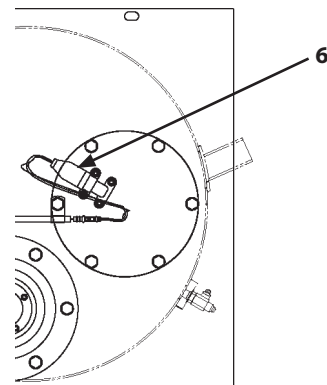
IMPORTANT: Changing interval differs according to the brand of hydraulic oil used, kind of filter element or average attachment operating availability.

IMPORTANT: Precautions for the filter element

- Excavators engaged in demolition and logging work use full-flow filter with high performance (micro-glass) element.
- When replacing the element, use the same kind of high performance element.
- In case a filter-paper element is unavoidably used, change hydraulic oil and replace full-flow filter element by referring to the "Change Hydraulic Oil and Replace Full-Flow Filter Element" in the OPERATING THE MACHINE section.
- If a filter-paper element is used, the full-flow filter restriction indicator does not operate. Isolate the circuit for full-flow filter restriction indicator (6).



M104-07-021



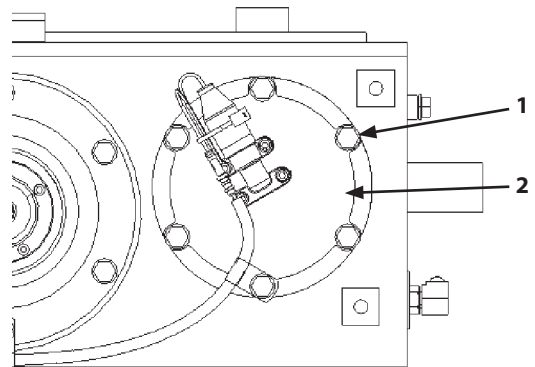
MDAA-07-005

MAINTENANCE

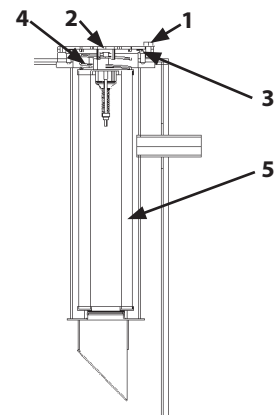
Procedures:

1. Park the machine on solid and level ground with the bucket cylinder fully extended and the arm cylinder fully retracted. Lower the bucket on the ground as shown to the right. Stop the engine.
2. Before replacing element (5), be sure to bleed air pressure from the hydraulic oil tank by pressing the air bleed valve on the hydraulic oil tank.
3. Loosen bolts (1) (6 used) to remove cover (2) and O-ring (3). When removing cover (2), slowly remove the cover while pressing the cover downward so that spring (4) does not fly off.
4. Remove spring (4), and element (5).
5. When installing new element (5) into the hydraulic oil tank, replace O-ring (3) with a new one at the same time.
6. Install cover (2) with bolts (1) (6 used).

Tightening Torque: 50 N·m (5 kgf·m)



MDCN-07-024



MDCN-07-023

MAINTENANCE

5 Replace Pilot Oil Filter --- every 1000 hours

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

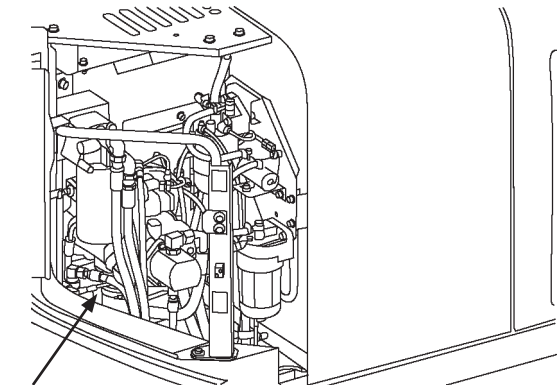
CAUTION: The hydraulic oil tank is pressurized. Push the pressure release button on the air breather before removing the air breather.

7. Remove the filter cartridges of pilot oil filter (2) by turning it counterclockwise with the filter wrench.
8. Clean the filter O-ring contact area on filter head (1).
9. Apply a thin film of clean oil to the gasket of new filter (2).
10. Install new filter (2). Turn the filter cartridge clockwise by hand until the O-ring touches the contact area. Be sure not to damage the O-ring when installing filter (2).

IMPORTANT: Do not re-use the filter cartridge.



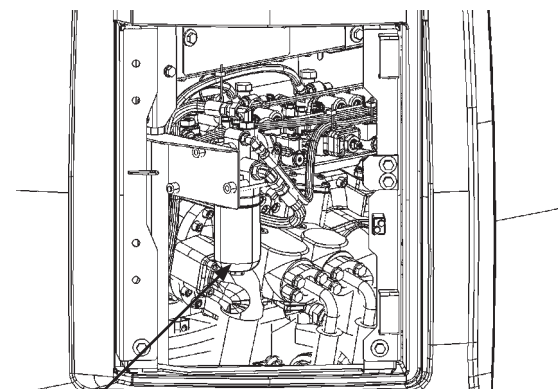
M104-07-021



Pilot Filter

ZX135US-5B

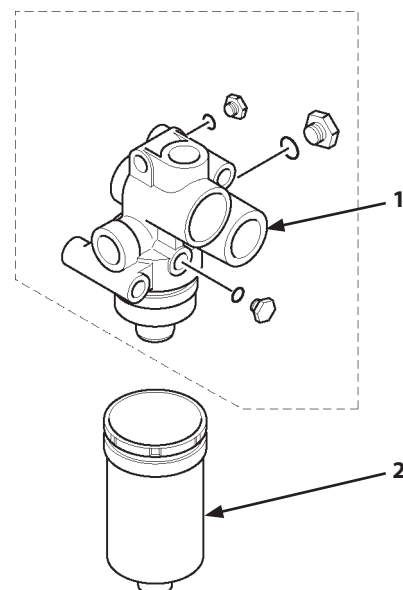
M1U4-07-038



Pilot Filter

ZX225US-5B, 225USLC-5B

MDCN-07-025



M1U1-07-050

MAINTENANCE

6 Replace Air Breather Element

--- every 5000 hours

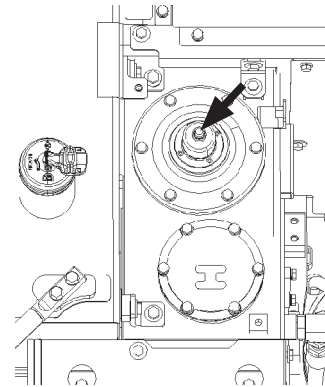
CAUTION: Hydraulic oil becomes hot and pressurized during operation. Severe burns may result if skin comes in contact with escaping hydraulic oil immediately after operation. Wait for the oil to cool before starting any maintenance work.



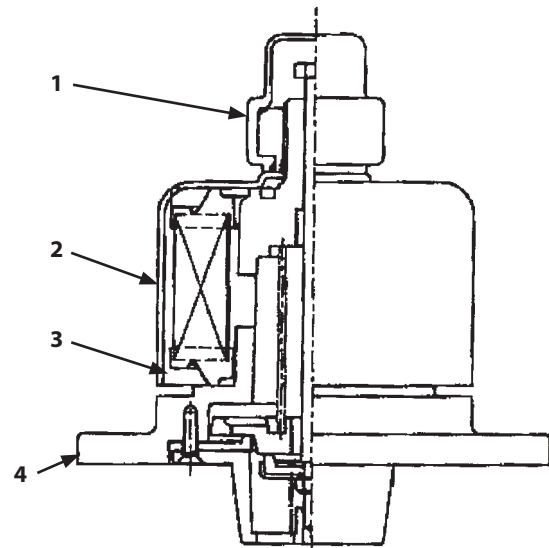
M104-07-021

Procedures:

1. Park the machine on solid and level ground with the bucket cylinder fully extended and the arm cylinder fully retracted. Lower the bucket on the ground as shown to the right. Stop the engine.
2. Before replacing element (3), be sure to bleed air pressure from the hydraulic oil tank by pressing the air bleed valve on the hydraulic oil tank.
3. Rotate cover (2) clockwise approx. 1/4 turns. Remove cap (1) by rotating it counterclockwise.
4. Rotate cover (2) counterclockwise and remove it. Remove element (3).
5. Install new element (3). Tighten to install cover (2) until cover (2) comes in contact with element (3). Then, further tighten the cover 1/4 turn.
6. Securely tighten cap (1) clockwise by hand. While holding cap (1) by hand so that cap (1) does not rotate, securely tighten cover (2) by rotating counterclockwise 5 to 10° by hand.
7. Take care never to allow water and/or contaminant to stay between cover (2) and body (4) (air breathing port).
8. Replace element (3) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.



MDCN-07-022



M1G6-07-001

MAINTENANCE

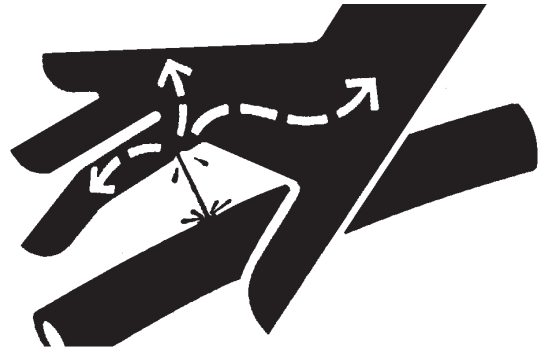
7 Check Hoses and Lines

- daily
- every 250 hours

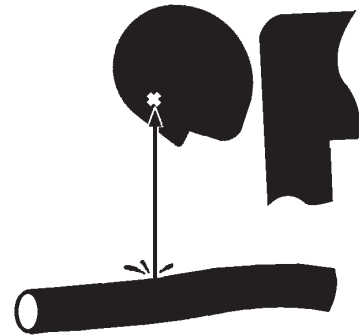
! WARNING:

- Hydraulic oil and lubricant leaks can lead to fire that may result in serious injury. Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damaged oil cooler, and loose oil cooler flange bolts, for leaks.
- Escaping oil under pressure can penetrate the skin causing serious injury. To avoid this hazard, search for oil leaks with a piece of cardboard. Take care to protect hands and body from high-pressure fluids. If an accident occurs, see a doctor familiar with this type of injury immediately.
- Tighten, repair or replace any missing, loose or damaged clamps, hoses and lines.
- Do not bend or strike high-pressure lines.
- Never install bent or damaged hoses or lines.

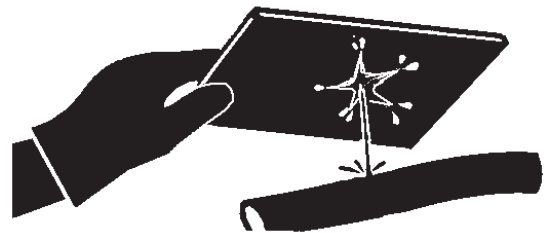
According to the check points shown below, check hoses and lines for oil leaks and damage. If any abnormality is found, replace or retighten as instructed in the table.



SA-031



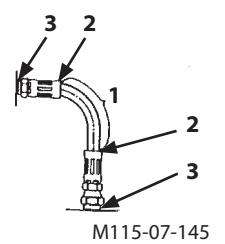
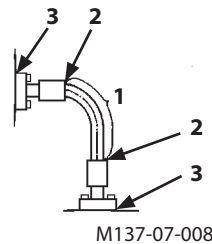
SA-292



SA-044

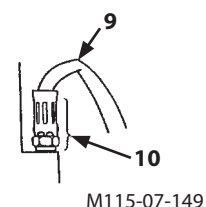
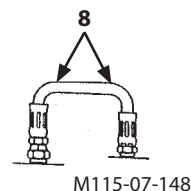
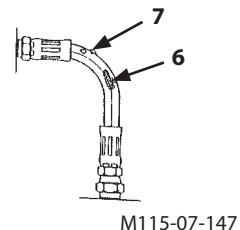
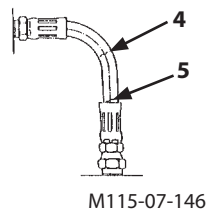
Hose

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Hose covers	Leak (1)	Replace
	Hose ends	Leak (2)	Replace
	Fittings	Leak (3)	Retighten or replace hose or O-ring



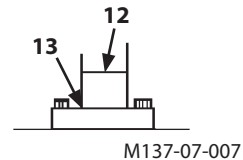
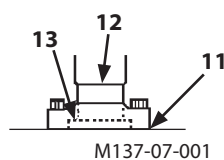
MAINTENANCE

Interval (hours)	Check Points	Abnormalities	Remedies
Every 250 hours	Hose covers	Damage or leak (4)	Replace
	Hose ends	Damage or leak (5)	Replace
	Hose covers	Exposed reinforcement (6)	Replace
	Hose covers	Crack or blister (7)	Replace
	Hose	Bend (8), Collapse (9)	Replace
	Hose ends and Fittings	Deformation or corrosion (10)	Replace



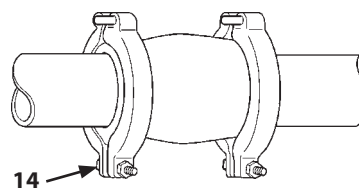
Lines

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Contact surfaces of flange joints	Leak (11)	Replace
	Bolts	Loose or leak (11)	Retighten or replace O-ring
	Welded surfaces on flange joints	Leak (12)	Replace
Every 250 hours	Flange joint neck	Crack (13)	Replace
	Welded surfaces on flange joints	Crack (12)	Replace
	Clamps	Missing or deformation Loose bolts	Replace or retighten



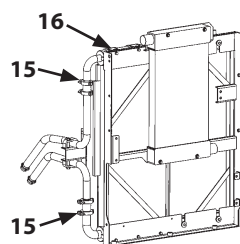
Hose and Lines

Interval (hours)	Check Points	Abnormalities	Remedies
Daily Check	Flexible master coupling	Leak (14)	Replace or retighten

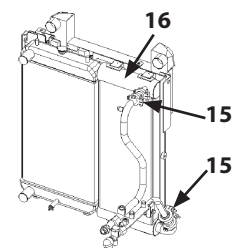


Oil Cooler

Interval (hours)	Check Points	Abnormalities	Remedies
Every 250 hours	Coupling	Leak (15)	Retighten or replace
	Oil Cooler	Leak (16)	Replace



ZX225US-5B, 225USLC-5B



ZX135US-5B

MAINTENANCE

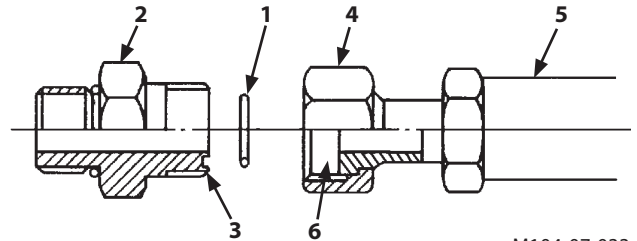
Service Recommendations for Hydraulic Fittings

Two hydraulic fitting designs are used on this machine.

- Flat Face O-ring Seal Fitting (ORS Fitting)
O-ring (1) is used on the sealing surfaces of adaptor (2) to prevent oil leakage.

Precautions for Use

1. Replace O-ring (1) with a new one when assembling fittings.
 2. Check that O-ring (1) is properly fitted in O-ring groove (3). Tighten union (4).
- Tightening union (4) with O-ring (1) out of the groove may damage O-ring (1) and cause oil leak.
3. When assembling fittings, take care not to make a dent on O-ring groove (3) of adaptor (2) and sealing surface (6) on hose (5) or valve side. Failure to do so may result in damage to O-ring (1) leading to oil leak.
 4. If oil leaks from a loose connection of union (4), do not tighten fitting (2). Open the connection, replace O-ring (1) with new one and check for correct O-ring position before tightening the connection.



M104-07-033

Tightening Torque:

Tighten fittings to the torque values shown below.

±10 %

Wrench size (mm)		27	32	36	41, 46
Tightening Torque:	N·m	95	140	180	210
	(kgf·m)	(9.5)	(14)	(18)	(21)

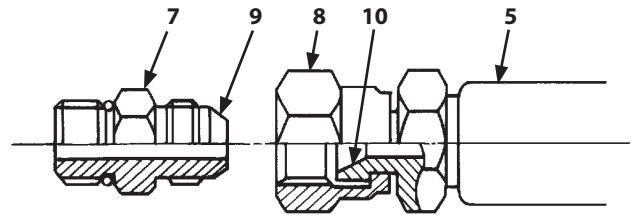
MAINTENANCE

- **Metal Face Seal Fittings**

Tight contact between metal flares on adaptor (7) and metal connector (8) of hose (5) prevents pressure oil leakage. This type of fittings is used on smaller diameter joint.

Precautions for Use

Connect or disconnect fittings with care not to damage seat surfaces (9 and 10).



M202-07-051

Tightening Torque:

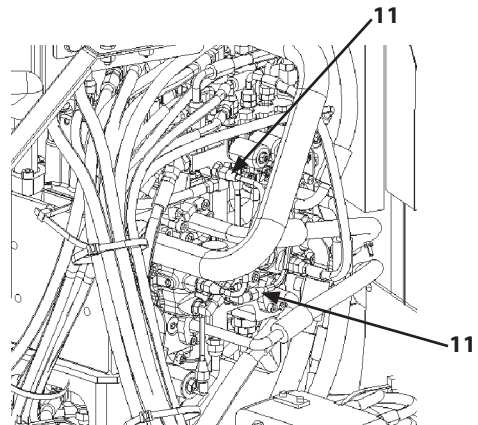
Tighten fittings to the torque values shown below.

Wrench size (mm)		17	19	22	27
Torque	N·m	25	30	40	80
	(kgf·m)	(2.5)	(3)	(4)	(8)

- **Bent Tube**

Tighten bent tube (11) mounted on the control valve to the torque values shown below.

Wrench size (mm)	17, 19	
Tightening torque	N·m	35
	(kgf·m)	(3.5)



MDCN-07-029

MAINTENANCE

E. Fuel System

 **CAUTION: Beware of fire.**

Fuel is flammable. Keep fuel away from fire hazards.

Recommended Fuel

Use only super high quality or high quality DIESEL FUEL (JIS K-2204) (ASTM D-975) (EN-590). Kerosene must NOT be used.

Besides, using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine parts, leading to malfunction. Using fuel other than ultra low-sulfur or low-sulfur diesel fuel has adverse effects on the engine and the muffler filter, which may result in malfunction.

MAINTENANCE

Refueling

1. Park the machine on a level surface. Lower the bucket to the ground. Check the fuel level with fuel gauge (1).

If the fuel level is low, stop the engine. Refuel by removing cap (2) on the fuel tank.

2. Remove cap (2) of filler port.

[Cap (2) unlock procedures]

- Release the key lock.
- Pull up handle (3) and turn handle (3) counterclockwise for releasing cap (2) lock.
- Remove cap (2).

3. To avoid condensation, fill the tank at the end of each day's operation. Tank capacity is as follows.

Model	Tank Capacity
ZX135US-5B	220 L
ZX225US-5B, 225USLC-5B	380 L

Do not fill the tank more than specified. Stop filling when a yellow mark on fuel level gauge (4) becomes visible.

Position the oil filler gun so that the gun will not encumber the movement of the level gauge (4) float.

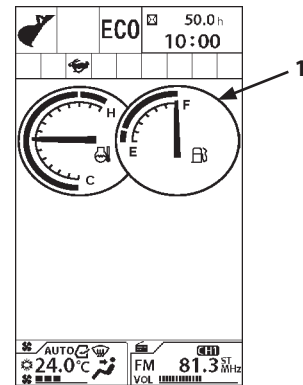
4. Immediately after fueling, install and lock filler cap (2) to prevent vandalism and loss.
5. Install cap (2) of filler port.

[Cap (2) lock procedures]

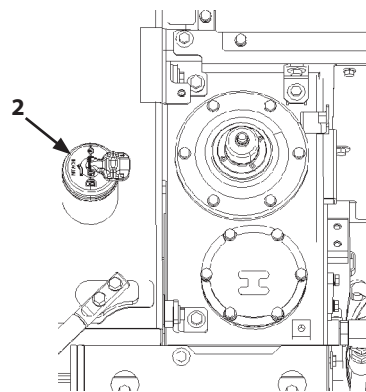
- If Install cap (2).
- Turn handle clockwise until cap (2) is locked, and push down handle (3).
- Lock the key.

IMPORTANT:

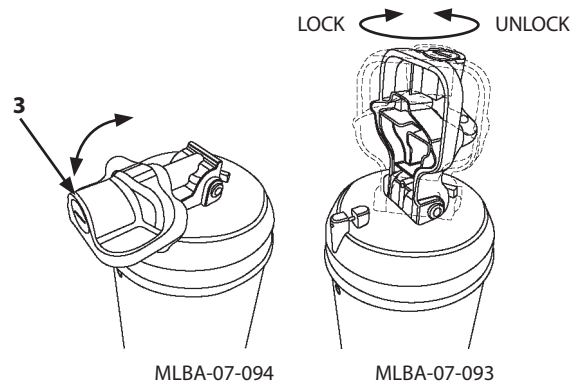
- **Take care not to allow dirt and/or water to enter the fuel tank.**
- **Wipe off any spilled fuel.**
- **Never fail to remove filler cap (2) when refueling with the automatic fueling device and be sure to stop fueling when the yellow mark on the float of level gauge (4) becomes visible.**



MDAA-01-001

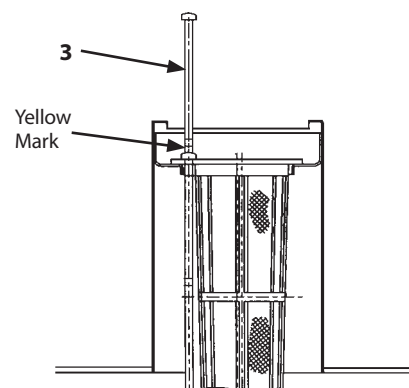


MDCN-07-022



MLBA-07-094

MLBA-07-093



M157-07-060

MAINTENANCE

1 Drain Fuel Tank Sump

--- daily

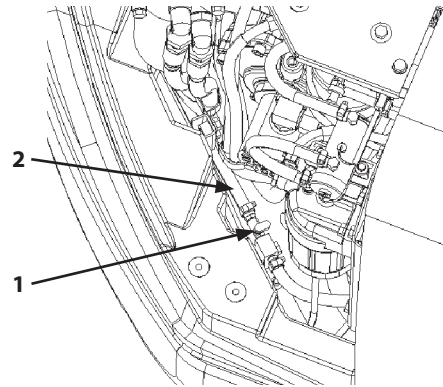
1. Park the machine on a level surface with the upperstructure rotated 90° for easier access.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.



M104-07-117

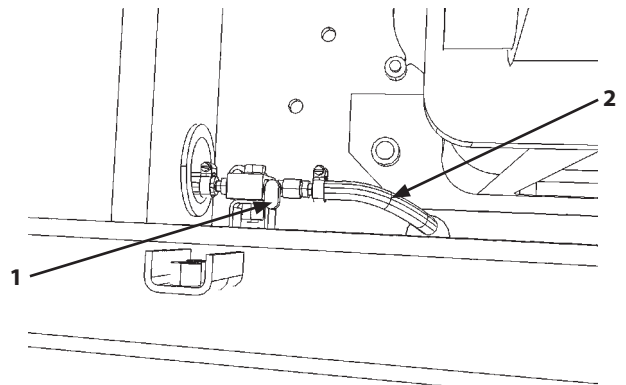
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Place a container with a capacity of 0.5 liters or larger under drain hose (2) to collect the drained water.
8. Open drain valve (1) to drain water and/or sediment through the drain hose.
9. After draining water, securely tighten drain valve (1).



ZX135US-5B

MDCN-07-030



ZX225US-5B, 225USLC-5B

MDCN-07-031

MAINTENANCE

2 Drain Fuel Filter

--- daily

IMPORTANT: Drain fuel filter daily before starting operation. The engine may be damaged if you do not drain fuel filter daily.

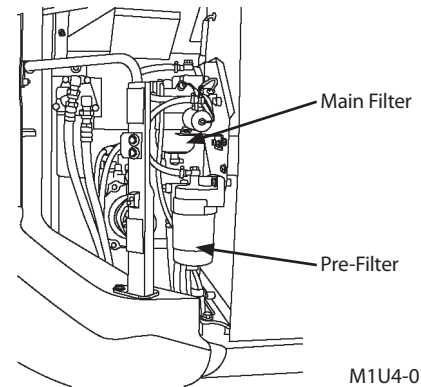
Fuel main filter and pre-filter have water separator functions, these allow float to rise as water accumulates. Be sure to drain daily the water accumulated in the filter until float (4) goes to the bottom of case.

Draining Procedures (Main Filter)

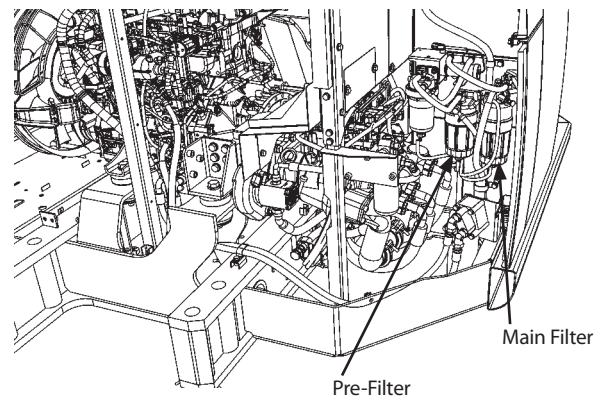
1. Place a container with a capacity of 0.5 liters or larger under drain hose (3) to collect the drained water.
2. Rotate drain plug (2) on the bottom of the filter about 4-turns counterclockwise. Drain the water accumulated in the filter until float (4) goes to the bottom of case. If it is difficult to drain, loosen plug (1) on the top of the main filter.
3. After draining water, securely tighten drain plug (2) and plug (1).
4. Start the engine. Check drain plug (2) and plug (1) for fuel leaks.

Wrench size: 10 mm

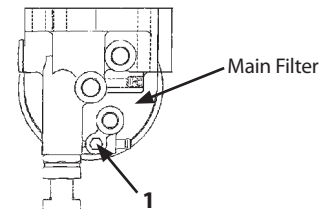
IMPORTANT: After draining water mixed in fuel, bleed air from the fuel supply system.



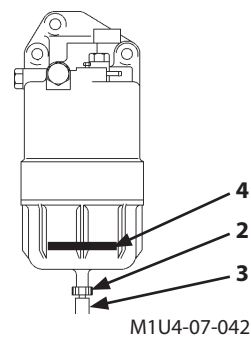
ZX135US-5B



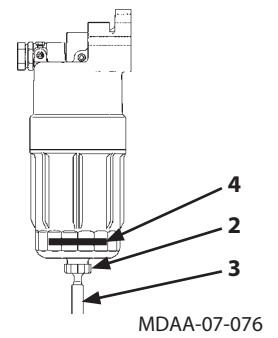
ZX225US-5B, 225USLC-5B



MDAA-07-075



ZX135US-5B



ZX225US-5B,
225USLC-5B

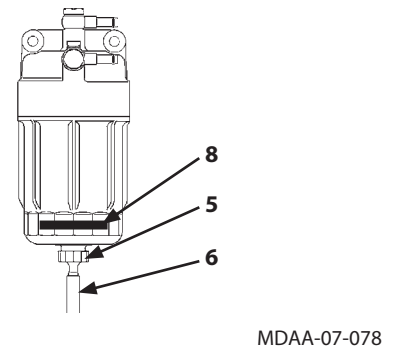
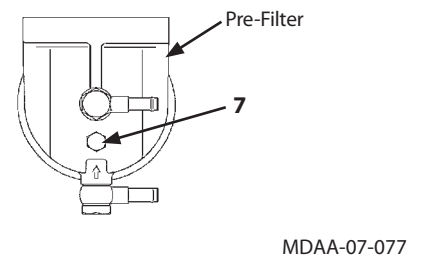
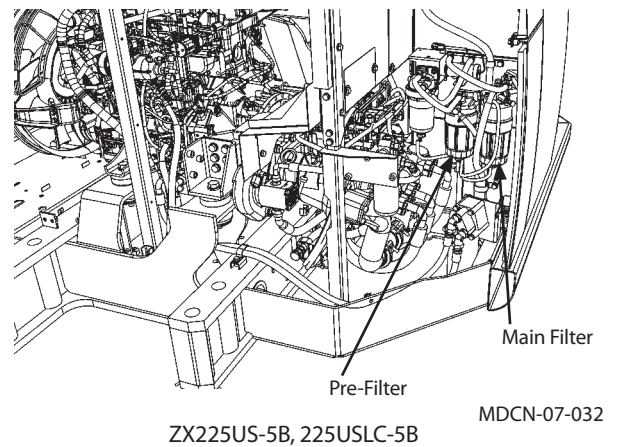
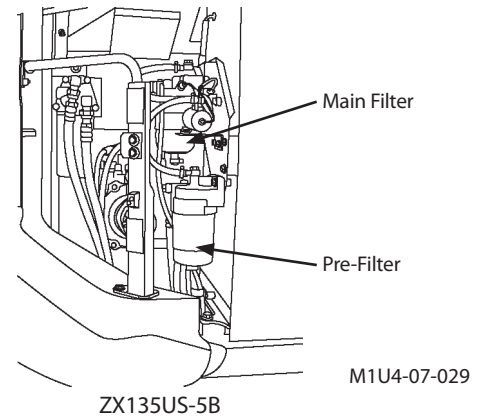
MAINTENANCE

Draining Procedures (Pre Filter)

1. Place a container with a capacity of 0.5 liters or larger under drain hose (6) to collect the drained water.
2. Rotate drain plug (5) on the bottom of the filter counterclockwise. Drain the water accumulated in the filter until float (8) goes to the bottom of case. If it is difficult to drain, loosen plug (7) on the top of the fuel pre-filter.
3. After draining water, securely tighten drain plug (5) and plug (7).
4. Start the engine. Check drain plug (5) and plug (7) for fuel leaks.

IMPORTANT: After draining water mixed in fuel, bleed air from the fuel supply system.

Wrench size: 14 mm



MAINTENANCE

Bleed Air from the Fuel System

Air in the fuel system may make the engine hard to start or make it run irregularly.

After draining water and sediment from the fuel filter, replacing the fuel filter, cleaning the solenoid fuel pump strainer or running the fuel tank dry, be sure to bleed the air from the fuel system.

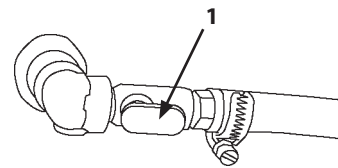
Main Points to Bleed Air

This machine is equipped with a solenoid fuel pump.

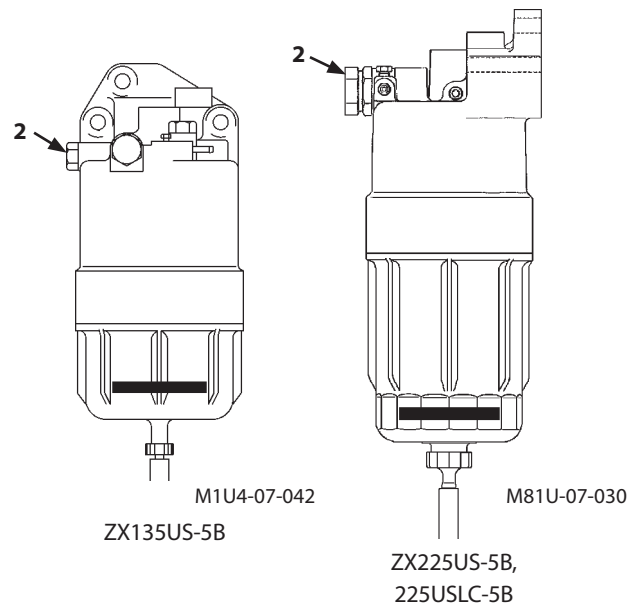
CAUTION: Fuel leaks may lead to fires.

1. Check that fuel cock (1) on the bottom of the fuel tank is opened.
2. Turn the key switch ON and hold it in that position for approx. 3 minutes. Thereby, the solenoid fuel pump operates, starting to bleed air.
3. While holding the key switch in the ON position, reciprocate fuel main filter priming pump (2). After air is bled from the main filter, return priming pump (2) to the original position.
4. After the main filter is filled with fuel, hold the key switch in the ON position for 30 seconds.
5. Start the engine. Check the fuel supply system for fuel leaks.

IMPORTANT: Even if air is not thoroughly bled, do not hold the key switch in the ON position for more than 5 minutes. In case air is not thoroughly bled, first return the key switch to the OFF position. Then, after waiting for more than 30 seconds, turn the key switch to the ON position again. Failure to do so may cause damage to the solenoid fuel pump and/or discharging the batteries.



MDAA-07-007



MAINTENANCE

Air Bleeding by Priming Pump

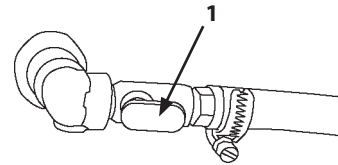
In case air is not bled due to malfunction of the solenoid fuel pump, operating the priming pump only can bleed air.

1. Check that fuel cock (1) on the bottom of the fuel tank is opened.
2. Loosen air bleed plug (2) on the fuel main filter.
3. Supply fuel by reciprocating priming pump (3).

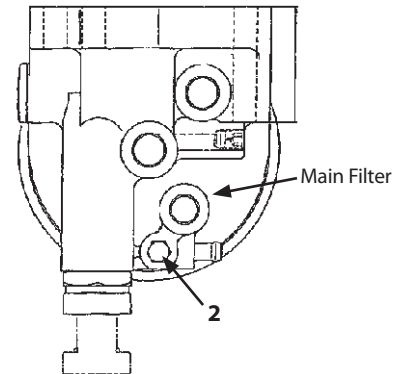
After no air bubbles are spouted through air bleed plug (2), tighten air bleed plug (2).

4. After tightening air bleed plug (2), reciprocate priming pump (3) approx. 150 strokes.
5. Wipe off any spilled fuel.
6. Start the engine. Check that no fuel leaks are present. If the engine does not start, repeat the above procedures from step 1.

Wrench size: 10 mm



MDAA-07-007

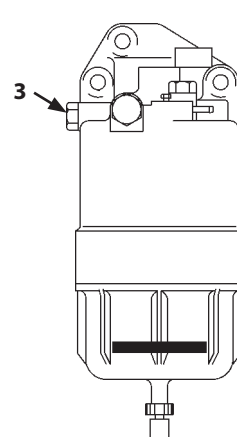


M1GR-07-010

If Air Mixed After Common Rail

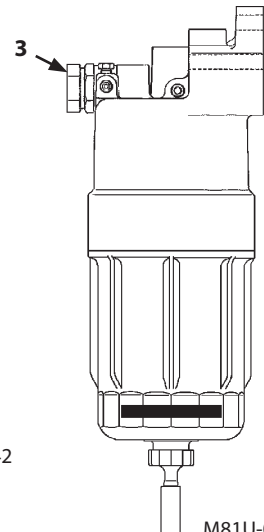
In case air mixed in the fuel system due to lack of fuel and the engine is difficult to start, release air by following the procedure given below.

1. Bleed air until the engine supply pump entrance enough according to the above-mentioned procedures.
2. Operate starter motor for long cranking within 20 seconds. If engine falls to start, return key switch to OFF. Wait more than about 60 seconds, and then try again.



M1U4-07-042

ZX135US-5B



M81U-07-030

ZX225US-5B,
225USLC-5B

MAINTENANCE

- 3** **Replace Fuel Main Filter Element**
--- every 1000 hours or when fuel filter clogging lamp is lit

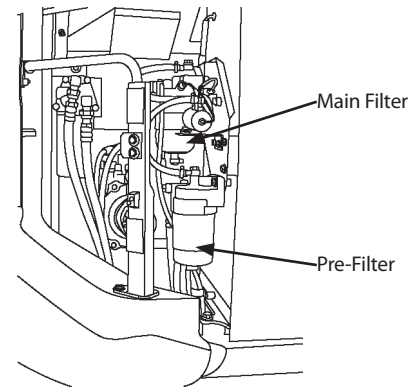
IMPORTANT:

- Be sure to use only genuine Hitachi elements for the fuel main filter element and the pre-filter element. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.
- Take care not to allow dirt and/or water to enter the fuel tank.

Procedures:

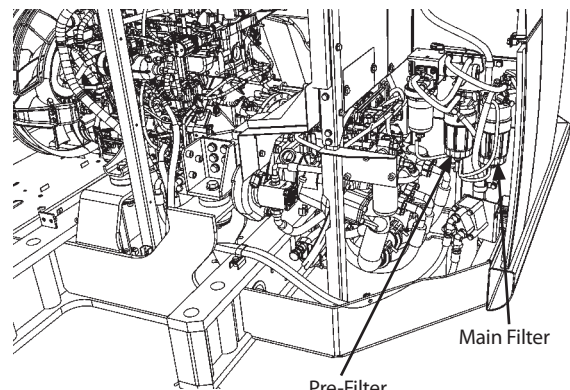
1. Close cock (1) on the bottom of the fuel tank.

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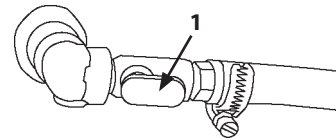
ZX135US-5B

M1U4-07-029



ZX225US-5B, 225USLC-5B

MDCN-07-032



MDAA-07-007

MAINTENANCE

2. Place a container with a capacity of 1 liters or larger under drain hose (3) to collect the drained water.
3. Loosen air bleed plug (1) and drain plug (2). Drain fuel until fuel does not flow out of the filter.

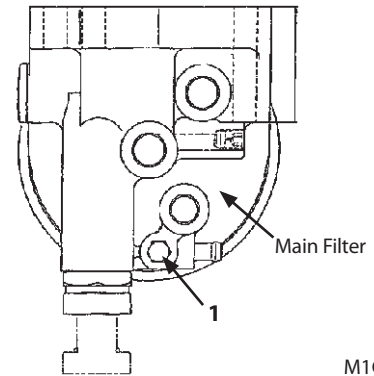
After draining fuel, remove drain plug (2) and replace O-ring.

4. Remove transparent filter case (4) using the exclusive tool.
5. When transparent filter case (4) is removed, the element is exposed. Remove the element by hand.
6. Install a new element. Replace O-ring and tighten transparent filter case (4) to 30 +/- 2 N·m using the exclusive tool.
7. Tighten air bleed plug (1) and drain plug (2).
8. Open cock (5) on the bottom of the fuel tank.
9. Bleed Air from the Fuel System

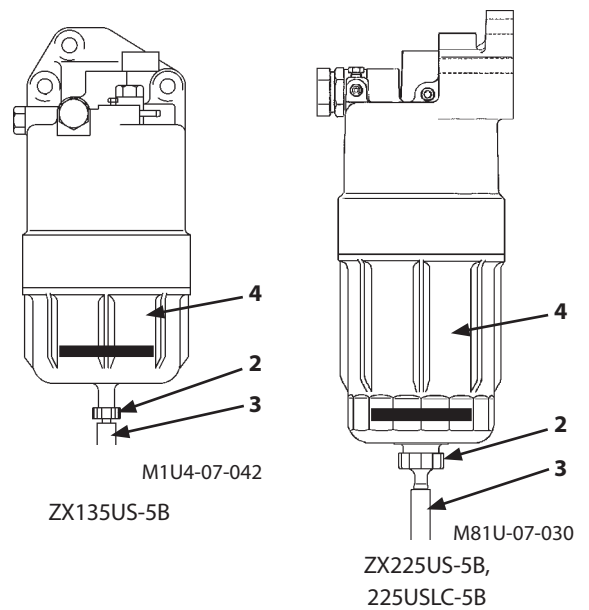
After replacing the fuel filter element, bleed air from the fuel supply system.

(Refer to " **2** Bleed Air from the Fuel System".)

Wrench size: 10 mm



M1GR-07-010

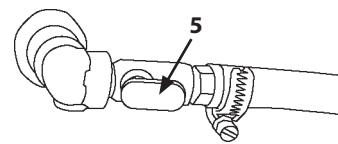


M1U4-07-042

ZX135US-5B

M81U-07-030

ZX225US-5B,
225USLC-5B



MDAA-07-007

MAINTENANCE

- 4** **Replace Fuel Pre-Filter Element**
---every 1000 hours or when fuel filter clogging lamp is lit

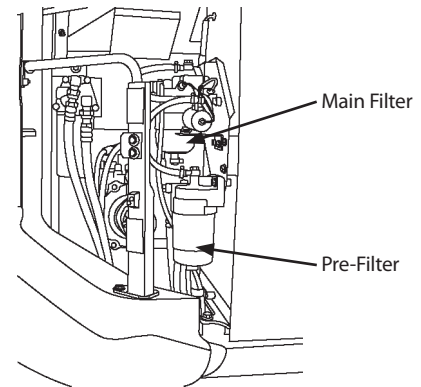
IMPORTANT:

- Be sure to use only genuine Hitachi elements for the fuel main filter element and the pre-filter element. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.
- Take care not to allow dirt and/or water to enter the fuel tank.

Procedures:

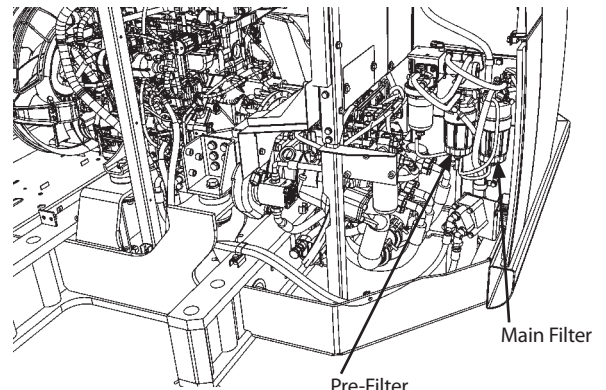
1. Close cock (1) on the bottom of the fuel tank.

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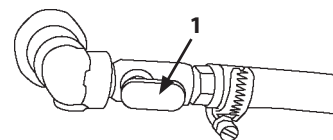
ZX135US-5B

M1U4-07-029



ZX225US-5B, 225USLC-5B

MDCN-07-032



MDAA-07-007

MAINTENANCE

2. Place a container with a capacity of 1 liters or larger under drain hose (3) to collect the drained water.
3. Loosen air bleed plug (1) and drain plug (2). Drain fuel until fuel does not flow out of the filter.

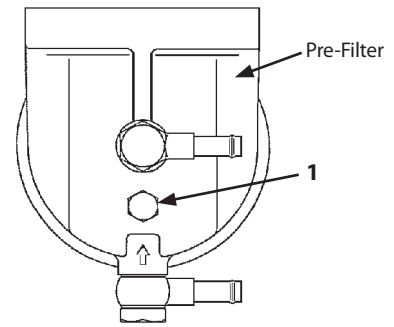
After draining fuel, remove drain plug (2) and replace O-ring.

4. Remove transparent filter case (4) using the exclusive tool.
5. When transparent filter case (4) is removed, the element and O-ring for transparent filter case (4) is exposed. Remove the element by hand.
6. Install a new element. Replace O-ring and tighten transparent filter case (4) to 30 +/- 2 N·m using the exclusive tool.
7. Tighten air bleed plug (1) and drain plug (2).
8. Open cock (5) on the bottom of the fuel tank.
9. Bleed Air from the Fuel System

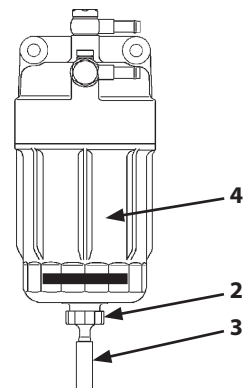
After replacing the fuel filter element, bleed air from the fuel supply system.

(Refer to "2 Bleed Air from the Fuel System".)

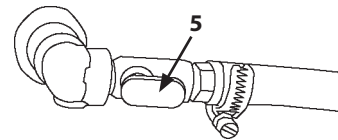
Wrench size: 14 mm



M1U1-07-004



M81U-07-031



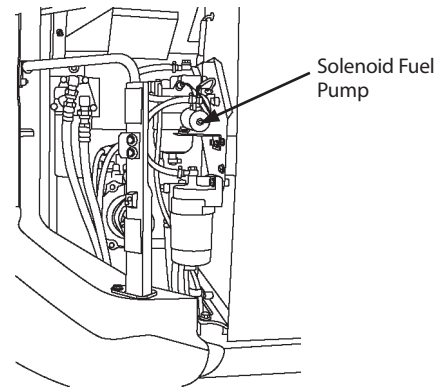
MDAA-07-007

MAINTENANCE

- 5** Clean Solenoid Fuel Pump Strainer
--- every 1000 hours

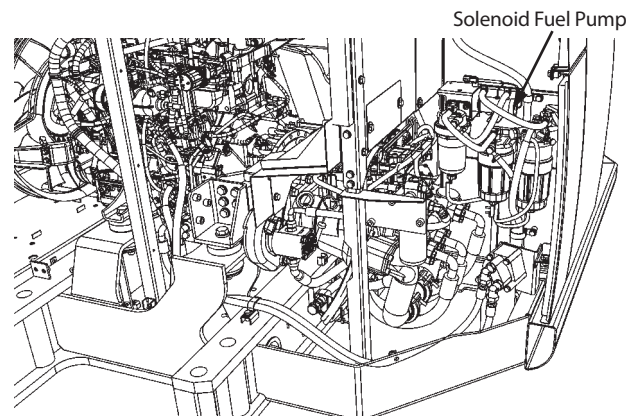
Cleaning

When the strainer is disassembled, be sure to replace the gasket. Install the cover and the magnet only after sufficiently cleaning them. After being assembled, closely check the air-tightness of the strainer.



ZX135US-5B

M1U4-07-029



ZX225US-5B, 225USLC-5B

MDCN-07-033

MAINTENANCE

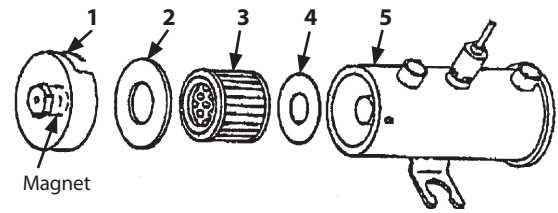
Disassembling/ Assembling

Close the cock on the bottom of the fuel tank.
To remove cover (1), loosen with a spanner. After cover (1) is removed, gasket (2), strainer (3), and gasket (4) are easily removed in order. Wash removed strainer (3) with light oil. Install the strainer in the reverse order of disassembling. At that time, install gasket (2) into cover (1) first. Then, securely tighten cover (1) to pump (5) using a spanner.

 NOTE: Wrench size: 17 mm

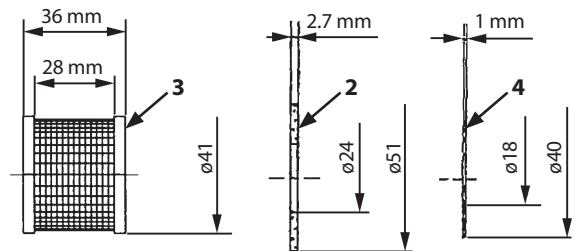
IMPORTANT:

- Only do the cleaning and replacement of the strainer as well as the replacement of gaskets (2) and (4) while servicing the machine. Never attempt to disassemble other parts.
- Gasket (4) can get caught with the shaft of pump (5), making it difficult to remove the gasket, but do not disassemble the shaft of pump (5). If the gasket is difficult to remove, do not disassemble other parts but extend gasket (4) to remove it. Use new gasket (4) for assembling.

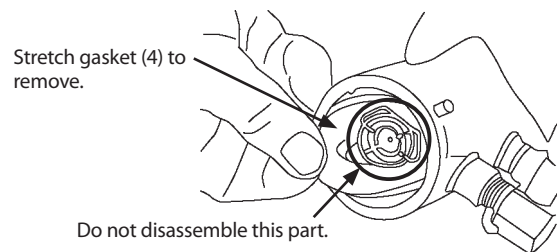


Magnet

M1GR-07-004



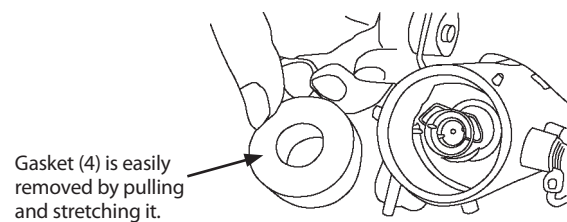
M1U1-07-006



Stretch gasket (4) to remove.

Do not disassemble this part.

MDAA-07-053



Gasket (4) is easily removed by pulling and stretching it.

MDAA-07-054

MAINTENANCE

6 Check Water Separator

Drain water --- daily

Replace Element --- every 2000 hours

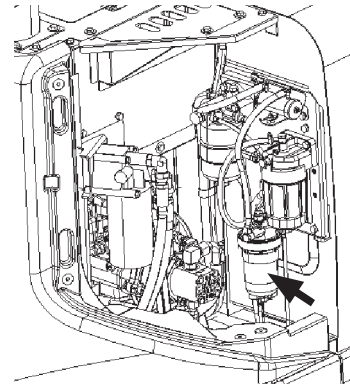
Water separator (2) is a device designed to separate water from the fuel. There is a float inside the case which buoys when water accumulates.

When the float rises to the water draining level, drain water.

Drain Procedures

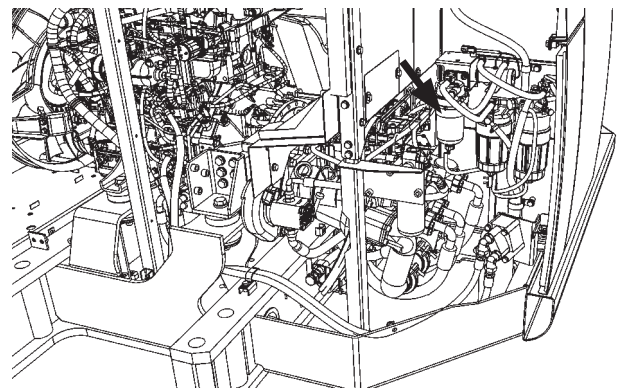
1. Close the cock located at lower part of the fuel tank to stop feeding fuel.
2. Place a container with a capacity of 0.5 liters or larger under drain hose (4) to collect the drained water.
3. Loosen plug (1) at upper part of water separator (2). Loosen drain plug (3) at lower part of the case to drain water.
4. After draining water, securely tighten drain plug (1) and plug (3).
5. Return the fuel cock to its original position (open).

IMPORTANT: After draining water from the water separator, bleed air from the fuel supply system.



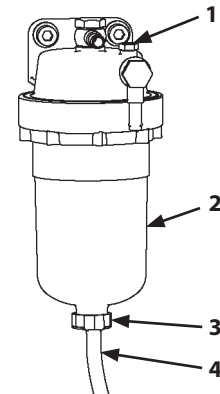
ZX135US-5B

MDCN-07-034



ZX225US-5B, 225USLC-5B

MDCN-07-033



MDAA-07-009

MAINTENANCE

Element replacement procedure

1. Close cock (1) on the bottom of the fuel tank.
2. Place a container with a capacity of 1 liters or larger under drain hose (5) to collect the drained water.
3. Loosen air bleed plug (2) and drain plug (4). Drain fuel until fuel does not flow out of the filter.

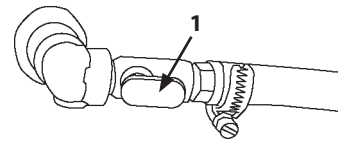
After draining fuel, remove drain plug (4) and replace O-ring.

4. Remove transparent filter case (3) using the exclusive tool.
5. When transparent filter case (3) is removed, the element and O-ring for transparent filter case (3) is exposed. Remove the element by hand.
6. Install a new element. Replace O-ring and tighten transparent filter case (3) to 30 +/- 2 N•m using the exclusive tool.
7. Tighten air bleed plug (2) and drain plug (4).
8. Open cock (1) on the bottom of the fuel tank.
9. Bleed Air from the Fuel System

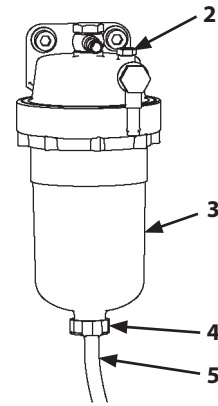
After replacing the water separator element, bleed air from the fuel supply system.

(Refer to " **2** Bleed Air from the Fuel System".)

Wrench size: 10 mm



MDAA-07-007



MDAA-07-009

MAINTENANCE

- 7** Check Fuel Hoses
 ---daily
 --- every 250 hours

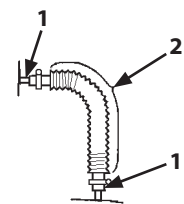
⚠ CAUTION: Fuel leaks can lead to fires that may result in serious injury.

- Escaping combustible fluid can cause fires. Check for kinked hoses, hoses that rub against each other, and any fuel leaks.
- Repair or replace any loose or damaged hoses.
- Never reinstall bent or damaged hoses.

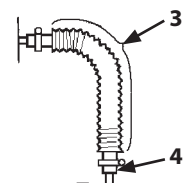
According to the check points shown below, check hoses for oil leaks and damage.
 If any abnormality is found, replace or retighten as instructed in the table.

Hose

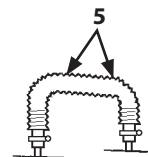
Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Hose ends	Leak (1)	Retighten or replace
	Hose covers	Wear, crack (2)	Replace
Every 250 hours	Hose covers	Crack (3)	Replace
	Hose ends	Crack (4)	Replace
	Hose	Bend (5), Collapse (6)	Replace
	Hose fittings	Corrosion (7)	Replace



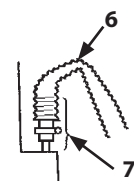
M137-07-003



M137-07-004



M137-07-005



M137-07-006

MAINTENANCE

F. Air Cleaner

- 1** Clean and Replace Air Cleaner Element (Outer)
Clean --- every 250 hours or when the restriction indicator comes ON
Replace --- after cleaning 6 times or after one year

CAUTION: When using compressed air pressure (less than 0.69 MPa (7 kgf/cm²)), dust may scatter. Wear goggles or safety glasses, gloves and face shield.

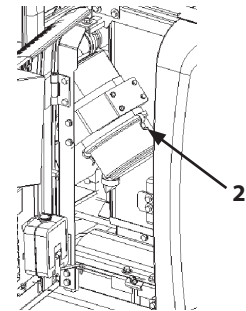
IMPORTANT: Clean and replace the air cleaner element by following the procedure below. If following procedures are not followed, dirt may enter into the system and engine trouble may result.

- Clean and replace the air cleaner element when the engine is stopped.
- Do not remove the inner element when cleaning the outer element.
- Replace the inner element when replacing the outer element. Do not reuse elements.
- Use clean and dried compressed air.
- When blowing compressed air, be sure to keep the air nozzle away from the element.
- Otherwise filter paper may be broken by the pressure of air.

Clean or replace the outer element.

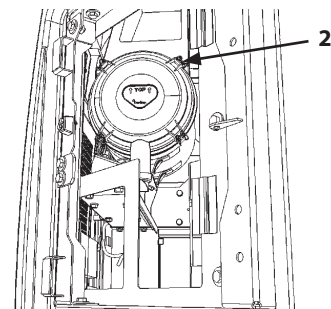
Stop the engine before servicing outer element (1).

1. Remove clamp (2) of the cover. Remove the cover. Remove any dirt from the case.
2. Remove outer element (1) by holding its edge and slowly shaking it left to right, up and down while twisting it. Do not scatter dirt while removing outer element (1).



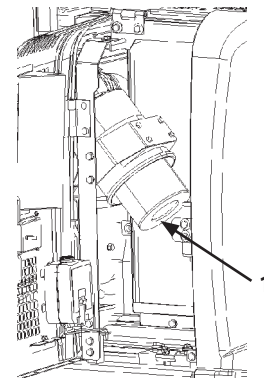
ZX135US-5B

MDCN-07-035



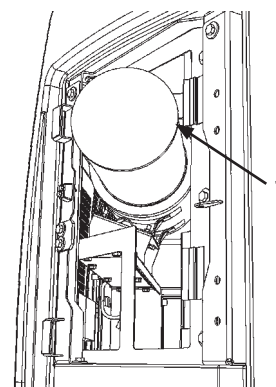
ZX225US-5B, 225USLC-5B

MDCN-07-036



ZX135US-5B

MDCN-07-038



ZX225US-5B, 225USLC-5B

MDCN-07-039

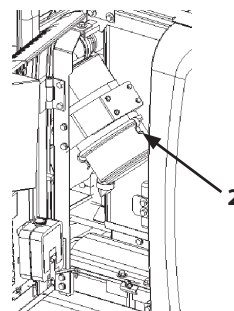
MAINTENANCE

3. At this time, do not remove the inner element.

IMPORTANT: Do not hit or clash outer element (1) against other object to clean the element.

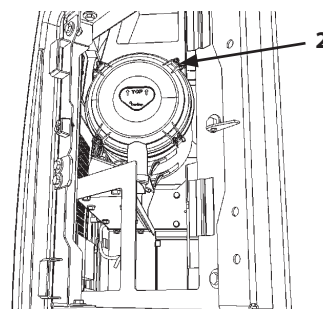
4. Allow compressed air pressure [less than 0.69 MPa (7 kgf/cm²)] to blow out of the inside of outer element (1) to clean the element. After that, blow compressed air along the pleats, and then blow out from the inside. When blowing compressed air, be sure to keep the air nozzle 50 mm or away from the element.
5. After cleaning is complete, be sure to check outer element (1) for any damage such as holes or worn of filter paper. If any damage is found, replace the element with new one.
6. Press outer element (1) into the air cleaner body straightly by hand. Ensure that outer element (1) is properly installed by pushing its bottom edge.
7. Install cover and tighten clamps (2).
8. In case the air filter restriction indicator lights soon after cleaning outer element (1) even if the cleaning times are less than 6 times, replace both outer and inner elements with new ones.

IMPORTANT: Do not install outer element (1) and/or the cover forcibly when installing the clamps. Failure to do so may result in deformation of clamps (2), element, and/or cover.



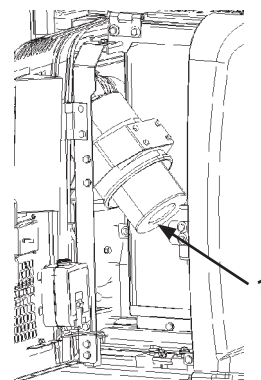
ZX135US-5B

MDCN-07-035



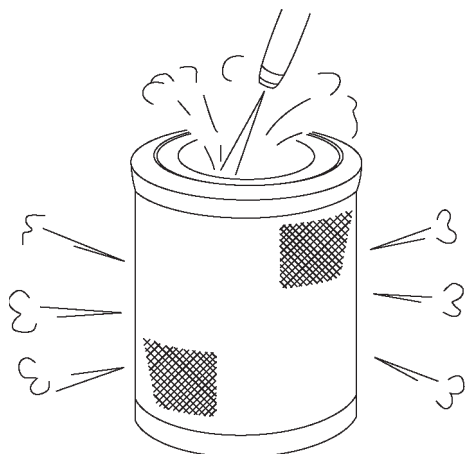
ZX225US-5B, 225USLC-5B

MDCN-07-036

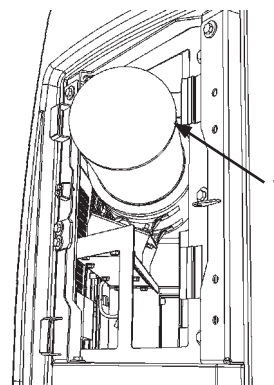


ZX135US-5B

MDCN-07-038



MJAE-07-059



ZX225US-5B, 225USLC-5B

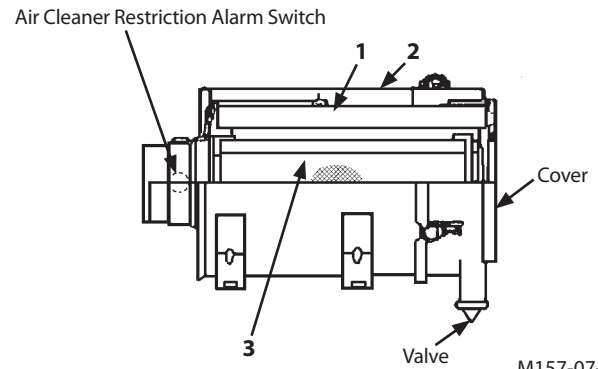
MDCN-07-039

MAINTENANCE

2 Replace Air Cleaner Element (Inner) Replace --- When outer element is replaced

IMPORTANT: Do not clean and reuse the inner element.

1. After removing outer element (1). Clean inside the air cleaner body (2) with clean cloth before removing inner element (3).
2. Remove inner element (3). Replace it with new one.



M157-07-061

MAINTENANCE

G. Cooling System

Coolant

IMPORTANT: Use soft water as a coolant. Do not use strong acid or alkaline water. Use the coolant with genuine Hitachi Long-Life Coolant (LLC) mixed by 30 to 50 %.

If a coolant mixed with less than 30 % of Hitachi Long-Life Coolant is used, service life of the cooling parts may be shortened due to damage by freezing or corrosion of coolant system parts.

Antifreeze Mixing Ratio

Air Temperature [°C]	Mixing Ratio [%]	ZX135US-5B		ZX225US-5B, 225USLC-5B	
		Antifreeze [L]	Soft water [L]	Antifreeze [L]	Soft water [L]
-1	30	6.0	14.0	7.8	18.2
-15	35	7.0	13.0	9.1	16.9
-20	40	8.0	12.0	10.4	15.6
-25	45	9.0	11.0	11.7	14.3
-30	50	10.0	10.0	13.0	13.0

Precautions for handling antifreeze

CAUTION: Antifreeze is poisonous.

- Antifreeze is poisonous; if ingested, it can cause serious injury or death. Induce vomiting and get emergency medical attention immediately.
- If antifreeze is accidentally splashed into eyes, flush with water for 10 to 15 minutes and get emergency medical attention.
- When storing antifreeze, be sure to keep it in a clearly marked container with a tight lid. Always keep ANTIFREEZE out of the reach of children.
- Use attention to fire hazards. LLC is specified as a dangerous substance in the fire protection law.
- When disposing of LLC, be sure to comply with all local regulations. When storing or disposing of antifreeze, be sure to comply with all local regulations.

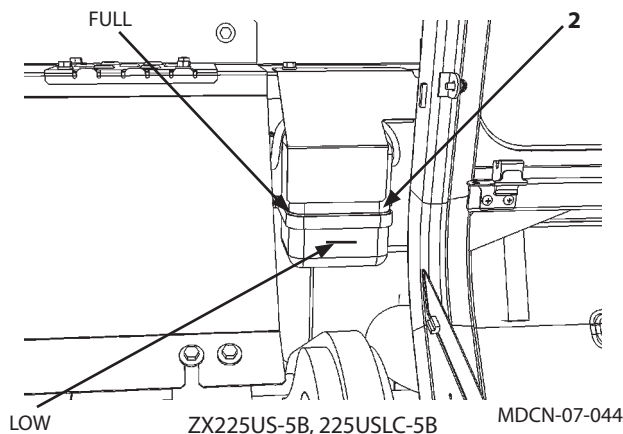
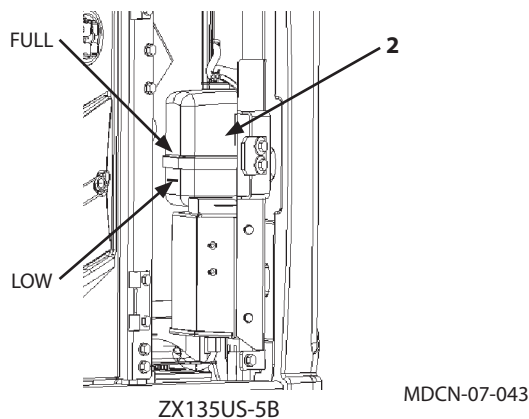
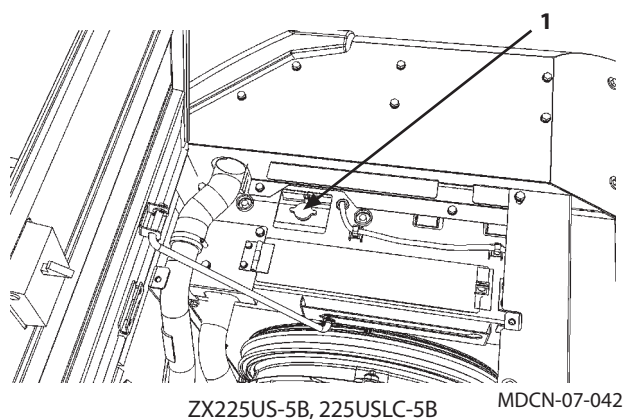
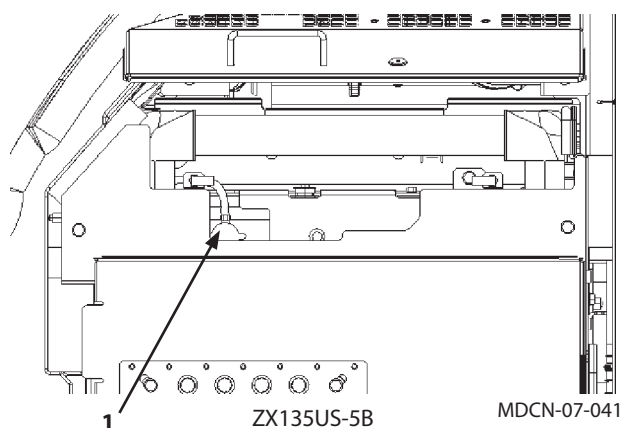
MAINTENANCE

1 Check Coolant Level --- daily

When the engine is cold, the coolant level must be between the FULL and LOW marks on coolant reservoir (2). If the coolant level is below the low mark, add coolant to coolant reservoir (2).

CAUTION: Do not remove cap (1) until the coolant temperature in the radiator becomes cool. Hot steam may spout out, possibly causing severe burns. After the coolant temperature has lowered, slowly loosen cap (1) to release the inside air pressure before removing cap (1).

If coolant reservoir (2) is empty, add coolant to the radiator and then to coolant reservoir (2).



MAINTENANCE

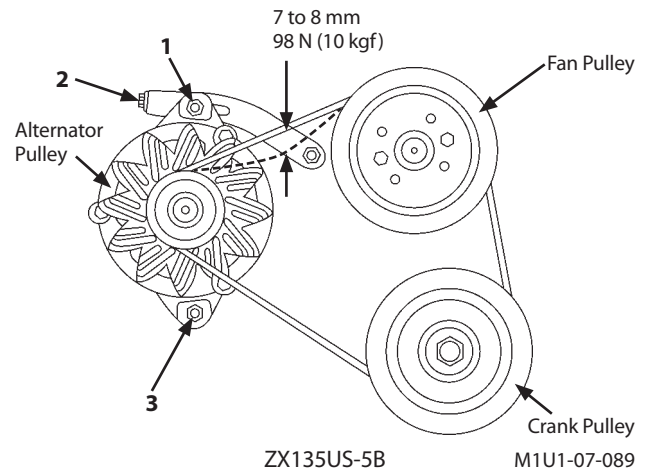
2 Check and Adjust Fan Belt Tension (ZX135US-5B)

--- every 250 hours (50 hours at first time only)

IMPORTANT: Loose fan belt may result in insufficient battery charging, engine overheating, as well as a rapid, abnormal belt wear. Belts that are too tight, however, can damage both bearings and belts.

Inspection

Check fan belt tension by depressing the midpoint between the fan pulley and the alternator pulley by your thumb with a depressing force of approximately 98 N (10 kgf). Deflection must be within the value illustrated in the right. Visually check the belt for wear. Replace if necessary.



Adjust Drive Belt Tension

1. Loosen lock nut (1) and alternator lower mounting bolt (3).
2. Rotate tension adjust bolt (2) to adjust the belt tension.
3. After completing adjustment, tighten lock nut (1) and alternator lower mounting bolt (3) to specifications.

Standard Tightening Torque:

Nut : 25 N·m (2.5 kgf·m)

Bolt : 52 N·m (5.2 kgf·m)

IMPORTANT: When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.

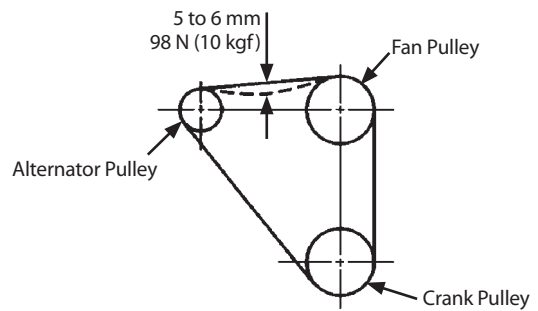
MAINTENANCE

- 2** Check and Adjust Fan Belt Tension
(ZX225US-5B, 225USLC-5B)
--- every 250 hours (first time after 50 hours)

IMPORTANT: Loose fan belt may result in insufficient battery charging, engine overheating, as well as premature belt wear. Belts that are too tight, however, can damage both bearings and belts.

Inspect

Check fan belt tension by depressing the midpoint between the fan pulley and the alternator pulley by your thumb with a depressing force of approximately 98 N (10 kgf). Deflection must be within the value illustrated in the right. Visually check the belt for wear. Replace if necessary.

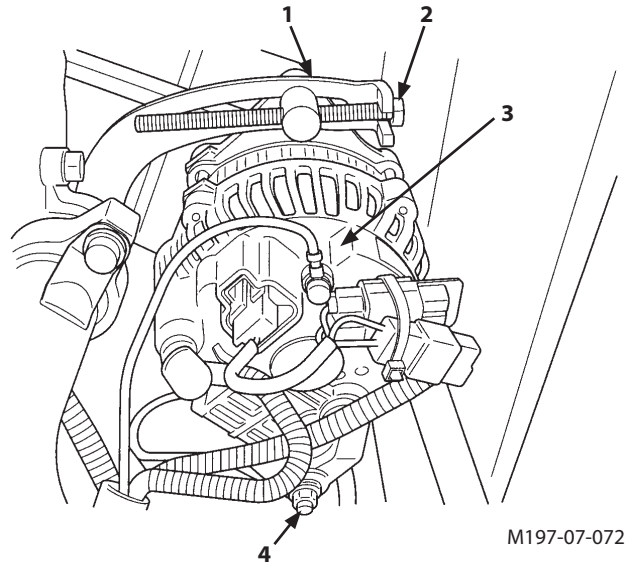


ZX225US-5B, 225USLC-5B M1GR-07-006

Adjust Drive Belt Tension

1. Loosen lock nut (1) at the top of alternator (3), and lock nut (4) at the bottom of alternator (3).
2. Adjust belt tension by moving alternator (3) forward or backward by using adjustment bolt (2).
3. Securely tighten lock nut (1) and (4).


IMPORTANT: When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.




M197-07-072

MAINTENANCE

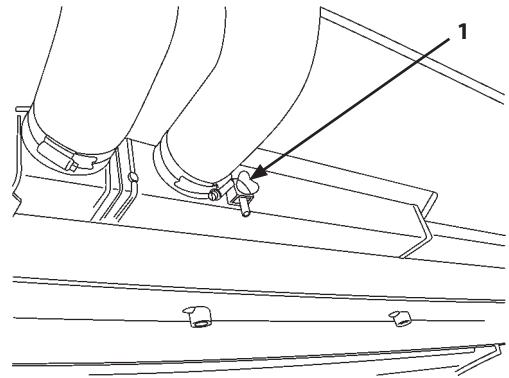
3 Change Coolant --- twice a year (in spring and autumn)

 **NOTE:** When genuine Hitachi Long-Life Coolant is used, change interval is once every two years (in autumn every other year) or every 4000 hours whichever comes first.

 **CAUTION:** Do not loosen the radiator cap until the system has cooled. Hot steam may spout out, possibly causing severe burns. Loosen the cap slowly to the stop. Release all pressure before removing the cap.

Procedure:

1. Park the machine on a solid level surface. Lower the bucket to the ground. Stop the engine.
2. Remove the under cover. Remove the radiator cap. Open drain cock (1) on the radiator to allow the coolant to drain completely. Remove impurities such as scale at the same time.
3. Close drain cock (1). Fill the radiator with soft water containing fewer impurities or tap water and a radiator cleaner agent. Run the engine at a speed slightly higher than slow idle for about 10 minutes until the coolant temperature gauge becomes horizontally.
4. Stop the engine and open radiator drain cock (1). Flush out the cooling system with tap water, until draining water is clear. This helps remove rust and sediment.



M1U1-07-029

MAINTENANCE

5. Close drain cock (1). Fill the radiator with tap water and LLC at the specified mixing ratio. When adding coolant, do so slowly to avoid mixing air bubbles in the system.

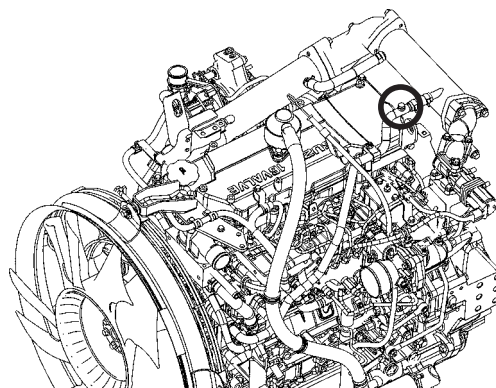
Run the engine to sufficiently bleed air from the cooling system.

It is necessary to bleed air from water lines of EGR.

Loosen the plug and bleed air.

6. After adding coolant, operate the engine for several minutes until the temperature gauge stabilizes. Check the coolant level again, and add coolant if necessary.

ZX135US-5B is not necessary to bleed air from water lines of EGR.



ZX225US-5B, 225USLC-5B

MDAA-07-099

MAINTENANCE

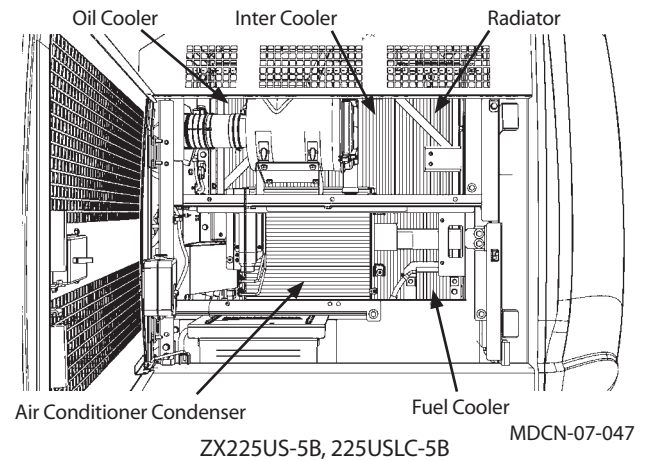
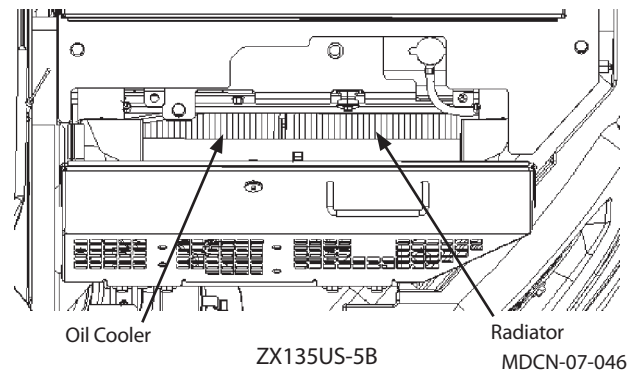
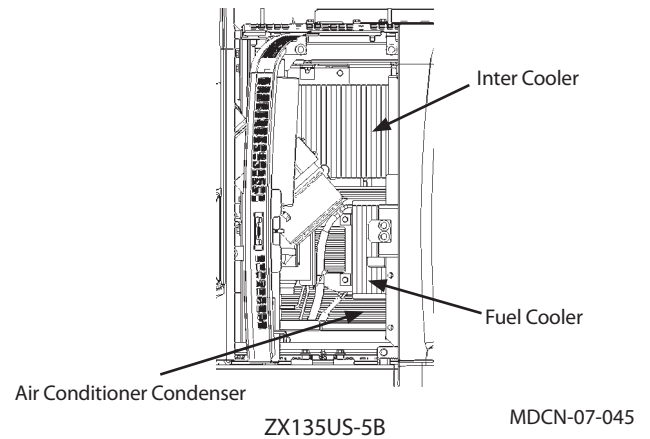
- 4** Clean Radiator/Oil Cooler/Inter Cooler Core
 Outside --- every 500 hours
 Inside --- once a year

CAUTION: Use reduced compressed air pressure (Less than 0.2 MPa, 2 kgf/cm²) for cleaning purposes. Wear personal protection equipment including eye protection.

IMPORTANT: If air with pressure of higher than 0.2 MPa (2 kgf/cm²) or tap water with high delivery pressure is used for cleaning, damage to the radiator/oil cooler/inter cooler fins may result.

The radiator and the oil cooler are arranged in parallel. The inter cooler is arranged in tandem.

If dirt or dust is accumulated on them, cooling system performance decreases. Clean the radiator/oil cooler/inter cooler cores with compressed air pressure (less than 0.2 MPa (2 kgf/cm²)) or tap water. It will prevent a reduction in cooling system performance.



MAINTENANCE

WARNING:

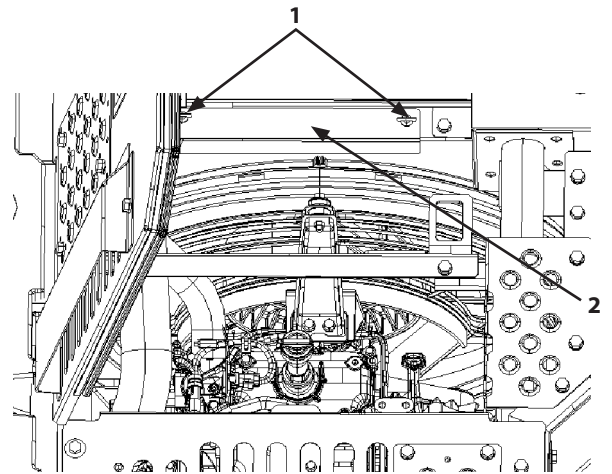
- Entanglement in moving parts can cause serious injury.
- Before servicing, stop the engine and the fan to prevent any accident.
- Never attempt to start the engine when the cover is open.
- In case tools or parts are dropped into the radiator/oil cooler/inter cooler core, remove them before starting the engine.

Twist screw (1) to open cover (2) and perform cleaning.

Take care not to break the fin during clean operation.

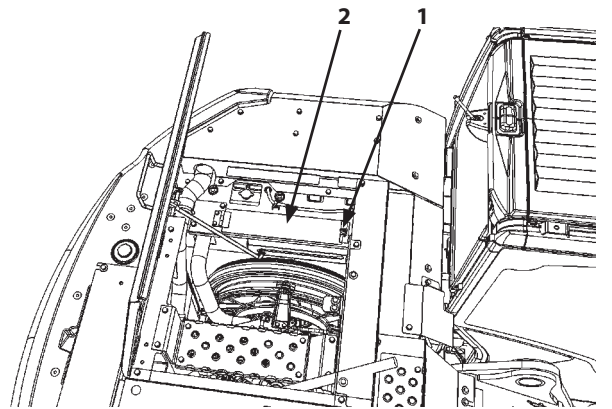
Close cover (2) and tighten screw (1) after cleaning.

IMPORTANT: Check the core periodically and replace it if necessary when the machine is operated in dusty areas.



ZX135US-5B

MDCN-07-014



ZX225US-5B, 225USLC-5B

MDCN-07-048

MAINTENANCE

5 Clean Oil Cooler, Radiator and Inter Cooler Front Screen

--- every 500 hours

IMPORTANT: Check the screen daily and replace it if necessary when the machine is operated in dusty areas.

Pull the clip lever on the screen to remove the screen.

Insert the clip into the cover hole and turn over the clip lever to hold the screen.

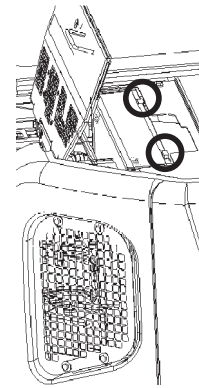
The screen can not be held properly if the clip nut is too tight or loose. Adjust the tightening torque of the clip nut to hold the screen.

For rough indication of the tightening torque, refer to the below.

Tightening Torque: 0.5 N·m

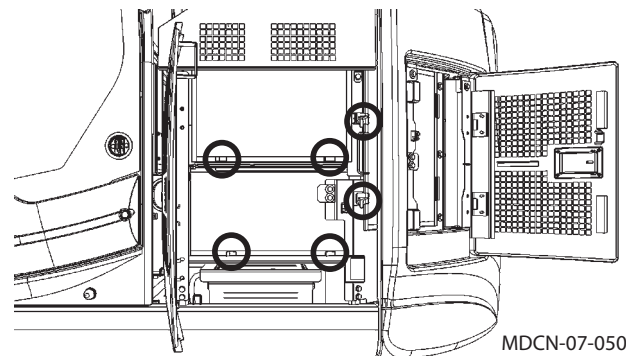
or

A: 23 ± 0.5 mm



ZX135US-5B

MDCN-07-049



ZX225US-5B, 225USLC-5B

MDCN-07-050

6 Clean Air Conditioner Condenser

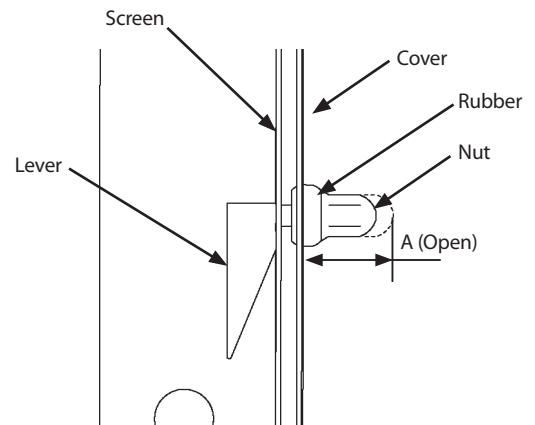
--- every 500 hours

IMPORTANT: Check the screen daily and replace it if necessary when the machine is operated in dusty areas.

7 Clean Fuel Oil Cooler

--- every 500 hours

IMPORTANT: Check the screen daily and replace it if necessary when the machine is operated in dusty areas.



MDCS-07-003

MAINTENANCE

H. Electrical System

IMPORTANT:

- **Improper radio communication equipment and associated parts, and/or improper installation of radio communication equipment affects the machine's electronic parts, causing involuntary movement of the machine.**
- **Also, improper installation of electrical equipment may cause machine failure and/or a fire on the machine.**
- **Be sure to consult your authorized dealer when installing radio communication equipment or additional electrical parts, or when replacing electrical parts.**
- **Never attempt to disassemble or modify the electrical/electronic components. If replacement or modification of such components is required, contact your authorized dealer.**

MAINTENANCE


1 Battery

⚠ WARNING:

- Battery gas can explode. Keep sparks and flames away from batteries.
- Do not leave cover (1) removed. Do not keep tools, metals or flammable materials around the battery or inside the battery room. If a metal tool is placed across the battery terminal and a vehicle component such as the engine block, sparks may be created, possibly resulting in fire and/or explosion.
- Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
- Charge the batteries in a well ventilated location.
- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes. Wearing eye protection and rubber gloves.

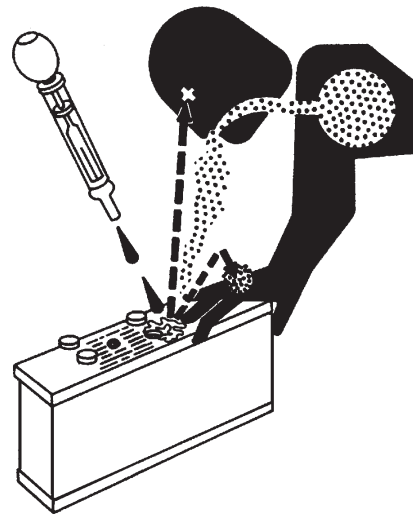
IMPORTANT:

- If the battery is used with the electrolyte level lower than the specified lower level, the battery may deteriorate quickly.
- Do not refill electrolyte more than the specified upper level. Electrolyte may spill, damaging the painted surfaces and/or corroding other machine parts.

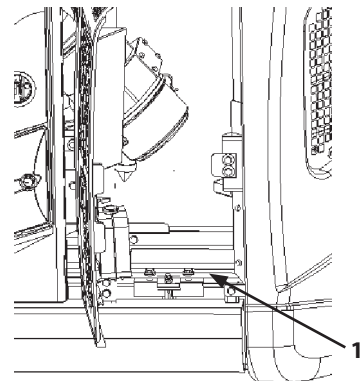
 **NOTE:** In case electrolyte is refilled more than the specified upper level line or beyond the bottom end of the sleeve, remove the excess electrolyte until the electrolyte level is down to the bottom end of the sleeve using a pipette. After neutralizing the removed electrolyte with sodium bicarbonate, flush it with plenty of water, otherwise, consult the battery manufacturer.



SA-032

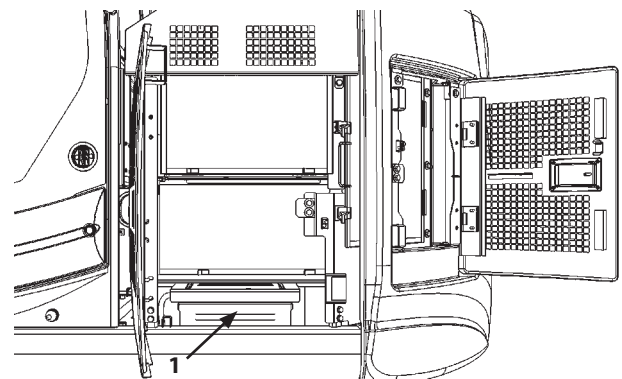


SA-036



ZX135US-5B
Batteries Location

MDCN-07-052



ZX225US-5B, 225USLC-5B
Batteries Location

MDCN-07-053

MAINTENANCE

Precautions for Handling Batteries

- If electrolyte spills on your skin and/or clothes, immediately flush the skin and/or clothes with water and then wash further with soap.
If splashed in eyes, flush with water for approximately 15 minutes and seek immediate medical attention.
- Avoid using fire hazards such as matches lighters and tobacco near the batteries. Do not allow sparks to fly.
- Check or service the battery only after stopping the engine, turning the key OFF and removing the battery caps.
- Contact with the battery immediately after operation may cause personal injury.
Wait for the battery to cool.
- When the battery is recharged, inflammable hydrogen gas is created. Remove the battery from the base machine. Recharge the battery after removing the caps in a well ventilated area.
- When disconnecting the battery terminals, first disconnect the battery minus (-) side terminal. When connecting the battery terminals, connect the battery minus (-) side terminal last. If a piece of metal, such as a tool comes in contact with the battery plus (+) side terminal and the vehicle frame when both terminals are connected, the electrical system may short-circuit, possibly creating a dangerous situation.
- If a new battery is used along with an old battery, the service life of the new battery may be shortened. Replace two batteries at one time. Using old battery together with new battery may shorten the new battery life time.
- Loose terminal may allow sparks to fly. Securely tighten the terminals.

MAINTENANCE

Electrolyte Level Check --- every one month

Check the electrolyte level at least once a month.

1. Park the machine on level ground and stop the engine.
2. Check the electrolyte level.
 - 2.1 When checking the level from the battery side:

Clean around the level check lines with a wet towel. Do not use a dry towel. Static electricity may be developed, causing the battery gas to explode. Check if the electrolyte level is between U.L (Upper Level) and L.L (Lower Level).

In case the electrolyte level is lower than the middle level between the U.L and L.L, immediately refill with distilled water or commercial battery fluid.

After refilling, securely tighten the filler plug.

Be sure to refill with distilled water before recharging (operating the machine).

- 2.2 When impossible to check the level from the battery side or no level check mark is indicated on the side:

After removing the filler plug from the top of the battery. Check the electrolyte level by viewing through the filler port. It is difficult to judge the accurate electrolyte level in this case. Therefore, when the electrolyte level is flush with the U.L, the level is judged to be proper. Then, referring to the right illustrations, check the level. When the electrolyte level is lower than the bottom end of the sleeve, refill with distilled water or commercial battery fluid up to the bottom end of the sleeve.

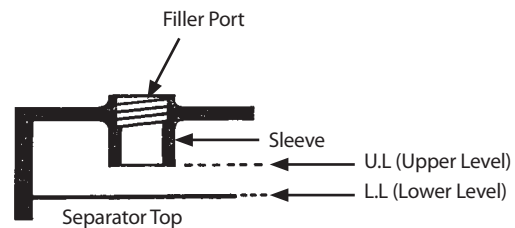
After refilling, securely tighten the filler plug.

Be sure to refill with distilled water before recharging (operating the machine).

- 2.3 When an indicator is available to check the level, follow the checking results.



M146-07-109



M146-07-110

Proper



Since the electrolyte surface touches the bottom end of the sleeve, the electrolyte surface is raised due to surface tension so that the electrode ends are seen curved.

M146-07-111

Lower



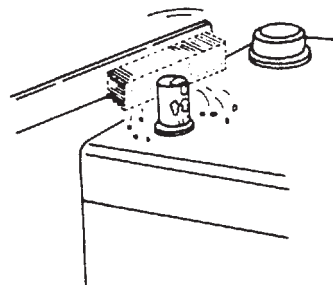
When the electrolyte surface is lower than the bottom end of the sleeve, the electrode ends are seen straight.

M146-07-112

MAINTENANCE

3. Always keep around the battery terminals clean to prevent battery discharge. Check terminals for loose and/or rust.

Coat terminals with grease or petroleum jelly to prevent corrosion build up.



M409-07-072

Replace Battery

IMPORTANT: Turn the battery disconnect switch to OFF before replacing the battery.

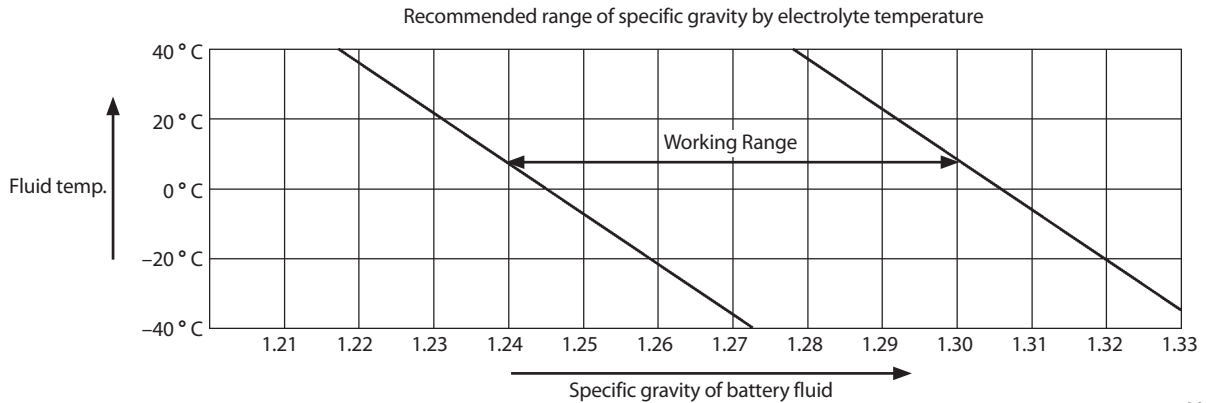
This machine is equipped with two 12V batteries. Negative terminal is connected to the ground.

If one battery is damaged on the 24V system, replace the damaged battery with the same type of new battery. If a maintenance free battery is damaged, replace it with new maintenance free battery. Battery charger differs depending on the type of battery. If improper battery is connected, the battery is overloaded and possibly resulting in malfunction.


MAINTENANCE

Check electrolyte specific gravity --- every one month

The electrolyte specific gravity varies depending on the electrolyte temperature. The specific gravity should be kept within the range shown below. Charge the battery if the specific gravity is below the limit.



M104-07-054

 **NOTE:** Measure the electrolyte specific gravity when the electrolyte temperature is equal to the atmospheric temperature. Do not check the electrolyte specific gravity immediately after operation as the correct value can not be obtained.

MAINTENANCE

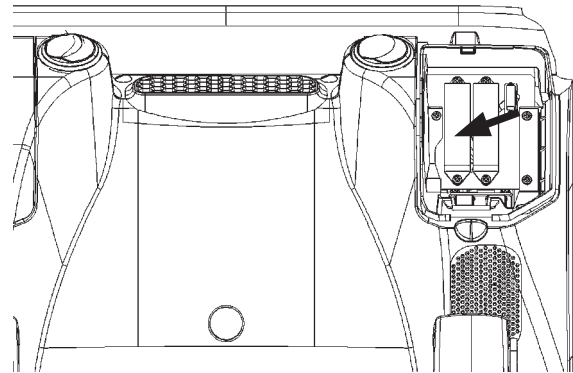
2 Replacing Fuses --- as necessary

If any electrical part or component ceases to function, check its fuse first. The fuse box is located behind the operator's seat.

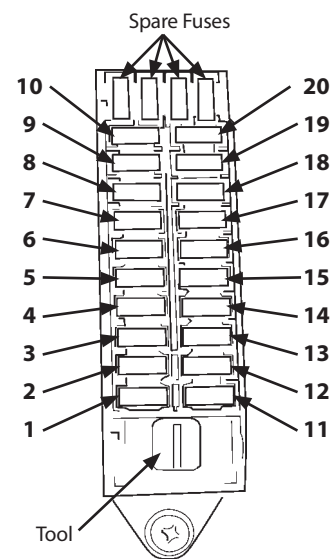
 **NOTE:**

- One spare fuse for each capacity is provided in the fuse box.
- A special tool for fuse removal is also provided in the fuse box.

10- CONTROLLER 5 A	20- OPTION3 5 A
9- BACK UP 10 A	19- HORN 10 A
8- ECM 30 A	18- IDLE STOP 5 A
7- START 5 A	17- POWER ON 5 A
6- OPTION2 20 A	16- GLOW RELAY 5 A
5- OPTION1 5 A	15- AUXILIARY 10 A
4- SOLENOID 20 A	14- MONITOR 5 A
3- HEATER 20 A	13- LIGHTER 10 A
2- WIPER 10 A	12- RADIO 5 A
1- LAMP 20 A	11- FUEL PUMP 5 A



MDCN-01-010



M1GR-01-003

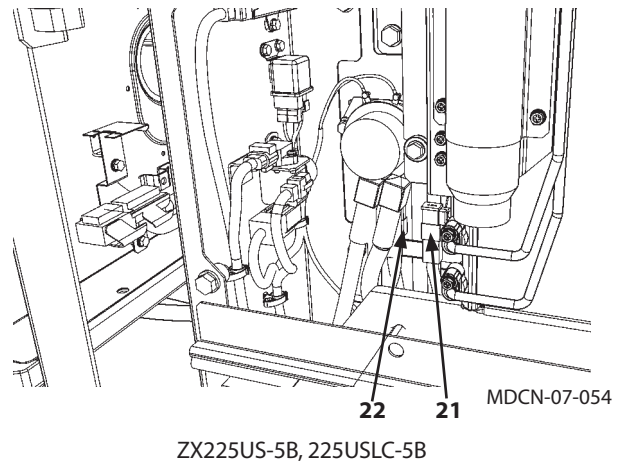
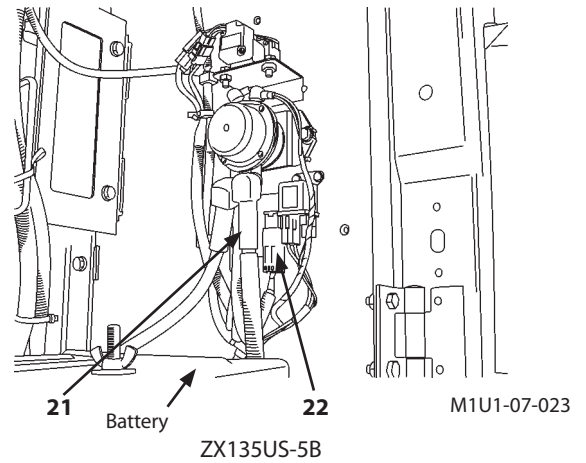
MAINTENANCE

- Fusible Link (Main Fuse)

In case the starter won't rotate even if the key switch is turned to the START position, fusible link may be the cause of the trouble. Remove the cover next to the engine coolant reservoir to check the fuse. Replace it if blown.

21- + Side (Red)
45 A

22- - Side (Black)
65 A



MAINTENANCE

I. Miscellaneous

1 Check and Replace Bucket Teeth --- daily

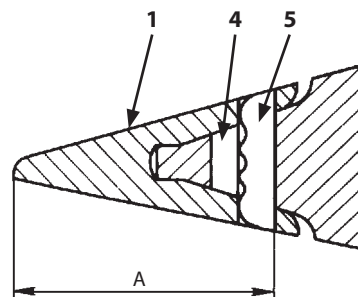
Check bucket teeth (1) for wear and looseness. Replace teeth (1) if tooth wear exceeds the designated service limit shown below.

Model	A (mm)	
	New	Limit of Use
ZX135US-5B	166	85
ZX225US-5B, 225USLC-5B	200	95

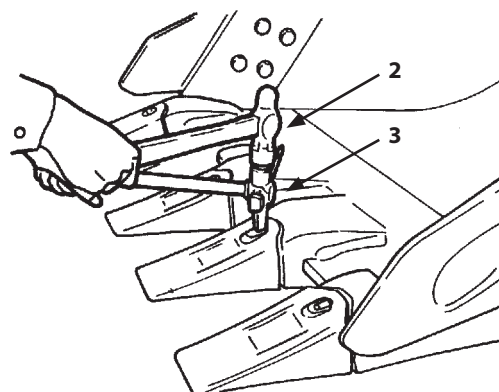
Replace

⚠ CAUTION:

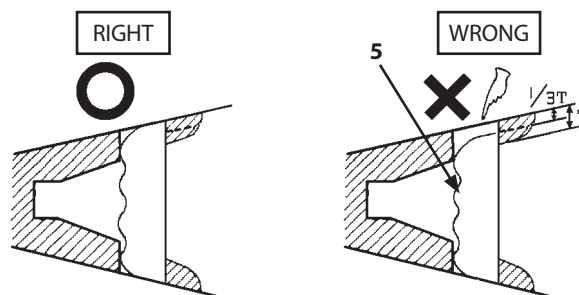
- Guard against injury from flying pieces of metal.
 - Wear goggles or safety glasses, and safety equipment appropriate to the job.
1. Use hammer (2) and drift (3) to drive out locking pin (5). Take care not to damage lock rubber (4).
 2. Check lock pin (5) and lock rubber (4). Short locking pins and damaged rubber pin locks must be replaced with new ones.



M104-07-056



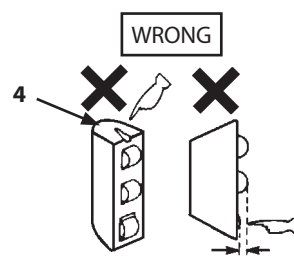
M104-07-116



Flush one end of the locking pin to evaluate. In this instance, the locking pin is too short.

M104-07-118

M104-07-058



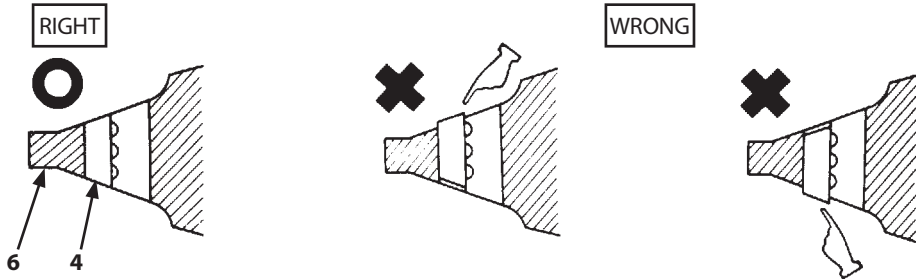
Crack on the rubber. The steel ball may come out.

The steel ball dents when pushing the ball.

M104-07-059

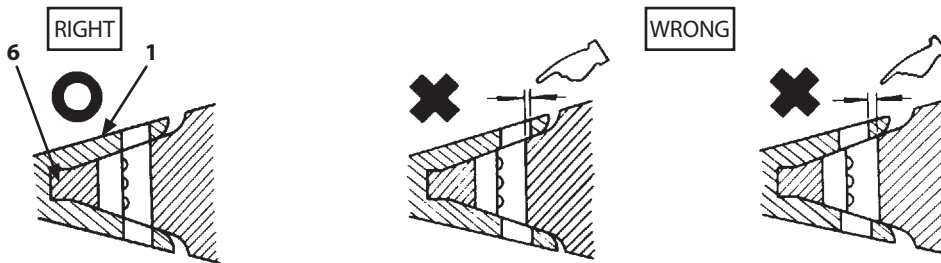
MAINTENANCE

- Clean shank (6) surface.
- Install rubber pin lock (4) into shank (6) hole as shown.



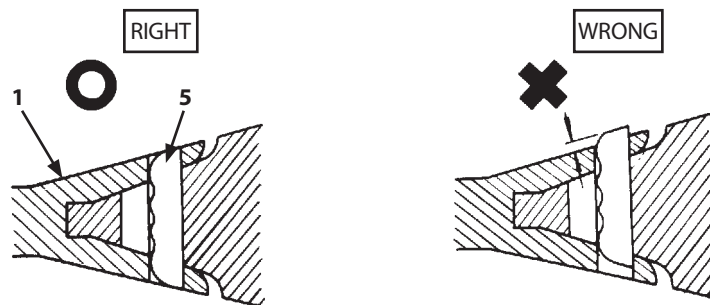
M104-07-060

- Position new tooth (1) over shank (6).



M104-07-061

- Drive locking pin (5) fully into the hole as shown.



M104-07-062

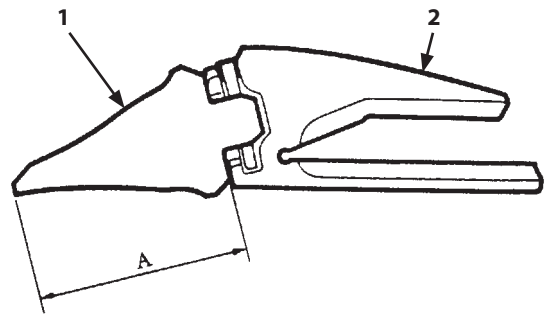
MAINTENANCE

Check Bucket Teeth for Super V Type Bucket Teeth (ZX225US-5B, 225USLC-5B)

--- **daily**

Check bucket teeth (1) for wear and looseness.
When tooth points (1) wear beyond the service limit, replace them.

		Parts No.	New	Limit of Use
A (mm)	0.8 m ³ Reinforced Hoe Bucket with Super V type Bucket Teeth	4400250	232	99



M116-07-124

NOTE: When tooth point (1) is used in excess of the service limit, a hole will be made on the tooth point, which makes the nose exposed and worn out, and will eventually break or let the tooth point fall off.

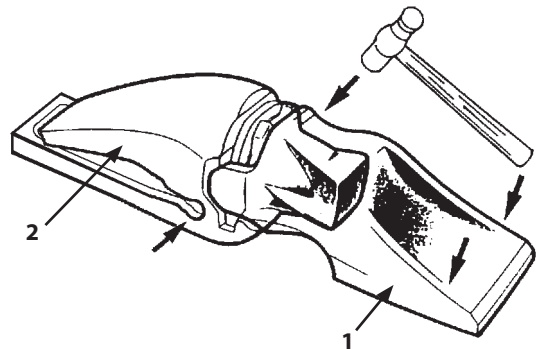
CAUTION: Guard against injury from flying pieces of metal. Wear goggles or safety glasses, and safety equipment appropriate to the job.

Procedures:

Removing the tooth point

1. Preparations for removing tooth point

Hit the left and right top ends and the left and right lugs of tooth point (1) alternately with hammer to knock off pebbles, soil, etc., stuck in the gap between tooth point (1) and adapter (2).



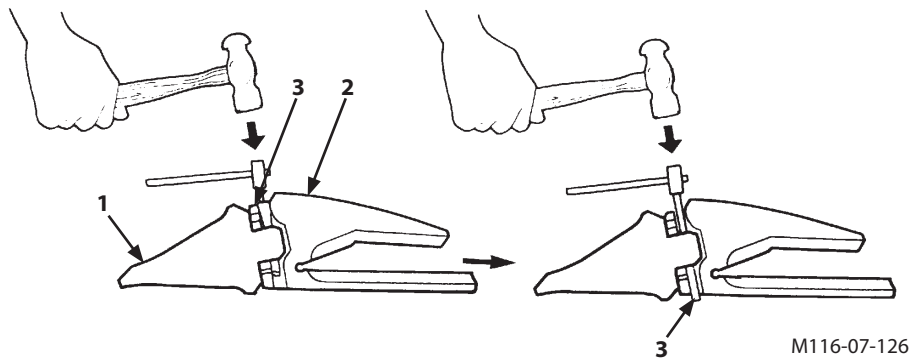
M116-07-125

MAINTENANCE

2. Driving out locking pin

Remove pebbles, dirt, etc., completely from the gap between lock pin (3) and adapter (2). Place pin-removing jig on the top end of lock pin (3) and hit it with hammer to remove lock pin (3).

When driving out the pin, first hit with a shorter jig until top end of lock pin (3) comes to the upper end position of the lug of tooth point (1), and then use the longer jig to remove lock pin (3).



M116-07-126

MAINTENANCE

3. Removing the tooth point

Turn tooth point (1) to the left, twist and pull it toward you to remove it.

IMPORTANT: Check if lock pin (3) has cracks. If it has, replace the rubber with new one. While the pin and plug can withstand several replacements of the tooth point, be sure to check whether they are usable or not when replacing tooth point (1).

Mounting the tooth point

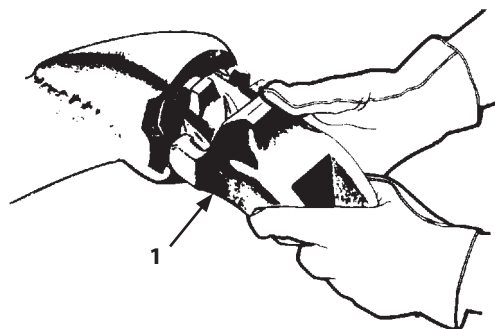
1. Mounting the tooth point

Clean the top end of the adapter nose.

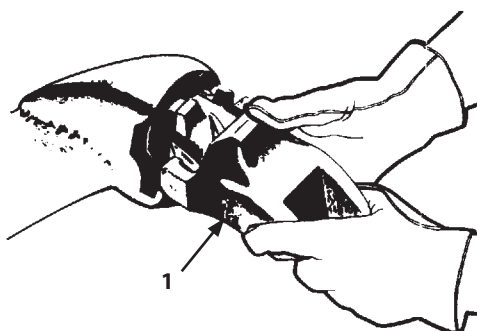
Also check that lock pin (3) has no cracks.

If pebbles, dirt, etc., are stuck to the adapter nose, tooth point (1) will not insert properly and the pin cannot be driven in.

Insert tooth point (1) slowly until the tooth point comes to the end of the adapter nose while twisting and turning it to the right.



M113-07-078



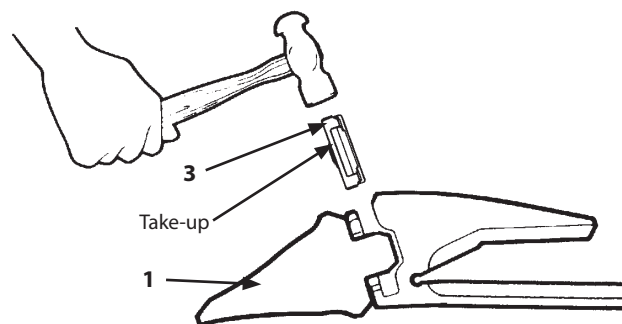
M113-07-080

2. Inserting the pin

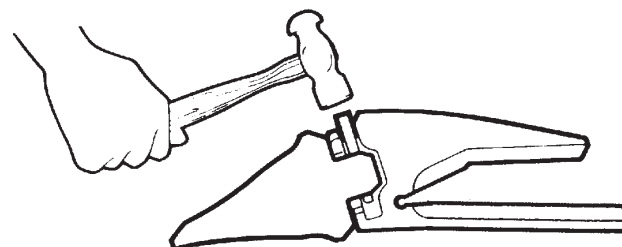
Insert lock pin (3) with take-up facing toward the adapter nose.

With tooth point (1) fully inserted onto adapter (2), tap lock pin (3) into tooth point (1) with a hammer until the top of lock pin (3) comes flat with the nose surface. (i.e. until the take-up on lock pin (3) fits into the grooves of tooth point (1).)

(i.e. until the take-up on lock pin (3) fits into the grooves of tooth point (1).)



M173-07-001



M116-07-128

MAINTENANCE

Other Precautions

1. Since rubber is susceptible to corrosion, do not use grease, oil and other oily materials when inserting the lock pin.
2. In mounting welding-type nose and the adapter onto the bucket, lock pin (3) should be removed from the nose when preheating and welding. Otherwise the rubber will be spoiled.

MAINTENANCE

2 Change Bucket

CAUTION: When driving the connecting pins in or out, guard against injury from flying pieces of metal or debris. Wear goggles or safety glasses, hard hat and face shield.

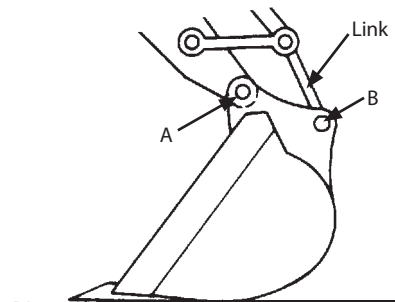
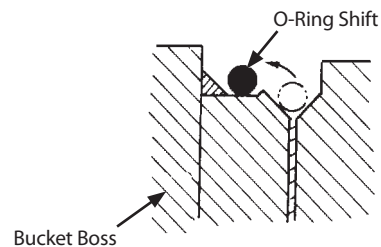
Before starting converting work, keep bystanders clear of the machine. Slowly move the front attachment. When using a signal person, coordinate hand signals before starting.

Removal

1. Place the bucket in a stable position.
2. Slide the O-rings out of the way, as shown.
3. Remove bucket pins A and B to separate the arm and bucket.

Installation

1. Clean the pins and pin bores. Apply sufficient grease to the pins and pin bores.
2. Place the new bucket in stable position as shown in the figure.
3. Fit the arm and alternate bucket. Be sure the bucket will not roll. Install bucket pins A and B.
4. Install the locking pins and snap rings on pins A and B.
5. Install O-rings to the specified positions.
6. Apply grease to each pin.
7. Start the engine and run at slow idle. Slowly operate the bucket in both directions to check for any interference in bucket movement.



M104-07-063

MAINTENANCE

3 Convert Bucket Connection Into Face Shovel

CAUTION: When driving the connecting pins in or out, guard against injury from flying pieces of metal or debris. Wear goggles or safety glasses, hard hat and face shield.

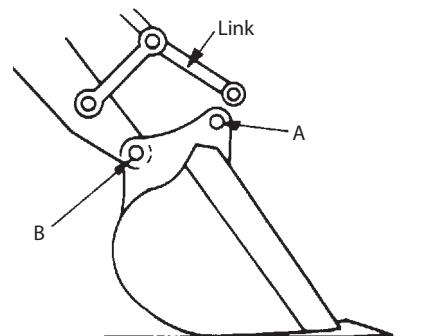
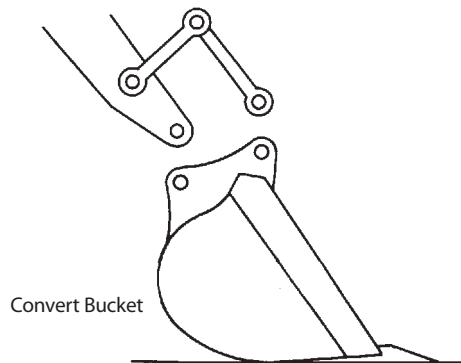
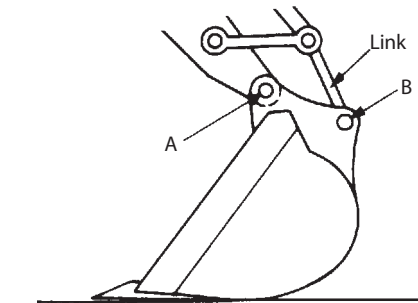
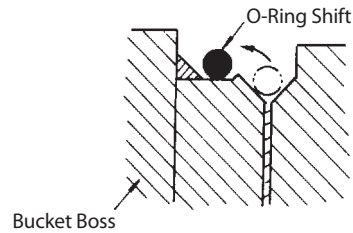
Converting the bucket connection allows you to use the machine as a face shovel. Before starting converting work, keep bystanders clear of the machine. Slowly move the front attachment. When using a signal person, coordinate hand signals before starting.

Procedure:

1. Place the bucket in a stable position.
2. Slide the O-rings out of the way, as shown.
3. Remove bucket pins A and B to separate the arm and bucket.

Clean the pins and pin bores. Apply sufficient grease to the pins and pin bores.

4. Turn the bucket 180°. Be sure the bucket will not roll.
5. Fit the arm and alternate bucket. Be sure the bucket will not roll. Install bucket pins A and B.
6. Install the locking pins and snap rings on pins A and B.
7. Install O-rings to the specified positions.
8. Apply grease to each pin.
9. Start the engine and run at slow idle. Slowly operate the bucket in both directions to check for any interference in bucket movement.




M104-07-064

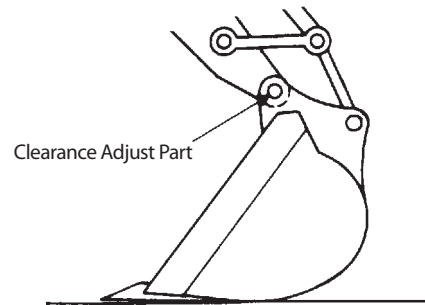
MAINTENANCE

4 Adjust Bucket Linkage

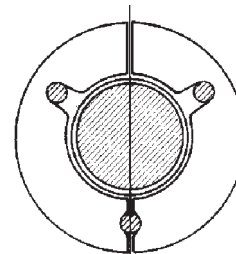
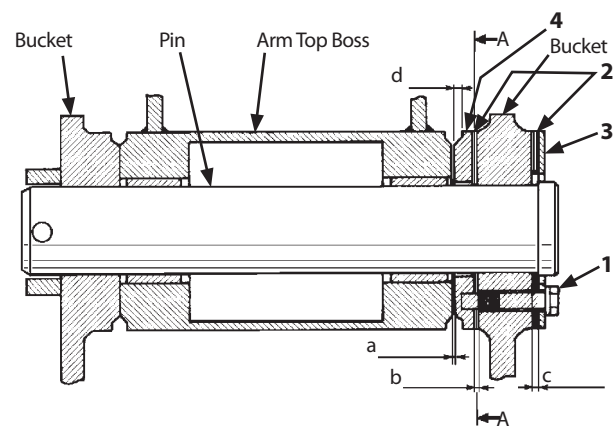
The machine is provided with a bucket adjustment system to take up play in the linkage. When play in the linkage increases, remove and install shims as follows:

1. Place the bucket in a stable position.
2. Run the engine at slow idle. With the bucket on the ground, slowly swing counterclockwise slightly until the top of the left bucket boss contacts the arm.
3. Stop the engine. Pull the pilot control shut-off lever to the LOCK position.
4. Slightly loosen three bolts (1) using a 22 mm wrench. Remove all shims (2) from clearance (c) between plate (3) and bucket. As shim (2) is a dual partitioning type, it can be easily removed by slightly loosening bolt (1) and inserting tip of a screw driver into the contact surface of left and right shims (2).
5. Push and hold bolts (1) to remove all clearance (a) between arm and boss (4). Holding boss (4) against arm increases clearance (b). Install as many shims (2) into clearance (b) as possible.
6. Install remaining shims (2) into clearance (c) and tighten bolts (1) to 140 N·m (14 kgf·m).

 **NOTE:** The total number of shims (2) used in clearance (b) and (c) are $6 \times 2 = 12$. Remaining shims (2) must be installed in clearance (c) to prevent arm end face or bolt damage. Replace boss (4) with new one if measurement (d) is 5 mm or less.



M503-07-056



Section A

M1G6-07-010

MAINTENANCE

5 Remove Travel Levers

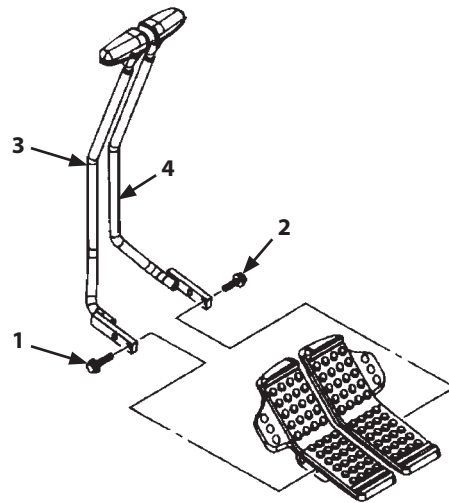
The travel levers may be removed if desired.

Procedure:

Remove bolts (1) and (2) to remove travel levers (3) and (4) from brackets.

 **NOTE:** Wrench size: 17 mm

Tightening Torque: 50 N·m (5 kgf·m)



M178-07-077

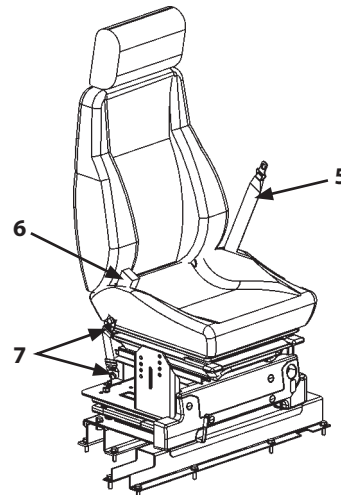
6 Check and Replace Seat Belt

Check --- daily

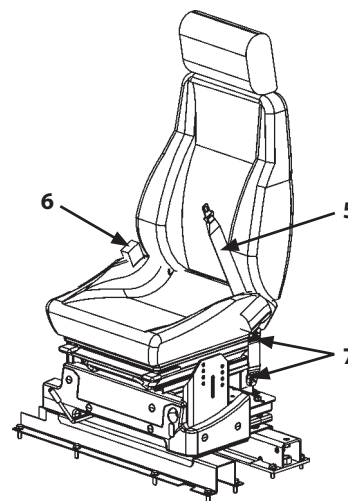
Replace --- every 3 years

Prior to operating the machine, thoroughly examine belt (5), buckle (6) and attaching hardware (7). If any item is damaged or materially worn, replace the seat belt or component before operating the machine.

We recommend that the seat belt be replaced every three years regardless of its apparent condition.



M1U1-07-008

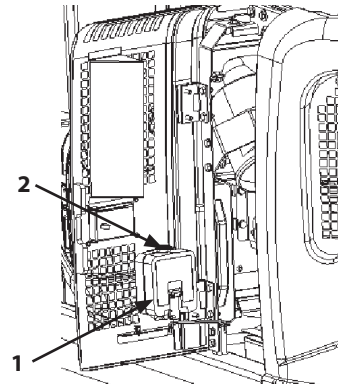


M1U1-07-009

MAINTENANCE

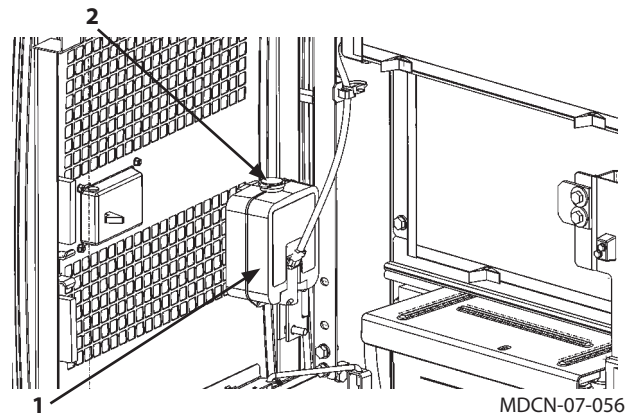
7 Check Windshield Fluid Level

Check fluid in windshield washer tank (1). If the fluid level is low, remove cap (2) and add fluid via the opening.



ZX135US-5B

MDCN-07-009



ZX225US-5B, 225USLC-5B

MDCN-07-056

MAINTENANCE

8 Check Track Sag --- every 50 hours

Swing the upperstructure 90 ° and lower the bucket to raise the track off the ground as shown. Measure distance (A) at the middle of the track frame from the bottom of the track frame to the back face of the track shoe.

Each time, be sure to place blocks under the machine frame to support the machine.

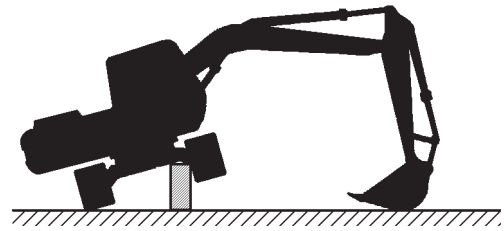
CAUTION: To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

Model	Appropriate sag A (mm)
ZX135US-5B	250 to 280
ZX225US-5B, 225USLC-5B	300 to 335

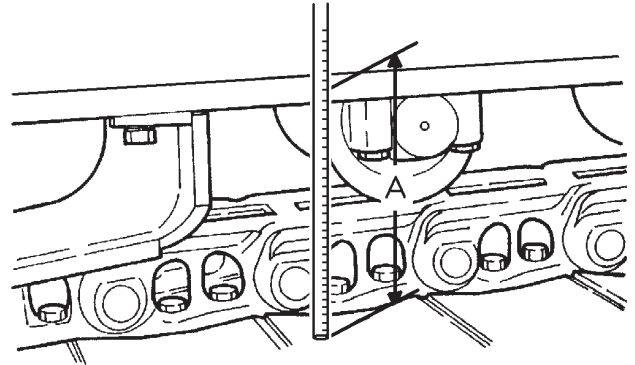
NOTE: Check track sag after thoroughly removing soil stuck on the track area by washing.

Adjust Track Sag

1. If track sag is not within specifications, loosen or tighten the track following the procedures shown on the next page.
2. When adjusting track sag, lower the bucket to the ground to raise one track off the ground. Repeat this procedure to raise the other track. Each time, be sure to place blocks under the machine frame to support the machine. To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.
3. After adjusting both side track sags, rotate the tracks backward and forward to equalize both side track sags.
4. Recheck the track sag once more. Readjust as necessary.



M104-07-067

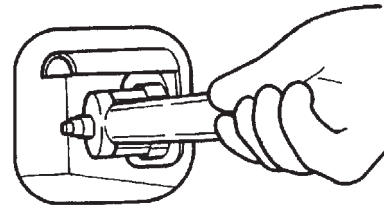


M107-07-068

MAINTENANCE

Loosen the Track (ZX135US-5B)

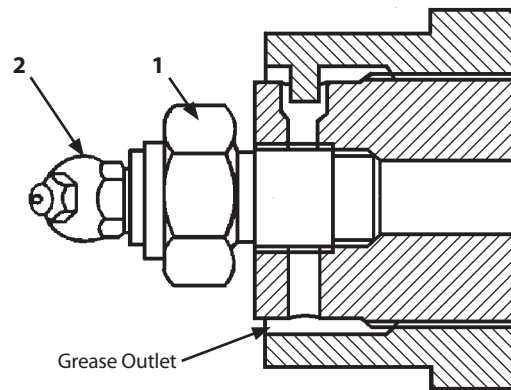
CAUTION: The pressure inside the cylinder of the track adjuster is high. Do not loosen valve (1) quickly or loosen it too much as valve (1) may fly out or high-pressure grease in the adjusting cylinder may spout out. Slowly loosen valve (1) while keeping body parts and face away from valve (1). Never loosen grease fitting (2).



M107-07-075

IMPORTANT: When gravel or mud is packed between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 24; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track.
3. If grease does not drain smoothly, slowly rotate the raised track.
4. When proper track sag is obtained, turn valve (1) clockwise and tighten to 90 N·m (9 kgf·m, 67 lbf·ft).



M104-07-119

Tighten the Track

CAUTION: It is abnormal if the track remains tight after turning valve (1) counterclockwise or if the track is still loose after charging grease to fitting (2). In such cases, NEVER ATTEMPT TO DISASSEMBLE the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.

MAINTENANCE

Loosen the Track (ZX225US-5B, 225USLC-5B)

CAUTION: The pressure inside the cylinder of the track adjuster is high. Do not loosen valve (1) quickly or loosen it too much as valve (1) may fly out or high-pressure grease in the adjusting cylinder may spout out. Slowly loosen valve (1) while keeping body parts and face away from valve (1). Never loosen grease fitting (2).

IMPORTANT: When gravel or mud is packed between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 24; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track. When valve (1) comes in contact with stop plate (3), do not loosen valve (1) further.
3. If grease does not drain smoothly, slowly rotate the raised track.

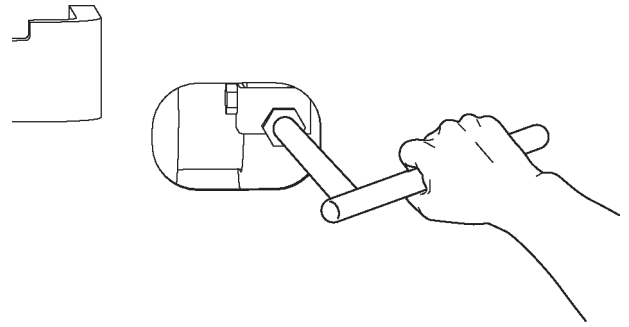
CAUTION: To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

4. When proper track sag is obtained, turn valve (1) clockwise to the original condition.

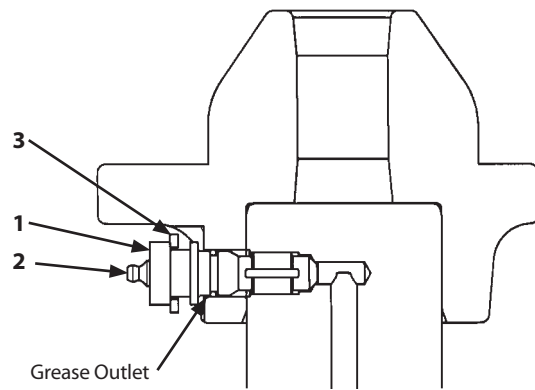
Tightening Torque: 90 N·m (9 kgf·m)

Do not remove valve stop plate (3). Do not loosen bolt (4) while adjusting the track sag.

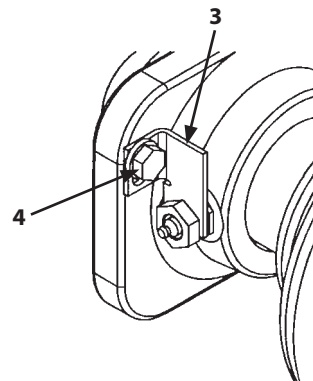
CAUTION: Consult your authorized dealer if grease is not sufficiently drained.



MDAA-07-013



MDAA-07-014



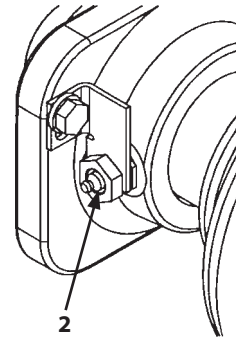
MDAA-07-057

MAINTENANCE

Tighten the Track

⚠ CAUTION: It is abnormal if the track can not be adjusted. The strong force acts on the spring in track adjuster. Therefore, the grease in the cylinder is highly pressurized. In such cases, **NEVER ATTEMPT TO DISASSEMBLE** the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.



MDAA-07-057

MAINTENANCE

9 Clean and Replace Air Conditioner Filter

Clean Circulating/Fresh Air Filters

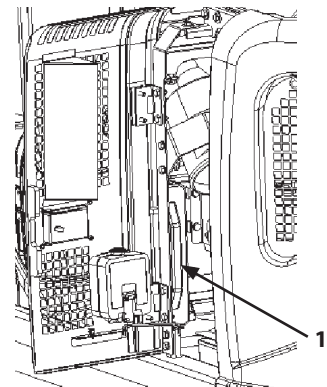
Circulating Air Filter --- every 500 hours

Fresh Air Filter --- every 500 hours

Replace Circulating/Fresh Air Filters

Circulating Air Filter --- After cleaning 6 times or so

Fresh Air Filter --- After cleaning 6 times or so

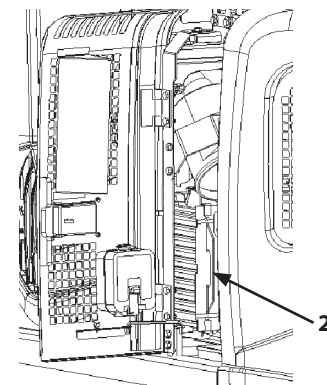


ZX135US-5B

MDCN-07-009

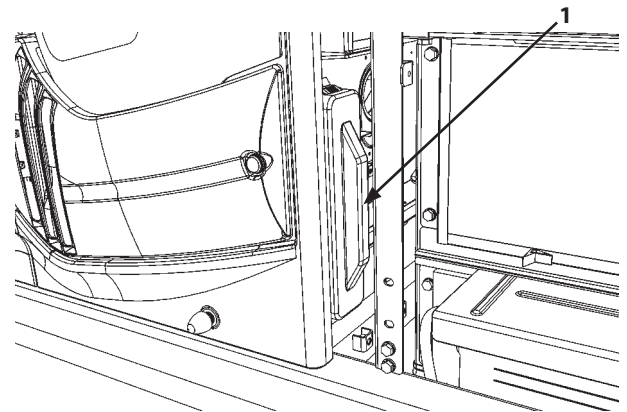
Removing Fresh Air Filter

1. Grasp the upper section of filter cover (1) and pull to remove filter cover (1).
2. Grasp the grip on fresh air filter (2) through the opening from which filter cover (1) is removed and pull to remove fresh air filter (2).



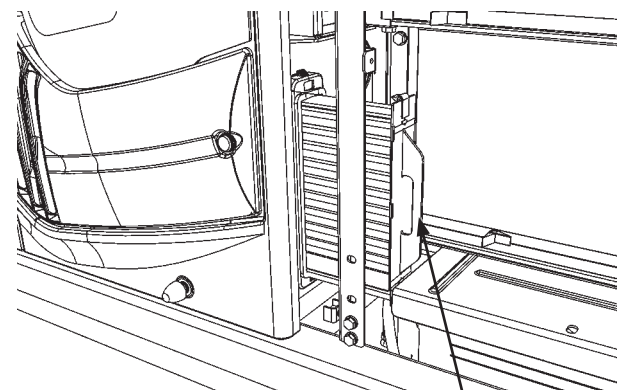
ZX135US-5B

MDCN-07-057



ZX225US-5B, 225USLC-5B

MDCN-07-058



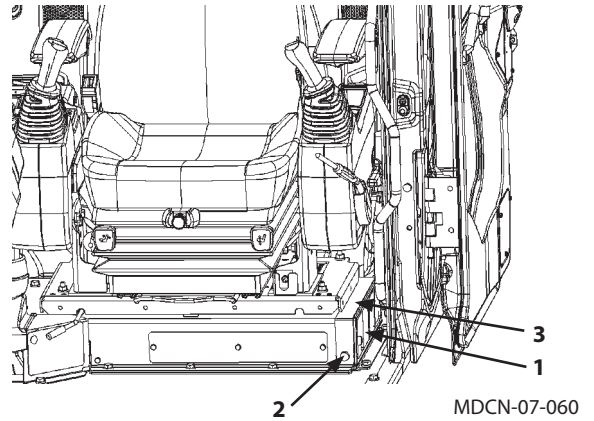
ZX225US-5B, 225USLC-5B

MDCN-07-059

MAINTENANCE

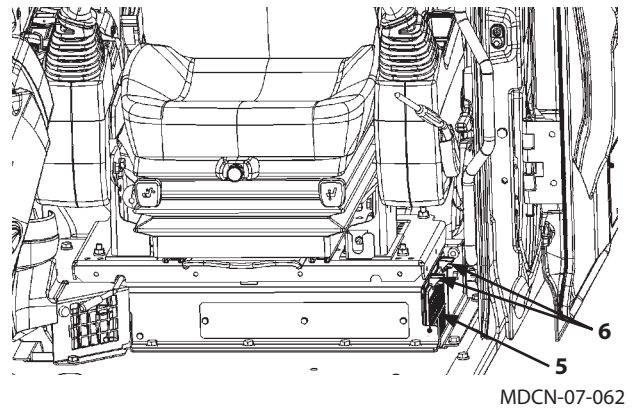
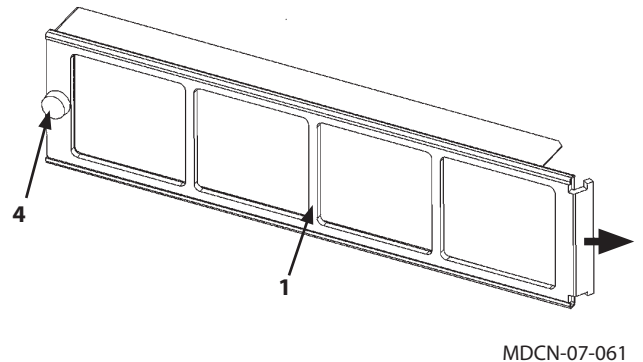
Removing Circulating Air Filter (Outside)

1. Circulating air filter (outside) (1) is located beside the seat stand.
2. Remove screws (2). Remove circulating air filter (outside) cover (3) by pulling it toward the cab front.
3. Remove screws (4). Remove circulating air filter (outside) (1) by sliding it to the arrow direction.



Removing Circulating Air Filter (Inside)

1. Remove circulating air filter (inside) (5) by holding grip (6) and pulling it toward you through the opening for cover (3).



MAINTENANCE

WARNING: When using compressed air pressure, wear safety glasses or goggles.

Cleaning

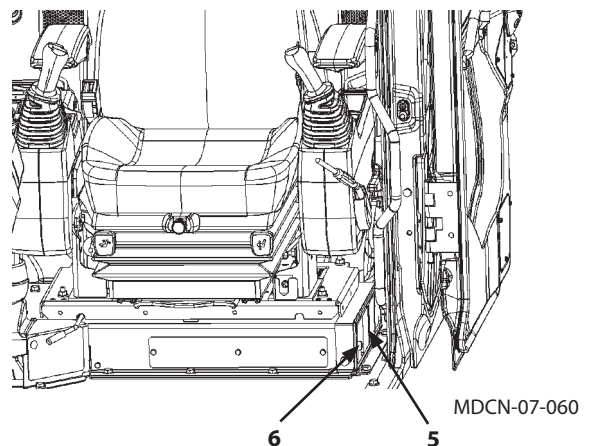
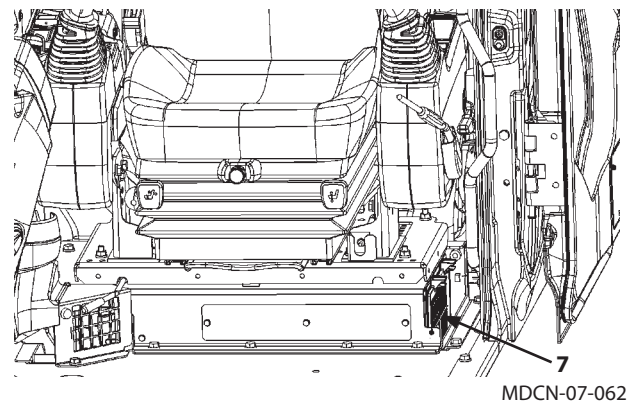
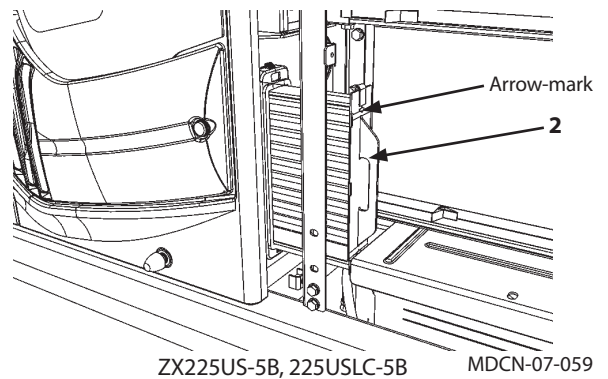
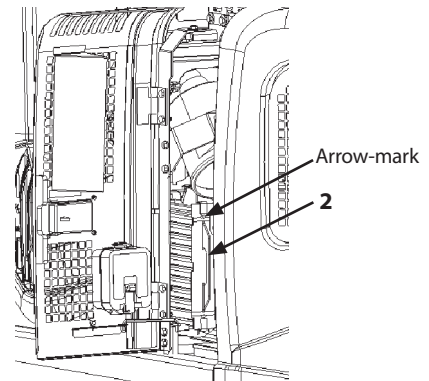
Clean the circulating and fresh air filters.
Clean both the external and internal filters by blowing compressed air or washing with water.

Washing procedure with water is as follows:

1. Use tap water.
2. Submerge the filter in water containing a neutral detergent for about 5 minutes.
3. Clean the filter with water again.
4. Dry the filters.

Installation

- Fresh air filter (2) ZX135US-5B
Install fresh air filter (2) so that the direction of the arrow points inside the cab.
After installing fresh air filter (2), install the filter cover by fitting it with the duct. Install the inner element of the air cleaner. Secure it with three stoppers.
- Fresh air filter (2) ZX225US-5B, 225USLC-5B
Install fresh air filter (2) so that the direction of the arrow points inside the cab.
After installing fresh air filter (2), install the filter cover by fitting it with the duct.
- Circulating Air Filter (Inside) (7)
Install filter (rear section in two pieces) (7) into the groove and slide it toward the cab rear side. Then, install filter (front section in two pieces) (7) into the groove.
- Latch circulating air filter (outside) (5) into the seat stand.
Slide it toward the cab rear side and secure it with screw (6).



MAINTENANCE

10 Check Air Conditioner

Check pipe connections for refrigerant gas leakage

If oil seepage is found around pipe connections, it indicates possible gas leakage.

Check Refrigerant

Start the engine and run at approximately 1500 min⁻¹ (rpm). Turn the air conditioner switch to ON. Set the blower switch to HI and set the temperature control switch to the coolest position (18 °C on the monitor screen). Operate the air conditioner 2 to 3 minutes. Check if cool air comes out from the vent in the cab.

Kind of refrigerant and amount when shipping the machine

Model	Type	Amount
ZX135US-5B	HFC134a	0.85±0.05 kg
ZX225US-5B, 225USLC-5B		0.85±0.05 kg

Check the condenser

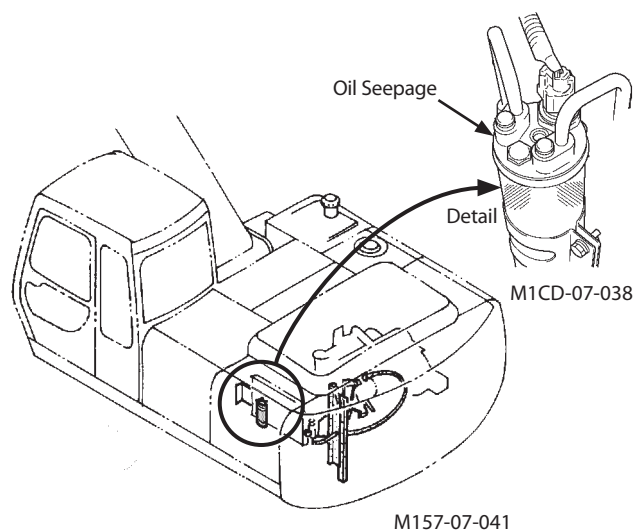
If the condenser fins become clogged with dirt or insects, the cooling effect will be decreased.
Be sure to keep it clean at all times. (Refer to "Clean Radiator Core" in Maintenance Section.)

Check compressor

After operating the air conditioner for 5 to 10 minutes, touch both the high pressure pipe and the low pressure pipe.
If normal, the high-pressure side pipe will be hot, and the low-pressure side cold.

Check mounting bolts for looseness

Confirm that the compressor mounting bolts and other mounting/fastening bolts are securely tightened.



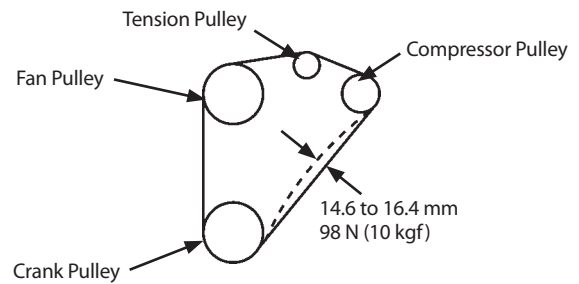
MAINTENANCE

Inspect belt, check and adjust tension

--- every 250 hours

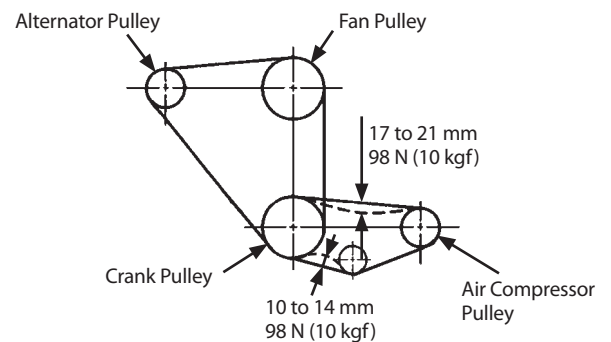
Visually check the compressor and fan belts for wear. Check fan belt tension by depressing the midpoint of the belt with the thumb. Deflection must be shown in the right figure with a depressing force of approximately 98 N (10 kgf).

If cool air does not come out, or any other abnormalities are found in air conditioner system, see your authorized dealer for inspection.



ZX135US-5B

M1U1-07-086



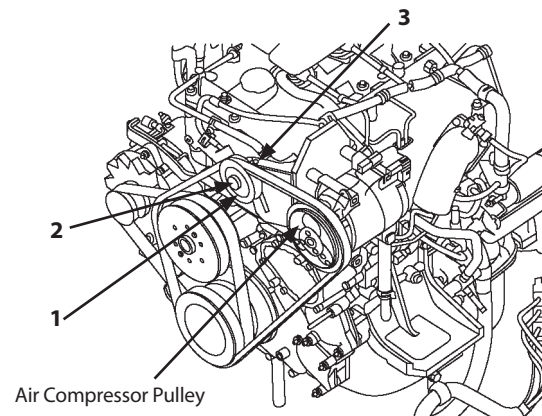
ZX225US-5B, 225USLC-5B

M1GR-07-007

Adjust Compressor Belt Tension

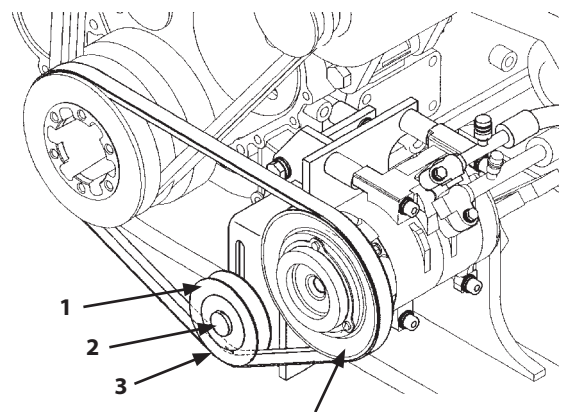
1. Loosen bolt (2) of tension pulley (1).
2. Move the tension pulley by adjusting bolt (3) under tension pulley (1) until tension is correct.
3. Securely tighten bolt (2) of tension pulley (1).
4. Securely tighten adjusting bolt (3).

IMPORTANT: When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.



ZX135US-5B

M1U4-07-041



Air Compressor Pulley
ZX225US-5B, 225USLC-5B

M1G6-07-013

MAINTENANCE

11 Clean Cab Floor

--- as required

IMPORTANT: When cleaning the cab floor with tap water, spray the floor only. Take care not to splash the surrounding area. Do not increase water spray speed by restricting the hose end, and do not use high pressure steam for cleaning. Be sure to completely remove any moisture from the surrounding area.

1. Park the machine on solid and level surface. Lower the bucket to the ground. Before cleaning, stop the engine.

Protect the air conditioner in-cab air suction port and the foot air vent with covers (1) and (2) stored in the pocket behind the backrest.

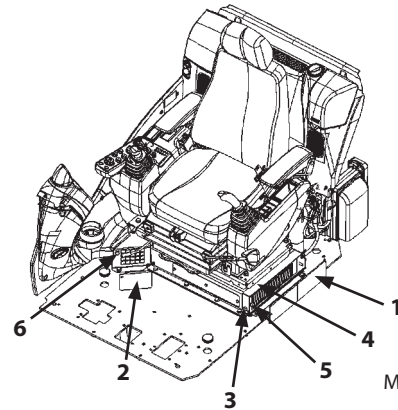
2. Remove screws (3) under the floor mat. Remove circulating air filter (outside) cover (4). Remove the circulating air filter (outside) from circulating air filter (outside) cover (4). Install cover (1) with screws (5) in the position where the circulating air filter was installed. Secure circulating air filter (outside) cover (4) with screws (3). Remove foot air vent holding screws (6). Attach cover (2) onto the foot air vent and secure it with screws (6).

IMPORTANT: Never fail to do this preparation work.

Failure to do so may result in damage/failure of the air conditioner.

3. Sweep the cab floor clean using a brush, and brush dust from the cab floor while spraying water.
4. When cleaning the floor mat, sweep dust (water) along the grooves on the floor mat.
5. When cleaning after removing the floor mat, sweep dust (water) through two cleaning holes.
6. After cleaning, remove covers (1) and (2) from the air conditioner in-cab suction hole and the foot air vent while following the above steps in reverse. Install the circulating air filter. (Refer to the descriptions for Clean and Replace Circulating Air Filter and Fresh Air Filter.) Store covers (1) and (2) in the pocket behind the backrest.

IMPORTANT: If the A/C is operated without removing the cover, the A/C will not operate efficiently so that its cooling ability is reduced.



MAINTENANCE

- 12** **Retighten Cylinder Head Bolt**
--- as required

See your authorized dealer.

- 13** **Inspect and Adjust Valve Clearance**
--- every 1000 hours

See your authorized dealer.

- 14** **Measure Engine Compression Pressure**
--- every 1000 hours

See your authorized dealer.

- 15** **Check Starter and Alternator**
--- every 1000 hours

See your authorized dealer.

- 16** **Check and Replace EGR Device**
--- every 4500 hours

See your authorized dealer.

- 17** **Clean EGR Cooler**
--- every 4500 hours

See your authorized dealer.

- 18** **Check Turbocharger**
--- every 4500 hours

See your authorized dealer.

MAINTENANCE

19 Check and Clean Injector --- every 4500 hours

See your authorized dealer.

20 Check Gas Damper --- as required

⚠ CAUTION: The gas damper has been charged with high-pressure nitrogen gas. Inappropriate handling may cause explosion, possibly resulting in serious injury or death.

The gas dampers are used in the tool box cover and the cab overhead window. Contact your nearest authorized dealer immediately at any of the following situations.

- The cover or window can not be opened with normal operating force.
- The cover or window can not maintain its open position.
- Oil or gas leak is found.

21 Tightening and Retightening Torque of Nuts and Bolts --- every 250 hours (first time after 50 hours)

Tighten or retighten nuts and bolts used on this machine in accordance with the torque values shown in the following table. Bolts and nuts should be replaced with those of the same or higher grade.

Check tightness after the first 50 hours then every 250 hours. For tightening bolts and nuts other than specified in the following table, refer to the Tightening Torque Chart at the end of this section.

MAINTENANCE

ZX135US-5B

No.	Descriptions	Bolt Dia	Q'ty	Wrench size	Torque		
					N-m	(kgf-m)	
1.	Engine cushion rubber mounting bolt and nut	16	4	24	240	(24)	
2.	Engine bracket mounting bolt (Pump side)	12	8	19	110	(11)	
3.	Hydraulic oil tank mounting bolt	16	4	24	270	(27)	
4.	Fuel tank mounting bolt	16	4	24	270	(27)	
5.	Radiator mounting bolt (Upper side)	-	-	-	-	-	
	Radiator mounting bolt (Lower side)	12	3	19	90	(9)	
6.	Pump transmission mounting bolt	10	8	17	65	(6.5)	
7.	Control valve mounting bolt	16	4	24	210	(21)	
	Control valve bracket mounting bolt	16	5	24	270	(27)	
8.	Swing device mounting bolt	20	10	30	500	(50)	
9.	Swing motor mounting bolt	10	7	8	65	(6.5)	
10.	ORS fittings for hydraulic hoses and piping	-	-	17	25	(2.5)	
		-	-	19	30	(3)	
		-	-	22	40	(4)	
		-	-	27	80	(8)	
		-	-	27	95	(9.5)	
		-	-	32	140	(14)	
		-	-	36	180	(18)	
-	-	41	210	(21)			
11.	Hycolin tube mounting nut	-	-	17	35	(3.5)	
12.	Battery mounting nut	10	4	17	50	(5)	
13.	Cab mounting nut	16	4	24	210	(21)	
	Cab mounting anchor bolt	22	1	32	550	(55)	
	Cab cushion rubber mounting bolt	12	8	19	110	(11)	
14.	Cover mounting bolt	6	-	10	-	-	
		8	-	13	-	-	
		10	-	17	50	(5)	
		12	-	19	90	(9)	
15.	Flexible master coupling of low pressure piping	-	4 pairs	13	10.3 to 12.4 : (1.05 to 1.26)		
		11		6	(0.6)		
	Jubilee clamp of low pressure piping	-	-	7	6	(0.6)	
	T-bolt clamp of low pressure piping	-	-	8	6	(0.6)	
16.	Swing bearing mounting bolt to	(Upperstructure)	18	30	27	400	(40)
		(Undercarriage)	16	45	24	270	(27)
17.	Travel device mounting bolt	16	28	24	320	(32)	
	Travel reduction device cover mounting bolt	14	8	22	180	(18)	
	Sprocket mounting bolt	16	32	24	270	(27)	
18.	Upper roller mounting bolt	12	8	19	100	(10)	
19.	Lower roller mounting bolt	16	56	24	310	(31)	
20.	Track shoe mounting bolt	16	352	24	420	(42)	
21.	Track guard mounting bolt	16	8	24	310	(31)	
22.	Muffler filter mounting bolt	10	4	17	50	(5)	
23.	Front pin-retaining bolt	18	2	27	400	(40)	







MAINTENANCE

ZX225US-5B, 225USLC-5B

No.	Descriptions	Bolt Dia	Q'ty	Wrench size	Torque		
					N-m	(kgf-m)	
1.	Engine cushion rubber mounting bolt and nut	22	4	32	550	(55)	
2.	Engine bracket mounting bolt (Pump side)	16	12	24	270	(27)	
	Engine bracket mounting bolt (Fan side)	10	8	17	65	(6.5)	
3.	Hydraulic oil tank mounting bolt	16	4	24	270	(27)	
4.	Fuel tank mounting bolt	16	6	24	270	(27)	
5.	Radiator mounting bolt (Right side, Left side)	10	6	17	50	(5)	
	Radiator mounting bolt (Lower side)	16	3	24	210	(21)	
6.	Pump transmission mounting bolt	10	8	17	65	(6.5)	
7.	Control valve mounting bolt	16	4	24	210	(21)	
	Control valve bracket mounting bolt	16	4	24	270	(27)	
8.	Swing device mounting bolt	20	14	30	500	(50)	
9.	Swing motor mounting bolt	12	8	10	90	(9)	
10.	ORS fittings for hydraulic hoses and piping	-	-	17	25	(2.5)	
		-	-	19	30	(3)	
		-	-	22	40	(4)	
		-	-	27	95	(9.5)	
		-	-	32	140	(14)	
		-	-	36	180	(18)	
		-	-	41	210	(21)	
-	-	50	260	(26)			
11.	Hycolin tube mounting nut	-	-	17	35	(3.5)	
12.	Battery mounting nut	10	2	17	50	(5)	
13.	Cab mounting nut	16	4	24	210	(21)	
	Cab mounting anchor bolt	22	1	32	550	(55)	
	Cab cushion rubber mounting bolt	12	8	19	110	(11)	
14.	Cover mounting bolt	6	-	10	3.3 to 4.2	(0.3 to 0.4)	
		8	-	13	10	(1)	
		10	-	17	50	(5)	
15.	Flexible master coupling of low pressure piping	-	4 pairs	13	10.3 to 12.4 (1.05 to 1.26)		
		11		6	(0.6)		
	Jubilee clamp of low pressure piping	-	-	7	6	(0.6)	
		-	-	8	6	(0.6)	
	T-bolt clamp of low pressure piping	-	-	10	6	(0.6)	
16.	Swing bearing mounting bolt to	(Upperstructure)	20	37	30	510	(51)
		(Undercarriage)	20	36	30	490	(49)
17.	Travel device mounting bolt	20	28	30	630	(63)	
	Travel reduction device cover mounting bolt	14	12	22	180	(18)	
	Sprocket mounting bolt	20	36	30	490	(49)	
18.	Upper roller mounting bolt	16	16	24	270	(27)	
19.	Lower roller mounting bolt	18	64	27	460	(46)	
20.	Track shoe mounting bolt	20	392	27	820	(82)	
21.	Track guard mounting bolt	18	8	27	500	(50)	
		18	16	27	500	(50)	
22.	Muffler filter mounting bolt	12	4	19	110	(11)	
23.	Front pin-retaining bolt	18	2	27	400	(40)	

MAINTENANCE

Tightening Torque Chart

Bolt Dia. mm	Hexagon Wrench						Socket Bolt			
	 		 		 		Wrench size mm	Socket Bolt		Wrench size mm
	N-m	(kgf-m)	N-m	(kgf-m)	N-m	(kgf-m)		N-m	(kgf-m)	
6					3.3 to 4.2	(0.3 to 0.4)	10			5
8	30	(3.0)	20	(2.0)	10	(1.0)	13	20	(2.0)	6
10	65	(6.5)	50	(5.0)	20	(2.0)	17	50	(5.0)	8
12	110	(11)	90	(9)	35	(3.5)	19	90	(9)	10
14	180	(18)	140	(14)	55	(5.5)	22	140	(14)	12
16	270	(27)	210	(21)	80	(8.0)	24	210	(21)	14
18	400	(40)	300	(30)	120	(12)	27	300	(30)	14
20	550	(55)	400	(40)	170	(17)	30	400	(40)	17
22	750	(75)	550	(55)	220	(22)	32			
24	950	(95)	700	(70)	280	(28)	36			
27	1400	(140)	1050	(105)	400	(40)	41			
30	1950	(195)	1450	(145)	550	(55)	46			
33	2600	(260)	1950	(195)	750	(75)	50			
36	3200	(320)	2450	(245)	950	(95)	55			

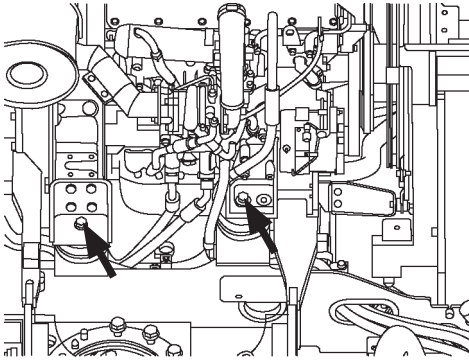
⚠ CAUTION: If fixing bolts for counterweight are loosened, consult your nearest authorized dealer.

IMPORTANT:

- Apply lubricant (e. g. white zinc B solved into spindle oil) to bolts and nuts to stabilize their friction coefficient.
- Remove soil, dust, and/or dirt from the nut and bolt thread surfaces before tightening.
- Tighten nuts and bolts to specifications. If tightened with excessively low or high torque, missing or breakage of nuts and/or bolts may result.

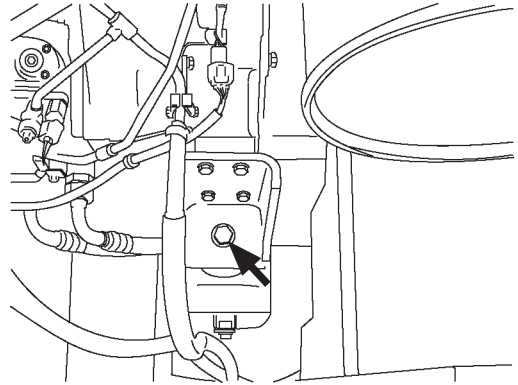
MAINTENANCE

1. Engine cushion rubber mounting bolt and nut



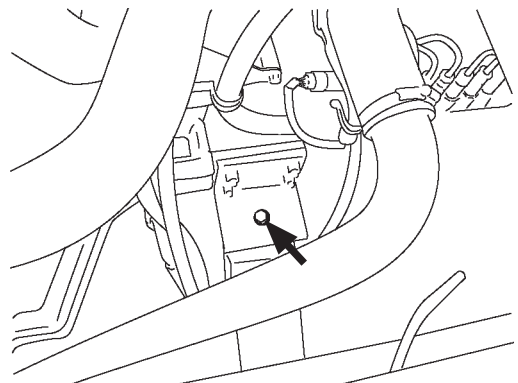
ZX135US-5B

M1U4-07-046



Pump Side
ZX225US-5B, 225USLC-5B

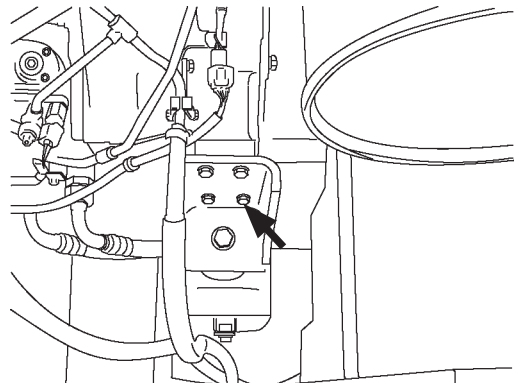
M1U1-07-040



Fan Side
ZX225US-5B, 225USLC-5B

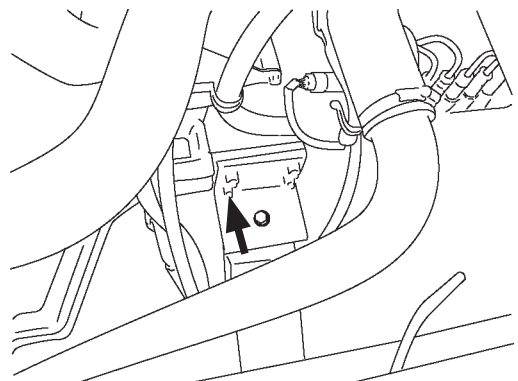
M1U1-07-034

2. Engine bracket mounting bolt



Pump Side
ZX135US-5B, 225US-5B, 225USLC-5B

M1U1-07-040

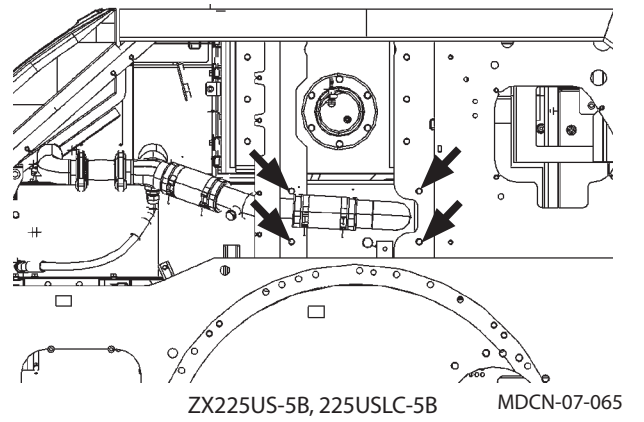
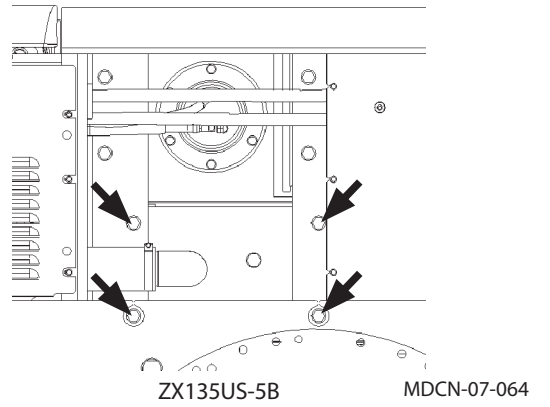


Fan Side
ZX225US-5B, 225USLC-5B

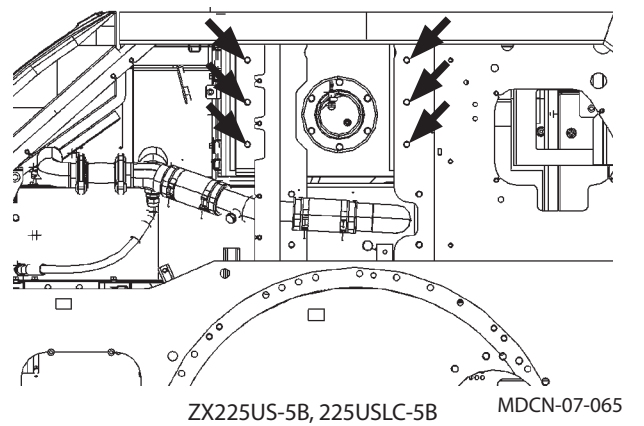
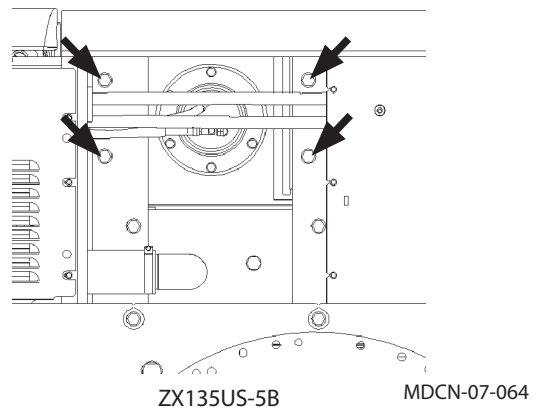
M1U1-07-034

MAINTENANCE

3. Hydraulic oil tank mounting bolt

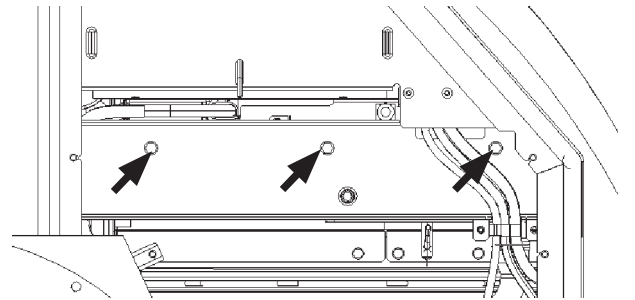


4. Fuel tank mounting bolt



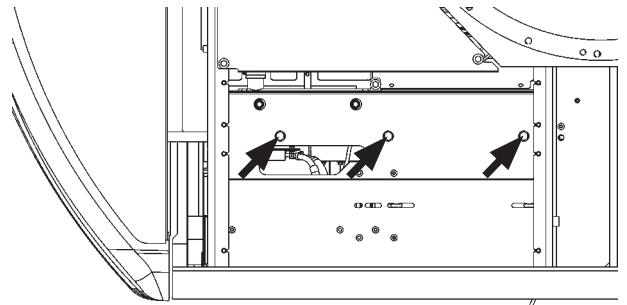
MAINTENANCE

5. Radiator mounting bolt



ZX135US-5B

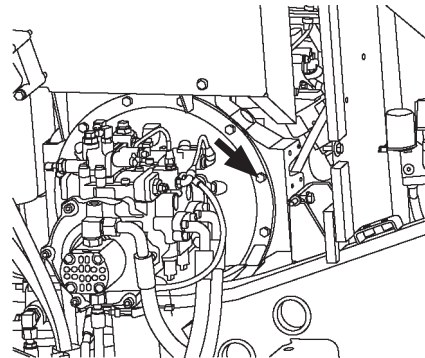
MDCN-07-066



ZX225US-5B, 225USLC-5B

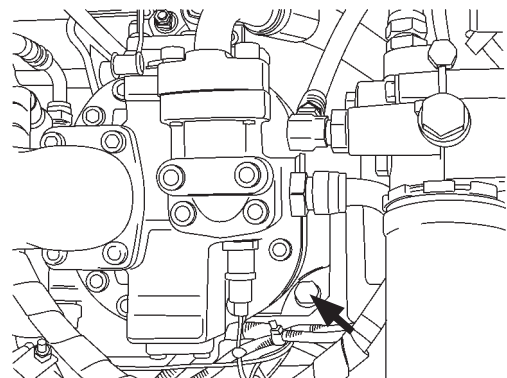
MDCN-07-067

6. Pump transmission mounting bolt



ZX135US-5B

M1U4-07-050

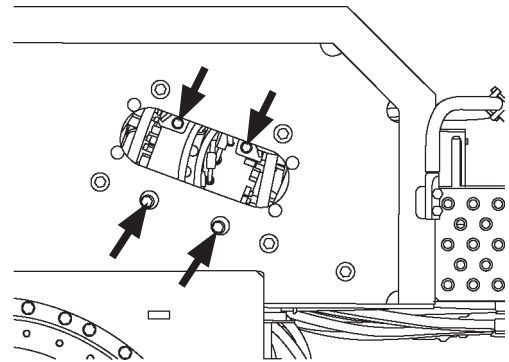


ZX225US-5B, 225USLC-5B

M1U1-07-021

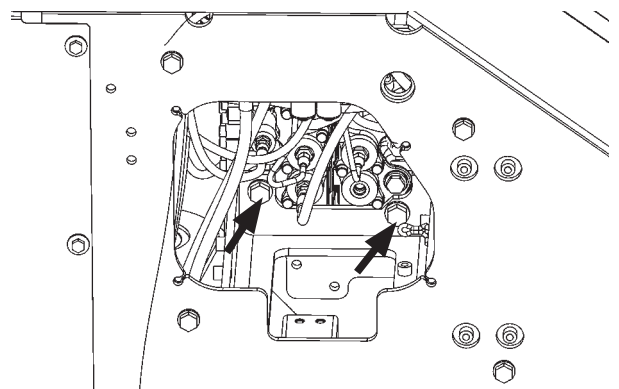
MAINTENANCE

7. Control valve mounting bolt



ZX135US-5B

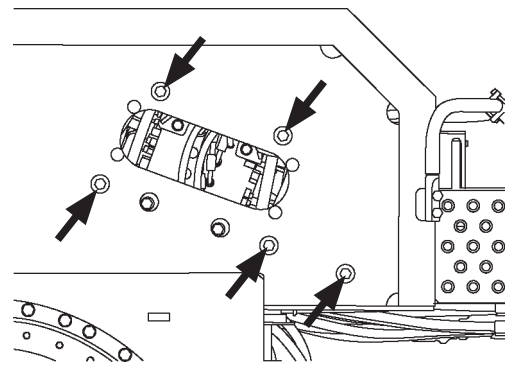
M1U4-07-051



ZX225US-5B, 225USLC-5B

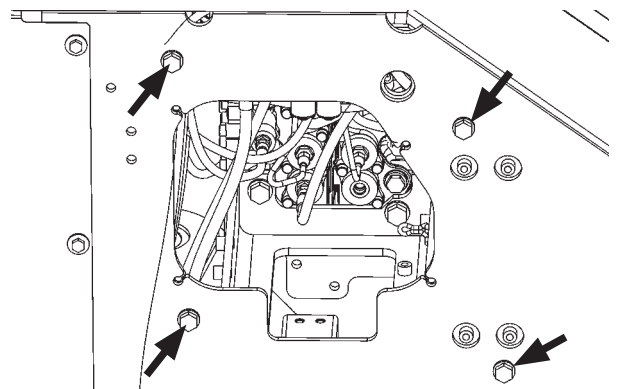
MDCN-07-068

Control valve bracket mounting bolt



ZX135US-5B

M1U4-07-051

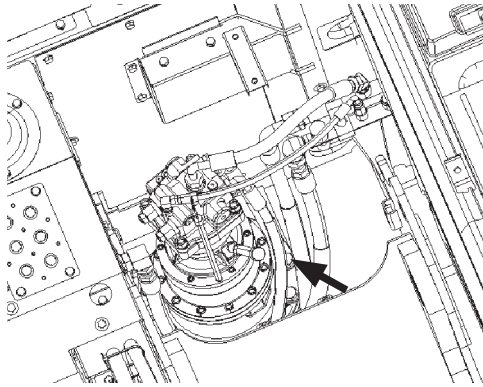


ZX225US-5B, 225USLC-5B

MDCN-07-068

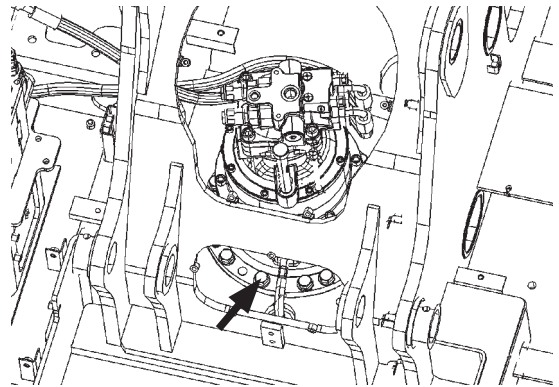
MAINTENANCE

8. Swing device mounting bolt



ZX135US-5B

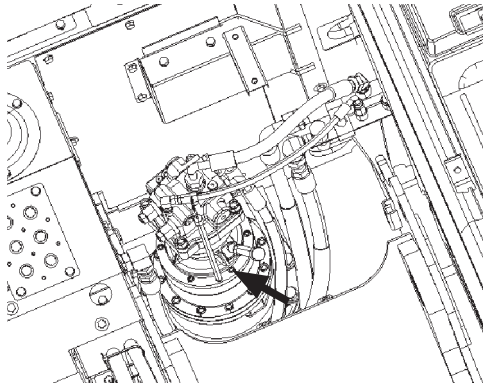
MDCN-07-018



ZX225US-5B, 225USLC-5B

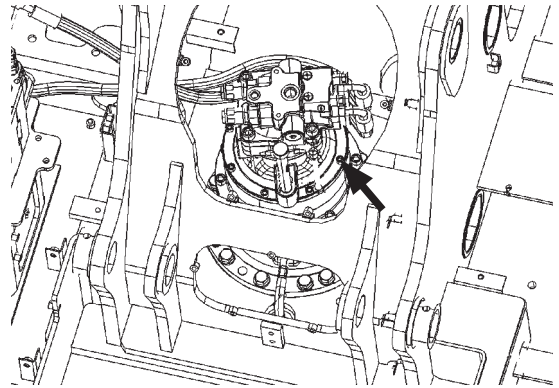
MDCN-07-069

9. Swing motor mounting bolt



ZX135US-5B

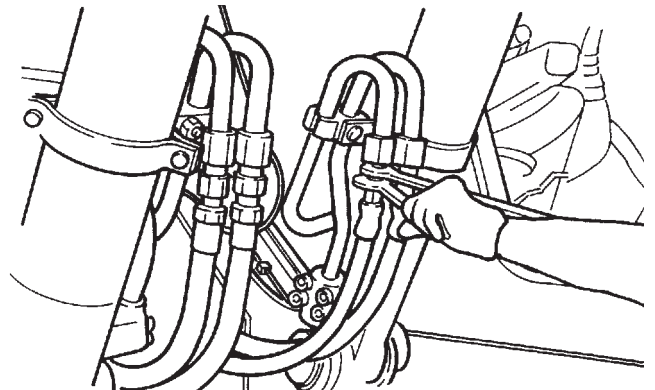
MDCN-07-018



ZX225US-5B, 225USLC-5B

MDCN-07-069

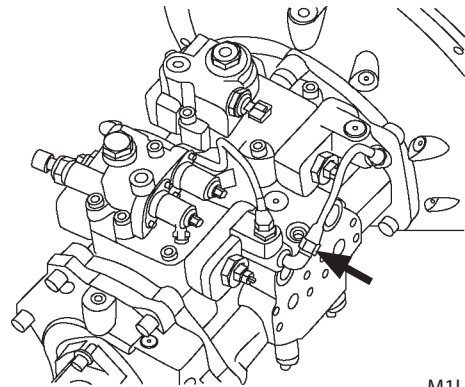
10. ORS fittings for hydraulic hoses and piping



M104-07-079

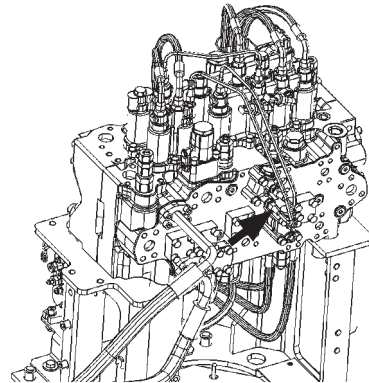
MAINTENANCE

11. Hycolin tube mounting nut



ZX135US-5B

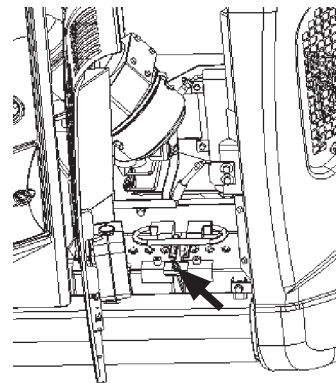
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ZX225US-5B, 225USLC-5B

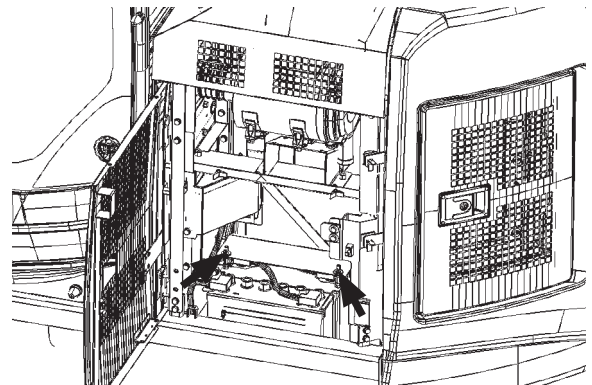
MDCN-07-071

12. Battery mounting nut



ZX135US-5B

MDCN-07-070

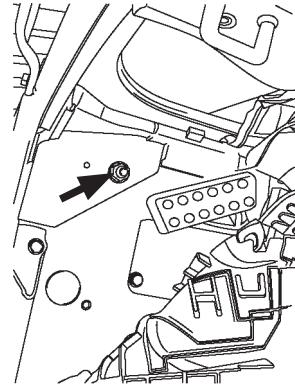


ZX225US-5B, 225USLC-5B

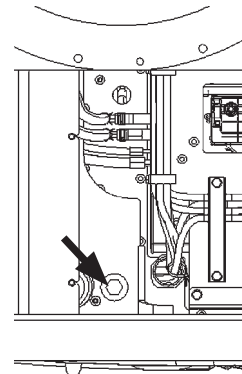
MDCN-07-072

MAINTENANCE

13. Cab mounting nut



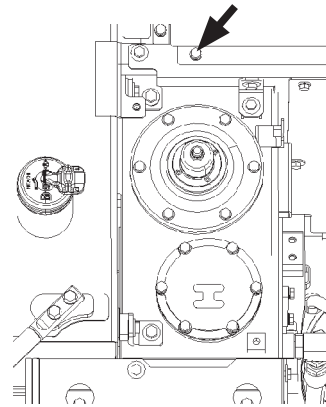
M1U1-07-026



Anchor Bolts

MDCN-07-073

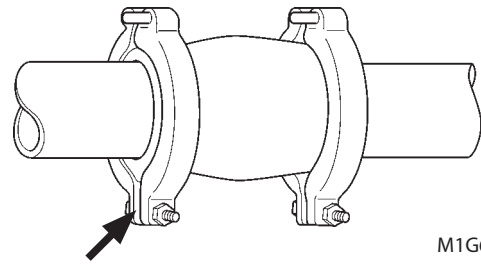
14. Cover mounting bolt



MDCN-07-022

MAINTENANCE

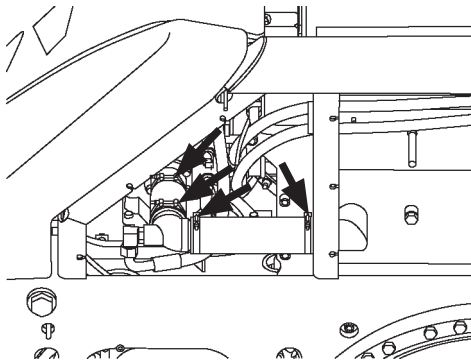
15. Flexible master coupling of low pressure piping



Flexible Master Coupling

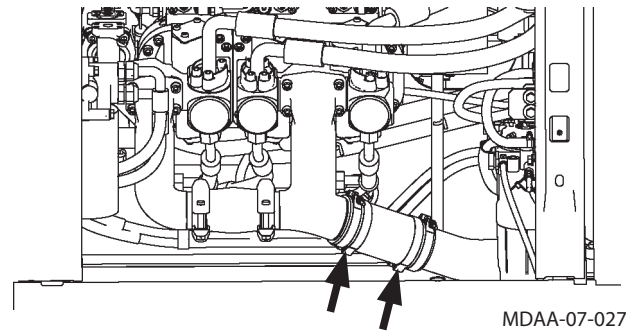
M1G6-07-008

T-bolt clamp of low pressure piping



ZX135US-5B

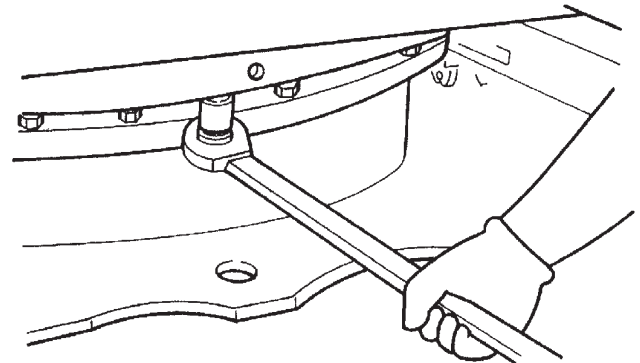
M1U4-07-052



ZX225US-5B, 225USLC-5B

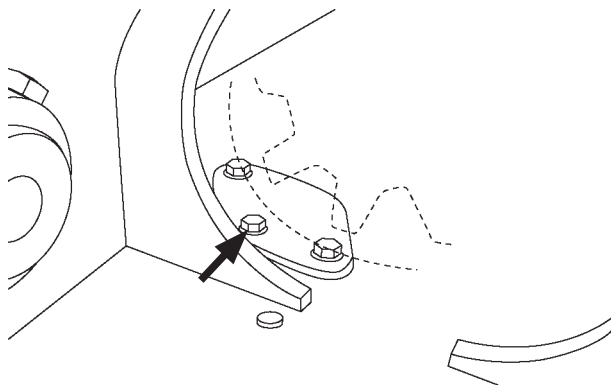
MDAA-07-027

16. Swing bearing mounting bolt



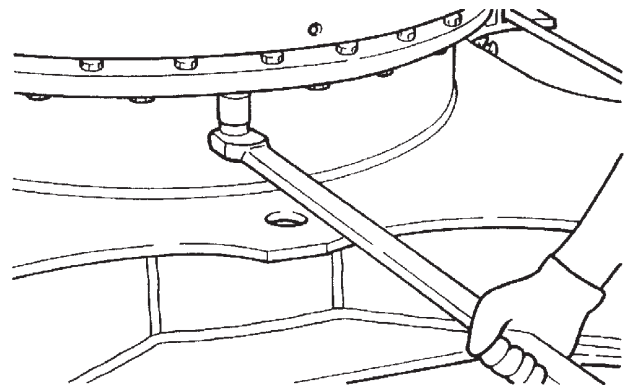
Upperstructure Side

M107-07-088



Undercarriage Side
ZX135US-5B

M1U1-07-113

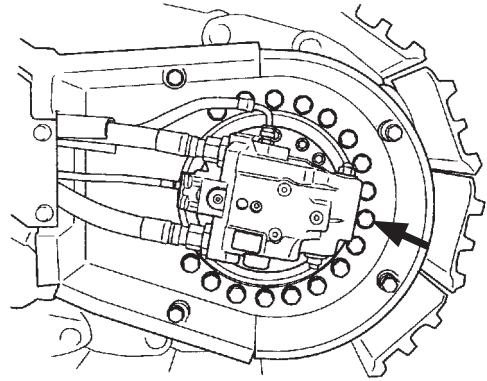


Undercarriage Side
ZX225US-5B, 225USLC-5B

M107-07-089

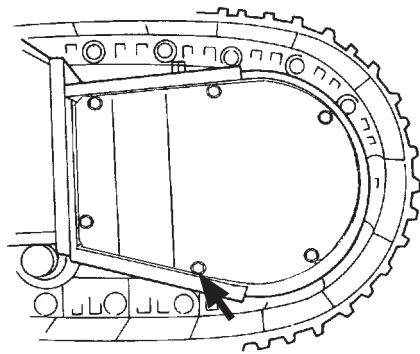
MAINTENANCE

17. Travel device mounting bolt



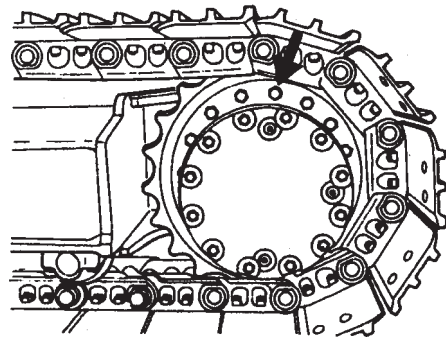
M164-07-005

Travel reduction device cover mounting bolt



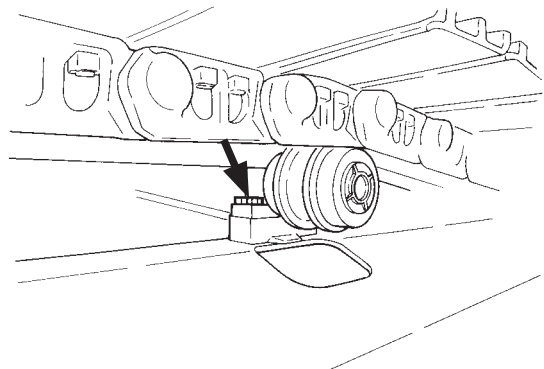
M1G6-07-007

Sprocket mounting bolt



M154-07-050

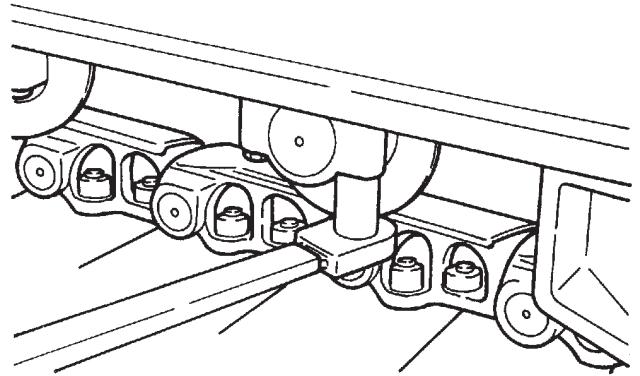
18. Upper roller mounting bolt



M157-07-224

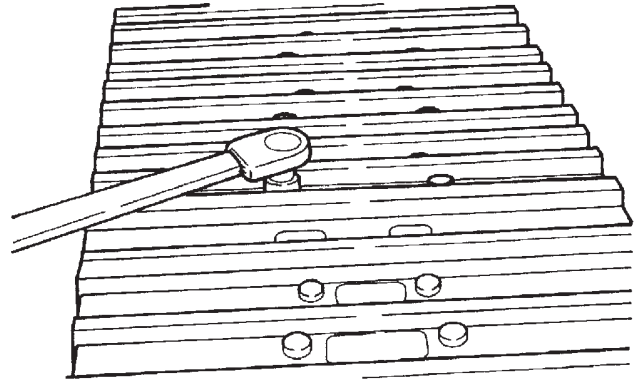
MAINTENANCE

19. Lower roller mounting bolt



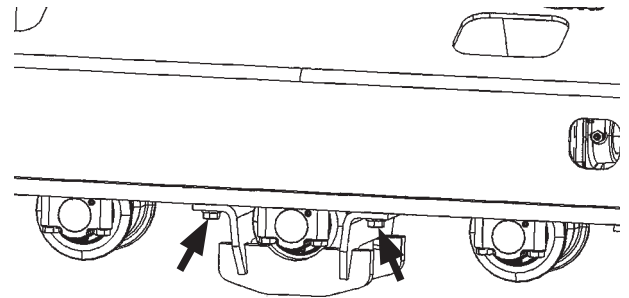
M107-07-092

20. Track shoe mounting bolt



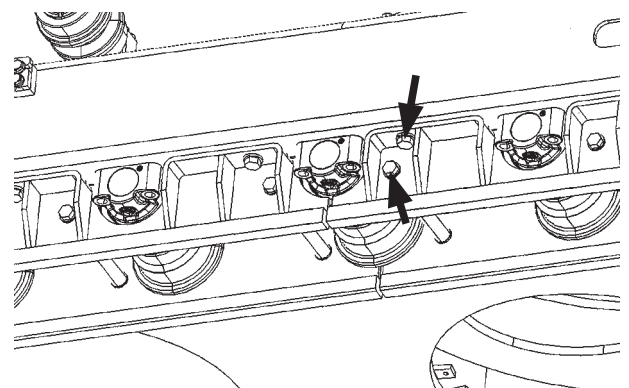
M107-07-093

21. Track guard mounting bolt



MDAA-07-058

Full track guard mounting bolt
(Only ZX225US-5B, 225USLC-5B)

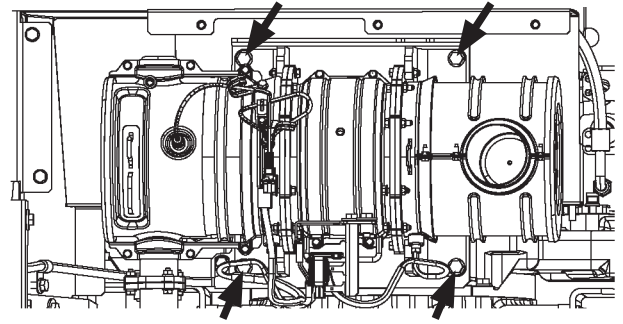


MDAA-07-059

MAINTENANCE

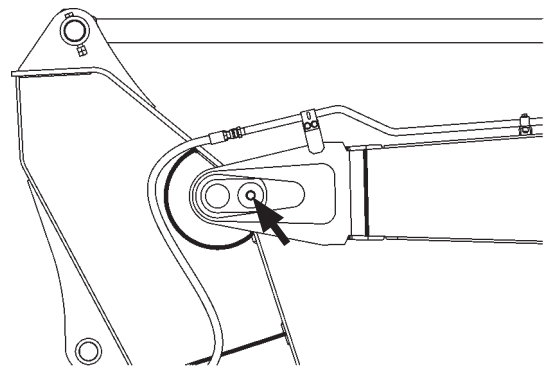
22. Muffler filter mounting bolt

Contact your nearest authorized dealer.

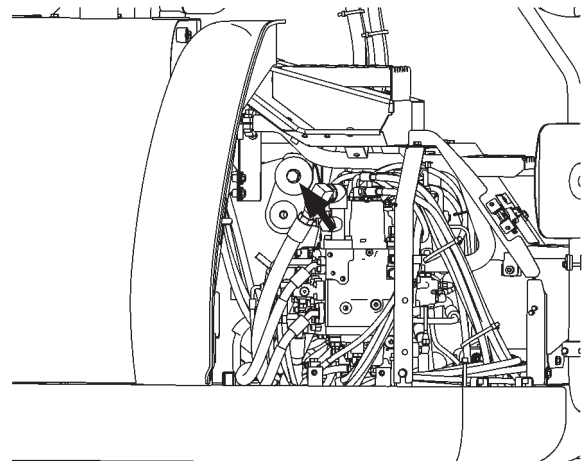


MDAA-07-061

23. Front pin-retaining bolt



MDCS-07-004



MDCN-07-080

MAINTENANCE

J. Muffler Filter

- 1** Check and Clean Filter Element of Muffler Filter
--- every 4500 hours

Contact your nearest authorized dealer.

- 2** Check and Clean Muffler Filter
--- as required

IMPORTANT: Check and clean flammable objects on the area around the muffler filter.

Do not disassemble the base machine support parts, sensors, differential pressure hoses and pipes.

When the machine is operated in dusty areas, refer to "9-1 Maintenance Under Special Environmental Conditions".

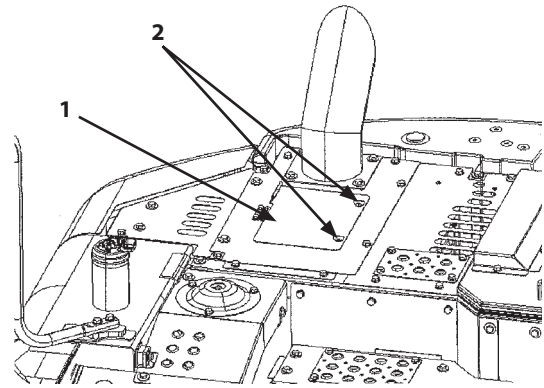
Twist screw (2) to open muffler filter maintenance window (1) located at the top of the engine cover.

Check differential hoses and pipes for disconnection or cracks.

Check the differential sensors and harnesses of exhaust temperature sensors for abnormality.

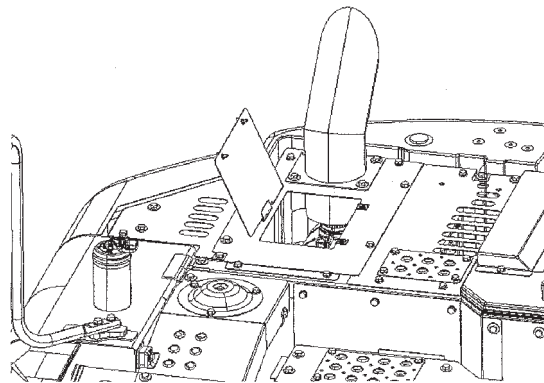
Securely close muffler filter maintenance window (1).

Remove muffler upper cover if necessary and clean muffler filter. In this case, contact your nearest authorized dealer.



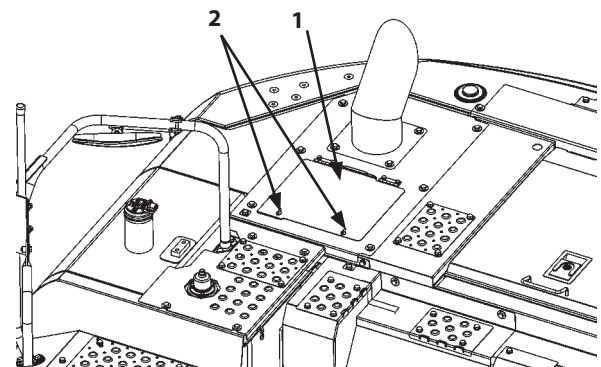
ZX135US-5B

MDCN-07-076



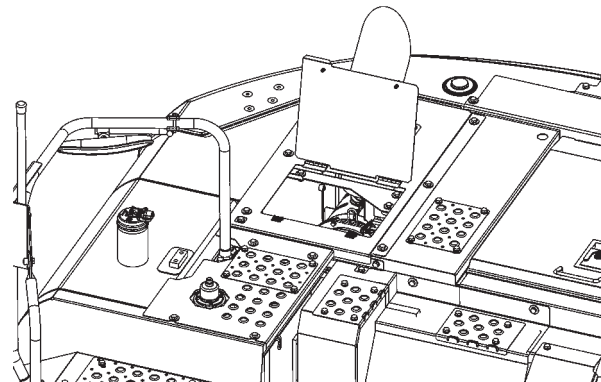
ZX135US-5B

MDCN-07-077



ZX225US-5B, 225USLC-5B

MDCN-07-074

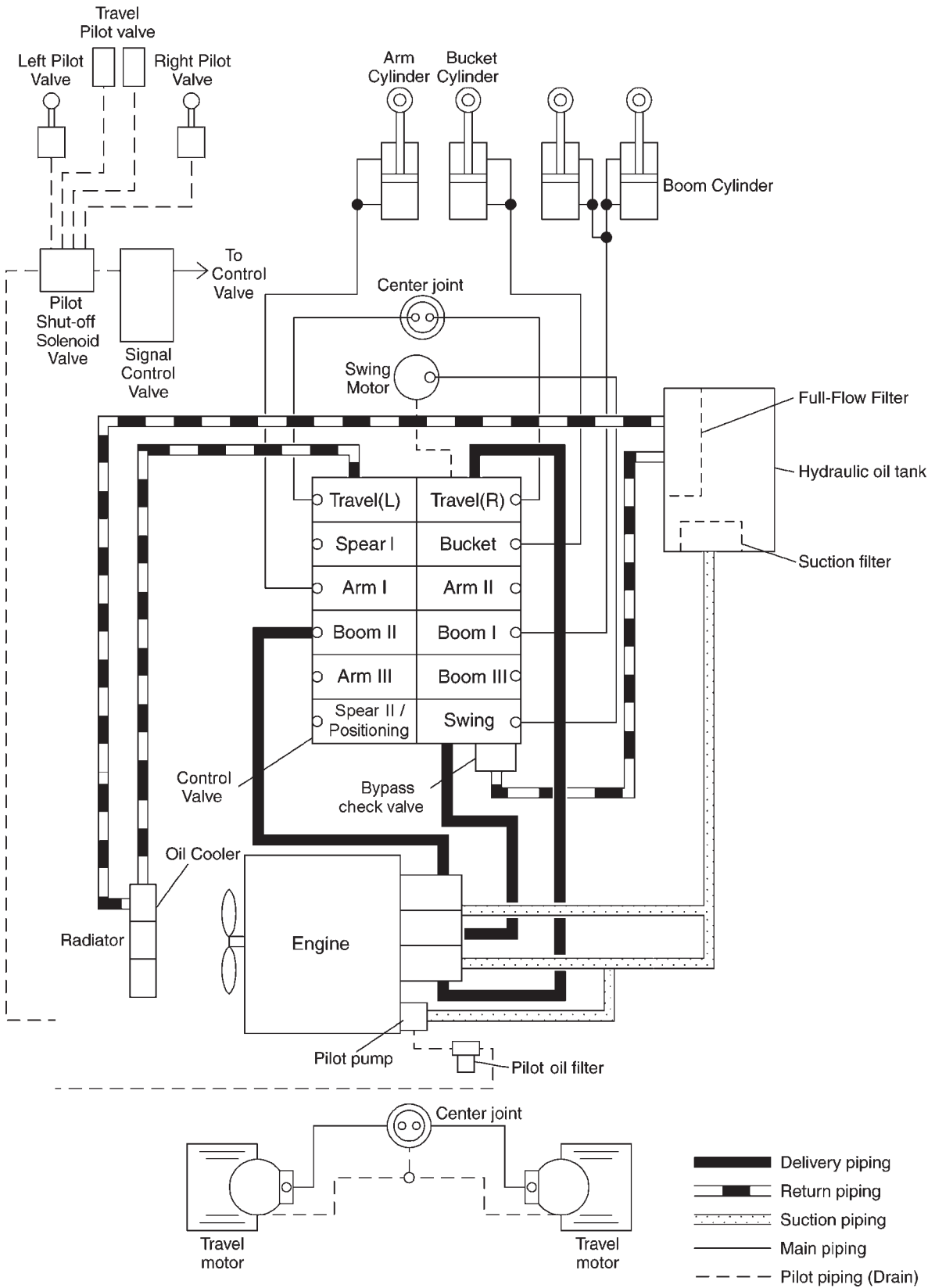


ZX225US-5B, 225USLC-5B

MDCN-07-075

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

Hydraulic Circuit



MDA-08-001

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

Electrical Circuit

Electrical Diagram

1. FUSIBLE LINK
2. BATTERY
3. BATTERY RELAY
4. STARTER
5. STARTER RELAY
6. ALTERNATOR
7. GLOW RELAY
8. SOLENOID FUEL PUMP
9. AIR-CON. COMPRESSOR
10. AMBIENT SENSOR
11. PRESSURE SWITCH
12. BOOM LIGHT
13. WORK LIGHT
14. WASHER
15. HORN (H), HORN (L)
16. PILOT CONTROL SHUT-OFF SOLENOID VALVE
17. PILOT CONTROL SHUT-OFF RELAY
18. STARTER CUT RELAY
19. LOAD DUMP RELAY
20. PILOT CONTROL SHUT-OFF SWITCH
21. ENGINE STOP SWITCH
22. AIR-CON. UNIT
23. WIPER RELAY
24. WIPER MOTOR
25. ECU
26. STARTER SWITCH
27. FUSE
28. SECURITY RELAY
29. SECURITY HORN
30. SECURITY HORN RELAY
31. LIGHTER
32. RADIO
33. SPEAKER R
34. SPEAKER L
35. LIGHTER RELAY1
36. LIGHTER RELAY2
37. WASHER RELAY
38. HORN RELAY
39. HORN SWITCH
40. AUTO SHUT DOWN RELAY
41. CAB LIGHT
42. MONITOR
43. POWER DIGGING SWITCH
44. MC
45. SWITCH BOX
46. AUTO-IDLE SWITCH
47. MODE SWITCH
48. TRAVEL 2-SPEED SWITCH
49. ENGINE SPEED CONTROL DIAL
50. LIGHT SWITCH
51. WASHER SWITCH
52. WIPER SWITCH
53. HYD. OIL FILTER WARNING
54. AIR CLEANER RESTRICTION SWITCH
55. FUEL SENSOR
56. COOLANT TEMP. SENSOR
57. OVER-HEAT SWITCH
58. ENGINE OIL LEVEL SWITCH
59. CAMERA
60. SWING ALARM
61. TRAVEL ALARM

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

Maintenance Under Special Environmental Conditions

Operating Conditions	Precautions for Maintenance
Muddy Soil, Rainy or Snowy Weather	After Operation : Clean the machine and check for cracks, damaged, loose or missing bolts and nuts. Lubricate all necessary parts without delay.
Near the Ocean	After Operation : The following salt pollution measures must be taken when the machine is operated at sea or at coastline. <ol style="list-style-type: none"> (1) After completing the work, extend/retract the hydraulic cylinders several times to form oil film on the rod surface. Store the machine with cylinders retracted as much as possible. (2) Thoroughly clean the machine with fresh water to wash off salt. (3) Perform touch up painting periodically on hose fittings, lubrication piping and inserting position of cover, where sea water is easily collected, in order to prevent corrosion. (4) During storage of the machine, cover the machine by tarps to prevent sea water from entering into the cab vent. Apply rust prevention oil (example: ANTIRUST P-1300NP-3 JX Nippon Oil & Energy Corporation) onto plated part of the cylinder rods.
Dusty Atmosphere	Air Cleaner : Clean the element regularly at shorter service intervals. Radiator : Clean the oil cooler screen to prevent clogging of the radiator core. Fuel System : Clean the filter element and strainer regularly at shorter service intervals. Engine, Muffler : Clean earlier than the normal interval to prevent dust from sticking and accumulating. Inhibit regeneration according to the machine operating condition.
Rocky Ground	Tracks : Carefully operate while checking for cracks, damage and loose bolts and nuts. Loosen the tracks a little more than usual. Front Attachment : Standard attachment may be damaged when digging rocky ground. Reinforce the bucket before using it, or use a heavy duty bucket.
Falling Stones	Cab Head Guard : Provide a cab guard to protect the machine from falling stones. Consult your nearest Hitachi dealer.
Freezing Weather	Fuel/Lubricant : Use high quality and low viscosity fuel and oil. Engine Coolant : Be sure to use antifreeze. Battery : Fully charge the batteries at shorter intervals. If not fully charged, electrolyte may freeze. Track : Keep the track clean. Park the machine on a hard surface to prevent the tracks from freezing to the ground.

STORAGE

Storing the Machine

In case the machine is to be stored for longer than one month, pay attention to the following points to prepare next operation.

Precautions for Long-Term Storage

Item	Remedy
Machine Cleaning	Wash the machine. Remove soil or other debris adhered to the machine.
Lubrication/Greasing	Check lubricant's level and contamination. Fill up or change if necessary. Lubricate all grease points. Coat grease to exposed metal surfaces which are subject to rust. (i.e. cylinder rods etc.)
Battery	Remove the batteries and store them in a dry protected place after charging fully. Turn the battery disconnect switch to the OFF position.
Coolant	Add anti-rusting agent. If storing in extremely cold areas, either add extra anti-freeze or drain coolant completely to avoid freezing. In this case, place a sign reading "NO COOLANT".
Protection Against Dust and Moisture	Store the machine in a dry storage area using a protective cover.
Tools	Inspect and repair, then store.
Lubrication Operation	If oil film on the metal surfaces is lost, rust may begin, possibly causing abnormal wear of the machine when the machine operation is restarted. If the machine is stored for a long time, operate hydraulic functions for travel, swing and digging two to three times for lubrication, at least once a month. Be sure to check the coolant level and lubrication conditions before operating.

NOTE:

- *Lubricating operation is a series of warm-up, travel, swing and digging operation carried out repeatedly for a few cycles at slow speed.*
- *Lubricants will deteriorate during long term storage of the machine. Be sure to carefully check the lubricants before restarting operation of the machine.*

Precautions for Disconnecting or Connecting Batteries

In case the batteries are kept disconnect for more than one month or the battery disconnect switch is turned off, data in the information controller or preset data of the radio may be initialized.

Contact your nearest Hitachi dealer before restarting operation of the machine after the batteries are disconnected for one month or more.

TROUBLESHOOTING

Troubleshooting

If any machine trouble has occurred, immediately repair it. Make certain the cause of the trouble and take necessary measures to prevent the reoccurrence of the same trouble.

In case troubleshooting is difficult, or measures marked with * must be taken, consult the nearest Hitachi dealer. Never attempt to adjust, disassemble, or repair the hydraulic and/or electrical/electronic parts/components.

IMPORTANT: Never attempt to disassemble or modify the electrical/electronic components.

Engine

Consult the nearest Hitachi dealer for the engine troubleshooting.

Engine Auxiliaries

Problem	Cause	Solution
Batteries will not be charged	Broken battery separator	Replace
	Faulty regulator	* Adjust and replace
	Faulty ground line	* Repair
	Faulty alternator	* Repair or replace
Batteries discharge quickly after being charged	Shorted cable	* Repair or replace
	Shorted battery separator	* Repair or replace
	Increased sediment in battery	* Replace
Coolant temperature is too high	Low coolant level	Refill
	Insufficient fan belt tension	Adjust
	Damaged rubber hose	* Replace
	Faulty thermostat	* Replace
	Faulty coolant temperature gauge	* Replace

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Impossible to Start the Engine			
Problem	Cause	Solution	
Engine will not start	Starter does not rotate or is not powerful	Discharged battery	Charge or replace battery
		Disconnected, loose, or corroded battery terminals	After repairing the corroded area, securely tighten the connectors
		Lowered pilot control shut-off lever	Pull pilot control shut-off lever up
		Disconnected, loose, or corroded starter ground line terminals	After repairing the corroded area, securely tighten the connectors
		Faulty pilot control shut-off lever electrical system	Repair
		Too high engine oil viscosity	Change engine oil with appropriate viscosity
		Faulty starter and/or electrical system	* Repair and replace
		Battery disconnect switch is OFF position	Turn battery disconnect switch to the ON position
	Starter rotates	No fuel	After checking that no fuel is leaking, refill fuel
		Air in the fuel system	Bleed air
		Clogged fuel filter	After draining water, replace the element
		Frozen fuel	Warm the fuel pump with hot water or wait until the atmospheric temperature rises
		Engine stop switch is ON	* Repair and replace
		Faulty preheat system	* Repair and replace
Even though the engine is started, the engine stalls soon	Too low idle speed	* Repair and replace	
	Clogged fuel filter	After draining water, replace the element	
	Clogged pre-fuel filter	Clean or replace the element	
	Faulty engine control system	* Repair and replace	
	Clogged air cleaner	Clean or replace the element	
	Faulty injection pump	* Repair and replace	
Engine runs irregularly	Faulty fuel system	* Repair and replace	
	Water or air in the fuel system	Drain water or bleed air	
	Faulty engine control system	* Repair and replace	
	Clogged muffler filter	* Repair and replace	

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Control Lever		
Problem	Cause	Solution
Lever is heavy to operate	Rusted joint	* Lubricate or repair
	Worn pusher	* Replace
Does not move smoothly	Worn pusher	* Repair or replace
	Faulty pilot valve	* Replace
Does Not Return to Neutral	Faulty pilot valve	* Replace
The lever is tilted in the neutral position due to increase in play	Worn joint	* Repair or replace
	Faulty pilot valve	* Replace

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Hydraulic System

When the machine is stored without operation, air mixed in hydraulic oil will become separated and will accumulate in the cylinder upper sections, causing a delay in the response time of the machine movement or weak power development.

In case these symptoms appear, repeatedly operate all actuators several times.

Problem	Cause	Solution
No hydraulic Functions (Noise from pumps)	Faulty hydraulic pump	* Repair or replace
	Lack of hydraulic oil	Refill
	Broken suction pipe and/or hose	* Repair or replace
No hydraulic Functions (Hydraulic pump noise remains unchanged)	Faulty pilot pump	* Replace
	Faulty pilot control shut-off solenoid valve	* Replace
	Faulty wire harness (pilot control shut-off solenoid valve) pilot control shut-off switch	* Repair or replace
	The pilot control shut-off lever is in the LOCK position	Turn the pilot control shut-off lever to the UNLOCK position
All actuators have no power	Malfunction due to worn hydraulic pump	* Replace
	Decreased main relief valve set pressure in the control valve	* Adjust
	Lack of hydraulic oil	Refill
	Clogged suction strainer in the hydraulic oil tank	Clean
	Absorption of air from the oil suction side	Retighten
	Faulty pressure sensor	* Replace
	Faulty solenoid valve	* Replace
Only one side lever is inoperable or has no power	Faulty relief valve in the control valve	* Repair or replace
	Broken pipe and/or hose	* Repair or replace
	Loose pipe line joint	Retighten
	Broken O-ring at pipe line joint	* Replace
	Faulty hydraulic pump	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
	Faulty pilot solenoid valve	* Repair or replace

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Problem	Cause	Solution
Only one actuator is inoperable	Broken control valve spool	* Replace
	Embedded foreign matter in valve spool	* Repair or replace
	Broken pipe and/or hose	* Repair or replace
	Loose pipe line joint	Retighten
	Broken O-ring at pipe line joint	* Replace
	Broken actuator	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Only one cylinder is inoperable or has no power	Faulty pilot solenoid valve	* Repair or replace
	Broken oil seal in cylinder	* Repair or replace
	Oil leak due to damage to cylinder rod	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Hydraulic oil temperature increases	Faulty pilot solenoid valve	* Repair or replace
	Stained oil cooler	Clean
Oil leak from low pressure hose	Insufficient engine fan belt tension	Adjust
	Loose clamps	Retighten
	Faulty suction manifold	* Repair or replace

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Drive Function		
Problem	Cause	Solution
One or both side tracks are inoperable	Damaged center joint	* Repair or replace
	Incompletely released parking brake	* Repair or replace
	Broken travel motor	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Does not travel smoothly	Overly tensioned or slackened crawler sag	Adjust
	Lack of lubricant in front idler and/or roller	Refill
	Deformed track frame	* Repair or replace
	Embedded foreign matter such as rock fragments	Remove
	Dragged parking brake	* Repair
Travel speed does not change	Faulty travel mode switch	* Replace
	Faulty pressure sensor	* Replace
	Pump 1 and 2 delivery pressure sensors	* Replace
	Pumps 1, 2 control pressure sensors	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness	* Repair
	Faulty controller (MC)	* Replace
	Faulty solenoid valve	* Repair or replace
Faulty motor	* Repair or replace	

Items with * mark: Consult your nearest Hitachi dealer.

TROUBLESHOOTING

Swing Function		
Problem	Cause	Solution
Upperstructure does not swing	Faulty swing parking brake	* Repair or replace
	Faulty swing parking brake release valve	* Repair or replace
	Broken swing motor	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Swing is not smooth	Worn swing gear	* Repair or replace
	Damaged swing bearing and bearing balls	* Repair or replace
	Lack of grease	Refill
	Inversion protective valve	* Repair or replace

Items with * mark: Consult your nearest Hitachi dealer.

Immediately after the control valve, swing motor relief valve and/or the swing motor is replaced, a noise may be emitted and/or operation may not be performed smoothly due to air trapped in the hydraulic line.

Slowly continue to operate the machine for approx. 10 minutes to bleed air.

After repair work is complete, be sure to check the oil level in the hydraulic oil tank. Refill hydraulic oil as needed.

TROUBLESHOOTING

Engine Speed		
Problem	Cause	Solution
Even if operating the engine control dial, the engine speed does not change	Blown fuse	Replace
	Faulty engine control dial	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness (between EC dial and MC, or MC and ECM)	* Repair
	Faulty controller (MC, ECM)	* Replace
	Performing manual regeneration	(Normal control)
Work mode does not change	Faulty mode switch	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness (between MC and monitor)	* Repair
	Faulty controller (MC)	* Replace
	Faulty solenoid valve	* Repair or replace
Auto-idle is inoperable or not released	Faulty pressure sensor	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness	* Repair
	Faulty controller	* Replace
	Performing manual regeneration	(Normal control)

Items with * mark: Consult your nearest Hitachi dealer.

Pump Control		
Problem	Cause	Solution
Front attachment and/or travel speed is slow	Blown control fuse	Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness	* Repair
	Faulty controller	* Replace
	Faulty pump solenoid valve	* Replace
	Faulty pressure sensor	* Replace

Items with * mark: Consult your nearest Hitachi dealer.

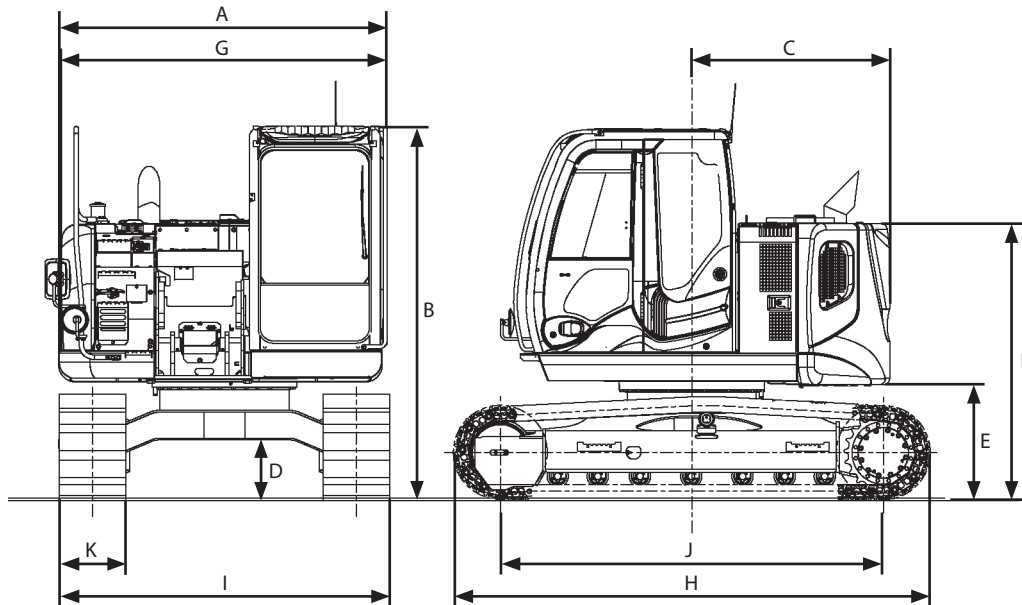
Others

The machine may have a noise, excessive vibration, and abnormal smell when any trouble occurs. Always beware of the machine conditions during operation.

SPECIFICATIONS


Specifications

ZX135US-5B



MDCN-12-006

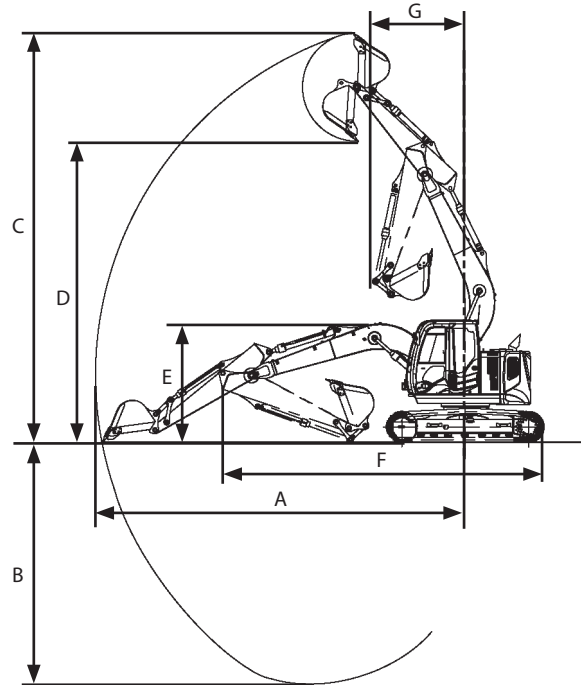
Model	ZX135US-5B
Type of Front-End Attachment	2.52 m Arm
Bucket Capacity (Heaped)	PCSA 0.50 m ³ , CECE 0.45 m ³
Operating Weight	13400 kg
Base Machine Weight	10800 kg
Engine	ISUZU AM-4JJ1XZSA-03 73.4 kW/2000 min ⁻¹ (100 PS/2000 rpm)
A: Overall Width (Excluding back mirrors)	2490 mm
B: Cab Height	2790 mm
C: Rear End Swing Radius	1490 mm
D: Minimum Ground Clearance	*410 mm
E: Counterweight Clearance	*840 mm
F: Engine Cover Height	*2060 mm
G: Overall Width of Upperstructure	2480 mm
H: Undercarriage Length	3580 mm
I: Undercarriage Width	2490 mm
J: Sprocket Center to Idle Center	2880 mm
K: Track Shoe Width	500 mm (Grouser shoe)
Ground Pressure	42 kPa (0.43 kgf/cm ²)
Swing Speed	13.3 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5/3.3 km/h
Gradeability	35° (tanθ = 0.70)

 NOTE: * The dimensions do not include the height of the shoe lug.

SPECIFICATIONS


Working Ranges (Grouser shoe)

ZX135US-5B



MDCN-12-001

Category	2.10 m Arm	2.52 m Arm	3.01 m Arm
	Backhoe	Backhoe	Backhoe
Item	mm	mm	mm
A: Maximum Digging Reach	8020	8390	8860
B: Maximum Digging Depth	5070	5490	5980
C: Maximum Cutting Height	9020	9290	9690
D: Maximum Dumping Height	6550	6830	7220
E: Overall Height	2790	2790	*2780
F: Overall Length	7360	7370	7390
G: Minimum Swing Radius	2000	2110	2450

 **NOTE:** The dimensions do not include height of the shoe lug (except Item E). *The dimensions asterisked are for transport pin position.

SPECIFICATIONS

Shoe Types and Applications

ZX135US-5B

Shoe Width		500 mm Grouser Shoe	600 mm Grouser Shoe	700 mm Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)	For Weak Footing (Option)
Operating Weight	kg	13400	13700	13900
Base Machine Weight	kg	10800	11100	11300
Cab Height	mm	2790	2790	2790
Minimum Ground Clearance	mm	*410	*410	*410
Undercarriage Length	mm	3580	3580	3580
Undercarriage Width	mm	2490	2590	2690
Ground Pressure		42 kPa (0.43 kgf/cm ²)	36 kPa (0.37 kgf/cm ²)	31 kPa (0.32 kgf/cm ²)

Shoe Width		500 mm Pad Crawler Shoe	500 mm Rubber Pad Shoe
Application		For Paved Road (Option)	For Paved Road (Option)
Operating Weight	kg	13500	13800
Base Machine Weight	kg	10900	11300
Cab Height	mm	2830	2830
Minimum Ground Clearance	mm	470	470
Undercarriage Length	mm	3670	3660
Undercarriage Width	mm	2490	2490
Ground Pressure		42 kPa (0.43 kgf/cm ²)	43 kPa (0.44 kgf/cm ²)


 NOTE:

- The specifications for the front-end attachment is for 2.52 m arm with PCSA 0.50 m³ bucket.
- 600 mm, 700 mm grouser shoe, 500 mm pad crawler shoe and 500 mm rubber pad shoe should not be used on gravel or rocky ground.
- * The dimensions do not include the height of the shoe lug.

SPECIFICATIONS

Bucket Types and Applications

ZX135US-5B

Bucket	Bucket Capacity m ³		Bucket Width mm		Front-End Attachment		
	PCSA (Heaped)	CECE (Heaped)	With Side Cutters	Without Side Cutters	2.10 m Arm	2.52 m Arm	3.01 m Arm
Hoe Bucket	0.19	0.17	550	450	●	●	●
	0.30	0.25	700	580	●	●	●
	0.40	0.33	800	680	●	●	●
	0.45	0.40	970	850	●	●	○
	0.50	0.45	1010	890	●	●	*○
	0.59	0.50	1070	950	●	○	–
	0.66	0.55	–	1030	□	–	–
Reinforced Hoe Bucket	0.50	0.45	1010	890	●	●	*○
Reinforced Hoe Bucket	0.59	0.50	1070	950	●	○	–
One Point Ripper	–	–	–	–	■	■	–
Slope-Finishing Blade	–	–	1000 x 1600		◇	◇	◇
V-Type Bucket	–	–			○	○	○

 **NOTE:**

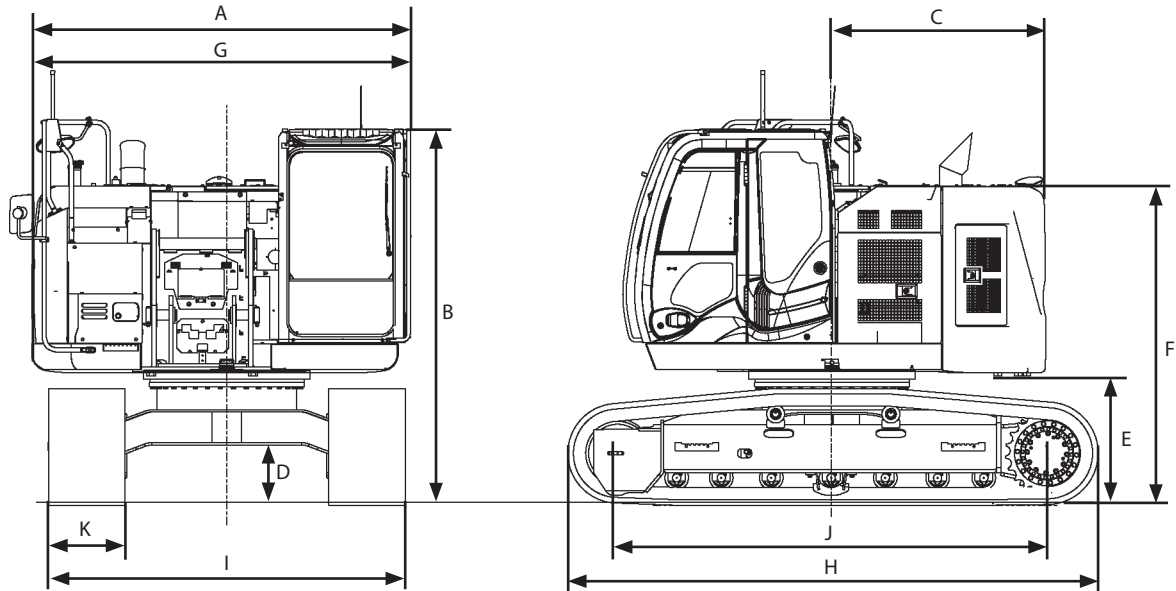
- Symbols in the above table have the following meanings.
 - : General excavating
 - : Light duty excavating
 - : Rock digging
 - : Loading work
 - ◇ : Slope-finishing work
 - : Not applicable (not warrantable)
- Hoe bucket is applicable to the following types of work.
 - General excavating:
For digging and loading operation of sand, gravel, clay, ordinary earth and so on.
 - Light duty excavating:
For digging and loading operation of dry, loosened earth, sand, mud and so on.
Their bulk density shall be less than 1.60 t/m³ as a standard.
 - Loading:
For loading operation of dry, loosened earth and sand.
Their bulk density shall be less than 1.10 t/m³ as a standard.
 - Rock digging:
For digging/loading operation of mountain gravels, blasted rock, hard clay, soft rock and so on.
- * Applicable only to 700 mm grouser shoe.

IMPORTANT: Using inapplicable buckets may cause serious damage to the front structure such as boom, arm and hydraulic cylinders.

SPECIFICATIONS

Specifications

ZX225US-5B, 225USLC-5B



MDCN-12-002

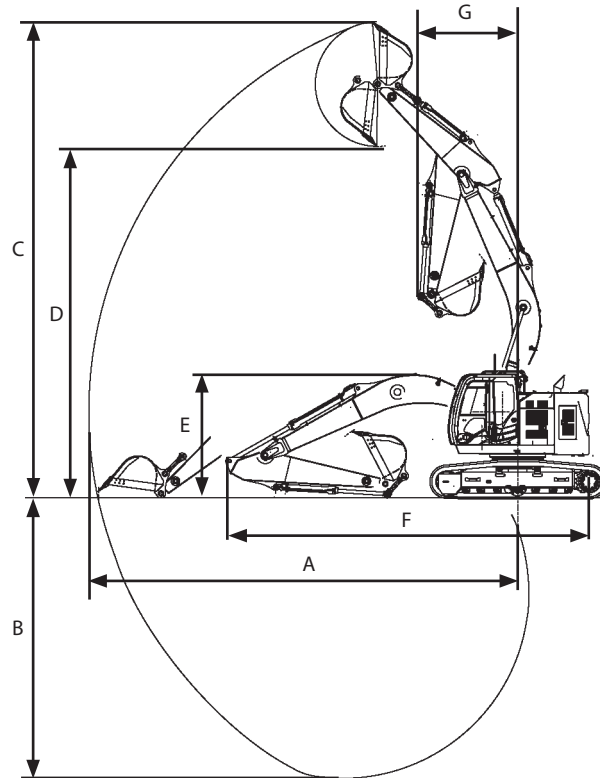
Model	ZX225US-5B	ZX225USLC-5B
Type of Front-End Attachment	2.91 m Arm	
Bucket Capacity (Heaped)	PCSA 0.80 m ³ , CECE 0.70 m ³	
Operating Weight	23800 kg	24300 kg
Base Machine Weight	19400 kg	19900 kg
Engine	ISUZU AM-4HK1XZSA-03 122 kW/2000 min ⁻¹ (166 PS/2000 rpm)	
A: Overall Width (Excluding back mirrors)	2910 mm	2990 mm
B: Cab Height	2950 mm	
C: Rear End Swing Radius	1680 mm	
D: Minimum Ground Clearance	*450 mm	
E: Counterweight Clearance	*990 mm	
F: Engine Cover Height	*2490 mm	
G: Overall Width of Upperstructure	2910 mm	
H: Undercarriage Length	4170 mm	4460 mm
I: Undercarriage Width	2800 mm	2990 mm
J: Sprocket Center to Idle Center	3370 mm	3660 mm
K: Track Shoe Width	600 mm (Grouser shoe)	
Ground Pressure	53 kPa (0.54 kgf/cm ²)	50 kPa (0.51 kgf/cm ²)
Swing Speed	11.8 min ⁻¹ (rpm)	
Travel Speed (fast/slow)	5.5/3.5 km/h	
Gradeability	35° (tanθ = 0.70)	

NOTE: *The dimensions do not include the height of the shoe lug.

SPECIFICATIONS

Working Ranges (Grouser shoe)

ZX225US-5B, 225USLC-5B



MDCN-12-003

Item	Category	2.42 m Arm	2.91 m Arm
		Backhoe	Backhoe
		mm	mm
A: Maximum Digging Reach		9620	10110
B: Maximum Digging Depth		6120	6620
C: Maximum Cutting Height		10790	11230
D: Maximum Dumping Height		7860	8290
E: Overall Height		3230	3020
F: Overall Length		9270	9110
G: Minimum Swing Radius		2720	2380

 NOTE: The dimensions do not include height of the shoe lug (except Item E).

SPECIFICATIONS

Shoe Types and Applications

ZX225US-5B

Shoe Width		600 mm Grouser Shoe	700 mm Grouser Shoe	800 mm Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)	For Weak Footing (Option)
Operating Weight	kg	23800	24200	24500
Base Machine Weight	kg	19400	19800	20100
Cab Height	mm	2950	2950	2950
Minimum Ground Clearance	mm	*450	*450	*450
Undercarriage Length	mm	4170	4170	4170
Undercarriage Width	mm	2800	2900	3000
Ground Pressure		53 kPa (0.54 kgf/cm ²)	46 kPa (0.47 kgf/cm ²)	41 kPa (0.42 kgf/cm ²)

ZX225USLC-5B

Shoe Width		600 mm Grouser Shoe	700 mm Grouser Shoe	800 mm Grouser Shoe	900 mm Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)	For Weak Footing (Option)	For Weak Footing (Option)
Operating Weight	kg	24300	24700	25000	25500
Base Machine Weight	kg	19900	20300	20600	21100
Cab Height	mm	2950	2950	2950	2950
Minimum Ground Clearance	mm	*450	*450	*450	*450
Undercarriage Length	mm	4460	4460	4460	4460
Undercarriage Width	mm	2990	3090	3190	3290
Ground Pressure		50 kPa (0.51 kgf/cm ²)	44 kPa (0.45 kgf/cm ²)	39 kPa (0.39 kgf/cm ²)	35 kPa (0.36 kgf/cm ²)

 **NOTE:**

- The specifications for the front-end attachment is for 2.91 m arm with PCSA 0.8 m³ bucket.
- 700 mm, 800 mm and 900 mm grouser shoe should not be used on gravel or rocky ground.
- * The dimensions do not include the height of the shoe lug.

SPECIFICATIONS

Bucket Types and Applications

ZX225US-5B, 225USLC-5B

Bucket	Bucket Capacity m ³		Bucket Width mm (With side cutter)	Application	Front-End Attachment	
	PCSA (Heaped)	CECE (Heaped)			2.42 m Arm	2.91 m Arm
Hoe Bucket	0.51	0.45	830		●	●
	0.80 HD	0.7	1150		●	●
	0.80	0.7	1140		●	●
	0.91	0.8	1260		●	●
	1.10	0.9	1440		○	□
	1.20	1.0	1450 (Without side cutter)		□	–
Bucket reinforcement can be welded in four places upon customer's request	0.80	0.7	1140		●	●
	0.91	0.8	1260		●	●
Reinforced Hoe Bucket HD Type (Transverse- Type-Pin-Used Type)	0.80	0.7	1140		●	●
V-Type Bucket	–		90 °	Excavating V-trenches	○	○
Ripper Bucket		0.50	800 (Without side cutter)		■	–
One Point Ripper	–		–		■	–
Slope-Finishing Blade	–		1800	Bank cutting finish	◇	◇

 **NOTE:**

- Symbols in the above table have the following meanings.
 - : General excavating
 - : Light duty excavating
 - : Rock digging
 - : Loading work
 - ◇ : Slope-finishing work
 - : Not applicable (not warrantable)
- Hoe bucket is applicable to the following types of work.
 - General excavating:
For digging and loading operation of sand, gravel, clay, ordinary earth and so on.
 - Light duty excavating:
For digging and loading operation of dry, loosened earth, sand, mud and so on.
Their bulk density shall be less than 1.60 t/m³ as a standard.
 - Loading:
For loading operation of dry, loosened earth and sand.
Their bulk density shall be less than 1.10 t/m³ as a standard.
 - Rock digging:
For digging/loading operation of mountain gravels, blasted rock, hard clay, soft rock and so on.

IMPORTANT: Using inapplicable buckets may cause serious damage to the front structure such as boom, arm and hydraulic cylinders.

OPTIONAL ATTACHMENTS AND DEVICES

Using Pad Crawler Shoe

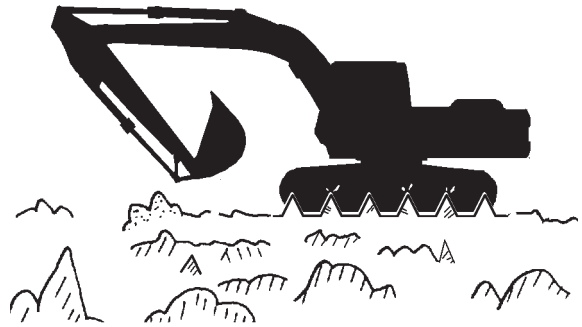
Pad crawler is a tract link on which a rubber pad is installed so the machine does not damage road surfaces when traveling. Be sure to observe all precautions for handling pad crawler. Avoid operating the machine in the following conditions:

Forbidden Operations

Do not operate on sharp, rocky, uneven surfaces, such as river rock, gravel, etc.

Do not allow engine oil, gasoline, etc. to remain on the track, and avoid traveling in oil in order to reduce the danger of slipping.

While raising the machine using the front attachment do not allow the other side track to drive, possibly causing personal injury, damaging or displacing pad crawler.



M107-05-051

OPTIONAL ATTACHMENTS AND DEVICES

Traveling and Other Cautions

Do not keep the pad crawler shoe under direct sunlight for more than three months.

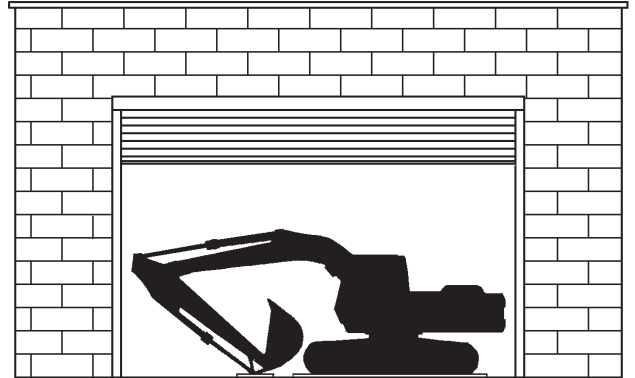
Avoid reckless steering operations on concrete road to the extent possible, as this will cause wear to the shoe lug. Also, avoid running on asphalt road of more than 60 °C (140 °F) in temperature, as this will cause wear to the shoe as well as damage to the road surface.

Ease the machine down from the jacked-up position. Do not let it drop.

Pad crawler has large friction force. Therefore to avoid damaging the pad crawler slowly operate the control levers to gradually turn the machine.

After raising one side track with the front attachment, slowly lower the pad crawler equipped machine.

If the pad crawler becomes severely damaged, contact your nearest Hitachi Dealer for replacement.



M107-05-052

OPTIONAL ATTACHMENTS AND DEVICES

Transporting

Transporting

⚠ CAUTION: Fasten chains or cables to the machine frame. Do not place chains or cables over or against the hydraulic lines or hoses.

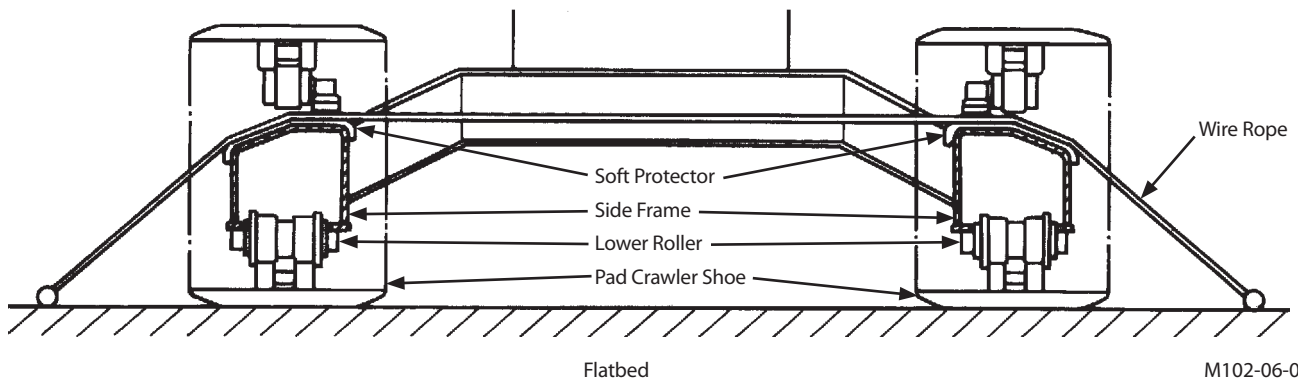
1. Place blocks in front of and behind the tracks.
2. Fasten each corner of the machine and front attachment to the trailer with a chain or cable.



M107-06-013

Precautions for Transporting Machines with Pad Crawler Shoes

When transporting a machine with pad crawler shoes, be sure to fasten the right and left track frames securely to the flatbed with wire ropes and soft protectors, as shown. Do not allow wire ropes to come into direct contact with pad crawler shoes.



OPTIONAL ATTACHMENTS AND DEVICES

Check Track Sag --- every 50 hours


Swing the upperstructure 90 ° and lower the bucket to raise the track off the ground as shown.

Keep the angle between the boom and arm 90 to 110 ° and position the bucket's round side on the ground. Place blocks under the machine frame to support the machine. Rotate the raised track in reverse two full rotations and then forward two full rotations.

Measure distance (A) at the middle of the track frame from the bottom of the track frame to the back face of the track shoe.

Track sag specifications

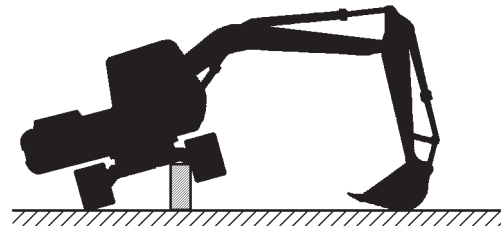
Model	A
ZX135US-5B	250 to 280 mm (9.8 to 11.0 in)
ZX225USLC-5B, 225USRLC-5B	300 to 335 mm (11.8 to 13.2 in)

 **NOTE:** Check track sag after thoroughly removing soil stuck on the track area by washing.

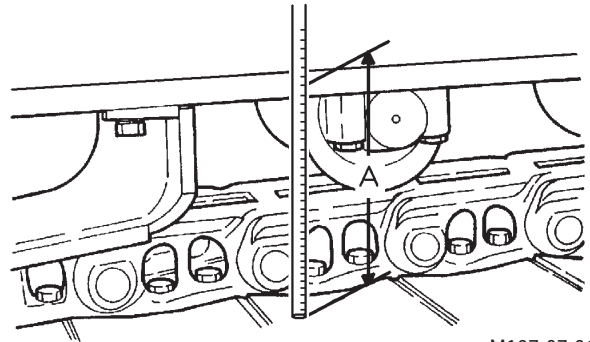
Adjust Track Sag

Precautions for Adjusting Track Sag

1. If track sag is not within specifications, loosen or tighten the track following the procedures shown on the next page.
2. When adjusting track sag, lower the bucket to the ground to raise one track off the ground. Repeat this procedure to raise the other track. Each time, be sure to place blocks under the machine frame to support the machine.
3. After adjusting track sag of both tracks, move the machine back and forth several times.
4. Check track sag again. If track sag is not within specifications, repeat adjustment until correct sag is obtained.



M104-07-067



M107-07-068

OPTIONAL ATTACHMENTS AND DEVICES

Loosen the Track (ZX135US-5B)

CAUTION: Do not loosen valve (1) quickly or loosen it too much as high-pressure grease in the adjusting cylinder may spout out. Loosen carefully, keeping body parts and face away from valve (1). Never loosen grease fitting (2).

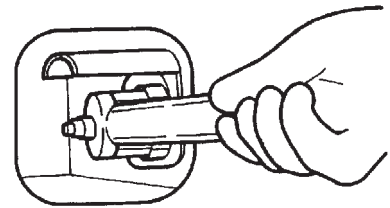
IMPORTANT: When gravel or mud is packed between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 19; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track.
3. If grease does not drain smoothly, slowly rotate the raised track.
4. When proper track sag is obtained, turn valve (1) clockwise and tighten to 90 N·m (9 kgf·m).

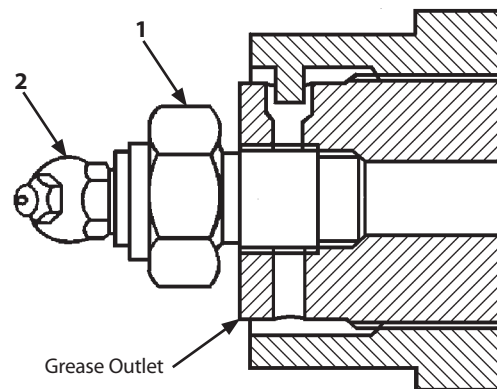
Tighten the Track

CAUTION: It is abnormal if the track remains tight after turning valve (1) counterclockwise or if the track is still loose after charging grease to fitting (2). In such cases, NEVER ATTEMPT TO DISASSEMBLE the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.



M107-07-075



M104-07-119

OPTIONAL ATTACHMENTS AND DEVICES

Loosen the Track (ZX225USLC-5B, 225USRLC-5B)

CAUTION: The pressure inside the cylinder of the track adjuster is high. Do not loosen valve (1) quickly or loosen it too much as valve (1) may fly out or high-pressure grease in the adjusting cylinder may spout out. Slowly loosen valve (1) while keeping body parts and face away from valve (1). Never loosen grease fitting (2).

IMPORTANT: When gravel or mud is packed between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 24; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track. When valve (1) comes in contact with stop plate (3), do not loosen valve (1) further.
3. If grease does not drain smoothly, slowly rotate the raised track.

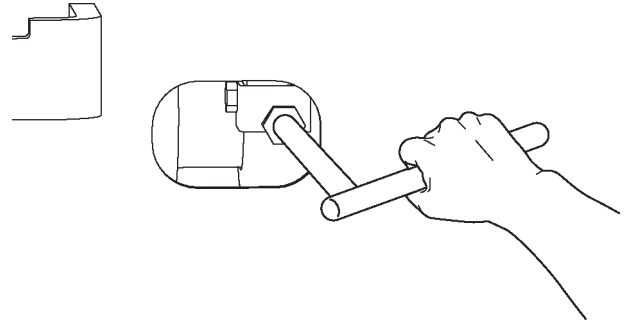
CAUTION: To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

4. When proper track sag is obtained, turn valve (1) clockwise to the original condition.

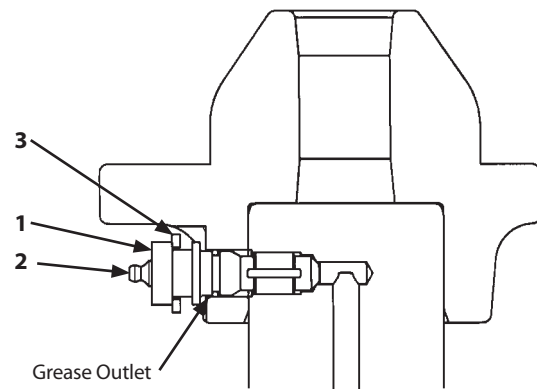
Tightening Torque: 90 N·m (9 kgf·m)

Do not remove valve stop plate (3). Do not loosen bolt (4) while adjusting the track sag.

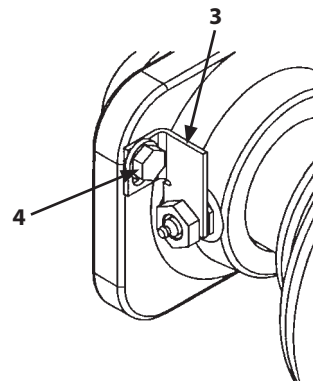
CAUTION: Consult your authorized dealer if grease is not sufficiently drained.



MDAA-07-013



MDAA-07-014



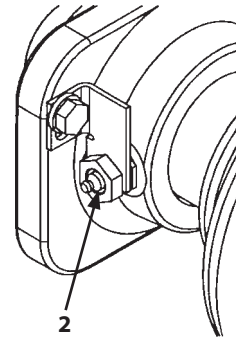
MDAA-07-057

OPTIONAL ATTACHMENTS AND DEVICES

Tighten the Track

⚠ CAUTION: It is abnormal if the track can not be adjusted. The strong force acts on the spring in track adjuster. Therefore, the grease in cylinder is highly pressurized. In such cases, **NEVER ATTEMPT TO DISASSEMBLE** the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.



MDAA-07-057

OPTIONAL ATTACHMENTS AND DEVICES

Long Arm Operation --- If Equipped

ZX135US-5B

1. The optional [3.01 m] long arm is only for light works such as loam loading, sludge handling, etc.. Do not use it for heavy works such as digging gravel. When the arm is used for digging, apply shallow cut to the ground to avoid tough digging, or arm damage may result.
2. When the machine is equipped with the [3.01 m] long arm, the hoe-bucket size must be limited to the followings due to stability and strength of the machine;
 - * PCSA 0.45 m³
 - PCSA 0.50 m³
 - * with 700 mm shoe
3. When the machine is equipped with the long arm, connect the arm cylinder end to:
 - Pin bore A (when the machine is in operation)
 - Pin bore B (when the machine is transported)

IMPORTANT: Connect the arm cylinder rod end to pin bore B only when the machine is transported. Do not operate the digging or loading function with the arm cylinder connected to pin bore B as the bucket may hit the cab accidentally with this connection.

When transporting the machine, follow the procedure shown below to convert it into the transporting posture.

- (a) Position the bucket cylinder with rod retracted a little from the fully extended position.
- (b) Position the arm cylinder with rod retracted a little from the fully extended position.
- (c) Lower the boom until the arm top comes into contact with the ground.

Unit: mm

Arm Cylinder Rod End Connected To:	Height of Front Attachment (H)	
	ZX135US-5B	
	Without Bucket	With Bucket
Pin Bore A	2900	3160
Pin Bore B	2610	2760

Dimensions include shoe lug height.



M163-05-001

OPTIONAL ATTACHMENTS AND DEVICES

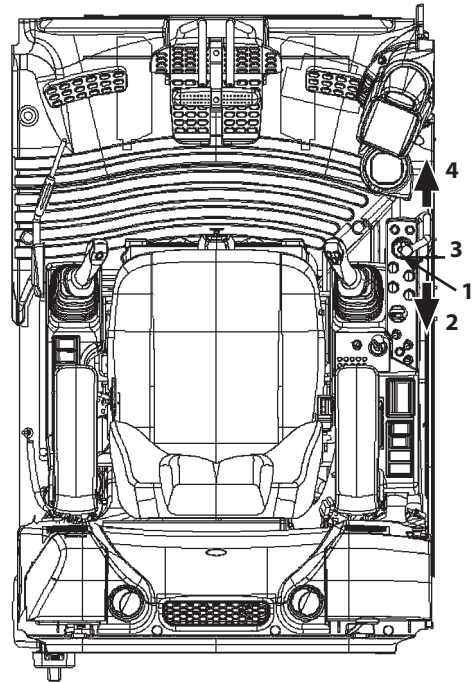
Blade Lever

ZX135US-5B, 225USLC-5B

Use blade lever (1) on the operator's right to raise and lower the blade.

When the lever is released, it automatically returns to neutral, keeping the blade in its position until the lever is operated again.

- 1- Blade Lever
- 2- Blade Raise
- 3- Neutral
- 4- Blade Lower



MDCN-13-001

Precautions for Blade Operation

This blade is designed as a light service attachment for the hydraulic excavator. Please keep the following points in mind:

1. This blade is designed to be used for dozing work only. Do not attempt to dig deeply with the blade. Doing so will damage not only the blade but the undercarriage as well.
2. Do not apply intensive or uneven loads. Never apply high-speed impact to the blade by running the machine into a load.
3. Jacking up the machine with this blade, the surface beneath the blade comes under high pressure, increasing the risk of surface collapse.

Always be sure that the surface is strong enough to support the weight of the machine during operation.

Avoid dangerously uneven distribution of weight on the blade by maintaining even contact between the blade and the ground.
4. Never use this blade as an outrigger.
5. Avoid contact between the bucket and the blade while digging.

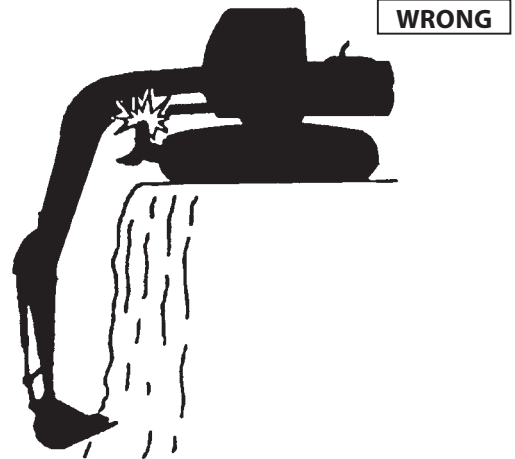


M155-14-008

OPTIONAL ATTACHMENTS AND DEVICES

Avoid Hitting Blade with Front-End Attachment

When operating the machine with the blade positioned towards the front, the bucket or boom cylinder may come into contact with the blade if you are not careful. Be sure to prevent this from happening.



M155-14-009



M155-14-010

Avoid Hitting Blade with Bucket

When crowding the arm into a traveling or transporting position, be careful not to let the bucket hit the blade.



M155-14-010

Avoid Striking the Blade into a Rock

Do not attempt to strike large rocks with the blade, as doing so will damage the blade and the blade cylinders, shortening their operating lives.



M155-14-011

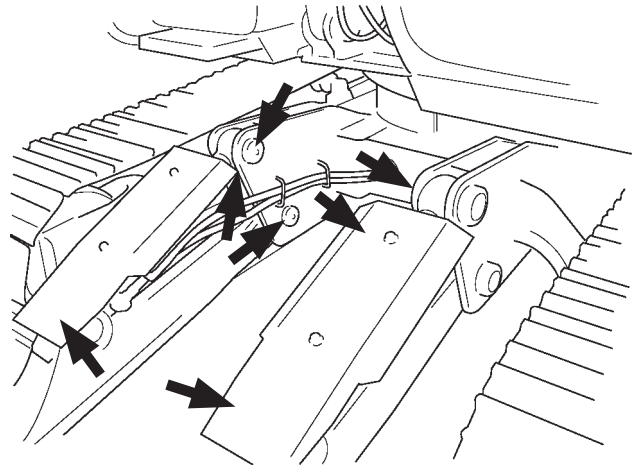
OPTIONAL ATTACHMENTS AND DEVICES

Blade Maintenance

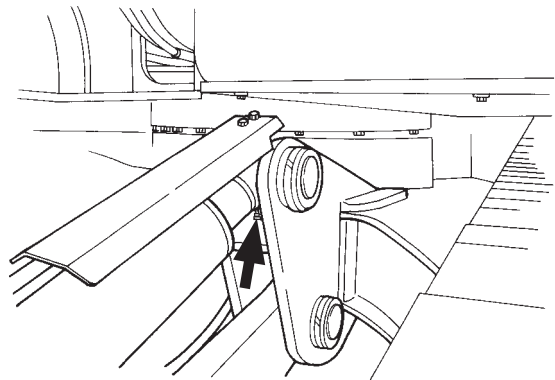
Greasing --- every 250 hours

Lubricate all fittings shown in the figure.

- Blade Joint Pins (4 points)
- Blade Cylinder Rod (2 points)
- Blade Cylinder Bottom (2 points)



M175-13-002



M198-07-017

Transportation Figure for Machine Equipped with Blade

When transporting the machine equipped with a blade and a long arm front attachment on a trailer, place the blade in the opposite position toward the front attachment. Otherwise, the bucket may come in contact with the blade.

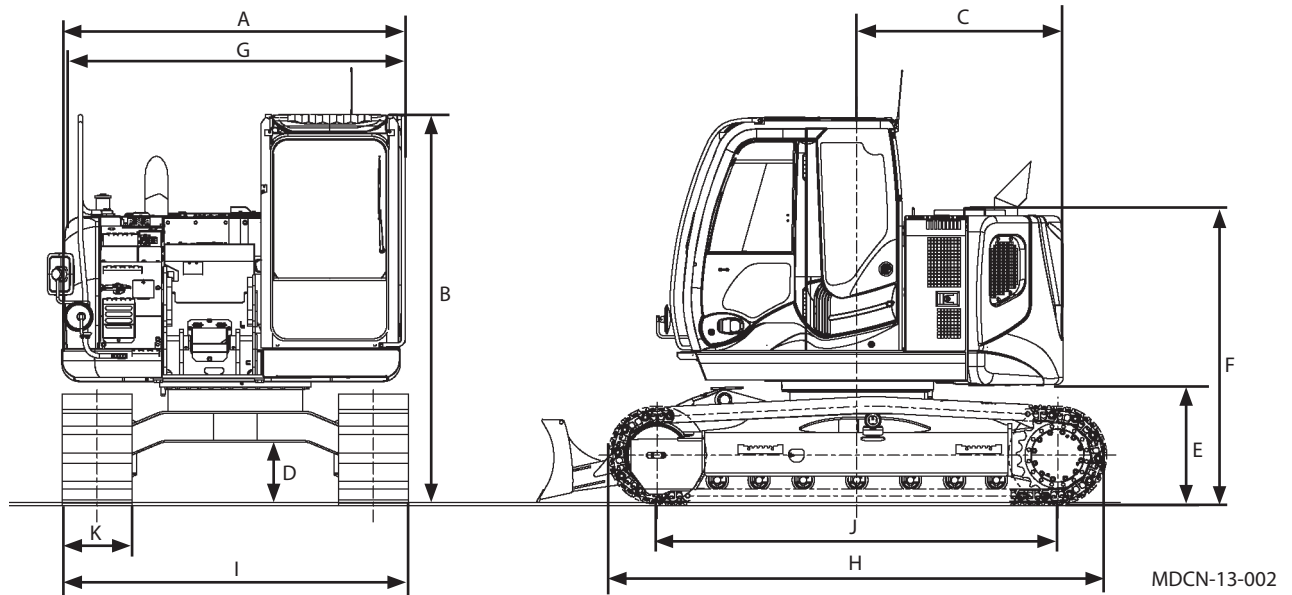


M175-13-005

OPTIONAL ATTACHMENTS AND DEVICES

Specifications

ZX135US-5B with Blade



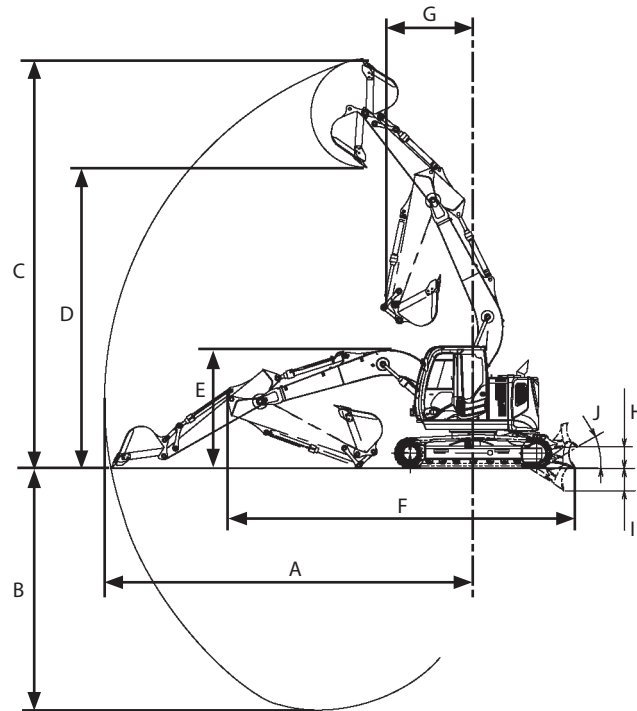
Model	ZX135US-5B with Blade
Type of Front-End Attachment	2.52 m Arm
Bucket Capacity (Heaped)	PCSA 0.50 m ³ , CECE 0.45 m ³
Operating Weight	14400 kg
Base Machine Weight	11800 kg
Engine	ISUZU AM-4JJ1XZSA-03 73.4 kW/2000 min ⁻¹ (100 PS/2000 rpm)
A: Overall Width (Excluding back mirrors)	2490 mm
B: Cab Height	2790 mm
C: Rear End Swing Radius	1490 mm
D: Minimum Ground Clearance	*410 mm
E: Counterweight Clearance	*840 mm
F: Engine Cover Height	*2060 mm
G: Overall Width of Upperstructure	2480 mm
H: Undercarriage Length	3580 mm
I: Undercarriage Width	2490 mm
J: Sprocket Center to Idle Center	2880 mm
K: Track Shoe Width	500 mm (Grouser Shoe)
Ground Pressure	45 kPa (0.46 kgf/cm ²)
Swing Speed	13.3 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5/3.3 km/h
Gradeability	35 ° (tanθ = 0.70)

NOTE: * The dimensions do not include the height of the shoe lug.

OPTIONAL ATTACHMENTS AND DEVICES

Working Ranges

ZX135US-5B with Blade



MDCN-13-004

Model		ZX135US-5B with Blade		
Category		2.10 m Arm	2.52 m Arm	3.01 m Arm
Item				
A: Maximum Digging Reach	mm	8020	8390	8860
B: Maximum Digging Depth	mm	5070	5490	5980
C: Maximum Cutting Height	mm	9020	9290	9690
D: Maximum Dumping Height	mm	6550	6830	7220
E: Overall Height	mm	2790	2790	*2780
F: Overall Length	mm	7880	7890	*7910
G: Minimum Swing Radius	mm	2000	2100	2450
H: Max. Raising Height	mm		460	
I: Max. Digging Depth	mm		540	
J: Blade Angle	degree		28.5	

NOTE: The dimensions do not include height of the shoe lug (except Item E). * The dimensions asterisked are for transport pin position.

OPTIONAL ATTACHMENTS AND DEVICES

Shoe Types and Applications

ZX135US-5B with Blade

Shoe Width		500 mm Grouser Shoe	500 mm Pad Crawler Shoe	500 mm Rubber Pad Shoe
Application		For Ordinary Ground (Standard)	For Paved Road (Option)	For Paved Road (Option)
Operating Weight	kg	14400	14500	14900
Base Machine Weight	kg	11800	11900	12300
Cab Height	mm	2790	2830	2830
Minimum Ground Clearance	mm	*410	470	470
Undercarriage Length	mm	3580	3670	3660
Undercarriage Width	mm	2490	2490	2490
Ground Pressure		45 kPa (0.46 kgf/cm ²)	45 kPa (0.46 kgf/cm ²)	46 kPa (0.47 kgf/cm ²)

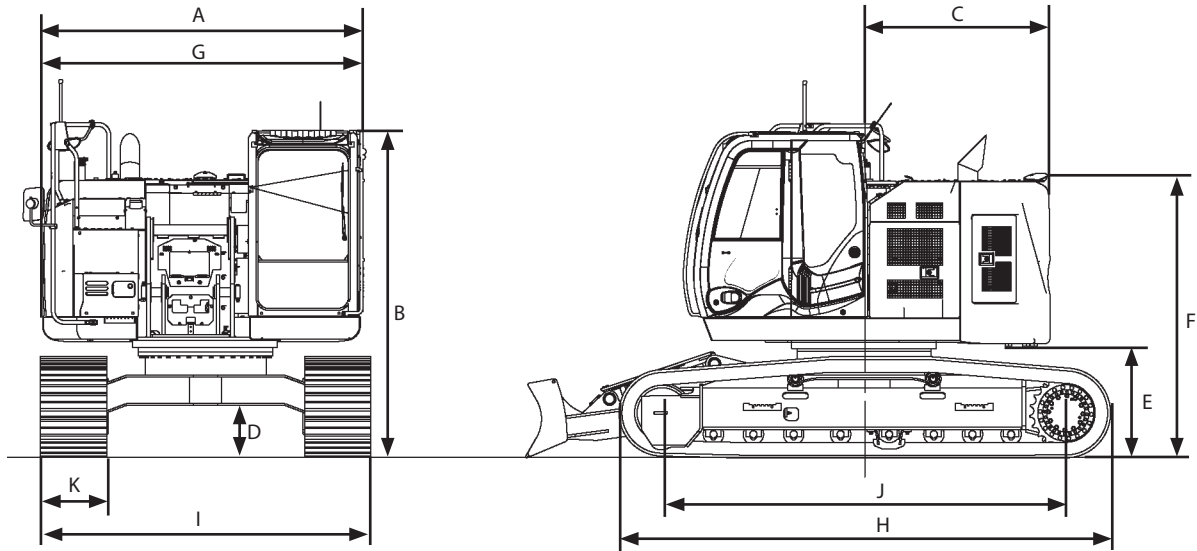
 **NOTE:**

- *The specifications for the front-end attachment are for a 2.52 m arm with PCSA 0.50 m³ standard bucket.*
- *700 mm grouser shoe, 500 mm pad crawler shoe and 500 mm rubber pad shoe should not be used on gravel or rocky ground.*
- ** The dimensions do not include the height of the shoe lug.*

OPTIONAL ATTACHMENTS AND DEVICES

Specifications

ZX225USLC-5B with Blade



MDCN-13-014

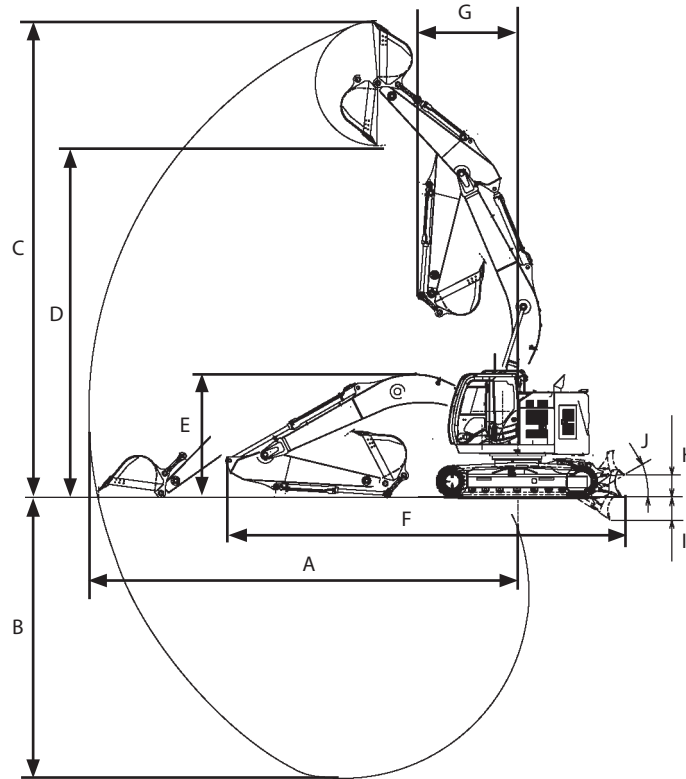
Model	ZX225USLC-5B with Blade
Type of Front-End Attachment	2.91 m Arm
Bucket Capacity (Heaped)	PCSA 0.80 m ³ , CECE 0.70 m ³
Operating Weight	26300 kg
Base Machine Weight	21900 kg
Engine	ISUZU AM-4HK1XZSA-03 122 kW/2000 min ⁻¹ (166 PS/2000 rpm)
A: Overall Width (Excluding back mirrors)	2990 mm
B: Cab Height	2950 mm
C: Rear End Swing Radius	1680 mm
D: Minimum Ground Clearance	*450 mm
E: Counterweight Clearance	*990 mm
F: Engine Cover Height	*2490 mm
G: Overall Width of Upperstructure	2910 mm
H: Undercarriage Length	4460 mm
I: Undercarriage Width	2990 mm
J: Sprocket Center to Idle Center	3660 mm
K: Track Shoe Width	600 mm (Grouser shoe)
Ground Pressure	55 kPa (0.56 kgf/cm ²)
Swing Speed	11.8 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5/3.4 km/h
Gradeability	30 ° (tanθ = 0.58)

NOTE: *The dimensions do not include the height of the shoe lug.

OPTIONAL ATTACHMENTS AND DEVICES

Working Ranges (Grouser shoe)

ZX225USLC-5B with Blade



MDCN-13-015

Model		ZX225USLC-5B with Blade	
Item	Category	2.42 m Arm	2.91 m Arm
		A: Maximum Digging Reach	mm
B: Maximum Digging Depth	mm	6120	6620
C: Maximum Cutting Height	mm	10790	11230
D: Maximum Dumping Height	mm	7860	8290
E: Overall Height	mm	3230	3020
F: Overall Length	mm	9270	9110
G: Minimum Swing Radius	mm	2720	2380
H: Max. Raising Height	mm	570	
I: Max. Digging Depth	mm	300	
J: Blade Angle	degree	25	

NOTE: The dimensions do not include height of the shoe lug (except Item E).

OPTIONAL ATTACHMENTS AND DEVICES

Shoe Types and Applications

ZX225USLC-5B with Blade

Shoe Width		600 mm Grouser Shoe
Application		For Ordinary Ground (Standard)
Operating Weight	kg	26300
Base Machine Weight	kg	21900
Cab Height	mm	2950
Minimum Ground Clearance	mm	*450
Undercarriage Length	mm	4460
Undercarriage Width	mm	2990
Ground Pressure		55 kPa (0.56 kgf/cm ²)

 **NOTE:**

- The specifications for the front-end attachment is for 2.91 m arm with PCSA 0.8 m³ bucket.
- * The dimensions do not include the height of the shoe lug.

OPTIONAL ATTACHMENTS AND DEVICES

Bucket Teeth (Transverse-Type-Pin-Used Type)

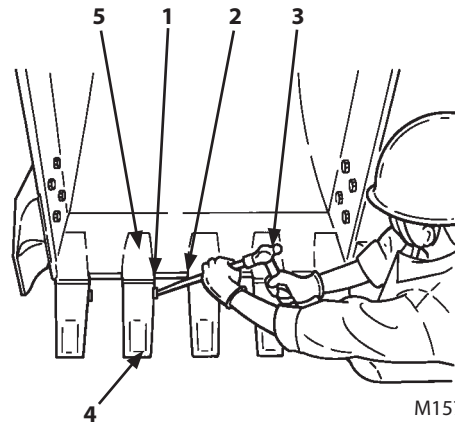
Replacement Procedure

⚠ CAUTION: Guard against injury from flying pieces of metal. Wear goggles or safety glasses.

1. Securely lower the bucket to the ground.
2. Use hammer (3) and drift (2) to drive out transverse-type locking pin (1) to remove tooth (4).

✎ NOTE: Be sure to use a drift (2) thinner than pin (1).

3. Clean shank (5) surface. Attach a new tooth (4) onto shank (5). Insert pin (1) as deep as it goes. Then, drive pin (1) using hammer (3) and drift (2) to securely lock tooth (4).



M157-14-013

INDEX

A		
Acting Time Setting	1-48	
Actual Operation	1-79	
Adjust Bucket Linkage	7-94	
Adjust the Operator's Seat	5-6	
Adjusting Operator's Seat	1-126	
Adjusting Operator's Seat (Optional)	1-128	
Adjusting Procedures	1-130	
Adjusting Seat Height	1-128	
After the First 100 Hours	2-1	
After the First 50 Hours	2-1	
Air Bleeding Procedures	7-39	
Air Cleaner	7-66	
Air Conditioner	1-27	
Air Conditioner ON/OFF	1-27	
Alarm Occurrence Screen	1-17	
AM/FM Radio Operation	1-112	
AM/FM Selector/Tuning Switch (Radio)	1-89	
Angle Adjustment of Seat Surface	1-129	
Armrest Adjustment	1-127, 1-129	
Attachment	5-36	
Attachment Adjustment	1-39	
Attachment Connection Parts	5-40	
Attachment Name Input	1-45	
Attachment Operation	1-75	
Attachment Pedal (Hydraulic Breaker) (Optional)	5-2	
Attachment Pedal (Hydraulic Crusher) (Optional)	5-3	
Attachment Selection	1-29	
Audio Input (Optional)	1-116	
Auto Air Conditioner	1-104	
Auto Shut-Down	1-47, 5-9	
Auto Shut-Down: ON/OFF	1-47	
AUTO/OFF Switch/Fan Switch (Air Conditioner)	1-88	
Auto-Idle	5-7	
Auto-Idle Switch	1-90	
Avoid Abusive Operation	5-23	
Avoid Applying Heat to Lines Containing Flammable Fluids	5-34	
Avoid Hammer Work	5-22	
Avoid Heating Near Pressurized Fluid Lines	5-34	
Avoid High-Pressure Fluids	5-29	
Avoid Hitting Blade with Front-End Attachment	13-10	
Avoid Injury from Attachment Falling Accident	5-28	
Avoid Injury from Back-Over and Swing Accidents	5-17	
Avoid Injury from Rollaway Accidents	5-16	
Avoid Power Lines	5-21	
Avoid Side Load the Bucket	5-23	
Avoid Tipping	5-19	
Avoid Undercutting	5-19	
B		
BREAK-IN	2-1	
Backrest Adjustment	1-127, 1-129	
Basic Screen	1-9	
Battery	7-79	
Battery Disconnect Switch	1-133	
Before Starting Engine	3-2	
Beware of Asbestos and Silicon Dust and Other Contamination		5-35
Beware of Exhaust Fumes		5-32
Blade Lever		13-9
Blade Maintenance		13-11
Breaker Operation		1-73
Brightness Adjustment		1-59
Bucket Teeth (Transverse-Type-Pin-Used Type)		13-18
Bucket Types and Applications		12-4
ZX135US-5B		12-4
ZX225US-5B, 225USLC-5B		12-8
C		
COMPONENTS NAME		1-1
Cab Door Release Lever		1-118
Cab Features (Std. Model)		1-6
Cab Heater Operation		1-108
Cab Light Switch		1-101
Change Bucket		7-92
Change Coolant		7-73
Change Engine Oil		7-25
Change Hydraulic Oil		7-37
Change Hydraulic Oil and Replace Full-Flow Filter Element		5-32
Check Air Conditioner		7-104
Check and Adjust Fan Belt Tension		7-71
Check and Clean Around the Engine		7-27
Check and Clean Filter Element of Muffler Filter		7-123
Check and Clean Muffler Filter		7-123
Check and Replace Bucket Teeth		7-86
Check and Replace EGR Device		7-107
Check and Replace Seat Belt		7-95
Check Coolant Level		7-70
Check Fuel Hoses		7-65
Check Gas Damper		7-108
Check Hoses and Lines		7-46
Check Hydraulic Oil Level		7-36
Check Instruments After Starting		3-7
Check Starter and Alternator		7-107
Check the Hour Meter Regularly		7-3
Check Track Sag		7-97
Check Turbocharger		7-107
Check Water Separator		7-63
Check Windshield Fluid Level		7-96
Cigar Lighter		1-100
Circulation Air Mode		1-27
Clean Air Conditioner Condenser		7-77
Clean and Replace Air Cleaner Element (Outer)		7-66
Clean and Replace Air Conditioner Filter		7-101
Clean Cab Floor		7-106
Clean EGR Cooler		7-107
Clean Fuel Oil Cooler		7-77
Clean Oil Cooler, Radiator and Inter Cooler Front Screen		7-77
Clean or replace the outer element		7-66
Clean Radiator/Oil Cooler/Inter Cooler Core		7-75
Clean Solenoid Fuel Pump Strainer		7-61

INDEX

Clock.....	1-13	Fore-Aft Position Adjustment of Seat Surface	1-129
Components Name	1-1, 1-105	Front Joint Pins.....	7-19
Confirm Direction of Machine to Be Driven.....	S-13	Fuel Consumption.....	1-71
Console and Seat Fore-aft Adjustment	1-126, 1-128	Fuel Gauge.....	1-13
Console Height Adjustment	1-130	Fuel System.....	7-50
Control Lever (ISO Pattern)	5-1	Fuse Box.....	1-103
Controller Part Name and Function.....	1-106	G	
Controls on the Radio	1-112	GETTING ON/OFF THE MACHINE	1-2
Convert Bucket Connection Into Face Shovel.....	7-93	General Precautions for Cab.....	S-5
Cool Head/Warm Feet Operation	1-110	Grading Operation.....	5-21
Coolant Temperature Gauge.....	1-14	Greasing.....	7-19
Cooling Operation	1-109	H	
Cooling System	7-69	HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT	8-1
Correct Maintenance and Inspection Procedures.....	7-1	Handle Chemical Products Safely.....	S-37
D		Handle Fluids Safely—Avoid Fires.....	S-23
DRIVING THE MACHINE	4-1	Hood and Access Covers.....	7-7
Daily Check.....	7-9	Horn Switch.....	1-97
Date Adjustment	1-35	Hour Meter.....	1-13
Date and Time.....	1-33	How to Lower Boom in Case of Emergency and When Engine Stops.....	5-44
Default Setting	1-8	How to Use Screens.....	1-10
Defroster Operation	1-110	Hydraulic Breaker, Hydraulic Crusher and Quick Coupler.....	5-25
Dig with Caution.....	S-20	Hydraulic Circuit	8-1
Display Item Selection (Rear View Camera OFF).....	1-66	Hydraulic System.....	7-32
Display Mode Setting.....	1-37	I	
Displaying Basic Screen	1-10	Information Menu.....	1-70
Dispose of Waste Properly.....	S-37	Input Password.....	1-15
Do Not Strike the Ground with Bucket Teeth.....	5-22	Inspect and Adjust Valve Clearance.....	7-107
Do Not Use Wide Track Shoes on Rough Ground.	5-24	Inspect Machine	S-4
Drain Fuel Filter.....	7-53	Inspect Machine Daily Before Starting	3-1
Drain Fuel Tank Sump	7-52	Inspection and Maintenance of Hydraulic Equipment... ..	7-32
Drive Machine Safely.....	S-14	Install OPG Guard	S-12
Drive the Machine Carefully	4-1	Installation and Adjustment of Mirrors	1-131
E		Installing Fire Extinguisher (Optional)	1-101
Electrical Circuit	8-2	Investigate Job Site Beforehand	S-11
Electrical Control Main Switch (Optional).....	1-96, 1-98	J	
Electrical System.....	7-78	Jump Starting	S-9
Emergency Exit	1-125	K	
Engine.....	7-23	Keep Person Clear from Working Area.....	S-18
Engine Auto-Stop in Extremely Low Temperature.....	3-11	Keep Riders off Machine	S-9
Engine Control Dial.....	1-89	Key Switch.....	1-97
Engine Oil Level	7-23	Kind of Oils.....	7-16
Engine Speed Control.....	5-6	L	
Engine Stop Switch.....	1-102	Language Settings.....	1-61
Ensure Safety Before Rising from or Leaving Operator's Seat	S-7	Layout.....	1-117
Evacuating in Case of Fire.....	S-32	Lifting Machine	6-7
Every 8 Hours or Daily.....	2-1	Lists of Display Language.....	1-63
Extending Password Duration Time	1-16	Loading/Unloading on a Trailer	6-2
F		Long Arm Operation --- If Equipped.....	13-8
Fasten Your Seat Belt.....	S-7	M	
Fastening Machine for Transporting	6-5	MACHINE NUMBERS.....	1
Features:	1-104		
Flow Rate Adjustment	1-39		
Follow Safety Instructions.....	S-2		
For Rapid Cooling.....	1-111		

INDEX

MAINTENANCE	7-1	Overload Alarm Switch (Optional)	1-95
MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS	9-1	P	
Mail (Optional).....	1-30	Park Machine Safely.....	S-23
Main Menu.....	1-26	Parking the Machine	4-8
Main Menu Sequence Change	1-68	Parking the Machine on Slopes.....	4-8
Maintenance	1-81	Password Change (Optional).....	1-51
Maintenance Guide	7-10	Periodic Replacement of Parts.....	7-15
Maintenance Under Special Environmental Conditions.....	9-1	Pilot Accumulator Functions.....	5-43
Manual Regeneration Procedure.....	1-25	Pilot Control Shut-Off Lever	1-102, 5-4
Measure Engine Compression Pressure.....	7-107	Piping for Breaker and Crusher	5-26
Miscellaneous	7-86	Power Boost Switch	1-97, 5-17
Monitor Operation	1-117	Power Mode	5-18
Monitoring.....	1-85	Power Mode Switch.....	1-91
Move and Operate Machine Safely	5-8	Power Switch/Volume Control Knob (Radio)	1-89
Muffler Filter.....	1-3, 1-23, 7-123	Practice Safe Maintenance.....	S-25
Muffler Filter Condition Display	1-23	Precaution for Arm Roll-In/Bucket Roll-In Combined Operation.....	5-42
Muffler Filter Manual Regeneration.....	5-12	Precaution for Communication Terminal Equipment	S-39
Muffler Filter Manual Regeneration Request	1-24	Precautions for After Operations	5-45
Muffler Filter Regeneration Inhibited	1-49	Precautions for Breaker Operation.....	5-28
Multi Function Monitor	1-7	Precautions for Communication Terminal.....	S-38
N		Precautions for Crusher Operation	5-33
Never Position Bucket Over Anyone	S-18	Precautions for Handling Accumulator and Gas Damper.....	S-34
Never Ride Attachment.....	S-38	Precautions for Lightning.....	S-21
Never Undercut a High Bank.....	S-20	Precautions for Operations.....	S-10
Notes for Muffler Filter.....	S-38	Precautions for Transporting Machines with Pad Crawler Shoes	13-3
Notes on Protection of Operator's Station When the Machine Rolls Over.....	S-41	Precautions for Welding and Grinding	S-33
Numeric Keypad	1-93	Preparations for Inspection and Maintenance	7-6
O		Prepare for Emergencies.....	S-3
OPERATING THE ENGINE	3-1	Prevent Battery Explosions	S-36
OPERATING THE MACHINE	5-1	Prevent Burns.....	S-28
OPERATOR'S STATION	1-3	Prevent Fires	S-30
OPTIONAL ATTACHMENTS AND DEVICES.....	13-1	Prevent Parts from Flying	S-27
Object Handling	S-22	Priority (arm roll-in).....	1-43
Observe Engine Operation Closely.....	2-1	Priority (arm roll-out)	1-41
Off-Season Air Conditioner Maintenance	1-111	Protect Against Flying Debris	S-22
Opening Side Windows.....	1-122	Protect Against Noise	S-4
Opening Upper Front Window	1-120	Provide Signals for Jobs Involving Multiple Machines.....	S-13
Opening/Closing and Removing Cab Inside Window	1-119	Pump Transmission	7-28
Opening/Closing Overhead Window (Clear Hatch: If Equipped)	1-124	R	
Opening/Closing Overhead Window (Std. Model)	1-123	Radio	1-28
Operate Only from Operator's Seat	S-8	Raise One Track Using Boom and Arm	4-5
Operate with Caution	S-20	Rear Light Switch (Optional)	1-95
Operating Backhoe.....	5-19	Rear View Camera Monitor	1-57
Operating in Water or Mud	4-7	Rear View Camera ON/OFF	1-57
Operating on Soft Ground	4-5	Recognize Safety Information	S-1
Operating Status Icon Display	1-14	Recommended Engine Oil	7-16
Operation	1-71	Recommended Fuel	7-50
Operational Procedures for Stop Valves and Selection Valve.....	5-26	Refueling	7-51
Overhead Window Wiper and Washer Switch (Optional).....	1-93	Remaining Time and Maintenance Interval.....	1-83
		Remedy	1-19
		Remove Paint Before Welding or Heating	S-35
		Remove Travel Levers.....	7-95

INDEX

Removing and Storing Lower Front Window	1-121	Swing Alarm Deactivation Switch (Optional).....	1-95
Replace Air Breather Element	7-45	Swing Bearing.....	7-21
Replace Battery	7-82	Swing Internal Gear	7-22
Replace Engine Oil Filter	7-25	Swing Reduction Gear.....	7-29
Replace Fuel Main Filter Element	7-57	Switch Operation.....	1-133
Replace Fuel Pre-Filter Element	7-59	Switch Panel	1-87
Replace Pilot Oil Filter	7-44	Switch Panel (for Optional Equipment).....	1-94
Replace Rubber Hoses Periodically.....	5-29	T	
Replacement of Full-Flow Filter.....	7-41	TRANSPORTING.....	6-1
Replacing Fuses	7-84	TROUBLESHOOTING.....	11-1
Restriction of Attachment Installation	5-13	Temperature Control Switch/Mode Switch (Air Conditioner).....	1-88
Retighten Cylinder Head Bolt	7-107	Tightening and Retightening Torque of Nuts and Bolts	7-108
Return to Basic Screen (Monitor).....	1-88	Time Adjustment.....	1-33
Return to Previous Screen (Monitor).....	1-88	Tips for Optimal Air Conditioner Usage	1-111
Revolving Light Switch (Optional)	1-96	TONE Control	1-115
S		Towing Machine a Short Distance.....	4-6
SAFETY	S-1	Transmission	7-28
SAFETY SIGNS.....	S-42	Transport Safely	5-24
SPECIFICATIONS.....	12-1	Transporting.....	13-3
STORAGE.....	10-1	Transporting by Road	6-1
Seat Belt.....	1-132	Travel Alarm.....	4-4
Seat Fore-Aft Adjustment.....	1-126, 1-128	Travel Alarm Deactivation Switch.....	1-95
Seat Heater Switch	1-96	Travel Mode Switch	1-90, 4-4
Seat Height and Angle Adjustment.....	1-126	Travel Operation	1-77
Secondary Relief Pressure Adjustment	5-27	Travel Reduction Gear	7-30
Security Functions (Optional)	1-15	Traveling and Other Cautions.....	13-2
Select/Confirm Switch (Monitor).....	1-88	Troubleshooting	11-1
Service Air Conditioning System Safely	S-36	Tuning Procedure.....	1-112
Setting Menu	1-32	U	
Setting Procedure	1-49	Understand Signal Words.....	S-1
Shackle Hole Usage	5-42	Unit Selection	1-64
Shoe Types and Applications.....	12-3	Unloading	6-5
ZX135US-5B	12-3	Use Handholds and Steps	S-6
ZX135US-5B with Blade.....	13-14	Using Booster Batteries.....	3-8
ZX225US-5B	12-7	Using Cigar Lighter	1-100
ZX225USLC-5B	12-7	Using Cigar Lighter Port as External Power Source.....	1-100
ZX225USLC-5B with Blade.....	13-17	Using Pad Crawler Shoe.....	13-1
Shovel.....	5-20	W	
Side Monitor (Optional)	1-117	Warming Up Operation.....	5-5
Specifications.....	12-1	Warn Others of Service Work	S-26
ZX135US-5B	12-1	Wear Protective Clothing.....	S-3
ZX135US-5B with Blade.....	13-12	When Windows Become Clouded.....	1-111
ZX225US-5B, 225USLC-5B.....	12-5	Wiper/Washer Switch.....	1-92
ZX225USLC-5B with Blade.....	13-15	Work Light Switch	1-91
Starting the Engine.....	3-3	Work Mode	1-29, 5-14
Station Auto-Presetting Procedure.....	1-114	Working Ranges	
Station Presetting Procedure	1-113	ZX135US-5B with Blade.....	13-13
Stay Clear of Moving Parts	5-27	Working Ranges (Grouser shoe)	
Steering the Machine Using Levers	4-3	ZX135US-5B	12-2
Steering the Machine Using Pedals	4-2	ZX225US-5B, 225USLC-5B.....	12-6
Stopping the Engine	3-10	ZX225USLC-5B with Blade	13-16
Storing the Machine.....	10-1		
Sub Meter	1-55		
Suction Filter Cleaning	7-40		
Support Machine Properly.....	S-26		
Suspension Adjustment.....	1-126, 1-129		