

Operation & Maintenance Manual

HYDRAULIC
EXCAVATOR

PC210LCi-11

SERIAL NUMBERS 500470 and up

⚠ WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

NOTICE


Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

KOMATSU

FOREWORD

WARNING

This Operation and Maintenance Manual contains only the parts that differ in handling from the standard machine.
Read Operation and Maintenance Manual for the standard machine first, and then read this manual.

 **WARNING:** Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engines in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or temper with with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel

 **WARNING:** This product can expose you to chemicals including lead, which is known in the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to www.P65warnings.ca.gov.

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READ THIS MANUAL

Before reading this manual, read the Operation and Maintenance Manual of standard machine (PC210LC-11).

This manual describes only the special device or function for PC210LCI-11. For the other part than described in this manual, see the Operation and Maintenance Manual of standard machine.

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be observed in order to use the machine safely. Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines.

Read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance. Failure to do so may result in serious injury or death.

Komatsu cannot predict every circumstance that might involve a potential hazard when the machine is used. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

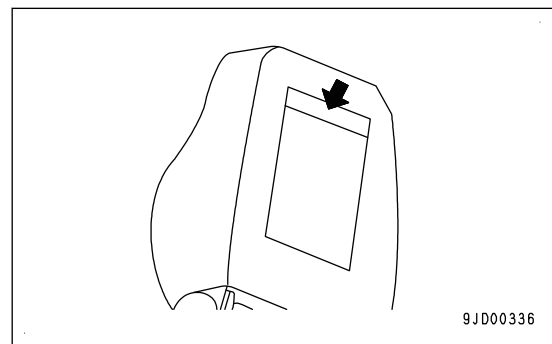
If you perform any operation, inspection, or maintenance under conditions that are not described in this manual, understand that it is your responsibility to take the necessary precautions to ensure safety. In no event should you or others engage in the prohibited uses or actions described in this manual. It is dangerous to perform improper operation and maintenance of the machine. It may cause serious injury or death.

If you sell the machine, be sure to give this manual to the new owner together with the machine.

Always keep this Operation and Maintenance Manual in the indicated location on the right so that all relevant personnel can read it at any time.

Storage location for the Operation and Maintenance Manual

It is provided on the back of the backrest of operator's seat.



If this manual is lost or damaged, contact Komatsu or your Komatsu distributor and tell them about the machine model name and the serial No. immediately to arrange for its replacement.

For details regarding the machine model name and the serial No., see the machine serial No. plate. In order to arrange the proper Operation and Maintenance Manual, you will need to provide the machine model name and the serial No.

This manual uses the International System of Units (SI) for units of measurement. For reference, units that have been used in the past are given in { }.

The explanations, values, and illustrations in this manual have been prepared based on the latest information available as of the date of its publication. Continuing improvements in the design of this machine may lead to additional changes that are not reflected in this manual. If there is any question or suggestion, consult your Komatsu distributor.

The numbers in the illustrations correspond to the numbers in () in the text. (Example: 1 → (1))

Komatsu delivers machines that comply with all applicable regulations and standards of the country to which it has been shipped. If this machine has been purchased in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult your Komatsu distributor before operating the machine.

The software which uses the Open Source Software (OSS) is provided to this machine. Under license by OSS, Komatsu publishes the license information of the software to be used in the following website.

<https://home.komatsu/en/ProductInfo/opensoft/>

SAFETY INFORMATION

To enable you to use the machine safely, and to prevent personal injury to operators, service personnel or bystanders, the precautions and warnings included in this manual and the safety signs attached to the machine must always be observed.

To identify important safety messages in the manual and on the machine labels, the following signal words are used.

The "Safety Alert Symbol" identifies important safety messages on machines, in manuals, and elsewhere. When you see this symbol, be alert to the risk of personal injury or death. Follow the instructions in the safety message.

**DANGER**

This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

This signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

The following signal words are used to alert you to information that must be followed to avoid damage to the machine.

NOTICE

If precautions described are not observed, the machine may be damaged or the service life may be reduced.

REMARK

This word is used for information that is useful to know.

INTRODUCTION

intelligent Machine Control

The system that utilizes ICT (Information Communication Technology) in each stage of earth moving operation, such as survey, design, operation, supervision, examination and maintenance.

It enables the highly efficient and highly accurate earth moving operation by utilizing information provided in each stage of operation.

Utilizing the information provided in the operation to the other operations enables better productivity and quality in the whole operation.

MAIN USE OF MACHINE

This Komatsu machine is designed to be used mainly for the following work:

- Digging work
- Ditching work
- Loading work
- Leveling work

For the detail of operation procedure, see the Operation and Maintenance Manual of standard machine.

Machine with the intelligent Machine Control specification cannot be used for demolition or quarry work.

Also the intelligent Machine Control work with bucket inverted cannot be performed.

Semi-auto mode

You can change the mode from manual mode to semi-auto mode by using Auto/Manual switch located at top right of control box.

In semi-auto mode, work equipment (boom, arm, bucket) cylinder is automatically controlled not to dig deeper than the design data. Operator can perform the work without checking the design data constantly by using this function effectively.

ABBREVIATION LIST

- This list of abbreviations includes the abbreviations for functions, devices, and parts which are used in the operation and maintenance manual.
- Commonly used abbreviations are not included.
- Special abbreviations which are not shown frequently are included in the text as additional information.

List of abbreviations used in the text

Abbreviation	Actual word spelled out	Explanation
API	American Petroleum Institute	API is the abbreviation for American Petroleum Institute.
BOC	Bolt-On Cutting edge	BOC is a cutting edge that is attached with bolts to the bucket.
CAN	Controller Area Network	CAN is one of networks that communicate between the machine monitor and controllers.
DEF	Diesel Exhaust Fluid	DEF is a urea solution that is used for the SCR system.
EGR	Exhaust Gas Recirculation	EGR is a function that recirculates part of exhaust gas to the intake side to control NOx emissions.
FOPS	Falling Object Protective Structure	FOPS is a structure that protects operators from falling objects.
GNSS	Global Navigation Satellite System	GNSS is a general term for satellite positioning systems.
GPS	Global Positioning System	GPS is one of satellite positioning systems.
IMU	Inertial Measurement Unit	IMU is a device that senses the angles (or angular velocity) and acceleration of the three axes.
KCCV	KOMATSU Closed Crankcase Ventilation	KCCV is a function that isolates oil from blowby gas in the engine and returns the blowby gas to the intake side.
KDOC	KOMATSU Diesel Oxidation Catalyst	KDOC is a device that purifies exhaust gas.
KDPF	KOMATSU Diesel Particulate Filter	KDPF is a device that is composed of the KCSF and KDOC, and catches soot (Particulate Matter, PM) in exhaust gas.
KOWA	Komatsu Oil and Wear Analysis	KOWA is a preventive maintenance service that collects and analyzes oil in the machine at the specified interval so that wear of the machine and other problems can be found at short time.
OPG	Operator Protective Guards	OPG is a structure that protects operators from falling objects.
PPC	Proportional Pressure Control	PPC is a function that controls the pressure of the hydraulic circuit in proportion to the degree of the lever operation.
PTO	Power Take Off	PTO is a mechanism that takes out the engine power.
ROPS	Roll-Over Protective Structure	ROPS is a structure that protects operators from falling objects or in the event of a machine roll-over.
SCR	Selective Catalytic Reduction	SCR is a device that purifies nitrogen oxides (NOx) in exhaust gas from the engine.
TOPS	Tip-Over Protective Structure	TOPS is a protection structure that protects operators in the event of a machine tip-over.

SAFETY

WARNING

This Operation and Maintenance Manual contains only the parts that differ in handling from the standard machine.

Read Operation and Maintenance Manual for the standard machine first, and then read this manual.

SAFETY LABELS

WARNING

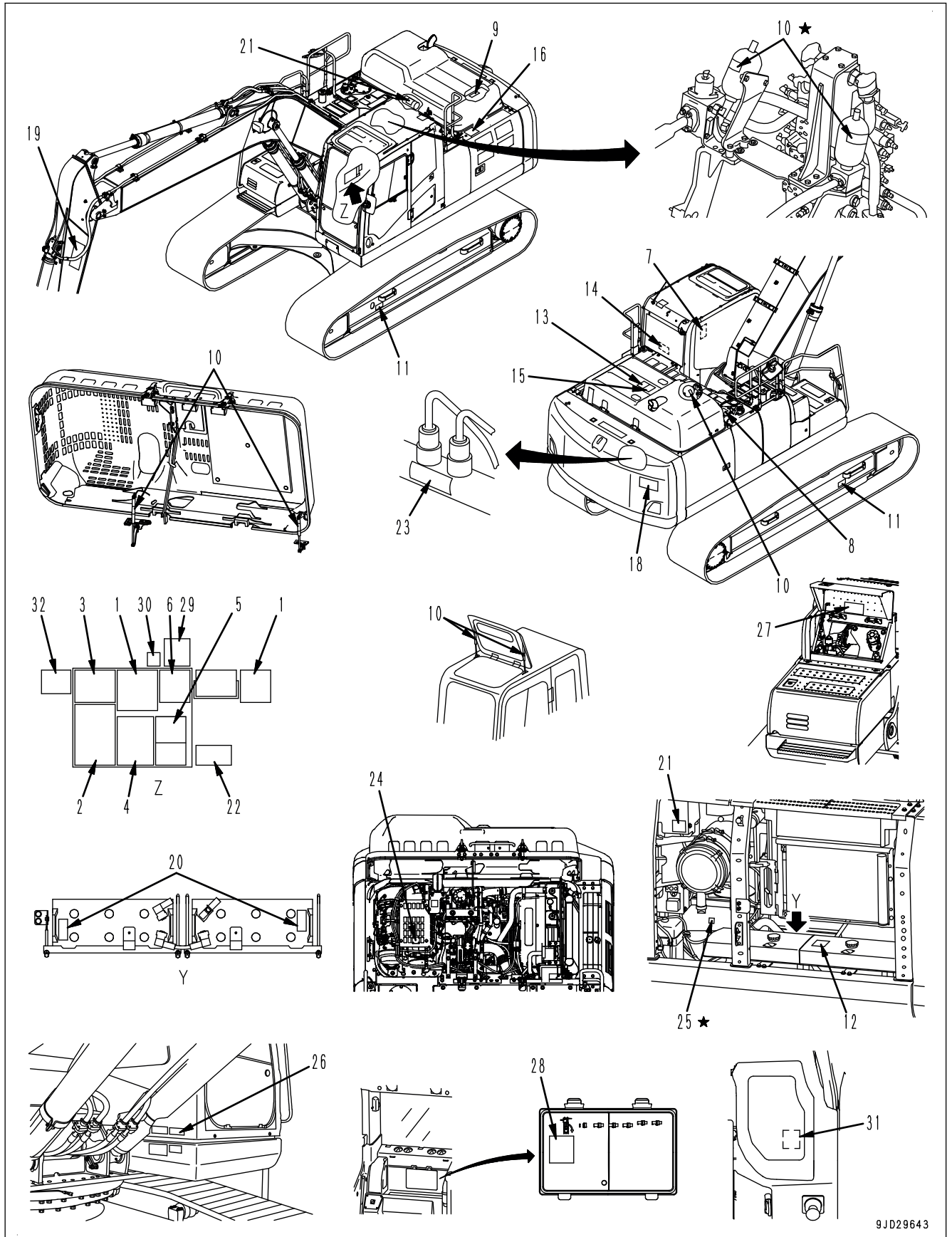
Fully understand any potential danger, and how to avoid the danger shown in the safety labels. Remember where these safety labels are located.

Only the parts different from the standard machine in the safety labels used on this machine are described below.

Handle the warning signs and safety labels used on this machine as follows.

- Always keep the safety labels clean so that you can read it properly. When cleaning the safety labels, do not use organic solvents or gasoline. These may cause the labels to peel off.
- If the safety labels are damaged, lost, or cannot be read properly, replace them with new ones. For details of the part numbers for the safety labels, see this manual or the actual label, and place an order to your Komatsu distributor.
- There are also other labels in addition to the warning signs and safety labels. Handle those labels in the same way.

LOCATION OF SAFETY LABELS



Options are shown with ★ marks in the figure.

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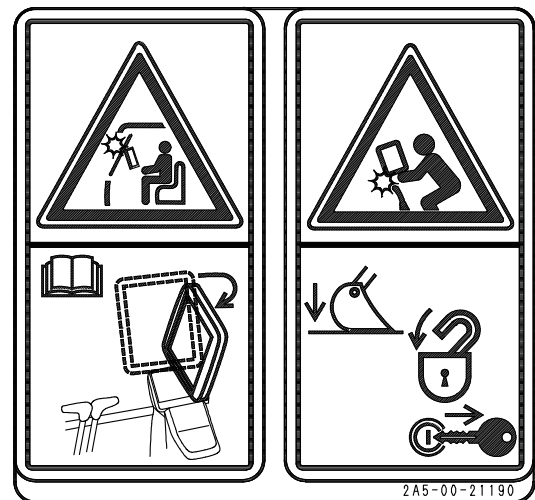
- 1. Caution for operation, inspection and maintenance
- 2. Caution before operating
- 3. Caution when leaving operator's seat
- 4. Caution against high-voltage cables
- 5. Caution for control pattern
- 6. Caution when opening or closing front window
- 7. Caution when stowing front window
- 8. Caution for high-temperature oil
- 9. Caution for high-temperature coolant
- 10. Caution for handling accumulator and gas spring
- 11. Caution for adjusting track tension
- 12. Caution for handling cable
- 13. Stop rotation during inspection and maintenance
- 14. Emergency escape
- 15. Caution against falling
- 16. Caution when swinging and traveling in reverse
- 17. Prohibition of entering within swing range
- 18. Caution for work equipment
- 19. Caution for handling battery
- 20. Prohibition of start by short-circuiting
- 21. Caution for blast site
- 22. Caution for high-pressure fuel
- 23. Caution when changing control pattern (machine with control pattern changeover valve)
- 24. Caution for control pattern
- 25. Caution for handling ROPS
- 26. Prohibition of use of ether
- 27. Caution for handling DEF
- 28. Caution for high-temperature resistance
- 29. Caution for handling control box
- 30. Auto/Manual switch
- 31. Boom secondary drive switch
- 32. Caution for cylinder function when starting engine

For details of safety labels 1 to 28, see the Operation and Maintenance Manual of standard machine.

SAFETY LABELS

Caution for handling control box

2A5-00-21190



Warning!

a. Caution when opening or closing front window

When opening or closing the front window, it may hit the control box and be damaged.

When opening or closing the front window, move the control box to prevent the front window from hitting the box.



b. Caution for moving control box

When moving the control box, if the control levers are touched by mistake, there is a danger that the machine may suddenly move and cause serious personal injury or death.

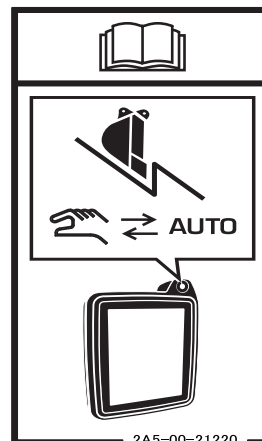
When moving the control box, lower the work equipment to the ground, lock the control levers, and remove the key.



Auto/manual switch

2A5-00-21220

Use this switch to shift Auto/Manual of Semi-auto mode. For details of the switch, see "OPERATION".

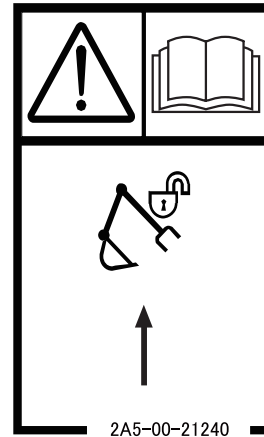


2A5-00-21220

Boom secondary drive switch

2A5-00-21240

Use this switch to operate boom from necessity in case of emergency (when work equipment is stopped by failure in electrical system). For details of the switch, see "OPERATION".

**Caution for cylinder function when starting engine**

208-00-27130



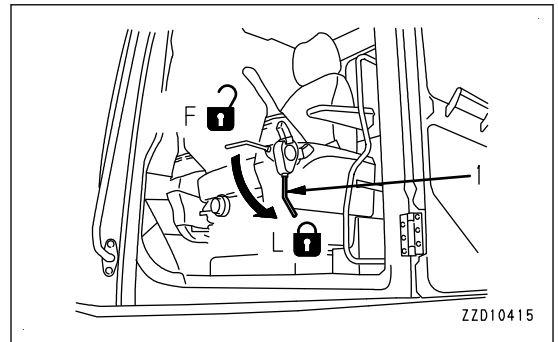
PRECAUTIONS FOR OPERATION

START ENGINE

CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

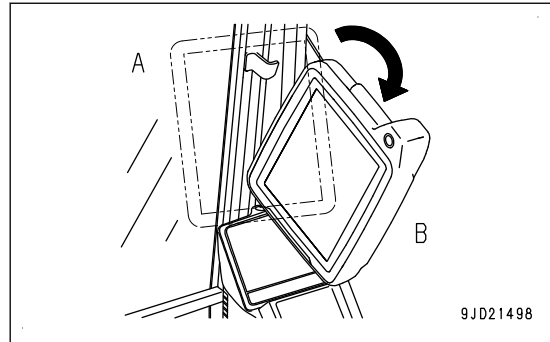
Perform the following checks before starting the engine at the beginning of the day's work to ensure that there is no problem with the operation of the machine. If these checks are not performed properly, problems may occur with the operation of the machine, and there is a danger that may lead to serious personal injury or death.

- Remove all dirt from the surface of the window glass to ensure a good view.
- Be sure to perform thorough walk-around check.
- Remove all dirt from the surface of the lens of the headlamps and working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, DEF level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of any pedals, and check that the pedals work properly.
- Adjust the operator's seat to a position where it is easy to perform operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the mirror, and check that the control levers are all at NEUTRAL position.
- Check that the control box is securely fixed at the position where the operator can see it easily when sitting on the operator's seat. Check that a clearance of 40 mm {1.6 in} or more are secured when the R.H. work equipment control lever is tilted to the front.
- Before starting the engine, check that lock lever (1) is in LOCK position (L).
- Adjust the mirrors so that the rear of the machine can be seen easily from the operator's seat.
For the method for adjustment, see the Operation and Maintenance Manual for standard machine.
- Adjust the angle of camera so that the area around the machine can be seen clearly from the operator's seat.
For the method for adjustment, see the Operation and Maintenance Manual for standard machine.
- Adjust the armrest to a position for easier operation, and then fix it securely. Operation in an improper position can cause a serious personal injury or death.
- Check that there are no people or obstacles above, below, or in the area around the machine.



PRECAUTIONS RELATED TO CONTROL BOX

- Set the lock lever to LOCK position and stop the engine always when removing, installing, adjusting, and stowing the control box.
- Keep a clearance of 40 mm {1.6 in} or more always when the position (A) of the control box is adjusted while the R.H. work equipment control lever is tilted to the front.
- Loosen the handle of the mount always before adjusting the control box. Determine the position of the control box. Tighten the handle of the mount fully, and check that the control box is held securely. If the tightening of the handle is insufficient, the control box may fall to cause serious personal injury or death.



- If the position of the control box is adjusted without loosening of the handle of the mount, it may damage the mount or control box.
- Stow the control box in the stowed position (B) always when open or close the front window. Return the control box in the original position (A) immediately after open or close the front window. Do not start the engine when the control box is in the stowed position (B).
- Open or close the front window slowly with careful attention not to interfere the control box.
- Improper setup can lead to a machine failure or serious injury or death caused by malfunction. Stop the work immediately if any abnormality is found during the work.
- Relying only on the monitor screen of the control box for performing the work is dangerous. See with your own eyes when perform the work.

Consult a Komatsu distributor when the intelligent Machine Control devices are used along with other systems. The system malfunction, such as communication error between devices may occur.

PRECAUTIONS RELATED TO SEMI-AUTO MODE

- Be sure to perform the warm-up operation before starting the work. If the work equipment is operated without sufficient warming-up operation of the machine, response of the work equipment to movement of the control lever will be slow. There is a danger that the work equipment may not respond as the operator intends, or the semi-auto limited digging mode may not operate normally. Warm up the engine adequately especially in the cold weather. Start the work after checking that the work equipment moves smoothly.
- Improper use of the semi-auto limited digging mode can lead to an unexpected move of the work equipment, or the semi-auto limited digging mode may not operate normally. Refer to the content of "SEMI-AUTO MODE", and get a full understanding of it before start using the machine.
- Perform calibration before start using the semi-auto limited digging mode. There is a danger that the work equipment may not respond as the operator intends if it is operated with semi-auto limited digging mode without calibration.
- Check the bucket configuration before start using the semi-auto limited digging mode. There is a danger that the work equipment may not respond as the operator intends if it is operated with semi-auto limited digging mode whose bucket configuration is different from the bucket actually installed.

PRECAUTIONS FOR TRANSPORTATION

When the machine is transported on a trailer, serious personal injury or death may result because of the accident during transportation. Always observe the following.

- Always check the machine dimensions carefully. Depending on the work equipment and optional devices installed, the machine weight, transportation height, and overall length differ.
- Check beforehand that all bridges and other structures on the transportation route are strong enough to withstand the combined weight of the transporter and the machine being transported.
- This machine may need to be divided into components for transportation depending on the regulation. When transporting the machine, consult your Komatsu distributor.

PRECAUTIONS WHEN LOADING AND UNLOADING

If handling is improper when loading or unloading the machine, it is dangerous that the machine may tip over or fall. It requires particular attention. Always observe the following.

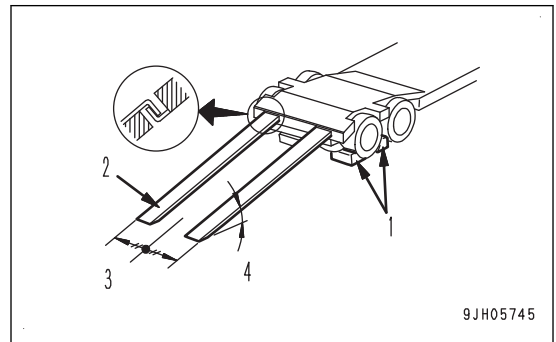
- Perform loading and unloading on a firm, level ground only. Avoid road edge or place near the cliff.
- Never use the work equipment to load or unload the machine. There is danger that the machine may fall or tip over.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.

(1) Chocks

(2) Ramp

(3) Center of ramp

(4) Angle of ramp: Max. 15 °.



- Be sure the ramp surface and the platform of trailer are clean and free of grease, oil, ice, water and other loose materials. If any, remove them. Remove dirt around the undercarriage of the machine. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Always turn the auto-deceleration switch OFF (cancel). If the machine is operated with the auto-deceleration system ON (activated), there is danger that the engine speed will suddenly rise, the machine will suddenly move off, or the machine travel speed will become faster.
- Be sure to set it to MANUAL mode by operating the auto/manual switch. There is a danger that the work equipment may move unexpectedly if it is operated with semi-auto limited digging mode.
- Run the engine at low idle and drive the machine slowly at low speed.
- When on the ramps, do not operate any lever except for the travel lever (travel forward and reverse).
- Never correct your steering on the ramps. If necessary, drive off the ramps onto the ground, correct the direction, then enter the ramps again.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the loading platform, and there is danger of the machine losing its balance. Drive slowly over this point.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- When swinging the upper structure on the loading platform, lower the work equipment, retract it, and perform the operation slowly.
- Be sure to fold the radio antenna.
For the method to stow the antenna, see Operation and Maintenance Manual for the standard machine.
- For machines equipped with a cab, always lock the door after loading the machine. To prevent the door from opening during transportation.
- Be sure to remove the GNSS antenna and GNSS radio device.

OPERATION

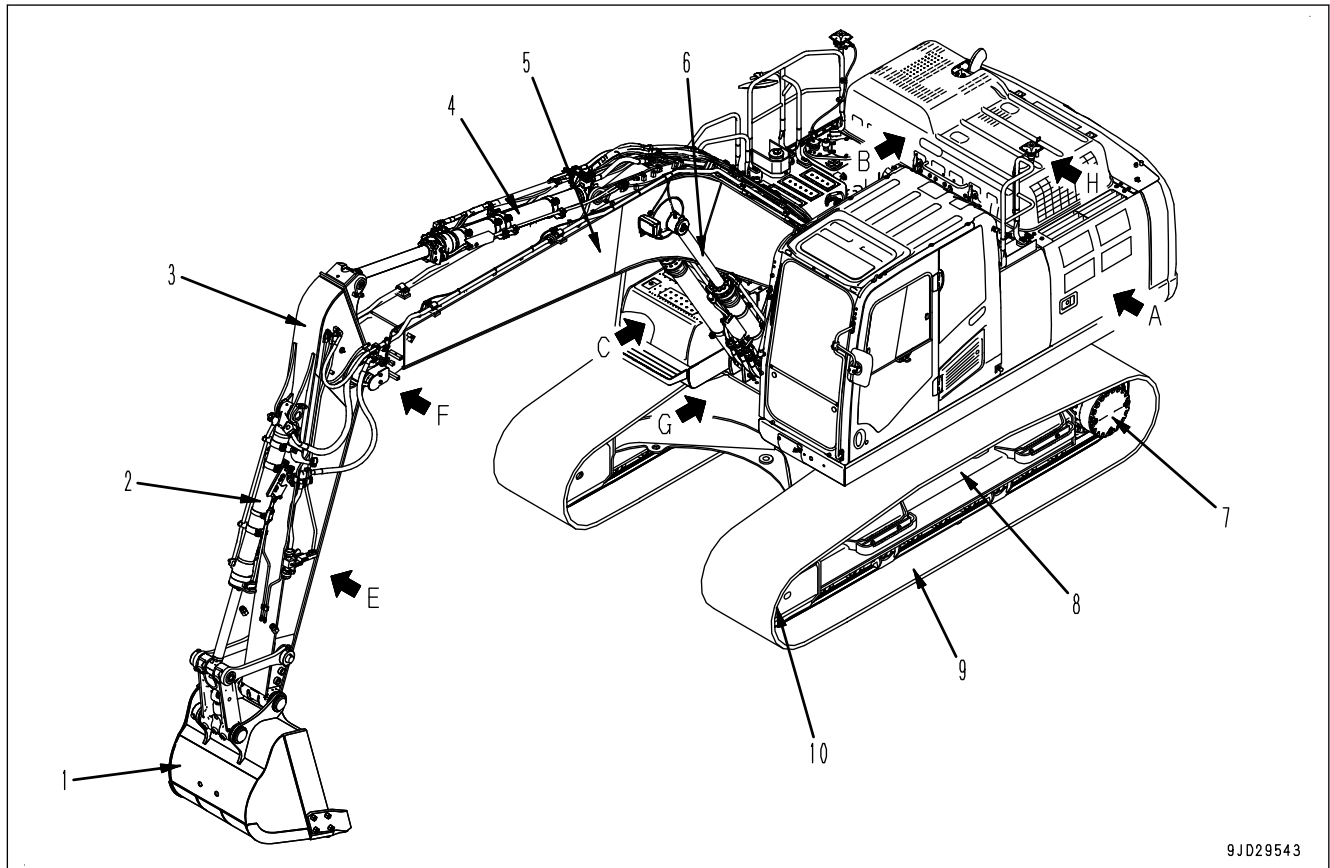
WARNING

This Operation and Maintenance Manual contains only the parts that differ in handling from the standard machine.

Read Operation and Maintenance Manual for the standard machine first, and then read this manual.

GENERAL VIEW

MACHINE EQUIPMENT NAME

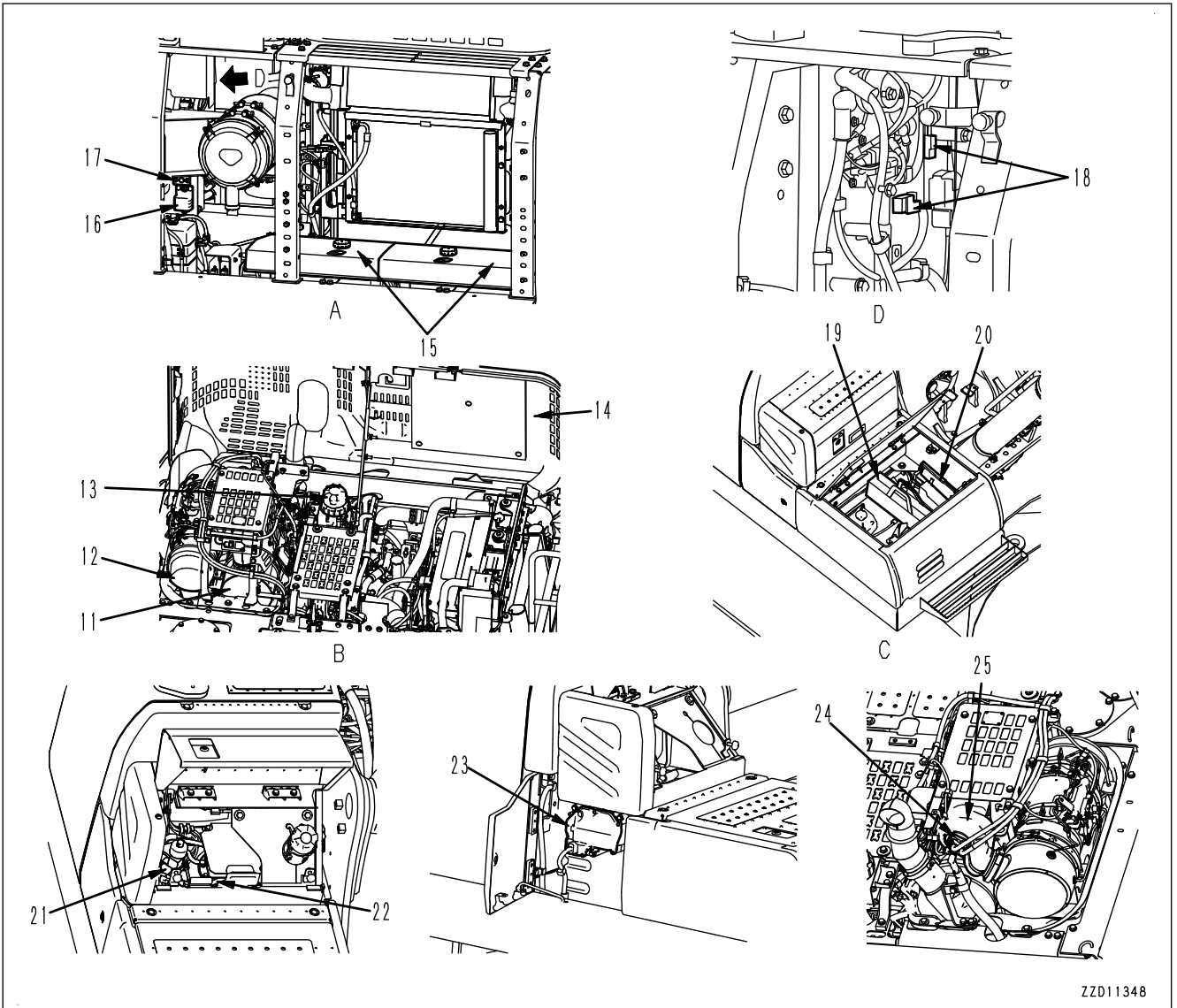


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- (1) Bucket
- (2) Bucket cylinder
- (3) Arm
- (4) Arm cylinder
- (5) Boom

- (6) Boom cylinder
- (7) Sprocket
- (8) Track frame
- (9) Track
- (10) Idler

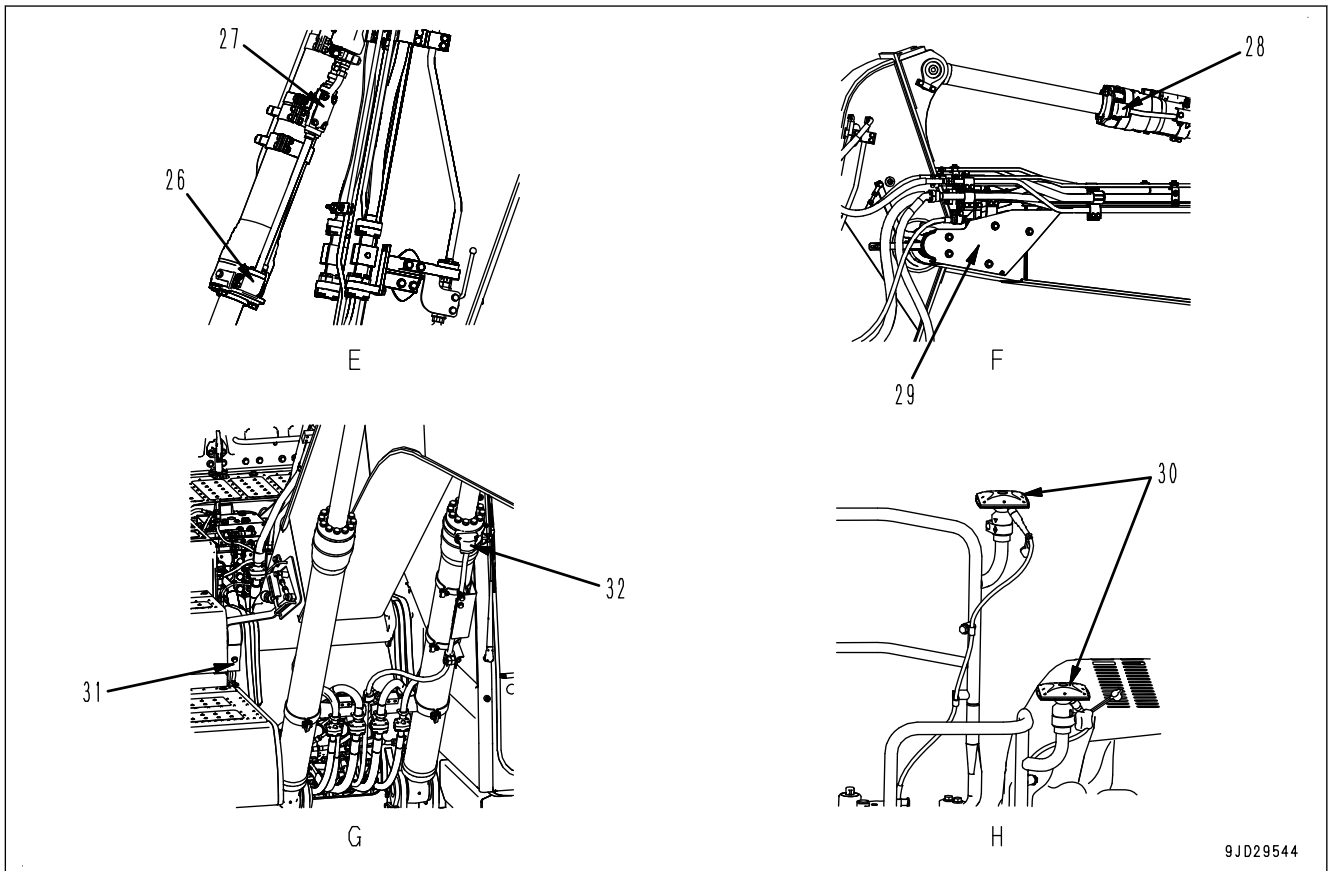
Details of A to D part



ZZD11348

- | | |
|---|-------------------------|
| (11) Selective Catalytic Reduction (hereafter SCR) | (18) Fusible link |
| (12) Komatsu Diesel Particulate Filter (hereafter KDPF) | (19) Toolbox |
| (13) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator | (20) Grease pump holder |
| (14) Engine hood | (21) DEF tank |
| (15) Battery | (22) DEF hose |
| (16) Battery disconnect switch | (23) DEF pump |
| (17) System operating lamp | (24) DEF injector |
| | (25) DEF mixing tube |

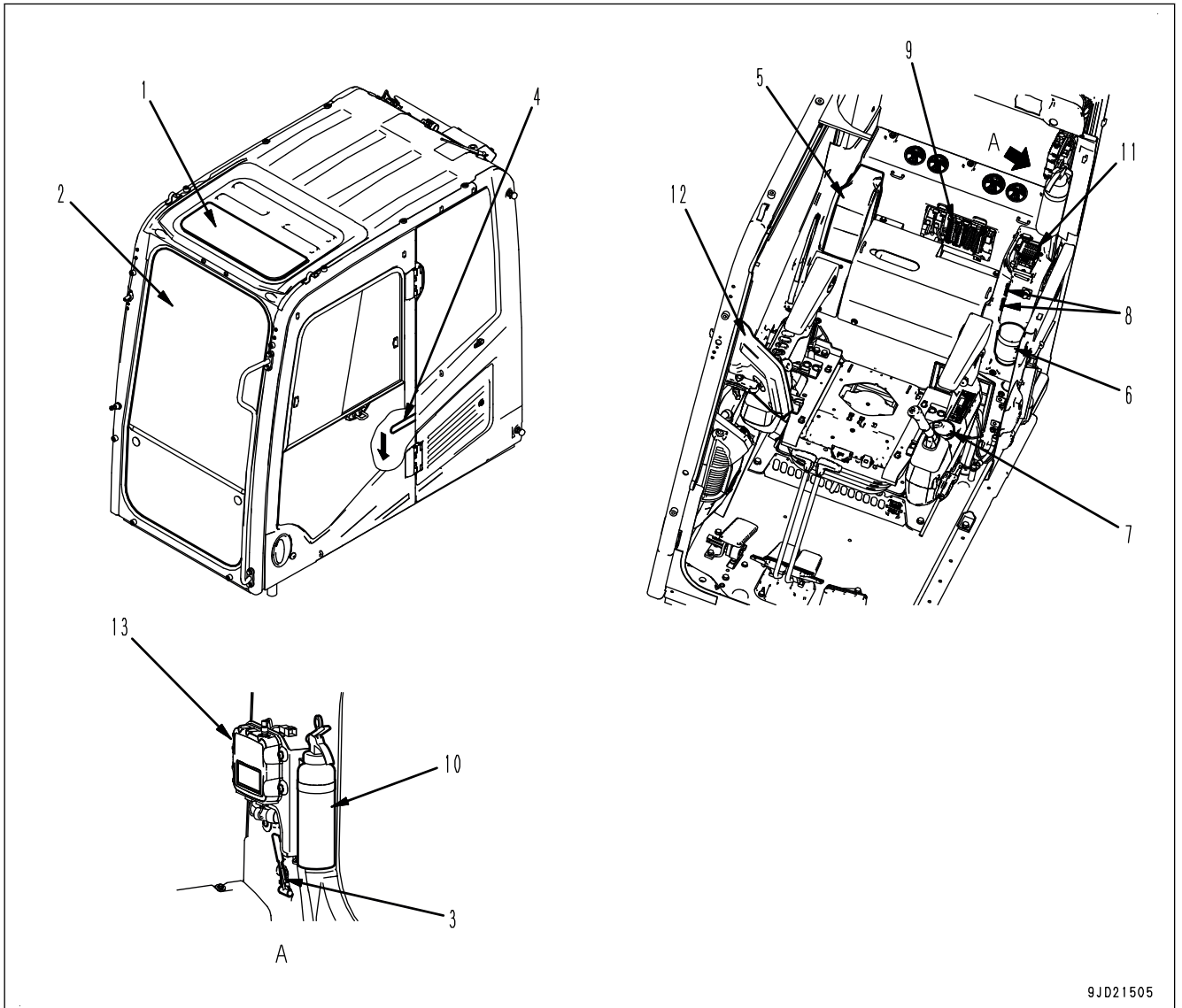
Details of E to H part



- (26) Stroke sensor for bucket cylinder
- (27) Stroke and reset sensor for bucket cylinder
- (28) Stroke sensor for arm cylinder
- (29) Stroke and reset sensor for arm cylinder

- (30) GNSS antenna
- (31) Stroke and reset sensor for boom cylinder
- (32) Stroke sensor for boom cylinder

CAB EQUIPMENT NAMES



9J021505

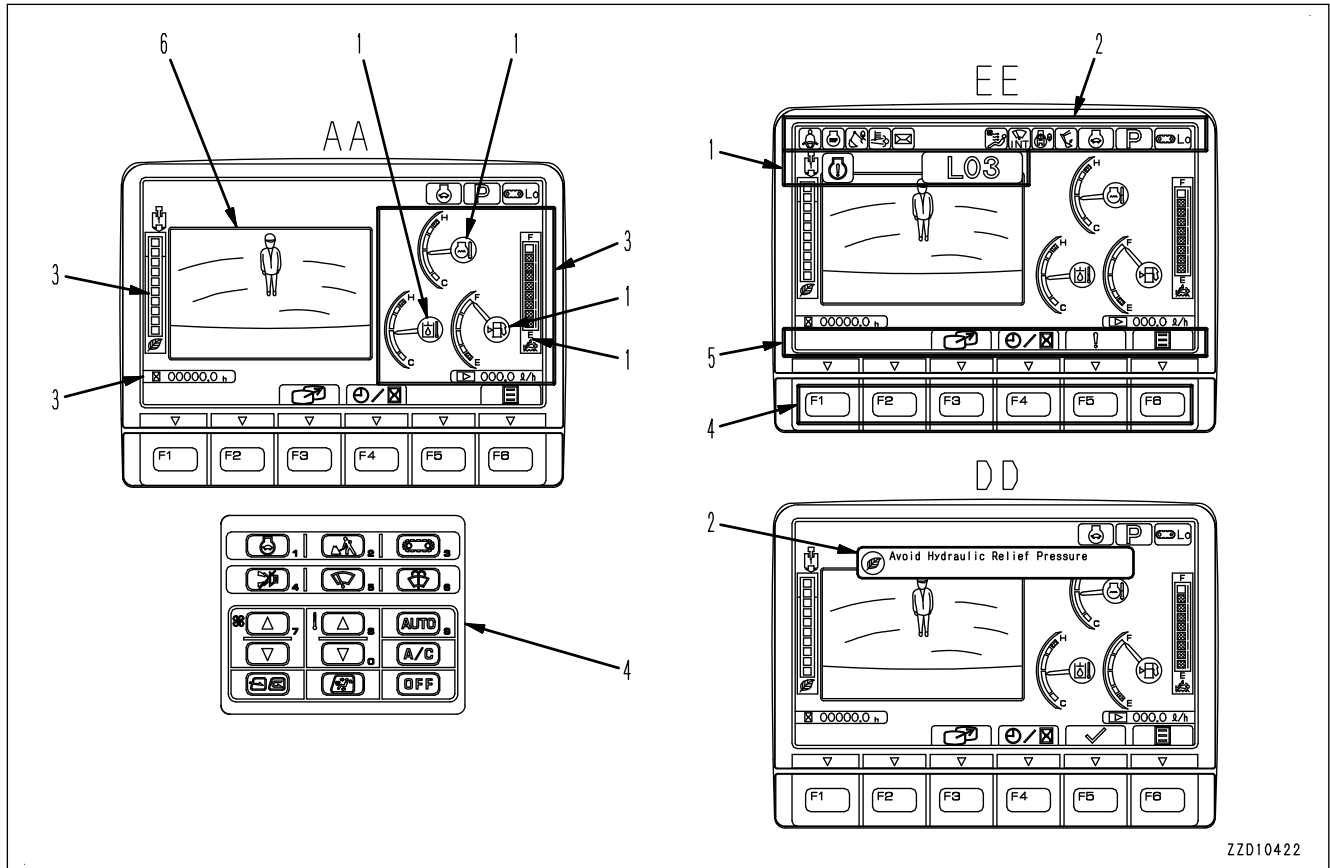
- (1) Ceiling window
- (2) Front window
- (3) Emergency escape hammer
- (4) Door lock release lever
- (5) Drink box
- (6) Cup holder
- (7) Ashtray
- (8) Power supply outlet
- (9) Fuse 1
- (10) Fire extinguisher (if equipped)
- (11) Fuse 2
- (12) Control box
- (13) Network modem

EXPLANATION OF COMPONENTS

The following is an explanation of devices necessary to operate the machine.

To perform suitable operations correctly and safely, it is important to completely understand methods of operating the equipment, and the meanings of the displays.

EXPLANATION OF MACHINE MONITOR EQUIPMENT



ZZD10422

AA: Standard screen, EE: Warning or Error screen, DD: Guidance screen

- (1) Warning display
- (2) Pilot display
- (3) Meter display
- (4) Monitor switch area
- (5) Guidance icon display
- (6) Camera image display

REMARK

- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal.
- Intensity or color of the objects may change because of the automatic adjustment function of the camera.

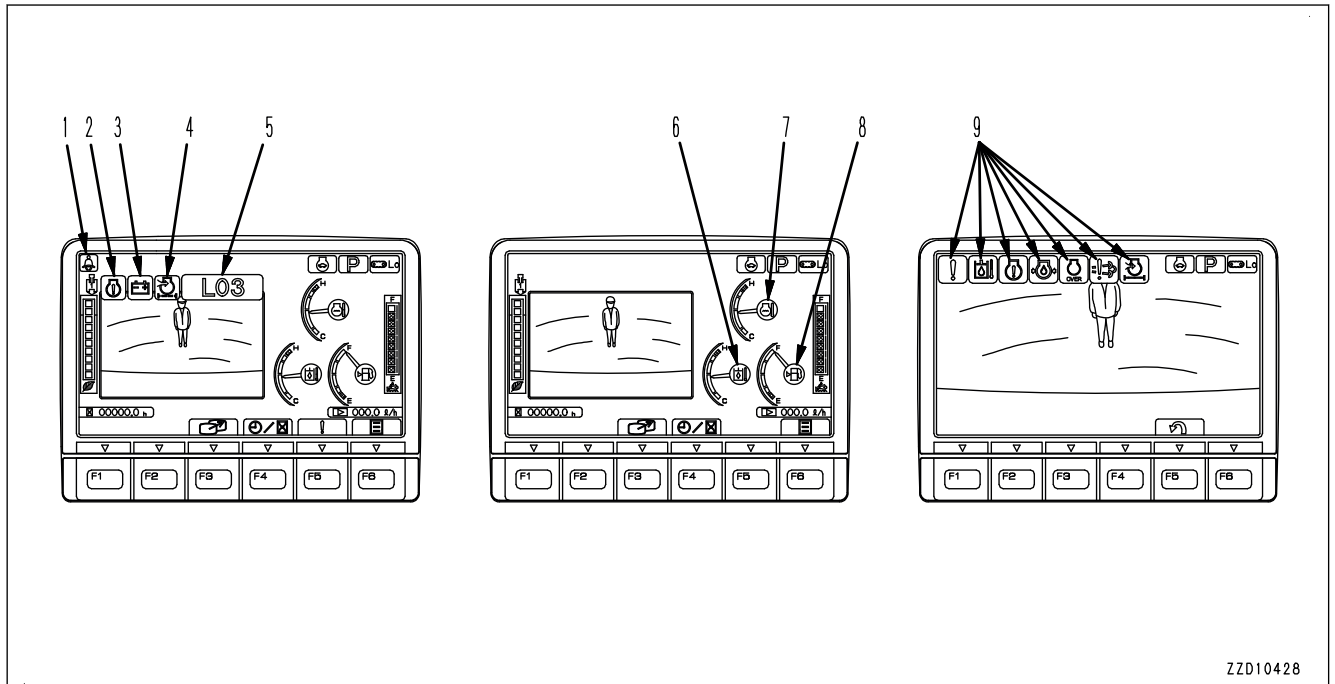
WARNING DISPLAY

NOTICE

The machine has a trouble if any of action levels “L01” to “L04” is displayed on the machine monitor. Take appropriate actions following the list of action level displays and required actions.

The caution lamp that lights up in red when an action level is displayed warns operator to stop the machine urgently, stop or pause the current operation.

If no action is taken, the machine can be seriously affected. Take necessary actions immediately.



- (1) Seat belt caution lamp
- (2) Caution lamp
- (3) Caution lamp
- (4) Caution lamp
- (5) Action level display

- (6) Engine coolant temperature caution lamp
- (7) Hydraulic oil temperature caution lamp
- (8) Fuel level caution lamp
- (9) Caution lamp

Standard screen (camera display and meter display)

When 1 type of caution is generated, it is displayed on the caution lamp (2).

When 2 types of cautions are generated, they are displayed on the caution lamps (2) and (3).

When 3 types of cautions are generated, they are displayed on the caution lamps (2), (3), and (4).

When 3 types or more of caution are generated, they are displayed on the caution lamps (2), (3), and (4) alternately at intervals of 2 seconds.

Whole camera image display screen

The current cautions are indicated by flashing of caution lamp (9).

When 2 or more cautions are generated, they are sequentially displayed starting from the leftmost side of the screen.

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ACTION LEVEL DISPLAY

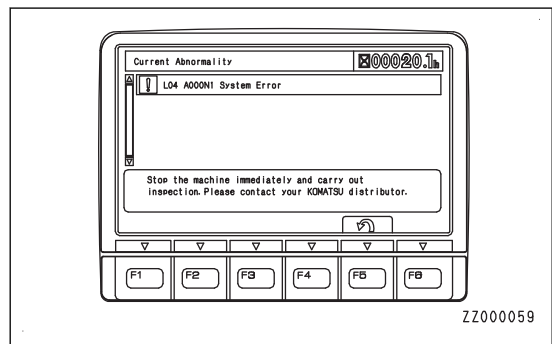
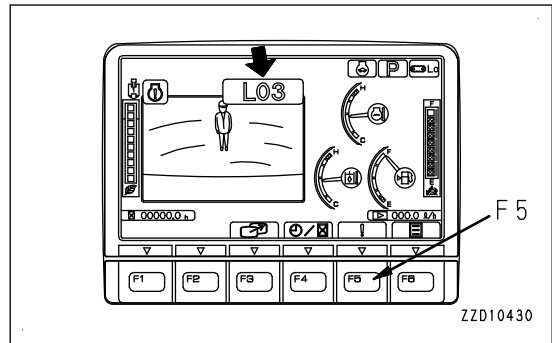
Action level display indicates the degree of urgency of the abnormality currently generated on the machine by “L01” to “L04”.

The larger the number in the table is, the more serious effects the abnormality may have on the machine if it is left with no action.

If the machine monitor indicates an action level, check the message displayed on the machine monitor.

By pressing switch F5 on the standard screen while the action level is displayed, the list of the current abnormality is displayed.

Take appropriate actions by following the message displayed on the machine monitor.



List of action level display and remedies






Degree of urgency	Action level	Buzzer	Caution lamp	Required action
↑ High ↓ Low	L04	Sounds continuously	Lights up in red	Stop the machine immediately and ask your Komatsu distributor for inspection and maintenance.
	L03	Sounds intermittently	Lights up in red	Stop the operation, move the machine to a safe place, then ask your Komatsu distributor for inspection and maintenance.
	L02	Sounds intermittently	Lights up in red	Stop the operation, and run the engine at medium speed with no load or stop it. If the condition is not improved, ask your Komatsu distributor for inspection and maintenance.
	L01	Does not sound	Lights up in yellow	Some functions may be restricted from use, but the machine can operate. When you finish the operation, always perform the inspection and maintenance. Ask your Komatsu distributor for the inspection and maintenance as needed.

CAUTION LAMP LIST

NOTICE

- These caution lamps do not guarantee the condition of the machine.
Do not simply rely on the caution lamp when performing check before starting (start-up inspection). Always get off the machine and check each item directly.
- When the caution lamp is displayed in red, if no action is taken, the machine can be seriously affected.
Take the action immediately.
- The engine output or engine speed is limited and the machine operation speed may become slow, depending on the contents of the warning.

Caution lamps and display colors

Symbol	Type of caution lamp	Display color/ Machine condition (action level)			
		Red	Yellow	White	Blue
	Equipment state caution lamp for the intelligent Machine Control	Abnormal (L03, L04)	Abnormal (L01)	-	-
	System state caution lamp for the intelligent Machine Control	Abnormal (L03, L04)	Abnormal (L01)	-	-
	IMU state caution lamp	-	Startup is in trouble. (-)	-	-
	Calibration state caution lamp	-	Abnormal (L01)	-	-
			Startup is in trouble. (-)		
	Cylinder function state caution lamp	-	Cylinder reset (Not performed yet) (-)	-	-

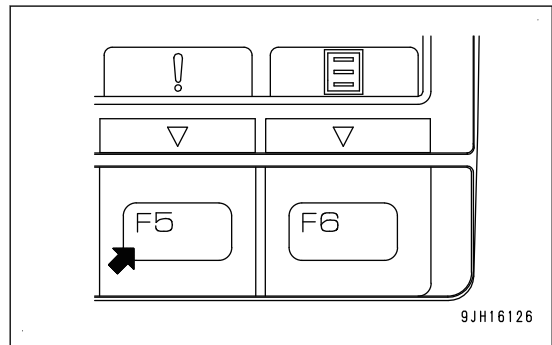
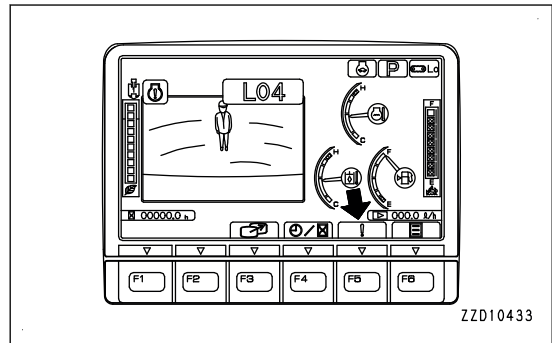
For the meaning of each caution lamp and the action to take for it, see the section of each caution lamp.

CURRENT ABNORMALITY DISPLAY SWITCH

If there is any abnormality currently generated, “!” is displayed on top of switch F5

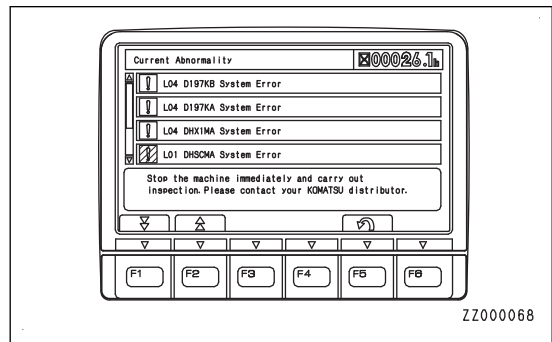
While “!” is displayed, press switch F5 to shift the monitor display screen to the Current Abnormality screen.

Take appropriate remedies according to the message displayed on the monitor.



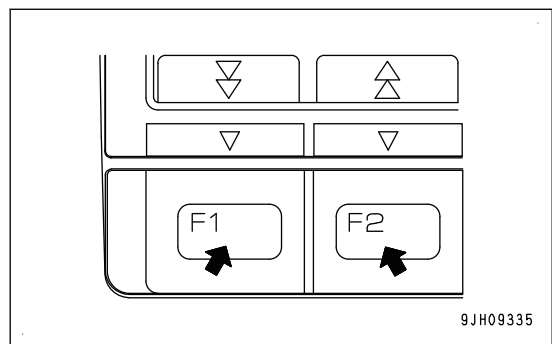
Operation on the Current Abnormality screen

On the Current Abnormality screen, you can perform the following operations with switches F1, F2 and F5.

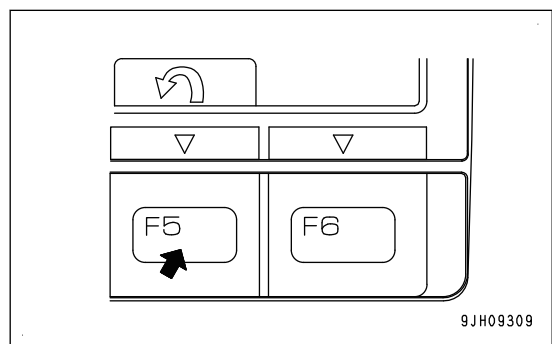


F1: Displays next page. When on the last page, it displays the first page.

F2: Displays the previous page. When on the first page, it displays the last page.



F5: Returns the screen to the standard screen.



Intelligent Machine Control EQUIPMENT STATE CAUTION LAMP

The intelligent Machine Control equipment state caution lamp warns about abnormality of intelligent machine control equipment such as sensor.

When action level “L04” is displayed

The caution lamp lights up in red and the alarm buzzer sounds continuously.

Stop the machine immediately, and have the inspection and maintenance performed.

Ask your Komatsu distributor for an inspection and maintenance.

When action level “L03” is displayed

The caution lamp lights up in red and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, and have the inspection and maintenance performed.

Ask your Komatsu distributor for an inspection and maintenance.

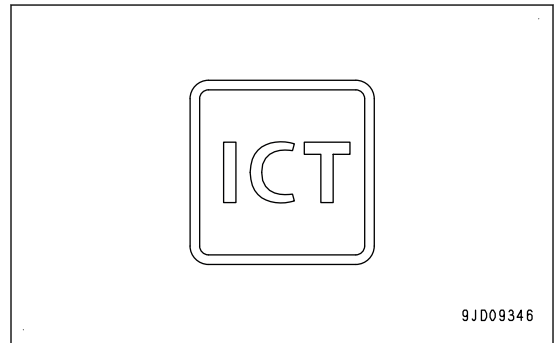
When action level “L01” is displayed

The caution lamp lights up in yellow.

Intelligent machine control equipment has a trouble.

The intelligent Machine Control cannot be performed but other work than the intelligent Machine Control can be performed, since the intelligent Machine Control function is limited.

If this caution lamp does not go out, ask your Komatsu distributor for inspection and maintenance.



Intelligent Machine Control SYSTEM STATE CAUTION LAMP

the intelligent Machine Control system state caution lamp warns about abnormality of intelligent machine control system such as controller connecting condition.

Action level “L04”

The caution lamp lights up in red and the alarm buzzer sounds continuously.

Stop the machine immediately, and have the inspection and maintenance performed.

Ask your Komatsu distributor for an inspection and maintenance.

Action level “L03”

The caution lamp lights up in red and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, and have the inspection and maintenance performed.

Ask your Komatsu distributor for an inspection and maintenance.

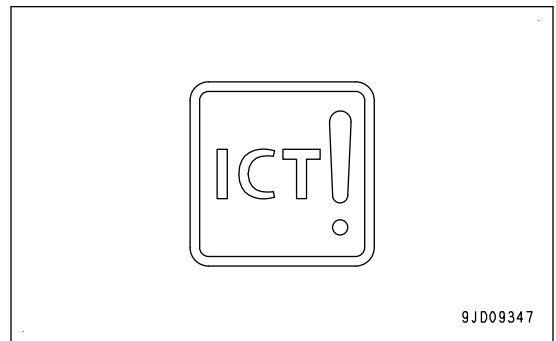
When action level “L01” is displayed

The caution lamp lights up in yellow.

Sensor related to the intelligent Machine Control has a trouble.

The intelligent Machine Control cannot be performed but other work than the intelligent Machine Control can be performed, since the intelligent Machine Control function is limited.

If this caution lamp does not go out, ask your Komatsu distributor for inspection and maintenance.



CALIBRATION STATE CAUTION LAMP

Calibration state caution lamp displays the calibration state of the sensor of the intelligent Machine Control.

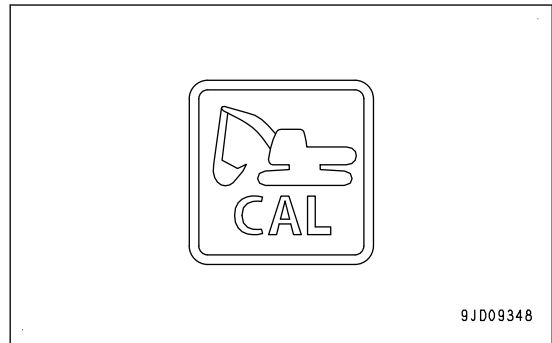
When calibration is not completed

The caution lamp lights up in yellow, and action level “L01” is displayed.

Calibration for the sensor of the intelligent Machine Control installed to the machine is not completed.

The intelligent Machine Control cannot be performed since the intelligent Machine Control function is limited. Works other than the intelligent Machine Control can be performed.

Ask your Komatsu distributor for an inspection and maintenance.



IMU STATE CAUTION LAMP

IMU state caution lamp warns about abnormality of IMU.

When abnormal

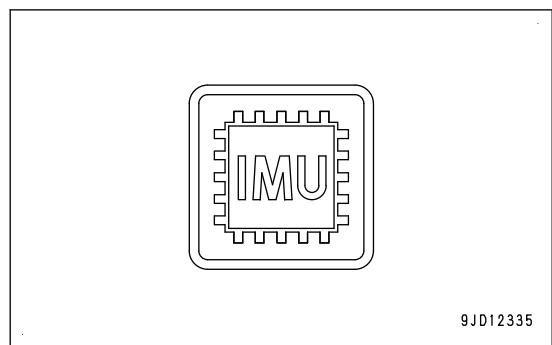
The caution lamp lights up in yellow. (Action level is not displayed.)

IMU has not been started normally.

Wait until caution lamp goes out, or turn the starting switch to OFF position once and to ON position again.

Since IMU does not operate normally, the intelligent Machine Control cannot be performed but other work than the intelligent Machine Control can be performed.

If this caution lamp does not go out although starting switch is operated, ask your Komatsu distributor for inspection and maintenance.



CYLINDER FUNCTION STATE CAUTION LAMP

Cylinder function state caution lamp displays the state that stroke measuring function of cylinder has not been reset.

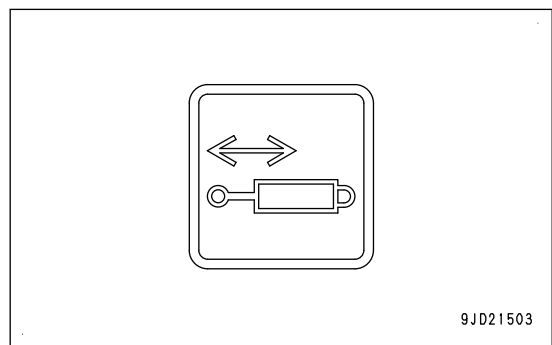
Stroke measuring function of boom cylinder, arm cylinder, and bucket cylinder has not been reset since the starting switch was turned on.

The caution lamp lights up in yellow. (Action level is not displayed.)

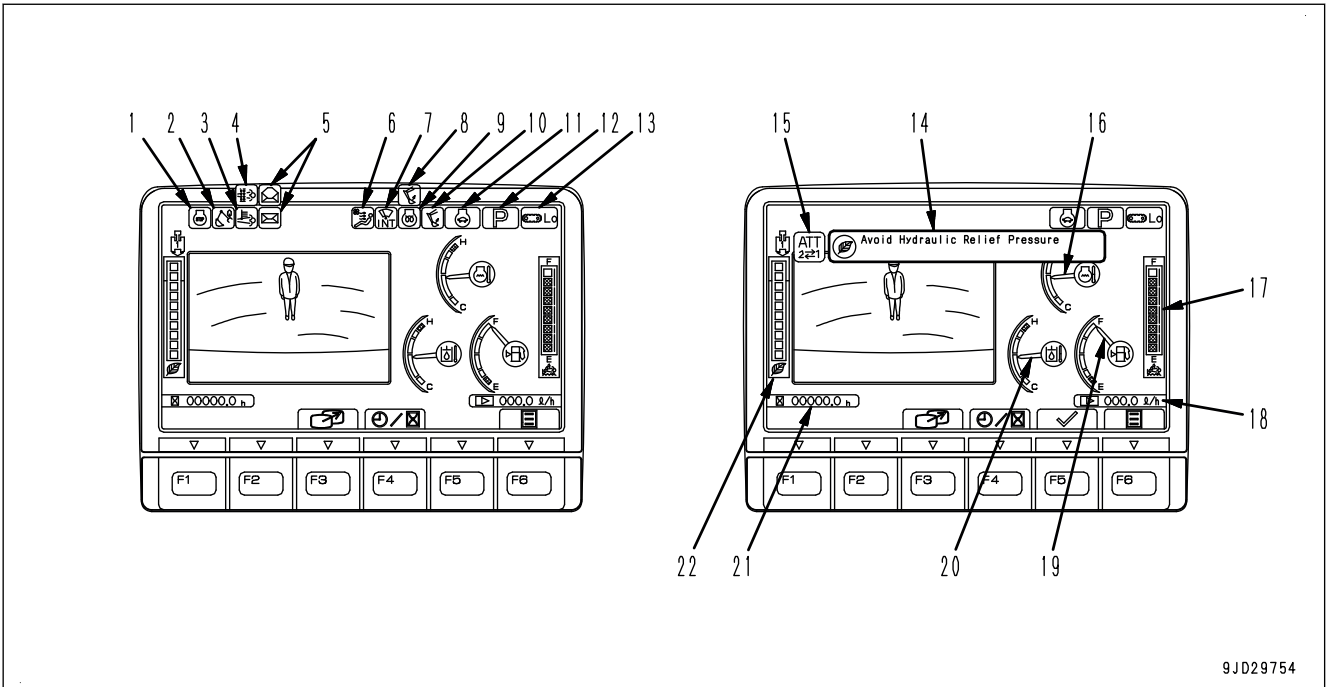
This is the state that stroke measuring function of cylinder has never been reset since the starting switch was turned on.

Cylinder stroke may be mistakenly recognized. Keep each cylinder of boom cylinder, arm cylinder, and bucket cylinder at its stroke end for 2 seconds before operation.

If this caution lamp does not go out, ask your Komatsu distributor for an inspection and maintenance.



PILOT DISPLAY AND METER DISPLAY



9JD29754

Pilot display

- (1) Engine stop pilot lamp
- (2) Lock lever pilot lamp
- (3) Aftertreatment devices regeneration pilot lamp
- (4) Aftertreatment devices regeneration disable pilot lamp
- (5) Message display
- (6) Air conditioner pilot lamp
- (7) Wiper pilot lamp
- (8) Swing lock pilot lamp

- (9) One-touch power maximizing pilot lamp
- (10) Preheating pilot lamp
- (11) Auto-deceleration pilot lamp
- (12) Working mode display
- (13) Travel speed display
- (14) ECO guidance
- (15) Proportional lever reverse side view pilot lamp

Meter display

- (16) Engine coolant temperature gauge
- (17) DEF level gauge
- (18) Fuel consumption gauge
- (19) Fuel gauge

- (20) Hydraulic oil temperature gauge
- (21) Service meter/clock
- (22) ECO gauge

PILOT DISPLAY

The pilot display at the top of the screen consists of the pilot lamps to check the actuation of each function. When the starting switch is turned on and the display items are functioning, the pilot lamps light up.

PROPORTIONAL LEVER REVERSE SIDE VIEW PILOT LAMP

Proportional control lever reverse side view pilot lamp indicates the state of proportional setting.

Proportional control lever reverse side view pilot lamp is lit: Inverted is selected (Operate ATT1 with L.H. lever, operate ATT2 with R.H. lever)

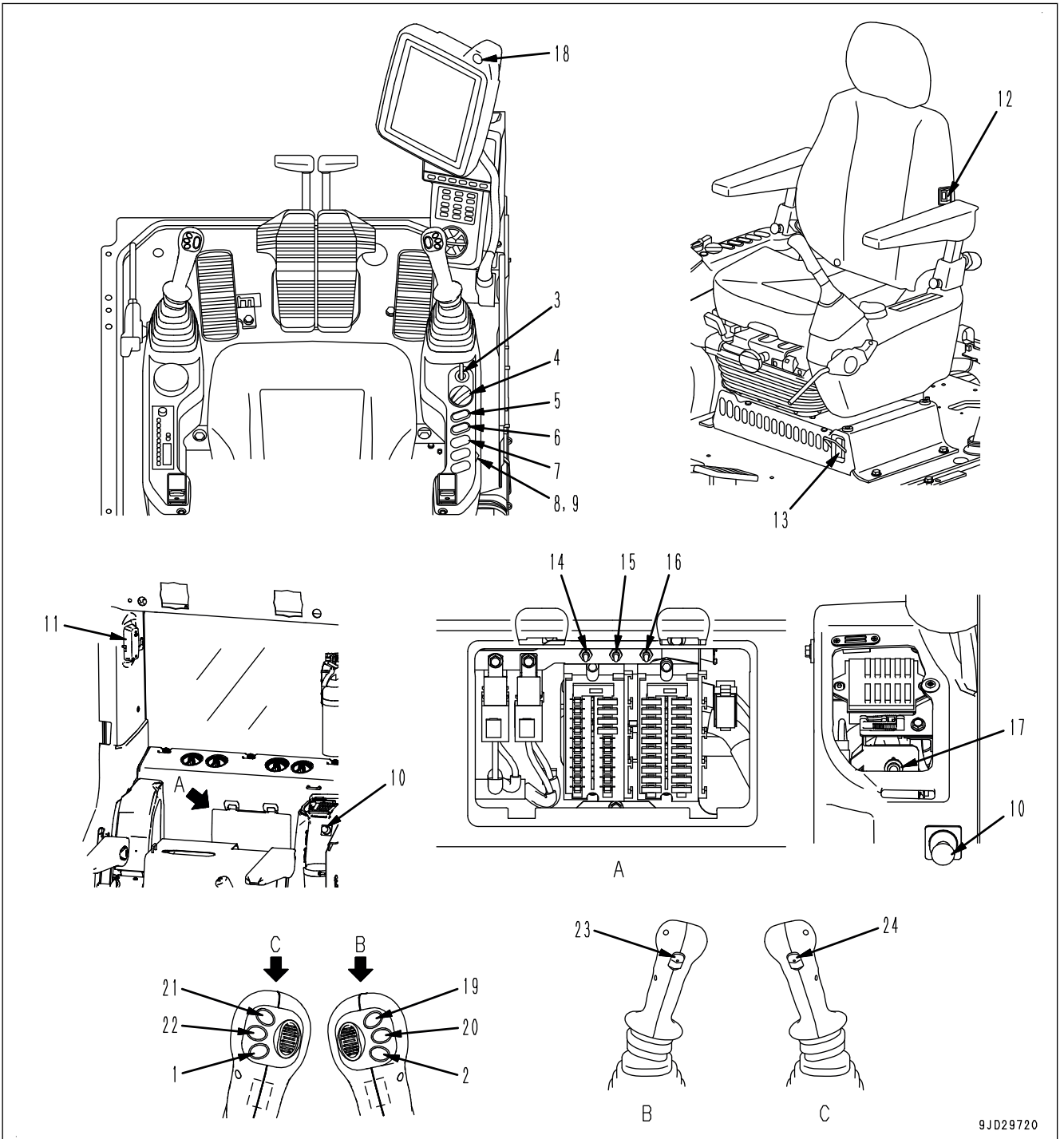
Proportional control lever reverse side view pilot lamp is not lit: Standard is selected (Operate ATT1 with R.H. lever, operate ATT2 with L.H. lever)

REMARK

Proportional control lever reverse side view pilot lamp is displayed only for 2ATT machines with proportional control lever. For reversing the proportional control lever, see PROPORTIONAL SETTING.



SWITCH



- (1) One-touch power maximizing switch
- (2) Horn switch
- (3) Starting switch
- (4) Fuel control dial
- (5) Lamp switch
- (6) Swing lock switch
- (7) Machine push-up switch
- (8) Revolving lamp switch (if equipped)
- (9) Ceiling window wiper switch (if equipped)

- (10) Cigarette lighter
- (11) Room lamp switch
- (12) Seat heater switch (if equipped)
- (13) Engine shutdown secondary switch
- (14) Pump secondary drive switch
- (15) Swing parking brake cancel switch
- (16) Lock lever automatic lock cancel switch
- (17) Boom secondary drive switch
- (18) Auto/manual switch

(19) Breaker operation switch

(20) Offset up switch

(21) Quick coupler switch

(22) Offset down switch

(23) Auto/manual switch

(24) Not used

LAMP SWITCH

Lamp switch is used to make the working lamp and monitor illumination light up.

(a) Night position

Lamps light up and monitor illumination and control box are set to night mode. Auto/Manual switch lights up.

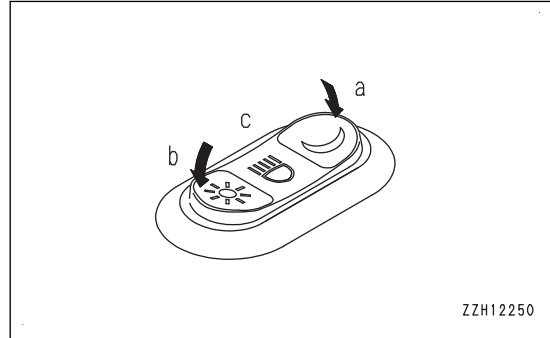
(b) Day position

Lamps light up and monitor illumination and control box are set to day mode.

(c) OFF position

Lamps go out.

(The monitor illumination and control box are set to day mode.)



BOOM SECONDARY DRIVE SWITCH

The boom secondary drive switch is used only when you are forced to move the boom to secure the safety when the work equipment stops due to the abnormality in the electrical system.

If an action level indication (1) or caution lamp (2) is displayed while all of the work equipment cannot move, press function switch F5 on the machine monitor and check whether the current error list includes “DB92KK” or the items of “DB9RKR” and “DB9QKR” at the same time which indicate the abnormality in hydraulic system. Also check that the boom secondary drive switch is in normal position.

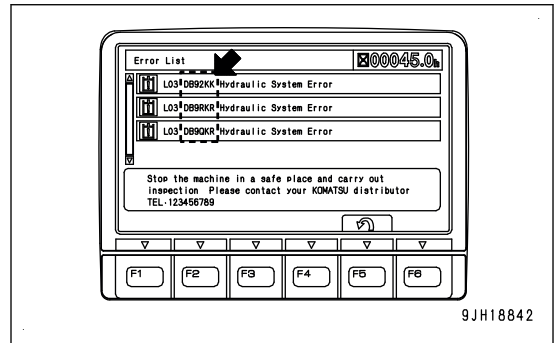
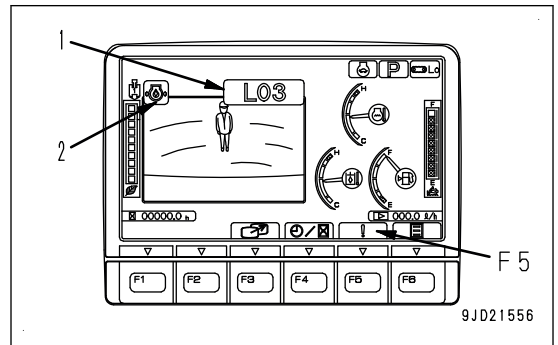
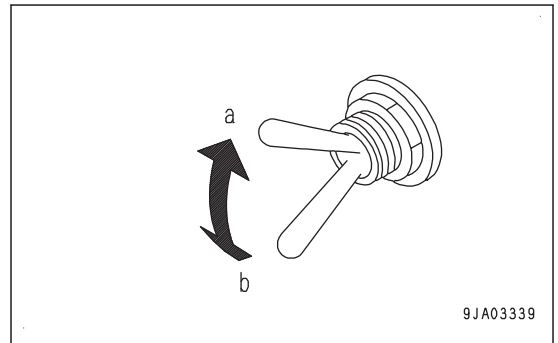
(a) Position for emergency

Set the switch to this position for emergency.

(b) Normal position

Set the switch to this position for normal operation.

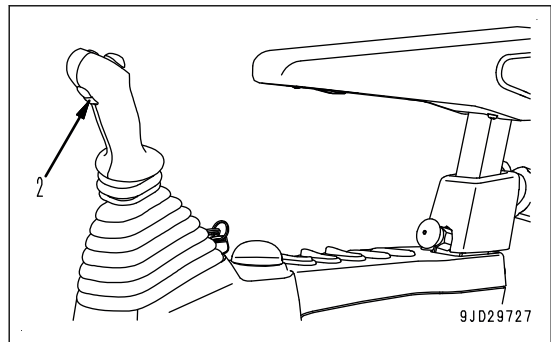
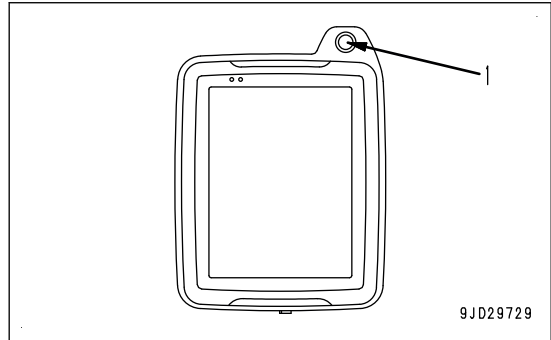
If operation is performed with this switch at the emergency position (a), the semi-auto mode cannot be used.



AUTO/MANUAL SWITCH

You can switch between semi-auto mode and manual mode by using Auto/Manual switch.

You can use either switch (1) of the control box or switch (2) of the R.H. control lever for selection.



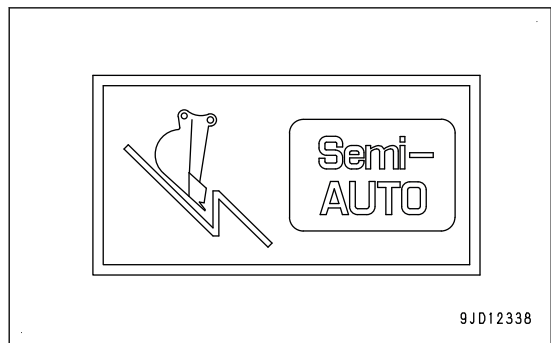
(a) Semi-auto mode

Pressing this switch during manual mode changes the mode to semi-auto mode.

Symbol indicating semi-auto mode is displayed on the control box, and voice signal sounds.

The manual mode cannot be changed to the semi-auto mode in the following condition.

- Travel mode is selected on the control box.
Select "Rough Digging" mode or "Fine Digging" mode.
- When the calibration has not been completed
Complete the calibration.
- Machine has detected a failure.
Repair the failure.
- The working mode other than P, E, ATT/P, and ATT/E modes is selected.
Select any of working modes of P, E, ATT/P, and ATT/E.
- Control levers are being operated.
Set the control levers to NEUTRAL position.
- Machine is on the steep slopes.
Move to the gentle slopes or level ground.



REMARK

Working mode will be shifted from semi-auto mode to manual mode if you are in the following condition even when Auto/Manual switch is not pressed during operation of the semi-auto mode.

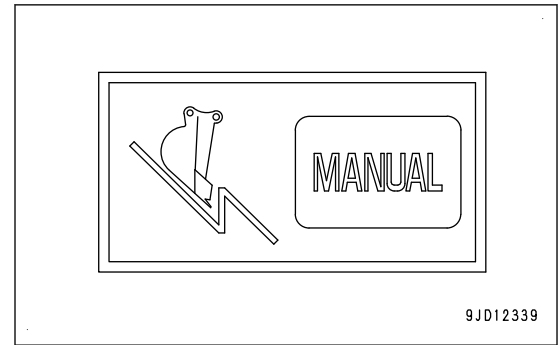
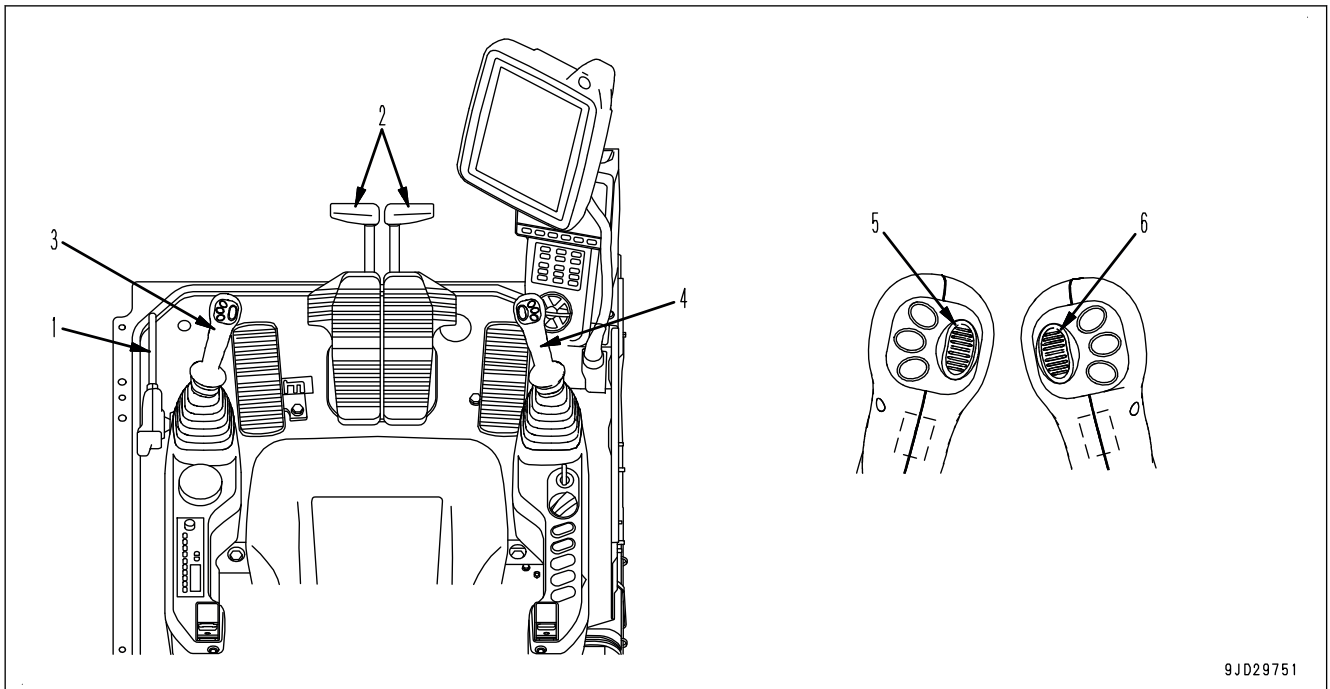
- Machine has detected a failure.
Repair the failure.
- Machine digs the design surface by 500 mm {1 ft 8 in} or more.
- Machine is out of the area of the design surface.
Return within the area.
- GPS receiver becomes the state of initializing and it elapses the semi-auto hold time at initialization.

(b) Manual mode

Pressing this switch during the semi-auto mode changes the mode to the manual mode.

The symbol indicating the manual mode is displayed on the control box, and voice signal sounds.

Shifting from the semi-auto mode to the manual mode can be performed regardless of the machine condition.

**CONTROL LEVERS AND PEDALS**

- | | |
|---|---|
| (1) Lock lever | (4) R.H. work equipment control lever (with auto-deceleration system) |
| (2) Travel levers (with pedal and auto-deceleration system) | (5) L.H. proportional control lever |
| (3) L.H. work equipment control lever (with auto-deceleration system) | (6) R.H. proportional control lever |

LOCK LEVER**⚠ WARNING**

- When opening/closing the window, adjusting the position of operator's seat, and leaving the operator's seat, set the lock lever securely to **LOCK** position. If the lock lever is not at **LOCK** position and the control levers or control pedals are touched by mistake, it may lead to serious personal injury or death.
- Always check that the lock lever is in **LOCK** position.
- When pulling up or pushing down the lock lever, be careful not to touch the work equipment control lever.
- Before raising the lock lever, make sure that all levers and pedals are set to **NEUTRAL** position.

The lock lever is a device to lock the work equipment, swing, travel, and attachment control levers (if equipped).

(L) LOCK position

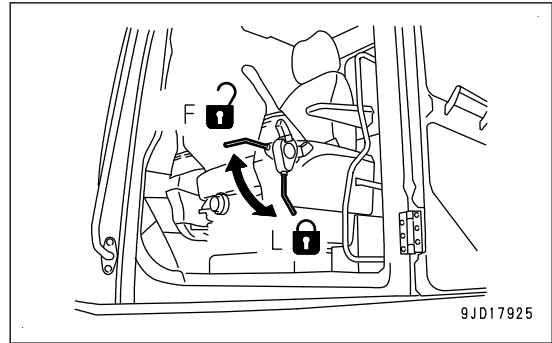
Even when levers or attachment control pedal (if equipped) are operated, machine does not move.

(F) FREE position

Machine moves according to operation of levers or attachment control pedal (if equipped).

REMARK

This lock lever is of hydraulic lock type. The control levers or control pedals move but the machine does not move when it is in LOCK position (L).



Automatic lock function of lock lever

⚠ WARNING

- The lock lever automatic lock function assists the operator in judgment to reduce damage caused by accident. It does not stop the work equipment or machine in all situations.
- Even if the lock lever automatic lock function works, the work equipment or machine may not stop immediately or may stop after moving by a certain distance. Also, the lock lever automatic lock function may not work in the following cases. Accordingly, do not rely on it too much.
 - When the hydraulic oil temperature is low (When the hydraulic oil temperature caution lamp indicates low temperature)
 - When the viscosity of the hydraulic oil used is higher than that of the genuine hydraulic oils which Komatsu recommends
- Before setting the lock lever to FREE position, make sure that all control levers and pedals are set to NEUTRAL position. If any of them is out of NEUTRAL position, the work equipment or machine may move suddenly and cause a serious personal injury or death.

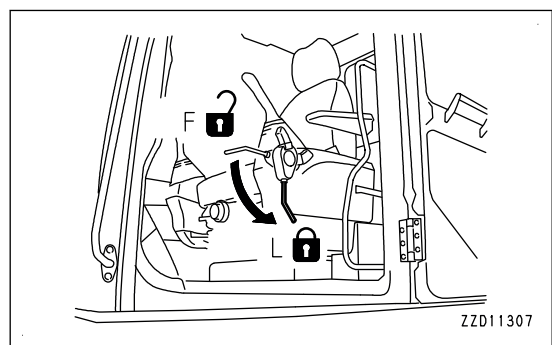
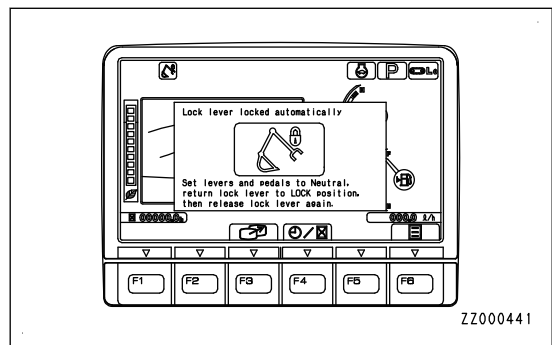
The lock lever automatic lock function prevents the work equipment or machine from operating unexpectedly when the lock lever is released while the work equipment control lever or travel lever is operated. The lock lever is set in the same state as when locked automatically.

When this function works, the operations of the work equipment, swing, travel, and attachment are locked automatically and the message shown in the figure is displayed.

While this function is in operation, the machine does not move even if a control lever or the attachment control switch is operated while the lock lever is in FREE position (F).

To cancel the lock, return the lock lever to LOCK position (L), check that each control lever and the attachment switch are in neutral, and then release the lock lever again.

For the genuine hydraulic oils which Komatsu recommends, see the Operation and Maintenance Manual of standard machine.



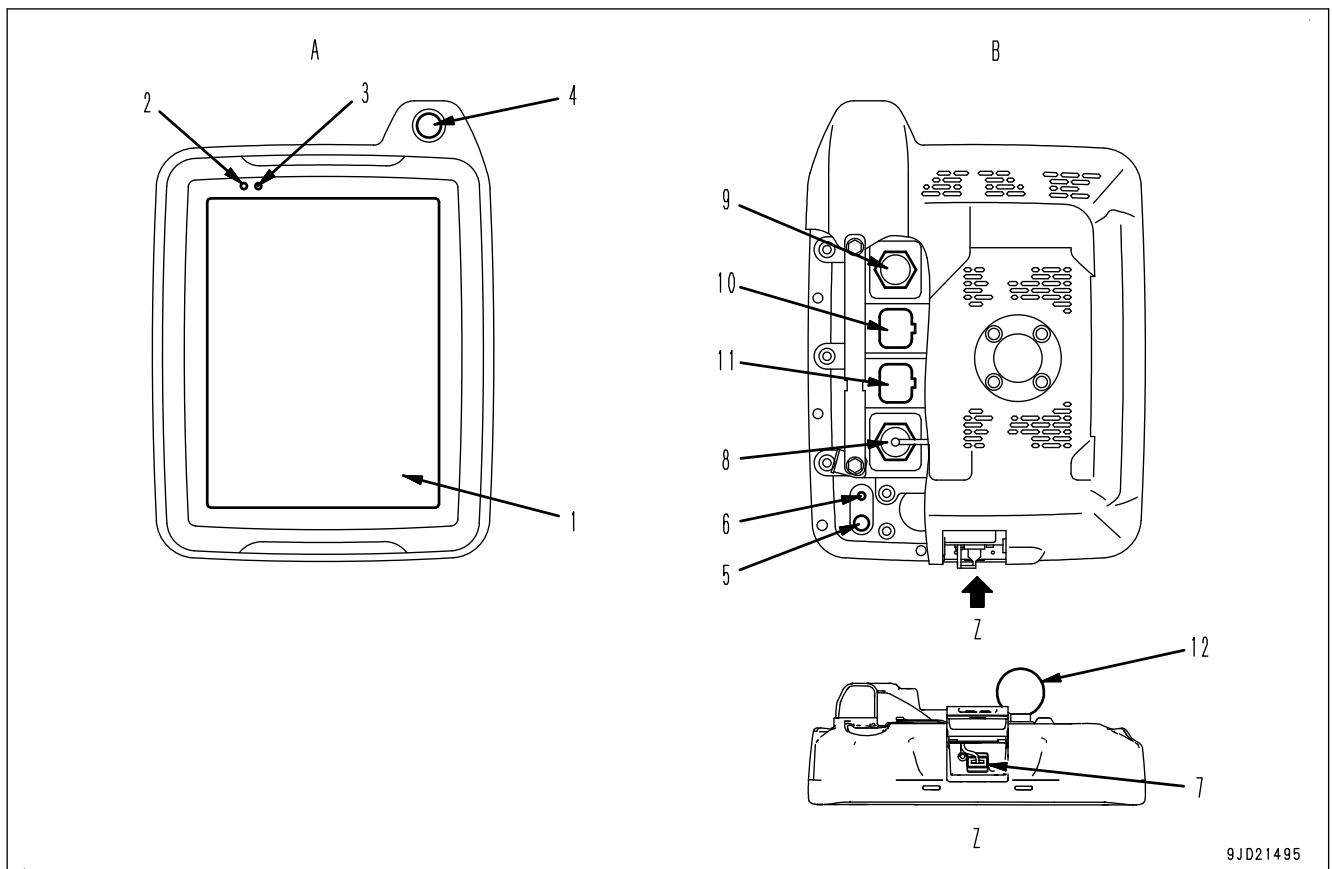
intelligent Machine Control SYSTEM

CONTROL BOX

⚠ WARNING

- Do not operate the control box during the operation of the work equipment in order to prevent unexpected accident from occurring. Also, do not gaze the control box during performing the work.
- The image of the machine displayed on the control box is only a representation. The image displayed on the control box is not enough to ensure the safety around the machine. Check around the machine with your own eyes.

Control box is the monitor to display the necessary information for the intelligent Machine Control. Various settings are performed on this monitor by inputting data into the touch panel.



(A) Front face of control box

(B) Back face of control box

(1) Touch panel type control box

(2) Internal battery state LED

(3) External power supply state LED

(4) Auto/manual switch

(5) Power button

(6) Reset button

(7) USB port (for uploading and downloading the data by USB flash drive)

(8) Spare USB port (for mouse connection as needed)

(9) Ethernet connection port

(10) Connector port 1

(11) Connector port 2

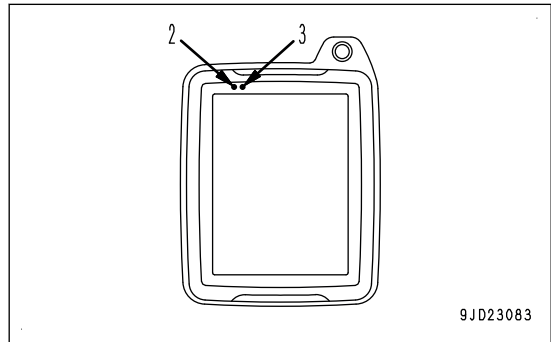
(12) Control box fixing joint

Touch panel

This machine uses an electrostatic capacity type touch panel. When operating touch panels with hands wearing gloves, the reaction becomes degraded.

Power supply state LED

- Power supply state LED displays the state of control box power supply.
- Control box power is supplied from GNSS receiver.



Display of the internal battery state LED (2)	Display of the external power supply state LED (3)	State
Green	Green	<ul style="list-style-type: none"> • Power supply is normal. • Internal battery has been fully charged.
Green, blue (flashes alternately)	Green	<ul style="list-style-type: none"> • Power supply is normal. • Internal battery is being charged (battery charged level: high).
Orange, blue (flashes alternately)	Green	<ul style="list-style-type: none"> • Power supply is normal. • Internal battery is being charged (battery charged level: medium).
Red, blue (flashes alternately)	Green	<ul style="list-style-type: none"> • Power supply is normal. • Internal battery is being charged (battery charged level: low).
Green	Orange	<ul style="list-style-type: none"> • Power supply voltage is low. • Internal battery has been fully charged.
Green, blue (flashes alternately)	Orange	<ul style="list-style-type: none"> • Power supply voltage is low. • Internal battery is being charged (battery charged level: high).
Orange, blue (flashes alternately)	Orange	<ul style="list-style-type: none"> • Power supply voltage is low. • Internal battery is being charged (battery charged level: medium).
Red, blue (flashes alternately)	Orange	<ul style="list-style-type: none"> • Power supply voltage is low. • Internal battery is being charged (battery charged level: low).
Green	Red	<ul style="list-style-type: none"> • Power supply voltage is extremely low. • Internal battery has been fully charged.
Green, blue (flashes alternately)	Red	<ul style="list-style-type: none"> • Power supply voltage is extremely low. • Internal battery is being charged (battery charged level: high).
Orange, blue (flashes alternately)	Red	<ul style="list-style-type: none"> • Power supply voltage is extremely low. • Internal battery is being charged (battery charged level: medium).

Display of the internal battery state LED (2)	Display of the external power supply state LED (3)	State
Red, blue (flashes alternately)	Red	<ul style="list-style-type: none"> Power supply voltage is extremely low. Internal battery is being charged (battery charged level: low).
Orange	Red	<ul style="list-style-type: none"> Power supply voltage is extremely low. Internal battery is not charged.
Red	Red	<ul style="list-style-type: none"> Power supply voltage is extremely low. Internal battery is not charged.

The intelligent Machine Control system starts/ends according to ON/OFF of starting switch.

REMARK

- If the intelligent Machine Control system does not start even if the starting switch is turned to ON position, turn the starting switch to OFF position once, and press the reset button on the control box for 2 seconds. After that, turn the starting switch to ON position again.
- If the intelligent Machine Control system does not end even if the starting switch is turned to OFF position, press the reset button on the control box to stop the system.
- Restart the system if the sensors for attachment is removed and installed, or setting is changed while the intelligent Machine Control system is starting. When the individual end is set, end the control box individually, then start it up again.
 - The intelligent Machine Control system can be stopped individually regardless of ON/OFF of starting switch. For this setting, consult your Komatsu distributor.
 - When the individual end is set, take care not to forget ending the intelligent Machine Control system. For ending, be sure to tap the menu button first, and then tap "Exit" button.
- If the system does not end by preceding procedure, keep pressing the power supply button on the control box for 2 seconds or longer. If the system does not end with 1 time of this procedure, repeat several times.
- If the intelligent Machine Control system is ended by holding down the reset button, the behavior of the system becomes slow or an error display appears due to the initialization of the intelligent Machine Control system. In this case, on "GNSS Status" screen, confirm that "Main GPS" and "Aux GPS" respectively acquire the satellites, and then restart the intelligent Machine Control system.

NOTICE

Do not press the reset button while the control box is in the midst of ending procedure or in a normal operation. This may cause failures of the control box.

USB port

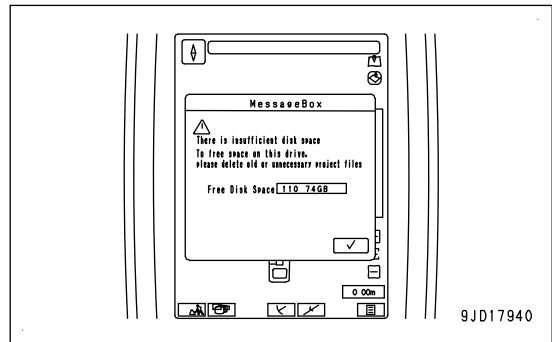
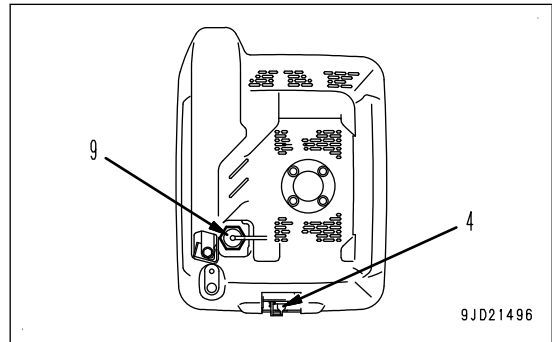
You can upload and download the data to/from control box by inserting the USB flash drive into the USB port (4).

USB port (9) is a spare USB port. Use it as needed.

Close the USB ports with the cap when they are not used in order to prevent water and dust from entering.

REMARK

- USB flash drive with password lock function cannot be used.
- Perform virus scanning for the USB flash drive. Check that it is free from virus, and then use it.
- Save the data directly to the USB flash drive (root directly). If the data is saved in a folder made in the USB flash drive (sub directly), control box cannot recognize the data.
- The control box may not operate properly when the capacity of internal memory reaches the limit due to saving the large data. Frequently delete the unnecessary data.
- If the remaining capacity of internal memory becomes less, warning message shown right is displayed. In this case, delete the unnecessary files.
- Be careful for the control box not to get infected with a virus through the USB flash drive.
Take measures such as to use the USB flash drive which antivirus software is installed to, or to perform virus check with computer.

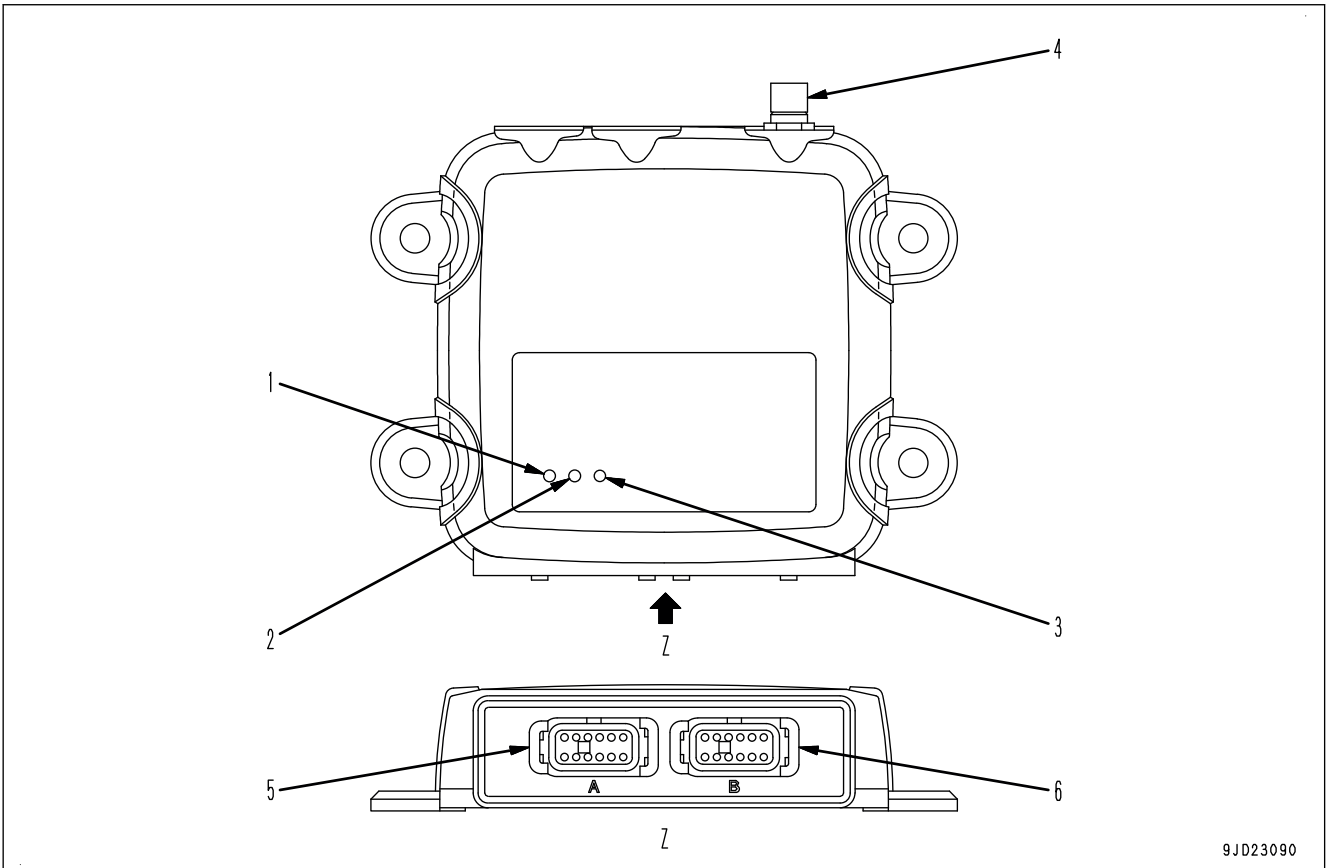


NETWORK MODEM

The network modem is a necessary terminal for 3G communication in order to obtain the satellite compensation information via network, and connect the construction management system such as Site-Link.

NOTICE

Use an antenna for network modem which KOMATSU recommends always when using this device. If an antenna which is not recommended by KOMATSU is used, it may not be complied with the regulations in the country or area where the machine is used. This is because the network modem is a wireless device which uses radio wave.



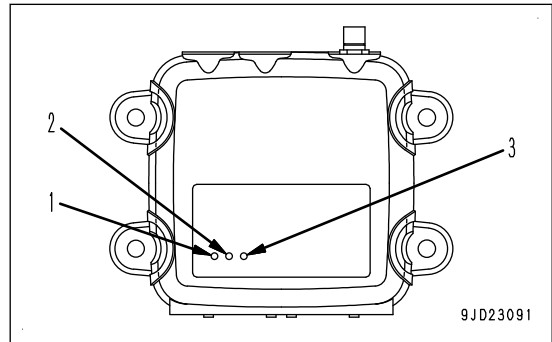
9JD23090

- (1) Power supply state LED
- (2) Communication state LED
- (3) Blue tooth state LED

- (4) Antenna connecting port
- (5) Connector port 1
- (6) Connector port 2

How these various state LED work

For questions about the communication, consult your Komatsu distributor.



Display of the power supply state LED (1)

Lighting color	State
Green	ON
Not lit	OFF

Display of the communication state LED (2)

Lighting color	State
Not lit	OFF
Yellow	Being started up
Flashing in green	Not being connected to SiteLink server. (No GPRS connection information is obtained)
Green	Connection to SiteLink server is established, but no RTK compensation information is obtained.
Green, red (flashes alternately)	Connection to SiteLink server is established, and GPS compensation information is received.

Display of the blue tooth state LED

Lighting color	State
Not lit	Connection to the blue tooth is not established.

OTHER EQUIPMENT

METHOD FOR OPENING AND CLOSING CAB FRONT WINDOW

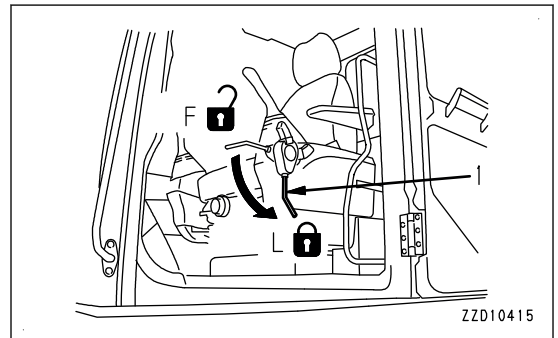
⚠ WARNING

- Set the lock lever in LOCK position always when opening or closing the front window, bottom window, or door.
If the control lever or control pedal is touched by mistake when the lock lever is in FREE position, it may cause serious personal injury or death.
- When opening or closing the front window or bottom window, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, and then perform the work.
- Stow the control box before opening or closing the front window. Return the control box in the original position immediately after opening or closing the front window.
- Do not start the engine with control box being stowed.
- When opening the front window, hold the handle securely with both hands to pull up, and do not release your hands until the front window is locked by the automatic lock catch.
- Hold the handles securely with both hands when closing the front window otherwise it may drop under its own weight.

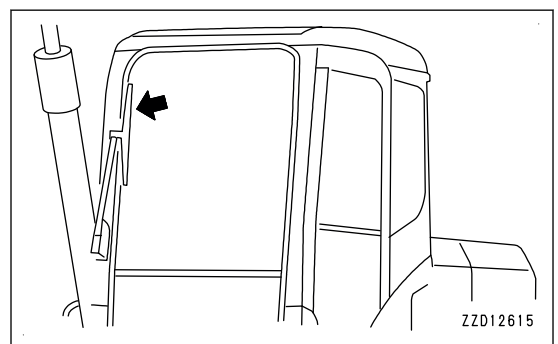
It is possible to stow (pull-up) the front window (upper side) in the roof of the operator's compartment.

METHOD FOR OPENING CAB FRONT WINDOW

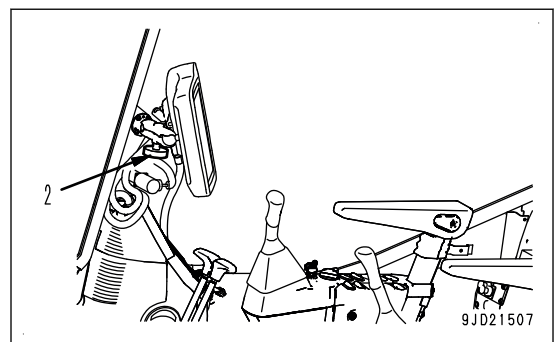
1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
2. Stop the engine.



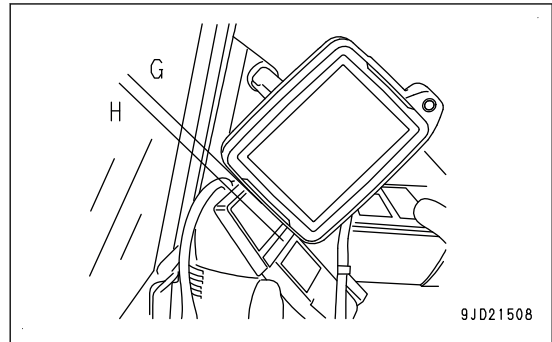
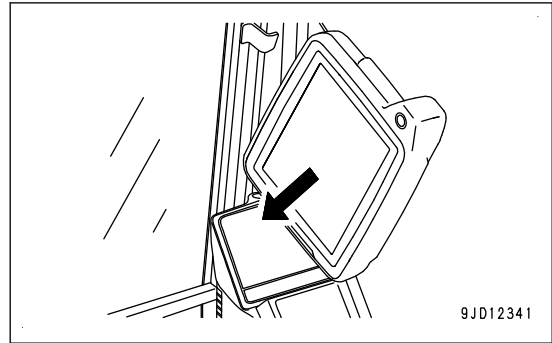
3. Check that the wiper blade is stowed in the right stay.



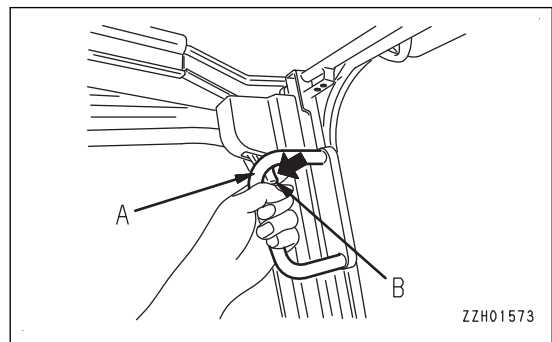
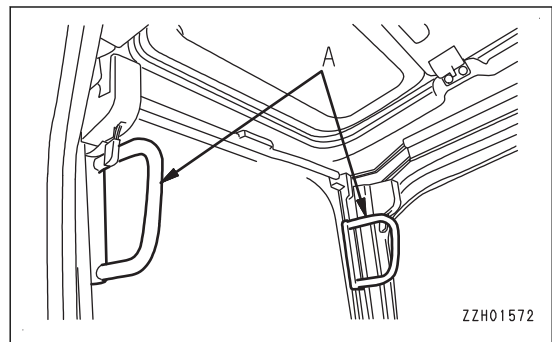
4. Turn the handle (2) of mount to loosen it.



5. Face the screen of control box toward left of the machine, and tilt it so that the bottom (G) of control box is parallel to the screen (H) of machine monitor.
6. Turn the handle (2) of mount to fix the control box.



7. Hold the handles (A) (2 places) on the right and left top sides of the front window, and pull the levers (B) (2 places) to release the locks at the top of the front window. The top of the front window will come out.

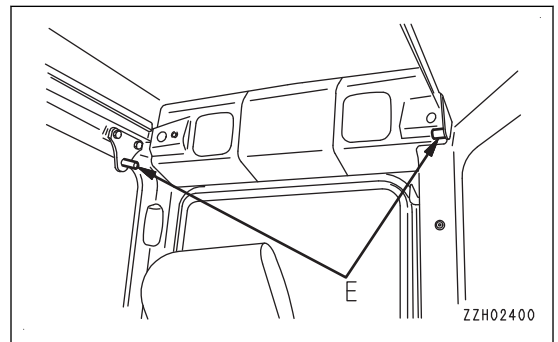
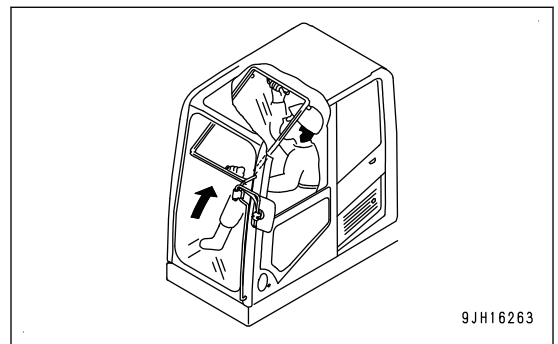
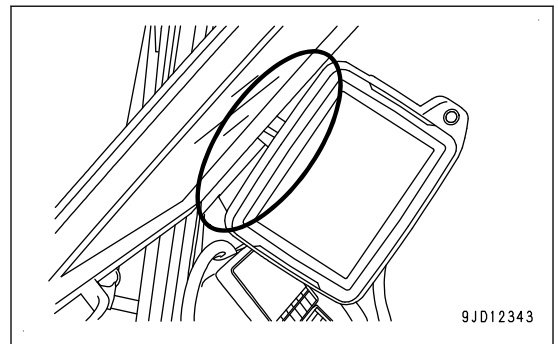
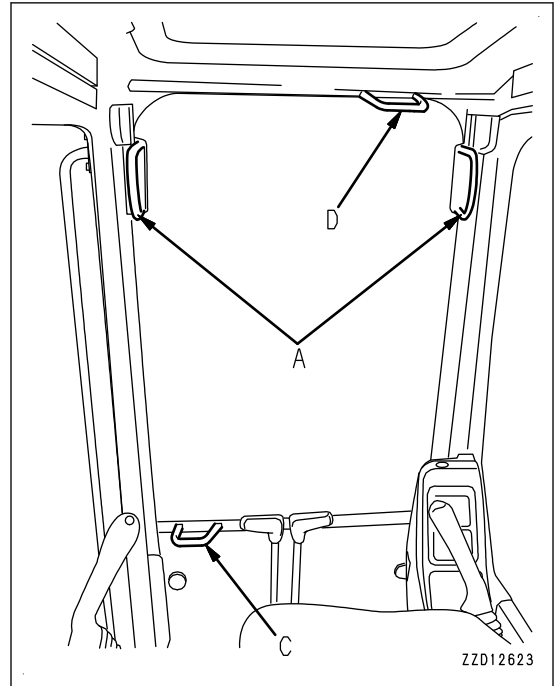


8. Hold the lower handle (C) with your left hand from inside the operator's cab, and with your right hand, grip the top handle (D), pull it up, and push it securely against the lock catch (E) at the rear of the cab to lock the window.

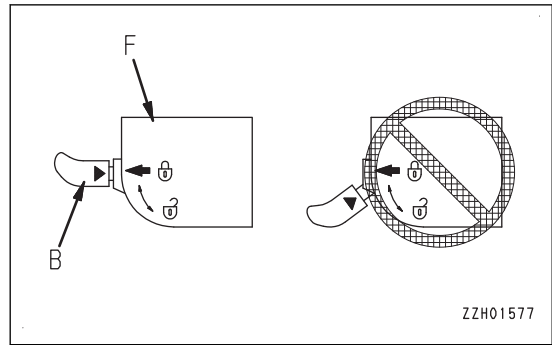
Pull up the front window checking that the front window does not interfere with the control box.

REMARK

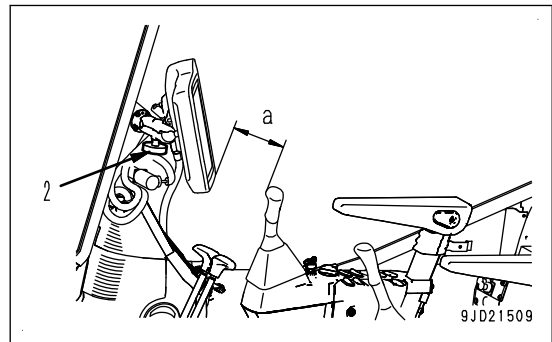
Handles (A) on the right and left top sides of the front window are not for pulling up the front window. Do not pull up the front window with the handles (A).



9. Check that the lever (B) is securely at LOCK position.
 - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
 - The lock is not engaged if the arrow on the lock case (F) does not match the position of the arrow on the lever (B). Repeat the operation in step 5 to engage the lock.



10. Adjust the control box to the position for you to see it well.
11. Turn the handle (2) of mount to screw it in, and fix the control box so that it does not move.
12. Check that the clearance with the control box is enough for the work equipment lever when it is moved. (Keep 40 mm {1.6 in} or more for the clearance (a).)

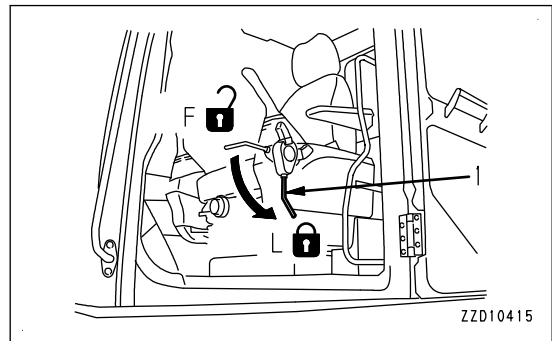


METHOD FOR CLOSING CAB FRONT WINDOW

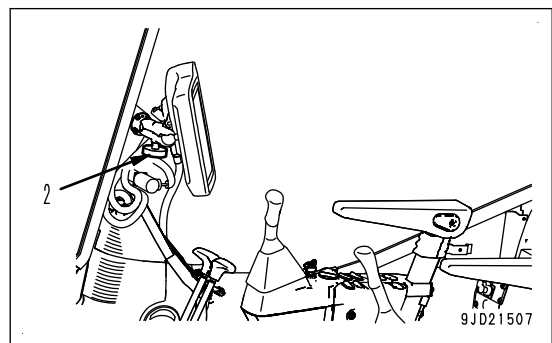
CAUTION

When closing the cab front window, lower it slowly and be careful not to get your hand caught.

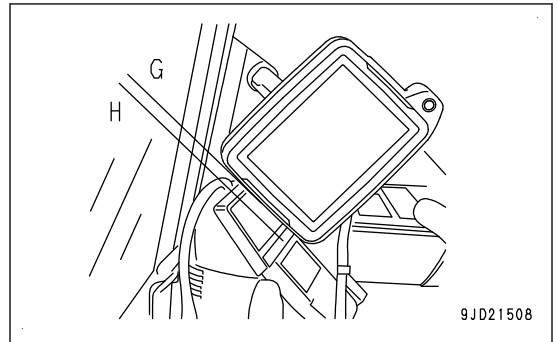
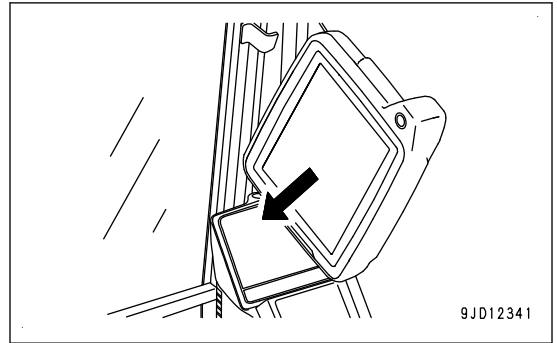
1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
2. Stop the engine.



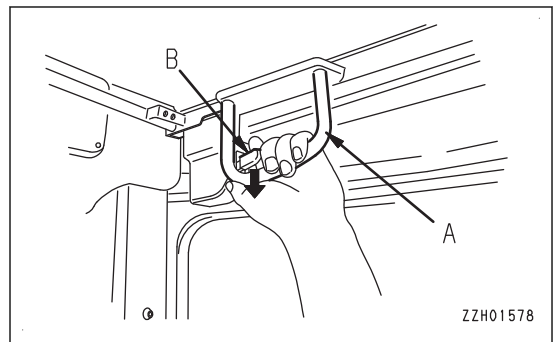
3. Turn the handle (2) of mount to loosen it.



4. Face the screen of control box toward left of the machine, and tilt it so that the bottom of control box is parallel to the screen of machine monitor.
5. Turn the handle of mount to tighten it in order to fix the control box.



6. Grip the right and left handles (A), and pull down the lever (B) to release the lock.

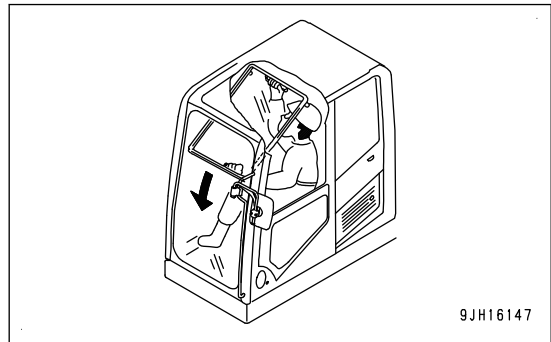
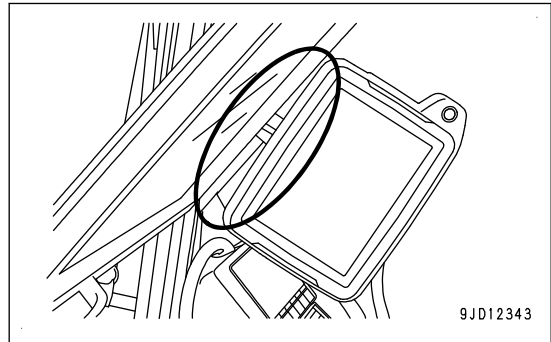
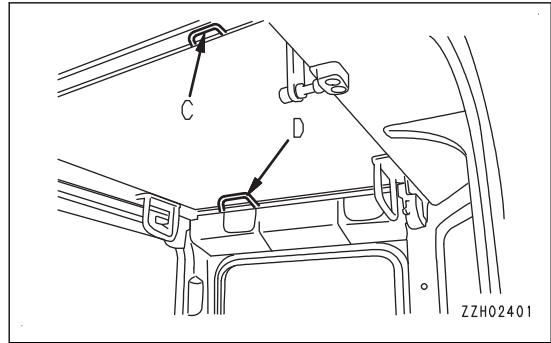


- 7. Grip the handle (C) at the bottom of the front window with your left hand and the handle (D) at the top with your right hand, push the cab front window to the front, then lower it slowly.

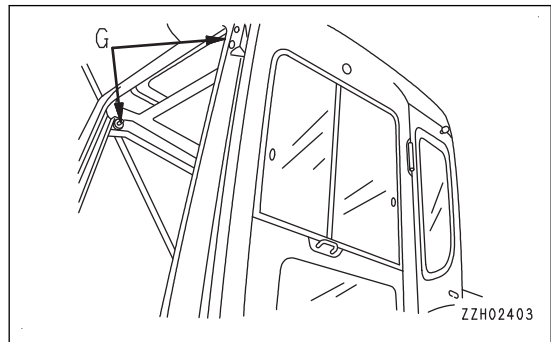
Lower the front window as checking that the front window does not interfere with the control box.

REMARK

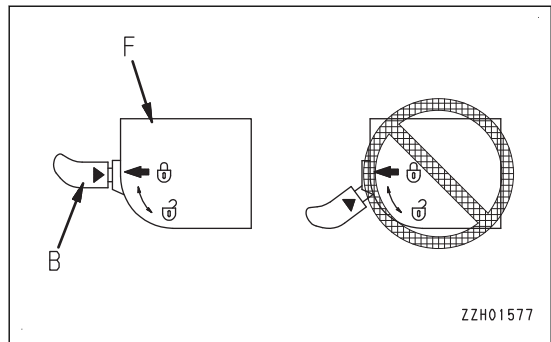
The handles (A) on the right and left top sides of the front window are not for pulling up and down the window. Do not pull down the front window with the handles (A).



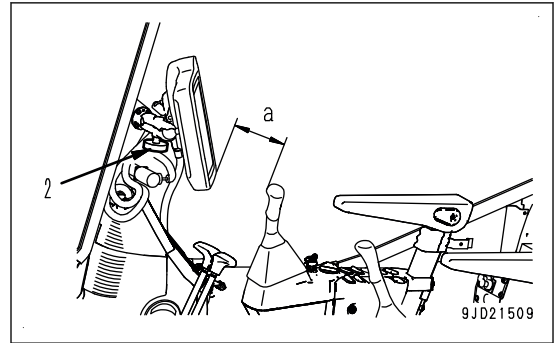
- 8. When the bottom of the window reaches the top of lower side window, push the top of the window to the front, and lock it by pushing it against the right and left lock catchers (G).



- 9. Check that the lever (B) is securely at LOCK position.
 - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
 - The lock is not engaged if the arrow on the lock case (F) does not match the position of the arrow on the lever (B). Repeat the operation in step 5 to engage the lock.

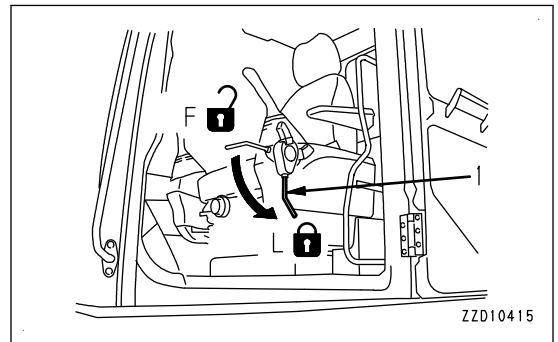


10. Adjust the control box to the position for you to see it well.
11. Turn the handle (2) of mount to screw it in, and fix the control box so that it does not move.
12. Check that the clearance with the control box is enough for the work equipment lever when it is moved.
(Keep 40 mm {1.6 in} or more for the clearance (a).)

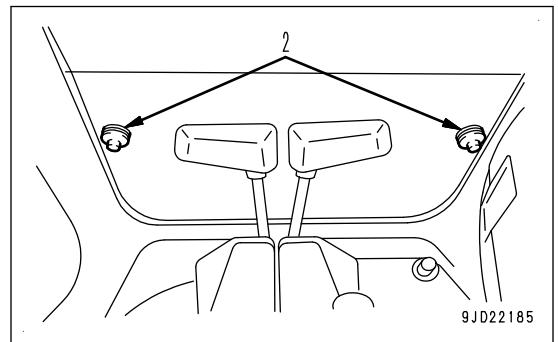


METHOD FOR REMOVING LOWER CAB FRONT WINDOW

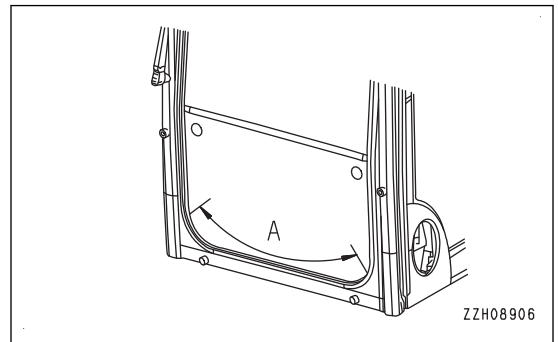
1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
2. Stop the engine.



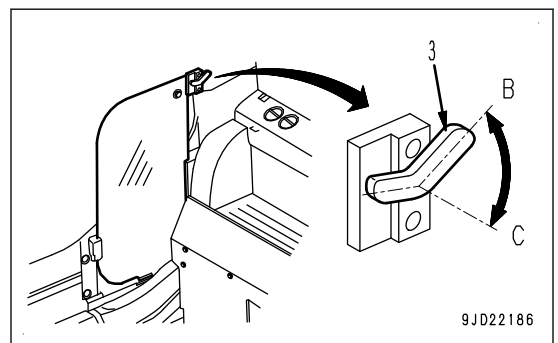
3. Open the front window (upper side), then hold the grip (2), pull it up, and remove the lower side window.



If sand or dust is collected at the bottom of the front window (lower side), it will be difficult to remove the window. In addition, when stowing, the sand and dust stuck to the glass will be carried inside the cab. To prevent this, clean the area (A) before removing.

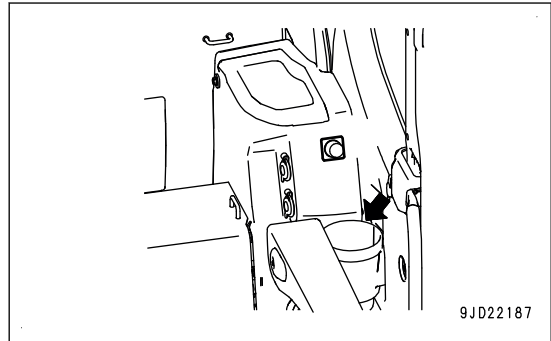


4. Store the lower side window at the right rear of the operator's cab after it has been removed.
5. Set the lever (3) to the lock position (B) to hold it securely in position.
6. Set the lever (3) to the release position (C), hold the glass with both hands, and pull it up when removing the lower side window.



CUP HOLDER

The cup holder is located on the left side of the operator's seat.



9JD22187

POWER SUPPLY OUTLET

24V power supply

NOTICE

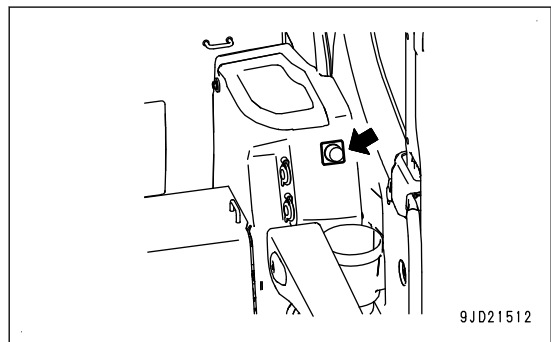
Do not use this as a power supply for 12 V equipment. This will cause a failure of the equipment.

When cigarette lighter is removed, the lighter socket can be used as a power source.

The capacity of the cigarette lighter is 85 W (24 V x 3.5 A).

REMARK

Use 24 V power source while engine is running.



9JD21512

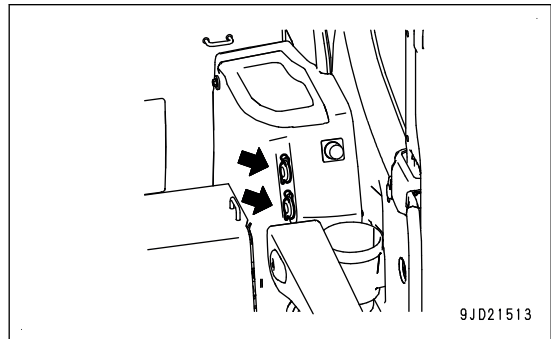
12V power supply

Capacity of this power supply is 144 W (12 V x 12 A).

- When it is used at one place 144 W (12 V x 12 A)
- When it is used at 2 places: 144 W in total

REMARK

Use this power source while engine is running.



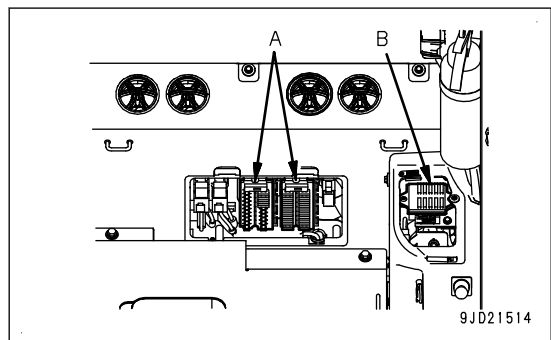
9JD21513

FUSE

NOTICE

Turn the starting switch to OFF position, then turn the battery disconnect switch to OFF position always before replacing the fuse.

- The fuse holder for the fuse 1 (A) is installed at the rear of the operator's seat. The fuse holder for the fuse 2 (B) is installed at the rear left of the operator's seat.
- The fuses protect the electrical component and wiring from burning out.
- If the fuse is corroded, or loose in the fuse holder, or looks white powdery, replace it.
- Replace the fuse with the one of the same capacity.

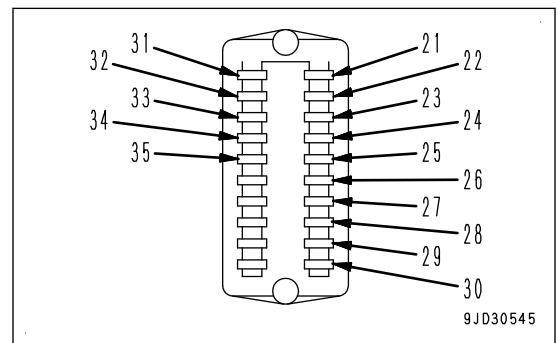
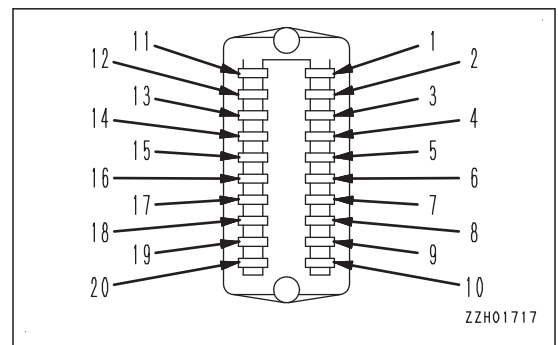


9JD21514

Fuse 1

Fuse capacities and circuit names

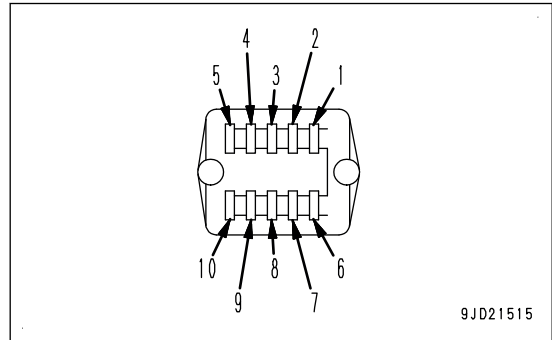
No.	Fuse capacity	Name of circuit
(1)	5 A	Secondary switch, work lump relay
(2)	30 A	Solenoid valve
(3)	5 A	PPC hydraulic lock solenoid
(4)	10 A	Window washer, cigarette lighter
(5)	10 A	Horn, right knob switch
(6)	5 A	Auto preheater relay
(7)	10 A	Revolving lamp, heated mirror
(8)	10 A	Radio, speaker, left knob switch
(9)	10 A	Rear lamp
(10)	20 A	Air conditioner unit
(11)	10 A	Optional power supply (1)
(12)	30 A	Optional power supply (2), 12 V power supply and air suspension seat with heater
(13)	5 A	Air conditioner ECU power supply
(14)	5 A	Key ACC signal
(15)	10 A	Working lamp
(16)	10 A	Radio backup, room lamp, system operating lamp
(17)	20 A	Monitor, pump controller
(18)	30 A	Engine controller
(19)	5 A	Air conditioner ECU backup
(20)	10 A	Optional power supply (continuous power supply)
(21)	10 A	Cab head light (1)
(22)	10 A	Cab rear light
(23)	10 A	Lower wiper
(24)	10 A	Quick coupler
(25)	15 A	Refueling pump
(26)	10 A	Cab head light (2)
(27)	10 A	Option light
(28)	20 A	Auto grease
(29)	30 A	Option heater
(30)	10 A	Spare
(31)	20 A	Sensor power supply relay (1)
(32)	10 A	Sensor power supply relay (2)
(33)	10 A	DEF line heater relay (1)



No.	Fuse capacity	Name of circuit
(34)	20 A	DEF line heater relay (2)
(35)	10 A	KomVision controller

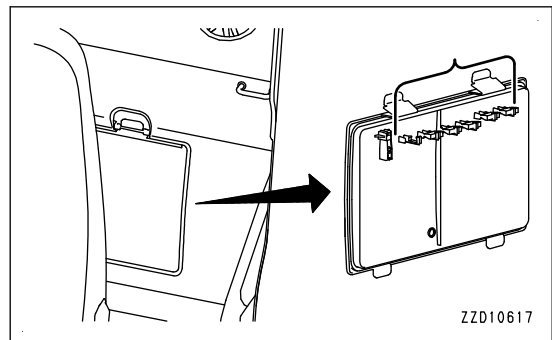
Fuse 2

No.	Fuse capacity	Name of circuit
(1)	5 A	ICT sensor controller, work equipment controller, voice amplifier
(2)	20 A	GNSS receiver, control box
(3)	10 A	Spare
(4)	10 A	Spare
(5)	10 A	Spare
(6)	5 A	IMU
(7)	5 A	Solenoid valve
(8)	20 A	Solenoid valve
(9)	20 A	Boom secondary drive switch
(10)	10 A	Spare



REMARK

- Spare fuses are installed in the back of the fuse holder lid at the rear of the operator's seat.
- After using spare fuses, replenish them immediately.
- One spare fuse is installed for each 5 A, 10 A, 15 A, 20 A, 25 A, and 30 A.



METHOD FOR REMOVING AND INSTALLING CONTROL BOX

⚠ WARNING

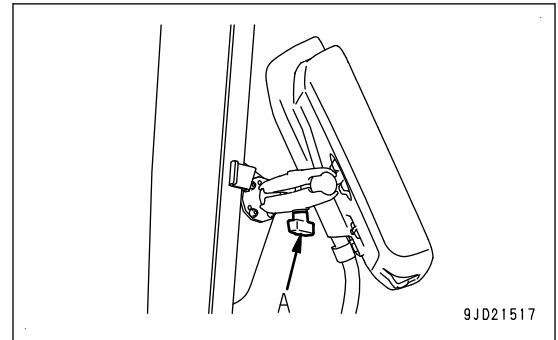
- For the removal and installation of control box, place the machine on a level ground, lower the work equipment to the ground, stop the engine, check the power supply of control box is off, and then perform the operation.
- When removing or installing the control box, always set the lock lever to LOCK position. If the control lever or control pedal is touched by mistake when the lock lever is in FREE position, it may cause serious personal injury or death.

NOTICE

- After operation has been done in a rain or at the humid place, dry up the control box and then store it. If it is stored with moisture, dew condensation occurs inside and it may cause a failure or malfunction.
Also, if the inside of the case, etc. is wet, dry up the device before storing.
- When carrying or transporting the control box, avoid the shock as much as possible by using cushion. Strong shock causes a failure or malfunction.

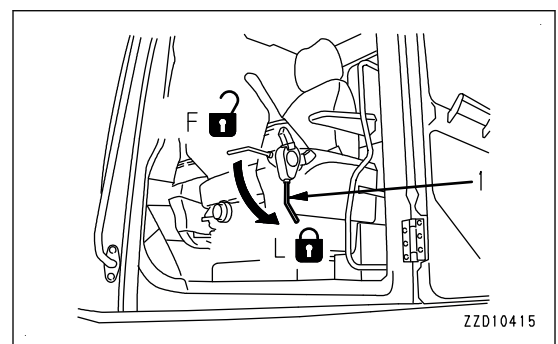
NOTICE

- The control box may fall by its own weight when loosening the mount of control box. Hold the control box securely, and loosen the handle (A) of mount.
- Hold the control box securely when installing the mount of control box. Tighten the handle (A) of the mount fully, and do not release the control box until the position is secured.
If the handle (A) is not tightened sufficiently, control box may fall off and break.
- Do not perform position adjustment of control box while the handle (A) is tightened. Otherwise, control box or mount may break.



METHOD FOR REMOVING CONTROL BOX

1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
2. Stop the engine.

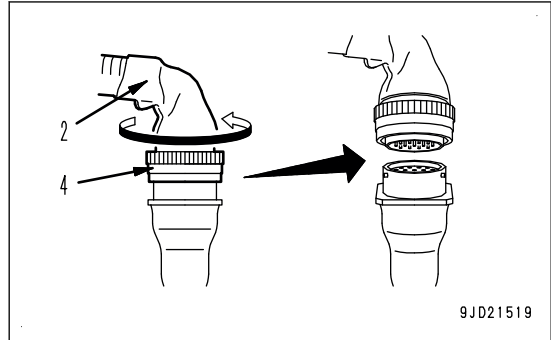
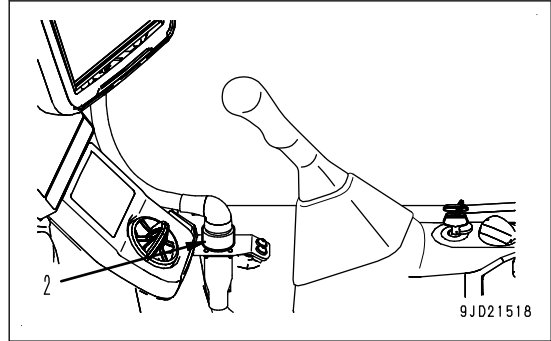


- 3. Turn the ring (4) of the wiring harness connector (2) counterclockwise to disconnect the connector.
- 4. Put the cap on the disconnected connector to prevent the dust from entering.

Control box side connector: Red cap
Chassis harness side connector: Yellow cap

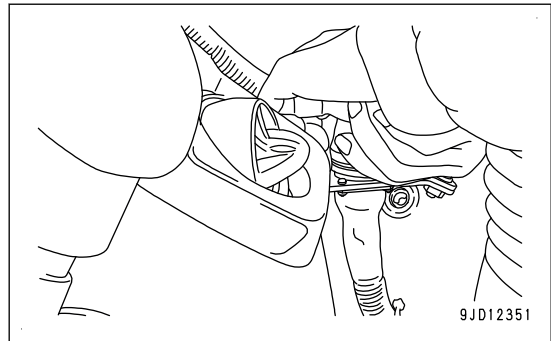
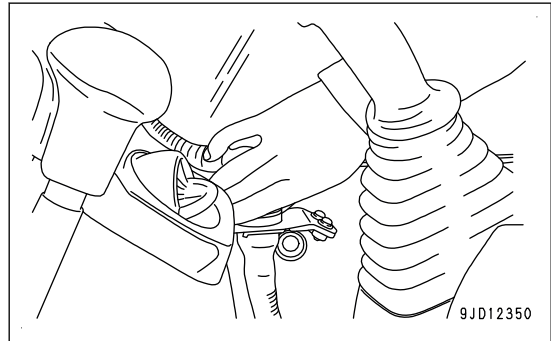
REMARK

3 each of caps including spares are attached to the machine. Keep them carefully not to lose them.

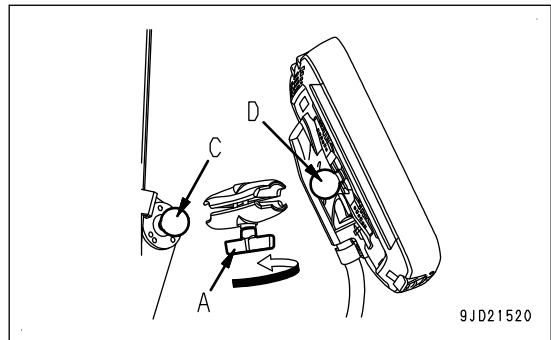


REMARK

Hold the ring as shown in the figure on the right so that it can be turned easily when disconnecting the connector.

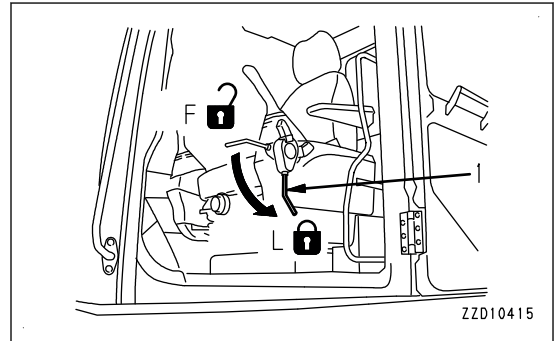


- 5. Support the control box securely not to drop. Turn the handle (A) counterclockwise to loosen the mount until the ball (D) at the rear of control box is removed from the mount.
- Face the handle (A) of the mount downward to operate.



METHOD FOR INSTALLING CONTROL BOX

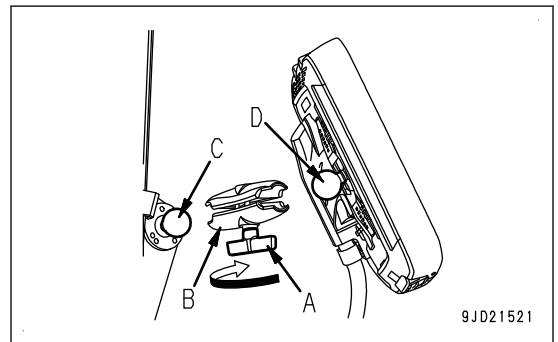
1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
2. Stop the engine.



3. Hold the cab fixing ball (C) and ball (D) at the rear of control box with the mount (B), and turn the handle (A) of the mount (B) clockwise to fix the mount.

Face the handle (A) of the mount downward to operate.

- 1) Install the control box having the clearance (slit) of mount facing sideways.
 - Optimum holding force against gravity direction can be obtained by doing this.
 - Enough space is secured under the handle (A) and it makes tightening easier.



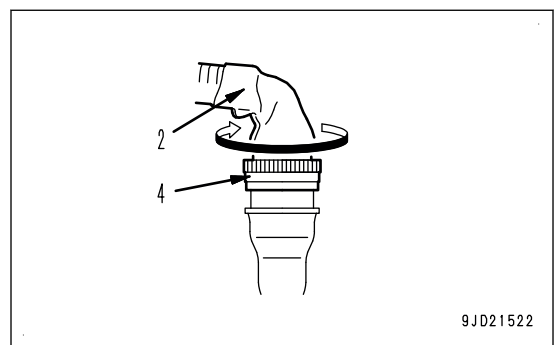
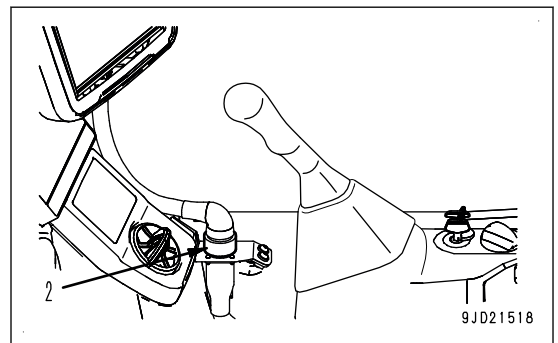
- 2) Fix the mount so that it is vertical against the ball bracket (C).
Fix it so that it is vertical against the right side glass.
- 3) Retighten it a few times while checking the play.

Perform it in order of "Tighten → Check the play → Tighten → Check the play → Tighten".

REMARK

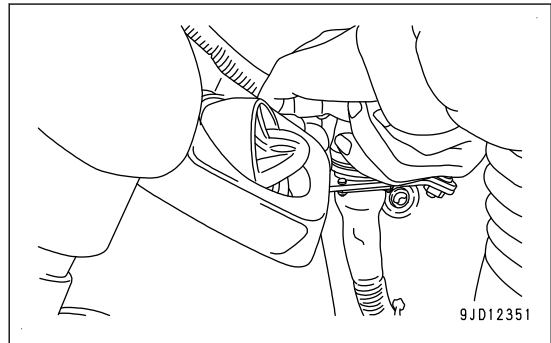
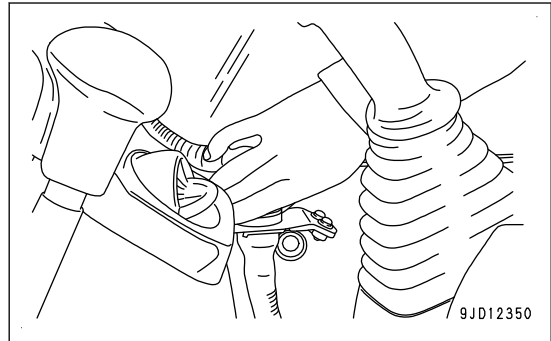
If the above procedures are not followed, the mount may become loose easily. Retighten the handle of the mount periodically. It prevents the mount from loosening.

4. Remove the cap, turn the ring (4) of the wiring harness connector (2) clockwise, and tighten it lightly so that the wiring harness connector (2) can move.
Keep the removed cap and do not lose it.

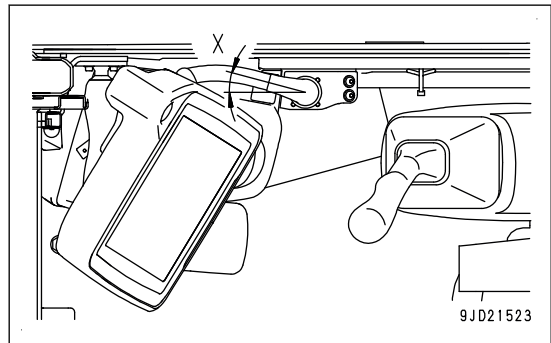


REMARK

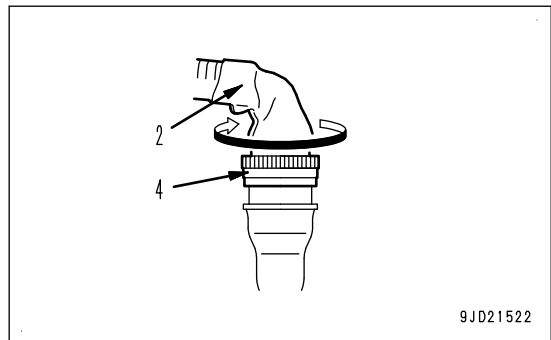
When connecting the connector, support the ring as shown in the right figure so that it can be turned easily.



5. Move the wiring harness connector (2) to make the angle (X) of approximately 15° by seeing the wiring harness connector (2) from directly above, and hold it.



6. While holding the wiring harness connector (2), turn the ring (4) clockwise until it "clicks", and check that the connector is connected securely.



MACHINE OPERATIONS AND CONTROLS

CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

METHOD FOR WALK-AROUND CHECK

Walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, leakage of fuel, oil and coolant before starting the engine. Also check the condition of the work equipment and the hydraulic system.

Check also for loose wiring, play, and accumulation of dust in places that get very hot and are exposed to extremely high temperatures.

WARNING

Any combustible materials accumulated around the exhaust pipe, aftertreatment devices, turbocharger, or other high temperature engine parts or the battery, and leakage of fuel or oil will cause the machine to catch fire.

Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.

Perform the following inspections and cleaning every day always before starting the engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage, and hoses.
Check all of the work equipment, cylinders, linkage and hoses for cracks, excessive wear, and abnormal play. If any problem is found, repair it.
2. Remove dirt and debris from around the engine, battery, and radiator.
Check for dirt accumulated around the engine and radiator. Also check for combustible material (dry leaves, twigs, etc.) around the battery, exhaust pipe, aftertreatment device, turbocharger, or other high temperature engine parts. If any dirt or combustible materials are found, remove them.
For the cleaning of dust in the radiator, see the Operation and Maintenance Manual of standard machine.
3. Check around the engine for coolant and oil leakage.
Check for oil leakage from the engine and coolant leakage from the cooling system. If any problem is found, repair it.
4. Check the fuel line for leakage.
Check for leakage of fuel or damage to the hoses and tubes. If any problem is found, repair it.
5. Clean DEF line and check that there is no leakage.
Check around DEF tank for dirt, and clean the blue DEF filler cap and the area around. Check DEF tank, pump, injector, and hoses and their connections for leakage. If any problem is found, ask your Komatsu distributor for repair.
6. Check the hydraulic component, hydraulic tank, hoses, and joints for oil leakage.
Check for oil leakage. If any problem is found, repair the place where the oil is leaking.
7. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers.
If any problem is found, repair it.
8. Check the handrails and steps for problems and check the bolts for looseness.
If any problem is found, repair it. Tighten any loose bolts.
9. Check the gauges and monitor for problem.
Check for problem in the gauges and monitor in the operator's cab. If any problem is found, replace the part. Clean off any dirt on the surface.

REMARK

When cleaning the stains deposited on the monitor surface such as dusts, brush them off with a clean, soft and dry cloth.

For sticky dirt such as oil, remove it with glass cleaner for family use on the market (weakly acid to weakly alkaline, containing no abrasive), and then finish-wipe with a clean, soft, and dry cloth.

10. Check and clean the rearview mirrors.

Check the rear view mirror for trouble. If it is damaged, repair it. Clean the surfaces of the mirrors and adjust the angle so that the area at the rear can be seen from the operator's seat.

11. Check the seat belt and mounting hardware.

Check the seat belt and mounting hardware for any abnormality. If any damage is found, ask your Komatsu distributor to replace it with new one.

12. Check the bucket with hook (if equipped) for damage.

Check the hook, guide, and hook mount for damage. If any problem is found, ask your Komatsu distributor for repair.

13. Check and clean the camera

Check the camera for any abnormality. If any problem is found, ask your Komatsu distributor for repair.

14. Remove dirt from around the aftertreatment devices.

Check for dirt and combustible materials (dry leaves, twigs, etc.) accumulated around the aftertreatment devices. If any dirt or combustible materials are found, remove them.

15. Check around the aftertreatment devices for exhaust gas leakage.

Check the pipe connecting the turbocharger to the aftertreatment devices and also KDPF connections for leakage of exhaust gas (and deposition of soot). If any problem is found, ask your Komatsu distributor for repair.

16. Check around SCR for exhaust gas leakage.

Check the pipe between the KDPF and SCR and also the SCR connections for leakage of exhaust gas (and urea deposit). If any problem is found, ask your Komatsu distributor for repair.

17. Check the GNSS antenna.

Check that the mounting knob of GNSS antenna and connector are not loose. Retighten the knob if any looseness is found.

18. Check the control box and mount, and clean them.

Check the mount of control box for abnormality or wear, and replace it if any problem is found.

Check that the handle is not loose, and retighten it if any looseness is found.

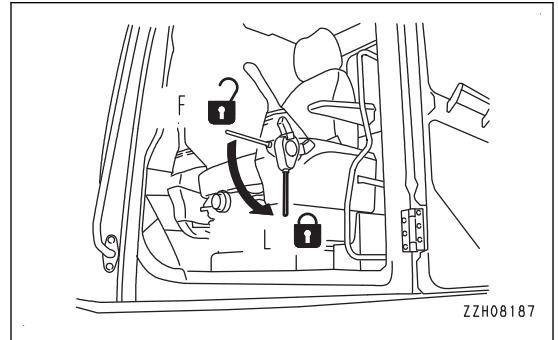
If the control box is dirty, clean it.

METHOD FOR ADJUSTING

METHOD FOR ADJUSTING OPERATOR'S SEAT

WARNING

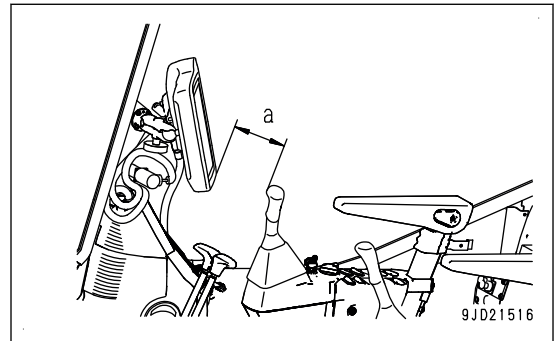
- Set the lock lever to LOCK position (L) and stop the engine always when adjusting the position of the operator's seat in order to prevent any malfunction due to accidental contact with the control levers.
- Adjust the position of whole seat so that the clearance (a) between control box and R.H. work equipment control lever is kept 40 mm {1.6 in} or more with the lever tilted.



NOTICE

If you adjust the position of operator's seat while parts, tools, empty cans, etc. are left around, the peripheral parts and operator's seat may be damaged. Check that there is no parts, etc. around the operator's seat, and adjust the seat position.

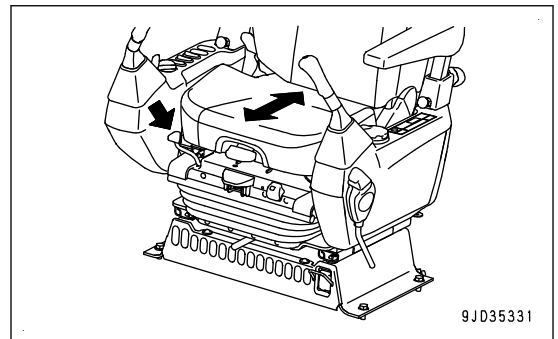
- Adjust the operator's seat before starting each operation or always when the operators change shift.
- Adjust the operator's seat so that control levers and switches can be operated freely and easily with the operator's back against the backrest.



METHOD FOR ADJUSTING SEAT IN FORE-AND-AFT DIRECTION

Pull up the fore-aft adjustment lever, set the seat to the desired position, then let go of the lever.

Fore-and-aft adjustment: 160 mm (16 steps)



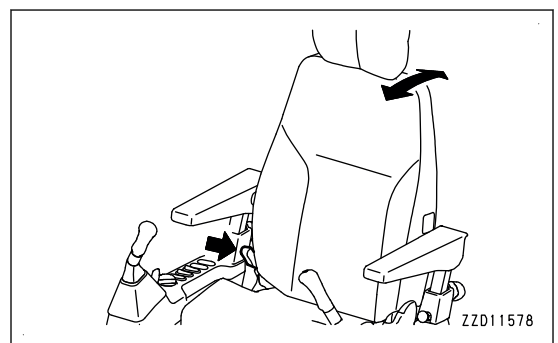
METHOD FOR RECLINING SEAT

The reclining of the seat becomes large when the seat is moved forward, and it becomes smaller as the seat is moved backward. When moving the seat backward, return the reclined seat back to the original position.

Pull up the reclining adjustment lever and set the seat back to a position which is comfortable for operation, then release the lever.

REMARK

Sit with your back against the backrest when adjusting. If your back is not touching the backrest, the backrest may suddenly move forward.

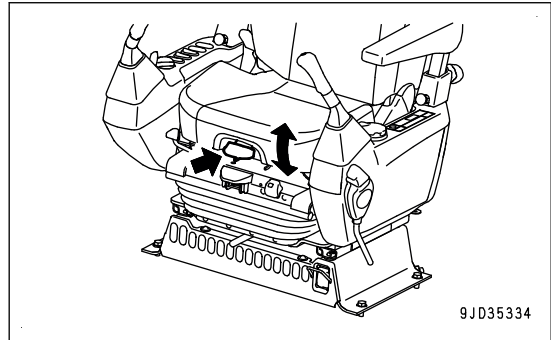


METHOD FOR TILTING SEAT

Pull up the tilt adjustment lever and adjust the front angle of the seat.

- To raise the front of the seat, apply your weight to the rear of the seat, while you pull up the lever.
- To lower the front of the seat, apply your weight to the front of the seat, while you pull up the lever.

Tilt adjustment: Up 5 °, down 5 ° (3 levels)



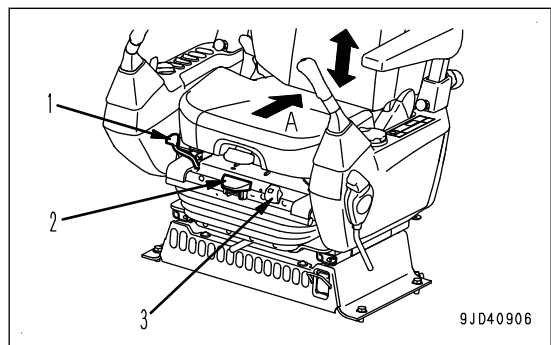
ADJUST SEAT HEIGHT

Pull up the adjustment lever (1), move the seat rearward (A), and operate the switch (2) to adjust the height.

- It rises when you pull the switch (2).
- It lowers when you push the switch (2).

Adjust it to let the weight adjustment indicator (3) go in the green range.

Adjustment quantity of height: 75 mm {3 in}



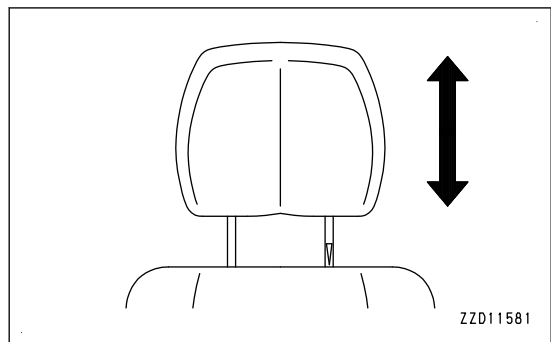
METHOD FOR ADJUSTING HEADREST IN VERTICAL DIRECTION

Move the headrest up or down to the desired height.

Amount of adjustment: 60 mm {2.4 in} (2 stages)

NOTICE

When adjusting the headrest height, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



METHOD FOR ADJUSTING ARMREST HEIGHT

CAUTION

Firmly tighten the knob. If it is found loosened, tighten it further.

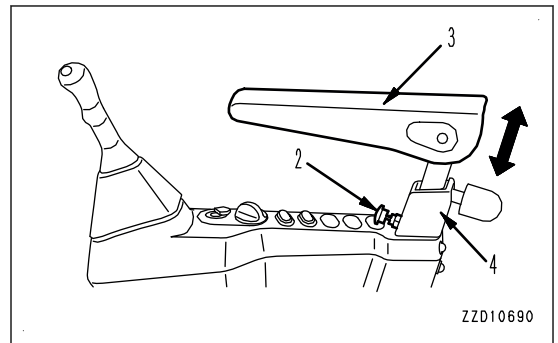
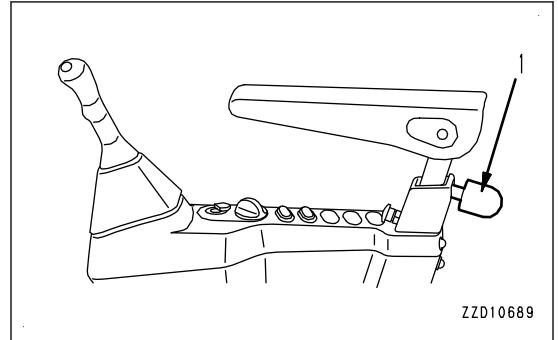
Height of the armrest can be adjusted up or down by using the knob at the rear of the armrest.

Armrest height adjustment: 43 mm {1.7 in} (4 steps)

1. Loosen knob (1) at the rear of the armrest.
2. Pull plunger (2).
3. Adjust the height of armrest (3) while pulling plunger (2).
4. Push back plunger (2) after aligning it to the height adjustment hole of armrest (3).
5. Tighten knob (1) at the rear of the armrest.

NOTICE

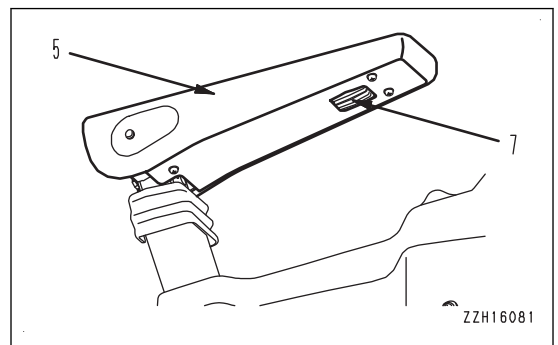
If you loosen knob (1) at the rear of the armrest too much, it touches the stopper in cover (4) and you cannot adjust the armrest height. Take care.



METHOD FOR ADJUSTING ARMREST ANGLE

Angle of the armrest can be adjusted vertically by turning adjustment dial (7) at the bottom of the armrest (5).

Angle adjustment: 9 ° in lower direction, 4 ° in upper direction

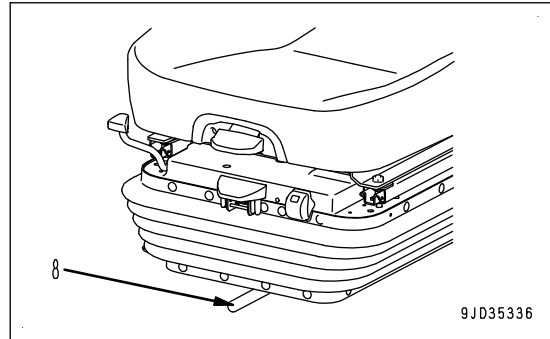


METHOD FOR ADJUSTING SEAT UNIT IN FORE-AND-AFT DIRECTION

Operate the fore-aft adjustment lever (8) to the right, and set the seat to the desired position, then let go of the lever.

The operator's seat, right and left control levers, and lock lever move together.

Fore-and-aft adjustment: 180 mm {7.1 in} (9 steps)



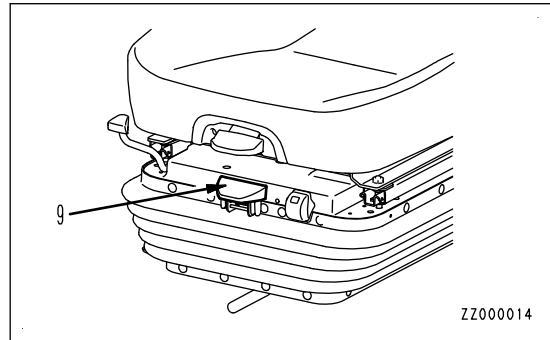
METHOD FOR ADJUSTING AIR SUSPENSION SEAT HARDNESS

Air suspension seat (if equipped)

Operate the suspension switch (9) to adjust the hardness of the suspension.

- If you press the suspension switch (9), the suspension becomes hard.
- If you pull the suspension switch (9), the suspension becomes soft. (Air release sound is heard.)

Weight adjustment range: 60 to 150 kg {132 to 331 lb}

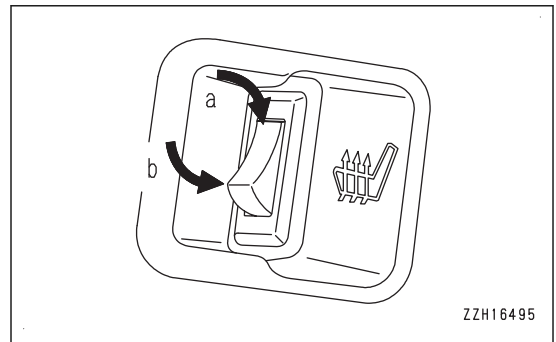
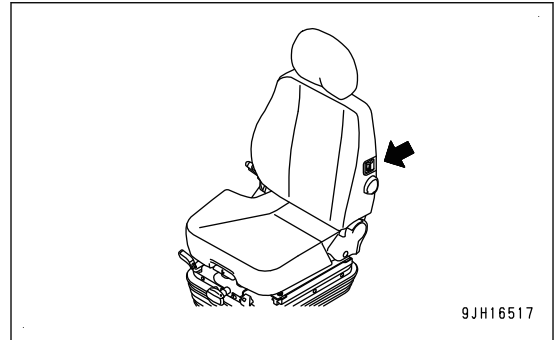


METHOD FOR HEATING SEAT

Heated seat (if equipped)

CAUTION

- Do not use it in the following cases to prevent low temperature burn or excessive cooling.
 - When a person's ability to perceive the temperature is decreased
 - When a person's ability to feel pain is decreased
 - When a person has a delicate skin
- Do not put a heavy object on the seat cushion. Do not stick the seat cushion with needles or nails.
- When you use it, do not put objects which retain heat such as blankets or floor cushions on the seat. The seat heater will overheat and it can cause burn injury or failure.
- Do not use it while the seat is wet. If water or beverage is spilled, immediately wipe it off with a dry cloth and dry it well. Do not use the seat heater to dry the seat.



Turn the seat heater switch ON.

(a): OFF position

(b): ON position

The seat cushion and backrest become warm.

METHOD FOR REMOVING AND INSTALLING HEADREST

METHOD FOR REMOVING HEADREST

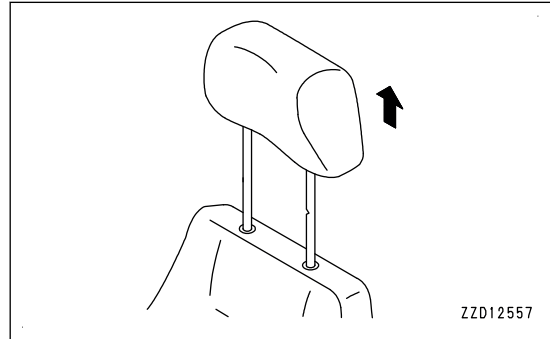
When the headrest is not necessary, remove it according to the following procedure.

Pull up the headrest 80 mm {3.1 in} or more.

The headrest is pulled out.

NOTICE

When removing the headrest, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



METHOD FOR INSTALLING HEADREST

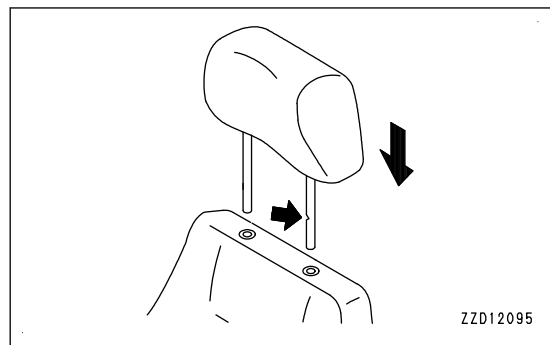
1. Insert the headrest into the hole at the seat back.

When installing, turn the notch of the shaft toward the front of the machine.

2. Push down the headrest.

NOTICE

When installing the headrest, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



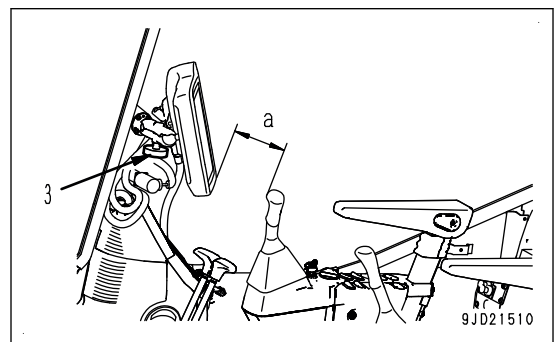
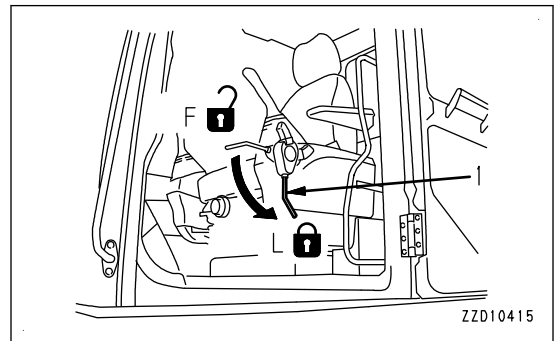
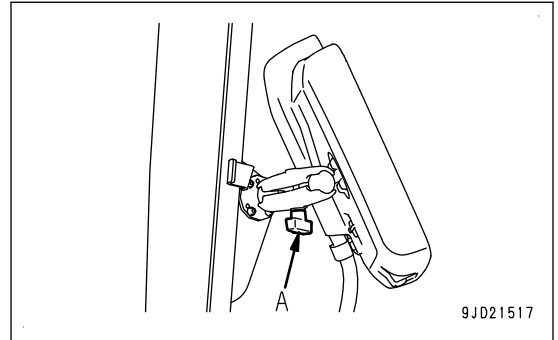
METHOD FOR ADJUSTING CONTROL BOX POSITION

⚠ WARNING

- In order to perform the position adjustment of control box, place the machine on a level ground, lower the work equipment to the ground, stop the engine, and check that the power supply of control box is off.
- Set the lock lever to LOCK position always when performing the position adjustment of control box. If the control lever or control pedal is touched by mistake when the lock lever is in FREE position, it may cause serious personal injury or death.

NOTICE

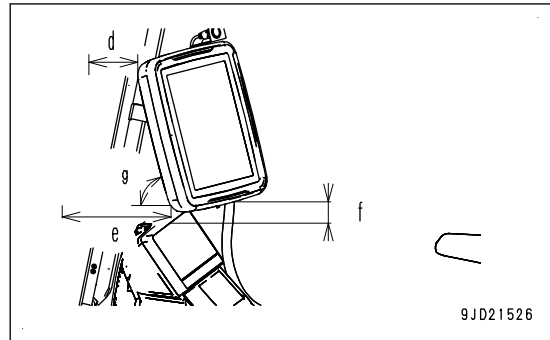
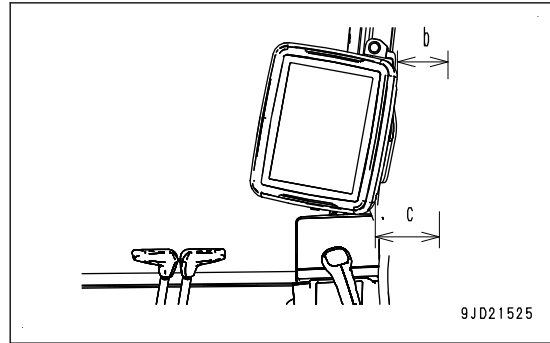
- The control box may fall by its own weight when loosening the mount of control box. Hold the control box securely, and loosen the handle (A) of mount.
 - Hold the control box securely when installing the mount of control box. Tighten the handle (A) of the mount fully, and do not release the control box until the position is secured. If the handle (A) is not tightened sufficiently, control box may fall off and break.
 - Do not perform position adjustment of control box while the handle (A) is tightened. Otherwise, control box or mount may break.
1. Lower the work equipment to the level ground, and set the lock lever (1) securely to LOCK position (L).
 2. Stop the engine.
 3. Turn the handle (3) of mount to loosen it, adjust the position of control box for you to see it well, and securely tighten the mount.
Adjust the position of control box so that the clearance (a) is kept 40 mm {1.6 in} or more with R.H. work equipment control lever tilted forward.



REMARK

If adjustment is not enough with this position adjustment of control box, slide the whole seat, and perform the position adjustment of R.H. work equipment control lever. For the adjustment method, see "METHOD FOR ADJUSTING OPERATOR'S SEAT".

- Fix the control box at the position shown in the figure on the right for you to see it better.
This is an optimum position because it does not interfere with machine monitor, and front visibility is secured.
Mounting position (b): 40 mm {1.6 in}
Mounting position (c): 55 mm {2.2 in}
Mounting position (d): 51 mm {2.0 in}
Mounting position (e): 168 mm {6.6 in}
Mounting position (f): 78 mm {3.1 in}
Mounting angle (g): 79 °
- Fix it according to the mounting procedure, and this position is obtained.
This position is just a guide line. You do not need to follow exactly.



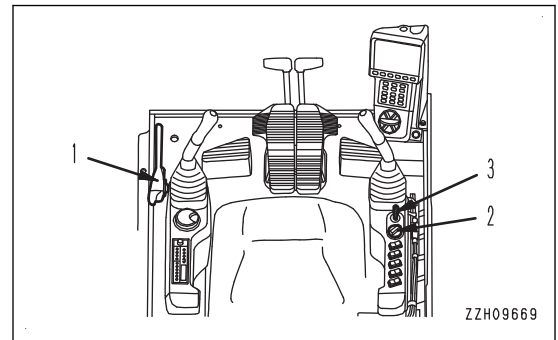
METHOD FOR STARTING ENGINE

⚠ WARNING

- Start the engine only while sitting on the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. This may cause a fire or serious personal injury or death.
- Check that there is no person or obstacle in the area around the machine, then sound the horn and start the engine.
- Never use starting aid fluids as they may cause explosions.
- Exhaust gas is toxic.
Be particularly careful to ensure good ventilation when starting the engine in confined spaces.

NOTICE

- Check that the fuel control dial (2) is at Low idle (MIN) position before starting the engine. The engine will accelerate suddenly and cause damage to the engine parts if the fuel control dial is at High idle (MAX) position.
- Wait for the internal battery state LED of the control box to light up in green or flashes alternately in green and blue when it is lit in orange or red, and then start the engine.
- The battery voltage may suddenly drop depending on the temperature and the battery condition when starting the engine. The control box may not start normally at that time if the internal battery is not charged.
- Do not keep the starting switch key (3) at the START position continuously for more than 20 seconds. If the engine does not start, wait for at least 2 minutes, then start again from the beginning.
- After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.

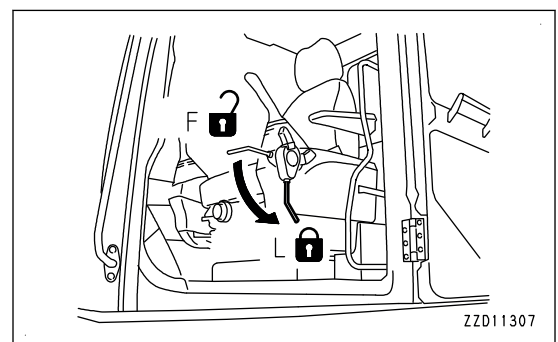


This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically.

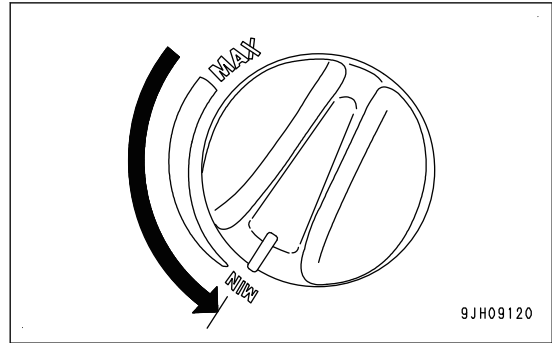
The preheating monitor lights up when the starting switch key (3) is turned to ON position in order to inform the operator that preheating has been started automatically when the ambient temperature is low.

Start the engine according to the following procedure.

1. Check that lock lever (1) is at LOCK position (L).
If lock lever (1) is in FREE position (F), the engine does not start.



- Turn fuel control dial (2) to Low idle (MIN) position.



- Turn starting switch key (3) to ON position (B).

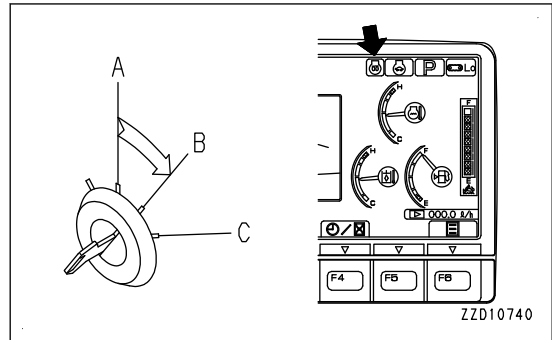
The preheating monitor lights up and automatic preheating is performed if the ambient temperature is low. Keep the starting switch key (3) at ON position (B) until the preheating monitor goes out.

The lighting time that the preheating pilot lamp stays lit depends on the ambient temperature as shown in the table.

REMARK

If the ambient temperature is low, the preheating pilot lamp lights up and automatic preheating is performed. Keep the starting switch key (3) at ON position (B) until the preheating pilot lamp goes out.

The lighting time that the preheating pilot lamp stays lit depends on the ambient temperature as shown in the table.



Ambient temperature	Lighting time
-4 °C {24.8 °F} to -20 °C {-4 °F}	5 seconds to 40 seconds
-20 °C {-4 °F} and below	40 seconds

If a password has been set, the input display screen will be indicated on the monitor screen, but the preheating pilot lamp also operates as in the standard screen.

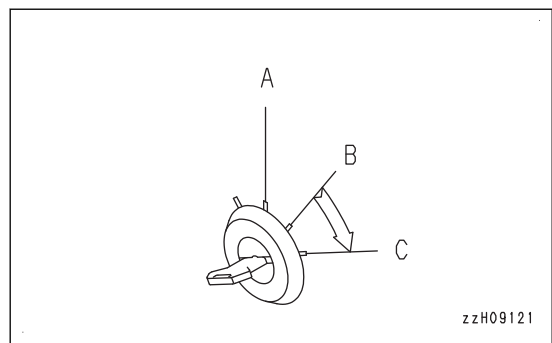
- If the preheating pilot lamp does not light up, or it lights up and then goes out to inform that the engine preheating has been completed, turn the key in starting switch (3) to START position (C). The engine starts.

REMARK

If the ambient temperature is low, the engine may not start even when the key in starting switch (3) is kept at START position for 20 seconds.

If this happens, wait for at least 2 minutes, then start again from the beginning.

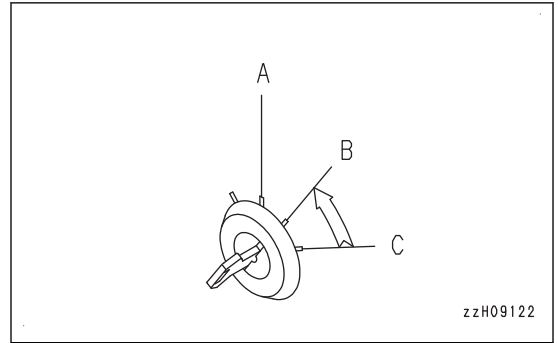
For preheating the engine forcibly when the automatic preheating does not start, see the Operation and Maintenance Manual of standard machine.



5. When the engine starts, release the starting switch key (3). The key will automatically return to ON position (B).

REMARK

When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition. If this happens, the display on the machine monitor may momentarily go out, but this does not indicate any abnormality.



6. After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.

NOTICE

If the engine oil pressure caution lamp does not go out in 4 to 5 seconds, stop the engine immediately. Check the oil level, oil leakage, etc. and take proper measures.

REMARK

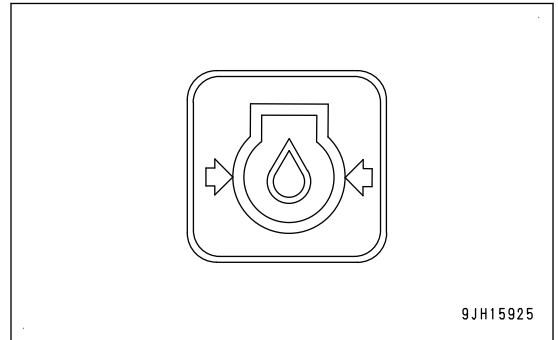
White smoke may be discharged for a short time immediately after the engine is started or during the aftertreatment devices regeneration in the cold season, but this is not a failure.

REMARK

Urea SCR system has the function of heating system and keeping it warm to prevent freezing of DEF. If DEF is frozen, the DEF system is automatically heated to thaw DEF after the engine is started. The devices do not operate until DEF is thawed and supplied, but this does not indicate any abnormality. When the ambient temperature decreases to a level where DEF may freeze while the machine is in operation, the DEF system is warmed automatically to prevent freezing. When the ambient temperature decreases to a level where freezing of DEF is not preventable, the devices stop automatically, but this does not indicate any abnormality. If DEF freezes, thawing operation is performed automatically. Never heat DEF. Harmful ammonia gas may be generated.

REMARK

After turning the starting switch to ON position, the control box starts and the intelligent Machine Control system is ready to use. These process takes approximately 1 minute.



METHOD FOR STARTING CONTROL BOX

WARNING

Do not operate the control box during the operation of the work equipment in order to prevent unexpected accident from occurring. Also, do not gaze the control box during the operation of the work equipment.

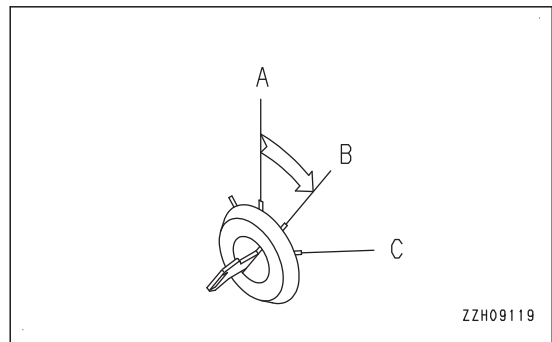
NOTICE

Start the engine when starting the control box to prevent the battery discharge.

Set the machine to the parking posture defined in the Operation and Maintenance Manual of standard machine when starting the control box. After that, check the precautions when starting engine, secure the safety, and then start the control box.

The starting of the control box is completed after the Project files and Setting files are downloaded. The working screen (main screen) is displayed after the starting is completed.

1. Turn the starting switch of the machine to ON position (B).
(While starting switch is in ON position, control box screen starts.)



2. Control box starts automatically.

NOTICE

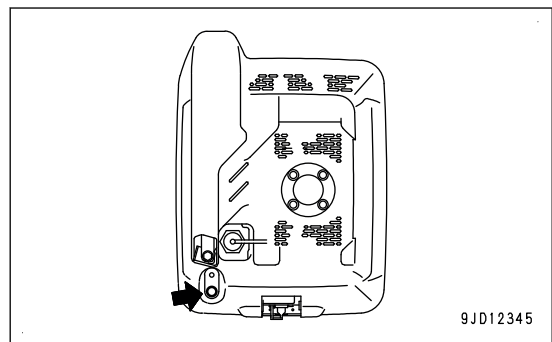
Do not turn the starting switch to OFF position before starting of control box is completed. This may cause failures of the control box. Before turning the starting switch to OFF position, make sure that the starting of control box is completed.

Also, do not turn the starting switch to ON position while control box is in finishing after starting switch is turned to OFF position, nor repeat ON/OFF of starting switch, because such operation may cause the failures of control box.

REMARK

Power supply of control box can be shut down from application menu while starting switch is in ON position. Keep pressing the power button at the rear of control box for approximately 20 seconds to turn on the power supply in order to restart the control box.

Turn the starting switch to OFF position and ON position when restarting the control box due to freeze, etc.



Method for resetting stroke of the work equipment cylinder

CAUTION

Reset the stroke of work equipment cylinder always after the engine is started, and move the machine. The cylinder sensor may mistakenly detect the stroke and causes the work equipment to move unexpectedly if the operation is started without resetting the work equipment cylinder. This may result in serious personal injury or death.

The posture of work equipment may change slightly due to hydraulic drift of work equipment while engine is stopped.

Sensor cannot detect the change of posture while engine is stopped. The posture of work equipment displayed on the control box at engine start may change if hydraulic drift occurs.

Reset the work equipment posture detection according to the following procedure.

1. Move the R.H. work equipment control lever slowly in the direction to the end of the bucket DUMP side.
2. Move the R.H. work equipment control lever slowly in the direction to the end of the bucket CURL side.
3. Repeat steps 1 to 2 a few times.
4. Move the L.H. work equipment control lever slowly in the direction to the end of arm OUT side.
5. Move the L.H. work equipment control lever slowly in the direction to the end of arm IN side.
6. Repeat steps 4 to 5 a few times.
7. Check that both bucket and arm are most retracted position.
8. Move the R.H. work equipment control lever slowly in the direction to the end of boom RAISE side.
9. Move the R.H. work equipment control lever slowly in the direction to the end of boom LOWER side.
10. Repeat steps 8 to 9 a few times.
11. Check visually that posture of work equipment displayed on the control box is the same as that of the actual machine.

METHOD FOR SHUTTING DOWN CONTROL BOX

WARNING

Do not operate the control box during the operation of the work equipment in order to prevent unexpected accident from occurring. Also, do not gaze the control box during the operation of the work equipment.

When shutting down the control box, set the machine to the parking posture defined in the Operation and Maintenance Manual of standard machine. Check the precautions for starting the engine, secure the safety, and then start it.

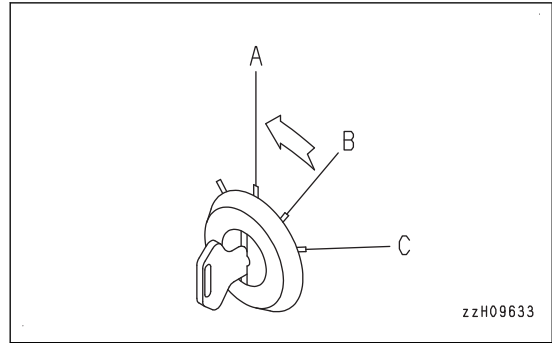
It takes some time to turn off (shut down) the power of control box, but this is not a failure. Wait a little while until it is finished.

When turning off the power supply of the machine and turning off the power supply of control box

NOTICE

Do not turn the starting switch to OFF position before starting of control box is completed. This may cause failures of the control box. Before turning the starting switch to OFF position, make sure that the starting of control box is completed. Do not turn the starting switch to ON position while control box is being shut down after starting switch is turned to OFF position, nor repeat turning ON/OFF of starting switch, because such operation may cause failures of control box.

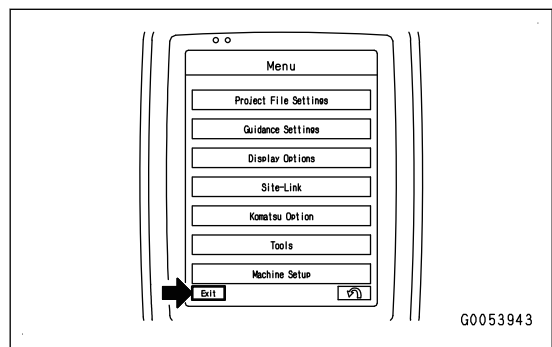
Turn the starting switch of machine to OFF position (A).
 The power supply of machine is turned off, and the power supply of control box is also turned off automatically.



When not turning off the power supply of the machine (engine) and turn off the power supply of control box

Display the main menu screen of the control box.

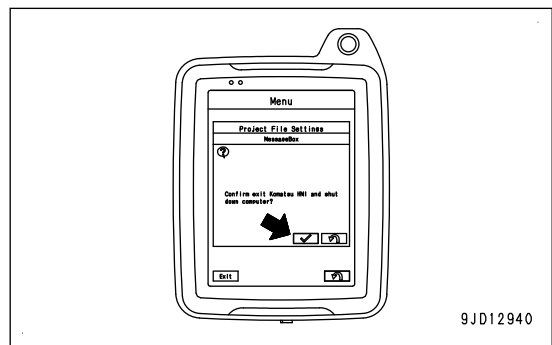
1. Tap the “Exit” button on the main menu screen.
 The message box is displayed.



2. Tap the ENTER button.
 The power supply of the control box is turned off.

REMARK

- The operation can be performed except the intelligent Machine Control even when the power supply of control box is turned off.
- The power supply of GNSS receiver (MC-R3) and GNSS is turned off as well when the power supply of control box is turned off.



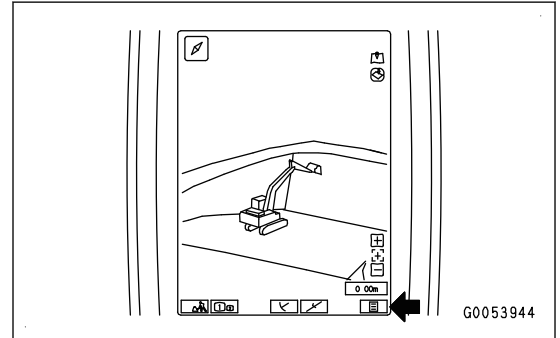
Caution for the canceling the starting switch interlock function of control box

Starting and ending of the intelligent Machine Control system is interlocked with starting switch.

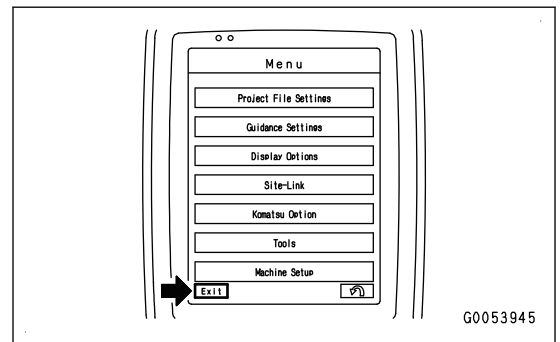
It can be stopped individually regardless of the starting switch being turned off. In this case, the intelligent Machine Control system does not end even if the starting switch is turned to OFF position. For this setting, consult your Komatsu distributor.

End the intelligent Machine Control system individually when the individual end is set. Always end the control box according to the following procedure.

1. Tap the main menu button on the control box.



2. The menu screen is displayed. Tap the "Exit" button.



If system does not end by above procedure, end it by pressing the Reset button of control box in emergency.

Wait for 2 minutes if it is not emergency. Control box automatically terminates.

- The following phenomena may occur related to the intelligent Machine Control system when the individual end is set, but they are not failures.
 Sound volume becomes 0, but it is restored by turning the starting switch to ON position.
 The posture of work equipment displayed on the control box differs from that of actual machine due to the hydraulic drift of work equipment. Check it after turning the starting switch to ON position by referring to "METHOD FOR CHECKING CONTROL BOX SCREEN DISPLAY".
- When the individual end is set, pay attention to the following.
 Battery is not charged while the engine is stopped. At the end of day's operation or when the machine is to be parked for a long time, end the intelligent Machine Control system without fail.
 If the intelligent Machine Control system has been continuously used for a long time, battery may be discharged. If the battery is discharged, read the Operation and Maintenance Manual of standard machine, OPERATION, TROUBLES AND ACTIONS, "PRECAUTIONS FOR DISCHARGED BATTERY".
 End the intelligent Machine Control always before disconnecting the wiring harness associated with removal of control box, and when turning the battery disconnect switch to OFF position associated with long-term storage or maintenance.
 Performing wrong procedure may break the intelligent Machine Control system, and the system may not start normally. If it does not start normally, consult your Komatsu distributor.

METHOD FOR STOPPING ENGINE

WARNING

Keep away from the exhaust pipe immediately after stopping the engine.

NOTICE

Do not stop the engine abruptly except in an emergency. Otherwise, the service lives of component parts of the engine will be reduced.

If the engine is overheated, do not try to stop it abruptly but run it at medium speed to allow it to cool down gradually, and then stop it.

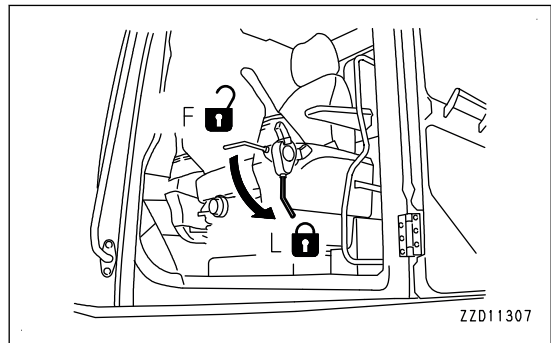
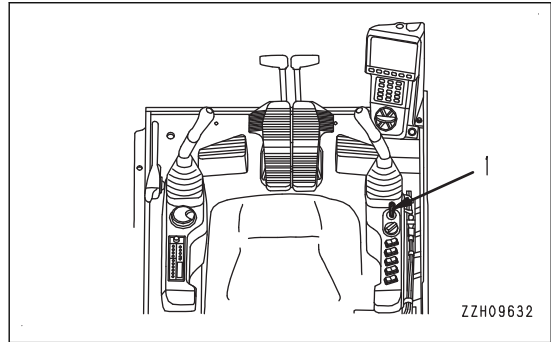
If the engine is stopped during the aftertreatment devices regeneration, the components may be damaged.

Stop the aftertreatment devices regeneration, and run the engine at low idle for approximately 5 minutes before stopping the engine. Then stop the engine.

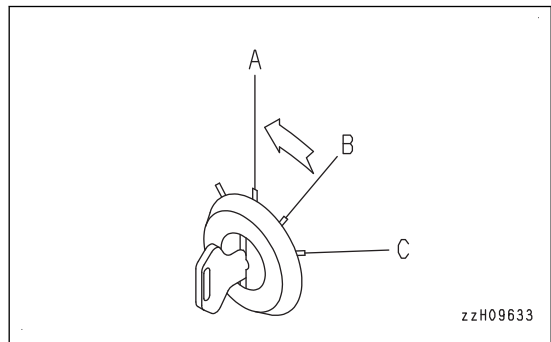
For the aftertreatment devices regeneration, see the Operation and Maintenance Manual of standard machine.

Stop the engine according to the following procedure.

1. Set the lock lever to LOCK position (L).
2. Run the engine at low idle for approximately 5 minutes to cool down the engine gradually.



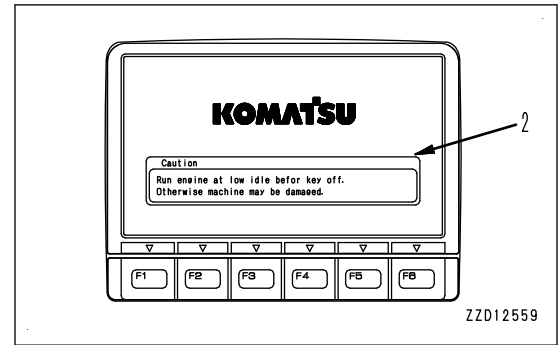
3. Turn the starting switch key (1) to OFF position (A), and stop the engine.



4. Remove the key from starting switch (1).

REMARK

- Turn the starting switch key (1) to OFF (A) position, and the control box also shuts down at the same time.
- When the key in starting switch (1) is turned to OFF (A) position, the engine stops, but the machine's main power supply is not turned off immediately.
This is because that the power is supplied for the controller to save the operating condition and then finish the system. The time to keep supplying the power depends on the operating condition.
- Also when the cooling fan is used for a cleaning purpose, the machine's main power supply is not turned off immediately, even if the key in starting switch (1) is turned to OFF (A) position.
This is for protection of the hydraulic circuit, and the power is kept supplied for 7 seconds.
- If the starting switch key (1) is turned to OFF (A) position while the engine is still hot, guidance (2) may be displayed on the machine monitor. To cool down the engine before stopping, run it at low idle for approximately 5 minutes, because it may cause damage to the devices.
- After the engine is stopped, DEF in DEF injector and pump is automatically purged and returned to the tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.
For this purpose, the devices keep operating up to 7 minutes after the key in the starting switch is turned to OFF position, and this does not indicate abnormality.
Do not turn the battery disconnect switch to OFF position while the devices are purging DEF. After the purging operation is finished, the devices stop automatically.



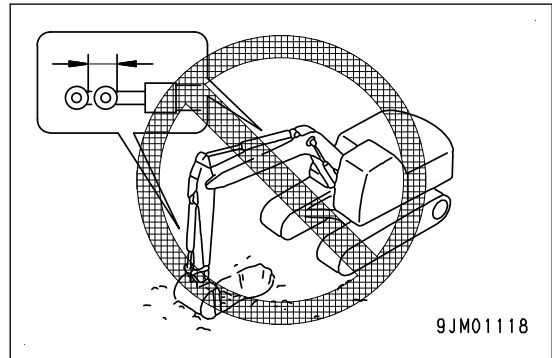
PROHIBITED OPERATIONS

WARNING

- Do not operate the work equipment control lever when the machine is traveling.
- If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful when operating.

PROHIBITION OF OPERATIONS USING HYDRAULIC CYLINDERS TO STROKE END

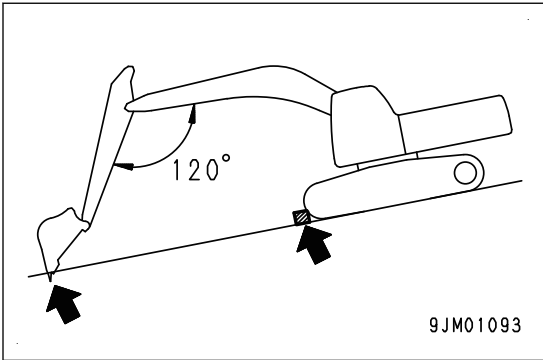
If the work equipment is used with the cylinder rod operated to its stroke end, and given impact by some external force, the sensors installed to the hydraulic cylinders may be broken. Do not perform operations with the hydraulic cylinder fully retracted or fully extended.



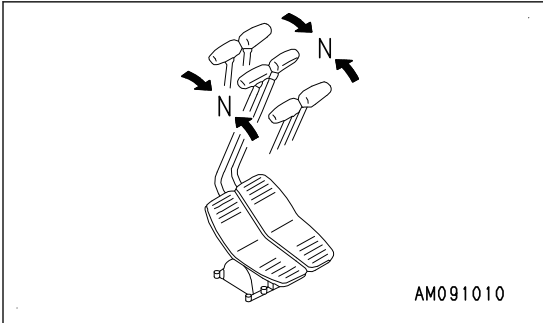
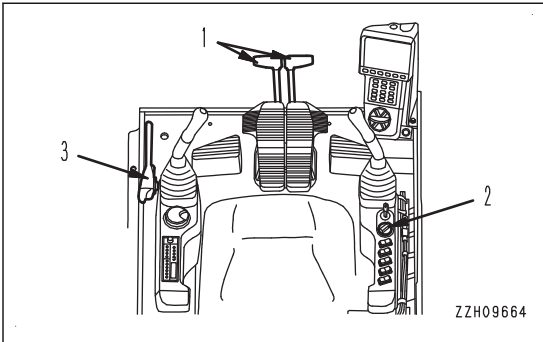
METHOD FOR PARKING MACHINE

⚠ WARNING

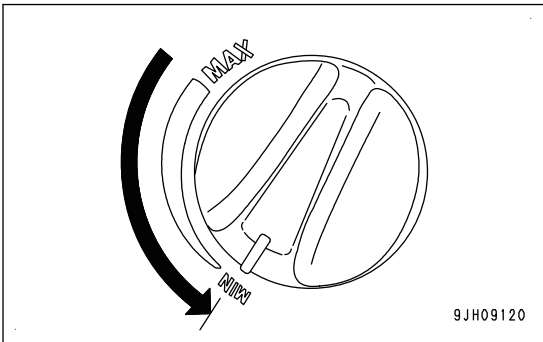
- Stop the machine gradually. Avoid a sudden stop.
- Place the machine on a firm and level place. Do not park the machine on a slope. Block the tracks from movement if it is unavoidably necessary to park the machine on a slope. As an additional safety measure, thrust the work equipment into the ground.
- The machine may move suddenly if the control lever is touched by accident. This may lead to a serious personal injury or death. Set the lock lever securely to LOCK position and stop the engine always before leaving the operator's seat.



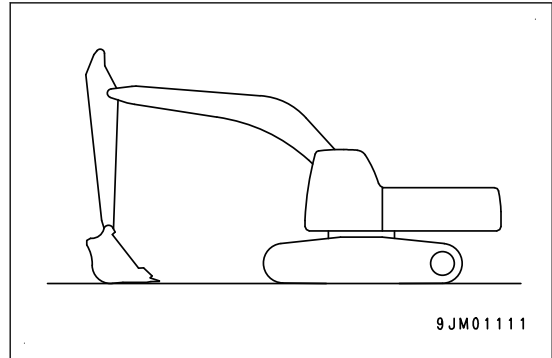
1. Set the right and left travel levers (1) in NEUTRAL position. The machine stops.



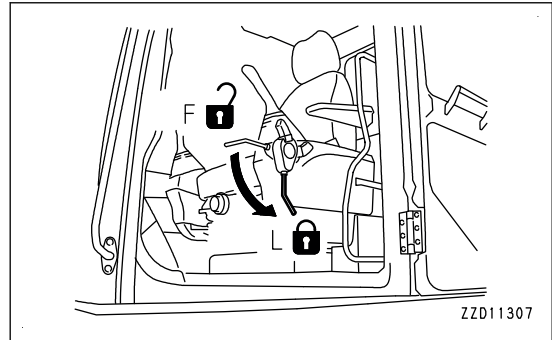
2. Turn the fuel control dial (2) to low idle (MIN) position in order to lower the engine speed.



3. Lower the bucket to the ground with its bottom face horizontal.

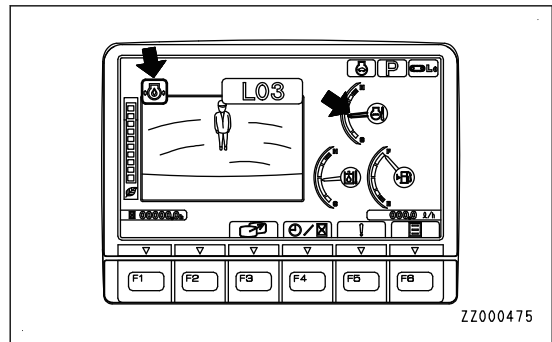


4. Set the lock lever (3) to LOCK position (L).



5. Check the engine coolant temperature and the engine oil pressure with the machine monitor.

- If the engine coolant temperature gauge is in the red range, cool down the coolant until the gauge enters the green range, and stop the engine. Then, perform an inspection and take necessary remedy according to the Operation and Maintenance Manual of standard machine.
- Stop the engine immediately when the engine oil pressure caution lamp is lit. Then, perform an inspection and take necessary remedy by referring to the Operation and Maintenance Manual of standard machine.

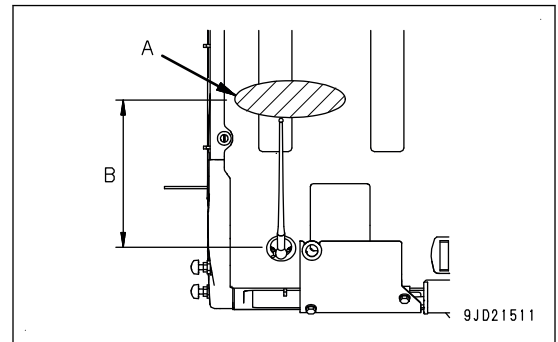


6. Stop the engine. For the stopping procedure of the engine, see the Operation and Maintenance Manual of standard machine.

HANDLING RADIO

- To ensure safety, always keep the volume to a level where you can hear the outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to failure. Take care not to let water get on them.
- Do not wipe the display or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth.
- When the battery disconnect switch is turned to OFF position or the power for the machine is turned off for the replacement of the battery, the clock may be initialized. In such a case, set it again.
For handling of the battery disconnect switch, see the Operation and Maintenance Manual of standard machine.
- Noise contamination makes it hard to hear the radio when the machine operates at the place where the received radio wave is weak.
- Noise contamination makes it hard to hear the radio depending on the type of radio and modem to be used, position of antenna, and communication condition.

The recommended distance is 300 mm {11.8 in} (B) from the radio antenna for a installing position (A) in order to install the radio and modem.



TRANSPORTATION

For the method of transportation, see the Operation and Maintenance Manual of standard machine, OPERATION, "TRANSPORTATION".

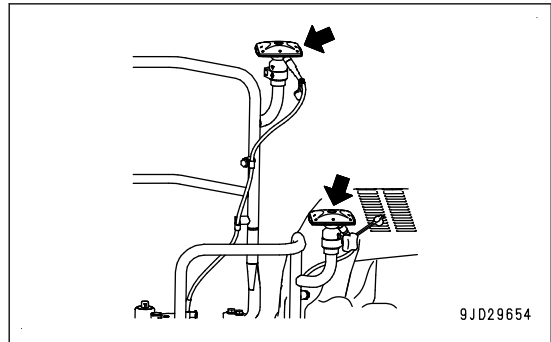
However, this machine is different from standard machine in machine weight, radio antenna, GNSS antenna bracket, and work equipment cylinder with sensor which automatically controls work equipment.

For the transportation, see the Operation and Maintenance Manual of standard machine.

REMOVE AND INSTALL GNSS ANTENNA

GNSS antenna is located at the position in the figure on the right.

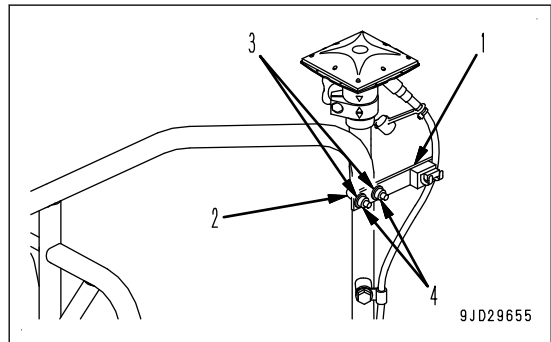
if the GNSS antenna is damaged or for transportation, perform the removal or installation of the antenna by the following procedure.



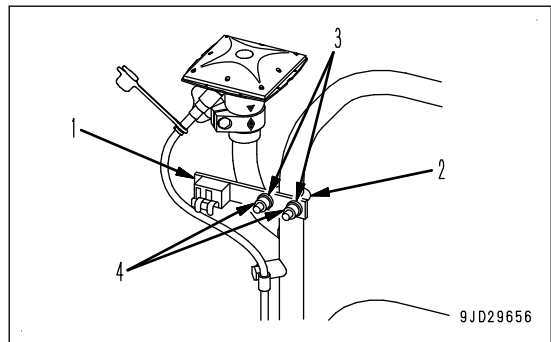
METHOD FOR REMOVING GNSS ANTENNA

1. Install the wiring harness fixing bracket (1) for transportation to the antenna bracket with the U bolt (2), washer (3), and nut (4), and secure it.

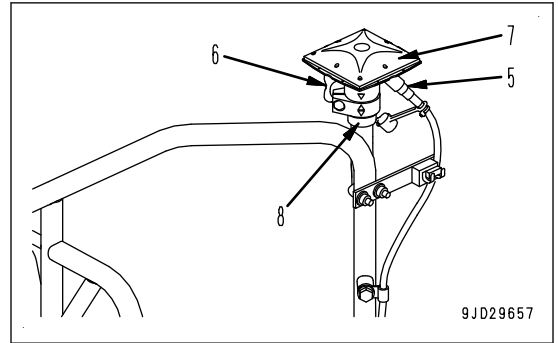
Right side of the machine



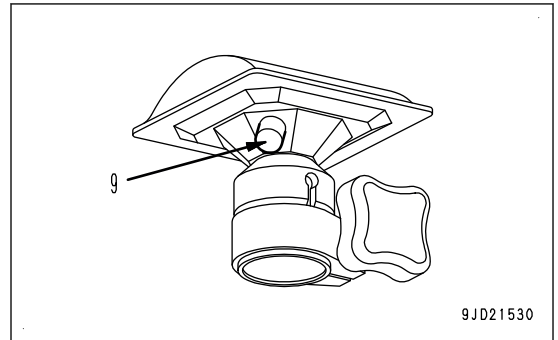
Left side of the machine



2. Loosen the connector (5) for GNSS antenna installed to the handrail, and disconnect the connector.
3. Loosen the GNSS antenna mounting knob (6), and remove the GNSS antenna (7) and the bracket (8) from the handrail.

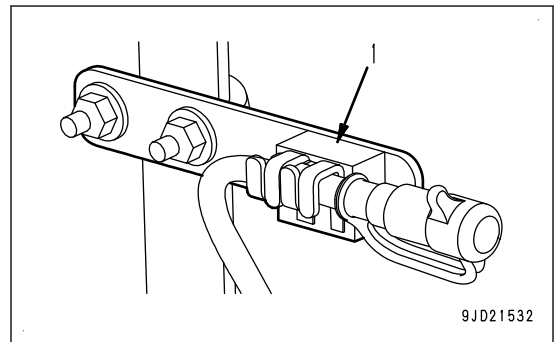
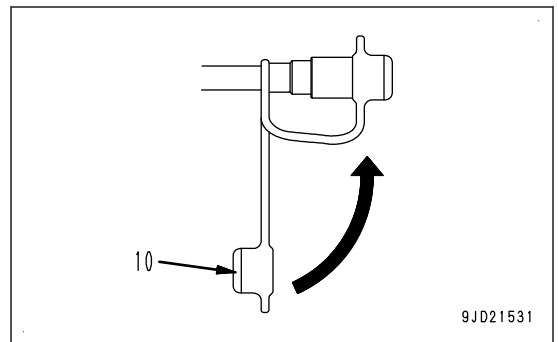


4. Install the dustproof cap (9) to the connector for GNSS antenna.



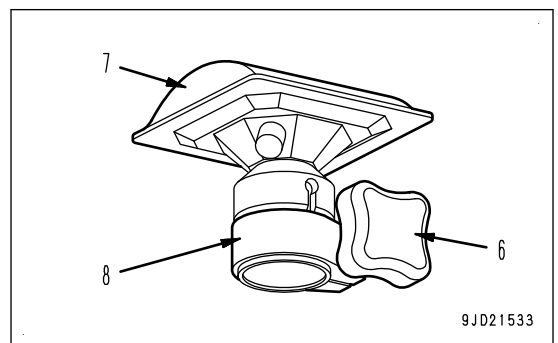
5. Check that there is no dust or water drop inside the dustproof cap (10).

6. Install the dustproof cap (10) to the connector (5) for GNSS antenna cable, and fix it to the bracket (1).



METHOD FOR INSTALLING GNSS ANTENNA

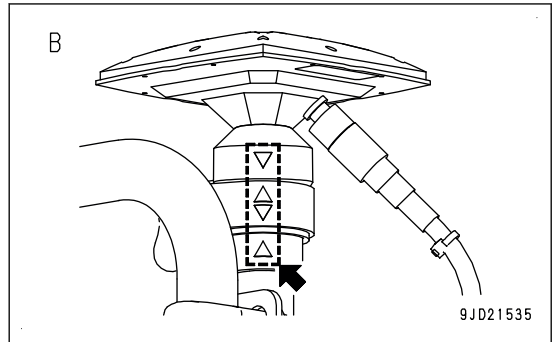
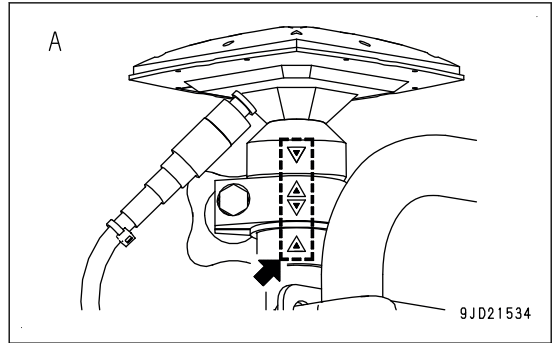
1. Remove the GNSS antenna and the dust proof caps (9) and (10) of GNSS antenna cable.
2. Remove the GNSS antenna cable from the bracket (1).
3. Loosen the GNSS antenna mounting knob (6), and set the GNSS antenna (7) and the bracket (8) to the handrail.



- 4. Align the marks of the handrail and GNSS antenna, tighten the GNSS antenna mounting knob (6) at that position, and fix the antenna to the handrail.

Main antenna (A): Rear of cab

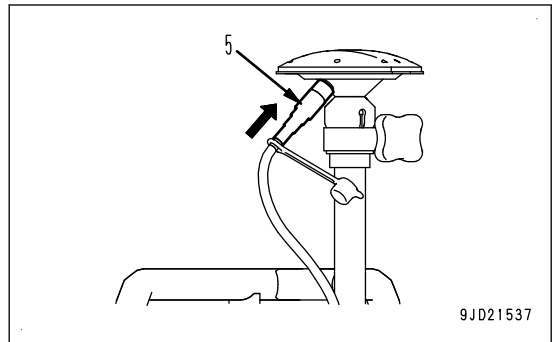
AUX antenna (B): Hydraulic tank side



- 5. Put the connector (5) of GNSS antenna and tighten it.

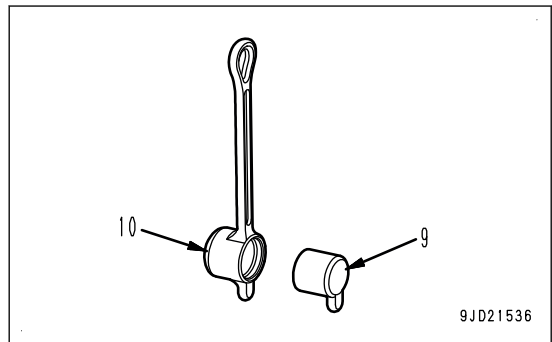
NOTICE

Tighten the thread while pushing the connector in the direction of arrow when connecting the connector (5) of GNSS antenna. If it is tightened lightly, it may become loose during operation.



- 6. Put on the dustproof cap (9) removed from GNSS antenna to the dustproof cap (10) of GNSS antenna cable side.

If the cap is not put on, the dust easily enters the inside.



REMOVE AND INSTALL HANDRAIL

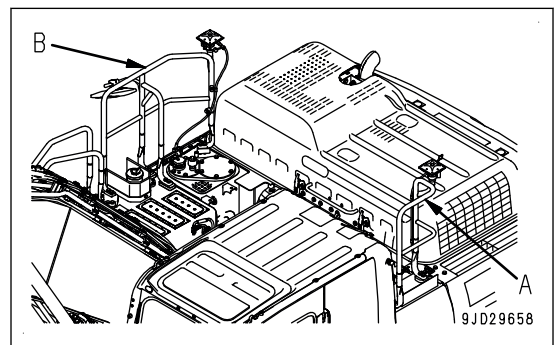
Consult your Komatsu distributor for handling of the handrails when the machine is transported. This is because the total height may exceed the height regulation depending on the height of the trailer.

WARNING

- After the machine is transported, be sure to install the handrails before inspection and maintenance.
- Use the crane etc. for carrying the handrails.
There is a danger of rolling over or falling from high place that can lead to serious personal injury or death. Check the footing and ensure your safety before starting the work.
- If installation or removal work of the handrail is improper, there is a hazard that someone may fall from the machine during the installation or removal work.
Observe the following procedures for the removal and installation.

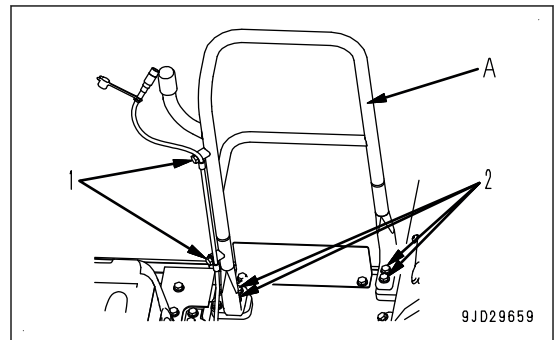
Removal and installation order of handrail

- Remove the GNSS antenna always before removing or installing the handrail. For the removal and installation of GNSS antenna, see REMOVE AND INSTALL GNSS ANTENNA.
- When removing the handrail, remove the handrails (A), (B) in this order.
- When installing the handrail, install the handrails (B), (A) in this order.

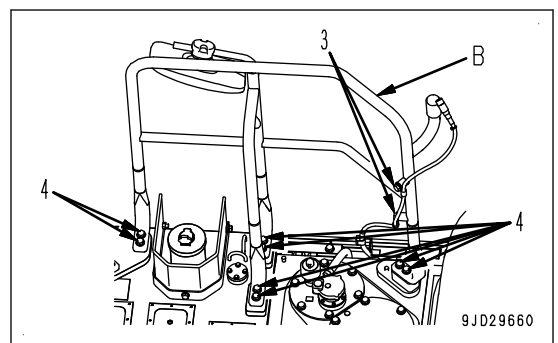


METHOD FOR REMOVING HANDRAIL

1. Remove the bolts (1) and remove the clips which clamp the wiring harness.
When removing the clip, check the clamping position and record it as needed in order to prevent a wrong installation.
2. Remove the bolts (2), and remove the handrail (A).



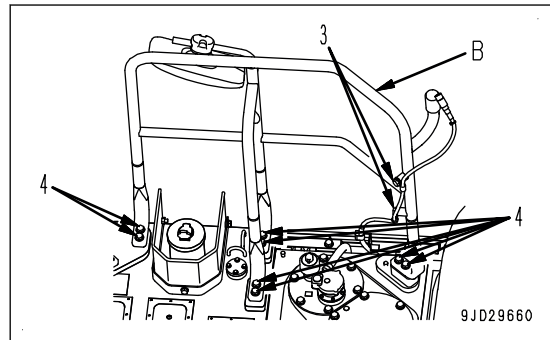
3. Remove the bolts (3) and remove the clips which clamp the wiring harness.
When removing the clip, check the clamping position and record it as needed in order to prevent a wrong installation.
4. Remove the bolts (4), and remove the handrail (B).



METHOD FOR INSTALLING HANDRAIL

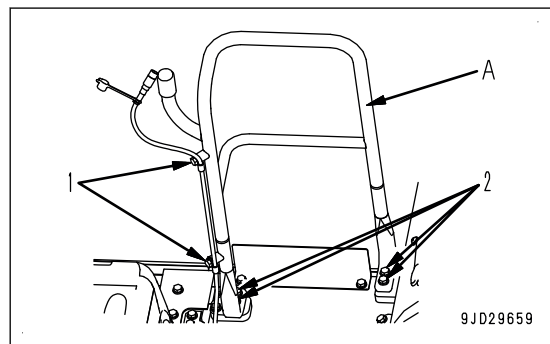
1. Tighten the bolts (4) to assemble the handrail (B).
2. Clamp the wiring harness with the clip and bolts (3).

When installing, be careful that there is no kinks and no interference with the parts around it.



3. Tighten the bolts (2) to assemble the handrail (A).
4. Clamp the wiring harness with the clip and bolts (1).

When installing, be careful that there is no kinks and no interference with the parts around it.



Perform a daily calibration after installing the hand rail. For details, see DAILY CALIBRATION.

If the bucket edge accuracy is degraded, consult your Komatsu distributor and perform the antenna calibration.

REMOVE AND INSTALL GNSS ANTENNA AND ANTENNA FOR NETWORK MODEM

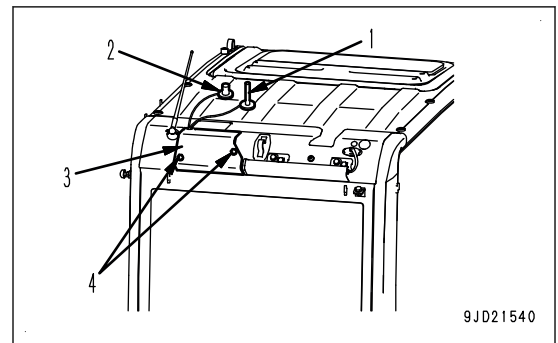
METHOD FOR REMOVING GNSS ANTENNA AND ANTENNA FOR NETWORK MODEM

NOTICE

For the GNSS radio device, built-in radio device specification and external radio device specification are available. Either one is installed depending on your intended use. The built-in radio device specification and the external radio device specification have different connector positions to which GNSS antenna is connected. Consult your Komatsu distributor when the machine is transported.

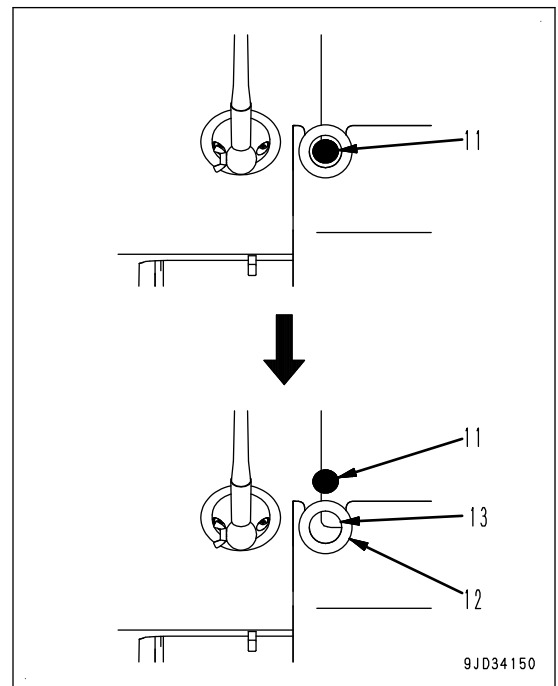
Remove the GNSS antenna (1) and the antenna (2) for network modem according to the following procedure.

1. Remove the cover (3).



- 1) Remove the cover mounting bolt (4) at the rear of cab, and remove the cover (3).

Remove the cover, and take the antenna cable (11) out through the slit (13) of the grommet (12).

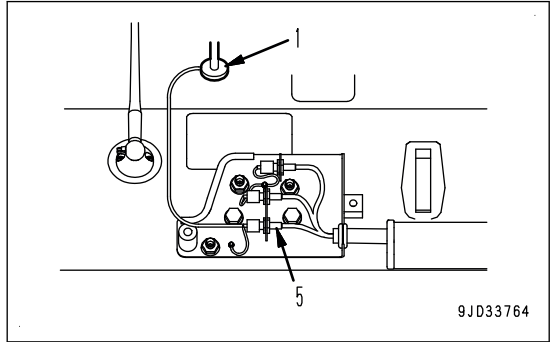


2. Remove the GNSS antenna.

1) Remove the GNSS antenna (1) from the antenna cable connector.

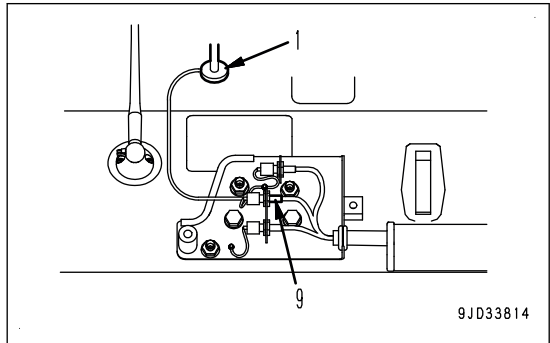
- When built-in specification is used for GNSS radio device

Remove the GNSS antenna (1) from the antenna cable connector (5) (CN-AA39).



- When external specification is used for GNSS radio device

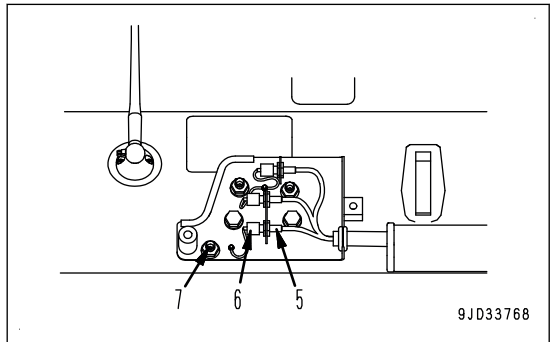
Remove the GNSS antenna (1) from the antenna cable connector (9) (CN-AA26).



2) Remove the waterproof cap installed to the cap holder, and install it to the antenna cable connector.

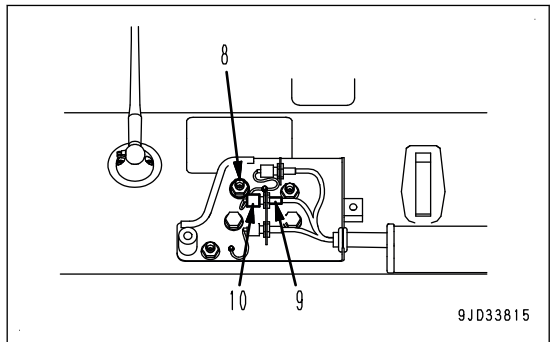
- When built-in specification is used for GNSS radio device

Remove the waterproof cap (6) installed to the cap holder (7), and install it to the antenna cable connector (5).

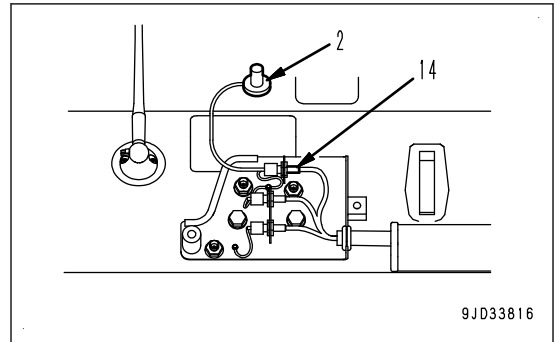


- When external specification is used for GNSS radio device

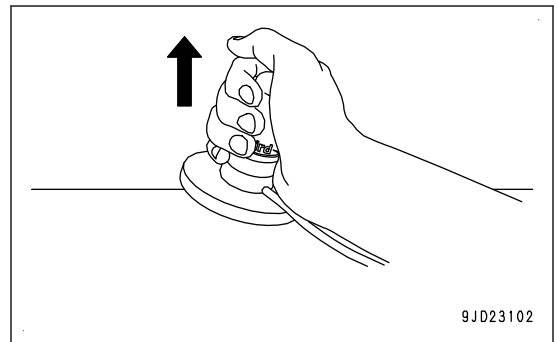
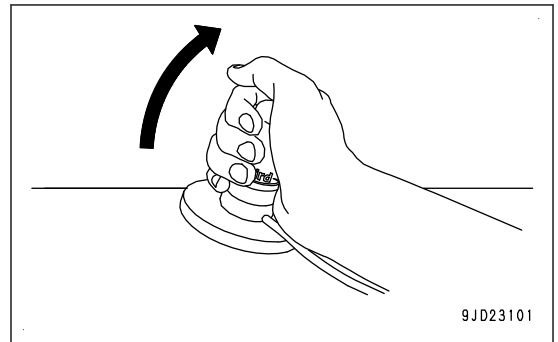
Remove the waterproof cap (10) installed to the cap holder (8), and install it to the antenna cable connector (9).



3. Remove the antenna for network modem.
 - 1) Remove the antenna (2) for network modem from the antenna cable connector (14) (CN-AA37).

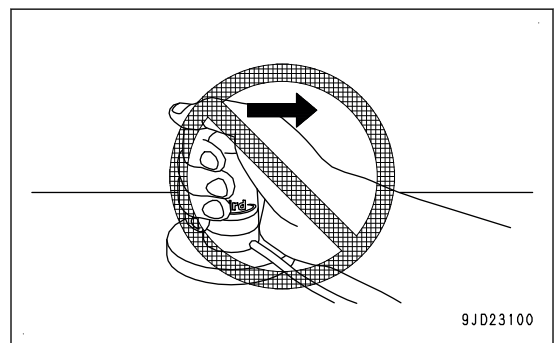
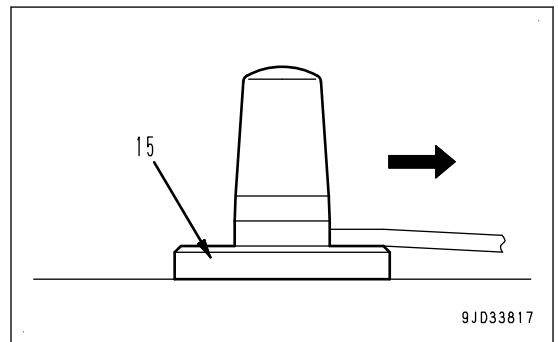


- 2) Tilt the antenna (2) for network modem, and pull it up straight to remove.

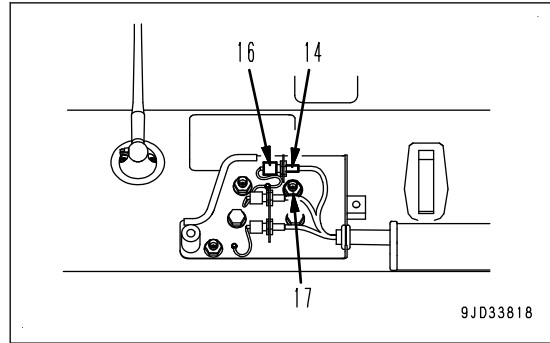


NOTICE

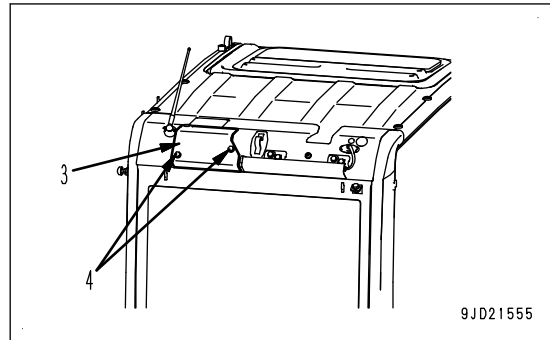
- Do not slide the antenna (2) for network modem sideways when it is removed from the cab. Otherwise the film on the bottom surface of the antenna base (15) will be peeled off, or the rubber cover will get damaged.
- Cover the antenna (2) for network modem with the provided connector cover in order to prevent water and dust from entering the connecting portion during the storage.



- 3) Remove the waterproof cap (16) installed to the cap holder (17), and install it to the antenna cable connector (14).



4. Installing the cover (3)
Tighten the mounting bolt (4) at the rear of cab, and fix the cover (3).



METHOD FOR INSTALLING GNSS ANTENNA AND ANTENNA FOR NETWORK MODEM

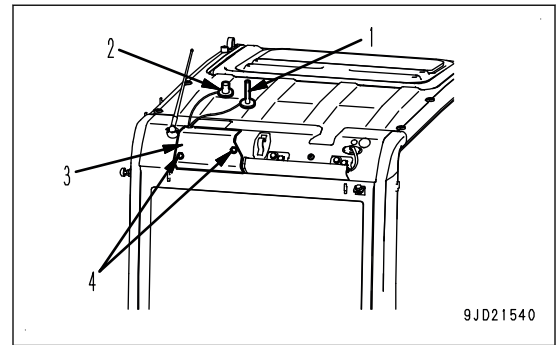
NOTICE

For the GNSS radio device, built-in radio device specification and external radio device specification are available. Either one is installed depending on your intended use. The built-in radio device specification and the external radio device specification have different connector positions to which GNSS antenna is connected. Consult your Komatsu distributor when the machine is transported.

Install the GNSS antenna (1) and the antenna (2) for network modem according to the following procedure.

1. Remove the cover (3).

- 1) Remove the cover mounting bolt (4) at the rear of cab, and remove the cover (3).

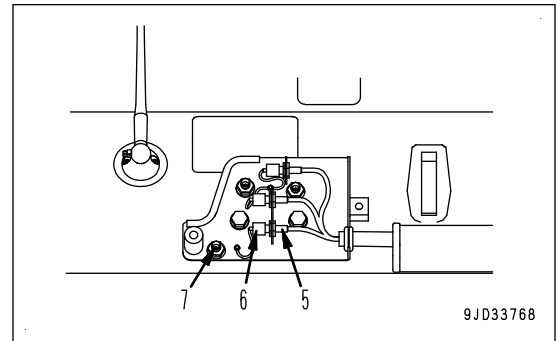


2. Install the GNSS antenna (1).

- 1) Remove the waterproof cap installed to the antenna cable connector, and install it to the cap holder.

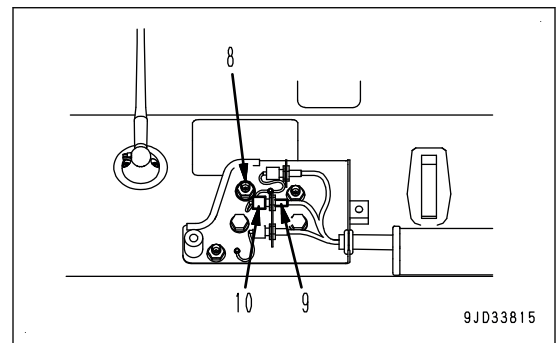
- When built-in specification is used for GNSS radio device

Remove the waterproof cap (6) installed to the antenna cable connector (5) (CN-AA39), and install it to the cap holder (7).



- When external specification is used for GNSS radio device

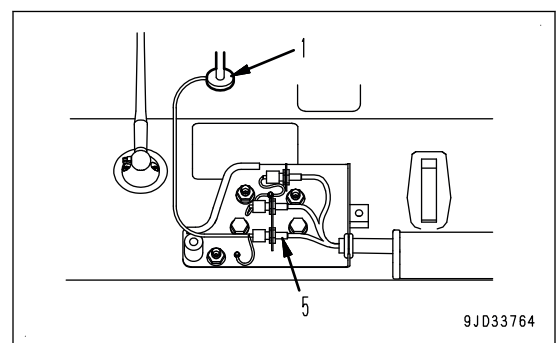
Remove the waterproof cap (10) installed to the antenna cable connector (9) (CN-AA26), and install it to the cap holder (8).



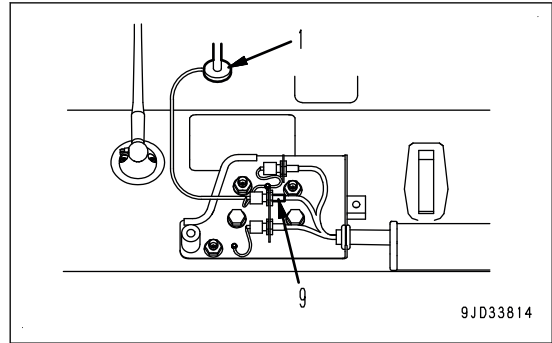
- 2) Install the GNSS antenna (1) to the antenna cable connector.

- When built-in specification is used for GNSS radio device

Install the GNSS antenna (1) to the antenna cable connector (5) (CN-AA39).

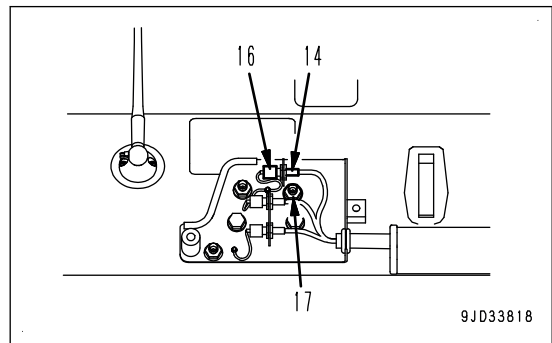


- When external specification is used for GNSS radio device
Install the GNSS antenna (1) to the antenna cable connector (9) (CN-AA26).

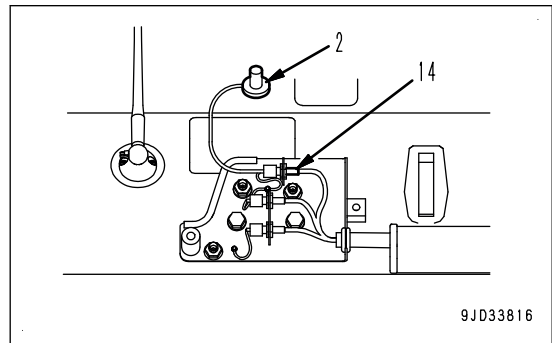


3. Install the antenna for network modem

- 1) Remove the waterproof cap (16) installed to the antenna cable connector (14) (CN-AA37), and install it to the cap holder (17).



- 2) Install the antenna (2) for network modem to the antenna cable connector (14) (CN-AA37).

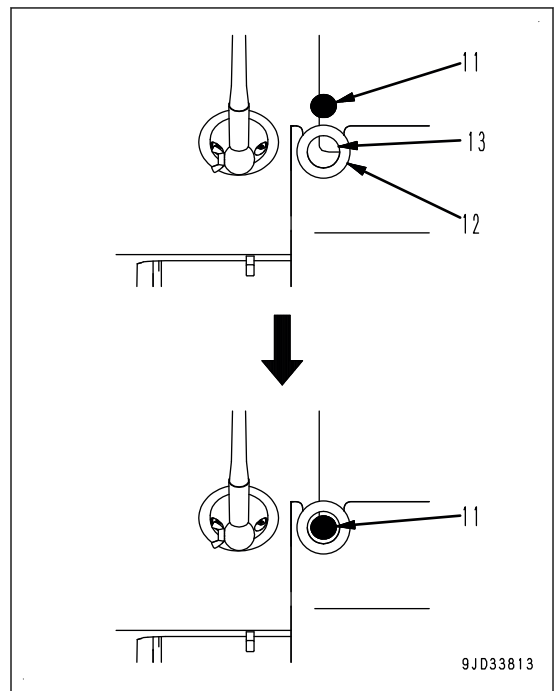
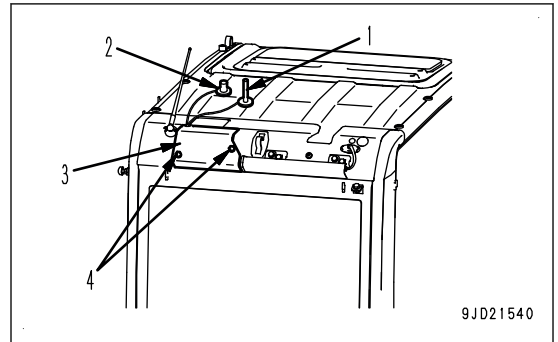


4. Installing the cover (3)

1) Tighten the mounting bolt (4) at the rear of cab, and fix the cover (3).

2) Insert the antenna cable (11) into inside through the slit (13) of the grommet (12).

Set these antennas (1) and (2) as far from radio antenna as possible.



PRECAUTIONS FOR LONG-TERM STORAGE

STARTING MACHINE AFTER LONG-TERM STORAGE

Perform engine warm-up operation when starting the engine after long-term storage by referring to the Operation and Maintenance Manual of standard machine.

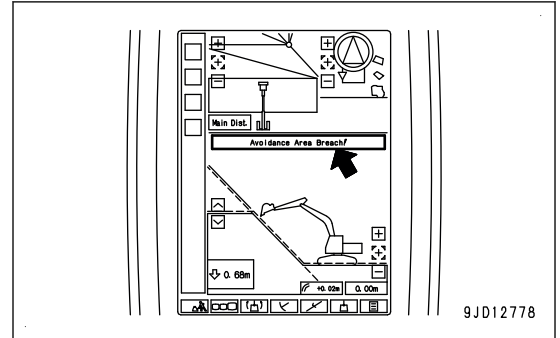
Perform daily calibration when performing the intelligent Machine Control.

Ask your Komatsu distributor for repair if the accuracy of bucket edge is deteriorated.

TROUBLES AND ACTIONS

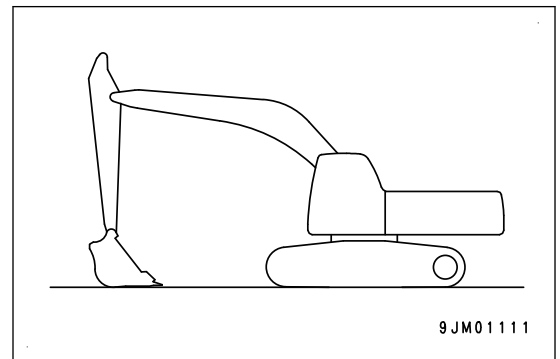
IF ERROR INFORMATION IS DISPLAYED ON CONTROL BOX

The following warning message (in red or yellow) is displayed on the screen if any abnormality occurs during operation or starting the engine.

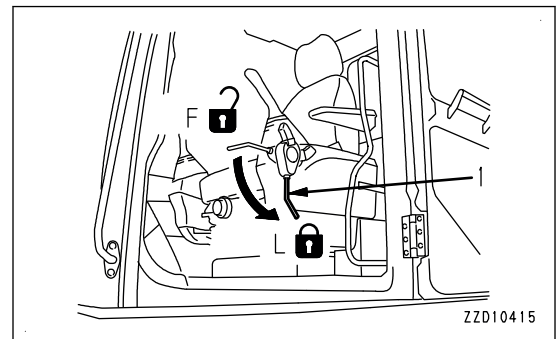


Place the machine as follows if an error message is displayed.

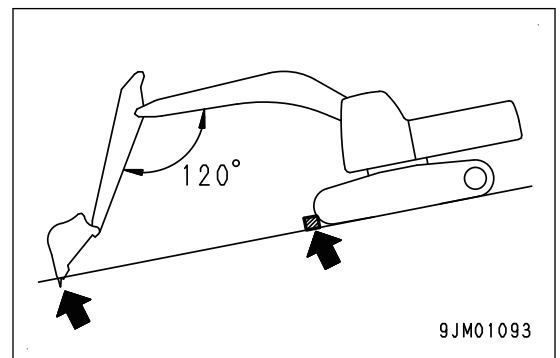
- Place the machine on a firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment to the ground.



- When leaving the machine, set the lock lever (1) to LOCK position (L), then stop the engine.
- Close the operator's cab door, and lock all the equipment. Remove the key in order to prevent any unauthorized person from moving the machine, and keep it in the specified place.



- If it is necessary to park the machine on a slope, always observe the following.
 - Set the work equipment to face the downhill side and thrust it in the ground.
 - In addition, block the tracks from movement.



IF Initializing IS DISPLAYED

The function of semi-auto mode is limited while the warning message of “Initializing...” (satellite communication is in poor condition) is displayed, however, setting “Design face Data Hold Time in Initializ” and “Cumulative Swing Angle Set in Initializ” on the machine monitor can reduce such case to occur.

To set this function, see “SEMI-AUTO ADJUSTMENT”.

The warning messages of “Initializing...” (satellite communication is in poor condition) are the following warning messages displayed on the control box.

- “Waiting for satellites...”
- “Waiting for radio link...”
- “Waiting to initialize...”
- “Initializing...”

NOTICE

The purpose of this function is to reduce the case that the function of semi-auto mode is limited while the satellite communication is degraded.

The accuracy of construction cannot be guaranteed while the warning message of “Initializing...” (satellite communication is in poor condition) is displayed. If the accuracy of construction is required, do not operate until “Initializing...” is cleared.

When “Initializing...” is displayed while upper structure does not swing and machine does not travel

(A) Semi-auto mode waiting state

- Even if “Initializing...” is displayed, the machine position is presumed by IMU. The semi-auto mode waiting state continues within the set time (*1) and within the set cumulative swing angle (*1).
- During waiting state, you can move to semi-auto mode operating state. (To (B) below)
- If “Initializing...” is not cleared although the set time has passed or the angle exceeds the set cumulative swing angle, you cannot select the semi-auto mode until the system moves to manual mode and “Initializing...” is cleared.

(B) Semi-auto mode operating state

- Even if “Initializing...” is displayed, the machine position is presumed by IMU. The semi-auto mode operating state continues unlimitedly (*2) based on the design surface data that is presumed.
- If “Initializing...” is displayed continuously when system moves to the semi-auto mode waiting state, that state continues within the set time (*1) from the time system moves to the semi-auto mode waiting state.

(*1): Available setting time is 0 second (invalid) to 60 seconds. It is set at 60 seconds when the machine is shipped from factory.

(*2): Available setting angle is 0 deg. (invalid) to 250 deg. It is set at 250 deg. when the machine is shipped from factory.

When “Initializing...” is displayed while the machine travels

(C) Semi-auto mode waiting state

- If the state becomes “Initializing...”, the system moves to the manual mode. You cannot select the semi-auto mode until “Initializing...” is cleared.
- You cannot set semi-auto mode operating state while machine travels.

OTHER TROUBLE

IF MACHINE MONITOR SHOWS WARNING DISPLAY

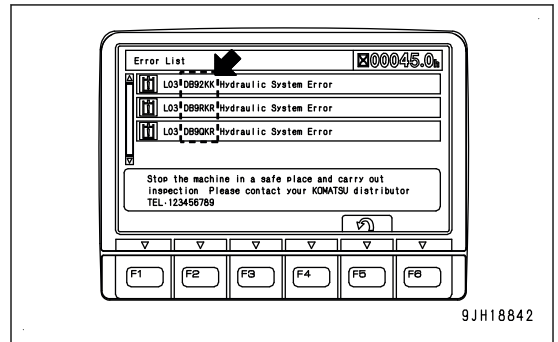
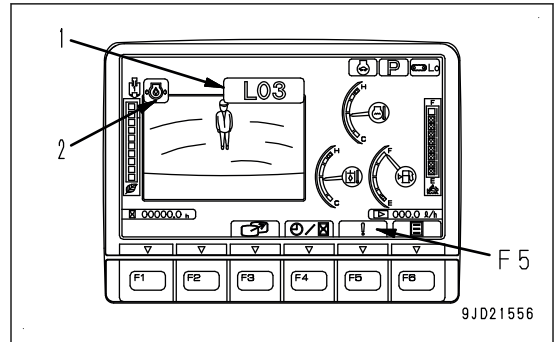
1. When the action level display (1) or caution lamp (2) is shown on the display of the machine monitor, press the switch F5 to display the Current Abnormality and check the details and the remedy.

For the contents of the action level display and caution lamp, see the Operation and Maintenance Manual of standard machine and "CAUTION LAMP LIST".

2. Set the boom secondary drive switch upward (emergency) side if all the work equipment do not move when Hydraulic System Abnormality of "DB92KK" or "DB9RKR" and "DB9QKR" are displayed on the Current Abnormality screen at the same time.

Boom operation is available temporarily.

Immediately ask your Komatsu distributor for an inspection and repair after the work.



PHENOMENA AND ACTIONS FOR CONTROL BOX

- Contact your Komatsu distributor for the remedies indicated with (*) in the remedy column.
- Ask your Komatsu distributor for repairs for problems or causes which are not listed below.

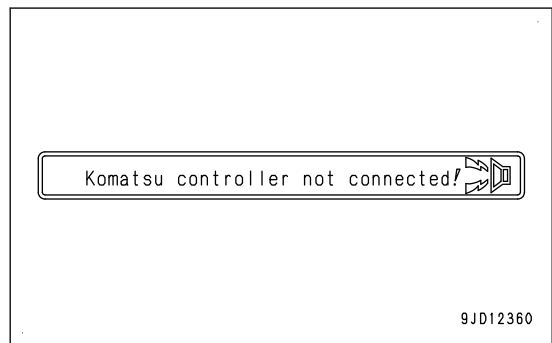
ERROR BY FAILURE IN THE ELECTRICAL COMPONENT

Message displayed on control box	Back-ground color	Semi-auto mode	Main causes	Remedy
Komatsu controller not connected!	Red	Not available	ICT sensor controller and control box cannot communicate.	Check the connection of connector.
				Check, repair. (*)
GPS receiver not connected!	Red	Not available	GNSS receiver (MC-R3) and control box cannot communicate.	Check, repair. (*)
Site Link server not connected!	Yellow	Available	Connection of Sitelink server is not established.	Check the connection setting.
				Check, repair. (*)
Tilt Bucket Sensor Offline!	Red	Not available	Tilt sensor is cannot communicate.	Check the bucket setting, check the connection of connector.
				Check, repair. (*)
Sensors are invalid	Red	Not available	Connection of MC sensors are not established or any of them has a failure.	Check, repair. (*)

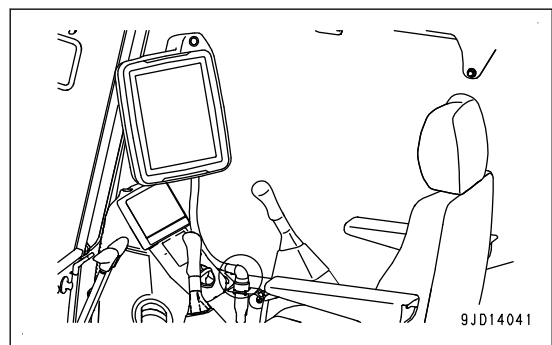
ACTION FOR Komatsu controller not connected

Phenomena: ICT sensor controller and control box cannot communicate.

Stop the operation and perform the following procedure.



1. Check if the density of triangle mesh (TIN) of the design data is high.
If it is 9/m² or more, this message may be easily displayed.
2. Check if the cable connectors are connected securely.
(The connector at the side of air conditioner vent and the connector at the back of control box)



If there is no abnormality in the cables, ICT sensor controller or control box has a trouble.

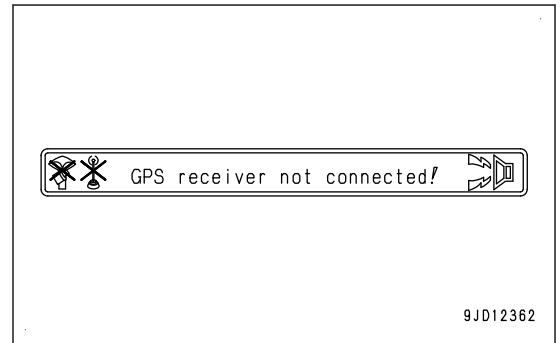
Check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

ACTION FOR GPS receiver not connected

Phenomena: GNSS receiver and control box cannot communicate.

GNSS receiver has a trouble.

Restart the intelligent Machine Control system according to the following procedure, and check if error display is cleared.

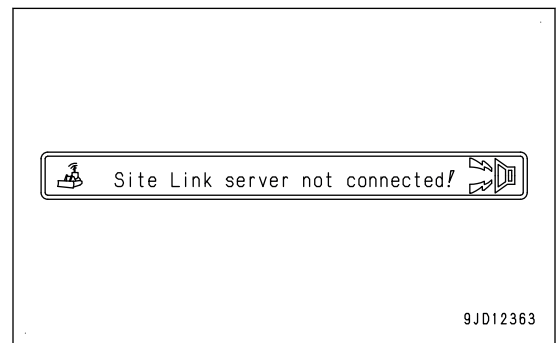


1. Tap the menu button.
2. Tap the "Exit" button.
3. Keep pressing the power supply button on the back of control box for 2 seconds.

If the error display is not cleared, stop the operation, check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

ACTION FOR Site Link server not connected

Phenomena: Site link server is not connected.



Check the setting for connection to Sitelink3D.

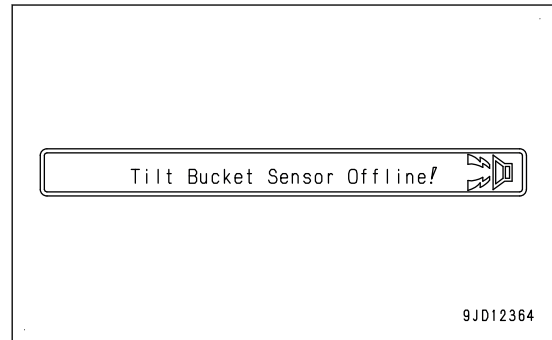
For details, see "METHOD FOR CONNECTING TO Sitelink3D".

If the error display is not cleared, stop the operation, check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

ACTION FOR Tilt Bucket Sensor Offline

Phenomena: Communication with Tilt sensor for the tilt bucket is not established.

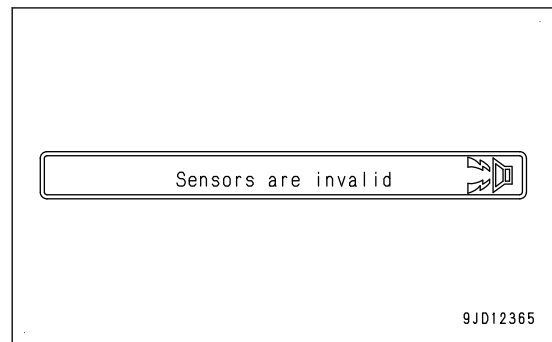
Stop the operation and perform the following procedure.



1. Check if the density of triangle mesh (TIN) of the design data is high.
If it is $9/m^2$ or more, this message may be easily displayed.
2. Check if the setting for the bucket is correct on the Bucket Configuration.
For details, see "BUCKET CONFIGURATION".
If the setting is correct, tilt sensor or wiring harness has a trouble.
Check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

ACTION FOR Sensors are invalid

Phenomena: Sensors (stroke sensing hydraulic cylinder, IMU sensor, stroke and reset sensor for cylinder, EPC, etc.) of MC are not connected or faulty.



Check if the density of triangle mesh (TIN) of the design data is high.
If it is $9/m^2$ or more, this message may be easily displayed.

Sensors (stroke sensing hydraulic cylinder, IMU sensor, stroke and reset sensor for cylinder, EPC, etc.) of MC may have a trouble.

Stop the operation. Check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

OTHER ERROR

Message shown on control box	Back-ground color	Semi-auto limited digging mode	Main causes	Remedy
No GPS localization	Red	Not available	The number of control points in the control point file is not sufficient or the setting is incorrect.	Check the setting of the control point files.
Waiting for satellites...	Red	*1	The satellites are not captured yet.	Move the machine to the area which no obstacles exist. Check the connection of connector.
Waiting for radio link...	Red	*1	GNSS base station cannot communicate.	Check the power supply of GNSS base station. Check the channel of the modem of GNSS radio device and GNSS base station. Check the connection of connector. Check, repair. (*)
Waiting to initialize...	Red	*1	Accuracy of bucket edge is poor.	Move the machine to the area which no obstacle exists. Check the connection of connector. Reset the GNSS receiver.
Initializing...	Red	*1	The accuracy of the bucket edge is not good.	Move the machine to the area which no obstacle exists. Check the connection of connector. Reset the GNSS receiver.
Low precisions...	Red	Available	The accuracy of the bucket edge is bad.	Move the machine to the area which no obstacle exists.
Out of design area...	Red	Not available	The bucket edge is out of the design data.	Turn back the bucket edge into the design data.
Avoidance Area Breach!	Yellow	Available	The machine moves in the operation prohibited area.	Move the machine out of the operation prohibited area.
Komatsu controller is busy Calibration Rejected!	Red	-	Calibration on machine monitor is in operation.	Finish the calibration on machine monitor.

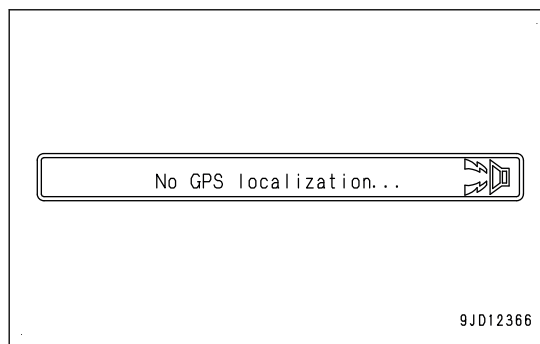
Message shown on control box	Background color	Semi-auto limited digging mode	Main causes	Remedy
Semi-auto function is unavailable	Yellow	Not available	The accuracy of tilt sensor is deteriorated.	<p>Make the work equipment be at an angle that the accuracy of tilt sensor does not become worse.</p> <p>Use the fixed sensor value mode.</p>

*1: The condition will change by the setting of Semi-auto Hold Time in Initializing.

If the hold time is not set, semi-auto mode is not available.

ACTION FOR No GPS localization

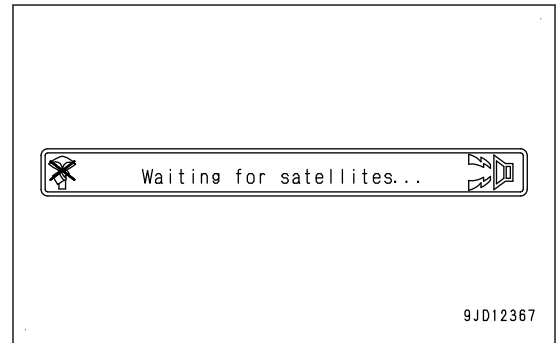
Phenomena: Project file (.tp3) does not contain the control point file or the number of control points in the control point file is not enough.



Check the setting item in the control point file for setting project file, and check if the control point file is set correctly or if the number of control points in the control point file is enough. For setting of control point file, see "CONTROL POINT SETTINGS".

ACTION FOR Waiting for satellites

Phenomena: The system is acquiring satellites. Wait for a while.



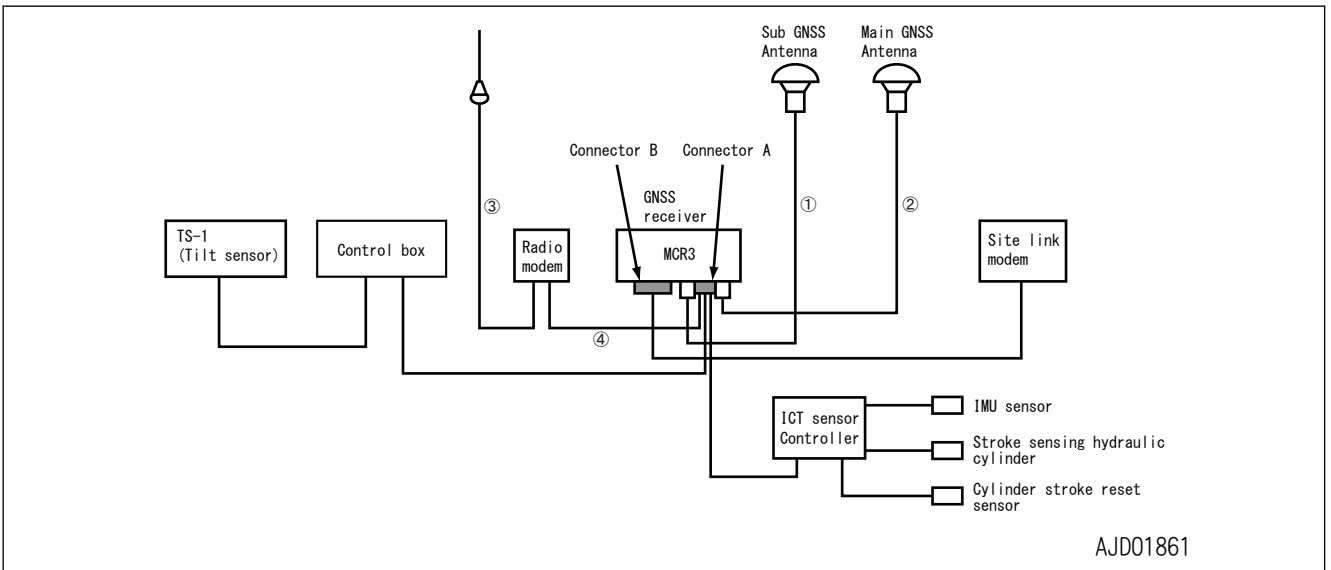
1. Check if there is an obstacle around GNSS antenna (tall building, tree, wall, etc. which disturbs communication or reflects radio wave).

If there is an obstacle, move to the place with no obstacle, and wait for a while. (approximately for 15 to 20 minutes)

REMARK

It may take time to acquire the satellites if the power supply of GNSS base station or GNSS receiver (MCR3) is turned on for the first time or after a long period of time.

2. Check if the connectors at the both ends of cables (1) and (2) shown in the following figure are connected securely.

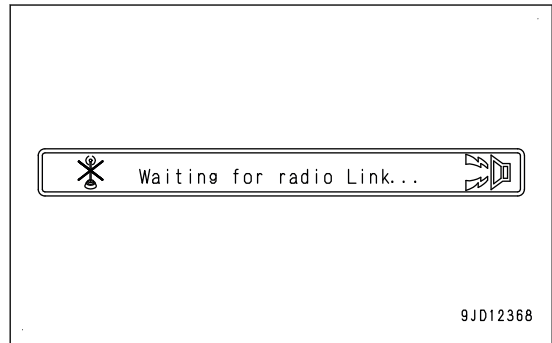


If it does not return after waiting for 15 to 20 minutes and cable connector has no looseness, ask your Komatsu distributor for an investigation of the cause and repair of it.

ACTION FOR Waiting for radio link

Phenomena: GNSS base station is being communicated, or power of GNSS base station is not supplied, or the cable of GNSS radio device has a trouble.

Stop the operation and perform the following procedure.

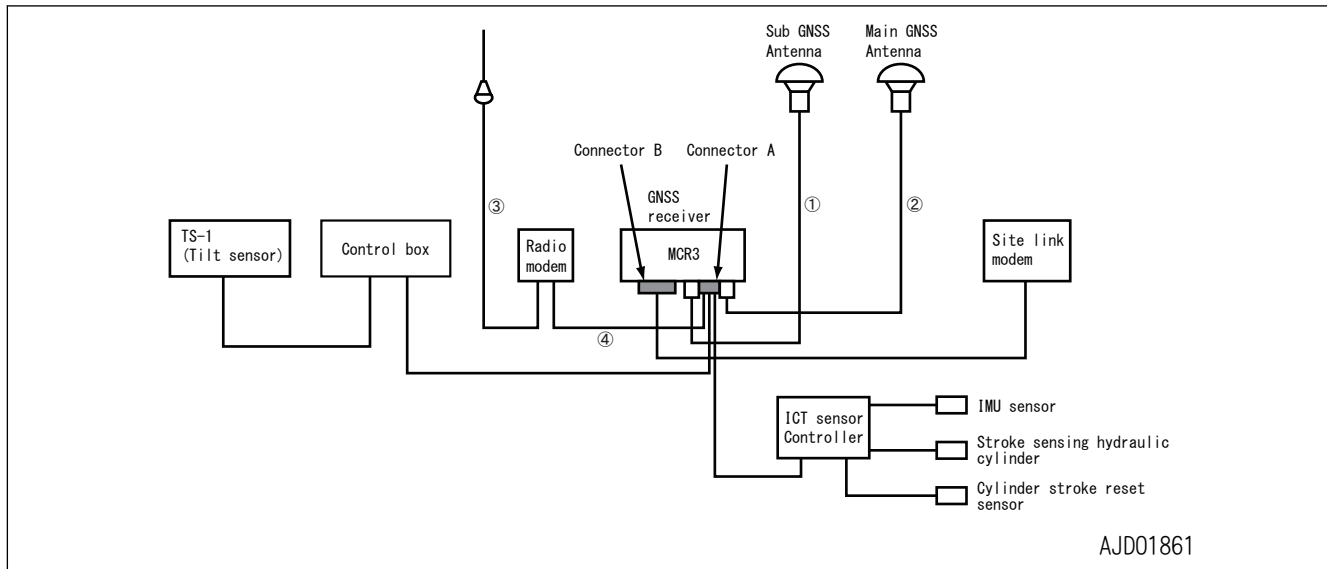


1. Check if the power supply of GNSS base station is turned on.
When GNSS base station works correctly, wait for a while. (approximately for 15 to 20 minutes)

REMARK

It may take time to acquire the satellites if the power supply of GNSS base station or GNSS receiver is turned on for the first time or after a long period of time.

2. If the message is not cleared after waiting a while, check if the modem channel of radio device is the same as that of GNSS base station.
If channel setting is correct, display indicates that it is in communication.
3. Reset the connection between the intelligent Machine Control system and GNSS base station.
For the method to reset, see "METHOD FOR DISPLAYING GNSS RECEIVER INFORMATION".
4. If there is no abnormality or if the message is not cleared after waiting a while after step 3 has been performed, check if connectors at the both ends of cables (3) and (4) shown in the following figure are connected securely.

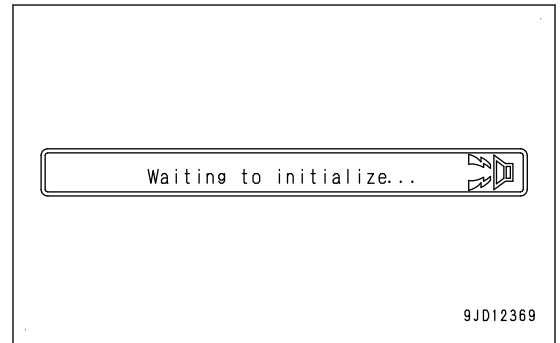


If the cables have no trouble, modem of GNSS radio device or GNSS receiver may have a trouble. Check if the failure code is not displayed on machine monitor, and then ask your Komatsu distributor for an investigation of the cause and repair of it.

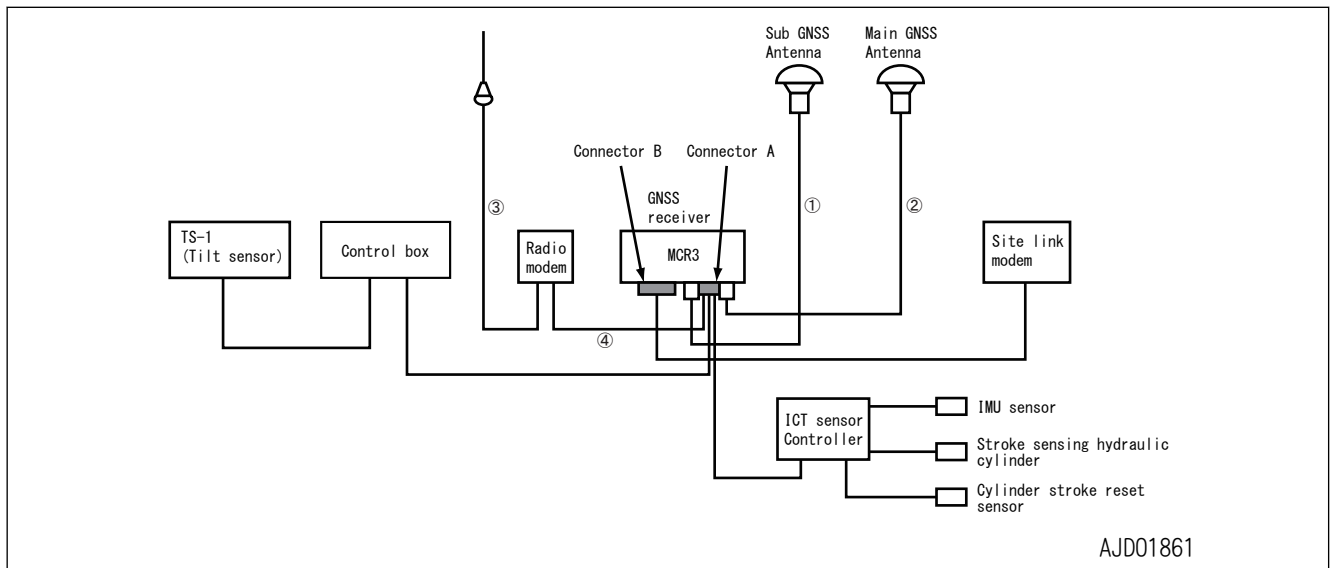
ACTION FOR Waiting to initialize

Phenomena: Bucket edge accuracy is bad.

In this condition, the intelligent Machine Control does not function correctly.

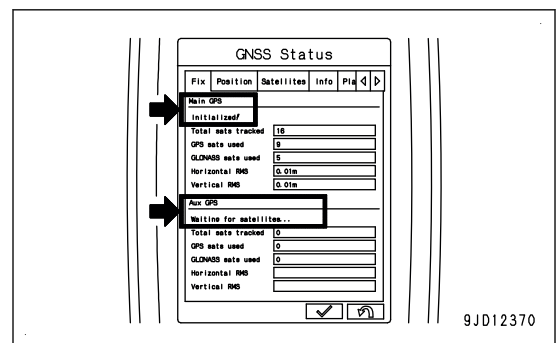


1. Check if there is an obstacle around GNSS antenna (tall building, tree, wall, etc. which disturbs communication or reflects radio wave).
If there is an obstacle, move to the place with no obstacle, and wait for a while. (approximately for 15 to 20 minutes)
2. If the message is not cleared after waiting a while, check that the connectors at the both ends of cables (1) and (2) are connected securely.

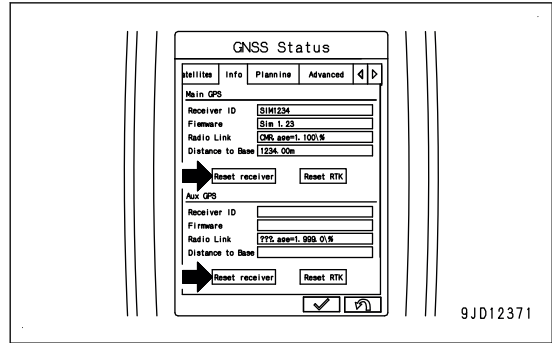


When the connector is connected correctly

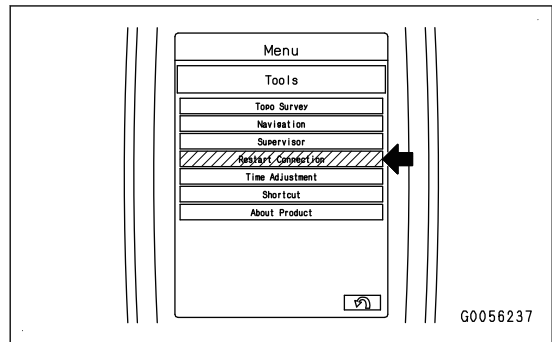
1. On the "GNSS Status" menu, select "Fix" tab.
2. Check that "Initialized!" is displayed on "Main GPS" and "Aux GPS".



- 3. If "Initialized!" is not displayed, tap the "Reset receiver" button of the antenna which has not yet been "Initialized!" by using "Info" tab of "GNSS Status" menu.



- 4. If "Initialized!" is not displayed in both antennas, execute "Restart Connection" on the "Tools" menu.

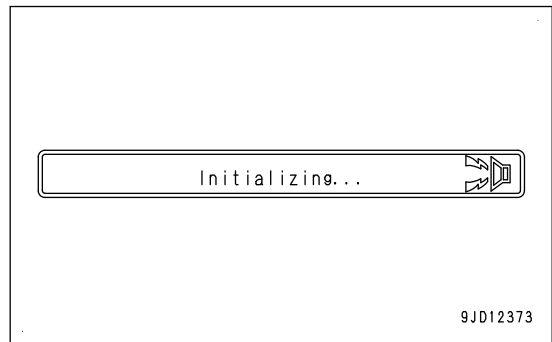


ACTION FOR Initializing

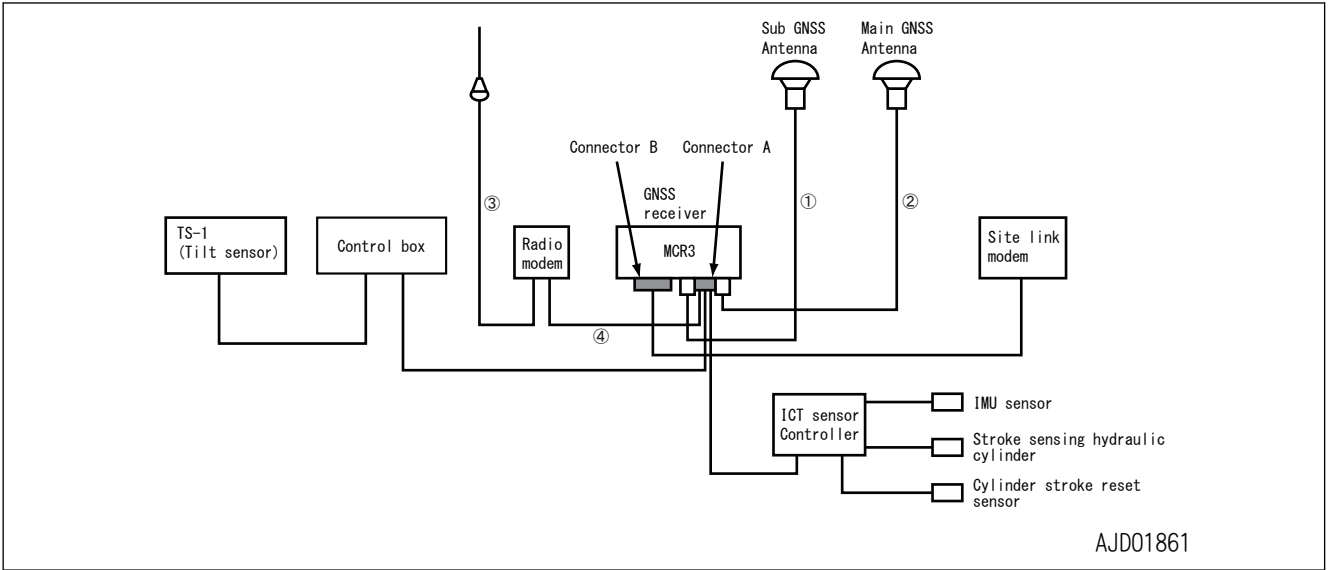
The bucket edge accuracy is better than that of the state of "Waiting to initialize...", but it is not good enough.

This message is displayed when receiving condition of GNSS or communication condition with GNSS base station is bad even if the bucket edge accuracy is good enough.

In this condition, the intelligent Machine Control does not function correctly.

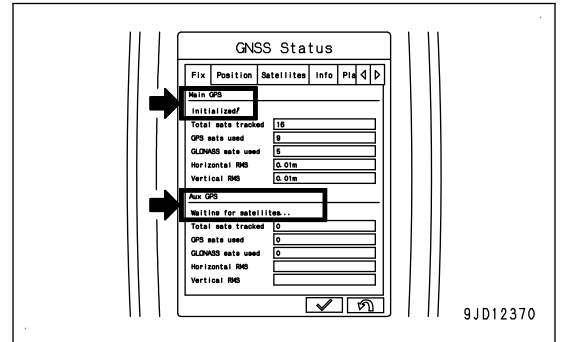


- 1. Check if there is an obstacle around GNSS antenna (tall building, tree, wall, etc. which disturbs communication or reflects radio wave).
If there is an obstacle, move to the place with no obstacle, and wait for a while. (approximately for 15 to 20 minutes)
- 2. If the message is not cleared after waiting a while, check that the connectors at the both ends of cables (1) and (2) are connected securely.

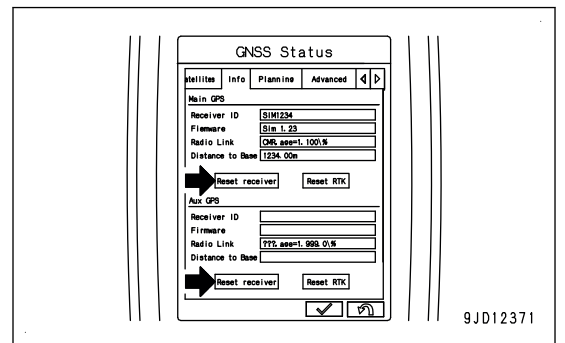


When the connector is connected correctly

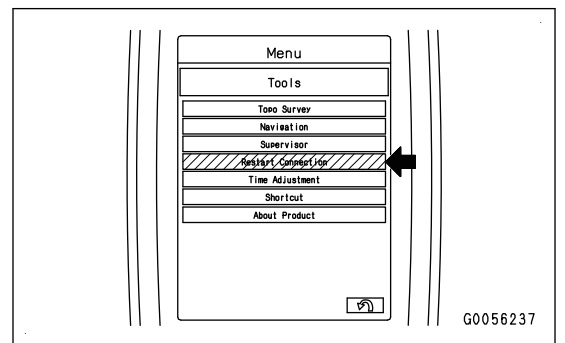
1. On the “GNSS Status” menu, select “Fix” tab.
2. Check that “Initialized!” is displayed on “Main GPS” and “Aux GPS”.



3. If “Initialized!” is not displayed, tap the “Reset receiver” button of the antenna which has not yet been “Initialized!” by using “Info” tab of “GNSS Status” menu.



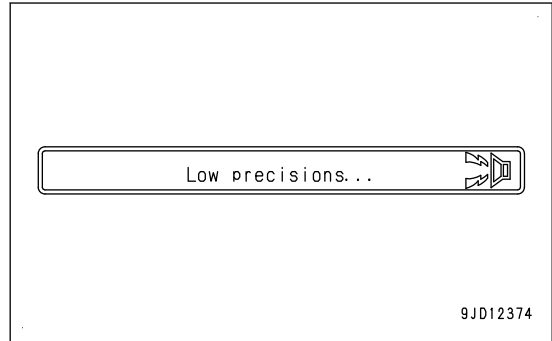
4. If “Initialized!” is not displayed in both antennas, execute “Restart Connection” on the “Tools” menu.



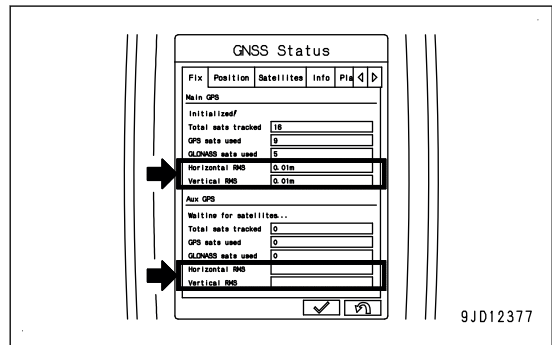
ACTION FOR Low precisions

Phenomena: Bucket edge accuracy is low.

If the locus condition (position, number, etc.) of GNSS satellite is bad, the blade edge accuracy is degraded to a "Low precisions..." state. This is not a system error. Wait for the locus condition to be restored. Rough digging which does not require the accuracy can be performed.



9JD12374

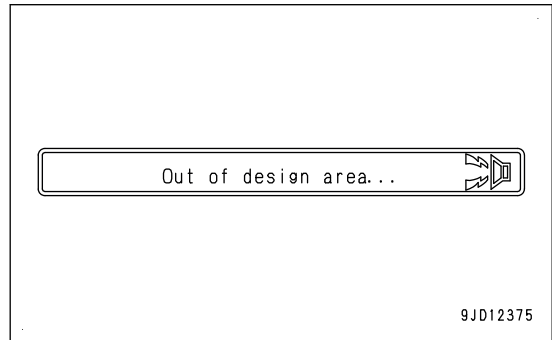


9JD12377

ACTION FOR Out of design area

Phenomena: Bucket edge of hydraulic excavator is out of "Design Data".

Return the bucket edge to inside of "Design Data".

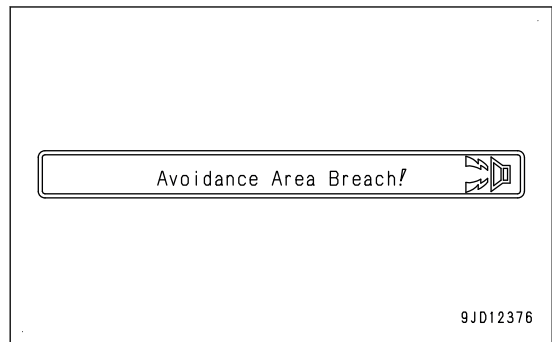


9JD12375

ACTION FOR Avoidance Area Breach

Phenomena: Hydraulic excavator is in the operation prohibited area.

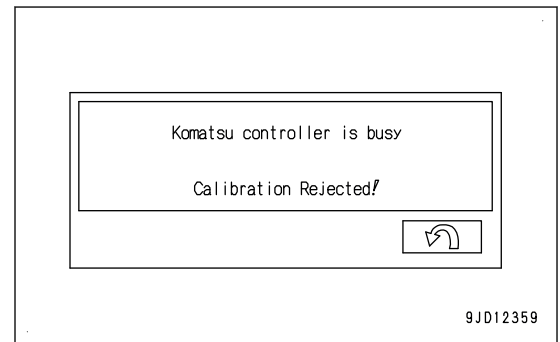
Move the hydraulic excavator to outside of the operation prohibited area.



9JD12376

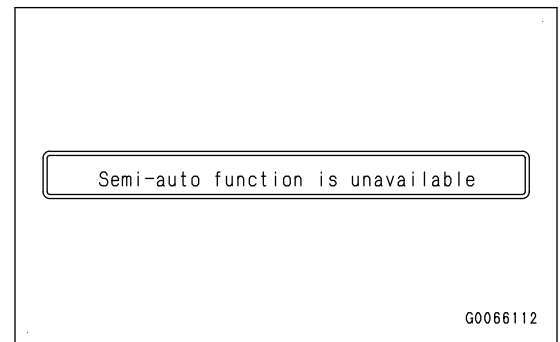
ACTION FOR Komatsu controller is busy Calibration Rejected

Phenomena: Calibration on machine monitor is in process, wait for a while until it is completed.

**ACTIONS FOR Semi-auto function is unavailable**

Phenomenon: The accuracy of tilt sensor is deteriorated.

See EXECUTIONS, "CHECK GNSS COMMUNICATION STATUS" , "METHOD FOR SETTING TILT SENSOR" to resolve the problem that the tilt sensor accuracy becomes worse.



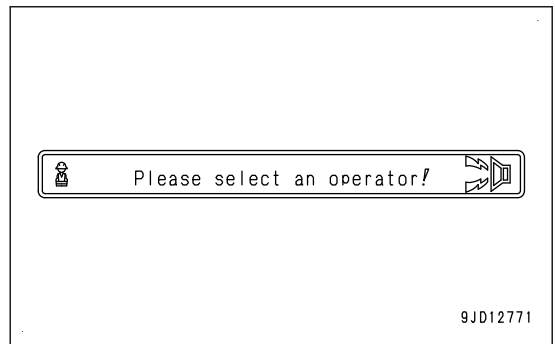
DISPLAY OF MESSAGES OF Sitelink3D

The following messages are not abnormalities but take a remedy according to the message.

Message displayed on control box	Main causes	Remedy
Please select an operator!	Operator is not set on the site link menu.	Tap the status bar to select the name, or select the name of an operator on the site link menu. If the name is not displayed on drop down list, register the name of an operator from office side. This message does not affect the work even if it is left displayed.
You are in "****" delay status!	Delay status is set on the site link menu.	Tap the status bar to set the delay to None, or set the delay to None on the site link menu. This message does not affect the work even if it is left displayed.
Registered name of terminal: "Content of message"	A message is received from the device which is connected to the same site of Site-link 3D.	No action is needed since the message display will be cleared as time elapsed. To see the detail of message, check the content of the message on the message screen of the site link menu.

ACTION FOR Please select an operator

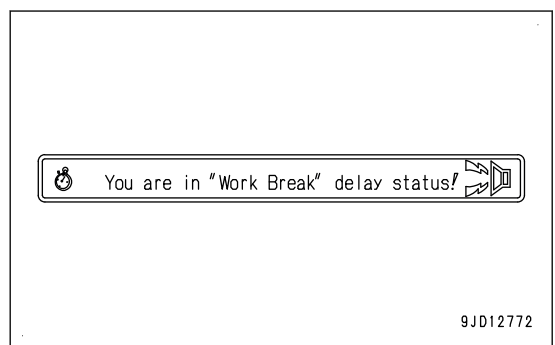
Phenomena: Operator name on the site link menu is not set.
You do not need to stop the operation, but the office side cannot recognize the name of the operator if it is not set.
The following is the procedure for setting the name of an operator.



Tap the status bar to select the name, or select the name of an operator on the site link menu.
If the name is not displayed on drop down list, register the name of an operator from office side.

ACTION FOR You are in *** delay status

Phenomena: Delay status is set on the site link menu.
You do not need to stop the operation, but the delay status information is displayed at the office side if it is set.
The following is the procedure for canceling the setting of delay status.



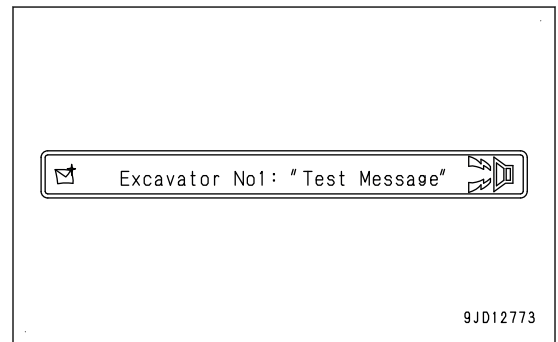
Set the delay to "None" by tapping the status bar, or set the delay to "None" on the site link menu.

ACTION FOR Registered terminal name:Contents of message

A message is sent from other terminal.

No action is needed since the message display will be cleared as time elapsed.

The following is the procedure for reading the detail of the message.



Check the content of the message on the message screen of the site link menu.

MAINTENANCE

WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

MAINTENANCE SCHEDULE

MAINTENANCE SCHEDULE TABLE

EVERY 500 HOURS MAINTENANCE	4-3
METHOD OF CHECKING LOOSENESS OF BUCKET CYLINDER STROKE SENSOR WIRING HARNESS CLAMP, HARDENING OF RUBBER.....	4-3
METHOD OF CHECKING AND CLEANING CYLINDER STROKE SENSOR CASE BOLT.....	4-3

MAINTENANCE PROCEDURE

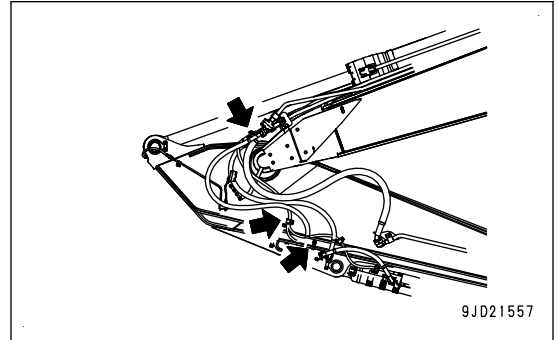
EVERY 500 HOURS MAINTENANCE

Maintenance for every 50 and 250 hours should be performed at the same time.

METHOD OF CHECKING LOOSENESS OF BUCKET CYLINDER STROKE SENSOR WIRING HARNESS CLAMP, HARDENING OF RUBBER

Check visually and by touching with hand that there is no loose clamp mounting bolts and no hardening of the rubber for the bucket cylinder stroke sensor wiring harness.

Replacement is required if any trouble is found. Ask your Komatsu distributor for that work.



METHOD OF CHECKING AND CLEANING CYLINDER STROKE SENSOR CASE BOLT

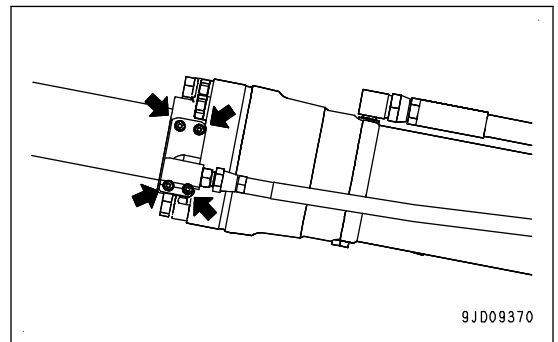
WARNING

If compressed air, high-pressure water, or steam hits your body directly or dirt is scattered by the compressed air, high-pressure water, or steam, there is a danger of personal injury. Wear protective equipment such as protective eyeglasses and dust mask.

Check if the dirt and dust are accumulated in the hexagonal hole of bolt for cylinder stroke sensor case. If the dirt and dust are accumulated, clean it.

NOTICE

If the dirt and dust accumulated in the hexagonal hole of bolt for sensor case are left without cleaning, the dirt and dust stick and bolt cannot be removed.

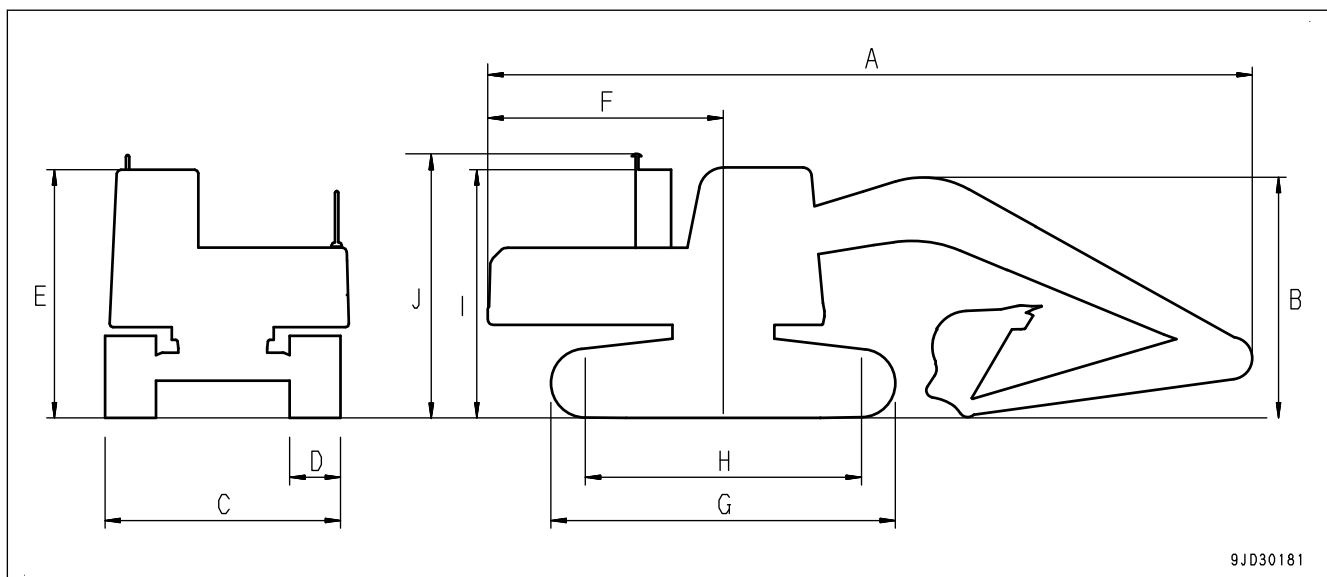


SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS:PC210LCI-11

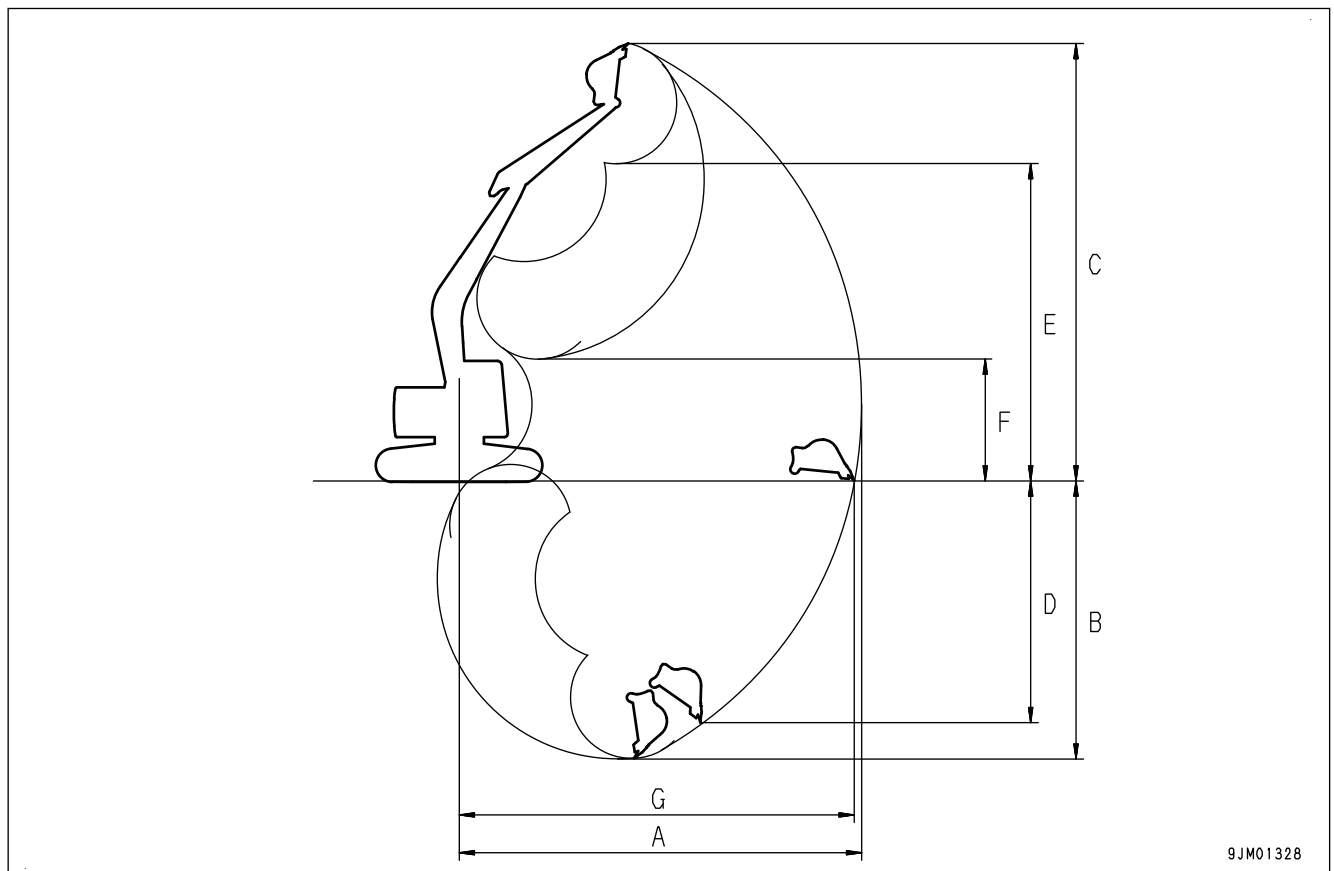
Item		Unit	PC210LCI-11
Operating weight		kg {lb}	21700 {47848.5}
Bucket capacity		m ³ {cu/yd}	0.8 {1.1}
Engine model		-	Komatsu SAA6D107E-3 diesel engine
Rated horse-power	SAE J1995 (gross)	kW {HP} / min ⁻¹ {rpm}	123.2 {165} / 2000 {2000}
	ISO 9249 /SAE J1349 (net)		123 {165} / 2000 {2000}
A	Overall length	mm {ft in}	9705 {31' 10"}
B	Overall height (work equipment)	mm {ft in}	2970 {9' 9"}
C	Overall width	mm {ft in}	3080 {10' 1"}
D	Shoe width	mm {ft in}	700 {2' 4"}
E	Cab height	mm {ft in}	3045 {10' 0"}
F	Tail swing radius	mm {ft in}	3020 {9' 11"}
G	Overall length of track	mm {ft in}	4450 {14' 7"}
H	Distance between tumbler centers	mm {ft in}	3655 {12' 0"}
I	Height of handrail (including the installing part of GNSS antenna)	mm {ft in}	3135 {10' 3"}
J	Height of GNSS antenna	mm {ft in}	3200 {10' 6"}
Minimum ground clearance		mm {ft in}	440 {1' 5"}
Travel speed (Lo/Mi/Hi)		km/h {MPH}	3.0/4.1/5.5 {1.9/2.5/3.4}
Swing speed		min ⁻¹ {rpm}	12.4 {12.4}



9JD30181

*: Minimum values of cooling fan speed

	Working ranges	Unit	PC210LCI-11
A	Maximum digging range	mm {ft in}	9875 {32' 5"}
B	Maximum digging depth	mm {ft in}	6620 {21' 9"}
C	Maximum digging height	mm {ft in}	9970 {32' 9"}
D	Maximum vertical wall digging depth	mm {ft in}	5980 {19' 7"}
E	Maximum dumping height	mm {ft in}	7110 {23' 4"}
F	Minimum dumping height	mm {ft in}	2645 {8' 8"}
G	Maximum reach at ground level	mm {ft in}	9700 {31' 10"}



9JM01328

ATTACHMENTS AND OP- TIONS

WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

PRECAUTIONS FOR USING ATTACHMENT AND OPTIONS

WARNING

Install only attachments or options authorized by Komatsu. Komatsu cannot accept any responsibility for any not authorized by Komatsu. Any personal injury, failure, or property damage caused by the use of unauthorized attachments or options will not be the responsibility of Komatsu.

When installing attachments or options to the machine, it is necessary to pay attention to safety. Observe the following precautions strictly when selecting, installing or removing, or using attachments or options.

PRECAUTIONS WHEN SELECTING

Consult your Komatsu distributor before installing attachments or options to the machine. Depending on the type of attachment or option, it may be necessary to install a front guard, overhead guard, or other safety structure to the machine. There may also be problems of the attachment or option hitting the operator's cab.

READ THE OPERATION AND MAINTENANCE MANUAL THOROUGHLY

Before installing or using any attachment or option, make sure that you thoroughly read and understand the instruction manuals for the machine and the attachment or option.

If you lose the instruction manual or it is damaged, obtain a new copy from the attachment manufacturer or your Komatsu distributor.

PRECAUTIONS WHEN REMOVING AND INSTALLING

When removing or installing the attachment or option, observe the following precautions, and take care to ensure safety during the operation.

- Perform the removal and installation operation on a level and firm ground surface.
- When the operation is performed by 2 or more workers, choose the leader and follow his/her instructions.
- Use a crane when handling heavy objects (25 kg {55.1 lb} or more).
(The crane must be operated by a qualified operator.)
- Never go under a load raised by the crane.
- Do not perform operations with the load kept raised by the crane. Always use a stand to prevent the load from falling.
- When removing a heavy part, consider the machine balance after it is removed. To prevent the machine from tipping over, set a support in position if necessary before removing the part.
- Before installing or after removing the attachment or option, set it in a stable condition to prevent it from falling over.
- For details of the removal or installation operation, consult your Komatsu distributor.

PRECAUTIONS FOR USING

Keep the following precautions in your mind when long or heavy work equipment is installed. Before starting operations, move the machine to a safe place and perform a test operation to make sure that you fully understand the movement, center of gravity, and working range of the machine.

- Do not perform the swing operation if the machine is at an angle. If the swing is performed with the machine at an angle, there is a danger that the machine may tip over.
- Always allow extra space to the position you want to stop swinging when performing the swing.
If long work equipment is installed, the working range becomes larger. So be more careful to maintain a safe distance from the surroundings.
- If heavy work equipment is installed, pay attention to the following precautions.
 - The swing overrun (the distance the work equipment moves before completely stopping after the swing brake is applied) will be greater. It is dangerous if a lifted load hits any person or structure. Always maintain a safe distance to the swing stop position when operating.

- The hydraulic drift of the work equipment (the amount of the work equipment moves down under its own weight when it is stopped in a raised position) also becomes greater. Do not stop the work equipment in air.
- Do not suddenly swing, lower, or stop the work equipment. It is dangerous that the machine may tip over.
- Do not suddenly extend or retract the boom cylinder rod. The shocks may cause the machine to tip over.

ATTACHMENTS AND OPTIONS

WARNING

- Read the instruction manual for the attachment and the sections of this manual related to attachments and options.
- Installing any attachment or optional equipment is related to the safety issue. Contact your Komatsu distributor before installing.
- Installing attachments or optional equipment without consulting your Komatsu distributor may not only cause problems with safety, but may also have an adverse effect on the operation of the machine and the life of the equipment.
- Any personal injuries, product failures, physical loss or damage resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.

AUTO TILT BUCKET

The following are the setting procedures, precautions, and recommended devices for performing the operation with auto tilt bucket installed.

AUTO TILT BUCKET SETTING

Perform the setting for the auto tilt bucket according to the following procedure.

1. Perform "Auto Tilt Bucket Exchange" calibration
For details, see PROCEDURES OF CALIBRATION AFTER REPLACING AUTO TILT BUCKET.
 2. Perform "Auto Tilt Bucket Control Adjustment"
For details, see AUTO TILT BUCKET CONTROL ADJUSTMENT.
- For performing the setting described below, see SETTING, MC SETTING.
 - IMU ADJUSTMENT
 - BUCKET WEIGHT SETTING
 - BOOM FINE CONTROL ADJUSTMENT
 - SEMI-AUTO ADJUSTMENT
 - For performing the setting of auto tilt bucket flow rate, see SETTING, ATTACHMENT SETTING.
"S2" is automatically set in the auto tilt bucket flow rate setting after "Auto Tilt Bucket Exchange" calibration is performed.

WORK EQUIPMENT CONTROL OF AUTO TILT BUCKET

WARNING

- If the auto tilt bucket is abruptly operated, the tilt stop control and tilt grading assist control cannot follow the operation, and it may dig deeper than the design surface.
- If the auto tilt bucket is abruptly operated, shock symptom may occur on the machine body. In such a case, return the work equipment control lever to NEUTRAL position.
- If the machine is operated for a long time without resetting the stroke sensor, the illustration displayed on the control box becomes different from the actual machine posture. Perform the stroke end reset in such a case.
- If a wrong bucket file is selected, or a wrong dimension is input in the bucket file, the machine may move unexpectedly, or the accuracy of operation may deteriorate.
- When the auto tilt bucket is to be replaced with the conventional bucket, select the bucket file for the standard bucket before removing the auto tilt bucket.
- When the auto tilt bucket is installed, the bucket may contact the machine body depending on the bucket posture or the work equipment posture.
- It may appear on the sectional view that the blade tip is digging deeper the design surface, but it is not a problem on the automatic control.

For the operation of the work equipment when the auto tilt bucket is installed, see the explanation below.

1. Daily calibration
See EXECUTIONS, METHOD FOR CHECKING CONTROL BOX SCREEN DISPLAY.
Daily calibration method when the auto tilt bucket is installed is different from that when the conventional bucket is installed.
2. Working mode
See EXECUTIONS, WORKING MODE (WHEN AUTO TILT BUCKET IS EQUIPPED).
3. Troubleshooting
See EXECUTIONS, AUTO TILT BUCKET.

For the name of switches and explanation of the function when the auto tilt bucket is installed, see the following items.

1. Proportional lever reverse side view pilot lamp
See OPERATION, PROPORTIONAL LEVER REVERSE SIDE VIEW PILOT LAMP.
2. Switches used for the operation of auto tilt bucket
See OPERATION, SWITCHES.
3. Control levers and pedals used for the operation of auto tilt bucket
See OPERATION, CONTROL LEVERS AND PEDALS.
4. Display of Facing Angle Compass
See EXECUTIONS, METHOD FOR SETTING ROUGH DIGGING SCREEN and METHOD FOR SETTING FINE DIGGING MODE SCREEN.
5. Tilt fixing button
See EXECUTIONS, METHOD FOR SETTING TILT SENSOR.

RECOMMENDED ATTACHMENT OPERATIONS

The following descriptions are the precautions which must be followed when operating the hydraulic excavator equipped with an attachment.

NOTICE

Select the optimum attachment model for the hydraulic excavator body.
 The attachments and models ready for installation differ according to the machine body. For details of the selection of the attachments or the models, consult your Komatsu distributor.

HYDRAULIC BREAKER

Applicable work

Road construction

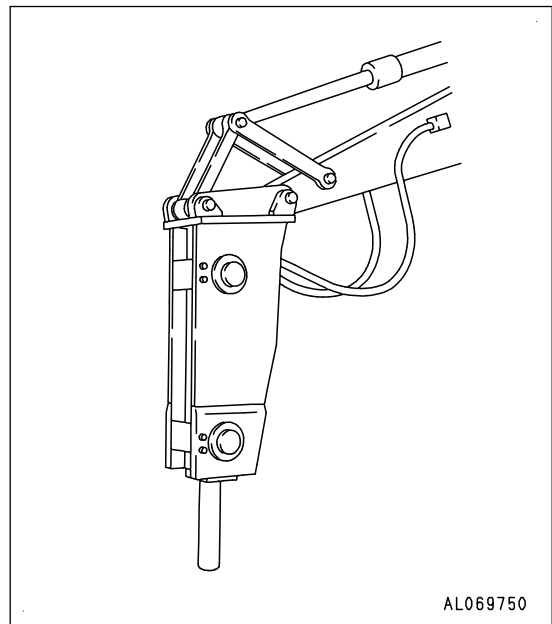
This can be used for applications including breaking up road surfaces or slag, rock crushing and breaking operations in quarries.

The machine with the intelligent Machine Control specification cannot be used for demolition or quarry work. The machine is for construction work.

Also, the intelligent Machine Control cannot be used in a tunnel or inside building where GNSS signal cannot be received.

NOTICE

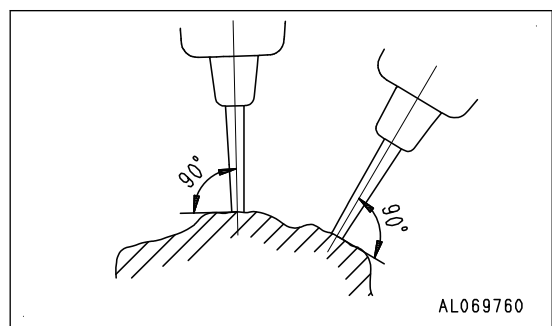
The intelligent Machine Control cannot be used with working mode other than P, E, ATT/E and ATT/P modes.



AL069750

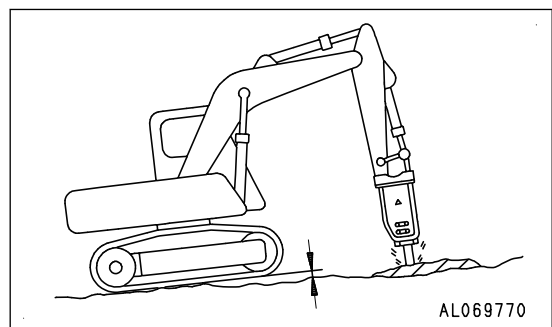
Precautions when performing breaking operations

Keep the chisel pushed perpendicularly against the impact surface when performing breaking operations.



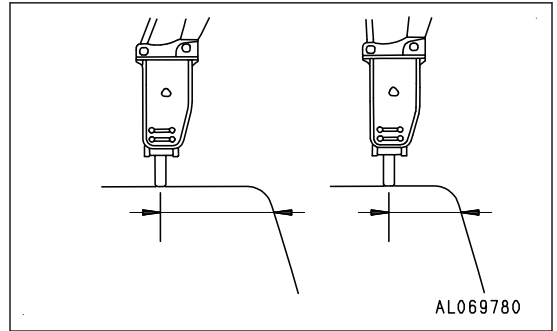
AL069760

Push the chisel against the impact surface so that the machine rises approximately 5 cm {2 in} off the ground when performing breaking operations. Do not let the machine rise further off the ground than this amount.

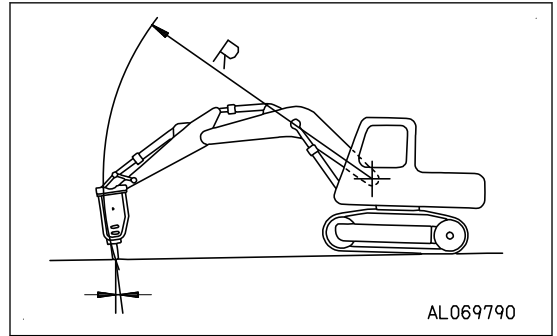


AL069770

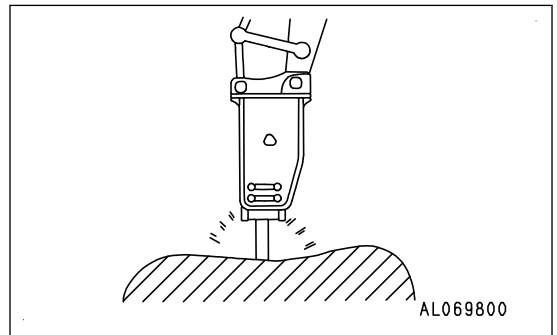
When the chisel does not penetrate or break the surface by continuous impact to the same impact surface for 1 minute, change the point of impact and perform breaking operations by scraping from the edge.



The direction of penetration of the chisel and the direction of the breaker body will gradually move out of line with each other, always adjust the bucket cylinder to keep them aligned.



Always keep the chisel pressed against the impact surface properly not to strike at the air.



SETTING

INTELLIGENT MACHINE CONTROL SETTINGS

Settings of the intelligent Machine Control can be performed with the control box and machine monitor.

Control box

- MAIN MENU DISPLAY
- PROJECT FILE SETTING AND EDITING
- GUIDANCE SETTINGS
- DISPLAY OPTIONS
- SITE LINK TASK DETAIL MENU
- SITE LINK
- TOOLS
- PREPARATIONS FOR CALIBRATION
- BUCKET CONFIGURATION

Machine monitor

- MC SETTING
- IMU ADJUSTMENT
- BUCKET WEIGHT SETTING
- BOOM FINE CONTROL ADJUSTMENT
- SEMI-AUTO ADJUSTMENT

CONTROL BOX

METHOD FOR DISPLAYING MAIN MENU

On the main menu screen of control box, settings of intelligent Machine Control system can be performed.

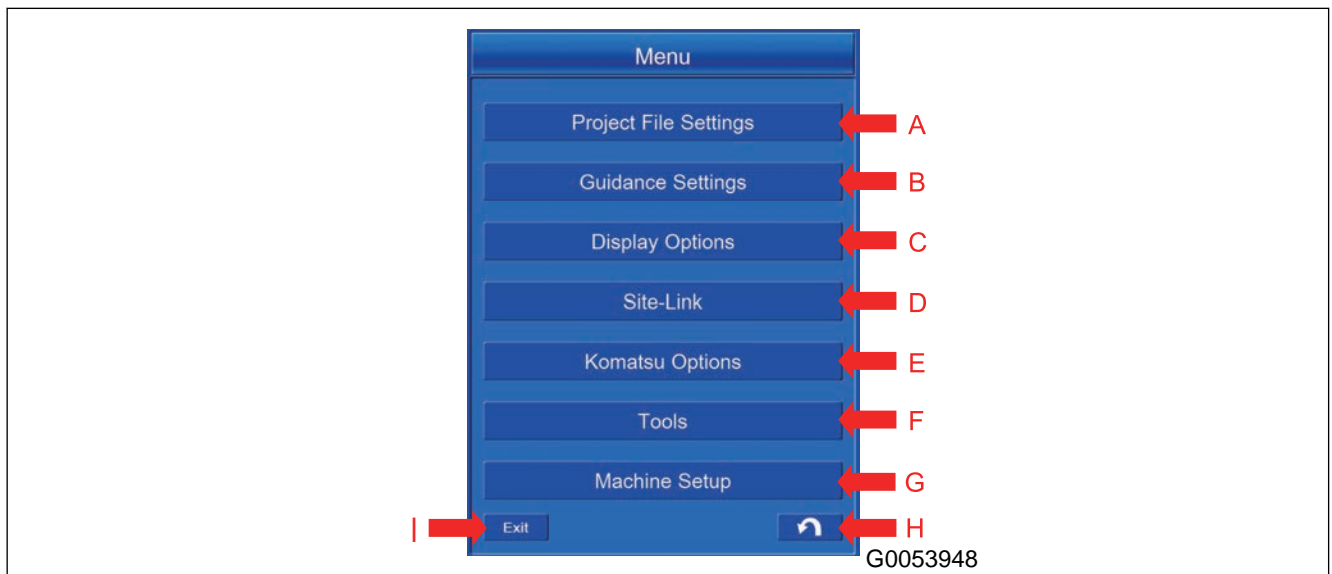
Tap the main menu display button at the bottom right of the working screen, the screen changes to "Menu" screen.

REMARK

- To perform the settings, press the Auto/Manual switch to set it to Manual mode.
- In semi-auto mode, Menu button is disabled. Even if you tap Menu button, the screen does not change.



MAIN MENU DISPLAY



- | | |
|------------------------------------|----------------------------|
| (A) "Project File Settings" button | (F) "Tools" button |
| (B) "Guidance Settings" button | (G) "Machine Setup" button |
| (C) "Display Options" button | (H) RETURN button |
| (D) "Site-Link" button (*) | (I) Exit button |
| (E) "Komatsu Options" button | |

(*): This is shown only when the Site Link connection is set.

Project File Settings button

Tap "Project File Settings" button, and you can do the setting of files related to the Project File.

Guidance Settings button

Tap "Guidance Settings" button, and you can do the setting of the guidance of the intelligent Machine Control.

Display Options button

Tap “Display Options” button, and you can do the display setting of the working screen used in the intelligent Machine Control.

Site-Link button

Tap “Site-Link” button, and you can do the setting for Network function, Operator, Activity, Delay, Material, Export Data, and Message.

Komatsu Options button

Tap “Komatsu Options” button, you can connect to the KomConnect, output the KomConnect settings, disconnect the KomConnect, output the KomConnect offline data, and check the connection to the KomConnect.

Tools button

Tap “Tools” button, and you can do other settings of the intelligent Machine Control.

Machine Setup button

Tap “Machine Setup” button, and you can do various settings of the machine for the intelligent Machine Control.

Exit button

Tap the Exit button, and you can finish the control box.

RETURN button

Tap the RETURN button and the screen goes back to the working screen.

PROJECT FILE SETTING AND EDITING

The Project Files consist of Control files, Point files, Surface files, and Layer files, etc.

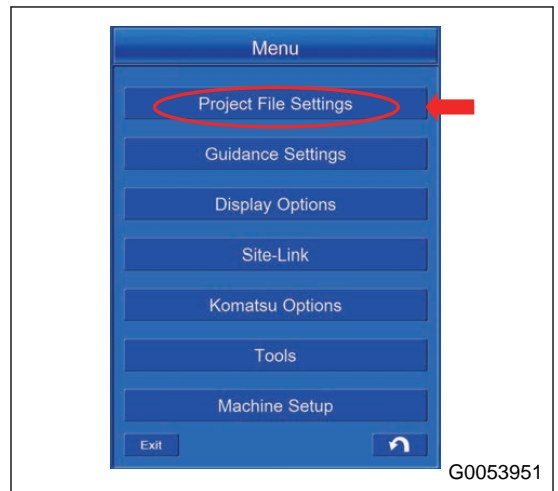
With the Project File Settings Menu, you can perform the setting and editing of the preceding file, and setting of Surface, Alignment, As-built view, and Layer.

Method for setting the Project File

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap Project File Settings button on the main menu screen, the screen changes to Project File Settings screen.



PROJECT FILE SETTING CONTENTS

You can perform the setting and editing of the following items with the Project File Settings.

(1) "Project Files" button.

You can perform the setting and editing of the Project File.

(2) "Current Project:"

The currently selected Project File is displayed.

(3) "Control Points" button

You can perform the setting and editing of Control files.

(4) "Points" button

You can add and edit the Point file.

(5) "Surfaces" button

You can perform the setting and editing of the Surface file.

(6) "Layers" button

You can perform the setting and editing of the Layer file.

(7) "Surface"

You can perform the setting of the Surface file.

(8) "Alignment"

You can set the Alignment file.

(9) "As-built View"

You can set the display method of As-built.

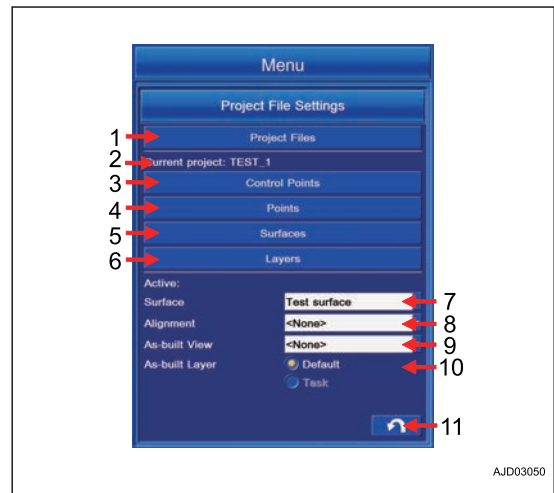
(10) "As-built Layer"

Set it only when the connection to "Site-Link" is done.

When the connection to "Site-Link" is not done, set it to the Default value.

(11) "RETURN button"

Tap RETURN button and the screen returns to the main menu screen.

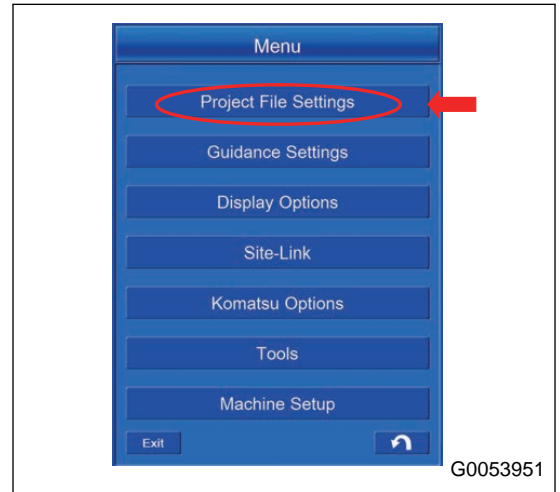


METHOD FOR SETTING PROJECT FILE

METHOD FOR IMPORTING PROJECT FILE

Import the Project Files according to the following procedure.

1. Tap the Project Files button to select the Project File.



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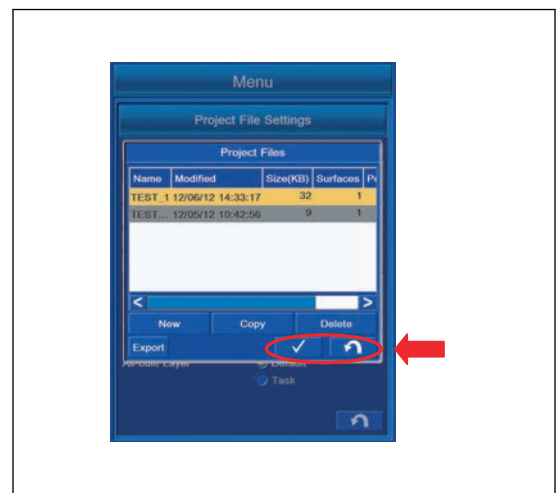
2. Highlight the Project File to be imported, and tap ENTER button.

The Project File is set.

REMARK

Even if the currently selected Project File is highlighted, it cannot be selected by ENTER button.

3. After setting is completed, the name of currently selected Project File is displayed in "Current Project:" on "Project File Settings" screen.
4. Tap RETURN button and the screen returns to "Main Menu" screen.



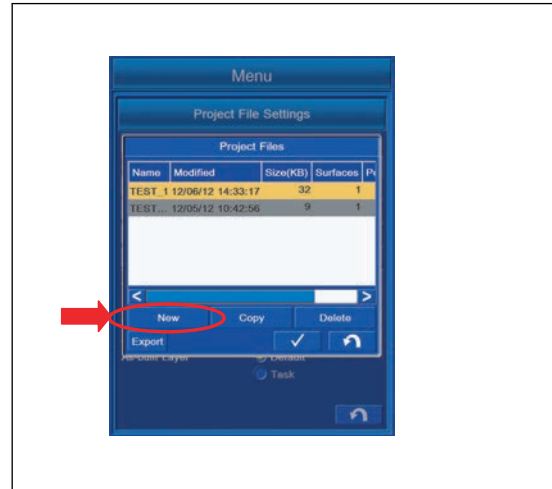
CREATE NEW PROJECT FILE

Project File can be newly created on the intelligent Machine Control system or can be created on the basis of the currently selected Project File or the Project File which is obtained via Site-Link.

REMARK

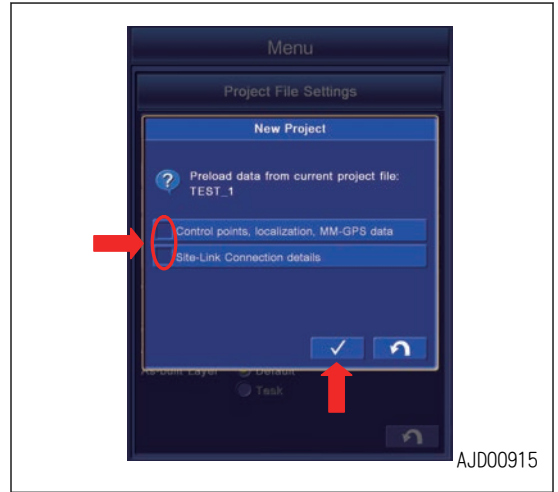
If a large capacity of data is saved in the control box, hard disk is used fully and the control box may not operate normally. Delete unnecessary data frequently.

1. Tap "Project Files" button.
2. Tap "New" button and "New Project" screen is displayed.

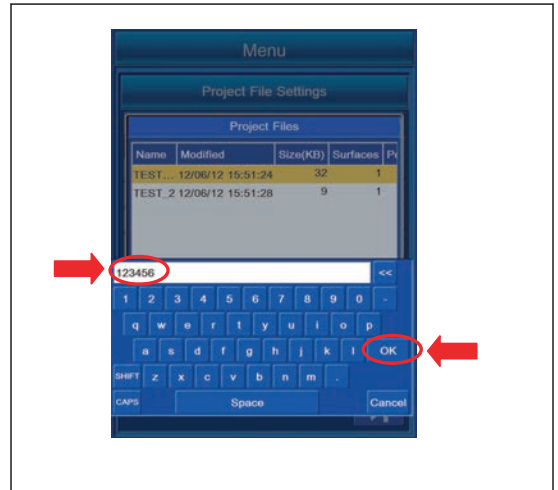


METHOD FOR CREATING NEW PROJECT FILE

1. On “New Project” screen, tap the ENTER button while you do not put a tick to the 2 items as follows.
 - “Control points, localization, MM-GPS data”
 - “Site-Link Connection details”



2. The screen changes to the screen to input the Project File name. Input the file name to be created newly, and tap “OK” button.

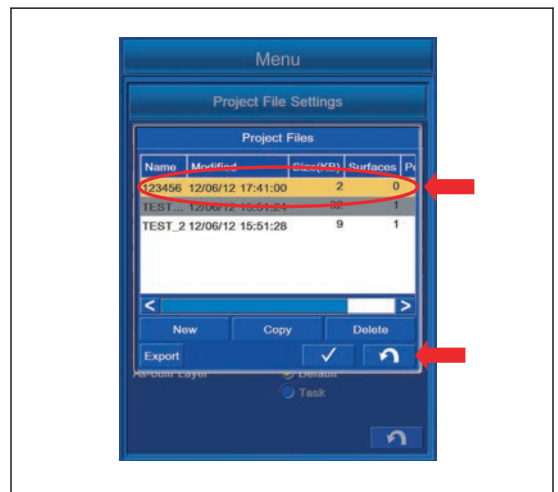


3. The file name of the newly created Project File is added to the Project Files list.

REMARK

For the setting of Project Files, see “METHOD FOR IMPORTING PROJECT FILES”.

4. Tap the RETURN button to move the screen back to the previous screen.

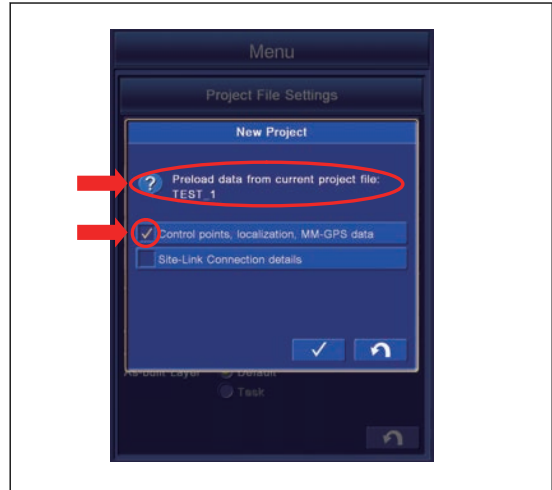


METHOD FOR CREATING NEW PROJECT FILE FROM CURRENTLY SELECTED FILE

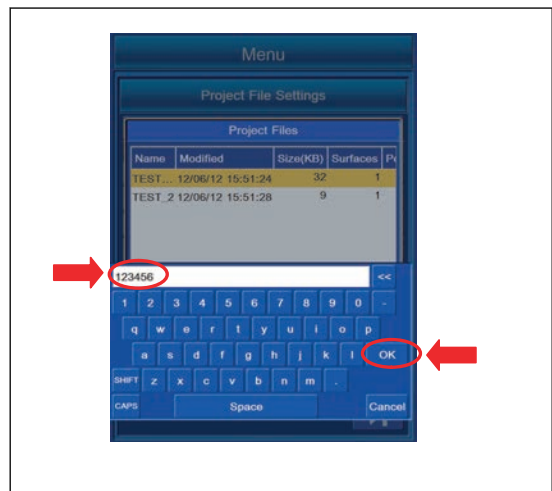
You can create the new Project File based on the data of the currently selected Project File.

The name of the currently selected Project File is displayed in "Preload data from current project file:".

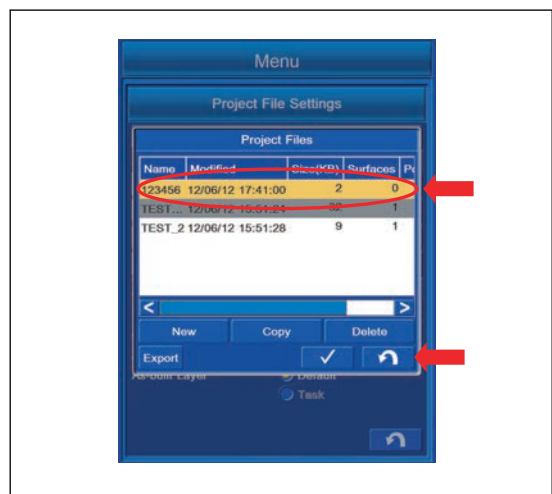
1. Put a tick to the following item on "New Project" screen.
"Control points, localization, MM-GPS data"



2. The screen changes to the screen for inputting Project File name. Input the file name to be created newly, and tap OK button.



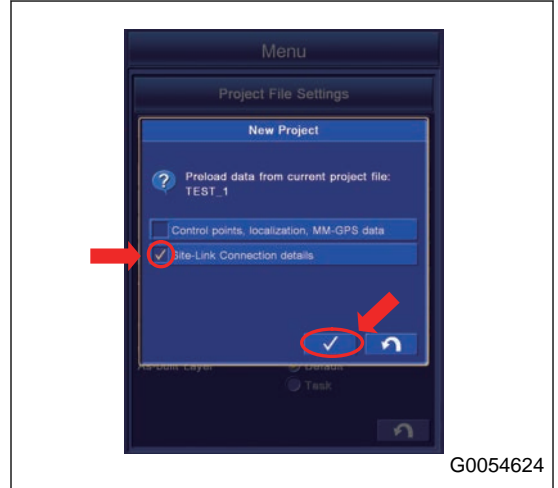
3. The file name of the newly created Project File is added to the Project Files list.
4. Tap RETURN button to return the screen to the previous screen.



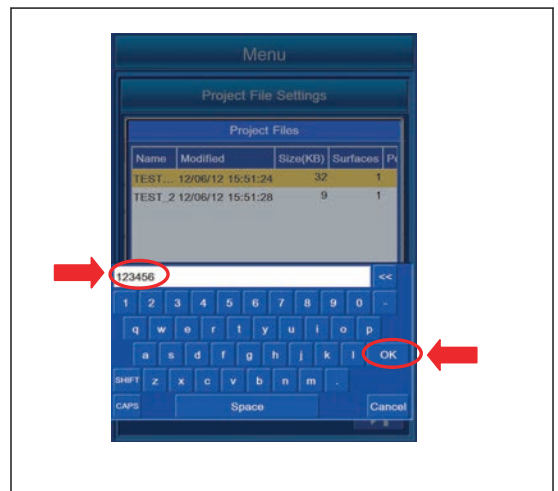
METHOD FOR CREATING NEW FILE BASED ON PROJECT FILE FROM Site-Link SERVER

You can create the new Project File based on the data of Project File obtained from Site-Link server. The name of the currently selected Project File is displayed in "Preload data from current project file:".

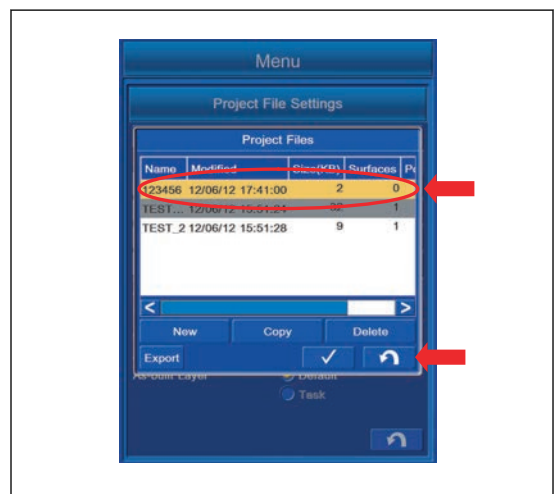
1. Put a tick to the following item on "New Project" screen.
"Site-Link Connection details"



2. The screen changes to the screen for inputting Project File name. Input the file name to be created newly, and tap "OK" button.



3. The file name of the newly created Project File is added to "Project Files" list.
4. Tap RETURN button to return the screen to the previous screen.



METHOD FOR COPYING PROJECT FILE

You can create the copy of Project File.

Connect the USB flash drive to the control box.

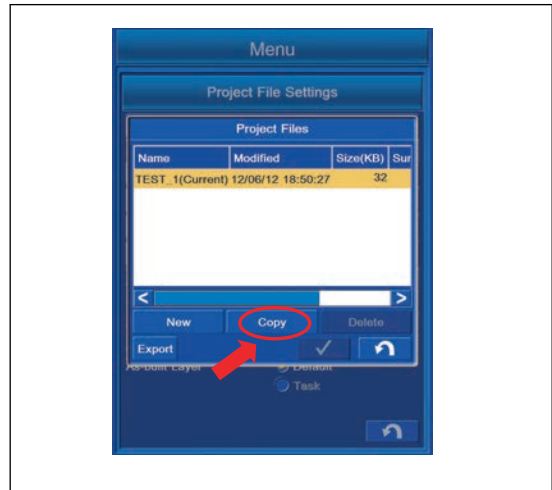
If the Project File is not created newly, Project File is not displayed in the list.

Copy the Project File from the USB flash drive to the control box.

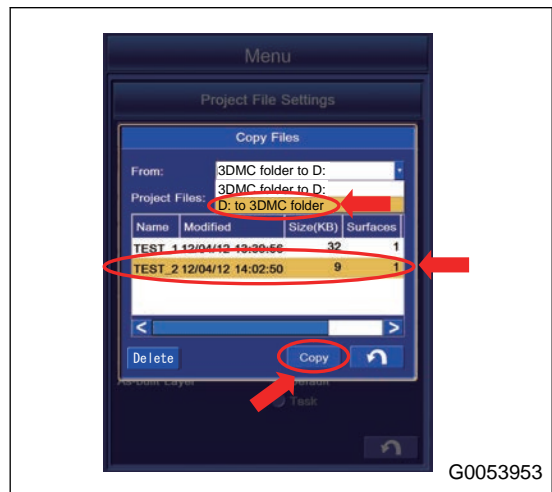
REMARK

If a large capacity of data is saved in the control box, hard disk is used fully and the control box may not operate normally. Delete the unnecessary data frequently.

1. Tap "Project Files" button to select the Project File.
2. Tap "Copy" button on "Project Files" screen.
The screen changes to "Copy Files" screen.

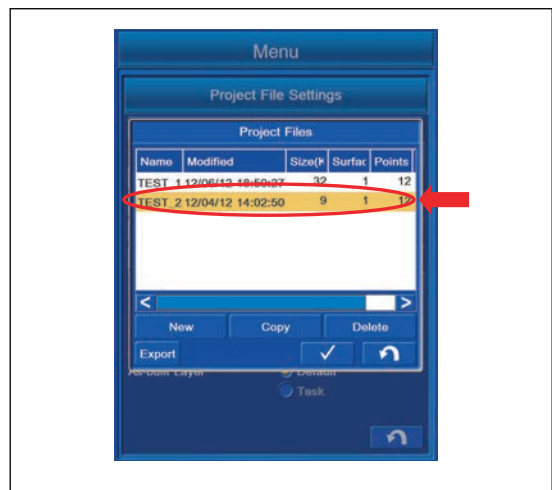


3. With "From:", select the folder (3DMC folder) in which the file will be saved (in the control box) from the drive having the original file (to which USB flash drive is connected).
Example: D: to 3DMC folder
4. Highlight the Project File to be copied, and tap "Copy" button.



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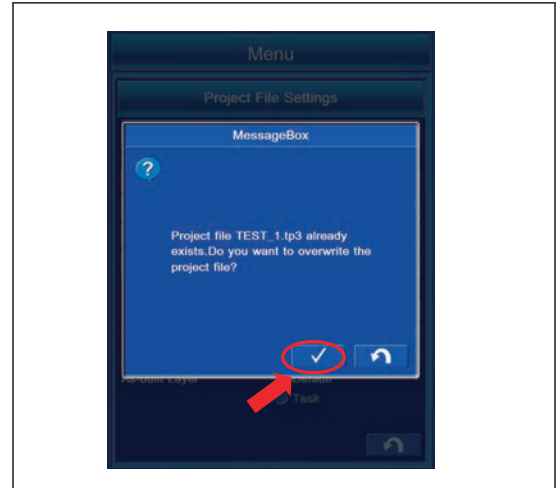
5. Check that the copied file is added to the list of Geoid Files.



- When the Project File name is already in the list and copying the file by overwriting, "MessageBox" is displayed. Tap ENTER button.

REMARK

- The extension of Project File is ".tp3".
- Display of the drive name depends on the connecting condition of USB flash drive.
- The Project File is saved in "3DMC folder" of the control box.
- Tap RETURN button to return the screen to the previous screen.
- Save the Project file directly to the USB flash drive (root directory).
If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize the Project file.
- The USB flash drive with password function cannot be used.



When copying the Project File saved in the control box to the USB flash drive

- With "From:", select the drive to which the file will be copied (to which the USB flash drive is connected) from the folder (in the control box) in which the Project File is saved.

Example: 3DMC folder to F:

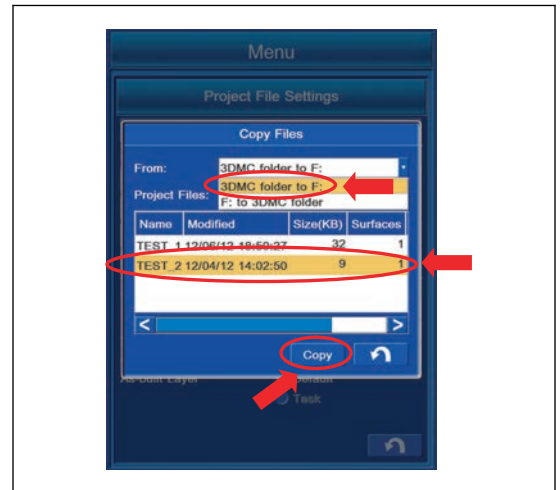
- Highlight the Project File to be copied, and tap "Copy" button.

The Project File is added in the USB flash drive.

REMARK

- The extension of Project File is ".tp3".
- Display of the drive name depends on the connecting condition of USB flash drive.
- The Project File is saved in "3DMC folder" of the control box.
- Tap RETURN button to return the screen to the previous screen.

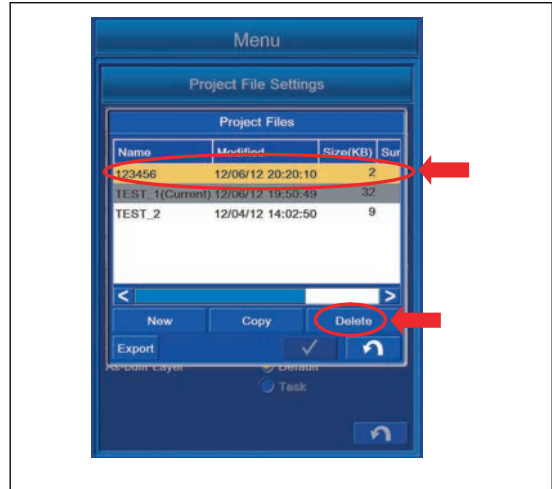
- When the Project File name is already in the list and copying the file by overwriting, "MessageBox" is displayed. Tap ENTER button.



METHOD FOR DELETING PROJECT FILE

You can delete the Project File.

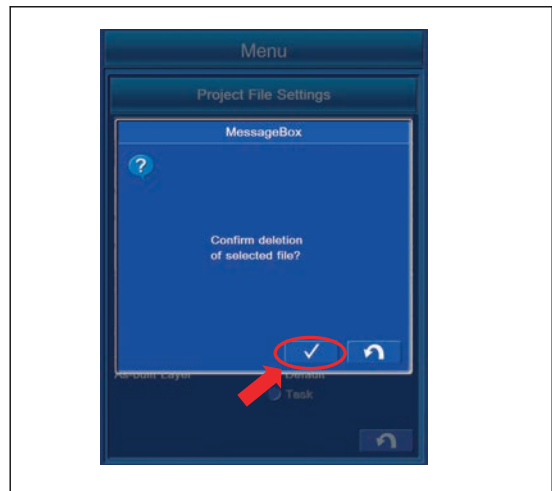
1. Highlight the Project File to be deleted, and tap “Delete” button.



2. The screen changes to “MessageBox” screen. Tap ENTER button to delete.

REMARK

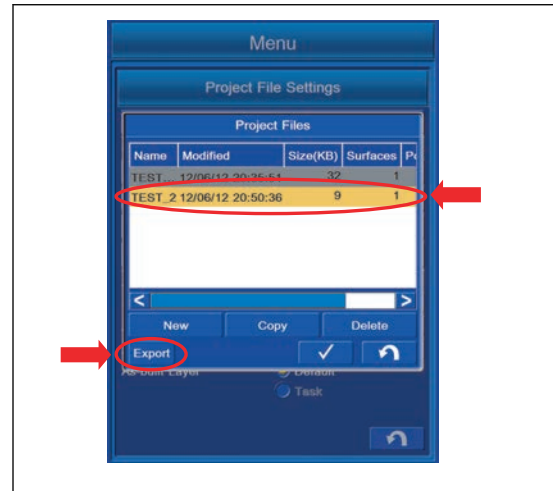
- The Project File currently selected cannot be deleted. The Project File with “(Current)” is the currently selected file.
- Tap RETURN button to return the screen to the previous screen.



METHOD FOR EXPORTING PROJECT FILE








The Project Files consist of Control files, Point files, Surface files, Layer files, etc.

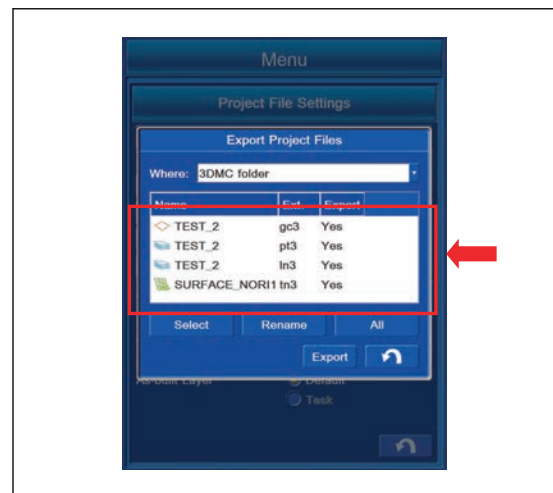
1. On “Project Files” setting screen, select the Project File which contains the file to be exported, and tap the “Export” button.



2. The list of the File saved in the Project Files is displayed. The name, extension “Ext.,” export or not export (“Yes”/ “No”) are displayed in the list.

The details of the Files displayed in the list are as follows.

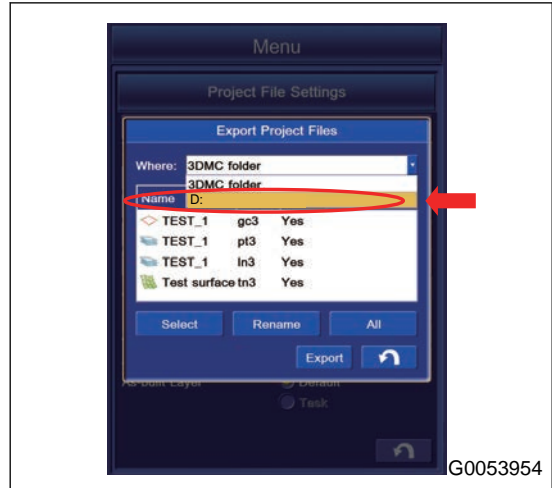
symbol	Ext	Contents
	gc3	Control Point
	pt3	Point
	ln3	Linework
	tn3	Surface
	rd3	Alignment
	pl3	Simple plane created by this machine
	gd3	As-Built



- With “Where:”, select the place to where the file is exported (the drive to which the USB flash drive is connected).

REMARK

If you set 3DMC folder (place where File is saved in control box) as the folder to where File is exported, the data is overwritten. Select other folder than 3DMC folder as the folder to where the file is exported.



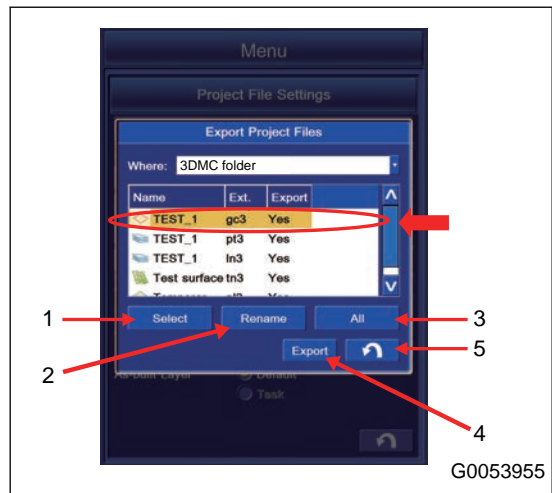
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- Select the file to be exported, highlight it in yellow, tap “Select” button (1), and you can select Yes/No of export.

“Yes”: Export

“No”: Not export

- Tap “Rename” button (2), and you can change the file name.
- After inputting the File name, tap OK button on the confirmation screen, and the File name is changed.
- Tap “All” button (3), and you can change Yes/No of the export for all files in the list.
- After setting is completed, tap “Export” button (4), and the selected items are exported to the folder where it will be saved.
- Tap RETURN button (5) to return the screen to the previous screen.

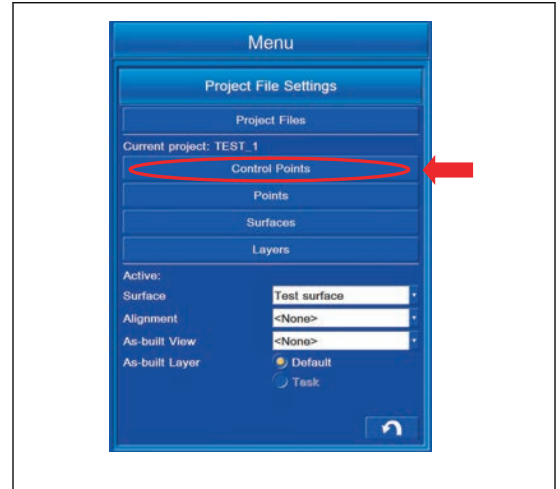


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CONTROL POINT SETTINGS

With “Control Points”, you can set and edit the Control Point.

Tap “Control Points” button, and the screen changes to the setting and editing screen of “Control Points”.



CONTROL POINT SETTING CONTENTS

Function of “Control Points” setting is as follows.

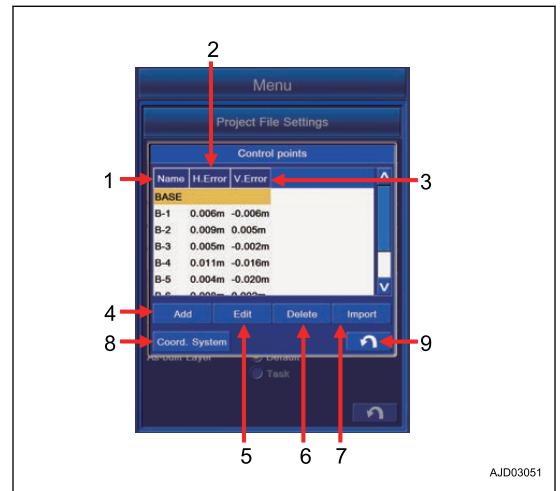
Contents displayed in “Control Points” setting

- (1) “Name”: Name of Control Point
- (2) “H.Error”: Error in horizontal direction
- (3) “V.Error”: Error in vertical direction

Contents controlled by “Control Points” setting

- (4) “Add”: Adds Control Point.
- (5) “Edit”: Edits Control Point.
- (6) “Delete”: Deletes Control Point.
- (7) “Import”: Imports Control files from USB flash drive.
- (8) “Coord. System”: Sets coordinates system at jobsite.
- (9) RETURN button: Returns the screen to the previous screen.

ENTER button: Saves the setting.



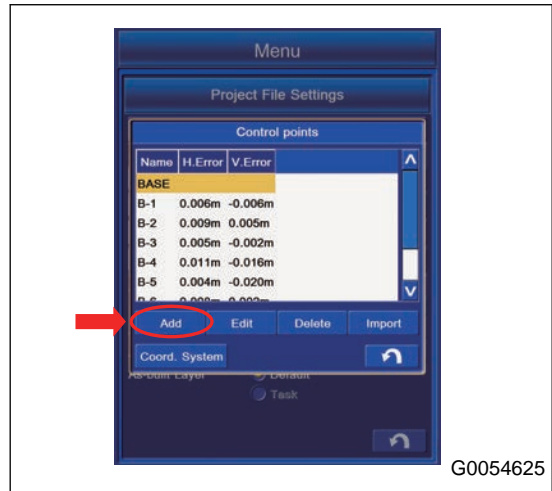
AJD03051

SETTING CONTENTS BY ADDING CONTROL POINTS

You can add the Control Point.

Tap “Add” button on “Control Points” setting screen, and the screen changes to “Control Point” screen.

You can input “Points” by measurement and the coordinate data of existing “Points”.



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Contents which can be set and edited with “Add”

(1) “Name”:

You can input the new Control Point name.

(2) “Site Coords”:

You can input the value of N, E, and Elevation at the World Geodetic System (Japan Geodetic System).

You can change the display of the Coordinates with Display Options.

(3) “WGS84”:

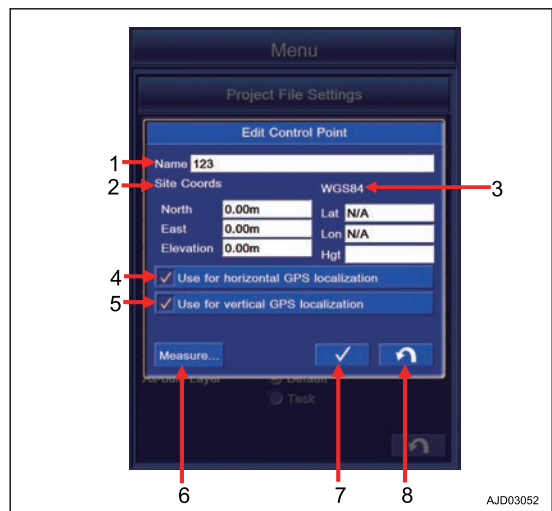
You can input the value of latitude, longitude, and elevation of Ellipsoid at the USA World Geodetic System “WGS84(World Geodetic System 1984)”.

(4) “Use for horizontal GPS localization” is used for the plane correction.

To use it, put a tick in the check box. After you put a tick, this Control Point becomes the horizontal Control Point.

(5) “Use for vertical GPS localization” is used for the elevation correction.

To use it, put a tick in the check box. After you put a tick, this Control Point becomes the vertical Control Point.



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(6) "Measure...":

Extend the cable of GNSS antenna (main side) of machine, and you can get the Control Point Coordinates.

This is used to get the localized GNSS Coordinates.

Tap "Measure..." button, and the screen changes to "Measure Control Point" screen.

Select "Antenna Type" of GNSS antenna in order to get the Control Point Coordinates.

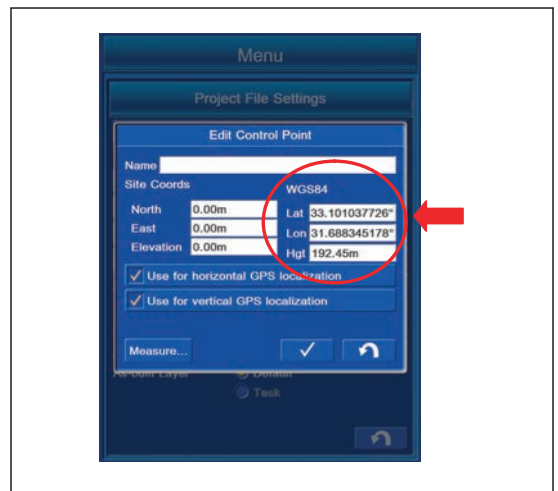
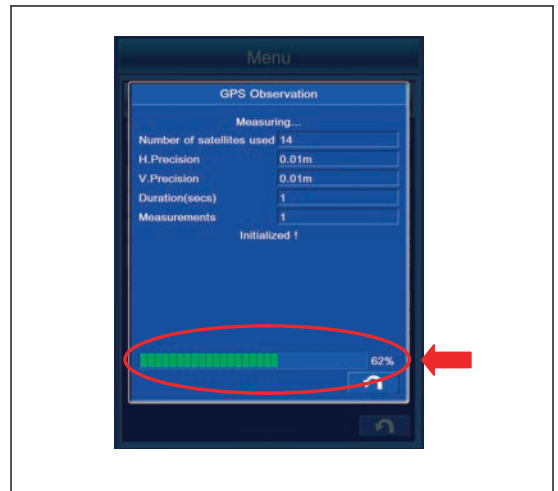
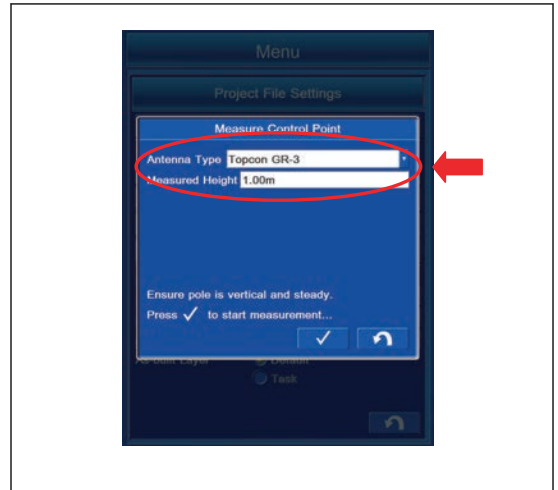
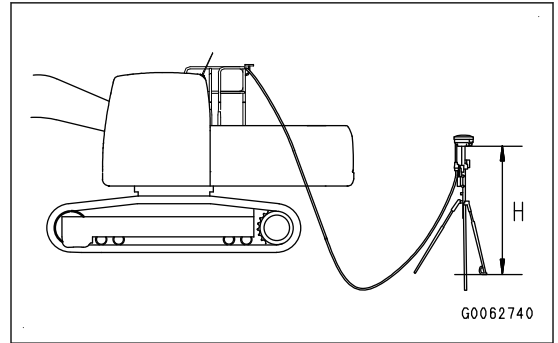
You can input the value (H) of "Measured Height" (the distance between the center of electric potential and ground).

Make sure that the antenna is vertical and stationary, and tap the ENTER button. The measurement of Coordinates (main antenna position) starts.

When the indicator shows 100%, the measurement is completed. After completion of measurement, the coordinates measured with world geodetic system WGS84 is shown in "Control Point" screen.

(7) ENTER button: You can save the setting.

(8) RETURN button: You can move the screen back to the previous screen.



METHOD FOR EDITING CONTROL POINTS

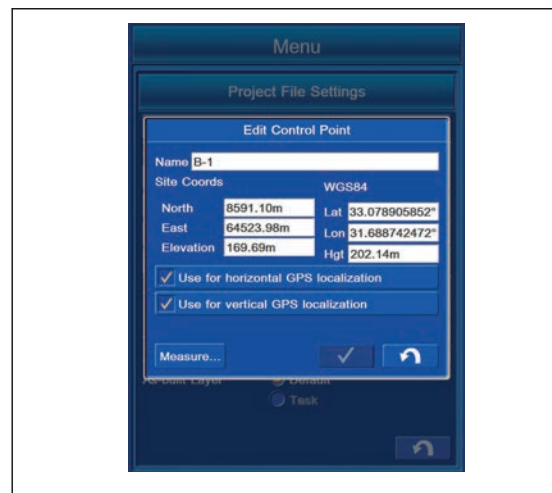
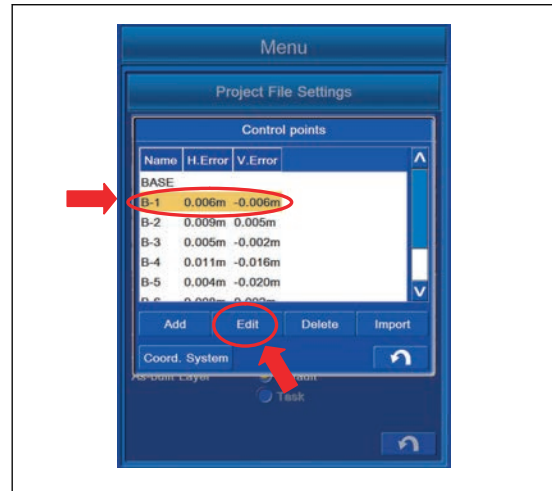
You can edit the Control Point.

Highlight the Control Point to be edited on “Control Points” setting screen, tap “Edit” button, and the screen changes to “Control points” editing screen.

You can input the Point obtained by measurement and Coordinates data of the existing Point.

On “Control points” screen, the data of Point which has been inputted is displayed.

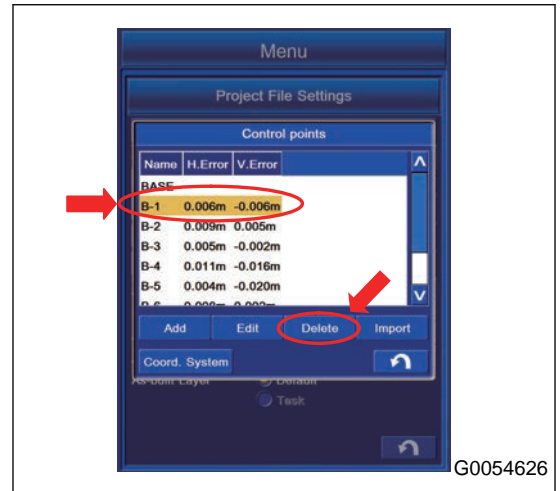
For the editing method of the Control Point, see “SETTING CONTENTS BY ADDING CONTROL POINTS”.



METHOD FOR DELETING CONTROL POINTS

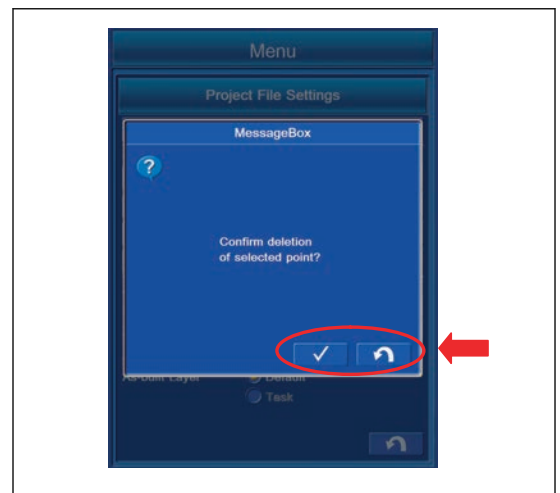
You can delete the Control Points.

1. Highlight the Control Point to be deleted on “Control Points” setting screen, tap “Delete” button, and the screen changes to “MessageBox” screen.



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2. To delete them, tap ENTER button. The Control Point will be deleted.
Not to delete it, tap RETURN button. Control Point is not deleted and the screen returns to the previous screen.



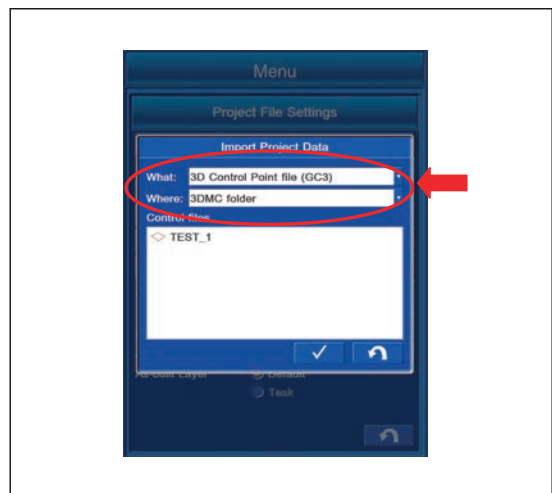
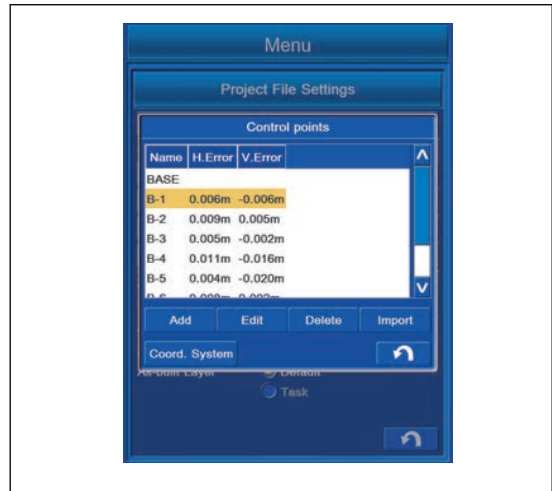
IMPORT CONTROL POINTS

The Control Points saved in the USB flash drive can be imported into the control box.

Tap "Import" button on the setting screen of "Control Points", the screen changes to "Import Project Data" screen.

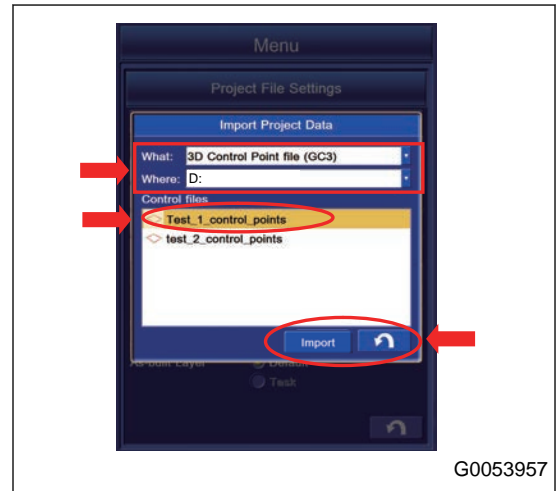
REMARK

- The extension of Control files is ".gc3".
- Display of the drive name depends on the connecting condition of USB flash drive.
- The Control files are saved in "3DMC folder" of the control box.
- The currently set Control files will be overwritten.
- The names of Control files must be written in alphanumeric character.
- Save the Project file directly to the USB flash drive (root directory).
If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize the Project file.
- The USB flash drive with password function cannot be used.

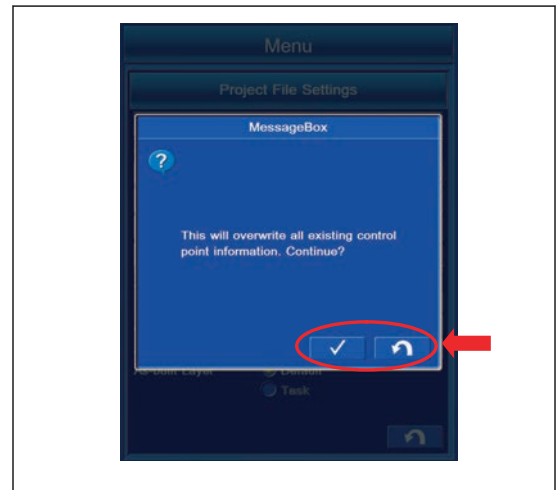


METHOD FOR COPYING CONTROL POINT FILES FROM USB FLASH DRIVE

1. With “What:”, select “3D Control Point file (GC3)”.
2. With “Where:”, select D: (the drive to which USB flash drive is connected).
3. Highlight the Control files to be imported, and tap ENTER button to import.
The screen changes to “MessageBox” screen.

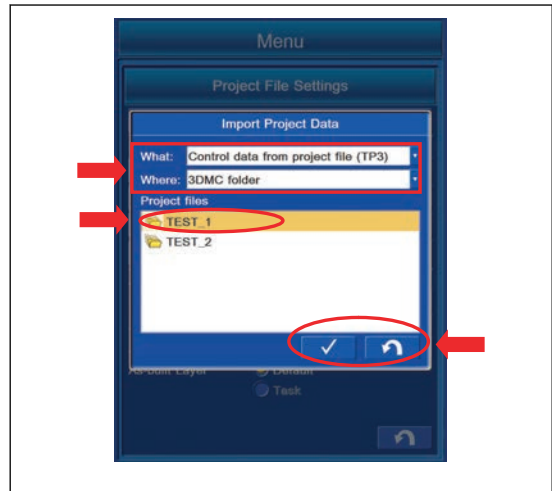


4. If it is OK that the Control files which are set in the currently selected Project files are overwritten, tap ENTER button. The Control files are imported.
5. If you do not want to import, tap RETURN button. Import is canceled, and the screen returns to the previous screen.



METHOD FOR IMPORTING CONTROL POINT FILES FROM PROJECT FILE

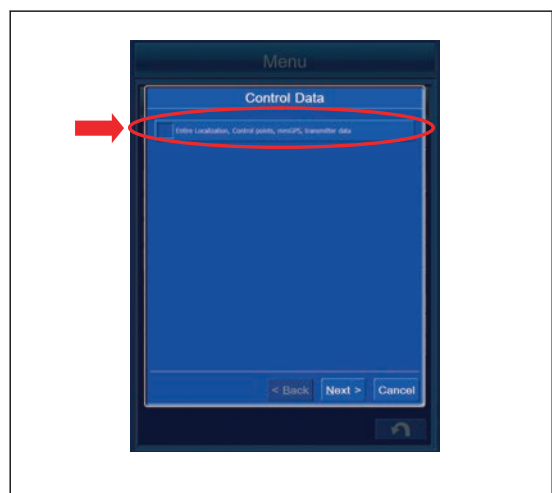
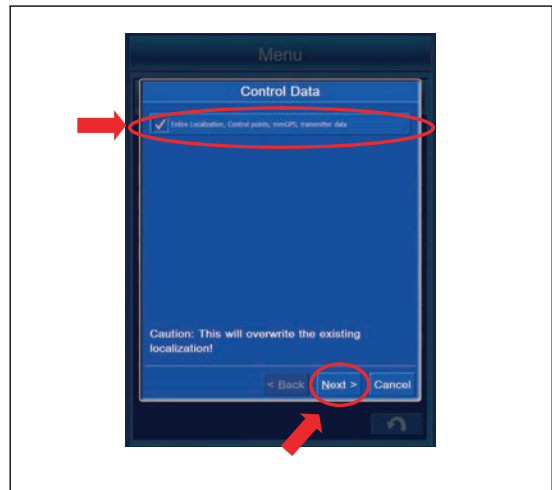
1. With “What:”, select “Control data from project file (TP3)”.
2. With “Where:”, select “3DMC folder”.
3. Highlight the Control file to be imported, and tap ENTER button to import.
The screen changes to “Control Data” screen.
4. If you do not want to import, tap RETURN button. Import is canceled, and the screen returns to the previous screen.



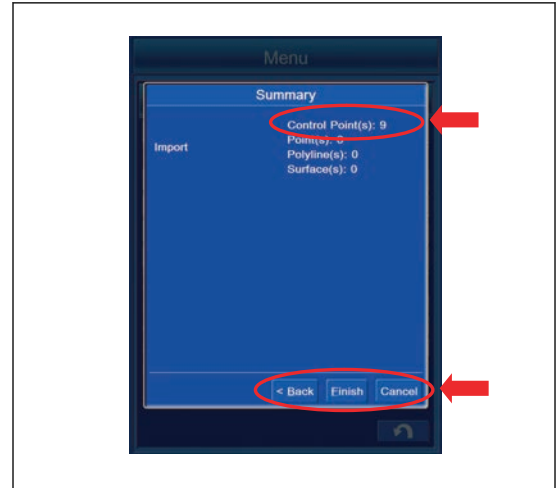
5. To import the Control files, put a tick in the check box.
After putting a tick in it, a message of “Caution:This will overwrite the existing localization!” is displayed.
6. When it is OK to be overwritten, tap “Next>” button.

REMARK

Even if you tap “Next>” button without putting a tick in the check box, Control files are not imported.

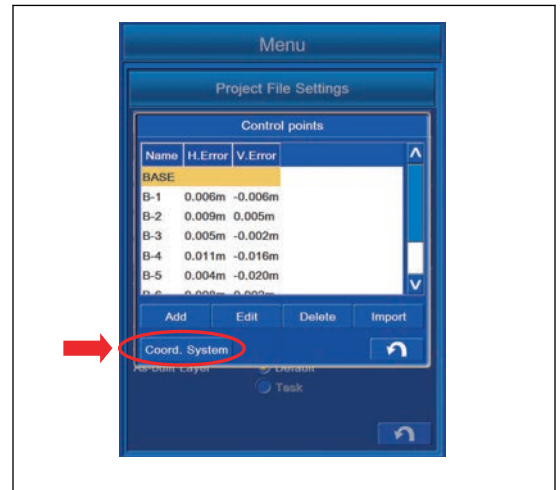


7. The screen of "Summary" is displayed.
8. The number of the Control Point(s) which is imported to "Control Point(s):" is displayed.
9. Tap "Exit" button. The Control Point(s) is imported.
10. To change the setting, tap "<Back" button. Returns the screen to the previous screen.
Tap "Cancel" button and the screen returns to the previous screen.



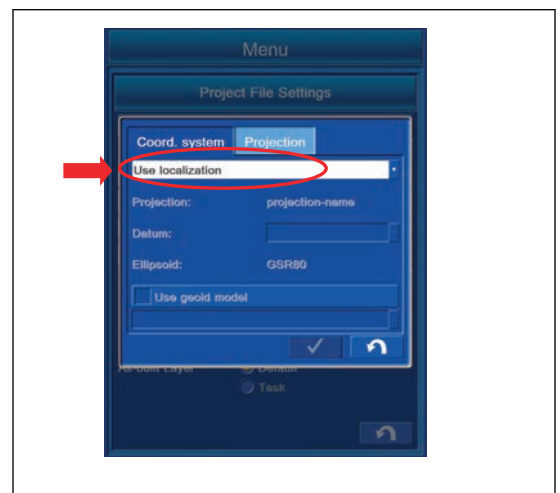
SELECT WORLD GEODETIC SYSTEM (WGS) COORDINATES

You can select "World Geodetic System".
Tap "Coord. System" button on "Control points" setting screen.



METHOD FOR USING LOCALIZATION

You can select "World Geodetic System".
Select "Coord. system" tab, and select "Use localization".
The Control Point which is measured based on USA WGS84 "World Geodetic System 1984" is used.



METHOD FOR USING PREDEFINED PROJECTION

Select "Projection" tab, and highlight "World Geodetic System" to be used.

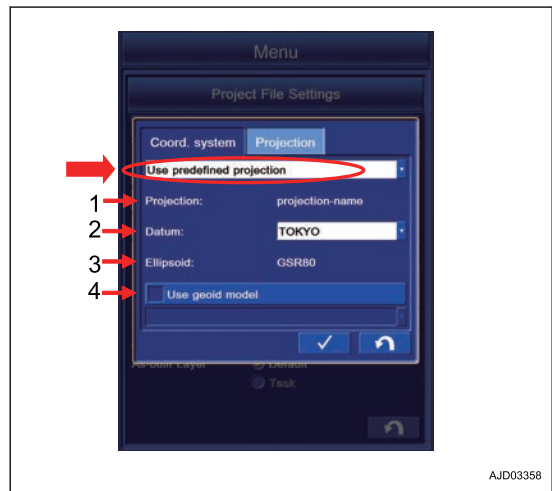
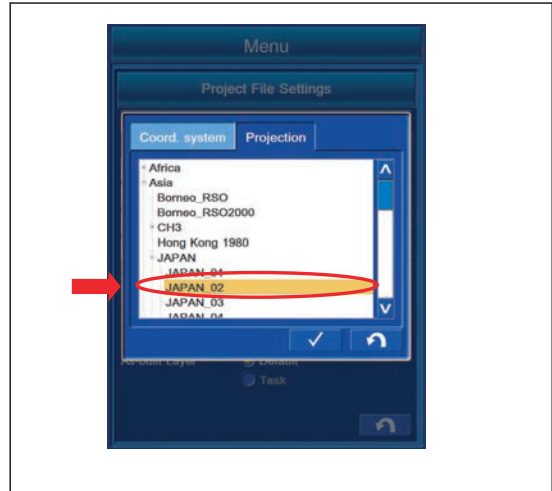
Select "Coord. system" tab, and select "Use predefined projection", and then use the coordinates system of "World Geodetic System".

Display contents of "Projection" tab

- (1) "Projection:": The name of the Projection is displayed.
- (2) "Datum:": The name of the world geodetic system is displayed.
- (3) "Ellipsoid:": The name of the Ellipsoid is displayed.
- (4) "Use geoid model": To use the Geoid model, put a tick in the check box to select the model name.

REMARK

BESS is the name of Ellipsoid.



AJD03358

METHOD FOR COPYING GEOID FILES

You can create the copy of the Geoid File (.gff).

Connect the USB flash drive to the control box.

Copy the Geoid File from USB flash drive to the control box.

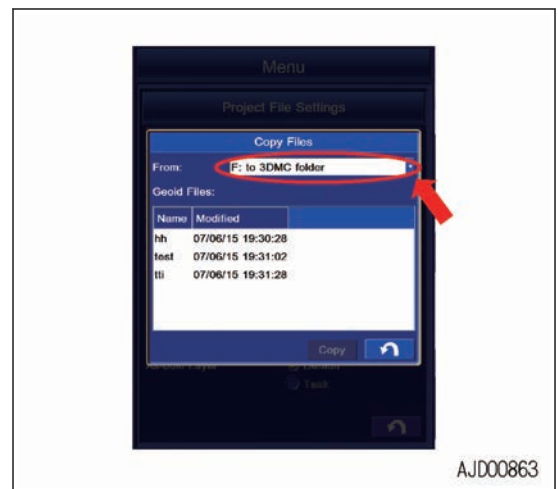
1. Tap “Copy” button.

The screen changes to “Copy Files” screen.

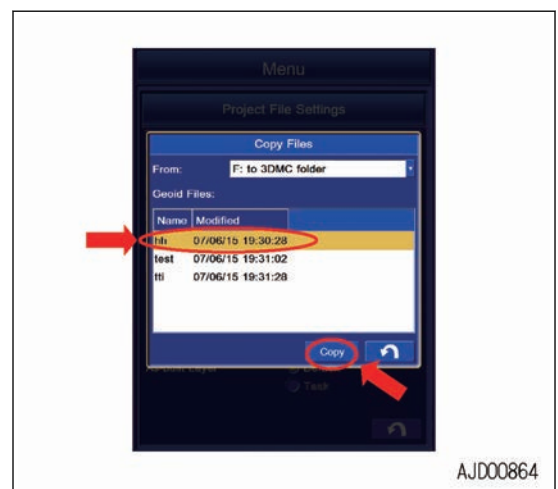


2. With “From:”, select the folder (3DMC folder) in which the file will be saved (in the control box) from the drive having the original file (to which USB flash drive is connected).

Example: “F: to 3DMC folder”



3. Highlight the Geoid File to be copied, and tap “Copy” button.



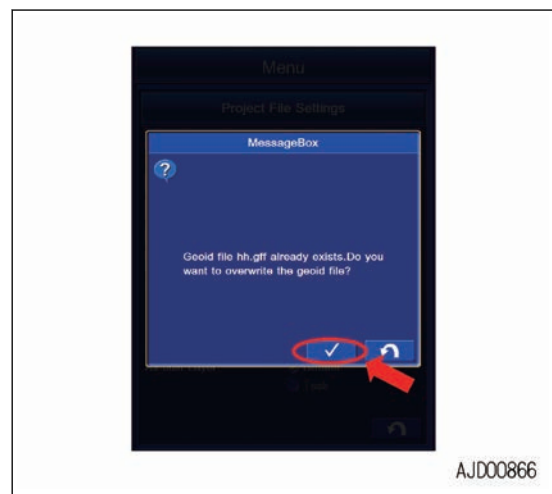
4. Check that the copied file is added to the list of Geoid Files.



5. When the Geoid File name is already in the list and copying the file by overwriting, "MessageBox" is displayed. Tap ENTER button.

REMARK

- Display of the drive name depends on the connecting condition of USB flash drive.
- The Geoid File is saved in "3DMC folder" of the control box.
- Tap RETURN button to return the screen to the previous screen.
- Save the Geoid File directly to the USB flash drive (root directory).
If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize the Geoid File.
- The USB flash drive with password function cannot be used.

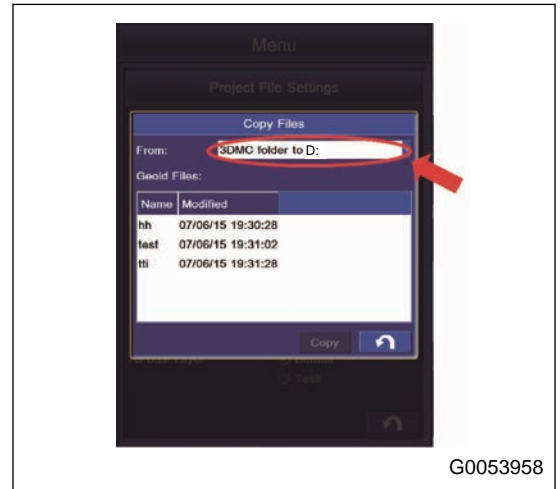


METHOD FOR COPYING GEOID FILES TO USB MEMORY

When copying the Geoid File saved in the control box to USB flash drive, follow the following procedure.

1. Select the drive to which the file will be copied (to which USB flash drive is connected) from the folder (in the control box) in which the Geoid File is saved.

Example: "3DMC folder to D:"

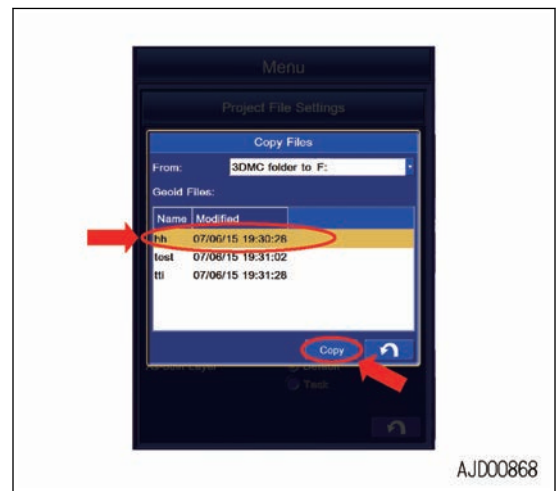


2. Highlight the Geoid File to be copied, and tap the Copy button.

Geoid File is added in the USB flash drive.

REMARK

- Display of the drive name depends on the connecting condition of USB flash drive.
 - The Geoid File is saved in "3DMC folder" of the control box.
 - Tap RETURN button to return the screen to the previous screen.
3. When the Geoid File name is already in the list and copying the file by overwriting, a message box is displayed. Tap ENTER button.

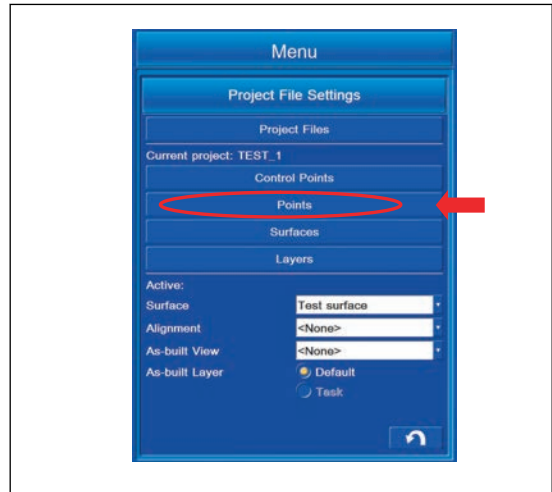


POINT SETTING AND EDITING

Control Point, Topo survey point, Surface point, etc. are prepared as Points, and you can do the setting and editing with "Points" menu. (If the Layer is not created, you cannot set or edit the Points.)

For the creation method of the Layer, see "LAYERS SETTINGS".

Tap "Points" button on "Project File Settings" screen, the screen changes to "Points" setting screen.



POINT SETTING CONTENTS

Setting and editing function of "Control Points" is as follows.

Contents displayed in "Points" setting and editing

(1) The following items are displayed in a list.

- "Name": The name of the Point is displayed.
- "Description": The remarks are displayed.
- "Layer": The name of the Layer in which the Point is saved is displayed.
- "Created": The creation date and time are displayed.
- "North": The value of N is displayed.
- "East": The value of E is displayed.
- "Elev": The value of Elevation is displayed.

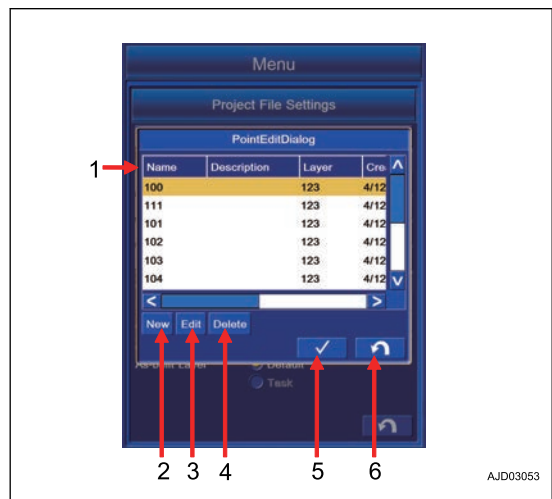
(2) "New" button: You can create the new Point.

(3) "Edit" button: You can edit the Point.

(4) "Delete" button: You can delete the Point.

(5) ENTER button: You can save the setting.

(6) RETURN button: You can return the screen to the previous screen.

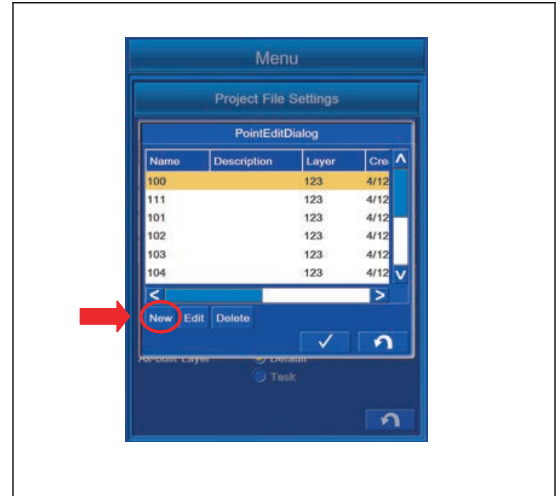


AJD03053

METHOD FOR CREATING NEW POINT

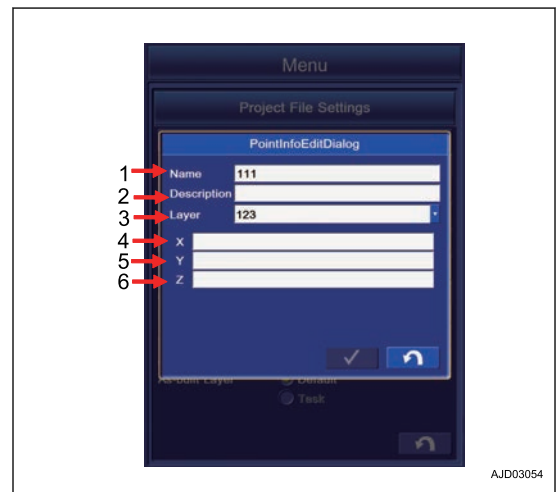
You can create the new Point.

Tap “New” button on the setting and editing screen of “Points”.
The screen changes to “PointEditDialog” screen.



The displayed contents of “PointEditDialog” screen

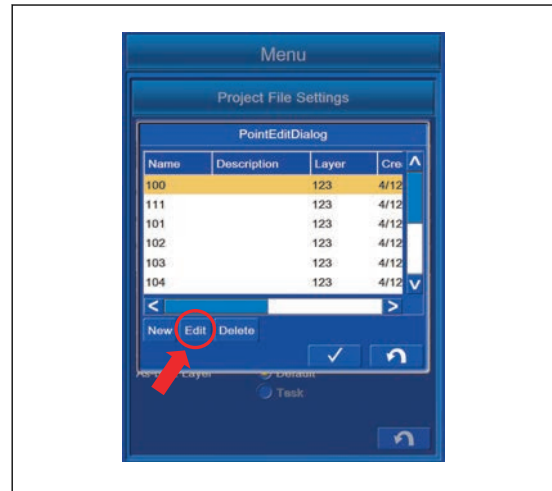
- (1) “Name”: The name of Point is displayed.
- (2) “Description”: The Remarks are displayed.
- (3) “Layer”: The name of Layer in which Point is saved is displayed.
- (4) “North”: The value of N is displayed.
- (5) “East”: The value of E is displayed.
- (6) “Elevation”: The value of Elevation is displayed.



AJD03054

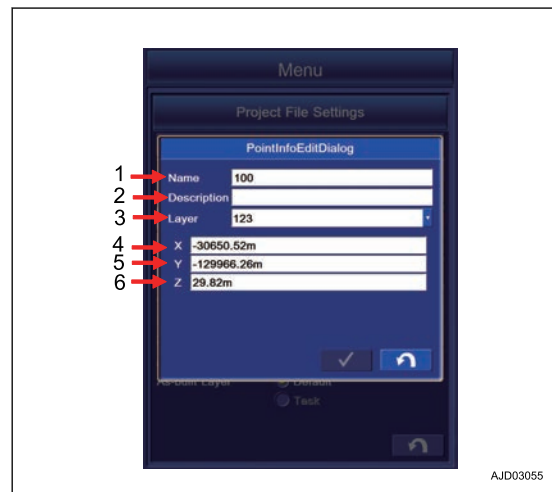
METHOD FOR EDITING EXISTING POINT

Tap “Edit” button on the setting and editing screen of “Points”.
The screen changes to “Points” screen.



The displayed contents of “Points” screen

- (1) “Name”: The name of Point is displayed.
- (2) “Description”: The Remarks are displayed.
- (3) “Layer”: The name of Layer in which Point is saved is displayed.
- (4) “North”: The value of N is displayed.
- (5) “East”: The value of E is displayed.
- (6) “Elevation”: The value of Elevation is displayed.

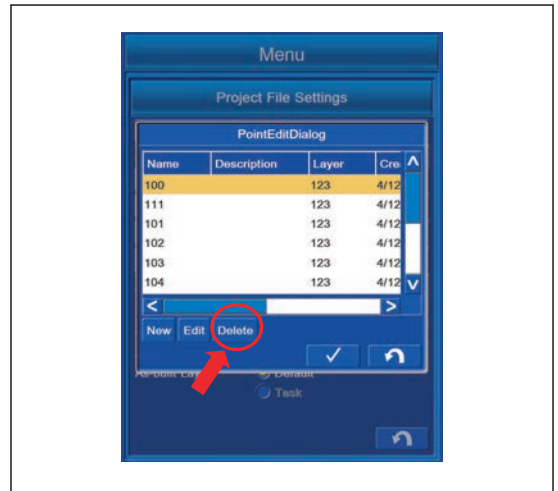


AJD03055

METHOD FOR DELETING EXISTING POINT

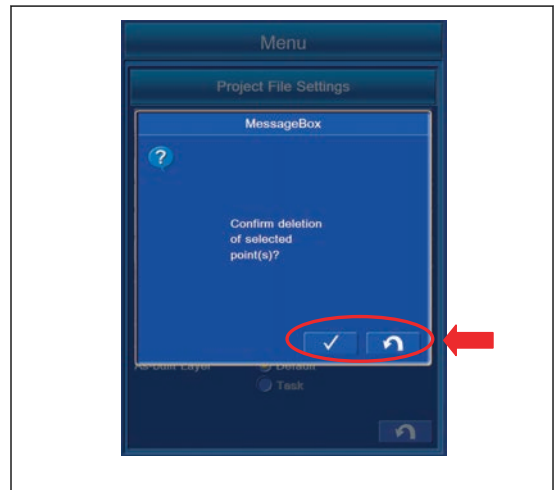
1. Tap “Delete” button on the setting and editing screen of “Points”.

The screen changes to “MessageBox” screen.



2. To delete the Point, tap ENTER button. The Point is deleted.

Tap RETURN button to return the screen to the previous screen.



SURFACES SETTINGS

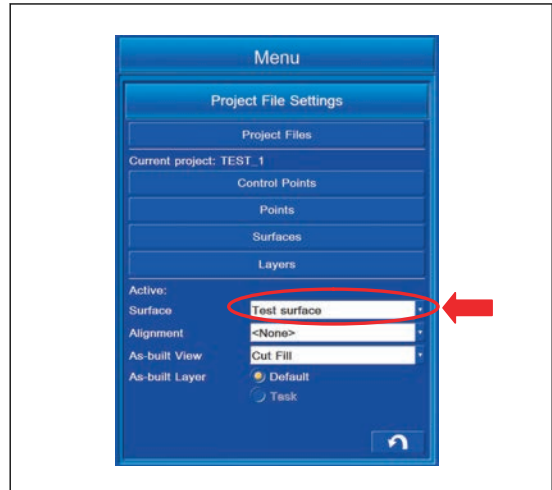
The Surface denotes the target construction surface in the intelligent Machine Control. The Surface includes the Triangle mesh (TIN) and Alignment, etc.

METHOD FOR IMPORTING SURFACES FROM PROJECT FILE

You can perform the setting of the Surface.

When the Surfaces are already saved in the Project File, the list of the Surface names is displayed in "Surface" column.

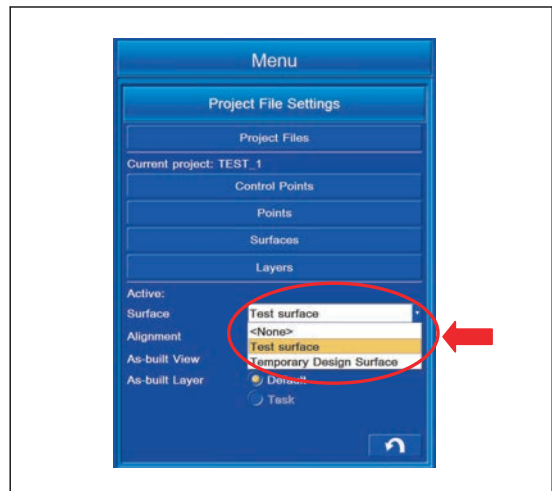
When the Surface is not saved in the Project File, no name is displayed in the column. Create the Surface newly or import the Surface.



Highlight and tap the Surface to be configured in "Surface" column.

Return to the working screen, and the Surface is displayed.

Not to display the Surface, highlight and tap "<None>". Even if you return to the working screen, the Surface is not displayed.



G0053959

METHOD FOR SETTING ALIGNMENT

You can perform the setting of the Alignment.

When the Surfaces are already saved in the Project File, the Surface is displayed in the list of “Alignment”.

If the Surface is not saved in the Project File, the Surface is not displayed in the list. In this case, import the Alignment.

Highlight and tap the Alignment to be set in the items of “Alignment”.
Return to the working screen, and Alignment is displayed.

Not to display the Alignment, highlight and tap “<none>”.

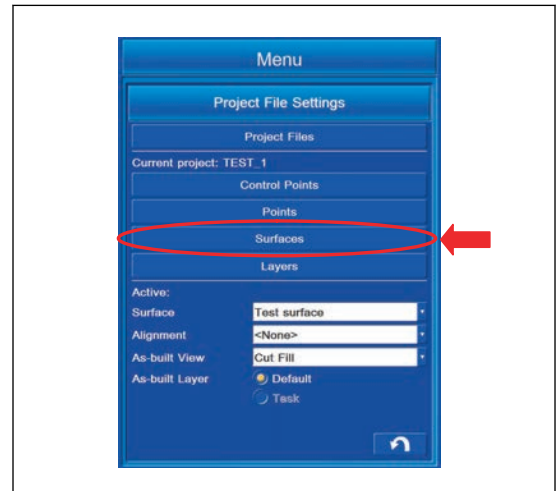
Even if you return to the working screen, Alignment is not displayed.

METHOD FOR EDITING SURFACES

You can edit the Surface.

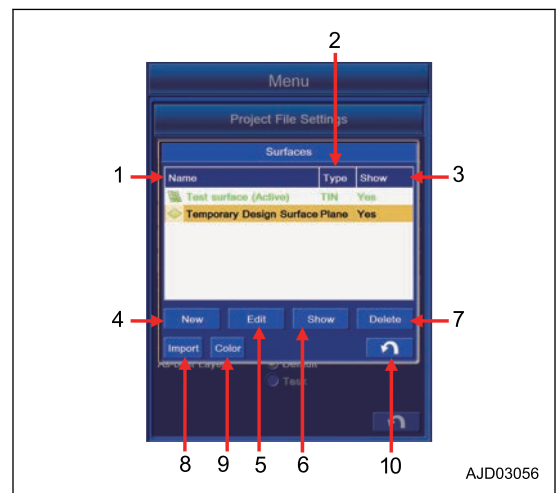
Tap “Surfaces” button on the Project File setting screen.

The screen changes to “Surfaces” editing screen.



The contents displayed on “Surfaces” editing screen

- (1) “Name”: The name of the Surface is displayed.
- (2) “Type”: The type of the Surface is displayed.
- (3) “Show”: The setting of Display/Non-display is indicated by “Yes/No”.
- (4) “New” button: You can create the new Surface.
- (5) “Edit” button: You can edit the Surface.
- (6) “Show” button: You can set Display/Non-display by “Yes/No”.
- (7) “Delete” button: You can delete the Surface.
- (8) “Import” button: You can import the Surface.
- (9) “Color” button: You can set the display color of the Surface.
- (10) RETURN button: You can return the screen to the previous screen.



AJD03056

METHOD FOR CREATING NEW SURFACES

You can create new Surface.

Tap “New” button on the editing screen of Surface.
The screen changes to “Surface Name and Type” screen.

Input the name of the Surface created newly, select the Surface type, and tap “Next>” button.

REMARK

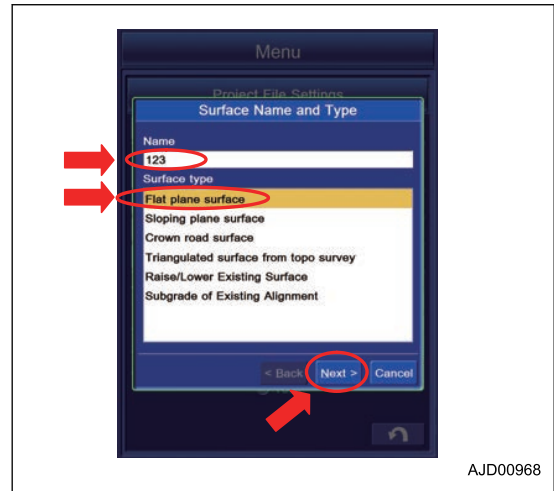
- If the Surface name is not inputted, “Next>” button cannot be selected.
- Check that there is no Surface File with the same name, and tap “Next>” button. If you create it with the same name, it is overwritten on the data created this time.

You can select the Surface type from the following 6 kinds.

- “Flat plane surface”
You can create the Surface of infinite plane.
- “Sloping plane surface”
You can create the Surface of inclined plane.
- “Crown road surface”
You can create the Surface for Alignment.
- “Triangulated surface from topo survey”
You can create the Surface based on the Topo survey point.
- “Raise/Lower Existing Surface”
You can create the Surface by offsetting the existing Surface vertically.
- “Subgrade of Existing Alignment”
You can create the Surface based on the existing Alignment.

REMARK

If there is no Surface including the Alignment on the control box, “Subgrade of Existing Alignment” is not displayed.

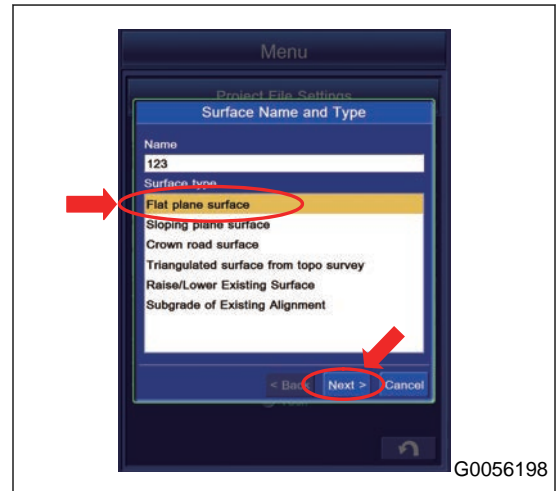


FLAT PLANE SURFACE

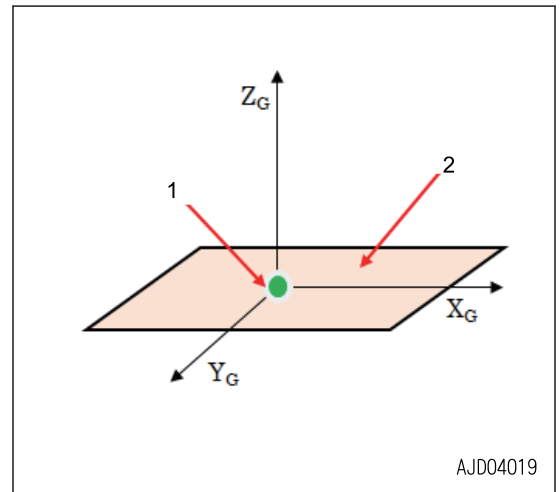
Highlight “Flat Plane Surface” in the Surface type, and tap “Next>” button.

You can create the Flat Plane Surface from the Grid interval and Coordinates of the specified Point.

- (1) Coordinates of the specified Point
- (2) Design surface of Flat surface



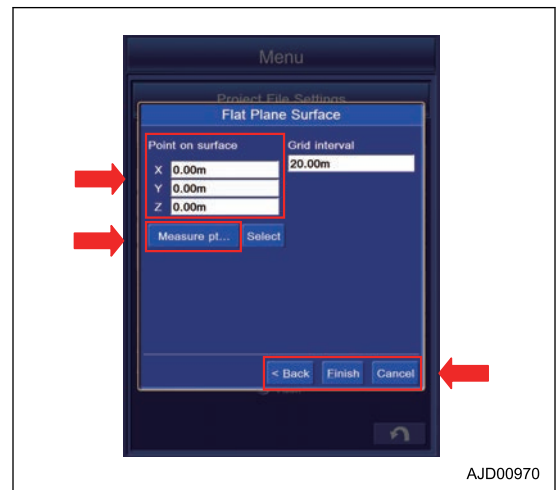
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AJD04019

Coordinates of the specified Point

- To input the Point Coordinates
 - Tap the item of “Point on surface”, and input the arbitrary Point Coordinates of Surface which you want to create.
 - Tap “<Back” button to move the screen back to the previous screen.
 - To save the setting, tap “Exit” button.
 - Tap “Cancel” button, and the screen goes back to the editing screen of Surface.



AJD00970

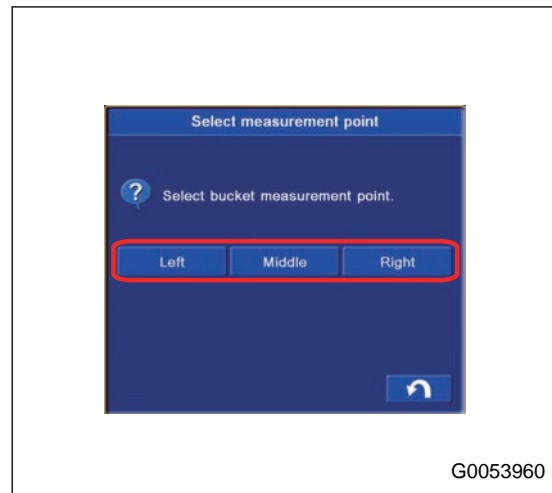
- When you use the bucket edge coordinates

Set the bucket edge to arbitrary position, and tap “Measure Point” button. Measurement of the bucket edge coordinates starts. When the measurement is finished, the value is shown in “Point on surface”.



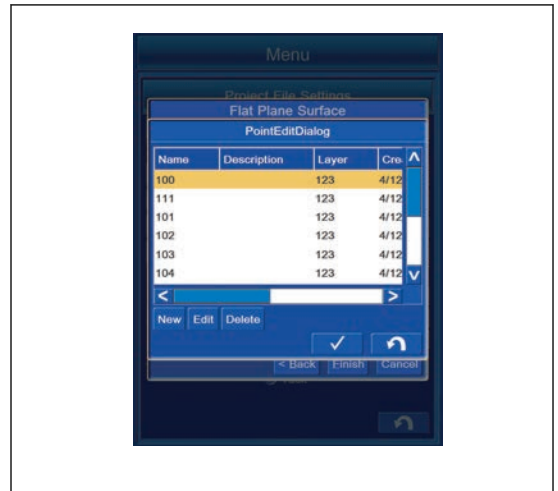
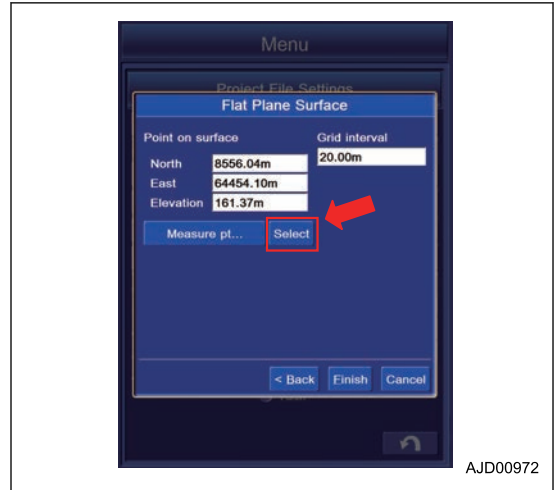
REMARK

Tap “Measure Point” button, and you can select the bucket edge reference point from “Left”, “Center”, and “Right”.



G0053960

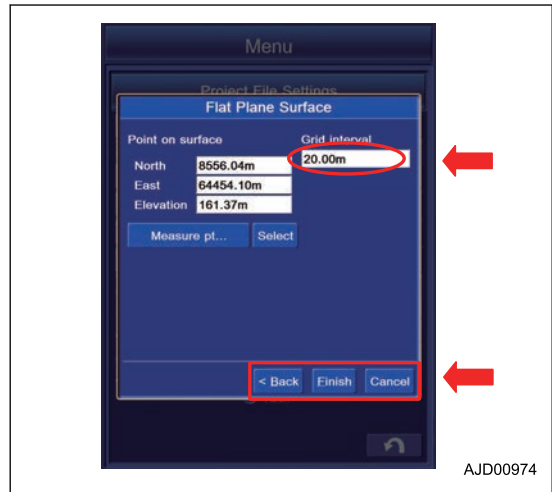
- When you use the existing point coordinates
Tap “Select” button, and select a point by which Surface is made from the list.



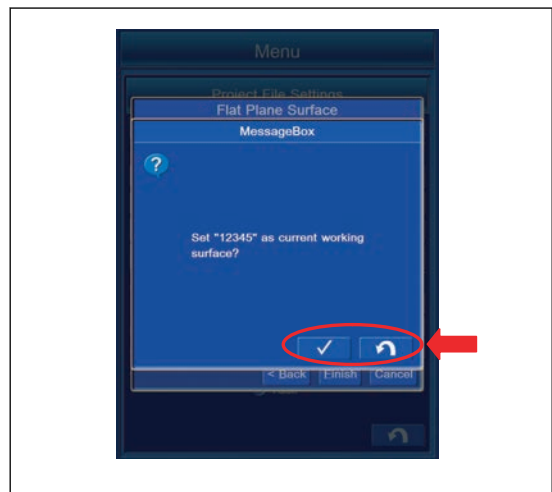
Grid interval

You can set the Grid interval.

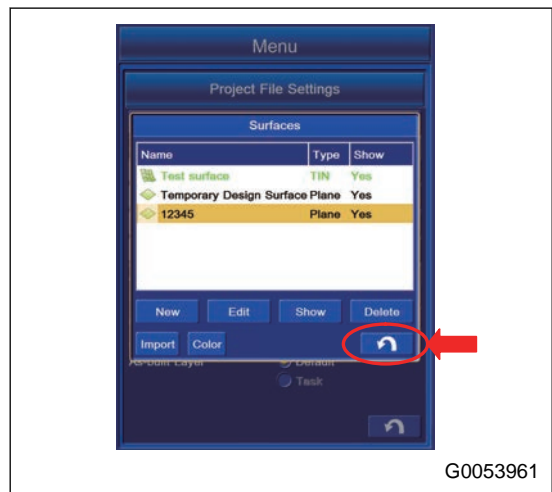
1. Tap the item of "Grid interval" to input the Grid interval.
2. Tap "<Back" button to move the screen back to the previous screen.
Tap "Cancel" button, and the screen goes back to the editing screen of Surface.



3. Tap "Exit" button, and the screen changes to the message box screen. To reflect the created Surface to the currently setting Surface, tap the ENTER button. Not to reflect it to the currently setting Surface, tap the RETURN button.



4. The screen changes to the editing screen of Surface, and the creation of Surface is completed.
5. Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.

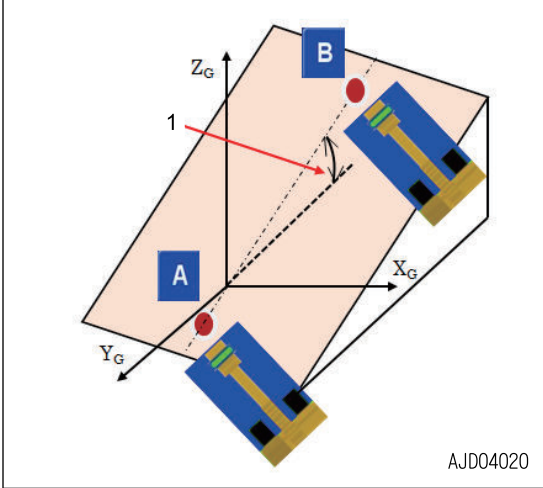
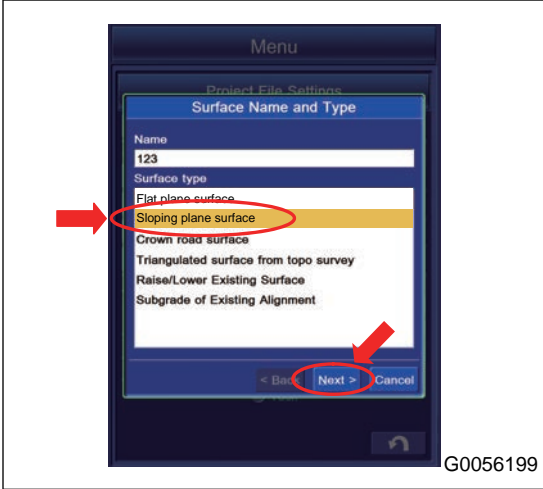


SLOPING PLANE SURFACE

Highlight the Sloping Plane Surface in the Surface type, and tap “Next>” button.

You can create the Sloping Plane Surface.

- (1) Main-fall
- (A) Start Point
- (B) End Point



FUNCTION OF SLOPING PLANE SURFACE

(1) Selection of creation method of sloping plane surface

“Set Start Point and End Point”:

With this method, the Main-fall is set by the start point and end point.

“Set Start Point and Main-fall”:

With this method, the Main-fall is set manually.

In case of “Set Start Point and Main-fall”

(2) Coordinates of the Point of surface

For the input procedure of “Start Point”, see “FLAT PLANE SURFACE”.

You cannot input the end point.

(3) Input of machine grade in longitudinal direction

“Direction”:

Set the direction to which Surface is shown. Tap the item and you can input the numeric value.

REMARK

North is 0 ° and the angle increases in a counterclockwise direction.

“Grade”:

Tap the item and input the numeric value.

(4) Input of machine grade in the Cross Section direction

“Grade”:

Tap the item and input the numeric value.

(5) Input of the Grid interval

You can set the Grid interval.

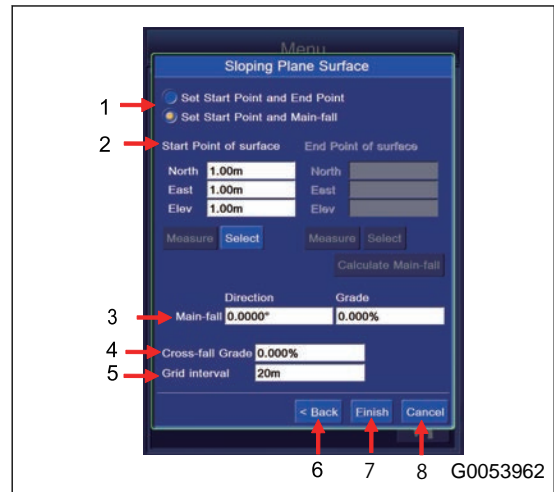
Tap the item of the Grid interval and you can input the numeric value.

For the input procedure of the Grid interval, see “FLAT PLANE SURFACE”.

(6) To move the screen back to the previous screen, tap “<Back” button.

(7) To save the setting, tap “Exit” button.

(8) Tap “Cancel” button, and the screen goes back to “Design Data” screen.



In case of “Set Start Point and End Point”

(2) Coordinates of the Point of surface

For the procedure to input “Start Point” and “End Point”, see “FLAT PLANE SURFACE”.

(3) “Calculate Main-fall” button

When it is tapped, the grade in longitudinal direction (direction and grade) is calculated automatically from the coordinate of Start Point and the coordinate of End Point.

(4) Input of machine grade in longitudinal direction

“Grade”:

Tap the item and input the numeric value.

(5) Input of the Grid interval

You can set the Grid interval.

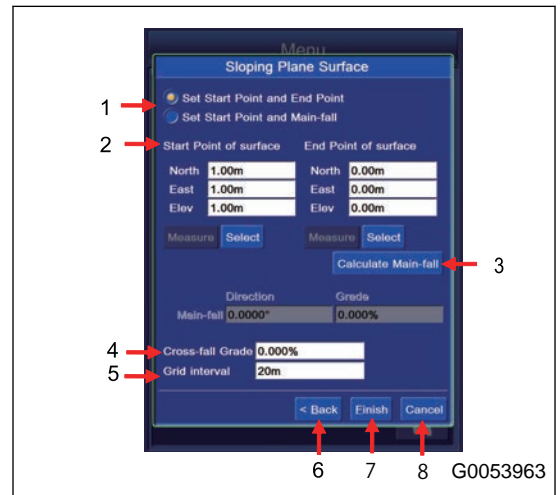
Tap the item of the Grid interval and you can input the numeric value.

For the input procedure of the Grid interval, see “FLAT PLANE SURFACE”.

(6) To move the screen back to the previous screen, tap “<Back” button.

(7) To save the setting, tap “Exit” button.

(8) Tap “Cancel” button, and the screen goes back to “Design Data” screen.



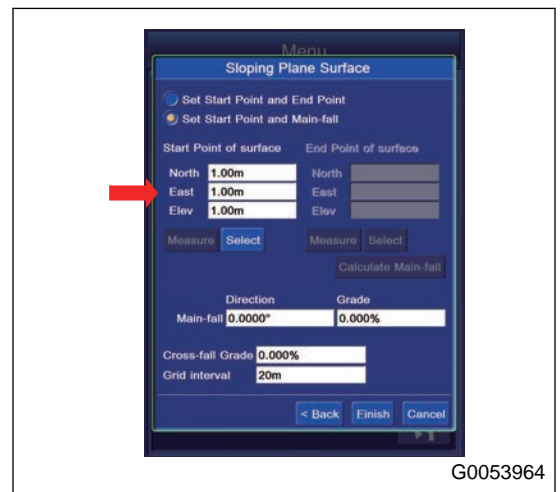
METHOD FOR CREATING SLOPING PLANE SURFACE

You can create the Sloping Plane Surface.

If you select “Set Start Point and Main-fall”

You can create the Sloping Plane Surface by setting the Plane Surfaces and Grade.

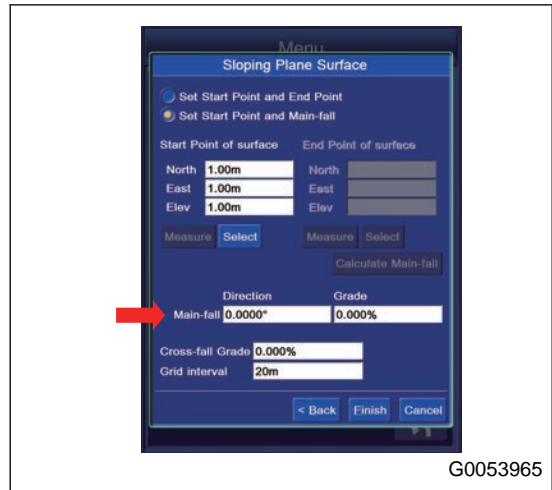
1. Lower the bucket edge to the ground at an arbitrary place, tap “Measure Point” button or tap “Select” button to select a point, and show the Point Coordinates.



- Tap the item of “Grade” of “Main-fall”, and input the numeric value.

REMARK

- Set “Direction”, “Cross-fall Grade”, and “Grid interval” as needed.
- You do not use “Calculate Main-fall” button.

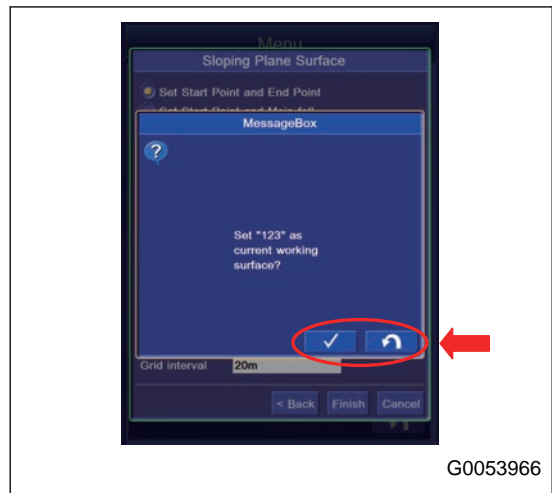


G0053965

- Tap “Exit” button, and the screen changes to “Message-Box” screen.
- To reflect the created Surface to the currently setting Surface, tap the ENTER button.

REMARK

On this screen, even if you tap the ENTER button, the setting will not be completed.

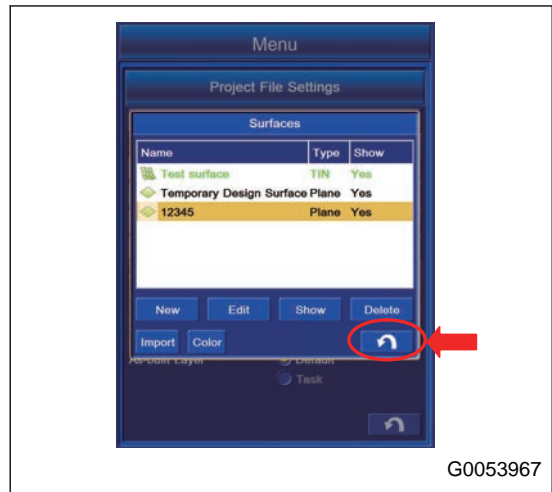


G0053966

- The screen changes to the editing screen of Surface. Tap the ENTER button. The creation of the Surface is completed.
- Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.

REMARK

For the operation procedure of the Surface editing screen, see “METHOD FOR EDITING SURFACES”.

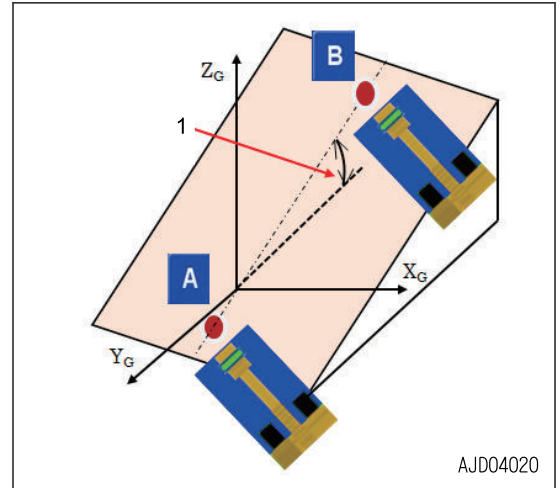


G0053967

If you select “Set Start Point and End Point”

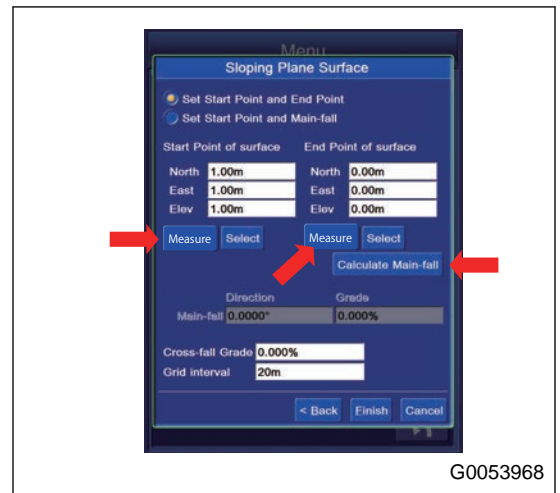
Measure 2 arbitrary points on the existing Surface, and create the Sloping Plane Surface.

1. Measure the Coordinates of 2 points on the existing Surface. Lower the bucket edge on "Start Point of surface" (A) position, and tap "Measure Point" button.
(1) Grade
2. Coordinates of "Start Point of surface" (A) are shown.
3. Move the bucket edge to "End Point of surface" (B) position.



AJD04020

4. Set the bucket edge at "End Point of surface" (B) position, and tap "Measure" button.
5. When the coordinates of "End Point of surface" (B) are shown, tap "Calculate Main-fall" button.

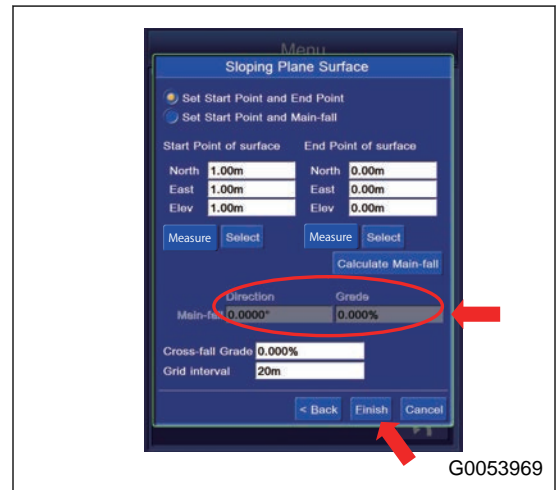


G0053968

6. When "Direction", and "Cross-fall Grade" are shown, tap "Exit" button.

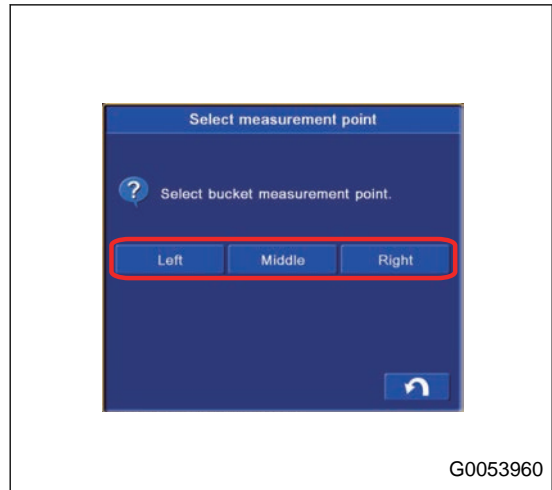
REMARK

Set "Grid interval" as needed.



G0053969

When you tap “Measure” button, you can select the bucket edge reference point from “Left”, “Middle”, and “Right”.

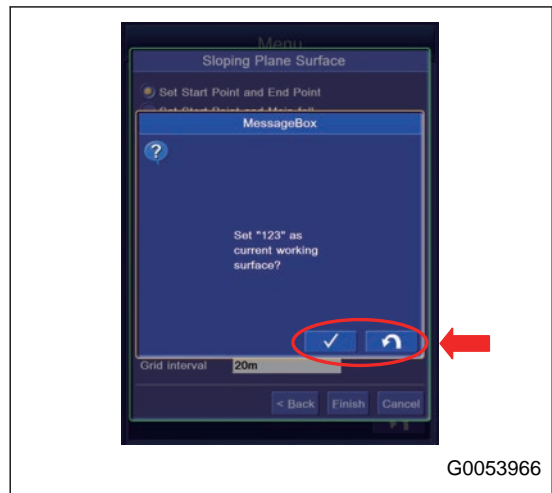


G0053960

- 7. Tap “Exit” button, and the screen changes to “Message-Box” screen.
- 8. To reflect the created Surface to the currently setting Surface, tap the ENTER button.

REMARK

On this screen, even if you tap the ENTER button, the setting will not be completed.

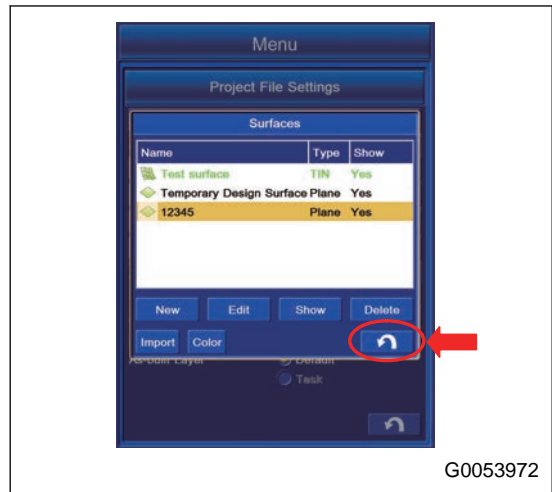


G0053966

- 9. The screen changes to the editing screen of Surface. Tap the ENTER button.
The creation of the Surface is completed.
- 10. Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.

REMARK

For the operation procedure of the Surface editing screen, see “METHOD FOR EDITING SURFACES”.



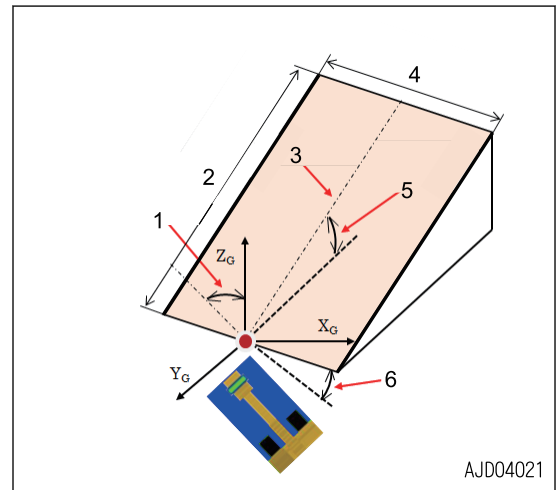
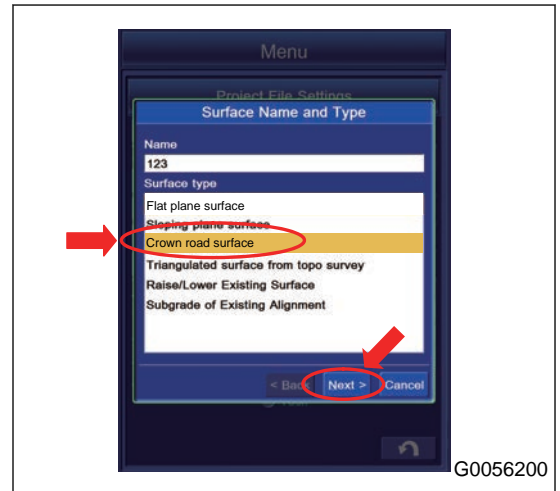
G0053972

CROWN ROAD SURFACE

Highlight "Crown road surface" in the Surface type, and tap "Next>" button.

You can create the Crown road surface.

- (1) Direction
- (2) Length
- (3) Center line
- (4) Width of road
- (5) Main-fall
- (6) Cross-fall



FUNCTION OF CROWN ROAD SURFACE

(1) Selection of creation method of Crown road surface

“Set Start Point and End Point”:

With this method, the Main-fall is set by the start point and end point.

“Set Start Point and Main-fall”:

With this method, the Main-fall is set manually.

In case of “Set Start Point and Main-fall”

(2) Setting of “Start Point”

For the input procedure of “Start Point”, see “FLAT PLANE SURFACE”.

You cannot input the end point.

(3) Input of machine grade in longitudinal direction

“Direction”:

Set the direction to which Surface is shown. Tap the item and you can input the numeric value.

REMARK

North is 0 ° and the angle increases in a counterclockwise direction.

“Grade”, “Length”:

Tap the item and input the numeric value.

(4) Input of machine grade in cross-fall direction on crown road

“Cross-fall Grade”:

Tap the item and input the numeric value.

(5) Input of “Width of road”

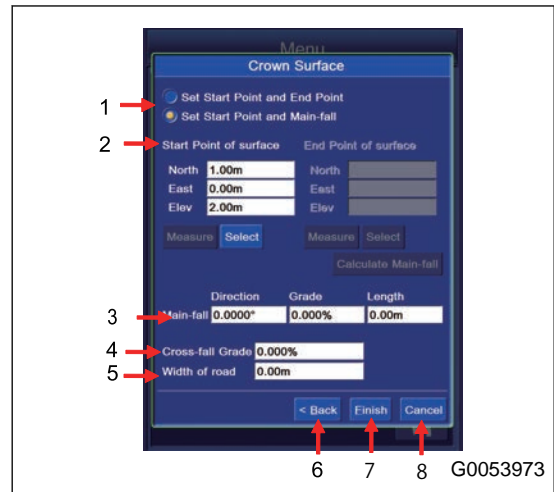
You can set the width of the road.

Tap the item of “Width of road”, and input the value.

(6) To move the screen back to the previous screen, tap “<Back” button.

(7) To save the setting, tap “Exit” button.

(8) Tap “Cancel” button, and the screen goes back to the editing screen of “Design Data”.



In case of “Set Start Point and End Point”

(2) Coordinates of the Point of surface

For the procedure to input “Start Point” and “End Point”, see “FLAT PLANE SURFACE”.

(3) “Calculate Main-fall” button

When it is tapped, the grade in longitudinal direction (direction and grade) is calculated automatically from the coordinate of Start Point and the coordinate of End Point.

(4) Input of machine grade in cross-fall direction on crown road “Cross-fall Grade”:

Tap the item and input the numeric value.

(5) Input of “Width of road”

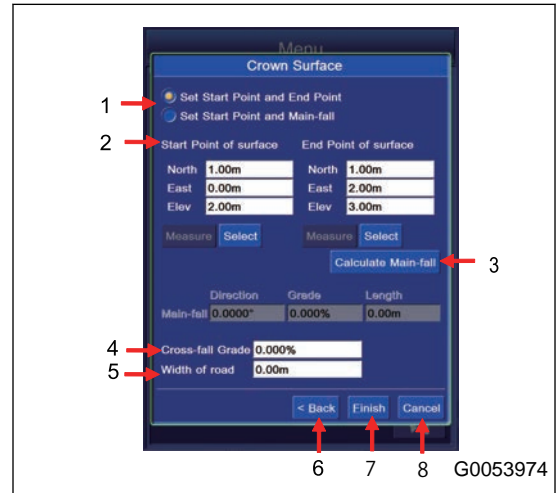
You can set the width of the road.

Tap the item of “Width of road”, and input the value.

(6) To move the screen back to the previous screen, tap “<Back” button.

(7) To save the setting, tap “Exit” button.

(8) Tap “Cancel” button, and the screen goes back to the editing screen of “Design Data”.



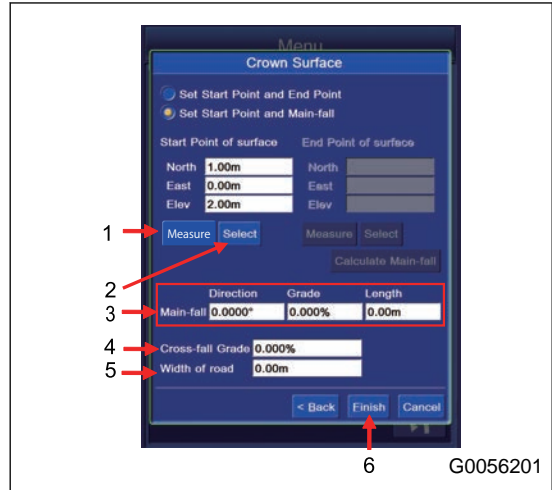
METHOD FOR CREATING CROWN ROAD SURFACE

You can create the Crown road surface.

When you select “Set Start Point and Main-fall”

Set the starting point.

1. Lower the bucket edge to the ground at an arbitrary place, tap “Measure Point” button (1) or tap “Select” button (2) to select a point, and show the Point Coordinates.
(1) Grade
2. Tap the items (3) of “Direction”, “Grade”, and “Length” on “Main-fall”, and input the values.
3. Tap the item (4) of “Cross-fall Grade” and input the value of “Cross-fall Grade”.
4. Tap the item (5) of “Width of road”, and input the width of road.
5. Tap “Exit” button (6), and the screen changes to “Message Box” screen.



To reflect the created Surface to the currently setting Surface, tap the ENTER button. Not to reflect it to the currently setting Surface, tap the RETURN button.

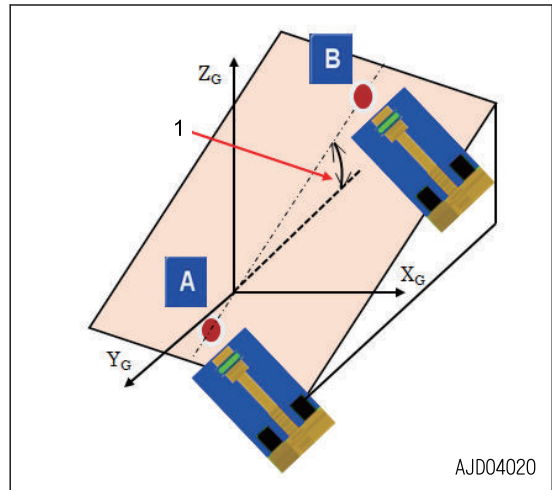
REMARK

On this screen, even if you tap the ENTER button, the setting will not be completed.

6. The screen changes to the editing screen of Surface. Tap the ENTER button. The creation of Surface is completed.
7. Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.

REMARK

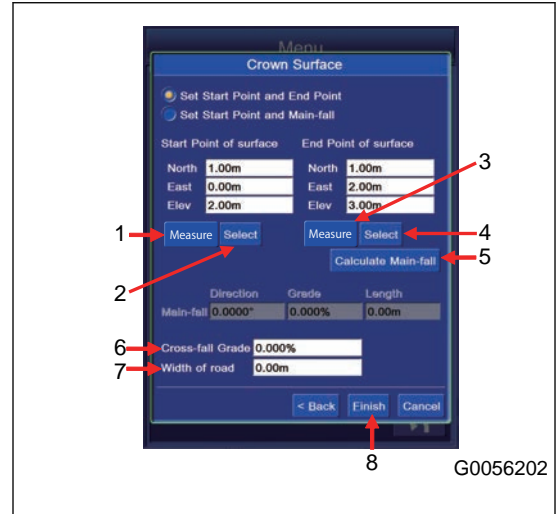
For the operation procedure of the Surface editing screen, see “METHOD FOR EDITING SURFACES”.



When you select “Set Start Point and End Point”

Set the starting point.

1. Lower the bucket edge to the ground at an arbitrary place, tap “Measure Point” button (1) or tap “Select” button (2) to select a point, and show the Point Coordinates.
(1) Grade
2. Lower the bucket edge to the ground at an arbitrary place, tap “Measure Point” button (3) or tap “Select” button (4) to select a point, and show the Point Coordinates.
3. Tap “Calculate Main-fall” button (5).
4. The values of “Direction”, “Grade”, and “Length” of “Main-fall” are shown after they are automatically calculated from the coordinates of “Start Point of surface” and “End Point of surface”.
5. Tap the item (6) of “Cross-fall Grade” and input the value of “Cross-fall Grade”.
6. Tap the item (7) of “Width of road”, and input the width of road.
7. Tap “Exit” button (8), and the screen changes to “Message Box” screen.

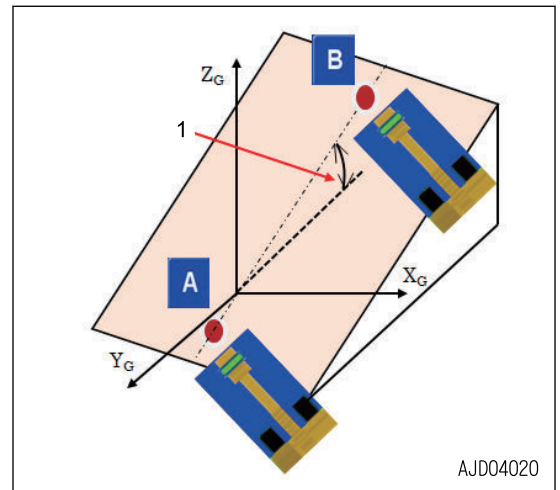


To reflect the created Surface to the currently setting Surface, tap the ENTER button. Not to reflect it to the currently setting Surface, tap the RETURN button.

REMARK

On this screen, even if you tap the ENTER button, the setting will not be completed.

8. The screen changes to the editing screen of Surface. Tap the ENTER button. The creation of Surface is completed.
9. Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.



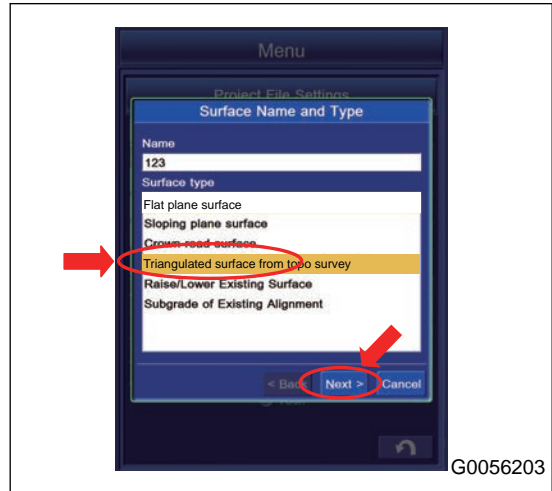
REMARK

For the operation procedure of the Surface editing screen, see “METHOD FOR EDITING SURFACES”.

METHOD FOR CREATING SURFACE BY TRIANGULATED SURFACE FROM TOPO SURVEY

Highlight “Triangulated surface from topo survey” with “Surface type”, and tap “Next>” button.

You can create “Surfaces” based on the Triangulated surface from topographical survey.

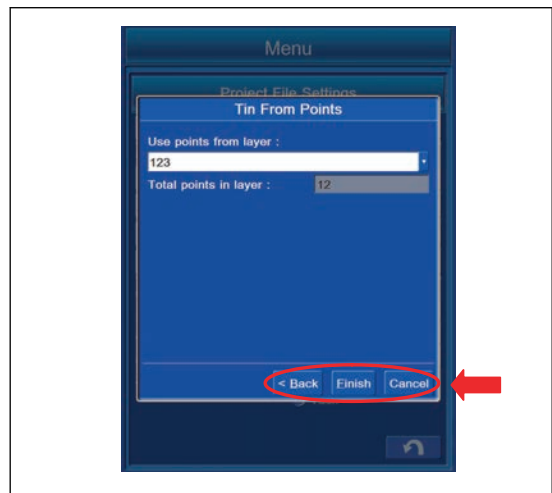


G0056203

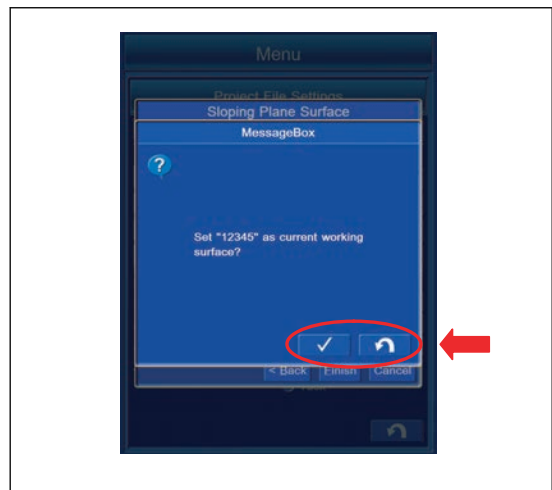
1. Select the layer for the item of “Use points from layer:”.
2. Select the layer in which the topographical survey point is saved, and tap “Exit” button.

REMARK

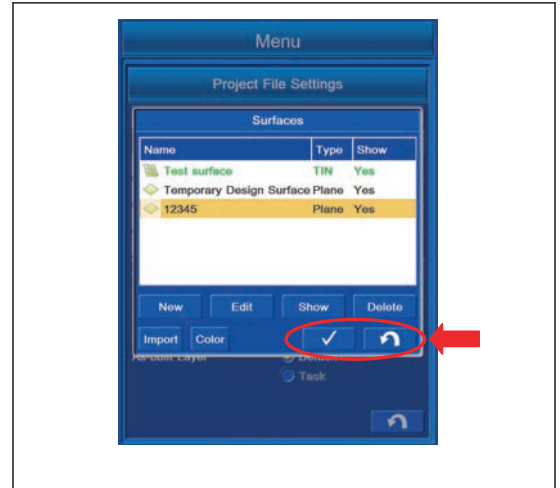
- To move the screen back to the previous screen, tap “<Back” button.
- Tap “Cancel” button to move the screen back to the editing screen of “Surfaces”.



3. Tap “Exit” button, and the screen changes to “Message-Box” screen.
4. To reflect the created Surface to the currently setting Surface, tap the ENTER button.



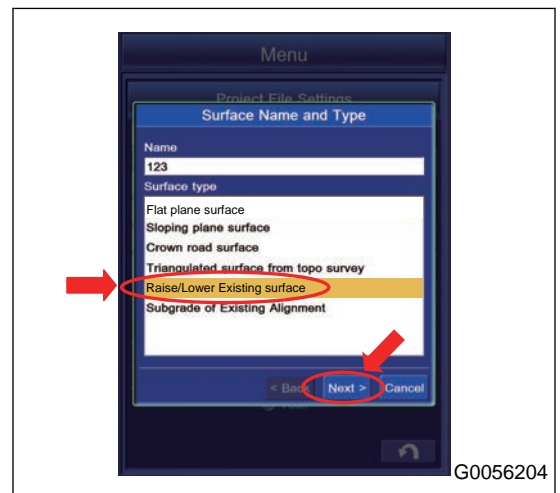
5. Then, the screen changes to “Surfaces” edit screen, and the creation the Surface is completed.
6. Tap the RETURN button on the editing screen of “Surfaces”, and the creation of Surface is canceled.



METHOD FOR CREATING SURFACE BY OFFSETTING EXISTING SURFACE

Highlight “Raise/Lower Existing Surface” in the Surface type, and tap “Next>” button.

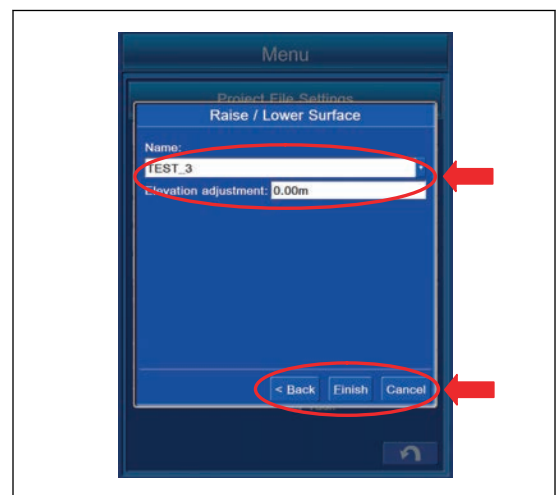
You can create the Surface by offsetting the existing Surface vertically.



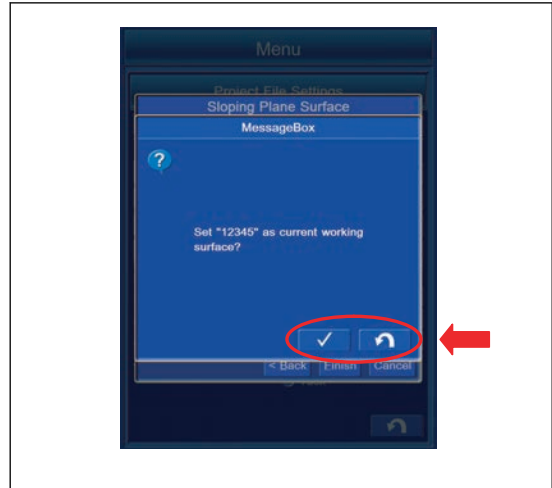
1. Highlight the Surface to be offset from “Name” list and tap it.
2. Tap the item of “Elevation adjustment:”, and input the offset value.
3. When you complete the input, tap “Exit” button.

REMARK

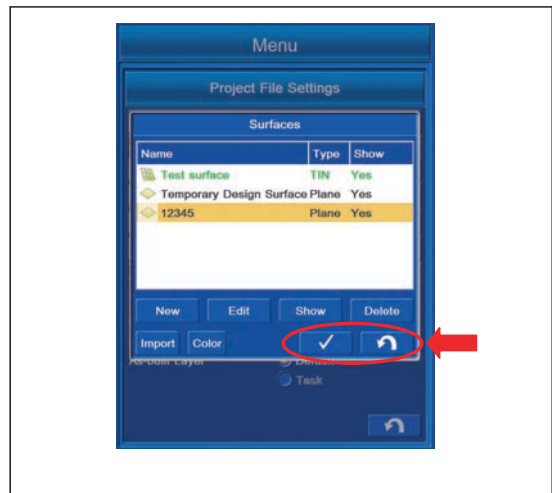
- Tap “<Back” button to move the screen back to the previous screen.
- Tap “Cancel” button to move the screen back to the editing screen of “Surfaces”.



- 4. Tap "Exit" button, and the screen changes to "Message-Box" screen.
- 5. To reflect the created Surface to the currently setting Surface, tap the ENTER button.



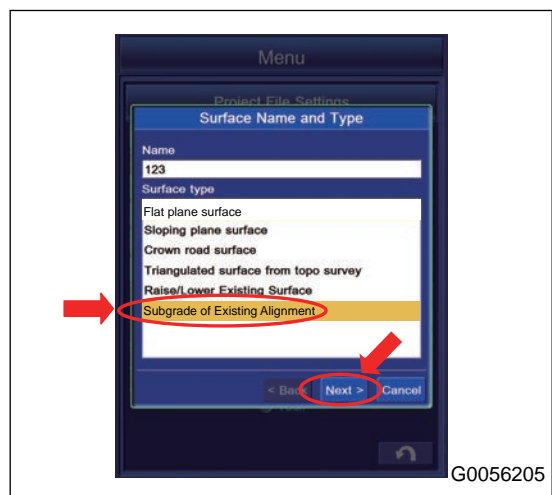
- 6. Then, the screen changes to "Surfaces" edit screen, and the creation the Surface is completed.
- 7. Tap the RETURN button on the editing screen of "Surfaces", and the creation of Surface is canceled.



METHOD FOR CREATING SURFACE BY OFFSETTING EXISTING ALIGNMENT

Highlight "Subgrade of Existing Alignment" with "Surface type", and tap "Next>" button.

You can create the new Subgrade Surface by offsetting the existing Alignment.



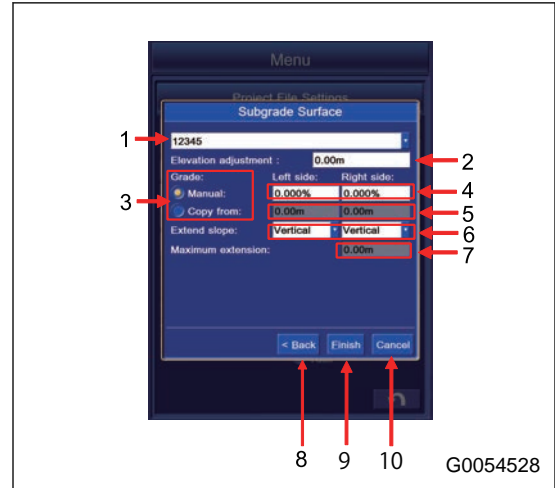
Creation of the Surface of the road

- (1) You can select the existing Alignment from the list.
- (2) You can offset the vertical Elevation of the road center line. Tap the item and you can input the offset value.
- (3) For the numeral value of “Left side:” and “Right side:” of “Grade:”, you can select the setting of input from “Manual:” and “Copy from:”.
- (4) When you set “Manual:”, input the numeral value of “Left side:” and “Right side:” of “Grade:” in percentage (%).
- (5) When you set “Copy from:”, input the numeral value of “Left side:” and “Right side:” of “Grade:” in meter (m).
- (6) You can select “Vertical”/“Continue”. When you select “Continue” you can extend the length of the Grade.
- (7) You can specify the length to be extended when you select “Continue” with “Vertical”/“Continue” in item 6.
- (8) Tap “<Back” button to move the screen back to the previous screen.
- (9) To save the setting, tap “Exit” button.
- (10) Tap “Cancel” button to move the screen back to the editing screen of Surface.

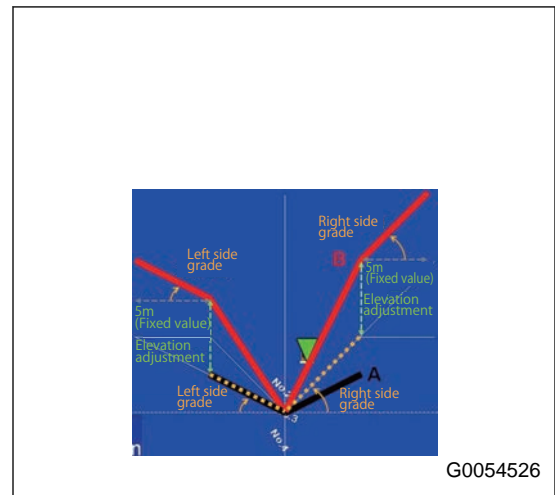
Input the setting or value of each setting item and tap “Exit” button, and the display changes to the message box screen. To reflect the created Surface to the currently setting Surface, tap the ENTER button. Not to reflect it to the currently setting Surface, tap the RETURN button. The screen changes to the editing screen of Surface, and the creation of Surface is completed. Tap the RETURN button on the editing screen of Surface, and the creation of Surface is canceled.

REMARK

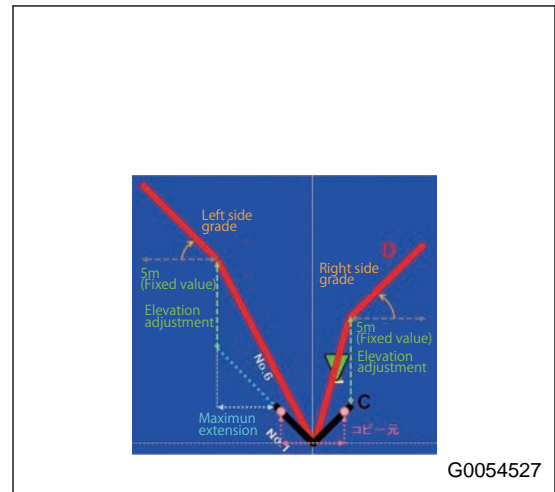
For the operation procedure of the Surface editing screen, see “METHOD FOR EDITING SURFACES”.



G0054528



G0054526

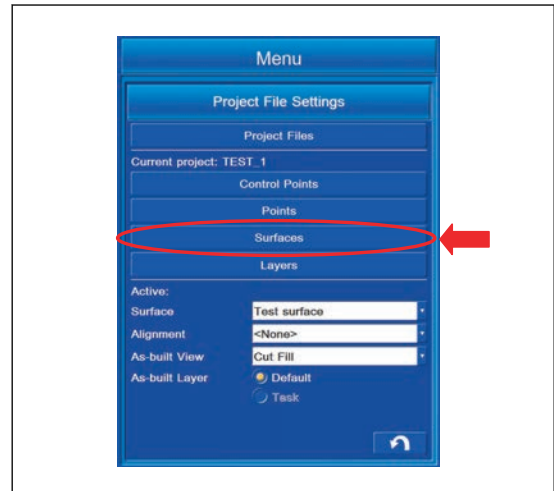


G0054527

METHOD FOR EDITING SURFACES

You can edit the Surface.

Tap the Surface button. The screen changes to “Surfaces” editing screen.



METHOD FOR SETTING DISPLAY/NON-DISPLAY OF SURFACE

You can select the Display/Non-display of the Surface.

Tap “Show” button.

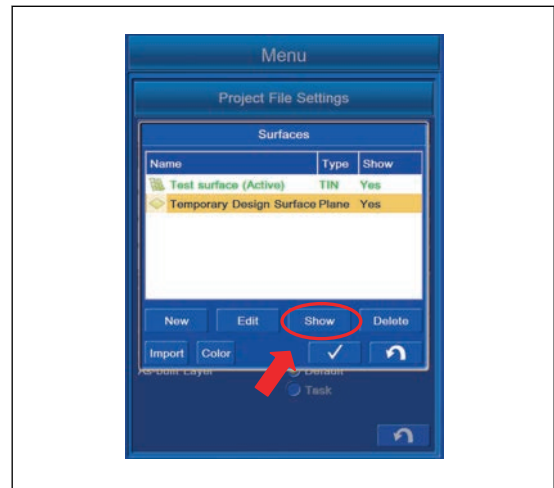
Each time it is tapped, “Yes/No” in the Show column switches.

“Yes”: The Surface is displayed.

“No”: The Surface is not displayed.

REMARK

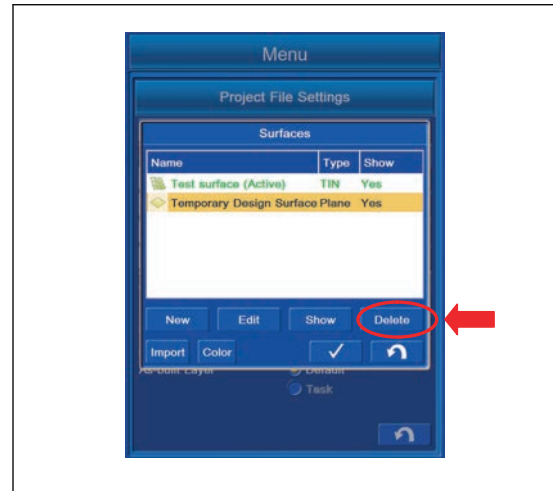
You cannot set the Display/Non-display for the file which is set as Surface.



METHOD FOR DELETING SURFACES

You can delete the Surface.

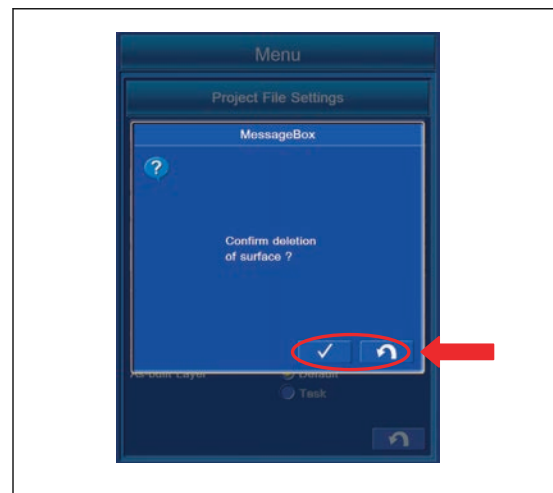
Highlight the Surface to be deleted, and tap “Delete” button. The screen changes to the message box screen.



- If you delete the selected Surface, tap the ENTER button.
- If you do not delete it, tap the RETURN button. The screen goes back to the edit screen of the Surface.

REMARK

You cannot delete the Surface when it is active. If “(Active)” is shown, the Surface is currently active.

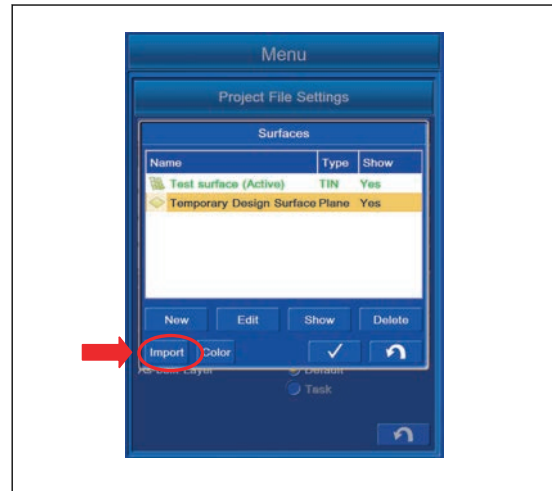


METHOD FOR IMPORTING SURFACES

You can import the Surfaces from the USB flash drive or Project Files.

Tap “Import” button, and the screen changes to the screen of Import Project Data.

You can import the Surfaces from the USB flash drive or Project Files according to the following procedure.



METHOD FOR IMPORTING SURFACES FROM USB FLASH DRIVE

1. With “What:”, select “3D Surface File (TN3, RD3, PL3, GC3)”.
2. With “Where:”, select “D:”.

REMARK

- The extension of Surface File is “.tn3”.
 - Display of the drive name depends on the connecting condition of USB flash drive.
 - The Surface files are saved in “3DMC folder” of the control box.
 - Save the Surface file directly to the USB flash drive (root directory).
If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize the Surface file.
 - Check that there is no Surface File with the same name, and import it. If Surface File with the same name is imported, it is overwritten.
 - The USB flash drive with password function cannot be used.
3. Highlight the Surface file to be imported, and tap ENTER button.

The screen changes to “MessageBox” screen.

- To import the Surface, tap ENTER button.
The Surface is imported.
- Not to import the Surface, tap RETURN button.
The screen returns to the previous screen of the Surfaces screen.

METHOD FOR IMPORTING SURFACES FROM PROJECT FILE

1. With "What:", select "Surfaces from project file (TP3)".

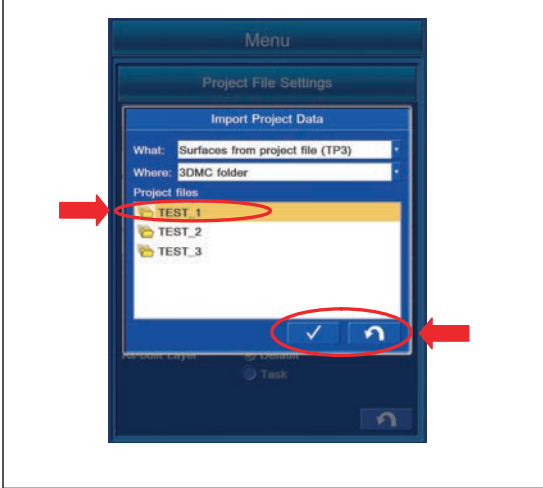
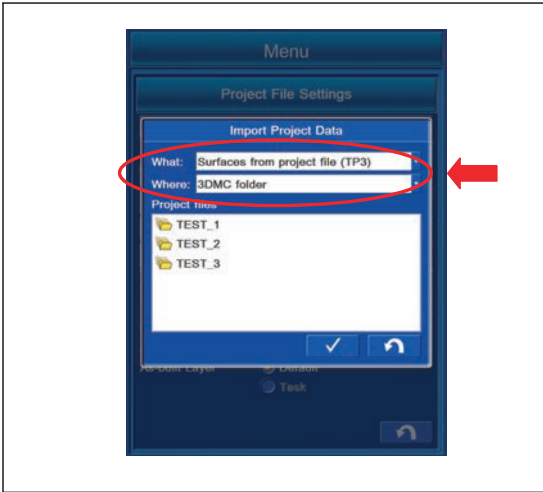
REMARK

"Surfaces from Autocad file (DWG)" can also be selected with "What:".

2. With "Where:", select "3DMC folder".

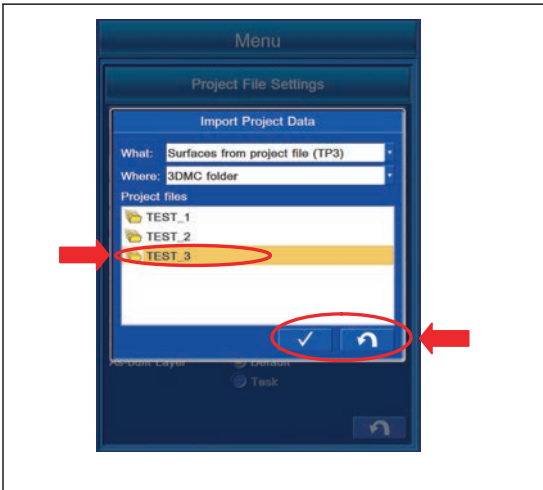
REMARK

- When copying the Surface from the Project File saved in the USB flash drive, select the drive "F:" (to where the USB flash drive is connected) with "Where:".
- The extension of Surface is ".tn3".
- Display of the drive name depends on the connecting condition of USB flash drive.
- Project File is saved in "3DMC folder" of the control box.
- Save the Project file directly to the USB flash drive (root directory).
If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize the Project file.
- The USB flash drive with password function cannot be used.



3. Select the Project File which contains the Surface to be imported, and tap ENTER button.

If you tap RETURN button, and the screen returns to the editing screen of "Surfaces".



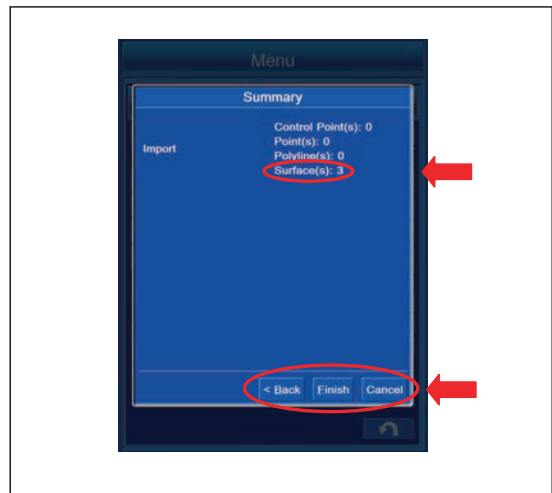
- 4. Select the Surface to be imported, and tap “Next>” button. The screen changes to “Summary” screen.
- 5. If you tap “Cancel” button, and the screen returns to the editing screen of “Surfaces”.

REMARK

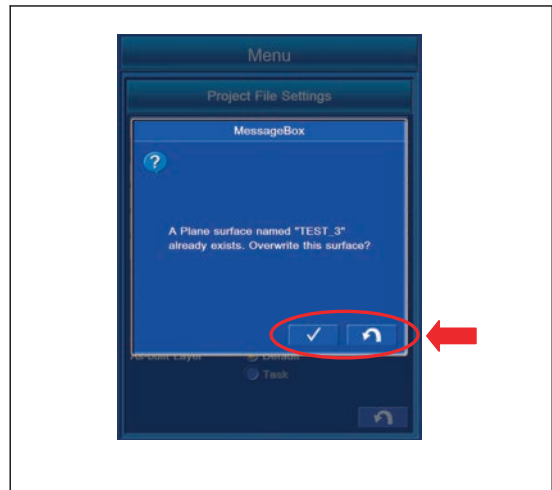
- You can select the multiple Surfaces to be imported. Tap all the Files to be imported to highlight them.
- If you import and set the file with large capacity, operation of the intelligent Machine Control may become slow.



- 6. Check that the number of the Surface(s) to be imported is displayed in the column of the Surface(s), and tap “Finish” button.
- 7. If you tap “<Back” button, and the screen returns to the editing screen of “Surfaces”.



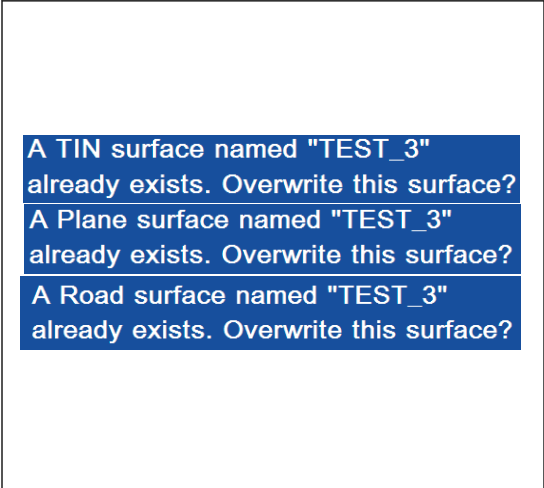
- 8. If Surface with the same name exists in the folder to where Surface will be saved, the display changes to “Message-Box” screen.
- 9. To overwrite, tap ENTER button.



- 10. Not to overwrite, tap RETURN button. “MessageBox” is displayed for each extension of File, select whether you need to overwrite or not for each.

REMARK

The display of “MessageBox” is different as shown in the illustration on the right.



A TIN surface named "TEST_3"
already exists. Overwrite this surface?

A Plane surface named "TEST_3"
already exists. Overwrite this surface?

A Road surface named "TEST_3"
already exists. Overwrite this surface?

LAYERS SETTINGS

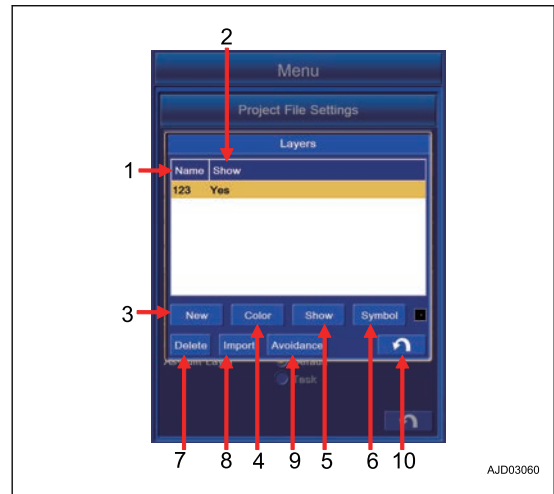
Layer contains the points which configure Control Point, Topo survey point, and Surface. These points are saved in the layer, and you can set and edit the display with this menu.

The contents displayed in the layer setting are as follows.

- (1) "Layer Name": Surface Names are displayed.
- (2) "Show": Setting of Display/Non-display is indicated by "Yes"/"No".

Contents of operation by Layer setting

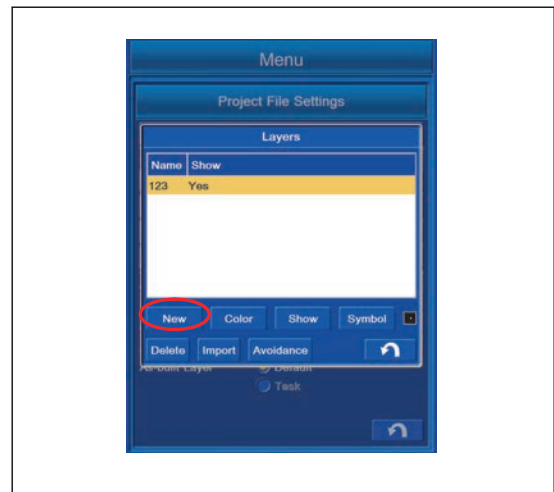
- (3) "New" button: You can create the new layer.
- (4) "Color" button: You can select the color of point.
- (5) "Show" button: You can set Display/Non-display of layer by "Yes/No".
- (6) "Symbol" button: You can change the display of point.
- (7) "Delete" button: You can delete the layer.
- (8) "Import" button: You can import the Point(s) and Line-work(s).
- (9) "Avoidance" button: You can set the Avoidance Data.
- (10) RETURN button: The screen returns to the previous screen.



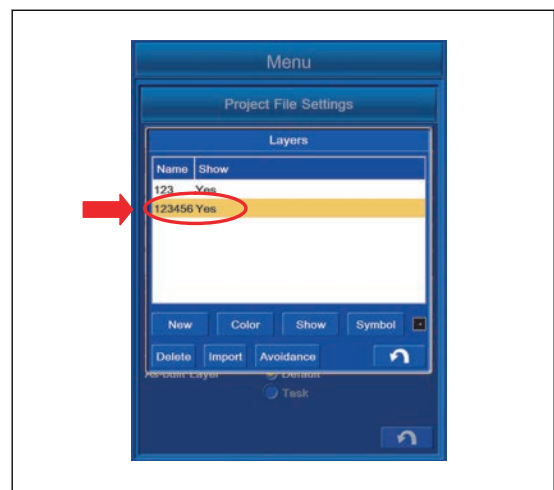
METHOD FOR CREATING NEW LAYERS

You can create new Layers.

1. Tap "New" button on "Layers" setting screen.



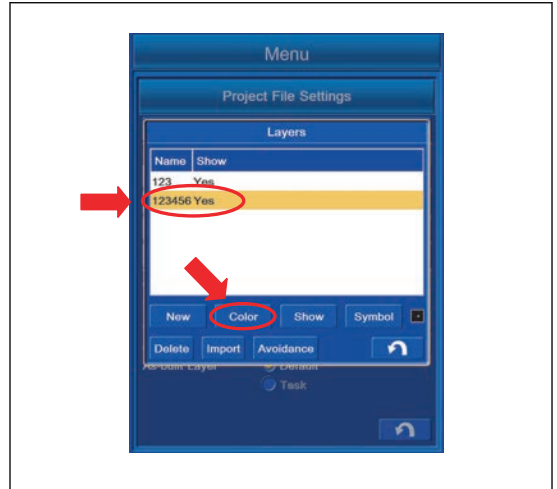
2. Input the name of new layer which is added, and tap OK button.
A new layer is added.



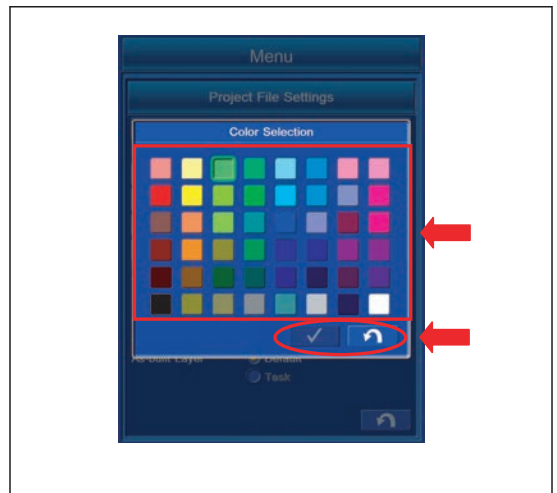
METHOD FOR CHANGING POINT COLOR SELECTION

You can change the display color of the Point.

1. Select the layer of the Point which you want to change the display color, and tap “Color” button.



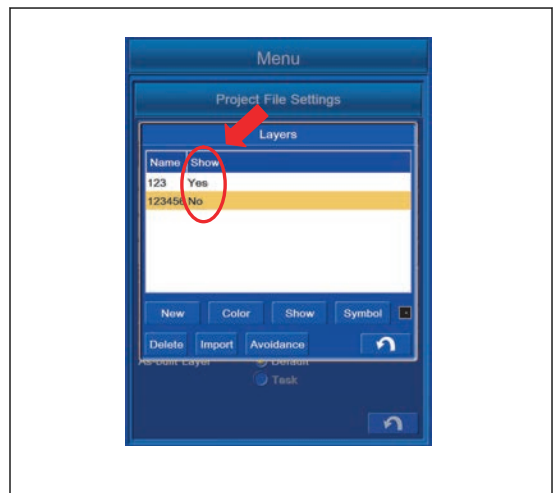
2. “Color Selection” screen is displayed. Tap the desired display color out of 48 colors, and tap ENTER button.
The display color is changed.
Tap RETURN button to return the screen to the previous screen.



METHOD FOR SETTING LAYERS DISPLAY

You can set Display/Non-display of Point and Linework saved in the layer.

1. Highlight the layer which you want to set Display/Non-display, and tap “Show” button.
2. The display of the column of “Show” changes as follows.
The display color is changed.
“Yes”: Displayed
“No”: Not displayed



METHOD FOR CHANGING POINT SYMBOL

You can change the display of the Point.

1. Highlight the layer of the Point which you want to change the display, and tap "Symbol" button.

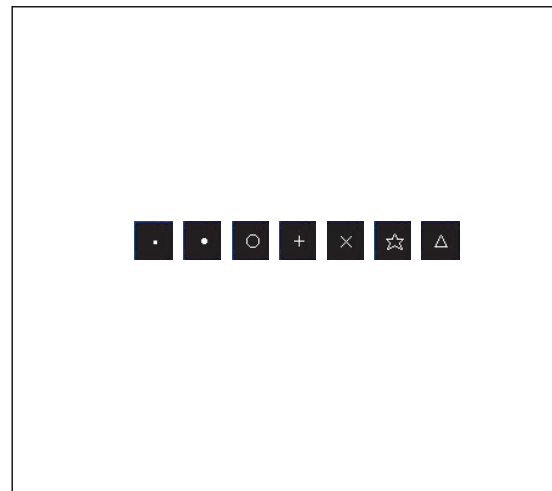
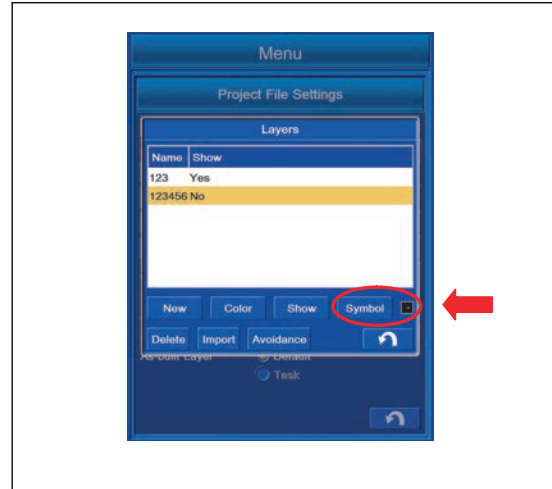
The mark display beside "Symbol" button changes.

2. Select any display.

The Point display changes.

REMARK

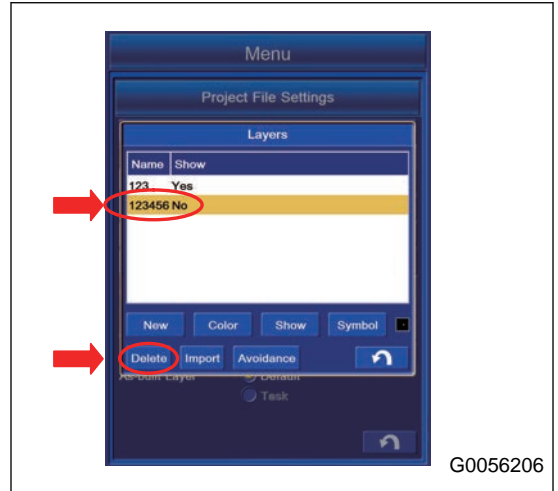
You can select the Point display out of 7 kinds.



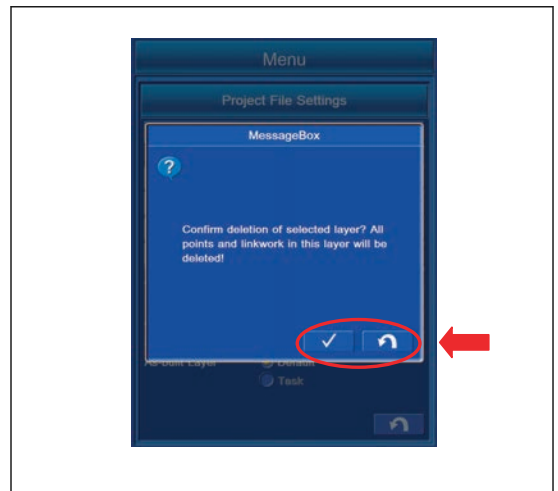
METHOD FOR DELETING LAYERS

You can delete the layer.

1. Highlight the layer to be deleted, and tap “Delete” button.
The screen changes to “MessageBox” screen.



2. To delete all Points and Linework(s) saved in the layer, tap ENTER button.
All Points and Linework(s) saved in the layer are deleted.
3. Tap RETURN button to return the screen to the previous screen.

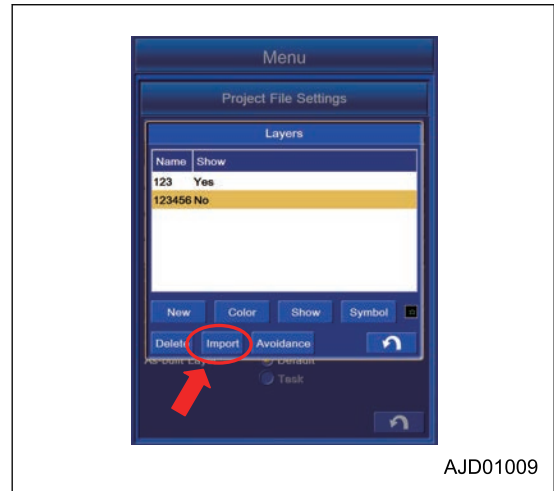


IMPORT 3D POINTS FILE AND 3D LINEWORK FILE

The point and line work can be imported.

Highlight the layer to be saved, and tap the “Import” button. The screen changes to “Import Project Data” screen.

Files which can be imported are the two types of point and line work.



AJD01009

METHOD FOR COPYING POINTS FILE AND LINEWORK FILE FROM USB FLASH DRIVE

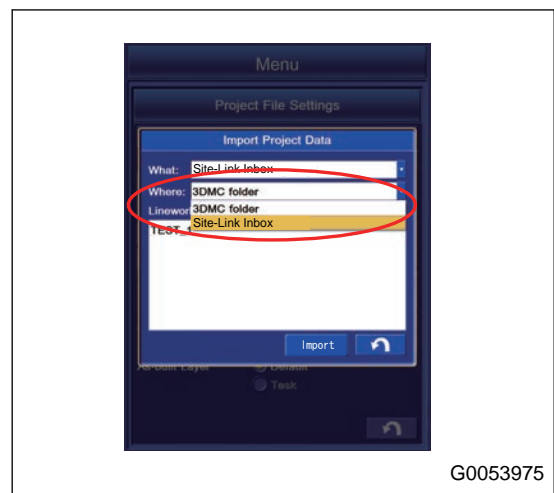
1. With “What:”, select the file to be imported.
2. With “Where:”, select the drive “F:” to which the USB flash drive is connected.

With “What:”, you can select the items that follow.

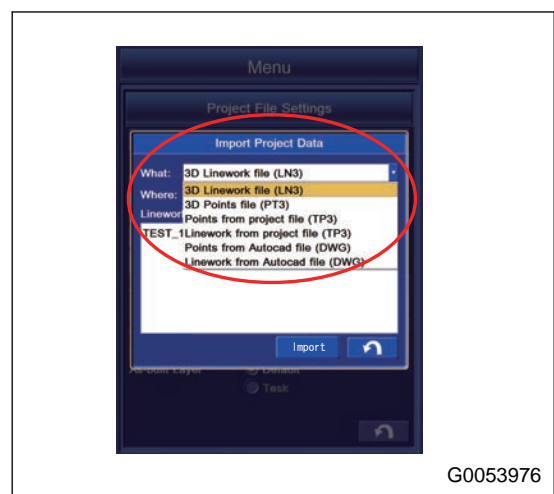
- “3D Linework file (LN3)”:
- “3D Points file (PT3)”:
- “Points from project file (TP3)”:
- “Linework from project file (TP3)”:
- “Points from Autocad file (DWG)”:
- “Linework from Autocad file (DWG)”:

REMARK

- Display of the drive name agrees with the connection status of USB flash drive.
- Save the files (LN3, PT3, TP3, and DWG) directly to the USB flash drive (root directory). If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize each file.
- You cannot use the USB flash drive with password function.



G0053975



G0053976

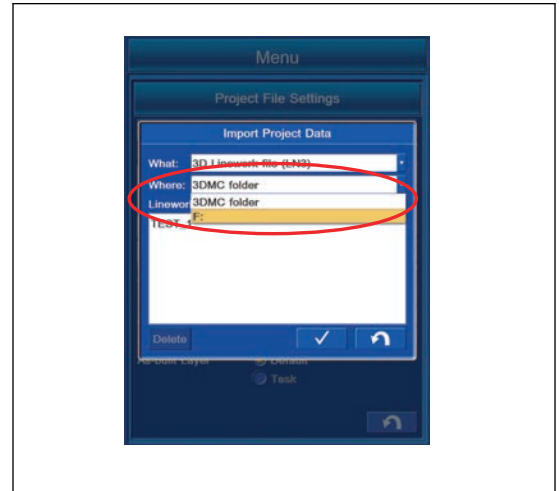
METHOD FOR COPYING POINTS FILE AND LINEWORK FILE FROM 3DMC FOLDER

1. With “What:”, select the file to be imported.
2. With “Where:”, select “3DMC folder”.

Selected item with “What:” is the same as when copying from the USB flash drive.

REMARK

- Extension of the Point files is “PT3”.
- Extension of the Linework files is “LN3”.
- Display of drive name depends on the connecting condition of the USB flash drive.
- The Points and Linework files are saved in 3DMC folder of the control box.
- Use half size of alphanumeric character for the name of the Control files.



AVOIDANCE DATA SETTINGS

Regard the point that is saved in the Layer or the linework(s) as a starting point, and you can set the prohibited area.

Tap “Avoidance” button on the setting screen of the Layer, the screen changes to “Avoidance Data” screen.

Contents shown in “Avoidance Data” setting

(1) The items that follow are shown in a list.

“Layer Name”: The name of layer is shown.

“Mode”: The shape of Avoidance data is shown.

“Proximity”: The area of Avoidance data is shown.

“Surface Mode”: Detection condition for the surface of Avoidance data is set.

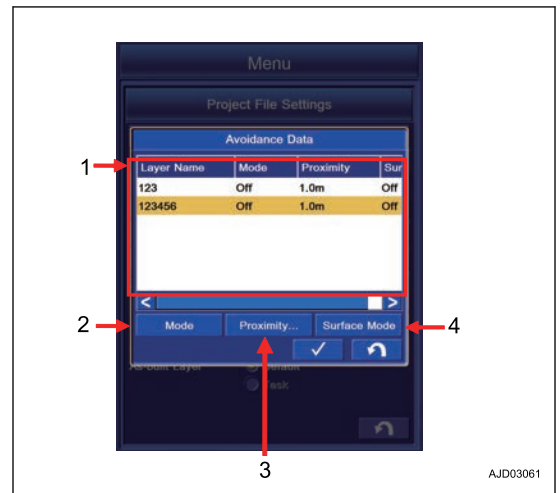
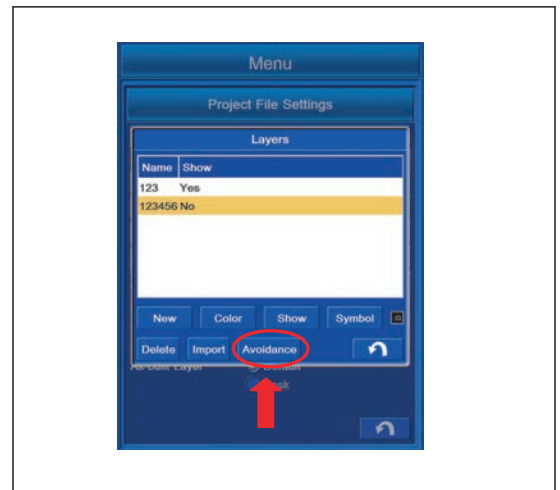
Contents of operation by “Avoidance Data” setting

(2) “Mode” button: The shape of Avoidance data can be selected.

(3) “Proximity...” button: The area of Avoidance data can be selected.

(4) “Surface Mode” button: Surface mode can be selected.

For the procedure to select the surface mode, see “SURFACE MODE SETTINGS (7-72)”.

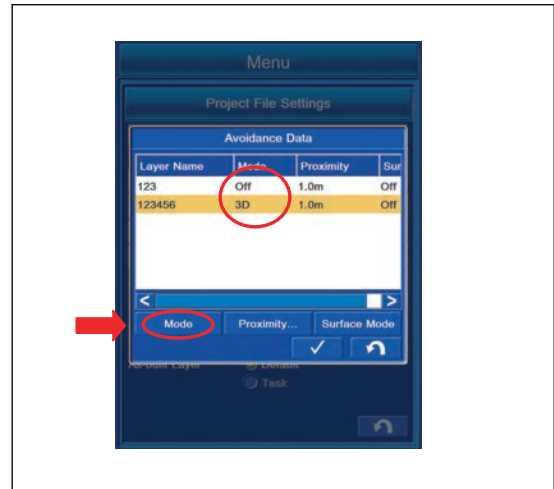


AJD03061

METHOD FOR SETTING AVOIDANCE DATA SHAPE

You can select the shape of the Avoidance Data.

1. Tap "Mode" button on the setting screen of the Avoidance Data.
The column of "Mode" changes.
2. Display "Mode" which you want to select.
You can select a "Mode" from Modes shown below.
"3D": You can set an Avoidance Data which is with height limit.
"2D": You can set an Avoidance Data which is without height limit.
"Off": You can disable the setting of the Avoidance Data.



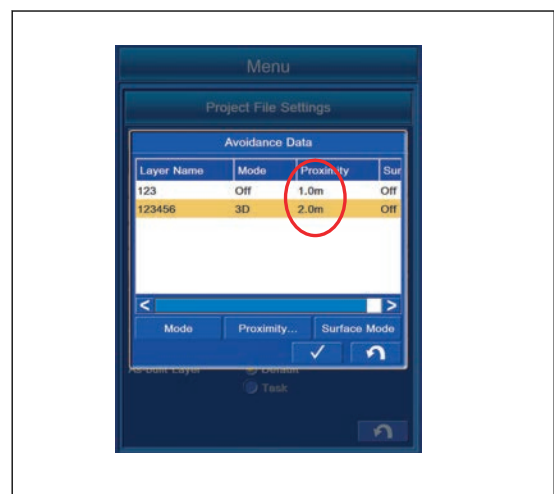
METHOD FOR SETTING AVOIDANCE DATA PROXIMITY

You can select the area of the Avoidance Data.

1. Tap "Proximity..." button on the setting screen of the Avoidance Data.
The screen changes to the numeric keypad screen.

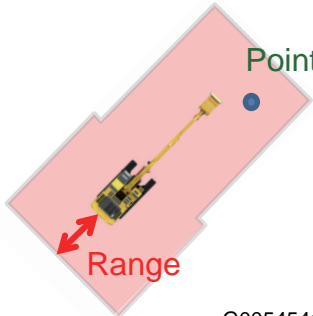



2. Input the desired area, and tap the OK button.
Selected Proximity is shown.

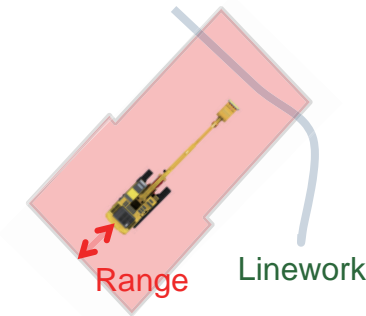



Proximity varies with the shape of Avoidance Data.
Proximity by the shape of the Avoidance Data is shown in the figure.

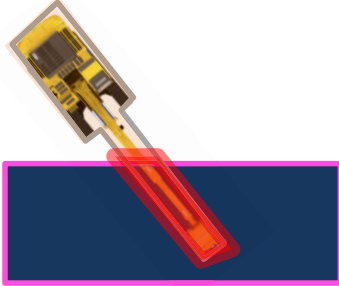
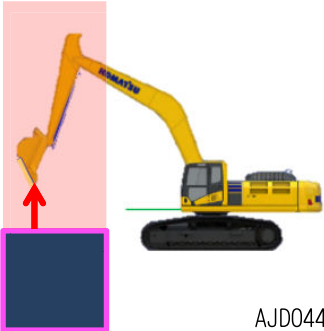
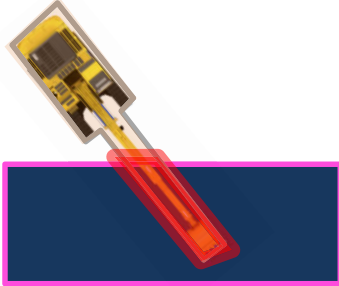
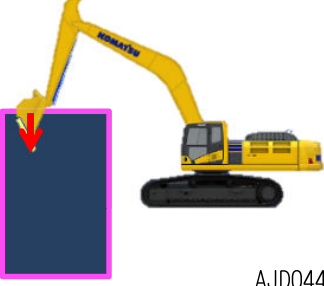
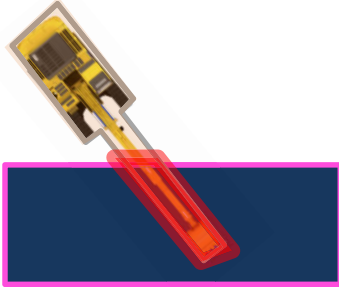
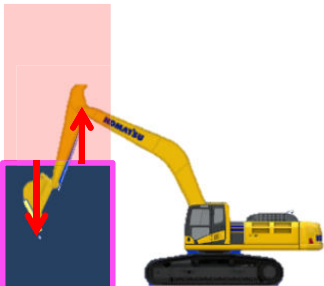
List of decisions for each object

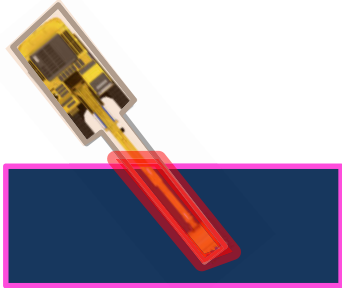
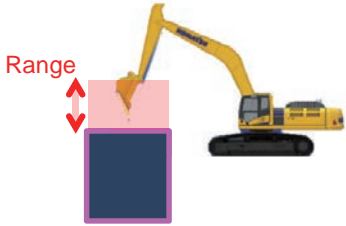
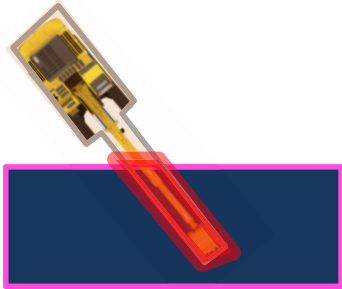

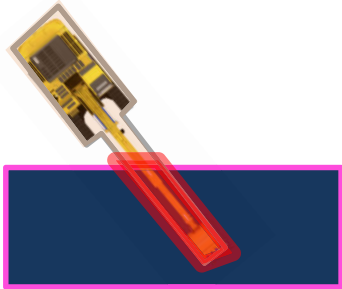

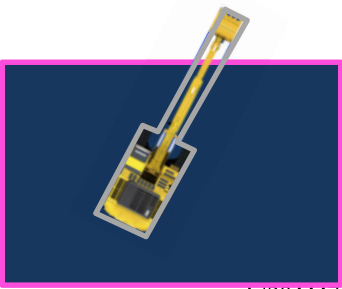
Mode	Surface Mode	Caution display (Plan)	Caution display (Profile)
2D	-	-	-
3D	-	 <p style="text-align: right;">Point</p> <p style="text-align: center;">Range</p> <p style="text-align: right;">G0054541</p>	 <p style="text-align: center;">Range</p> <p style="text-align: center;">Point</p> <p style="text-align: right;">G0054540</p>

List of decisions for each object (If the Linework is the Object)

Mode	Surface Mode	Caution display (Plan)	Caution display (Profile)
2D	-	-	-
3D	-	 <p style="text-align: right;">Linework</p> <p style="text-align: center;">Range</p> <p style="text-align: right;">G0054542</p>	 <p style="text-align: center;">Range</p> <p style="text-align: center;">Linework</p> <p style="text-align: right;">G0054543</p>

List of decisions for each object (If the Surface is the Object)

Mode	Surface Mode	Caution display (Plan)	Caution display (Profile)
	Above	 <p>AJD04443</p>	 <p>AJD04440</p>
2D	Below	 <p>AJD04443</p>	 <p>AJD04441</p>
	Above/ Below	 <p>AJD04443</p>	 <p>AJD04442</p>

Mode	Surface Mode	Caution display (Plan)	Caution display (Profile)
	Above	 <p>AJD04443</p>	 <p>G0054544</p>
3D	Below	 <p>AJD04443</p>	 <p>G0054545</p>
	Above/ Below	 <p>AJD04443</p>	 <p>G0054546</p>
2D or 3D	Outside	 <p>AJD04447</p>	-

SURFACE MODE SETTINGS

Surface mode can be selected.

You can select the Surface mode that follows.

“Above”: When the work equipment is above the Starting point or Linework, a warning is shown in this mode.

“Below”: When the work equipment is below the Starting point or Linework, a warning is shown in this mode.

“Above/Below”: When the work equipment is above or below the Starting point or Linework, a warning is shown in this mode.

“Outside”: Warning is made when the work equipment is below “Surface” of origin.

“Off”: Disables the Surface mode.

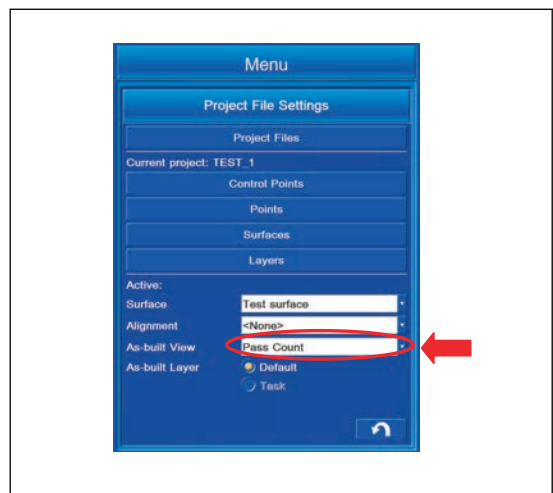
Tap the RETURN button to move the screen back to the previous screen.

AS-BUILT VIEW SETTINGS

As-built View in this section is the current terrain which is shown in 2D. When the As-built View is set, the state of construction can be shown in color, and it can be a guide for the progress and accuracy of construction.

SELECT AS-BUILT VIEW

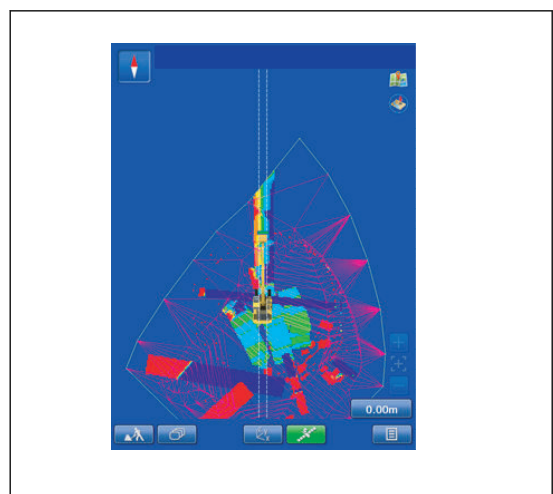
In the column of “As-built View” on “Project File Settings” screen, select a display out of 2 kinds display of “Cut Fill” and “Pass Count”.



CUT FILL SETTINGS

The distance from the bucket edge to Surface can be displayed in color. If you want to grasp the distance from the bucket edge to Surface in digging operation, this setting is recommended.

For setting the display color by Cut Fill setting of As-built View, see “METHOD FOR SETTING CUT FILL COLOR SELECTION”.



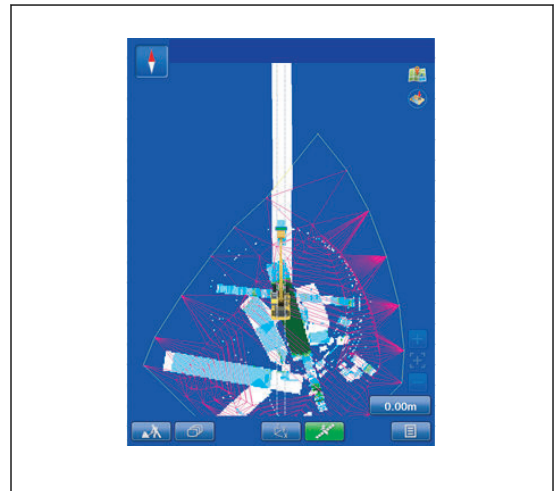
PASS COUNT SETTINGS

The same place on the Surface where the bucket edge passes can be shown in color. If you want to know the number of passage at the same place on the Surface, this setting is recommended.

When you set the display color by the Pass Counts setting of the As-built View, see “METHOD FOR SETTING PASS COUNT COLOR SELECTION”.

REMARK

When the bucket edge goes through the deepest point in the Cut/Fill setting, the number of times that the machine goes through is counted only in the condition that the display in color is updated in the Cut/Fill setting.



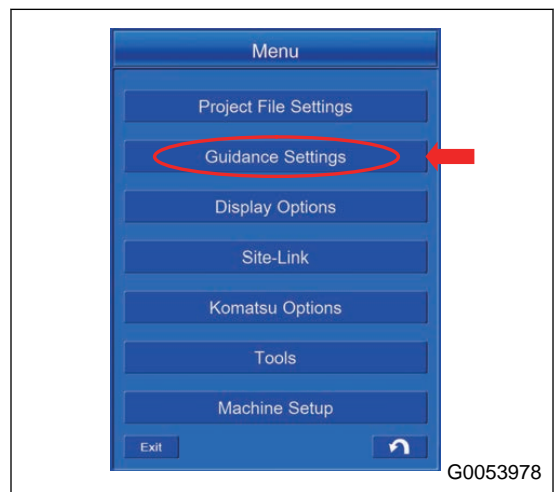
GUIDANCE SETTINGS

With “Guidance Settings”, you can perform the setting for Light Bar, Sound, Grade Indicator, measured distance between bucket edge and Surface, Steering Reference, As-Built, and Target Surface.

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap “Guidance Settings” button on the main menu screen, the screen changes to Guidance Settings screen.



GUIDANCE SETTING CONTENTS

With “Guidance Settings”, you can set and edit for the items that follow.

(1) “Elevation Reference”

The height of guidance can be set.

(2) “Light Bar & Sound” button

The setting for the light bar and sound guidance can be set.

(3) “Grade Indicators” button

You can do the setting of height display.

(4) “Measurement Distance”

The setting for measurement of the distance between the bucket edge and design data can be set.

- “Vertical to Surface”
You can measure the distance from the bucket edge to the design data in vertical direction.
- “Normal to Surface”
You can measure the distance from the bucket edge to the design data in perpendicular direction.

(5) “Measurement Distance Line”

You can do the display setting for the line which is selected at “Measurement Distance” between the bucket edge and design data.

(6) “Steer Indication”

You can do the setting of display for steering.

(7) “Light Bar” button

You can do the setting of the light bar for steering display.

(8) “Facing Angle Range:” button

You can do the setting of the angle range in which the facing angle compass is shown in green, and the setting of the sound guidance.

(9) “AsBuilt” button

You can do the setting of the as-built.

(10) “Target Surface” button

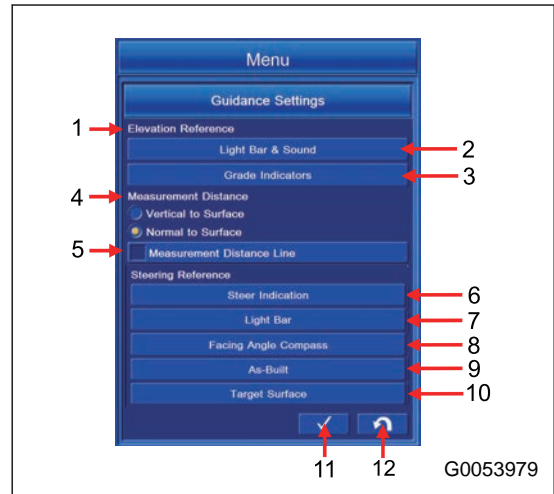
You can do the setting of the target surface.

(11) ENTER button

You can save the contents which were changed in “Guidance Settings”.

(12) RETURN button

Tap the RETURN button, and the screen goes back to the menu screen.



LIGHT BAR AND SOUND SETTINGS

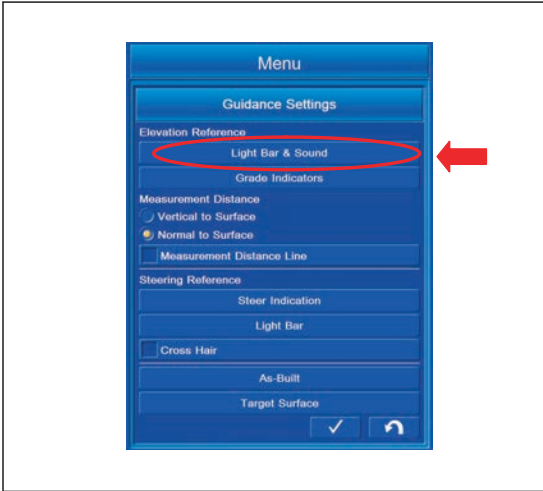
You can check the bucket edge position against the Surface with the Light Bar and Sound.



Tap "Light Bar & Sound" button on "Guidance Settings" menu. The screen changes to "Light Bar & Sound" Guidance Settings screen.

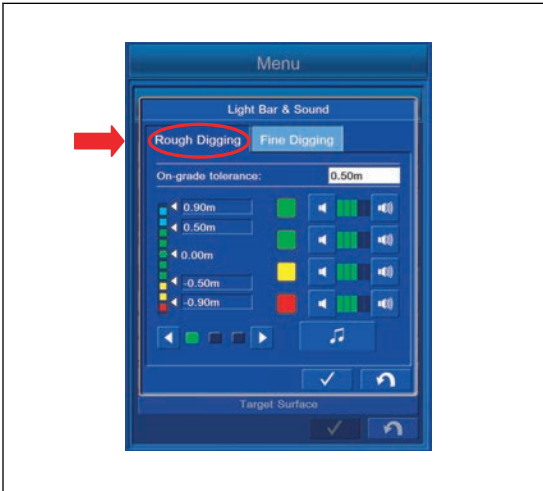
REMARK

You can do the setting of the Light Bar separately for the Fine Digging mode and Rough Digging mode. The setting of the Sound is common to the Fine Digging mode and Rough Digging mode.



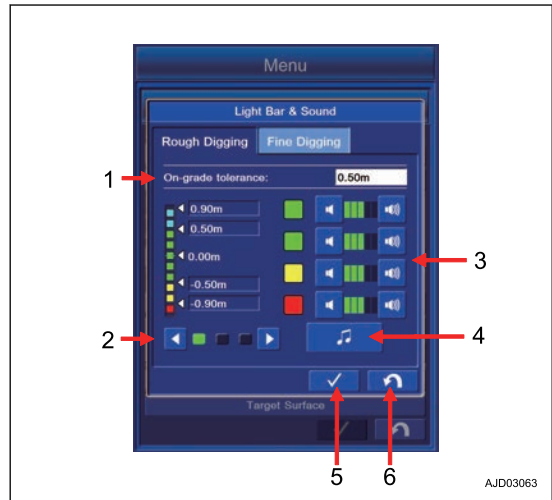
ROUGH DIGGING MODE SETTINGS

You can perform the setting of the Light Bar & Sound in Rough Digging mode. Select "Rough Digging" tab on "Light Bar & Sound" screen.



LIGHT BAR AND SOUND SETTING CONTENTS

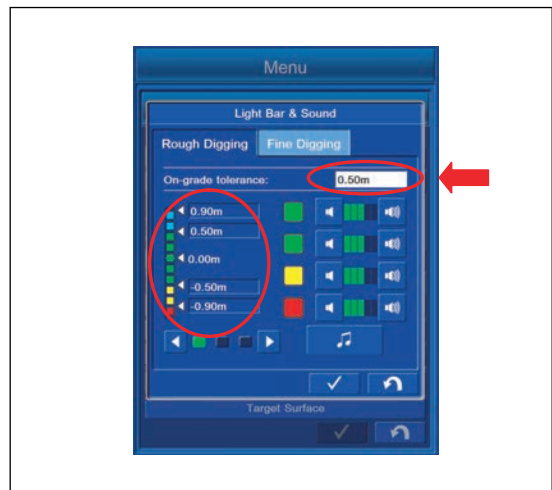
- (1) "On-grade tolerance:": Allowance range which is displayed as a green Light Bar in the digging operation can be set.
- (2) Setting of the range which is displayed as a green Light Bar in the digging operation can be changed.
- (3) The sound volume can be adjusted per color of the Light Bar.
- (4) The tone of Sound can be changed.
- (5) ENTER button: Tap this button and the setting is saved.
- (6) RETURN button: Tap this button and the screen returns to the previous screen.



METHOD FOR SETTING TOLERANCE IN ROUGH DIGGING MODE

You can set the tolerance when the Light Bar is displayed in green range in the Rough Digging mode.

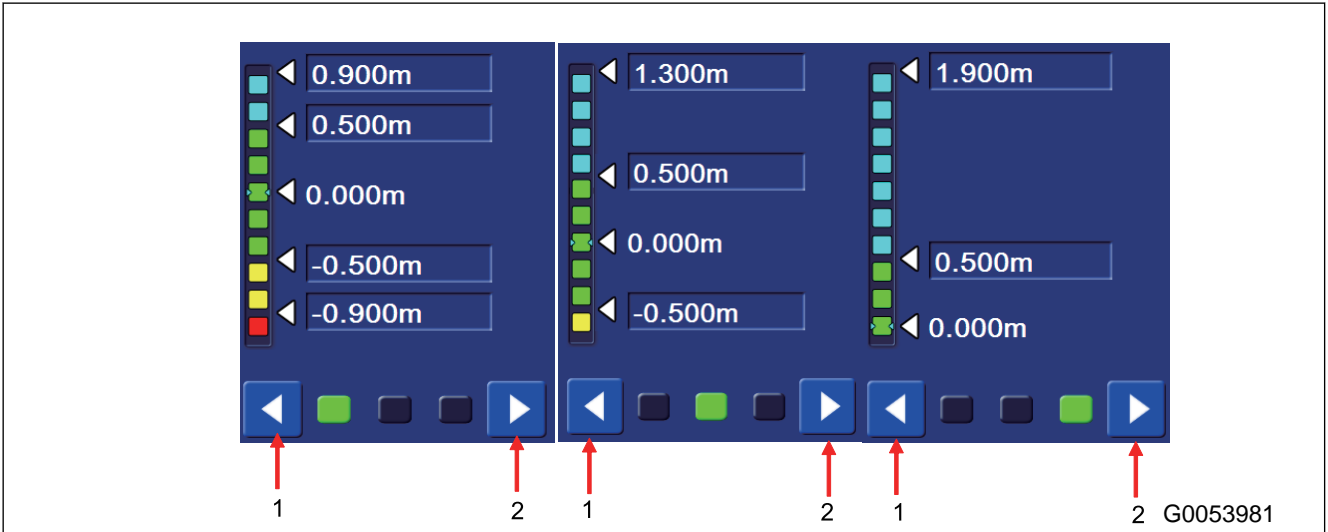
Tap "On-grade tolerance:" column, and input the tolerance.
If the numeral value is inputted, the Light Bar is automatically renewed and reflected on the screen.



METHOD FOR CHANGING LIGHT BAR DISPLAY RANGE IN ROUGH DIGGING MODE

Tap the buttons (1) and (2), and you can change the display range of Light Bar.

You can select the display range from the following 3 patterns.



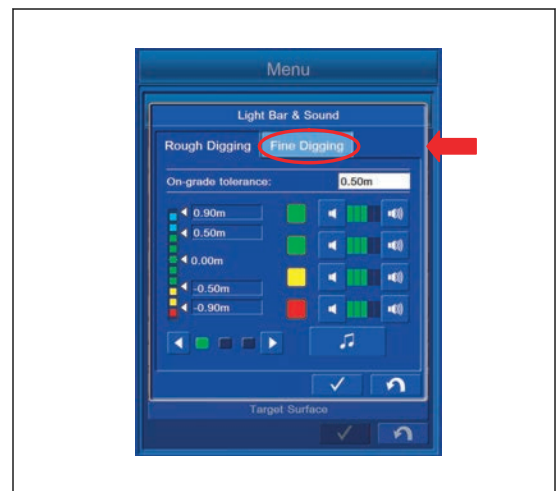
FINE DIGGING MODE SETTINGS

You can perform the setting of Light Bar & Sound in Fine Digging mode.

Select "Fine Digging" on "Light Bar & Sound" screen.

For the following 5 items, the contents are the same as those which can be controlled in Rough Digging mode.

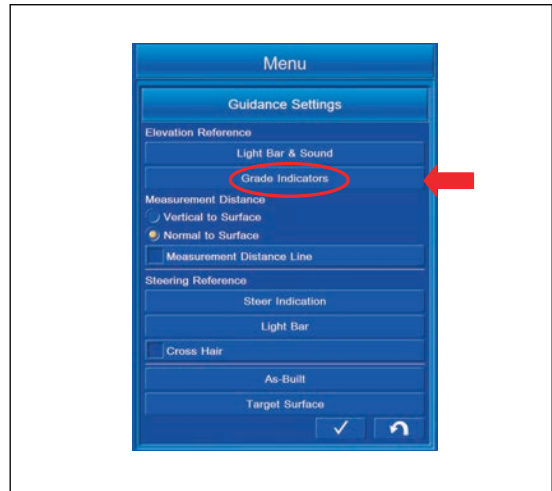
- The displayed contents of "Light Bar & Sound" guidance setting screen
For this item, see "LIGHT BAR AND SOUND SETTING CONTENTS (7-76)".
- Setting of allowable value in Rough Digging mode
For this item, see "METHOD FOR SETTING TOLERANCE IN ROUGH DIGGING MODE (7-76)".
- Changing Light Bar display range in Rough Digging mode
For this item, see "METHOD FOR CHANGING LIGHT BAR DISPLAY RANGE IN ROUGH DIGGING MODE (7-77)".
- Setting volume of Sound
For this item, see "METHOD FOR SETTING SOUND VOLUME (7-89)".
- Setting tone of Sound
For this item, see "METHOD FOR SETTING SOUND TONE (7-90)".



GRADE INDICATORS SETTINGS

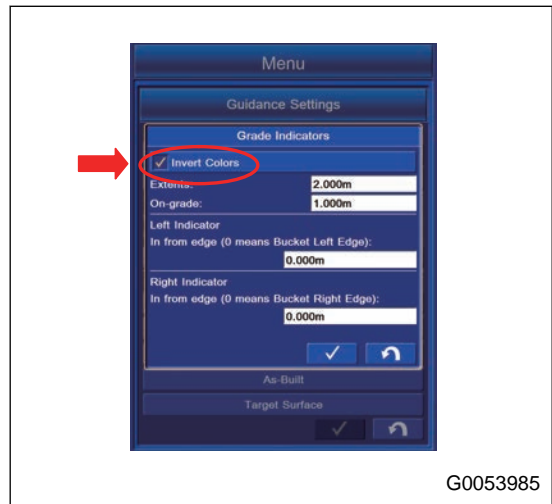
You can perform the setting of Grade Indicator.

Tap “Grade Indicators” button on “Guidance Settings” screen.



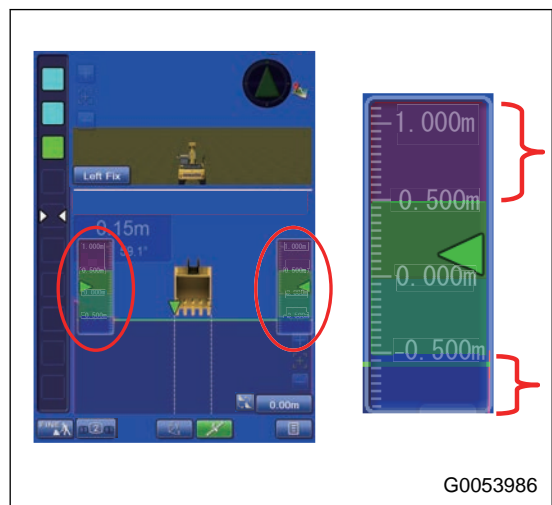
METHOD FOR INVERTING GRADE INDICATOR COLORS

1. Put a tick in the check box of “Invert Colors”.



G0053985

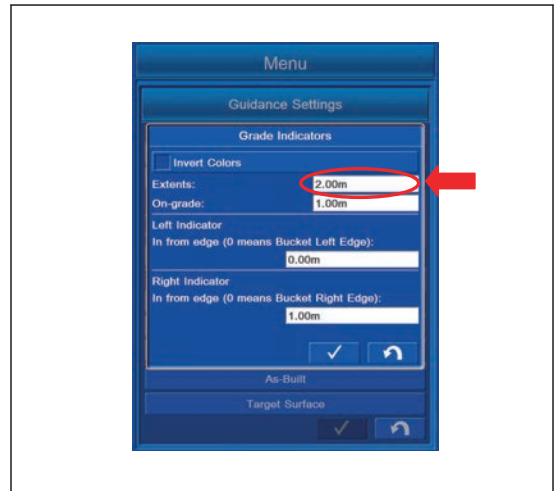
2. You can invert the display color of Grade Indicator between red and blue corresponding to the bucket edge position whether it is above Surface or below Surface.



G0053986

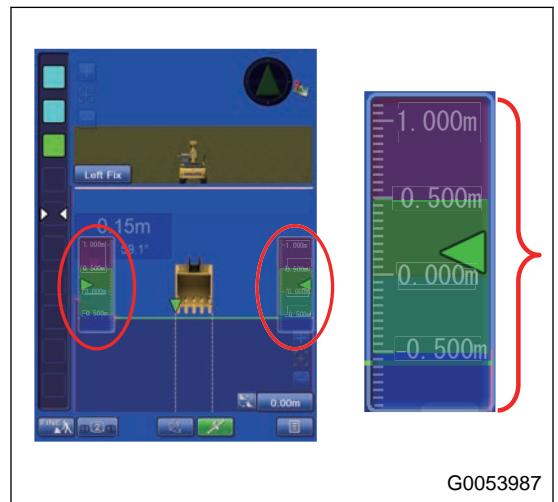
METHOD FOR SETTING GRADE INDICATOR EXTENTS

1. Tap “Extents:” column, and input the value of the range of the Grade Indicator.
 After completing the input, tap “OK” button.
 Tap ENTER button to save the setting.



G0056208

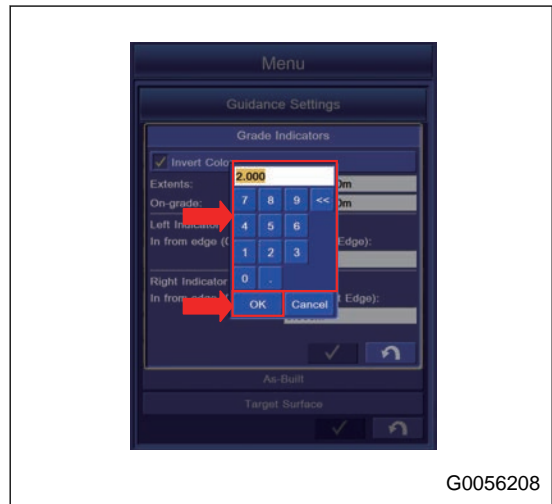
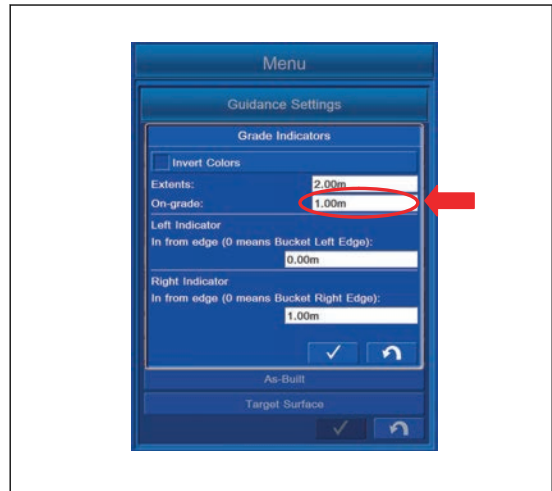
2. The width of Grade Indicator to be displayed can be set by the inputted value.



G0053987

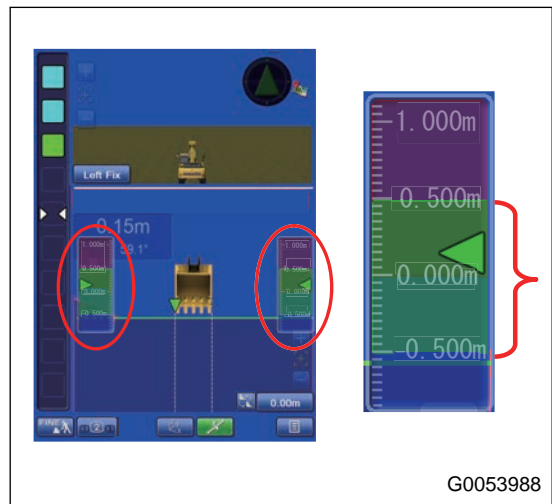
METHOD FOR SETTING GREEN GRADE INDICATOR WIDTH

1. Tap “On-grade:” column, and input the value of the width of the Grade Indicator.
After completing the input, tap “OK” button.
Tap ENTER button to save the setting.



G0056208

2. The width of the Grade Indicator to be displayed in green can be set by the inputted value.



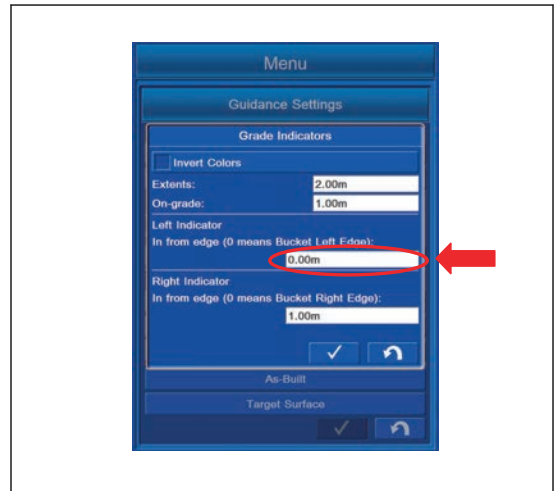
G0053988

METHOD FOR SETTING LEFT GRADE INDICATOR

Tap “Left Indicator” column and input the numeric value.
After completing the input, tap “OK” button.

Tap ENTER button to save the setting.

You can offset the detection position of the bucket edge from the left to right.



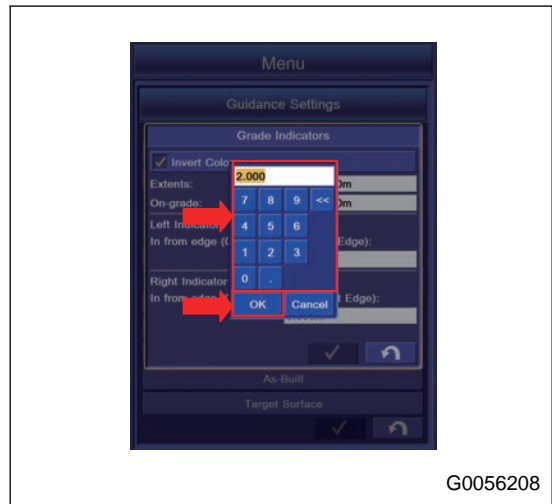
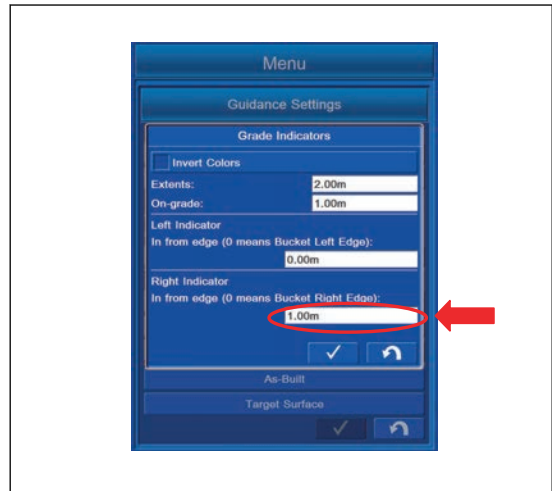
G0056208

METHOD FOR SETTING RIGHT GRADE INDICATOR

Tap “Right Indicator” column, and input the numeric value.
After completing the input, tap “OK” button.

Tap ENTER button to save the setting.

You can offset the detection position of bucket edge from the right to left.



G0056208

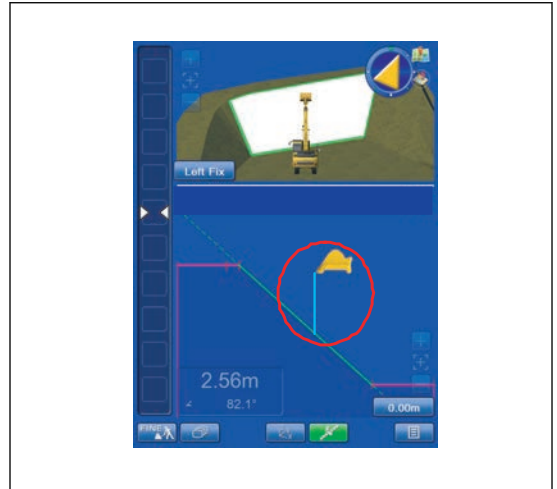
MEASUREMENT DISTANCE

You can set the measurement method of the distance between the bucket edge and Surface.

- Perpendicular against the horizontal plane
In this setting, the constant vertical distance against Surface is measured.

REMARK

In the Travel mode, this setting is automatically selected.



- Perpendicular against Surface
In this setting, the constant perpendicular distance against Surface is measured.

REMARK

In the Semi-auto mode, this setting is automatically selected.

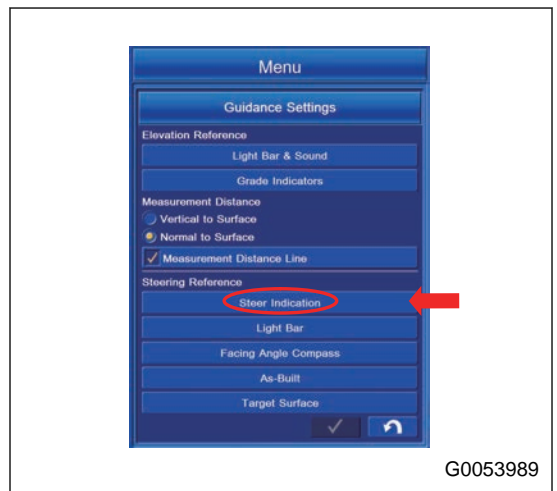


STEERING REFERENCES SETTINGS

The setting for the bucket tooth position to be steering to the selected alignment data can be set.

Tap the “Steer Indication” button on the “Guidance Settings” screen.

The display changes to the “Steer Indication” screen.



STEER REFERENCE SETTING CONTENTS

The setting for the bucket edge position to be guided can be set to the selected alignment data.

(1) "Alignment"

The name of the alignment files which has been set in "Project File Settings" is shown.

If none of the alignment files was set, set it in "Project File Settings".

For details, see "METHOD FOR SETTING ALIGNMENT (7-35)".

(2) "Point of interest"

The bucket edge position to be guided can be set.

(3) "Alignment Feature"

Alignment position to be referred can be set.

(4) "Steering offset"

Alignment data can be offset for the bucket edge to be referred.

(5) "Match"

The centerline of alignment data can be offset to the bucket edge position.

(6) ENTER button

The settings can be saved.

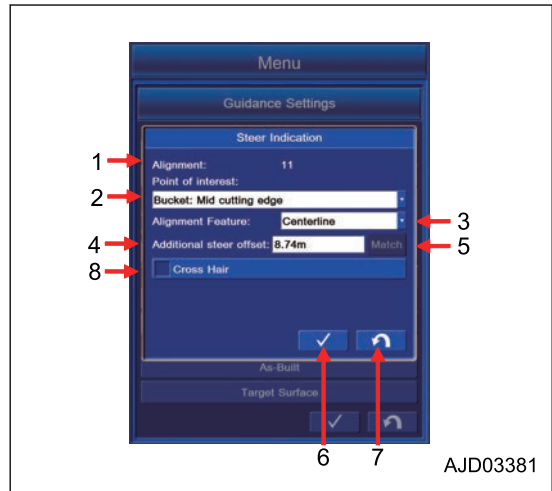
(7) RETURN button

The screen goes back to the previous screen.

(8) "Cross Hair"

You can add a cross hair to the bucket position to be referred on "Steer Indication".

Put a check and you can show the cross hair at the swing center position.



METHOD FOR SETTING NAVIGATION OF BUCKET EDGE

You can set the bucket edge position for navigation.

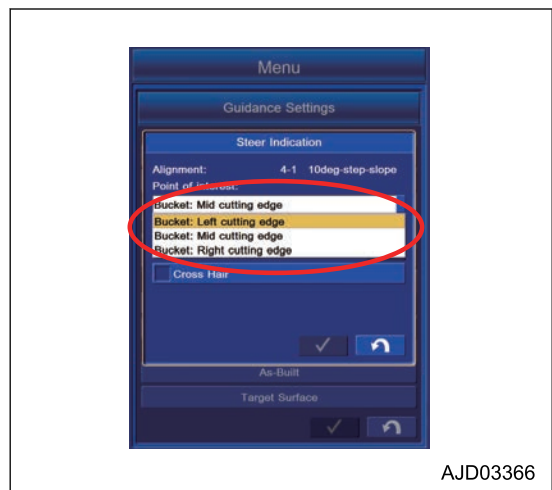
Tap "Point of interest:" column, and select the bucket edge position.

You can select the following bucket edge positions.

"Bucket: Left cutting edge"

"Bucket: Mid cutting edge"

"Bucket: Right cutting edge"



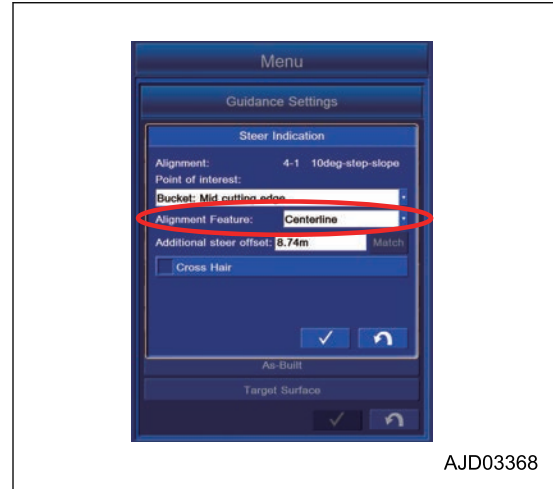
ALIGNMENT FEATURE IN STEER INDICATION SETTINGS

Alignment data can be set for the bucket edge to be guided.

Tap “Alignment Feature:” column to select the position of the alignment data.

You can select the following position for the alignment data.

- “Left” (the left side of the alignment data)
- “Centerline” (the center of the alignment data)
- “Right” (the right side of the alignment data)



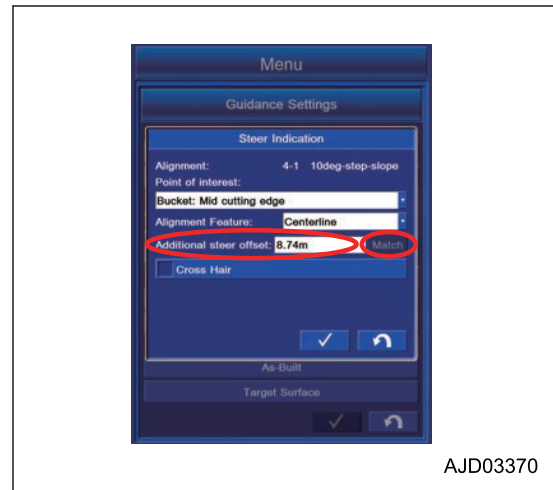
ADDITIONAL STEER OFFSET IN STEER INDICATION SETTINGS

Alignment data can be offset for the bucket edge to be guided.

The numeric value can be changed as follows by the selection from the column of the steering function.

- “Left” The width from the left end of the alignment data to the inside is “increased (+)”.
- “Centerline” The width from the center to the right side is “increased (+)”.
- “Right” The width from the right end of the alignment data to the inside is “decreased (-)”.

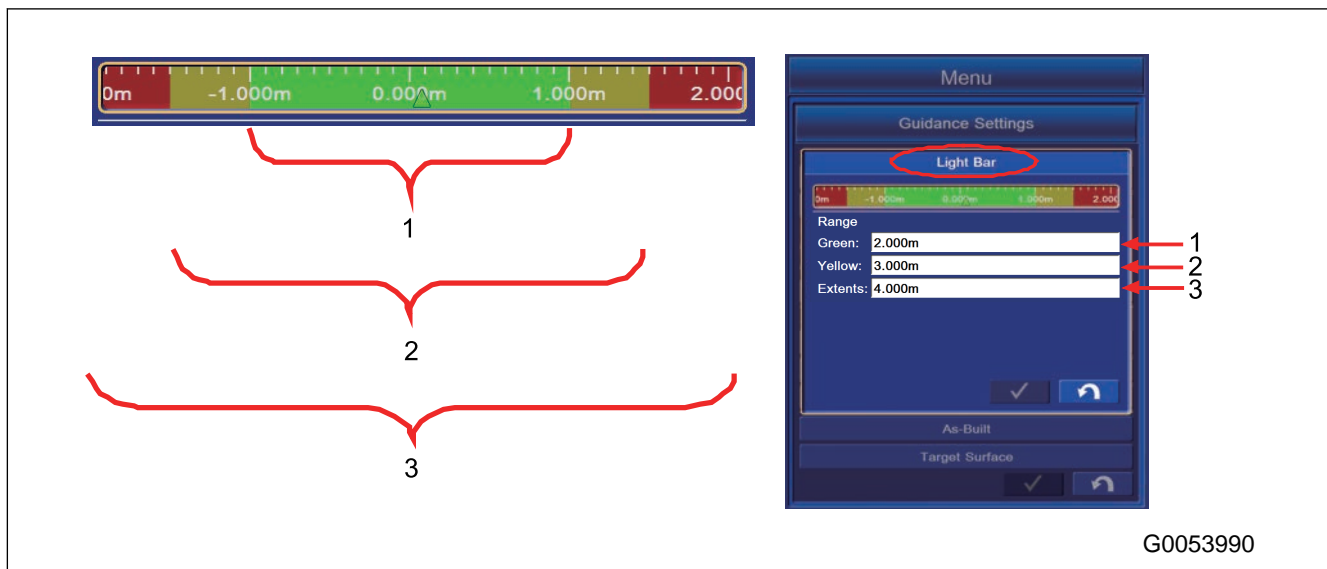
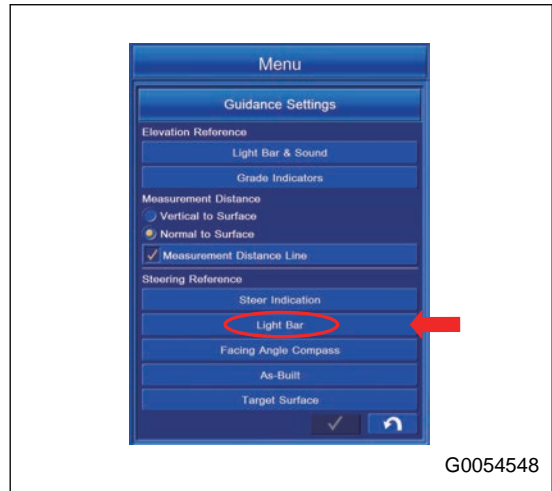
Tap “Match” button to offset the alignment data to the bucket edge position. The offset quantity is automatically set.



METHOD FOR SETTING LIGHT BAR IN STEERING REFERENCES

you can do the setting of the light bar shown for steering references can be set.

Tap “Grade Indicators” button on “Guidance Settings” screen.
The screen changes to “Machine Setup” screen.



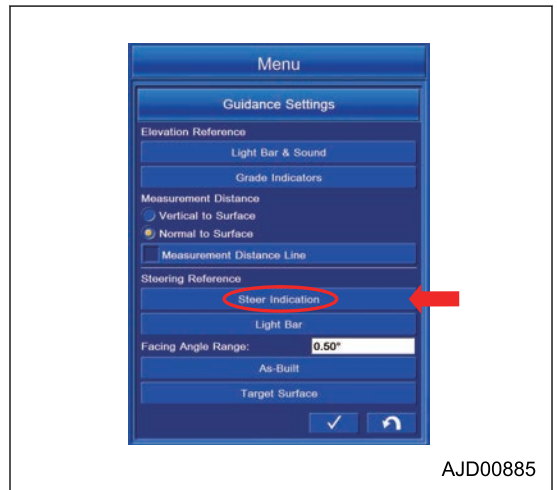
- (1) “Green”
This is for setting the range of green slope.
Tap the “Green” column and input the numeric value.
- (2) “Yellow”
This is for setting the range of yellow slope.
Tap the “Green” column and input the numeric value.
- (3) “Extents”
This is for setting the width of the slope.
Tap “Green” column and input the numeric value.

METHOD FOR SETTING CROSS HAIR IN STEERING REFERENCES

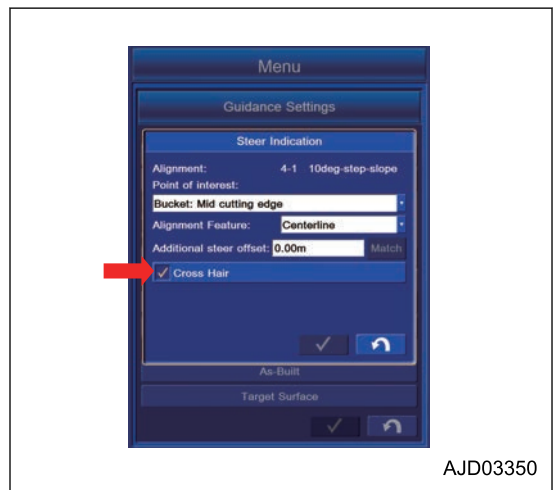
Bucket tooth position can be displayed with a cross hair for steering.



Push the “Steer Indication” button, put a tick in “Cross Hair” on the “Steer Indication” menu to display it. You will see the bucket tooth position displayed with a cross hair in the working screen.



AJD00885



AJD03350

SETTING ITEMS ON FACING ANGLE COMPASS

(1) "Facing Angle Range"

You can set the angle range that "Facing Angle Compass" is shown in green.

(2) "Facing Proximity Angle Range":

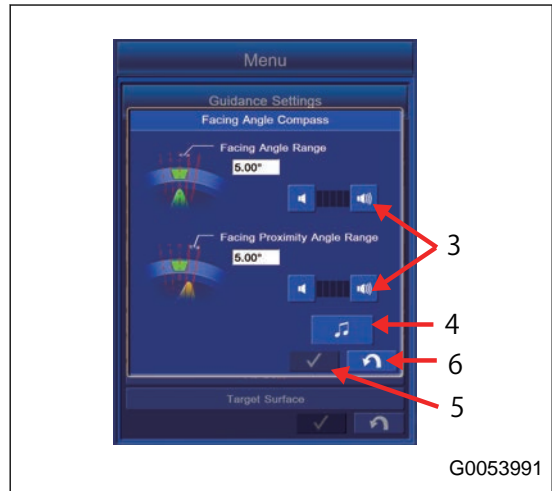
You can set "Facing Proximity Angle Range" with the sound guidance.

(3) You can adjust each sound volume of "Facing Angle Range" or "Facing Proximity Angle Range".

(4) You can change the tone of Sound.

(5) ENTER button: Tap this button and the setting is saved.

(6) RETURN button: Tap this button and the screen goes back to the previous screen.



METHOD FOR SETTING GREEN RANGE OF FACING ANGLE COMPASS

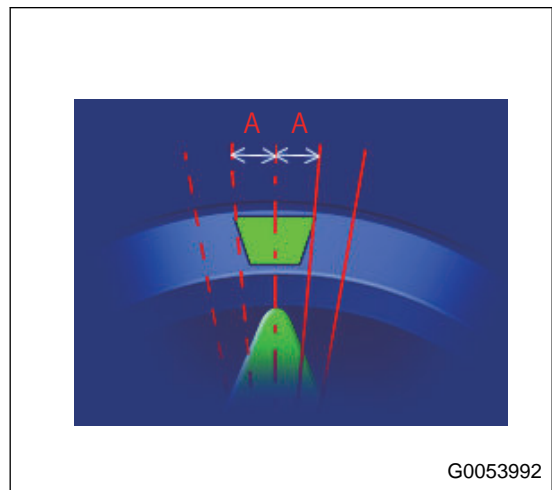
Tap "Facing Angle Range:" column, and input the value of angle range in which the Facing Angle Compass is shown in green.

When you complete the input, tap "OK" button to save the setting.



REMARK

Angle (A): You can set the value in the range of 0.50 ° to 5.00 °



METHOD FOR SETTING FACING PROXIMITY ANGLE SOUND GUIDANCE RANGE

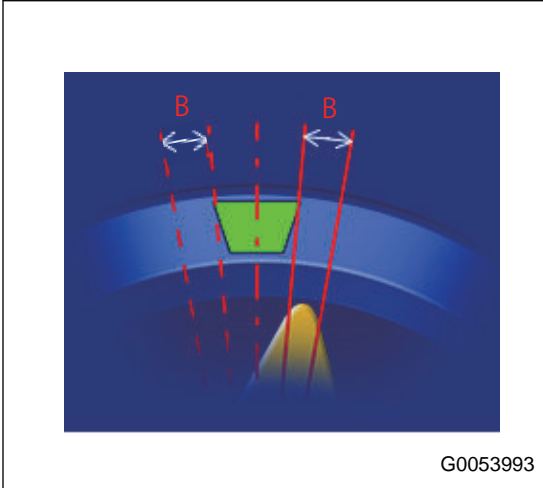
Tap “Facing Proximity Angle Range” column, and input the value of angle range in which the sound guidance is enabled within the Facing Proximity Angle Range.
 When you complete the input, tap “OK” button to save the setting.



G0056210

REMARK

Angle (B): You can set the value in the range of 0.00 ° to 10.00 °



G0053993

METHOD FOR SETTING SOUND VOLUME

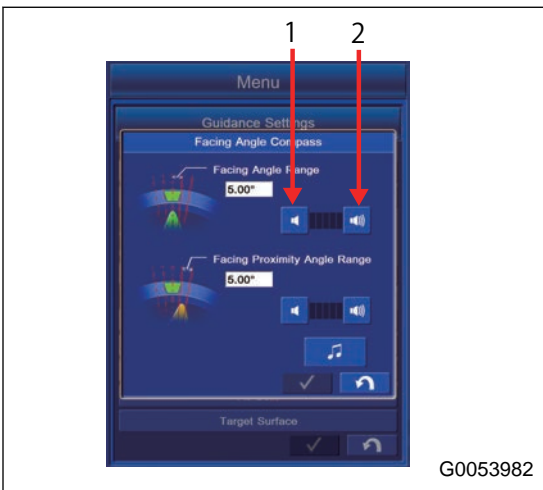
You can set the sound volume for “Facing Angle Range” and “Facing Proximity Angle Range”.

Tap the button (1) and the volume decreases.

Tap the button (2) and the volume increases.

REMARK

Each time the button (1) or (2) is tapped, the green indicator decreases or increases.

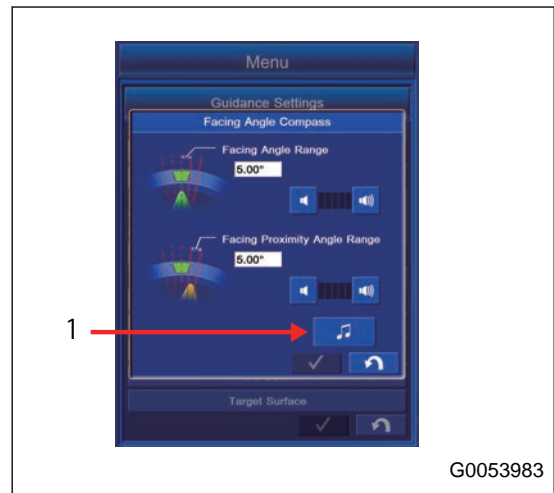


G0053982

METHOD FOR SETTING SOUND TONE

1. Tap the button (1) on the Sound Volume setting screen, the screen changes to the Tone Settings screen.

You can select a Tone from 3 patterns.



G0053983

2. Select the tone for "Facing Angle Range" and "Facing Proximity Angle Range" on "Tone Settings".

When you complete the selection, tap the ENTER button to save the setting.



G0053984

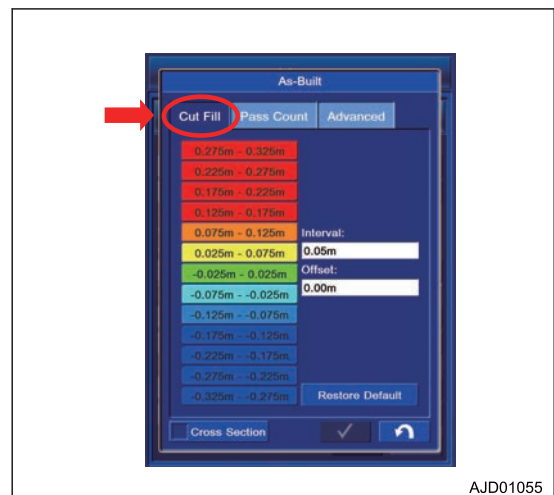
AS-BUILT SETTINGS

As-Built is the current terrain displayed in 2 dimension. By setting As-Built, state of construction can be displayed in color, and it can be a guide line for progress and accuracy of construction. If the bucket edge position or machine moves, As-Built data will be updated. To display As-Built, set Main to Plan view in Screen Layout of Display Options. For setting of View, see "VIEW SETTINGS".

CUT FILL SETTINGS

On Project File Settings, set the display of "As-Built" to "Cut Fill" display, and you can perform the setting of display color in the case that Plan view is set to Main in the screen layout.

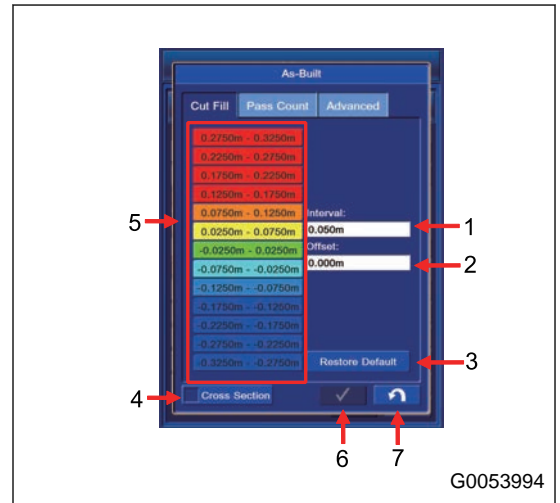
Tap "Cut Fill" tab on the setting screen of "As-Built".



AJD01055

METHOD FOR SETTING CUT FILL COLOR SELECTION

- (1) “Interval:”
Sets the interval of display color.
- (2) “Offset”
Offsets the range of display color for As-Built.
- (3) “Restore Default”
Restores the interval and offset value to the default value.
- (4) “Cross Section”
Displays the Elevation of As-Built with a line in the Profile view or Section view.



- (5) Change of display color “Color Selection”
You can change the display color of As-Built. Tap the item of which you want to change the display color.
The screen changes to the display color change screen of “Color Selection”. Select any color and tap ENTER button.

REMARK

If you tap the Default Color, the default color is set.

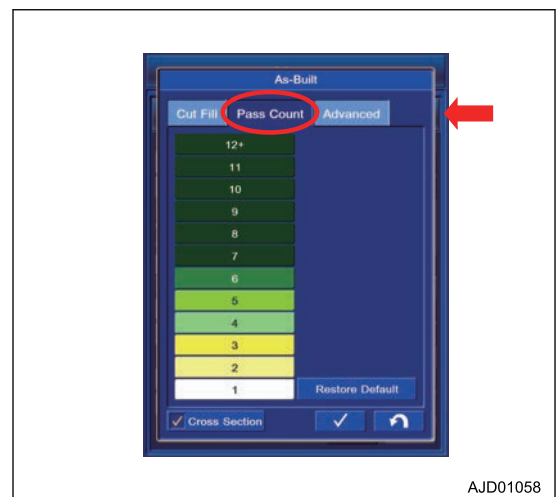
- (6) ENTER button
Tap ENTER button and the setting is saved.
- (7) RETURN button
Tap RETURN button and the screen returns to the previous screen.



PASS COUNT SETTINGS

In Project File Settings, set the display of “As-Built” to “Pass Count” display, and you can perform the setting of display color in the case that the Plan view is set to Main in the screen layout.

Tap “Pass Count” tab on the setting screen of “As-Built”.



METHOD FOR SETTING PASS COUNT COLOR SELECTION

(1) Tap the Pass Count of which you want to change the display color.
The screen changes to the screen of "Color Selection". Select any color and tap ENTER button.

REMARK

If you tap the Default Color, the default color is set.

(2) "Restore Default"

Restores the interval and offset value to the default value.

(3) "Cross Section"

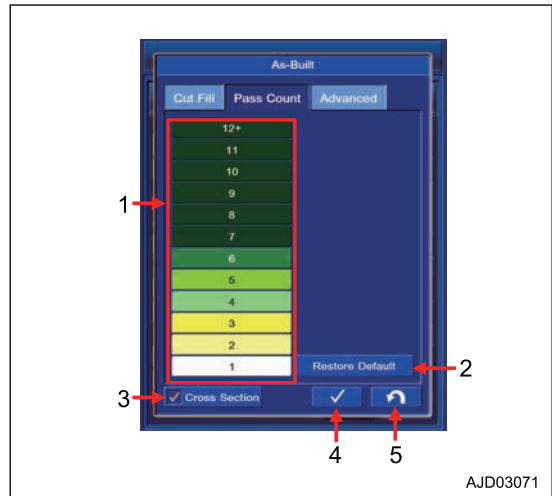
Displays the Elevation of As-Built with a line in the Profile view or Section view.

(4) ENTER button

Tap ENTER button and the setting is saved.

(5) RETURN button

Tap RETURN button and the screen returns to the previous screen.



AS-BUILT ADVANCED MENU

On “Advanced” screen of “As-Built”, you can perform the setting of Server/Local for As-Built Control management and Selection/Deletion of As-Built Control file.

METHOD FOR SETTING AS-BUILT CONTROL

- (1) “Manage by:”
 - When “Site-Link server” is selected
HMI reads the As-built data from Site-Link server. Even if the user deletes the As-built cache locally, HMI keeps getting the As-built data from the server.
 - When “Local as-built only” is selected
The control box itself manages the As-built. In this setting, the server does not renew the As-built data.

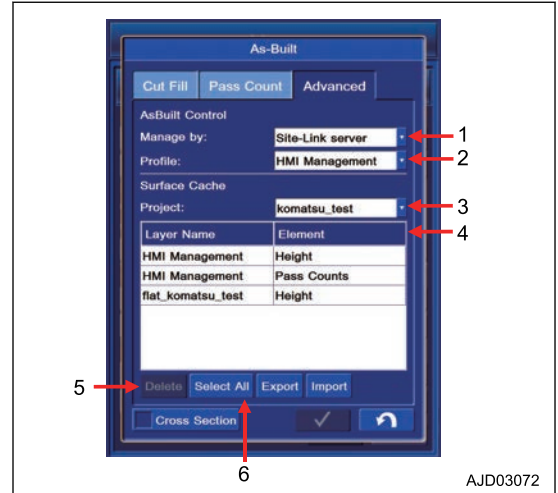
- (2) “Profile:”
“AsBuilt Control” setting puts the As-Built data used in different scenarios all together in 1 set. This setting is used only when the As-Built is managed locally.

In several cases, when operating or comparing the different As-Built data, user needs the different As-Built layer (Elevation, construction, frequency, temperature, etc.) or different cell size.

When operating with the local mode by using 1 profile, operation does not change.

However, when multiple settings exist, if a setting is changed to another setting, the As-Built data will be changed.

- (3) “Project:”
Selects the necessary setting from the list of “AsBuilt Control” setting for each Project which is saved locally.
- (4) Displays all layers included in “AsBuilt Control” setting of the Project.
- (5) “Delete” button
Deletes the selected Layer.
- (6) “Select All” button
Selects all the As-Built files existing in the list.



AJD03072

METHOD FOR IMPORT/EXPORT AS-BUILT CONTROL FILES

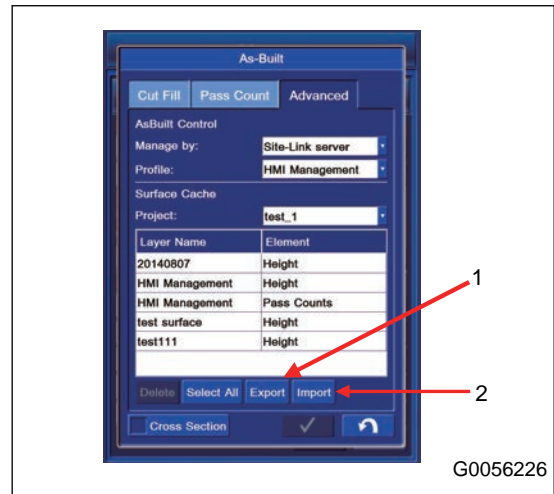
Use the USB flash drive and you can take out the AsBuilt Control files (GD3 file) from the control box or put the file into the control box.

1. Export button

You can write the AsBuilt Control files of the control box into the drive to which the USB flash drive is connected.

2. Import button

You can import the AsBuilt Control files saved in the USB flash drive into the 3DMC folder of the control box.



Export display



Import display



METHOD FOR SETTING TARGET SURFACE

You can do the setting of "Target Surface".

(1) "Isolation Mode"

You can apply the semi-auto digging only to the selected "Target Surface".

(2) "Maximum grade transition:"

You can change the size of selected "Target Surface".

Input the numeral value in "Maximum grade transition:" column to change.

(3) "Extend grade at edge by:"

You can extend the selected "Target Surface" in "Isolation Mode".

(4) "Surface color"

You can set the display color of the Surface.

(5) "Extension color"

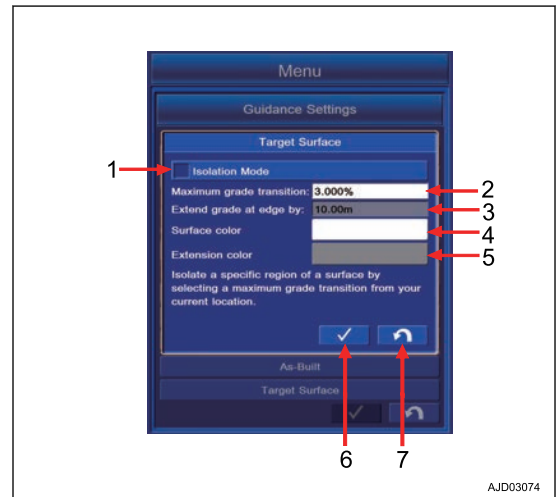
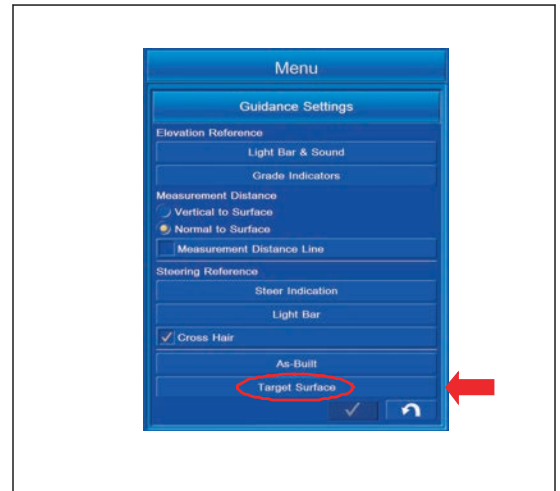
You can set the display color of the extended Surface.

(6) ENTER button

Tap the ENTER button and the setting is saved.

(7) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.



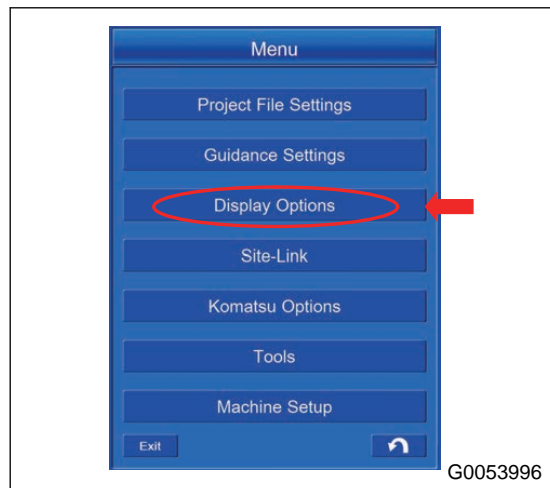
DISPLAY OPTIONS

“Display Options” is for setting the working screen layout, displays, point, alignment data, machine image, working range, bucket alignment lines, configurations for display of other machines, background color, brightness, language, and unit.

1. Tap the main menu display button at the right bottom of the working screen, then the screen changes to the “Menu”.



2. Tap the “Display Options” button on “Menu” screen, and the screen changes to the “Display Options” setting screen.



DISPLAY OPTIONS CONTENTS

With “Display Options”, you can set and edit the items that follow.

(1) “Screen Layout”

You can set the layout of screen.

(2) “View”

You can do the setting of display.

(3) “Design Data”

You can configure Design Data display.

(4) “Machine Image”

You can configure the display setting of machine.

(5) “Working Range”

You can do Display/Non-display setting of the operation range of the work equipment. (This is shown only in Travel mode.)

(6) “Bucket Alignment Lines”

You can do Display/Non-display setting of Bucket Alignment.

(7) “Display Other Machines”

You can do the display setting of other machine. (Only when it is connected to the Site-Link.)

(8) “Background Color”

You can do the display setting of background of working screen.

(9) “Brightness Adjustment”

You can adjust the brightness of the control box.

(10) “Language & Units”

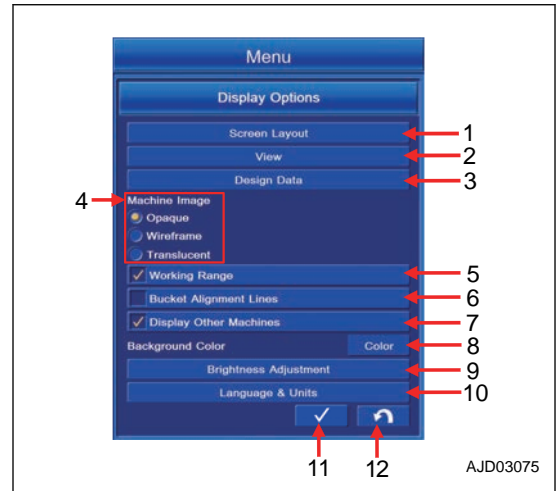
You can do the setting of the language and unit.

(11) ENTER button

Tap the ENTER button and new setting is saved.

(12) RETURN button

Tap the RETURN button, and the screen goes back to the menu screen.

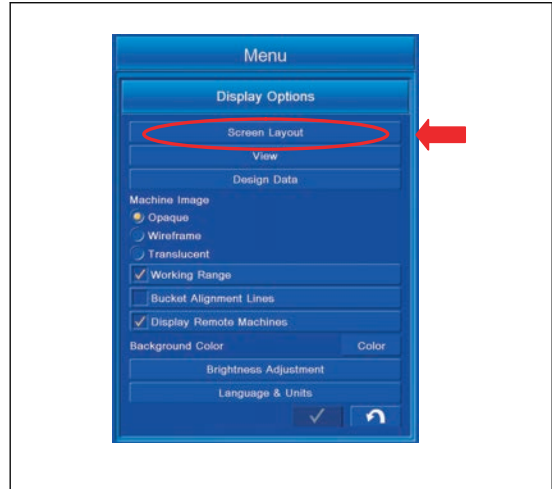


SCREEN LAYOUT SETTINGS

With “Display Options”, you can set and edit for following items.

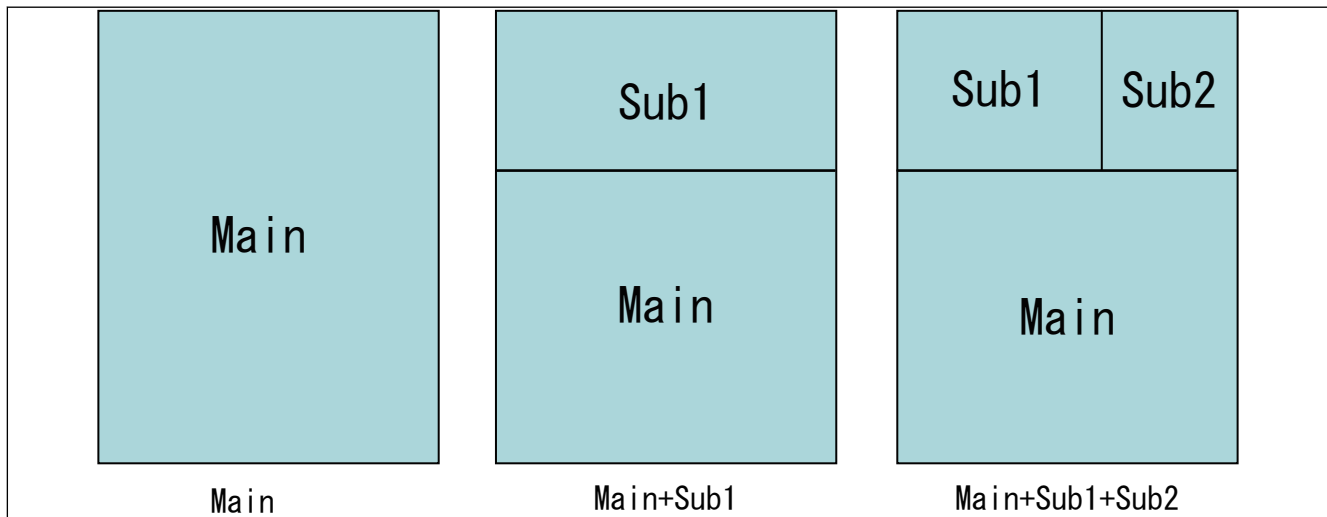
Perform the layout setting of the working screen.

Tap “Screen Layout” button on “Display Options” screen, the screen changes to the layout setting screen of the working screen.



SCREEN LAYOUT

You can select the layout of the working screen from the following 3 types.



REMARK

When Drive mode is selected, you cannot set the Screen Layout of “Main+Sub1+Sub2”

METHOD FOR SETTING SCREEN LAYOUT FOR DRIVING

You can do the display setting for the Driving mode.

Display setting can be saved in "Driving1" and "Driving2".

Tap "Driving1" tab on the setting screen of "Screen Layout".
You can do the display setting of "Driving1" screen.

(1) "Pop-Up Map"

Displays the wide area map on the working screen with pop-up display.

(When you tap the button on the right top, the pop-up is shown on the screen.)

(2) "Facing Angle Compass"

Displays Facing Angle Compass on the working screen.

(Facing Angle Compass is shown when you tap the Target Surface on the design surface of the .tn3 file and .pl3 file.)

(3) "Steering Light Bar"

Displays the steering light bar on the working screen. It is shown on the screen only when the designed data of the alignment is shown.

(4) "Left Grade Indicator"

Displays the L.H. grade indicator (Elevation on the working screen.

(5) "Right Grade Indicator"

Displays the R.H. grade indicator (Elevation) on the working screen.

(6) "Main"

You can select the view to be shown in Main.

(7) "Sub1"

You can select the view to be shown in Sub1.

(8) "3D view direction"

You can select the display of 3D view.

(9) The image selected in "Driving1" is shown.

REMARK

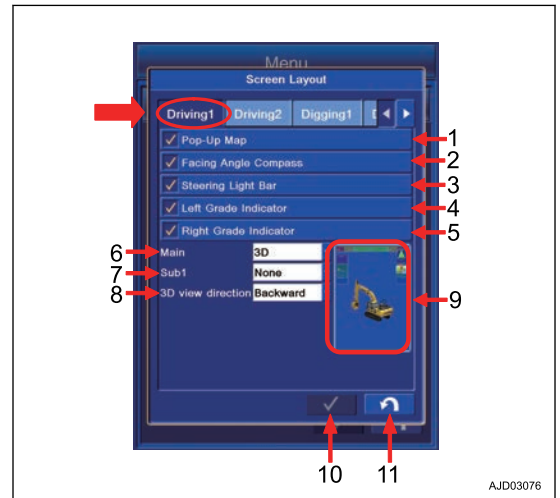
The contents selected in "3D view direction" are not reflected to the image.

(10) ENTER button

Saves the contents which have been changed in the guidance settings.

(11) RETURN button

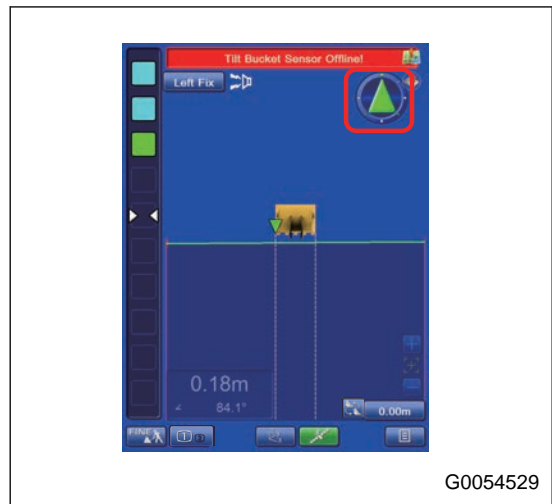
Tap the RETURN button. The screen goes back to the menu screen.



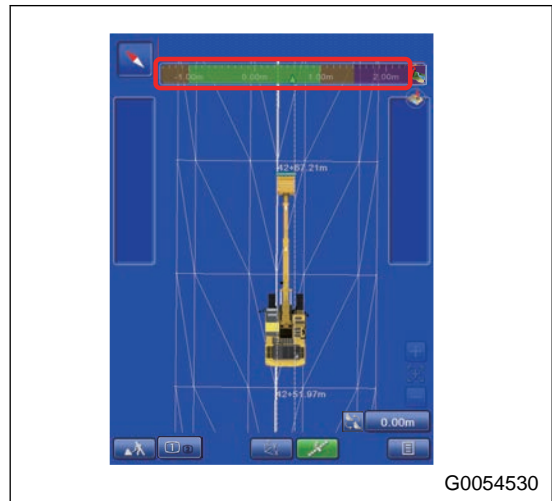
Display of the Pop-Up Map



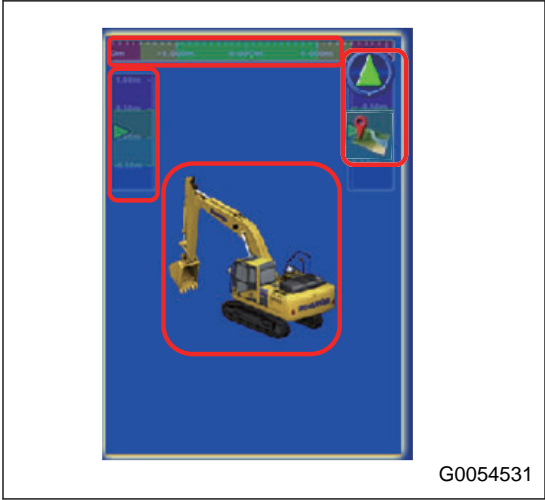
Display of the Facing Angle Compass



Steering Light Bar display when Alignment is selected in Surface



Machine image



G0054531

VIEW SELECTIONS FOR DRIVING

The setting for the view displayed on “Main” and “Sub1” in traveling mode can be set.

REMARK

The view selected for “Main” can not be selected neither for “Sub1”.

Available views are the following 3 types.

“3D”



“Plan”



“Profile”

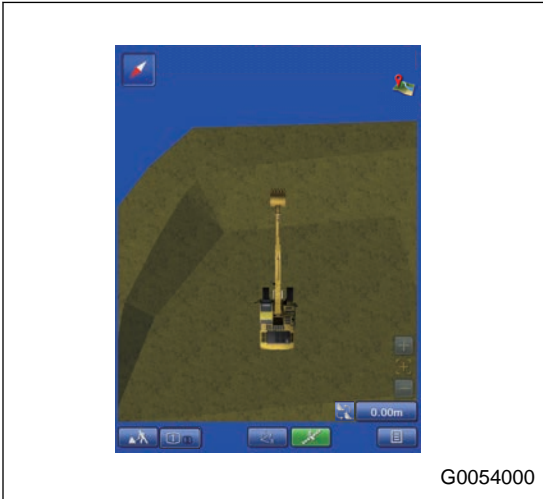


3D VIEW POINT SETTINGS FOR DRIVING

You can set the direction of 3D display. You can set only when 3D view is selected by “Main” or “Sub1” in Driving mode.

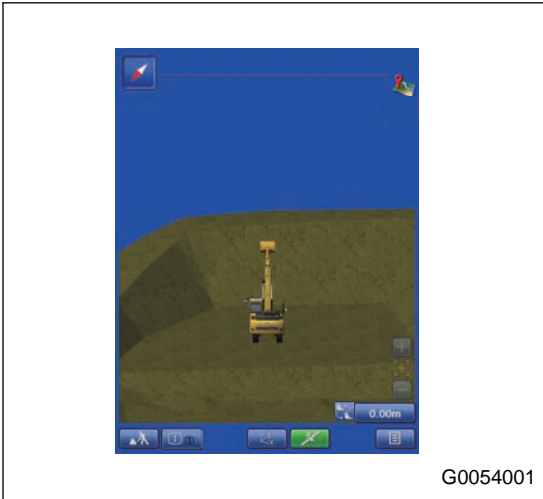
Available directions of display are the following 4 kinds.

“Overhead”



G0054000

“Backward”



G0054001

“Left”



G0054002

“Right”



METHOD FOR SETTING SCREEN LAYOUT FOR DIGGING

The setting for the display of fine digging mode and rough digging mode can be set.

The setting can be saved in “Digging 1”, “Digging 2”, and “Digging 3” for configurations.

Tap the “Digging 1” tab on the setting screen of “Screen Layout”.

The setting for the display of “Digging 1” screen can be set.

(1) “Pop-Up Map”

Displays the wide area map on the working screen with pop-up display.

(2) “Facing Angle Compass”

Displays “Facing Angle Compass” on the working screen. (It is displayed on the screen only when the design data is selected.)

(3) “Light Bar”

Displays the light bar when the rough digging is performed.

(4) “Steering Light Bar”

Displays the steering light bar on the working screen. It is displayed on the screen only when the designed data of the alignment is displayed.

(5) “Left Grade Indicator”

Displays the L.H. grade indicator (elevation) on the working screen.

(6) “Right Grade Indicator”

Displays the R.H. grade indicator (elevation) on the working screen.

(7) “Main”

The view displayed in “Main” can be selected.

(8) “Sub1”

The view displayed in “Sub1” can be selected.

(9) “Sub2”

The view displayed in “Sub2” can be selected.

(10) “3D view direction”

The display of 3D view can be selected.

(11) The image selected in the digging1 is displayed.

REMARK

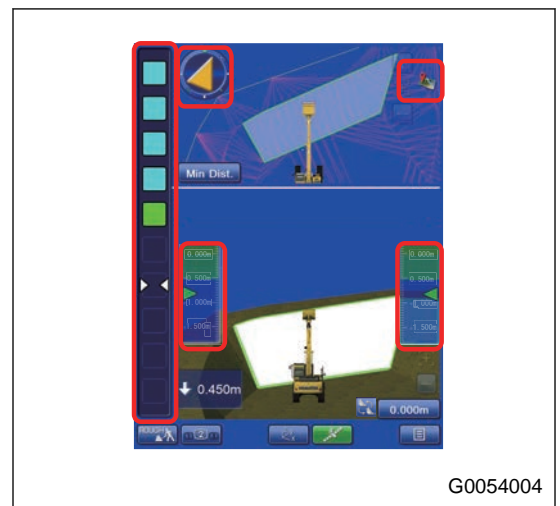
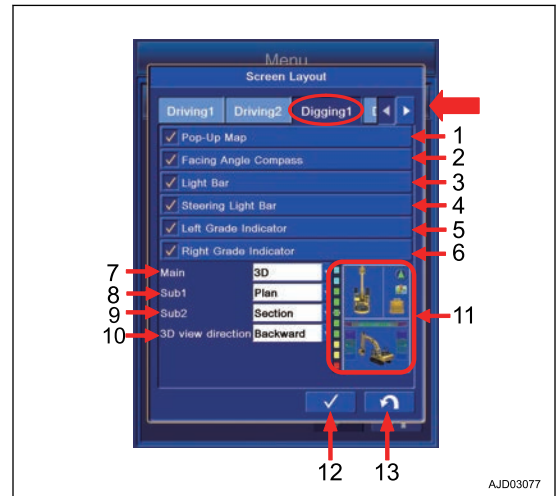
The contents selected in “3D view direction” are not reflected to the image.

(12) ENTER button

The contents which have been changed in the guidance settings can be saved.

(13) RETURN button

Tap the RETURN button and the display returns to the main menu screen.



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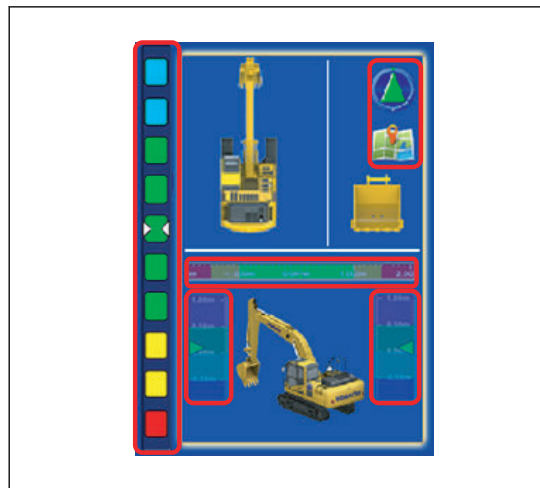
G0054004

G0054005

Machine image

REMARK

The machine image differs from the contents displayed on the working screen.



VIEW SELECTIONS FOR DIGGING

The setting for the view of the fine digging mode and the rough digging mode, "Digging 1", "Digging 2", and "Digging 3" can be set.

The views to be displayed in the "Main", "Sub1", and "Sub2" in the digging mode can be selected.

REMARK

- The view selected for "Main" can not be selected neither for "Sub1" nor "Sub2".
- The view selected for "Main" and "Sub1" can not be selected for "Sub2".

Available views are the following 4 types.

"3D"



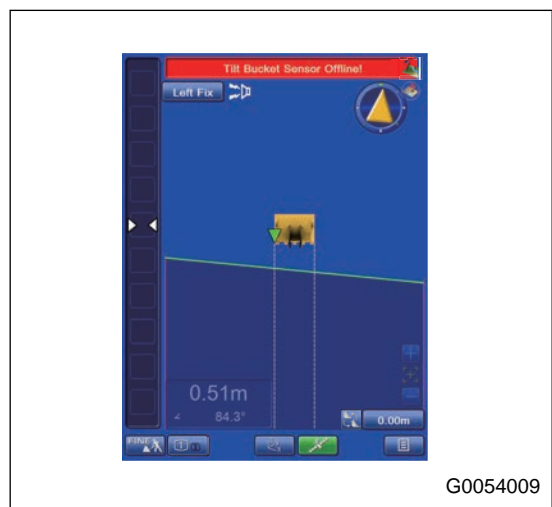
"Plan"



“Profile”



“Section”



3D VIEW POINT SETTINGS FOR DIGGING

You can set the direction of 3D display. You can set only when 3D view is selected by “Main” or “Sub1” or “Sub2” in Digging mode.

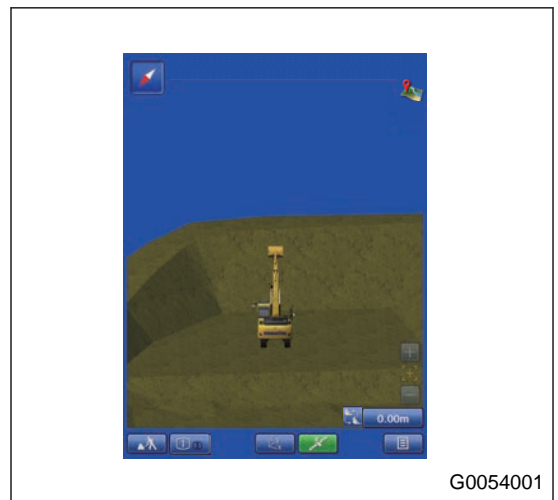
Available directions of view are the following 4 kinds.

“Overhead”



G0054000

“Backward”



G0054001

“Left”



G0054002

“Right”

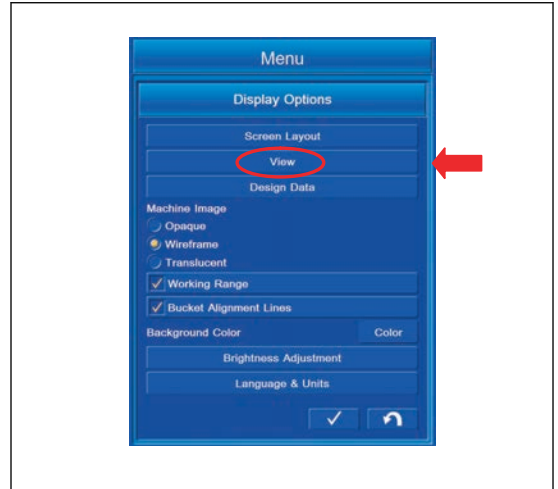


VIEW SETTINGS

You can perform the setting of View contents selected in Main, Sub1, and Sub2.

Perform the layout setting of the working screen.

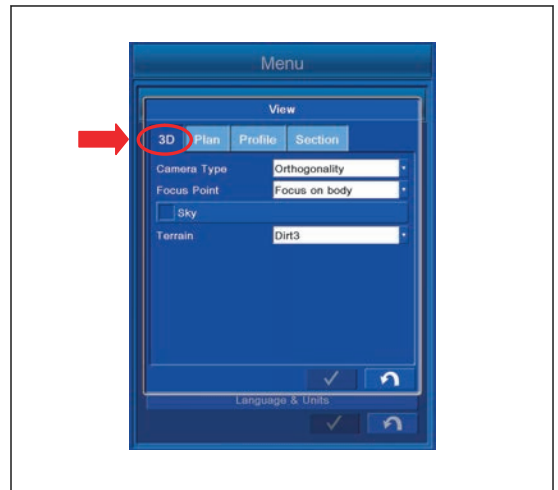
Tap “View” button on “Display Options” screen, and the screen changes to the setting screen of View.



3D VIEW SETTINGS

You can perform the setting of 3D view.

Tap “3D” tab on the setting screen of “View” to select.



3D VIEW SETTING CONTENTS

(1) “Camera Type”

You can set the type of camera.

(2) “Focus Point”

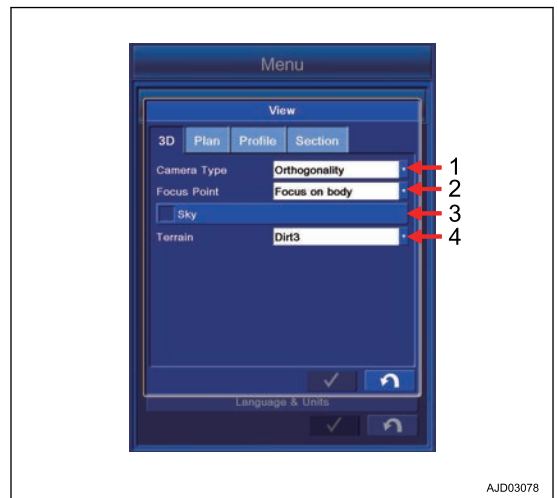
You can set the focus point.

(3) “Sky”

You can set the background of working screen to “Sky”.

(4) “Terrain”

You can set the image of the terrain.

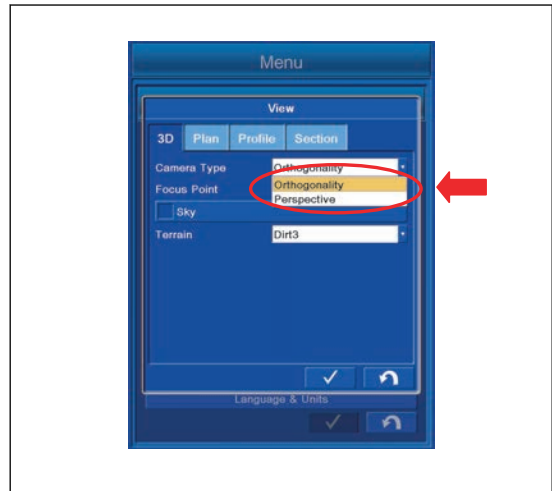


AJD03078

METHOD FOR SETTING CAMERA TYPE

Select “3D” tab, and tap the column of “Camera Type”.
“Camera Type” can be set.

You can select “Camera Type” from the following 2 kinds.



“Orthogonality”



G0054014

“Perspective”

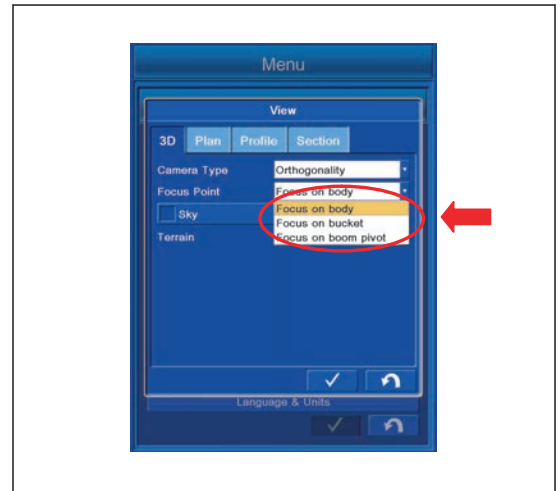


G0054015

METHOD FOR SETTING FOCUS POINT

Select “3D” tab, and tap the column of “Focus Point”.
You can set “Focus Point”.

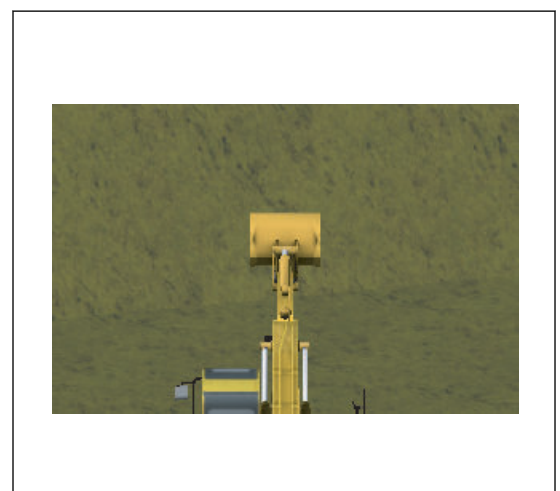
You can select “Focus Point” from the following 3 kinds.



“Focus on body”: Focuses on the machine body.



“Focus on bucket”: Focuses on the bucket.

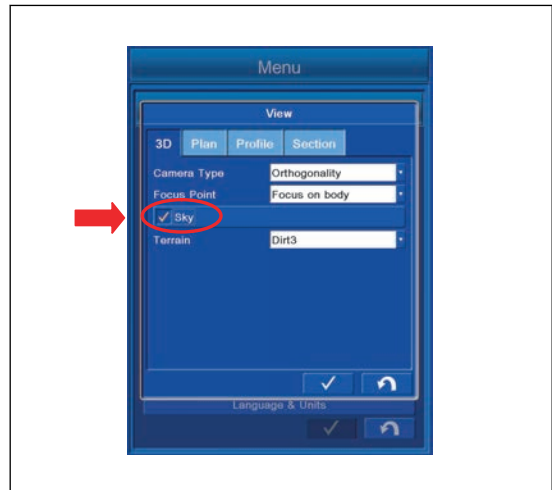


“Focus on boom pivot”: Focuses on the boom.



METHOD FOR SETTING BACKGROUND

Select “3D” tab, and put a tick in the check box of “Sky”.

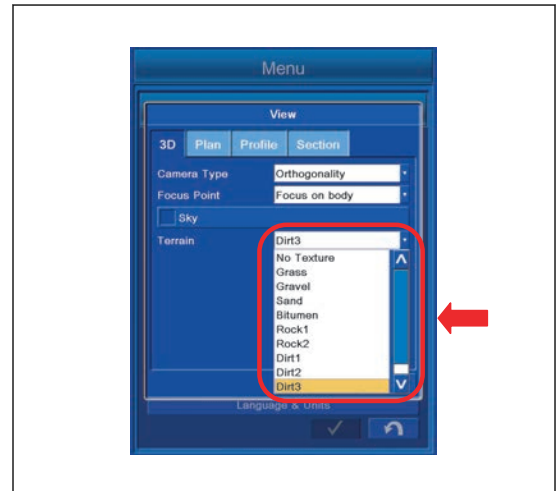


“Sky” is set as a background on working screen.



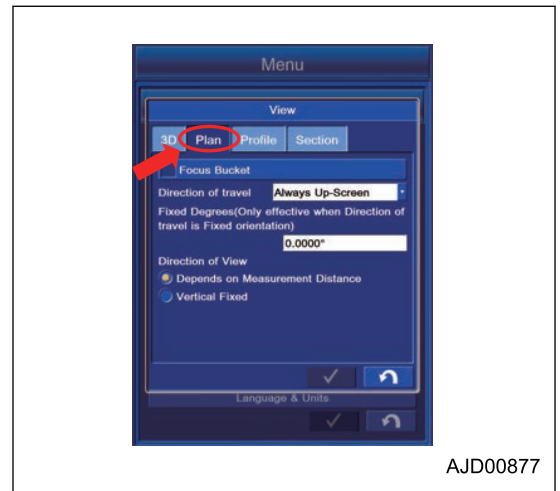
METHOD FOR SETTING TERRAIN

Select “3D” tab, and tap the column of “Terrain”.
You can set Terrain.



PLAN VIEW SETTINGS

The setting for the plan view can be set.
Tap the “Plan” tab on the setting screen of the “View” to select.



AJD00877

PLAN VIEW SETTING CONTENTS

(1) "Focus Bucket"

You can focus on the bucket center.

(2) "Direction of travel"

The direction of travel of the machine can be set.

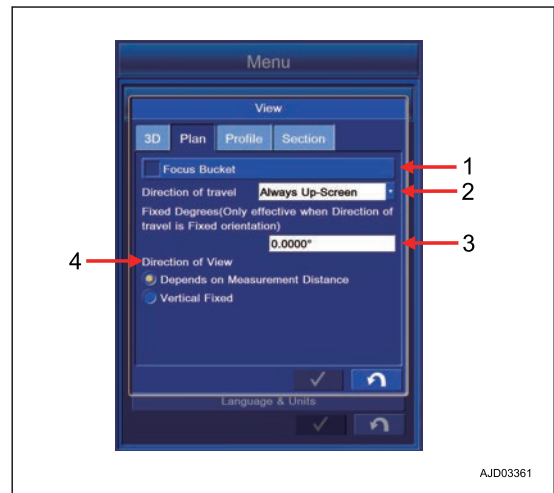
(3) "Fixed Degrees(Only effective when Direction of travel is Fixed orientation)"

The direction of travel of the machine can be fixed.

(4) Direction of view

The point of view of which you will see can be selected.

- "Depends on Measurement Distance"
- "Vertical Fixed"

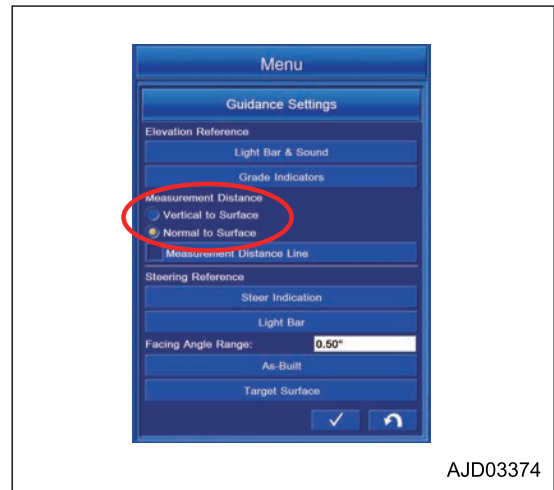


AJD03361

REMARK

Setting of the measurement distance

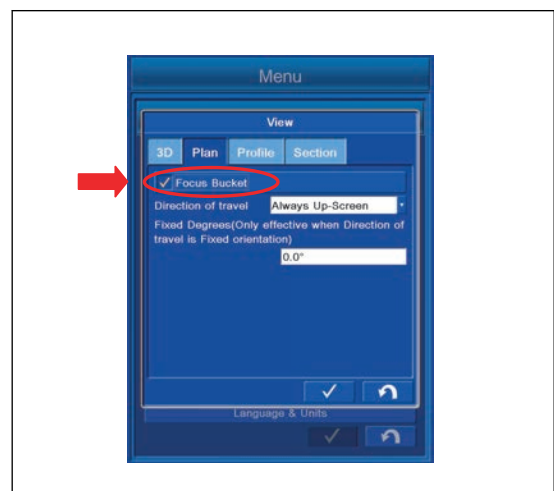
- When the "Vertical to Surface" is selected, the view is displayed as if it were seen from directly above in the vertical direction.
- "Normal to Surface" is selected, the view is displayed as if it were seen from directly above the machine.



AJD03374

METHOD FOR SETTING FOCUS POINT

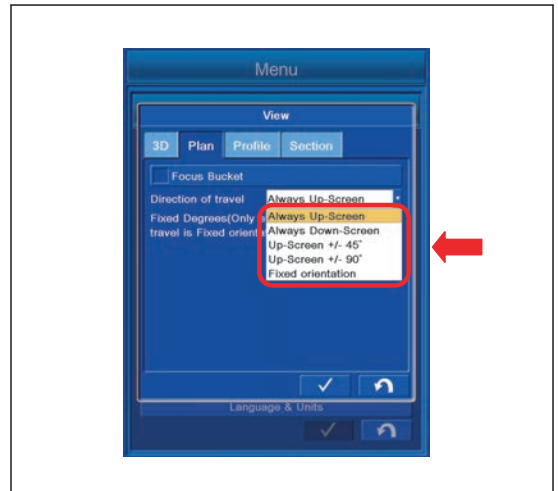
Put a tick in the check box of "Focus Bucket", and Focus Bucket is set.



METHOD FOR SETTING DIRECTION OF TRAVEL

Select “Plan” tab, tap the column of “Direction of travel”, and you can select the direction of travel.

You can select the direction of travel from the following 5 kinds.



“Always Up-Screen”

Displays the machine so that the bucket edge comes upward.



G0056211

“Always Down-Screen”

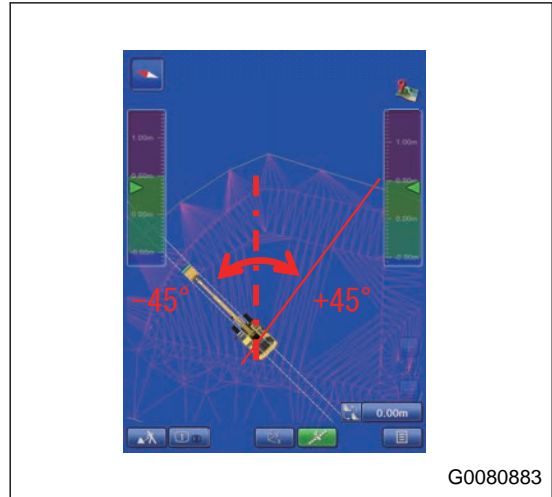
Displays the machine so that the bucket edge comes downward.



G0056212

“Up-Screen +/- 45°”

The direction of travel can be set between +45 ° and -45 °.



G0080883

“Up-Screen +/- 90°”

The direction of travel can be set between +90 ° and -90 °.



G0056214

“Fixed orientation”

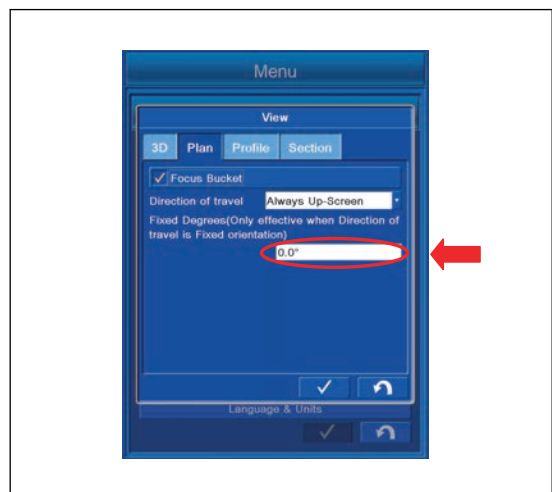
The direction of travel can be fixed at specified angle.

METHOD FOR SETTING DIRECTION OF TRAVEL FIXED DEGREES

Select “Plan” tab, and tap the column of “Fixed Degrees(Only effective when Direction of travel is Fixed orientation)”. You can set the angle to be fixed.

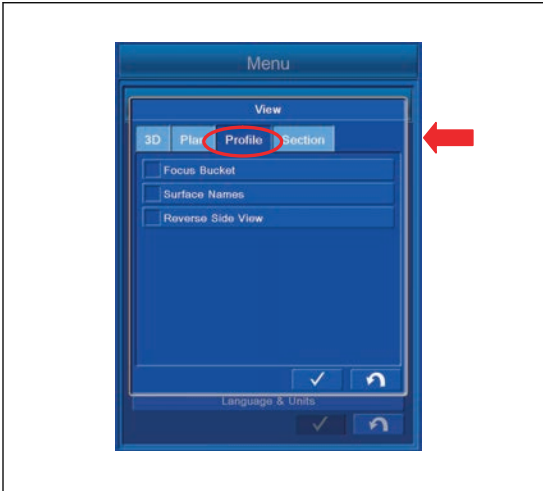
REMARK

The angle can be set only when the fixing angle is set to “Fixed orientation”.



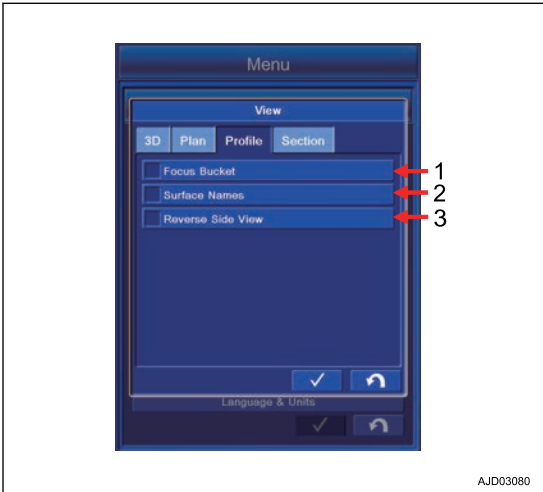
PROFILE VIEW SETTINGS

You can perform the setting of Profile view.
Tap "Profile" tab on the setting screen of "View" to select.



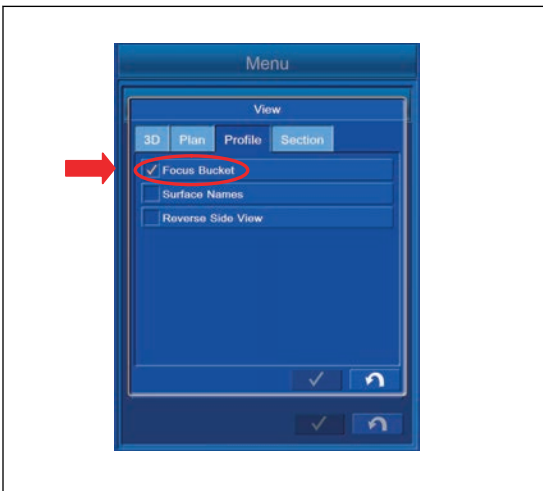
SECTION VIEW SETTING CONTENTS

- (1) "Focus Bucket"
You can focus on the bucket.
- (2) "Surface Names"
You can display Surface Names.
- (3) "Reverse Side View"
You can reverse the working screen.



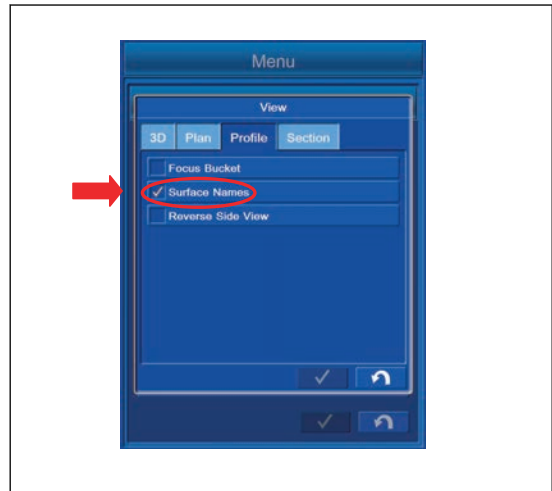
METHOD FOR SETTING FOCUS POINT

Put a tick in the check box of "Focus Bucket".
You can focus on the bucket.



METHOD FOR DISPLAYING SURFACE NAMES

Put a tick in the check box of "Surface Names".

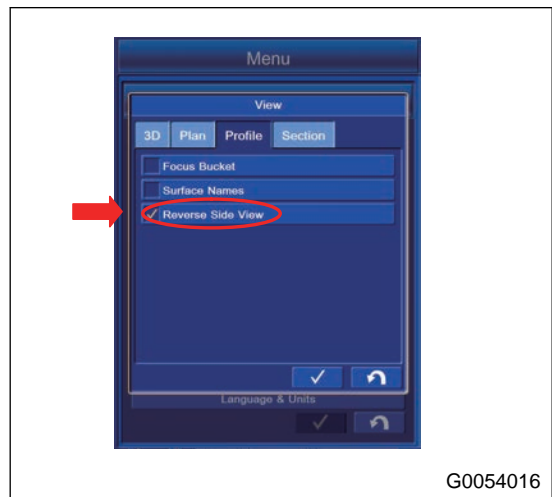


Surface Name is displayed.



METHOD FOR SETTING REVERSE SIDE VIEW

Put a check mark in the check box of "Reverse Side View".
The work screen in reverse side view is shown.

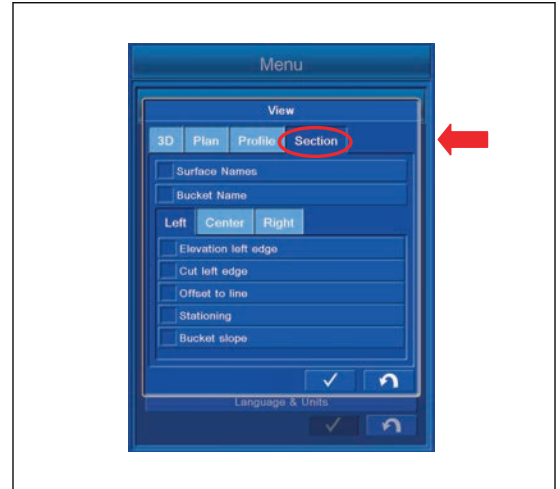


G0054016

SECTION VIEW SETTINGS

You can perform the setting of Section view.

Tap "Section" tab on the setting screen of "View" to select.



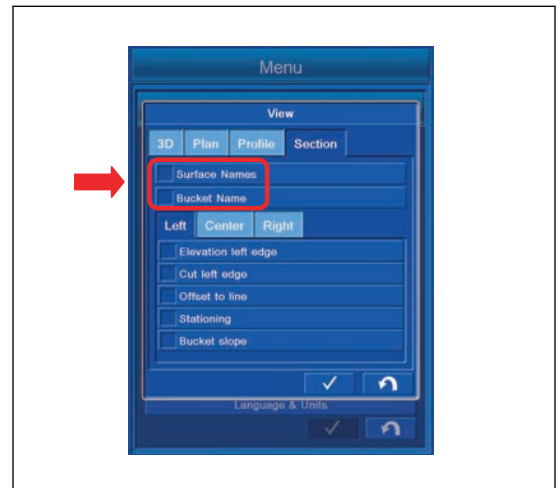
SECTION VIEW SETTINGS CONTENTS

"Surface Names"

You can display Surface Names.

"Bucket Name"

You can display Bucket Name.



For the items explained below, by putting a tick in the check box, "Display" is set. If a tick is not put, "Non-display" is set.

SETTING ITEMS BY LEFT TAB

You can perform the display setting for the leftmost position information of the bucket edge.

“Elevation left edge”

You can perform the display setting for Elevation of the bucket edge (leftmost).

“cut left edge”

You can perform the display setting for the distance from the bucket edge (leftmost) to the Surface.

“Offset to line”

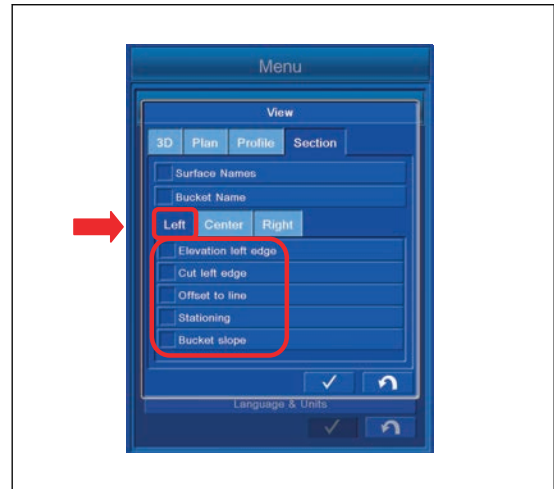
You can perform the display setting for the distance from the bucket edge to the Alignment.

“Stationing”

You can perform the display setting for the distance from the bucket edge to the Stationing.

“Bucket slope”

You can perform the display setting for the inclination of the bucket edge (lateral direction of machine) against Alignment.



SETTING ITEMS BY CENTER TAB

You can perform the display setting for the center position information of the bucket edge.

“Steering offset”

You can perform the display setting for the offset amount which is set in the configuration of the steering Light Bar.

“Offset to line”

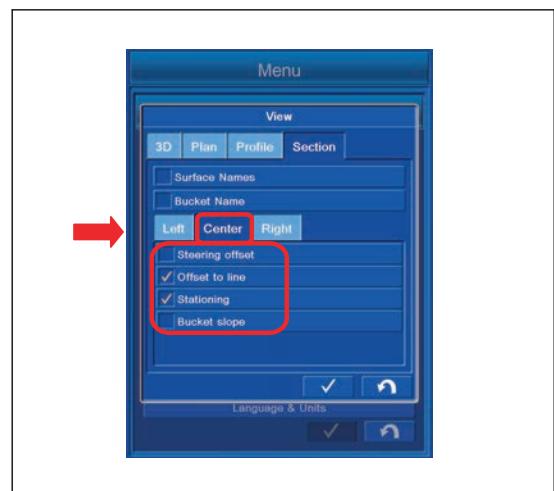
You can perform the display setting for the distance from the bucket edge to the Alignment.

“Stationing”

You can perform the display setting for the distance from the bucket edge to the Stationing.

“Bucket slope”

You can perform the display setting for the inclination of the bucket edge (lateral direction of machine) against Alignment.



SETTING ITEMS BY RIGHT TAB

You can perform the display setting for the rightmost position information of the bucket edge.

“Elevation right edge”

You can perform the display setting for the Elevation of the bucket edge (rightmost).

“Cut right edge”

You can perform the display setting for the distance from the bucket edge (rightmost) to the Surface.

“Offset to line”

You can perform the display setting for the distance from the bucket edge to the Alignment.

“Stationing”

You can perform the display setting for the distance from the bucket edge to the Stationing.

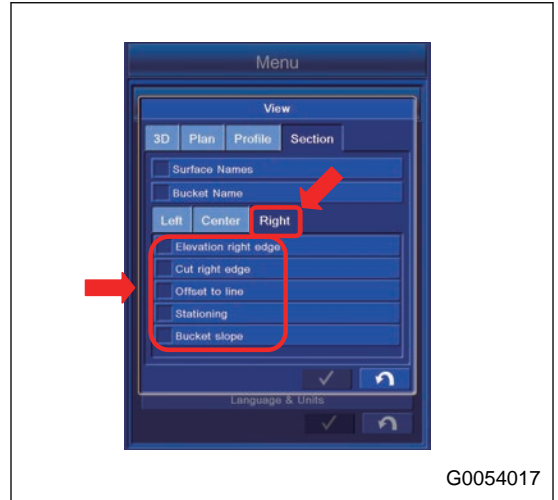
“Bucket slope”

You can perform the display setting for the inclination of the bucket edge (lateral direction of machine) against Alignment.

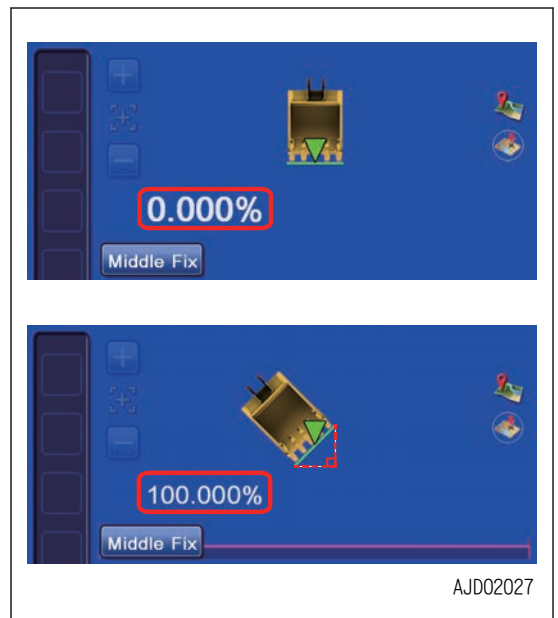
REMARK

The bucket inclination is displayed in %.

- 0.000 % for the inclination of 0 °
- 100.000 % for the inclination of 45 °



G0054017

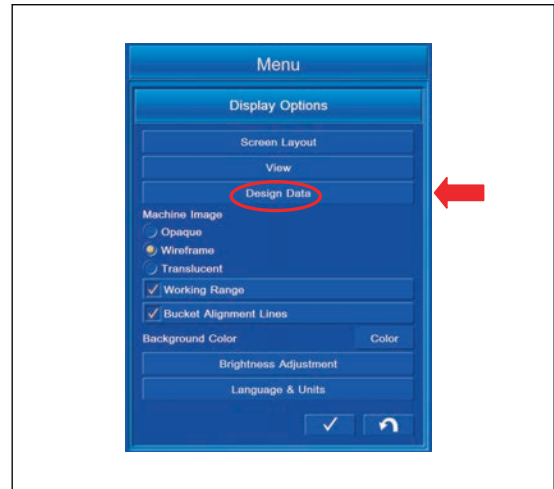


AJD02027

DESIGN DATA SETTINGS

You can perform the display setting of Design Data, Alignment, and Point Options.

Tap “Design Data” button on “Display Options” screen, the screen changes to Configurations screen of “Design Data”.



SETTING ITEMS BY ALIGNMENT TAB

Tap “Alignment” tab to select.

(1) “Alignment centerline color:”

You can set the color of Alignment centerline.

(2) “Alignment feature-line color:”

You can set the color of Alignment-feature line.

(3) “Station line color:”

You can set the color of Station line.

(4) “Regular station lines”

You can set the color of Regular station lines.

(5) “Station labels”

You can set the color of Station labels.

(6) “Station interval:”

You can set the color of Station interval.

(7) “Cross section color”

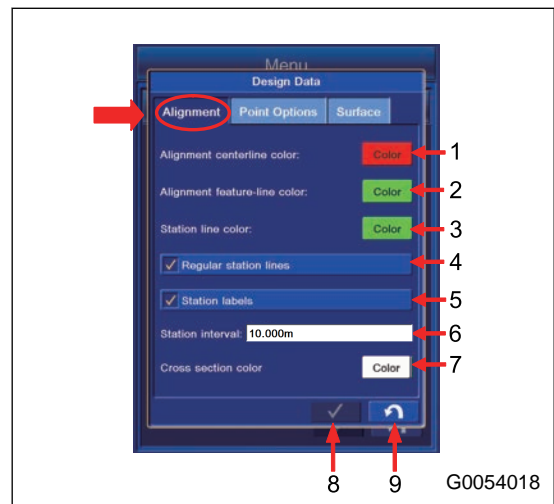
You can set the color of Alignment displayed in Cross section view.

(8) ENTER button

Tap ENTER button and new setting is saved.

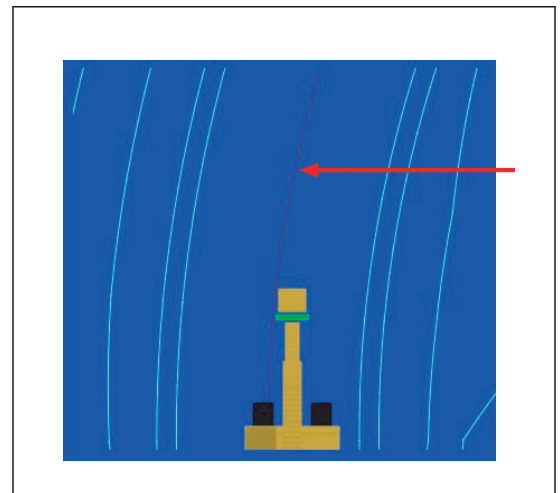
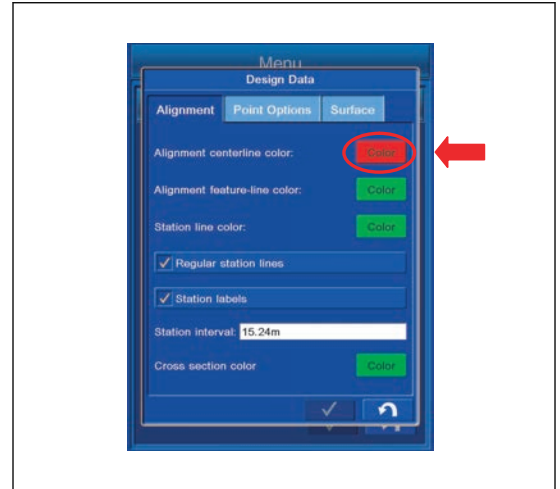
(9) RETURN button

Tap RETURN button and the screen returns to the main menu screen.



METHOD FOR SETTING ALIGNMENT CENTERLINE COLOR

1. Tap "Alignment" tab to select.
2. Tap "Color" button of "Alignment centerline color:".
The screen changes to "Color Selection" screen.



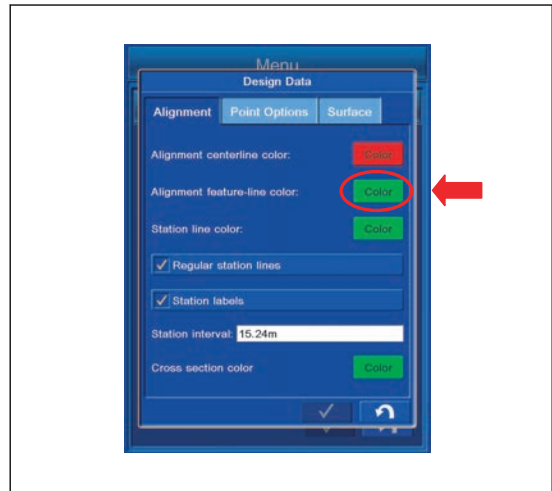
3. Select the color on "Color Selection" screen.
 - (1) : "Default Color"
The color is set to the Default color.
 - (2) : ENTER button
Tap ENTER button and new setting is saved.
 - (3) : RETURN button
Tap RETURN button and the screen returns to the previous screen.



G0056215

METHOD FOR SETTING ALIGNMENT FEATURE LINE COLOR

- 1. Tap "Color" button of "Alignment feature-line color:".
The screen changes to "Color Selection" screen.

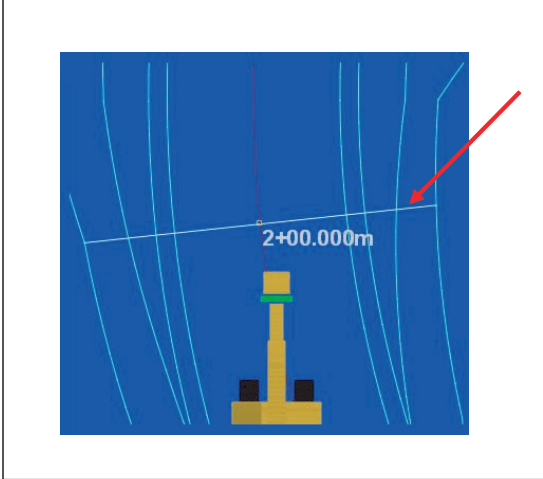
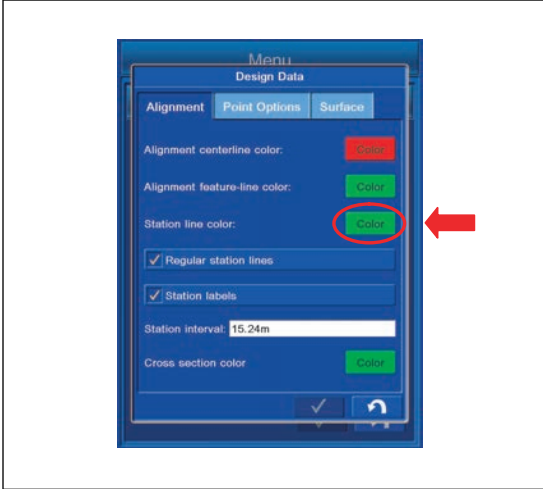


- 2. Select the color on "Color Selection" screen.
(1) : "Default Color"
The color is set to the Default color.
(2) : ENTER button
Tap ENTER button and new setting is saved.
(3) : RETURN button
Tap RETURN button and the screen returns to the previous screen.



METHOD FOR SETTING ALIGNMENT STATION LINE COLOR

- 1. Tap "Color" button of "Station line color:"
The screen changes to "Color Selection" screen.



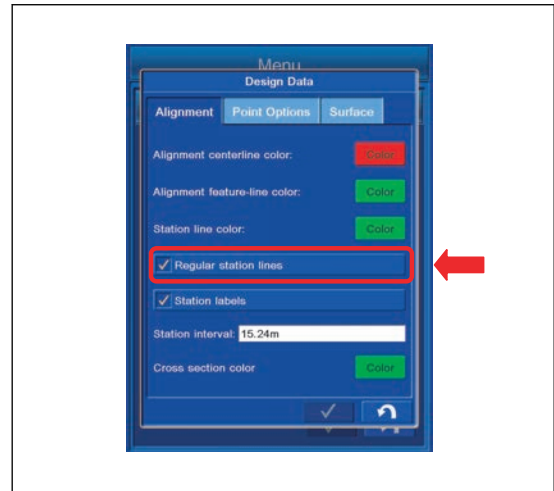
- 2. Select the color on "Color Selection" screen.
(1) : "Default Color"
The color is set to the Default color.
(2) : ENTER button
Tap ENTER button and new setting is saved.
(3) : RETURN button
Tap RETURN button and the screen returns to the previous screen.



METHOD FOR SETTING REGULAR STATION LINE DISPLAY

You can set Display/Non-display of “Regular station lines”.

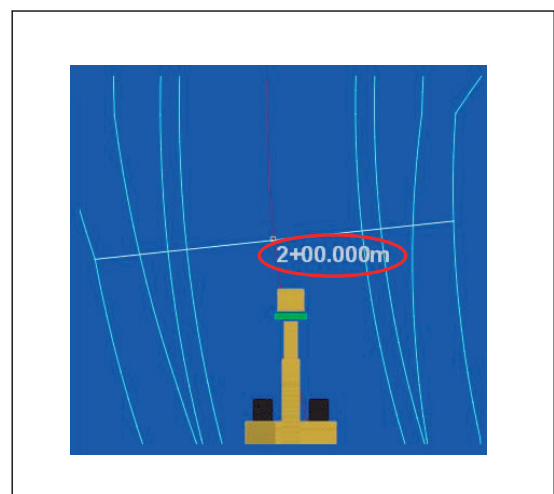
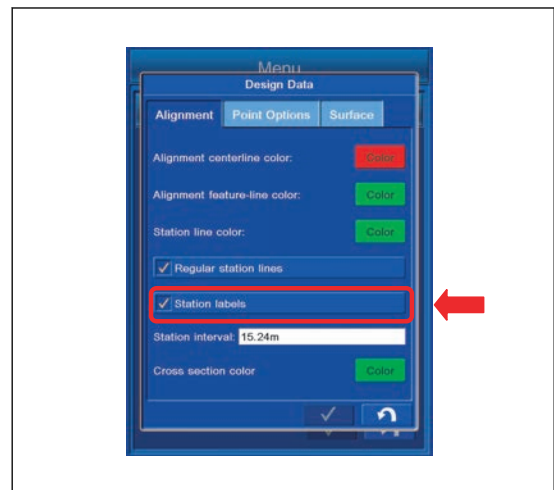
To set it to display, put a tick in the check box.



METHOD FOR SETTING STATION LABELS DISPLAY

You can set Display/Non-display of “Station labels”.

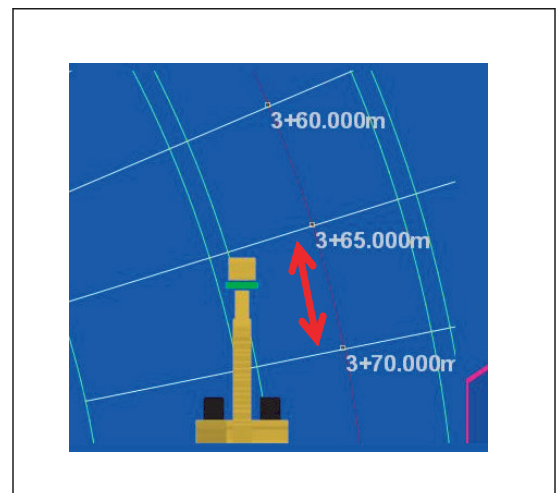
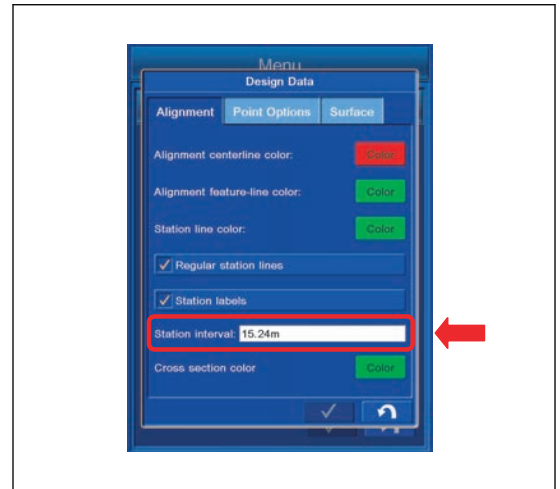
To set it to display, put a tick in the check box.



METHOD FOR SETTING STATION INTERVAL

You can set Station interval of "Alignment".

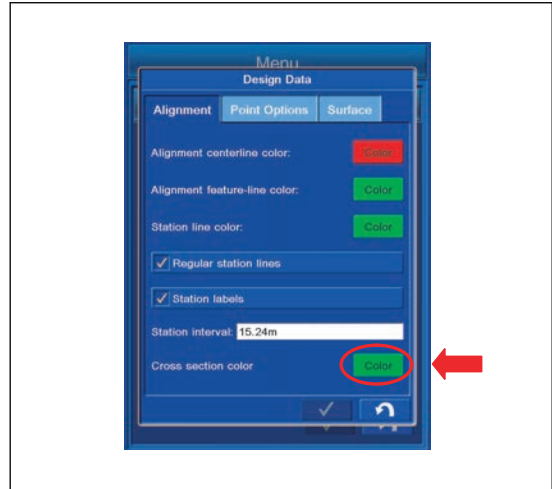
Tap "Station interval:" column and input the numeric value.



METHOD FOR SETTING CROSS SELECTION COLOR

You can set the color of Alignment displayed in “Section” view.

- 1. Tap “Color” button of “Section”.
The screen changes to “Color Selection” screen.



- 2. Select the color on “Color Selection” screen.
(1) : “Default Color”
The color is set to the Default color.
(2) : ENTER button
Tap ENTER button and new setting is saved.
(3) : RETURN button
Tap RETURN button and the screen returns to the previous screen.



METHOD FOR DISPLAY SETTING BY POINT OPTION TAB

You can perform the display setting of Topo survey point, Control point, and Points.

For the items explained below, by putting a tick in the check box, "Display" is set. If a tick is not put, "Non-display" is set.

Tap "Point Options" tab to select items.

(1) "Point symbols"

You can perform the display setting for symbol of Point to be saved.

(2) "Point numbers"

You can perform the display setting for number of Point to be saved.

(3) "Point descriptions"

You can perform the display setting for explanation of Point to be saved.

(4) "Point elevations"

You can perform the display setting for Height of Point to be saved.

(5) "Control points"

You can perform the display setting for Control points.

(6) "Control point names"

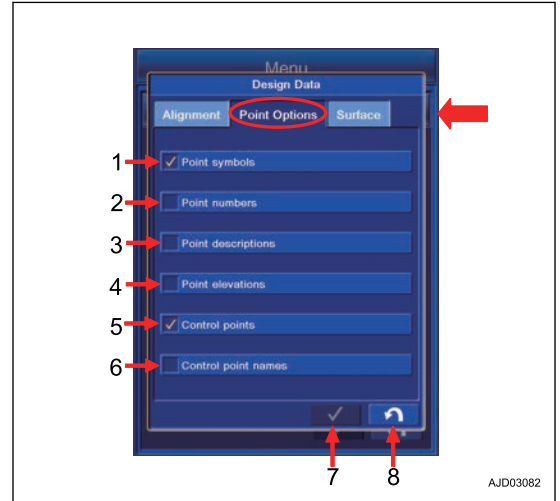
You can perform the display setting for Control point names.

(7) ENTER button

Tap ENTER button and new setting is saved.

(8) RETURN button

Tap RETURN button and the screen returns to the previous screen.



SETTING ITEMS BY SURFACE TAB

You can perform the display setting of Triangle mesh, Boundaries, and Contours in Top Views and 3D View.

(1) "Triangle mesh in Top Views"

You can perform the display setting for Triangle mesh in Surface view.

(2) "Triangle mesh in Bird Eye View"

You can perform the display setting for Triangle mesh in 3D View.

(3) "Boundaries/breaklines"

You can perform the display setting of Boundaries/breaklines.

(4) "Contours at interval"

You can perform the display setting for Contours at interval.

(5) "Contours color"

You can perform the display setting for Contours color.

(6) "Cross section color"

You can perform the display setting for Surface color displayed in Cross section view.

(7) "Cross section filling color"

You can perform the display setting for color of piled soil (filling color) displayed in Cross section view.

(8) "Grade transitions"

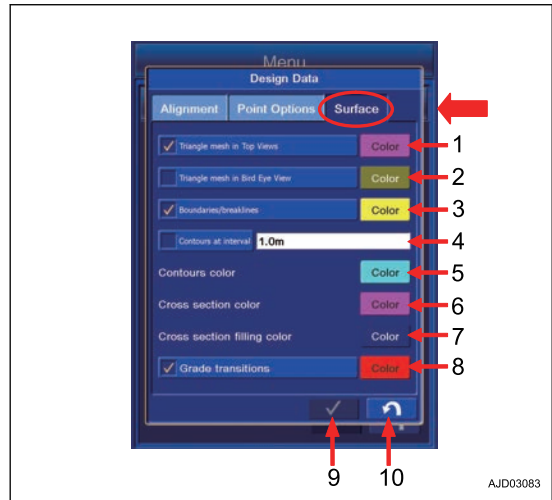
You can perform the display setting for the color of Grade transitions.

(9) ENTER button

Tap ENTER button and new setting is saved.

(10) RETURN button

Tap RETURN button and the screen returns to the previous screen.



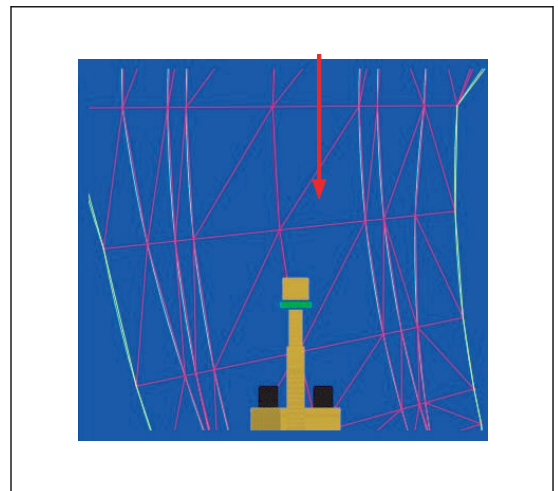
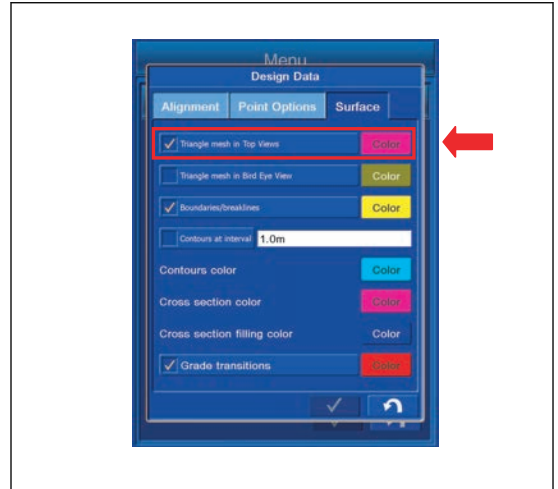
METHOD FOR DISPLAY SETTING OF TRIANGLE MESH IN TOP VIEW

You can perform the display setting of Triangle mesh in Surface view.

Put a tick in the check box, and set Display/Non-display.

By putting a tick, "Display" is set.

Tap "Color" button, and you can set the color of triangle mesh to display.



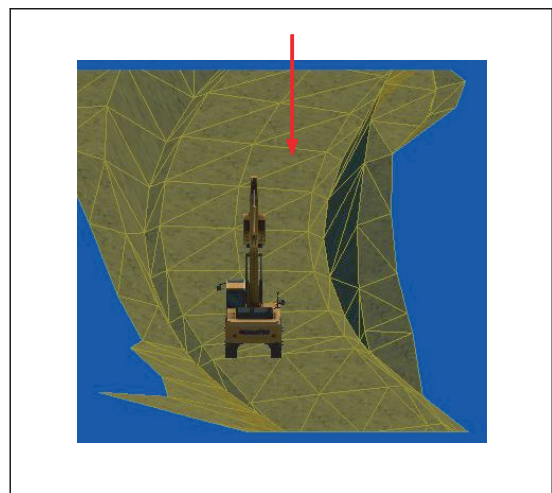
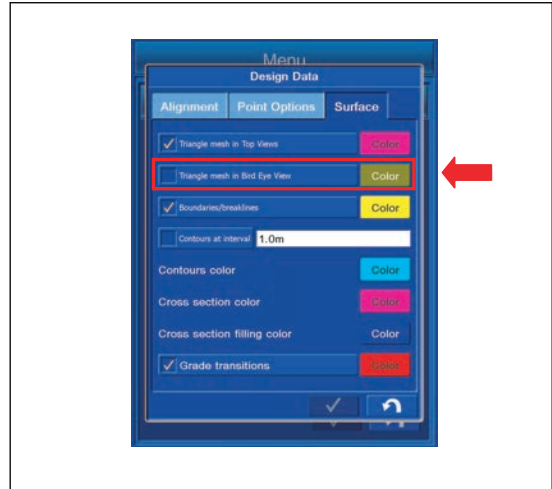
METHOD FOR DISPLAY SETTING OF TRIANGLE MESH IN BIRD EYE VIEW

You can perform the display setting of Triangle mesh in 3D view.

Put a tick in the check box, and set Display/Non-display.

By putting a tick, "Display" is set.

Tap "Color" button, and you can set the color of triangle mesh to display.



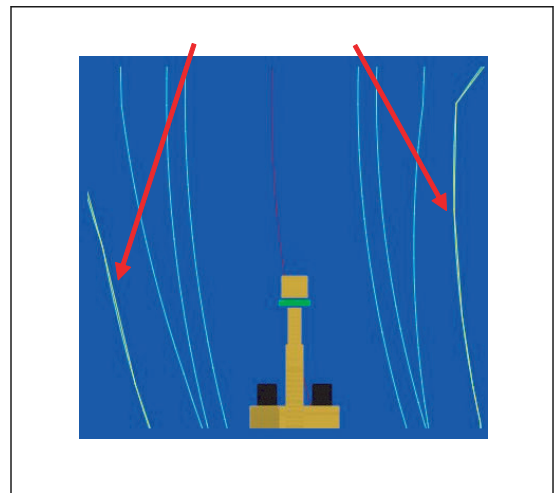
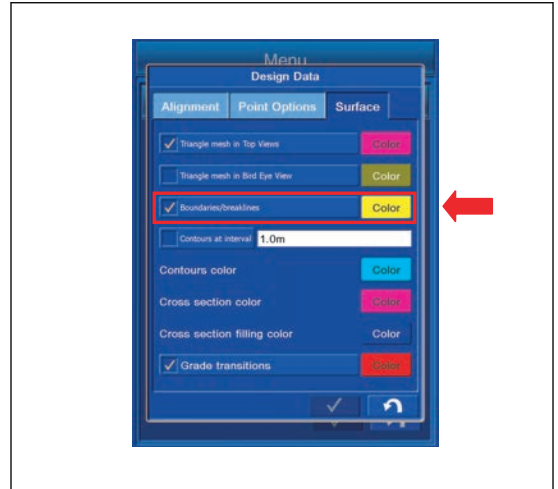
METHOD FOR DISPLAY SETTING OF BOUNDARIES/BREAKLINES

The setting for the display of “Boundaries/breaklines” can be set.

Put a tick in the check box, then you can choose either to display or not to display it by this setting.

By putting a tick, the boundaries and break lines are displayed.

Tap the “Color” button, and the color of the boundaries and break lines to display can be set.

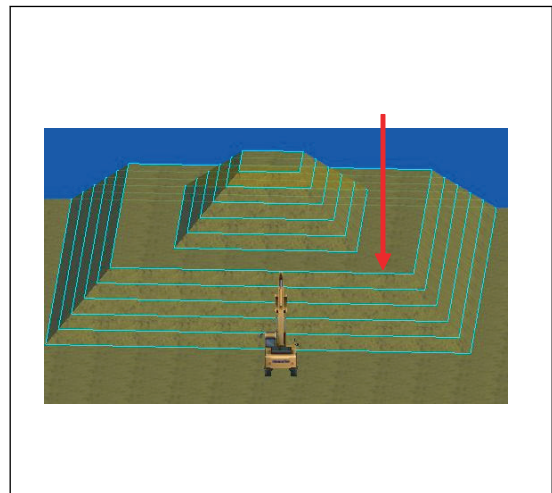
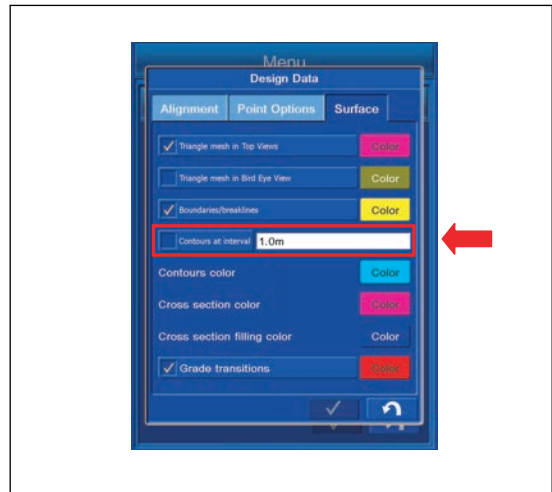


CONTOURS AT INTERVAL SETTINGS

“Contours at interval” can be displayed and the interval of contours can be set.

Put a tick in the check box, and set Display/Non-display. By putting a tick, “Display” is set.

Tap “Contours at interval” column and input the numeric value.
The interval of “Contours at interval” can be set.

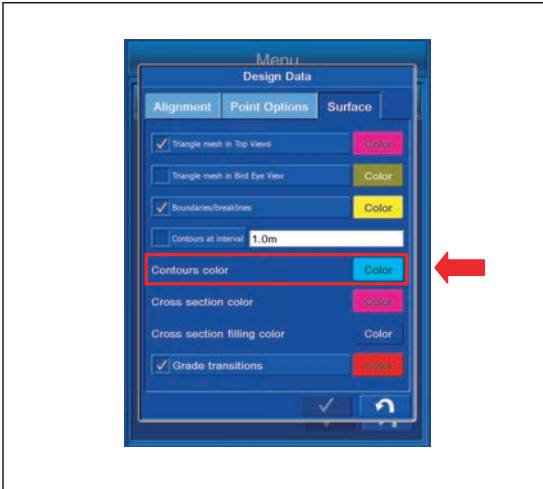


METHOD FOR SETTING CONTOURS COLOR

You can perform the display setting of “Contours color”.

Tap “Color” button.

You can set “Contours color” to display.



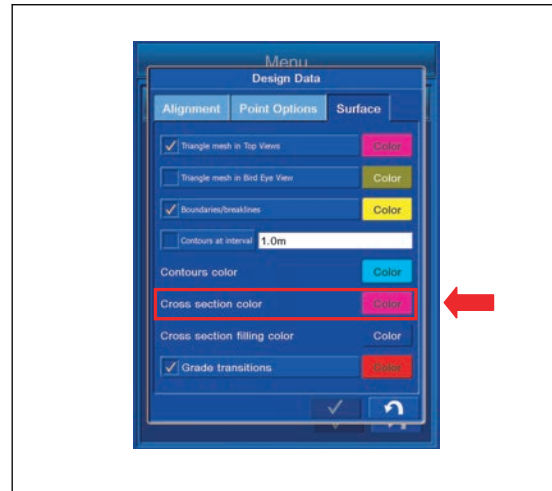
G0054019

METHOD FOR DISPLAY SETTING OF CROSS SECTION COLOR

You can perform the display setting of Cross Section color displayed in Section View.

Tap “Color” button.

You can set the color of the displayed Cross Section.



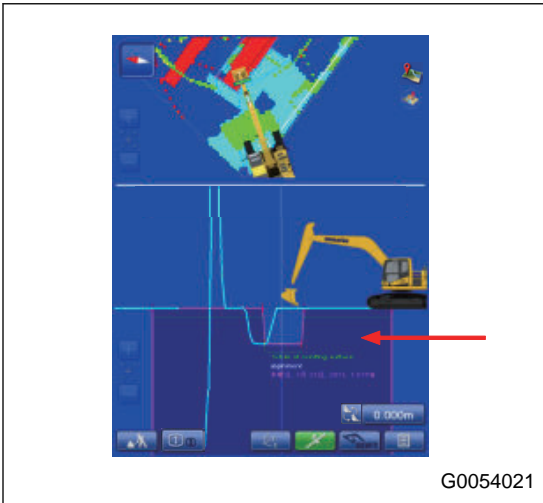
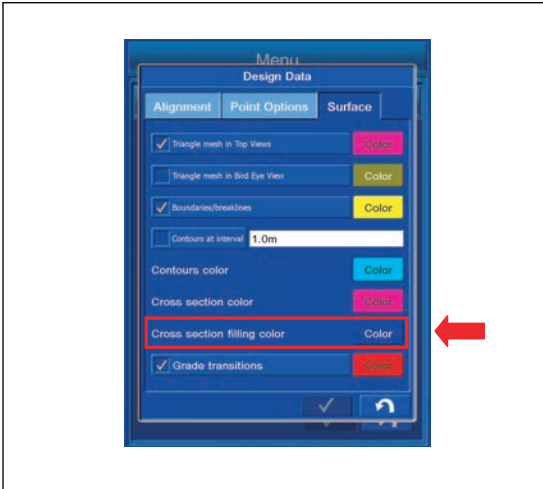
G0054020

METHOD FOR DISPLAY SETTING OF CROSS SECTION FILLING COLOR

You can perform the display setting of color for piled soil (filling color) displayed in Section View.

Tap “Color” button.

You can set the color for the piled soil to display.

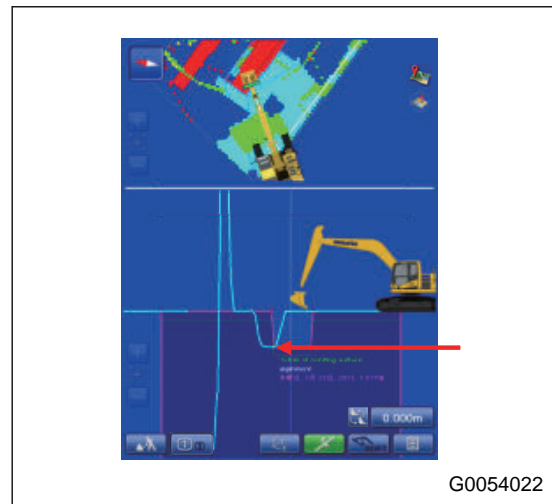
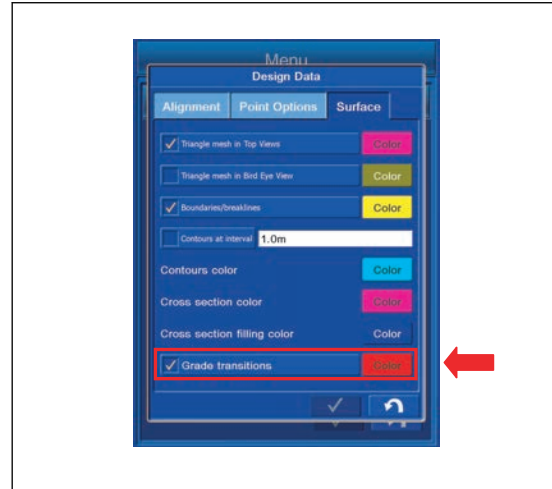


G0054021

METHOD FOR DISPLAY SETTING OF GRADE TRANSITIONS

You can perform the display setting of “Grade transitions”.

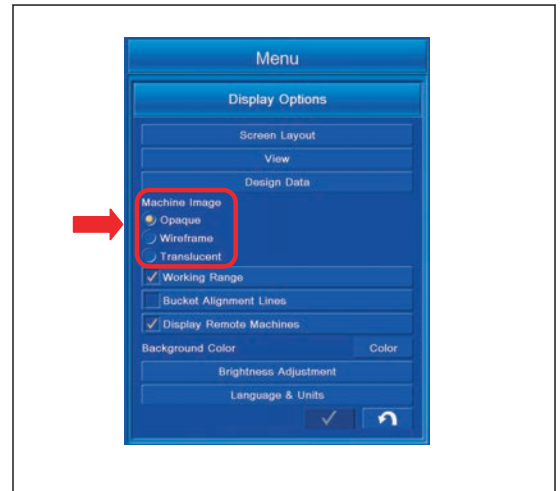
1. Put a tick in the check box, and set Display/Non-display.
By putting a tick, “Display” is set.
2. Tap “Color” button.
You can set the color of “Grade transitions” to display.



G0054022

METHOD FOR SETTING MACHINE IMAGE

You can select the Machine Image from the following 3 kinds. To see the current Terrain directly under the machine or shape of Design Data from Plan view, set it to “Wireframe” or “Translucent”.



“Opaque”



“Wireframe”



“Translucent”



G0054025

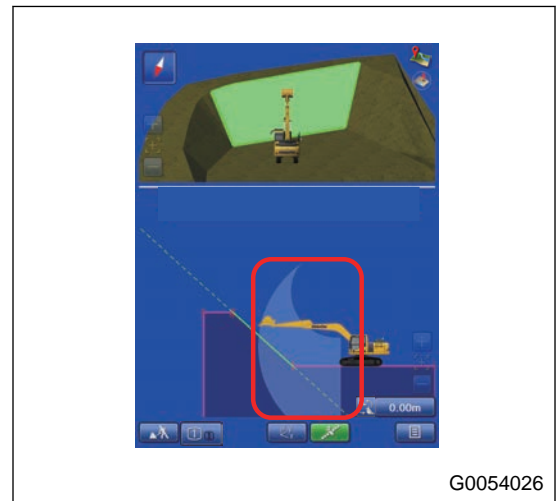
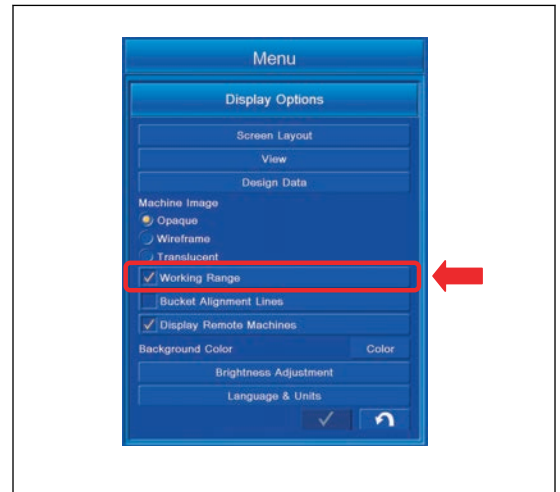
METHOD FOR DISPLAY SETTING OF WORKING RANGE

You can perform the display setting for “Working Range” of the work equipment.

This setting is valid only in Travel mode.

Put a tick in the check box, and set Display/Non-display.

By putting a tick, “Display” is set.



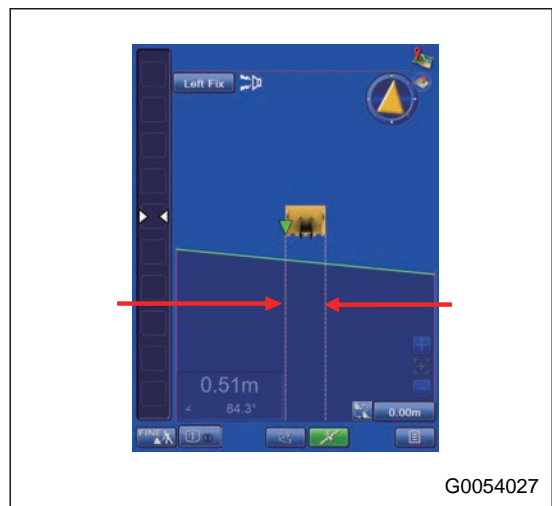
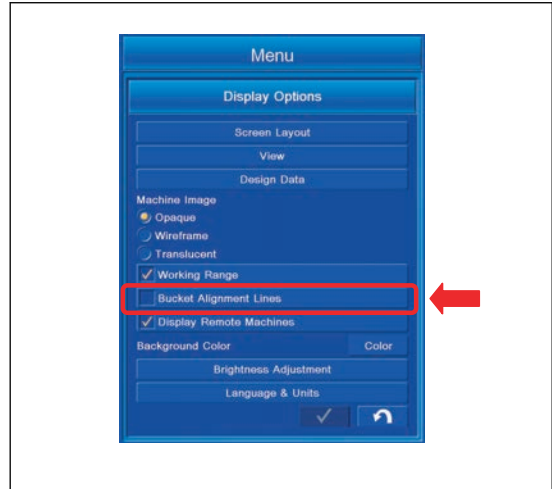
G0054026

METHOD FOR DISPLAY SETTING OF BUCKET ALIGNMENT LINES

You can perform the display setting for “Bucket Alignment Lines”.

Put a tick in the check box, and set Display/Non-display.

By putting a tick, “Display” is set.

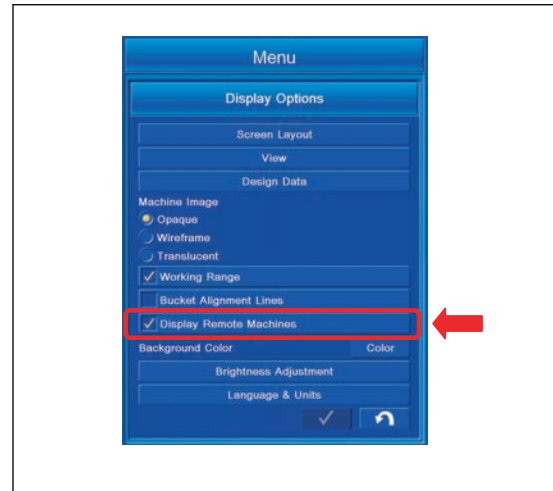


G0054027

METHOD FOR DISPLAY SETTING OF REMOTE MACHINES

You can perform the display setting of other machines connected to Site-Link.

Put a tick in the check box, and set Display/Non-display.
By putting a tick, "Display" is set.

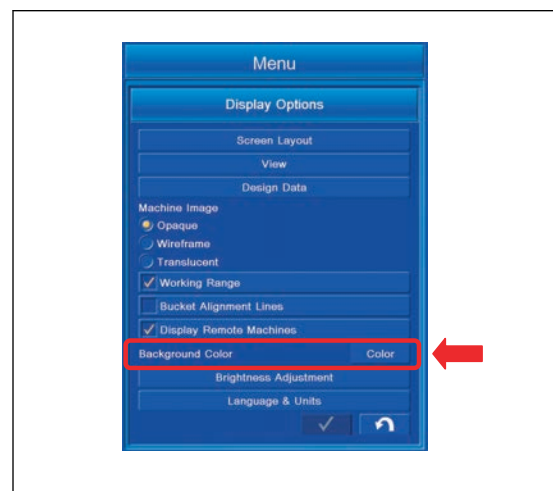


METHOD FOR SETTING BACKGROUND COLOR

You can set Background Color of the working screen.

Tap "Color" button of "Background Color".

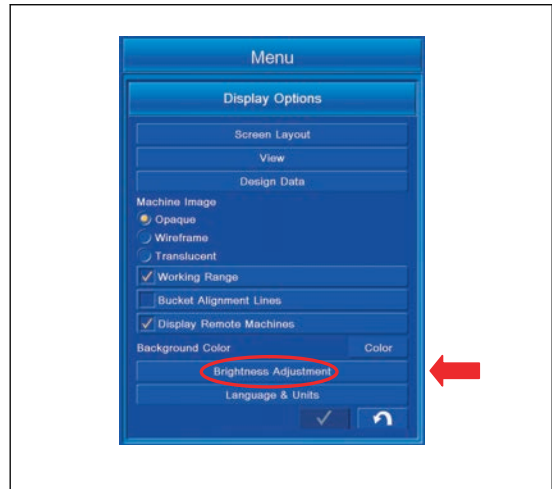
Background color of the working screen can be set.



BRIGHTNESS ADJUSTMENT

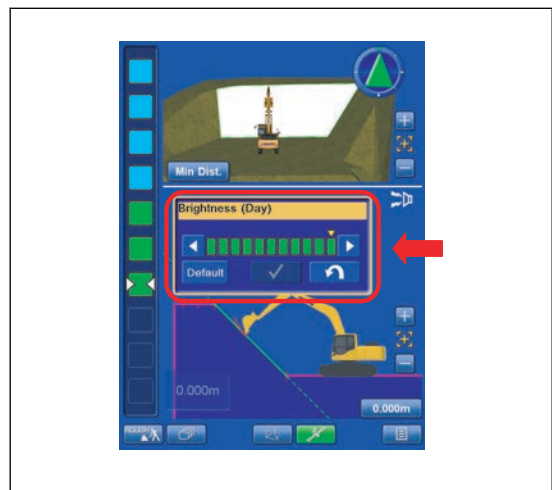
You can adjust the brightness of the control box.

Tap “Brightness Adjustment” button on “Display Options” screen, the screen changes to Brightness Adjustment screen.

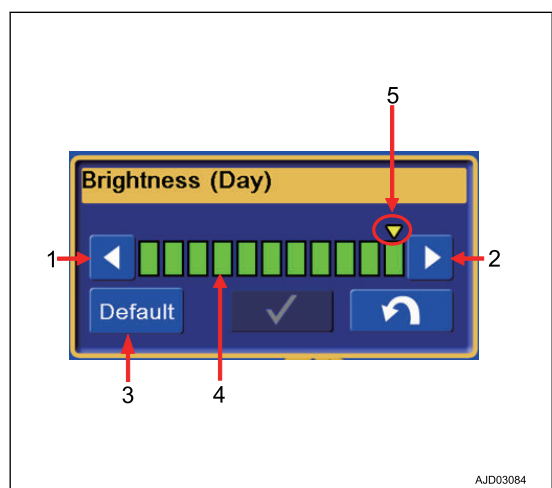


METHOD FOR ADJUSTING BRIGHTNESS ADJUSTMENT SCREEN

Adjust the brightness.



- (1): Tap this button to decrease the brightness.
Tap this button and the number of green indicators (4) decreases, and the screen becomes dark.
- (2): Tap this button to increase the brightness.
Tap this button and the number of green indicators (4) increases, and the screen becomes bright.
- (3): With this button, you can return the brightness in Day and Night to the default value.
- For the default value in Day and Night, refer the position of mark (5) on the green indicator (4).



AJD03084

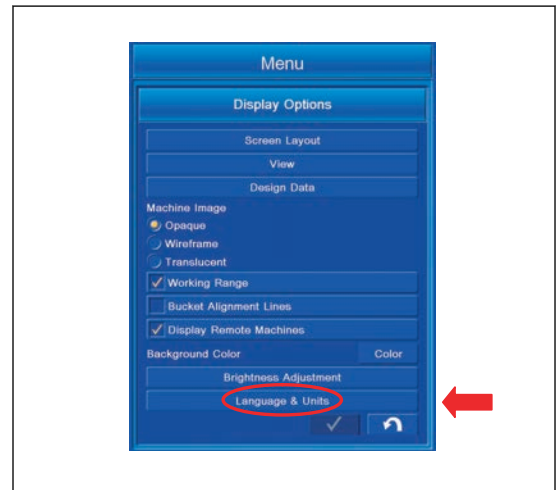
REMARK

Turn the lamp switch to “ON” position, and the brightness of the control box becomes “Brightness (Night)” of Night setting.
The default value of brightness in Night is shown in the figure.



LANGUAGE AND UNITS SETTINGS

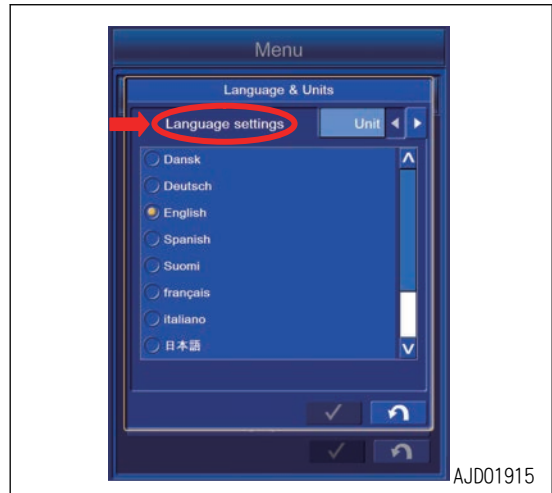
You can perform the setting of the language and unit.
Tap “Language & Units” button on “Display Options” screen, the screen changes to Language & Units setting screen.



METHOD FOR SETTING LANGUAGE

You can set the language.

1. Tap "Language settings" tab to select.
The screen changes to "Language settings" screen.

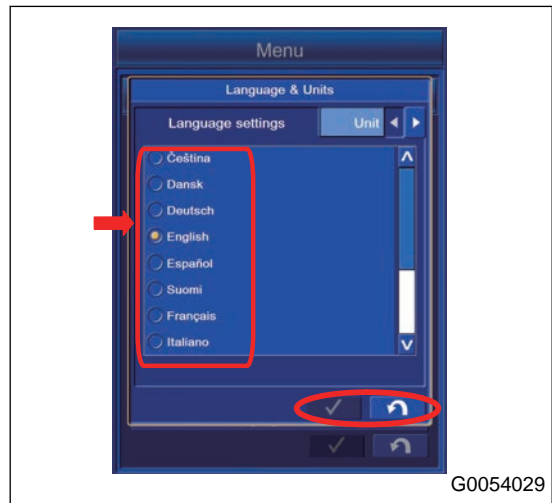


2. Tap the desired language and put a tick.
Tap the ENTER button and new setting is saved.
Tap the RETURN button and the screen goes back to the previous screen.

If a language setting is changed, turn the starting switch key to "OFF" position, turn it to "ON" position again, and start the control box again.

You can select the following languages.

- "Cestina": Czech
- "Dansk": Danish
- "Deutsch": German
- "English": English
- "Espanol": Spanish
- "Estonian": Estonian
- "Suomi": Finnish
- "Francais": French
- "Italiano": Italian
- "Japanese"
- "Latvian": Latvian
- "Lithuanian": Lithuanian
- "Nederlands": Dutch
- "Norsk": Norwegian
- "Portuguese": Portuguese
- "Polski": Polish
- "Slovak": Slovak
- "Svenska": Swedish



METHOD FOR SETTING UNIT

You can set the unit.

Tap "Unit settings" tab to select.

The screen changes to "Unit settings" screen.

(1) "Distances"

You can set the Unit of Distances displayed on the working screen.

(2) "Angles"

You can set the Unit of Angles displayed on the working screen.

(3) "Grades"

You can set the Unit of Grades displayed on the working screen.

(4) "Stations"

You can set the Unit of additional distances displayed on the working screen.

(5) "Volumes"

You can set the Unit of Volumes displayed on the working screen.

(6) "Square measure"

You can set the Unit of Square measure displayed on the working screen.

(7) "Coordinates"

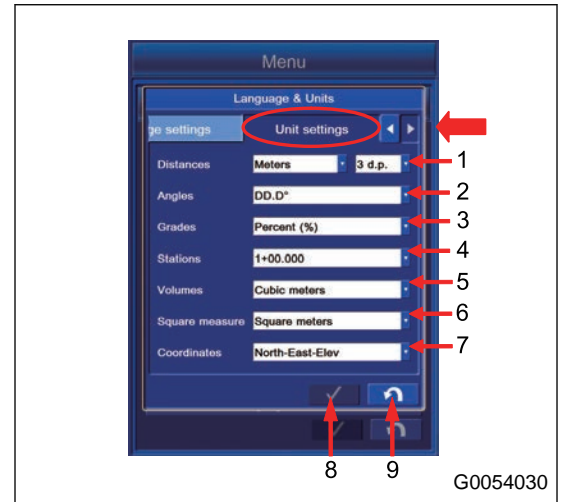
You can set the Unit of Coordinates displayed on the working screen.

(8) ENTER button

Tap ENTER button and new setting is saved.

(9) RETURN button

Tap RETURN button and the screen returns to the previous screen.

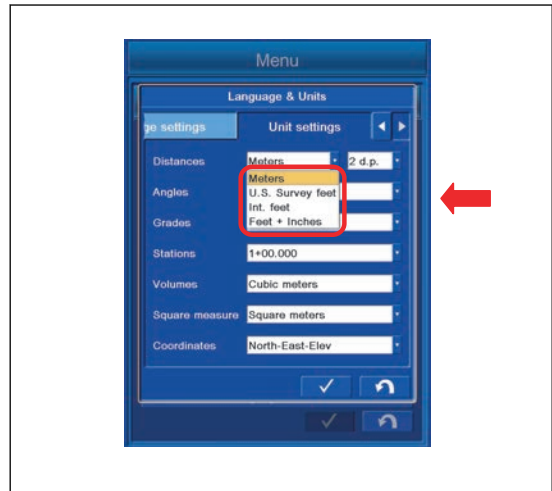


METHOD FOR SETTING DISTANCE

1. Set the unit of Distances displayed in the working screen.

The following units can be set.

- “Meters”
- “U.S. Survey feet”
- “Int. feet”
- “Feet + inches”



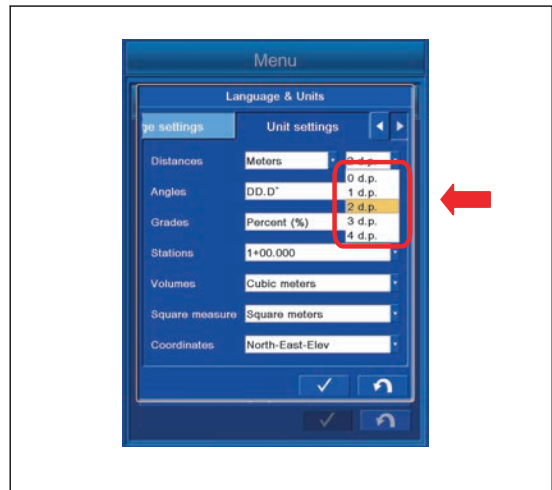
2. Set the decimal place for numeric value of the displayed distance.

Following number of digits can be set.

- “0d.p.”
- “1d.p.”
- “2d.p.”
- “3d.p.”
- “4d.p.”

REMARK

d.p. is the abbreviation of “Decimal place”, and it denotes the number of digits of decimal.

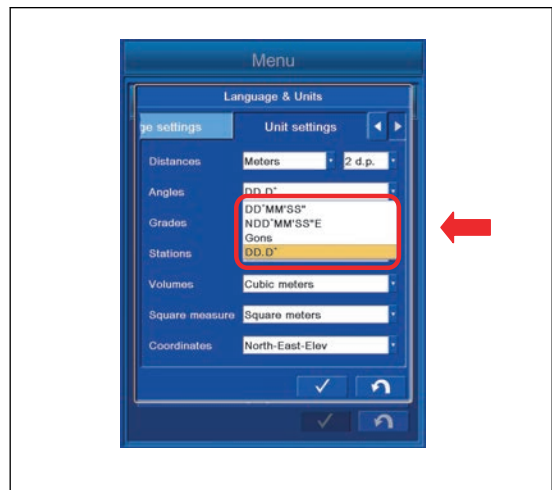


METHOD FOR SETTING ANGLES

Set the Unit of Angles displayed in the working screen.

The following units can be set.

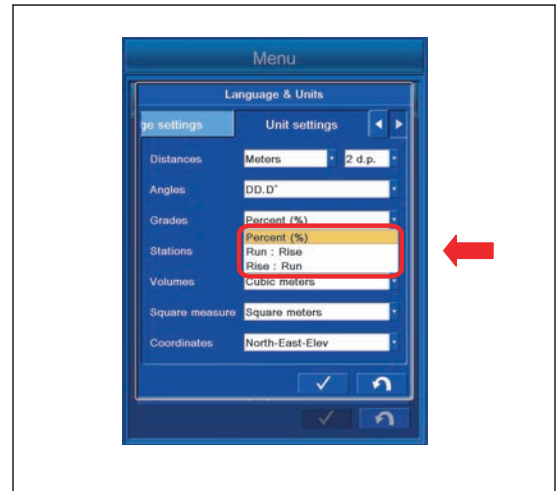
- “DD°MM'SS””: (Deg., minute, second)
- “NDD°MM'SS”E”
- “Gons”: (1 Gon is 0.9 deg.)
- “DD.D°”: (Deg.)



METHOD FOR SETTING GRADES

Set the unit of grades displayed on the working screen.
The following units can be set.

- “Percent (%)”
- “Run:Rise”
- “Rise:Run”

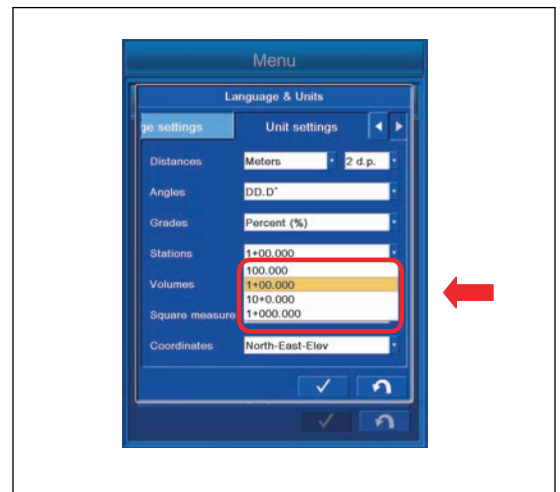


METHOD FOR SETTING STATIONS

You can set the Unit of additional distances displayed on the working screen.

The following units can be set.

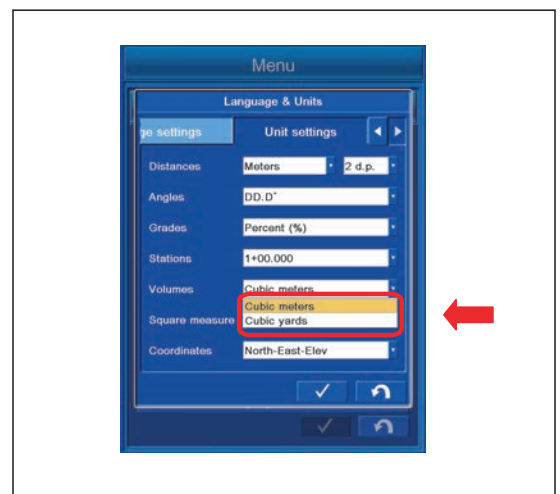
- “100.000”
- “1+00.000”
- “10+0.000”
- “1+000.000”



METHOD FOR SETTING VOLUMES

Set the Unit of Volumes displayed on the working screen.
The following units can be set.

- “Cubic meters”
- “Cubic yards”

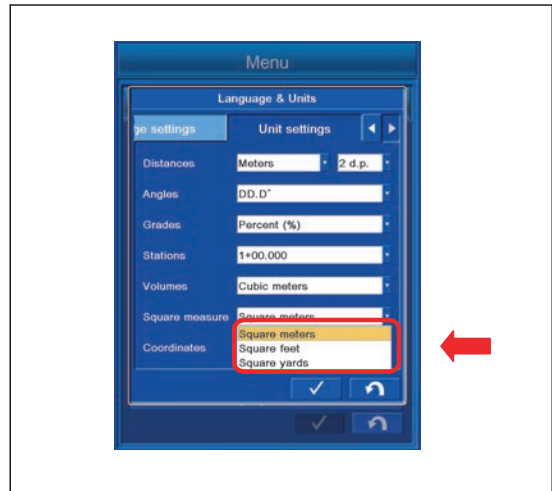


METHOD FOR SETTING SQUARE MEASURE

Set the Unit of Square measure displayed on the working screen.

The following units can be set.

- “Square meters”
- “Square feet”
- “Square yards”

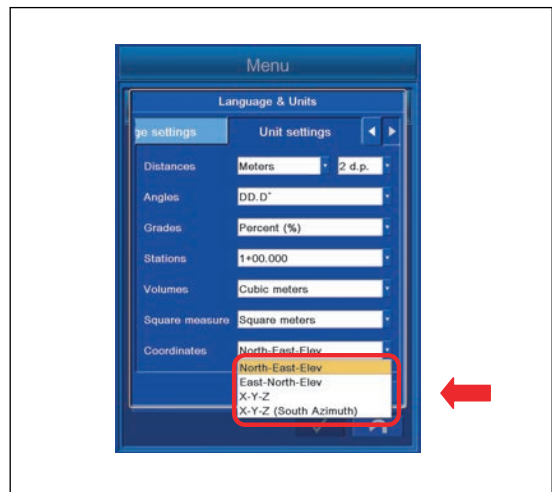


METHOD FOR SETTING COORDINATES

Set coordinates system.

The following units can be set.

- “North-East-Elev”
- “East-North-Elev”
- “X-Y-Z”
- “X-Y-Z (South Azimuth)”



SITE LINK TASK DETAIL MENU

You can perform the check of task information, check of task progress, check of task productivity, check of task status, and check of task log display with the Site-Link Task Detail menu.

TASK STATUS BUTTON

Tap the Task Status button on the working screen, and the Task Detail menu is shown.

(The Task Status button is shown only when one or more tasks are received from the Site-Link server.)

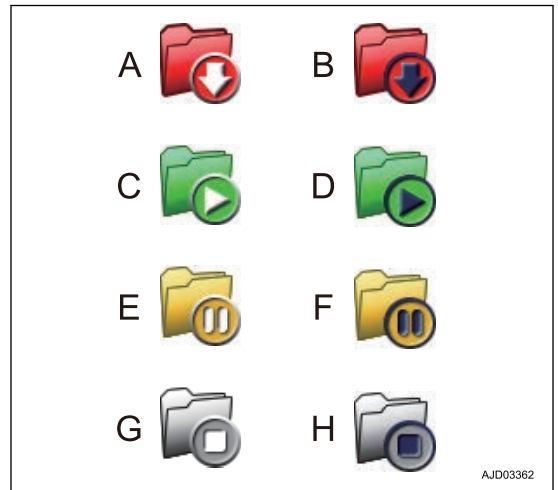


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The display of the Task Status button changes in response to the state of the Task as follows.

- (A): When the Task Status is made The display will be (B) in the semi-auto limited digging mode setting.
- (C): When the Task Status is in progress The display will be (D) in the semi-auto limited digging mode setting.
- (E): When the Task Status is stopped The display will be (F) in the semi-auto limited digging mode setting.
- (G): When the Task Status is completed The display will be (H) in the semi-auto limited digging mode setting.

In the semi-auto limited digging mode setting, the Task Status button is disabled.



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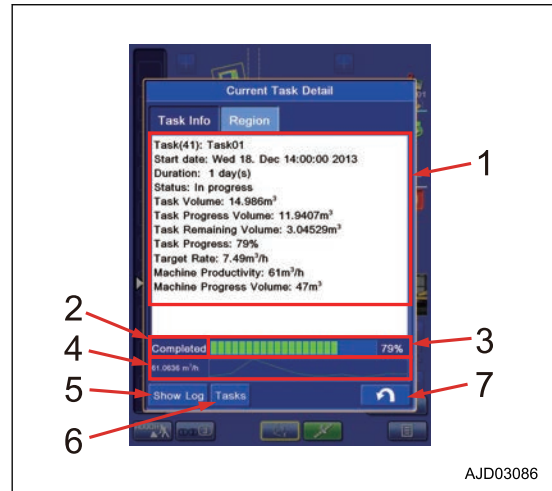
CHECKING CONTENTS BY TASK DETAIL TAB

With Task Detail menu, the following items can be checked.

(1) Display of "Task Info"

The task information is displayed.

- "Task (n):" Task name
- "Start date:" Task starting time
- "Duration:" Executing time of Task
- "Status:" Task status
 - "Created": Task is created newly
 - "In progress": Task is in progress
 - "Suspended": Task is suspended
 - "Completed": Task is completed
- "Task Volume:" Assigned amount of soil for the Task
- "Task Progress Volume:" Completed amount of soil of the Task
- "Task Remaining Volume:" Remained amount of soil of the Task
- "Task Progress:" Progress of Task
- "Target Rate:" Target productivity
- "Machine Productivity:" Productivity of the machine
- "Task Progress Volume:" Progressed production of the machine



AJD03086

(2) Display of Task status

Displays the current Task status.

(3) Check of Task progress status

Progress status of Task is displayed by the graduation indicator and value in percentage (%).

(4) Check of Task productivity

Task productivity (m³/h) is displayed.

(5) "Show Log" button

Displays the Task log.

(6) "Tasks" button

Displays the Task selection screen.

(7) RETURN button

Returns the screen to the previous screen.

SITE LINK

With “Site-Link”, you can perform the setting for Network Connection, Operator, Activity, Delay, Material, Export Data, and Message.

To execute “Site-Link” menu, the control box must be connected to the Internet. In addition, it is necessary to create a site, to issue a one-time registration code of the Sitelink3D, and to create a task from the WebPortal of the Sitelink3D that is the Topcon construction management system. For the operation method of WebPortal, see the Topcon materials.

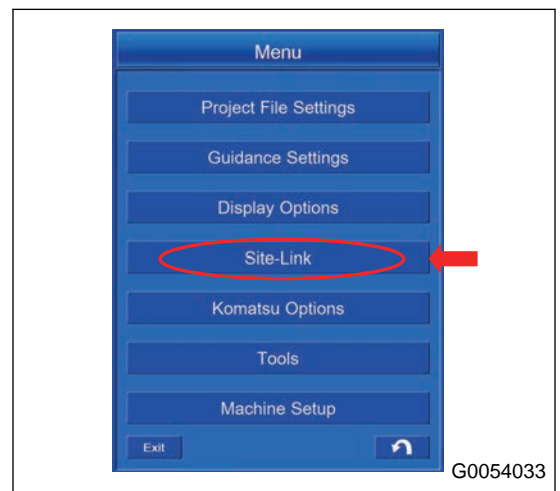
REMARK

If a large capacity of data is saved in the control box, hard disk is used fully and the control box may not operate normally. Delete the unnecessary data frequently.

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap “Site-Link” button on the main menu screen, and the screen changes to “Site-Link” setting screen.



SETTING CONTENTS BY SITE LINK MENU

The following contents can be set with “Site-Link” menu.

(1) “Network Connection”

You can perform the setting for connecting the control box to Sitelink3D.

(2) “Operator” (*)

You can select the operator.

(3) “Activity” (*)

You can select the name of activity.

(4) “Delay” (*)

You can select the delay information.

(5) “Material” (*)

You can select the material information.

(6) “Export Data”

You can send the Surface file via network to the devices (control box, 3D-Office, etc.) which are connected to Sitelink3D.

(7) “Message”

You can send the message to the devices (control box, 3D-Office, etc.) connected to the same site of Site-link3D.

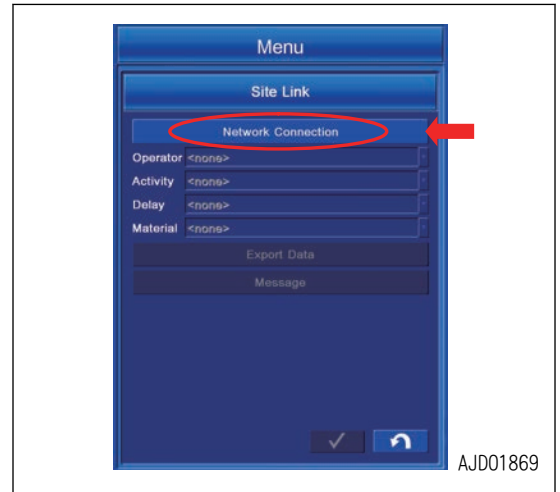
(*): The list of information set at WebPortal is displayed, and the item is selected from the list. For the item which is not set at WebPortal, only “<none>” is displayed.



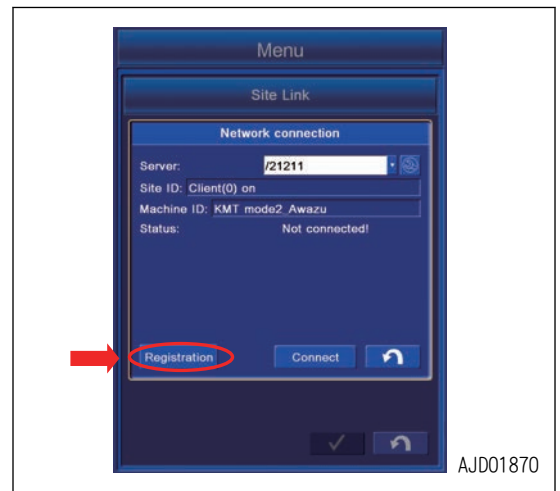
METHOD FOR REGISTERING ON Sitelink3D

In order to register on Sitelink3D, issue the one-time registration code with WebPortal of Sitelink3D in advance. After issuing the one-time registration code, register the control box on Sitelink3D according to the following procedure.

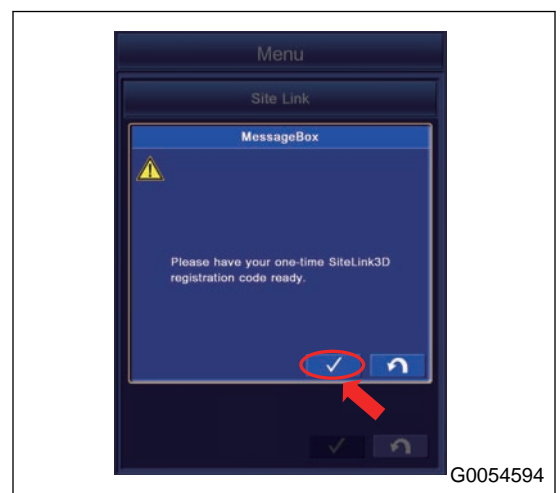
1. Tap "Network Connection" button in "Site-Link" menu, and open "Network Connection" screen.



2. Tap "Registration" button.



3. The message of "Please have your one-time SiteLink3D registration code ready." is displayed, and tap ENTER button.



4. Input the one-time registration code issued with WebPortal of Sitelink3D, and tap "OK" button.

When the registration of code is succeeded, the message indicating the success of registration is displayed.

If the registration of code is failed, the error message is displayed. Check the one-time registration code and input the correct code.

5. When the registration is completed, turn the starting switch key to OFF position, turn it to ON position again, and re-start the control box in order to make the setting enabled.



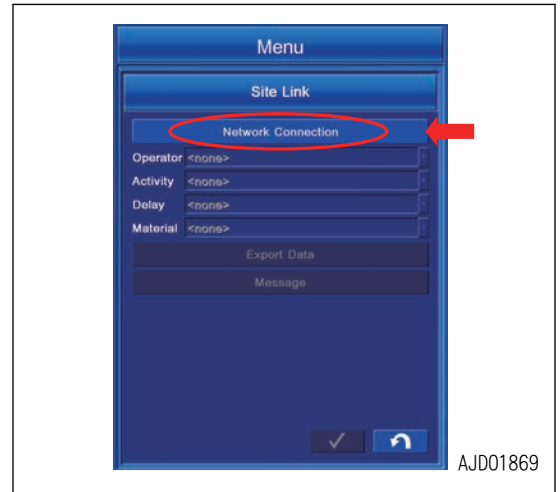
G0054607

METHOD FOR CONNECTING TO Sitelink3D

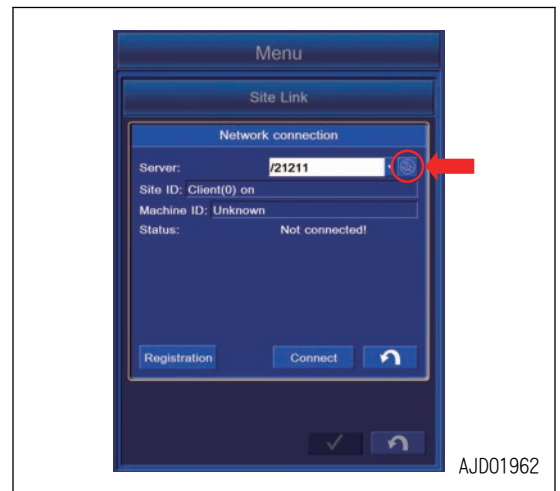
To connect to Sitelink3D, the registration of the control box to Sitelink3D must have been completed.

In addition, write the address and site number of server with WebPortal of Sitelink3D in advance. (Example: 192.168.0.1/21211)

1. Tap "Network Connection" button in "Site-Link" menu, and open "Network Connection" screen.



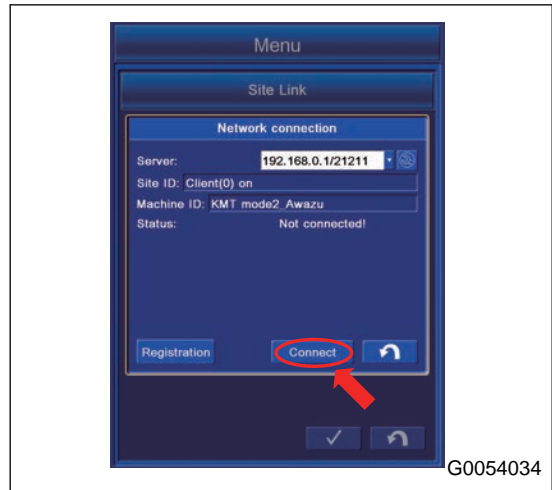
2. Tap the Setting Change button.



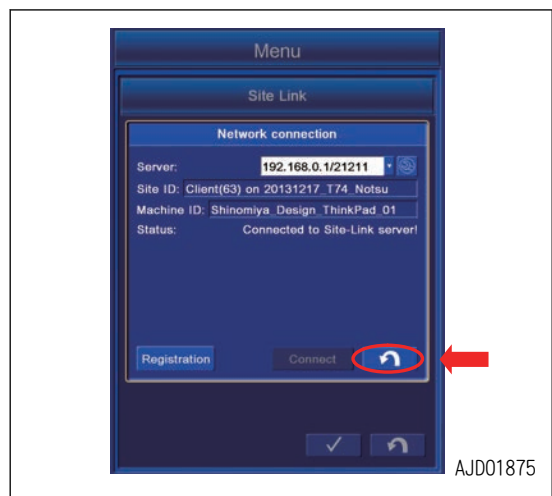
3. Input the address and site number checked with WebPortal, and tap "OK" button.



- 4. Tap "Connect" button and connect to Sitelink3D.



- 5. After connection to Sitelink3D is succeeded, the Status changes to "Connected to Site-Link server!" and "Site ID:" is displayed. After confirming the connection, tap RETURN button.



- 6. Each setting item in "Site-Link" menu becomes Enabled as shown in the figure.



METHOD FOR SETTING CONSTRUCTION INFORMATION

Once the construction information (Operator, Activity, Delay, Material) are set, the current construction information can be checked at the office.

To enable the setting of construction information, the control box must be connected to the Sitelink3D.

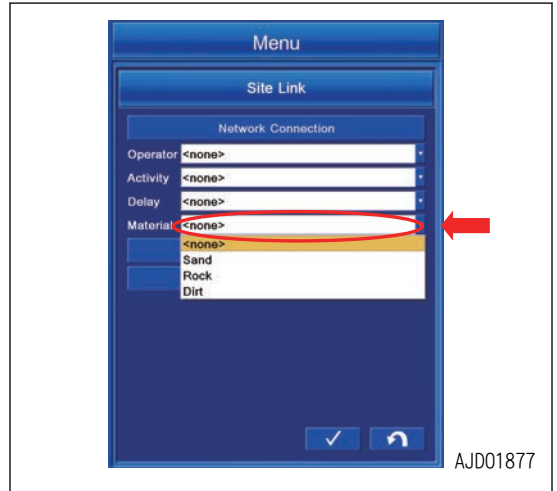
In addition, the setting of construction information must be completed at the WebPortal of Sitelink3D.

1. Tap any selection button of “Operator”, “Activity”, “Delay”, and “Material” in “Site-Link” menu connected to the Site-link3D, the selected items are displayed in the drop-down list.

Tap the target item to select.

REMARK

The construction information set at the WebPortal of Site-link3D is displayed in a list for selection. For the item with no setting of construction information, only “<none>” is displayed.



2. After completing the setting of construction information, tap ENTER button to reflect the change.



METHOD FOR OUTPUTTING DATA

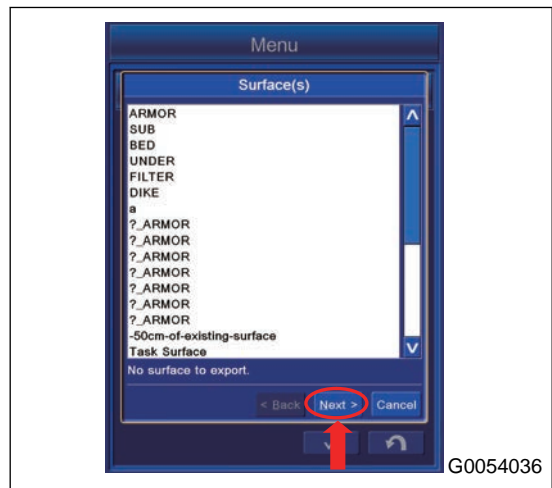
You can select the necessary information from the active Project File and export the Design Surface File to the devices (control box, 3D-Office, etc.) connected to the same site of Sitelink3D.

To export, the control box must be connected to the Sitelink3D.

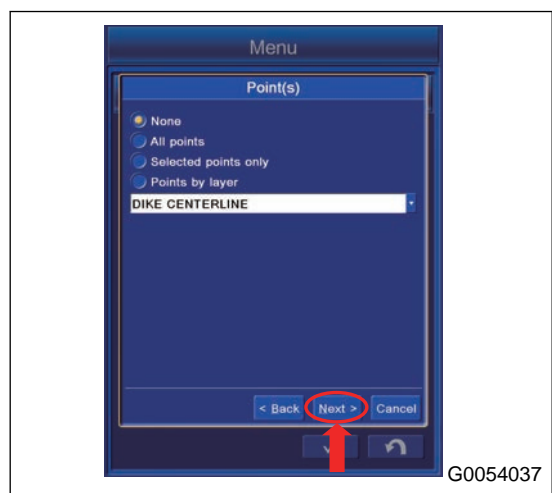
1. With "Site-Link" menu which is connected to Sitelink3D, tap "Export Data" button, and open "Surface(s)" screen.
The list of the Surfaces in the active Project Files is displayed.



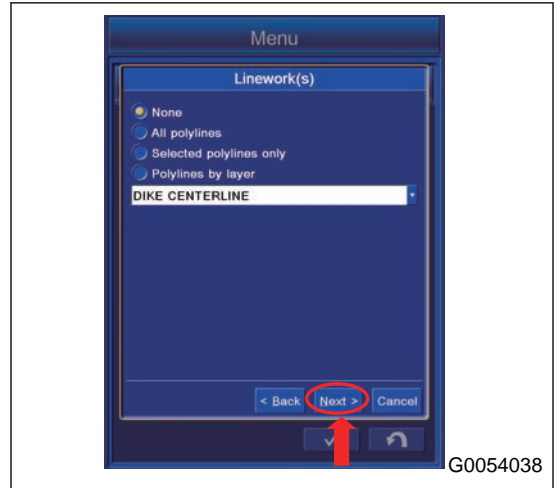
2. Select all the Surfaces to be exported, and tap "Next>" button.



3. Select the export method of Point(s) included in the active Project File, and tap "Next>" button.
 - "None": Exports none.
 - "All points": Exports all the Points.
 - "Selected points only": Exports the selected Points.
 - "Points by layer": Exports the Points which are included in the selected Layer.



4. Select the export method of Linework(s) included in the active Project File, and tap “Next>” button.
 - “None”: Exports none.
 - “All polylines”: Exports all the polylines.
 - “Selected polylines only”: Exports the selected polylines.
 - “Polylines by layer”: Exports the polylines which are included in the selected Layer.

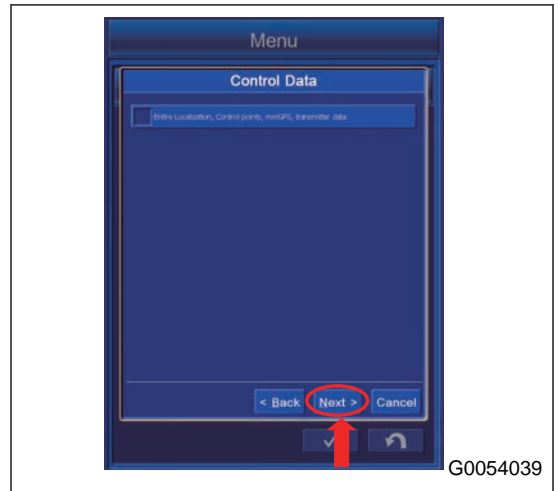


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5. To export “Control Data” included in the active Project File, tap the check box to put a tick in it, and tap “Next>” button.

NOTICE

When “Control Data” is exported, all Localization File, Control Point(s), and mmGPS data are exported. In addition, the active Project at Recipients is overwritten by “Control Data”.

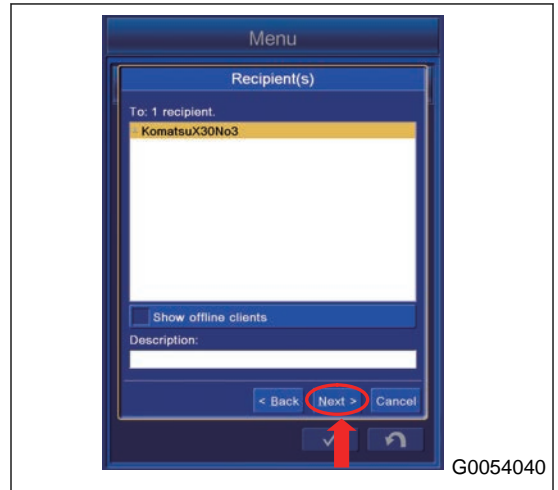


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6. Select the device of Recipients, and tap “Next>” button.

REMARK

Tap the check box of “Show offline clients” to put a tick in it, the devices currently in offline are also displayed.



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7. Select if you import the exported data to the active Surface at Recipients of data, and tap "Next>" button.

(1) "Import into recipients' current active project"

Exported data to the active Project at Recipients is imported.

(2) "Overwrite surface with the same name"

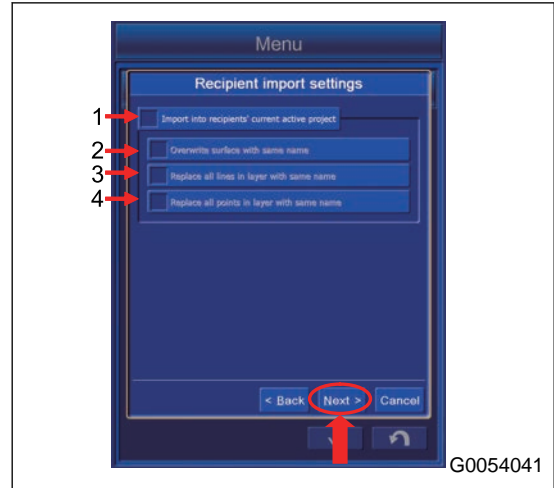
Surface with the same name is overwritten.

(3) "Replace all lines in layer with the same name"

All lines in the Layer with the same name are replaced.

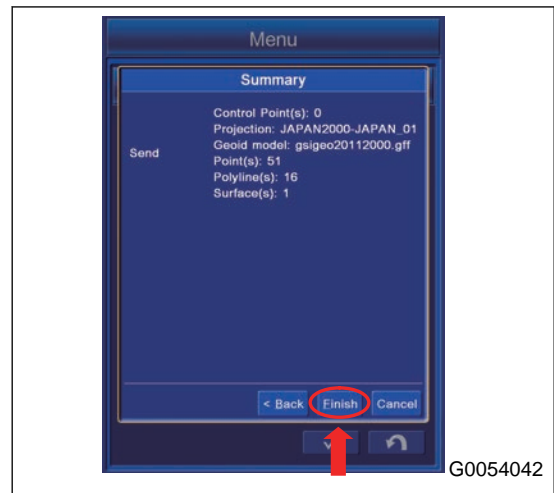
(4) "Replace all points in layer with the same name"

All points in Layer with the same name are replaced.



8. "Summary" of Export Data setting is displayed.

Tap "Exit" button and Export Data starts.



9. The indicator of "Transferring file" is displayed on the working screen, and you can check the progress of Export Data.

When indicator is cleared after showing 100 %, Export Data is completed.

(When the control box receives the data from other devices, the indicator of "Transferring file" is also displayed on the working screen.)

NOTICE

While transmitting/receiving the data, do not change Project File or Site-Link setting.

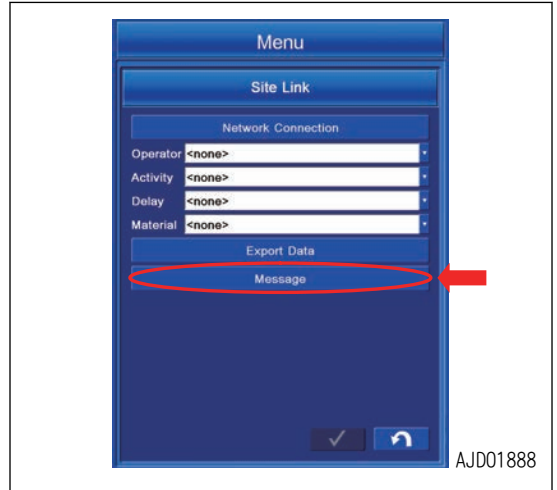


METHOD FOR SENDING MESSAGE

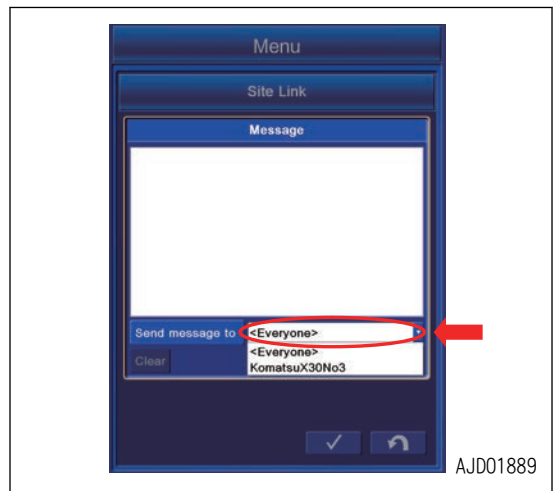
You can send the message to the devices (control box, 3D-Office, etc.) which are connected to the same site of Sitelink3D.

To send the message, the control box must be connected to Sitelink3D.

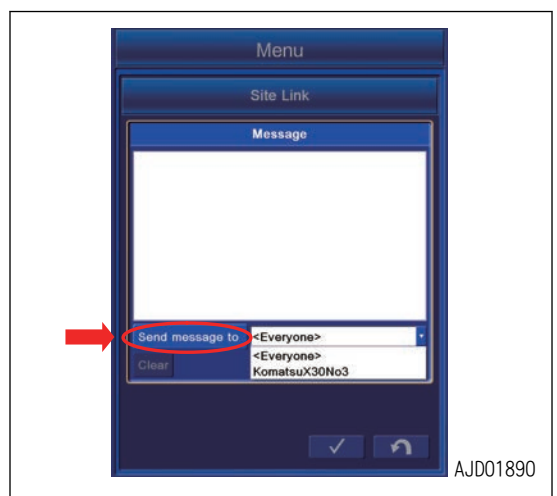
1. With "Site-Link" menu which is connected to Sitelink3D, tap "Message" button, and open "Message" screen.



2. Tap the selection button beside "Send message to" button, the list of devices currently connected to the same site is displayed in the drop-down list.
Select the name of the devices to which you want to send the message. If you select "<Everyone>", the message is sent to all the devices in the list.



3. After selecting the devices to which message is sent, tap "Send message to" button.



- 4. A keyboard is displayed. Input the message.
After completing the input, tap "OK" button to send the message.



- 5. After transmission is completed, the transmission record is displayed on "Message" screen.



REMARK

When the control box receives the message from other devices, the transmission record is displayed on "Message" screen as well.

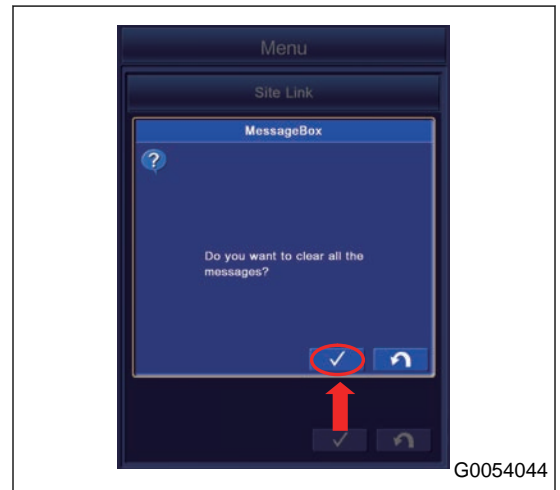


METHOD FOR CLEARING MESSAGE HISTORY

1. Tap "Clear" button on "Message" screen.



2. The confirmation screen for clearing the message is displayed. Tap ENTER button to clear.



3. The message is cleared.



KOMATSU OPTIONS

With “Komatsu Options”, you can connect to the KomConnect, output the KomConnect settings, disconnect the KomConnect, output the KomConnect offline data, and check the connection to the KomConnect.

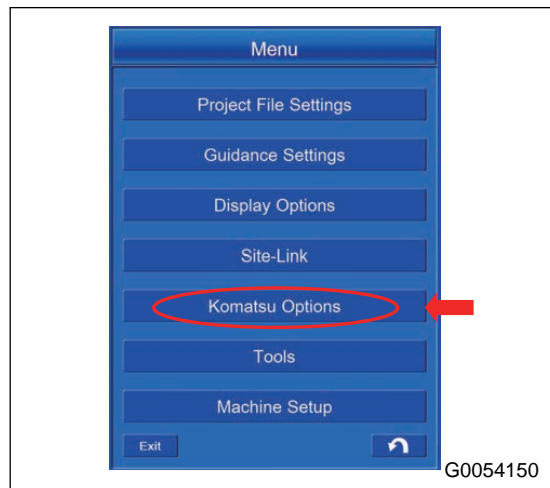
REMARK

To use “Komatsu Options”, you need to connect the control box to the Internet. You also need the registration to the KomConnect that is a construction management system by Komatsu.

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap “Komatsu Options” button on the main menu screen, and the screen changes to “Komatsu Options” setting screen.



SETTING ITEMS ON KOMATSU OPTIONS MENU

The contents to be set with “Komatsu Options” menu are as follows.

(1) “Import Site Settings”

You can get the Site Setting files and connect to the KomConnect.

(2) “Export Site Settings”

The KomConnect settings can be saved.

(3) “Reset Site Settings”

You can disconnect the KomConnect.

(4) “Export Site Data”

You can output the KomConnect offline data.

(5) “MAC Address:”

The MAC address of the control box is shown.

(6) “Site ID:”

The site ID to connect is shown.

(7) “Status”

The connection status of the site to connect is shown.

(8) “As-built Update During Semi-AUTO”

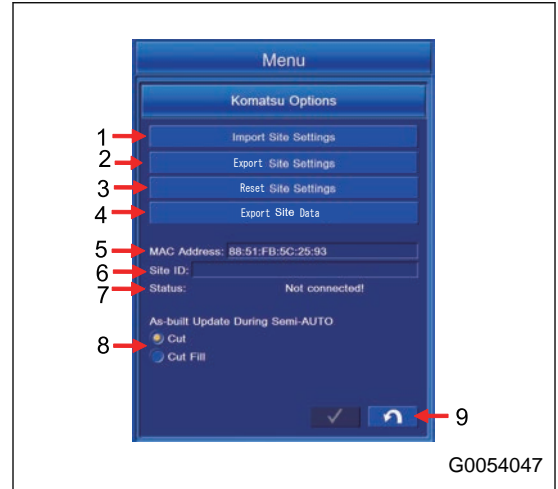
You can select the specifications of the As-Built update on the KomConnect.

“Cut”: It is updated by the digging at the blade tip position.

“Cut Fill”: The Cut Fill is updated at the position nearest to the design surface during MC.

(9) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.

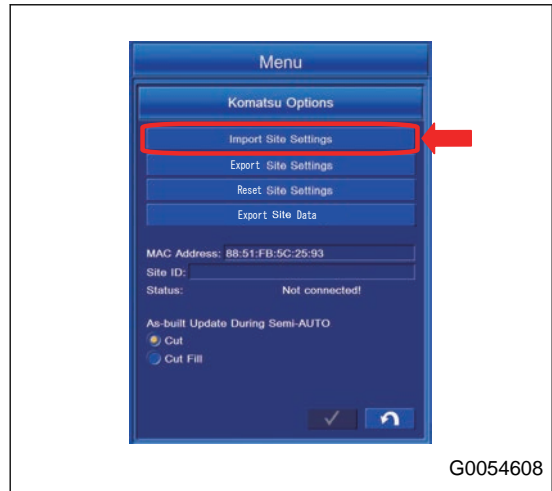


METHOD FOR CONNECTING TO KomConnect

Before you connect the KomConnect site, make "Site Setting file" first on the KomConnect.

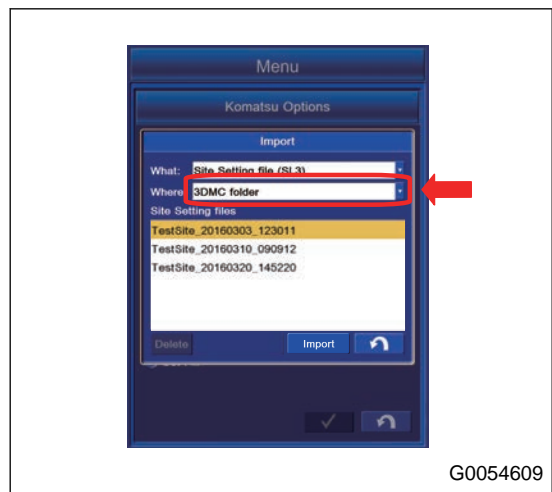
When "Site Setting file" is made, input "Site Setting file" to the control box as follows.

1. Save the Site Setting file to the USB flash drive.
2. Connect the USB flash drive to the control box.
3. On "Komatsu Options" screen, tap "Import Site Settings" button and open the input screen.



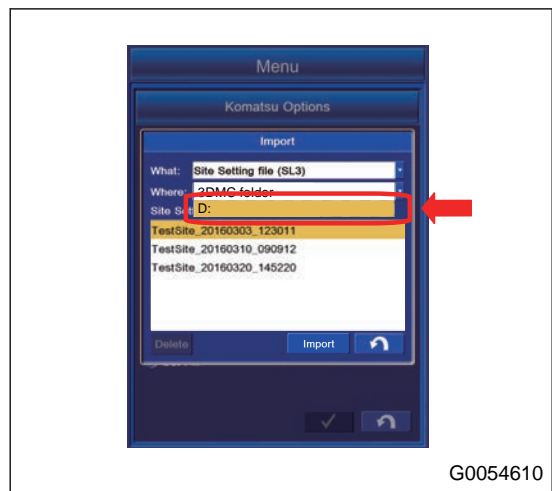
G0054608

4. Tap the pull-down menu of "Where:", and select the drive (USB flash drive) to input.



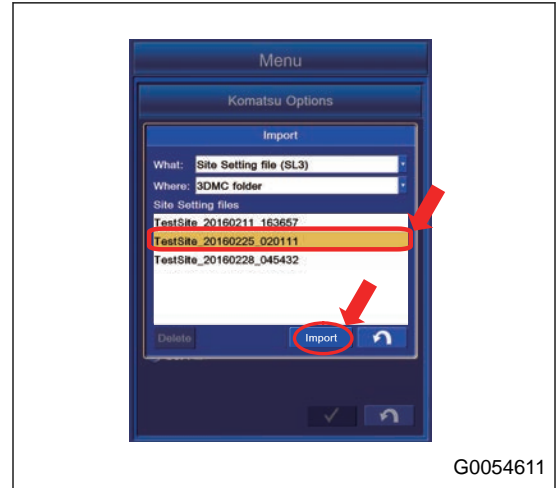
G0054609

Example: D:



G0054610

5. "Site Setting file" list which is saved in the USB flash drive is shown, make "Site Setting file" to import highlighted, and tap "Import" button.



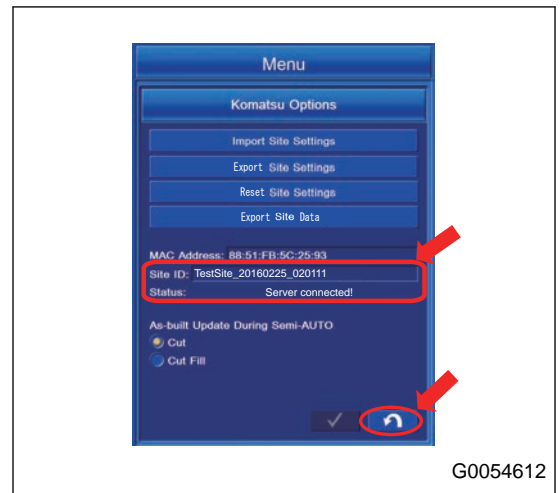
G0054611

6. "Site Setting file" is copied to "3DMC folder", and the ID of the site to connect is shown on "Site ID:."

Connection to the site starts.

When the connection to the KomConnect is done successfully, "Status" of "Komatsu Options" screen changes to "Server connected!".

7. After you check the connection, tap the RETURN button.



G0054612

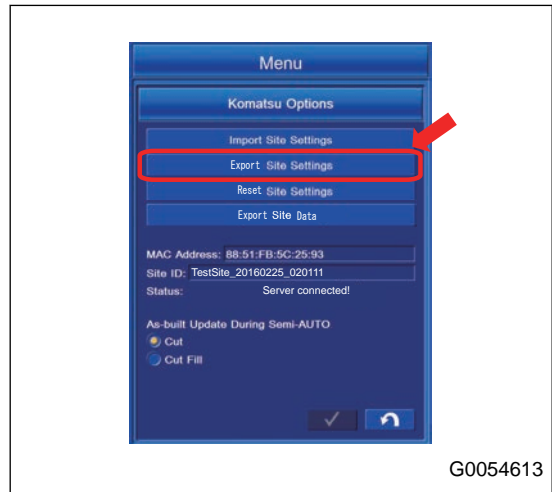
REMARK

- The extension of "Site Setting file" is ".SL3".
- Display of the drive name agrees with the connection status of USB flash drive.
- "Site Setting file" is saved in "3DMC folder" of the control box.
- Tap the RETURN button to move the screen back to the previous screen.
- Save "Site Setting file" just below the USB flash drive (root directory). If it is saved in the folder made in the USB flash drive (sub directory), the control box cannot recognize "Site Setting file".
- You cannot use the USB flash drive with password function.
- If "Site Setting file" name exists in "3DMC folder" and you want to overwrite it by copying, tap the ENTER button on the Message Box.
- If you again need to "Site Setting file" which was imported, select "3DMC folder" on "Where:", and select the one from the list of "Site Setting file" which was imported.
- When you delete "Site Setting files" saved in the control box, select "Site Setting files" you want to delete, and tap the delete button.
But, you cannot delete the Site Setting files and Site Setting files saved in the USB flash drive if "Site Setting files (Current)" is shown.

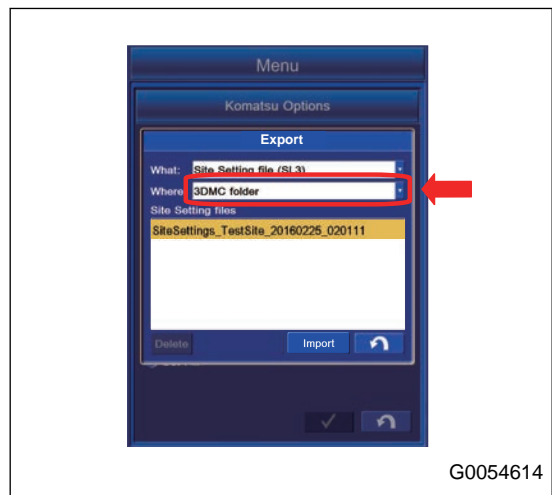
METHOD FOR EXPORTING CONNECTION SETTINGS TO KomConnect

You can export "Site Setting file" to the USB flash drive.

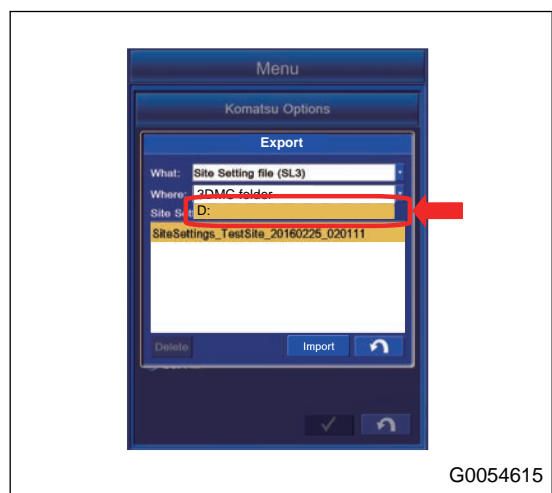
1. Connect the USB flash drive to the control box.
2. On "Komatsu Options" screen, tap "Export Site Settings" button to open the export screen.



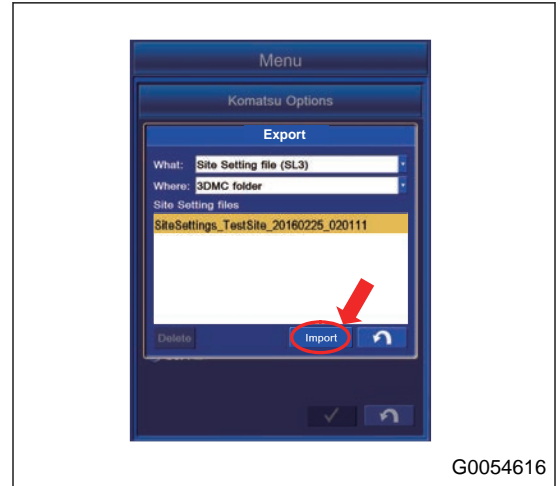
3. Tap the pull down menu of "Where:", and select the drive to export to (drive to which the USB flash drive is connected).



Example: D:



- The name of the file which is exported is highlighted. Check the file name, and tap the “Export” button to export it.



G0054616

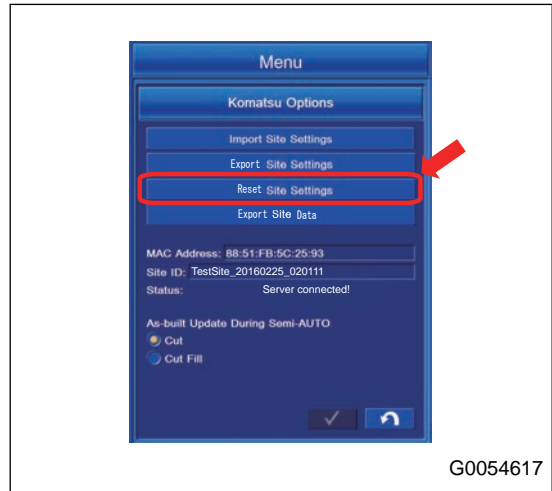
REMARK

- The extension of “Site Setting files” is “.SL3”.
- Display of the drive name depends on the connection condition of the USB flash drive.
- The “Site Setting files” is saved in “3DMC folder” of the control box.
- Tap the RETURN button to move the screen back to the previous screen.
- The USB flash drive with password function cannot be used.
- The “Site Setting files” is saved under the root directory of the USB flash drive.

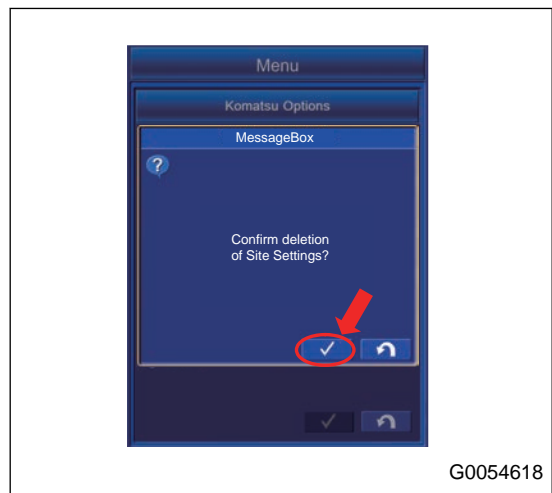
METHOD FOR DISCONNECTING FROM KomConnect

To disconnect the connection to the KomConnect, delete the site setting which is saved in the control box.

1. On "Komatsu Options" screen, "Reset Site Settings" button.

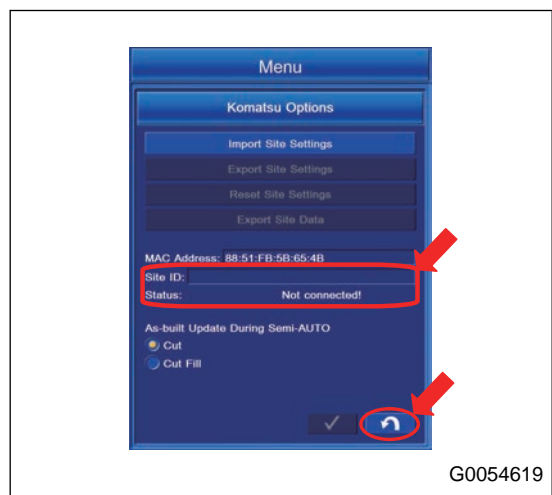


2. When the Message Box is shown, tap the Enter button.



When the connection to the KomConnect is cancelled, "Site ID:" on "Komatsu Options" screen changes to blank, and "Status" changes to "Not connected!".

3. After you check that the connection to the KomConnect is disconnected, tap the RETURN button.



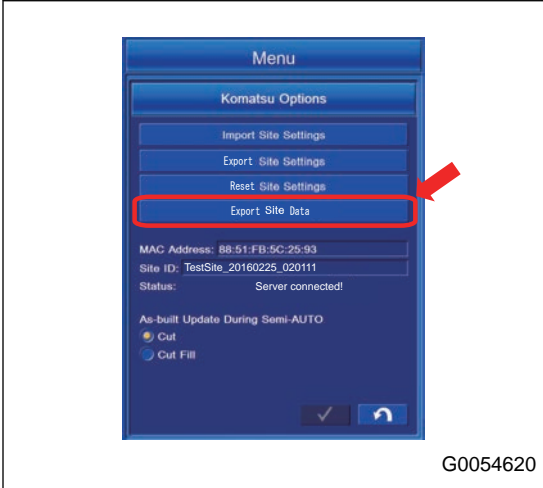
REMARK

- Tap the RETURN button to move the screen back to the previous screen.
- "Site Setting files" is not deleted from the control box. If you connect again to the site which you deleted the connection, tap "Import Site Settings" button, select "3DMC folder" already saved in "Where:", and select "Site Setting files".

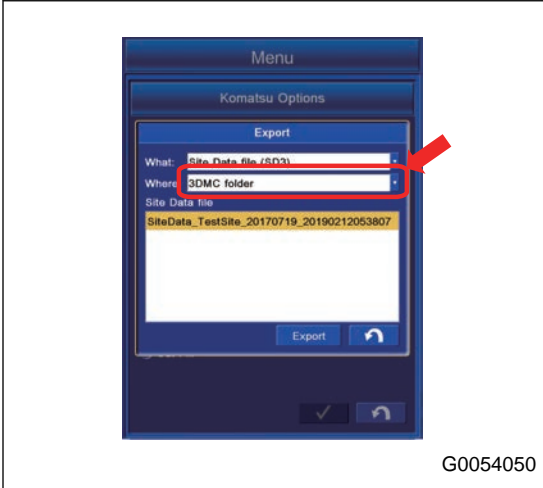
METHOD FOR EXPORTING DATA TO USB MEMORY IF YOU CANNOT SEND TO KomConnect

When the internet connection is not established and you can send the off line data to KomConnect, you can output it to the USB flash drive.

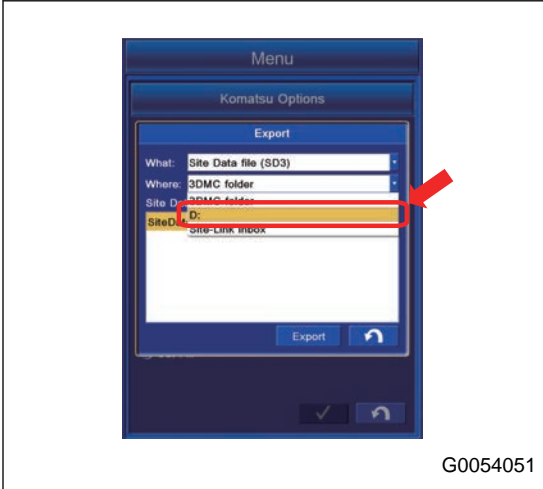
1. Connect the USB flash drive to the control box.
2. On "Komatsu Options" screen, tap "Export Site Data" button, and open the screen to output.



3. Tap the pull down menu of "Where:", and select the drive to export to (drive to which the USB flash drive is connected).



Example: D:



4. The name of the file which is exported is highlighted. Check the file name, and tap the "Export" button to export it.

REMARK

- The extension of "Site Data file" is ".SD3".
- Display of the drive name depends on the connection condition of the USB flash drive.
- The "Site Setting files" is saved in "3DMC folder" of the control box.
- Tap the RETURN button to move the screen back to the previous screen.
- The USB flash drive with password function cannot be used.
- When you delete the "Site Data file" saved in the control box, select the "Site Data file" you want to delete, and tap the delete button. But, you cannot delete the "Site Data file" and "Site Data file" saved in the USB flash drive if "Site Data file name (Current)" is shown.
- The "Site Setting files" is saved under the root directory of the USB flash drive.



G0054052

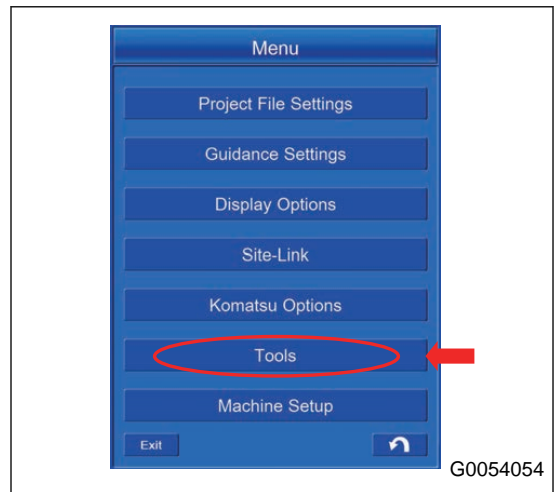
TOOLS

With Tools menu, you can perform the setting for Topo Survey, Navigation, Supervisor, Restart Connection, and About Product.

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap "Tools" button on the main menu screen, and the screen changes to "Tools" setting screen.



SETTING ITEMS BY TOOLS

The contents that can be set with the Tools are as follows.

(1) "Topo Survey"

You can do the setting of the Topo survey.

(2) "Navigation"

You can do the setting of the Navigation.

(3) "Supervisor"

The supervisor can change the setting of the intelligent Machine Control system on his (her) authority.

(4) "Restart Connection"

You can get the satellite information again.

(5) "Time Adjustment"

The time axis in the planning tab of GNSS Status can be set to the local time.

(6) "Shortcut"

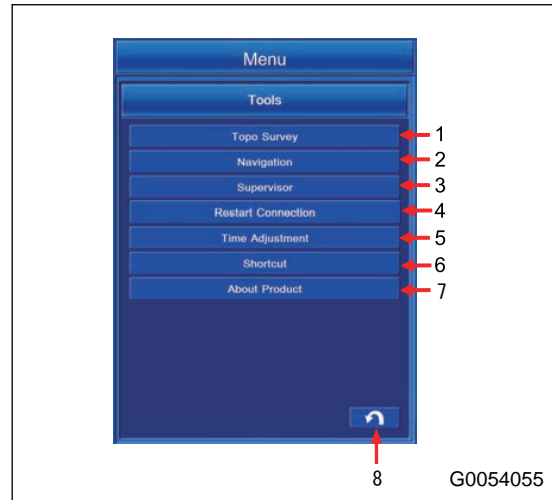
You can select the Display/Non-display of the Shortcut menu.

(7) "About Product"

You can show the intelligent Machine Control system information.

(8) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.



METHOD FOR SETTING TOPO SURVEY

Save the data of the bucket edge position, then you can observe the current terrain. For the observation, there are manual method and automatic method. In the manual method, a single datum is saved. In the automatic method, data are saved continuously.

Tap “Topo Survey” button in the Tools menu.
The screen changes to topographical survey setting screen.



G0054621

(1) “Project layer for Topo:”

You can set the layer to which the topographical survey point is saved.

(2) “Log at:”

You can set the bucket edge position for which the topographical survey is done.

(3) “Auto-Topo:”

You can switch the method of topographical survey between Manual and Auto.

(4) “Topo button:”

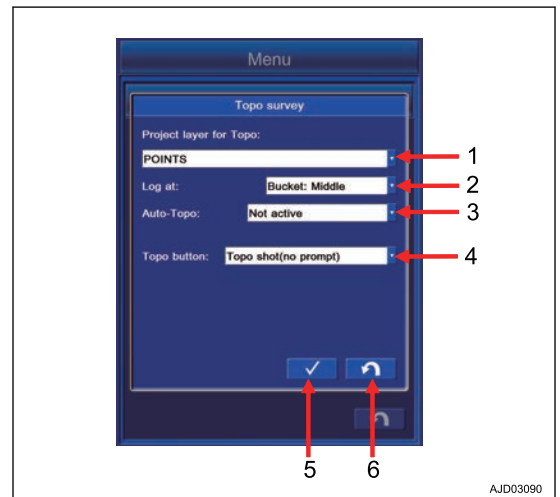
You can do setting of the operation of the TOPO survey button.

(5) ENTER button

Tap the ENTER button and the setting is saved.

(6) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.



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REMARK

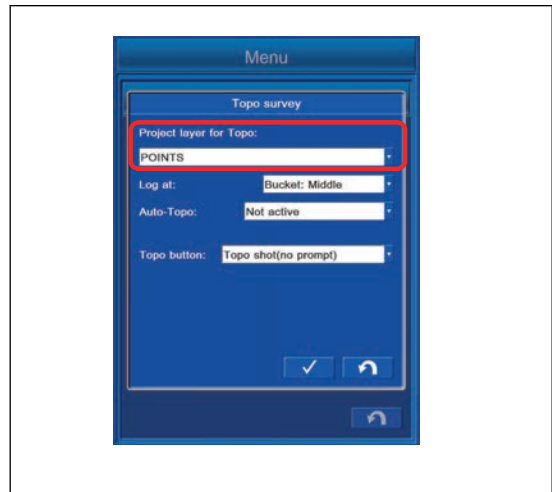
For the method of the topographical survey, there are 3 types as follows. For details, see “USE OF TOPO SURVEY”.

- Not active
Each time “Topo Survey” button is pushed on the working screen, a single point datum is saved.
- Minimum horz. distance
Coordinates of the bucket edge position are saved continuously by each time the work equipment moves for the set distance.
- Fixed time interval
Coordinates of the bucket edge position are saved continuously at the set time interval.

METHOD FOR SETTING MANUAL TOPO SURVEY

METHOD FOR SETTING LAYERS

Tap “Project layer for Topo:” column, and select the layer to which the Topo survey point is saved.



METHOD FOR SETTING LOGGING POINT

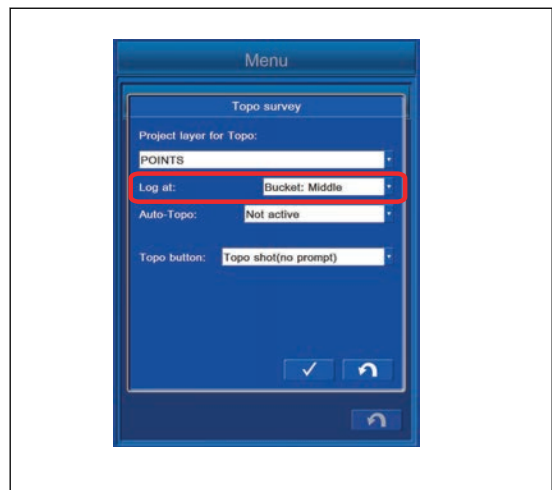
Tap “Log at:” column, and select the bucket edge position for which Topo survey is performed.

“Bucket:Left”: Bucket edge at left end

“Bucket:Middle”: Bucket edge at center

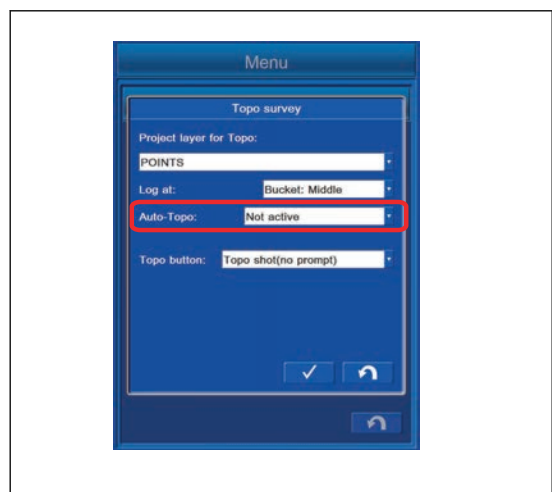
“Bucket:Right”: Bucket edge at right end

“Left and Right Edge”: Bucket edge at both ends



DEACTIVATE AUTO-TOPO

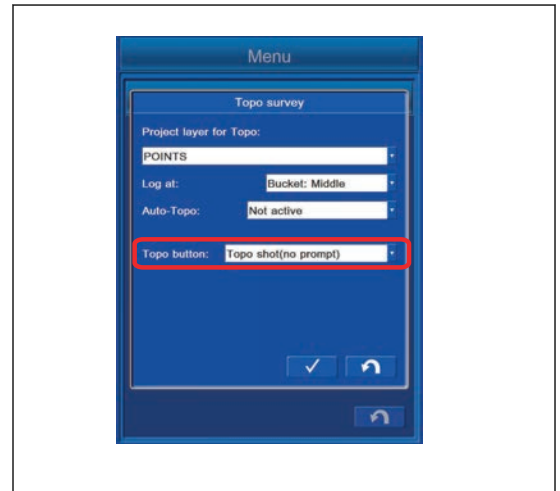
To perform the manual Topo survey, tap “Auto-Topo:” column, and select “Not active”.



METHOD FOR SETTING TOPO BUTTON

Select the saving method from the column of “Topo button:”, to change the operation of Topo survey button when you tap. Selectable operations are the 3 types that follow.

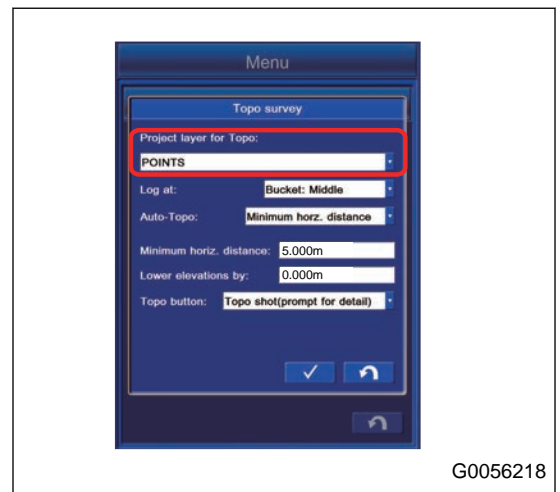
- “Not active”
Makes the button not to be shown.
- “Topo shot(no prompt)”
You can save the Point data with the Layer which you have specified in advance.
- “Topo shot(prompt for detail)”
Each time the Point data are saved, you can specify the Layer.



METHOD FOR SETTING AUTOMATIC TOPO SURVEY (DISTANCE BASED)

METHOD FOR SETTING LAYERS

Tap “Project layer for Topo:” column, and select the layer to which the Topo survey point is saved.



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METHOD FOR SETTING LOGGING POINT

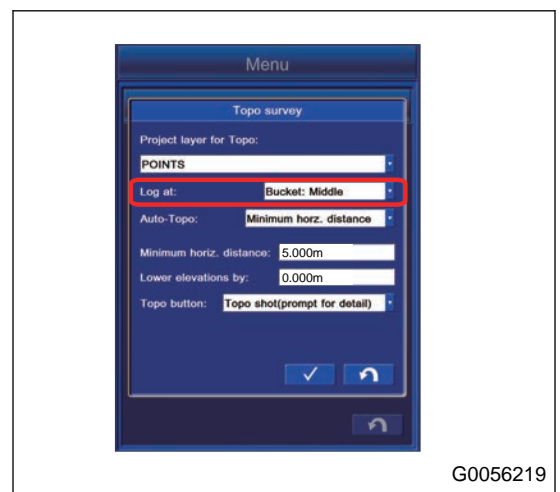
Tap “Log at:” column, and select the bucket edge position for which Topo survey is performed.

“Bucket:Left”: Bucket edge at left end

“Bucket:Middle”: Bucket edge at center

“Bucket:Right”: Bucket edge at right end

“Left and Right Edge”: Bucket edge at both ends

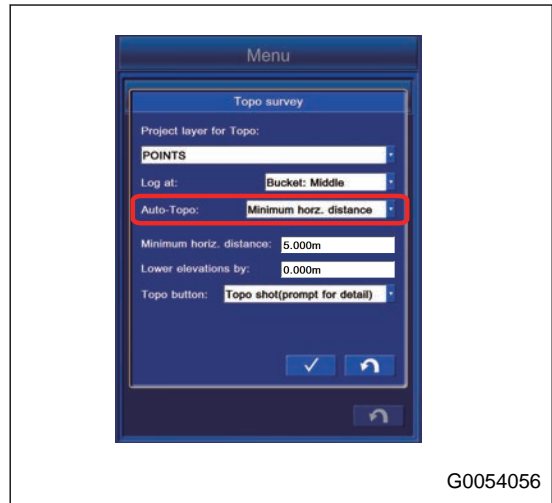


G0056219

METHOD FOR SETTING AUTO-TOPO (MINIMUM HORZ. DISTANCE)

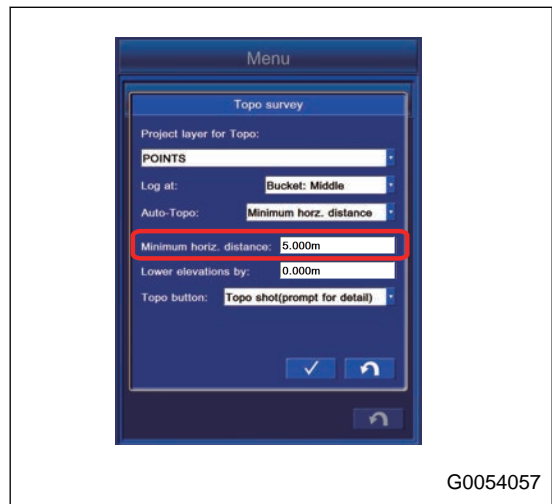
To perform the automatic Topo survey (minimum horizontal distance), tap “Auto-Topo:” column, and select “Minimum horz. distance”.

Coordinates of the bucket edge can be saved continuously each time when the work equipment moves the set distance.



METHOD FOR SETTING MINIMUM HORZ. DISTANCE

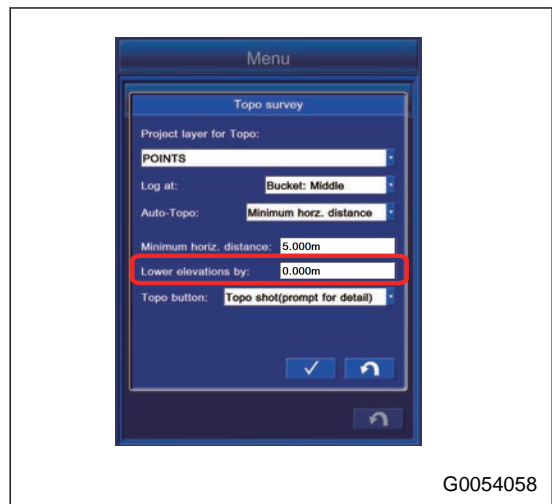
Tap “Minimum horz. distance” column, and input the moving distance of the work equipment of which you want to save the data.



METHOD FOR OFFSETTING LOWER ELEVATIONS

Tap “Lower elevations by:” column and input the value to be offset to the Elevation.

You can offset the Elevation Coordinates of bucket edge (of which position is measured and saved) and save the data.



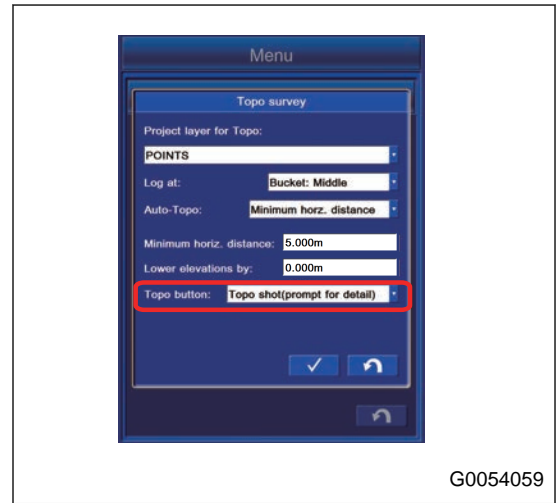
METHOD FOR SETTING TOPO BUTTON

Tap “Log at:” column, and select the operation to do topographical survey.

“Pause/resume auto-topo”:Stops or resumes the continuous topographical survey with Topo survey button.

“Topo shot(no prompt)”: You can save the Point data manually by the Layer which you specified in advance when you tap the Topo survey button even during the continuous topographical survey.

“Topo shot(prompt for detail)”: You can save the Point data manually when you tap the Topo survey button even during the continuous topographical survey. Each time the Point data are saved, you can specify the Layer.

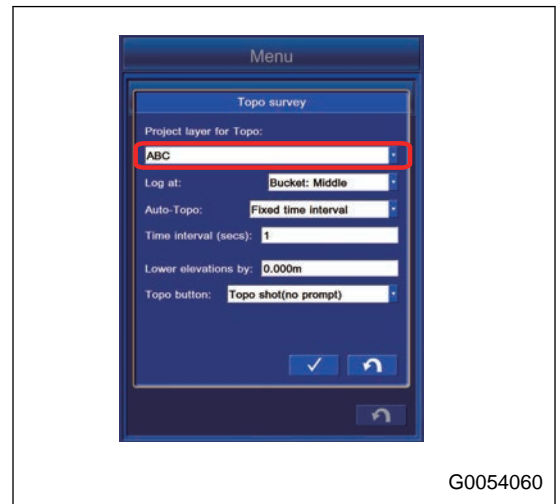


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METHOD FOR SETTING AUTOMATIC TOPO SURVEY (TIME BASED)

METHOD FOR SETTING LAYERS

Tap “Project layer for Topo:” column, and select the layer to which the Topo survey point is saved.



G0054060

METHOD FOR SETTING BUCKET EDGE

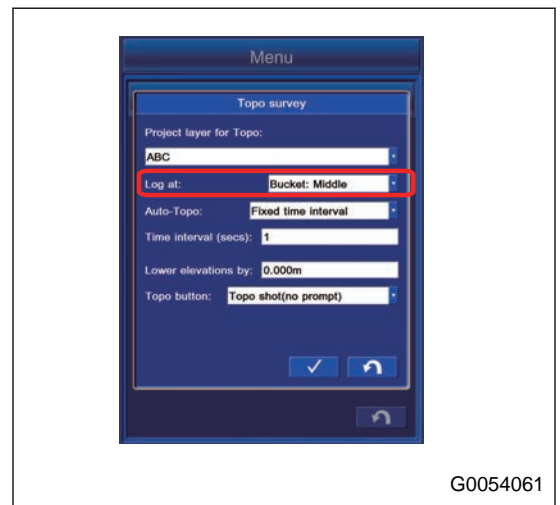
Tap “Log at:” column, and select the bucket edge position for which Topo survey is performed.

“Bucket:Left”: Bucket edge at left end

“Bucket:Middle”: Bucket edge at center

“Bucket:Right”: Bucket edge at right end

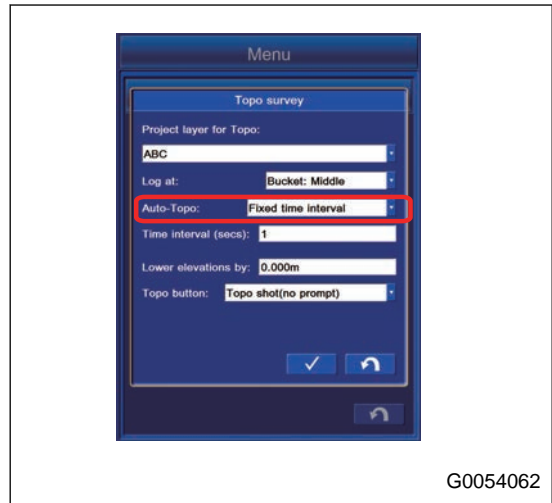
“Left and Right Edge”: Bucket edge at both ends



G0054061

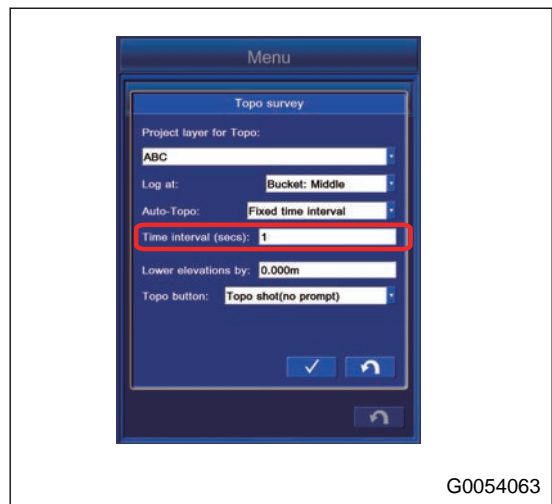
METHOD FOR SETTING AUTO-TOPO (FIXED TIME INTERVAL)

To perform the automatic Topo survey (fixed time interval), tap “Auto-Topo:” column, and select “Fixed time interval”. Coordinates of the bucket edge can be saved continuously with the set time interval.



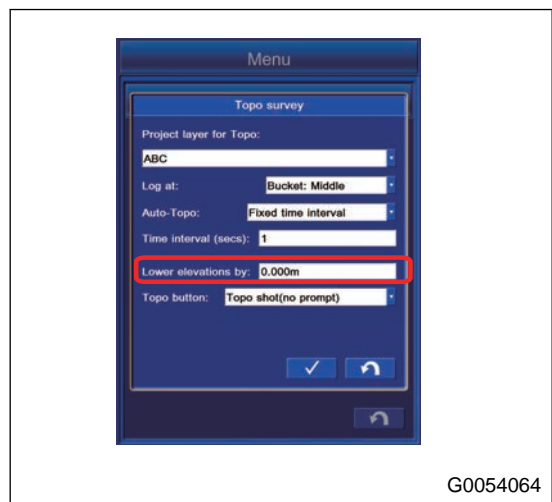
METHOD FOR SETTING MINIMUM HORIZ. DISTANCE

Tap “Time interval (secs):” column, and input the time interval (secs) to save the data.



METHOD FOR OFFSETTING LOWER ELEVATIONS

Tap “Lower elevations by:” column and input the value which is offset to Elevation. You can offset the Elevation Coordinates of bucket edge (of which position is measured and saved) and save the data.



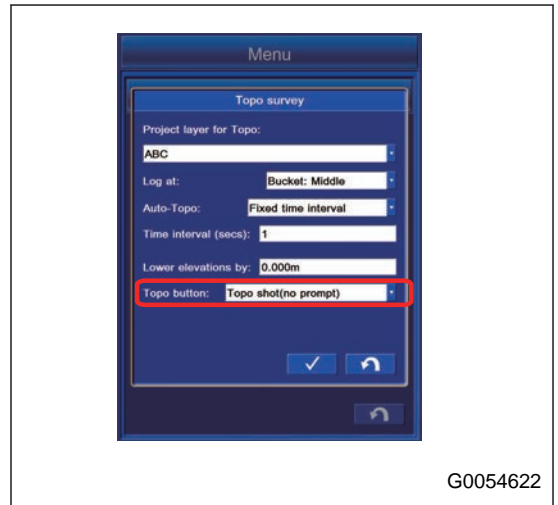
METHOD FOR SETTING TOPO BUTTON

Tap “Log at:” column, and select the operation to do topographical survey.

“Pause/resume auto-topo”:Stops or resumes the continuous topographical survey with Topo survey button.

“Topo shot(no prompt)”: You can save the Point data manually by the Layer which you specified in advance when you tap the Topo survey button even during the continuous topographical survey.

“Topo shot(prompt for detail)”: You can save the Point data manually when you tap the Topo survey button even during the continuous topographical survey. Each time the Point data are saved, you can specify the Layer.



G0054622

METHOD FOR SETTING NAVIGATION MENU

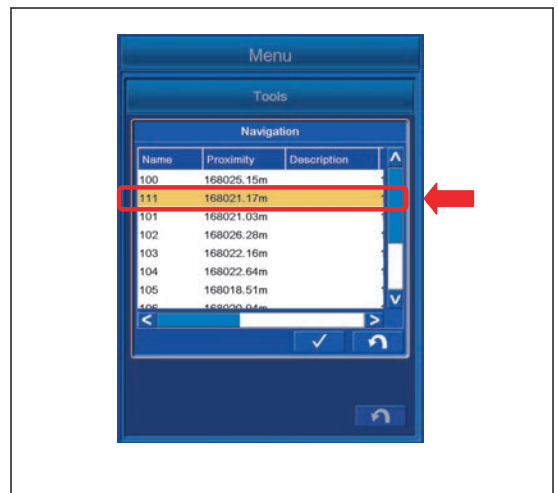
You can navigate the bucket edge to the specified point.

1. Tap “Navigation” button.
The screen changes to “Navigation” setting screen.



G0054065

2. Highlight the point to be navigated, and tap ENTER button.
Tap RETURN button to return the screen to the previous screen.



- 3. Display the pop up map on the working screen, the arrow for navigation is displayed.



G0054066

METHOD FOR SETTING SUPERVISOR MENU

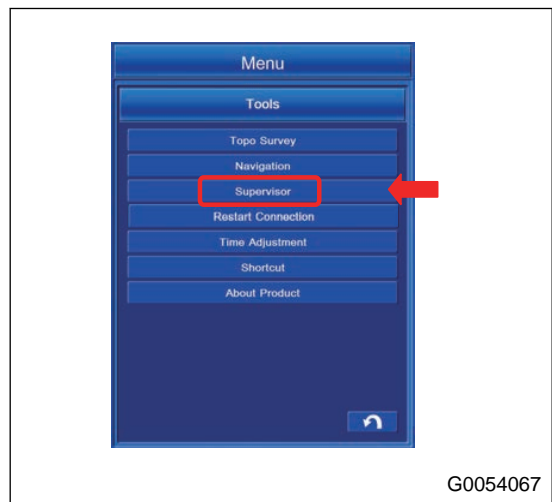
By using the Supervisor Menu of the intelligent Machine Control system, the supervisor can set Enable or Disable for the menu operation by a user.

A password is required to execute “Supervisor” Menu. The password differs, depending on the case.

Default password: komatsuhmi

NOTICE

Before using this setting, understand the function of the intelligent Machine Control thoroughly.



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METHOD FOR DISPLAYING SUPERVISOR MENU

- 1. Tap “Supervisor” button.

Password input screen is displayed. Tap the input column.

Tap RETURN button and the screen returns to the previous screen.



AJD02923

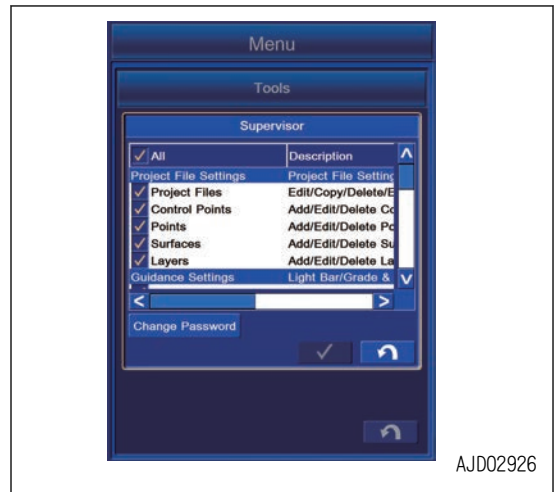
- The input screen is displayed. Input the Password and tap "OK".



- The screen with password inputted is displayed. Tap ENTER button.

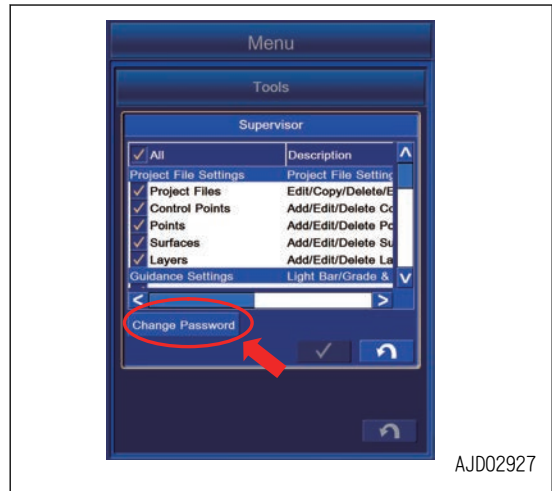


- "Supervisor" menu is displayed.

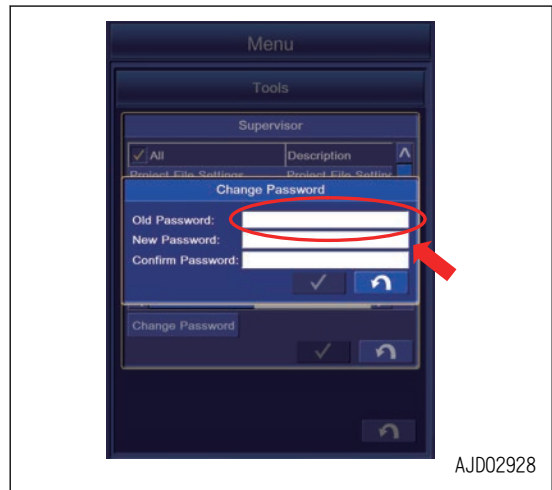


METHOD FOR CHANGING PASSWORD

1. Tap “Change Password” button in “Supervisor” menu.



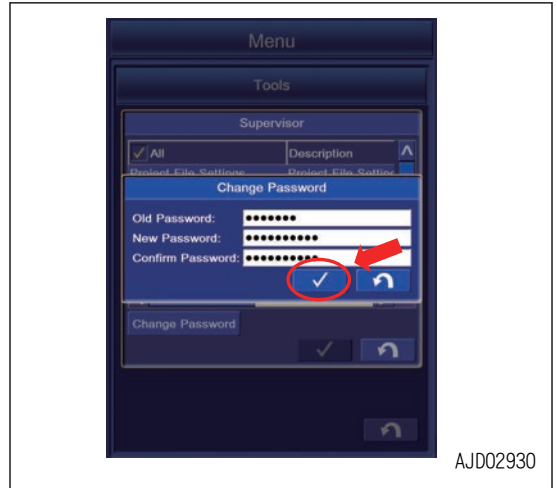
2. Tap the input column of “Old Password:”.



3. An input pad is displayed. Input the current password and tap “OK” button.

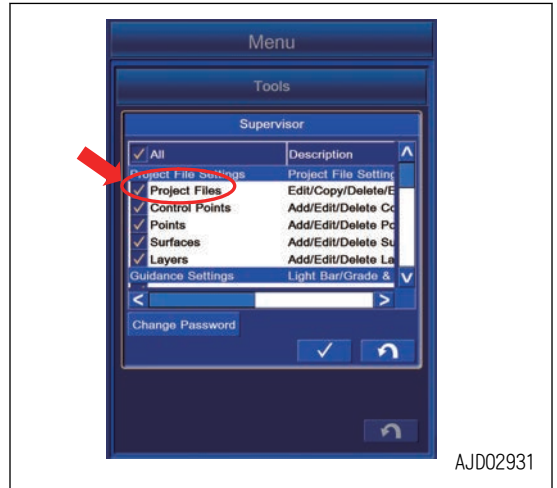


- 4. Input "New Password:" and "Confirm Password:" in the same manner, and tap ENTER button.
The screen returns to "Supervisor" menu.

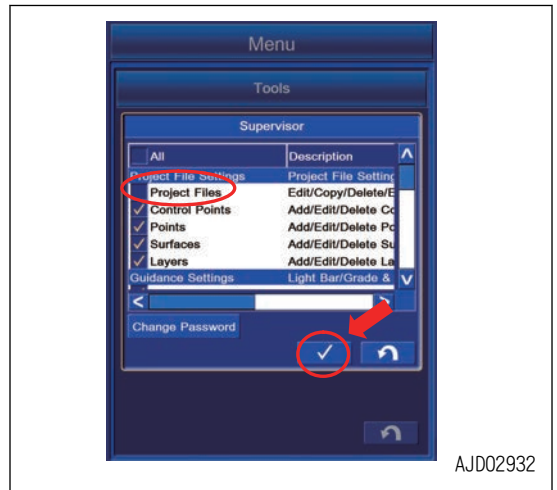


METHOD FOR CHANGING ENABLE/DISABLE SETTING

- 1. Tap the menu to be set to Disable in "Supervisor" menu.
Example: To disable the Project Files menu

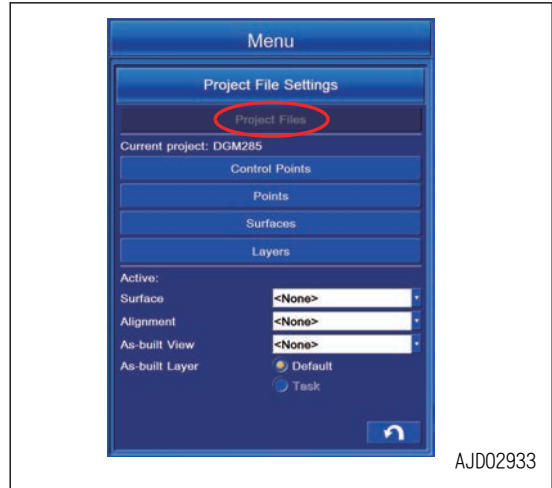


- 2. Tap the Project File and a tick is cleared. Tap ENTER button and the selected menu becomes disabled.
The screen changes to "Tool" screen.



REMARK

For the above example, see “Project File Settings” menu and you will find that the color of “Project Files” button in “Project File Settings” menu turns to gray and you cannot import or edit the Project files.

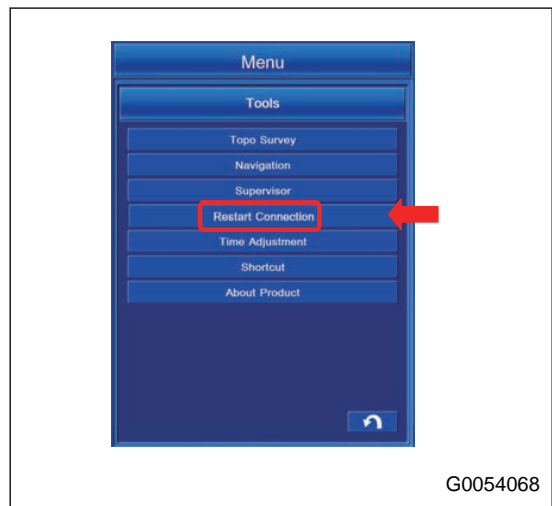


AJD02933

METHOD FOR RESETTING CONNECTION

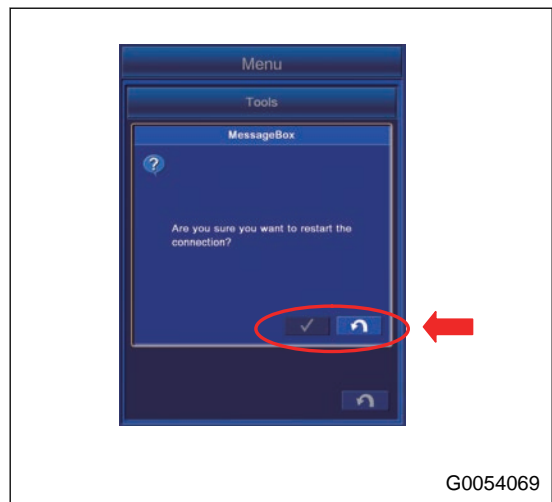
You can get the Satellite Information again.

- 1. Tap “Restart Connection” button.
The screen changes to the reconfirmation screen to reset.



G0054068

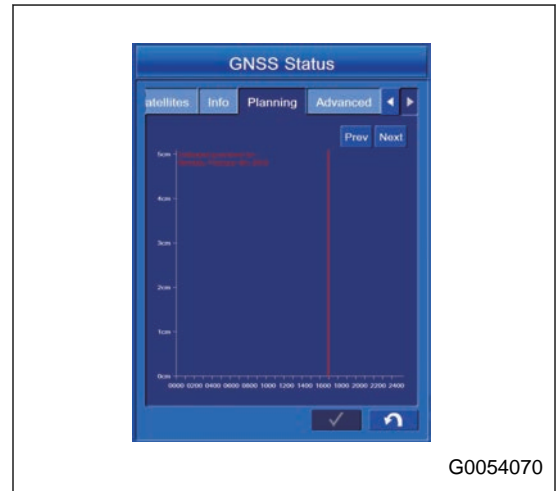
- 2. The screen changes to “MessageBox” screen. Tap “Yes” button to connect again.
If you tap “No” button, the screen goes back to the previous screen.



G0054069

METHOD FOR ADJUSTING CLOCK

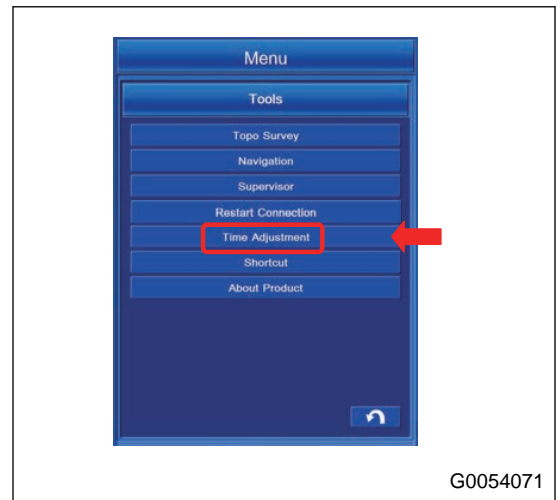
Change the Time Zone, and you can set the time axis in “Planning” tab of “GNSS Status” menu to the local time.



G0054070

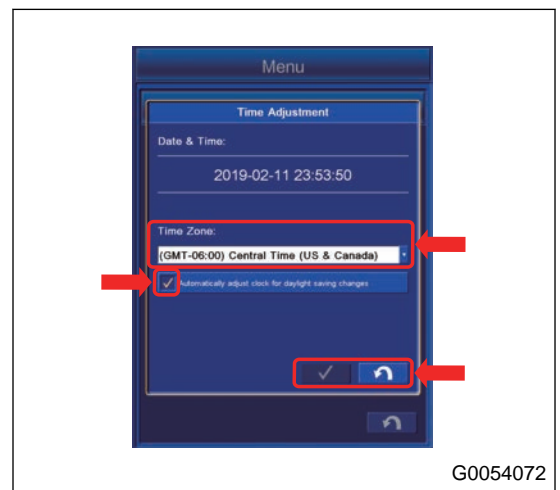
You can set the Time of the control box.

1. Tap “Time Adjustment” button.
The screen changes to “Time Adjustment” setting screen.



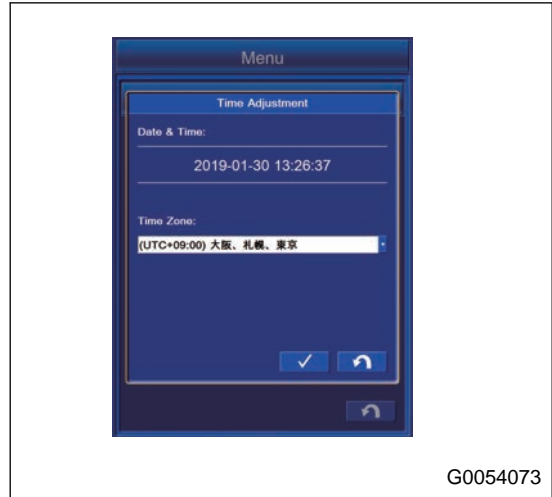
G0054071

2. Select “Time Zone”, and tap the ENTER button.
Tap the RETURN button and the screen goes back to the previous screen.
To set the daylight saving, put a tick in the check box.



G0054072

The check box is not shown for the areas where the daylight saving is not applied.



G0054073

About Komatsu HMI (About Product) MENU SETTINGS

In this menu, the intelligent Machine Control information is displayed.

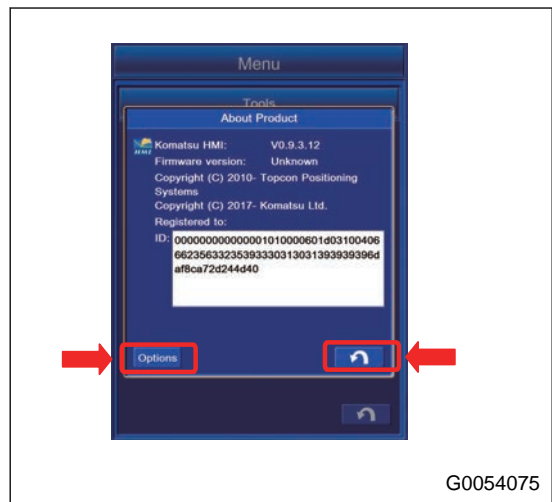
Tap "About Product" button. The software version, etc. of the intelligent Machine Control system is displayed.



G0054074

Tap "Options" button, and enabled option in the intelligent Machine Control system is displayed.

Tap RETURN button and the screen returns to the previous screen.



G0054075

AUTHORIZATION OPTIONS DISPLAY CONTENTS

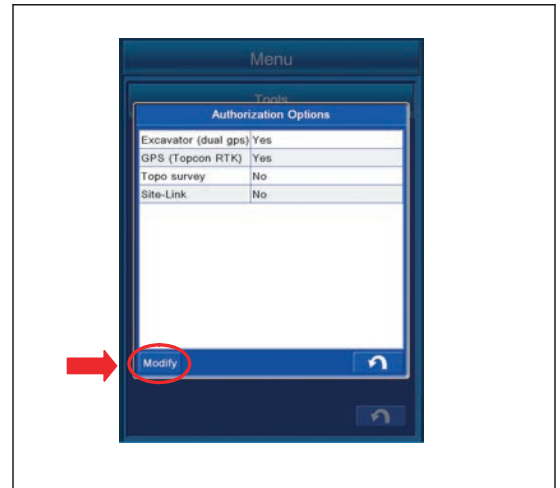
“Excavator (dual gps)” : Setting of GPS

“GPS (Topcon RTK)” : Setting of GPS

“Site-Link” : Setting of Site-Link

“Site-Link Advanced Features” : Setting of Site-Link

Tap “Modify” button, and you can check Authorization Code of the intelligent Machine Control system.



The contents displayed in Authorization Code is as follows.

(1) “Device ID”

This ID is assigned to the intelligent Machine Control system, and it cannot be changed.

(2) “User name”

The user name is displayed. To change it, tap User name column and change the user name.

(3) Setting of “Authorization code”

Setting methods of Authorization code are the following 2 kinds.

- Method to import “OAF” file
Tap “Paste” button, and you can paste the Authorization code copied as a text file.
Tap “From File” button, and import “OAF” file.

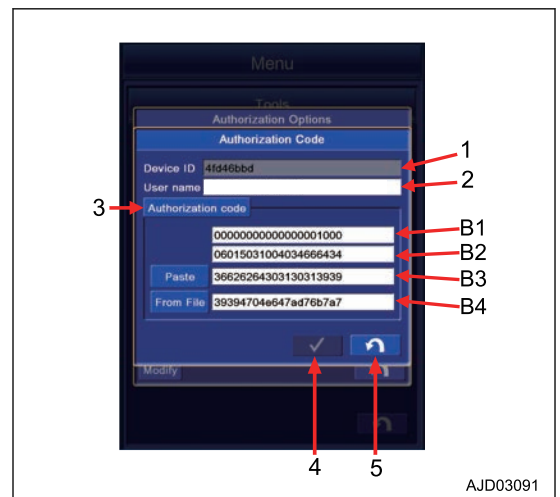
- Method to input Authorization code directly
Tap the columns B1, B2, B3, and B4 one by one, and you can input the Authorization code directly to each column.

(4) ENTER button

Tap ENTER button and new setting is saved.

(5) RETURN button

Tap RETURN button and the screen returns to the previous screen.



AJD03091

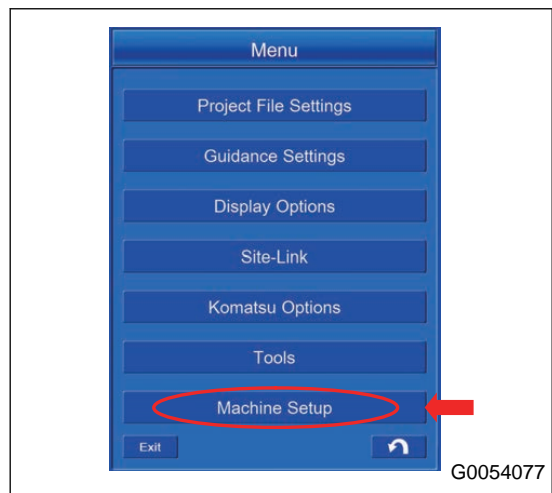
MACHINE SETTING

With Machine setting menu, you can do the setting for GNSS radio device and Bucket Configuration.

1. Tap the main menu display button at the bottom right of the working screen, the screen changes to the main menu screen.



2. Tap "Machine Setup" button on the main menu screen, and the screen changes to "Machine Setup" setting screen.



MACHINE SETTING CONTENTS

The contents shown in the machine setting are as follows.

- (1) "Machine Files"

"Machine Files" are set when the machine is shipped from the factory.

Do not change the setting since it can cause failure.

- (2) "Bucket Configuration"

You can do the Bucket Configuration.

- (3) "GNSS Configuration"

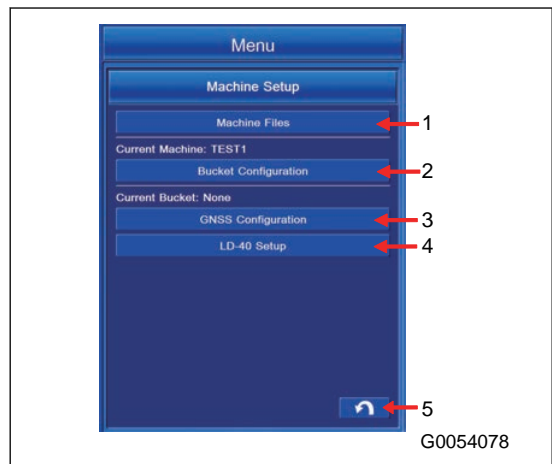
You can do setting of the GNSS radio device.

- (4) "LD-40 Setup"

Not used on this machine. Do not do the setting.

- (5) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.



METHOD FOR SETTING GNSS RADIO DEVICE

Configure the radio of the control box matching with the specifications of GNSS radio device installed to the machine and the radio setting of the base station.

This setting is valid as long as the setting of the GNSS radio device or base station is not changed.

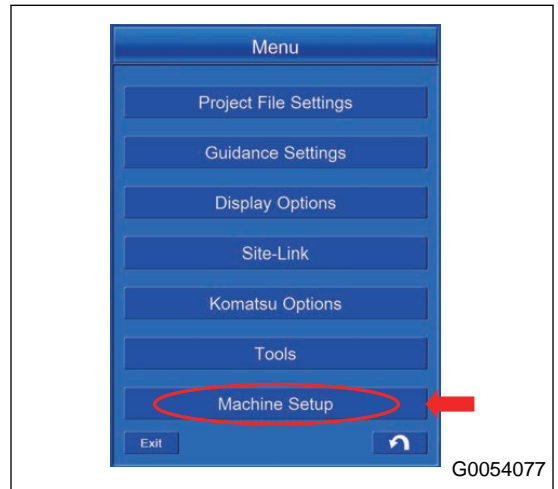
REMARK

Install the GNSS receiver matching to the radio specification of the base station.
For the usable GNSS radio device, consult your Komatsu distributor in advance.

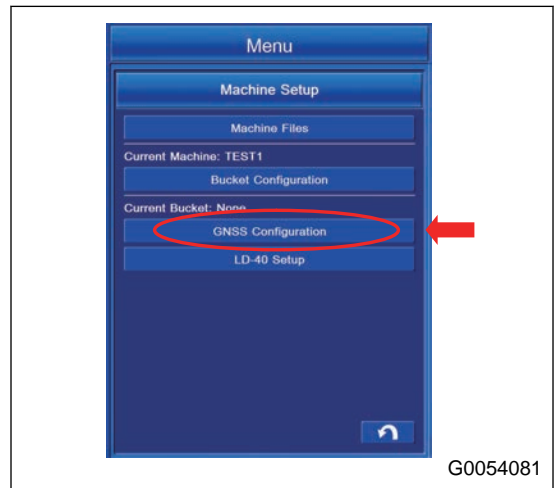
1. Set the base station and turn on the power supply.
2. Turn the starting switch of the machine to ON position, and turn on the power supply of the control box.
3. Tap the Menu button of the control box.
The screen of "Menu" is displayed.



4. Tap "Machine Setup" button.
The screen changes to "Machine Setup" screen.



5. Tap "GNSS Configuration" button.
The screen changes to "GNSS Precision" screen.



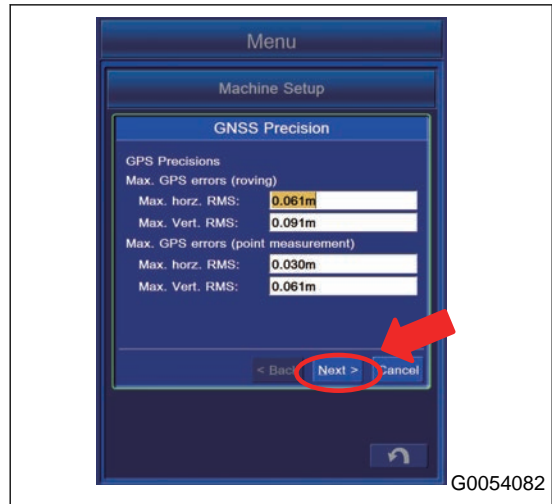
6. For the configuration setting of the radio device, it is not necessary to change the GNSS Precision. Tap “Next>” button.

The screen changes to “GNSS Comms” setting screen.

REMARK

In this screen, you can set the threshold value of RMS value (error) which alerts “Low Precision” error. You can input the value in accordance with the required precision of the construction.

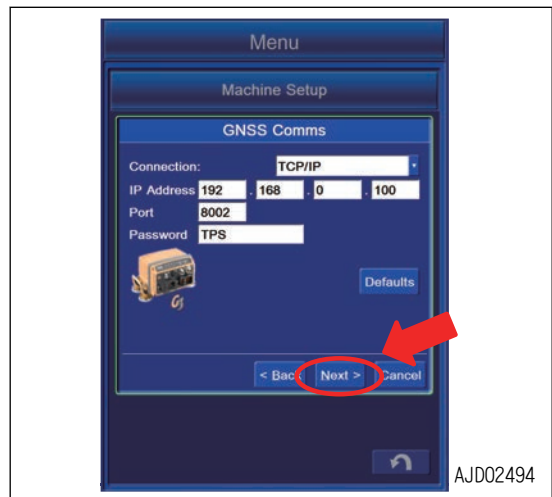
- “Max. GPS errors (roving)”: RMS threshold value used when the machine is moving
 - “Max. horz. RMS:”: Horizontal RMS threshold value
 - “Max. Vert. RMS:”: Vertical RMS threshold value
- “Max. GPS errors (point measurement)”: RMS threshold value used when the machine is stationary
 - “Max. horz. RMS:”: Horizontal RMS threshold value
 - “Max. Vert. RMS:”: Vertical RMS threshold value



7. Connection information with GNSS antenna is displayed in this screen.

If you change the information on this screen, GNSS positioning becomes disabled. Tap “Next>” button without changing any information.

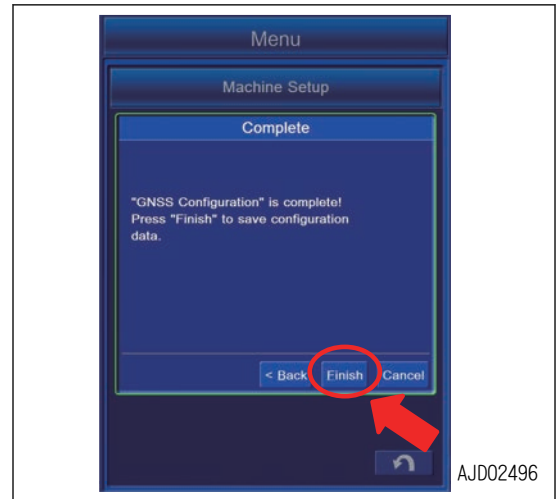
The screen changes to the “GNSS Radio” screen.



8. Select each item according to the specifications of GNSS radio device and the radio setting of the base station, and tap “Next>” button.



9. After "Complete" screen is displayed, tap "Exit" button.
The setting is saved.



METHOD FOR SETTING GNSS RADIO CONFIGURATION

Configure the GNSS Radio according to the following procedure. As long as the configuration of the base station is not changed, resetting is not needed.

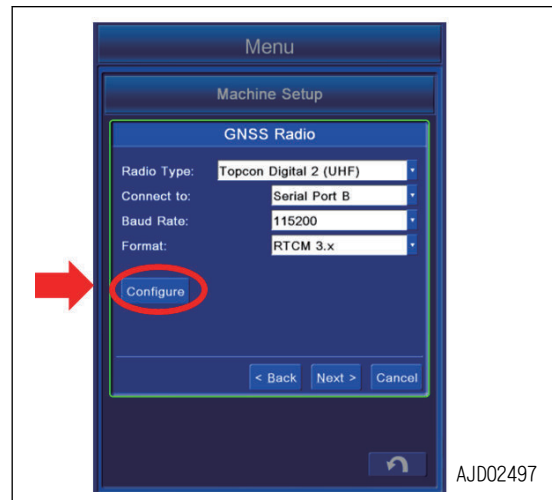
REMARK

There are 2 specifications for the radio device, "Topcon Digital 2 (UHF)" and "Topcon FH915 (SS)". Selection of specifications for the radio device depends on the built-in radio board of GNSS receiver.

If the radio device of which specification is different from the one of the base station is used, the communication is not possible. At that time, either the base station or built-in radio board of GNSS receiver must be replaced. Contact your Komatsu distributor.

The built-in radio device may not be equipped on machines for some countries or regions. Ask your Komatsu distributor that the machine has a built-in radio device or not, or about its type.

Tap Configure button. When Configure button is tapped, the setting screen of the built-in radio board is displayed.



METHOD FOR SETTING CONFIGURATION FOR TOPCON DIGITAL 2 (UHF)

You can configure the setting of communication between the Topcon Digital 2 (UHF) and fixed station.

1. Tap “Channel” column and select the channel.
The frequency of the selectable channel differs with the setting of GNSS controller.
2. Tap “Protocol” column and select the protocol.
3. Tap “Modulation” column and select the modulation type.

REMARK

GMSK can be selected only when “PDL Rover” is selected in “Protocol”.

4. Tap “FEC” column and select the Enable/Disable of FEC.
5. Tap “Scrambling” column and select the Enable/Disable of scrambling.

REMARK

Setting of “Power” is not needed.

6. Tap ENTER button and new setting is saved.
Tap RETURN button and the screen returns to the previous screen.

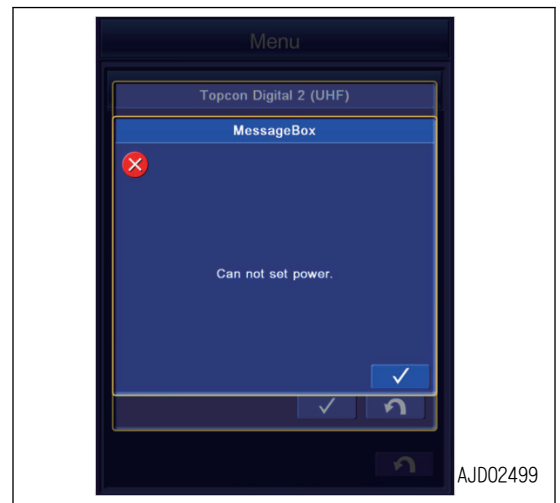
REMARK

After you tap ENTER button, the warning screen of “Can not set power.” is displayed. It is not a trouble because the Power cannot be selected with the specification of this radio device.

When other warning screen is displayed, see “PRECAUTIONS FOR GNSS RADIO CONFIGURATION”.



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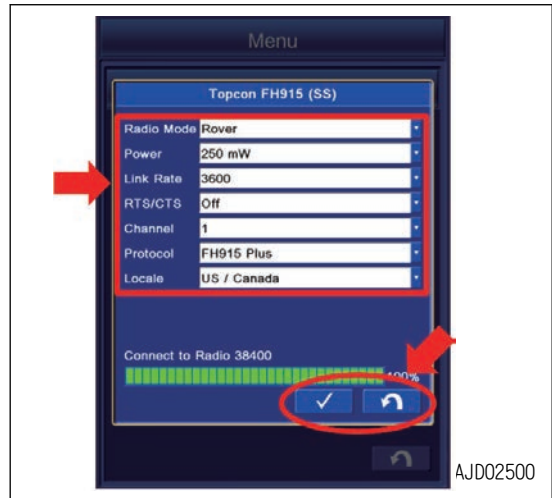


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METHOD FOR SETTING CONFIGURATION FOR TOPCON FH915 (SS)

You can configure the setting of communication between the Topcon FH915 (SS) and fixed station.

1. Tap "Radio Mode" column and select the radio mode.
2. Tap "Power" column and select the power.
3. Tap "Link Rate" column and select the link rate.
Selectable link rate type differs according to the protocol.
4. Tap "RTS/CTS" column and select the Enable/Disable of RTS/CTS.
5. Tap "Channel" column and select the channel.
6. Tap "Protocol" column and select the protocol.
7. Tap "Locale" column and select the locale.
8. Tap ENTER button and new setting is saved.
Tap RETURN button and the screen returns to the previous screen.



PRECAUTIONS FOR GNSS RADIO CONFIGURATION

NOTICE

While setting the built-in radio board, even if it is done correctly, warning screen may be displayed. In this case, perform the setting of the built-in radio board configuration again.



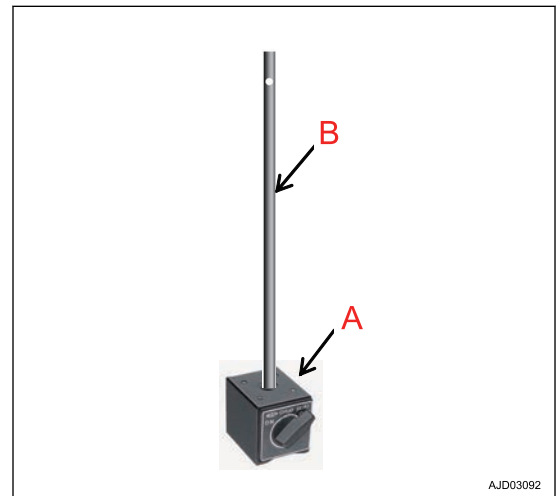
PREPARATIONS FOR CALIBRATION

CAUTION

- Do not approach the machine unless necessary. When approaching the machine, secure the safety according to the following procedure.
 - Inform the operator that you approach.
 - Only after the operator sets the lock lever to LOCK position, and gives you a sign, you can approach.
- When getting on and off the machine, do not jump in or out. Support yourself at 3 points always while getting on and off. Use a stand for getting on and off, as needed.

Prepare the following things in order to perform the calibration.

- Convex rule, tape measure (steel made)
- Plumb (or laser level)
- Level (or laser level)
- Digital angle gauge
- Marker (for put a mark on the bucket for shape recognition)
- Magnet pole jig set
 - (A) Magnet base
 - (B) Pole
- Rope



Special tools such as magnet pole, etc. is necessary for calibration (especially for measurement of bucket shape). Ask your Komatsu distributor for exchange calibration when the new bucket is to be installed.

It is possible to measure without special tool, but the accuracy of bucket edge may not be obtained sufficiently. Ask your Komatsu distributor for exchange calibration if high accuracy of construction is needed.

BUCKET CONFIGURATION

OUTLINE OF CALIBRATION

CAUTION

- Move the machine to the flat and firm ground such as concrete. (Angle of inclination within 5 °)
- Set the swing lock switch to ON (lock) position, and do not perform the swing operation once the calibration has started.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.

Machine calibration (TS machine calibration or manual machine calibration), and the positional calibration for the proportional control lever and potentiometer full lever should have been completed before the bucket configuration is performed.

Ask your Komatsu distributor for the machine calibration and the positional calibration for the proportional control lever and the potentiometer full lever if those have not been performed yet.

Bucket configuration is performed from the intelligent Machine Control system menu.

There are 3 kinds of bucket configurations as follows.

- “Conventional Bucket Exchange” calibration
Perform “Conventional Bucket Exchange” when changing the bucket to the one other than tilt bucket such as conventional bucket or slope finishing bucket.
- “Tilting Bucket Exchange” calibration
Perform “Tilting Bucket Exchange” when changing the bucket to the one with tilting function.
- “Bucket Tooth Calibration”
Perform “Bucket Tooth Calibration” when the tooth tip position changes due to the worn tooth.

REMARK

- If the bucket weight changes largely, bucket weight setting should be executed in addition to the above. Set the bucket weight by referring to “BUCKET WEIGHT SETTING”.
- Be careful of measuring position while performing the calibration when the bucket is equipped with a quick coupler. The shape of the bucket including the quick coupler is to be measured.
- In any calibration screen, you can escape from the calibration by tapping RETURN button. Tap RETURN button again and the screen returns to previous screen.
- The rotational bucket with rotation mechanism is not applicable to this machine. Do not use the rotational bucket.

PROCEDURES OF CALIBRATION AFTER REPLACING CONVENTIONAL BUCKET

Perform the conventional bucket replacement calibration when replacing the bucket to the one other than tilt bucket such as standard bucket or slope finishing bucket.

Perform this calibration on the steady ground so that machine does not incline when the bucket is operated.

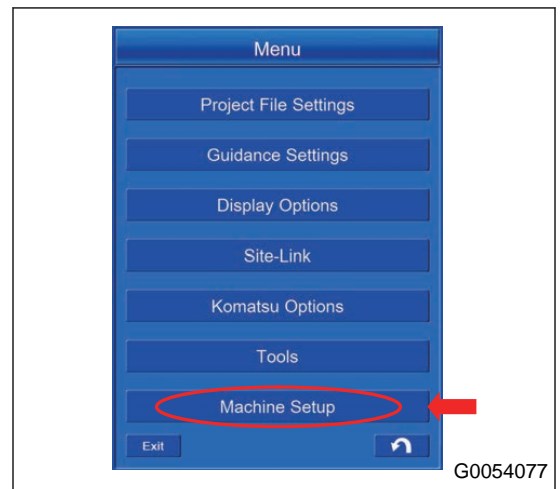
Check there is no person in the operating range of work equipment, and pay great attention to the safety when moving the work equipment.

METHOD FOR STARTING APPLICATION FOR CALIBRATION AFTER REPLACING CONVENTIONAL BUCKET

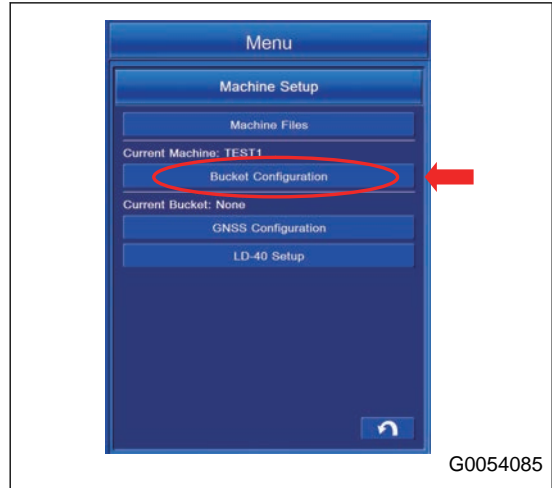
1. Tap the menu button of the control box.
Main menu screen is shown.



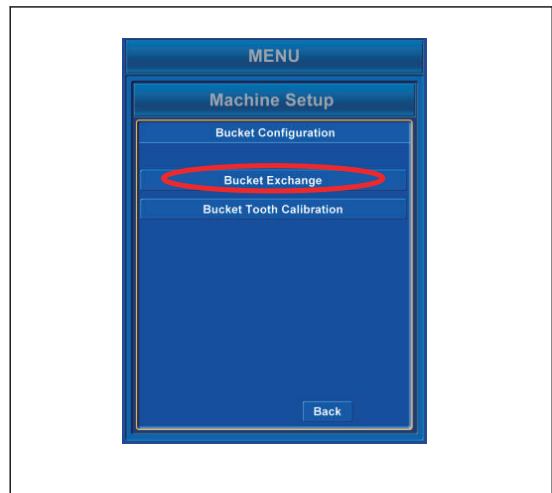
2. Tap "Machine Setup" button.
The screen changes to the "Machine Setup" screen.



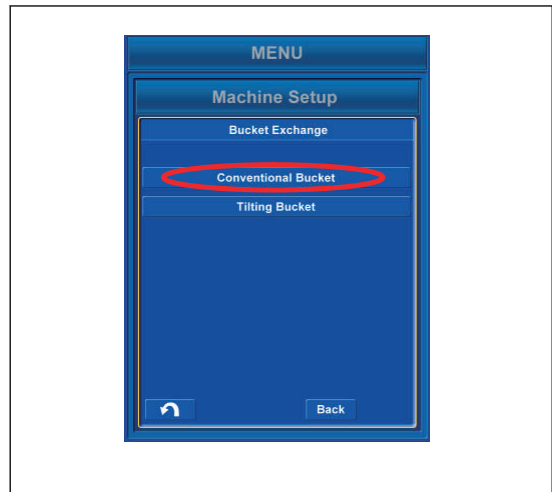
- 3. Tap "Bucket Configuration" button.
The screen changes to "Bucket Configuration" screen.



- 4. Tap "Bucket Exchange" button.
The screen changes to "Bucket Exchange" screen.



- 5. Tap "Conventional Bucket" button.
Calibration of "Conventional Bucket" starts and the screen changes to the Bucket File Select screen.
Tap the RETURN button and the screen goes back to the previous screen.



METHOD FOR SELECTING CONVENTIONAL BUCKET FILES

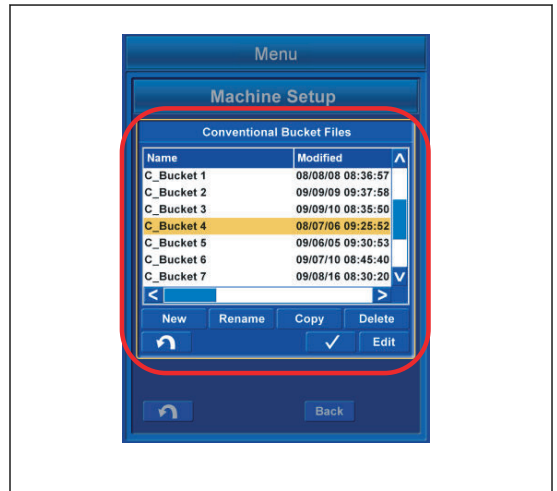
1. Select the bucket file to be used from the list on “Conventional Bucket Files” screen.

When you change the content of selected bucket file, tap “Edit” button.

When you do not change, tap the ENTER button, and do procedures of “METHOD FOR CALCULATING AUTOMATIC CALIBRATION AND WRITING PARAMETER VALUE”.

REMARK

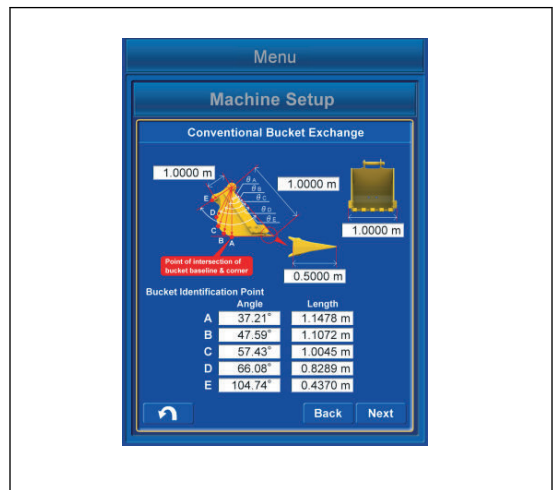
- The currently selected bucket is highlighted in yellow.
- If the bucket file is not in the list, tap “New” button and create the file newly. The input data will be saved in the file.
- When you check the content of the bucket file, tap “Edit” button. The content of the file is shown. When you do not change, tap the RETURN button.
- Function of the button in the screen is as follows.
 - “New” button
Creates the new file based on the highlighted file.
 - “Rename” button
Changes the name of the highlighted file.
 - “Copy” button
Copies the bucket file from the USB flash drive into the control box, or does vice versa.
 - “Delete” button
Deletes the highlighted file.
 - RETURN button
Moves the screen back to the previous screen.



2. Tap “Edit” button.

Information of the selected bucket file is shown.

Check the value. If a change is needed, measure the bucket shape.

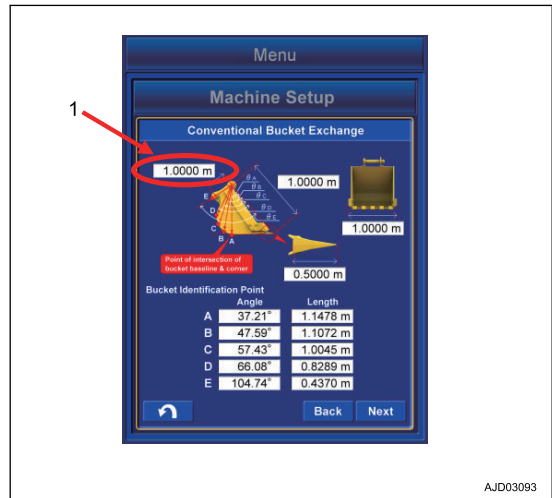


METHOD FOR MEASURING BUCKET SHAPE

Measure the dimensions and angles for inputting the bucket information.

Measure the length dimension to mm unit, and angle to 0.1 ° unit.

1. Measure the dimension (1).

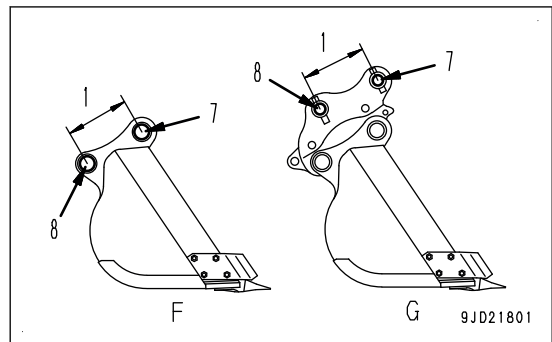


Dimension (1) is the distance between the bucket pin (7) and the bucket link pin (8).

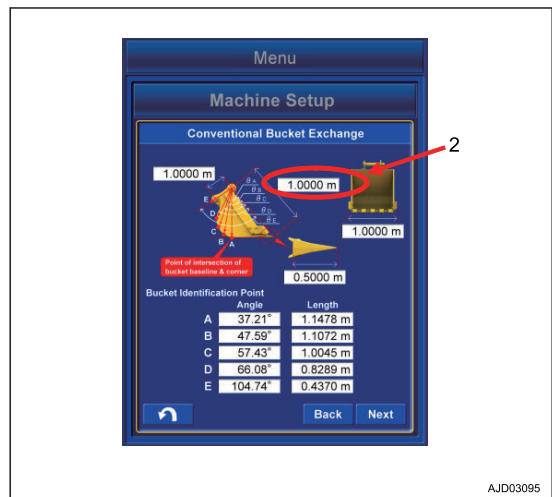
Measure with a tape measure, and input the data.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed



2. Measure the dimension (2).



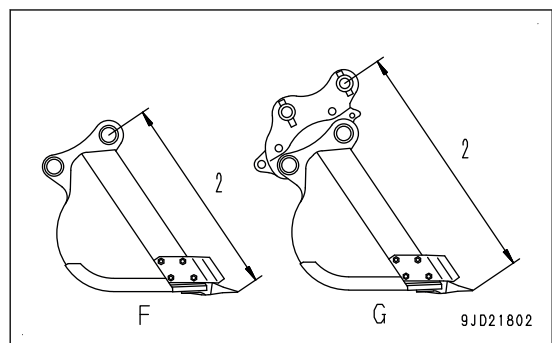
Dimension (2) is the distance between the bucket pin (7) and tooth tip.

Measure with a tape measure, and input the data.

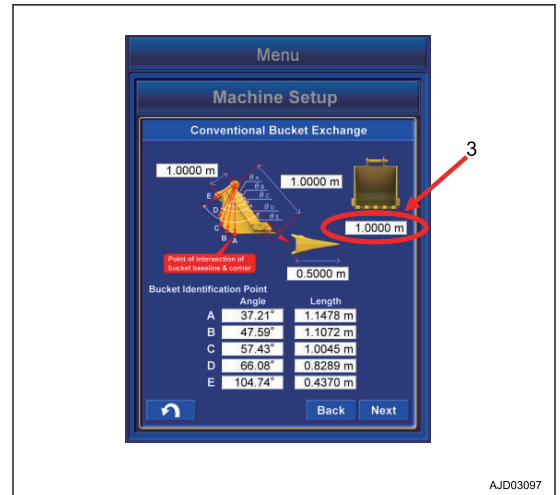
2 persons are required for the measurement.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed



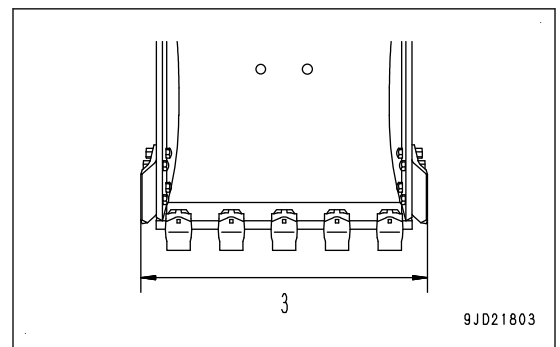
3. Measure the dimension (3).



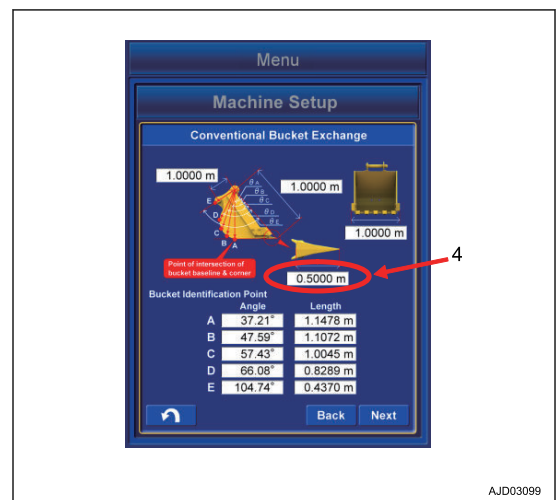
Dimension (3) is the distance between the bottom of bucket side cutters.

Measure with a tape measure, and input the data.

Measure the distance at widest part and input the data if the bucket has no side cutters.

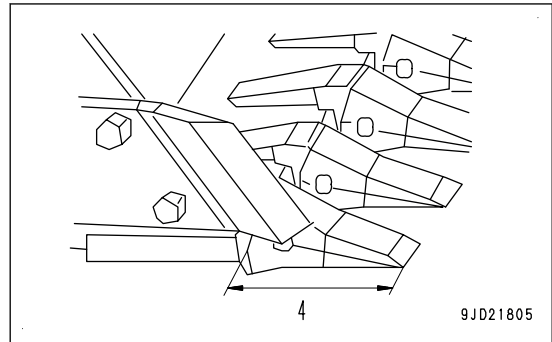
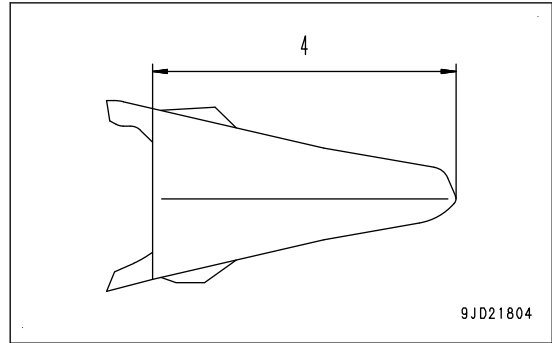


4. Measure the dimension (4).

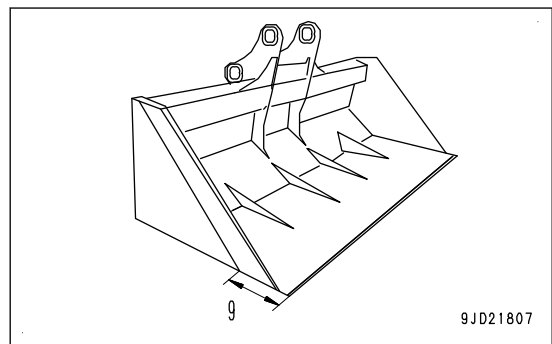
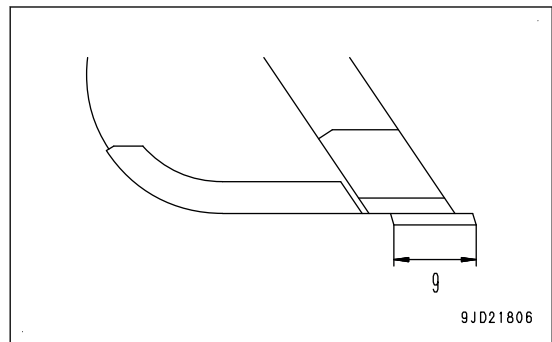


Dimension (4) is the distance between root and tip of the tooth.

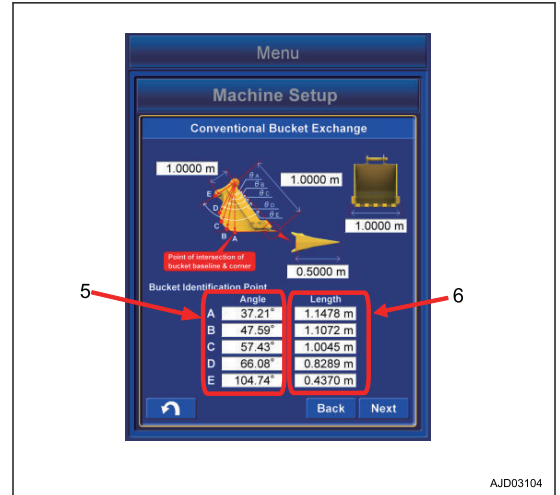
Measure with a tape measure, and input the data.



Measure the blade width (9) and input the data if bucket has no tooth.



5. Measure the angle (5) and dimension (6) of "Bucket Identification Point".



6. Put the marks with marker pen at the 5 points (A), (B), (C), (D), and (E) of "Bucket Identification Point".

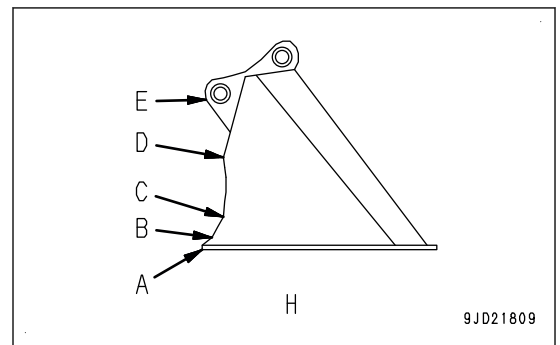
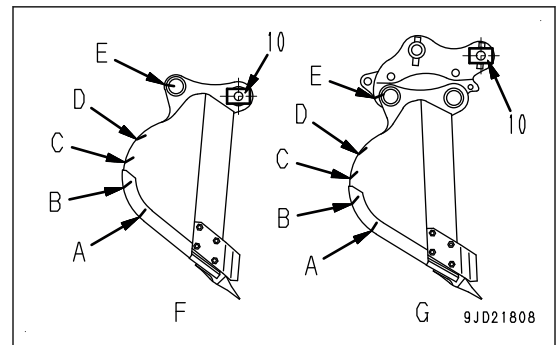
"Bucket Identification Point" (A) is the cross point of straight line of bucket bottom face and corner.

If it is difficult to distinguish the straight line of bottom face and corner, select the point that touches the ground if the floor face digging were performed.

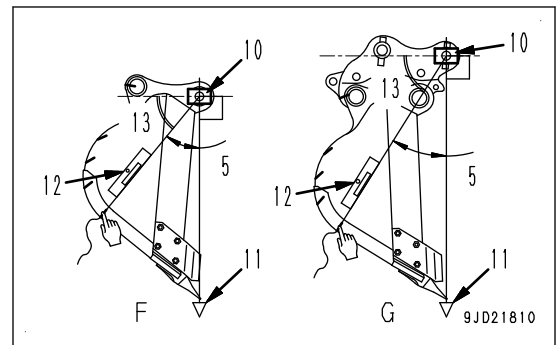
"Bucket Identification Point" (E) is the most outside part on the extended line between bucket pin and bucket link pin.

"Bucket Identification Point" (B), (C), and (D) divide equally the distance between (A) and (E).

7. Set the magnet pole jig (10) to the bucket pin.
Align the center of foot pin and center of pole.
(F): When the quick coupler is not installed
(G): When the quick coupler is installed
(H): When slope finishing bucket is installed



8. Apply the plumb (11) to the magnet pole jig (10), and set the bucket so that the line between bucket pin and tooth tip is vertical.
9. Measure the distance between the point out of (A) to (E) and center of pole with a tape measure, and input the data in the dimension column (6).
10. Put the end of string to the magnet pole (10) and stretch the string to the point out of (A) to (E).
11. Set the digital angle gauge (12) on to the string, and measure the angle (13) of (A) to (E).



Angle (13) is the angle between level line of bucket pin and each point of (A) to (E).

- When the string is below the level line of bucket pin
Subtract the angle (13) from 90°, and input the calculated value in the Angle (5) of the "Bucket Identification Point".
- When the string is above the level line of bucket pin
Add the angle (13) to 90°, and input the calculated value in the Angle (5) of the "Bucket Identification Point"

(F): When the quick coupler is not installed

(G): When the quick coupler is installed

REMARK

- 2 persons are required to measure the dimensions (6) and the Angle (5) of the “Bucket Identification Point”.
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform measuring of “Bucket Identification Point” as making sure that the plumb (11) is vertical from time to time.

METHOD FOR INPUTTING BUCKET INFORMATION

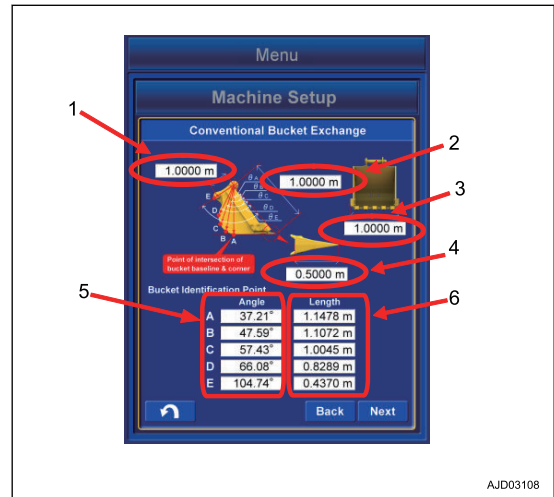
Input the measured dimensions and angles.

Tap within the white frame of dimension value to be input again, and then the numeric keypad pops up. Input the numeric value with it.

Measure the length dimension to mm unit, and angle to 0.1 ° unit.

You can input the numeric value within the range shown below.

- Numeric value (1)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (2)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (3)
Min: 0.0001 m to Max: 5.9999 m
- Numeric value (4)
Min: 0.0001 m to Max: 2.9999 m
- Angle (5)
Min: 0.01 ° to Max: 179.99 °
- Numeric value (6)
Min: 0.0001 m to Max: 5.9999 m



AJD03108

Check the input numeric value. If there is no problem, tap “Next” button.

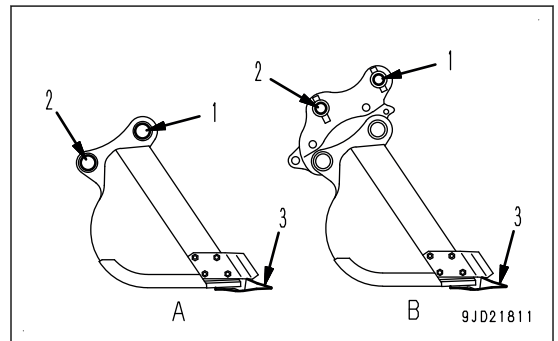
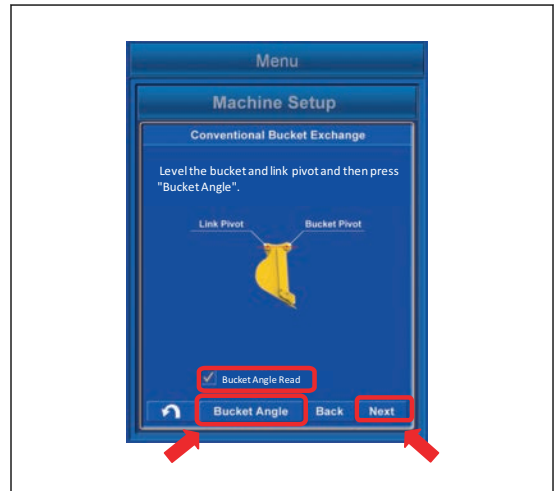
(If you input the value outside the range, “Next” button will be unavailable.)

If a numeric value or angle column is empty, even if “Next” button is pushed, it is invalid.

METHOD FOR MEASURING BUCKET FOOT ANGLE

1. Set the bucket foot pin (1) and the bucket link pin (2) horizontal by using a level or a laser level.
 - (A): When the quick coupler is not installed
 - (B): When the quick coupler is installed
2. Tap the “Bucket Angle” button.

A tick is put in the check box of “Bucket Angle Read”, and work equipment angle at that posture is saved.
3. Tap the “Next” button.



4. Set the bucket foot pin (1) and the tooth tip (3) vertical by using a plumb or a laser level.

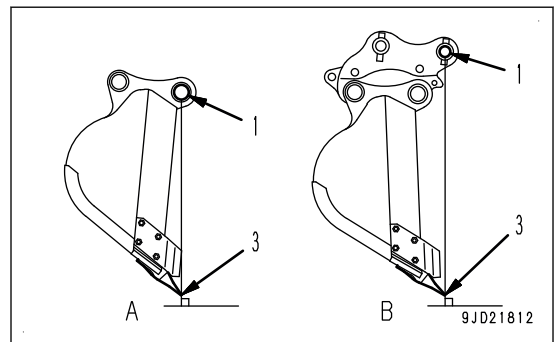
Move the bucket only. Do not move the other work equipment (boom, arm) at this time.

 - (A): When the quick coupler is not installed
 - (B): When the quick coupler is installed
5. Tap the “Bucket Angle” button.

A tick is put in the check box of “Bucket Angle Read”, and work equipment angle at that posture is saved.
6. Tap the “Next” button.

REMARK

In order to adjust work equipment angle again, tap the “Bucket Angle” button and you can execute again. If no tick is in the check box of “Bucket Angle Read”, “Next” button is invalid.

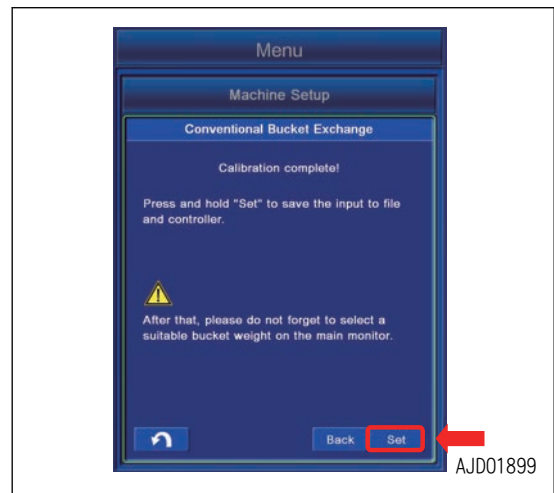


METHOD FOR CALCULATING AUTOMATIC CALIBRATION AND WRITING PARAMETER VALUE

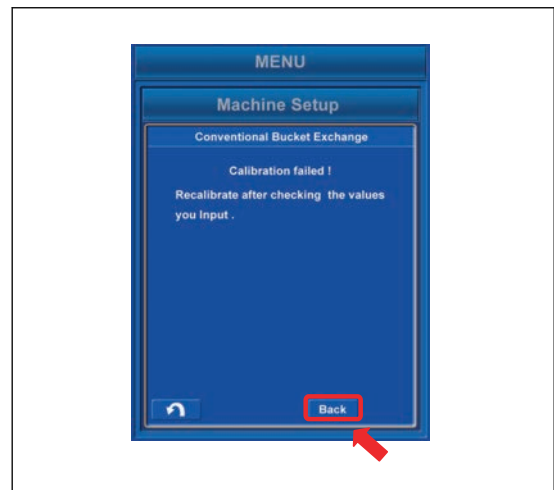
1. Tap the "Next" button.
Automatic calibration is executed.
After the calculation is finished, the screen changes.



2. Hold down the "Set" button for 0.5 seconds or longer.
The conventional bucket parameter obtained by automatic calibration calculation is written in Komatsu controller, and the display returns to the menu screen.
Conventional Bucket Exchange calibration is completed.
If the bucket weight changes largely, bucket weight setting should be executed.
For bucket weight setting, see "BUCKET WEIGHT SETTING".
3. After the setting is completed, turn the starting switch key to OFF position, turn it to ON position again, and restart the control box.



Tap the "Next" button and if automatic calibration calculation fails, error screen is displayed.
In this case, the numeric value which has been input may be wrong.
Tap the Back button, and check back the input result.



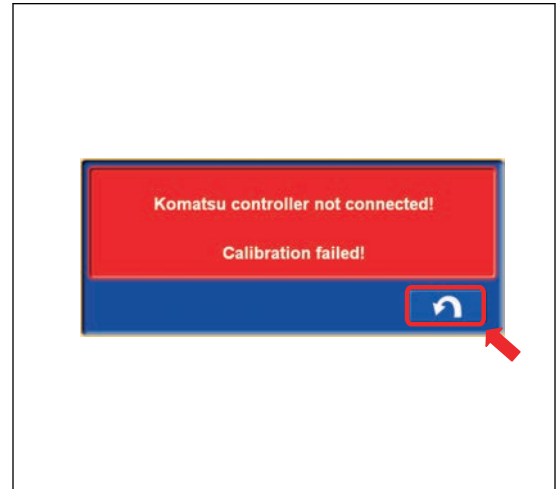
METHOD FOR ACTING WHEN COMMUNICATION ERROR OR SENSOR ERROR OCCURS

If the error screen shown in the figure is shown while you do the standard bucket exchange calibration, a communication error occurs between the Komatsu controller and control box.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see "TROUBLES AND ACTIONS".

After the error is resolved, do the calibration again.

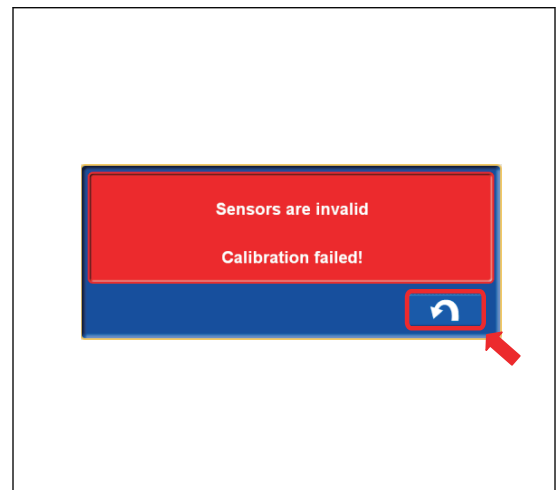


If the error screen shown in the figure is shown, an abnormality occurs in the sensor connected to the chassis.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see "TROUBLES AND ACTIONS".

After the error is resolved, do the calibration again.



PROCEDURES OF CALIBRATION AFTER REPLACING TILT BUCKET

Perform the tilt bucket replacement calibration when replacing the bucket to the tilt bucket. This is not applicable for the rotational bucket.

Perform this calibration on the steady ground so that machine does not incline when the bucket is operated.

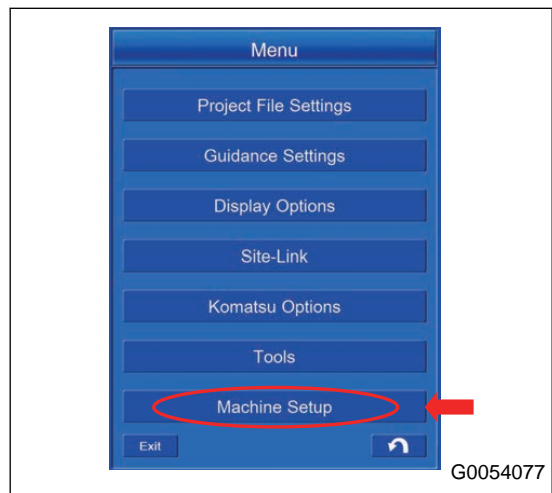
Check there is no person in the operating range of work equipment, and pay great attention to the safety when moving the work equipment.

METHOD FOR STARTING APPLICATION FOR CALIBRATION AFTER REPLACING TILT BUCKET

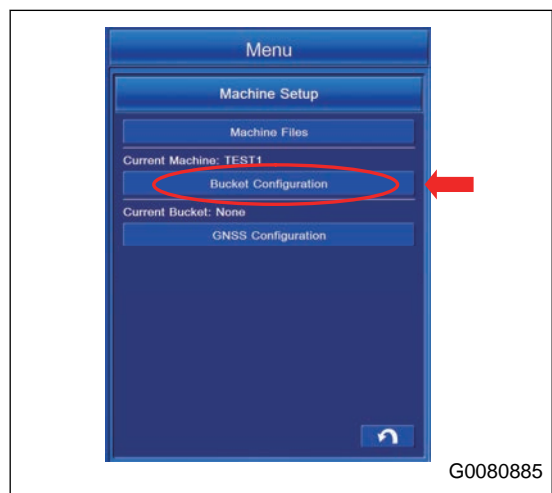
- 1. Tap the menu button on the control box.
Main menu screen is displayed.



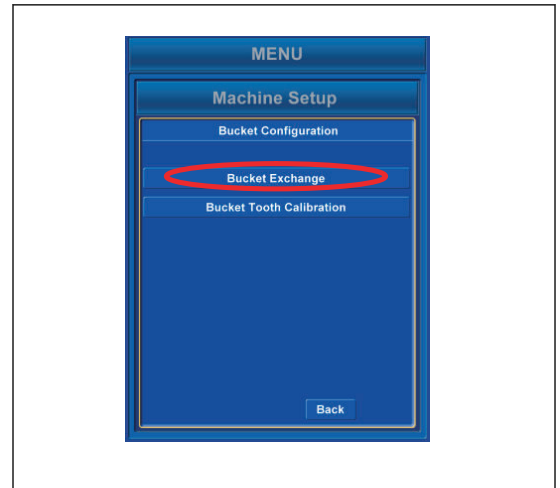
- 2. Tap the "Machine Setup" button.
The display changes to the "Machine Setup" screen.



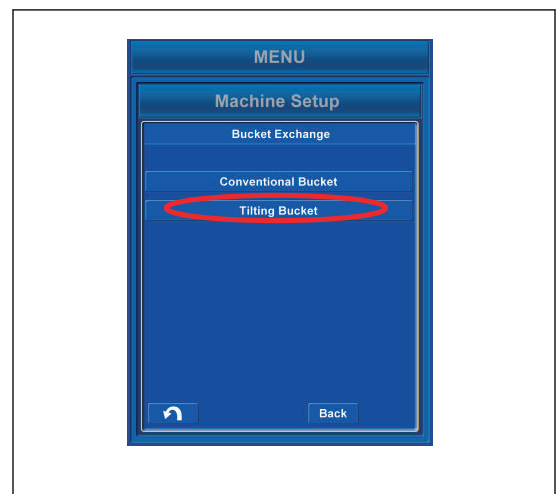
- 3. Tap the "Bucket Configuration" button.
The display changes to "Bucket Configuration" screen.



4. Tap the "Bucket Exchange" button.
The display changes to the Bucket Exchange screen.



5. Tap the "Tilting Bucket" button.
Calibration of the Tilting Bucket Exchange starts and the display changes to the Bucket File Select screen.



METHOD FOR SELECTING TILT BUCKET FILES

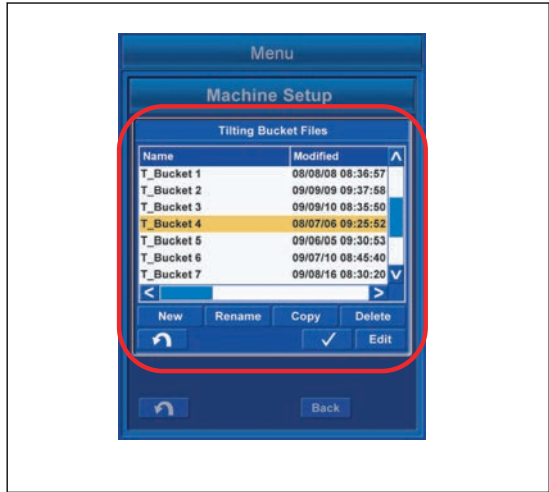
1. Select the bucket file to be used from the list on the Conventional Bucket Files screen.
 - When you change the content of selected bucket file, tap “Edit” button.
 - When you do not change, tap the ENTER button.

REMARK

- The currently selected bucket is highlighted in yellow.
- If the bucket file is not in the list, tap “New” button and create the file newly. The input data will be saved in the file.

Function of the button in the screen is as follows.

- “New” button
Creates the new file based on the highlighted file.
- “Rename” button
Changes the name of the highlighted file.
- “Copy” button
Copies the bucket file from the USB flash drive into the control box, or does vice versa.
- “Delete” button
Deletes the highlighted file.
- RETURN button
Moves the screen back to the previous screen.



2. When you complete the setting, turn the starting switch key to the OFF position, turn it to the ON position again, and restart the control box.

METHOD FOR SELECTING TILT SENSOR

1. Select the name of installed tilt sensor from the pull down menu (1).
2. Select the direction of installation of tilt sensor from the pull down menu (2).

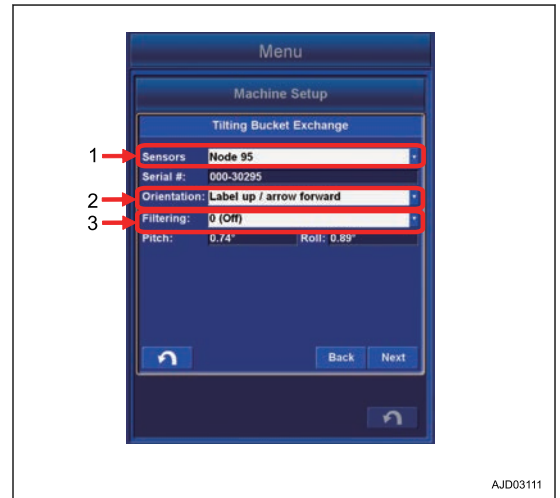
Set the tilt sensor label and direction of arrow on the label.

3. Select the filter level from the pull down menu (3).

Filter level can be selected from 0 to 4.

Filter level "0" is the state of no filter, and sensor sensibility is high. The higher the filter level is, the lower the sensor sensibility is.

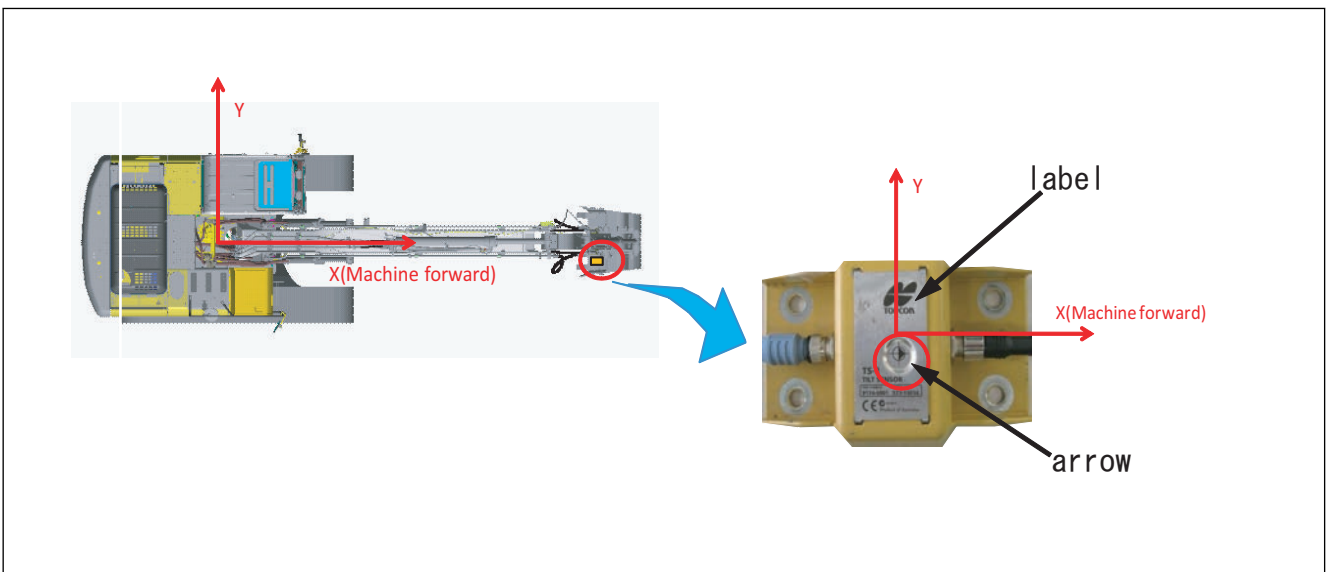
The error may occur on the value sensed by controller due to disturbance such as vibration or shock. The use at filter level "0" (OFF) is not recommended.



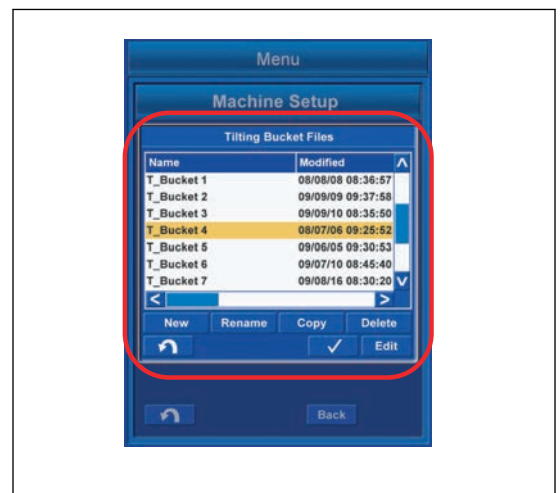
4. After the selection is completed, tap the "Next" button.

If there is unselected item in the pull down menus (1) to (3), the Next button is invalid.

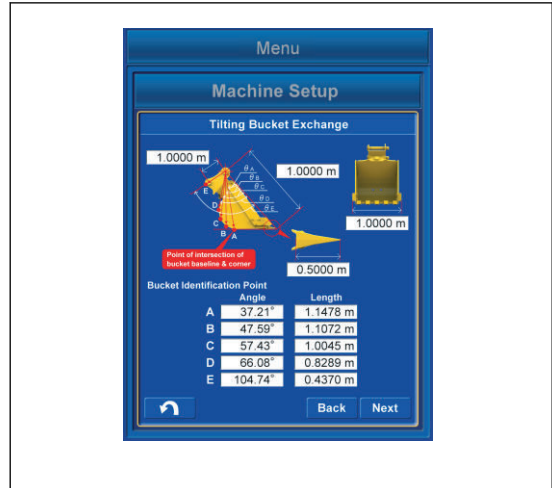
When "Label up/arrow forward" is selected in the pull down menu (2), the machine state is as shown in the figure.



If the ENTER button is selected on the selecting screen of bucket file, perform the procedure of auto calibration calculation and inputting of parameter value.



If the "Edit" button is selected, the display changes to the bucket information input screen.

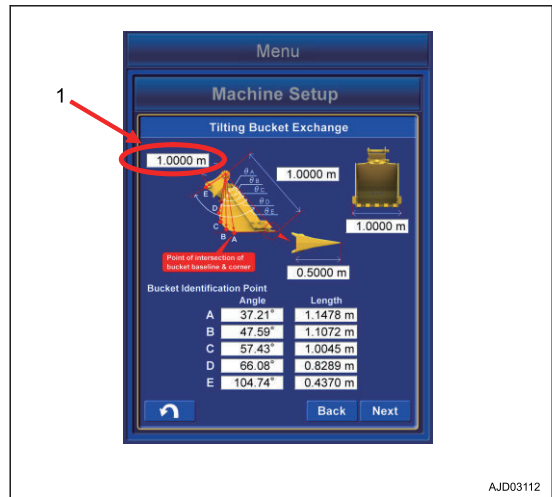


METHOD FOR MEASURING BUCKET SHAPE (TILT BUCKET)

Measure the dimensions and angles for inputting the bucket information.

Measure the length dimension to mm unit, and angle to 0.1 ° unit.

1. Measure the dimension (1).



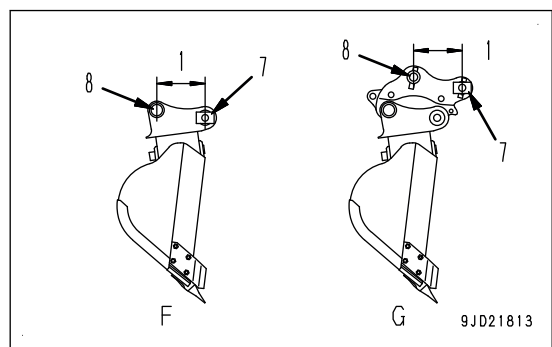
AJD03112

Dimension (1) is the distance between the bucket pin (7) and the bucket link pin (8).

Measure with a tape measure, and input the data.

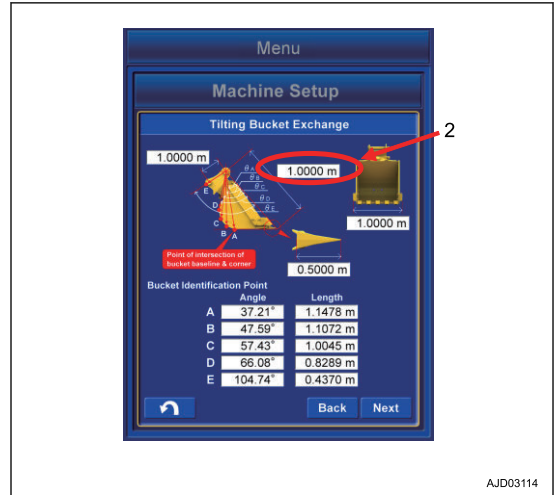
(F): When the quick coupler is not installed

(G): When the quick coupler is installed



9JD21813

2. Measure the dimension (2).

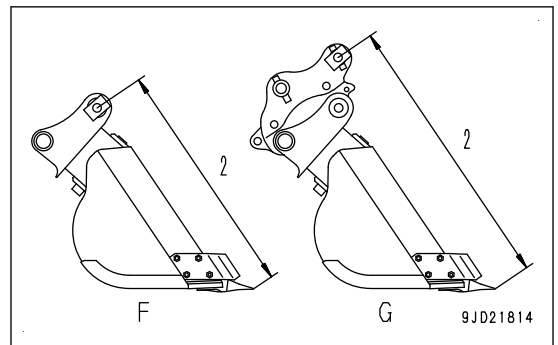


Dimension (2) is the distance between the bucket pin (7) and tooth tip.

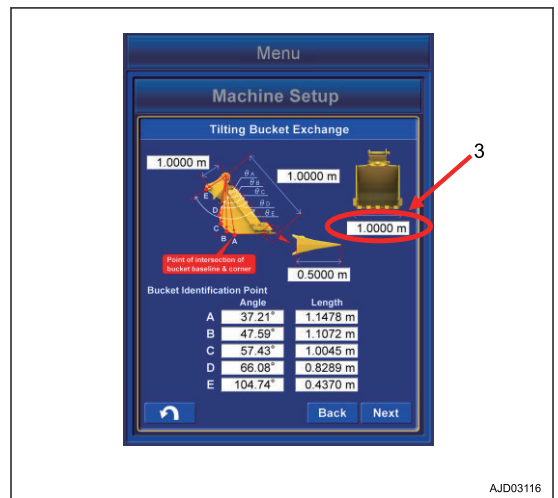
Measure with a tape measure, and input the data.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed



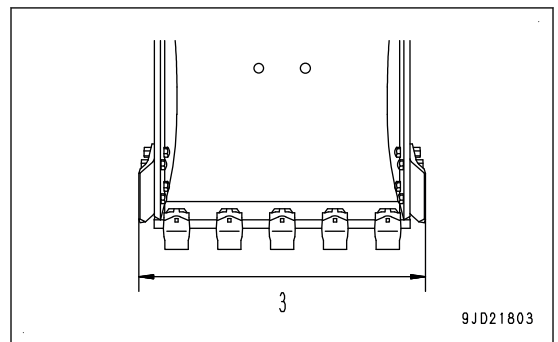
3. Measure the dimension (3).



Dimension (3) is the distance between the bottom of bucket side cutters.

Measure with a tape measure, and input the data.

Measure the distance at widest part and input the data if the bucket has no side cutters.



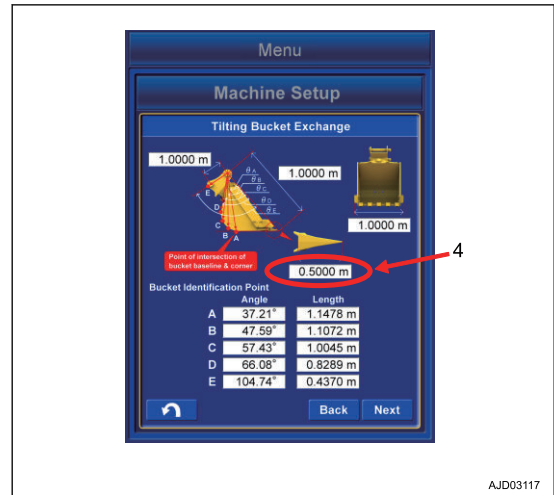
AJD03114

9JD21814

AJD03116

9JD21803

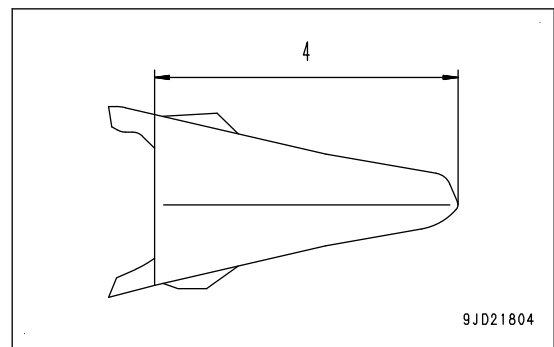
4. Measure the dimension (4).



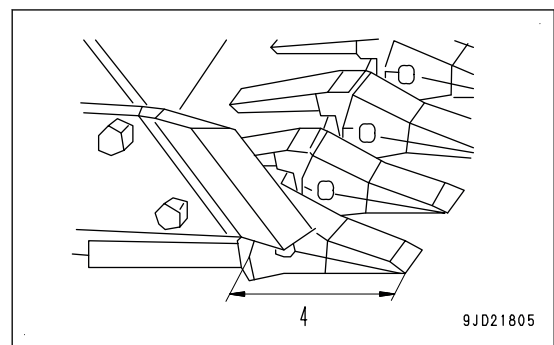
AJD03117

Dimension (4) is the distance between root and tip of the tooth.

Measure with a tape measure, and input the data.

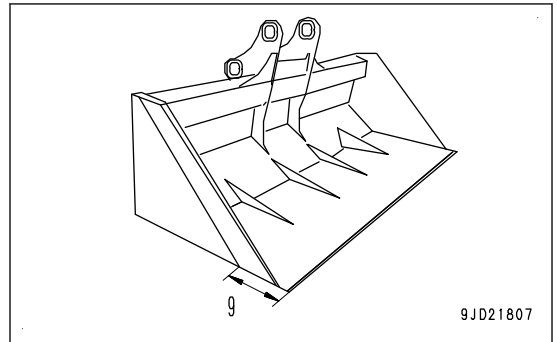
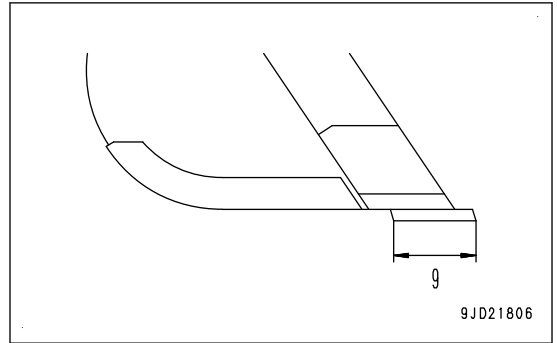


9JD21804



9JD21805

Measure the blade width (9) and input the data if bucket has no tooth.



5. Measure the angle (5) and dimension (6) of "Bucket Identification Point".

Menu

Machine Setup

Tilting Bucket Exchange

1.0000 m

1.0000 m

1.0000 m

0.5000 m

Point of intersection of bucket baseline & corner

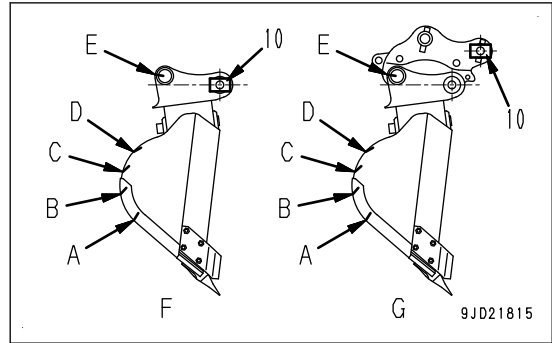
Bucket Identification Point

	Angle	Length
A	37.21°	1.1478 m
B	47.59°	1.1072 m
C	57.43°	1.0045 m
D	66.08°	0.8289 m
E	104.74°	0.4370 m

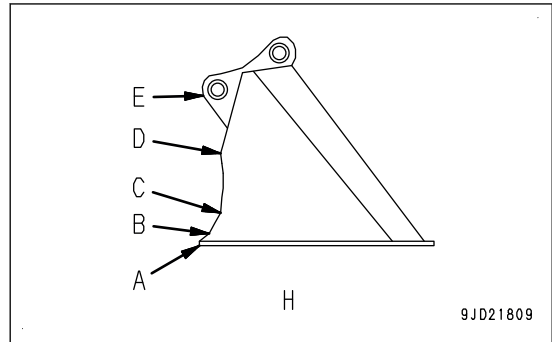
Back Next

AJD03118

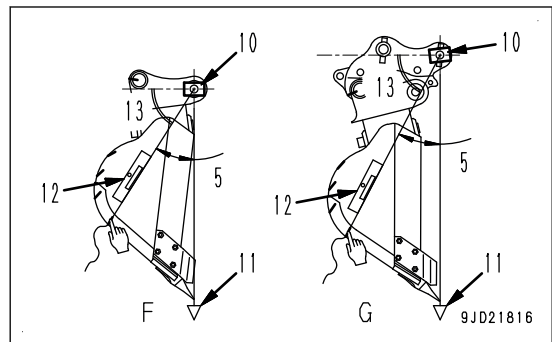
6. Put the marks with marker pen at the 5 points (A), (B), (C), (D), and (E) of "Bucket Identification Point".
7. "Bucket Identification Point" (A) is the cross point of straight line of bucket bottom face and corner.
If it is difficult to distinguish the straight line of bottom face and corner, select the point that touches the ground if the floor face digging were performed.
"Bucket Identification Point" (E) is the most outside part on the extended line between bucket pin and bucket link pin.
"Bucket Identification Point" (B), (C), and (D) divide equally the distance between (A) and (E).



8. Set the magnet pole jig (10) to the bucket pin.
Align the center of foot pin and center of pole.
(F): When the quick coupler is not installed
(G): When the quick coupler is installed
(H): When slope finishing bucket is installed



9. Apply the plumb (11) to the magnet pole jig (10), and set the bucket so that the line between bucket pin and tooth tip is vertical.
10. Measure the distance between the point out of (A) to (E) and center of pole with a tape measure, and input the data in the dimension column (6).
11. Put the end of string to the magnet pole (10) and stretch the string to the point out of (A) to (E).
12. Set the digital angle gauge (12) on to the string, and measure the angle (13) of (A) to (E).



Angle (13) is the angle between level line of bucket pin and each point of (A) to (E).

- When the string is below the level line of bucket pin
Subtract the angle (13) from 90°, and input the calculated value in the Angle (5) of the Bucket Identification Point.
- When the string is above the level line of bucket pin
Add the angle (13) to 90°, and input the calculated value in the Angle (5) of the Bucket Identification Point.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed

REMARK

- 2 persons are required to measure the dimensions (6) and the Angle (5) of the "Bucket Identification Point".
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform measuring of "Bucket Identification Point" as making sure that the plumb (11) is vertical from time to time.

METHOD FOR INPUTTING BUCKET INFORMATION (TILT BUCKET)

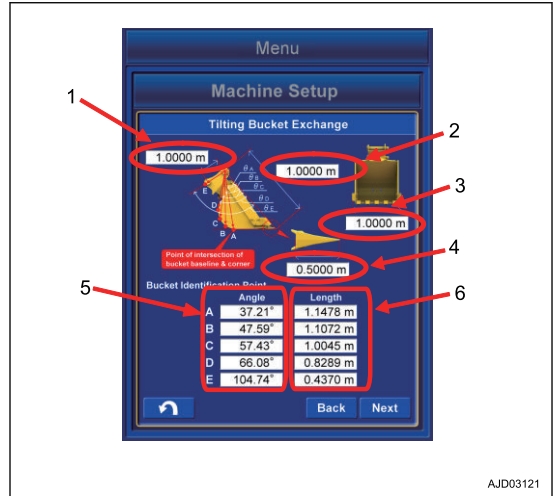
Input the measured dimensions and angles.

Tap within the white frame of dimension value to be input again, and then the numeric keypad pops up. Input the numeric value with it.

Measure the length dimension to mm unit, and angle to 0.1 ° unit.

You can input the numeric value within the range shown below.

- Numeric value (1)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (2)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (3)
Min: 0.0001 m to Max: 5.9999 m
- Numeric value (4)
Min: 0.0001 m to Max: 2.9999 m
- Angle (5)
Min: 0.01 ° to Max: 179.99 °
- Numeric value (6)
Min: 0.0001 m to Max: 5.9999 m



AJD03121

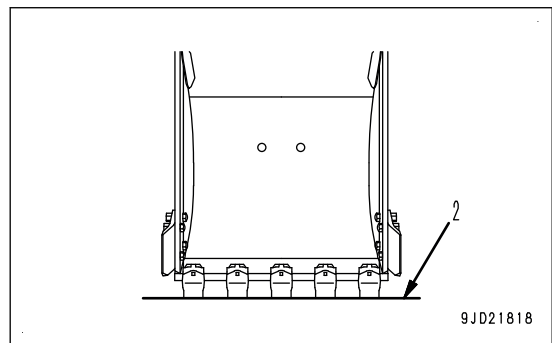
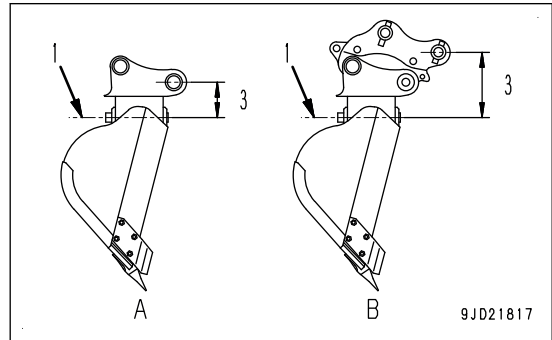
Check the input numeric value. If there is no problem, tap “Next” button.

(If you input the value outside the range, “Next” button will be unavailable.)

If a numeric value or angle column is empty, even if “Next” button is pushed, it is invalid.

METHOD FOR MEASURING BUCKET FOOT ANGLE AND TILT WIDTH ANGLE (TILT BUCKET)

1. Set the tilt axis (1) to be horizontal by using a level or a laser level.
2. With that condition, set the bucket tooth tip (2) to be horizontal.
 - (A): When the quick coupler is not installed
 - (B): When the quick coupler is installed



3. Tap the “Bucket Angle” button.
A tick is put in the check box of “Bucket Angle Read”, and work equipment angle at that posture is saved.
4. Measure the vertical distance (3) between the bucket foot pin and the tilt axis by using a tape measure and a plumb or a laser level, and input the numeric value.
Measure the length dimension to mm unit.
You can input the numeric value within the range shown below.
Input range of numeric value Min: 0.0001 m to Max: 5.9999 m
5. Tap the “Next” button after the inputting is completed.
If any numeric value column is empty, “Next” button is invalid.



- Set the bucket foot pin (4) and the bucket link pin (5) horizontal by using a level or a laser level.

Move the bucket only. Do not move the other work equipment (boom, arm) at this time. Also, do not move the bucket to the tilting direction (right and left direction against bucket face).

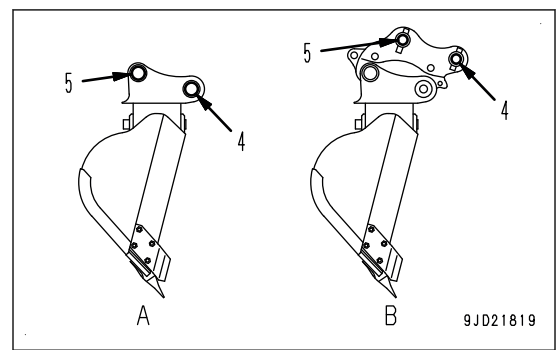
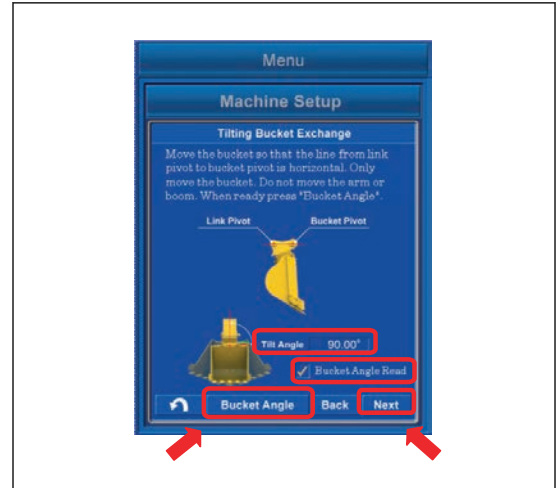
(A): When the quick coupler is not installed

(B): When the quick coupler is installed

- Tap the "Bucket Angle" button.

A tick is put in the check box of "Bucket Angle Read", and work equipment angle at that posture is saved.

- Tap the "Next" button.



- Set the bucket foot pin (4) and the tooth tip (2) vertical by using a plumb or a laser level.

Move the bucket only. Do not move the other work equipment (boom, arm) at this time. Also, do not move the bucket to the tilting direction (right and left direction against bucket face).

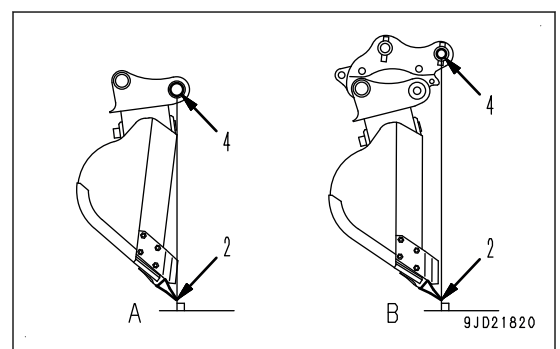
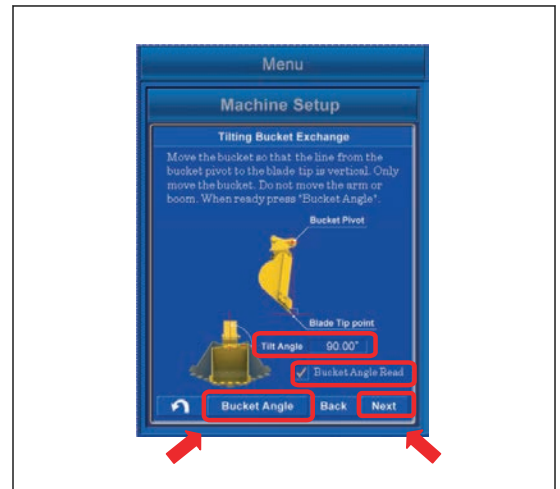
(A): When the quick coupler is not installed

(B): When the quick coupler is installed

- Tap the "Bucket Angle" button.

A tick is put in the check box of "Bucket Angle Read", and work equipment angle at that posture is saved.

- Tap the "Next" button.

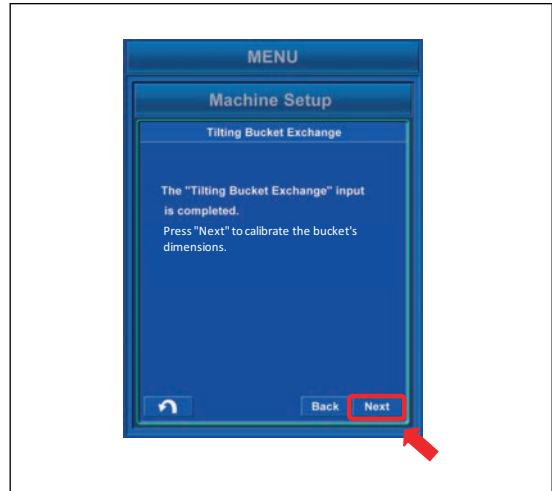


REMARK

- Tap the "Bucket Angle" button, and a tick is entered in the check box of "Bucket Angle Read", and work equipment angle is saved. Tap the "Bucket Angle" button again, and a tick in the check box is cleared, and then work equipment angle can be adjusted again.
- If no tick is in the check box of "Bucket Angle Read", "Next" button is invalid.
- "Tilt Angle" denotes the angle from perpendicular line of machine axis. When the tooth tip is set horizontal on a level ground, this tilt angle shows approximately 90°. Take care not to move the tilt axis referring to the displayed angle.

METHOD FOR CALCULATING AUTOMATIC CALIBRATION AND WRITING PARAMETER VALUE (TILT BUCKET)

1. Tap the "Next" button.
Automatic calibration is executed.
After the calculation is finished, the screen changes.

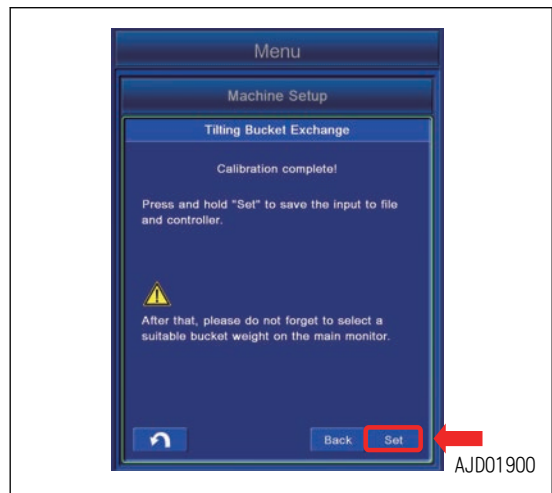


2. Hold down the "Set" button for 0.5 seconds or longer.
The tilt bucket parameter obtained by automatic calibration calculation is written in Komatsu controller, and the display returns to the menu screen.

If the bucket weight changes largely, bucket weight setting should be executed.

For bucket weight setting, see "BUCKET WEIGHT SETTING".

3. After the setting is completed, turn the starting switch key to OFF position, turn it to ON position again, and restart the control box.

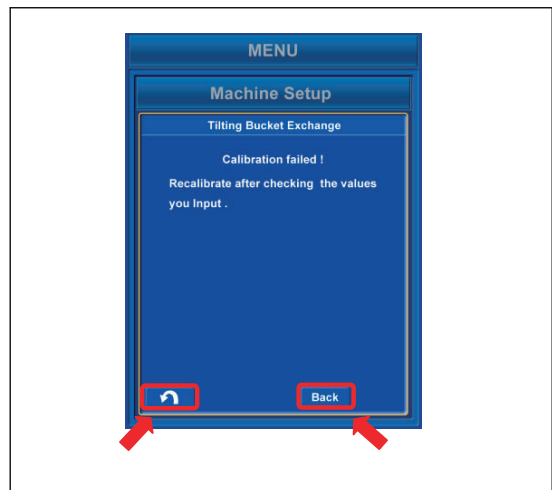


4. Tap the "Next" button.
If automatic calibration calculation fails, error screen is displayed.

In this case, the numeric value which has been input may be wrong.

Tap the "Back" button, and check back the input result.

Tap the RETURN button and the display returns to menu screen. At that time, the value which has been input and measured will be reset.



REMARK

The tilt bucket and arm connected with an yellow line are displayed on the working screen of control box when the Tilt Bucket Exchange calibration is completed.



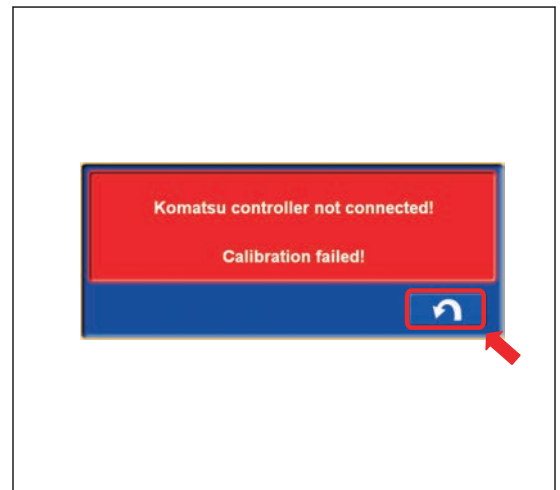
METHOD FOR ACTING WHEN COMMUNICATION ERROR OR SENSOR ERROR OCCURS (TILT BUCKET)

If the error screen shown in the figure is shown while you do the tilt bucket exchange calibration, a communication error occurs between the Komatsu controller and control box.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see “TROUBLES AND ACTIONS”.

After the error is resolved, do the calibration again.

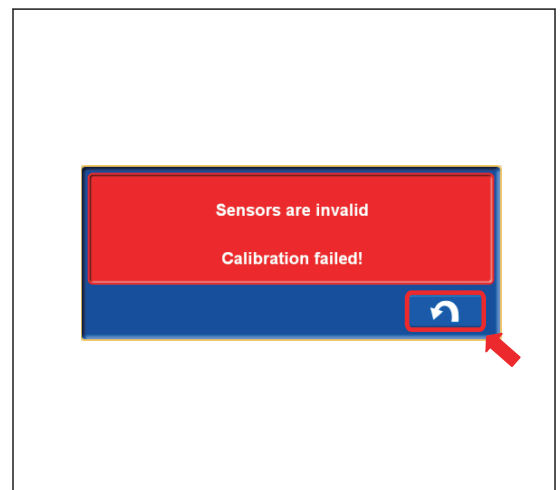


If the error screen shown in the figure is shown, an abnormality occurs in the sensor connected to the chassis.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see “TROUBLES AND ACTIONS”.

After the error is resolved, do the calibration again.



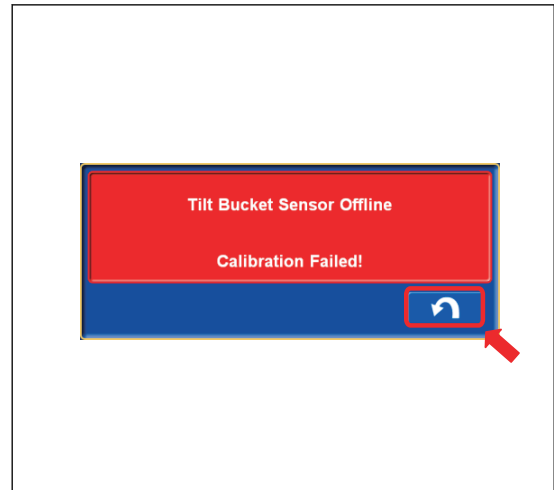
If the error screen shown in the figure is shown, an abnormality occurs in the tilt sensor connected to the bucket.

The signal from the tilt sensor cannot be received for 3 seconds or more.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see "TROUBLES AND ACTIONS".

After the error is resolved, do the calibration again.



PROCEDURES OF CALIBRATION AFTER REPLACING AUTO TILT BUCKET

Perform "Auto Tilt Bucket Exchange" calibration when replacing the bucket to the auto tilt bucket. This is not applicable for the rotational bucket.

Perform this calibration on the steady ground so that machine does not incline when the bucket is operated.

Check there is no person in the operating range of work equipment, and pay great attention to the safety when moving the work equipment.

Perform this calibration under the following conditions.

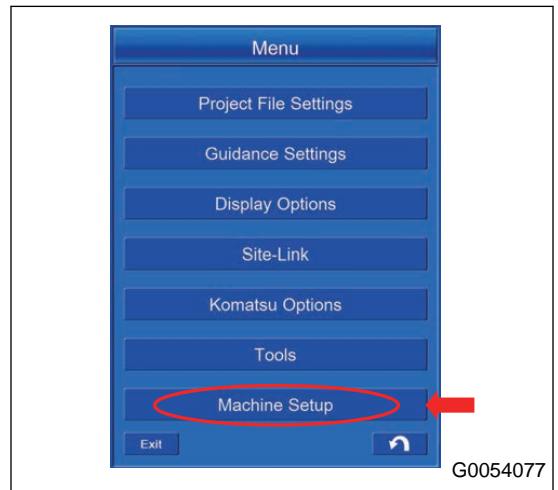
- Working mode: ATT/P mode
- Fuel control dial: High idle (MAX) position
- Auto-deceleration: Canceled

METHOD FOR STARTING APPLICATION FOR CALIBRATION AFTER REPLACING AUTO TILT BUCKET

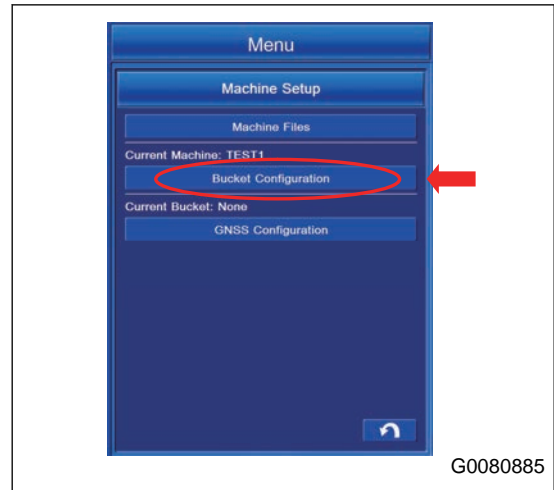
1. Tap "Menu button" of the control box.
Main menu screen is displayed.



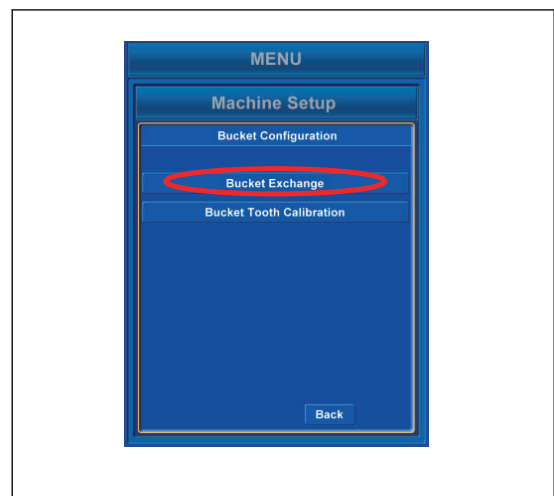
2. Tap Machine Setup button.
The screen changes to Machine Setup screen.



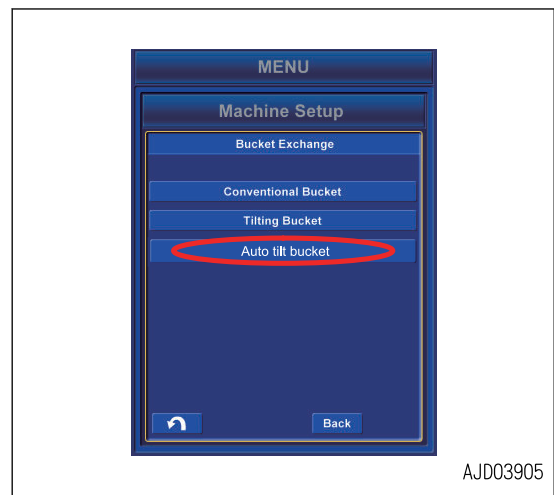
- 3. Tap Bucket Exchange button.
The screen changes to Bucket Exchange screen.



- 4. Tap Bucket Exchange button.
The screen changes to "Bucket Exchange" screen.



- 5. Tap Auto Tilt Bucket button.
"Auto Tilt Bucket Exchange" calibration starts and the screen changes to the bucket file select screen.



METHOD FOR SELECTING AUTO TILT BUCKET FILES

1. Select the bucket file to be used from the list on Conventional Bucket Files screen.
 - When changing the content of selected bucket file, tap Edit button.
 - When not changing, tap ENTER button.

REMARK

- The currently selected bucket is highlighted in yellow.
- When using the existing file, tap ENTER button.
- If the bucket file is not in the list, tap New button and create the file newly. The input data will be saved in the file.

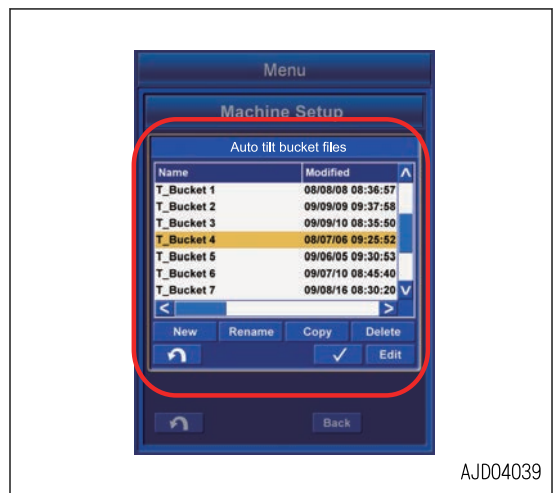
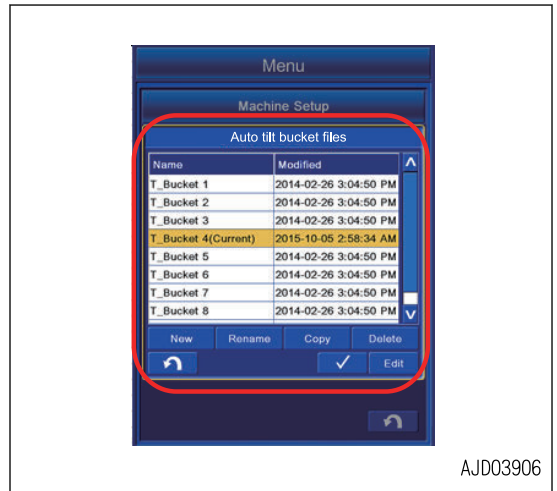
Function of the button in the screen is as follows.

- New button
Creates the new file based on the highlighted file.
- Rename button
Changes the name of the highlighted file.
- Copy button
Copies the bucket file from the USB flash drive into the control box.
- Delete button
Deletes the highlighted file.
- RETURN button
Returns the screen to the previous screen.

2. After the setting is completed, turn the starting switch key to OFF position, turn it to ON position again, and restart the control box.

When using the existing file, tap ENTER button.

If ENTER button is selected on the selecting screen of bucket file, perform the procedure of auto calibration calculation and inputting of parameter value.



If Edit button is selected, the screen changes to the bucket information input screen.



AJD03907

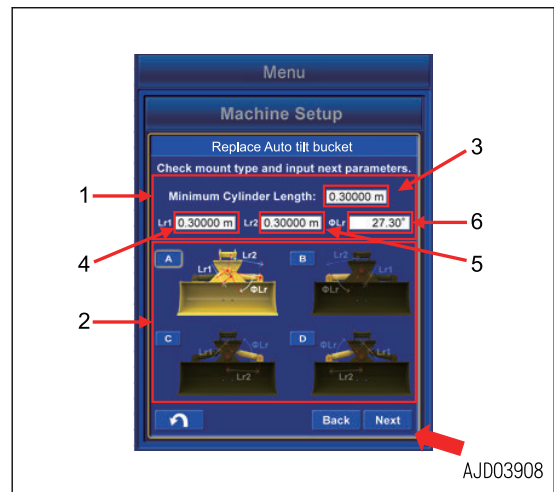
METHOD FOR SELECTING AUTO TILT BUCKET TYPE AND INPUTTING DIMENSIONS

1. Select a bucket type from among the bucket types (A) to (D) of (1) based on the description of the spec sheet which is provided at the time of the purchase of the auto tilt bucket.
2. Input the nominal values of (2) by referring to the spec sheet of the auto tilt bucket.

Input the length dimension to mm unit, and angle to 0.1 ° unit.

You can input the numeric value within the range shown below.

- Numeric value (3)
Min: 0.00001 m to Max: 5.99999 m
- Numeric value (4)
Min: 0.00001 m to Max: 1.99999 m
- Numeric value (5)
Min: 0.0001 m to Max: 1.99999 m
- Numeric value (6)
Min: -89.99 ° to Max: 89.99 °



AJD03908

Check the input numeric value. If there is no problem, tap Next button.

If any numeric value or angle column is empty, even if Next button is pressed, it is invalid.

3. Tap Next button after the selecting and inputting are completed.
Next button is invalid although it is tapped if there is any column which has been left unselected, or any numeric value is left empty.

METHOD FOR CALIBRATING AUTO TILT BUCKET TILT CYLINDER

⚠ CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Ensure the safety of the surroundings since the tilting speed may change suddenly during calibration. The sudden change of tilting speed does not affect the calibration.

1. Slowly perform the tilting operation of the auto tilt bucket clockwise until the oil pressure in the cylinder is relieved by following the instructions shown on the screen.
(Lever stroke 50 % or less)
2. Fully operate the control lever after the oil pressure is relieved. Hold it until the screen proceeds.
The screen automatically changes when the calibration is completed.



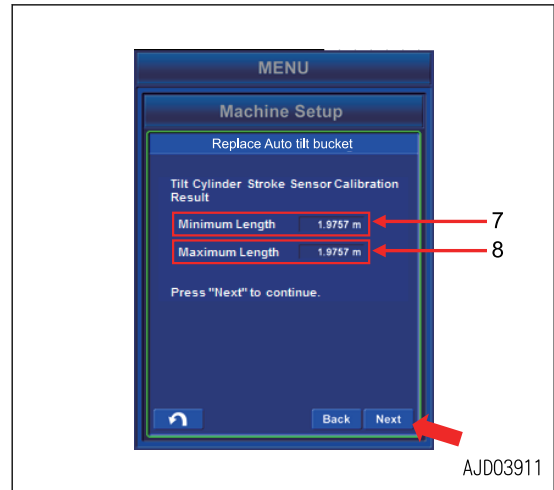
3. When the screen changed to the screen shown on the right, slowly perform the tilting operation of the auto tilt bucket counterclockwise until the oil pressure in the cylinder is relieved by following the instructions shown on the screen.
(Lever stroke 50 % or less)
4. Fully operate the control lever after the oil pressure is relieved. Hold it until the screen proceeds.
The screen automatically changes when the calibration is completed.

REMARK

If the calibration is not completed, and the screen does not automatically change from the screen of step 1., tap Back button, and return the screen to the step of METHOD FOR SELECTING AUTO TILT BUCKET TYPE AND INPUTTING DIMENSIONS. Then check the bucket type.



5. Check the result of the calibration for the tilt cylinder shown on the screen.
The minimum length of the auto tilt bucket is shown on (7).
The maximum length of the auto tilt bucket is shown on (8).
6. When the check is completed, tap Next button, and continue the calibration.



REMARK

If the calibration of tilt cylinder is failed, tap Next button, then the failure cause code is displayed. Find the cause and perform the calibration for the auto tilt bucket again by referring to the failure cause code list.
Tap Back button, and check back the input result.
Tap RETURN button, and the screen returns to the menu screen. At that time, the value which has been input and measured before will be reset.



Failure cause code list

Cause code	Content	Action
A-1	Engine speed signal is 0 rpm.	Check that the engine has started running.
A-A	CAN communication is faulty.	Ask your Komatsu distributor for the inspection and maintenance.
A-C	Starting switch is in OFF position (only the control box is started).	Turn the starting switch to ON position, and start the engine.
E-C	Working mode is not ATT/P mode.	Change the working mode to ATT/P mode.
SJ-1	Auto tilt bucket cylinder stroke sensor A open circuit	Ask your Komatsu distributor for the inspection and maintenance.
SJ-2	Auto tilt bucket cylinder stroke sensor A short circuit	Ask your Komatsu distributor for the inspection and maintenance.
SJ-3	Auto tilt bucket cylinder stroke sensor B open circuit	Ask your Komatsu distributor for the inspection and maintenance.
SJ-4	Auto tilt bucket cylinder stroke sensor B short circuit	Ask your Komatsu distributor for the inspection and maintenance.
SJ-5	Auto tilt bucket cylinder stroke sensor stroke sensor over range	Ask your Komatsu distributor for the inspection and maintenance.
TA-0	IMU calibration on the machine monitor side is in process.	Finish the calibration on the machine monitor side.

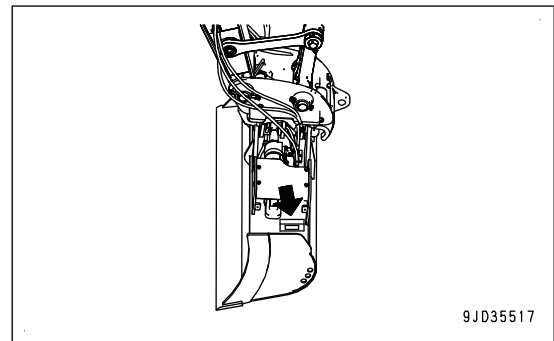
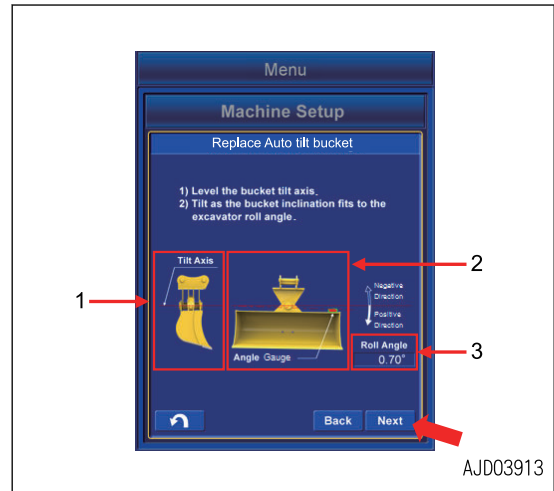
Cause code	Content	Action
WB-7	ATT1PPC pressure sensor (R.H.) malfunction	Ask your Komatsu distributor for the inspection and maintenance.
WB-8	ATT1PPC pressure sensor (L.H.) malfunction	Ask your Komatsu distributor for the inspection and maintenance.

PREPARATIONS FOR MEASURING AUTO TILT BUCKET SHAPE

1. Set the digital angle gauge to be as the figure (1). Adjust it so that the tilt axis is set horizontally.

REMARK

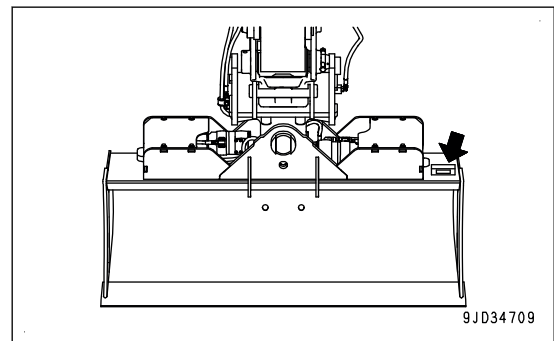
Roughly make the angle of inclination of the auto tilt bucket horizontal by tilting operation, then operate the bucket to adjust the tilt axis to be horizontal.



2. Set the digital angle gauge to be as (2).
3. Once it has been set, slowly perform the tilting operation so that the angle of inclination of the auto tilt bucket is aligned to Roll Angle (3) of the machine body. (Lever stroke 50 % or less)
4. Tap Next button after the operation is completed.

REMARK

- This preparation of measurement is to adjust the tilting angle of the auto tilt bucket.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- It will not be a problem if the tilt axis becomes not- horizontal by bucket operation performed after this adjustment.
- Do not perform the tilting operation until the shape measurement of the auto tilt bucket is completed.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.

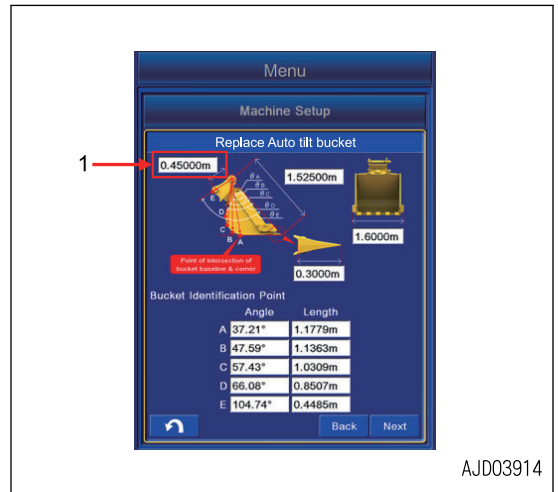


METHOD FOR MEASURING AUTO TILT BUCKET SHAPE

Measure the dimensions and angles for inputting the bucket information.

Measure the length dimension to mm unit, and angle to 0.1 ° unit.

1. Measure the dimension (1).

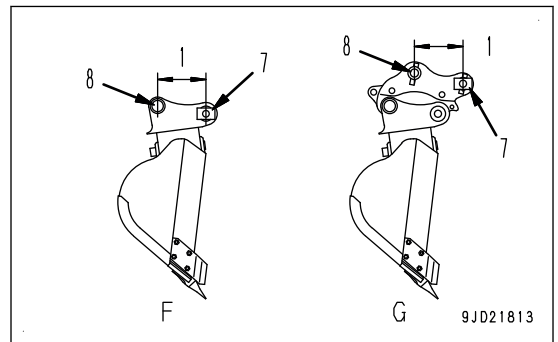


Dimension (1) is the distance between the bucket pin (7) and the bucket link pin (8).

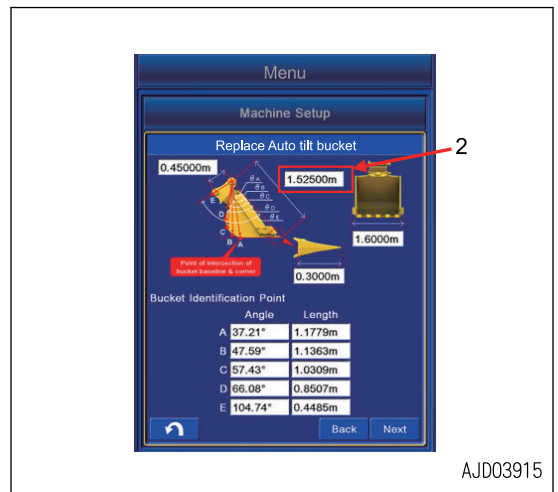
Measure with a tape measure, and input the data.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed



2. Measure the dimension (2).

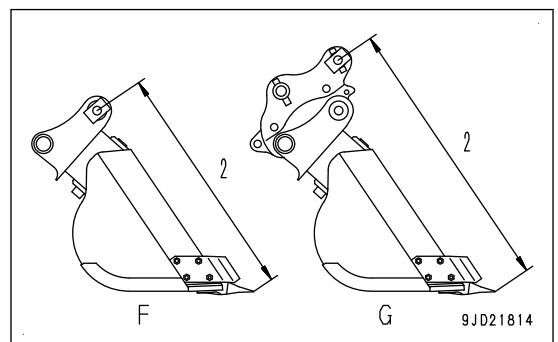


Dimension (2) is the distance between the bucket pin (7) and tooth tip.

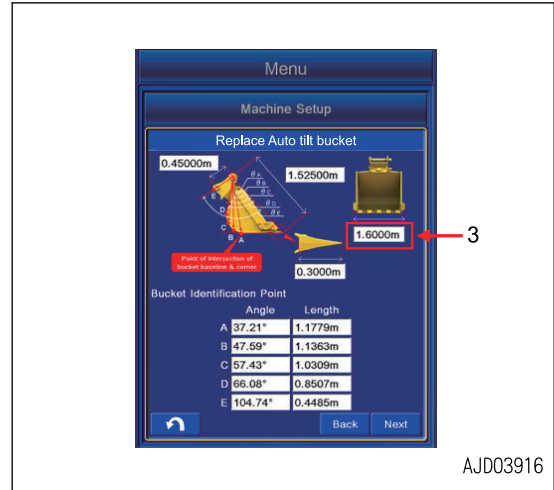
Measure with a tape measure, and input the data.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed



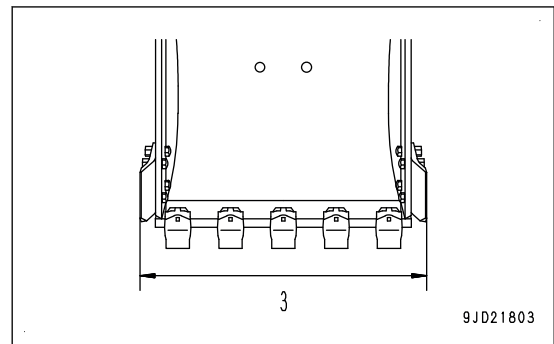
3. Measure the dimension (3).



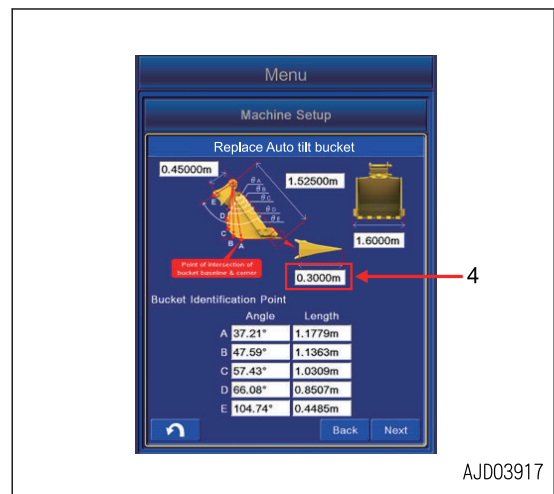
Dimension (3) is the distance between the bottom of bucket side cutters.

Measure with a tape measure, and input the data.

Measure the distance at widest part and input the data if the bucket has no side cutters.

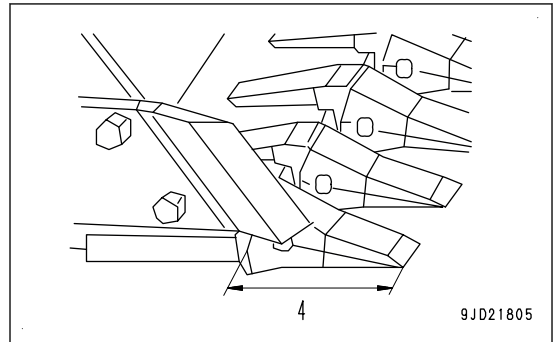
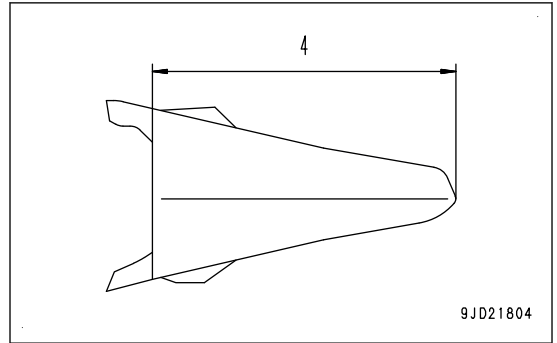


4. Measure the dimension (4).

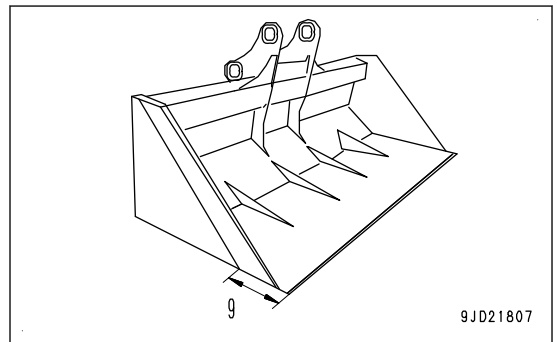
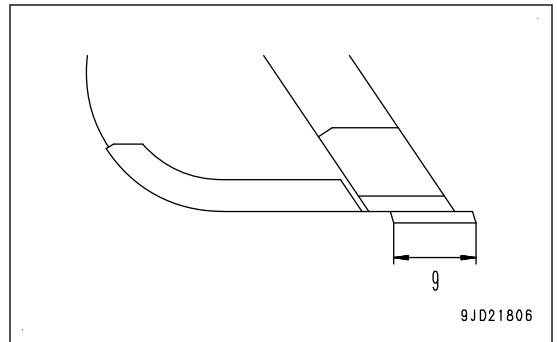


Dimension (4) is the distance between root and tip of the tooth.

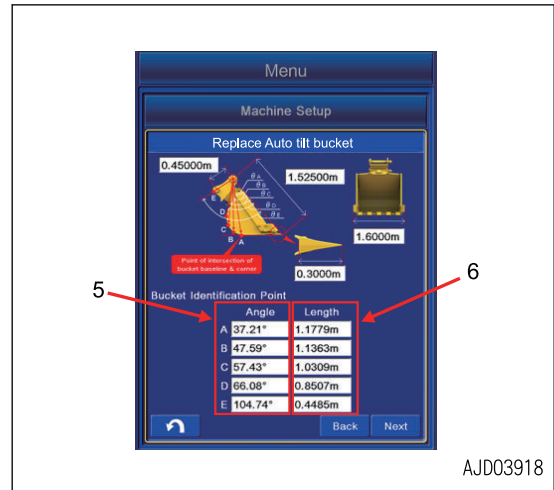
Measure with a tape measure, and input the data.



Measure the blade width (9) and input the data if bucket has no tooth.



5. Measure the angle (5) and dimension (6) of Bucket Identification Point.



6. Put the mark with marker pen at the 5 points (A) to (E) of Bucket Identification Point.

7. Bucket Identification Point (A) is the cross point of straight line of bucket bottom face and corner.

If it is difficult to distinguish the straight line of bottom face and corner, select the point that touches the ground if the floor face digging were performed.

Bucket Identification Point (E) is the most outside part on the extended line between bucket pin and bucket link pin.

Bucket Identification Point (B), (C), and (D) divide equally the distance between (A) and (E).

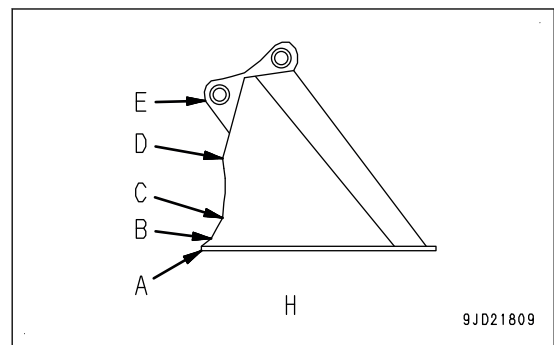
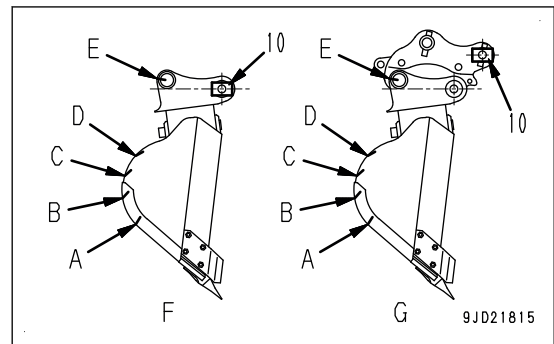
8. Set the magnet pole jig (10) to the bucket pin.

Align the center of foot pin and center of pole.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed

(H): When slope finishing bucket is installed

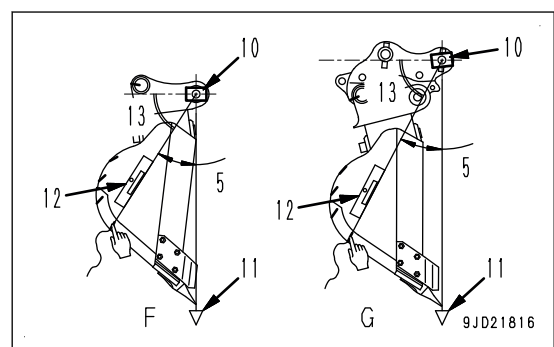


9. Apply the plumb (11) to the magnet pole jig (10), and set the bucket so that the line between bucket pin and tooth tip is vertical.

10. Measure the distance between the point out of (A) to (E) and center of pole with a tape measure, and input the data in the dimension column (6).

11. Put the end of string to the magnet pole (10) and stretch the string to the point out of (A) to (E).

12. Set the digital angle gauge (12) on to the string, and measure the angle (13) of (A) to (E).



Angle (13) is the angle between level line of bucket pin and each point of (A) to (E).

- When the string is below the level line of bucket pin
Input the value which is subtracted the angle (13) from 90 ° in the angle (5) of Bucket Identification Point.
- When the string is above the level line of bucket pin
Input the value which is added the angle (13) to 90 ° in the angle (5) of Bucket Identification Point.

(F): When the quick coupler is not installed

(G): When the quick coupler is installed

REMARK

- 2 persons are required to measure the dimensions (6) and the Angle (5) of Bucket Identification Point.
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform measuring of Bucket Identification Point as making sure that the plumb (11) is vertical from time to time.

METHOD FOR INPUTTING BUCKET INFORMATION (AUTO TILT BUCKET)

Input the measured dimensions and angles.

Tap the inside of the white frame of dimension value to be input again, and then the numeric keypad pops up. Input the numeric value with it.

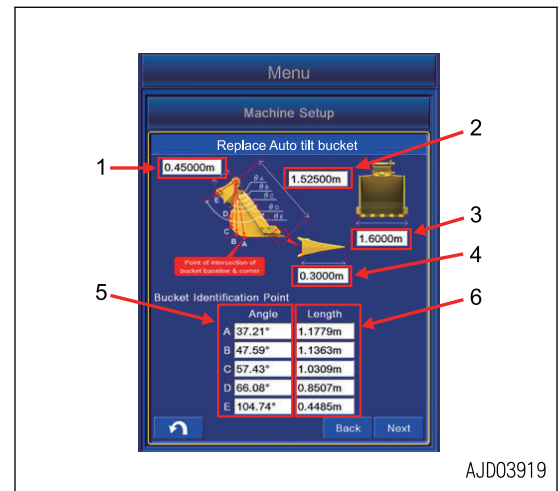
Measure the length dimension to mm unit, and angle to 0.1 ° unit.

You can input the numeric value within the range shown below.

- Numeric value (1)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (2)
Min: 0.00001 m to Max: 19.99999 m
- Numeric value (3)
Min: 0.0001 m to Max: 5.9999 m
- Numeric value (4)
Min: 0.0001 m to Max: 2.9999 m
- Angle (5)
Min: 0.01 ° to Max: 179.99 °
- Numeric value (6)
Min: 0.0001 m to Max: 5.9999 m

Check the input numeric value. If there is no problem, tap Next button.

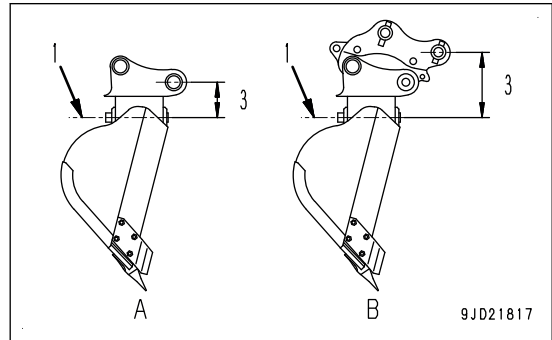
If any numeric value or angle column is empty, even if Next button is pressed, it is invalid.



AJD03919

METHOD FOR MEASURING BUCKET FOOT ANGLE AND TILT WIDTH ANGLE (AUTO TILT BUCKET)

- Set the tilt axis (1) horizontally by using a level or a laser level by referring to PREPARATIONS FOR MEASURING AUTO TILT BUCKET SHAPE.
 (A): When the quick coupler is not installed
 (B): When the quick coupler is installed



- Tap Bucket Angle button.
 A tick is put in the check box of Bucket Angle Read, and work equipment angle at that posture is saved.
- Measure the vertical distance (3) between the bucket pin and the tilt axis by using a tape measure and a plumb or a laser level, and input the numeric value.
 Measure the length dimension to mm unit.
 You can input the numeric value within the range shown below.
 Input range of numeric value Min: 0.0001 m to Max: 5.9999 m

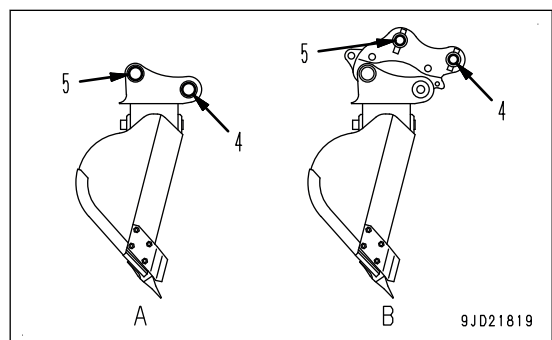


- Tap Next button after the inputting is completed.
 If any numeric value column is empty, Next button is invalid.

- Set the bucket pin (4) and the bucket link pin (5) horizontal by using a level or a laser level.
 Move the bucket only. Do not move the other work equipment (boom, arm) at this time. Also, do not move the bucket to the tilting direction (right and left direction against bucket face).



- (A): When the quick coupler is not installed
 (B): When the quick coupler is installed
- Tap Bucket Angle button.
 A tick is put in the check box of Bucket Angle Read, and work equipment angle at that posture is saved.
- Tap Next button.



8. Set the bucket so that the bucket pin (4) and the tooth tip (2) are vertical by using a plumb or a laser level.

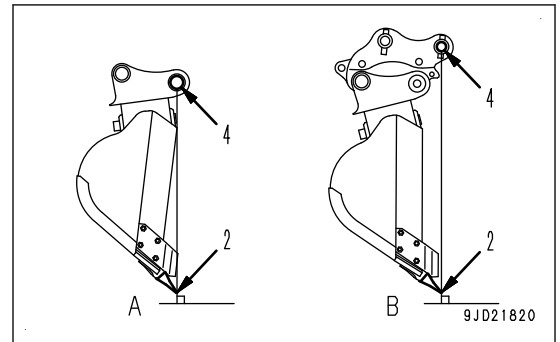
Move the bucket only. Do not move the other work equipment (boom, arm) at this time. Also, do not move the bucket to the tilting direction (right and left direction against bucket face).

(A): When the quick coupler is not installed

(B): When the quick coupler is installed

9. Tap Bucket Angle button.

A tick is put in the check box of Bucket Angle Read, and work equipment angle at that posture is saved.



10. Tap Next button.

REMARK

- Tap Bucket Angle button, and check mark is entered in the check box of Bucket Angle Read, and work equipment angle is saved. Tap Bucket Angle button again, and the check mark in the check box is cleared, and then the work equipment angle can be adjusted again.
- If no tick is in the check box of Bucket Angle Read, Next button is invalid.

REMARK

Tap Next button, then the error screen is displayed if there is an error in the bucket type or bucket information which has been set in the bucket file.

Tap Back button in order to check that the settings and input which have been performed are all correct.

Tap RETURN button, and the screen returns to the menu screen. At that time, the value which has been input and measured before will be reset.



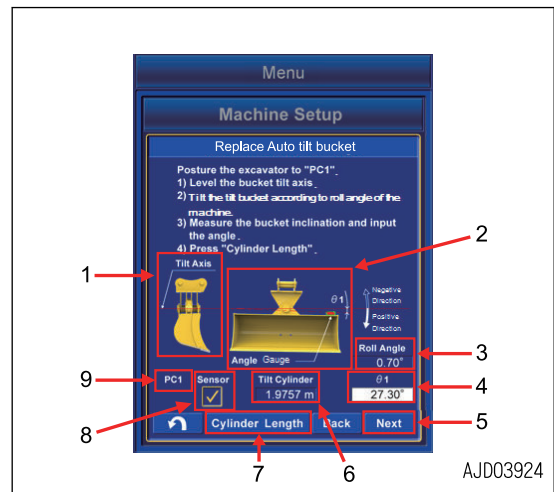
METHOD FOR CALIBRATING AUTO TILT BUCKET TILT CYLINDER

Auto tilt bucket posture 1 (PC1)

⚠ CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Do not perform the operation of the work equipment other than tilting operation.

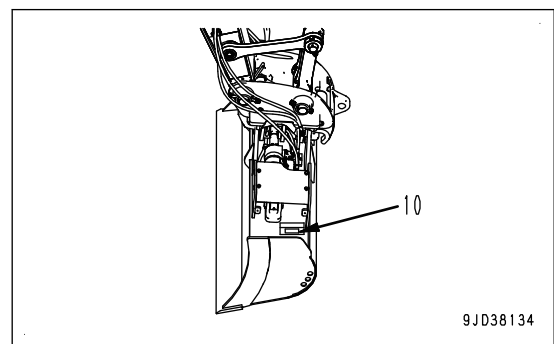
1. Check that the display (9) is PC1.



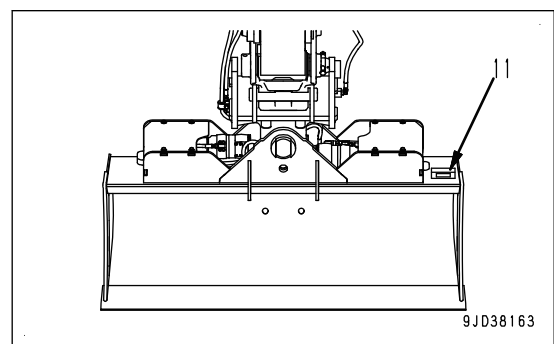
2. Set the digital angle gauge to be as (10). Adjust it so that the bucket tilt axis is set horizontally as shown in the figure (1).

REMARK

Roughly make the angle of inclination of the auto tilt bucket horizontal by tilting operation, then operate the bucket to adjust the tilt axis to be horizontal.



3. Set the digital angle gauge to be as (11) again.
4. Slowly perform the tilting operation so that the angle of inclination of the auto tilt bucket is aligned to the Roll Angle (3) of the machine body as shown in the figure (2).
(Lever stroke 50 % or less)
5. Measure the angle θ_1 of inclination of the auto tilt bucket, and input the value into the box (4).
6. Tap Cylinder Length button (7).



When it is completed, the check mark appears in the check box (8). The length (6) of bucket tilt cylinder is saved.

In order to perform it again, tap Cylinder Length button (7), the check mark disappears in the check box (8). Perform the operation again from step 1.

7. When the check is completed, tap Next button (5).

REMARK

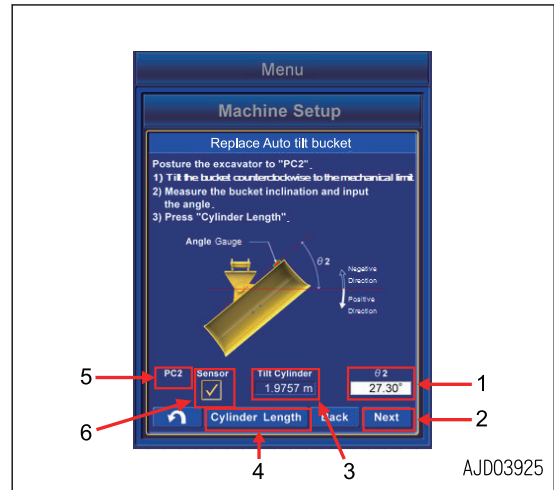
- Roll Angle (3) of the displayed machine is positive when it is in a clockwise direction in view of the cab side.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform the measurement while checking the horizontal of tilt axis one by one since the tilt axis may become out of the horizontal.

Auto tilt bucket posture 2 (PC2)

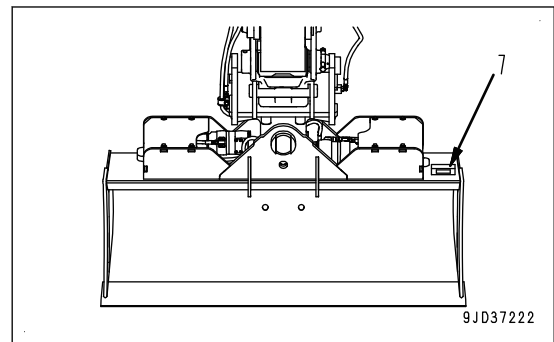
CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Do not perform the operation of the work equipment other than tilting operation.

1. Check that the display (5) is PC2.
2. Slowly perform the tilting operation of the auto tilt bucket counterclockwise until the oil pressure in the cylinder is relieved.
(Lever stroke 50 % or less)
3. After it is relieved, hold the control lever at FULL position approximately for 2 seconds, then let go of the control lever.



4. Set the digital angle gauge to be as (7).
5. Measure the angle θ_2 of inclination of the auto tilt bucket, and input the value into the box (1).
6. Tap Cylinder Length button (4).
When it is completed, the check mark appears in the check box (6). The length (3) of bucket tilt cylinder is saved.
In order to perform it again, tap Cylinder Length button (4), the check mark disappears in the check box (6). Perform the operation again from step 1.
7. When the check is completed, tap Next button (2).



REMARK

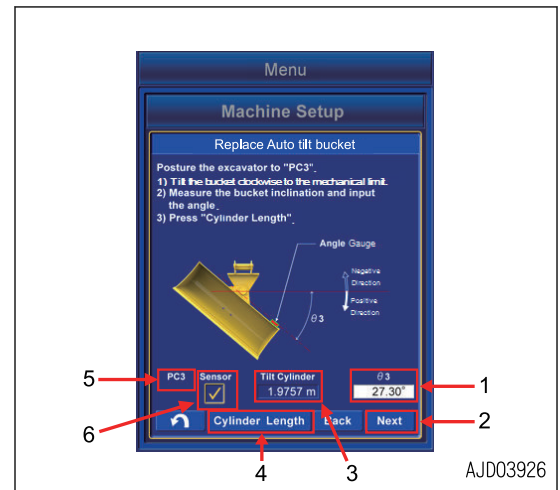
- Roll Angle of the displayed machine is positive when it is in a clockwise direction in view of the cab side.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.
- The work equipment is lowered due to hydraulic drift when it is above the ground.
Perform the measurement while checking the horizontal of tilt axis one by one since the tilt axis may become out of the horizontal.

Auto tilt bucket posture 3 (PC3)

⚠ CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Do not perform the operation of the work equipment other than tilting operation.

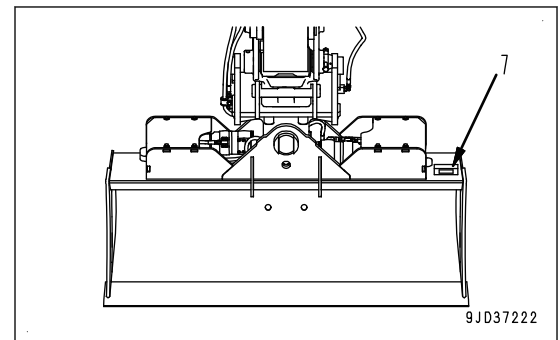
1. Check that the display (5) is PC3.
2. Slowly perform the tilting operation of the auto tilt bucket clockwise until the oil pressure in the cylinder is relieved.
(Lever stroke 50 % or less)
3. After it is relieved, hold the control lever at FULL position approximately for 2 seconds, then let go of the control lever.



4. Set the digital angle gauge to be as (7).
5. Measure the angle $\theta 3$ of inclination of the auto tilt bucket, and input the value into the box (1).
6. Tap Cylinder Length button (4).
When it is completed, the check mark appears in the check box (6). The length (3) of bucket tilt cylinder is saved.

In order to perform it again, tap Cylinder Length button (4), the check mark disappears in the check box (6). Perform the operation again from step 1.

7. When the check is completed, tap Next button (2).



REMARK

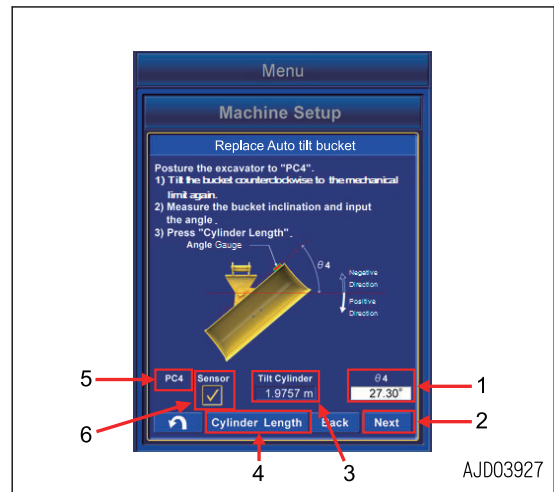
- Roll Angle of the displayed machine is positive when it is in a clockwise direction in view of the cab side.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.
- The work equipment is lowered due to hydraulic drift when it is above the ground.
Perform the measurement while checking the horizontal of tilt axis one by one since the tilt axis may become out of the horizontal.

Auto tilt bucket posture 4 (PC4)

⚠ CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Do not perform the operation of the work equipment other than tilting operation.

1. Check that the display (5) is PC4.
2. Slowly perform the tilting operation of the auto tilt bucket counterclockwise until the oil pressure in the cylinder is relieved.
(Lever stroke 50 % or less)
3. After it is relieved, hold the control lever at FULL position approximately for 2 seconds, then let go of the control lever.



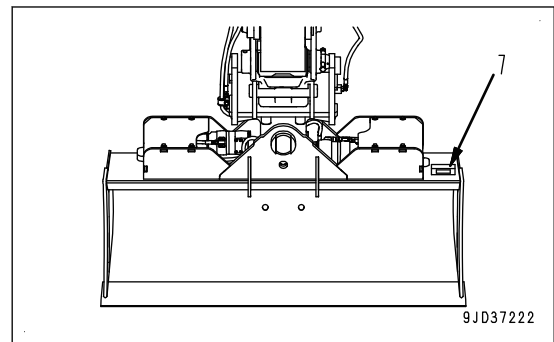
4. Set the digital angle gauge to be as (7).
5. Measure the angle θ_4 of inclination of the auto tilt bucket, and input the value into the box (1).

6. Tap Cylinder Length button (4).

When it is completed, the check mark appears in the check box (6). The length (3) of bucket tilt cylinder is saved.

In order to perform it again, tap Cylinder Length button (4), the check mark disappears in the check box (6). Perform the operation again from step 1.

7. When the check is completed, tap Next button (2).



REMARK

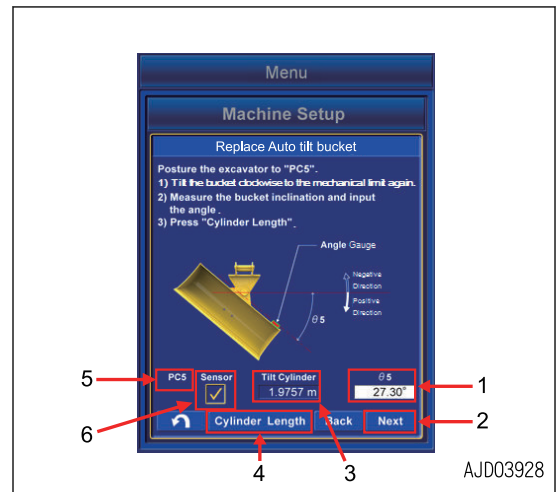
- Roll Angle of the displayed machine is positive when it is in a clockwise direction in view of the cab side.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform the measurement while checking the horizontal of tilt axis one by one since the tilt axis may become out of the horizontal.

Auto tilt bucket posture 5 (PC5)

CAUTION

- Set the fuel control dial to High idle (MAX) position.
- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Do not perform the operation of the work equipment other than tilting operation.

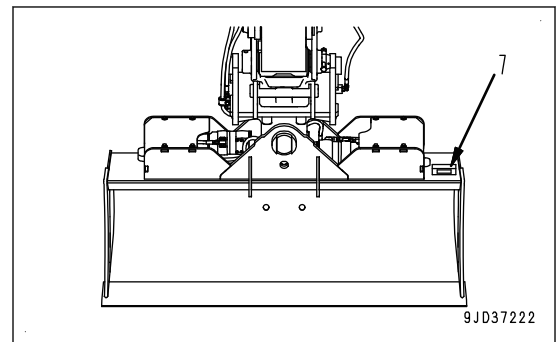
1. Check that the display (5) is PC5.
2. Slowly perform the tilting operation of the auto tilt bucket clockwise until the oil pressure in the cylinder is relieved. (Lever stroke 50 % or less)
3. After it is relieved, hold the control lever at FULL position approximately for 2 seconds, then let go of the control lever.



4. Set the digital angle gauge to be as (7).
5. Measure the angle θ_5 of inclination of the auto tilt bucket, and input the value into the box (1).
6. Tap Cylinder Length button (4).
When it is completed, the check mark appears in the check box (6). The length (3) of bucket tilt cylinder is saved.

In order to perform it again, tap Cylinder Length button (4), the check mark disappears in the check box (6). Perform the operation again from step 1.

7. When the check is completed, tap Next button (2).

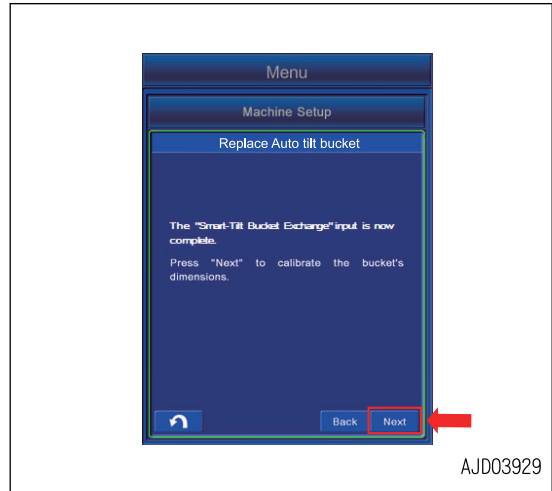


REMARK

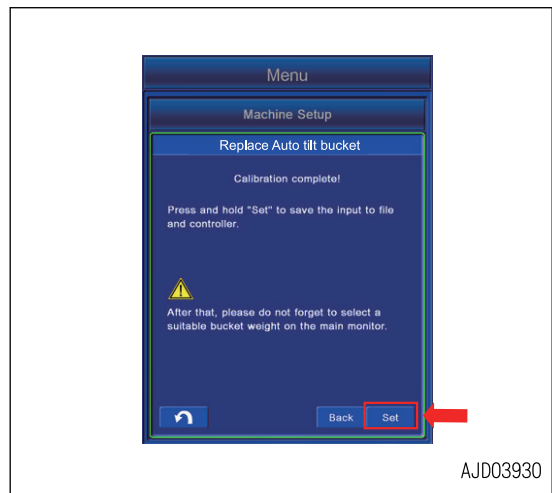
- Roll Angle of the displayed machine is positive when it is in a clockwise direction in view of the cab side.
- If you use the digital angle gauge in which the tilting operation in a counterclockwise direction is positive in view of the cab side, read the clockwise tilting operation as a positive value, and counterclockwise tilting operation as a negative value.
- Use the digital angle gauge of accuracy within $\pm 0.2^\circ$.
- Calibrate the digital angle gauge before using.
- The work equipment is lowered due to hydraulic drift when it is above the ground. Perform the measurement while checking the horizontal of tilt axis one by one since the tilt axis may become out of the horizontal.

METHOD FOR CALCULATING AUTOMATIC CALIBRATION AND WRITING PARAMETER VALUE (AUTO TILT BUCKET)

1. Tap Next button.
Automatic calibration is executed.
After the calculation is finished, the screen changes.

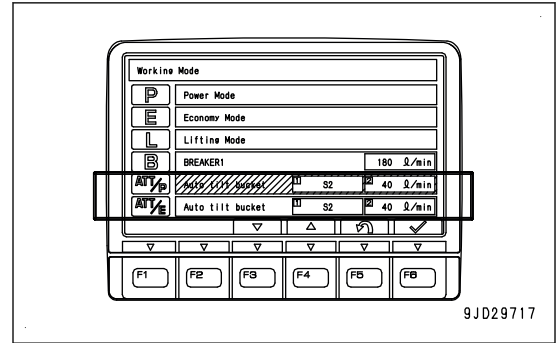


2. Hold down Set button for 0.5 seconds or longer.
The auto tilt bucket parameter obtained by automatic calibration calculation is written in Komatsu controller, and the screen returns to the menu screen.
"Auto tilt bucket exchange" calibration is completed.
If the bucket weight changes largely, bucket weight setting should be executed.
For the bucket weight setting, see BUCKET WEIGHT SETTING.
3. After the setting is completed, turn the starting switch key to OFF position, turn it to ON position again, and restart the control box.



REMARK

When "Auto tilt bucket exchange" calibration is completed, "Auto Tilt Bucket" (ATT/P) and "Auto Tilt Bucket" (ATT/E) will be available on "working mode" screen. If the calibration is performed with the "Working Mode" screen opened on the machine monitor, return to the standard screen first, then open the "Working Mode" screen again. The screen is updated.



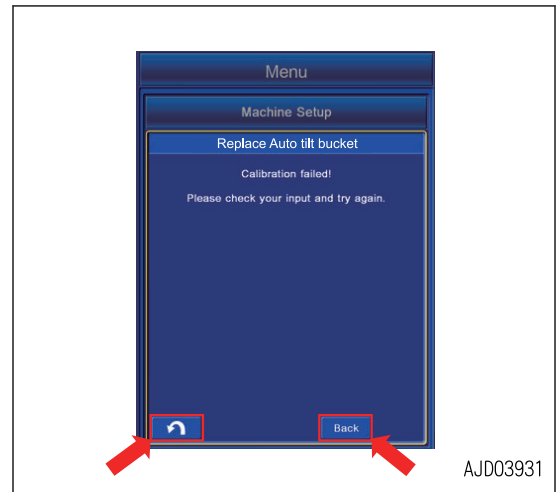
4. Tap Next button.

If automatic calibration calculation fails, error screen is displayed.

In this case, an input value may be wrong or the accuracy of the digital angle gauge may be poor.

Tap Back button, and check back the input result according to the following procedure.

- 1) Check that the inputs are correct.
Input the correct value again if there is anything wrong.
- 2) Check that the accuracy of digital angle gauge used is within 0.2 °.
Use another angle gauge if the accuracy of digital angle gauge used is not within 0.2 °.
- 3) Check that the calibration of digital angle gauge has been performed.
If the calibration of angle gauge is not performed, perform it.
- 4) Check that the digital angle gauge is set parallel to the bucket edge line.
If it is not parallel, set the digital angle gauge again.
- 5) Check that the tilt axis is horizontal.
If the tilt axis is not horizontal, adjust it again.
- 6) Perform the measurement of Auto tilt bucket posture 1 (PC1) to Auto tilt bucket posture 5 (PC5) again.
- 7) Check that the automatic calibration calculation has finished.
If it has not finished, it may have failed in other procedure. Perform the calibration again from the beginning.
If it does not yet finish, ask your Komatsu distributor for inspection.



Tap RETURN button, and the screen returns to the menu screen. At that time, the value which has been input and measured will be reset.

REMARK

The auto tilt bucket and arm connected with a yellow line are displayed on the working screen of control box when "Auto tilt bucket exchange" calibration is completed.

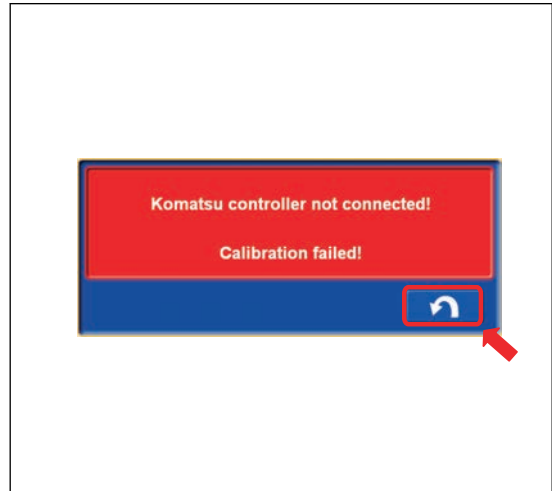


METHOD FOR ACTING WHEN COMMUNICATION ERROR OR SENSOR ERROR OCCURS (AUTO TILT BUCKET)

A communication error has occurred between Komatsu controller and control box if the error screen shown in the figure is displayed while performing the tilt bucket exchange calibration.

Tap RETURN button to stop the calibration, and return to the menu screen in this case.

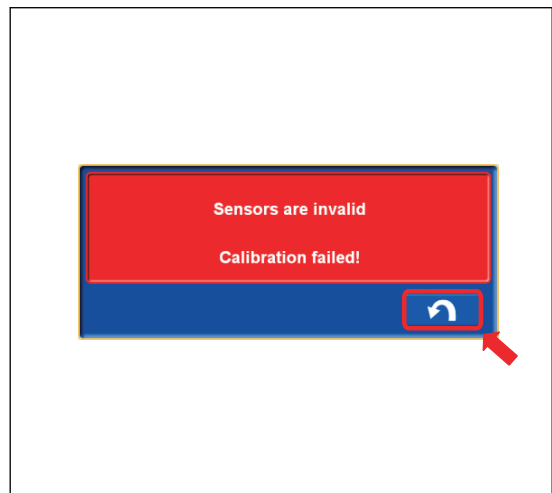
After the error is resolved, perform the calibration again.



An abnormality has occurred in the sensor connected to the chassis if the error screen shown in the figure is displayed.

Tap RETURN button to stop the calibration, and return to the menu screen in this case.

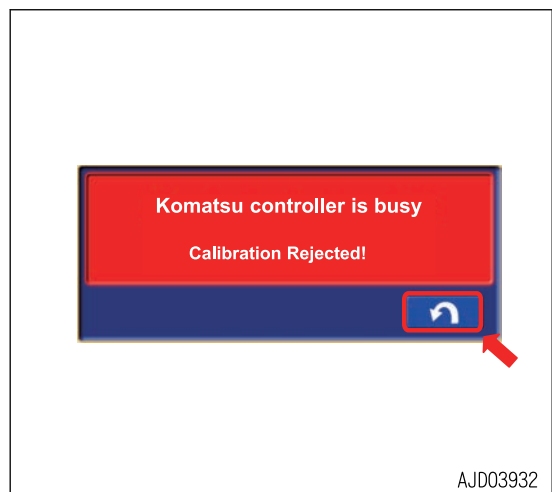
After the error is resolved, perform the calibration again.



If the error screen shown in the figure is displayed while performing "Auto tilt bucket exchange" calibration, a communication error has occurred between Komatsu controller and control box, or bucket type B and C are selected for auto tilt bucket type and dimension input screen.

Tap RETURN button to stop the calibration, and return to the menu screen in this case.

After the error is resolved, perform the calibration again.

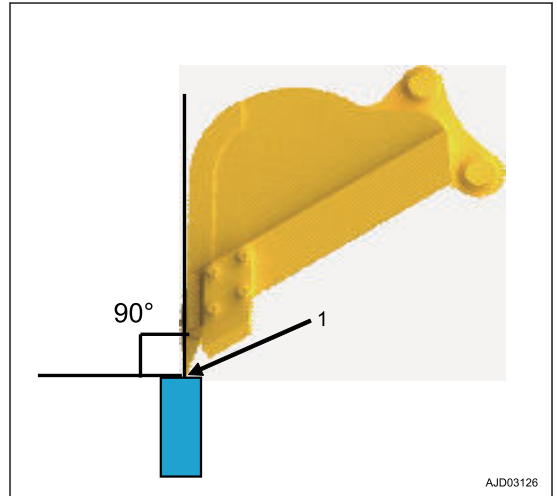


PROCEDURES OF CALIBRATION OF BUCKET TOOTH

Do the bucket tooth calibration when tooth is worn and tooth tip position changes or tooth is replaced.

Put the tooth tip to the point (1) whose coordinates are known in daily check. Let the bucket be in the posture of the figure, and check the coordinates of the tooth tip.

If the error is in the height direction of coordinates, bucket tooth is possibly worn. In that case, do the bucket tooth calibration.

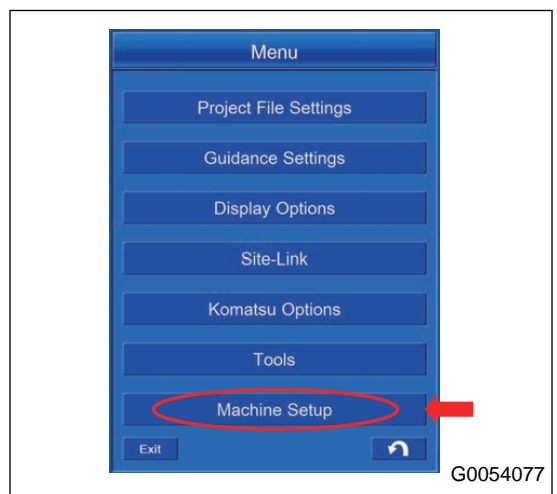


METHOD FOR STARTING APPLICATION FOR CALIBRATION OF BUCKET TOOTH

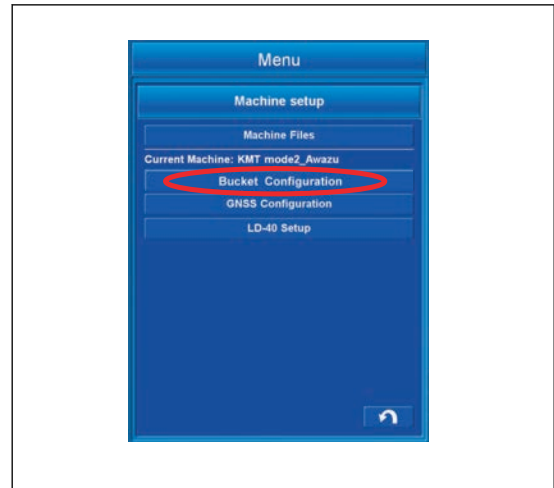
- 1. Tap the menu button on the control box.
Main menu screen is displayed.



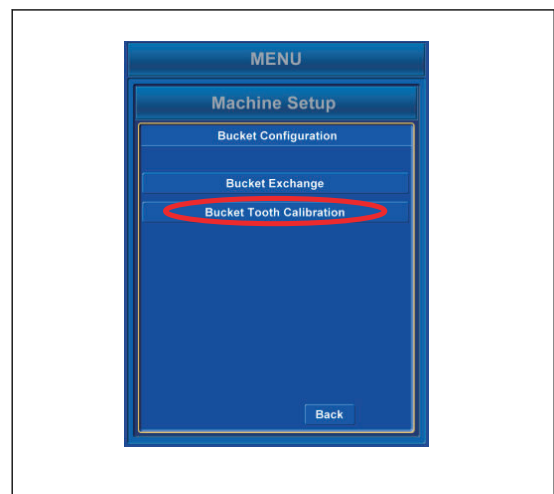
- 2. Tap the "Machine Setup" button.
The display changes to the Machine Setup screen.



3. Tap the “Bucket Configuration” button.
The display changes to Bucket Configuration screen.



4. Tap the “Bucket Tooth Calibration” button.
Bucket Tooth Calibration starts.



METHOD FOR MEASURING TOOTH LENGTH AND INPUTTING VALUE

1. Measure the dimension (1) of tooth length with a tape measure, etc., and input the value.

Dimension (1) is the distance between root and tip of the tooth.

Measure the length dimension to mm unit and input it.

You can input the numeric value within the range shown below.

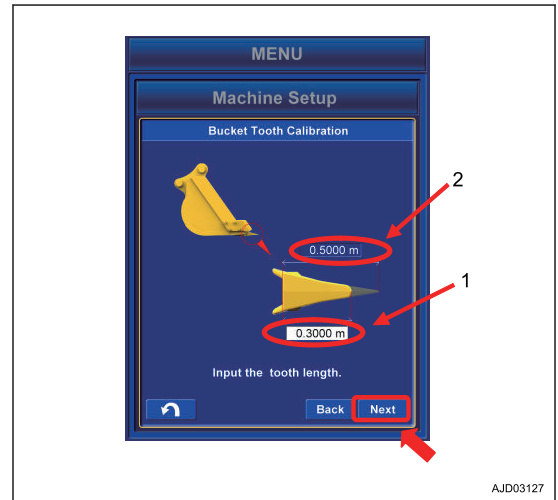
Input range of numeric value Min: 0.0001 m to Max: 2.9999 m

(If you input the value outside the range, "Next" button will be unavailable.)

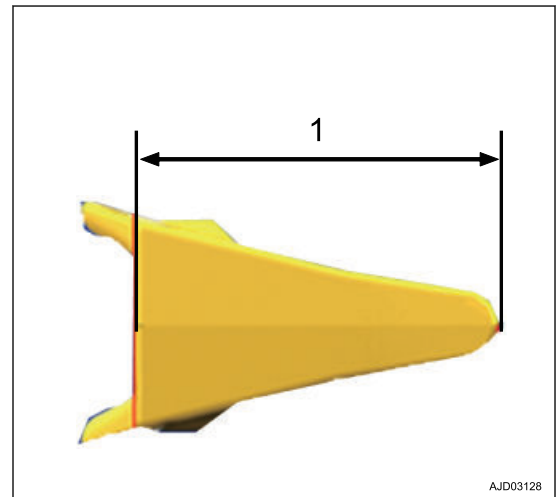
2. When you complete the input, tap "Next" button.
If a numeric value column is empty, "Next" button is invalid.

REMARK

The tooth length which has been input and saved by Komatsu controller is shown in the Dimension (2).



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METHOD FOR CALCULATING AUTOMATIC CALIBRATION AND WRITING PARAMETER VALUE

1. Tap the "Next" button.

Automatic calibration is executed.

After the calculation is finished, the screen changes.



2. Hold down the "Set" button for 0.5 seconds or longer.

The bucket parameter obtained by automatic calibration calculation is written in Komatsu controller, and the display returns to the menu screen.

"Bucket Tooth Calibration" is completed.

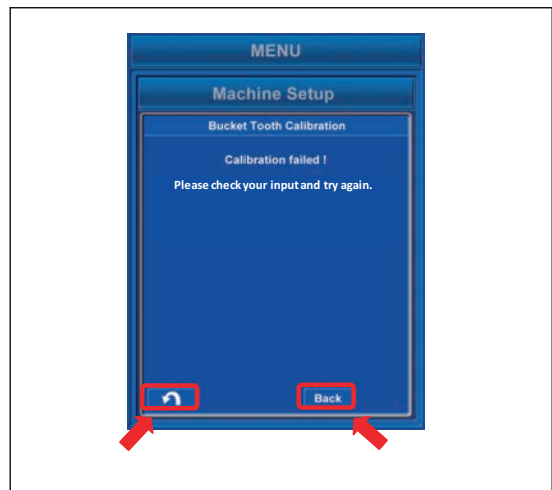


Tap the "Next" button and if automatic calibration calculation fails, error screen is displayed.

In this case, the numeric value which has been input may be wrong.

Tap the "Back" button, and check back the input result.

Tap the RETURN button and the display returns to menu screen. At that time, the value which has been input and measured will be reset.



METHOD FOR ACTING WHEN COMMUNICATION ERROR OR SENSOR ERROR OCCURS (BUCKET TOOTH)

If the error screen shown in the figure is shown while you do the bucket tooth calibration, a communication error occurs between the Komatsu controller and control box.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see "TROUBLES AND ACTIONS".

After the error is resolved, do the calibration again.

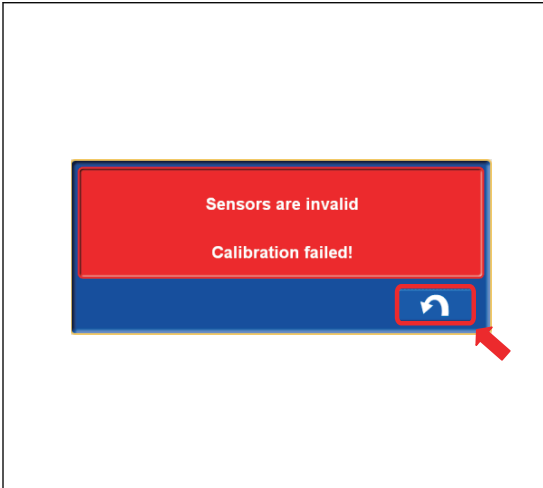


If the error screen shown in the figure is shown, an abnormality occurs in the sensor connected to the chassis.

Tap the RETURN button to stop the calibration, and let the screen go back to the menu screen in this case.

To resolve the errors, see "TROUBLES AND ACTIONS".

After the error is resolved, do the calibration again.

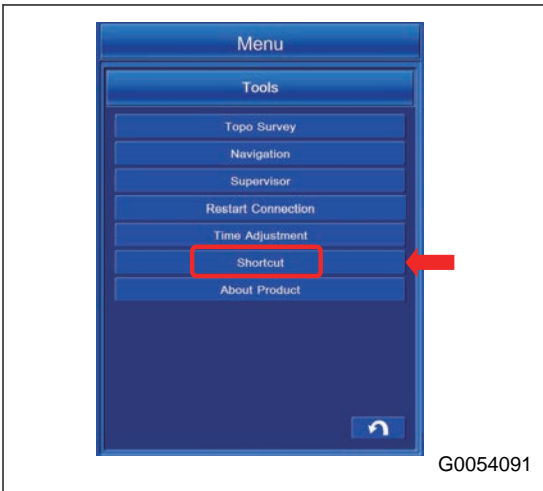


METHOD FOR SETTING SHORTCUTS MENU

You can set whether the shortcuts menu to the working screen is shown or not shown.

Tap "Shortcut" button in the Tools menu.

The screen changes to Shortcut menu setup screen.



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(1) "Show Bucket Shortcut"

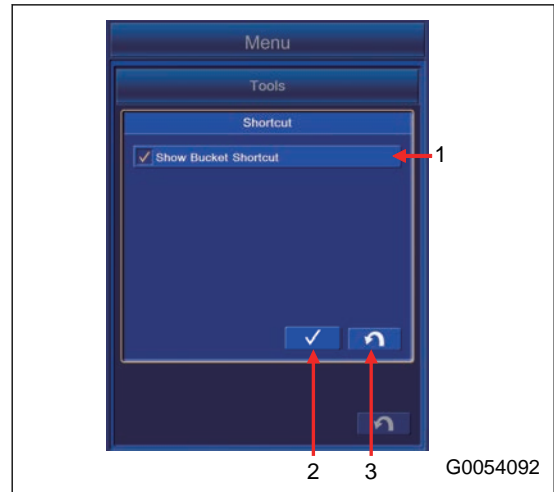
When you put a check mark in the check box, the bucket Shortcuts icon is shown on the working screen.

(2) ENTER button

Tap the ENTER button and the setting is saved.

(3) RETURN button

Tap the RETURN button and the screen goes back to the previous screen.



BUCKET SHORTCUT MENU

With a simple operation, you can select the Bucket Files.

1. Tap the bucket shortcut icon on the right bottom of the working screen.

The screen changes to "Bucket Exchange" menu.

REMARK

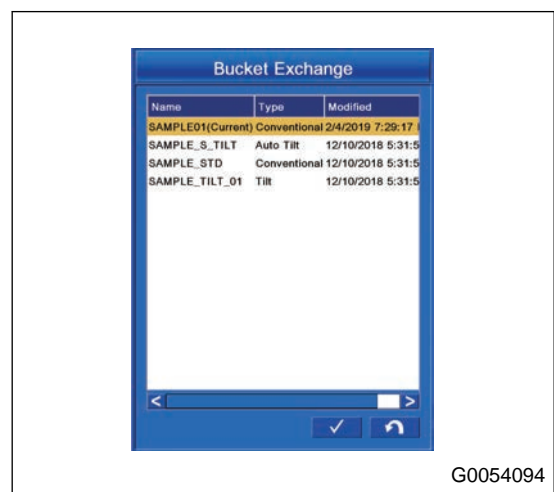
During the semi-auto limited digging mode, the bucket shortcut icon is not shown regardless of the setting.



2. Select the Bucket Files to use from the Bucket Files shown on "Bucket Exchange" menu.

REMARK

- The currently selected bucket is highlighted in yellow.
- The Bucket File of which calibration is not done is shown. Each parameter for the Bucket File of which calibration is not done is the default value.



MACHINE MONITOR

MACHINE SETTINGS

Machine Setting menu is for various machine settings. It is in the user menu on the machine monitor.

See this section for the explanation for flow rate setting which enables setting for the auto tilt bucket installed.

For other settings, see the Operation and Maintenance Manual of standard machine.

This menu is for setting and confirming the following items.

(a): Economy Mode Adjustment (*1)

(b): Breaker Setting (*1)

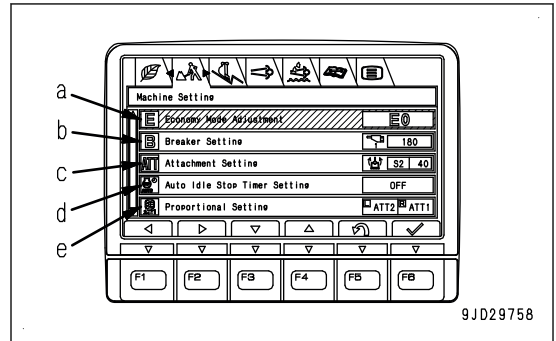
(c): Attachment Setting

(d): Auto Idle Stop Timer Setting (*1)

(e): Proportional Setting (*2)

(*1): See the Operation and Maintenance Manual of standard machine.

(*2): This is displayed only when the auto tilt bucket is installed.



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On the user menu screen, you can perform the following operations with switches F1 to F6.

F1: Moves the selection to the left menu. When it is on the left end menu, it moves to the right end menu.

F2: Moves to the right menu. When on the right end menu, it moves to the left end menu.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

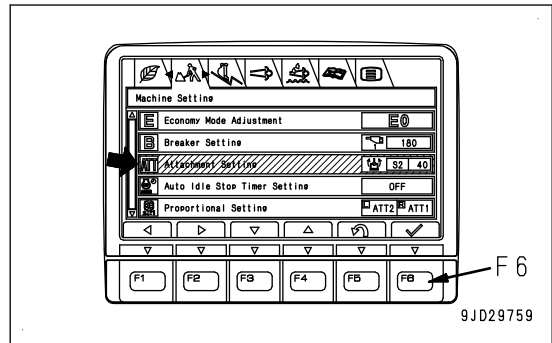
F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the screen to the standard screen.

F6: Displays the setting screen for selected item.

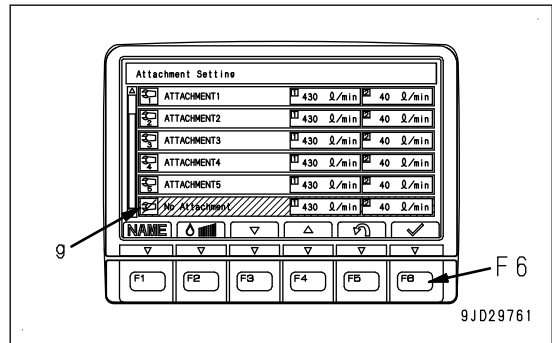
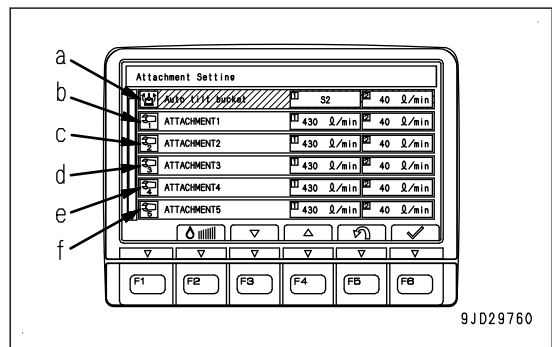
ATTACHMENT SETTING

Select Attachment Setting on Machine Setting screen, then press the switch F6.



The following are items which can be set and confirmed when the auto tilt bucket is installed.

- (a): Auto Tilt Bucket (*2)
 - (b): ATTACHMENT1 (*1)
 - (c): ATTACHMENT2 (*1)
 - (d): ATTACHMENT3 (*1)
 - (e): ATTACHMENT4 (*1)
 - (f): ATTACHMENT5 (*1)
 - (g): No Attachment (*1)
- (*1): See the Operation and Maintenance Manual of standard machine.
 (*2): This is displayed only when the auto tilt bucket is installed.

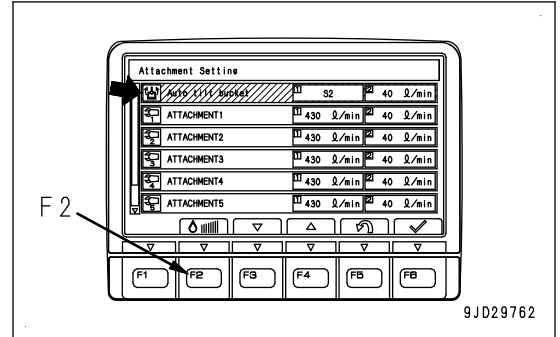


AUTO TILT BUCKET FLOW SETTING

REMARK

The medium speed (S2) is automatically set in Auto Tilt Bucket Speed Setting after "Auto Tilt Bucket Exchange" calibration is completed.

Select Auto Tilt Bucket on Attachment Setting screen, then press the switch "F2".



On Auto Tilt Bucket Speed Setting screen, you can perform the following operations with switches "F1" to "F6".

F1: Is displayed on the ATT2 setting screen. This switch changes the screen to ATT1 setting screen.

F2: Is displayed on the ATT1 setting screen. This switch changes the screen to ATT2 setting screen.

F3: Decreases the speed by one level.

F4: Increases the speed by one level.

F5: Returns the screen to Attachment Setting screen without changing the speed.

F6: Validates the speed, and the screen returns to Attachment Setting screen.

(1): Attachment which is being set

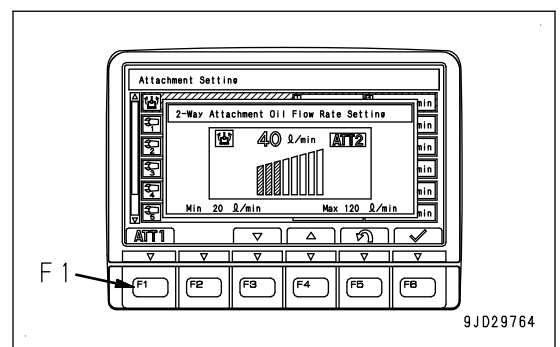
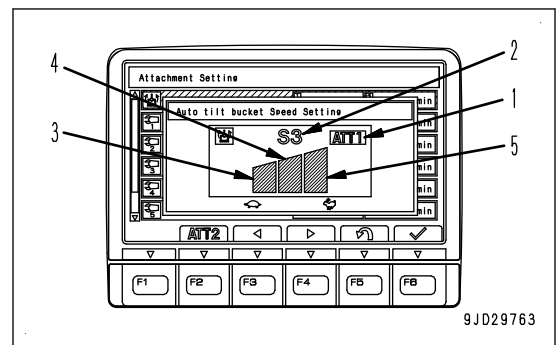
(2): Current speed setting

(3): Low speed (S1)

(4): Medium speed (S2)

(5): High speed (S3)

For the setting of ATT2, see the Operation and Maintenance Manual of standard machine.



REMARK

- Each speed which is set for low speed, medium speed, and high speed varies when the lever is operated finely or in the middle range. The maximum speed when the lever is operated fully is the same in all setting.
- Ask your Komatsu distributor for adjustment if the certain speed cannot be obtained, or if any failure code is displayed on the machine monitor when the low speed, medium speed or high speed is selected while the lever is operated fully.
- Flow rate can be set individually as usual when the auto tilt bucket is installed. But it is recommended to set it to any speed of low speed (S1), medium speed (S2), or high speed (S3) in order to avoid an effect on the accuracy of construction.

PROPORTIONAL SETTING

The lever setting of attachment 1 and 2 can be reversed on Proportional Setting screen.

REMARK

Proportional Setting is available only when 2 attachments are set.

Select Proportional Setting on Machine Setting screen, then press the switch "F6".

On Proportional Setting screen, you can perform the following operations with switches "F3" to "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Cancels the selection and returns the screen to Machine Setting screen.

F6: Allocates the selected setting to Proportional Setting.

When Standard is selected

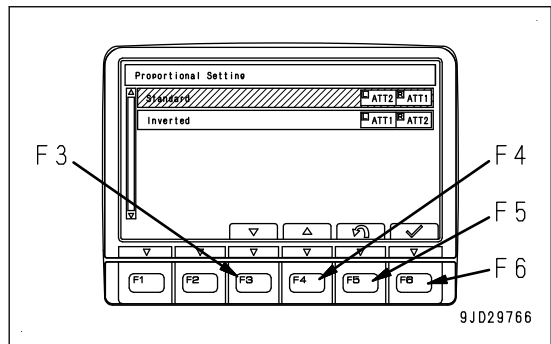
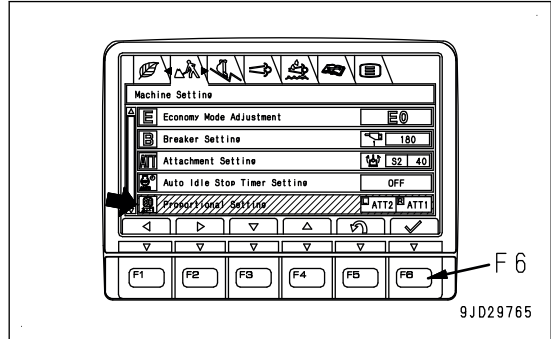
L.H. work equipment control lever: Operation of ATT2

R.H. work equipment control lever: Operation of ATT1

When Inverted is selected

L.H. work equipment control lever: Operation of ATT1

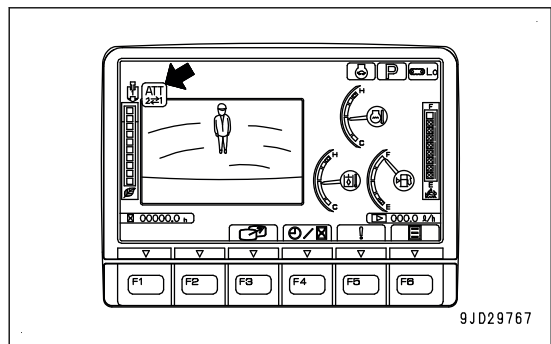
R.H. work equipment control lever: Operation of ATT2



Proportional control lever reverse side view pilot lamp is displayed when Inverted is selected in Proportional Setting.

REMARK

Foot pedal is not available when Inverted is selected.



MC SETTING

There is MC setting menu in the user menu on machine monitor, and it performs various settings related to Semi-auto limited digging mode.

For the user menu other than MC Setting menu, see the Operation and Maintenance Manual of standard machine.

For Semi-auto limited digging mode, see SEMI-AUTO MODE.

Each item of this menu is for setting related to Semi-auto limited digging mode.

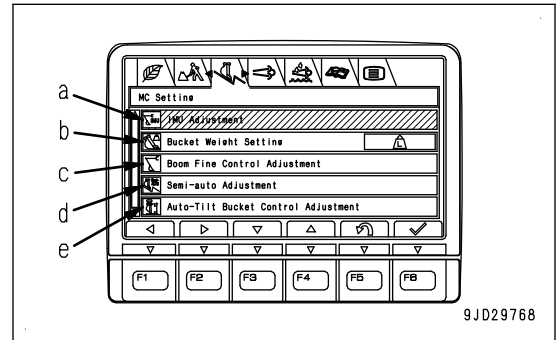
This menu is for setting and confirming the following items.

- (a): IMU Adjustment
- (b): Bucket Weight Setting (*)
- (c): Boom Fine Control Adjustment (*)
- (d): Semi-auto Adjustment (*)
- (e): Auto Tilt Bucket Control Adjustment

(*): Setting change of this item cannot be performed in Semi-auto limited digging mode. Change the mode to the manual mode.

The following operations can be performed with switches F1 to F6 on the user menu screen.

- F1: Moves the selection to the left menu. When it is on the left end menu, it moves to the right end menu.
- F2: Moves to the right menu. When on the right end menu, it moves to the left end menu.
- F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
- F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
- F5: Returns the display to the standard screen.
- F6: Displays the setting screen for selected item.



IMU ADJUSTMENT

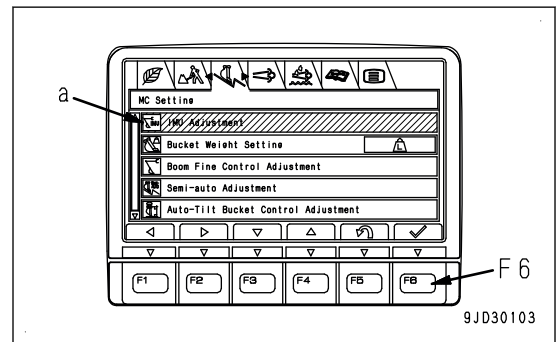
Select the IMU Adjustment (a) on the MC Setting screen, and press the switch F6.

When executing the daily calibration, diagnose the necessity of adjustment on Adjustment Diagnosis menu of IMU Adjustment. If it is judged to be necessary, perform the adjustment on Adjustment Execute menu.

REMARK

Setting change of this item cannot be performed during waiting or operating of Semi-auto limited digging mode. Change the mode to the manual mode, and perform the setting.

- F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
- F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
- F5: Returns the display to the standard screen.
- F6: Executes the selected item.



METHOD FOR DIAGNOSING IMU

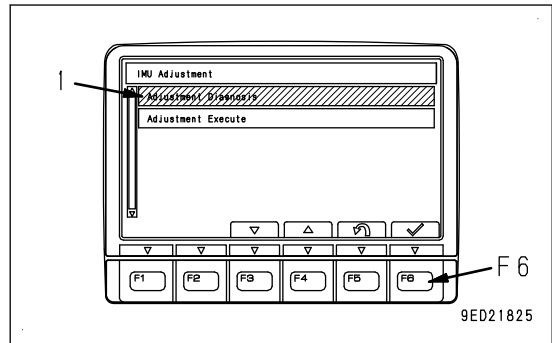
1. Select the "Adjustment Diagnosis" (1) on the "IMU Adjustment" screen, and press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the screen to "MC Setting" screen.

F6: Executes the selected item.



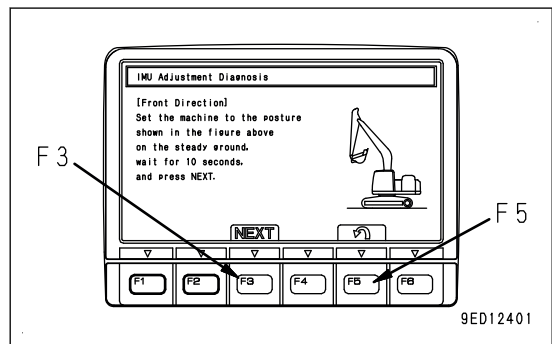
2. Move the machine to be the same posture as one displayed on the machine monitor.

Make the track frame face front (sprocket at rear), and set the upper structure and track frame in parallel at this time.

Move the machine to be the correct posture, and then press the switch "F3".

F3: Proceeds to the next step.

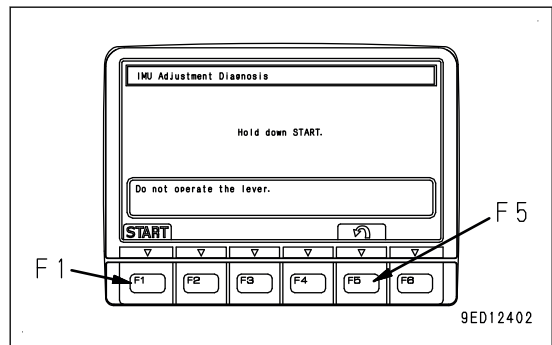
F5: Cancels "Adjustment Diagnosis" and returns the screen to "IMU Adjustment" screen.



3. Hold down the switch "F1" according to the display on machine monitor.

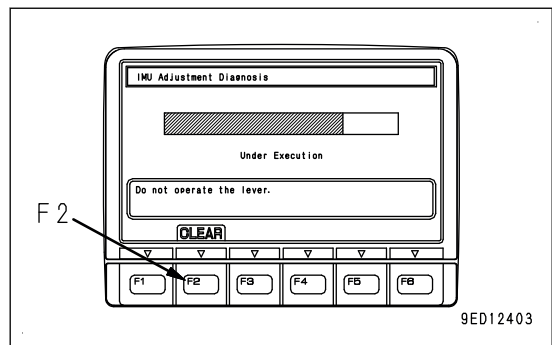
F1: Proceeds to the next step.

F5: The screen returns to the screen of step 2.



"Adjustment Diagnosis" in a forward direction is executed, wait for a little while until it is completed.

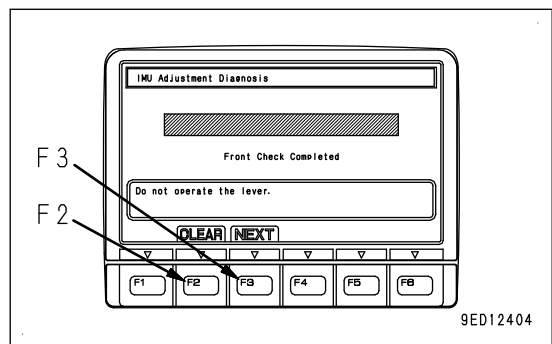
F2: Cancels the diagnosis and returns the screen to the screen of step 2.



4. When the "Adjustment Diagnosis" in a forward direction is completed, the screen changes to the screen shown in the figure on the right. Press the switch "F3".

F2: The screen returns to the screen of step 2.

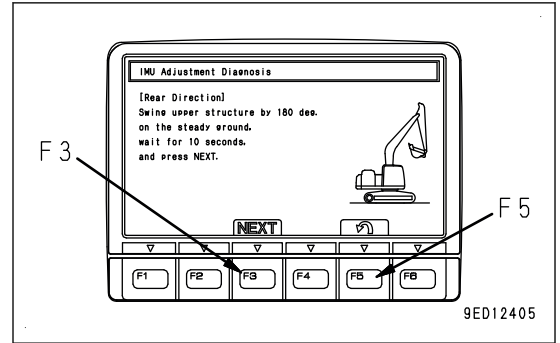
F3: Proceeds to the next step.



5. Swing the upper structure by 180 ° to set its posture to be the same as one displayed on the machine monitor, and set the upper structure parallel to track.
6. Move the machine to set it to the correct posture, wait 10 seconds, and then press the switch “F3”.

F3: Proceeds to the next step.

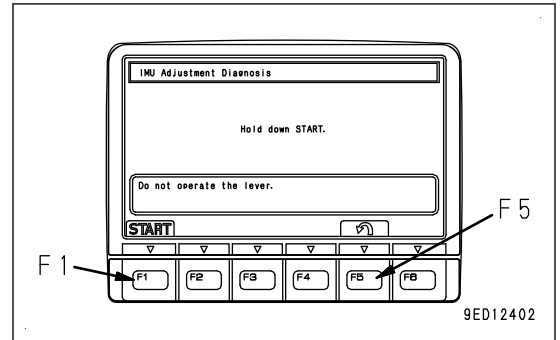
F5: The screen returns to the screen of step 2.



7. Hold down the switch “F1” according to the display on machine monitor.

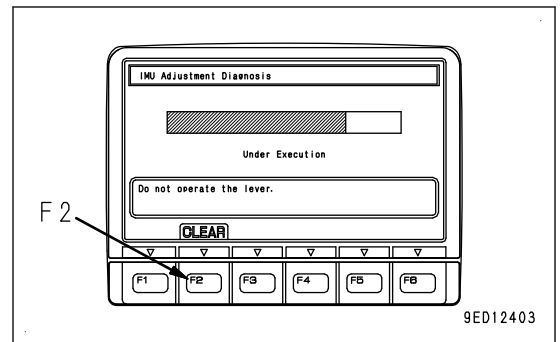
F1: Proceeds to the next step.

F5: The screen returns to the screen of step 6.



“Adjustment Diagnosis” in a rearward direction is executed, wait for a little while until it is completed.

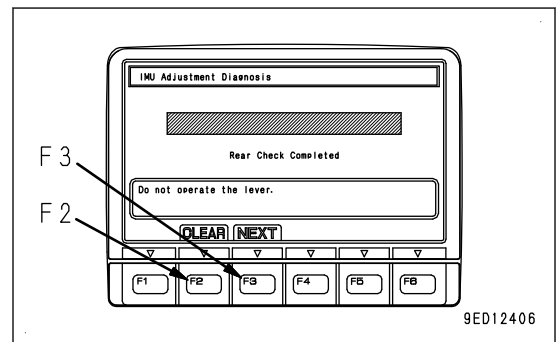
F2: Cancels the diagnosis and returns the screen to the screen of step 6.



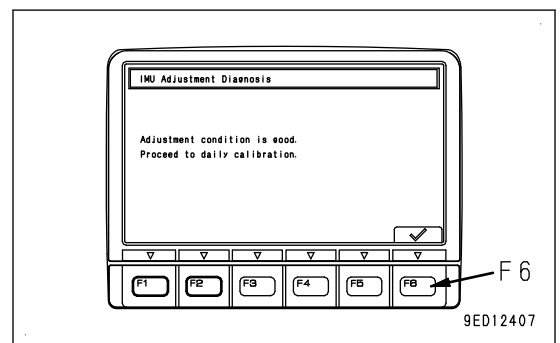
8. When the “Adjustment Diagnosis” in a rearward direction is completed, buzzer sounds, and the screen changes to the screen shown in the figure on the right. Press the switch “F3”.

F2: The screen returns to the screen of step 6.

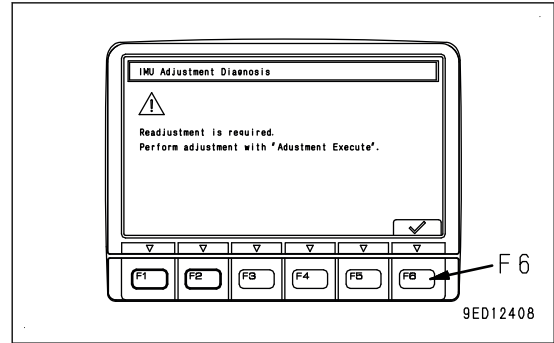
F3: Displays the diagnosis result.



- If the adjustment is judged to be unnecessary as a result of “Adjustment Diagnosis”, execute the daily calibration of bucket edge continuously. Press the switch “F6”, and the screen returns to “IMU Adjustment” screen.

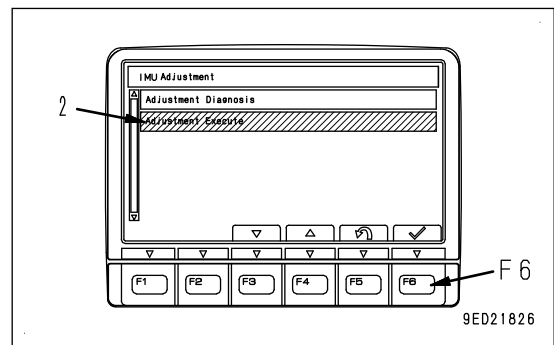


- If the adjustment is judged to be necessary as a result of "Adjustment Diagnosis", Proceed to execute the next "METHOD FOR ADJUSTING IMU". Press the switch "F6", and the screen returns to "IMU Adjustment" screen.

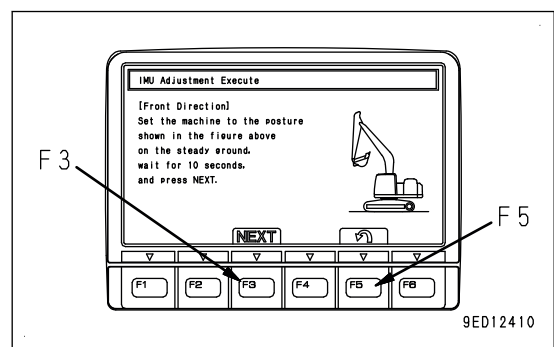


METHOD FOR ADJUSTING IMU

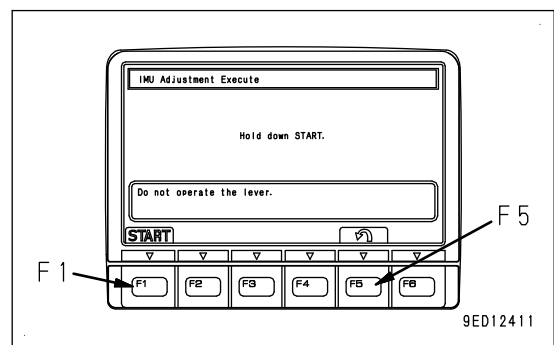
1. Select the "Adjustment Execute" (2) on the "IMU Adjustment" screen, and press the switch "F6".
 F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
 F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
 F5: Returns the screen to "MC Setting" screen.
 F6: Executes the selected item.



2. Move the machine to be the same posture as one displayed on the machine monitor.
 Make the track frame face front (sprocket at rear), and set the upper structure and track frame in parallel at this time.
3. Move the machine to set it to the correct posture, wait 10 seconds, and then press the switch "F3".
 F3: Proceeds to the next step.
 F5: Cancels "Adjustment Execute" and returns the screen to "IMU Adjustment" screen.

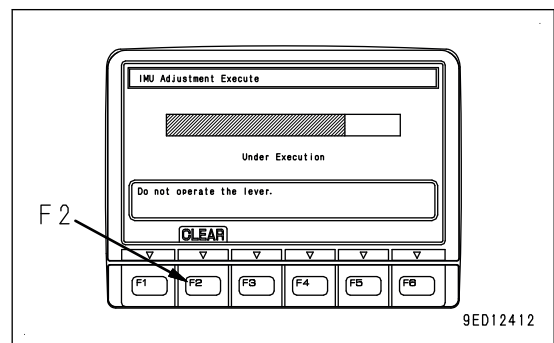


4. Hold down the switch "F1" according to the display on machine monitor.
 F1: Proceeds to the next step.
 F5: The screen returns to the screen of step 2.



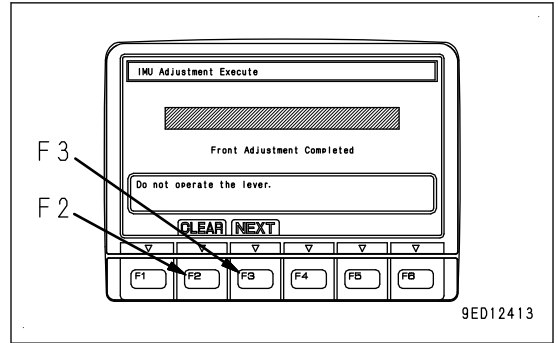
Adjustment in a forward direction is executed, wait for a little while until it is completed.

- F2: Cancels the adjustment and returns the screen to the screen of step 2.



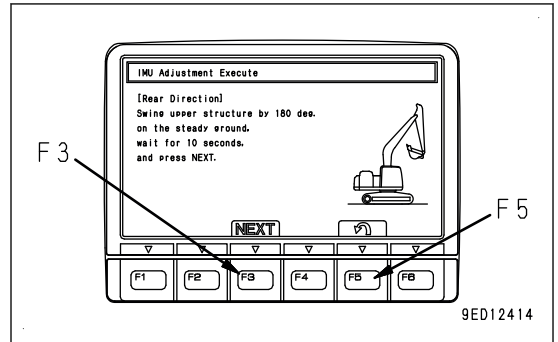
- When the Adjustment in a forward direction is completed, buzzer sounds, and the screen changes to the screen shown in the figure on the right. Press the switch “F3”.

F2: The screen returns to the screen of step 2.
 F3: Proceeds to the next step.



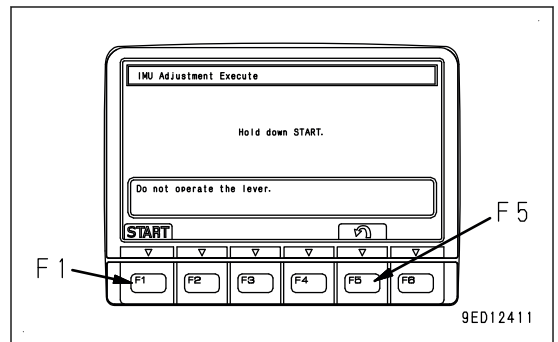
- Swing the upper structure by 180 ° to set its posture to be the same as one displayed on machine monitor, and set the upper structure parallel to track.
- Move the machine to set it to the correct posture, wait 10 seconds, and then press the switch “F3”.

F3: Proceeds to the next step.
 F5: The screen returns to the screen of step 2.



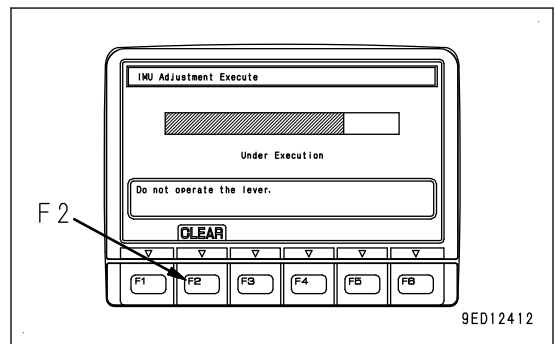
- Hold down the switch “F1” according to the display on the machine monitor.

F1: Proceeds to the next step.
 F5: The screen returns to the screen of step 5.



Adjustment in a rearward direction is executed, wait for a little while until it is completed.

F2: Cancels the adjustment and returns the screen to the screen of step 5.

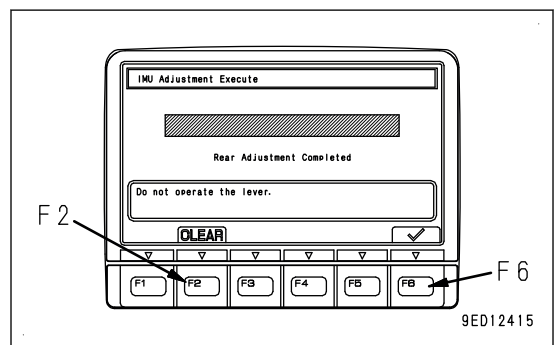


Buzzer sounds and the screen changes to the screen shown in the figure when the adjustment in a rearward direction is completed.

Adjustment Execute is completed.

- Press the switch “F6” to validate the “Adjustment Execute”, and execute daily calibration of bucket edge continuously.
- F2: The screen returns to the screen of step 5.

F6: Enters “Adjustment Execute” and returns the screen to “IMU Adjustment” screen.



REMARK

If the adjustment finishes abnormally, Failure Cause Code is displayed
Find the cause and perform the "IMU Adjustment" again referring to the Failure Cause Code list.

Failure Cause Code list

Cause code	Content	Remedies
A-1	Engine speed signal is 0 rpm.	Press the RETURN button F5, start the engine, and execute the calibration again.
A-A	Wiring harness of IMU sensor CAN circuit has an open circuit.	Press the RETURN button F5, and ask your Komatsu distributor for the inspection and maintenance of IMU sensor.
SH-1	IMU sensor is faulty.	
SH-2	Initialization of IMU sensor failed, or power supply voltage is low.	
FF	IMU sensor stabilization error	Stabilize the machine, and then execute the calibration again.

BUCKET WEIGHT SETTING

In the Semi-auto limited digging mode, the work equipment movement or the accuracy of operation may vary depending on the bucket weight.

Optimum control is obtained by changing the setting to be complied with the weight of actual bucket installed.

Perform the Boom Fine Control Adjustment when the Bucket Weight Setting , Auto tilt bucket control adjustment is changed.

REMARK

Setting change of this item cannot be performed while Semi-auto limited digging mode is enabled.

Change the mode to the manual mode, and perform the setting.

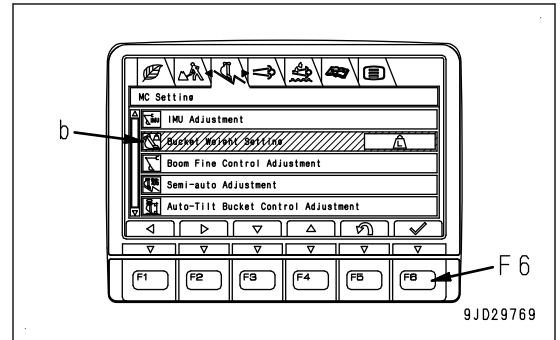
1. Select the Bucket Weight Setting (b) on the MC Setting screen, and press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the screen to the standard screen.

F6: Executes the selected item.



2. On the Bucket Weight Setting screen, change the setting to be complied with the actual bucket weight.

Bucket weight as a rough guide

(1) Weight Heavy: 1250 kg {2756 lb} to 1600 kg {3528 lb}

(2) Weight Medium: 900 kg {1985 lb} to 1249 kg {2754 lb}

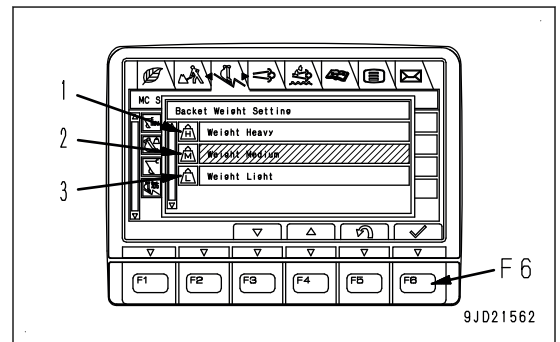
(3) Weight Light: 600 kg {1323 lb} to 899 kg {1982 lb}

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Cancels the change and returns the screen to MC Setting screen.

F6: Validates the change and returns the screen to MC Setting screen.



3. Perform the following Boom Fine Control Adjustment when the Bucket Weight Setting is changed.

BOOM FINE CONTROL ADJUSTMENT

In the Semi-auto limited digging mode, the work equipment movement or the accuracy of operation may differ depending on the bucket weight.

Optimum control is obtained by changing the setting to be complied with the weight of actual bucket installed.

Perform the adjustment of this section if the Bucket Weight Setting is changed. This adjustment result is saved by each selected bucket weight.

This adjustment enables the bucket control to be Optimum even if the bucket is changed within the same weight setting range.

REMARK

Setting change of this item cannot be performed while Semi-auto limited digging mode is enabled.

Change the mode to the manual mode, and perform the setting.

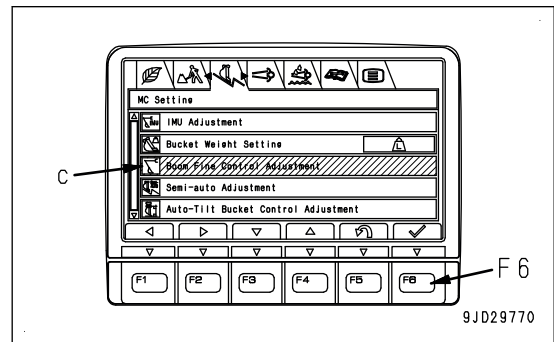
Select the Boom Fine Control Adjustment (c) on the MC Setting screen, and press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to the standard screen.

F6: Executes the selected item.



METHOD FOR ADJUSTING BOOM FINE CONTROL

⚠ WARNING

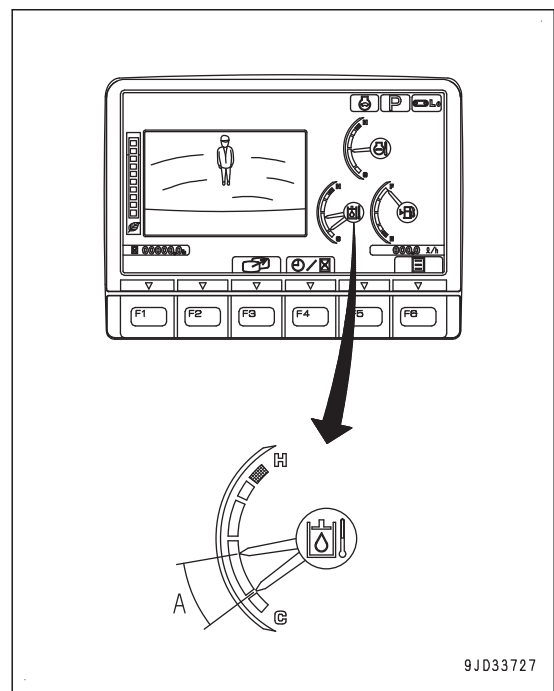
The boom moves automatically during the adjustment. Check the safety around before you start the adjustment.

1. Adjust the hydraulic oil temperature to make it within the range (A) of the right figure.

Hydraulic oil temperature must be within the range (A) of 40 °C {104 °F} to 60 °C {140 °F} to do the adjustment.

Also, the working mode must be P or ATT/P mode.

Cancel the auto-deceleration.



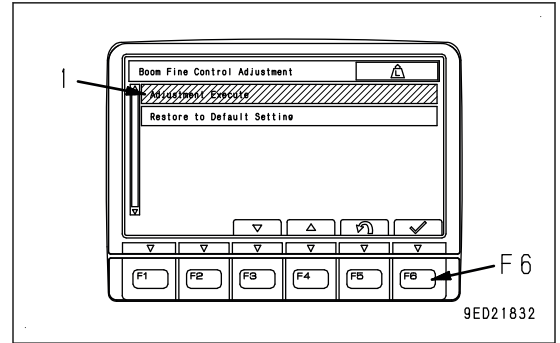
2. Select "Adjustment Execute" (1) on "Boom Fine Control Adjustment" screen of "MC Setting", and push the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Moves the screen back to "MC Setting" screen.

F6: The selected item is done.

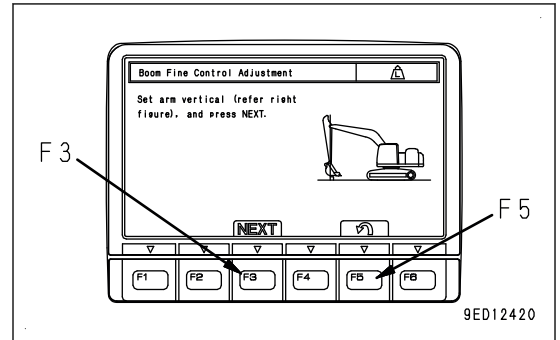


3. Move the machine to be the same posture as that shown on the machine monitor.

Move the machine to be the correct posture, and then push the switch F3.

F3: The screen goes to the next step.

F5: The screen goes back to the screen of step 2.



4. Check the conditions that follow and then hold down the switch F1.

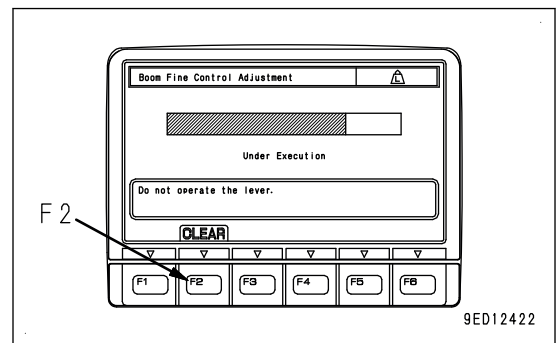
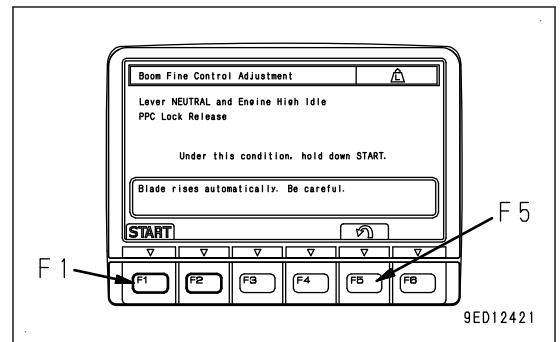
- Set each control lever to the NEUTRAL position.
- Set the fuel control dial to the High idle (MAX) position.
- Check that the hydraulic oil temperature is within the range of (A) in step 1.
- Set the lock lever to the FREE position.
- Check that there is no person in the area around the machine and no obstacle in the area of boom operation.

F1: The screen goes to the next step.

F5: The screen goes back to the screen of step 2.

Calibration is done, wait for a while until it is completed.

F2: Cancels the adjustment. The screen goes back to the screen of step 2.



5. Buzzer operates when the adjustment is completed, and the screen changes to the screen shown in the figure on the right. Push the switch "F6".

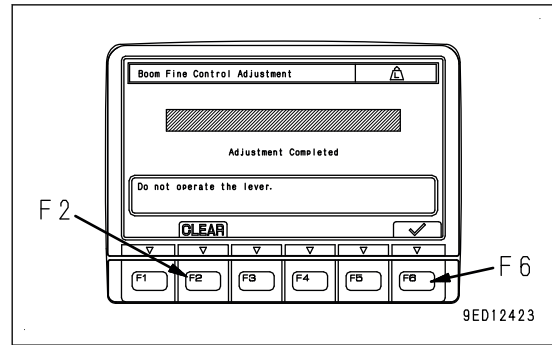
F2: Cancels the adjustment. The screen goes back to the screen of step 2.

F6: Validates "Adjustment Execute" and moves the screen back to "Boom Fine Control Adjustment" screen.

REMARK

If the adjustment finishes abnormally, a failure cause code is shown.

Find the cause and do "Boom Fine Control Adjustment" again. See the Failure Cause Code list.



Failure Cause Code list

Cause code	Content	Action
A-1	Engine speed signal is 0 rpm.	Check that the engine starts.
A-2	Hydraulic oil temperature is low.	Check the minimum hydraulic oil temperature (40 °C {104 °F})
A-3	Hydraulic oil temperature is high.	Check the maximum hydraulic oil temperature (60 °C {140 °F})
A-4	Overheating	Check for the overheating.
A-A	CAN communication is defective.	Consult your Komatsu distributor for the inspection and maintenance.
B-3	The control lever is not in the NEUTRAL.	Set the control lever to the NEUTRAL.
E-7	The working mode is not set to P or ATT/P.	Set the working mode to P or ATT/P.
SG-6	Stroke sensor system for boom cylinder is abnormal. (*1)	Consult your Komatsu distributor for the inspection and maintenance.
WA-1	Boom RAISE PPC pressure sensor is abnormal (valve side).	Consult your Komatsu distributor for the inspection and maintenance.
WA-2	Boom LOWER PPC pressure sensor is abnormal (valve side).	Consult your Komatsu distributor for the inspection and maintenance.
WB-1	Boom RAISE PPC pressure sensor is abnormal (lever side).	Consult your Komatsu distributor for the inspection and maintenance.
WB-2	Boom LOWER PPC pressure sensor is abnormal (lever side).	Consult your Komatsu distributor for the inspection and maintenance.
WC-1	Stroke sensor for boom spool is abnormal.	Consult your Komatsu distributor for the inspection and maintenance.
WD-1	Boom RAISE PPC Intervention EPC is abnormal.	Consult your Komatsu distributor for the inspection and maintenance.
WD-2	Boom RAISE reduce pressure EPC is abnormal.	Consult your Komatsu distributor for the inspection and maintenance.
WD-3	Boom LOWER reduce pressure EPC is abnormal.	Consult your Komatsu distributor for the inspection and maintenance.
WE-1	Boom RAISE Intervention relay signal is OFF.	Consult your Komatsu distributor for the inspection and maintenance.
WH-7	Engine speed is not Hi.	Turn the fuel control dial to the MAX.
WH-8	PPC source pressure is low.	Consult your Komatsu distributor for the inspection and maintenance.
FF	The calibration value is out of normal range.	Do the calibration again.
FF-1	Ascending sequence error (Judgment is done by multi-monitor.)	Do the calibration again.

*1: One of A phase open circuit, A phase short circuit, B phase open circuit, B phase short circuit, and over range occurs in the stroke sensor of applicable work equipment, Failure Cause Code is shown.

METHOD FOR INITIALIZING BOOM FINE CONTROL ADJUSTMENT

In order to restore the setting value of “Boom Fine Control Adjustment”, execute this menu.

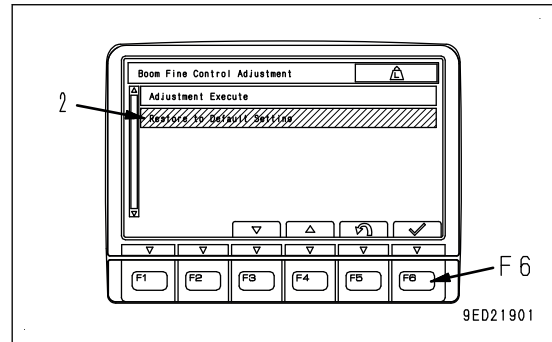
1. Select the “Restore to Default Setting” (2) on the “Boom Fine Control Adjustment” screen, and press the switch “F6”.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to “MC Setting” screen.

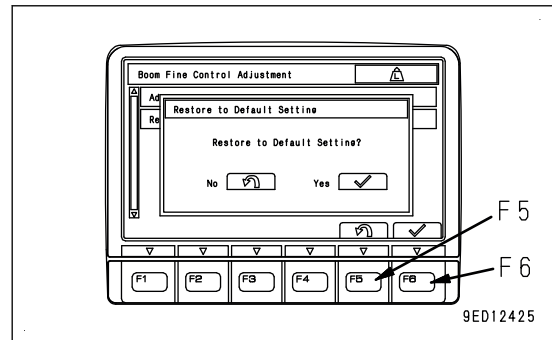
F6: Executes the selected item.



2. Confirmation screen is displayed. Hold down the switch “F6” to restore to default setting.

F5: Returns the display to “Boom Fine Control Adjustment” screen without restoring the value to the default setting..

F6: Returns the display to “Boom Fine Control Adjustment” screen restoring the value to the default setting.



SEMI-AUTO ADJUSTMENT

Each item of this menu is for detail setting related to Semi-auto limited digging mode.

REMARK

- Setting change of this item cannot be performed while Semi-auto limited digging mode is enabled. Change the mode to the manual mode, and perform the setting.
- Auto grade assist is the control to raise the boom automatically so that the bucket edge does not dig deeper than the design data when arm is operated near the design data.
- Auto stop control is the control to decelerate or stop the work equipment automatically so that the bucket edge does not dig deeper than the design data when the arm is not operated and the boom or bucket is operated near the design data.
- When GNSS communication state is not good, GNSS receiver becomes initializing state and error is displayed on the screen of control box. This state is called Initializing. Normally, the state becomes initializing is completed state.

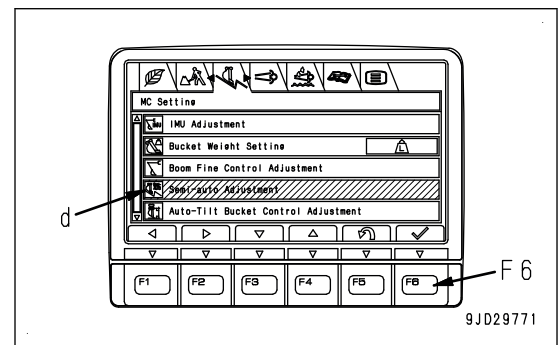
Select the Semi-auto Adjustment (d) on the MC Setting screen, and press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to the standard screen.

F6: Executes the selected item.



(1) Arm Initial Speed

When starting arm IN operation (scraping) near the design data while Semi-auto limited digging mode is executed, bucket edge drops right after starting and digs deeper than the design data. In this case, change the setting.

(2) Arm Steady Speed

If the bucket edge drops and digs deeper than the design data when performing arm IN operation (scraping) near the design data, change the setting.

(3) Stop Position Adjustment

if the bucket edge does not match the design data when the auto stop control is performed, change the setting.

(4) Design face Date Hold Time in Initialize

This is for setting the duration from the time when GNSS receiver starts initialization to the time when semi-auto mode is canceled.

(5) Cumulative Swing Angle Set in Initialize

This is for setting the angle for swing operation performed from the time when GNSS receiver starts initialization to the time when semi-auto mode is canceled.

(6) GNSS Fluctuation Reduction Filter

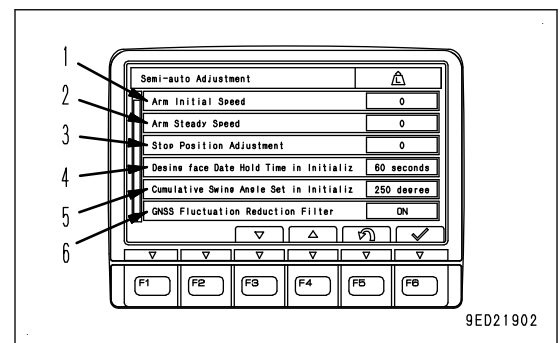
This is for setting the ON/OFF of the function which reduces the fluctuation of GNSS coordinates.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to MC Setting screen.

F6: Executes the selected item.



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METHOD FOR ADJUSTING ARM INITIAL SPEED

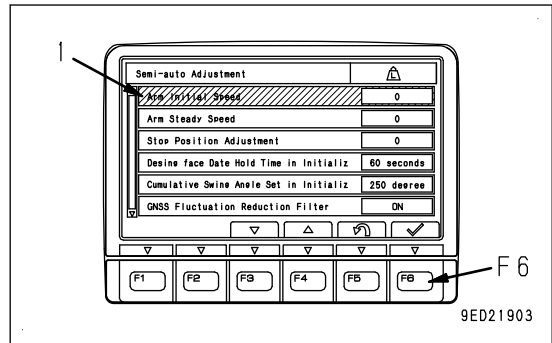
1. Select the “Arm Initial Speed” (1) on the “Semi-auto Adjustment” screen, and press the switch “F6”.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to “MC Setting” screen.

F6: Changes the setting of selected item.



2. “Arm Initial Speed” setting screen is displayed. Change the setting to the appropriate one.

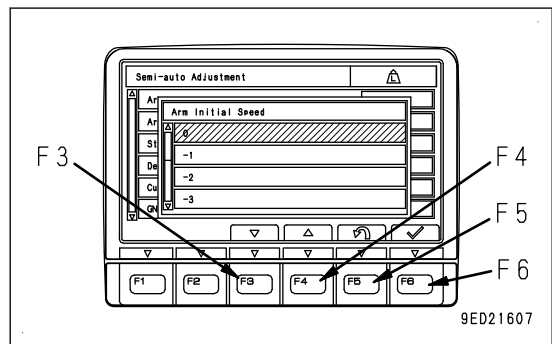
- Smaller the value is set, slower the arm speed is.
- It is set at “0” when machine is shipped from plant.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Cancels the change and returns the display to “MC Setting” screen.

F6: Validates the change and returns the display to “MC Setting” screen.



METHOD FOR ADJUSTING ARM STEADY SPEED

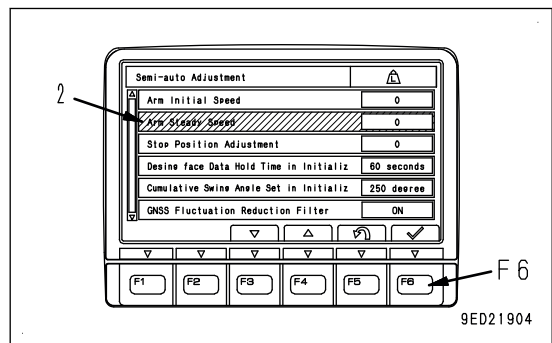
1. Select the “Arm Steady Speed” (2) on the “Semi-auto Adjustment” screen, and press the switch “F6”.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to “MC Setting” screen.

F6: Changes the setting of selected item.



2. “Arm Steady Speed” setting screen is displayed. Change the setting to the appropriate one.

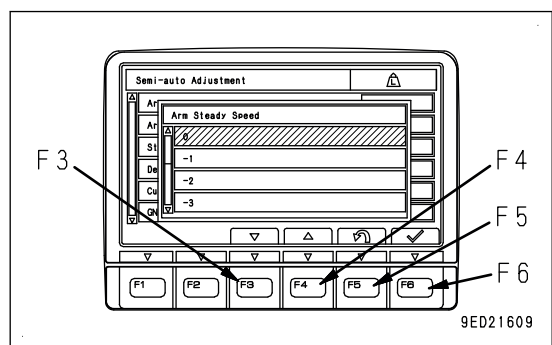
- Smaller the value is set, slower the arm speed is.
- It is set at “0” when machine is shipped from plant.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

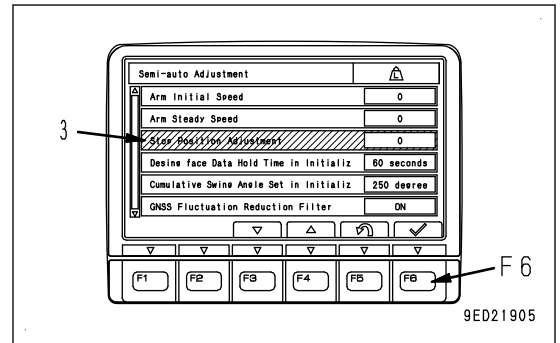
F5: Cancels the change and returns the display to “MC Setting” screen.

F6: Validates the change and returns the display to “MC Setting” screen.

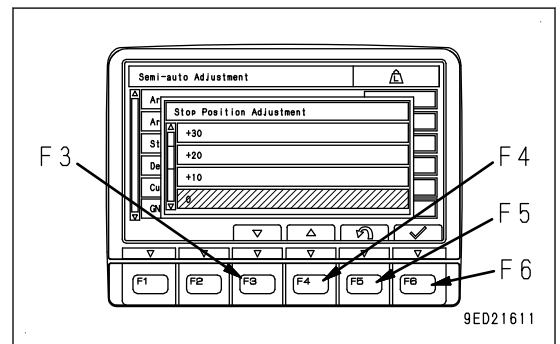


METHOD FOR ADJUSTING STOP POSITION

1. Select the "Stop Position Adjustment" (3) on the "Semi-auto Adjustment" screen, and press the switch "F6".
 - F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
 - F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
 - F5: Returns the display to "MC Setting" screen.
 - F6: Changes the setting of selected item.



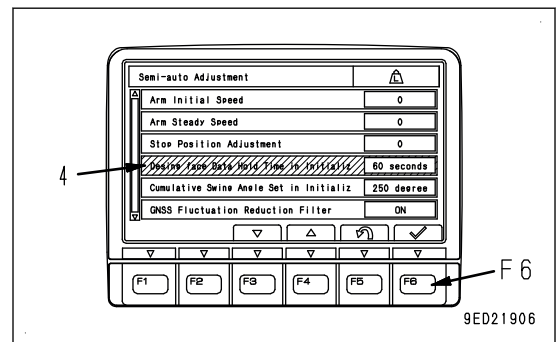
2. "Stop Position Adjustment" setting screen is displayed. Change it to the appropriate setting.
 - If the bucket edge digs into the design data, set the value larger.
 - If bucket edge does not reach the design data, set the value smaller.
- F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
- F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
- F5: Cancels the change and returns the display to "MC Setting" screen.
- F6: Validates the change and returns the display to "MC Setting" screen.



METHOD FOR ADJUSTING SURFACE HOLD TIME AT INITIALIZATION

Set how long it takes for the "Semi-auto limited digging mode" to be canceled from the time when GNSS receiver starts initialization.

1. Select the "Design face Date Hold Time in Initialize" (4) on the "Semi-auto Adjustment" screen, and press the switch "F6".
 - F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
 - F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
 - F5: Returns the display to "MC Setting" screen.
 - F6: Changes the setting of selected item.

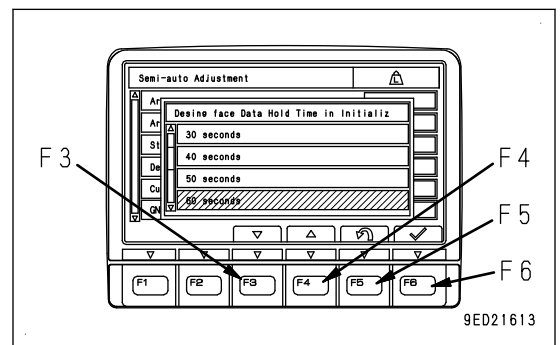


"Design face Date Hold Time in Initialize" setting screen is displayed.

2. Set how long it takes for the "Semi-auto limited digging mode" is canceled from the time when GNSS receiver starts initialization.

It is set at "60 secinds" when machine is shipped from plant.

 - F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.
 - F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.
 - F5: Cancels the change and returns the display to "MC Setting" screen.
 - F6: Validates the change and returns the display to "MC Setting" screen.



METHOD FOR ADJUSTING SURFACE TOTAL SWING HOLD ANGLE AT INITIALIZATION

Set the swing angle to be held from the time when GNSS receiver starts initialization to the time when the “Semi-auto limited digging mode” is canceled.

1. Select the “Cumulative Swing Angle Set in Initialize” (5) on the “Semi-auto Adjustment” screen, and press the switch “F6”.

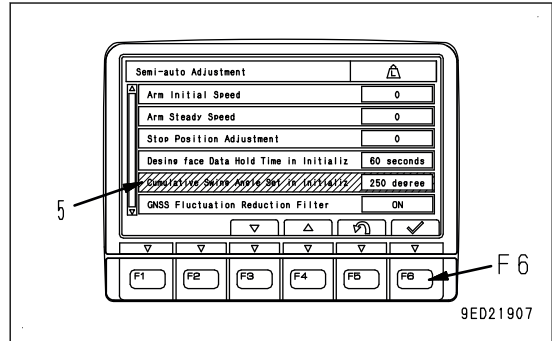
F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to “MC Setting” screen.

F6: Changes the setting of selected item.

“Cumulative Swing Angle Set in Initialize” setting screen is displayed.



2. Set the swing angle to be held until the “Semi-auto limited digging mode” is canceled when GNSS receiver starts initialization.

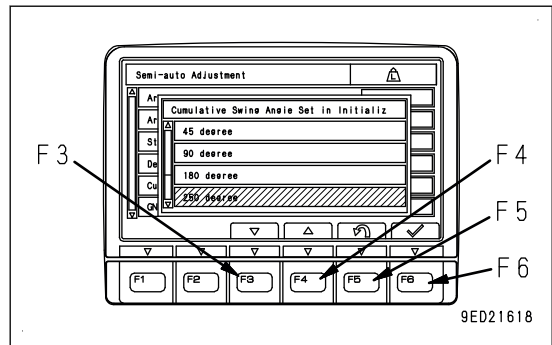
It is set at “250 degree” when machine is shipped from plant.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Cancels the change and returns the display to “MC Setting” screen.

F6: Validates the change and returns the display to “MC Setting” screen.



REMARK

Semi-auto mode is not canceled while semi-auto mode is in operation even if GNSS receiver is under initialization.

When GNSS receiver is under initialization, IMU presumes the machine self position, and keeps updating the design surface data within the set range of time and swing angle. The accuracy of construction may be degraded.

Semi-auto mode is not canceled while this setting is enabled. You can continue to use machine control, but we recommend not to operate the machine until GNSS receiver completes the initialization for safety reasons.

METHOD FOR SETTING GNSS FLUCTUATION REDUCTION FILTER

“GNSS Fluctuation Reduction Filter” can be set to ON or OFF.

1. Select the “GNSS Fluctuation Reduction Filter” (6) on the “Semi-auto Adjustment” setting screen, and press the switch “F6”.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the display to “MC Setting” screen.

F6: Changes the setting of selected item.

“GNSS Fluctuation Reduction Filter” setting screen is displayed.

2. Select ON or OFF of “GNSS Fluctuation Reduction Filter” setting.

It is set to ON when machine is shipped from plant.

REMARK

This function is used to reduce the fluctuation of GNSS coordinates when machine is stopped.

Wobbling of work equipment in semi-auto mode can be reduced.

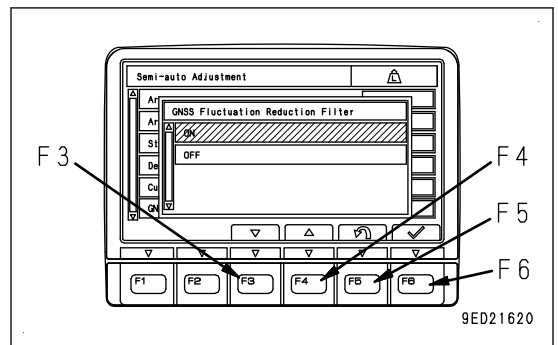
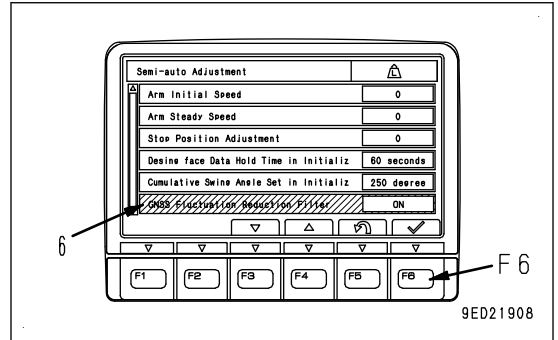
Filtering function automatically stops during swing or travel.

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Cancels the change and returns the display to “MC Setting” screen.

F6: Validates the change and returns the display to “MC Setting” screen.



AUTO TILT BUCKET CONTROL ADJUSTMENT

In Semi-auto limited digging mode, the work equipment movement or the accuracy of operation may vary with the tilt bucket weight.

Optimum control is obtained by changing the setting to be complied with the weight of actual tilt bucket installed. Perform the adjustment of this section if Bucket Weight Setting is changed. The adjustment result is saved by each selected bucket weight.

This adjustment enables the bucket control to be optimum even if the bucket is replaced when the bucket weight is within the same weight setting range.

REMARK

Setting change of this item cannot be performed while Semi-auto limited digging mode is enabled. Change the mode to the manual mode, and perform the setting.

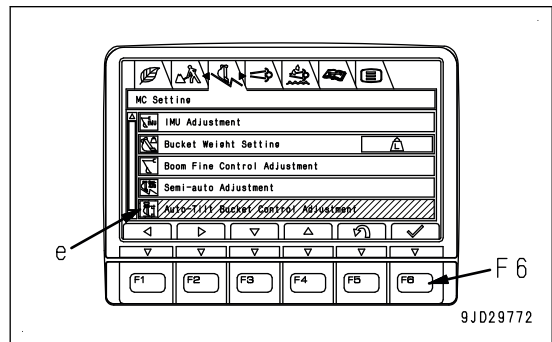
Select Boom Fine Control Adjustment (c) on MC Setting screen, then press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the screen to the standard screen.

F6: Executes the selected item.



METHOD FOR ADJUSTING AUTO TILT BUCKET CONTROL

⚠ WARNING

Auto tilt bucket moves automatically while executing the adjustment. Ensure the safety of the surrounding before starting.

⚠ CAUTION

- Provide a high enough space for the auto tilt bucket not to contact the ground during the tilting operation for calibration.
- Perform "Auto tilt bucket exchange" calibration, and then perform Auto Tilt Bucket Control Adjustment.

REMARK

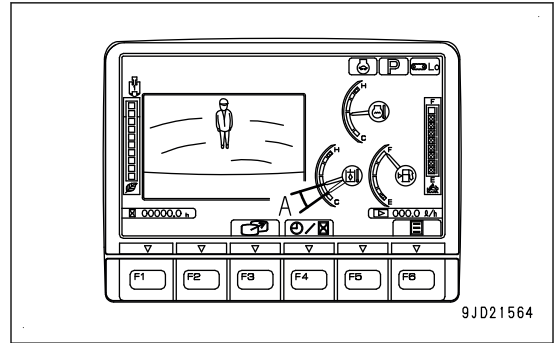
Setting change of this item cannot be performed while Semi-auto limited digging mode is enabled. Change the mode to the manual mode, and perform the setting.

Perform this calibration under the following conditions.

- Set the working mode to ATT/P mode
- Set the fuel control dial to High idle (MAX) position.
- Cancel the auto-deceleration.

- Adjust the hydraulic oil temperature so that it is within the range (A) of the right figure.

Hydraulic oil temperature should be within the range of 40 °C {104 °F} to 60 °C {140 °F} (A) in order to execute the adjustment.



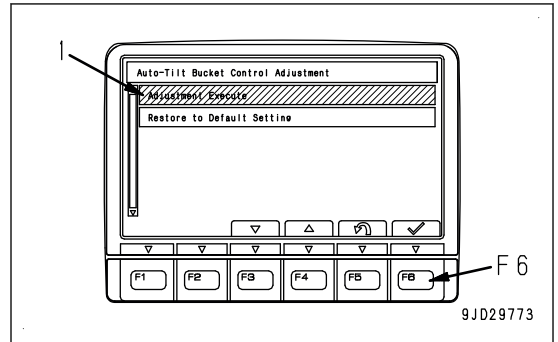
- Select Adjustment Execute (1) on Auto Tilt Bucket Control Adjustment screen of MC Setting, and press the switch "F6".

F3: Moves to the next item (1 line below). When it is on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.

F5: Returns the screen to MC Setting screen.

F6: Executes the selected item.

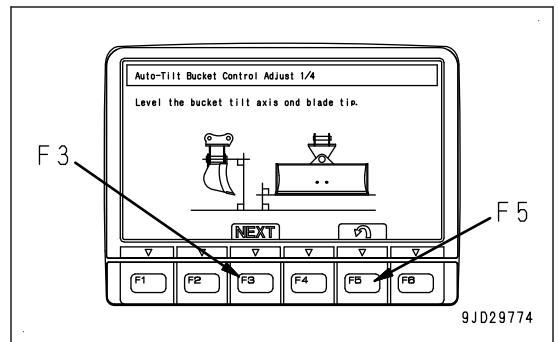


- Move the machine to be the same posture as that displayed on the machine monitor.

Move the machine to be the correct posture, and then press the switch F3.

F3: Proceeds to the next step.

F5: The screen returns to the screen of step 2.



- Check the following and then hold down the switch F1.

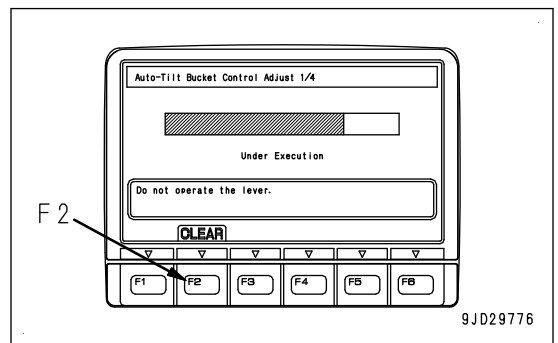
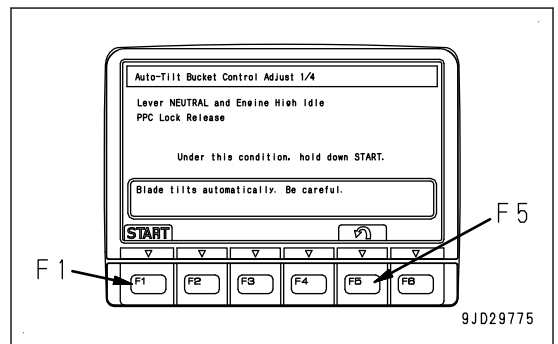
- Set each control lever to NEUTRAL.
- Set the fuel control dial to High Idle (MAX) position.
- Check that the hydraulic oil temperature is within the range of (A) in step 1.
- Set the lock lever to FREE position.
- Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates.

F1: Proceeds to the next step.

F5: The screen returns to the screen of step 3.

Calibration is executed, wait for a while until it is completed.

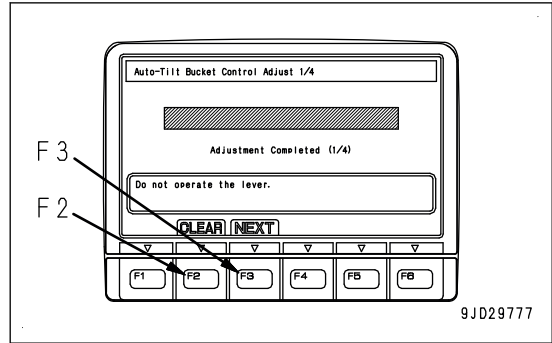
F2: Cancels the adjustment and the screen returns to the screen of step 3.



5. Buzzer sounds and the screen changes to the screen shown in the right figure when the adjustment is completed. Check that the adjustment is completed screen is displayed, and then press the switch "F3".

F2: Cancels the adjustment and returns the screen to the screen of step.

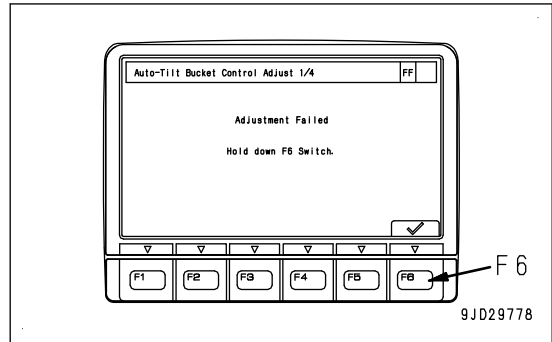
F3: Proceeds to the next step.



REMARK

If the adjustment finishes abnormally, a failure cause code is displayed

Find the cause and perform Auto Tilt BucketControl Adjust-ment again by referring to the failure cause code list.

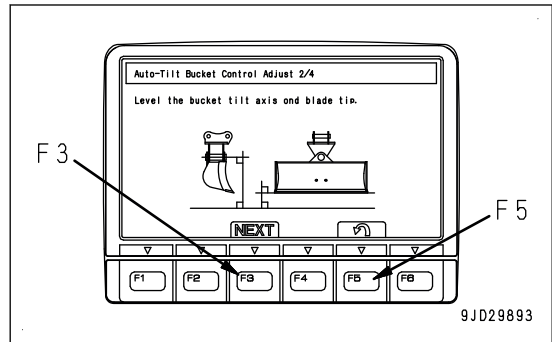


6. Move the machine to be the same posture as that displayed on the machine monitor.

Move the machine to be the correct posture, and then press the switch F3.

F3: Proceeds to the next step.

F5: The screen returns to the screen of step 3.



7. Check the following and then hold down the switch F1.

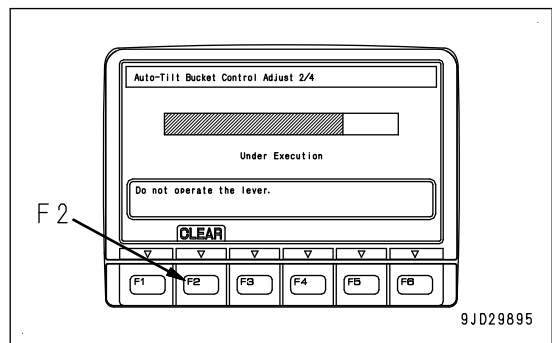
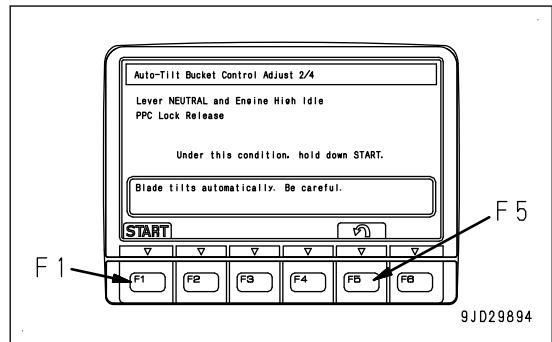
- Set each control lever to NEUTRAL.
- Set the fuel control dial to High idle (MAX) position.
- Check that the hydraulic oil temperature is within the range of (A) in step 1.
- Set the lock lever to FREE position.
- Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates.

F1: Proceeds to the next step.

F5: The screen returns to the screen of step 6.

Calibration is executed, wait for a while until it is completed.

F2: Cancels the adjustment and the screen returns to the screen of step 6.



8. Buzzer sounds and the screen changes to the screen shown in the right figure when the adjustment is completed. Check that the adjustment is completed screen is displayed, and then press the switch “F3”.

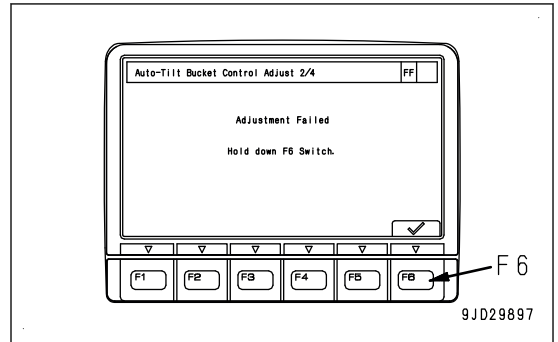
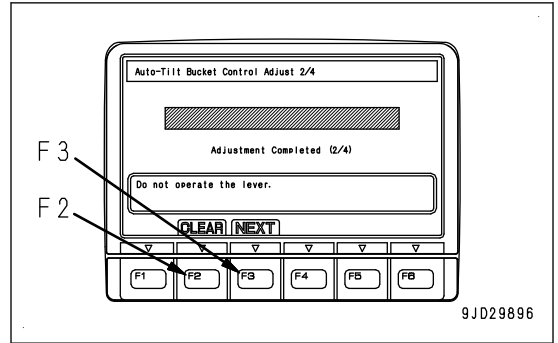
F2: Cancels the adjustment and the screen returns to the screen of step 6.

F3: Proceeds to the next step.

REMARK

If the adjustment finishes abnormally, a failure cause code is displayed

Find the cause and perform Auto Tilt BucketControl Adjustment again by referring to the failure cause code list.

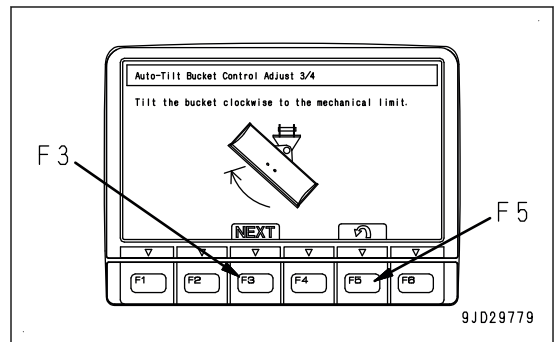


9. Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates. Set the machine to be the same posture as that shown on the machine monitor.

Move the machine to be the correct posture, and then press the switch F3.

F3: Proceeds to the next step.

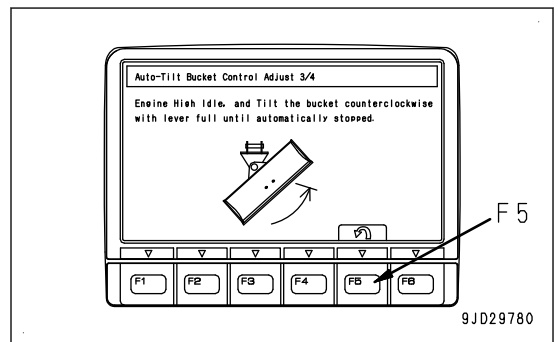
F5: The screen returns to the screen of step 6.



10. Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates. Set the machine to be the same posture as that shown on the machine monitor.

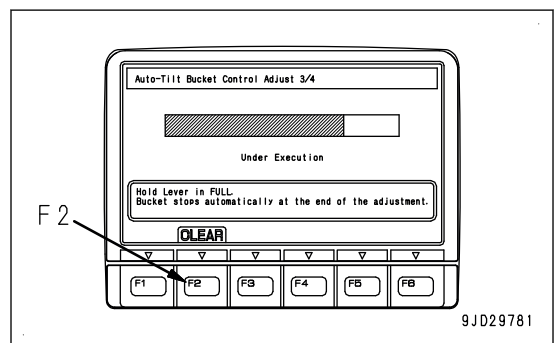
F5: The screen returns to the screen of step 9.

Calibration is executed, wait for a while until it is completed.



Hold the lever fully while Under Adjustment is being displayed.

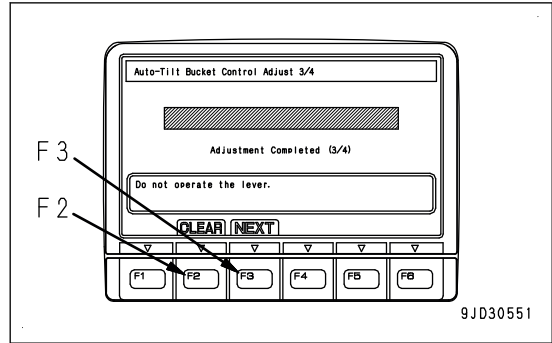
F2: Cancels the adjustment and the screen returns to the screen of step 9.



- Buzzer sounds and the screen changes to the screen shown in the right figure when the adjustment is completed. Check that the adjustment is completed screen is displayed, and then press the switch "F3".

F2: Cancels the adjustment and the screen returns to the screen of step 9.

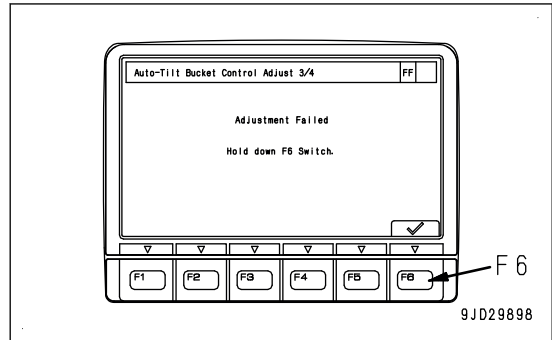
F3: Proceeds to the next step.



REMARK

If the adjustment finishes abnormally, a failure cause code is displayed

Find the cause and perform Auto Tilt BucketControl Adjust-ment again by referring to the failure cause code list.

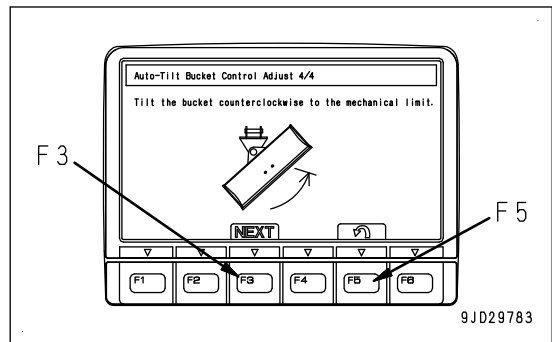


- Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates. Set the machine to be the same posture as that shown on the machine monitor.

Move the machine to be the correct posture, and then press the switch F3.

F3: Proceeds to the next step.

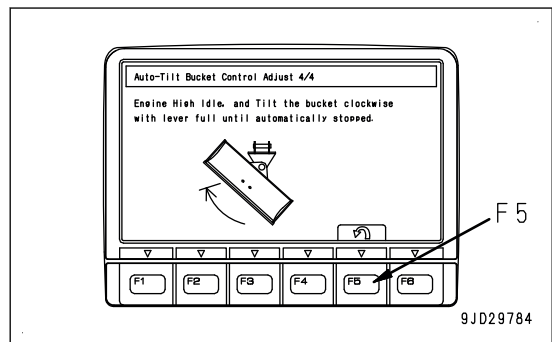
F5: The screen returns to the screen of step 9.



- Check that there is no person in the area around the machine and no obstacle in the area where the auto tilt bucket operates. Set the machine to be the same posture as that shown on the machine monitor.

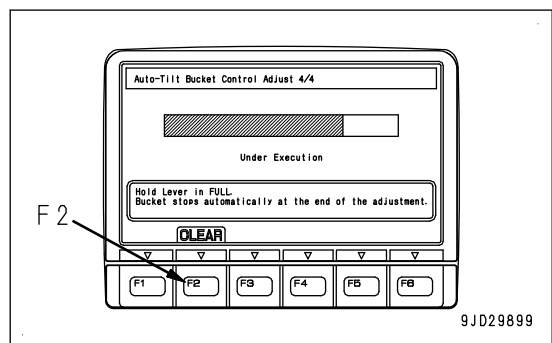
F5: The screen returns to the screen of step 12.

Calibration is executed, wait for a while until it is completed.



Hold the lever fully while Under Adjustment is being displayed.

F2: Cancels the adjustment and the screen returns to the screen of step 12.



14. Buzzer sounds and the screen changes to the screen shown in the right figure when the adjustment is completed. Check that the adjustment is completed screen is displayed, and then press the switch "F3".

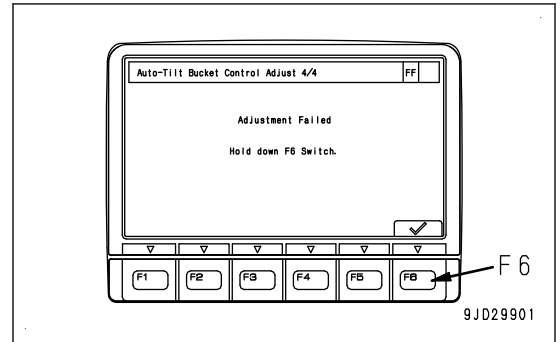
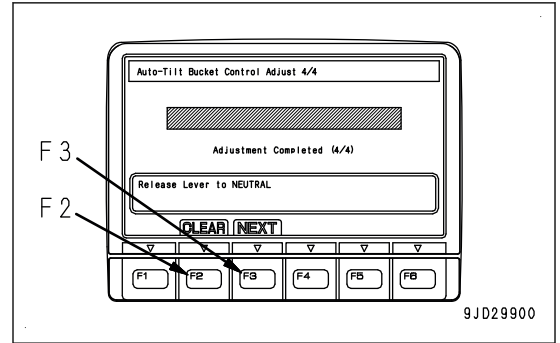
F2: Cancels the adjustment and the screen returns to the screen of step 12.

F3: Proceeds to the next step.

REMARK

If the adjustment finishes abnormally, a failure cause code is displayed

Find the cause and perform Auto Tilt BucketControl Adjustment again by referring to the failure cause code list.



Failure cause code list

Cause code	Content	Action
A-1	Engine speed signal is 0 rpm.	Check that the engine starts.
A-2	Hydraulic oil temperature is low.	Check that the hydraulic oil temperature is (40 °C {104 °F} or more).
A-3	Hydraulic oil temperature is high.	Check the hydraulic oil temperature is (60 °C {140 °F} or less).
A-4	Overheating	Check that it is overheated.
A-A	CAN communication is faulty.	Ask your Komatsu distributor for the inspection and maintenance.
B-3	Control lever is not in NEUTRAL.	Set the control lever to NEUTRAL.
C-3	Fuel control dial is not set to High idle (MAX) position.	Set the fuel control dial to High idle (MAX) position.
E-B	The bucket which is installed is not the auto tilt bucket.	Install the auto tilt bucket.
E-C	Working mode is not ATT/P.	Set the working mode to ATT/P mode.
SJ-6	Stroke sensor system for bucket tilt cylinder is abnormal	Ask your Komatsu distributor for the inspection and maintenance.
WB-7	ATT1PPC pressure sensor (R.H.) malfunction	Ask your Komatsu distributor for the inspection and maintenance.
WB-8	ATT1PPC pressure sensor (L.H.) malfunction	Ask your Komatsu distributor for the inspection and maintenance.
WF-7	EPC command current insufficiency	<ol style="list-style-type: none"> 1. Perform the setting for flow rate. For details, see "AUTO TILT BUCKET FLOW SETTING". 2. If there is nothing wrong with the flow rate setting, re-adjustment is necessary for the lever. Ask your Komatsu distributor for inspection and maintenance.
WH-7	Engine speed is not set in High idle (MAX) position.	Check that the engine speed is set in High idle (MAX) position.
WH-8	PPC source pressure is low.	Hydraulic system abnormality may be occurring. Ask your Komatsu distributor for the inspection and maintenance.
WJ-3	ATT1 drive EPC system error	Electric system error may be occurring. Ask your Komatsu distributor for the inspection and maintenance.
WJ-4	ATT1 drive lever potentiometer system error	Electric system error may be occurring. Ask your Komatsu distributor for the inspection and maintenance.
FF	Obtained calibration value is out of normal range.	Perform the calibration again.

EXECUTIONS

SEMI-AUTO MODE

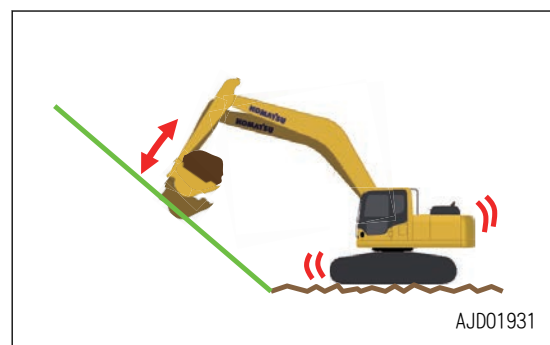
PRECAUTIONS FOR OPERATION

⚠ WARNING

- Semi-auto mode is the function to limit the range of digging automatically. For this reason, the work equipment may not move as operator intended even if the operator moves the work equipment to avoid the danger. Operate the machine with great care.
Do not use the semi-auto function to avoid the danger since it may worsen the situation.
- The work equipment automatically stops so that it does not dig deeper in the design data during the semi-auto mode. For this reason, you may not able to lower the bucket to the ground, that is, action to avoid the danger, in order to support the machine inclining. Observe the precautions for operation, and do not rush when operating the machine.
- Semi-auto mode controls the movement of the work equipment (boom, arm, and bucket), and does not control the swing and travel attachment. (Movements of some attachments such as auto tilt bucket, are controlled partially.)
However, the semi-auto mode is still in operation when you swing the upper structure while operating the work equipment. Operate the machine with great care.
The semi-auto mode becomes waiting state and does not operate when the machine travels.
- If the bucket goes out of the design data, warning message of Out of design area... is displayed on the control box, and machine becomes waiting state for semi-auto mode.
The work equipment moves as operator intended when the machine is waiting state for semi-auto mode. However, the semi-auto mode is executed if the machine returns to the area of the design data. Operate the machine with great care.
- If the control box freezes, stop the operation, lower the work equipment to the ground, set the lock lever to LOCK position, and then restart the control box.
- If the work equipment makes abnormal behavior, release the work equipment control lever, and set the lock lever to LOCK position. Work equipment stops.

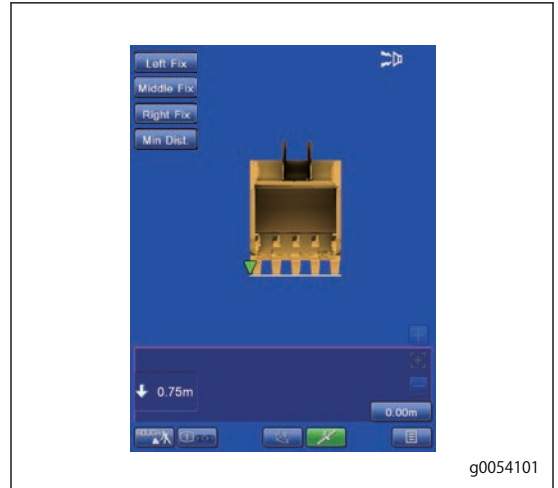
NOTICE

- Perform the warm-up operation sufficiently for starting the work when the ambient temperature is low. The accuracy of construction may becomes poor if the warm-up operation is insufficient.
- The accuracy of construction may become poor when the soil is hard or bucket load is large.
- The accuracy of construction may be lowered depending on the communication state of GNSS.
- Check that the working mode is any of P, E, ATT/P, and ATT/E mode when using the semi-auto mode.
- The guidance is displayed on the control box by calculating the distance between bucket edge and the design data, therefore, even if the bucket bottom face exceeds the design data, guidance is not displayed.
Semi-auto mode controls the operation so that not only the bucket edge but also the outline of bucket does not exceed the design data.
- Stop control by tilting operation (tilting angle auto stop control) is a control that controls the blade tip not to dig deeper than the design surface when the auto tilt bucket is installed.



1. The machine may behave unexpectedly if the bucket edge selection is not proper.

For setting the blade tip selection, see METHOD FOR SETTING ROUGH DIGGING SCREEN.



2. When the work equipment is moved from the place out of the design data to the place of the design data (For example: Operation of swing and boom lowering is performed simultaneously)

- The work equipment decelerates sharply or stops suddenly at any height of position and creates the shock after the bucket enters the design data (A).
- The machine digs too much with bucket edge or bucket bottom face after the bucket enters the design data (A).

3. The machine may dig too much in the design data with bucket edge or bucket bottom face when the machine rocks largely on the rough ground, but it is not an abnormality.

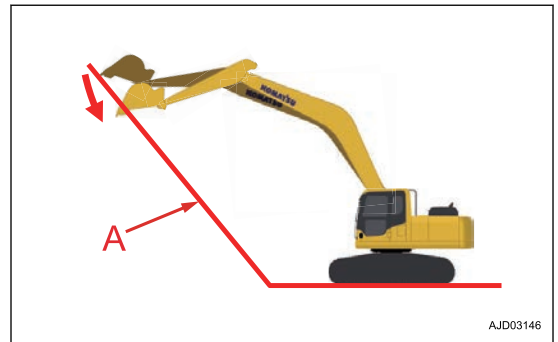
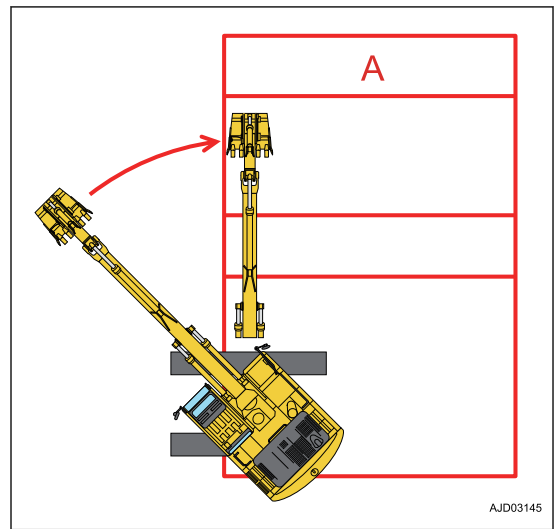
Operate the work equipment lever slowly for accurate finishing.

Stop position adjustment function is provided in order to adjust the digging amount of the auto stop control. For details, see SEMI-AUTO ADJUSTMENT.

Semi-auto mode changes to manual mode when the digging amount is 500 mm {1 ft 8 in} or more.

Create the design surface 500 mm {1 ft 8 in} or more away from the pipe when there is a buried pipe such as water pipe, or gas pipe, or high-voltage pipe in the jobsite so that the operation will be easy as the risk to damage the buried pipe is lowered.

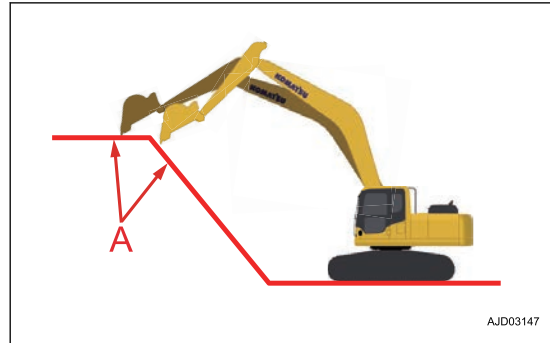
4. The machine may dig too much in the design data (A) with bucket edge or bucket bottom face if you start digging from the place near the MAX reach.



5. When an operation is performed at near the point where the angle of the design data (A) changes

The machine may dig too much with bucket edge or bucket bottom face.

The accuracy of construction may improve by operating the work equipment lever slowly.



- The bucket edge may change unexpectedly or shock may occur if the boom is lowered during arm OUT operation at near the design data. (for example, in reverse scraping operation)

PRECAUTIONS FOR REPLACING PARTS AND FAILURES

NOTICE

- **Calibration is needed if the boom, arm, or bucket is replaced. In such a case, consult your Komatsu distributor.**
- **Do not remove, install, disassemble, and modify a sensor. This may cause an malfunction of semi-auto mode. Ask your Komatsu distributor for this work to be performed.**
- **If sensor is hit or damaged, check if the semi-auto mode operates normally. If any problem is found, ask your Komatsu distributor for repair.**

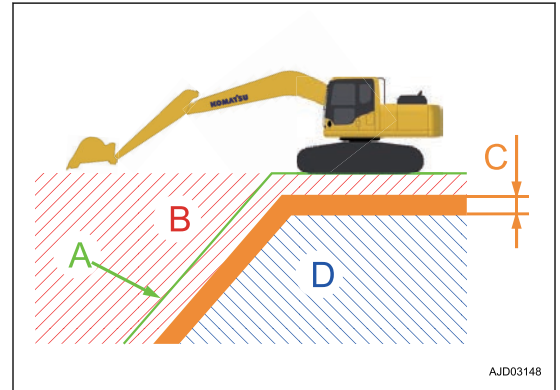
WORKING MODE

You can switch between semi-auto mode and manual mode by using the auto/manual switch on the control box and the control lever.

Semi-auto mode

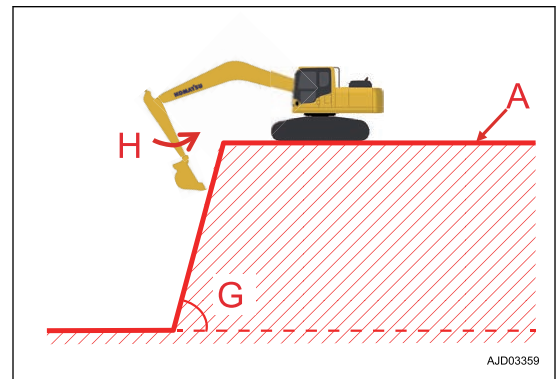
Semi-auto mode performs the following controls automatically.

Auto grade assist (when the arm is operated)



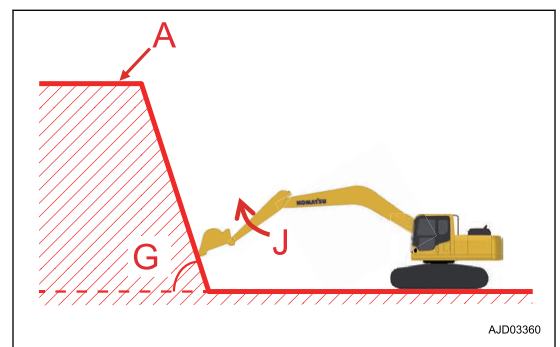
- The boom automatically rises so that the bucket does not dig deeper than the design data(A) when arm is operated.
The boom rises as needed even if the operator performs boom LOWER operation.
This controls not only the bucket edge but also the outline of the bucket not to dig deeper than the design data. (minimum distance control)

- This control is applied to the slope design surface (A) in which the angle (G) is less than 70°. On the slope design surface in which the angle (G) is 70° or more, the working mode becomes auto stop control when arm IN operation (H), and it automatically stops the work equipment not to dig deeper than the design surface (A).



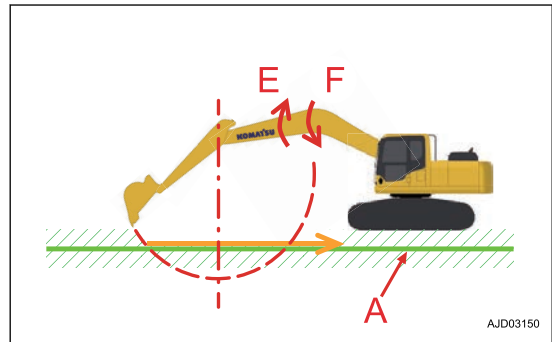
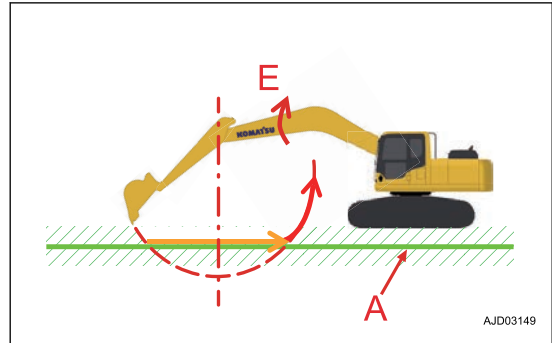
- The working mode becomes the manual mode for the slope surface in which the angle (G) is 70° or more when arm OUT (J) is operated.
(The working mode becomes the auto stop control when bucket operation or boom LOWER is operated.)

- The operation differs depending on the amount of digging if the bucket digs in the design data (A).
(B) Less than 300 mm {1 ft 0 in}: Machine operates not to dig in with the auto grade assist.
(C) 300 mm {1 ft 0 in} or more and less than 500 mm {1 ft 8 in} : Auto grade assist operates.
(D) 500 mm {1 ft 8 in} or more: Manual mode operates.



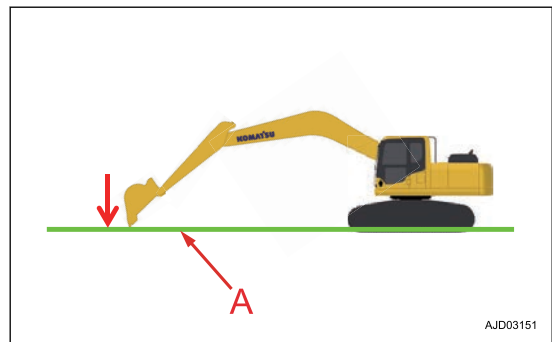
At finishing

- (E): Operation can be performed by the arm control lever only.
- (F): By operating arm control lever with boom LOWER control lever, you can move the bucket edge along to the design data for all working area.



Auto stop control (in boom LOWER and bucket operation)

- When boom LOWER or bucket is operated, this automatically stops the work equipment to prevent the bucket from digging in the design data (A). This controls not only the bucket edge but also the outline of the bucket not to dig deeper than the design data. (minimum distance control)
- The operation differs depending on the amount of digging if the bucket digs in the design data (A).
Less than 500 mm {1 ft 8 in} : Auto stop control operates.
500 mm {1 ft 8 in} or more: Manual mode operates.

**Manual mode**

The machine operates as same as operator's control.

In manual mode, even if the bucket edge exceeds the design data, automatic control of the work equipment is not performed. Be careful not to dig in too much.

WORKING MODE (WHEN AUTO TILT BUCKET IS EQUIPPED)

Semi-auto mode

Auto stop control and auto grade assist control, and the control below are performed automatically in the semi-auto mode when the auto tilt bucket is installed.

Tilt stop control (in tilt bucket operation)

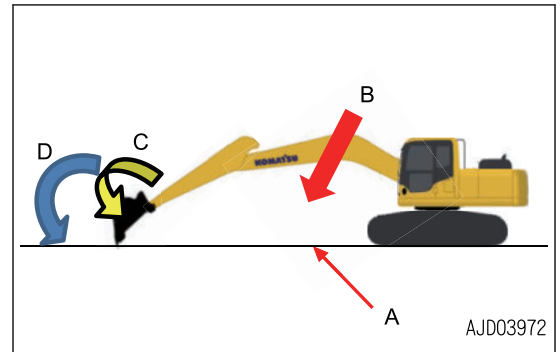
- When tilt bucket is operated, this automatically stops the work equipment to prevent the tilt bucket from digging in the design data (A).
- Performing the boom LOWER and tilting operation of the tilt bucket simultaneously makes the blade tip of the tilt bucket easily move along the design surface.

(A) Surface

(B) Boom operation

(C) Tilting operation

(D) Bucket operation



REMARK

- Tilt control controls the blade tip not to dig deeper than the design surface.
- Operate the tilt operation slowly near the inflexion point.

Method for operating work equipment

The L.H. work equipment control lever is used to operate the arm and upper structure.

Arm operation

(a): Arm OUT

(b): Arm IN

Swing operation

(c): Swing RIGHT

(d): Swing LEFT

N (NEUTRAL)

The upper structure and arm are held in position and do not move.

The R.H. work equipment control lever is used to operate the boom and bucket.

Boom operation

(e): Boom RAISE

(f): Boom LOWER

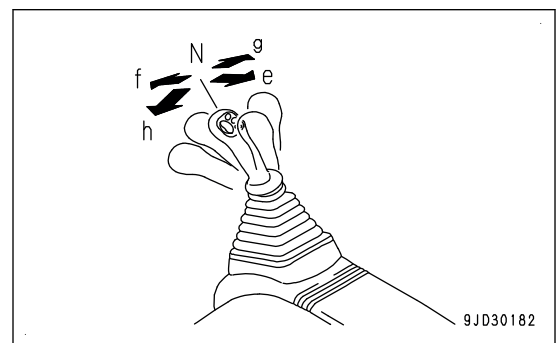
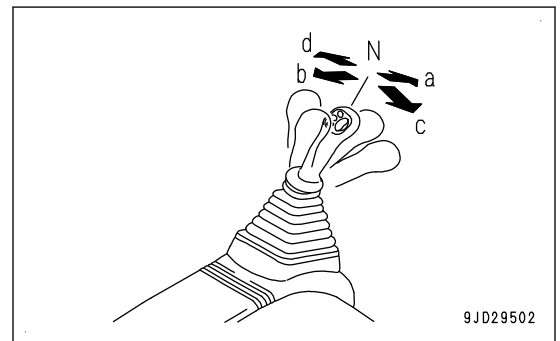
Bucket operation

(g): Bucket DUMP

(h): Bucket CURL

N (NEUTRAL)

The boom and bucket are held in position and do not move.



Operate the proportional control lever of the R.H. work equipment control lever for tilt operation.

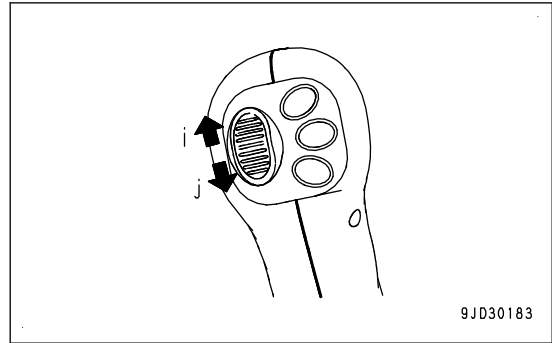
Tilting operation

(i): Tilt counterclockwise

(j): Tilt clockwise

REMARK

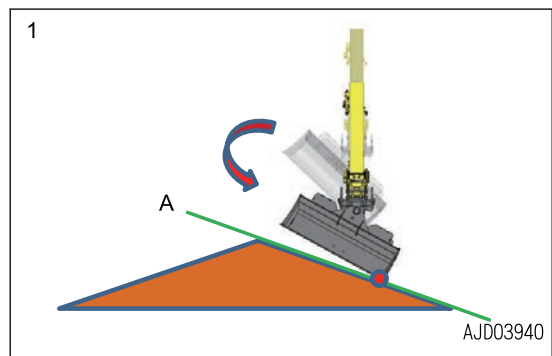
The description of "clockwise" and "counterclockwise" for tilt operation is operator's point of view from the cab.



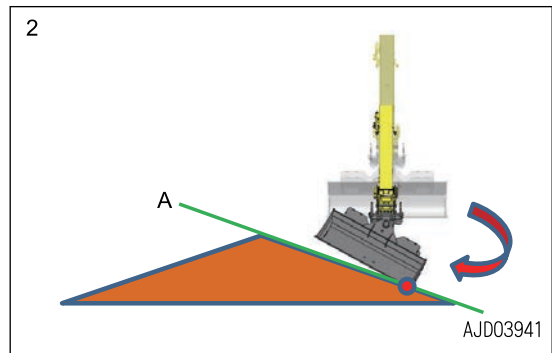
When tilt operation is operated singly

When tilt bucket is operated, this automatically stops the work equipment to prevent the tilt bucket from digging in the design data (A).

Counterclockwise tilt operation (i)



Clockwise tilt operation (j)



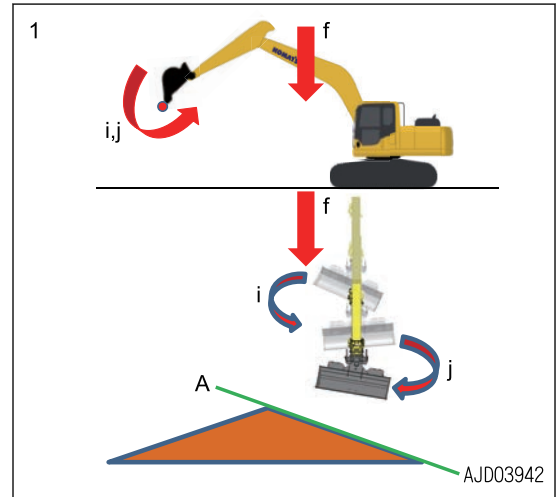
When performing the combined operation (performing the boom LOWER and tilt operation simultaneously)

Slowly operate the tilt operation while performing the boom LOWER in the direction for the blade tip and the design surface to be in parallel. Then the tilt movement automatically stops when the blade tip is in parallel with the design surface.

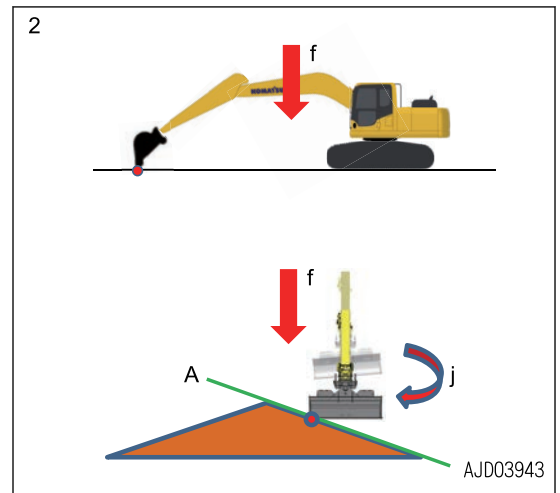
If the speed of tilt operation is too fast, the blade tip may not be in parallel with the design surface. In such a case, maintain the boom LOWER operation, and slowly operate tilt operation (clockwise and counterclockwise). When the blade tip is in parallel with the design surface, the bucket does not tilt even when performing the tilt operation.

(Example1)

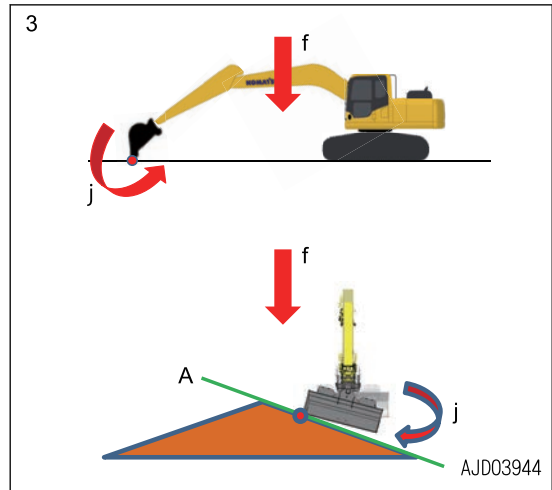
1. Perform clockwise tilt operation (j) and counterclockwise tilt operation (i) while performing boom LOWER (f) operation.



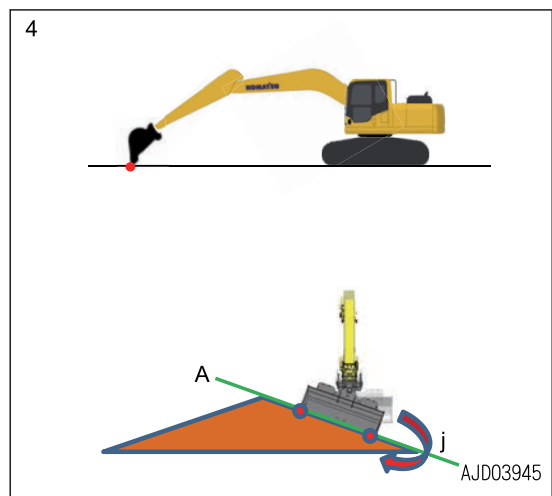
2. The work equipment stops automatically when the blade tip reaches the design surface (A) not to dig deeper than that.



- 3. Perform the counterclockwise tilt operation (j) while performing the boom LOWER (f) operation.

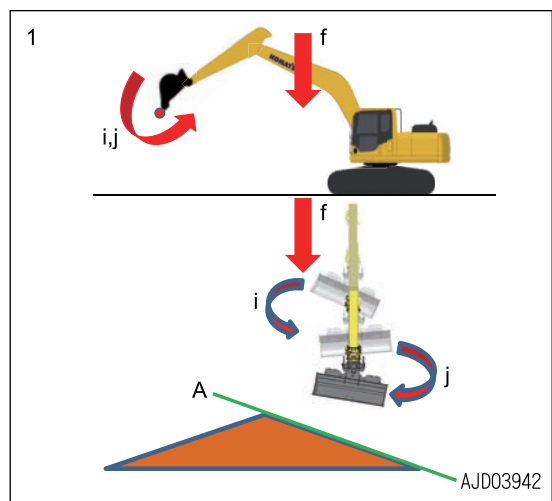


- 4. Tilt movement automatically stops when it is in parallel with the design surface (A).

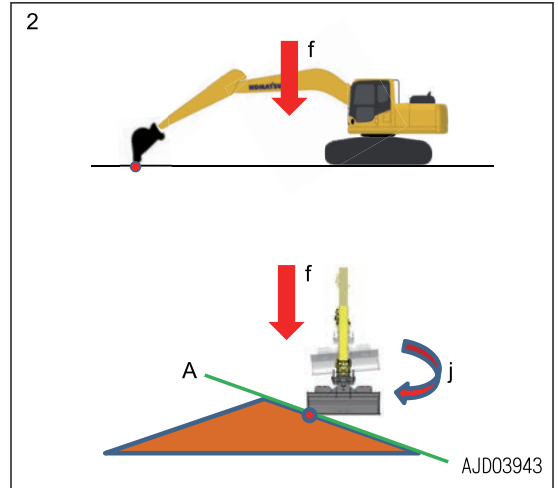


(Example2)

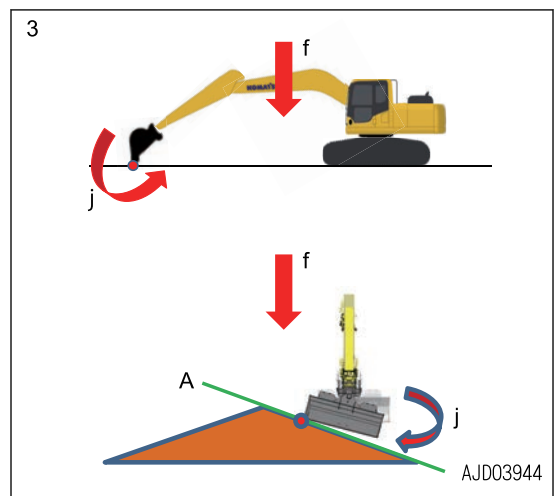
- 1. Perform clockwise tilt operation (j) and counterclockwise tilt operation (i) while performing boom LOWER (f) operation.



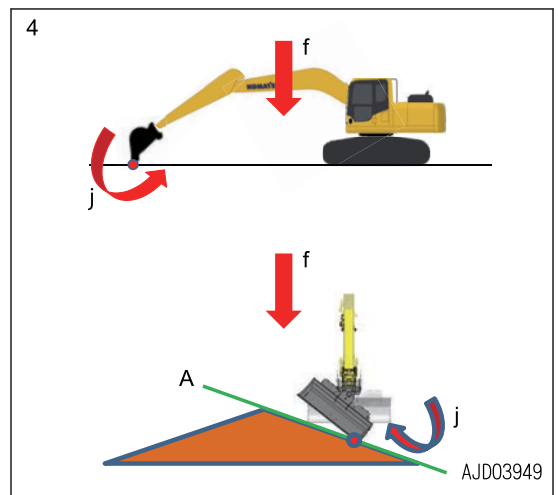
- The work equipment stops automatically when the blade tip reaches the design surface (A) not to dig deeper than that.



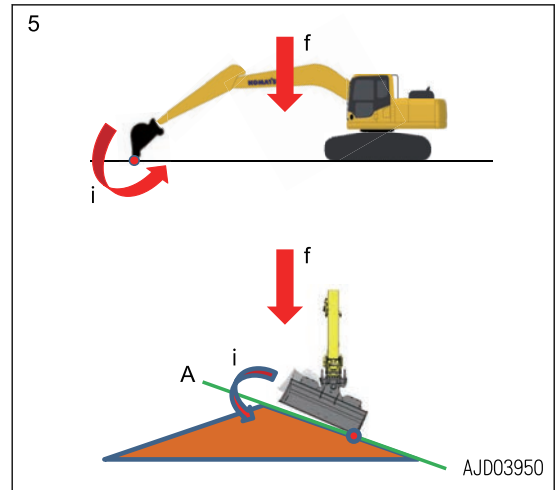
- Perform the counterclockwise tilt operation (j) while performing the boom LOWER (f) operation.



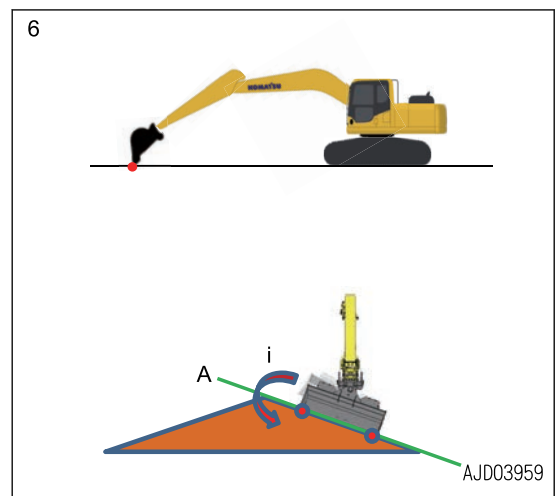
- If the speed of clockwise tilt operation (j) is too fast, the blade tip may not be in parallel with the design surface (A).



5. In such a case, slowly perform the counterclockwise tilt operation (i).



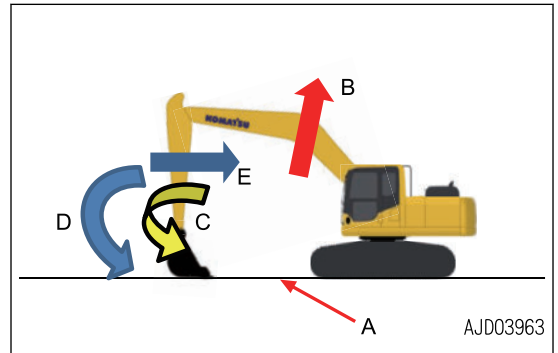
6. Tilt movement automatically stops when the blade tip is in parallel with the design surface (A).



Tilt grading assist (when tilt bucket is operated and arm is operated)

Digging and scooping work can be performed by moving the blade tip along the design surface.

- (A) Surface
- (B) Boom operation
- (C) Tilting operation
- (D) Bucket operation
- (E) Arm operation



REMARK

- Tilt control controls the blade tip not to dig deeper than the design surface.
- Operate the tilt operation slowly near the inflexion point.

When performing the combined operation (performing the arm IN and tilt operation simultaneously)

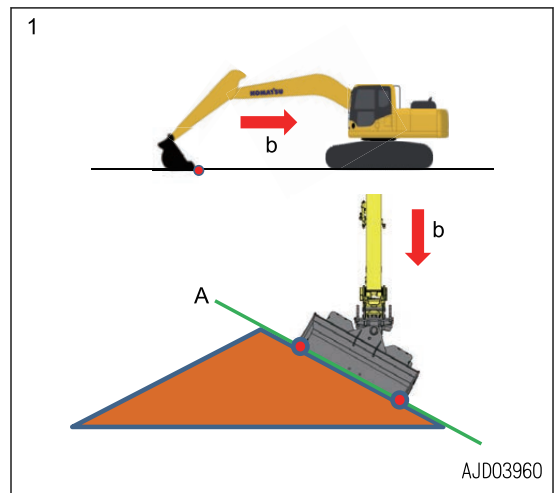
Slowly operate the tilt operation while performing the arm IN in the direction for the blade tip and the design surface to be in parallel. Then the tilt movement automatically stops when the blade tip is in parallel with the design surface.

If the tilt operation is kept performed in the one direction after the blade tip is parallel with the design surface, the tilt bucket rotates slightly, and the blade tip comes off from the design surface.

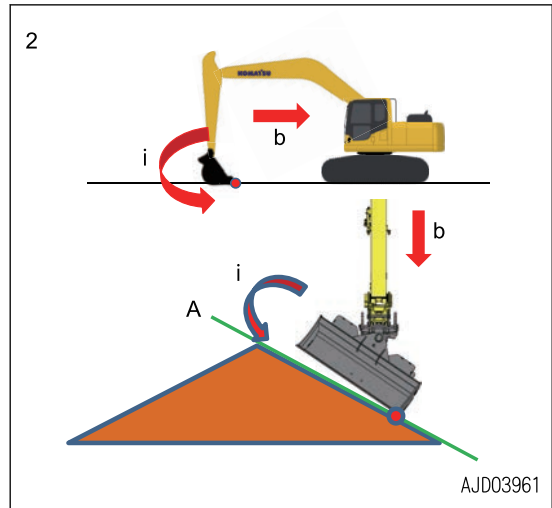
Adjust the tilting direction so that the blade tip is in parallel with the design surface.

(Example1)

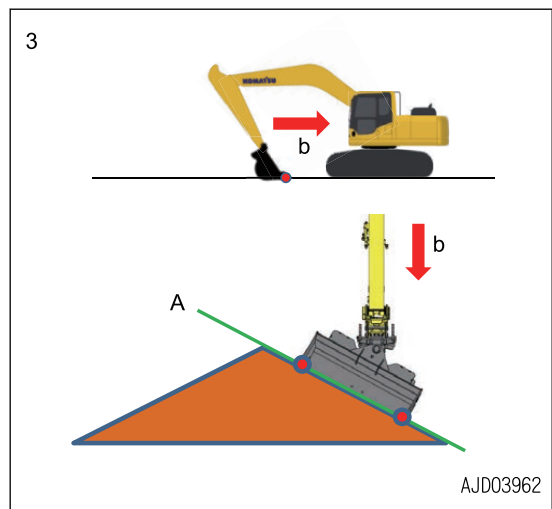
1. Perform the arm IN operation (b).



- 2. When the blade tip comes off from the design surface (A) as shown in the figure, perform counterclockwise tilt operation (i) while performing the arm IN operation (b).

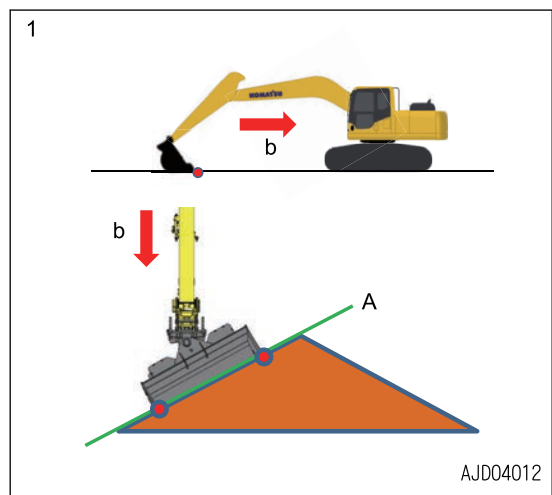


- 3. Perform the arm IN operation (b) as performing the tilt operation so that the blade tip moves along the design surface.

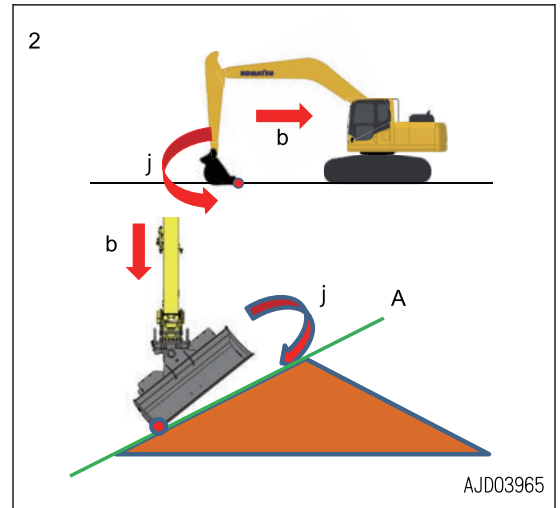


(Example2)

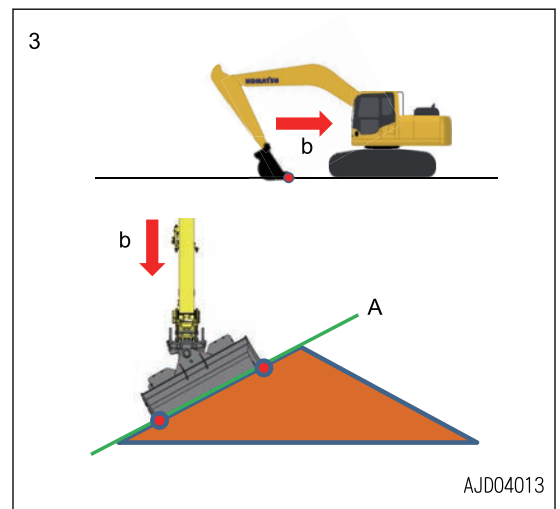
- 1. Perform the arm IN operation (b).



- When the blade tip comes off from the design surface (A) as shown in the figure, perform clockwise tilt operation (j) while performing the arm IN operation (b).



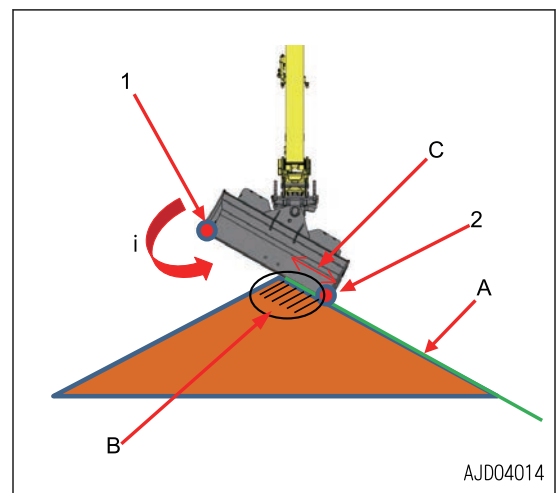
- Perform the arm IN operation (b) as performing the tilt operation so that the blade tip moves along the design surface.



Tilt stop control and tilt assist control

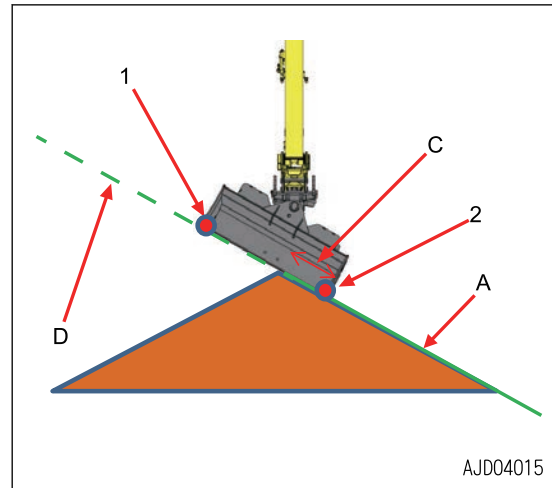
When performing the construction of the part (B) shown in the figure, tilting is controlled if the one third (C) of the bucket width is on the design surface (A).

- Bucket edge at left end
- Bucket edge at right end



The design surface (A) is extended, and it controls the blade tip not to dig deeper than the extended design surface (D), and not to let the bucket tilt counterclockwise (i).

If the design surface is to be changed, perform the boom RAISE operation, and start the work again.



SEMI-AUTO MODE SETTINGS

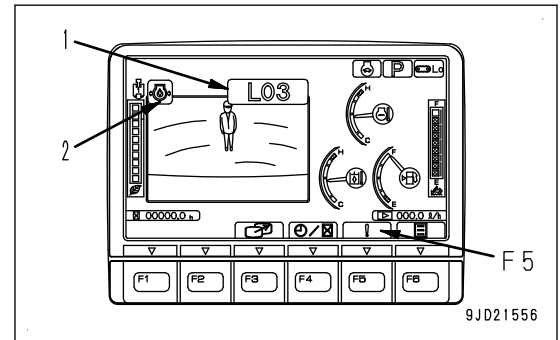
The following is the procedure for shifting the semi-auto mode and manual mode.

METHOD FOR SWITCHING TO SEMI-AUTO MODE

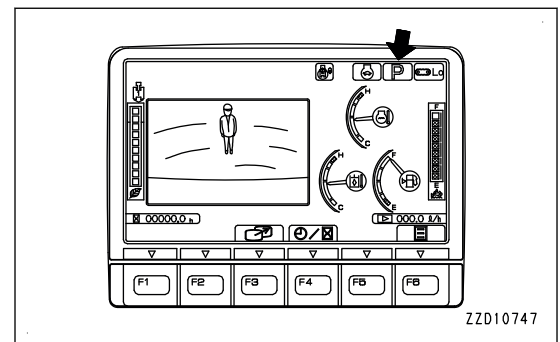
Semi-auto mode is valid only after the calibration is completed.

For the calibration, see "OUTLINE OF CALIBRATION".

1. Check that the engine is started.
2. Move the machine to a gentle slopes or level ground if the machine is on a steep slopes.
3. Check that neither the action level display (1) nor caution lamp (2) is displayed on the machine monitor.



4. Check with the machine monitor that the working mode is any of P, E, ATT/P, and ATT/E mode.



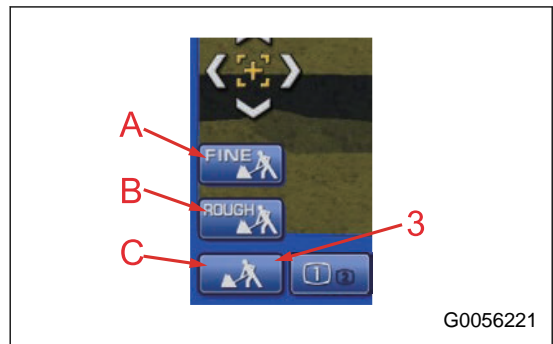
5. Check that the control box has been started normally.
Also, check that no warning message is displayed on the control box.



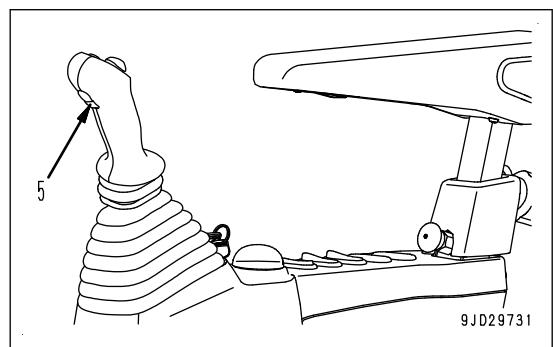
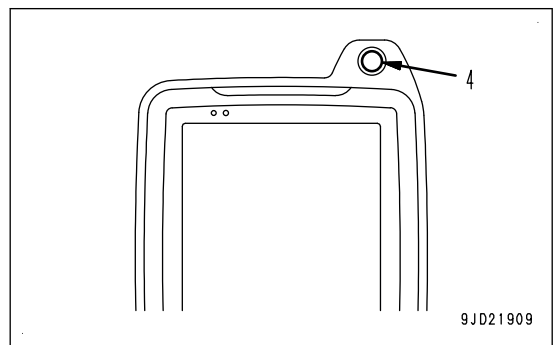
- 6. Check that the work equipment is on the design data.
(Check that warning message of “Out of design area...” is not displayed on the control box.)
- 7. Check that all control levers are at NEUTRAL position.



- 8. Tap “Mode selection” button (3) on the control box, and select either “Fine Digging” working mode (A) or “Rough Digging” working mode (B).
Semi-auto mode is not available if the travel mode (C) is selected.

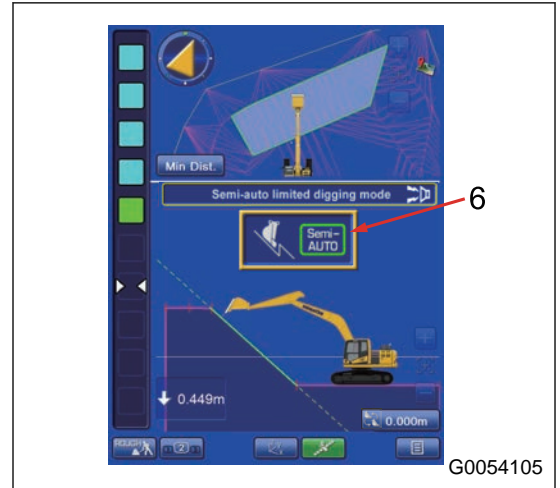


- 9. Press the auto/manual switch (4) on the top of the control box or the auto/manual switch (5) on the R.H. work equipment control lever.
Be sure to check that the tilting angle is stabilized, and then press the auto/manual switch (4) or (5) when the tilt bucket is installed.



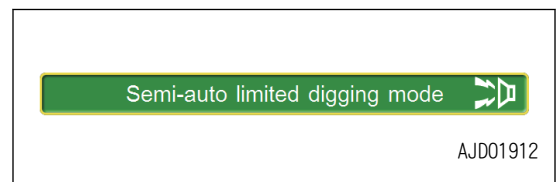
The symbol (6) indicating semi-auto mode is displayed on the screen of control box, and voice signal sounds when the semi-auto mode is selected.

The symbol (6) indicating semi-auto mode is displayed for a certain time, and then it is automatically cleared.

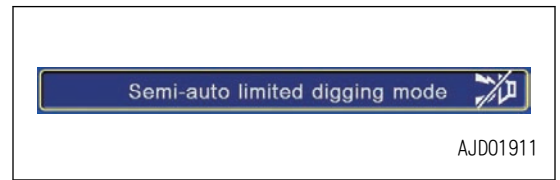


G0054105

- A bar of “semi-auto limited digging mode” with a symbol indicating that it is enabled is displayed on the screen of control box when the semi-auto mode is operating.
(the bar displayed in green, frame flashes in yellow)
- A bar of “semi-auto limited digging mode” with a symbol indicating that it is disabled is displayed on the screen of control box when the automatic control is not operating in semi-auto mode setting.
(the bar displayed in blue, frame flashes in yellow)



AJD01912



AJD01911

LIST OF RESTRICTED ITEMS DURING SEMI-AUTO MODE


















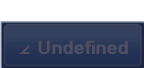

While the semi-auto limited digging mode is set, a part of function of control box is restricted.

(The icon of the unavailable function turns its color to gray and becomes invalid.)



G0054106

Type of icon	Display of icon when it is available (Valid)	Display of icon when it is restricted (Not active)	Manual mode	Semi-auto limited digging mode		
				Waiting		Operating
				Lever is in NEUTRAL.	Lever is operated.	
Menu			Available	Restricted	Restricted	Restricted

Type of icon	Display of icon when it is available (Valid)	Display of icon when it is restricted (Not active)	Manual mode	Semi-auto limited digging mode		
				Waiting		Operating
				Lever is in NEUTRAL.	Lever is operated.	
GNSS state			Available	Restricted	Restricted	Restricted
Information of blade edge position			Available	Restricted	Restricted	Restricted
Pop-up map display			Available	Available	Restricted	Restricted
Measure and record position			Available	Available	Restricted	Restricted
Task detail menu			Available	Available	Restricted	Restricted
Tilt sensor			Available	Restricted	Restricted	Restricted
Design data offset (value)			Available	Available	Restricted	Restricted
Design data offset (vertical)			Available	Restricted	Restricted	Restricted
Control surface offset			Available	Available	Restricted	Restricted
Creation of temporary design surface			Available	Available	Restricted	Restricted
Design data selection	-	-	Available	Restricted	Restricted	Restricted
Bucket edge position selection			Available	Restricted	Restricted	Restricted
Shortcut for bucket exchange		(Non-display)	Available	Restricted	Restricted	Restricted

METHOD FOR ADJUSTING CONTROL SURFACE OFFSET

Tap the Control Surface offset button.
Offset menu pops up.

You can offset the design surface as an effective surface to control with this menu only when the semi-auto limited digging mode settings is set.

REMARK

On the Control Surface offset, you can select from the Vertical or the Vertical to Surface.

When you do the Vertical offset to the design surface, tap the Vertical set button (A). When you do the Vertical to Surface offset to the design surface, tap the Vertical to Surface set button (B).

Digging area is restricted by regarding offset surface as surface to control when the semi-auto limited digging mode is set,

(1) "Offset limitation"

The offset value is adjusted with Δ and ∇ buttons.

Tap the numeric value column and numeric keypad pops up. You can input the offset value directly with this.

(2) "Increment step"

The range of offset is set.

(3) "Match"

Calculates the offset quantity automatically to let the offset surface come to the current bucket edge position.

(4) ENTER button

Tap this button and content of change is saved.

(5) RETURN button

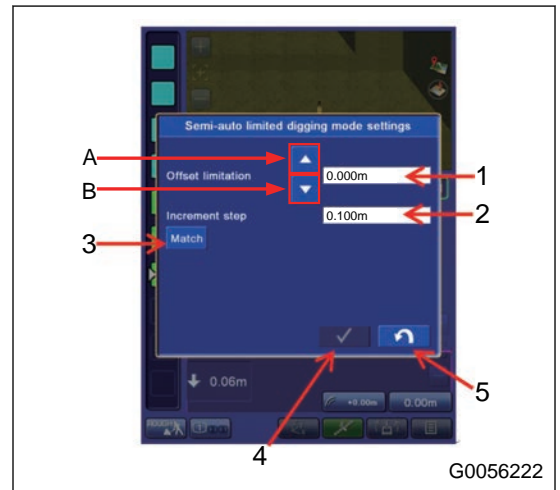
Tap this button and the screen goes back to the previous screen.

REMARK

When the Control Surface is offset, the screen is shown as in the figure.



AJD02919



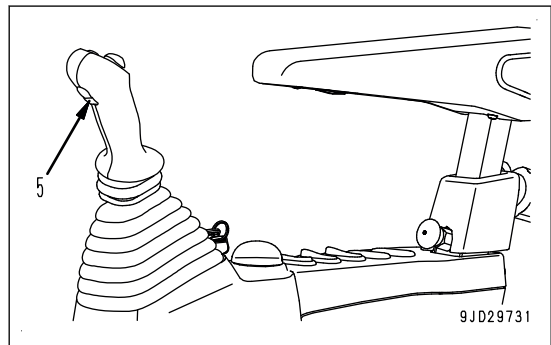
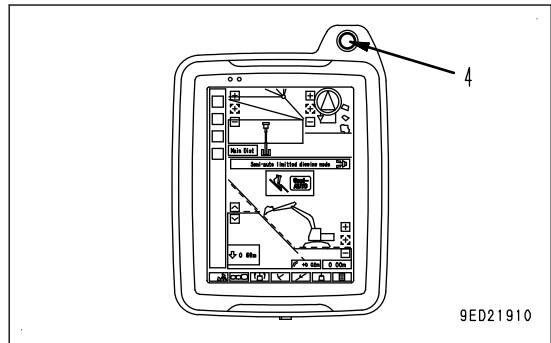
G0056222



AJD02921

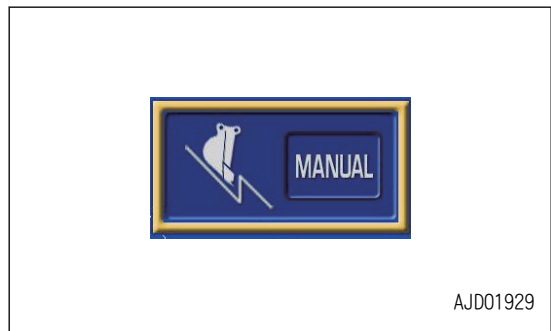
METHOD FOR SWITCHING TO MANUAL MODE

Press the auto/manual switch (4) on the top of the control box or the auto/manual switch (5) on the R.H. work equipment control lever.



Symbol indicating the manual mode is displayed on the screen of control box, and audio signal sounds when the manual mode is selected.

The symbol indicating the manual mode is displayed for a certain time, and then it is automatically cleared.



TRAVEL MODE

Use the Travel mode when machine travels in the job site.

TRAVEL MODE SETTINGS

Tap the button (1) at bottom left of the working screen, and button pops up. Tap the button (1) and select Travel mode.

Tap the button (2) to switch the display between the screen set in "Driving1" and the screen set in "Driving2".

REMARK

Semi-auto mode cannot be used when the travel mode is selected.



G0054108

DISPLAY OF TRAVEL MODE

(1) Azimuth angle compass

It shows the direction. Red arrow direction is north.

(2) Zoom in, zoom out key

Zoom in or zoom out the screen by tapping this key.

Tap the center (5) of scroll key, and the view returns to the default position.

(3) Scroll key

Tap the machine while the 3D view is displayed, and the scroll key is displayed.

Tap the outside part (4) of scroll key, and the display area scrolls.

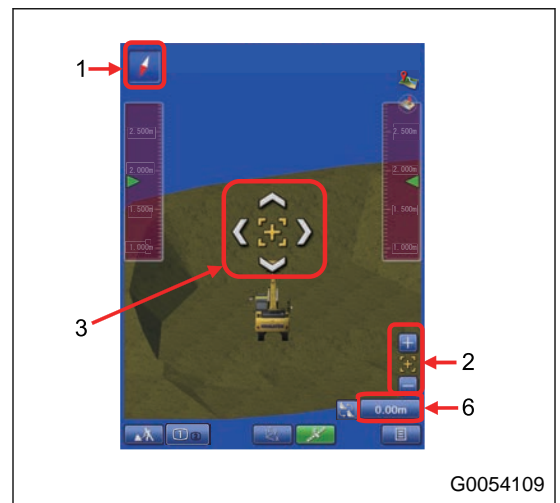
Tap the center (5) of scroll key, and the view returns to the default position.

Tap the any position other than the scroll key to set the scroll key to Non-display.

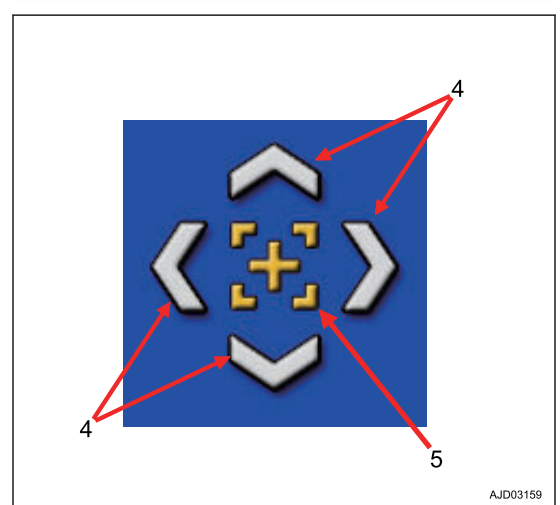
(6) Design data offset

Tap this button, and the design data offset menu (Adjust elevation menu) pops up.

The design data can be offset vertically (up and down) by inputting the value in the design data offset menu.



G0054109



AJD03159

OFFSET MENU OF SURFACE

(1) "Elevation (left edge)"

The height (elevation) of bucket edge at left end is shown.

(2) "Elevation (right edge)"

The height (elevation) of bucket edge at right end is shown.

(3) "Elevation set point"

The offset value is adjusted with Δ and ∇ buttons.

(4) "Increment step"

The range of offset is set.

(5) "Match"

The current bucket edge height is set to 0.

The offset quantity is automatically calculated to let the distance between the bucket edge and the design data become 0.

You can select the bucket edge position from "Left", "Middle", and "Right" after you tap "Match" button.

(6) "Zero"

The offset volume goes back to 0 (default value).

(7) "Offset preset"

You can register 3 points of the offset value.

Tap "Apply" button and you can set the registered offset value.

(8) "Button switch mode"

You can set the method to change the offset value when you tap the adjustment button or when you operate the offset up switch or offset down switch.

"Offset preset"(C): The offset value changes in the three points that was registered on "Offset preset".

"Increment step" (D): The offset increases or decreases in the range that was set on "Increment step".

(9) "Display adjustment buttons"

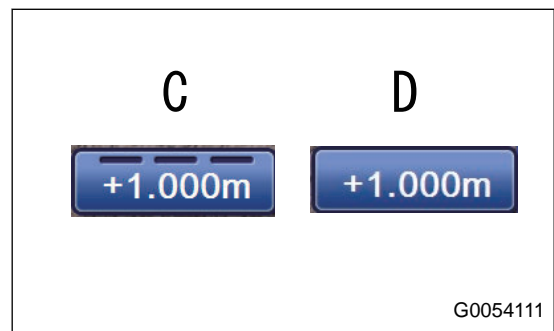
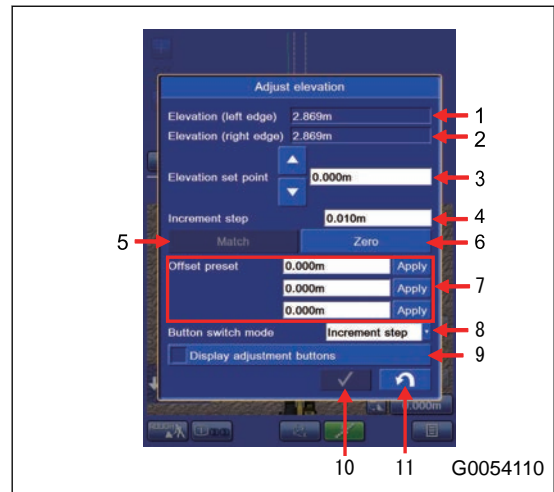
Put a tick in check box, and you can set the offset value on the working screen.

(10) ENTER button

Tap this button and new setting is saved.

(11) RETURN button

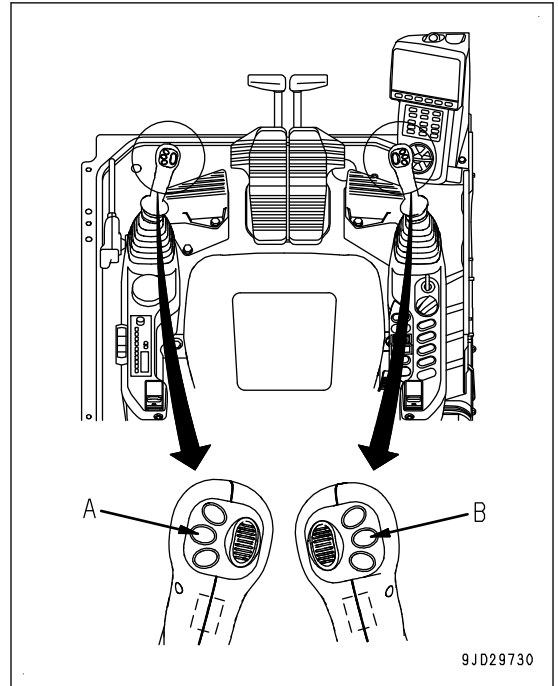
Tap this button and the screen goes back to the previous screen.



Surface offset can be done by switches (A) and (B) on the work equipment control lever, or by the buttons (A) and (B) on the control box screen as well.

(A): Offset down switch

(B): Offset up switch

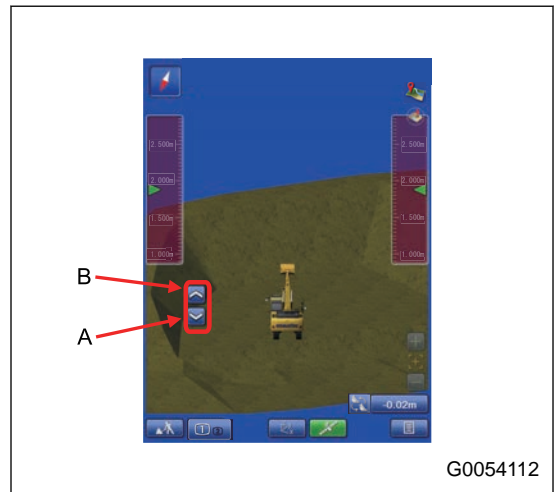


9JD29730

In case of “Display adjustment buttons”

(A): Offset down switch

(B): Offset up switch



G0054112

(12) Cross section line of the design data

Cross section line of the design data is shown.

Cross section line is shown in pink full line.

(13) Cross section line of the target surface

Cross section line of the target surface is shown.

Cross section line is shown in green full line.

(14) Extended line of cross section line of the target surface

Extended line of cross section line of the target surface is shown.

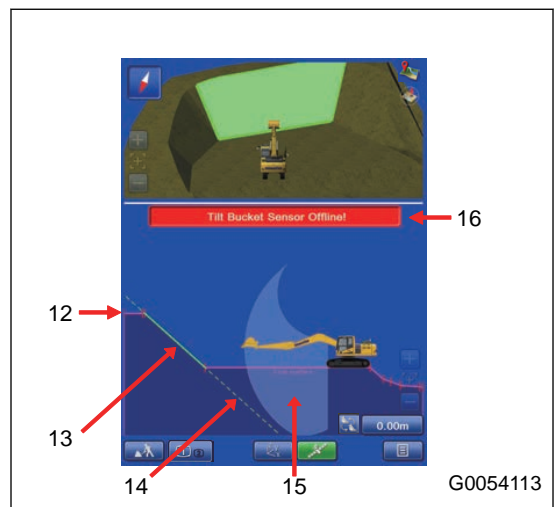
Extended line is shown in green broken line.

REMARK

Use this line as a guideline for digging the current construction surface.

(15) Workable range

The working range of work equipment is shown.



G0054113

REMARK

- This is shown only when the travel mode is selected.
- The working range of work equipment changes by the inclination angle of machine.

(16) Display of abnormality

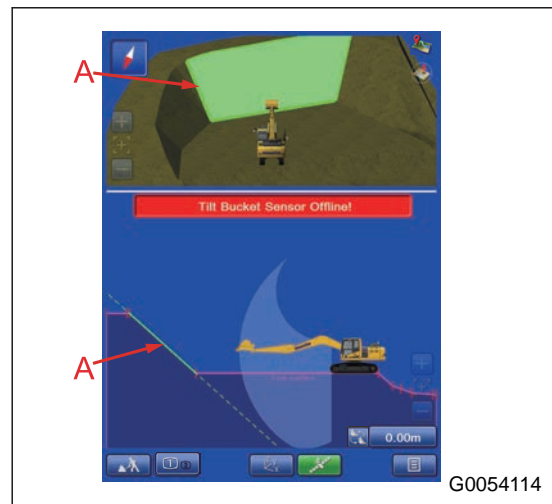
Error message is shown on the screen.

For details, see “TROUBLES AND ACTIONS”.

TARGET SURFACE SETTINGS**METHOD FOR SETTING TARGET SURFACE**

Target surface can be set by tapping the design data (A) or the section line (pink line) on sectional view.

The design data is highlighted when it is set.

**METHOD FOR RESETTING TARGET SURFACE**

Tap a place other than the design data to cancel the target surface setting.

ROUGH DIGGING MODE

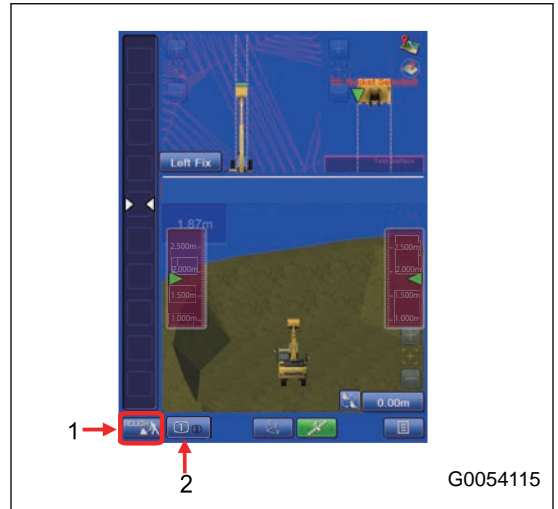
Rough digging mode is used when the fine digging mode is not used. Bucket edge position against the design data is shown, and the light bar or sound supports the digging operation.

Tap the button (1) at bottom left of the working screen, and the button pops up. Tap the button (1) and select the Rough Digging mode.

Tap the button (2) and you can change the Rough Digging screen display.

REMARK

The accuracy of control is not different in the Rough Digging mode and Fine Digging mode.



METHOD FOR SETTING ROUGH DIGGING SCREEN

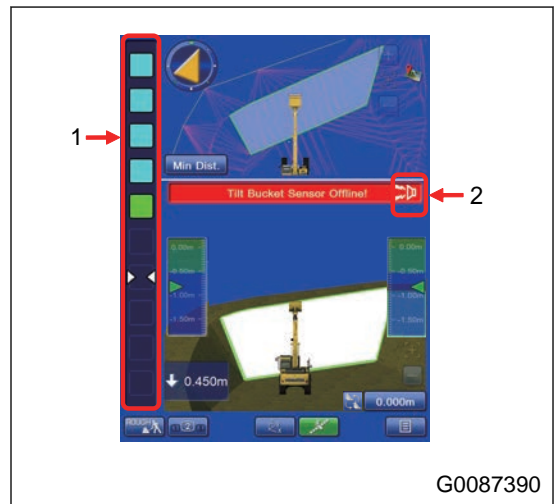
(1) Light Bar

Informs the bucket edge position against the design data with color.

The range lit in green on the light bar is the tolerance of the rough digging.

(2) Sound

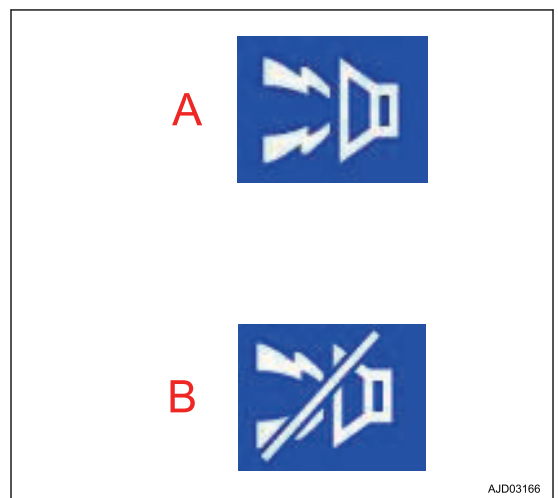
Informs the bucket edge position against the design data with sound.



(A) Sound is enabled

(B) Sound is disabled

Tap the button and ON/OFF of Sound can be switched.



(3) Facing Angle Compass

Facing angle of the bucket edge against the target surface is indicated with the direction of arrow and the color.

If the facing angle compass is yellow, swing the upper structure until it becomes green. Swing slowly until the triangle becomes upward direction after that.

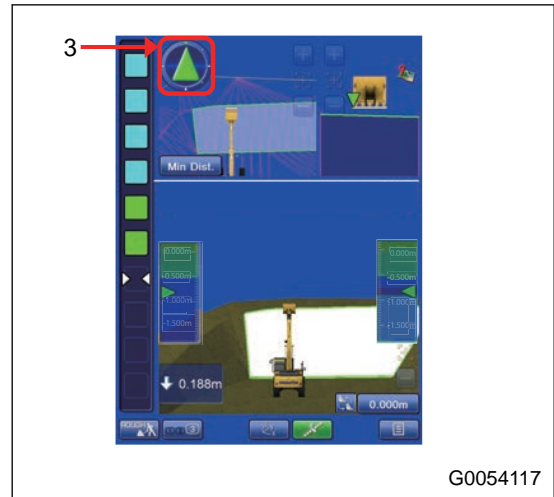
Use the direction of triangle in order to face perpendicularly to the target. Use the color as a guide line.

REMARK

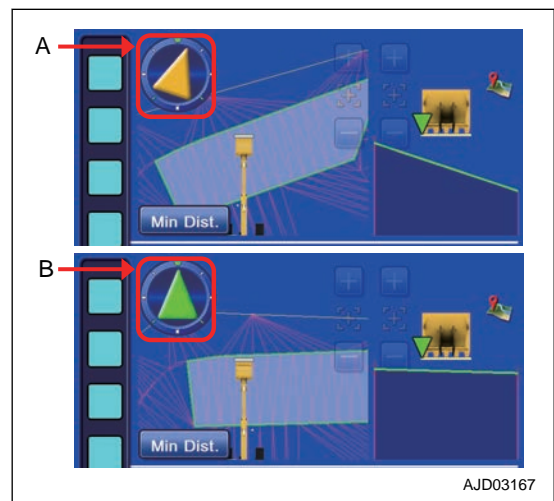
- To face correctly means that the bucket edge “faces front to front” to the target surface.
- Operate the machine with the facing angle compass in green particularly when making the face of slope for the finishing face with good accuracy.
- If you align the bucket edge with the line of top of slope, etc., it causes unsymmetrical contact against the target surface and the accuracy of finishing face is degraded. Take care.
- Compass is not displayed unless the design data is tapped.
- This function is likewise for the tilt bucket.

(A): State of misalignment from the design data (need to swing RIGHT to get correct position)

(B): State of correct position with the design data



G0054117



AJD03167

NOTICE

The color of the facing angle compass changes to gray in the following cases.

- Facing angle compass indicates the front-to-front position wherever it faces.
- Facing angle compass does not indicate the front-to-front position wherever it faces.
- It is more likely that the facing angle compass is grayed out depending on the relationship between the bucket posture and the design surface when the auto tilt bucket is installed. This is not a failure.



AJD01913

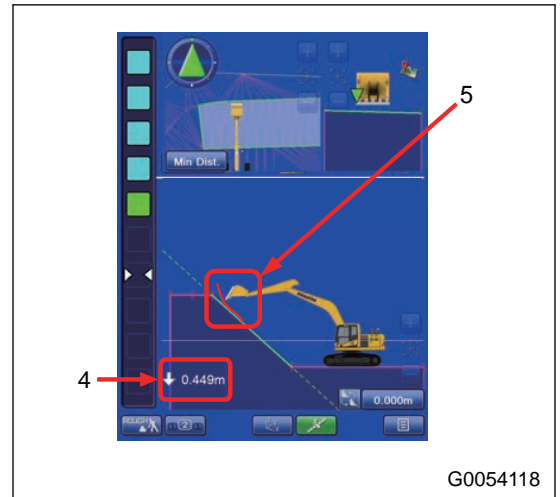
(4) Distance between bucket edge and the design data

Displays the minimum distance between bucket edge and the design data.

(5) Bucket edge trace

The trace of the bucket edge moved is displayed in red line.

The trace is displayed when the bucket edge position is in the green range of light bar.



(6) Bucket edge position (Plan view)

Green part is displayed as a bucket edge position.

REMARK

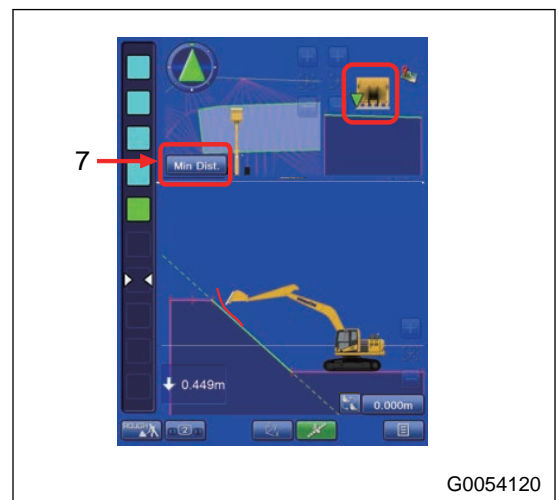
Bucket edge position is displayed only in Plan view.



(7) Bucket edge position selection

Tap "Bucket edge position button, and you can select the bucket edge position to be measured.

Symbol ▽ in front view of bucket indicates the measuring position of bucket edge. The sectional view is made at measuring position of selected bucket edge. Accordingly, the display of sectional view is changed if the measuring position is changed.



Tap "bucket edge position" button (7) and tap the desired bucket edge position.

The following 4 types are the available positions of bucket edge.

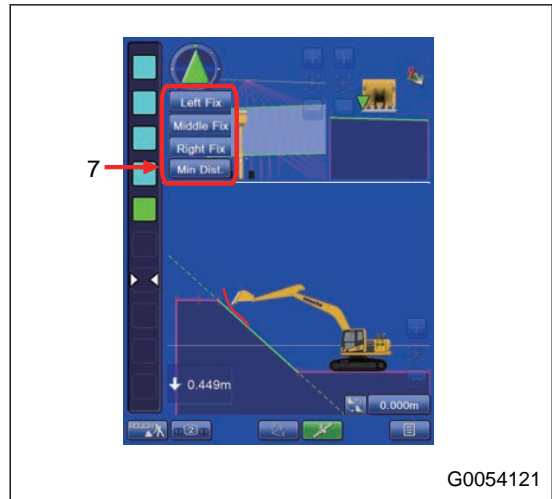
- Left Fix
Measurement is performed with the left end of bucket edge, and the sectional view is created based on that.
- Middle Fix
Measurement is performed with the middle of bucket edge, and the sectional view is created based on that.
- Right Fix
Measurement is performed with the right end of bucket edge, and the sectional view is created based on that.
- Min Dist.
Measurement is performed with the nearest point of bucket edge from measuring surface, and the sectional view is created based on that.

The position of mark ▽ in Section view changes when the bucket edge position is selected.

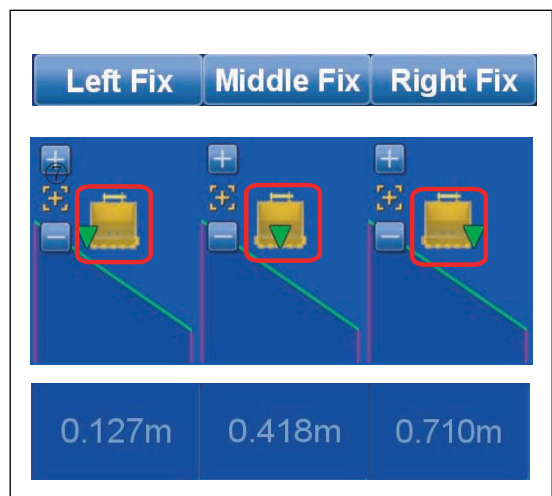
REMARK

It is recommended to select Min Dist. when the auto tilt bucket is installed. Selecting Min Dist. makes the tilt bucket easier to move along the design surface.

Blade tip location other than Min Dist. is selectable as well.



G0054121



TEMPORARY DESIGN MENU

When the designed data (the design data) is not displayed, the design data offset button changes to temporary design surface creation button.

Tap this button, and “Temp. Design” menu pops up.



METHOD FOR CREATING TEMPORARY DESIGN SURFACE

You can create the design surface such as flat surface and slope, etc. temporarily with this menu.

(1) Selection of the creation method of the sloping plane surface

“Set Start Point and End Point”:

With this method, the Main-fall is set by the start point and end point.

“Set Start Point and Main-fall”:

With this method, the Main-fall is set manually.

In case of “Set Start Point and Main-fall”

(2) “N”, “E”, “Elev” of the Start Point

Input the coordinates of control point of the design surface you are going to create.

You can also measure the bucket edge position.

(3) “Measure”

Measure the current bucket edge position.

You can select the bucket edge reference point from “Left”, “Middle”, and “Right”.

Result of measurement for bucket edge position is used for creating the design surface.

(4) “Select”

Measured point coordinates data are used for creating the design surface.

(5) Input of machine grade in longitudinal direction

“Direction”:

Set the direction to which Surface is shown. Tap the item and input the numeric value.

REMARK

North is 0 ° and the angle increases in a counterclockwise direction.

“Grade”:

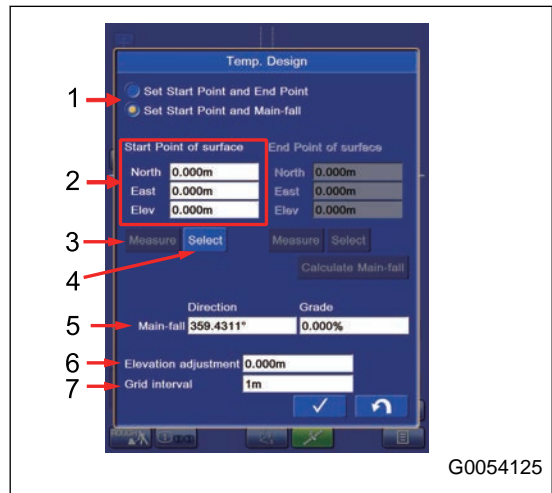
Tap the item and input the numeric value.

(6) “Elevation adjustment”

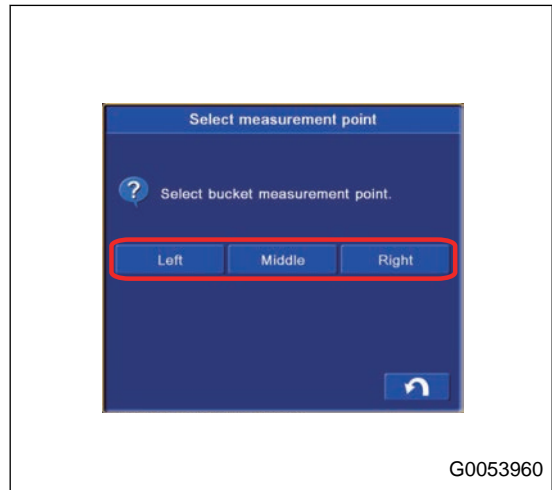
Input the offset amount of the control point in vertical direction.

(7) “Grid interval”

Input the grid interval to show.



G0054125



G0053960

In case of “Set Start Point and End Point”

(2) “N”, “E”, “Elev” of the Start Point and End Point

Input the coordinates of control point of the design surface you are going to create.

You can also measure the bucket edge position.

(3) “Measure”

Measure the current bucket edge position.

You can select the bucket edge reference point from “Left”, “Middle”, and “Right”.

Result of measurement for bucket edge position is used for creating the design surface.

(4) “Select”

Measured point coordinates data are used for creating the design surface.

(5) “Calculate Main-fall” button

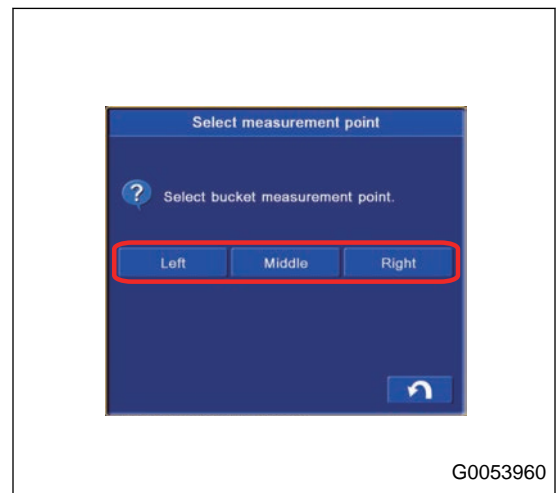
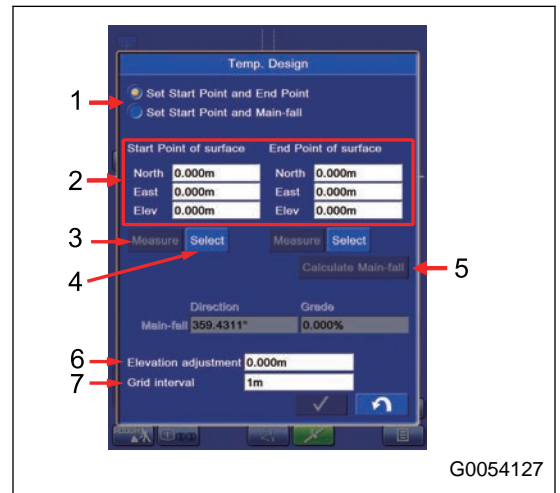
When you tap this button, the vertical Grade (direction and grade) is automatically calculated from the Start Point coordinate and End Point coordinate.

(6) “Elevation adjustment”

Input the offset amount of the control point in vertical direction.

(7) “Grid interval”

Input the grid interval to show.

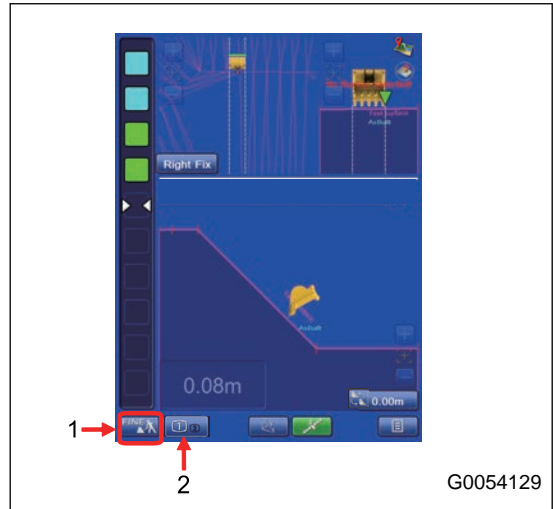


FINE DIGGING MODE

Fine Digging mode is used to finish the working surface. Bucket edge position against the design data is displayed, and the light bar or sound supports the digging operation.

Tap the button (1) at bottom left of the working screen, and button pops up. Tap the button (1) and select the fine digging mode.

Fine Digging screen display can be changed by tapping the button (2).



METHOD FOR SETTING FINE DIGGING MODE SCREEN

(1) Light Bar

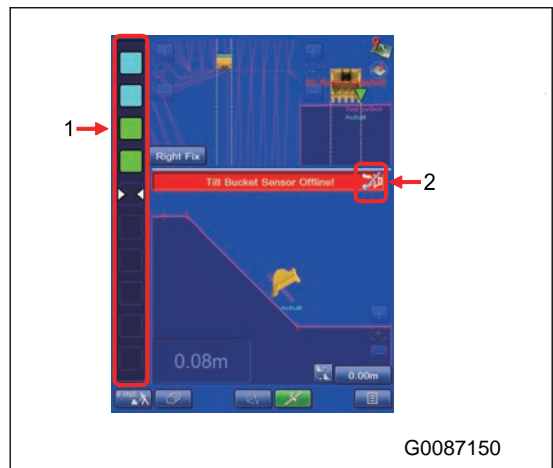
Informs the bucket edge position against the design data with color.

The range lit in green on the light bar is the tolerance of the rough digging.

For the setting of the light bar, see "LIGHT BAR AND SOUND SETTING CONTENTS".

(2) Sound

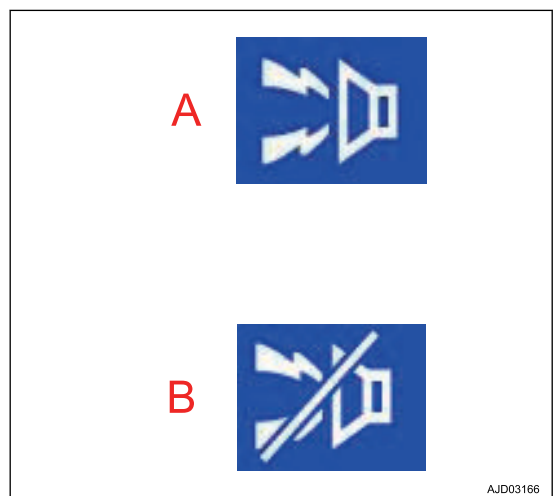
Informs the bucket edge position against the design data with sound.



(A) Sound is enabled

(B) Sound is disabled

Tap the button and ON/OFF of Sound can be switched.



(3) Facing Angle Compass

Facing angle of the bucket edge against the target surface is indicated with the direction of arrow and the color.

If the facing angle compass is yellow, swing the upper structure until it becomes green. Swing slowly until the triangle becomes upward direction after that.

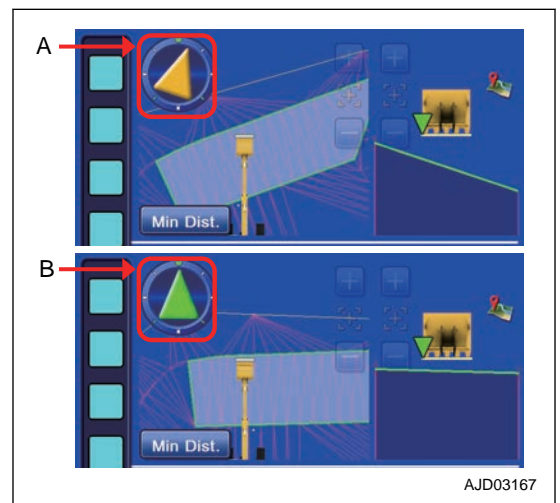
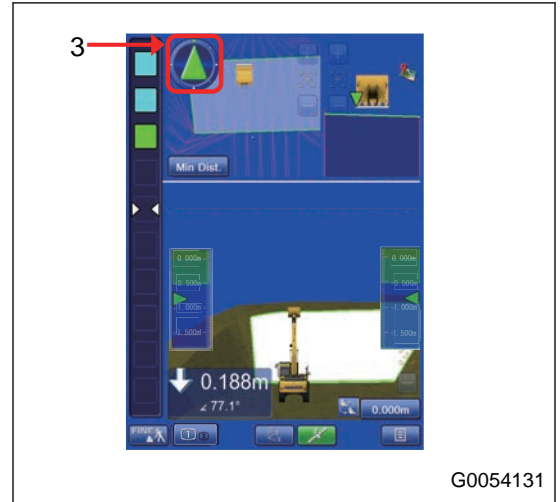
Use the direction of triangle in order to face perpendicularly to the target. Use the color as a guide line.

REMARK

- To face correctly means that the bucket edge “faces front to front” to the target surface.
- Operate the machine with the facing angle compass in green particularly when making the face of slope for the finishing face with good accuracy.
- If you align the bucket edge with the line of top of slope, etc., it causes unsymmetrical contact against the target surface and the accuracy of finishing face is degraded. Take care.
- Compass is not displayed unless the design data is tapped.
- This function is likewise for the tilt bucket.

(A): State of misalignment from the design data (need to swing RIGHT to get correct position)

(B): State of correct position with the design data



NOTICE

The color of the facing angle compass changes to gray in the following cases.

- Facing angle compass indicates the front-to-front position wherever it faces.
- Facing angle compass does not indicate the front-to-front position wherever it faces.
- It is more likely that the facing angle compass is grayed out depending on the relationship between the bucket posture and the design surface when the auto tilt bucket is installed. This is not a failure.



(4) Distance between bucket edge and the design data
 Displays the minimum distance between bucket edge and the design data.

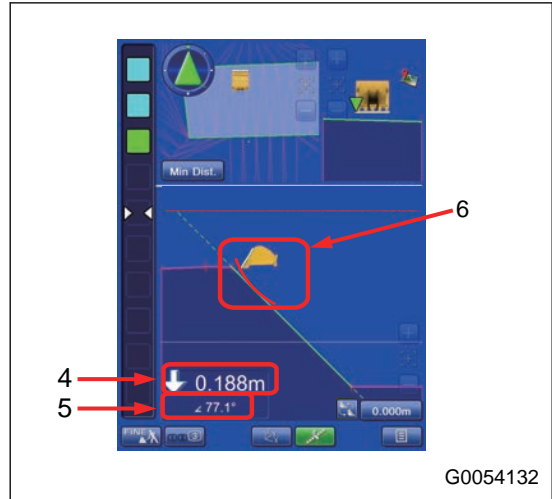
(5) Angle between bucket bottom and target surface
 Displays the angle between bucket bottom and target surface.

REMARK

"Angle between bucket bottom and target surface" is displayed only when the target surface is set.

(6) Bucket edge trace

The trace of the bucket edge moved is displayed in red line.
 The trace is displayed when the bucket edge position is in the green range of light bar.

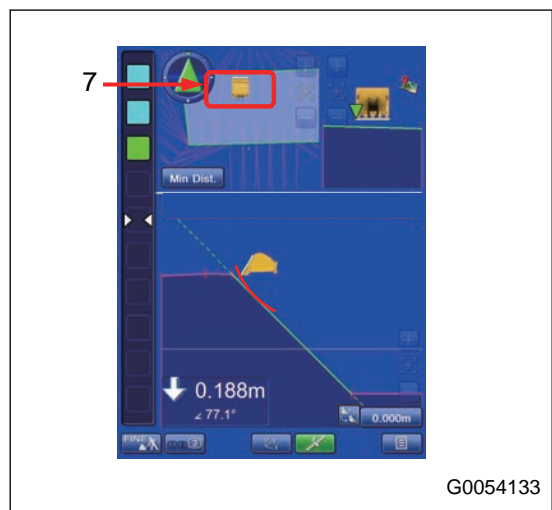


(7) Bucket edge position (Plan view)

Green part is displayed as a bucket edge position.

REMARK

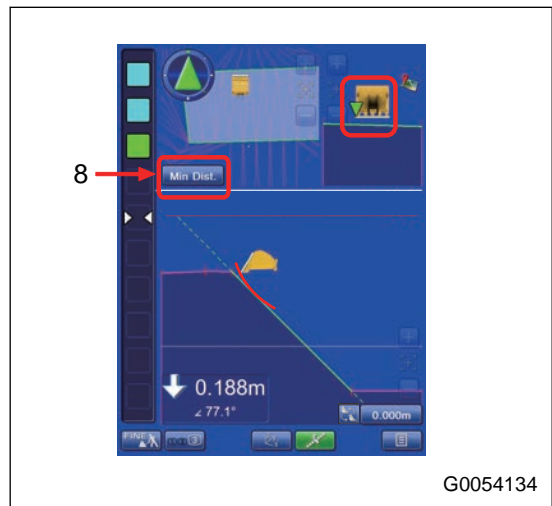
Bucket edge position is displayed only in Plan view.



(8) Bucket edge position selection

Tap "Bucket edge position button, and you can select the bucket edge position to be measured.

Symbol ▽ in front view of bucket indicates the measuring position of bucket edge. The sectional view is made at measuring position of selected bucket edge. Accordingly, the display of sectional view is changed if the measuring position is changed.



Tap "bucket edge position" button (8) and tap the desired bucket edge position.

The following 4 types are the available positions of bucket edge.

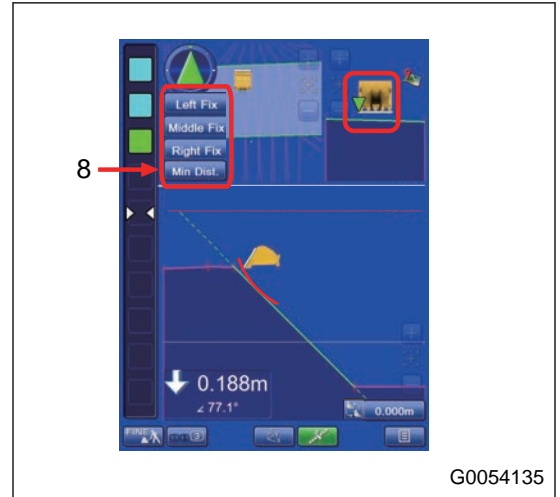
- Left Fix
Measurement is performed with the left end of bucket edge, and the sectional view is created based on that.
- Middle Fix
Measurement is performed with the middle of bucket edge, and the sectional view is created based on that.
- Right Fix
Measurement is performed with the right end of bucket edge, and the sectional view is created based on that.
- Min Dist.
Measurement is performed with the nearest point of bucket edge from measuring surface, and the sectional view is created based on that.

The position of cross mark ▽ changes when the bucket edge position is selected.

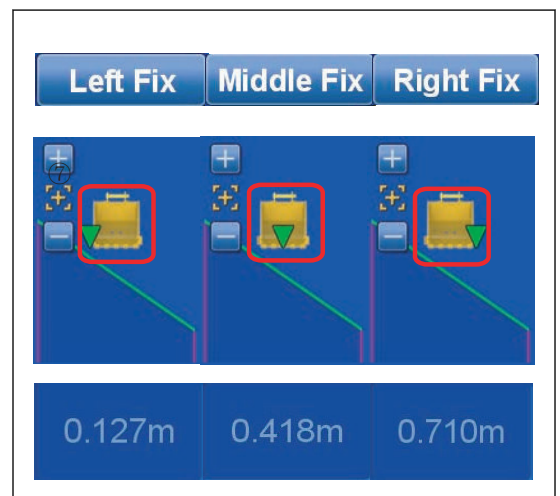
REMARK

It is recommended to select Min Dist. when the auto tilt bucket is installed. Selecting Min Dist. makes the tilt bucket easier to move along the design surface.

Blade tip location other than Min Dist. is selectable as well.



G0054135



TARGET SURFACE SETTINGS

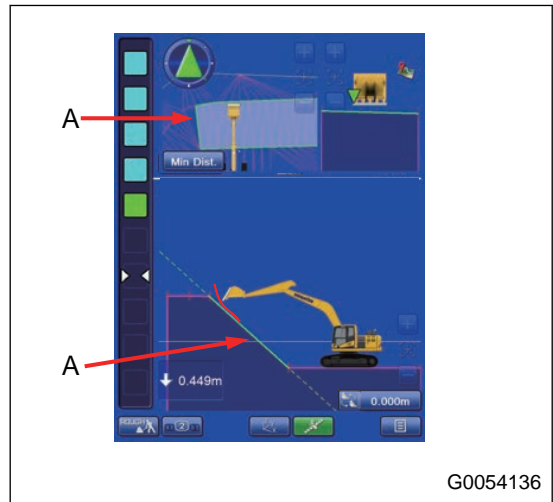
The detail of the target surface can be checked with the target surface setting menu, . Also you can display the finished target surface for construction management.

TARGET SURFACE SETTING MENU

Tap the target surface on the working screen (A), and the screen changes to the target surface setting menu.

REMARK

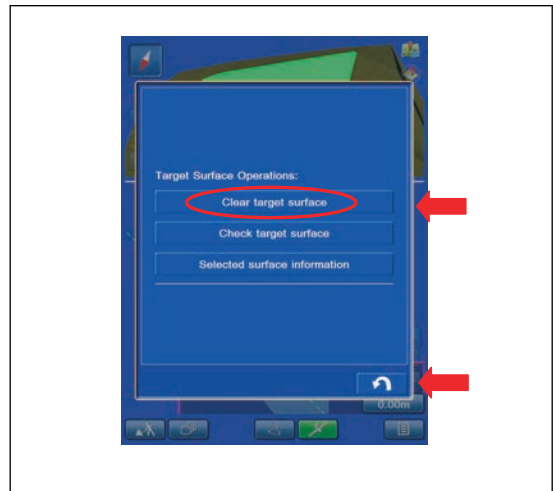
- When the view is 3D design display, tap the target surface.
- When the view is the section or the profile display, tap the line.



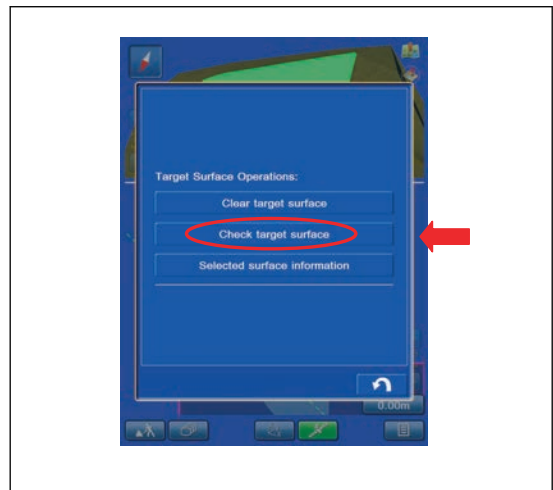
G0054136

METHOD FOR SETTING TARGET SURFACE

1. Tap the “Clear target surface” button.
The setting is canceled.
Tap the RETURN button and the display returns to working screen.



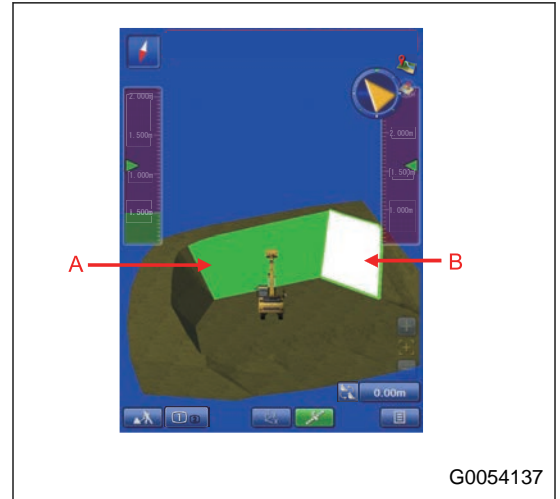
2. Tap “Clear target surface” button.
Target surface (white) changes to the finished surface (yellow-green).



The status of the design data is indicated with the following colors.

(A) Finished surface (yellow-green)

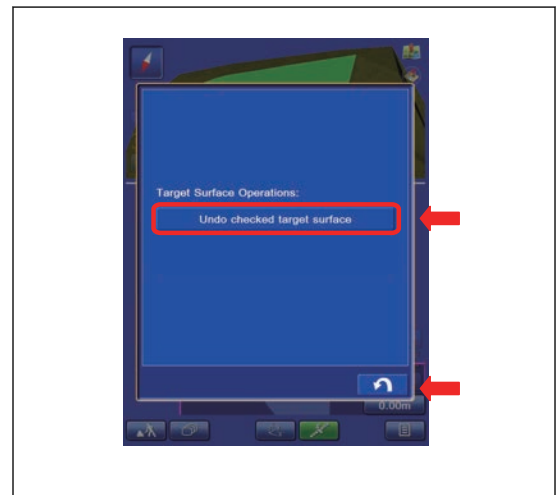
(B) Target surface (white)



G0054137

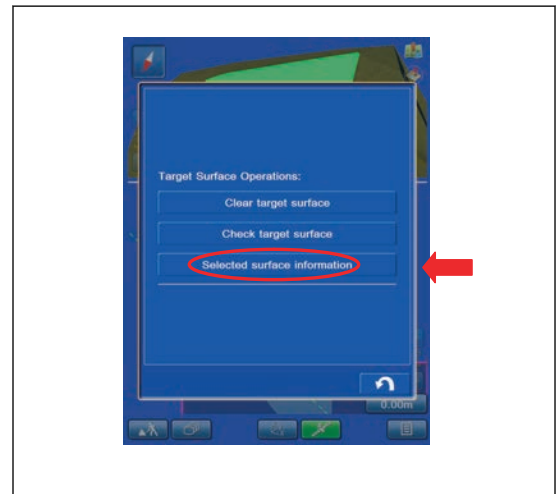
- To cancel the yellow green display of Target Surface, tap Target Surface of yellow green and then tap the “Undo checked target surface” button.

Tap the RETURN button and the display returns to previous screen.



- To display the information of the target surface, tap the “Selected Surface Information” button.

The information of the target surface is displayed.



(1) "Incline"

The inclination of the target surface is displayed.

(2) "Surface height"

The height of the target surface is displayed.

(3) "Surface width"

The width of the target surface is displayed.

(4) "Height of top of slope"

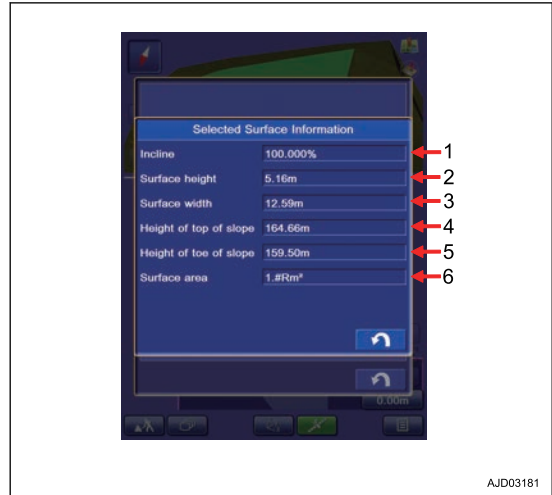
The altitude of the highest point of the target surface is displayed.

(5) "Height of toe of slope"

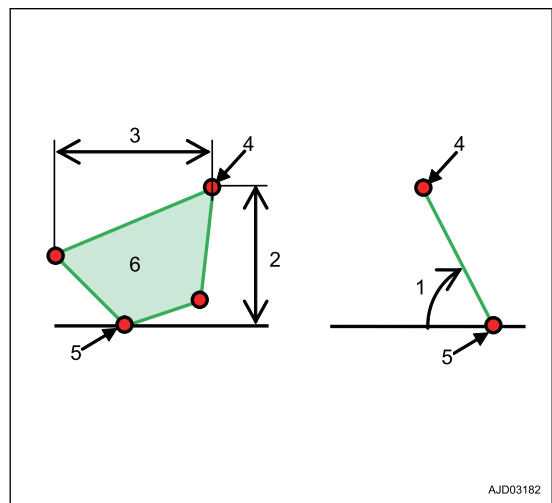
The altitude of the lowest point of the target surface is displayed.

(6) "Surface area"

The area of the target surface is displayed.



AJD03181



AJD03182

BUCKET EDGE POSITION

With “Bucket edge position” menu of bucket edge position information, you can check bucket edge position information (bucket edge accuracy), and correct the bucket edge position by comparing the bucket edge position with the bench mark (control point) at jobsite.

Tap the button (1) at the bottom of the working screen. The display changes to the bucket edge information screen.



G0054138

DISPLAY BUCKET EDGE POSITION

With “Position” tab, the current bucket edge position information is shown.

(1) “Point”

Measuring point of bucket edge position can be selected.

(2) “North”, “East”, “Elevation”

The bucket edge position coordinates are shown.

(3) “Cut to design surface”

The vertical distance between bucket edge and the design data is shown.

(4) “Alignment station”

The length of line between the nearest point on the Alignment from the bucket edge and the start point of the Alignment is shown.

(5) “Alignment offset”

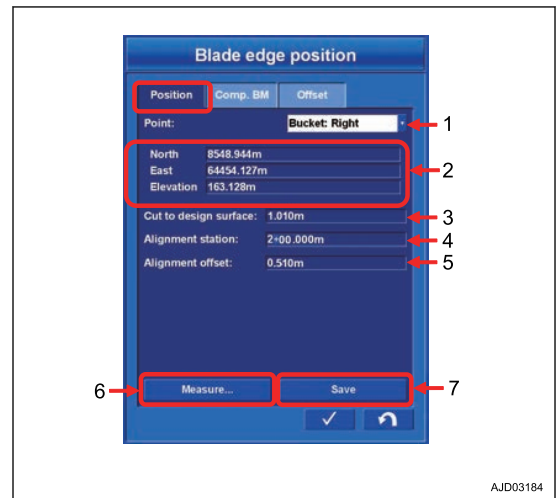
The distance between the nearest point on the Alignment from the bucket edge position and the bucket edge is shown.

(6) “Measure...”

You can measure the bucket edge position.

(7) “Save”

You can save the measured result.



AJD03184

METHOD FOR SETTING MEASURED BUCKET EDGE POSITION

Tap Point column, and you can set the bucket edge position to be measured.

- “Bucket: Left cutting edge”Leftmost position of bucket edge
- “Bucket: Middle cutting edge”Middle position of bucket edge
- “Bucket: Right cutting edge”Rightmost position of bucket blade edge

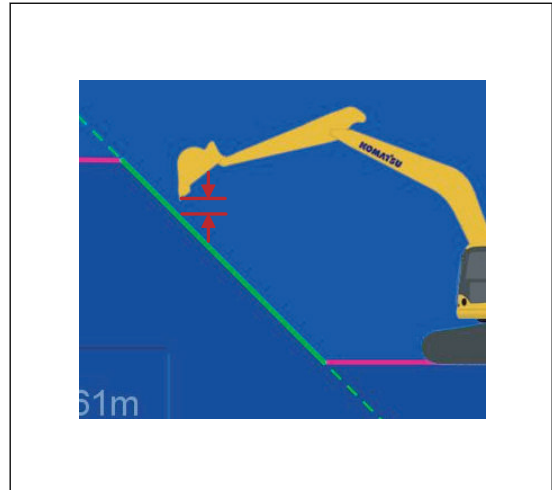
DISPLAY BUCKET EDGE COORDINATES

In the North, East, Elevation, bucket edge coordinates which has been set at point are displayed.

DISPLAY DISTANCE BETWEEN BUCKET EDGE AND DESIGN SURFACE

The cutting amount to the design data is displayed as the vertical distance between bucket edge and the design data (directly under the bucket edge position).

If the bucket edge cuts in the design data, distance is not displayed in minus, but display changes to fill amount to the design data.

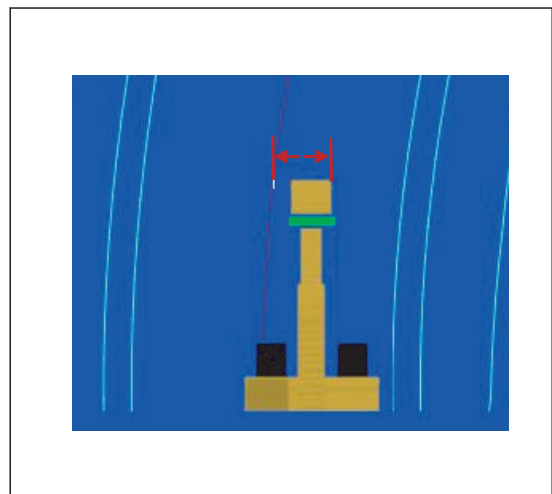


DISPLAY BUCKET EDGE POSITION ALIGNMENT STATION

With the Alignment station, the length of line between the nearest point on the Alignment from the bucket edge and the start point of the Alignment is shown.

DISPLAY DISTANCE BETWEEN CENTER LINE AND BUCKET EDGE POSITION

The distance between the nearest point on the Alignment from the bucket edge position and the bucket edge is shown.



METHOD FOR MEASURING BUCKET EDGE POSITION

When measuring the bucket edge position again, tap “Measure...” button.

Measurement starts.



METHOD FOR SAVING MEASURED DATA

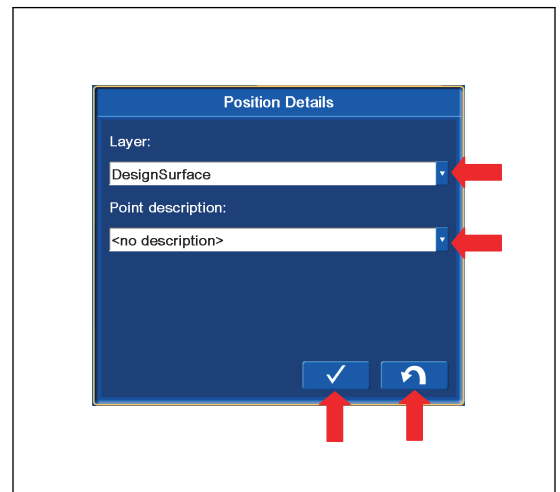
Tap the “Save” button to save the measuring result.

Position Details screen is displayed.

- Select the layer
Tap the pull down list of “Layer” and you can select the layer in which measurement result is saved.
- Input the description
Tap the “Point description” column and input the comment. Select the “<new description>” and keyboard pops up, and you can input the comment to the measurement result.

Tap the ENTER button and the measurement result is saved.

Tap the RETURN button to cancel.



METHOD FOR COMPARING WITH BENCHMARK

On “Comp. BM” tab, you can compare the coordinates of bucket edge position with the benchmark (control point) to check if there is an error of coordinates of bucket edge position.

(1) “Position of bucket”

World geodetic coordinates of bucket edge position is shown which is set from the point pull-down list of the Position tab.

(2) “Position of benchmark”

Input the benchmark coordinates used for construction into the text box with the world geodetic coordinates. Tap the item, and the numeric keypad pops up.

(3) “Offset”

You can offset the coordinates of benchmark in height direction. Tap the item, and the numeric keypad pops up.

The range of value to be inputted is -1.000 m to 1.000 m.

(4) “Select” button

Tap this button, and you can select the Point coordinates which exist from the list.

(5) “Comparison benchmark”

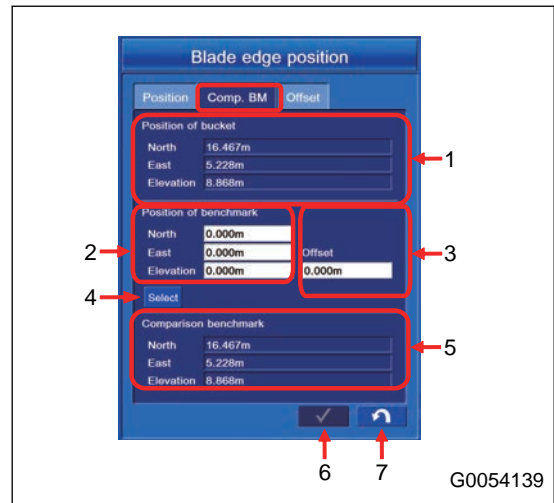
The difference of coordinates between the bucket edge position and the benchmark is shown.

(6) ENTER button

Tap this button and content of change is saved.

(7) RETURN button

Tap this button and the screen goes back to the previous screen.



METHOD FOR CORRECTING BUCKET EDGE POSITION

On "Offset" tab, compare the bucket edge position with the control point other than benchmark, and you can correct the bucket edge position.

You can also set the benchmark as a control point to correct it.

(1) "Raw Bucket Position"

Bucket edge position in world geodetic coordinates is shown.

When you do the measurement again, tap "Measure..." button

(2). Measurement starts.

(3) "Target"

The values of "Position of benchmark" and "Offset" on "Comp. BM" tab are reflected.

(4) "Difference"

The difference of coordinates between the bucket edge position and control point is shown.

(5) "Offset"

Input the offset quantity into the text box to let the bucket edge position become the same as the control point, and correct the error of bucket edge position.

Tap "Match" button (6) and the offset value is automatically calculated so that the bucket edge position becomes the same as the control point.

Tap "Zero" button (7) and the offset quantity goes back to 0.

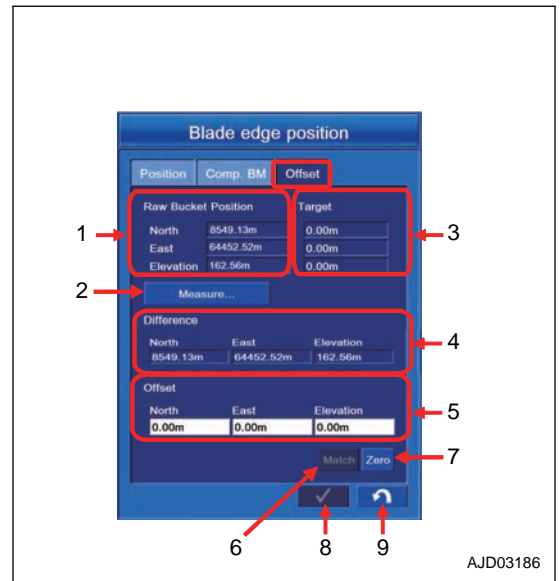
You can select the bucket edge position from "Left", "Middle", and "Right" after you push "Match" button (6).

(8) ENTER button

Tap this button and content of change is saved.

(9) RETURN button

Tap this button and the screen goes back to the previous screen.



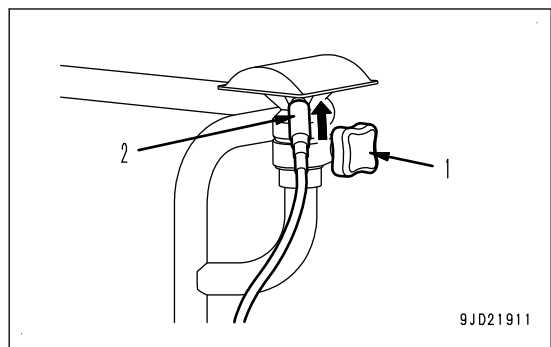
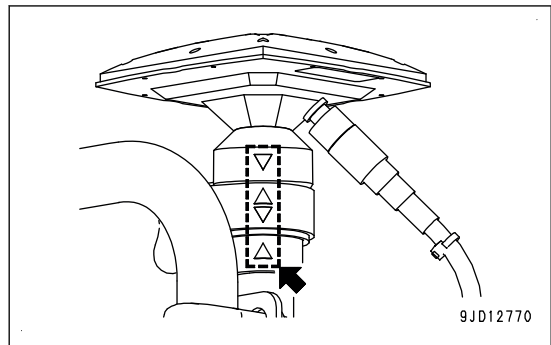
DAILY CALIBRATION

WALK-AROUND CHECKS OF INTELLIGENT MACHINE CONTROL EQUIPMENT

Check once a day before starting the engine that the bolts and nuts of the intelligent Machine Control are not loose, the wiring harness connector is not loose, and the play is proper.

METHOD FOR CHECKING GNSS ANTENNA AND CABLE

1. Check that the installing direction of GNSS antenna matches marks.
If it is misaligned, loosen the mounting knob (1) and align it so that marks are in a straight line.
2. When the connector (2) of GNSS antenna is connected, tighten the thread while pushing it in the direction of arrow.
If it is tightened lightly, it may become loose during operation.
Tightening torque:4.0 to 5.0 Nm {0.41 to 0.51 kgfm,2.97 to 3.69 lbft}



METHOD FOR CHECKING GNSS RADIO DEVICE

When GNSS radio device is installed, check that antenna is not faulty, installed position is not behind the machine, antenna cable coating is not damaged, and connector is not loosened.

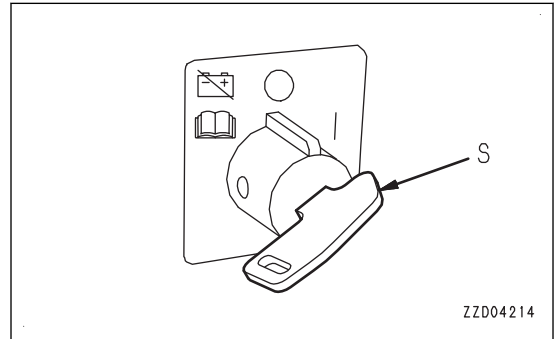
METHOD FOR CHECKING LOOSENESS OF CONTROL BOX

1. Check that the control box is located in the position for you to see it well, and the visibility of front right of cab is good. If visibility is not good, adjust the angle of control box.
2. Check that control box is fixed securely. If mounting knob is loose, retighten it further.

METHOD FOR CHECKS BEFORE STARTING ON intelligent Machine Control EQUIPMENT

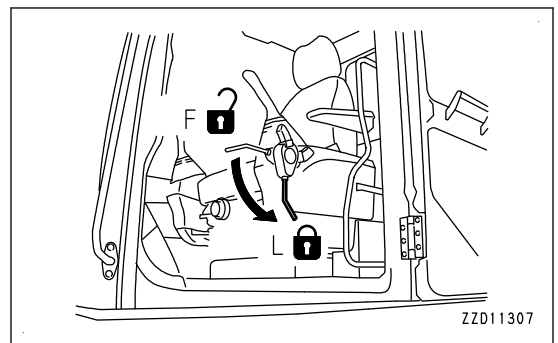
Before starting the work each day, perform the following inspection to check that the intelligent Machine Control is detecting the bucket edge position correctly.

1. Check that the battery disconnect switch (S) is in ON position (I).

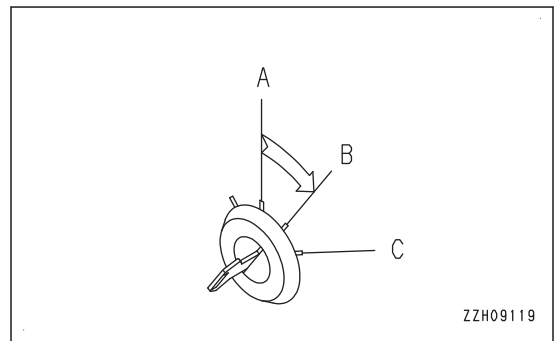


2. Check that the lock lever is at LOCK position (L).
3. Check that the control levers and control pedals are at NEUTRAL position.

If the control levers and control pedals are released, they return to NEUTRAL position.



4. Insert the key in the starting switch, turn the key to ON position (B), then check the control box.



A sand clock is displayed on the control box screen for approximately 4 seconds.

The display changes to Windows start screen in approximately 2 seconds, and it remains for approximately 6 seconds.

Screen turns to black for approximately 8 seconds until the next screen is displayed.

REMARK

White line may appear on the monitor but this is due to the screen change and not a trouble.

Welcome screen is displayed for approximately 2 seconds, desk top screen of Windows is displayed, and Komatsu logo is displayed. (for approximately 15 seconds)

Wait for a little while, and the intelligent Machine Control system starts up.

The following messages are displayed in this order on the message display area on the top of the screen. The intelligent Machine Control system is automatically checked.

- “Waiting for satellites...”
The system is waiting to receive the GNSS satellite signal.
- “Waiting for radio link...”
The system is waiting to be connected with Base station radio.
- “Waiting to initialize...”

The system is in preparation for the position calculation by GNSS.

- “Initializing...”

The system is securing the accuracy of bucket edge position calculation by GNSS.

REMARK

The intelligent Machine Control system is checked always when starting up the system. How long it takes to check through the system depends on the state of satellite and radio.

System check is completed normally when the screen returns to the standard working screen after a little while even if all of the above messages are not displayed.

Any of messages may remain displayed and the next message does not come. Check if the machine is hidden behind a building or mountain, etc. if the next message does not come after waiting for 15 to 20 minutes. If the machine is hidden, move it to a place under the open sky, and perform the display check of control box again.

If GNSS Base station cannot be connected, check if the power supply of GNSS Base station is ON.

For details, see “PHENOMENA AND ACTIONS FOR CONTROL BOX”.

METHOD FOR CHECKING PROJECT FILE

Check if the project file is set correctly on the control box.

For the method for checking project file, see “PROJECT FILE SETTING AND EDITING”.

METHOD FOR CHECKING GNSS COMMUNICATION STATUS

Check the satellite acquisition and positioning accuracy with the control box.

Check that the satellite communication state monitor is lit in green.

For the checking method for satellite acquisition and the positioning accuracy, see “METHOD FOR CHECKING GNSS COMMUNICATION STATUS”.



REMARK

If both Horizontal RMS and Vertical RMS values are ± 0.02 m { ± 0.8 in} and below the positioning accuracy is good.

METHOD FOR CHECKING CONTROL BOX SCREEN DISPLAY

Check visually that posture of work equipment displayed on the control box is the same as that of the actual machine.

REMARK

The posture of work equipment may change slightly due to hydraulic drift of work equipment while engine is stopped.

Sensor cannot detect the change of posture while engine is stopped. The posture of work equipment displayed on the control box at engine start may change if hydraulic drift occurs.

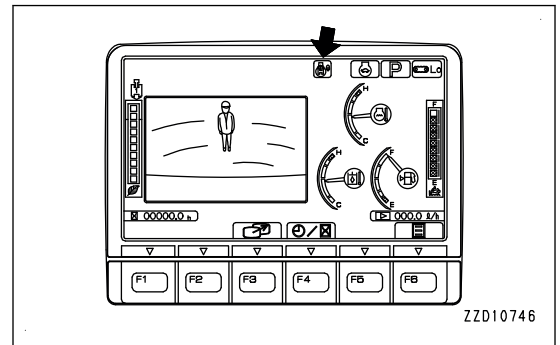
Reset the work equipment posture detection according to the following procedure if the posture of work equipment displayed on the control box differs from that of actual machine.



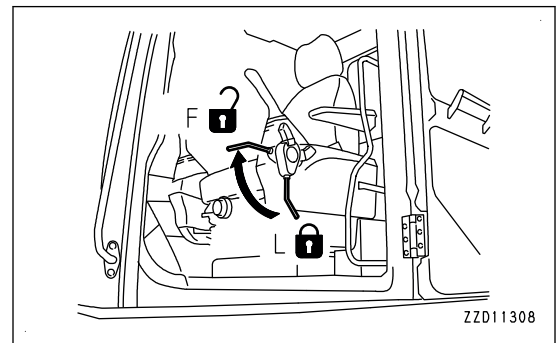
G0054141

Method for resetting the work equipment posture

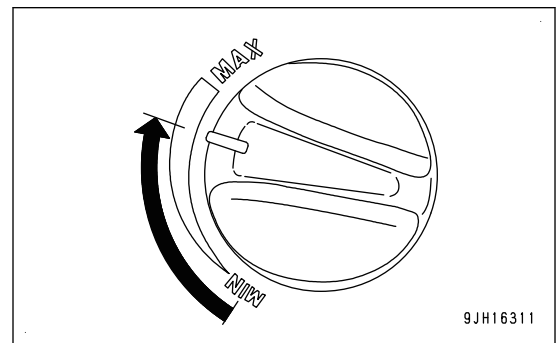
1. Set the swing lock switch to ON position and check that the swing lock monitor is lit on the machine monitor.



2. Move the lock lever slowly and steadily to FREE position, then raise the bucket from the ground.



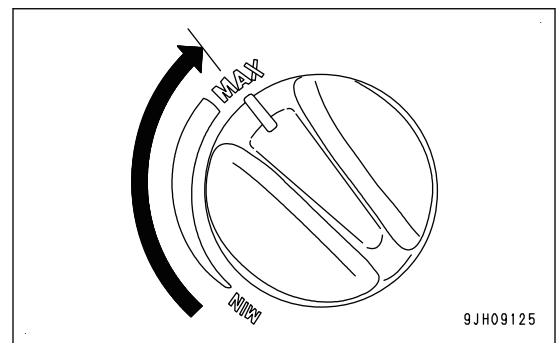
3. Set the fuel control dial to a point of 2/3 between Low idle (MIN) position and High idle (MAX) position.



(For machines with auto tilt bucket)

Set the fuel control dial (4) to High idle (MAX) position.

4. Move the R.H. work equipment control lever slowly in the direction to the end of the bucket DUMP side.
5. Move the R.H. work equipment control lever slowly in the direction to the end of the bucket CURL side.
6. Repeat steps 4 to 5 a few times.
7. Move the L.H. work equipment control lever slowly in the direction to the end of arm OUT side.
8. Move the L.H. work equipment control lever slowly in the direction to the end of arm IN side.
9. Repeat steps 7 to 8 a few times.
10. Check that both bucket and arm are most retracted position.
11. Move the R.H. work equipment control lever slowly in the direction to the end of boom RAISE side.
12. Move the R.H. work equipment control lever slowly in the direction to the end of boom LOWER side.
13. Repeat steps 11 to 12 a few times.



Perform the steps 14. to 18. only on machines with auto tilt bucket.

⚠ CAUTION

Ensure the safety of the surroundings since the tilting speed may change suddenly during calibration. The sudden change of tilting speed does not affect the calibration.

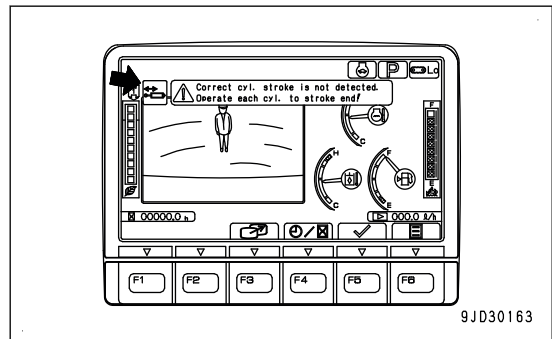
REMARK

- Finish "Auto tilt bucket exchange" calibration and "Auto Tilt Bucket Control Adjustment", then perform the calibration.
 - Set the flow rate (low speed, medium speed, high speed) with the auto tilt bucket flow rate setting in advance, then perform the calibration.
 - Cancel the semi-auto mode, then perform the calibration.
14. Operate the auto tilt bucket clockwise with 1ATT control lever, slowly move it until the oil pressure in the bucket circuit is relieved.
 15. After the oil pressure in the auto tilt bucket circuit is relieved, operate the 1ATT control lever fully, and hold it approximately for 2 seconds.
The engine speed fluctuates while the lever is held. This is not a problem.
 16. Operate the auto tilt bucket counterclockwise with 1ATT control lever, slowly move it until the oil pressure in the bucket circuit is relieved.
 17. After the oil pressure in the auto tilt bucket circuit is relieved, operate the 1ATT control lever fully, and hold it approximately for 2 seconds.
The engine speed fluctuates while the lever is held. This is not a problem.
 18. Repeat steps 14. to 17. a few times.
 19. Check visually that posture of work equipment displayed on the control box is the same as that of the actual machine.
 20. Check that the cylinder function state caution lamp is not lit.

If the cylinder function state caution lamp is lit, repeat the steps 4. to 18. until it goes out.

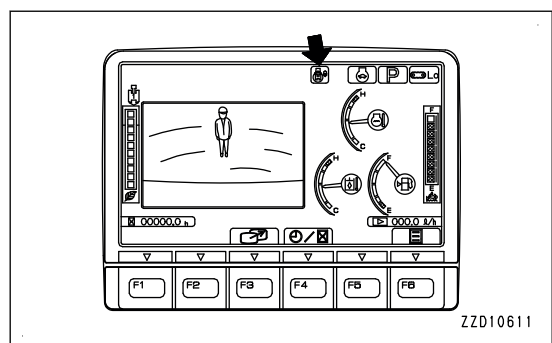
REMARK

The cylinder function state caution lamp goes out when the resetting of the work equipment posture is completed.



21. Set the swing lock switch to OFF position and check that the swing lock pilot lamp is not lit.
22. Check that it has been 5 minutes since the engine was started, perform "Adjustment Diagnosis" by referring to IMU ADJUSTMENT.

Perform Adjustment Execute if necessary according to the result of the diagnosis.

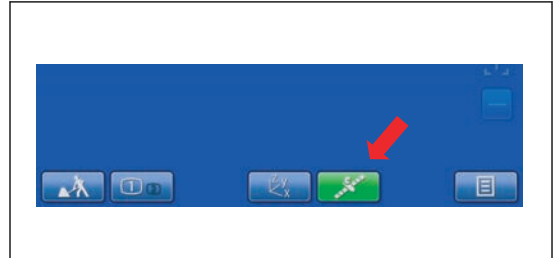


METHOD FOR CHECKING AND ADJUSTING BUCKET EDGE ACCURACY

NOTICE

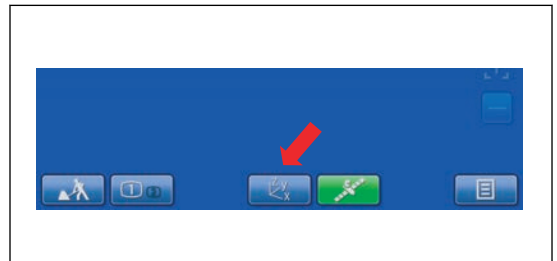
Be sure to refer “METHOD FOR CHECKING CONTROL BOX SCREEN DISPLAY”, and do it after you do the steps 6. to 15.

1. Make sure that the GNSS Status button on the control box lights up in green.



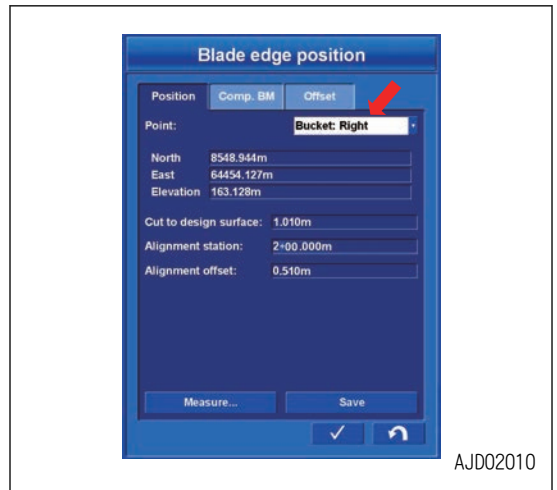
2. Tap “Blade edge position” information button on the control box.

“Blade edge position” screen is shown.



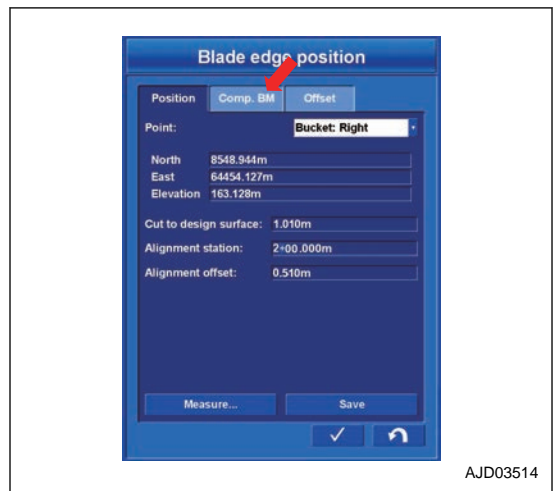
3. Check that the measured position of bucket edge in “Point” column of “Position” tab is the same as the bucket position placed on the control stake.

- “Bucket: Left”: Bucket edge at left end
- “Bucket: Middle”: Bucket edge at center
- “Bucket: Right”: Bucket edge at right end



AJD02010

4. Tap “Comp. BM” tab.



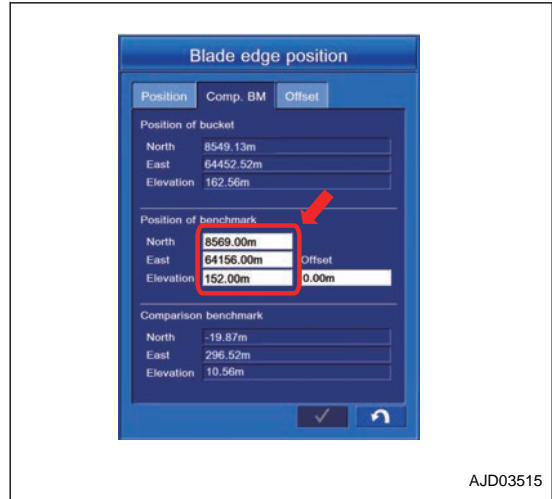
AJD03514

- Input the coordinates of control stake on which the bucket edge is fitted into "Position of benchmark" column.

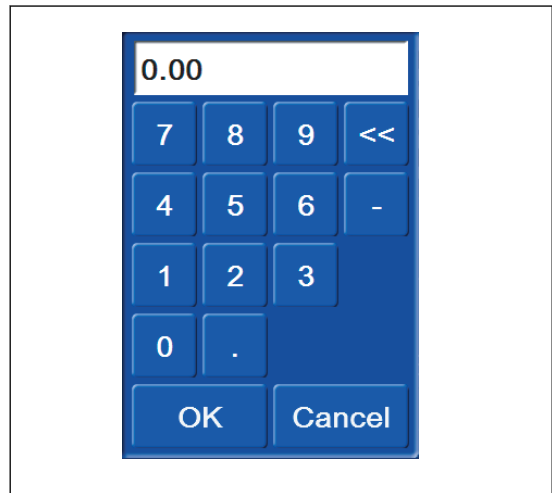
Tap the column to input, and the numeric keypad is shown. Input the coordinates value and tap "OK".

REMARK

<< button: Deletes 1 numeric number.
 "OK" button: Validates the input and moves the screen back to the previous screen.
 "Cancel" button: Cancels the input and moves the screen back to the previous screen.



AJD03515

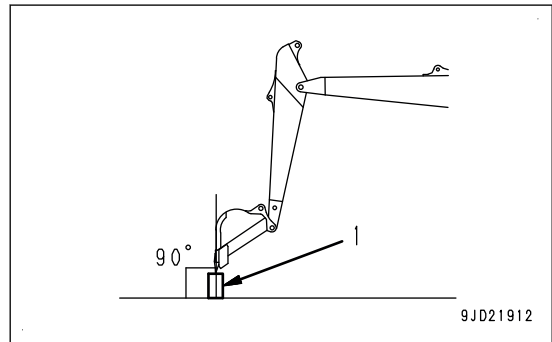


- Move the machine to the control point which was measured, and fit the bucket edge to the control stake (1).

REMARK

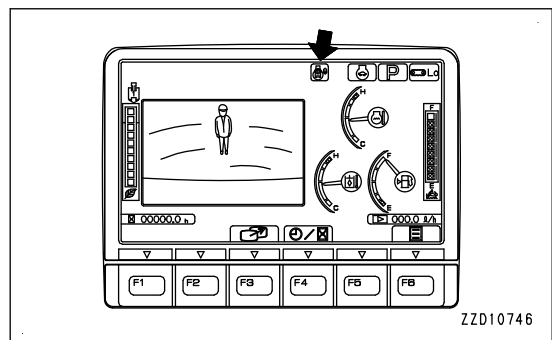
When the bucket edge is fitted to the control stake (1), adjust the posture of work equipment to let the angle of the bottom face of bucket against the ground face be a right angle.

If the bucket edge cannot be fitted directly to the control stake (1), raise the bucket edge within 1 m above the control stake (1) only in height direction, and input the value of raised distance into "Offset" column. Tap "Offset", and the numeric keypad is shown. Input the value of raised distance in height direction, and tap "OK".



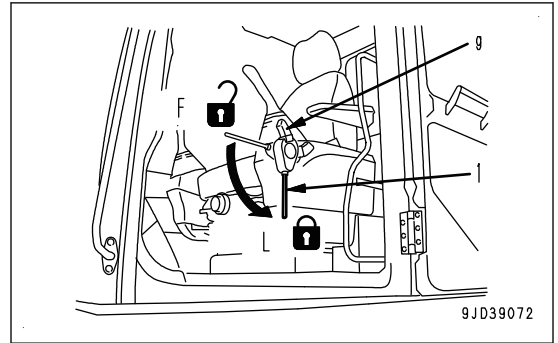
9JD21912

- Set the swing lock switch to the ON position and check that the swing lock monitor is lit on the machine monitor.

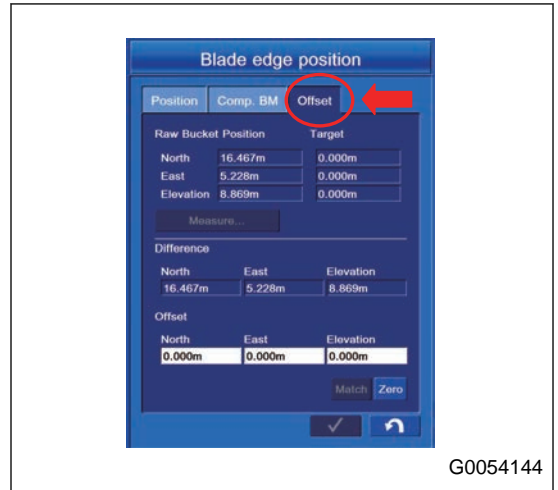


ZZD10746

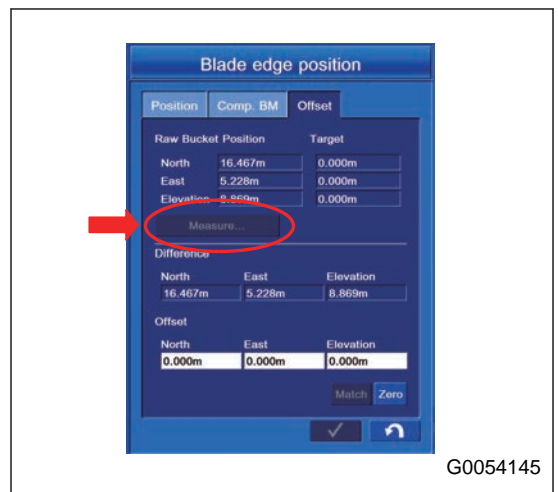
- Operate the operating portion (g) of the lock lever (1) to set it securely to the LOCK position (L).



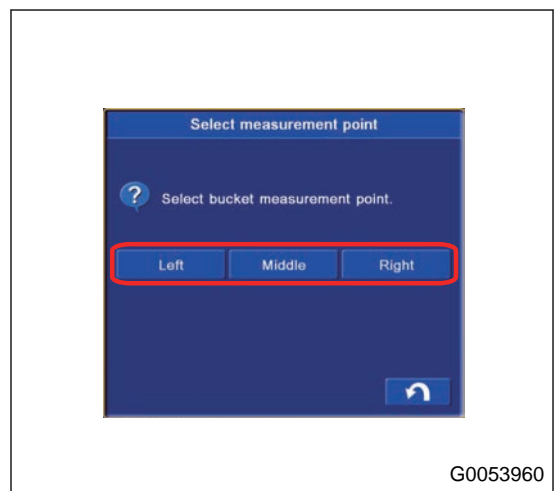
- Tap "Offset" tab.



- Tap "Measure..." button on the bottom left center of monitor screen.
Measurement of bucket edge position starts.



Tap "Measure..." button, and you can select the reference point of bucket edge from "Left", "Middle", and "Right".

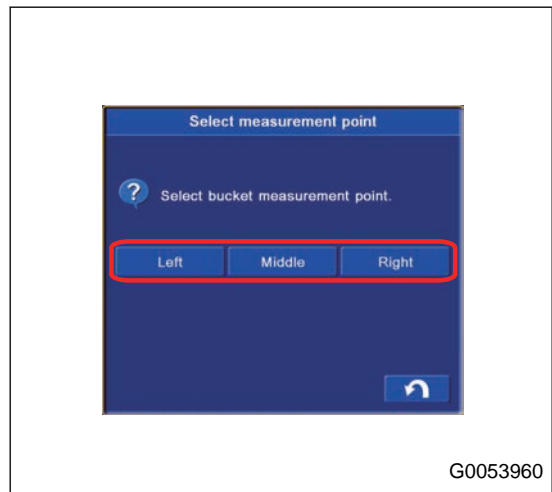


11. The bucket edge position coordinates measured by GNSS which is not offset is shown in "Raw Bucket Position" column.

If you want to measure the current bucket edge position again, tap "Measure..." button in the center of monitor screen. Measurement of bucket edge position starts.

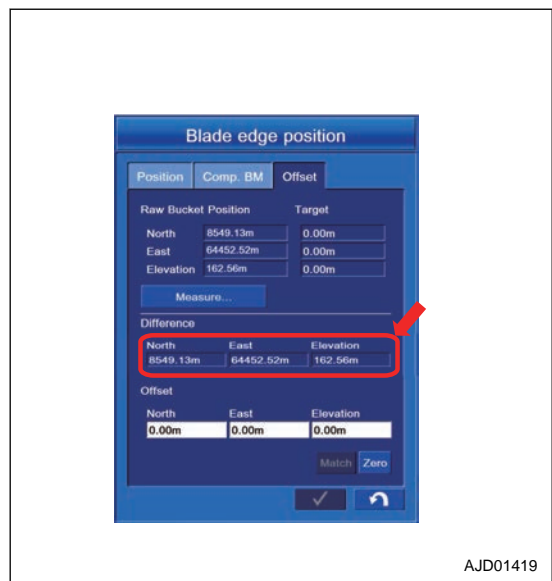


Tap "Measure..." button, and you can select the reference point of bucket edge from "Left", "Middle", and "Right".



Deviation between the current bucket edge position and the coordinates position of control stake is shown in "Difference" column.

Check that this deviation is within the required accuracy of the jobsite.



- 12. When the deviation of coordinates position satisfies the required accuracy of jobsite, tap "ENTER" button and the display goes back to the working screen.



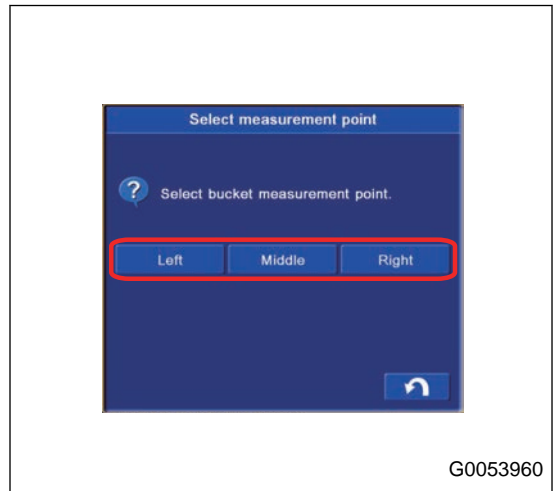
AJD01421

- 13. If the deviation of coordinates position does not satisfy the required accuracy of jobsite, tap "Match" button. Compensation value is automatically calculated to let the bucket edge position become the same as the control point.



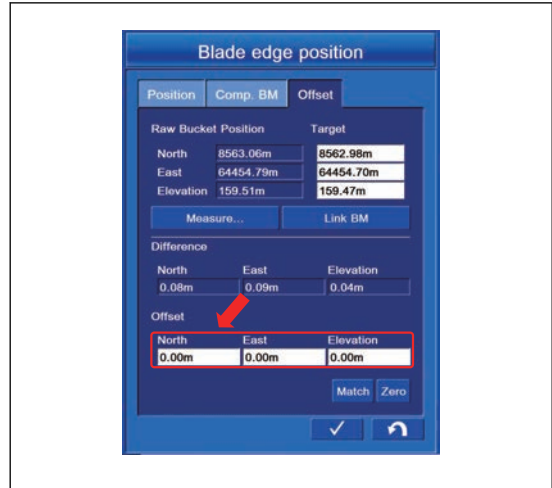
AJD02014

Tap "Measure..." button, and you can select the reference point of bucket edge from "Left", "Middle", and "Right".



G0053960

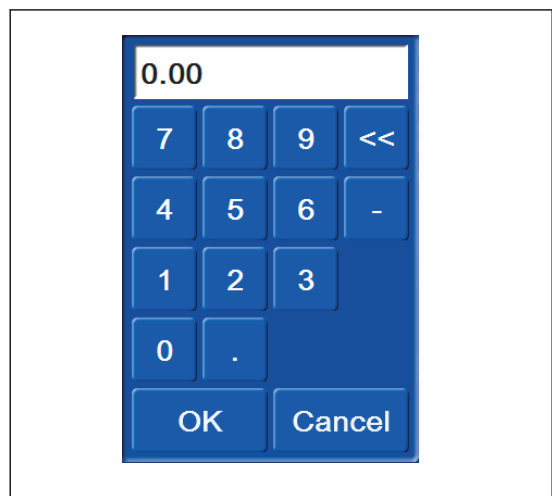
- To correct the deviation of coordinates position individually, tap the column in "Offset" column where you want to input.



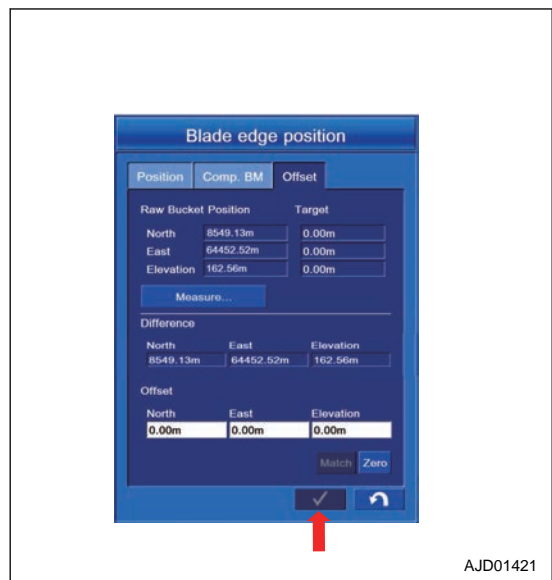
Numeric keypad is shown. Input the coordinates value and tap "OK".

REMARK

- << button: Deletes 1 numeric number.
- "OK" button: Validates the input and moves the screen back to the previous screen.
- "Cancel" button: Cancels the input and moves the screen back to the previous screen.

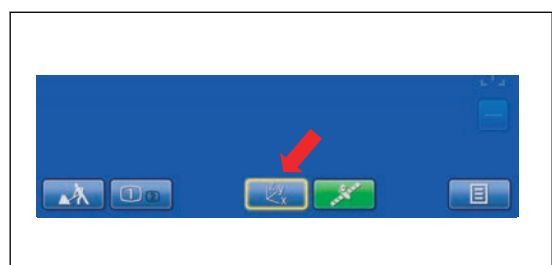


- Tap "ENTER" button and the screen goes back to the working screen.



AJD01421

- On the standard working screen, check that the bucket edge position button is surrounded by yellow frame.



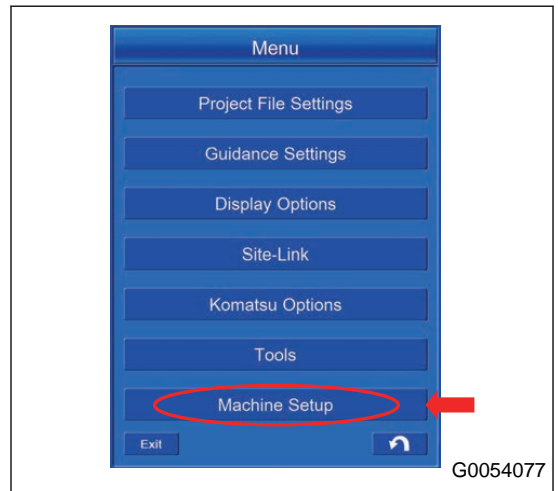
METHOD FOR CALIBRATING BUCKET TOOTH

When bucket tooth has been worn and shortened, the tooth length setting can be adjusted with Bucket Configuration in Machine Setup menu.

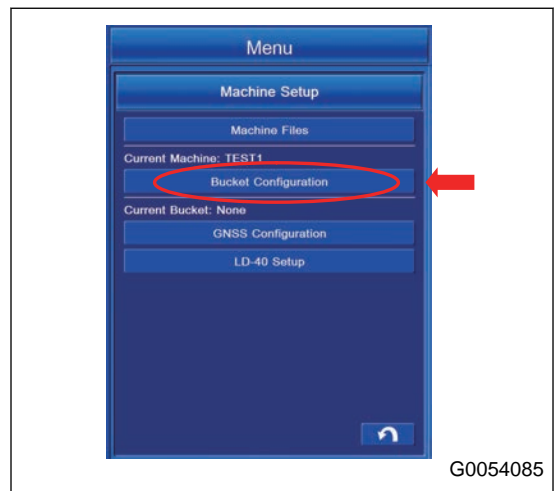
- 1. Tap the menu button on the control box.
Menu screen is displayed.



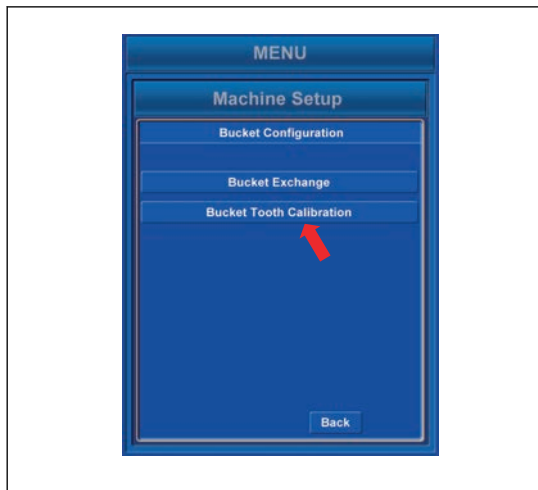
- 2. Tap the "Machine Setup" button.
The display changes to the Machine Setup screen.



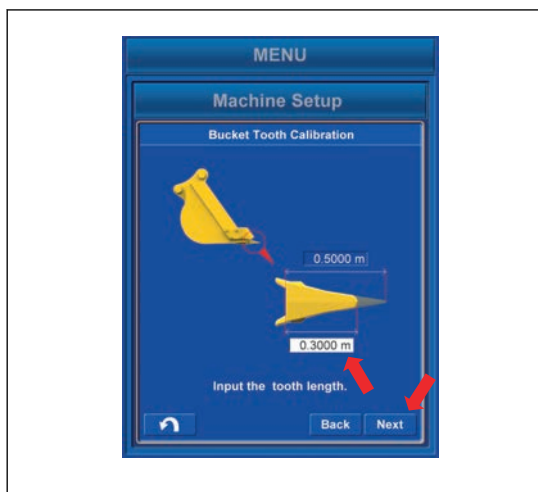
- 3. Tap the "Bucket Configuration" button.
The display changes to the Bucket Configuration screen.



4. Tap the “Bucket Tooth Calibration” button.



5. Input the length of bucket tooth on the Bucket Tooth Calibration screen.



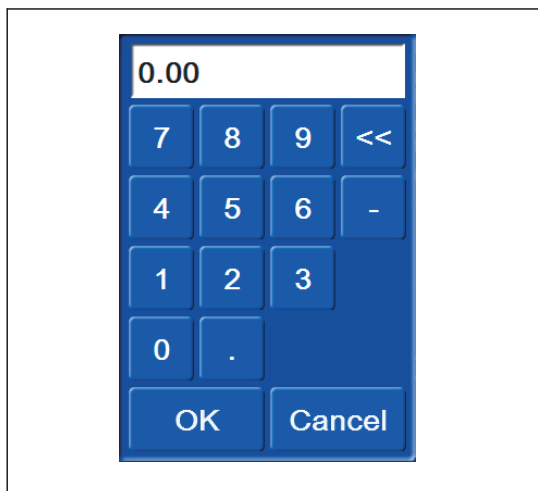
Tap the column to input, and the numeric keypad is displayed. Input the coordinates value and tap the “OK”.

REMARK

<< button: Deletes 1 numeric number.

“OK” button: Validates the input and returns the display to the previous screen.

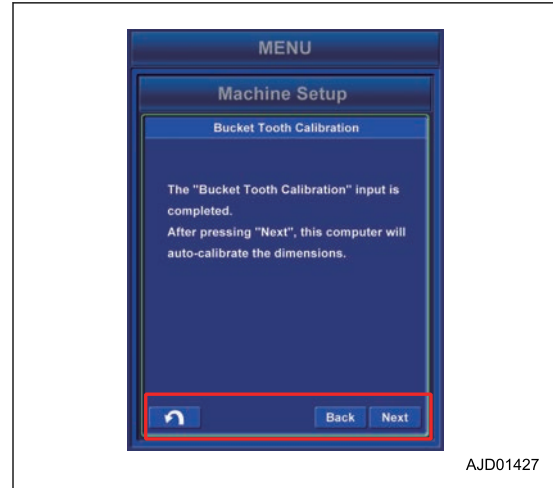
“Cancel” button: Cancels the input and returns the display to the previous screen.



- 6. Confirmation screen for resetting of bucket tooth dimension is displayed. Tap the "Next" button and proceed to the next screen.

REMARK

"Back" button: Display returns to previous screen.
RETURN button: Display returns to Machine Setup screen.



- 7. When the resetting of bucket tooth dimension is completed, the screen shown right is displayed. Tap the "Set" button and save the new dimension.

Display returns automatically to the Machine Setup screen after the saving is finished.

REMARK

"Back" button: Display returns to previous screen.
RETURN button: Display returns to Machine Setup screen.

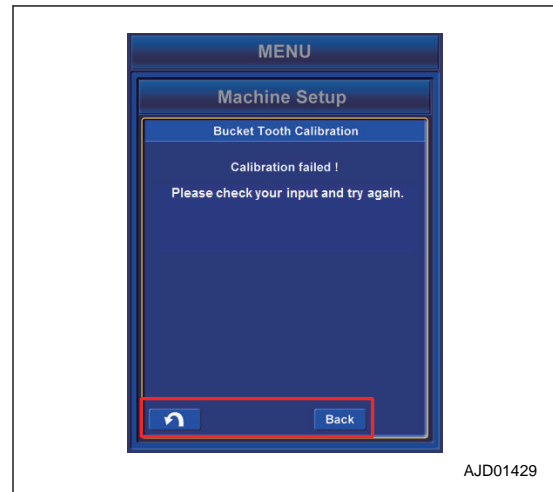


Resetting of dimensions is failed if the screen shown right is displayed.

In this case, repeat the procedure from inputting of compensation value of bucket tooth dimension, or correct the coordinates value referring to "METHOD FOR CHECKING AND ADJUSTING BUCKET EDGE ACCURACY".

REMARK

"Back" button: Display returns to previous screen.
RETURN button: Display returns to Machine Setup screen.



CHECK GNSS COMMUNICATION STATUS

Satellite communication state can be checked on GNSS acquiring state menu.

GNSS (Global Navigation Satellite System)

METHOD FOR CHECKING GNSS COMMUNICATION STATUS

Tap the button (1) on the screen, the display changes to "GNSS Status" screen and communication state of satellite can be checked.

Main GPS displays the received GPS information by L.H. antenna.



Aux GPS displays the received GPS information by R.H. antenna.

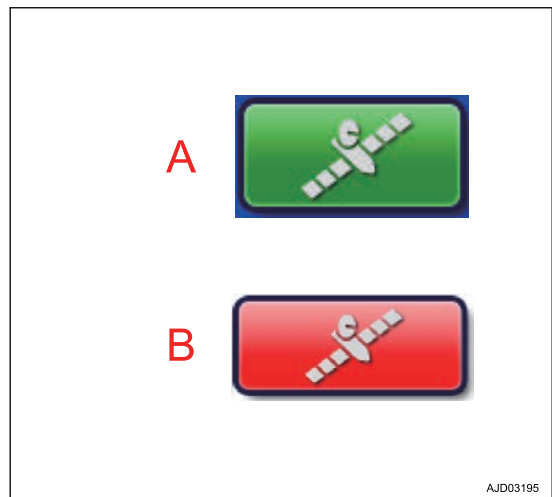
Color of the button (1) changes depending on the communication state of satellite.

Green (A): Communication state of satellite is good.

Red (B): Communication state of satellite is bad.

REMARK

While the button is red, monitor does not display correctly. Once the communication state of satellite becomes good, system returns to normal condition, so wait until the button becomes green.



METHOD FOR CHECKING NUMBER OF SATELLITES AND ERROR OF POSITIONING

You can show the status and coordinates error of GPS and GLONASS satellite which are caught.

Tap "Fix" tab to select.

The same items are shown in each of "Main GPS" and "Aux GPS".

(1) "Initialized!"

Status of main GPS and Aux GPS antenna is shown.

(2) "Total sats tracked"

Number of satellites which is caught is shown.

(3) "GPS sats used"

Number of GPS satellites used for the position calculation is shown.

(4) "GLONASS sats used"

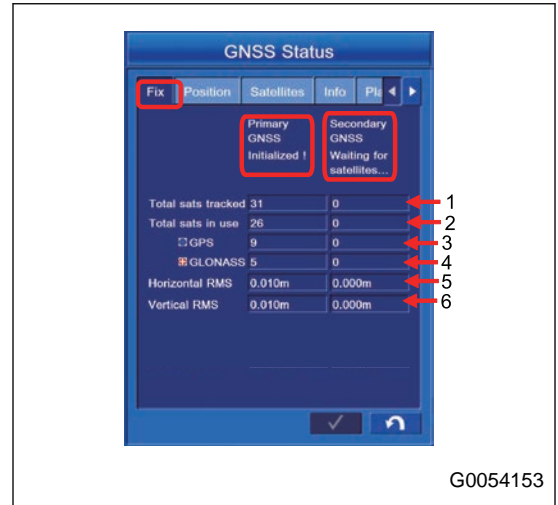
Number of GLONASS satellites used for position calculation is shown.

(5) "Horizontal RMS"

Horizontal RMS value (error) is shown.

(6) "Vertical RMS"

Vertical RMS value (error) is shown.



REMARK

The accuracy of positioning is good if each value of "Horizontal RMS" and "Vertical RMS" is 0.02 m or below.

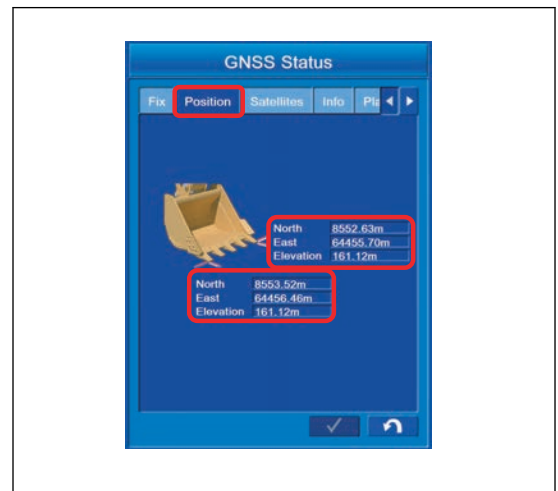
METHOD FOR DISPLAYING BUCKET EDGE COORDINATES

Bucket tooth tip coordinates can be displayed.

Coordinates of bucket tooth tips at left end and right end are displayed in set coordinates display.

REMARK

When the bucket width between bucket side cutters is input, left end and right end denotes the end of the side cutter.



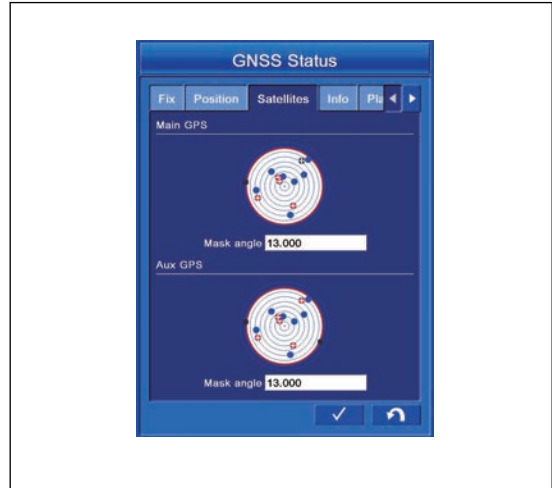
METHOD FOR SETTING SATELLITE POSITION DISPLAY AND ELEVATION ANGLE

Satellite position and elevation angle in the sky above the machine are displayed.

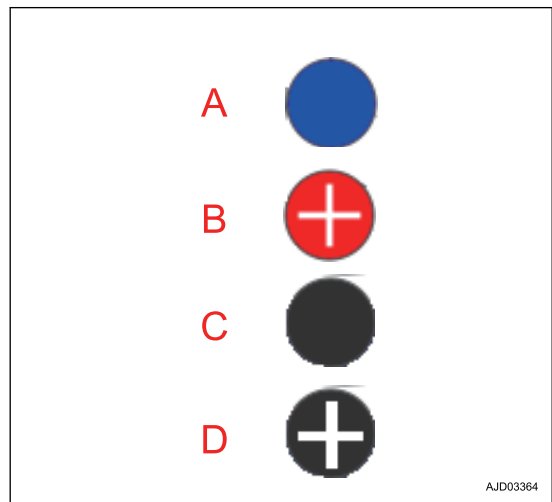
REMARK

Elevation angle means the upward angle based on the horizon.

1. Tap the "Satellites" tab to select.



- (A) Blue: Indicates GPS satellite.
- (B) Red cross: Indicates GLONASS satellite.
- (C) Black: Indicates GPS satellite which cannot be acquired.
- (D) Black cross: Indicates GLONASS satellite which cannot be acquired.



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Mask angle

The angle (elevation angle) which GNSS antenna can communicate is displayed.

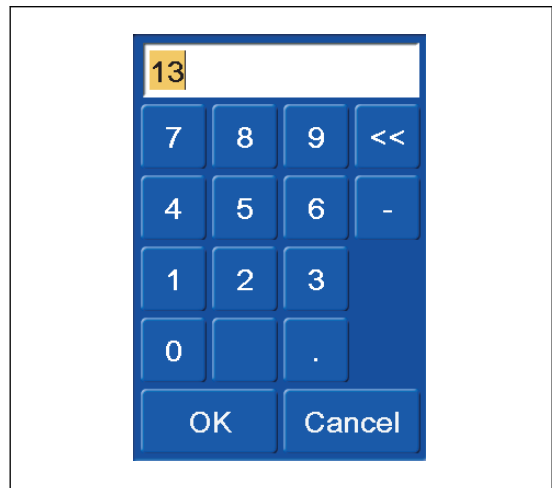
2. Input 13 ° normally.

When changing the setting, tap the numeric value. The numeric keypad pops up.

A red circle indicates the range of communication. The smaller the angle value of communication becomes, the larger the range of communication becomes. Making the value larger narrows the range of communication.

NOTICE

The accuracy of bucket edge may be deteriorated if the communication range of satellite is changed without reason.



METHOD FOR DISPLAYING GNSS RECEIVER INFORMATION

It displays the information of GNSS receiver.

Tap the "Info" tab to select.

Same items are displayed in each of "Main GPS" and "Aux GPS".

(1) "Receiver ID"

ID of GNSS receiver (MC-R3) is displayed.

(2) "Firmware"

Firmware version of GNSS receiver (MC-R3) is displayed.

(3) "Radio link"

Connecting condition with GNSS radio device is displayed.

(Type of connection, communication delay time, and the radio quality are displayed.)

(4) "Distance to Base"

Distance to GNSS Base station is displayed.

(5) "Reset receiver" button

When resetting satellite information, tap this button.

(6) "Reset RTK" button

When you cannot connect to GNSS Base station, tap this button.

If you cannot receive satellite information well, reset the satellite information of GNSS receiver (MC-R3).

Tap the "Reset receiver" button (5). Warning screen for confirmation pops up.

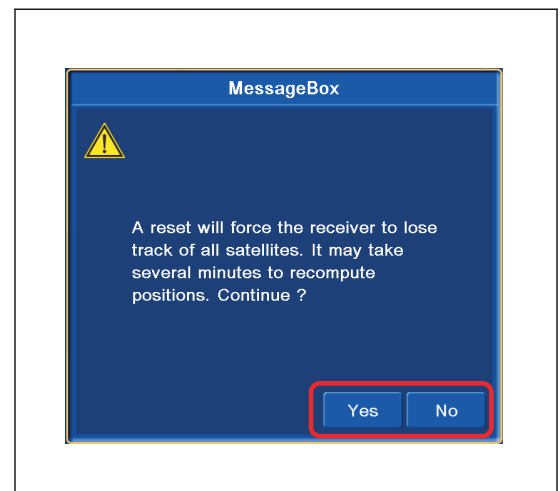
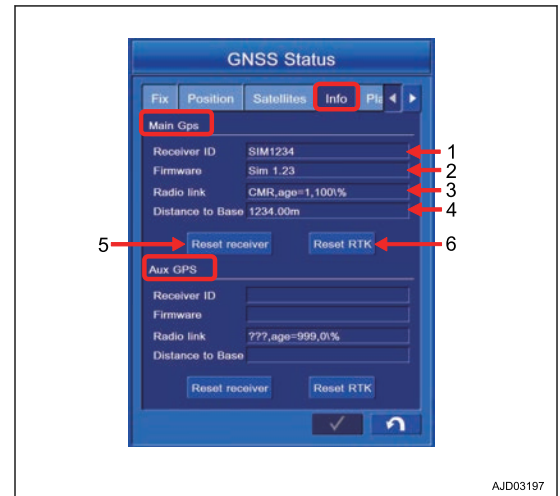
When resetting, tap "Yes" button.

When not resetting, tap "No" button.

REMARK

Performing this resetting initializes the NVRAM (satellite orbit information, including the almanac information). After the initialization is finished, it takes approximately 15 minutes to obtain the latest almanac information again.

If the error message of "Waiting for radio link..." is displayed on the working screen of the intelligent Machine Control system, tap the Reset "Reset RTK" (6) to reset the connection once.

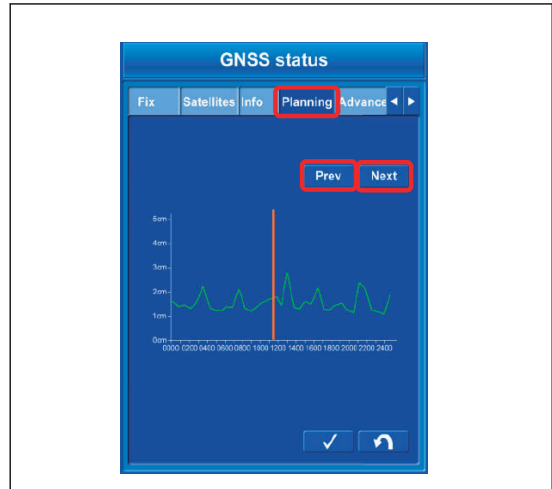


METHOD FOR CHEKING EXPECTANCY OF EDGE ACCURACY

You can see the expectancy of bucket edge accuracy of work equipment.

Tap the "Planning" tab to select.

- Horizontal axis of the graph
Time axis (24-hour system display)
- Vertical axis of the graph
Bucket edge accuracy
- Red vertical line
Current time
- "Prev" button
Tap this button in order to see the expectancy of bucket edge accuracy of previous day.
- Tap the "Next" button.
Tap this button in order to see the expectancy of bucket edge accuracy of next day.



METHOD FOR SETTING GLONASS SATELLITE

You can choose either to use the GLONASS satellite of main GPS or not to use it by this setting.

Tap the "Advanced" tab to select.

Put a tick in the check box of "Use GLONASS satellites", and you can use GLONASS satellite.

GLONASS satellite is not used when the tick is not put.

REMARK

GPS satellite and GLONASS satellite can be acquired in the intelligent Machine Control system.

The accuracy of the bucket edge may be deteriorated if the acquired number of GLONASS satellite increases compared to the number of GPS satellite depending on the state of satellite trace. In this case, do not use GLONASS satellite. Use GPS satellite only. The accuracy of the bucket edge may be improved by doing this.

Use GLONASS satellite normally.

When both of the machine and the base station use GLONASS and the base station is not manufactured by TOPCON, select an applied base station manufacturer such as Sokkia, Trimble, etc. from "Base manufacturer:" list.

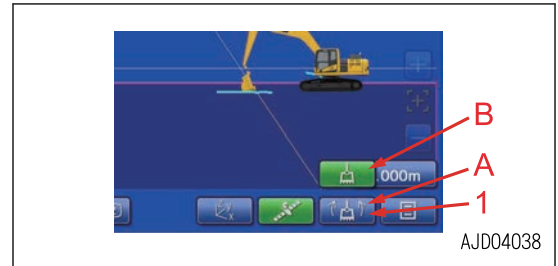


METHOD FOR SETTING TILT SENSOR

(when the tilt sensor TS-1 is installed)

1. Tap the button (1) at the bottom right of the working screen.

The button pops up.



2. Tap the button (1) to select the setting of bucket tilt sensor.

REMARK

The setting of bucket tilt sensor can be changed only when the manual mode is set.

When the semi-auto mode is set, it automatically changes to fixed sensor value mode, and the control of tilt axis is not performed.

The facing angle compass may be misaligned or the bucket edge angle may change if tilting angle changes after fixing due to external load. This is because the value of tilting angle is fixed when the tilt bucket is equipped if semi-auto mode is selected. In that case, change the setting to the manual mode once and detect the tilting angle by sensing mode, and then continue the operation.

When proceeding to the semi-auto mode, be sure to check that tilting angle is stabilized.

(A) Sensing mode

Select the blue icon (A), and the bucket tilting angle is detected.

It automatically changes to the fixed sensor value mode when semi-auto mode is set.

(B) Fixed sensor value mode

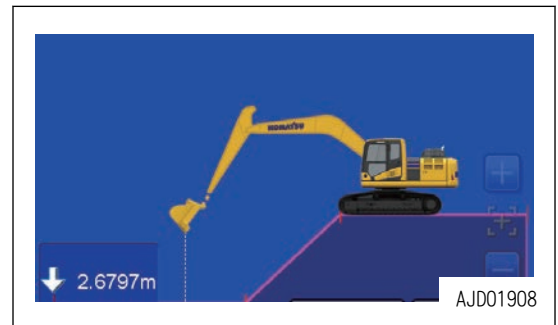
Select the green icon (B), and the sensor value of bucket tilting angle can be fixed.

Use this mode when performing the fine digging with the bucket tilted in order to make a slope and such.

It automatically changes to the fixed sensor value mode when semi-auto mode is set.

REMARK

- Tilt bucket display on the screen of control box may wobble when performing the construction in sensing mode, but this is not a trouble.
- Tilt bucket display on the control box may wobble despite the tilt bucket standing still when performing the operation in sensing mode.
This is due to the stability of bucket tilt angle sensor, and it is not a trouble.
- The accuracy is deteriorated when the tilt sensor is getting inclined. The color of button changes, but it is not a failure.
- The semi-auto mode cannot be used when the accuracy of tilt sensor is deteriorated.



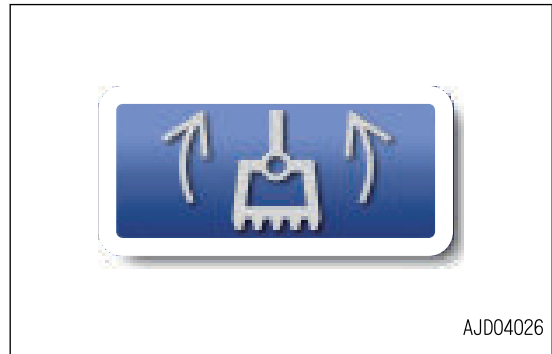
About tilt sensor icons

(1) When manual mode is set

(A) Sensing mode

When the accuracy is good, the blue icon shown in the figure is displayed.

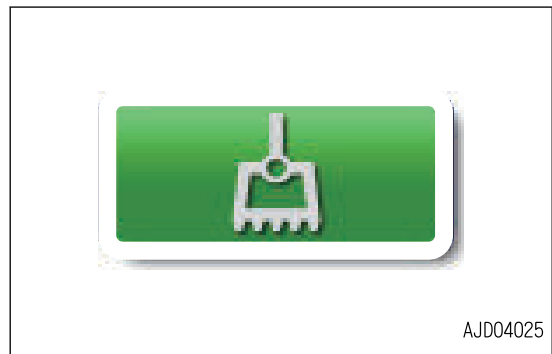
You can proceed to the semi-auto mode as long as this icon is displayed.



(B) Fixed sensor value mode

When the accuracy is good, the green icon shown in the figure is displayed.

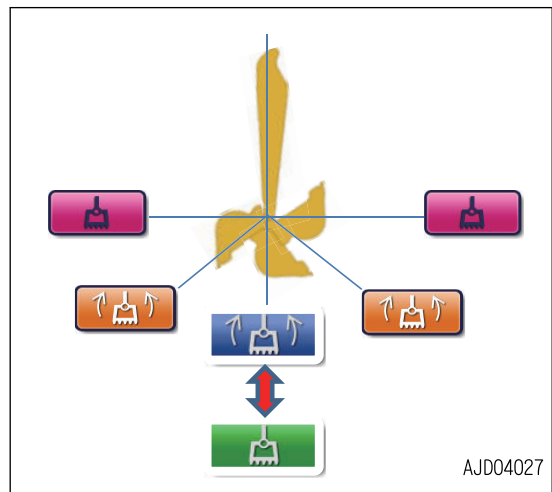
You can proceed to the semi-auto mode as long as this icon is displayed.



(C) When accuracy is deteriorated

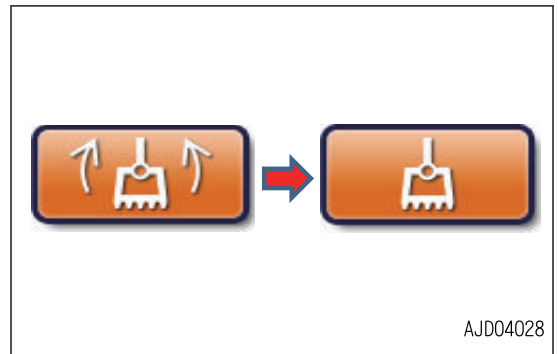
The accuracy of the tilt sensor is deteriorated when the bucket is getting inclined to the bucket DUMP side or bucket CURL side as shown in the figure.

In this case, you cannot proceed to the semi-auto mode and the accuracy of bucket edge is deteriorated.

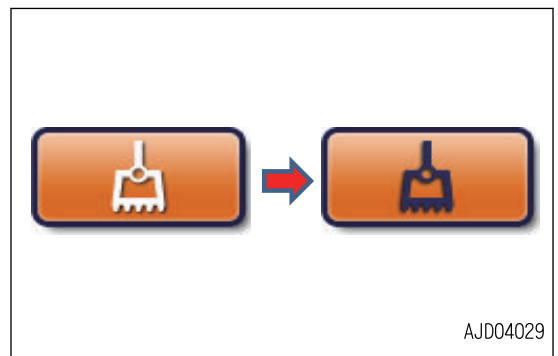


If the fixed sensor value mode is used by changing it from the sensing mode while the accuracy of tilt sensor is being deteriorated, the icon display changes as follows. Be careful that the accuracy of bucket edge may deteriorate.

If the fixed sensor value mode is selected while the sensing mode is being set and the orange icon is being displayed, the icon display changes as shown in the figure.

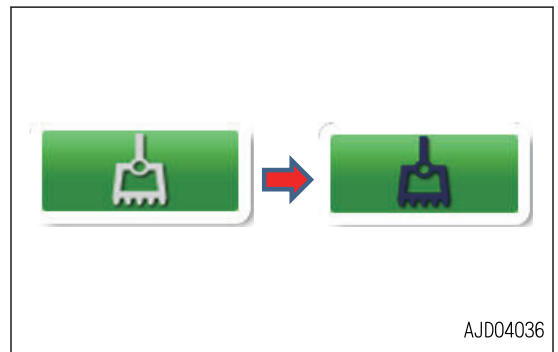


If the bucket is inclined further while the orange icon is being displayed, the bucket display color changes from white to black.



REMARK

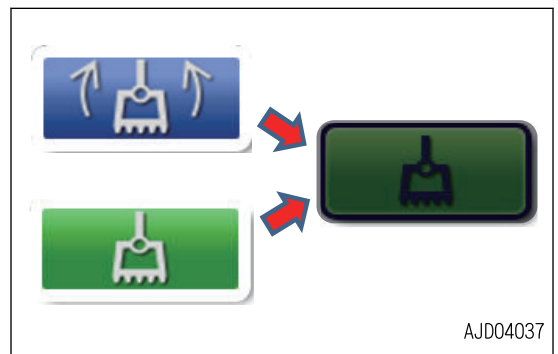
If the bucket is inclined while the fixed sensor value mode is being set and the green icon is being displayed, the bucket display color changes from white to black. There is no problem in the accuracy of bucket edge.



(2) When semi-auto mode is set

You can proceed to the semi-auto mode if the blue background icon is displayed while the manual mode is set, or if the green background icon is displayed while the fixed sensor value mode is set.

The grayed out icon as shown in the figure is displayed while the semi-auto mode is set.



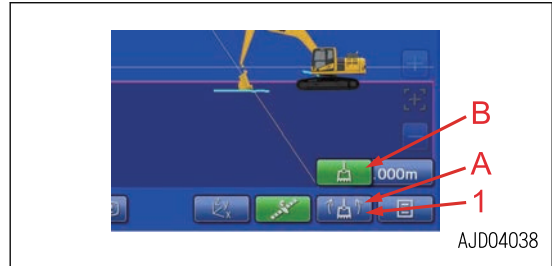
Setting tilt sensor

(when the auto tilt bucket is installed)

1. Tap the button (1) at the bottom right of the working screen.
The button pops up.
2. Tap the button (1) to select the setting of tilt sensor.

REMARK

The setting of tilt sensor can be changed only when the manual mode is set.



(A)Sensing mode

Select the blue icon (A), and the bucket tilting angle is detected.

(B)Fixed sensor value mode

Select the green icon (B), and the sensor value of bucket tilting angle can be fixed.

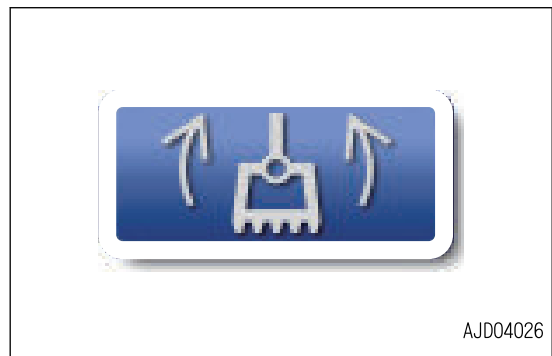
Use this mode when performing the fine digging with the bucket tilted in order to make a slope and such.

About tilt sensor icons

(1) When manual mode is set

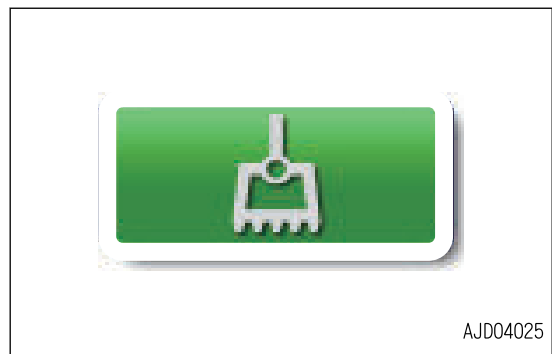
(A) Sensing mode

The blue icon shown in the figure is displayed.



(B) Fixed sensor value mode

The green icon shown in the figure is displayed.



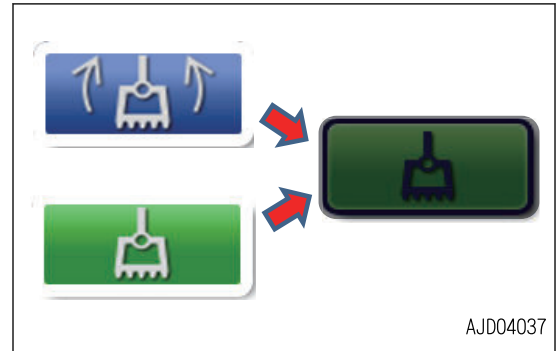
(2) When semi-auto mode is set

You can proceed to the semi-auto mode if the blue background icon is displayed while the manual mode is set, or if the green background icon is displayed while the fixed sensor value mode is set.

The grayed out icon as shown in the figure is displayed while the semi-auto mode is set.

REMARK

When the auto tilt bucket is installed, the accuracy of sensor does not deteriorate due to the bucket angle. So, highly accurate operation can be performed regardless of the bucket angle.



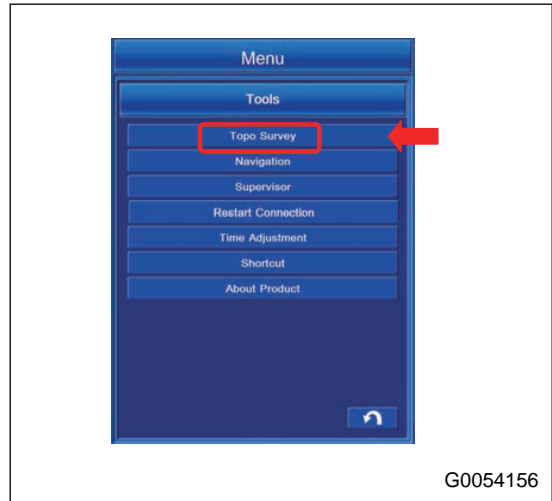
USE OF TOPO SURVEY

The current position can be measured by saving the position data of bucket edge. There are manual method and auto method for measuring. A single data is saved in manual method, and a series of data are saved in auto method.

For the position measurement, setting is needed at the beginning. For the details of position measurement, see "METHOD FOR SETTING TOPO SURVEY".

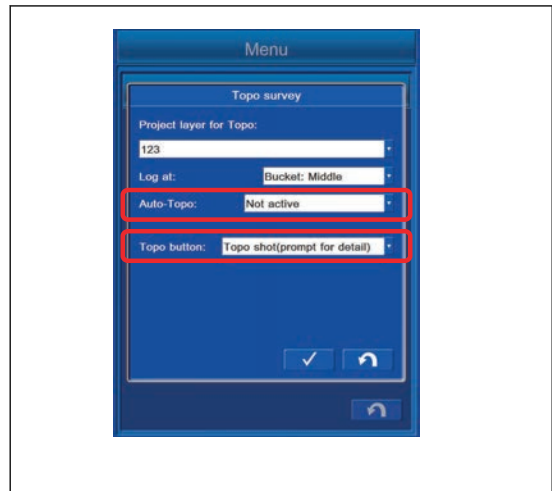
METHOD FOR PERFORMING TOPO SURVEY MANUALLY

- 1. Tap "Topo Survey" button in the Tools menu.
The screen changes to topographical survey setting screen.

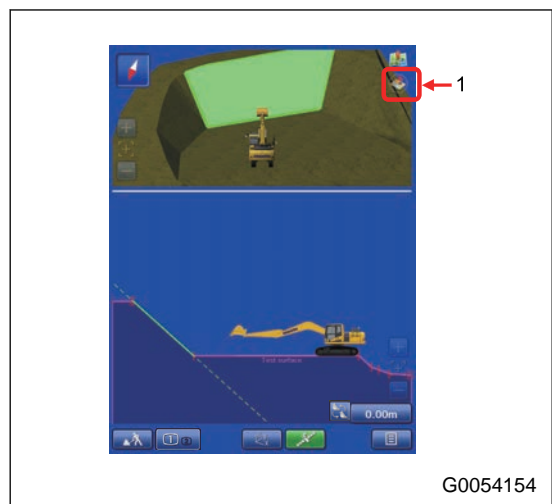


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- 2. Set "Auto-Topo" to the Not active, and set "Topo button" to "Topo shot(prompt for detail)" or "Topo shot(no prompt)".



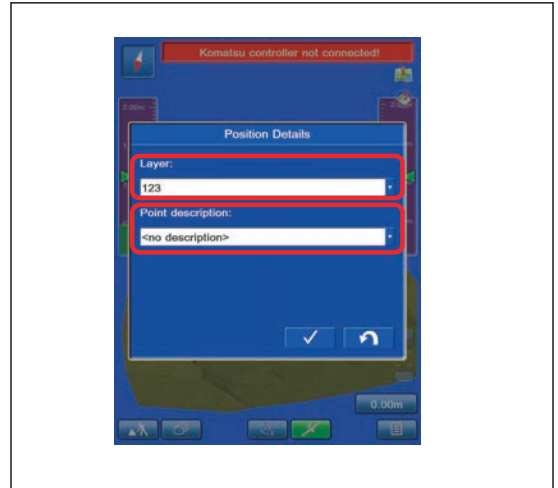
- 3. Move the bucket edge to the desired measuring point and tap the button (1).



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- 4. If you selected “Topo shot(prompt for detail)” at step. 2, screen to input the names of “Layer” and “Point descriptions” (bucket edge position data) is shown.

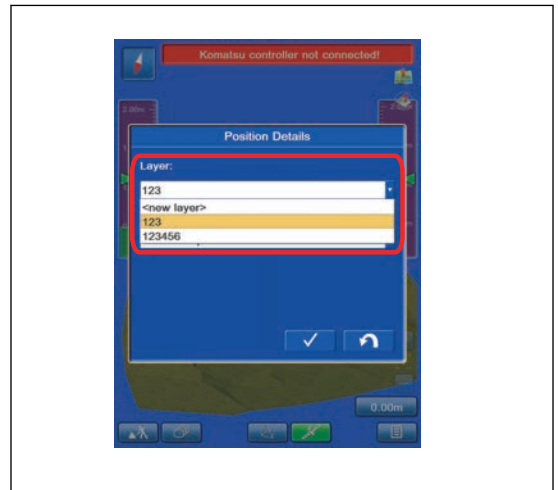
The name of set Layer and Point description (bucket edge position data) are shown if you selected “Topo shot(no prompt)” at step.2.



CREATE NEW LAYER TO RECORD DATA

Select the “<new layer>” on the layer column, and input a name.

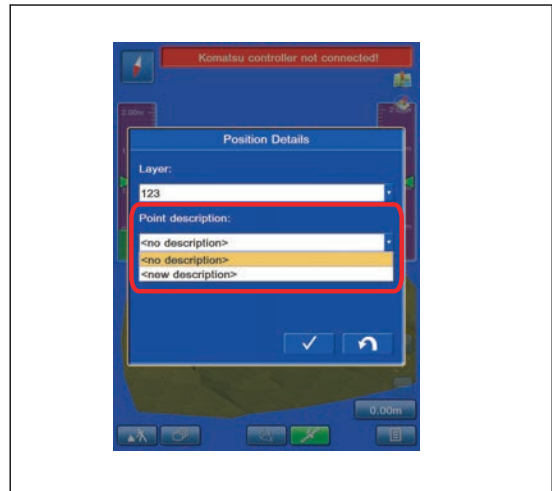
If the layer for saving data is in a list, select the layer.



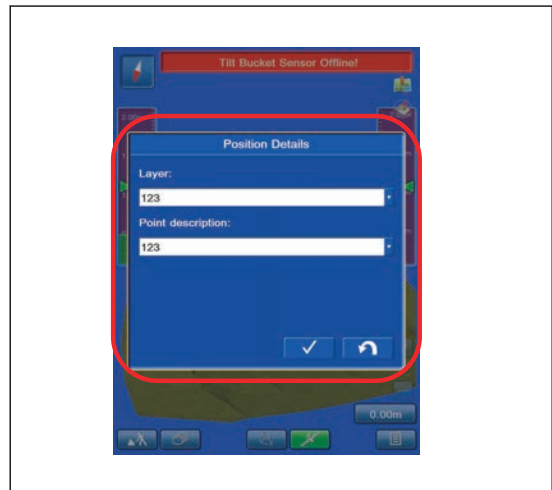
METHOD FOR INPUTTING NEW POSITION DETAILS NAME

1. Select the "<new description>" in "Point description" column, and input any name.

If the name of the point is in a list, select that "Point" name.



Data is saved with the layer name and point name which has been set.



2. Tap the ENTER button to save the setting.
Tap the RETURN button to return the display to the previous screen.
Each time the button (1) is pressed, data is saved.

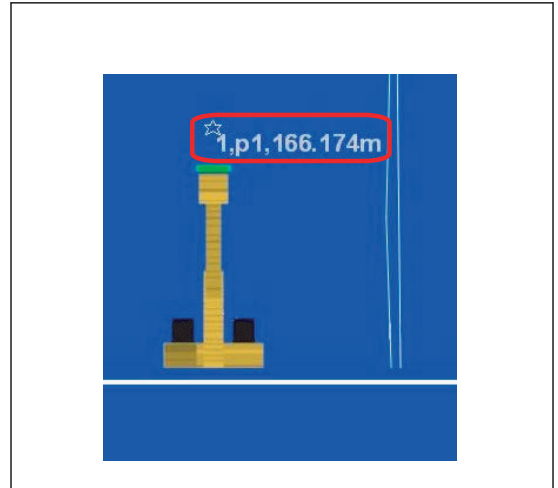


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Contents of point details (bucket edge position data) is displayed.

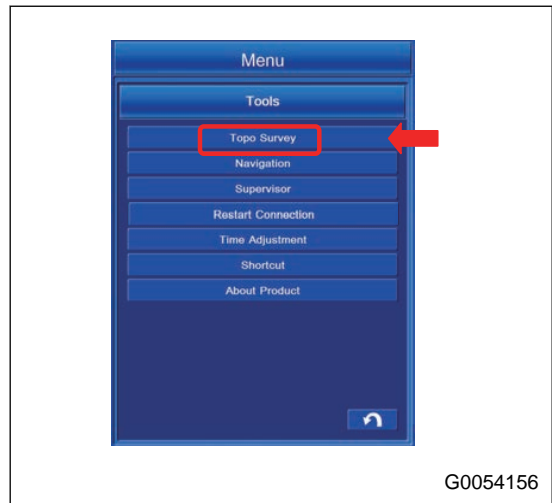
Contents of display are "Log at", "Number", "Name", and "Elevation".

For the setting procedure of display, see "LAYERS SETTINGS".



METHOD FOR PERFORMING AUTO-TOPO SURVEY

1. Tap "Topo Survey" button in the Tools menu.
The screen changes to topographical survey setting screen.



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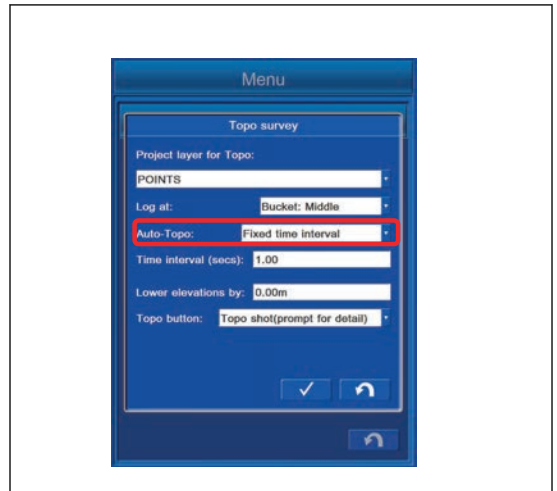
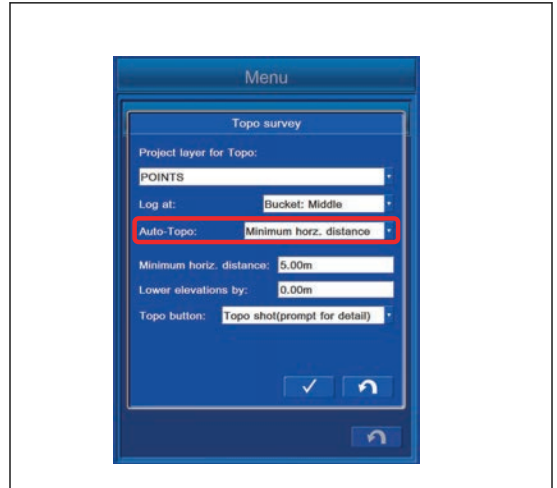
2. When you create a new layer, select "<New>" on "Project layer for Topo:", and input the name freely.
If the layer for saving data is in a list, select the layer.



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- 3. For setting Auto-Topo Survey, set it to "Minimum horz. distance" for the Auto-Topo (distance measurement). Set it to "Fixed time interval" for Auto-Topo (time measurement).

For setting Auto-Topo Survey, see "METHOD FOR SETTING AUTOMATIC TOPO SURVEY (DISTANCE BASED)", "METHOD FOR SETTING AUTOMATIC TOPO SURVEY (TIME BASED)".

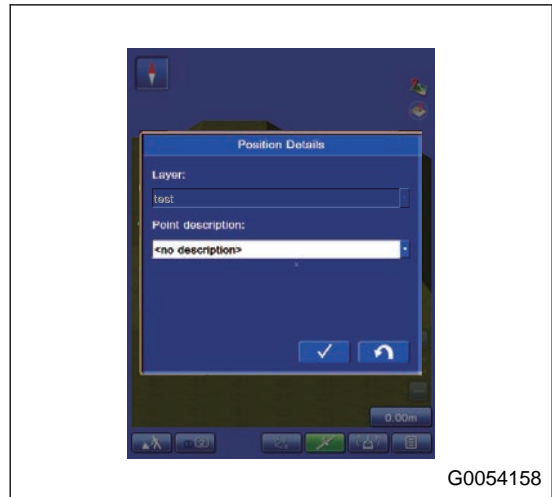


- 4. Move the bucket edge to the desired point and tap the button (1).



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5. The screen to input the name of the Layer to be saved and Point description (bucket edge position data) is shown.
The layer which has been set at step. 2. is shown.
You cannot create a layer or select a layer here.

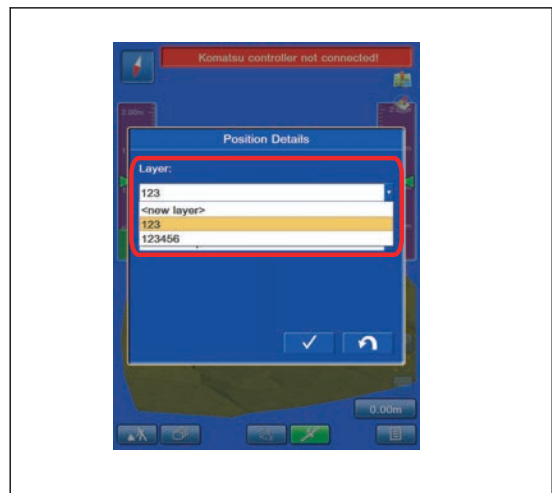


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METHOD FOR CREATING NEW LAYER TO RECORD DATA

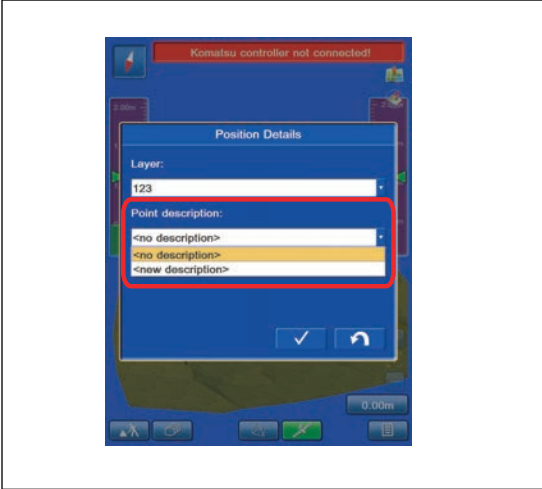
Select the "<new layer>" on the layer column, and input a name.

If the layer for saving data is in a list, select the layer.

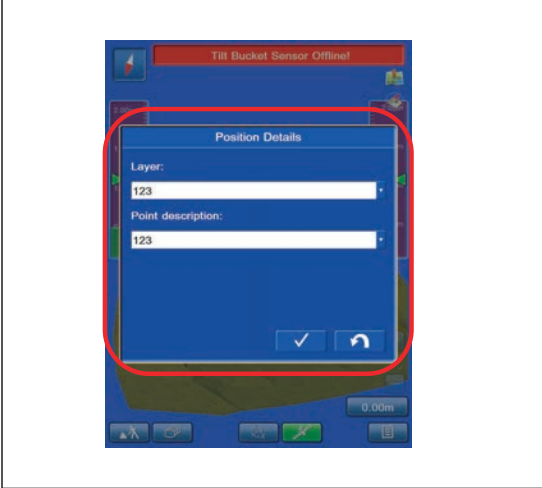


METHOD FOR INPUTTING NEW POSITION DETAILS NAME

1. Select the "<new description>" in "Point description" column, and input any name.
If the name of the point is in a list, select that survey point name.
Data is saved with the layer name and survey point name which has been set.



2. Tap the ENTER button to save the setting.
Tap the RETURN button to return the display to the previous screen.



3. Move the bucket edge to the desired point and tap the button (1).
Data is saved continuously in accordance with the recording condition until the button (1) is tapped again.

REMARK

Recording condition denotes the setting condition at "Minimum horz. distance" for distance observation and at "Fixed time interval" for time observation.

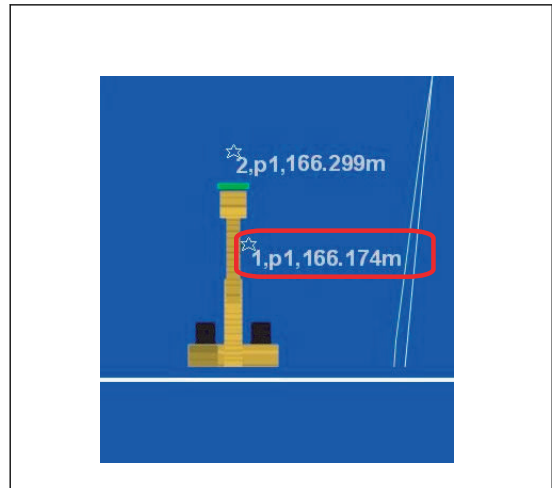


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- The details of the topographic survey point are displayed and recorded.

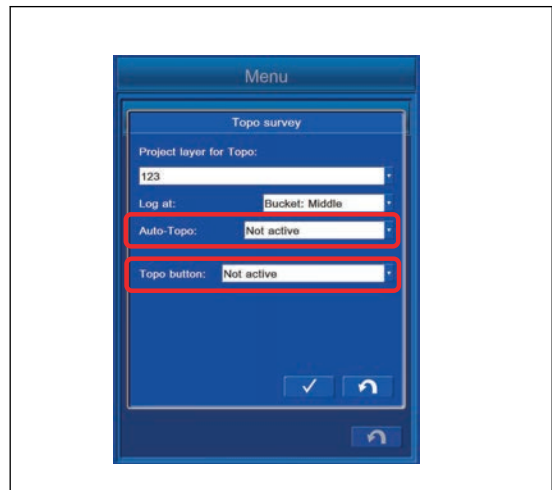
Contents of display are “Symbol”, “Number”, “Name”, and “Elevation”.

For the setting procedure of display, see “METHOD FOR SETTING LAYERS”.



METHOD FOR CANCELING TOPOGRAPHIC SURVEYS

Set the “Auto-Topo” to “Not active”, and set the “Topo button” to “Not active” as well.



TROUBLESHOOTING

CONTROL BOX SCREEN DISPLAY

Phenomena	Check item	Reference
No design data is displayed.	Check that "Out of designarea..." is not displayed. If it is displayed, this is the case that the design data is out of the screen and this is not a failure. Move to the job site and check again.	PHENOMENA AND ACTIONS FOR CONTROL BOX
	Check that the design data has been set. Create or download the design data, and check that it is displayed.	SURFACES SETTINGS
Screen suddenly rotates.	Check if the error message of "Initializing...", etc. is displayed. If any of the error messages is displayed, the phenomena like this may happen, but it is not a failure. Perform the remedy for the error message.	PHENOMENA AND ACTIONS FOR CONTROL BOX
Symbol mark of machine or bucket has disappeared.	Press the cross button between zoom in button and zoom out button to check that the symbol mark appears.	DISPLAY OF TRAVEL MODE

Phenomena	Check item	Reference
<p>The facing angle compass does not become perpendicular to the target.</p> <p>(Display of the machine is on slant against the design data despite of the actual machine facing perpendicular to the target data.)</p>	<p>Check that the desired design data is selected.</p> <p>Selected design data is highlighted in white. Check that the desired one is selected.</p>	METHOD FOR SETTING ROUGH DIGGING SCREEN
	<p>Check that the machine is on the stable ground so that it is not shaken.</p> <p>When the machine is operated on the unstable ground where the machine rocks heavily, the facing angle compass may not become perpendicular to the target due to poor response of IMU sensor sensing the machine posture. However, this is not a failure.</p>	-
	<p>Check that the bucket configuration is complied with the actual bucket installed.</p> <p>If the bucket configuration is not correct, the display of the facing angle compass is not correct, either.</p>	BUCKET CONFIGURATION
	<p>Check that the screen is not 3D view.</p> <p>The display of the machine may not seem to be facing perpendicular to the target despite of the actual machine facing perpendicular to it. However, this is not a failure.</p>	SCREEN LAYOUT SETTINGS
	<p>Check that the sensor value fix mode is not set as the setting of tilt sensor.</p> <p>When the sensor value fix mode is selected, the display of the tilt bucket on the control box screen does not tilt even if the actual bucket is tilted, and the facing angle compass display does not reflect the actual machine.</p>	METHOD FOR SETTING TILT SENSOR
	<p>Check that there is no defect such as hole or protrusion exists on the design data.</p> <p>If any defect exists, it may not be displayed correctly.</p>	-
	<p>When the auto tilt bucket is installed, the display may be grayed out, but this is not a failure.</p>	-
	<p>Check that the machine is not facing perpendicular to the target when the upper structure swings any direction.</p> <p>In this case, the color of the facing angle compass is grayed out.</p>	METHOD FOR SETTING ROUGH DIGGING SCREEN
	<p>Check that the IMU adjustment is normal.</p> <p>If the adjustment is necessary, perform "Adjustment Execute", and then check again that the facing angle compass is normally displayed.</p>	IMU ADJUSTMENT

Phenomena	Check item	Reference
Semi-auto mode is not displayed although the Auto/Manual switch is pressed.	<p>Check that the travel mode is not selected.</p> <p>Semi-auto mode cannot be selected in travel mode. Set it to "Rough Digging" mode or "Fine Digging" mode.</p>	SEMI-AUTO MODE SETTINGS
	<p>Check that the working screen is displayed but not any of menu screens.</p> <p>Semi-auto mode cannot be selected if any menu screen is displayed.</p>	
	<p>Check that the working mode is not in L or B mode.</p> <p>Change the working mode to any of P, E, ATT/P, and ATT/E modes, and then select the semi-auto mode.</p>	
	<p>Check that the work equipment control lever is not tilted (not operated).</p> <p>Set the work equipment control lever in NEUTRAL, then select the semi-auto mode.</p>	
	<p>Semi-auto mode may not be selected on a steep slopes.</p> <p>Move the machine to the gentle slopes or level ground, and then select the semi-auto mode.</p>	
When the tilt bucket is installed, the display may be shaky even when the machine stands still.	<p>This is an issue of stability of tilt angle sensor, and it is not an abnormality.</p> <p>Set the tilt sensor to the sensor value fix mode, and the shakiness of machine display can be controlled when tilting operation of the tilt bucket is not performed.</p>	METHOD FOR SETTING TILT SENSOR
The control box screen is not shown.	<p>If the intelligent Machine Control system does not start even if the starting switch is turned to the ON position, turn the starting switch to the OFF position, and push the reset button on the control box for 2 seconds.</p> <p>After that, turn the starting switch to the ON position again.</p>	-
The power supply of the control box cannot be turned off.	<p>If the intelligent Machine Control system does not stop even if the starting switch is turned to the OFF position, push the reset button on the control box to stop the system.</p>	-
Virtual Memory Minimum Too Low... is shown.	<p>Set the starting switch of the machine to the OFF position and shut down the control box.</p> <p>After that, set the starting switch of the machine to the ON position and start the control box again.</p>	METHOD FOR SHUTTING DOWN CONTROL BOX METHOD FOR STARTING CONTROL BOX

SEMI-AUTO MODE

Phenomena	Check item	Reference
Semi-auto mode is displayed but the auto grade assist control does not operate.	Check that the design data is displayed. Auto grade assist control does not operate without the design data.	CONTROL BOX SCREEN DISPLAY
	Check that the bucket edge is approaching the design data. The system becomes waiting state, and the auto grade assist control does not operate when digging the higher place than the design data.	-
	Check that travel lever is not operated. Auto grade assist control does not operate while the machine is traveling.	PRECAUTIONS FOR OPERATION
	Check that the machine does not dig in the design data 300 mm {1 ft} and deeper. If the machine digs in the design data 300 mm {1 ft} and deeper, the auto stop control operates.	WORKING MODE
	Check that the machine does not dig in the design data 500 mm {1 ft 8 in} and deeper. The mode changes to the manual mode if the machine digs in the design data by 500 mm {1 ft 8 in} and deeper.	
	Check that there is no defect such as hole or protrusion exists on the design data. The auto grade assist control may not operate normally if there is any defect.	-
	If the engine speed is low, make it full speed.	-
Semi-auto mode is displayed but the auto stop control does not operate.	Check that the design data is displayed. Without the design data, Auto Stop control does not operate. Refer "The design data is not displayed".	-
	Check that the bucket edge is approaching the design data. The system becomes waiting state, and the auto grade assist control does not operate when digging the higher place than the design data.	-
	Check that travel lever is not operated. Auto grade assist control does not operate while the machine is traveling.	PRECAUTIONS FOR OPERATION
	Check that the arm is not operated. Auto grade assist control operates while the arm is operated.	WORKING MODE
	Check that the machine does not dig in the design data 500 mm {1 ft 8 in} and deeper. The mode changes to the manual mode if the machine digs in the design data by 500 mm {1 ft 8 in} and deeper.	
	Check that there is no defect such as hole or protrusion exists on the design data. If there is any defect, the auto stop control may not operate normally.	-

Phenomena	Check item	Reference
<p>The auto grade assist control is not canceled even if the machine moves out the design data when the auto grade assist control is operating near the boundary of the design data.</p>	<p>Check that the machine is out of the design data.</p> <p>The auto grade assist control is canceled and system proceeds to the waiting state if the machine moves out of the design data while the auto grade assist control is operated. At this time, transition to the waiting state is performed slowly in order to prevent sharp change of machine behavior.</p>	<p>PRECAUTIONS FOR REPLACING PARTS AND FAILURES PHENOMENA AND ACTIONS FOR CONTROL BOX</p>
<p>The machine does not follow the design data from around arm vertical position while the auto grade assist control is operated.</p>	<p>Check that the boom LOWER operation is performed.</p> <p>The bucket edge may move away from the design data if the boom LOWER operation is not performed.</p> <p>Semi-auto mode is to restrict the movement of the work equipment, so operation to dig in the design data is necessary.</p>	<p>-</p>
<p>Arm speed during the auto grade assist control is slow.</p>	<p>Check the arm initial speed and arm constant speed in semi-auto adjustment.</p>	<p>SEMI-AUTO ADJUSTMENT</p>
<p>The arm stops before reaching arm stroke end while the auto grade assist control is operated .</p>	<p>if the arm reaches near the stroke end. Auto stop control operates, if the arm reaches near the stroke end.</p> <p>If the digging amount is 300 mm {1 ft} to 500 mm {1 ft 8 in}, Auto Stop control operates and bucket edge stops.</p>	<p>SEMI-AUTO MODE SETTINGS</p>

WORKING ACCURACY

Phenomena	Check item	Reference
The value varies largely when checking or adjusting the accuracy of bucket edge.	Reciprocate each cylinder by 1 round trip to place it to both stroke ends. Detection of cylinder stroke may have an error, reset the detection by placing it to the stroke end.	-
	Check that the IMU adjustment is normal. If the adjustment is necessary, perform the adjustment execute, and then check the accuracy of bucket edge again.	IMU ADJUSTMENT
Finishing accuracy is poor. <ul style="list-style-type: none"> • Average elevation of finished face is deeper than the design data or does not reach the design data. • The finished surface is rippled. 	Check that the error message of “Initializing...”, etc. is displayed on the screen of control box. The accuracy of bucket edge is deteriorated if an error message is displayed. Wait for the message to be cleared, and then start the work.	PHENOMENA AND ACTIONS FOR CONTROL BOX
	Check that the coordinates of bucket edge position changes largely. The changes of bucket edge behavior may occur irregularly due to the fluctuation of GNSS antenna position. If the things are not improved after waiting a while, acquire the satellite again.	BUCKET EDGE POSITION METHOD FOR RESETTING CONNECTION
	Check that there is no defect such as hole or protrusion exists on the design data. If there is any defect, semi-auto mode may not operate normally.	-
	Check that the machine is on the stable ground so that it is not shaken. Depending on the response of IMU sensor which detects the machine posture, if the machine rocks largely, machine may dig in the design data, but it is not a trouble.	PRECAUTIONS FOR REPLACING PARTS AND FAILURES
	Check that the IMU adjustment is normal. If the adjustment is necessary, perform the “Adjustment Execute”, and then check again that the facing angle compass is normally displayed.	IMU ADJUSTMENT
	Check that the bucket weight setting is complied with the actual bucket installed. The accuracy of construction may decrease if the bucket weight setting is not correct. Change the setting to be appropriate with the bucket weight setting.	BUCKET WEIGHT SETTING
	Check that the boom fine control adjustment is completed. When the bucket weight setting is changed, the starting movement of the work equipment becomes unstable, so does the machine behavior. Perform the Boom Fine Control Adjustment always when the bucket weight setting is changed.	BOOM FINE CONTROL ADJUSTMENT
	Check the stop control adjustment.	SEMI-AUTO ADJUSTMENT

AUTO TILT BUCKET

Phenomena	Check item	Reference
Auto Tilt Bucket Control Adjustment remains not completed.	Perform the adjustment again according to the troubleshooting for Auto Tilt Bucket Exchange calibration described below.	AUTO TILT BUCKET CONTROL ADJUSTMENT
The value obtained at checking the accuracy of bucket edge differs largely from the value at adjusting it.	Reciprocate the bucket tilt cylinder by 1 round trip until it touches to both stroke ends. Detection of cylinder stroke may have an error, reset the detection by placing it to the stroke end.	DAILY CALIBRATION

"Auto tilt bucket exchange" calibration troubleshoot

Check each item in the following order.

1. Check the items in METHOD FOR SELECTING AUTO TILT BUCKET TYPE AND INPUTTING DIMENSIONS, and check that inputs for dimensions and angles of the auto tilt bucket are all correct.

Input the correct value again if there is anything wrong.



2. Check the items in METHOD FOR SELECTING AUTO TILT BUCKET TYPE AND INPUTTING DIMENSIONS, and check that the auto tilt bucket type is correctly selected.

Select the correct value again if there is anything wrong.



- 3. Check the items in METHOD FOR CALIBRATING AUTO TILT BUCKET TILT CYLINDER, and check that it does not tilt in the different direction from the drawing of the bucket on the control box, and the screen does not proceed.

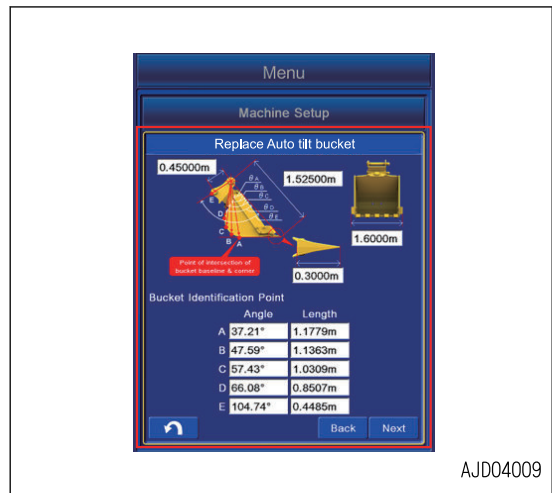
If it tilts in the unintended direction and the screen proceeds, check the connecting port of the hydraulic piping.



AJD04008

- 4. Check the items in METHOD FOR MEASURING AUTO TILT BUCKET SHAPE, and check that inputs for dimensions and angles of the auto tilt bucket information are all correct.

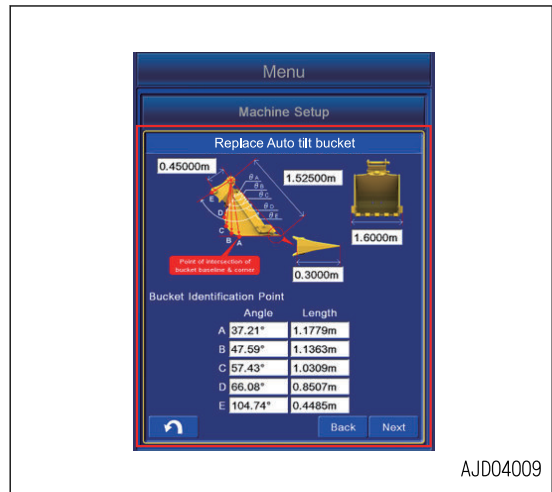
Input the correct value again if there is anything wrong.



AJD04009

- 5. Check the items in METHOD FOR MEASURING AUTO TILT BUCKET SHAPE, and check that the method and jigs for measuring the dimensions and angles of the auto tilt bucket information are all correct.

- Check that the length of the magnet stand pole is not too short.
- Check that the measuring method using the plumb is correct.



AJD04009

- 6. Check the items in METHOD FOR MEASURING BUCKET FOOT ANGLE AND TILT WIDTH ANGLE (AUTO TILT BUCKET), and check that the check box of the bucket angle reading has been checked.

If the check box has not been checked, perform the bucket angle reading again.



AJD04010

- 7. Check the items in METHOD FOR CALIBRATING AUTO TILT BUCKET TILT CYLINDER, and check that the check box has been checked.

If the check box has not been checked, perform the operation again.



AJD04011

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