101E-OM0906-00

OPERATION MANUAL

MINI-CRAWLER CRANE

MC-174CRM

Serial No. G0121 and up

⚠ WARNING

Unsafe use of this machine may cause serious injury or death. Operators must read this manual before operating 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

MAEDA has Operation Manual written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

MAEDA

2. FOR SAFE USE OF MACHINE

This manual classifies the risks into the following three categories to present the details of the safety labels in easy-to-understand manner.

⚠ DANGER

This denotes that there is an imminent hazard which will cause serious personal injury or death.
Follow instructions to avoid danger.

⚠ WARNING

This denotes that there is a hazard which can cause serious personal injury or death.
Follow instructions to avoid danger.

⚠ CAUTION

This denotes that there is a potential hazard which may cause minor or moderate personal injury or serious damage to this machine.
Follow instructions to avoid danger.

This manual also provides the following to indicate what must be observed for the sake of the machine and what will be of help.

CAUTION

This denotes that failure to handle the machine properly may damage the machine or shorten its life.

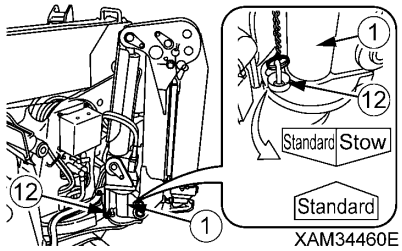
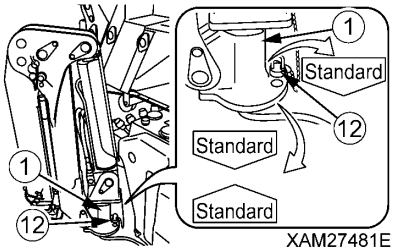
NOTES

This denotes helpful information.

This manual covers not only procedures for operation, inspection, and maintenance of this machine, but also safety precautions where this machine is only used for specified tasks.
Not every event is foreseeable and therefore, cautions given in this manual and on this machine do not necessarily cover every safety-related issue.
The result of operation, inspection, and maintenance carried out in a way that is not described in this manual are your responsibility.
Even in the above case, never attempt any work or operation that this manual prohibits you to do.

[Placement of outrigger position pins when "outriggers are extended to maximum".]

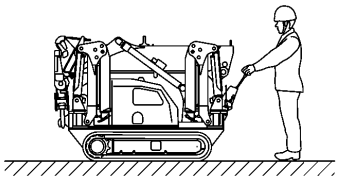
Figures below shows the placement of outrigger position pins (12) in a condition that "outriggers are extended to maximum"

The left rear outrigger. (The right rear outrigger is symmetrical.)	The left front outrigger. (The right front outrigger is symmetrical.)
 XAM34460E	 XAM27481E

CAUTIONS WHEN TRAVELLING

Always observe the following to prevent serious injuries, fatal accidents when the Machine is travelling.

- Do not attempt looking sideways or other dangerous acts when driving.
- Do not over speed, start moving suddenly, stop suddenly, swing suddenly or meander since such acts are dangerous.
- When travelling backward, the operator should be extremely careful of uneven ground. Lower the speed and drive the machine carefully and take care not to get trapped by bumps or other obstacles.
- Whenever you find a machine abnormality (sound, vibration, odor, instrument error, fuel leak, water leak or oil leak), immediately park the Machine in a safe location and inspect the cause.
- Do not suddenly change the direction. Doing so may cause the Machine to lose balance or damage the machine or nearby objects.
- When travelling over uneven terrain, change travel speed mode to "low speed" to travel as slow as possible to prevent tripping, and avoid acute operation when changing the direction.
- Avoid moving over obstacles as much as possible.
  Change travel speed mode to "low speed" and travel as slowly as possible when moving over an obstacle for unavoidable reason. Also, do not move diagonally over obstacles that cause the Machine to tilt excessively (10 degrees or more).
- When travelling, ensure extra clearance to prevent accidental contact with other machinery or objects.
- When travelling in water or crossing over shallow water, check the ground condition, depth and water velocity (never attempt to enter into flowing water) beforehand and make sure not to exceed the allowable water depth (no higher than center of idler (1)).
  ★ See “Operation 2.12 [2] Allowable Water Depth” for details.
- Check weight limits against the Machine mass before crossing over a bridge or construction that is private property. In case of public road, ask the applicable road management administration and follow the given advice.
- Do Not travel with load hoisted.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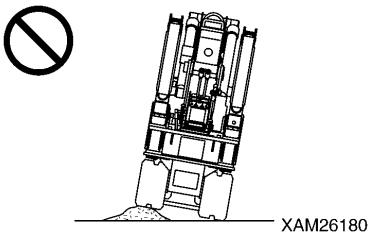
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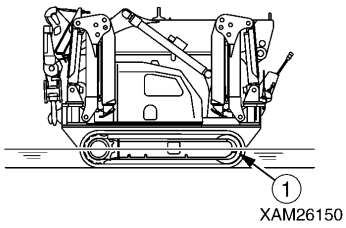

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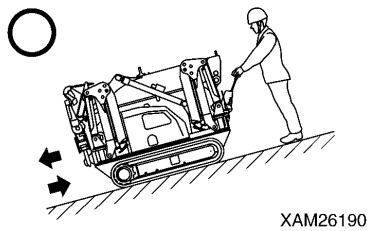
BE CAREFUL WHEN TRAVELLING OVER SLOPES

ALWAYS observe followings to prevent serious injuries, death or accidents when travelling over a slope for unavoidable reason.

- Be careful of tripping and skids when travelling over slope.
- Do not change orientation on or horizontally when travelling over slope. Practice safe travelling by for instance lowering to the flat land and divert.
  ★ See “Operation 2.12 [3] Cautions on Upward/downward slope” for details.
- Skids happen more than you think on grass, fallen leaves, and on wet steel plates.
  Avoid the Machine from being horizontal over the slope as much as possible, and decrease the speed sufficiently.
- Travel slowly in low speed when travelling downhill, after changing travel speed mode to "low speed". In addition, apply brake (by setting the travel lever to neutral) as necessary.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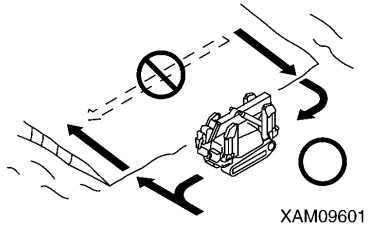
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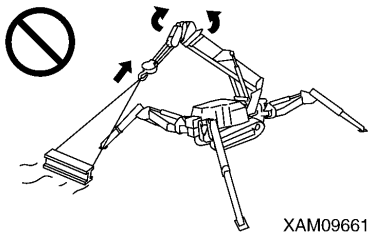
CAUTIONS WHEN OPERATING WINCH

- Do not allow anyone below the hoisted load.
- When hoisting a load, always stop at the "takeoff" position where the hoisted load leaves the ground. Check subjects such as load stability and load force, then hoist up the load.
- Do not pull laterally, pull toward you or hoist diagonally. Such attempt may cause the crane to trip or suffer damage.
- Overwinding of the hook block may result in collision with the boom, snipping the wire ropes and causes the hook block and load to fall and cause serious accidents. Be extra careful to prevent overwinding of the hook block.
- Be careful to prevent the wire rope and/or hoisted load from contacting an obstacle such as a tree or steel structure when hoisting a load.
  If caught by an obstacle, do not forcibly wind up the hoist load, but untangle the caught part before winding up.
- Do not operate the winch system if the rope is badly wound on the winch drum (tangled). If tangled the rope may be damaged, shortening its life span, and there is a possibility that it may break and cause a serious accident. Observe the following precautions to avoid the rope becoming tangled:
  - Do not let the hook block hit the ground.
  - Before leaving the hook block lowered for a long time for instance when working with underground, leave at least three loops of wire rope in the winch drum.
- If the wire rope is twisted and causes the hook block to turn, fully eliminate the twist before work.
  ★ See " Operation 4. What to do with Twisted Winch Wire Rope" for details.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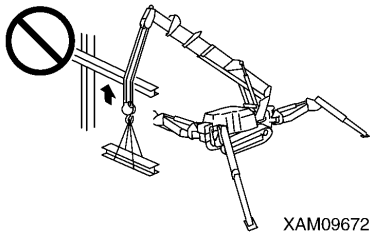
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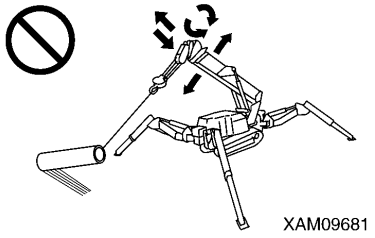
CAUTIONS WHEN OPERATING THE BOOM

- Operate the boom operation lever as slowly as possible.
  Especially avoid sudden lever operations when the load is hoisted, which may cause the load to move and give large impact to the Machine, and thus may damage the crane or trip the Machine.
- When the boom is lowered, the working radius increases, and the rated total load that can be hoisted decreases. When working while raising/lowering the boom, pay extra attention to ensure that the mass (weight) of the load at the time the boom is most lowered does not cause overloading.
- Attempts to pull the load laterally or pull to bring forth the load by raising/lowering and/or extracting/retracting operation of the boom are prohibited. Do not attempt under any circumstance.
- Be aware of the hook block windup condition and exercise caution when extending or retracting the boom.
- When the boom is extended, the working radius increases, and the rated total load that can be hoisted decreases. When working with extending/retracting the boom, pay extra attention to ensure that the mass (weight) of the load at the time the boom is most lowered does not cause overloading.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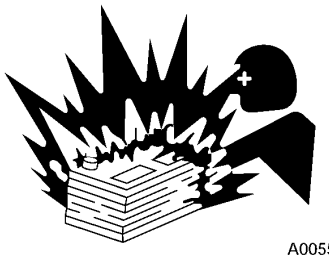
PRECAUTIONS DURING WELDING REPAIR

Weld in a location with good facilities, and, only authorized personnel are permitted to weld.
Unauthorized personnel are strictly prohibited since risks such as gas generation, fire and electrical shock are present when welding.
The personnel authorized to weld are requested to always observe the followings.

- Disconnect the battery terminals to prevent battery explosions.
- Peel off the paint from the welding section to prevent gas generation.
- Attempting to heat up a hydraulic machinery, piping or a section near such part may cause combustible vapor or mist to be generated and catch fire. Avoid heating such section.
- Directly heating a pressurized piping or rubber hose may cause a sudden snip. Apply a fire protection cover.
- Disconnect the wiring connectors of the remote control devices, moment limiter display and converter.
- Put on protective equipment.
- Keep the ventilation well.
- Put away the combustibles and prepare a fire extinguisher.
- Do not ground to a location near electrical part. Such may cause the electrical part to malfunction.

DISCONNECTING THE BATTERY TERMINAL

Disconnect (-) terminal of the battery and stop the electrical flow before repairing the electrical system or starting an electrical weld.
★See “Operation 8. Battery Handling” for details.



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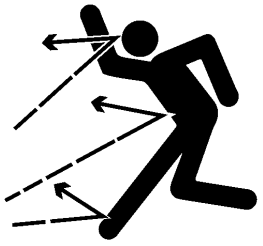
CAUTIONS WHEN ADJUSTING RUBBER TRACK TENSION

- Grease is sealed inside the rubber track tension adjuster. The grease is at a high pressure because of the tension of the rubber track. Attempting to release the grease without observing the following precautions may cause the grease valve to pop out and result in a serious accident.
- Do not loosen the tension adjustment grease valve one full turn or above. Doing so may cause the grease valve may pop out.
- To avoid the risk during tension adjustment, do not place your body in right front of the grease valve.

★ See “Operation 2.1.3 [1] Checking/adjusting Rubber Track Tension” for details.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HIGH PRESSURE HOSE HANDLING CAUTIONS

Oil leaking from high pressure hose may cause fire or bodily accident due to faulty operation.
Whenever a damaged hose or loosened bolt is found, abort working and ask us or our sales service agency for a repair.

- Replacement of high pressure hose requires experienced skill. In addition, the tightening torques are decided by the horse types and size.

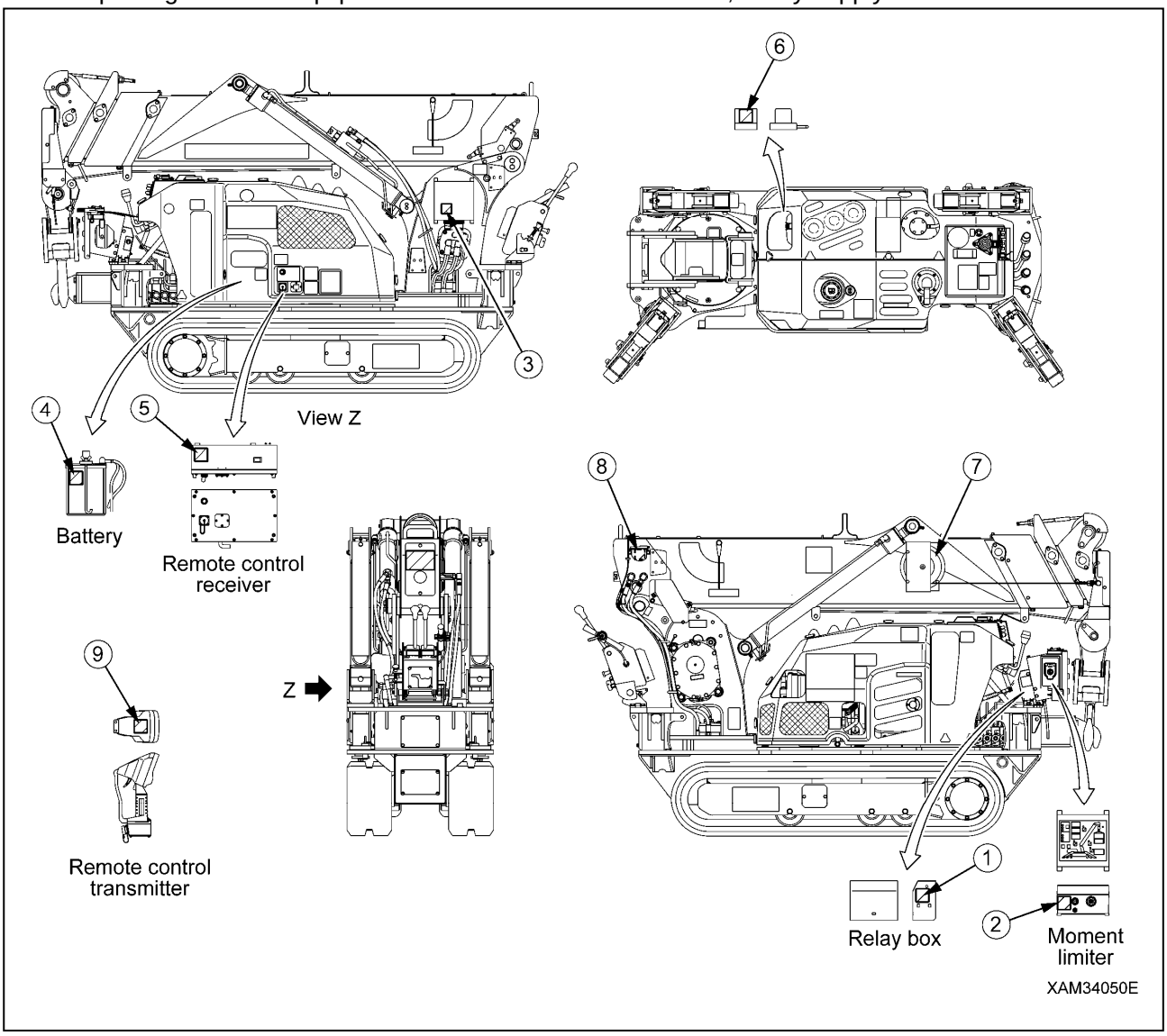
Customers are prohibited to repair.

- Replace the applicable part if any of the following conditions is found.
  - Hose sleeve damage or leak.
  - Scratch or truncation of the coat, or exposure of reinforcing layer of a wire
  - Coat is partially swollen.
  - Indication of twist or collapse is at a movable part of hose.
  - Alien object buried in coating.
  - Hose sleeve deformation.

7. WEEE DIRECTIVE LABEL LOCATIONS

Keep these labels clean all the time.

When replacing electrical equipment on which this label is affixed, always apply a new label.



[WEEE DERECTIVE LABEL (104-4549500)]

WARNING

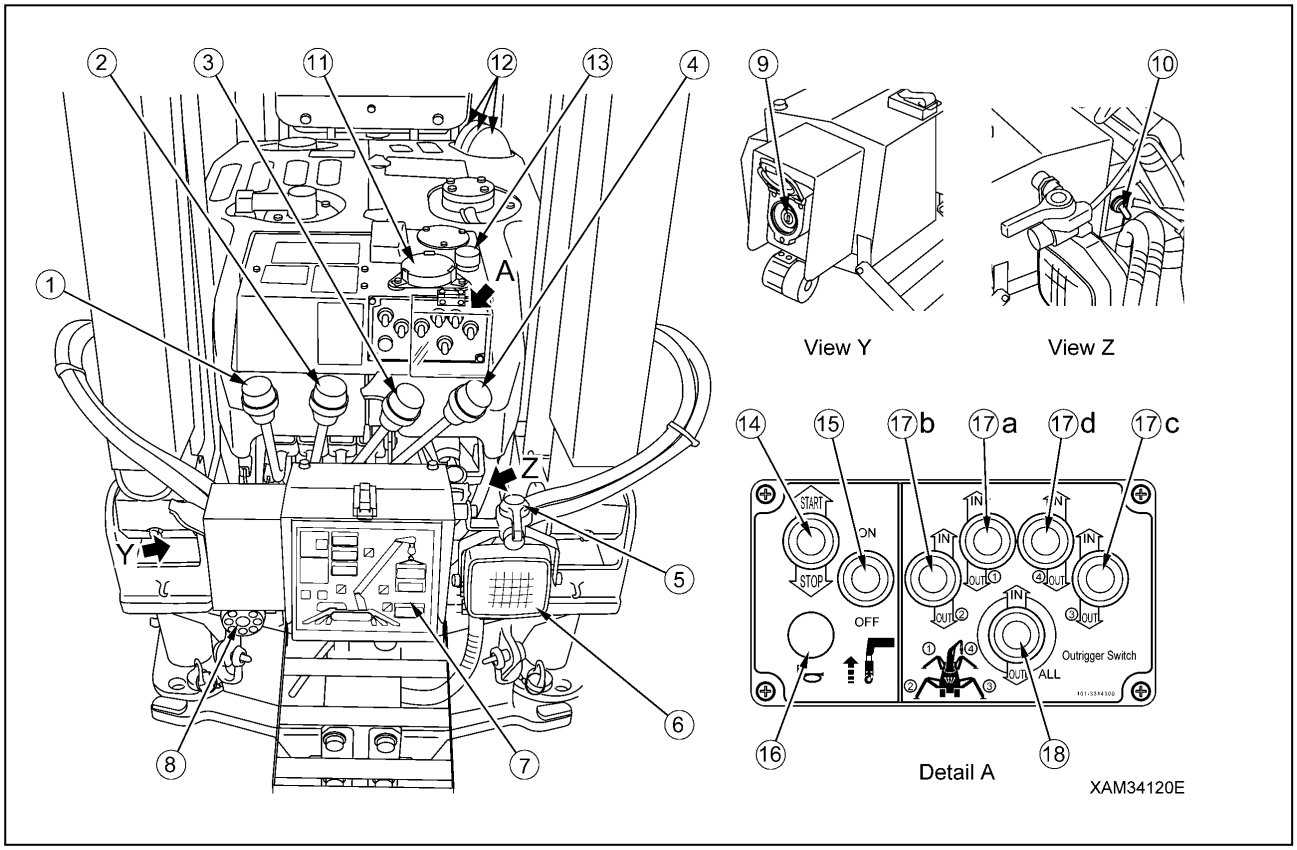
This unit is not subject to the WEEE Directive.Therefore,this unit is permissible be used in the EU area as long as this unit mounted in a large industrial equipment released by us.

Indiscriminate disposal of this unit or use of this unit for different purpose may cause this unit to be subject to the WEEE Directive and consequently subject to the punishments stipulated by the EU regulations.

[LOCATIONS OF WEEE DIRECTIVE LABELS]

(1) Side of the relay box at the moment limiter display backward
(2) Lower side of the moment limiter display
(3) Side of the moment limiter converter
(4) Side of the battery
(5) Top of the remote-controlled receiver
(6) Side of the inclination sensor
(7) Side of the boom length detector
(8) Side of the boom angle detector
(9) Side of the radio-controlled transmitter

1.3 CRANE OPERATION UNIT

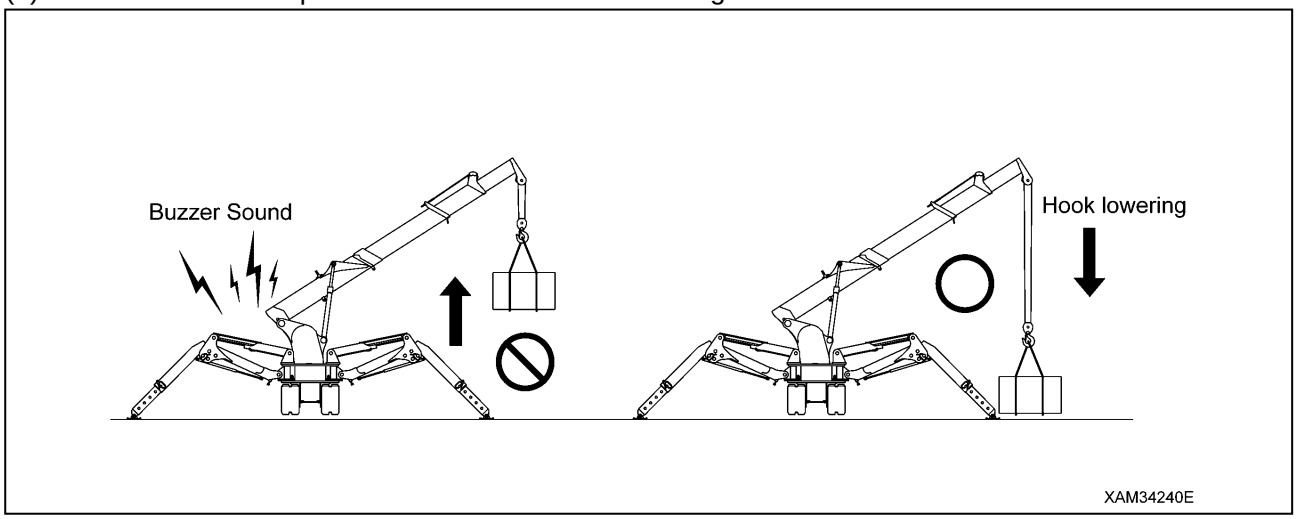


(1) Slewing lever
(2) Boom telescoping lever
(3) Winch lever
(4) Boom derricking lever
(5) Acceleration lever
(6) Headlight
(7) Moment limiter display panel
(8) Over hoist and moment limiter alarm buzzer
(9) Emergency stop cancel switch
(10) Boom stowing switch
(11) Level
(12) Working status lamps
(13) Engine emergency stop switch
(14) Auxiliary starter switch
(15) Hook stowing switch
(16) Horn switch
(17) Outrigger individual setting switch
  (a) Outrigger (1) setting switch
  (b) Outrigger (2) setting switch
  (c) Outrigger (3) setting switch
  (d) Outrigger (4) setting switch
(18) Outrigger collective setting switch

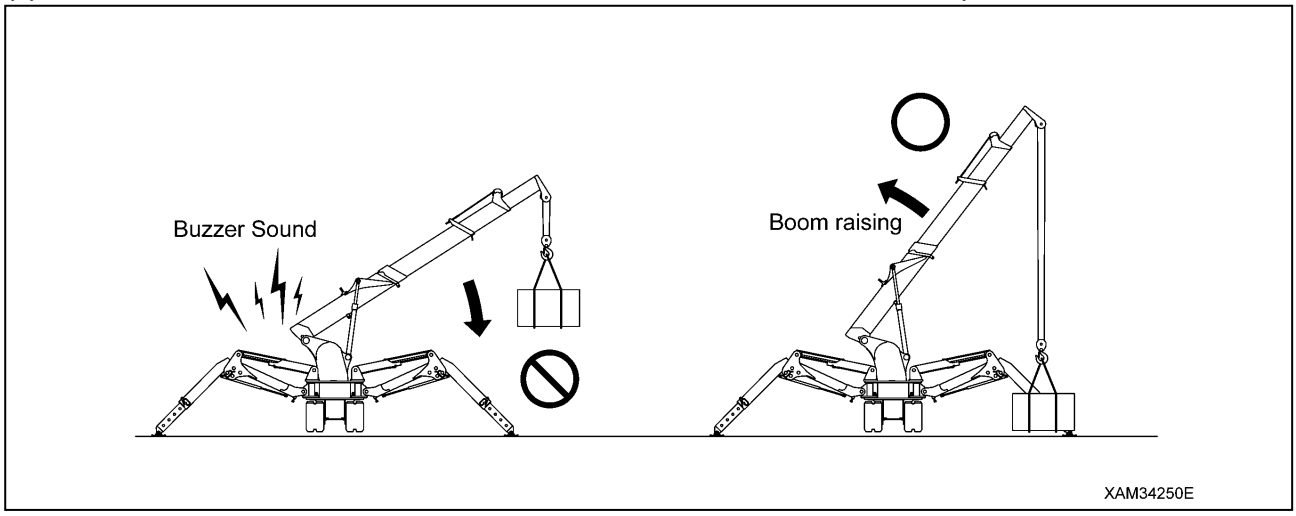
4. Recovery Operation from Auto Stop

The recovery operation from overloading should be the reverse operation of the crane operation that caused the auto stop. Perform one of the followings.

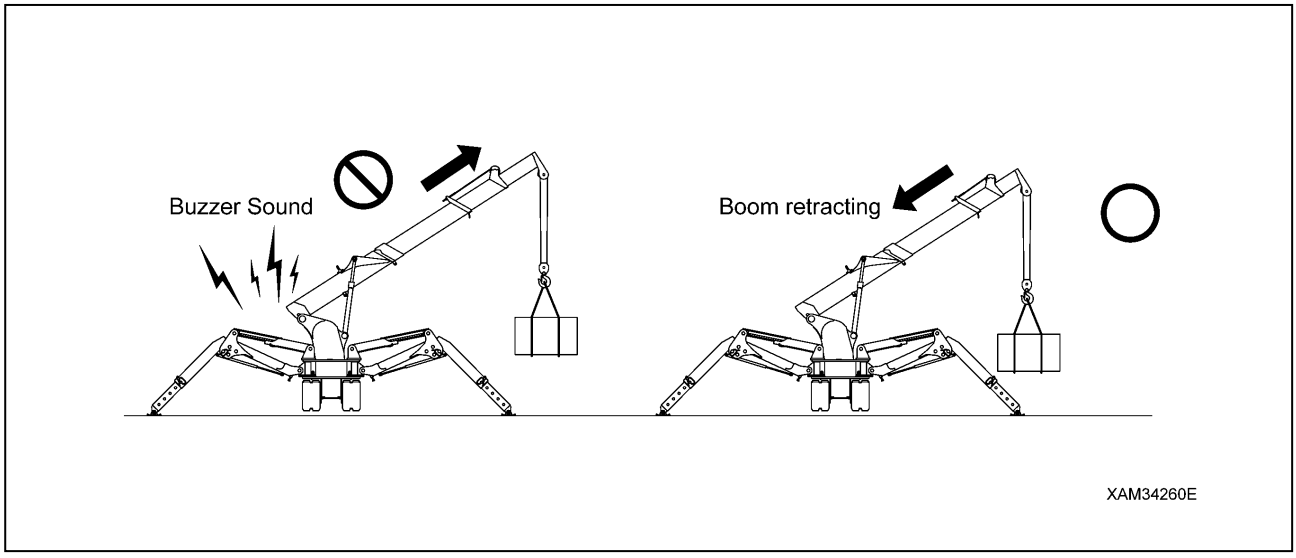
(1) Lower the hook and put down the hoisted load on the ground.



(2) Raise the boom. Lower the hook so that the hoisted load will be as low as possible.



(3) Retract the boom.



1.4.5 OTHER MOMENT LIMITER FUNCTIONS

[1] WORKING ENVELOPE RESTRICTION WARNING

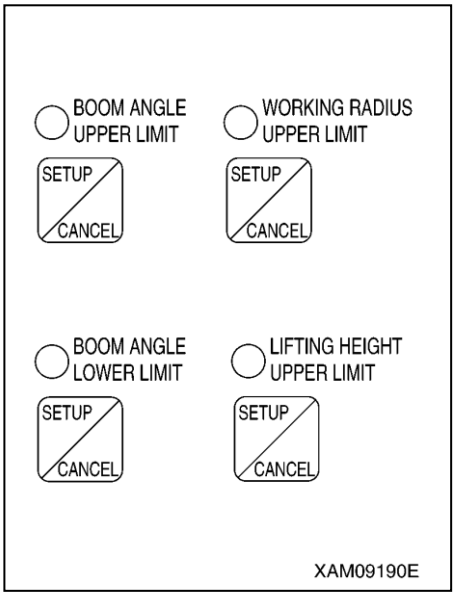
When the working envelope gets close to the set restriction value, a warning is issued to notify the operator and people around of the situation.

The last status of the set value for the working envelope restriction is memorized even if the starter switch is turned to the OFF position.

NOTES

See “Operation 1.4.4 [1] Descriptions of Switches on Moment Limiter Display Unit” for how to set the value for working envelope restriction.

When the working envelope has been set, the restriction will be as follows.



1. SAFETY ZONE

- The appropriate working envelope restriction LED (red) lights up.
- Green of the working status lamp lights up.

2. PRE-WARNING

- The appropriate working envelope restriction LED (red) lights up.
- The alarm sounds intermittently.
- Yellow of the working status lamp lights up.

3. LIMIT WARNING

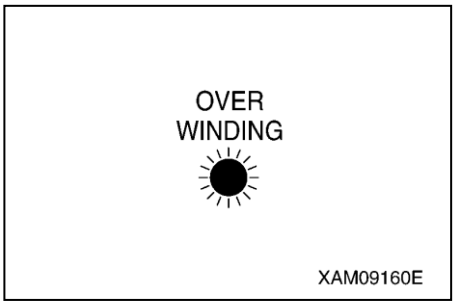
- The appropriate working envelope restriction LED (red) lights up.
- Red of the working status lamp lights up.
- The alarm sounds continuously.
- The appropriate operation of the crane stops automatically.

[2] OVER HOIST DETECTOR

CAUTION

Pay attention to the distance between the hook and boom when raising the hook.
Extending the boom also raises the hook.
Always check the hook height when extending the boom.

When you overwind the hook when raising the hook or extending the boom,



- The “Overwinding” LED (red) flashes.
- The alarm sounds continuously. (It stops sounding when the operation lever is released.)
- The hook raising, boom extending and boom raising operation stop automatically.

In case of auto stop, immediately perform the recovery operation.

Perform hook lowering and boom retracting operations as recovery operations.

[3] CHECKING/REFILLING OIL LEVEL IN HYDRAULIC OIL TANK

⚠ WARNING

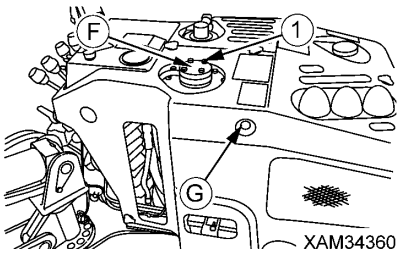
- **The oil may spout out when the cap of the hydraulic oil tank is removed. Loosen the bolts so that the cap is raised a little to allow the release of inner pressure, then remove bolts and remove the cap.**
- **Securely tighten mounting bolts of the oil filler cap after refilling with the oil. If the mounting bolts are loose and then filler cap falls during the operation, the hot oil spouts out of the pan, causing burns. Also, when attaching the oil filler cap, always attach a rubber packing, otherwise, when the rubber packing is neglected, The hot oil may spout out of the filler cap fitting, causing burns.**

CAUTION

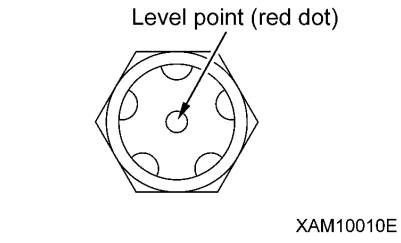
- **See "Maintenance 5.1 Use of Lubricating Oil According to Temperature" for which oil to be used.**
- **Be sure to put the machine in the travelling position when checking the oil level. Checking the oil level in the working position will cause overfilling since the oil in the cylinders has not returned to the tank.**
- **Avoid the oil exceeding the level point (red point) of the level gauge. When the oil goes beyond the correct level, it may spout out from the air breather during travelling or crane operation.**
- **Be careful not to let dust enter the filler opening when refilling with oil.**

1. Stop the machine on a level surface.

2. Check the oil level gauge (G) in the left side of the machinery cover and ensure that oil is sufficient to reach the level point (red point).



3. If there is not sufficient oil, refill with the hydraulic oil using the following procedure.
   (1) Remove 4 mounting bolts (1) and the filler cap (F) on the top of the hydraulic oil tank.
   (2) Refill with the hydraulic oil from the filler opening (F) while looking at the oil level gauge (G).
   (3) After refilling with oil, Set the filler cap (F) and rubber packing to the filler opening position and tighten mounting bolts securely.



[2] CHECKING RUBBER TRACKS FOR DAMAGE AND WEAR

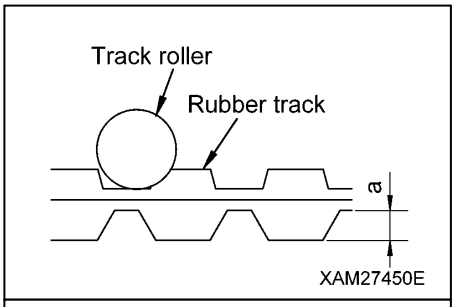
CAUTION

Contact us or our sales service agency for determining whether to replace, repair, or keep the rubber track.

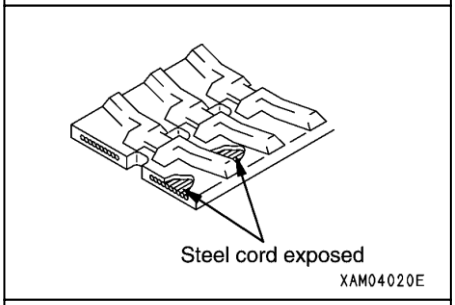
The following condition requires the repair or replacement of the rubber track. Ask us or our sales service agency for repair/replacement.

[LUG HEIGHT]

• When the lug height “a” decreases with wear, the traction force drops.
Replace the rubber track when the lug height decreases to 5 mm or lower with a new rubber track.

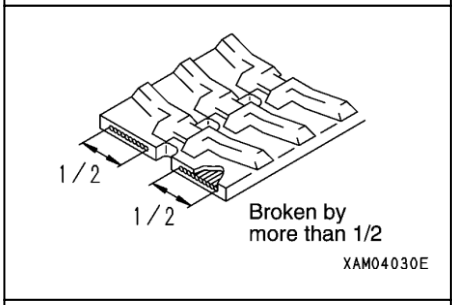


• When the lug is worn out and the steel cord inside the rubber track is exposed for more than 2 links, replace the rubber track with a new one.



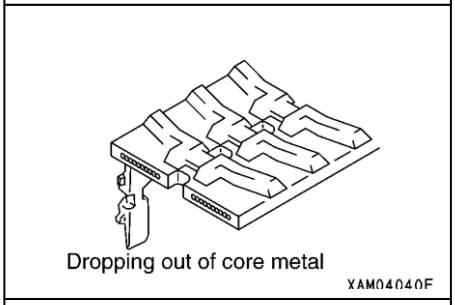
[BROKEN STEEL CORD]

• If more than half of the steel cord layer is broken on one side, replace the rubber track with a new one.



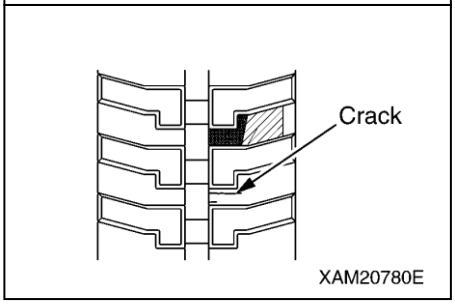
[FALLEN CORE METAL]

• If the core metal of the rubber track has fallen out at more than 1 location, change the rubber track with a new one.



[CRACKS]

• If there is a crack between rubber track lugs, change the rubber track with a new one.



2.3 OPERATIONS AND CHECKS AFTER STARTING THE ENGINE

⚠ DANGER

Never refuel (gasoline) while the engine is in operation. Always stop the engine when refueling.

⚠ WARNING

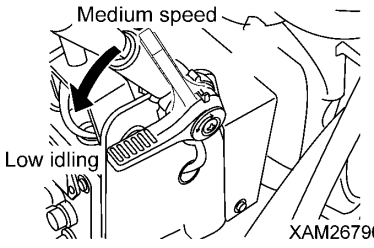
- **If any abnormal condition takes place during the warm-up operation, immediately press the engine emergency stop switch to stop the engine for emergency. Then, turn the starter switch to the OFF position. The power to the electrical system will be shut off.**
- **Always perform the warm-up operation. The sufficient warm-up operation is necessary particularly when it is cold.**
  Insufficient warm-up operation will slow down the movement response of the travelling system or crane system to the operation levers, resulting in serious accidents.
- **Always check the operation of the crane after warm-up operation.**
  Be careful not to let the hook block interfere or collide with the boom.
- **If you find any abnormality during the crane operation check, immediately press the engine emergency stop switch at the crane operating side to stop the engine for emergency. Then, turn the starter switch at the travelling operating side to the OFF position. The power to the electrical system will be shut off. After stopping the machine immediately for emergency and repair. Using the system in abnormal condition can result in serious accidents.**

CAUTION

- **The appropriate temperature of the hydraulic oil is 50 to 80 °C.**
  Even when operating at low temperature by necessity, increase the temperature of the hydraulic oil to about 20 °C.
- **Do not idle away suddenly until the warm-up operation is done.**
- **When the engine has started, check if the "battery charge lamp" went off. If this is any abnormality, repair.**
- **Where the operation in low revolution of the engine prolongs too much, that may cause in-sufficient lubrication of the engine cylinder head and may result a breakdown. When it is required to operate the engine in low revolution, the engine should be idled for around 5 minutes per day.**

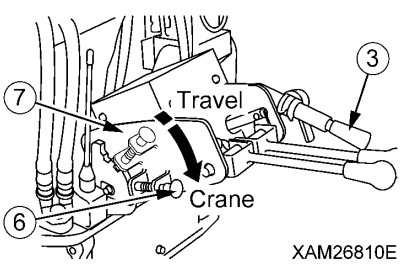
Perform the warm-up operation as follows once the engine has started.

1. Pull the acceleration lever toward you. Keep the engine idling and continue the operation with no load for about 5 minutes.



2. Check if there is any abnormality with the engine exhaust gas color, noise, and vibration.
   If there is any abnormality, repair.

3. Pull up the lock lever (6) before pressing the whole lever stand (7) down to the "Crane Operation Position", then release the lock lever (6).



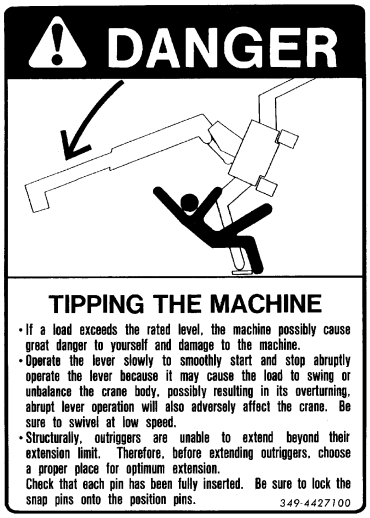
4. See "Operation 2.13 Outrigger Set Up Operation" and set the outriggers.

⚠ WARNING

• SELECTING LOCATION TO SET OUTRIGGERS

• When setting the outriggers on the structural objects such as construction site or concrete floor, verify in advance that the surface where the outriggers will be set has sufficient strength.
Insufficient strength in the setting surface will result in overturning or fall of machine due to collapse of the setting surface.

• Setting the outriggers on the soft ground as given below will cause the tray of the outriggers to sink in the ground, leading to the overturning of the machine.
- **Road surface with low-cost pavement (low-cost asphalt or thin concrete)**
- **Surface with paving stones.**
- **Area reclaimed after excavation work**
- **Landfill**
- **Road shoulders or area close to a hole such as excavation work**
- **Deteriorated pavement surface**
- **Areas where under the pavement surface is hollow due to water erosion and the top soil appears to be hard but soft in the ground.**
- **Slope**



• PROTECTING GROUND

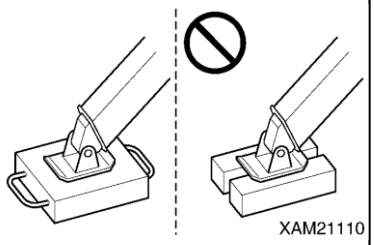
• Place a sole plate of sufficient size with sufficient strength under the tray of all the outriggers on the soft ground to protect the ground.

• If you have to set the outriggers near the road shoulder by necessity, take secure action to prevent the collapse of the road shoulder.

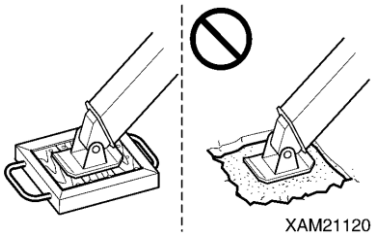
• When working on the slope, level the tray of all the outriggers and the ground under the rubber tracks before setting the outriggers.
Setting the outriggers with the tilted ground surface without leveling the ground surface will cause the outriggers to slip or overturn, causing serious accidents.

• If the ground is not protected or if the outriggers may sink even after protecting the ground, do not perform the crane operations.

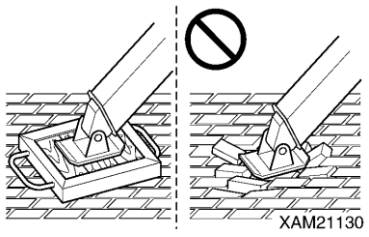
Use of stable sole plate



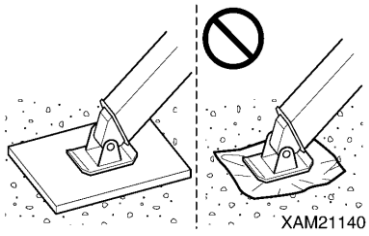
Surface with low-cost pavement



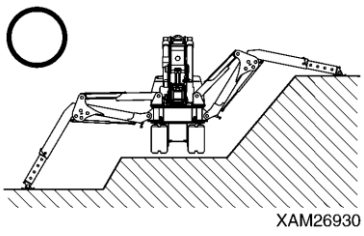
Surface with paving stones



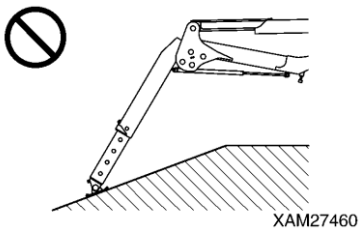
Landfill, etc.



Leveling ground of slope



Leveling ground of slope



2.18 BOOM DERRICKING OPERATION

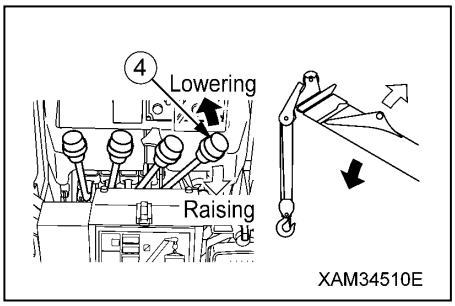
⚠ WARNING

- **Operate the boom derricking lever as slowly as possible.**
  Sudden lever operation especially while hoisting a load will cause the load to swing, giving a great impact to the machine, and thus may break the crane or overturn the machine.
- **Lowering the boom increases the working radius and the rated total load that can be hoisted decreases. Be extremely careful so that the load weight will not exceed an overload as the boom is lowered when working by derricking the boom.**
- **When the hook block is over-wound, such a condition is detected as an over hoist and operations including winching up, boom telescoping or boom raising are interrupted, also the Over hoist and moment limiter alarm buzzer beeps. When the buzzer beeps, immediately release control levers such as winch lever, boom telescoping lever or boom derricking lever to the NEUTRAL position so that all the crane operations are discontinued.**

Operate the boom derricking lever (4) as follows.

- Lower: Push the lever forward to the “LOWER” side.
- Neutral: Release your hand from the lever.

  The lever goes back to the NEUTRAL position and the boom derricking stops.
- Raise: Pull the lever toward you to the “RAISE” side.

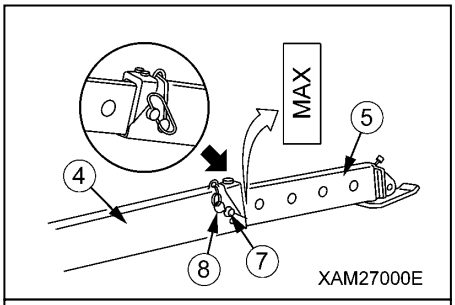


NOTES

Adjust the boom derricking speed with the boom derricking lever and the stroke of the acceleration lever.

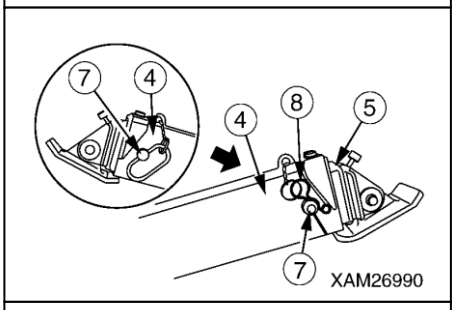
[2] TASKS TO BE PERFORMED UPON THE ENGINE STOP

1. Remove the snap pin (8) of the position pin (7) tip of the outrigger top (4) and pull out the position pin (7).

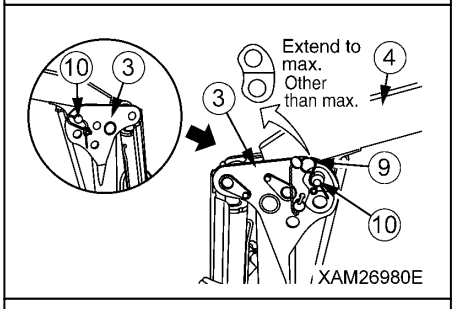


2. Push the innner box (5) into the outrigger top (4) and align the hole of the outrigger top (4) and the hole nearest to the end of the innner box (5).

3. Insert the position pin (7) to the hole of the outrigger top (4) and secure with snap pin (8).

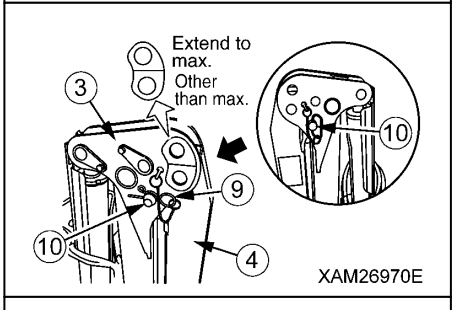


4. Remove the snap pin (9) of the position pin (10) tip of the outrigger base (3) and pull out the position pin (10).



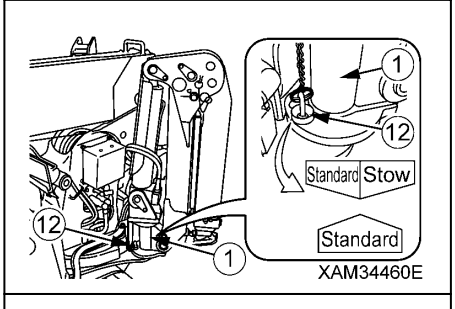
5. Lower the outrigger top (6) and align the hole of the outrigger top (6) and the hole of the lowest position in the outrigger base (3).

6. Insert the position pin (9) to hole of the lowest position in the outrigger base (3) and secure it with a snap pin (8) at the end.



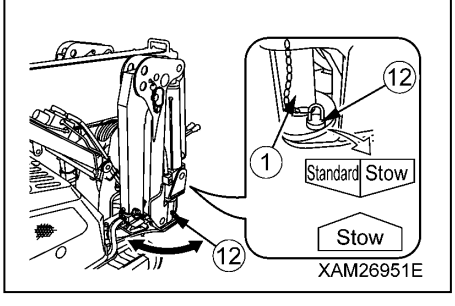
★Applicable to "Outrigger (1) and (4)"

7. Pull out the position pin (12) of the outrigger rotary (1) and rotate the outrigger rotary (1) inward.



8. Rotate the outrigger rotary (1) so that the sticker "Standard/Stow" affixed to its side and the sticker "Stow" affixed to the side of frame are aligned.

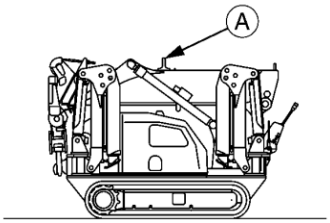
9. Insert positioning pin (12) to the hole with the sticker "Standard/Stow" of the outrigger rotary (1).



5.2 HOISTING MACHINE

⚠ DANGER

- **When lifting up the Machine, always set it to the stowage position first, and lift from the lifting bracket (A) on the top of the boom. Only use this bracket and only one sling wire. Any other manner than this, i.e. from other lifting brackets or multiple sling wires, may cause droppage of the machine and result serious injury or death.**
  Where there is no choice but the machine has to be hoisted in a different manner, please contact us or service agencies.
- **The hoisting attachments such as wire rope and shackle used in hoisting shall be sufficiently strong for the weight of this machine.**
- **Crane stowed position when it is hoisted means its "Travelling position" where 4 of outrigger position pins are securely inserted in the outrigger rotary. The centre of the balance of the machine is specified subject to the machine being in its travelling position. In addition, to set it into that position correctly, secure the hook block (4) to its stowing position, also tension the wire rope tight, this will prevent the boom derricking cylinder form extending. Refer to "Operation 2.5 Machine Travelling Position" for details of travelling position.**
- **Hoisting the machine for a long time will cause the boom derricking cylinder to extend, shifting the centre of gravity and the machine to lose balance.**
  Thus, hoisting should be limited to a max of 10 minutes.
- **Where it is required to hoist the machine for a longer time (exceeding 10 minutes), or when it is carried by a helicopter, use a proper carriage deck as shown in the diagram on the right, for safe transportation.**



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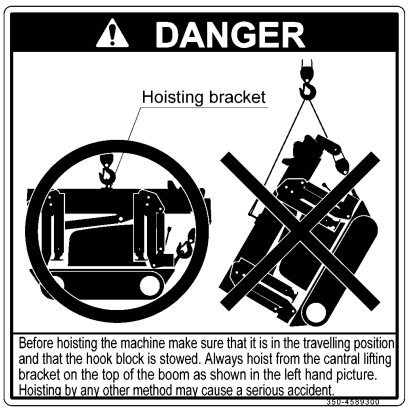


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CAUTION

- **When the local laws and regulations are applicable, the person who uses the crane to perform hoisting operation must be qualified to do it. If not, the operator must be well trained and skilled.**
- **See the Dimension or the nameplate attached to the machine for the weight of the machine.**
- **The dimensions are for standard specifications. The hoisting method varies depending on the attachments and options mounted. In that case, contact us or our sales service agency.**

9. TROUBLESHOOTING

9.1 ELECTRICAL COMPONENTS

• Make sure that you contact us or our sales service agency for the actions indicated in parentheses in the Actions field.
• Ask our sales service agency for repair if you suspect other abnormality or causes than those given below.

Abnormal Phenomenon	Major Cause(s)	Actions
Dim light even at highest engine speed	• Defective wiring	(• Check and repair slackened terminals and open circuits)
Light blinks during engine operation	• Defective alternator • Defective wiring	(• Replace) (• Check and repair)
Battery charge lamp does not goes off even after the engine starts	• Defective alternator • Defective wiring	(• Replace) (• Check and repair)
Starter not rotating even after the starter switch is turned	• Defective wiring • Insufficient battery charge • Defective fuse	(• Check and repair) • Charge the battery • Replace the fuse
Starter pinion going out and in repeatedly (struggling)	• Insufficient battery charge	• Charge the battery
Starter motor turning slowly	• Insufficient battery charge • Defective starter	• Charge the battery (• Replace)
Starter disengaged before the engine starts	• Defective wiring • Insufficient battery charge	(• Check and repair) • Charge the battery

9.2 MACHINE BODY

• Make sure that you contact us or our sales service agency for the actions indicated in parentheses in the Actions field.
• Ask our sales service agency for repair if you suspect other abnormality or causes than those given below.

Abnormal Phenomenon	Major Cause(s)	Actions
Crane cannot operate but can travel	• Defective travelling lever stand position detector	(• Check and repair)
• Travelling speed, boom and hook block operation speed too slow • Abnormal noise from pump	• Insufficient hydraulic oil • Hydraulic oil tank strainer and element clogged	• Refill with hydraulic oil to the specified oil level, referring to the section “Check before operation” • Clean and replace the filter by referring to the “Periodical Checks”.
Hydraulic oil temperature too high	• Insufficient hydraulic oil • Clogged cooling fins	• Refill with hydraulic oil to the specified oil level, referring to the section “Check before operation” • Clean
• Rubber tracks coming off • Abnormal wear on the sprockets	• Rubber tracks too loose	• See “Check before operation” and adjust the tension

[Table 2]

Nominal size (a; mm)	Width across flat (b; mm)	[3] Bolt marked with “12.9” (strength classification) on its head		[4] Other bolts	
		Tightening torque {N▪m (kgf▪m)}		Tightening torque {N▪m (kgf▪m)}	
		Target value	Tolerance	Target value	Tolerance
6	10	13.0 (1.30)	11.1-15.0 (1.11-1.50)	3.0 (0.30)	2.6-3.5 (0.26-0.35)
8	13	31.5 (3.20)	26.8-36.2 (2.72-3.70)	7.5 (0.75)	6.5-8.6 (0.65-0.85)
10	17	62.5 (6.40)	53.1-71.9 (5.44-7.35)	14.5 (1.45)	12.6-16.7 (1.25-1.65)
12	19	109 (11.1)	92.7-125 (9.44-12.8)	25.0 (2.55)	21.7-28.8 (2.20-2.95)
14	22	174 (17.7)	148-200 (15.0-20.4)	40.0 (4.10)	34.8-46.0 (3.55-4.70)
16	24	271 (27.7)	230-312 (23.5-31.9)	62.5 (6.40)	54.3-71.9 (5.55-7.35)
18	27	373 (38.1)	317-429 (32.4-43.8)	86.0 (8.75)	74.8-98.9 (7.60-10.0)
20	30	529 (54.0)	450-608 (45.9-62.1)	122 (12.4)	106-140 (10.8-14.3)
22	32	720 (73.4)	612-828 (62.4-84.4)	166 (16.9)	144-191 (14.7-19.4)
24	36	915 (93.3)	778-1050 (79.3-107)	211 (21.5)	183-243 (18.7-24.7)
27	41	1340 (136)	1140-1540 (116-156)	309 (31.4)	269-355 (27.3-36.1)
30	46	1820 (185)	1550-2090 (157-213)	419 (42.6)	364-482 (37.0-49.0)
33	50	2470 (252)	2100-2840 (214-290)	570 (58.0)	495-656 (50.4-66.7)
36	55	3180 (324)	2700-3660 (275-373)	732 (74.5)	636-842 (64.8-85.7)

[3] CHECKING/ADJUSTMENT BOOM TELESCOPING WIRE ROPE

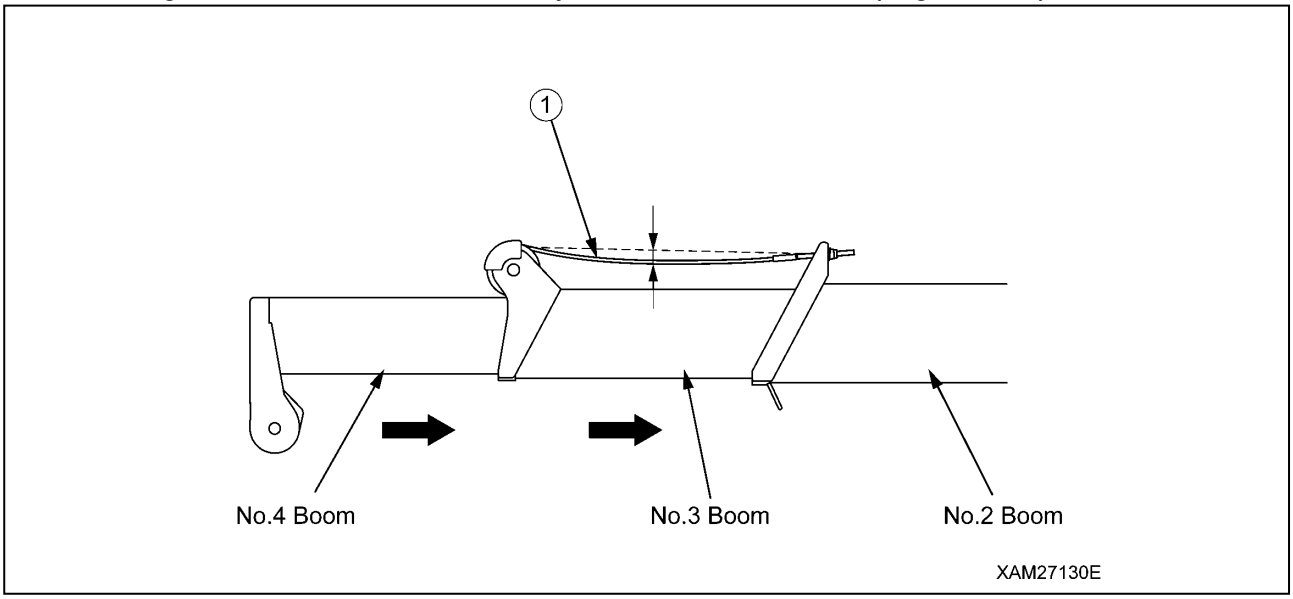
⚠ WARNING

Always wear work leather gloves when replacing the wire rope.

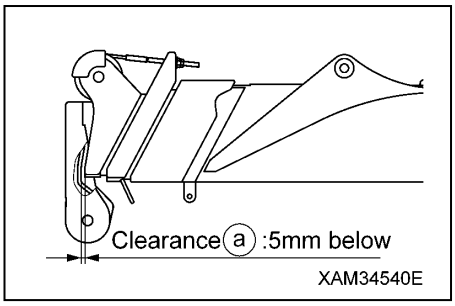
[CHECKING BOOM TELESCOPING WIRE ROPE]

When the telescoping wire rope (1) shows a condition as shown in the figure below, adjust is as follows:

1. Keep the boom level and check whether the center of the telescoping wire rope (1) sags during the boom retracting operation.
   When it sags, refer to the next section, "Adjustment of Boom Telescoping Wire Rope".



2. Check that 5mm clearance is formed between booms No.3 and No.4, clearance (a) shown at right, with the booms retracted in a horizontal position.
   If check finds clearance of 5mm or more, perform proper adjustment according to “Adjustment of boom telescoping wire rope”.



[5] CHECKING/CLEANING ENGINE SPARK PLUG

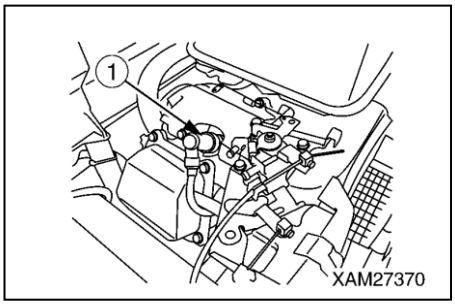
CAUTION

Make sure that the specified plug is used.
Those other than specified may cause deficiency in or shorten the useful life of engine.
• Specified spark plug: NGK BPR6HS

• Box wrench and handle for spark plug removal
• Plug cleaner or wire brush for cleaning

1. See “Operation 1.6 Machinery Cover” to remove the machinery cover.

2. Remove the spark plug wiring socket (1) (1 peace).



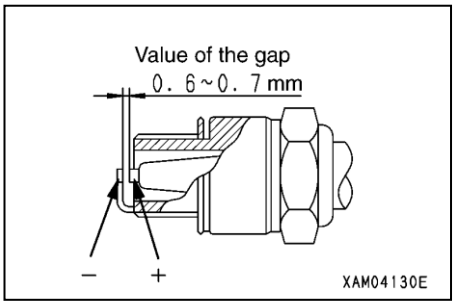
3. With the handle threaded through the hole in spark plug box wrench, remove the spark plug.

4. Remove carbon off the spark plug by means of the plug cleaner or the wire brush.

NOTES

Do not use a file or the like for this purpose as it wears electrode.

5. Measure the gap of the spark plug.
   Standard value of the gap: 0.6 to 0.7mm



6. If the gap is off the standard, change the bending of negative side to place the gap in the standard range.

7. Install the spark plug to the original position and connect the spark plug wiring socket (1).

8. See “Operation 1.6 Machinery Cover” to install the machinery cover.

SPECIFICATIONS

REMOTE CONTROL

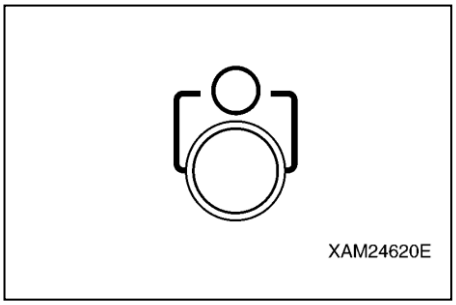
[1] LCD SCREEN (1)

The LCD screen displays the status of the Transmitter in operation, the established values for each mode, or error messages by symbols, comments or signs.

[2] START/RESET BUTTON (2)

This button has two usages as below:

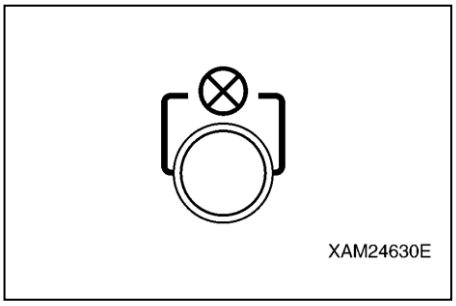
- To push this button starts the engine.
- This button resets the “Emergency Stop” and “Abnormal Signal Detect” conditions.



[3] STOP/EMO BUTTON (3)

This button also has two usages as below:

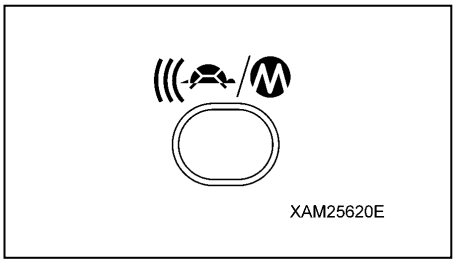
- To push this button stops the engine.
- In an emergency event where the Crane does not stop by normal operations, or such, this button provides the forced stop function.



[4] SPEED/MODE BUTTON (4)

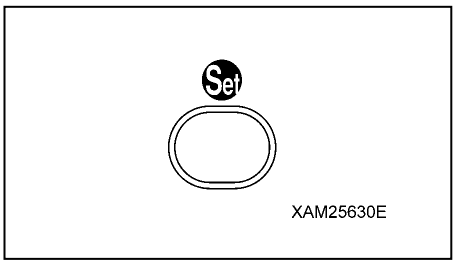
This button also provides two usages as below:

- During crane operations, to push this button decelerates the operation speed.
- Whilst the crane operation is paused, this button provides the selection of the Transmitter operation modes.
  The current active mode will be displayed in the LCD screen.



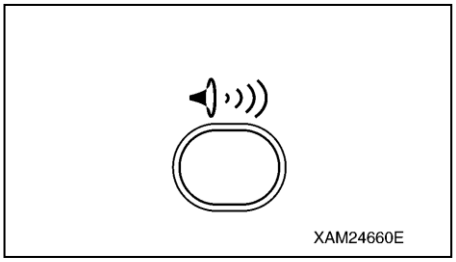
[5] SETTING BUTTON (5)

- For each of the setting of the modes, use this button to select one of the choice from the menu in the LCD screen.



[6] HORN BUTTON (6)

Push this button to toot the horn.

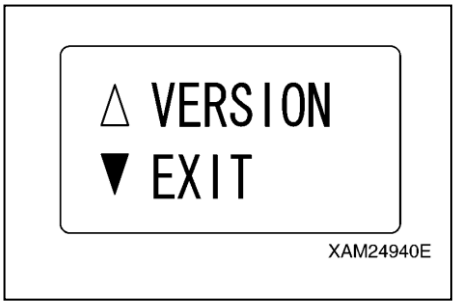


[9] EXIT

CAUTION

Once setting-up the desired function items are completed, do not forget to practice the termination procedure, below. Otherwise, when this process is not correctly terminated, the latest setting will not become valid.

1. Once setting-up the desired function items are completed, ensure that the display has returned to the A MODE screen.
2. Shift the cursor (▲ or ▼) using the Hook raising and lowering lever and select “EXIT”.
3. Push the Setting button, which will terminate the “A MODE” and turn the mode to “the “CRANE MODE”.



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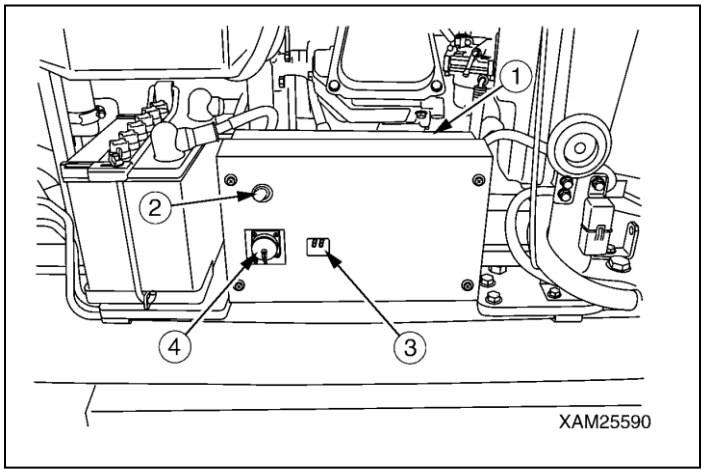
7.1.3 CHECKING RECEIVER

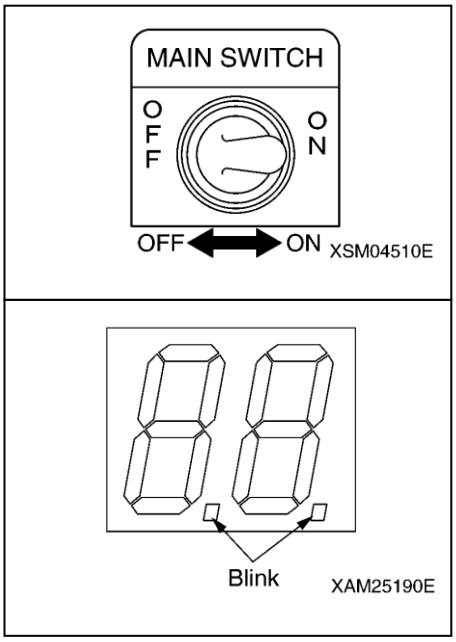
Perform the following inspections:



• Check the Control Box (1), Main Switch (2), Monitor display (3), and Cable Connector (4) for oily dirt or other contaminants.
Scrub away the dirt with a clean cloth.

• Check for any cracks and/or damages to the Control Box (1) or Monitor display (3).
Repair any cracks or damage immediately.
Cracks or damage may allow water to enter inside and bring troubles or failures to the Receiver, and may cause a serious hazard.

• Check the Main switch (2) and Cable Connector (4) for the loose conditions or damages.
Repair immediately when any such loose conditions or damages are found.
Such loose conditions or damages may cause errors or faults of the Receiver, which may result in a serious hazard.



• Toggle the Main switch (2) to ON and OFF alternately to verify that power is correctly turned ON or OFF.

• Turn ON the Transmitter, then toggle the Main switch (2) to ON, in addition, and confirm next that the two dots in the Monitor display as shown in the figure in the light blink.

NOTES

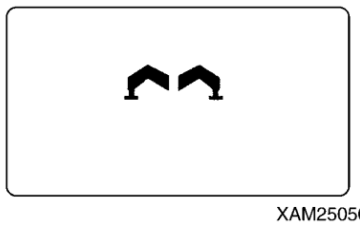
In the condition that the Transmitter is not powered ON , or reception has an error, the Monitor display shows the error code, “E2”, when the Receiver is turned ON.

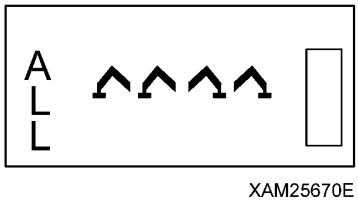
8.2.1 OUTRIGGER SETTING

⚠ WARNING

Avoid controlling outriggers collectively on ground conditions other than flat and leveled. Otherwise, 4 outriggers will not touch the ground consistently which makes the machine inclined and may result in tipping.

1. In accordance with “REMOTE CONTROL 6.2 Procedure in the Operation Mode”, enter into the “Outrigger collective setting mode”.

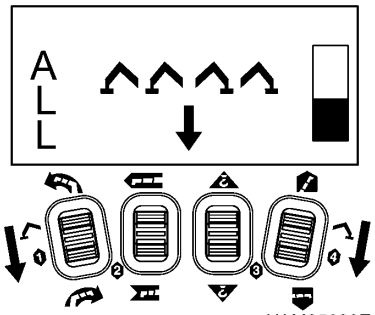

XAM25050E



XAM25670E

2. Turn one of the outrigger operation levers to “Extend (lower)” and pull the Accelerator lever slowly.

NOTES
In Outrigger collective setting mode (ALL), operation of any control lever controls all the outriggers.



XAM25680E

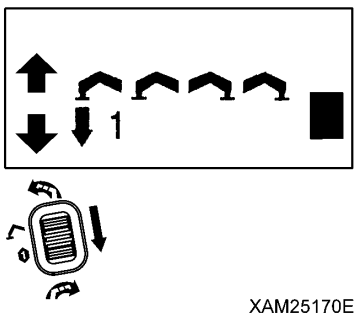
3. Just before outriggers touch the ground, slowly release the acceleration lever, then release the outrigger operation lever to return to its neutral position.

4. Push Speed/Mode button in the mode condition of above 3.
The operation mode is switched to “Outrigger individual setting mode”.


XAM25620E

5. Turn one of the outrigger operation levers to “Extend (lower)” and pull the Accelerator lever slowly.

NOTES
Repeat the same process to the other three outriggers and contact all the four outriggers to the ground.



XAM25170E

6. Push Speed/Mode button in the mode condition of above 5.
The operation mode is switched to “Outrigger collective setting mode”.


XAM25620E