TADANO

Publication No. TF

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Operation and Maintenance Manual

Rough Terrain Crane

Model TR-160M-3

Applicable Serial No. **525567** ~

⚠ CAUTION : Read this manual before operating the crane Save this manual for future reference.

TADANO LTD.

⚠About Prohibition of Release of Chlorofluorocarbons Into the Atmosphere

To protect the global environment, be sure to observe the following:

(1) Do not release the refrigerant (chlorofluorocarbon) filled in this product into the atmosphere in vain.

(2) When disposing of this product, recover the filled refrigerant (chlorofluorocarbon).

Contents

TR-160M-1(02-35

Preface

This manual is intended as a guide to help you operate and maintain the TADANO crane safely and correctly. This manual covers cranes of the following specification numbers.

Specification number (Specification number of the crane is given on the name-plate as shown below.)	1. TR-160M-3-00101
	2. TR-160M-3-00102
	3. TR-160M-3-00103
	4. TR-160M-3-00104
	5. TR-160M-3-00105

T200169

Nameplate is located on the side of the crane operator's cab.

Refer to the separate manuals for operation, inspection and maintenance for the engine, cooler, heater and tachograph.

The "TRAVELING" section of this manual describes the basic procedures for driving the vehicle. Read it carefully and become thoroughly familiar with the correct procedures for driving the vehicle.

The "OPERATION" section of this manual describes the basic procedures for operating the crane. Read it carefully and become thoroughly familiar with the correct procedures for operating the crane. Operating skill will improve as you gain knowledge of the crane and its capabilities.

The "INSPECTION AND MAINTENANCE" section covers the procedures for inspecting and servicing the crane. Proper inspection and servicing is essential for minimizing problems and obtaining optimum performance. Follow the instructions in this section to perform inspection and servicing properly.

Note that the illustrations in the manual may differ slightly from those on the machine. Also, some illustrations show the machine's components with their covers and guards removed to facilitate explanation.

If you transfer this machine, also hand this manual together with the machine for the convenience of the next use of this machine.

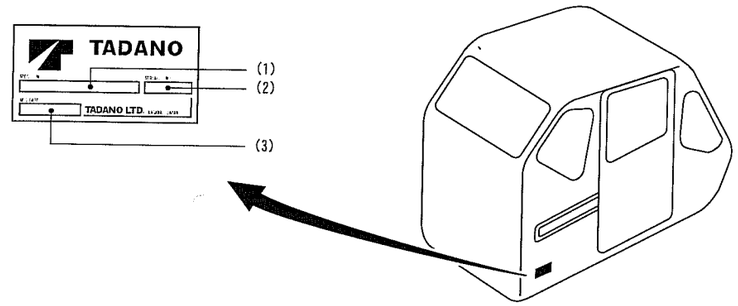
Please note that, for product improvement, some changes may have been incorporated in the machine that are not covered in this manual.

If there are any questions regarding the crane or this manual, contact the nearest TADANO distributor or dealer.

Servicing and Ordering Parts

When contacting the TADANO distributor or dealer for repairs or to order parts, please specify the following information:

(1) Specification number
(2) Production serial number
(3) Year of production



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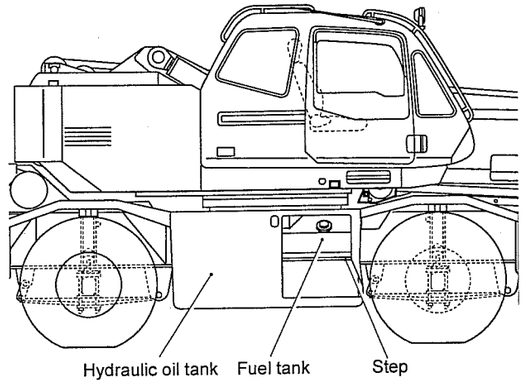
(4) Details of the problem, or the listing, number and quantity of desired parts

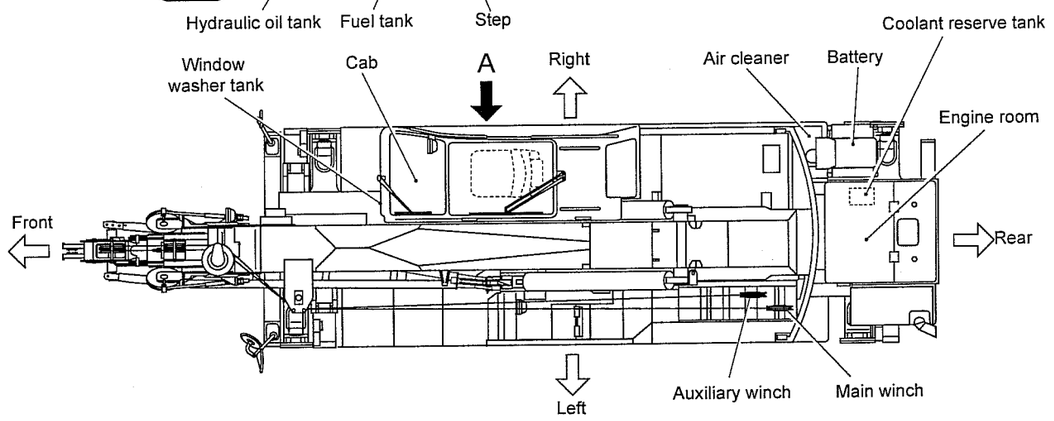
About the Year Limit of Supplying Repair Parts

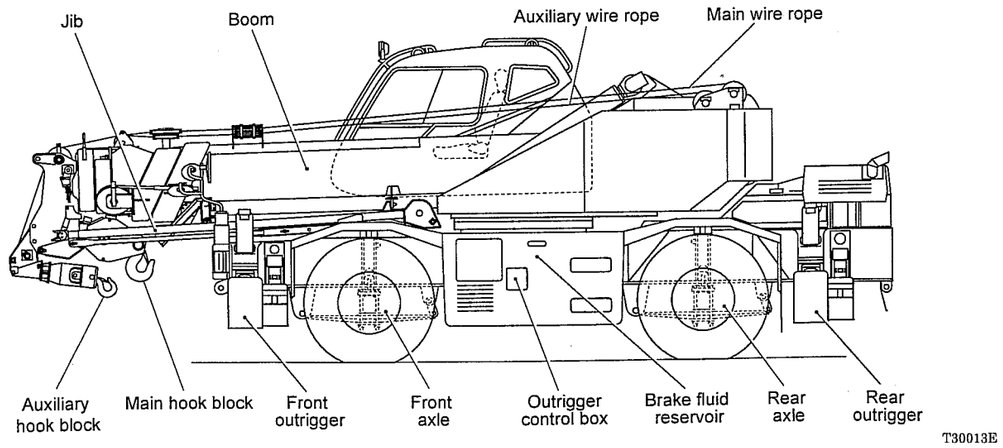
The year limit (period) of supplying repair parts for this product is 10 years after its production is discontinued. However, as for special parts, there are cases where we may consult with you about the delivery time even within the year limit. In principle, supply of repair parts is terminated at the above year limit, but we shall consult with you about the delivery time and price at your request to supply such parts even after the expiration of the year limit.

Components

The directional terms (front, rear, right and left) used in this manual are defined with reference to the operator's position when the boom is centered toward the front of the carrier. The definitions remain the same even when the crane's upper structure is rotated.







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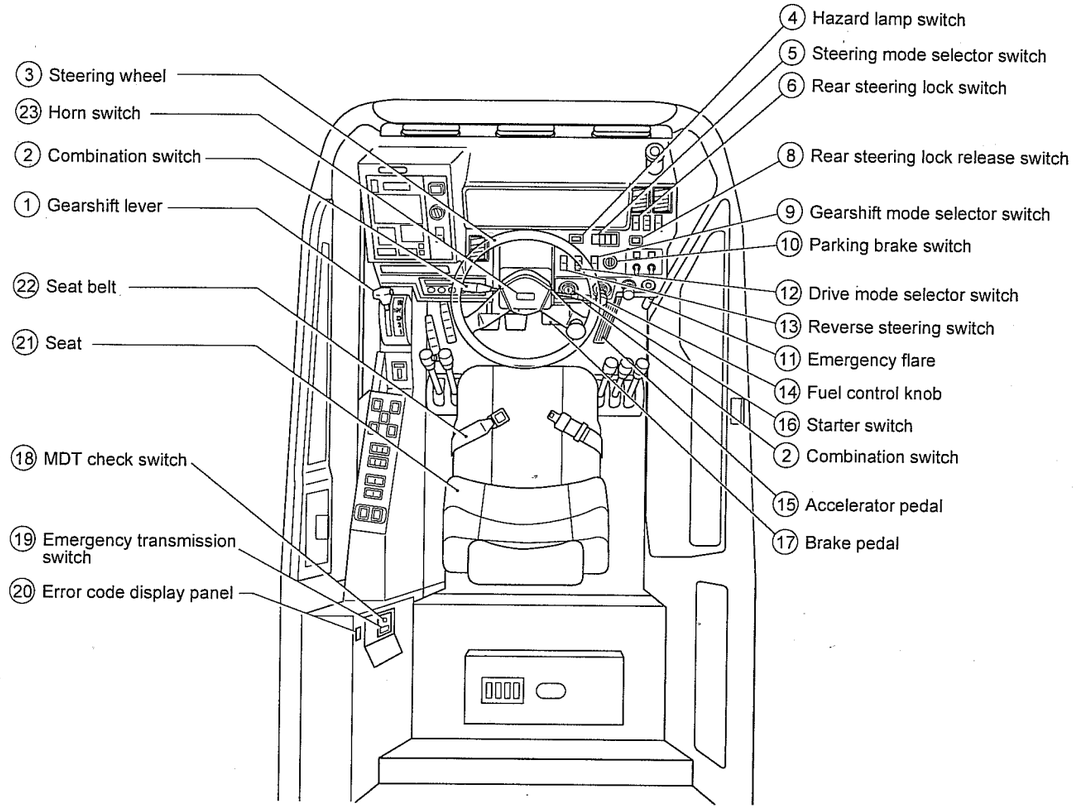
◆This illustration shows the traveling configuration of a machine with X-type outriggers.

◆Due to revisions, your machine may differ slightly from the above illustration.

Layout of Controls

Travel Operation Controls

Inside the Cab



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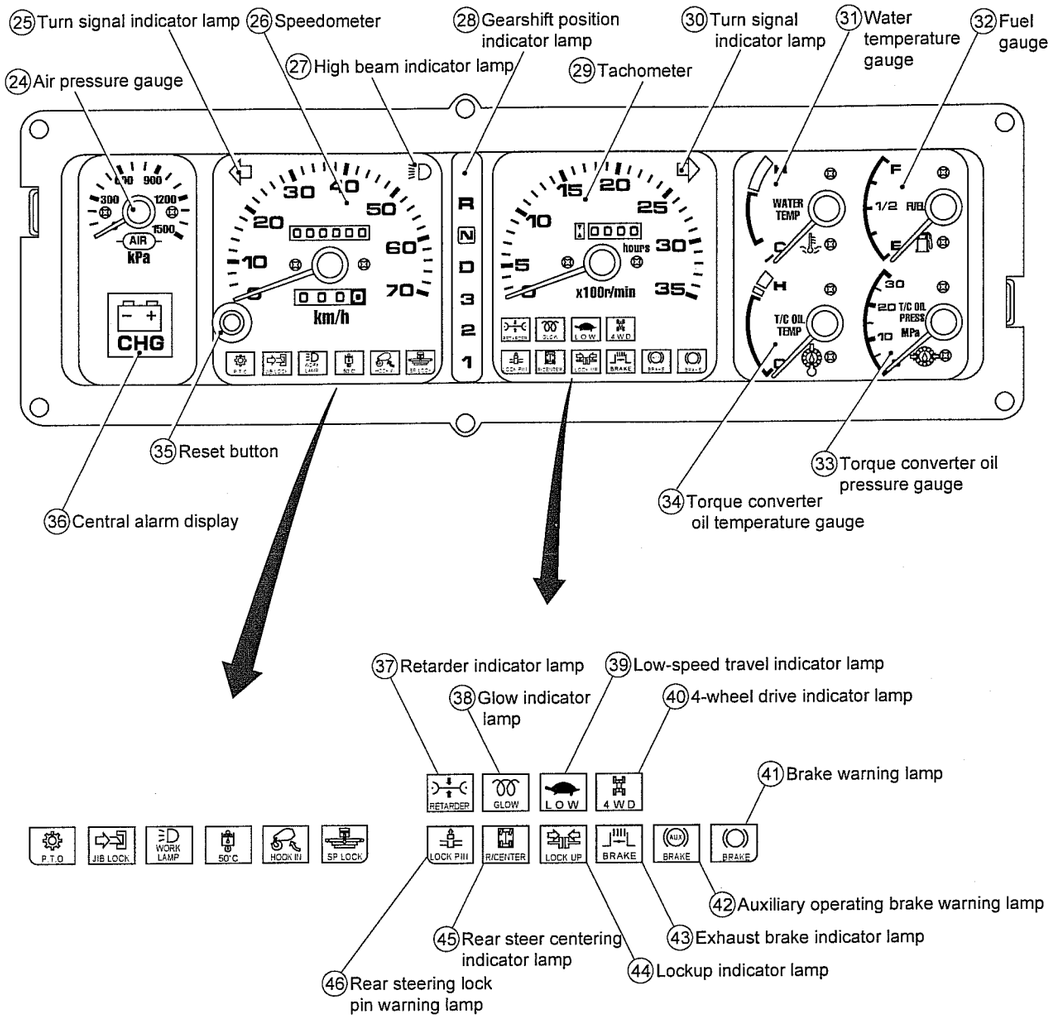

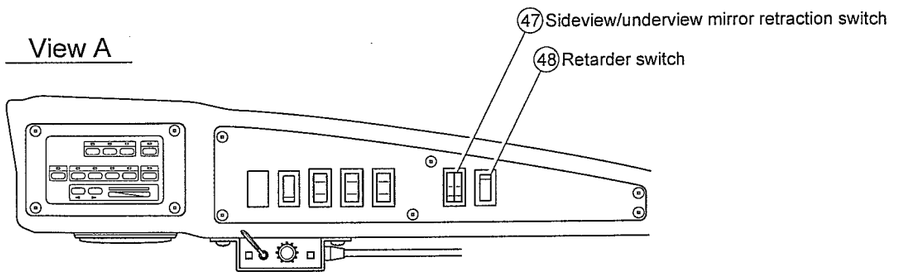

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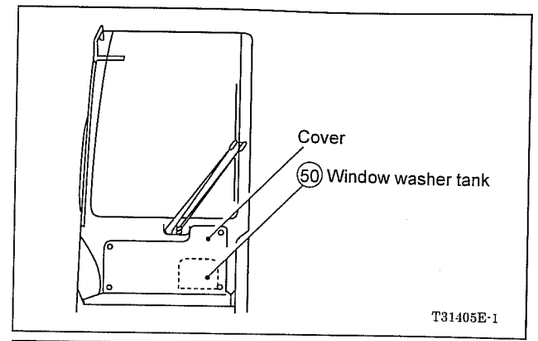
Outside Cab



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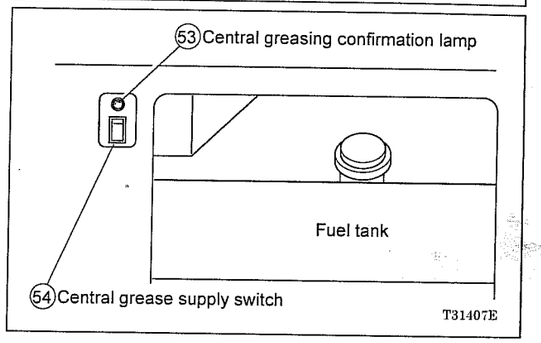

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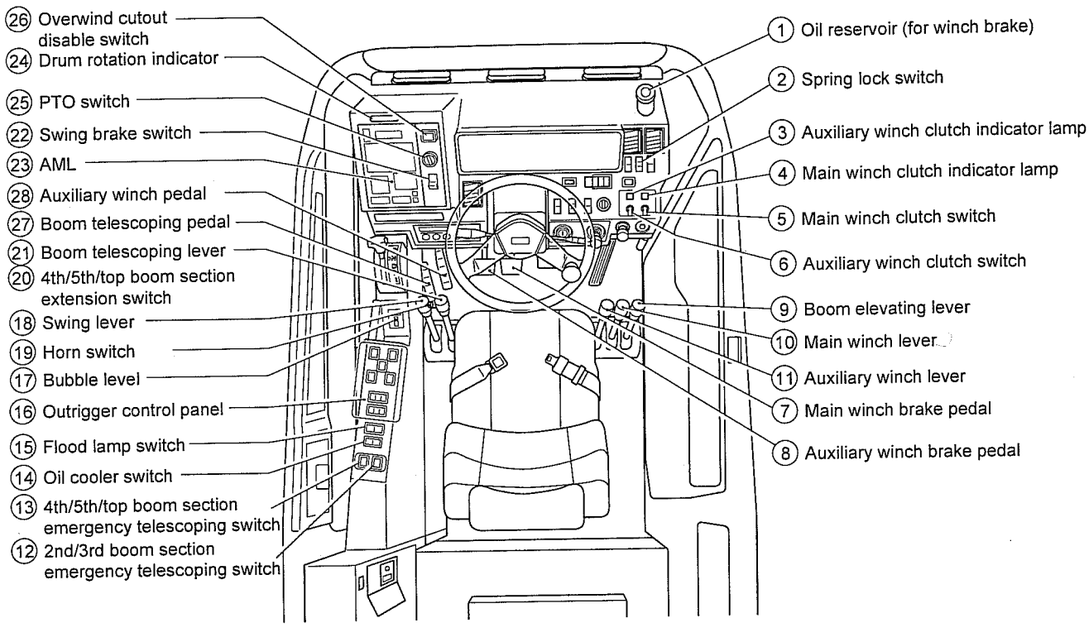
Crane Operation Controls

Inside Cab (ISO layout)



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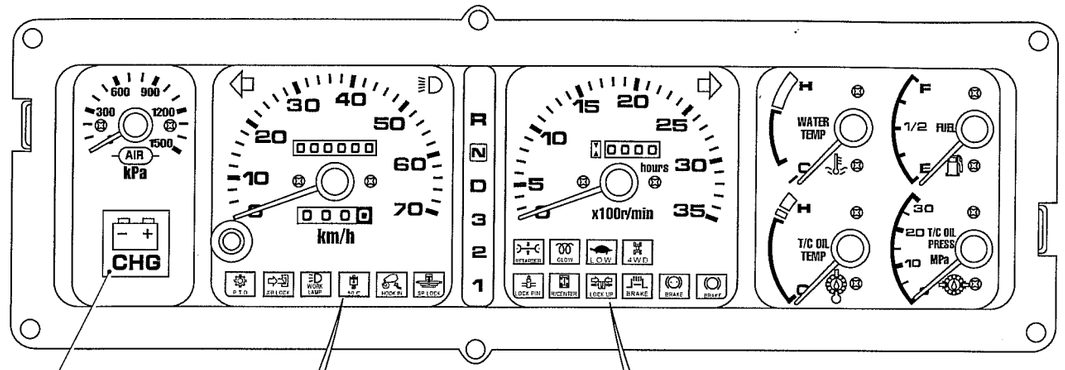

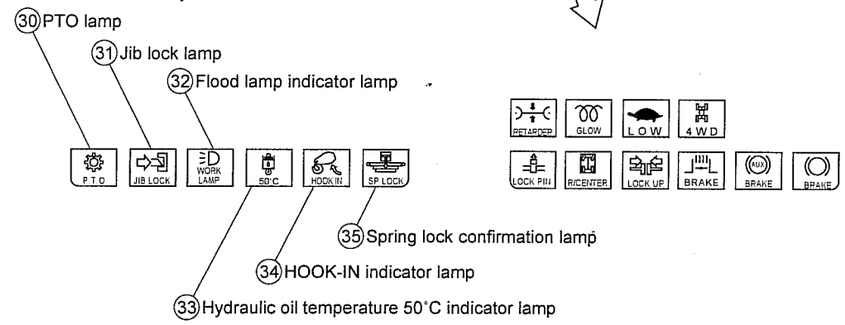

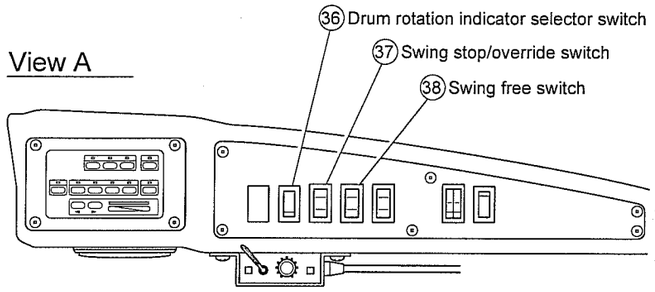

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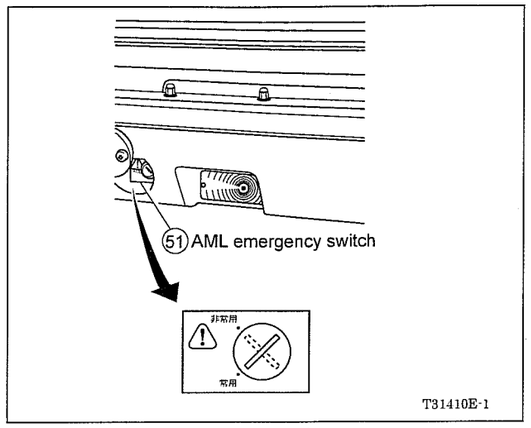
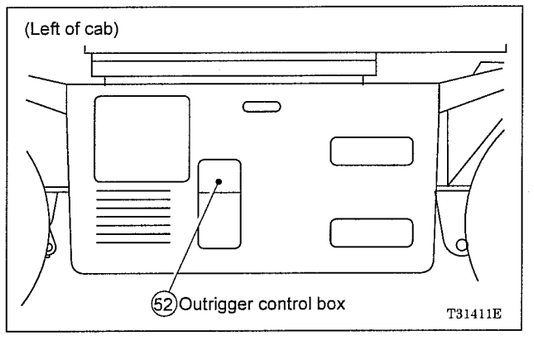
11. Auxiliary winch lever ····· 110
12. 2nd/3rd boom section emergency telescoping switch ····· 114
13. 4th/5th/top boom section emergency telescoping switch ····· 114
14. Oil cooler switch ····· 141
15. Flood lamp switch ····· 141
16. Outrigger control panel ····· 103
17. Bubble level ····· 103
18. Swing lever ····· 119
19. Horn switch ····· 119
20. 4th/5th/top boom section extension switch ···· 114
21. Boom telescoping lever ····· 114
22. Swing brake switch ····· 119
23. AML ····· 80
24. Drum rotation indicator (option) ····· 110
25. PTO switch ····· 80, 98
26. Overwind cutout disable switch ····· 95, 125
27. Boom telescoping pedal ····· 114
28. Auxiliary winch pedal ····· 110
29. Central alarm display ····· 31
30. PTO lamp ····· 98
31. Jib lock lamp ····· 131
32. Flood lamp indicator lamp ····· 141
33. Hydraulic oil temperature 50°C indicator lamp ····· 141
34. HOOK IN indicator lamp ····· 124
35. Spring lock confirmation lamp ····· 31, 100
36. Drum rotation indicator selector switch (option) ····· 110
37. Swing stop/override switch ····· 80, 119
38. Swing free switch ····· 119

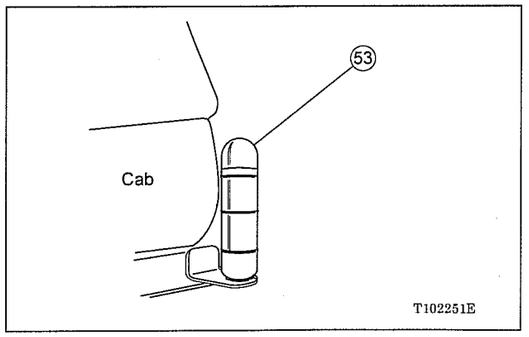
◆With the TADANO layout, levers and pedals are arranged as follows:

Boom elevating lever [9] → Main winch lever
Main winch lever [10] → Auxiliary winch lever
Auxiliary winch lever [11] → Boom telescoping lever
Boom telescoping lever [20] → Boom elevating lever
Boom telescoping pedal [27] → Boom elevating pedal
Auxiliary winch pedal [28] → Boom telescoping pedal

Outside Cab



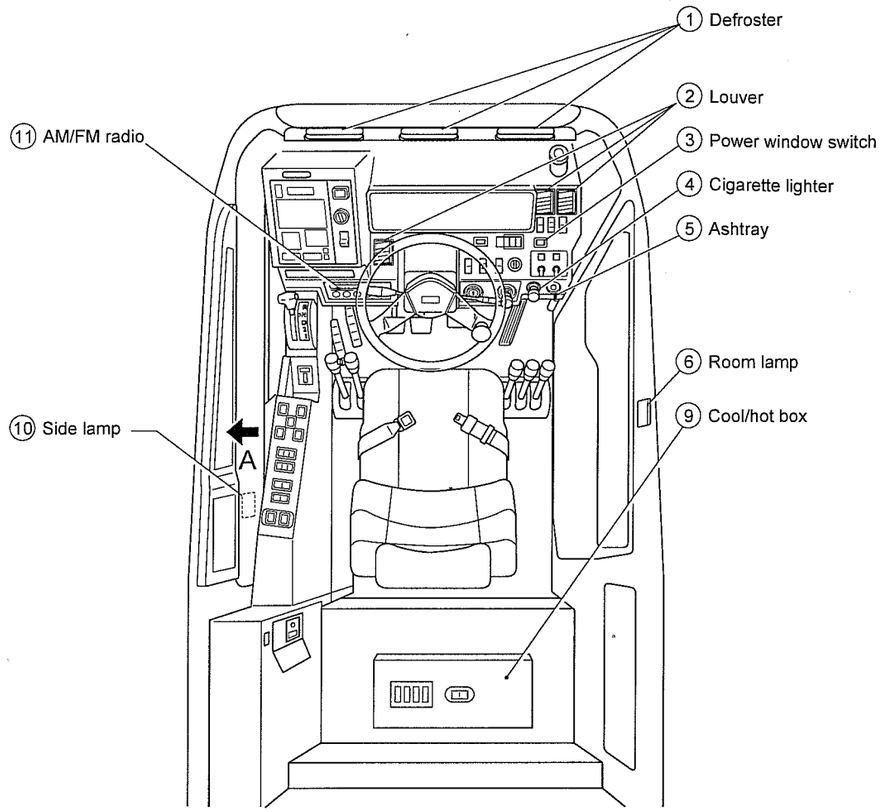




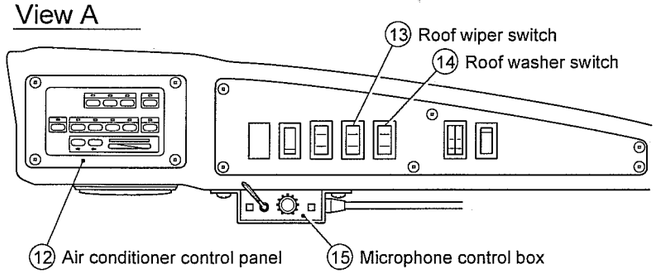
Page
51. AML emergency switch ····· 80, 98
52. Outrigger control box (lower structure) ····· 103
53. AML external warning lamps (option) ····· 97

Others

Inside Cab



View A



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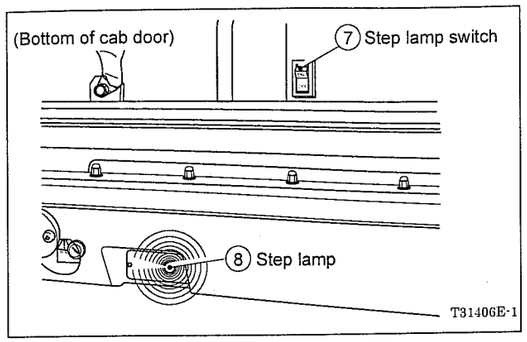
Outside Cab

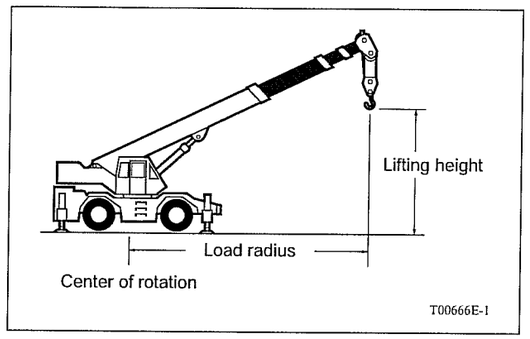


Terminology

This section provides the meaning of some important terms used in this manual.

Load Radius, Lifting Height

"Load radius" refers to the horizontal distance between the crane's center of rotation and the vertical center of the lifted load.
A "lifting height" is defined for each load radius and refers to the vertical distance between the ground and the bottom of the hook block raised to its uppermost position.

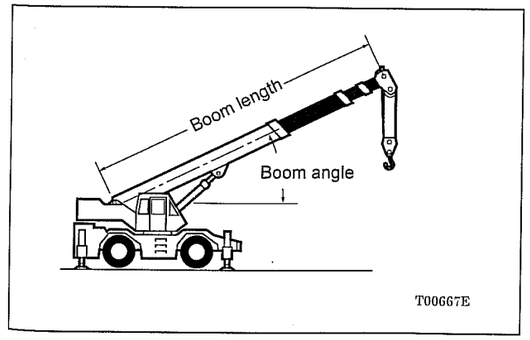


Maximum Lifting Height

"Maximum lifting height" refers to the maximum lifting height allowed.

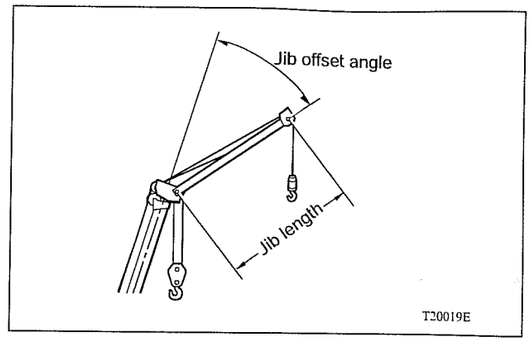
Boom Length, Boom Angle

"Boom length" refers to the distance from the pivot pin at the foot of the boom to the center axle of the sheave(s) at the boom head.
"Boom angle" refers to the angle formed by the boom's centerline and the horizontal.



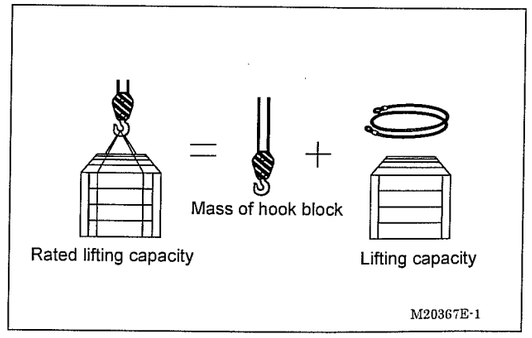
Jib Length, Jib Offset Angle

"Jib length" refers to the center-to-center distance as illustrated in the figure below.
"Jib offset angle" refers to the angle formed by the centerline of an extended jib and the centerline of the boom.



Rated Lifting Capacity, Lifting Capacity

"Rated lifting capacity" refers to the maximum allowable load for a particular boom length and load radius. The rated lifting capacity includes the mass of the hook block, rigging and load handling devices.
"Lifting capacity" refers to the actual mass of the load that can be lifted. It is obtained by subtracting the mass of the hook block, rigging and load handling devices from the rated lifting capacity.
The mass of individual hook blocks are indicated in the "INFORMATION AND DATA" section at the end of this manual.



Without Load

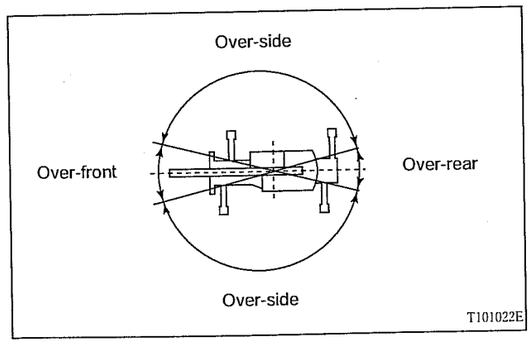
The phrase "without load" is used to indicate that no load is being lifted on the hook block.

Stability Section, Strength Section

"Stability section" refers to the section of the rated lifting capacity table in which the major factor for determining lifting capacity is the stability of the crane.
"Strength section" refers to the section of the rated lifting capacity table in which the major factor for determining lifting capacity is the structural strength of the crane.
In the rated lifting capacity table, the values below the blue line are based on the stability of the crane.
The values above the blue line are based on the structural competence of the crane.

Over-Front, Over-Rear, Over-Side

"Over-front" refers to the forward working area of the carrier for which lifting capacities have been rated and listed in the rated lifting capacity table.
"Over-rear" refers to the backward working area of the carrier for which lifting capacities have been rated and listed in the rated lifting capacity table.
"Over-side" refers to the forward working areas not included in "Over-front" and "Over-rear."



Over-Front, Over-Rear, Over-Side Capacities

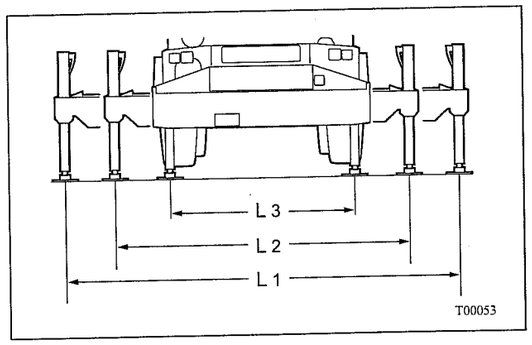
"Over-front capacities" refers to the rated lifting capacity that can be lifted in the over-front area.
"Over-rear capacities" refers to the rated lifting capacity that can be lifted in the over-rear area.
"Over-side capacities" refers to the rated lifting capacity that can be lifted in the over-side area.

360-Degree Capacity

"360-degree capacity" refers to the lifting capacities that remain the same regardless of the area in which the load is lifted.

Outrigger Extension Width

“Outrigger extension width” refers to the horizontal distance between the right and left outrigger floats when outriggers are extended.
(1) Outrigger maximum extension width (L1)
This refers to maximally extended outrigger extension width.
(2) Outrigger middle extension width (L2)
This refers to designatedly-middle-extended outrigger extension width.
(3) Outrigger minimum extension width (L3)
This refers to designatedly-minimum-extended outrigger extension width.



Maximum Extension Capacity, Middle Extension Capacity, Minimum Extension Capacity

(1) Maximum extension capacity
Lifting capacity when outriggers are maximally extended.
(2) Middle extension capacity
Lifting capacity when outriggers are extended to middle.
(3) Minimum extension capacity
Lifting capacity when outriggers are minimally extended.

On-Outrigger Operation

"On-outrigger operation" refers to an operation performed with a crane that is supported on outriggers.

On-Rubber Operation

"On-rubber operation" refers to an operation performed with a crane that is supported on the tires, and not on the outriggers.

Traveling with Load on Hook

"Traveling with load on hook" refers to traveling with a suspended load.

Free-Fall Operation

"Free-fall operation" refers to an operation whereby the winch clutch is disengaged, the winch drum is allowed to rotate freely, and the hook falls under its own weight.

Raising Load Just Clear of Ground

“Raising load just clear of the ground” refers to clearing the load from the ground by hoisting up.

MEMO

TRAVELING

Traveling Procedure

⚠ WARNING

⚠ This section describes briefly the essential steps for traveling the crane. For detailed information on the controls, refer to the appropriate pages in this section. Do not travel until you completely understand all the instructions and information given in this section.

⚠ The precautions to be observed when traveling are described in the "Safety Rules" section at the beginning of this manual. Carefully read the section before traveling the crane.

⚠ If there is anything abnormal with the crane when traveling, stop immediately, check and locate the cause of trouble, and arrange to repair any faulty components. To prevent accidents, do not travel until the repairs have been completed.

Preparatory Steps

1. Perform pre-operational inspections.

2. Enter the cab and adjust the seat, control levers, steering wheel so that you can easily operate the levers and all other controls. Fasten the seat belt.

3. Perform pre-start checks and start the engine.

4. Let the engine warm up. make sure that all meters and monitor displays are normal and that the engine is not making abnormal sounds.

5. Set the crane in the following traveling configuration:

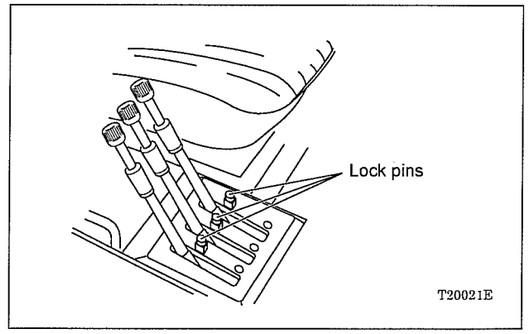
◆For information on the procedure for setting up the crane in traveling configuration, see the "OPERATION" section in this manual.

(1) Stow the jib in its stowing position.
(2) Fully retract the boom and place it over the front, and stow it on the boom rest.
(3) Stow the main hook block and the auxiliary hook block in their stowing positions.
(4) Lock the upper swing structure with the swing brake.
(5) Fully retract and stow the outriggers. Lock the outrigger beams with the lock pins.
(6) Release the suspension lock.

6. Make sure that the control levers and switches are in the following positions:

(1) Steering mode selector switch ·····(2-WHEEL)
(2) Suspension lock switch ·····(Neutral)
(3) Winch clutch switch (for a crane with free-fall device) ·····"ON"
(4) Parking brake switch ·····"PARK"
(5) Drive mode selector switch ·····(Neutral)
(6) Reverse steering switch ·····"OFF"
(7) Control levers (winch, boom telescoping, boom elevating and swing levers) ·····Leaned backward after locked in neutral positions
(8) Gearshift lever ·····"N"
(9) Swing brake switch ·····"ON"
(10) PTO switch ·····"OFF"
(11) Jack/slider selector switch ·····(Neutral)
(12) Extend/retract selector switch ·····(Neutral)

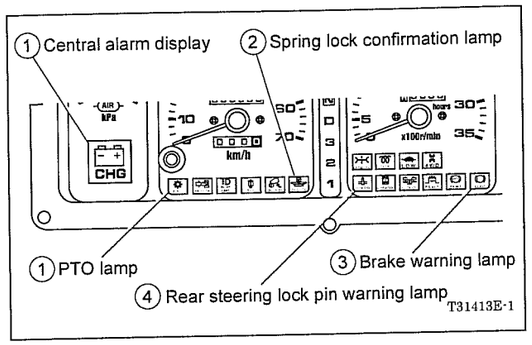
◆Press in the knobs for winch levers, boom elevating lever, boom telescoping lever, and swing lever, to their minimum lengths. Put lock pins in the all control levers and lean them backward.



7. Make sure that no warning and indicator lamps are lit, except for the brake warning lamp.

◆At this point, the brake warning lamp is on as the parking brake is activated.

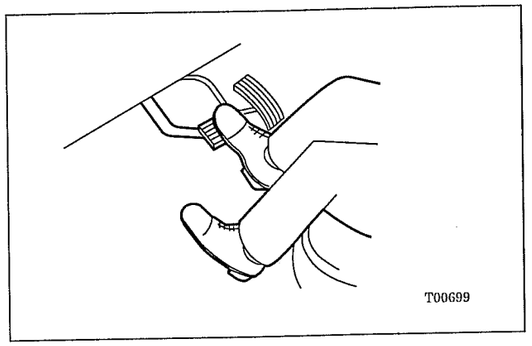
(1) Central alarm display ····· Off
(2) Spring lock confirmation lamp ····· Off
(3) Brake warning lamp ····· On
(4) Rear steering lock pin warning lamp ····· Off
(5) PTO lamp ····· Off



8. On rough or slippery roads, or on unpaved or soft ground, select a drive mode suitable for the terrain condition. When traveling in special steering modes depending on work site conditions, select steering and drive modes suitable for the operation.

Starting

1. Depress the foot brake pedal and hold it down.



2. Set the parking brake switch to OFF. Make sure that the brake warning lamp goes out.

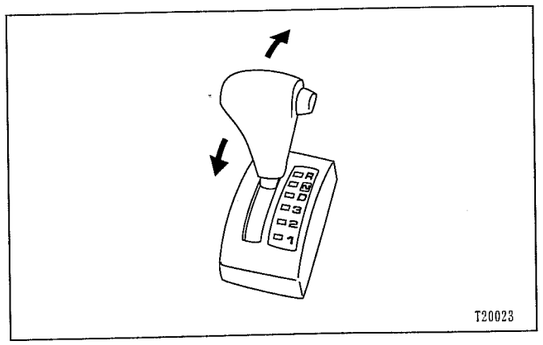
◆If the parking brake is switched to OFF when air pressure is below the specified level, an alarm buzzer sounds to alert that the air pressure is low.

3. Check the shift positions while operating the gearshift lever:

(1)To go forward ····· Drive, First, Second
(2)To go backward ···· Reverse

◆If the gearshift is operated without releasing the parking brake, the alarm buzzer will sound.

When the gearshift lever is in Drive, however, the alarm buzzer will not sound immediately; it will sound if you attempt to travel.



4. Make sure the area completely around the vehicle is safe. Release the foot brake pedal and start traveling by slowly depressing the accelerator pedal.

Traveling

Automatic Gear Shifting

Depressing the accelerator pedal with the gearshift in Drive automatically changes the transmission from first to third gear based on the traveling speed. This is the normal traveling mode.

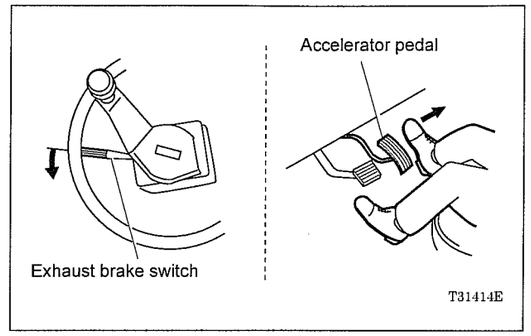
◆When the low-speed four wheel drive mode is selected (when the drive mode select switch is in L/4D), automatic shifting cannot be realized. The transmission is fixed to the third gear.

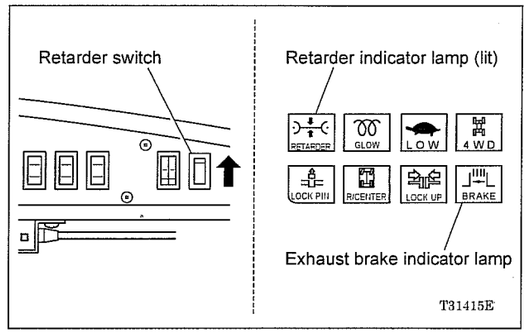
Manual Gear Shifting

Shift into First gear to start forward motion then shift into Second and then Drive to increase speed.
When climbing a grade while manually shifting gears, choose the gear best suited to the the grade.
When accelerating, depress the accelerator pedal and then release it when the traveling speed reaches the next higher range. Then shift to the next higher gear.
When decelerating, slow down to the next slower range and then shift to the next lower gear.

Traveling on Grade

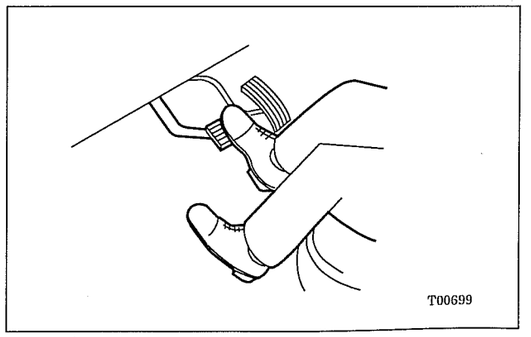
1. When traveling down a grade, release the accelerator pedal and pull out the exhaust brake switch to activate engine braking.





2. If the speed can not be controlled with the exhaust brake, shift down to activate stronger engine braking. Before shifting down, slow down to the next slower range by depressing the foot brake.

3. If the speed still cannot be controlled, also use the foot brake to slow down. Be sure to slowly pump the foot brake to slow down more effectively.



Stopping

1. Release foot from the accelerator pedal and activate engine braking to slow down.

2. Depress the brake pedal to stop the vehicle.

3. Shift into Neutral.

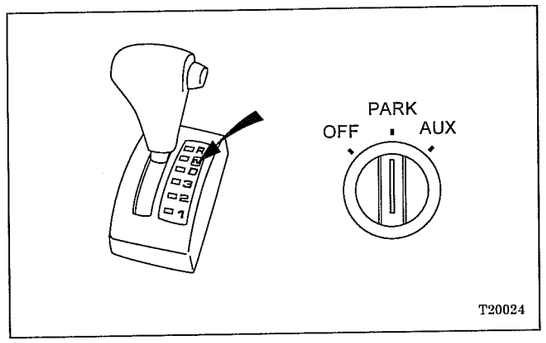
4. Switch the parking brake switch to PARK, then release foot from the brake pedal.

Parking

◆Parking the crane for long periods causes the portion of the tires that contact the ground to flatten. This effect may produce vibration until the tires return to their original shape with continued travel. To park for long periods, extend the outriggers and keep the tires off the ground.

1. Depress the brake pedal to stop the vehicle.

2. With the brake pedal held down, shift into Neutral and activate the parking brake.



3. Release the brake pedal.

4. Turn off the heater and other equipment inside the cab.

5. If a special traveling mode has been selected, return the steering mode and drive mode to the normal modes (two-wheel steering mode and high-speed two-wheel drive mode).

6. Close all the side windows and roof window in the cab.

7. Shut off the engine and remove the starter key.

8. Leave the cab and lock the door.

Crane Operator's Cab

Opening and Closing the Door

⚠ WARNING

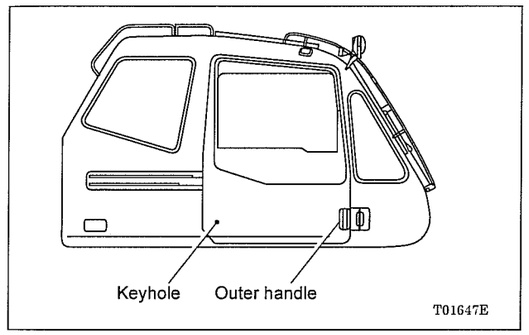
⚠ The door, if not completely shut, could open when the vehicle is traveling. Before traveling, be sure to close and lock the door.

⚠ CAUTION

⚠ Do not attempt to close the door holding its rear end. Your hand may be pinched . Hold the door handle when closing the door.

From Outside the Cab

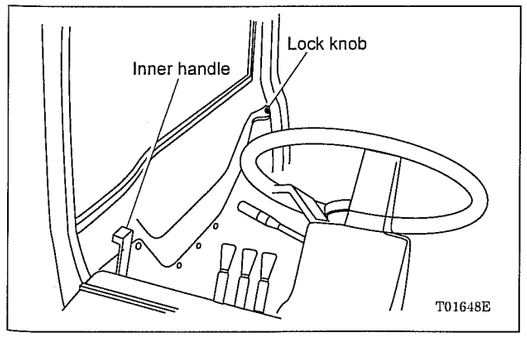
Pull the outer handle sideways to slide the door open or shut.



From Inside the Cab

Pull the inner handle sideways to slide the door open or closed.

◆The door will be locked after the door is closed and the lock knob is pushed in. The door lock will be released by pulling up the lock knob.

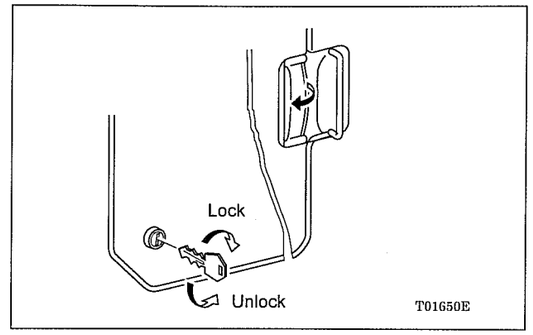


Locking and Unlocking

Insert the door key in the lock, and rotate it clockwise to lock the door, or counterclockwise to unlock it.

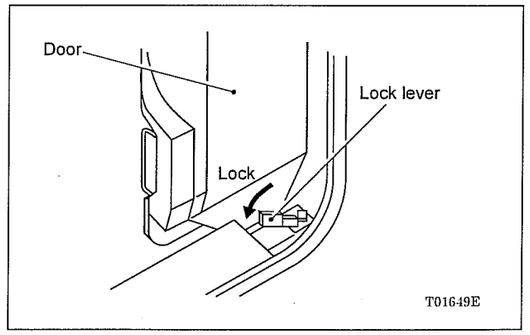
◆Do not leave the crane with the key inserted in the lock.

◆The door will lock if closed with the lock knob pushed in and the door handle pulled upwards. Do not leave the key in the cab or you will be locked out!



Leaving the Door Held Open

to keep the door open during crane operation, and press the lock lever forward with the door fully open. Before closing the door, press the lock lever to the rear.



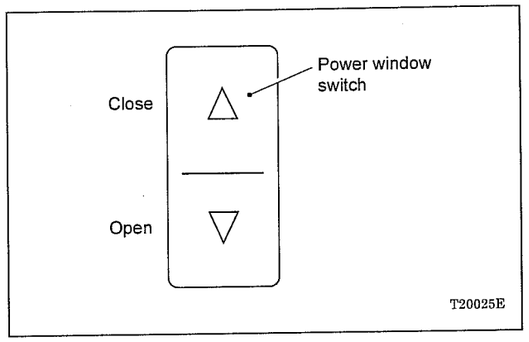
Opening and Closing the Windows

[NOTICE]

◆Do not leave the windows open; Wet controls may cause problems. Be sure to shut the windows before leaving the cab.

Opening and Closing the Door Window

Press the power window switch to open and close the window. The windows can be opened and closed only when the door is closed.

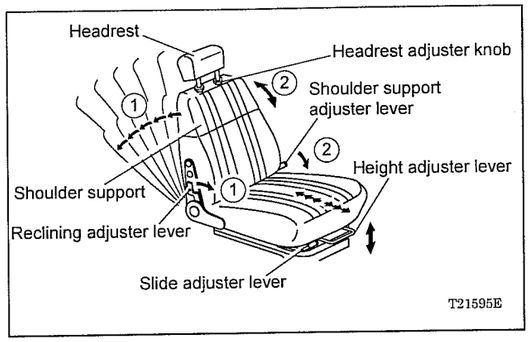


Adjusting the Seat Position

⚠ WARNING

⚠Adjust the seat position before traveling or starting operation. Making adjustments while traveling or during operation could be dangerous.

The seat can be adjusted up or down, and forward or backward. The seatback angle, shoulder support position, headrest height and arm rest position are also adjustable. Adjust the seat to a position that allows you to easily operate the control levers and pedals.



Height Adjustment

Pull the height adjuster lever until the seat is at the desired height.

Seat Sliding

Hold the slide adjuster lever up, and adjust the seat forward or backward. The seat is locked in position when the lever is released. Try to move the seat back and forth to ensure that it is locked in place.

Seatback Angle Adjustment

Pull the reclining lever forward and adjust the angle of the seatback. The seatback is locked in position when the lever is released.

Shoulder Support Adjustment

Hold the shoulder support adjuster lever up and adjust the shoulder support forward or backward. The shoulder support is locked in position when the lever is released.

Headrest Height Adjustment

Push in the headrest height adjuster knob and adjust the headrest height.

Armrest Angle Adjustment

Hold the armrest adjuster lever up and adjust the armrest angle. The armrest is locked in position when the lever is released.

Stowing the Control Levers

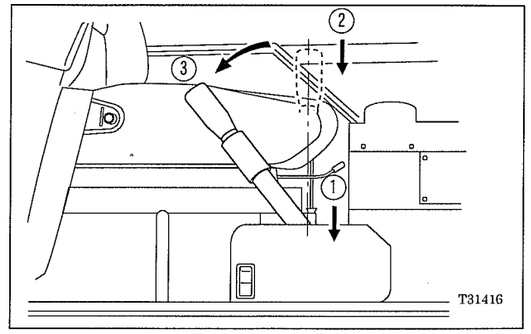
⚠ WARNING

⚠If your body touches a control lever when you go into the cab, the crane equipment may move inadvertently. To eliminate this danger, lock all control levers by inserting the lock pins and pull them backward to the stowing positions after you have completed crane operations.

1. Insert the lock pin.

2. Bring the control lever to the minimum length position.

3. Push the lever downward. Keeping downward pressure, pull the knob backward to the stowing position.

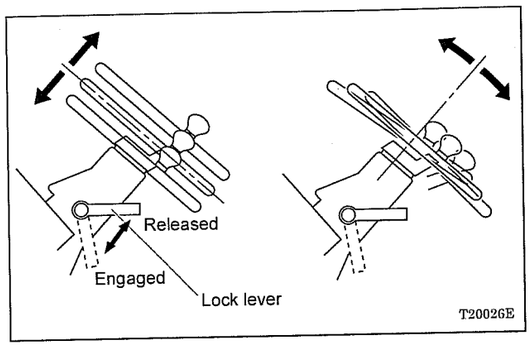


Adjusting the Steering Wheel

⚠ WARNING

⚠Be sure to adjust the steering wheel before traveling. Adjustment while traveling is dangerous.

The height and angle of the steering wheel are adjustable when the lock lever is disengaged. Adjust the steering wheel height and angle for maximum ease of steering.



Adjusting the Steering Wheel Height and Angle

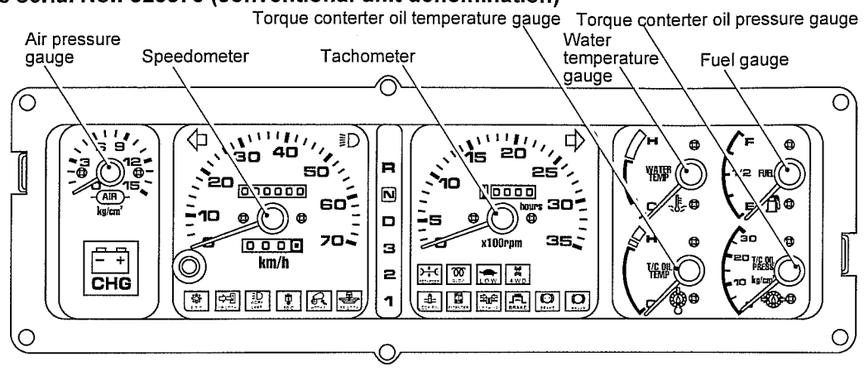
Pull up the steering wheel lock lever. Then you can freely adjust the steering wheel height and angle. Adjust the steering wheel height and angle for maximum ease of steering. After completing the adjustment, push down the lock lever.

◆Be sure to securely engage the lock lever after the adjustment.

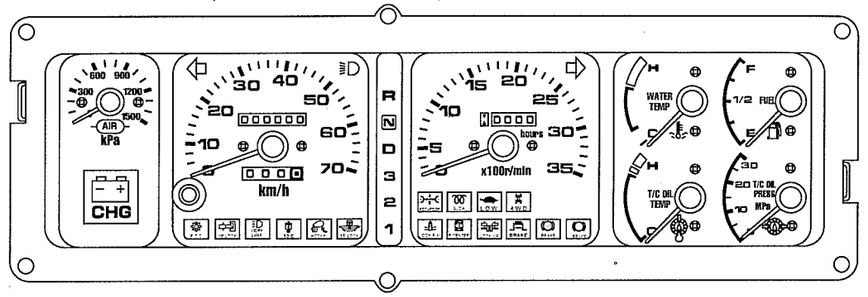
How to Read the Instrument Panel

Meters and Gauges

Applicable serial No.: 525576 (conventional unit denomination)



Applicable serial No.: 525577 (SI-unit denomination)



T31417E-1

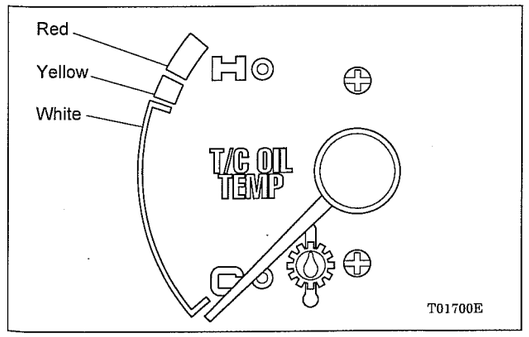
Torque Converter Oil Temperature Gauge

[NOTICE]

◆When the gauge needle reaches the yellow zone, decrease load and travel while paying attention to the oil pressure.

When the needle reaches the red zone, oil temperature is too high. Stop the vehicle in a safe location and idle the engine to lower the oil temperature.

This gauge indicates the temperature of the torque converter oil. When traveling, the needle should be in the white zone.

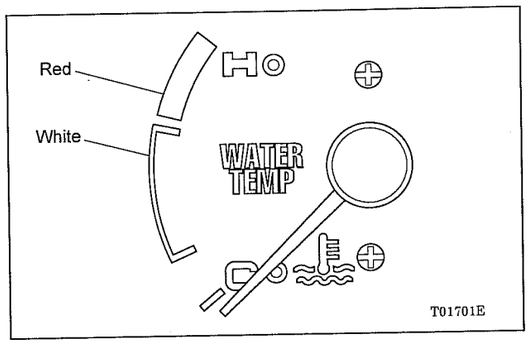


Water Temperature Gauge

[NOTICE]

◆The engine may overheat if the gauge needle reaches the red zone. Stop the vehicle in a safe place and idle the engine to lower the water temperature.
If the radiator fan is not running, however, stop the engine immediately. After the engine has cooled down, examine and locate the cause of trouble.

This gauge indicates the temperature of the engine cooling water. When traveling, the gauge needle should be in the white zone.

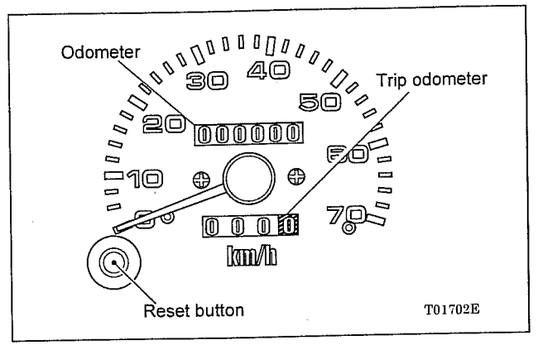


Speedometer

⚠ WARNING

⚠To prevent problems due to engine overrun, the warning buzzer will sound and the speed warning will appear in the central alarm display when the speed is excessively high. If the alarm is given, slow down immediately using the foot brake. Beware of engine overrun particularly while driving on a long downhill section.

The speedometer indicates the travel speed. An odometer and a trip odometer are built into the speedometer. The odometer indicates the total distance traveled in kilometers. The trip odometer reading is reset to "0000" when you press the reset button.



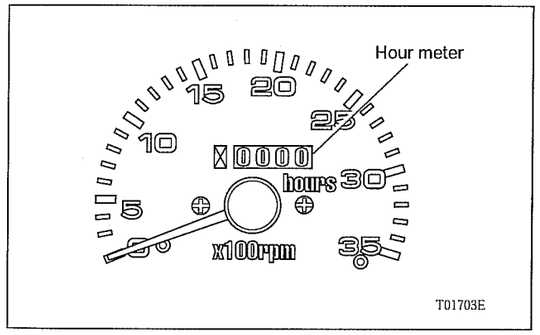
Tachometer

⚠ WARNING

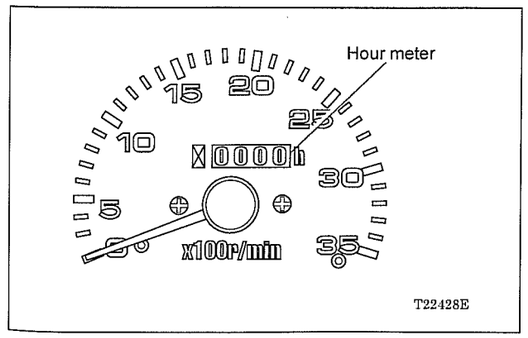
⚠If the engine overruns, the engine overrun warning appears on the central alarm display and the buzzer sounds. Immediately depress the brake pedal to decrease the vehicle speed.
Especially take care of the engine revolutions when when traveling down on a long grade.

This meter indicates the number of engine revolutions per minute.
The hour meter is built in the tachometer and counts 1 hour for each hour with an engine speed of 1,600 min^{-1} {rpm}. Perform inspection and maintenance work on the basis of the displayed hours.

Serial No.: –525576



Serial No.: 525577–



Air Pressure Gauge

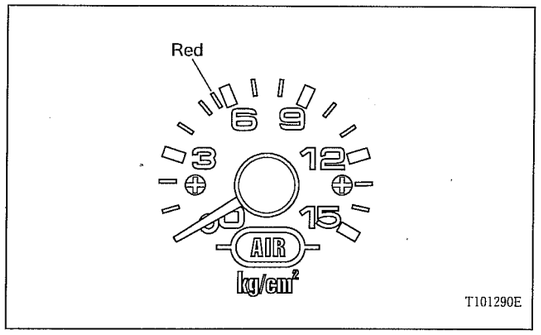
⚠ WARNING

⚠A drop in air pressure for the air brakes, below the specified range is dangerous as it reduces air brake performance. When the air pressure drops below the specified range, the air pressure warning will appear in the central alarm display, and the alarm buzzer sounds. Immediately stop the vehicle in a safe location. Shift into Neutral and rev the engine to increase air pressure.

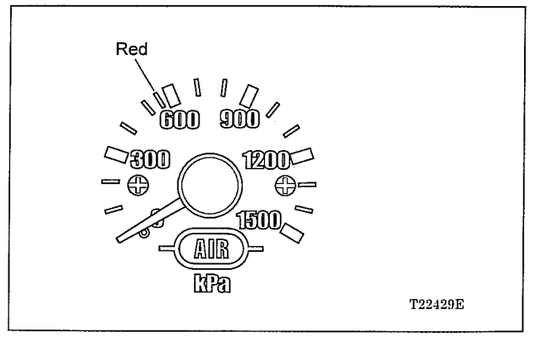
This gauge indicates the air pressure in the air tank.

Specified pressure range	550 to 900 kPa {5.5 to 9.0 kgf/cm^2}

Serial No.: –525576

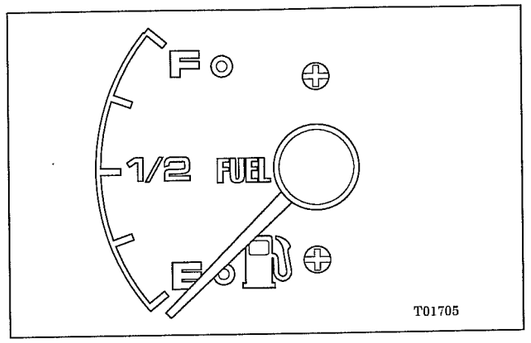


Serial No.: 525577–



Fuel Gauge

This gauge indicates the amount of fuel remaining in the fuel tank.
When only a small amount of fuel is left, the low fuel level warning will appear in the central alarm display.
F (full) ····· The fuel tank is full.
E (empty) ····· Supply fuel.



Torque Converter Oil Pressure Gauge

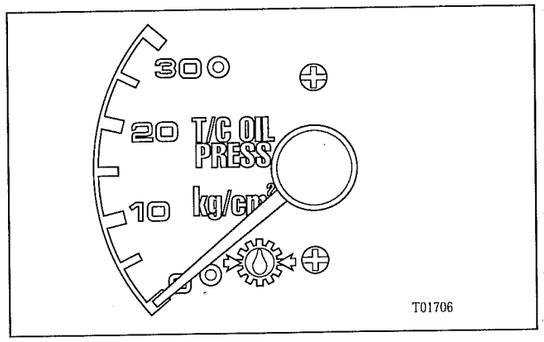
[NOTICE]

◆Driving the vehicle with low clutch pressure causes the clutch to slip, and become damaged. When the oil pressure gauge indicates a pressure below the normal range while the parking brake switch is set to OFF, the warning buzzer will sound and the torque converter oil pressure warning will appear in the central alarm display. If the pressure is below the specified level, immediately stop and have the nearest TADANO distributor or dealer check the vehicle.

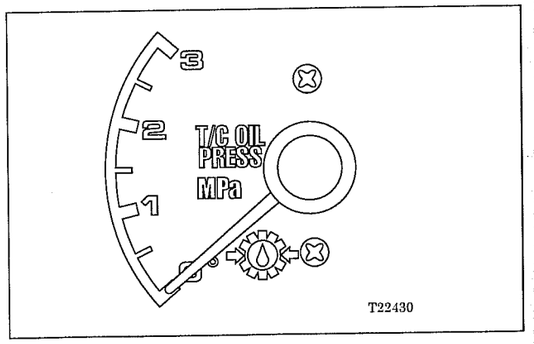
This gauge indicates the pressure of the torque converter oil supplied to the transmission clutch. The normal pressure levels are as follows:

With engine speeds of 650 min^{-1} {rpm}	1.3 MPa {13 kgf/cm^2} or more
With engine speeds of 2,800 min^{-1} {rpm}	1.8 to 2.1 MPa {18 to 21 kgf/cm^2}

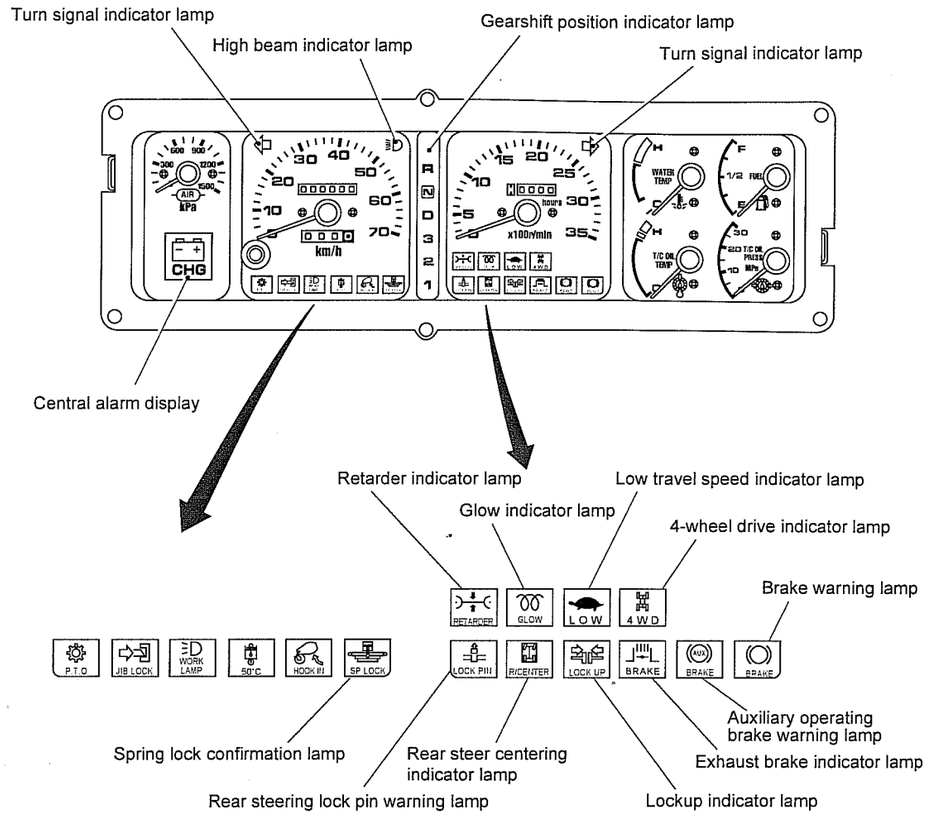
Serial No.: –525576



Serial No.: 525577–



Indicator Lamps



Turn Signal Indicator Lamps

One of the turn signal indicator lamps (right or left) flashes when the turn signal lamp is active.
◆ The flashing cycle will change when a turn signal bulb is defective or when a bulb with an irregular wattage is used.
◆ When the hazard lamp switch is set to ON, the both of the turn signal indicator lamps will flash.

High Beam Indicator Lamp

Lights up when the high beam head lamp is selected; goes out when the low beam head lamp is selected.

Retarder Indicator Lamp

The retarder indicator lamp lights up when the retarder lever is operated.

Central Alarm Display

Displays a warning sign when some abnormality is detected in one of the crane components. If a warning sign is displayed, take appropriate measures immediately. For the meaning of each warning sign, refer to the section titled “Central Alarm Display.” If two or more warning signs are stored for the output, different warning signs will appear in the cycle of 3 seconds.

Gearshift Position Indicator

Indicates the gearshift position during traveling.

Glow Indicator Lamp

Lights up when the starter switch is set to the HEAT position. Set the starter switch to the HEAT position only when starting the engine in cold weather.

Low Travel Speed Indicator Lamp

Lights up when the drive axle selector switch is set in the L/4D position (low speed, 4-wheel drive).

4-Wheel Drive Indicator Lamp

Lights up when the drive axle selector switch is set in one of the 4-wheel drive positions (H/4D or L/4D).

Spring Lock Indicator Lamp

Lights up when the springs are locked and goes out when the they are unlocked.
◆When travelling on public roads, make sure this lamp is not lit.

Rear Steering Lock Pin Warning Lamp

Lights up when the steering lock pin on the rear axle is released; goes out when the lock pin is inserted.
◆Before traveling on public roads using two-wheel steering, make sure that this lamp is not lit.

Rear Steering Center Indicator Lamp

Lights up when the rear steering lock pin is removed and the rear wheels point straight forward.
Before locking the rear steering, be sure to align the rear wheels such that the lamp is lit.

Lockup Indicator Lamp

The lockup unit located in the torque converter is activated when the crane speed exceeds a certain speed specified for each gearshift position. At this time, the lockup indicator lamp lights up.
When traveling on a downhill section of road, shift to the gear that best suits the road grade and travel with the lockup indicator lamp lit. This will improve the engine braking performance.

Exhaust Brake Indicator Lamp

Lights up when the exhaust brake switch is pulled down. The lamp goes out when the switch is restored.

Auxiliary Operating Brake Warning Lamp

Lights up when the auxiliary operating brake is used. The auxiliary operating brake is used to provide powerful braking for crane operation without extending the outriggers (on-rubber crane operation).

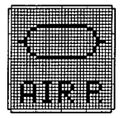
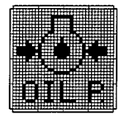
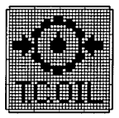
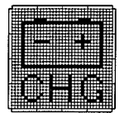
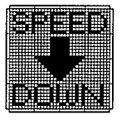
Brake Warning Lamp

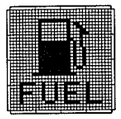
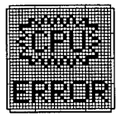
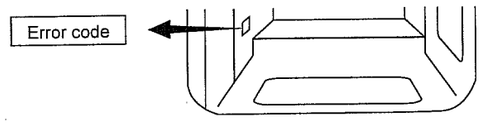
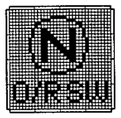
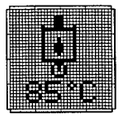
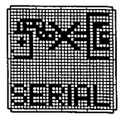
⚠ WARNING

⚠If the brake warning lamp lights up during travel, the brake fluid may be leaking or the brake disk pads may be worn out. Immediately stop in a safe location and check the brake fluid for leakage and the brake pad for wear.

This lamp lights up when the brake fluid level in the brake fluid reservoir tank has dropped.
It also lights up when the parking brake is activated.

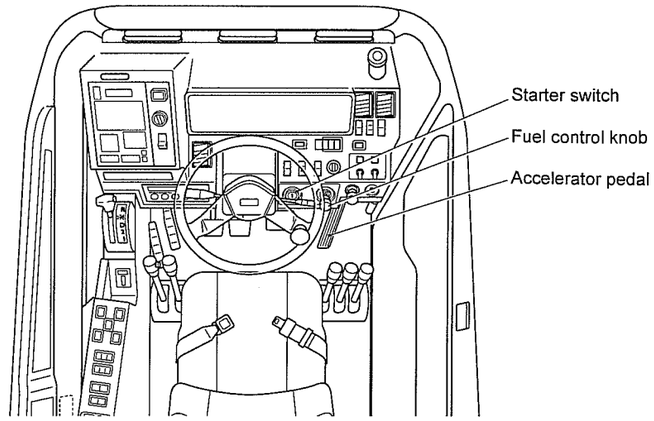
Central Alarm Display

Central alarm display	Machine condition	Safety measures
 Low air pressure warning T20027E	This sign appears and the warning buzzer sounds when the air pressure is abnormally low. The warning buzzer will be canceled when you set the parking brake switch to PARK. (The sign should normally go out when you have parked the crane and run the engine at a low speed for a certain period.)	Park the crane in a safe location. If the sign does not go out, contact your nearest TADANO distributor or dealer.
 Engine oil pressure warning T20028E	This sign appears when the engine oil pressure is abnormally low. (This sign should normally appear when the engine is not running and go out when the engine is running.)	Park the crane in a safe location and stop the engine. If the sign does not go out even when the oil level is normal, contact your nearest TADANO distributor or dealer.
 Torque converter oil pressure warning T20029E	This sign appears and the warning buzzer sounds when the torque converter oil pressure is abnormally low. The warning buzzer will be canceled when you set the parking brake switch to PARK. (This sign should normally appear when the engine is not running and go out when the engine is running.)	Park the crane in a safe location and stop the engine. Then contact your nearest TADANO distributor or dealer.
 Battery charging system abnormality warning T01711E-1	This sign appears when an abnormality of the battery charging system is detected. (This sign should normally appear when the engine is not running and go out when the engine is running.)	Park the crane in a safe location and stop the engine. Then contact your nearest TADANO distributor or dealer.
 Speed warning T20030E	This sign appears and the warning buzzer sounds when the traveling speed is excessively high. The warning buzzer will be canceled when you decrease the speed.	Take your foot away from the accelerator pedal and/or depress the brake pedal to slow down.
 Engine overrun warning T20031E	This sign appears and the warning buzzer sounds when the engine speed is excessively high and there is a danger of the engine overrunning. The warning buzzer will be canceled when you decrease the engine speed.	Take your foot away from the accelerator pedal to decrease the engine speed.

Central alarm display	Machine condition	Safety measures
 Low fuel level warning T20032E	This sign appears when only a small amount of fuel is left in the fuel tank.	Supply the fuel (gas oil).
 MDT abnormality warning T01715E	This sign appears when an abnormality of the multiplex data transmitter system is detected.  T101298E	Stop the travel or crane operation. Press the system check switch once to see whether the multiplex data transmitter system recovers itself or not. If the abnormality persists, report the error code to your nearest TADANO distributor or dealer.
 Outrigger switch activation warning T01716E	This sign appears when the outrigger control switch is active. When no operation is done with this state for about 10 seconds, the alarm buzzer will sound.	Bring the outrigger control switch back to the neutral position.
 Hydraulic oil pressure 85℃ warning T20815E	This sign appears when the hydraulic oil temperature is 85°C or higher.	Stop the crane operation and cool the hydraulic temperature.
 AML cancellation warning T01718E	This sign appears when the automatic stop feature of the AML system is canceled (i.e., the PTO switch is in the "ON (II)" position and the AML emergency switch is in the "Emergency" position).	Bring the AML emergency switch back to the "Normal" position.
 Serial data receiver abnormality warning T01719E	This sign appears when an abnormality of the data receiver system in the instrument panel is detected (instrumentation failure). It is not abnormal for this sign to appear for a few seconds after starting the engine.	Contact your nearest TADANO distributor or dealer.

Starting and Stopping the Engine

Controls

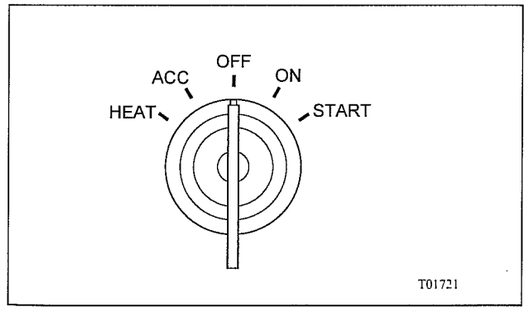


T31419E

How to Use the Starter Switch

[NOTICE]

◆Do not leave the starter switch turned ON with the engine shut off. The battery will run down if the radio, fan, or other equipment is used for hours with the engine shut off and the starter switch turned to ACC or ON. If using this electrical equipment for long periods of time, be sure to run the engine to maintain the battery charge.



T01721

"OFF" ····Shuts off the engine. The key can be inserted or removed in this position. Turning the switch back to OFF shuts off the engine.
"ON" ·····The engine in running position. All electrical systems are activated.
"START" ···Starts the engine. Release the key after the engine has started. The switch will automatically return to ON.
"ACC" ····The radio, power window, washer, wiper, defroster, horn, and working lamps can be used with the engine shut off.
"HEAT" ····Energizes the engine preheating circuit. Use this position to start the engine in cold weather. Releasing the key automatically returns the switch to ACC.

Pre-starting Checks

Before starting the engine, perform the following inspection and checks:

1. Perform the pre-operational inspections.
◆For an explanation of the engine pre-operational inspection procedure, see the Operation and Maintenance Manual for the engine.

2. Make sure that the controls are placed in the following positions:
(1)Winch, boom telescoping, boom elevating and swing levers ····· Neutral
(2)Parking brake switch ····· "PARK"
(3)Gearshift lever ····· "N"
(4)PTO switch ····· "OFF"

3. By turning the starter switch ON, all the lamps will be lit on the instrument panel for a few seconds. At this time, check that all of the lamps remain lit.

Starting the Engine

[NOTICE]

◆Do not hold the starter switch in the start position for more than 15 seconds, as this practice will overheat the starter motor. If the first attempt to start the engine fails, wait at least 30 seconds before trying again.

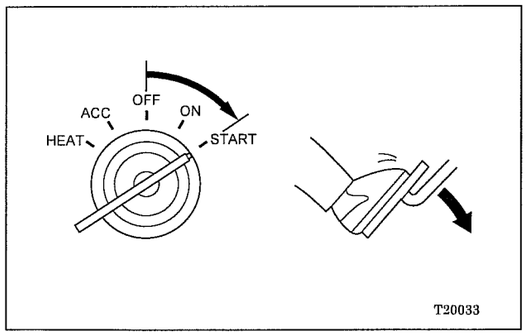
Starting the Engine

1. Turn the starter switch to the START position and depress the accelerator pedal slightly. Release the key immediately once the engine has started.

◆In cold weather, turn the starter switch to HEAT and hold it for 15 to 20 seconds to preheat the engine. Once the engine has been preheated, immediately turn the starter switch to START.

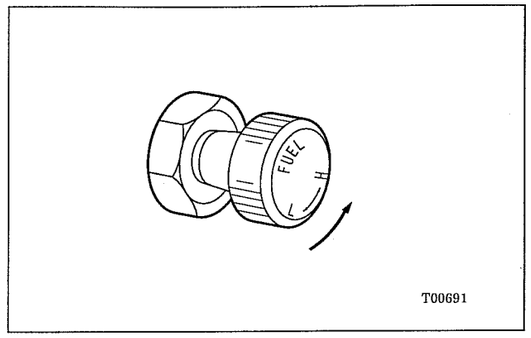
◆The engine will not start unless the gearshift lever is in the "N" position.

◆If the PTO switch is set to ON, do not depress the accelerator pedal.



Warming Up the Machine

1. Once the engine has started, turn the fuel control knob toward "H" to increase the engine speed until it's running smoothly. Warm up the vehicle until the needle in the water temperature gauge begins to move.



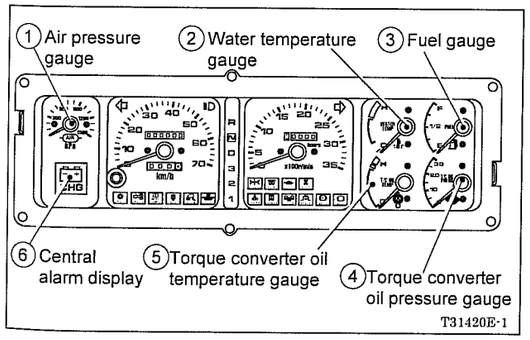
2. After warming up, turn the fuel control knob toward "L" to run the engine at idling speed.

Warm-up Checks

During warm-up, check for abnormal exhaust gas color, sound and vibration. Also, check that the gauges and indicator lamps related to the engine display their normal reading as shown. If not, shut off the engine and have the nearest TADANO distributor or dealer check the problem.

◆When air pressure is low after draining water from the air tank or for other reasons, an alarm buzzer sounds to indicate low air pressure after the engine has started. The alarm buzzer will stop once a sufficient amount of air is supplied.

1. Air pressure gauge	550 to 900 kPa {5.5 to 9.0 kgf/cm²}
2. Water temperature gauge	The needle should be in the white zone after the warm up.
3. Fuel gauge	The needle should be in the white zone (above the "E" level).
4. Torque converter oil pressure gauge	1.3 MPa {13 kgf/cm²} or above (at an engine speed of 750 min⁻¹{rpm}) 1.8 to 2.1 MPa {18 to 21 kgf/cm²} or above (at an engine speed of 2,800 min⁻¹{rpm})
5. Torque converter oil temperature gauge	The needle should be in the white zone after the warm up.
6. Central alarm display	No warning sign should appear.



Stopping the Engine

[NOTICE]

◆Stopping the engine when it is running at high speeds could damage the engine. Be sure to stop the engine when it is running at idling speeds.

◆Stopping the engine immediately after traveling could affect it adversely. Before shutting off the engine, be sure to idle it for approximately 5 minutes to cool down the engine components.

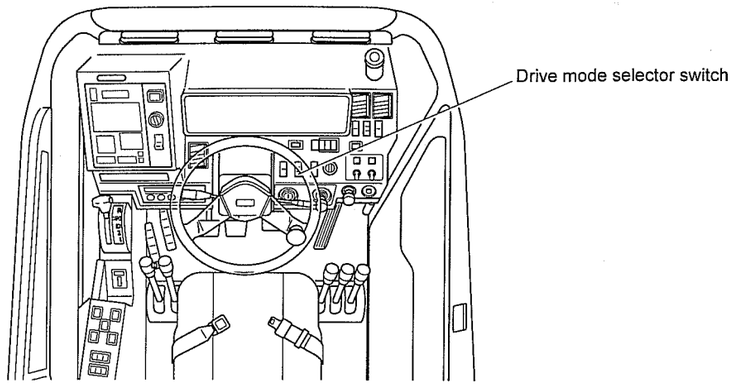
1. Before stopping the engine, place the parking brake switch, gearshift and PTO switch in the following positions:

(1) Parking brake switch ····· "PARK"
(2) Gearshift lever ····· "N"
(3) PTO switch ····· "OFF"

2. Turn the starter switch to "OFF" to stop the engine.

Changing Drive Mode

Controls



T31421E

Changing Drive Mode

[NOTICE]

◆Operating the drive mode selector switch when traveling or when the transmission is not in Neutral may damage the transmission or other components. Before operating the switch, be sure to stop the vehicle and shift into Neutral.

◆In 4 (four)-wheel drive mode, a greater torque load is applied to the drive system than in 2 (two)-wheel drive mode. Therefore, traveling in 4-wheel drive mode for long periods of time can cause the tires to wear quickly and can damage the drive system. If there is no reason to use 4-wheel drive mode, return to 2-wheel drive mode as soon as possible.

◆The continuous rotation of the front wheels only can produce damage to such parts as the transmission bearings. Be sure to change the drive mode to 4-wheel drive before lifting the crane with jack cylinders and rotating the wheels without touching the ground.

The above operation is allowed only with the wheels centered and with sufficient care to prevent anyone from approaching the crane.

Drive Modes

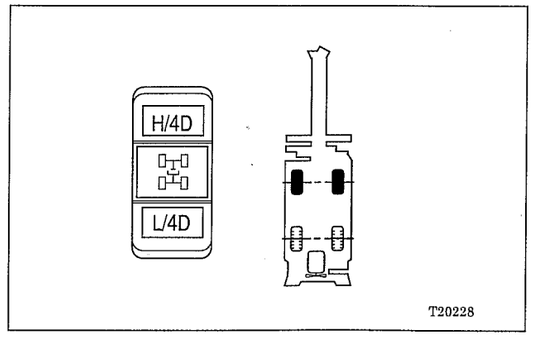
Three drive modes can be set by operating the drive mode selector switch.

Choose the drive mode suited to the road or working conditions.

(1)High-speed 2-wheel drive mode

Turning the drive mode selector switch to the neutral allows the crane to travel in the high-speed 2-wheel drive (front wheels) mode.

Select this drive mode when traveling on public roads.



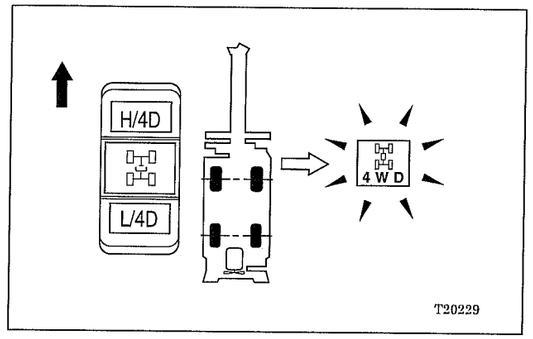
T20228

(2)High-speed 4-wheel drive mode

Turning the drive mode selector switch to "H/4D" allows the crane to travel in the high-speed 4-wheel drive mode.

Select this drive mode when traveling on slippery road surfaces such as rough or snow-covered roads.

◆When this drive mode is selected, the 4-wheel drive indicator lamp is lit.



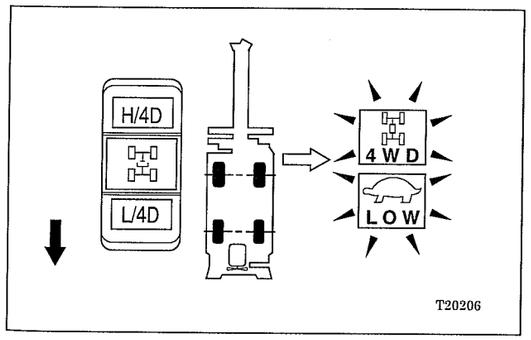
T20229

(3)Low-speed 4-wheel drive mode

Turning the drive mode selector switch to "L/4D" allows the crane to travel in the low-speed 4-wheel drive mode.

Select this drive mode when traveling on unpaved roads rough terrain or traveling with a load on the hook block.

◆When this drive mode is selected, the 4-wheel drive indicator lamp and the low travel speed indicator lamp are lit.



T20206

Changing Drive Mode

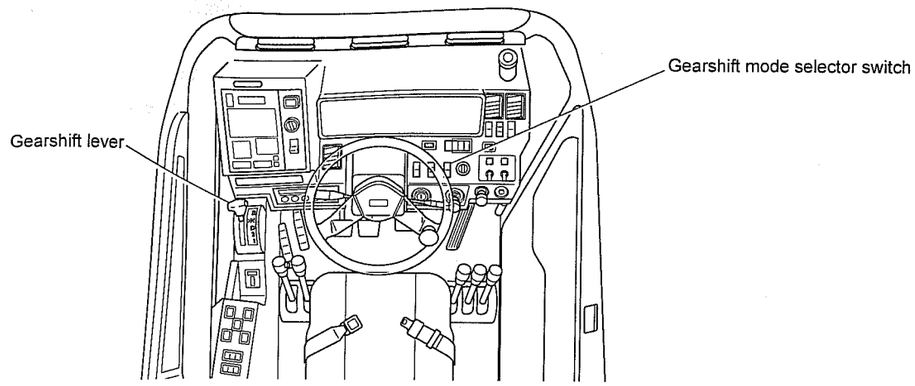
1. Stop the vehicle on level ground.

2. Make sure that the gearshift lever is in Neutral, then change the drive mode selector switch to the desired drive mode.

3. Make sure that the corresponding indicator lamp comes on (goes out).

Changing Speed Range

Controls



T31422E

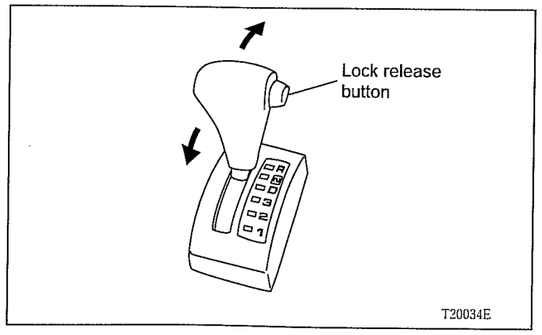
Gearshift Lever Operation

Gearshift Positions

⚠ WARNING

⚠When the transmission is in first second or third gear, gearshifts are not performed automatically based on the traveling speed. If the traveling speed exceeds the selected speed range of these gears, the engine will over-rev.
When the travel speed exceeds the selected speed range, traveling down a steep grade for example, slow down by slowly pumping the service brake pedal.

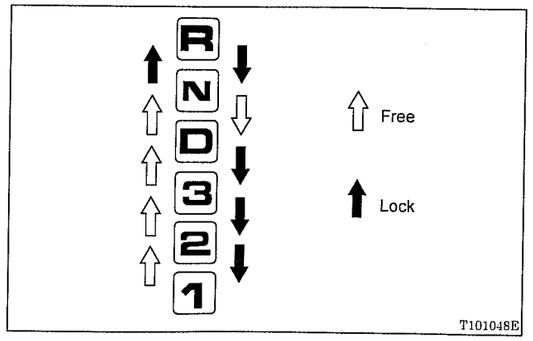
The transmission speed range is selected with the gearshift lever.



T20034E

"R"・・Reverse. Enables the vehicle to move backwards.
"N"・・Neutral. Select this position when starting the engine and stopping and parking, and during crane operations.

"D" ・・・ Drive. Usually use this speed for traveling. Depressing the accelerator pedal automatically will shift the transmission from the first to the third speed based on the traveling speed. (This is applicable only when the high-speed/2-wheel drive or the high-speed/4-wheel drive mode is selected.)
◆When the drive mode selector switch selects the low-speed/4-wheel drive, the transmission is fixed to the fourth gear if the gearshift is in Drive.
"3" ・・・ Third. Used when traveling down a grade with engine brakes. The transmission is fixed in the third gear.
"2" ・・・ Second. Used when traveling up a long grade or traveling down a grade with engine brakes. The transmission is fixed in the second gear.
"1" ・・・ First. Used when traveling up an extremely steep grade or when strong engine braking is required. The transmission is fixed in the first gear.
◆The gearshift lever is so constituted to move as shown below to prevent misoperation. To unlock, press the unlock button situated by the knob side.



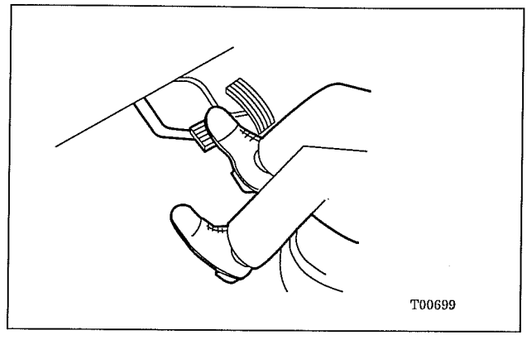
T101048E

Operating Gearshift Lever to Start Traveling

⚠ WARNING

⚠Shifting into Drive, First, Second, Third or Reverse causes the vehicle to begin moving. When shifting gears from the standstill, be sure to depress the foot brake pedal to prevent the vehicle from moving.

1. Step on the foot brake pedal by right foot and keep it depressed.



T00699

2. Snap the parking brake switch to OFF and make sure that the brake warning lamp goes out.

3. Operate the gearshift lever to check the position of each speed range:
(1) To move forward ・・・・ Drive, First, Second, Third
(2) To move backward ・・・ Reverse
◆The alarm buzzer will sound if the gearshift lever is operated without disengaging the parking brake. When the gearshift lever is in Drive, however, the alarm buzzer will not sound immediately; it will sound as soon as an attempt is made to move the crane.

4. Make sure it is safe around the vehicle and then release the foot brake pedal and slowly depress the accelerator pedal to start traveling.

Operating Gearshift Lever while Traveling

⚠ WARNING

⚠Do not travel with the gearshift in "N" position. This will cause transmission seizure, excess speeding, etc. to cause a serious trouble.

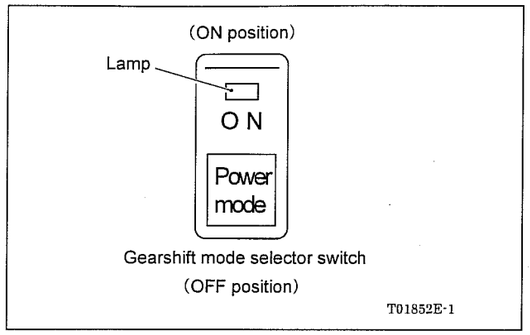
[NOTICE]
◆Shifting from First, Second, Third or Drive into Reverse, or from Reverse into First, Second, Third or Drive while traveling may damage the transmission. Be sure to stop the vehicle before shifting into or out of Reverse.

The grade can be shifted manually while traveling. Shift into First gear to start traveling and then change to Second gear, Third gear and then Drive to speed up. When accelerating while manually shifting gears, accelerate until the traveling speed reaches the next higher range. Then shift to the next higher gear. When decelerating, slow down to the next slower range and then gear down.
◆Shifting into Third, Second or First gear at high speeds activates the safety device for engine protection, which prevents the gear from shifting down until a safe traveling speed is reached. Before shifting to a lower gear, slow down using the foot brake.

Gearshift position	Transmission	Speed range	
		High speed mode	Low speed mode
"1"	1st gear	0–18 km/h	0–9 km/h
"2"	2nd gear	0–26 km/h	0–13 km/h
"3"	3rd gear	0–39 km/h	0–18 km/h
"D"	1 to 4th gear (H) 4th gear (L)	0–49 km/h	0–26 km/h
"R"	1st gear	0–26 km/h	0–9 km/h

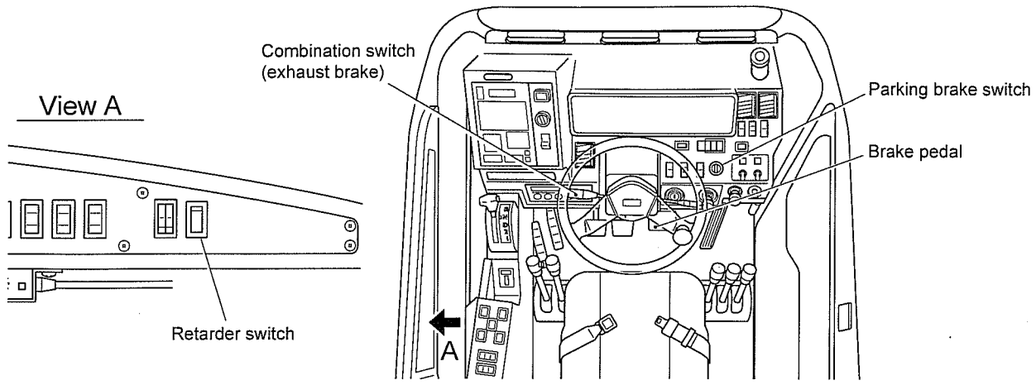
Changing the Gearshift Mode

You can either select or cancel the power mode. Power mode is used for normal traveling.
To cancel the power mode to reduce the running noise while traveling on city streets, for example, set the gearshift mode selector switch to the OFF position.
To select the power mode, set the gearshift mode switch to the ON position. At this time, the built-in indicator lamp lights up.
The gearshift mode selector switch is active only when the drive mode selector switch is set to H/2D or H/4D.



Brakes

Controls



T31423E

Foot Brake

⚠ WARNING

⚠Before traveling down a long or steep grade, perform a brake test and make sure that the brake system functions normally.
⚠Abrupt braking not only damages the tires and brake system, but also causes the vehicle to skid on a slippery road surface. Avoid abrupt braking.
⚠Excessive use of the foot brake pedal can overheat the brake discs and brake pads leading to a decrease in brake performance or "brake fade" which can cause the brake to become inoperable. When traveling down a long grade, shift down to the proper speed range to activate engine braking and use the exhaust brake as supplement. Slowly pump the foot brake pedal to effectively slow down.
⚠When the brake warning lamp goes on during travel, there may be external leakage of brake fluid or wear of disc brake pad. Stop the carrier immediately and check for fluid leaks and pad wear.

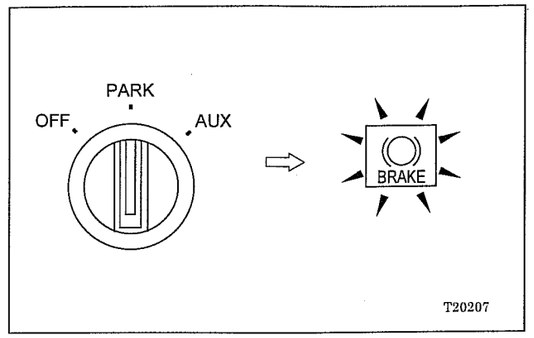
To stop the vehicle temporarily, depress the foot brake pedal with the transmission in "D", "3","2", "1" or "R". Apply the foot brake well ahead of the desired stop position. Rather than keeping the brake pedal continuously depressed, repeat depressing and releasing the brake pedal a few times until the vehicle stops.

Parking Brake

⚠ WARNING

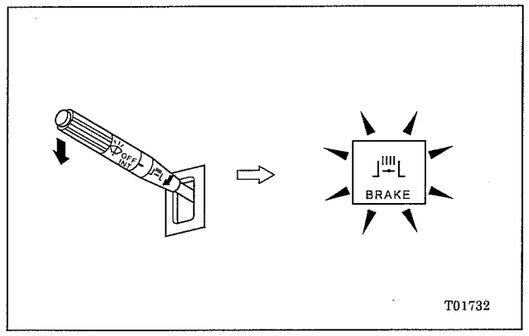
⚠To park, activate the parking brake with the transmission in Neutral.
⚠Avoid parking on a grade. To park on a steep grade, activate the parking brake and block the tires with chocks.

Activate/release the parking brake with the parking brake switch. Use this switch when parking the vehicle.
"AUX" ・・・・・ Activates the auxiliary operating brake.
"PARK" ・・・・ Activates the parking brake.
"OFF" ・・・・・ Releases the parking brake.
◆If the air pressure in the air tank is below the specified range, the parking brake will not be released even the parking brake switch is turned OFF. Also, an alarm buzzer sounds when the switch is turned to OFF.
◆If an attempt to start traveling with the parking brake activated is made, an alarm buzzer will sound.
◆The brake warning lamp is lit when the parking brake is activated.
◆Use the auxiliary operating brake only for on-rubber crane operations. Never use the auxiliary operating brake for any other purposes.



Exhaust Brake

Activate the exhaust brake by pulling out the exhaust brake switch and releasing the accelerator pedal. The exhaust brake is released temporarily when the accelerator pedal is depressed.
Use the exhaust brake when strong engine braking is required, such as when traveling down a grade. If the speed can not be controlled with the exhaust brake, downshift to activate stronger engine braking.
◆The exhaust brake indicator lamp comes on when the exhaust brake switch is pulled backward.



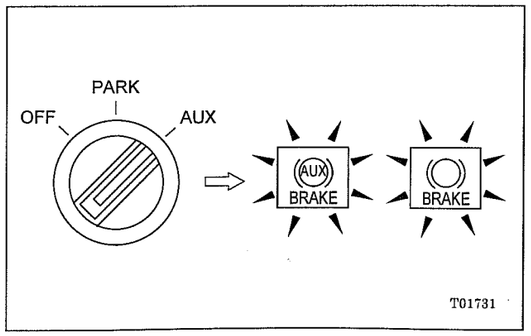
Auxiliary Operating Brake

⚠ WARNING

⚠Use the auxiliary operating brake for on-rubber crane operations. Never use the auxiliary operating brake for any other purpose.

First turn the parking brake switch to PARK and check that the brake warning lamp lights up. Then turn the parking brake switch to AUX to activate the auxiliary operating brake. At this time, the brake warning lamp and the auxiliary operating brake warning lamp are both lit.
◆ Observe the following about using the auxiliary operating brake:

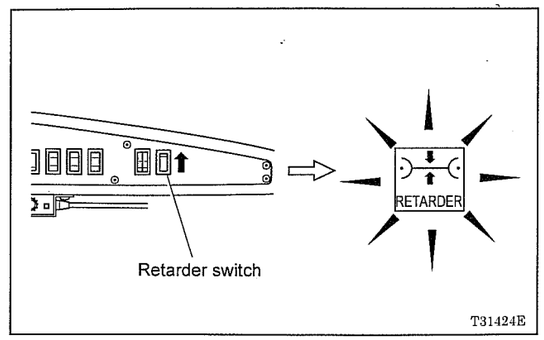
- Do not attempt to use the auxiliary operating brake with the engine shut down.
- Remain near the crane while the auxiliary operating brake is active.
- Do not use the auxiliary operating brake as a parking brake.
- Do not keep the auxiliary operating brake active for an hour or longer.



Retarder

⚠ WARNING

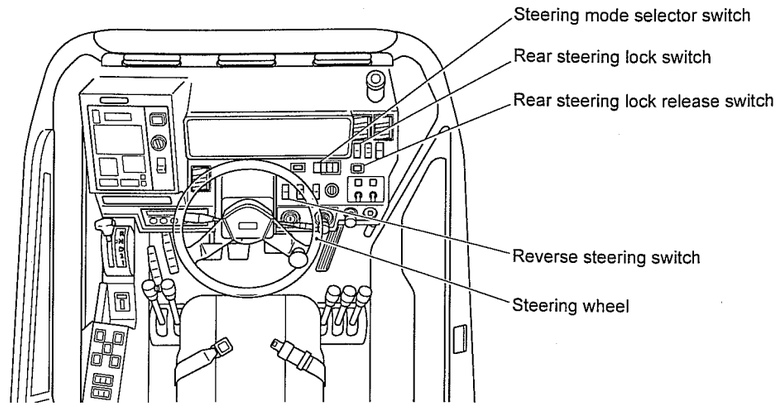
⚠Exercise caution when using the retarder on wet or otherwise dangerously slippery road surfaces. (The retarder applies braking force to the front wheels.)
⚠Do not use the retarder on icy road surfaces.
⚠The retarder cannot be used as a parking brake when the vehicle is parked.
⚠Never touch the retarder drum just after retarder operation as it reaches high temperature.
⚠When parking, be sure that no flammable materials are under the crane. The hot retarder drum could cause a fire.
⚠When the temperature of the retarder drum and the coil gets close to the specified limit, the braking force automatically decreases to protect the retarder. (The retarder indicator lamp flashes slowly this condition.) Be ready to depress the foot brake at any time. Once the retarder drum and the coil are cooled down, the retarder recovers its brake force (and the retarder indicator lamp stops flashing and lights up continuously).
⚠If the retarder indicator lamp flashes rapidly, a failure has occurred with the retarder. In such a case, set the retarder switch to the "OFF" position to disable the retarder. Have the nearest TADANO dealer or distributor inspect/repair it immediately.



Use the retarder as a supplement to the foot brake when traveling down long grades and on roads where very frequent use of the foot brake is required.
To activate the retarder, set the retarder switch to the "ON" position. The retarder indicator lamp will light up, and the retarder will become available for use. With the retarder available for use, release the accelerator pedal to make it operate.
The retarder is cancelled when the accelerator pedal is depressed. (The retarder indicator lamp remains lit.)
◆Once the vehicle slows down to 5 km/h or less, the retarder will be automatically deactivated.

Steering

Controls



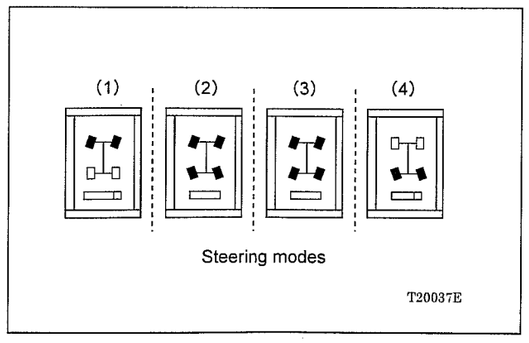
T31425E

Changing Steering Mode

⚠ WARNING

⚠ Traveling on public roads in one of the special steering modes (four-wheel coordinated steering, crab steering and rear steering) is dangerous. On public roads, never use special steering modes. Use special steering modes at low speeds and within work sites or rough terrain only.
On public roads, travel in the two-wheel steering mode.

Choose from four steering modes using the steering mode selector switch. The crane travels differently in each steering mode. Choose the steering mode best suited to the situation.



T20037E

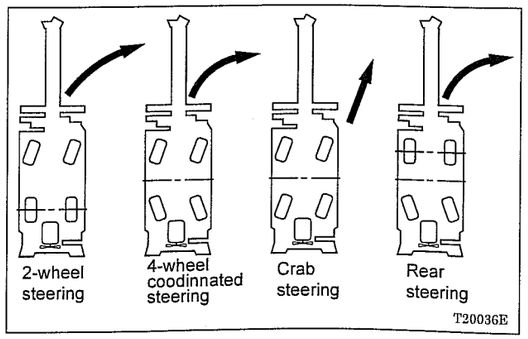
Steering Modes

(1) Two-wheel steering mode
Steering is performed by the two front axle wheels only. Use this steering mode to travel on public roads.

(2) Four-wheel coordinated steering mode
The front wheels and rear wheels turn in opposite directions. This steering mode is useful in a small work site, because it provides the smallest turning radius.

(3) Crab steering mode
The front wheels and rear wheels turn in the same direction. This steering mode is useful to pull the vehicle over to the side of a road, because the vehicle travels obliquely.

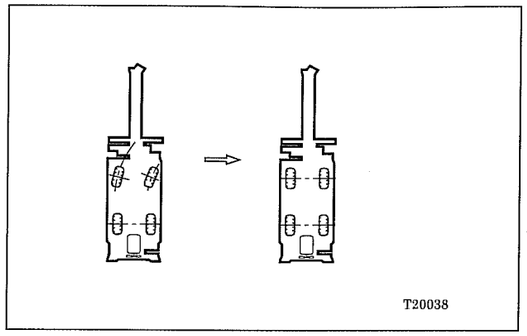
(4) Rear steering
The crane is steered with the rear wheels only. This mode is useful for moving out of a small section of the job site.



T20036E

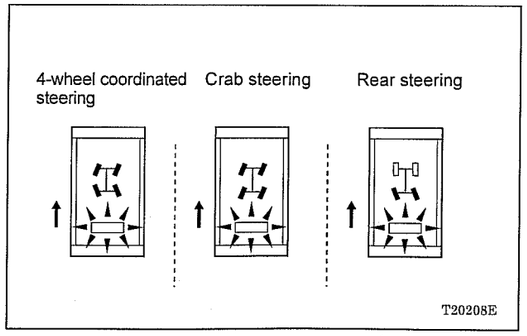
Switching between Steering Modes (Normal to Special Conditions)

1. Stop the vehicle with the front wheels centered.
◆Set the gearshift lever to "N" and activate the parking brake.
◆If the steering mode is changed with the front wheels turned even slightly, the steering angle will be different between the front wheels and rear wheels.



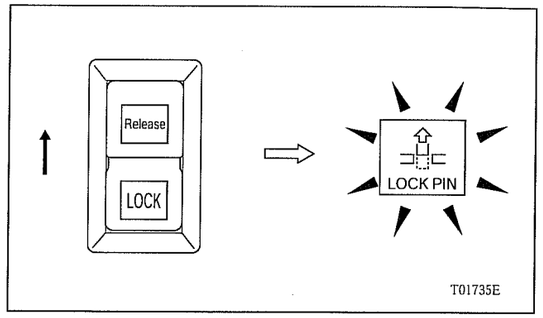
T20038

2. Press the steering mode selector switch for 4-wheel, crab, or rear steering.
The corresponding indicator lamp will flash.
◆At this time, the 2-wheel steering indicator lamp is still lit.



T20208E

3. Set the rear steering lock switch to the RELEASE side and check that the rear steering lock pin warning lamp (LOCK PIN) lights up. When the rear steering lock pin warning lamp lights up, a special steering mode indicator lamp (4-wheel, crab, or rear) lights up and the 2-wheel steering indicator lamp goes out.
◆When the gearshift lever is in the "3" position, the rear steering lock pin will not be removed.



T01735E

Reverse Steering

⚠ WARNING

⚠ Traveling on public roads in the reverse steering mode is dangerous. Never use the reverse steering mode on public roads.

⚠ The reverse steering mode can be cancelled by turning the upper swing structure to areas other than the over-rear area.

In the reverse steering mode, the advance/reverse shifting direction indicator and the backup buzzer function in the same manner as in the normal steering modes. Keep this very important fact in mind when traveling with the reverse steering mode.

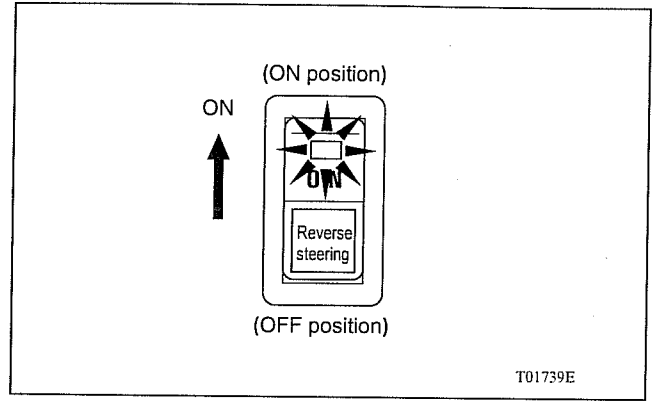
While the upper swing structure is directed toward the rear of the carrier in normal steering modes, the vehicle turns in the opposite direction from your apparent steering direction.

If the reverse steering mode is used in this case, however, the crane will turn in the same direction as you steer.

1. Rotate the upper swing structure to within 35° of the rear centerline of the carrier.

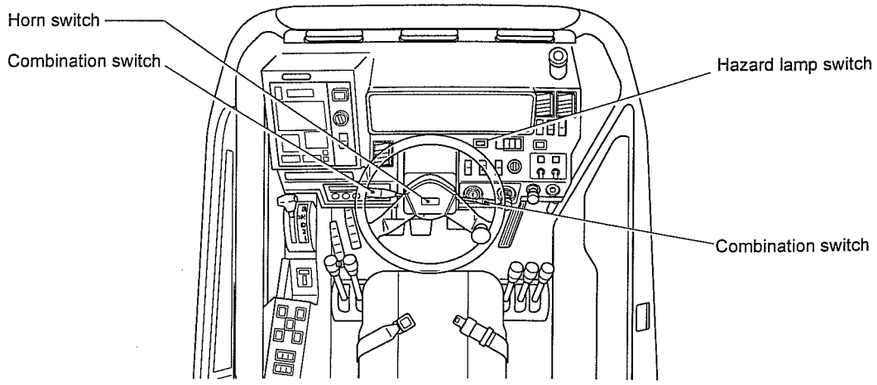
2. Snap the reverse steering switch to ON. Make sure that the reverse steering indicator lamp comes on. If the lamp is lit, the reverse steering mode has been set.

◆If the reverse steering indicator lamp flashes and the warning buzzer sounds intermittently, the upper swing structure is not rotated to within 35° of the rear centerline of the carrier. Rotate the upper swing structure to within 35° of the rear centerline of the carrier again.



Lighting and Other Switches

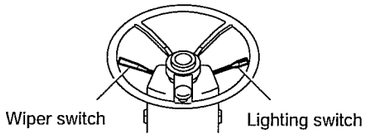
Controls



T31427E

Combination Switch

The combination switch attached on the steering column activates the following functions:

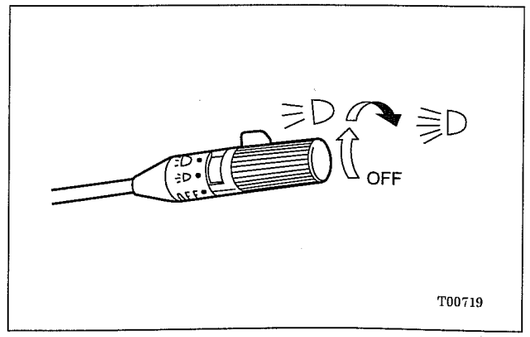


T101060E

(1) Lighting switch

Turning the lighting switch when the starter switch is ON activates the following lamps:

Position	Head lamp	Clearance lamp, tail lamp, license plate lamp, instrument lamp, each control switch lamp
"OFF"	——	——
≡D	——	Lights
≡D	ON	Lights



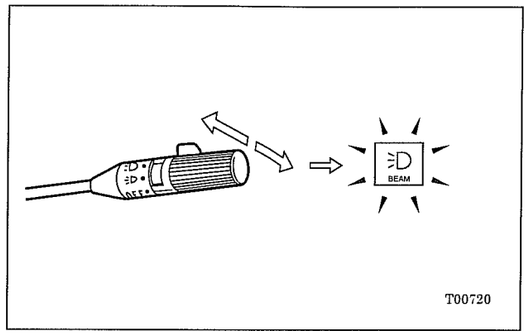
T00719

(2) Dimmer switch

Holding the lever down when the headlights are on switches from low beams to high beams. Returning the lever switches back to low beams.

If you want to momentarily turn on the headlights, pull up the lever. The high beams (or passing lights) will turn on regardless of the position of lighting switch. Releasing the lever returns it to its original position and the high beams turn off.

◆The beam indicator lamp is lit when the high beams are on.



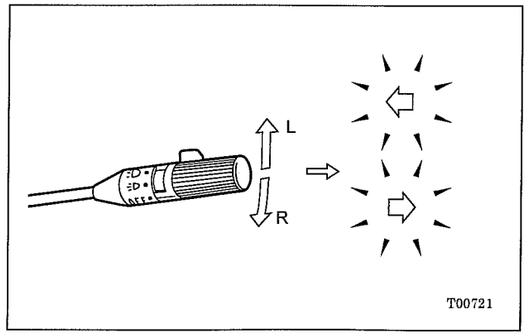
T00720

(3) Turn signal switch

Leaning the lever forward or backward causes the turn signal lamp to flash.

◆If the lever does not return automatically by recentering the steering wheel, return it by hand.

◆The right or left turn signal indicator lamp flashes in sync with the exterior turn signal lamp.



T00721

(4) Washer switch and wiper switch

[NOTICE]

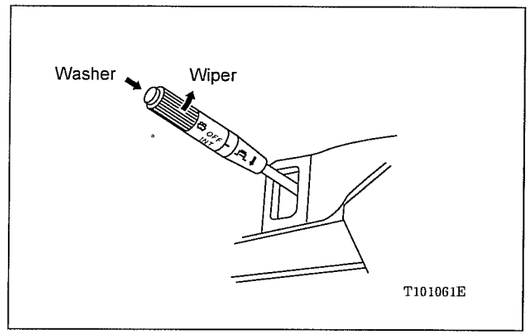
◆Do not use the wipers on dry glass; doing so will damage the glass. Wet glass by spraying the window with washer fluid before using the wipers.

◆Never spray washer fluid continuously for more than 3 seconds and do not operate the washer switch when there is no window washer fluid. This practice may burnout the pump.

Rotating the switch activates the wipers as follows:

"OFF" ····· Stops the wipers.
"INT" ····· Wipes once in 3 to 5 seconds.
"LO" ····· Wipes at low speed.
"HI" ····· Wipes at high speed.

To spray washer fluid onto the windshield, press the knob at the end of the switch.



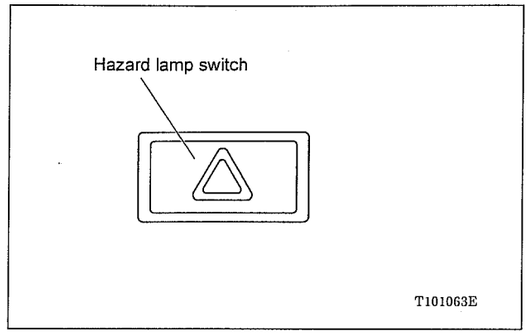
T101061E

Hazard Lamp Switch

[NOTICE]

◆Illuminating the hazard lamp for long periods when the engine is shut off causes the battery to run down.

Pressing the hazard lamp switch causes both turn signal lamps to flash. Pressing the switch again causes the lamps to go out.
Use this switch when parking on the road side, to alert other drivers of a vehicle problem.

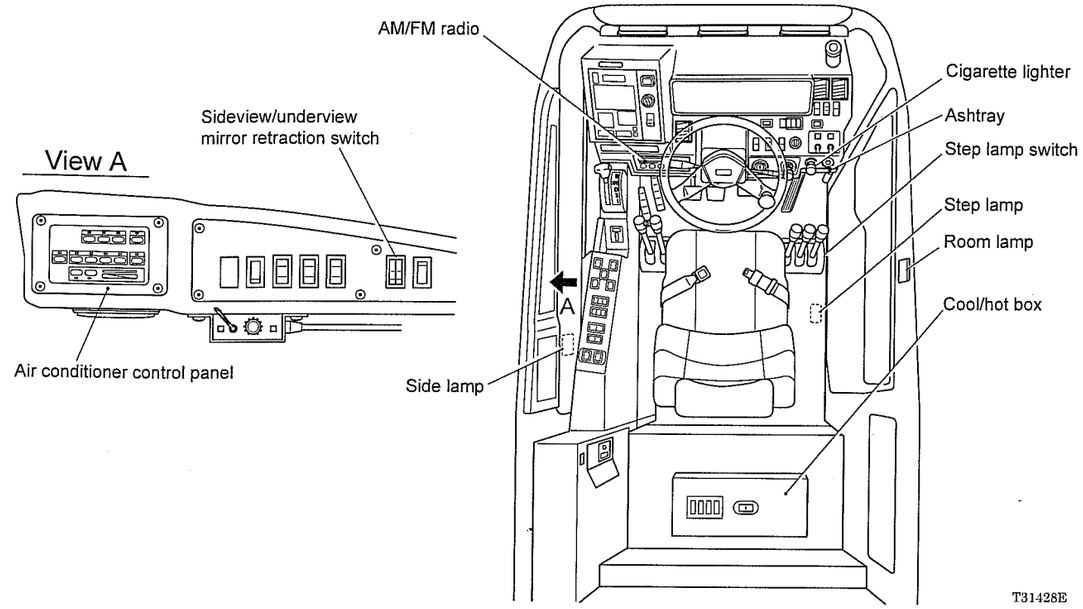


Horn Switch

Pressing the center of the steering wheel causes the horn to sound.

Equipment Inside the Cab

Controls

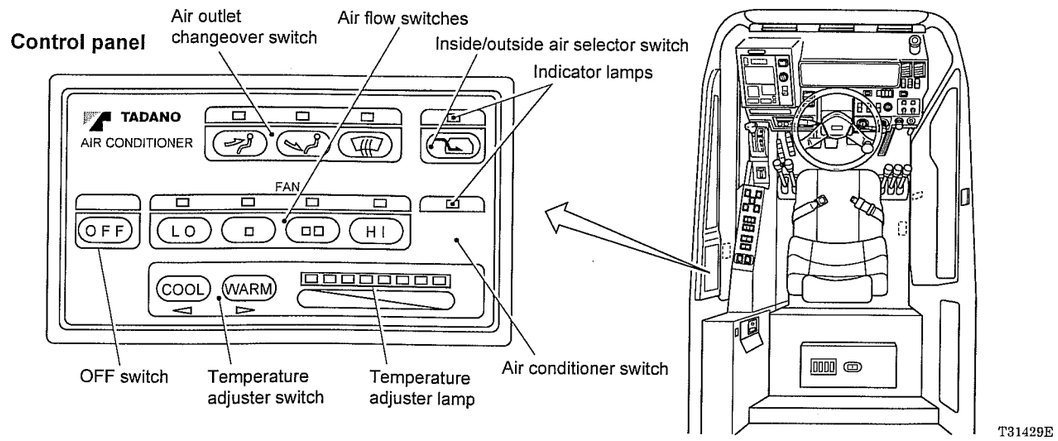


Air Conditioner

⚠ CAUTION

⚠Before using the air conditioner, read and understand well the separate volume of the manual covering the operation and maintenance of the air conditioner.

Controls

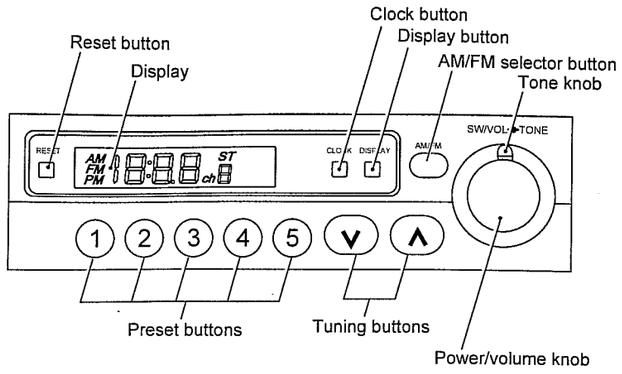


◆The compressor for air conditioner is stopped during the suspension lock and outrigger operations.

◆Keep the engine running while the air conditioner is used. Once you have stopped the engine, press the OFF switch on the air conditioner control panel.

AM/FM Radio

Component Names



T20848E

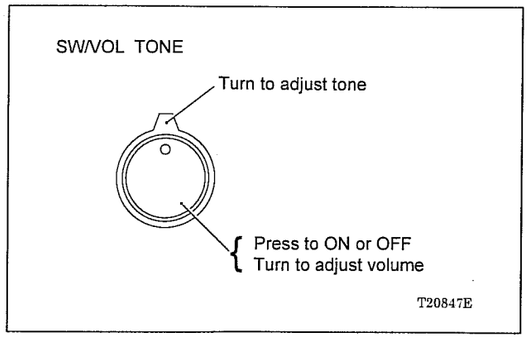
Power ON

1. Set the starter switch to ON or ACC.

2. Press the power/volume knob to turn on the radio. The display panel will indicate the frequency of the station you select most recently and you will hear the broadcast.
Press the same knob again to turn the radio off.

Volume/Tone Control

(1) To control the volume (loudness), turn the power/volume knob:
Clockwise to increase the loudness.
Counterclockwise to decrease the loudness.
(2) To control the tone, turn the tone knob:
Clockwise to amplify high frequency sound.
Counterclockwise to amplify low frequency sound.

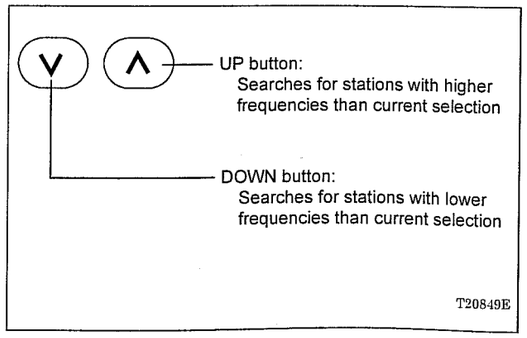


T20847E

Automatic Tuning

1. Press one of the tuning buttons (UP or DOWN) for more than 0.5 seconds or longer.
The radio is automatically tuned to the next higher or lower broadcast frequency. The frequency appears in the display panel.

2. To move to the next higher or lower broadcast frequency, press the UP or DOWN button again. (Release the button before you press it again.)



T20849E

Manual Tuning

If automatic tuning fails to find the desired station, follow the manual tuning procedure below.
The manual tuning is similar to automatic tuning except that you should press the UP or DOWN key for less than 0.5 second. The selected frequency will then increase or decrease in steps of 9 kHz (AM band) or 0.1 MHz (FM band).

Tuning to Preset Stations

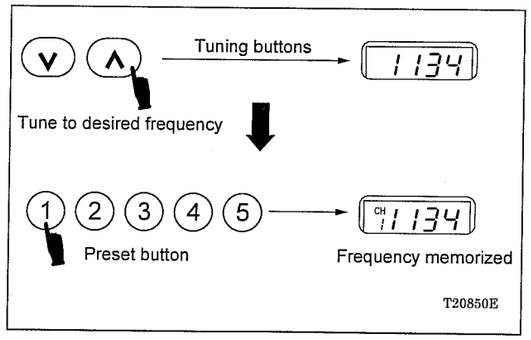
The preset buttons allow you to set up to five broadcast stations. Pressing a preset button automatically tunes the radio to the preset broadcast station.

Assigning Stations to Preset Buttons

1. Using the tuning buttons (UP/DOWN), tune the radio to the desired broadcast station.

2. When the display panel indicates the frequency of the selected station, keep pressing one of the preset buttons. The number of the pressed preset button (channel number) appears on the display panel. Keep on pressing the preset button for at least 2 seconds to assign the selected station to that preset button.

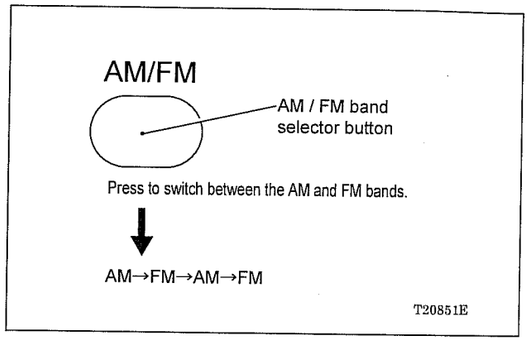
3. Repeat the same procedure to assign another station to another preset button.
◆Five preset buttons are available to assign the stations.
◆Assigning a new station to a preset button deletes the information on any other station that has been previously assigned to that preset button.



T20850E

Switching between AM and FM Bands

Press the AM/FM selector button to switch between the AM and FM bands.
Pressing the button switches bands from AM to FM or from FM to AM. The display panel indicates the current frequency selected in the AM or FM band.



T20851E

Changing the Display Mode

Each time you press the display button, the display mode alternates between the current time display and frequency display.
The frequency display mode is automatically canceled after 5 seconds even without you pressing the display switch, and the current time display mode is restored.

Adjusting the Clock

To adjust the clock, use the clock button and tuning buttons (UP/DOWN):
(1) Use the display button to select the current time display mode.
(2) Hour adjustment
While pressing down the clock button, press the DOWN key to decrease the hour value.
(3) Minutes adjustment
While pressing down the clock button, press the UP key to increase the minute value.
◆Pressing the key for less than 0.5 seconds increases or decreases the value by one. Pressing the key for 0.5 seconds or longer increases or decreases the value continuously.

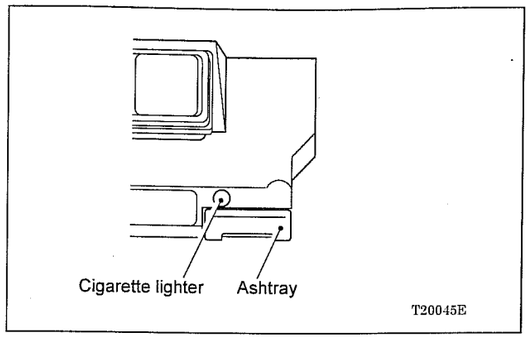
Resetting the Minutes Value to 00

To reset the minutes value to 00 upon hearing a time signal from the radio, press the reset button with the display panel set to the current time display mode.
If the minutes and seconds value is 29′ 59″ or before, the minutes value is reset to 00 and the hour value is kept.
If the minutes and seconds value is 30′ 00″ or later, the minutes value is reset to 00 and the hour value is increased by one.
To precisely adjust the clock, press the reset button upon hearing a time signal from the radio.

Other Equipment Inside the Cab

Ashtray

Close the lid after use. To clean, lift out the entire unit.



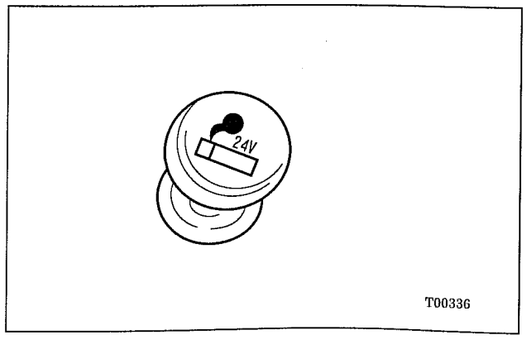
Cigarette Lighter

[NOTICE]

◆Observe the following precautions to prevent a fault in the electrical system:

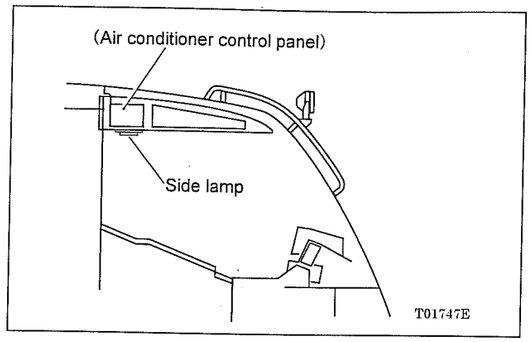
- **Do not let the cigarette lighter remain pushed in.**
- **Pull out the cigarette lighter by hand if it does not pop out within 15 to 20 seconds after it has been pushed in.**
- **Do not use power receptacle for anything other than a cigarette lighter.**
- **Do not allow the cigarette lighter to become deformed. A misshapen lighter will fail to come out. Replace a lighter that is malfunctioning.**

The cigarette lighter will pop out a few seconds after it has been pushed in. Pull out to use.



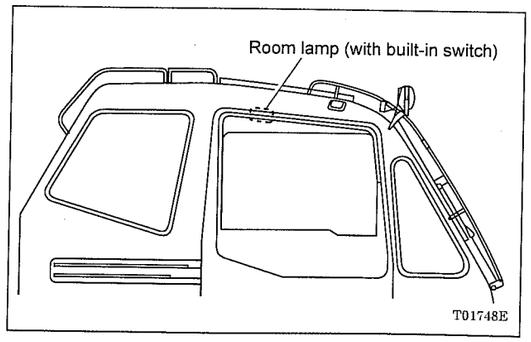
Side Lamp

The side lamp illuminates the control switches around the driver's seat.
Use the side lamp at night. A switch is built into the lamp.



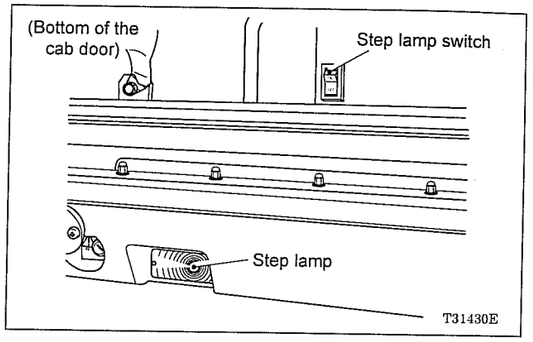
Room Lamp Switch (on the upper part of the interior wall of the door)

OFF position .....The room lamp remains unlit regardless of the door position.
Middle position.....The room lamp is lit when the door is open; unlit when the door is closed.
ON position .....The room lamp remains lit regardless of the door position.



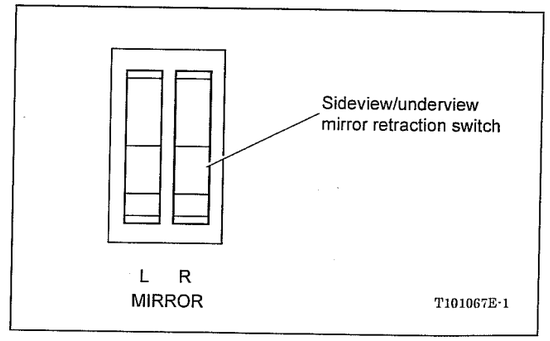
Step Lamp and Its Switch

The step lamp illuminates the steps at night when you go into or come out of the cab.
OFF position .....The step lamp remains unlit regardless of the door position.
ON position .....The step lamp is lit when the door is open; unlit when the door is closed.



Sideview/Underview Mirror Retraction Switch

The "L" switch and the "R" switch control the mirrors on the left side and those on the right side respectively.
The "L" switch controls the mirrors on the left side.
The "R" switch controls the mirrors on the right side.
The mirrors alternate extending with retracting every time this switch is pressed.



Cool/Hot Box

The cool/hot box utilizes the heat from the air conditioner/heater to cool or warm your drinks.

◆Use the cool/hot box only when the air conditioner/heater is operating.

◆In hot weather, as in summer, the temperature inside the cool box may increase considerably while the air conditioner is not operating. Note that the liquid may blow out when you open a warm bottle or can of carbonated drink. (In winter, do not store carbonated drinks in the hot box.)

Equipment Outside the Cab

How to Use the Air Inflator (Option)

⚠ WARNING

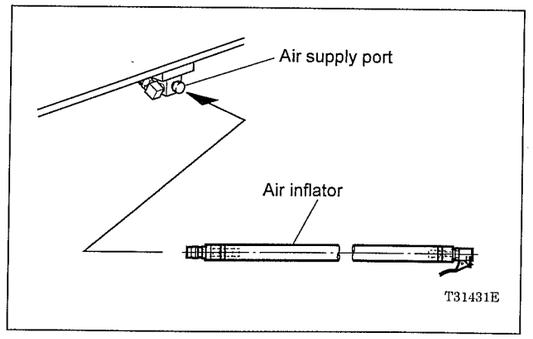
⚠ Never stand facing the side of a tire when adjusting the air pressure of a tire. The tire may burst or the wheel parts may fly off, causing serious injury or death. Use a tire guard to surround the tire and stand behind the tire treads.

If the crane is equipped with an air inflator, the tires can be inflated directly from the pneumatic circuit of the crane. When the air is short, inflate the tire as follows:

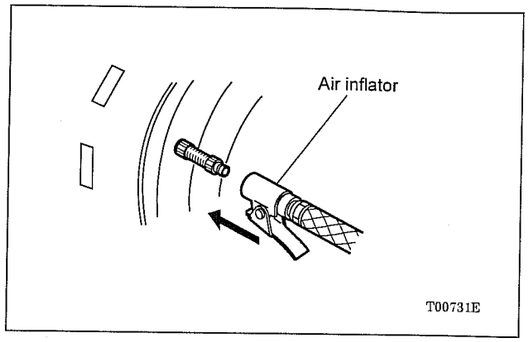
1. Remove the cap to the air-supply port. Connect the air inflator to the air-supply port.

⚠ WARNING

⚠ If the plug is removed on the air-supply port with the air tank under pressure, the plug can fly off, resulting in an injury. Check the air pressure in the tank with the air pressure gauge. If the air pressure in the air tank remains high, open the drain cock on the air tank to release pressure, then remove the plug.



2. Remove the tire valve cap. Connect the other end of the air inflator to the tire valve.



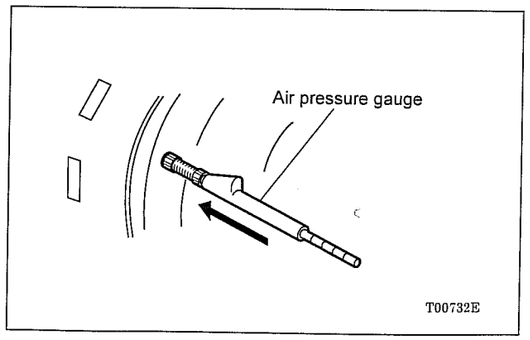
3. Start the engine to drive the air compressor and then inflate the tire.

◆The tire can be inflated more quickly if the engine speed is increased.

4. Check the approximate air pressure level with the air pressure gauge in the cab. Remove the air inflator from the tire at the proper inflation pressure.

5. Check the tire air pressure level with the air pressure gauge. If the pressure exceeds the specified level, bleed air off; if it is short, inflate the tire again.

Air pressure (tire size)	900 kPa {9.0 kgf/cm²} (325/95 R24 161E)



6. After the tires have been inflated, remove the air inflator from the air-supply port.

◆Replace the caps on the crane air-supply port and the tire valves.

Tachograph (Option)

The tachograph is fitted beneath the outrigger control box on the left-hand side of the vehicle. For details of the tachograph, refer to the separate tachograph manual.

Tire Chains (Option)

When fitting chains to the tires, note the following:
(1) Fit the chains only to the rear wheels.
(2) Set the steering mode selector switch to the 2-wheel steering position. Set the rear steering lock switch to Lock. Set the drive mode selector switch to L/4D or H/4D.

Emergency Procedures

If the crane is unable to move due to machine problems, take the following measures:
(1) If the crane fails on the road:
- Set the hazard lamp switch to ON and/or use other emergency signaling devices to prevent a rear-end collision.
- Request support for moving the crane to a safe location.
- Contact the nearest TADANO distributor or dealer.

(2) If the crane fails inside a railroad crossing:
- If the crossing has an emergency button, press it to warn a train engineer of the danger.
- If the crossing does not have an emergency button, position a signal person at a location well ahead of the crossing (in consideration of the long distance required by a train to stop). Let the signal person warn the train driver of the danger using the smoke candle, for example.
- Request support for moving the crane to a safe location.
- Contact the nearest TADANO distributor or dealer.

If the crane is unable to move due to a gearshift failure, try the recovery method described in "If Shifting Gears is Impossible."

How to Use the Emergency Flare

⚠ CAUTION

⚠ Point emergency flare away from your face and body, and stand well clear of them.
⚠ For safety, never use the emergency flare near gasoline or other flammable items.

◆Emergency flare should be used only as emergency warning devices.
◆Replace the emergency flare before the expiration date printed on it.
◆The life of the emergency flare is about 5 minutes from ignition. During this time, prepare another emergency signaling device.

1. Take the emergency flare out of the cab.
◆The emergency flare is stored to the right of the accelerator pedal inside the cab.

2. Take the emergency flare out of the case.

3. To ignite the emergency flare, rub the end of the emergency flare against the ignition surface of the case.

If Shifting Gears is Impossible

⚠ WARNING

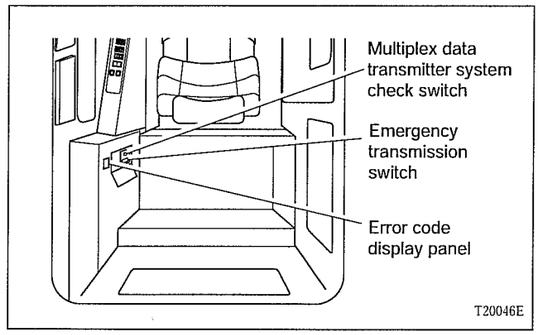
⚠ The following procedure is to be followed only for moving the crane to a service shop for repair. Never use this procedure for other purposes.

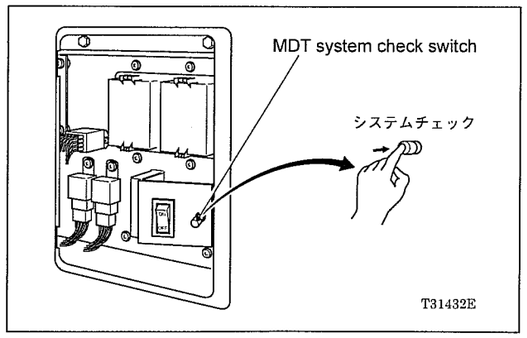
Inspection with Check Switch

Shifting gears on this crane is performed electrically using a multiple data transmitter (MDT) system. Therefore, if this system malfunctions, an error code appears on the error code display panel and shifting gears becomes impossible.

Under this condition, press the MDT system check switch at the rear of the cab before attempting to shift gears. If the error code disappears, the MDT system is again functioning normally, and shifting gears is available.

◆If the MDT system cannot be restored, follow the "Emergency Gear Shifting Procedure" in the next section.





Emergency Gear Shifting Procedure (1)

⚠ WARNING

⚠ When the emergency transmission switch is ON, the torque converter oil temperature gauge, water temperature gauge, and fuel gauge do not function. Be careful when traveling with the emergency transmission switch ON.

⚠ When the emergency transmission switch is ON, the safety device for engine protection does not function. Gearing down without slowing the crane's travel speed can cause the engine to overrev or damage the drive system.

Before gearing down, be sure to reduce the traveling speed to the next slower range.

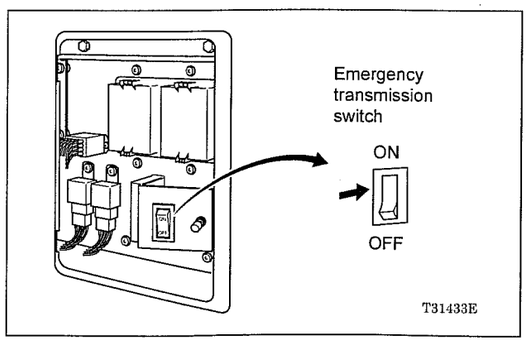
⚠ When the emergency transmission switch is set to ON, the engine brake performance is reduced because the lockup mechanism does not function. Beware of foot brake failure due to overuse.

1. Activate the parking brake. Shift into Neutral.

2. Snap the emergency transmission switch at the rear of the cab to ON and operate the gearshift. If the D range is selected in this case, the transmission is in the 4th gear. Manually shift into Second and Third. Note that the second gear is selected by shifting into First.

If shifting gears is possible, move the crane to a service shop.

◆After you have moved the crane, return the emergency transmission switch to OFF.



Gearshift position	Transmission	Speed range
"1", "2"	2nd gear	0 to 24 km/h
"3"	3rd gear	0 to 35 km/h
"D"	4th gear	0 to 49 km/h
"R"	1st gear	0 to 24 km/h

Emergency Gear Shifting Procedure (2)

⚠ WARNING

⚠ The manual locking device for the solenoid valve is provided for moving the crane in case of emergency. Do not touch the locking device except in an emergency.

⚠ Before following the procedure, take the following safety precautions:

- **Stop the engine.**
- **Chock the wheels.**
- **To prevent a collision, switch ON the hazard warning lamps and/or use an emergency warning device to alert drivers approaching from behind.**

⚠ Because the transmission can be extremely hot, be careful not to get burned.

⚠ If the solenoid valve is locked using the manual locking device, the vehicle begins to move as soon as the engine starts. Be sure to activate the parking brake, depress the brake pedal, and then start the engine.

After the crane has been moved, immediately stop the engine. Return the lock bolt for the solenoid valve to its original position.

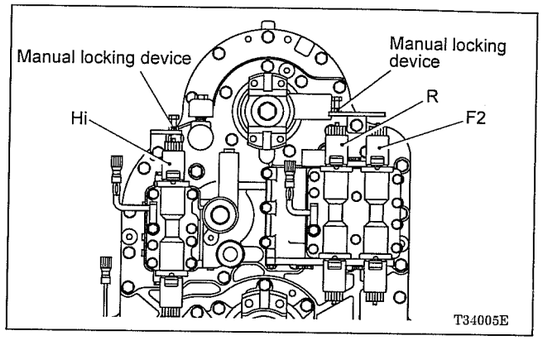
This section applies to machines with serial No. 525507 and upward.

1. Activate the parking brake. Shift into Neutral and stop the engine.

2. Loosen the lock nut of the manual lock device on the side of the transmission solenoid valve (Hi), and turn the lock bolt clockwise until it comes to an end. The solenoid valve (Hi) will work as if it is energized, and the clutch becomes operable.

The selection of solenoid valve determines whether to travel forward or backward.

Forward	Solenoid valves F2 and Hi
Backward	Solenoid valves R and Hi



3. Depress the service brake pedal and start the engine.

4. Release the parking brake. Start traveling by letting off the service brake pedal slowly.

Towing the Crane

⚠ WARNING

⚠ As the engine is not running, the steering wheel is difficult to turn. Run the crane very cautiously.
⚠ When a crane is towed, only the foot brake can be used. If a crane is towed on a long downward grade, it will be necessary to use the foot brake repeatedly, possibly overheating and damaging the brake. Do not tow the crane on a long downward grade.
⚠ Use tow cables with sufficient tensile strength and firmly fastened to the crane. It is dangerous if the tow line breaks or becomes disengaged.
⚠ Tow the crane at low speeds with minimum speed variation. Abrupt starting or braking is very dangerous.

When the crane must be towed in the event of engine failure, etc., follow the steps below:

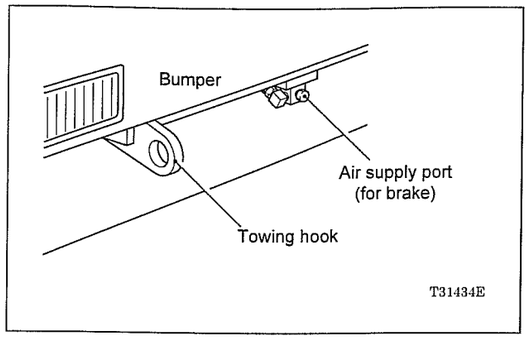
1. Connect the air hose.

⚠ WARNING

⚠ If the plug is removed from the air-supply port with the air tank under pressure, the plug can fly off, resulting in an injury. Check the air pressure in the tank with the air pressure gauge. If the air pressure in the air tank remains high, open the drain cock on the air tank to release pressure before removing the plug.

(1) Remove the plug on the air-supply port of the crane in order to supply compressed air to the brake.
(2) Connect the air hose from the towing vehicle to the air-supply port (PT 3/8) of the crane.

2. Attach a lengthy tow cable to the tow hook so that sufficient clearance is maintained between the towing vehicle and vehicle in distress.



3. Place the switches and levers in the following positions:
(1) Gearshift lever ····· "N"
(2) Drive mode selector switch ····· "H/2D" (Neutral)
(3) Starter switch ····· "ON"

4. Make sure that the air pressure is as specified and release the parking brake. Start towing the crane.

OPERATION

Crane Operation Procedure-Summary

⚠ WARNING

⚠ This summary describes briefly the essential steps for crane operation from start to finish. For detailed information on the individual procedures, refer to the appropriate pages in this section of the manual. Do not operate the crane until you have a complete understanding of all the instructions given in this manual.

⚠ "Safety Rules" section in this manual contains the precautions to be followed during the crane operation. Carefully read the section.

⚠ If you find anything abnormal with the crane during operation, stop the operation immediately, check and locate the cause, and repair any faulty components. To prevent accidents, do not operate the crane until repairs are completed.

⚠ When the X-type outriggers are extended to their minimum width, place planks under them to raise the tires off the ground.

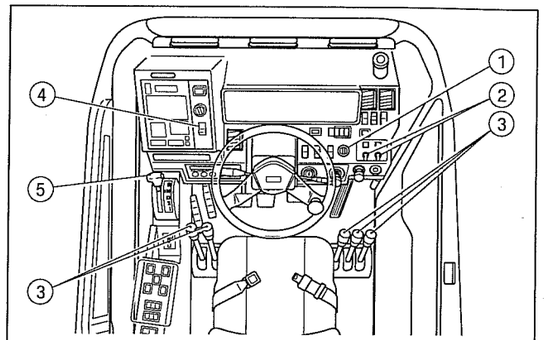
On-Outrigger Operation

Preparatory Steps

1. Enter the cab, and adjust the seat and the length of each lever so that the levers and all other controls can be operated easily.

2. Make sure that all the levers in the cab are in the following positions:

(1) Parking brake switch ····· "PARK"
(2) Winch clutch switch (for a machine with free-fall device) ····· "ON"
(3) Control levers (main and auxiliary winch levers, boom telescoping lever, boom elevating lever, and swing lever) ····· Neutral
(4) Swing brake switch ····· "ON"
(5) Gearshift lever ····· "N (neutral)"



3. Start the engine.

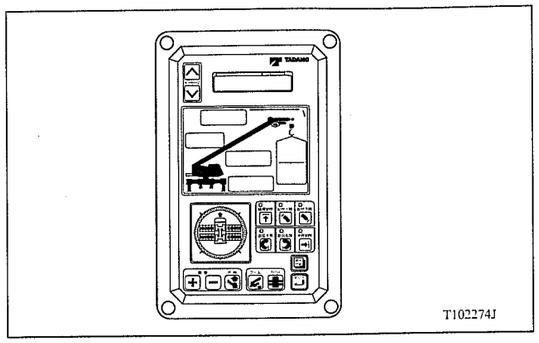
4. Lower the chassis frame fully activating suspension lock (lowering) operation.

5. Set the PTO to ON (I).

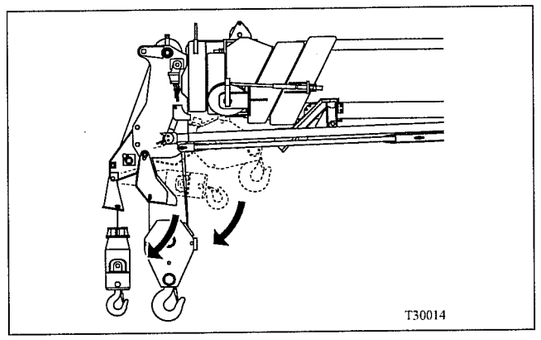
6. Let the machine warm up. While it is warming up, check that all meter and monitor displays are normal and that the machine is not making any abnormal sounds.

7. Fully extend the outriggers and level the crane.

8. Register the outrigger status and boom lift status into the AML.

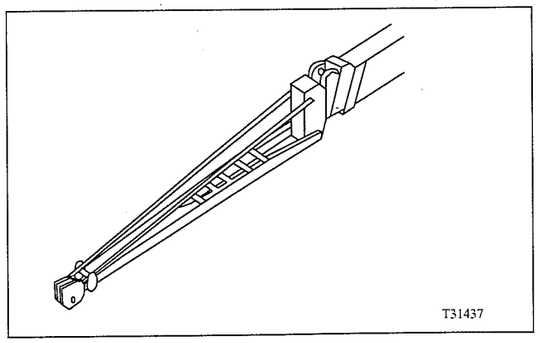


9. Remove the chain for the overwind cutout device from the hanger. Then, set the main and auxiliary winch levers to the hoisting down position to bring the main and auxiliary hook blocks from the stowing position to the operating position.



10. Reeve the wire rope around the main hook block sheaves as required for the operation.

11. Mount the jib as necessary.



12. If the single top or jib is mounted, enter the single top or jib lift status into the AML.

Crane Operation

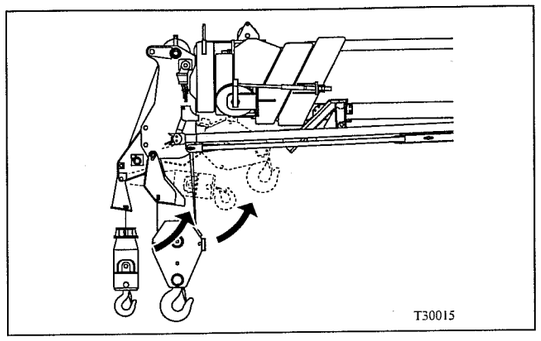
Lift and move the load by using the hoisting, boom telescoping, boom elevating and swing operations.

At the End of the Operation

1. Stow the jib.

2. Stow the boom in the traveling configuration.

3. Stow the main and auxiliary hook blocks. Then, hang the chain for the overwind cutout device on the hanger.



4. Make sure that the control levers are set in the appropriate positions as follows:

(1) Control levers (main and auxiliary winch levers, boom telescoping lever, boom elevating lever, and swing lever) ····· Neutral

(2) Winch clutch switch (for a machine with free-fall device) ····· "ON"

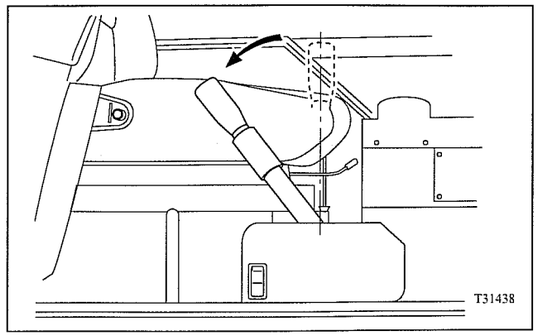
(3) Swing brake switch ····· "ON"

5. Stow the outriggers.

6. Set the PTO switch to OFF.

7. Unlock the suspension by suspension free operation.

8. Lean all the control levers backward at the minimum length and lock them, so that they will not hinder your entering or exiting the cab and traveling operation.



9. Turn off all the electrical instruments inside the cab, including the air conditioner.

10. Close all the cab windows.

11. Stop the engine and remove the key from the starter switch.

12. Exit the cab and lock the door.

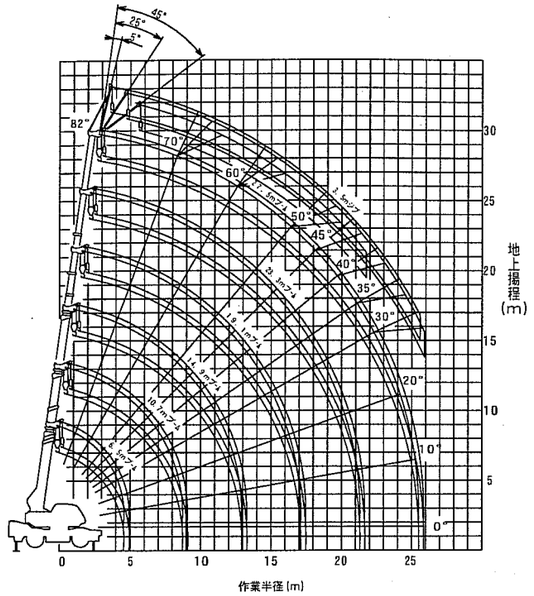
13. Perform the post-operational inspections for the same points as for the pre-operational inspections. If anything abnormal is found, have it repaired before operating the crane again.

How to Read the Performance Data Plate

Load Radius/Lifting Height Chart

◆The following diagram is an example of the load radius/lifting height chart. For the actual operation, refer to the rated lifting capacity table in the nameplate file in the cab.

ＴＲ－１６０Ｍ 作業半径-揚程



注意
◆ 上図はブームのたわみを含んでいません。
◆ 本図は、ｱｳﾄﾘｶﾞ最大(5.2m)張出状態での図です。

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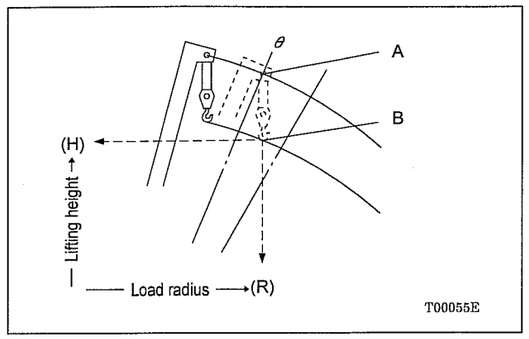
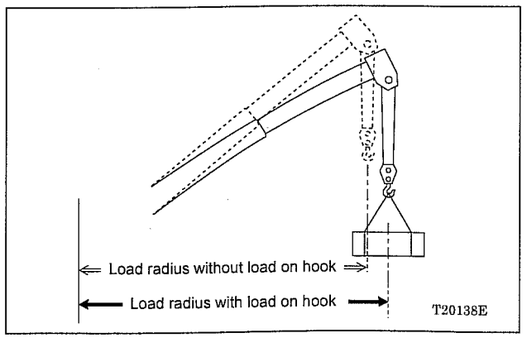
The load radius/lifting height chart provides the load radii and lifting heights in relation to different boom lengths (jib lengths) and boom angles (jib offset angles). Use the chart in conjunction with the rated lifting capacity table when making an operation plan.

◆While points A and B in the figure are at the same load radius, point A denotes the boom angle (or jib offset angle), and point B the lifting height.



◆The load radius/lifting height chart does not include the effect of boom deflection. The greater the weight of the load is, the more the boom deflects, causing the load radius to increase somewhat. Take this effect into consideration when reading the load radius/lifting height chart.



Rated Lifting Capacity Table

⚠ WARNING

⚠ The values shown in the rated lifting capacity table are based on ideal conditions where the crane is set level on a firm surface, there is no wind or side load, and the load is not swinging. When operating the crane under these conditions is not possible, reduce the load as necessary according to the actual operating conditions.

Rated lifting capacities tables are set up as shown below with the kind of job and the outrigger extension conditions. For actual values, see the rated lifting capacity tables provided in the nameplate file in the cab.

With X-type outriggers

Type	Kind of job	Outrigger extension
1	Outriggers extended Boom lift Single top lift	Fully extended 5.2 m
2		Extended to mid 4.8 m
3		Extended to mid 4.4 m
4		Extended to mid 3.2 m
5	Outriggers extended Jib lift	Fully extended 5.2 m
6		Extended to mid 4.8 m
7		Extended to mid 4.4 m
8		Extended to mid 3.2 m
9	Outriggers not extended (On-rubber) Boom lift Single top lift	———

With H-type outriggers

Type	Kind of job	Outrigger extension
1	Outriggers extended Boom lift Single top lift	Fully extended 5.2 m
2		Extended to mid 4.8 m
3		Extended to mid 4.4 m
4		Extended to mid 3.2 m
5		Extended to min 1.79 m
6	Outriggers extended Jib lift	Fully extended 5.2 m
7		Extended to mid 4.8 m
8		Extended to mid 4.4 m
9		Extended to mid 3.2 m
10	Outriggers not extended (On-rubber) Boom lift Single top lift	———

Below are some examples of rated lifting capacity tables.

[Example 1: Boom lift on outriggers]

TR-160M 定格総荷重表 (単位:t)

L(m)	アウトリガ最大(5.2m)張出 -全周-					
2.5	16.00	12.00	9.00	7.00		
3.0	16.00	12.00	9.00	7.00		
3.5	14.00	12.00	9.00	7.00	5.00	3.50
4.0	12.50	12.00	9.00	7.00	5.00	3.50
4.5	11.50	11.10	9.00	7.00	5.00	3.50
5.0		10.25	8.90	7.00	5.00	3.50
5.5		9.40	8.20	7.00	5.00	3.50
6.0		8.80	7.60	6.60	5.00	3.50
7.0		6.75	6.40	5.80	4.70	3.50
8.0		5.30	5.00	5.00	4.15	3.35
9.0		4.30	4.00	4.25	3.70	3.00
10.0		(8.7m)	3.25	3.50	3.30	2.75
11.0			2.65	2.95	3.00	2.50
12.0			2.15	2.45	2.70	2.30
13.0			1.80	2.05	2.30	2.10
14.0			(12.4m)	1.75	2.00	1.95
15.0				1.45	1.70	1.75
16.0				1.25	1.45	1.50
17.0				1.05	1.20	1.30
18.0					1.05	1.10
19.0					0.90	0.95
20.0					0.75	0.80
21.0					0.60	0.65
22.0					(21.3m)	0.45
A(°)	0~82					

L(m)	アウトリガ中間(4.8m)張出 -前方-					
2.5	16.00	12.00	9.00	7.00		
3.0	16.00	12.00	9.00	7.00		
3.5	14.00	12.00	9.00	7.00	5.00	3.50
4.0	12.50	12.00	9.00	7.00	5.00	3.50
4.5	11.50	11.10	9.00	7.00	5.00	3.50
5.0		10.25	8.90	7.00	5.00	3.50
5.5		9.20	8.20	7.00	5.00	3.50
6.0		7.90	7.50	6.60	5.00	3.50
7.0		5.85	5.85	5.80	4.70	3.50
8.0		4.55	4.50	4.85	4.15	3.35
9.0		3.80	3.95	3.90	3.70	3.00
10.0		(8.7m)	2.95	3.15	3.30	2.75
11.0			2.30	2.60	2.80	2.50
12.0			1.85	2.15	2.35	2.30
13.0			1.50	1.75	1.95	2.10
14.0			(12.4m)	1.45	1.65	1.75
15.0				1.20	1.40	1.50
16.0				1.00	1.20	1.25
17.0				0.85	1.00	1.05
18.0					0.85	0.90
19.0					0.70	0.75
20.0					0.58	0.60
22.0						0.40
A(°)	0~82				22~82	32~82

L(m)	アウトリガ最小(3.2m)張出 -前方-					
2.5	16.00	12.00	9.00	7.00		
3.0	14.50	12.00	9.00	7.00		
3.5	10.50	10.40	9.00	7.00	5.00	3.50
4.0	8.00	8.25	7.75	7.00	5.00	3.50
4.5	6.50	6.60	6.30	7.00	5.00	3.50
5.0		5.45	5.30	5.80	5.00	3.50
5.5		4.60	4.40	4.40	5.00	3.50
6.0		3.90	3.75	4.15	4.40	3.50
7.0		2.60	2.75	3.10	3.30	3.25
8.0		2.20	2.05	2.35	2.60	2.70
9.0		1.70	1.50	1.80	2.05	2.15
10.0		(8.7m)	1.10	1.40	1.60	1.70
11.0			0.75	1.05	1.25	1.35
12.0			0.50	0.80	0.95	1.10
13.0				0.55	0.75	0.85
14.0				0.40	0.55	0.65
15.0					0.40	0.50
A(°)	0~82		24~62	36~82	46~82	56~82

Blue line

(L:ブーム長さ
R:作業半径
A:ブーム角度の範囲
(無負荷時))

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[Example 2: Jib lift on outriggers]

TR-160M 定格総荷重表 (単位:t)

ブーム角度 (°)	アウトリガ最大(5.2m)張出 -全周-					
	オフセット5°		オフセット25°		オフセット45°	
	R(m)	W(t)	R(m)	W(t)	R(m)	W(t)
82	4.2	2.00	5.1	1.50	6.1	1.25
75	8.1	2.00	8.8	1.50	9.8	1.25
70	10.8	2.00	11.4	1.50	12.3	1.25
65	13.2	1.60	13.8	1.35	14.6	1.25
60	15.5	1.35	16.1	1.15	16.8	1.15
55	17.7	1.05	18.2	1.10	18.8	1.00
50	19.7	0.85	20.1	0.80	20.7	0.80
45	21.6	0.65	21.9	0.60	22.3	0.60
40	23.2	0.50	23.5	0.45		
35	24.7	0.35	24.9	0.35		
30	26.0	0.25	26.1	0.25		
A(°)	29~82				44~82	

ブーム角度 (°)	アウトリガ中間(4.8m)張出 -前方-					
	オフセット5°		オフセット25°		オフセット45°	
	R(m)	W(t)	R(m)	W(t)	R(m)	W(t)
82	4.2	2.00	5.1	1.50	6.1	1.25
75	8.1	2.00	8.8	1.50	9.8	1.25
70	10.8	2.00	11.4	1.50	12.3	1.25
65	13.2	1.60	13.8	1.35	14.6	1.25
60	15.5	1.25	16.1	1.15	16.8	1.15
55	17.6	0.90	18.2	0.85	18.8	0.85
50	19.7	0.65	20.1	0.65	20.6	0.60
45	21.5	0.45	21.9	0.50	22.3	0.45
40	23.2	0.35	23.5	0.35		
A(°)	39~82				44~82	

Blue line

ブーム角度 (°)	アウトリガ中間(4.4m)張出 -前方-					
	オフセット5°		オフセット25°		オフセット45°	
	R(m)	W(t)	R(m)	W(t)	R(m)	W(t)
82	4.2	2.00	5.1	1.50	6.1	1.25
75	8.1	2.00	8.8	1.50	9.8	1.25
70	10.8	2.00	11.4	1.50	12.3	1.25
65	13.1	1.45	13.8	1.35	14.6	1.25
60	15.4	1.00	16.0	1.00	16.8	0.90
55	17.6	0.70	18.1	0.70	18.7	0.65
50	19.6	0.50	20.1	0.50	20.6	0.45
45	21.5	0.30	21.9	0.30	22.2	0.30
A(°)	44~82					

ブーム角度 (°)	アウトリガ最小(X型)中間(H型)(3.2m)張出 -前方-					
	オフセット5°		オフセット25°		オフセット45°	
	R(m)	W(t)	R(m)	W(t)	R(m)	W(t)
82	4.2	2.00	5.1	1.50	6.1	1.25
75	8.1	2.00	8.8	1.50	9.8	1.25
72	9.6	1.50	10.3	1.30	11.3	1.25
70	10.6	1.20	11.3	1.10	12.2	1.05
65	13.0	0.75	13.7	0.70	14.4	0.65
60	15.3	0.40	16.0	0.35	16.6	0.35
A(°)	59~82					

Blue line

(R:作業半径
W:荷重
A:ブーム角度の範囲
(無負荷時))

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[Example 3: Boom lift on rubber]

TR-160M定格総荷重表 (単位:t)

	アウトリガなし															
	静止時								走行時 (1.6km/h以下)							
	360°								360°							
	前方		全周		前方		全周		前方		全周		前方		全周	
	8.00	4.40	7.50	4.50	7.00	4.65	5.50	5.00	6.70	3.70	6.30	3.80	5.90	3.80	4.60	4.20
	7.70	3.50	7.50	3.65	7.00	3.70	5.50	4.00	6.50	2.95	6.30	3.00	5.90	3.10	4.60	3.35
	7.30	2.80	7.30	2.90	6.80	3.00	5.50	3.15	6.10	2.35	6.00	2.45	5.75	2.50	4.60	2.65
	6.60	2.20	6.40	2.40	5.75	2.40	5.35	2.50	5.50	1.85	5.40	2.00	4.85	2.00	4.50	2.10
			5.45	1.90	4.85	1.85	5.00	2.00			4.60	1.60	4.10	1.55	4.20	1.65
			4.60	1.50	4.15	1.40	4.45	1.65			3.85	1.25	3.50	1.15	3.70	1.35
			3.95	1.15	3.70	1.05	3.90	1.35			3.00	0.95	3.10	0.85	3.50	1.10
			3.00	0.60	3.00	0.50	3.00	0.85			2.50	0.50	2.50	0.40	2.50	0.70
			2.30		2.30		2.45	0.45			1.90		1.90		2.05	
					1.70		1.90						1.40		1.60	
					1.25		1.45						1.05		1.20	
					0.95		1.15						0.80		0.95	
					0.65		0.85						0.55		0.70	
							0.60								0.50	
							0.40									
A(°)	0~82			38~82	24~82	57~82	36~82	62~82	0~82			38~82	24~82	57~82	42~82	65~82

Blue line

(L:ブーム長さ
R:作業半径
A:ブーム角度の範囲
(無負荷時))

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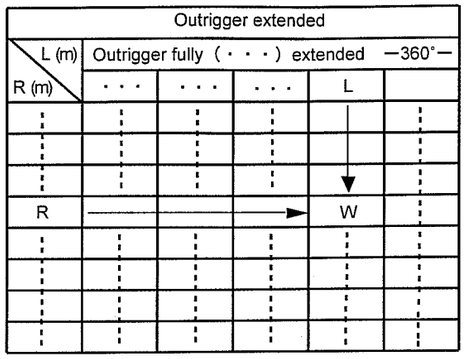
Boom Lift On Outriggers

See the applicable section of the rated lifting capacity table and find the rated lifting capacity value W (ton) that corresponds to the boom length L (m) and load radius R (m).

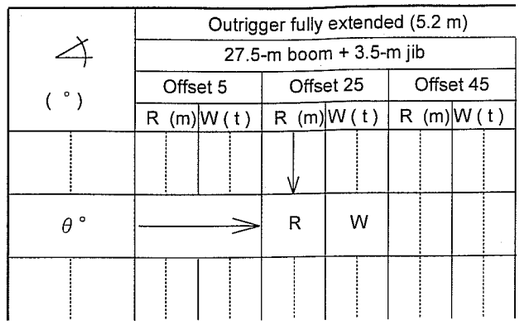


T21575E

◆Rated lifting capacities are based on the condition that the crane is installed level on the firm level ground. They include the mass of both the lifted load and slings.
◆The values above the blue line are based on the crane strength and those below, on the crane stability.
◆The rated lifting capacity values for boom lift assume the jib stowed.
◆The rated lifting capacity values for boom lift are based on the load radius. The load radii shown in the rated lifting capacity table include the deflection of the boom under the weight of a load. When determining capacity from the table, therefore, find the rated lifting capacity value based on the actual measured load radius.
◆When the actual boom length exceeds the length specified for a certain boom extension, compare the rated lifting capacity value for the specified length with that for one stage longer, and use the smaller of the two. (The value may be different from that indicated by the AML.)
◆Free-fall operations should, as a rule, be carried out only when the hook is not loaded. If a load must be lowered in this manner for unavoidable reasons, assume a rated lifting capacities of 20% or less of the value shown in the table and avoid sudden brake operations. (For a machine with free-fall device)

Jib Lift on Outriggers

Select the section of the rated lifting capacity table for the relevant outrigger extension width. From the jib length and jib offset angle, then find the load radius (R) and rated lifting capacity (W) that correspond to the boom angle (θ).



T21574E

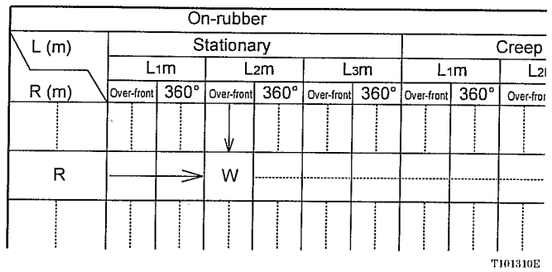
◆Rated lifting capacities are based on the condition that the crane is installed level on the firm level ground. They include the mass of both the lifted load and slings.
◆The values above the blue line are based on the crane strength and those below, on crane stability.
◆For jib lift, rely only on the boom angle, regardless of boom length.
◆The values on the load radius are reference values when the boom is fully extended (27.5 m).
◆High-speed hoist-down operation should be carried out when the hook block is not loaded. Avoid sudden lever operations. (For a machine without free-fall device)
◆Free fall operations should, as a rule, be carried out only when the hook is not loaded. If a load must be lowered in this manner for unavoidable reasons, assume a rated lifting capacities of 20% or less of the value shown in the table and avoid sudden brake operations. (For a machine with free-fall device)

Single Top Lift On Outriggers

For operations with the single top, use the boom lift and on-outriggers section of the rated lifting capacity table to find the allowable load. Find the rated lifting capacity value based on boom length and load radius. From that value, subtract the mass of the main hook block. The resultant value is the rated lifting capacity for a single top lift. However, remember that the maximum rated lifting capacity for a single top lift is 3.0 t. When the result of the above calculation (<table value> - the main hook block mass) is over 3.0 t, always regard the rated lifting capacity as 3.0 t.

Boom Lift On Rubber

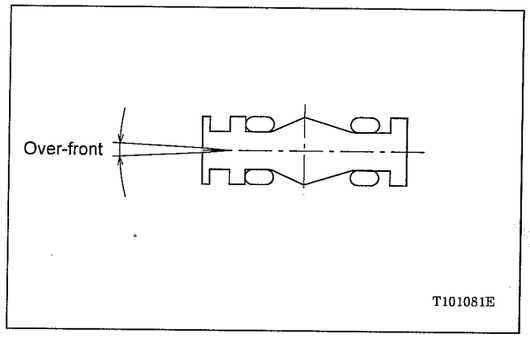
Choose "Stationary" or "Creep." Choose "Over Front" or "360°." Select the boom length L (m). And then read out the rated lifting capacity W (ton) from the load radius R (m).



T101310E

◆The rated lifting capacity values for on-rubber operation assume that the tires are at the specified air pressure and that the crane is set on firm and level ground with the suspension locked.
The rated lifting capacity includes the mass of the slings and the hook block.
◆The values above the blue line are based on crane strength and those below, on crane stability.
◆The load radii shown in the rated lifting capacity table include the deflection of the boom and the tires under the weight of a load. When determining capacity from the table, therefore, find the rated lifting capacity value based on the actual measured load radius.
◆Free-fall operations must not be carried out (For a machine with free-fall device).
◆Do not perform jib lift. Do not perform boom lift with the boom length exceeding 19.1 m.

◆For traveling with load on hook, shift the drive mode selector switch to "L/4D." Keep the gearshift lever to the first.
◆When traveling with a load on the hook, apply the swing brake, hold the load near the ground, and drive at 1.6 km/h or slower to prevent the load from swinging. Make every effort to avoid steering, starting, and braking suddenly.
◆Do not operate the crane during traveling with a load on hook.
◆Give due consideration in the actual ground and operating conditions.
◆The "over-front" area in the table refers to an area indicated by the "over-front area" symbol on the AML display. This area lies in ±2° frontward of the carrier.



T101081E

Single Top Lift On Rubber

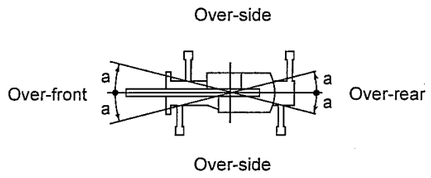
For operations with the single top mounted, use the boom lift and on-rubber section of the rated lifting capacity table to find the allowable load. Find the rated lifting capacity value based on boom length and load radius. From that value, subtract the mass of the main hook block. The resultant value is the rated lifting capacity for a single top lift. However, remember that the maximum rated lifting capacity for a single top operation is 3.0 t. When the result of the above calculation (<table value> - the main hook block mass) is over 3.0 t, always regard the rated lifting capacity as 3.0 t.
◆Free-fall operations must not be carried out (For a machine with free-fall device).

Notes on Using the Rated Lifting Capacity Table

Outrigger Extension Widths and Working Ranges

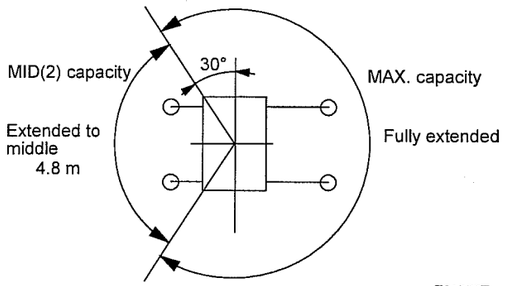
The capacities of your crane vary (between Max., Mid. and Min.) according to the outrigger extension widths and the working ranges (that is, the direction of the boom).
The over-front area and the over-rear area for which the maximum extension capacities are always applied vary according to the right and left outrigger extension widths as shown below.

Outrigger extension widths		4.8 m	4.4 m	3.2 m	1.79 m
Angle a°	X-type	30 (Mid.)	25 (Mid.)	15 (Min.)	No capacity
	H-type	30 (Mid.)	25 (Mid.)	15 (Mid.)	5 (Min.)



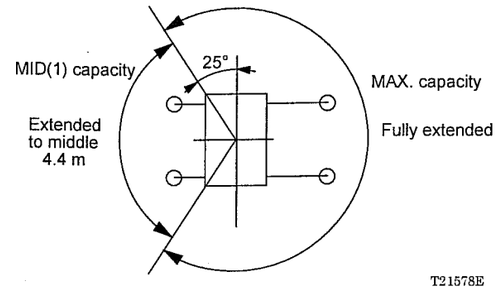
T101080E

[Example: Maximum/middle (2) extension combination]



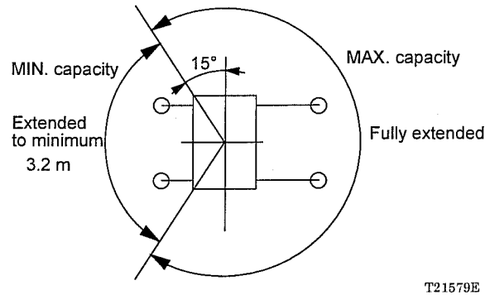
T21577E

[Example: Maximum/middle (1) extension combination]



T21578E

[Example: Maximum/minimum extension combination]

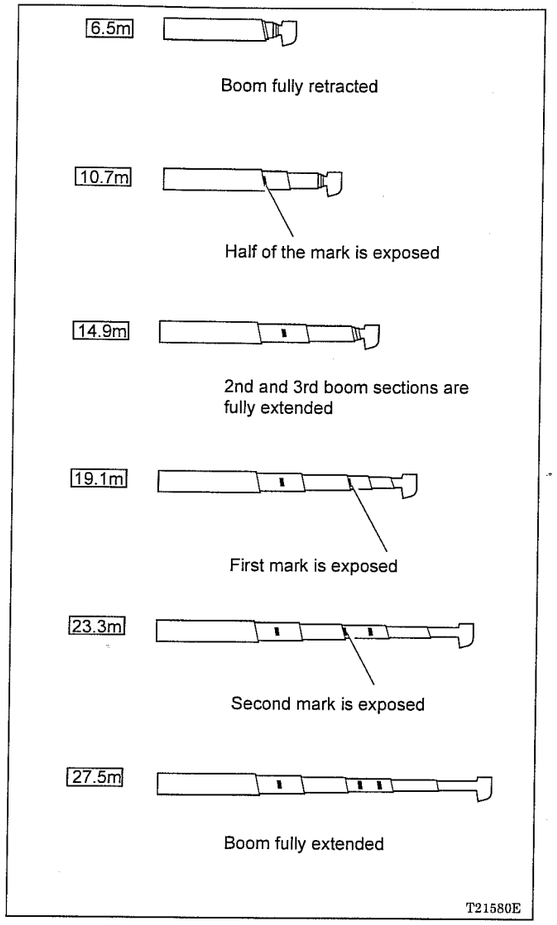


T21579E

"Max. capacity" refers to a maximum extension capacity.
"Middle (2) capacity" refers to a middle extension (4.8 m) capacity.
"Middle (1) capacity" refers to a middle extension (4.4 m) capacity.
"Min. capacity" refers to a minimum extension (3.2 m) capacity.

Boom length

The boom lengths listed in the rated lifting capacity table refer to the boom extension conditions as shown below.



T21580E

◆If the boom length is other than listed in the rated lifting capacity table, check the AML display for the rated lifting capacity.

The following tables show the standard numbers of parts of line for various boom lengths.
◆Load per one part of main wire rope line must not exceed 26.2 kN {2.67 tf}.
Load per one part of auxiliary wire rope line must not exceed 29.4 kN {3.0 tf}.

(1) On-outrigger operation

Boom length	6.5 m	10.7 m	14.9 m	19.1 m	23.3 m	27.5 m	Single top
No.of parts of line	6	6	4	4	4	4	1
Hook block capacity	16 tons						3 tons

(2) On-rubber operation

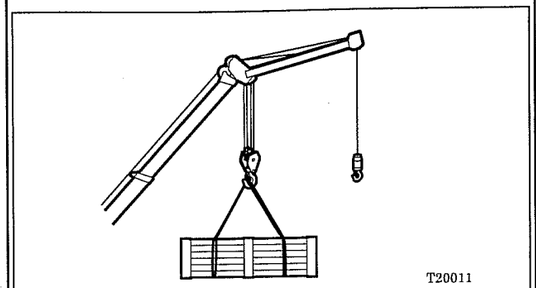
Boom length	6.5 m	10.7 m	14.9 m	19.1 m	Single top
No.of parts of line	8	6	4	4	1
Hook block capacity	16 tons				3 tons

AML
(Overload Prevention Device)

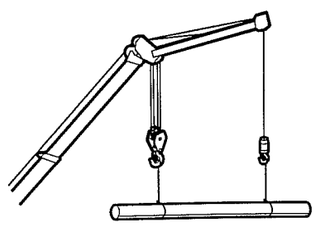
⚠ WARNING

⚠ The AML operates properly only when it is used exactly as instructed in this manual. If you do not follow the specified AML and crane operating procedures, the crane could overturn or be damaged, causing a serious accident. Be sure to observe the following precautions for safe operation.

- **Never perform any operation with the AML deactivated.**
- **Place the crane on firm and level ground with the outriggers extended and adjust the crane so that it is level (when outriggers extended).**
- **Before operating on rubber, check that the tires have the specified air pressure.**
- **Perform the suspension lock (lowering) operation to lower the chassis frame fully.**
- **Before starting operation, perform pre-operational checks on the AML to ensure that it is operating properly.**
- **Register the actual crane status (boom lift, jib lift, or single top lift).**
- **Be sure to register the outrigger extension width only after the outriggers have been extended and made ready for actual operation.**
- **When the AML moment ratio exceeds 90%, the alarm will sound intermittently. Slow the crane operation and take great care.**
- **In case that the swing stop/override switch is set to "OVERRIDE" or the crane is in on-rubber operation mode, swinging will not stop automatically even if overloading occurs. Check for safety before performing swinging operation when the outrigger extension widths are different in both sides. If the alarm buzzer sounds and a message appears on the moment indicator of the AML during swinging operation, stop swinging immediately. Then take necessary measures to avoid any danger by lowering the load, swinging the boom back, or the like.**
- **The buzzer will sound if the crane suffers any abnormality (including stoppage due to hook overwinding or overloading). If the buzzer sounds, stop the operation and carry out recovery operations in accordance with the message on the moment indicator of the AML.**
- **Do not perform boom lift with the jib mounted. If this operation is unavoidable, contact the nearest TADANO distributor or dealer.**



- **When lifting a load using the boom and jib together, register the jib lift rather than the boom lift. Also, make sure the mass of the load (including the load handling devices) does not exceed the rated lifting capacity for the jib lift. If the main wire rope is loosened and the load is hoisted using only the auxiliary wire rope, the load's center of gravity will move, causing the moment ratio to increase. Take care to prevent overloading.**



- **When the crane is automatically stopped during a critical operation (hoisting up, boom extension or boom lowering), operate the appropriate controls to move toward the non-critical condition (hoist down, retract boom or raise boom).**
- **Do not elevate the boom to raise the load clear of the ground. Doing so is dangerous because the crane will not stop automatically even when it is overloaded. Hoist up the load to raise it clear of the ground. Once the load has cleared the ground, stop hoisting and check for safety.**

[NOTICE]

◆While the elevating cylinder is extended or retracted to the full stroke, the display of the AML becomes erroneous. In this case, elevate the boom in the opposite direction to terminate the stroke end condition.

Configuration and Functions of the AML System

AML system has various kinds of functions, including the following four typical functions. Based on the registered work conditions by operator selection and the signals from various sensors, the crane operations are controlled.

(1) Automatic stop function for overloading
The AML calculates and compares the working and rated moment values and displays them as a percentage. When the working moment exceeds the rated moment (100% or more), failure message is shown, alarm buzzer sounds, and the crane operation toward the critical side stops.

(2) Working range limit functions
When any working range limit is registered to AML, the crane is controlled so that the crane work posture does not exceed this registered working range limit. When the boom reaches the previously registered restriction, failure message is shown, alarm buzzer sounds, and the crane operation stops.

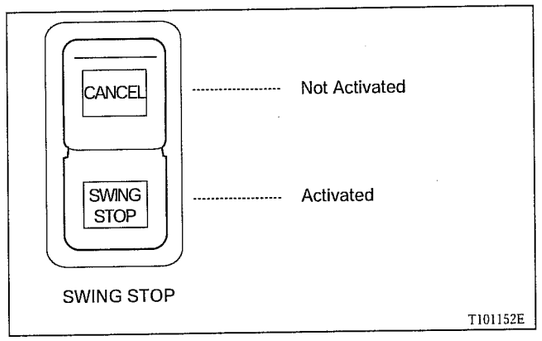
(3) Slow stop function
When the boom elevation stops in the above (1) or (2) case or reaches the stroke ends, the elevating speed slows down before the boom elevation stops.

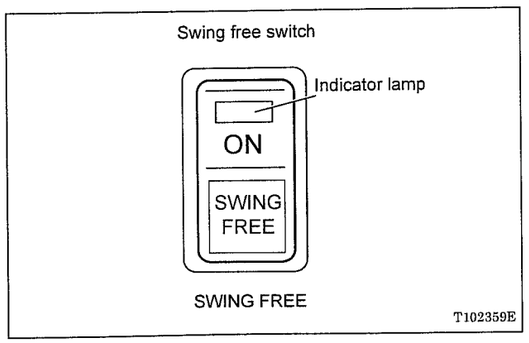
The above automatic stop, working range restricting and slow stop functions are available depending on the conditions shown in the following table:

		On-outrigger operation	On-rubber operation
Automatic stop by overloading	Hoisting up	○	○
	Boom lowering	◎	◎
	Boom extension	○	○
	Swing	○	×
Stop at stroke end	Boom raising/lowering	◎	◎
Stop by working range restriction	Boom raising/lowering	◎	◎
	Swing	○	×
	Boom extension	○	○

◎: Slow stop ○: Stop ×: Not stop

◆When swing stop/override switch is shifted to "Override" side or the swing free switch is shifted to "ON", swing stop does not activate.

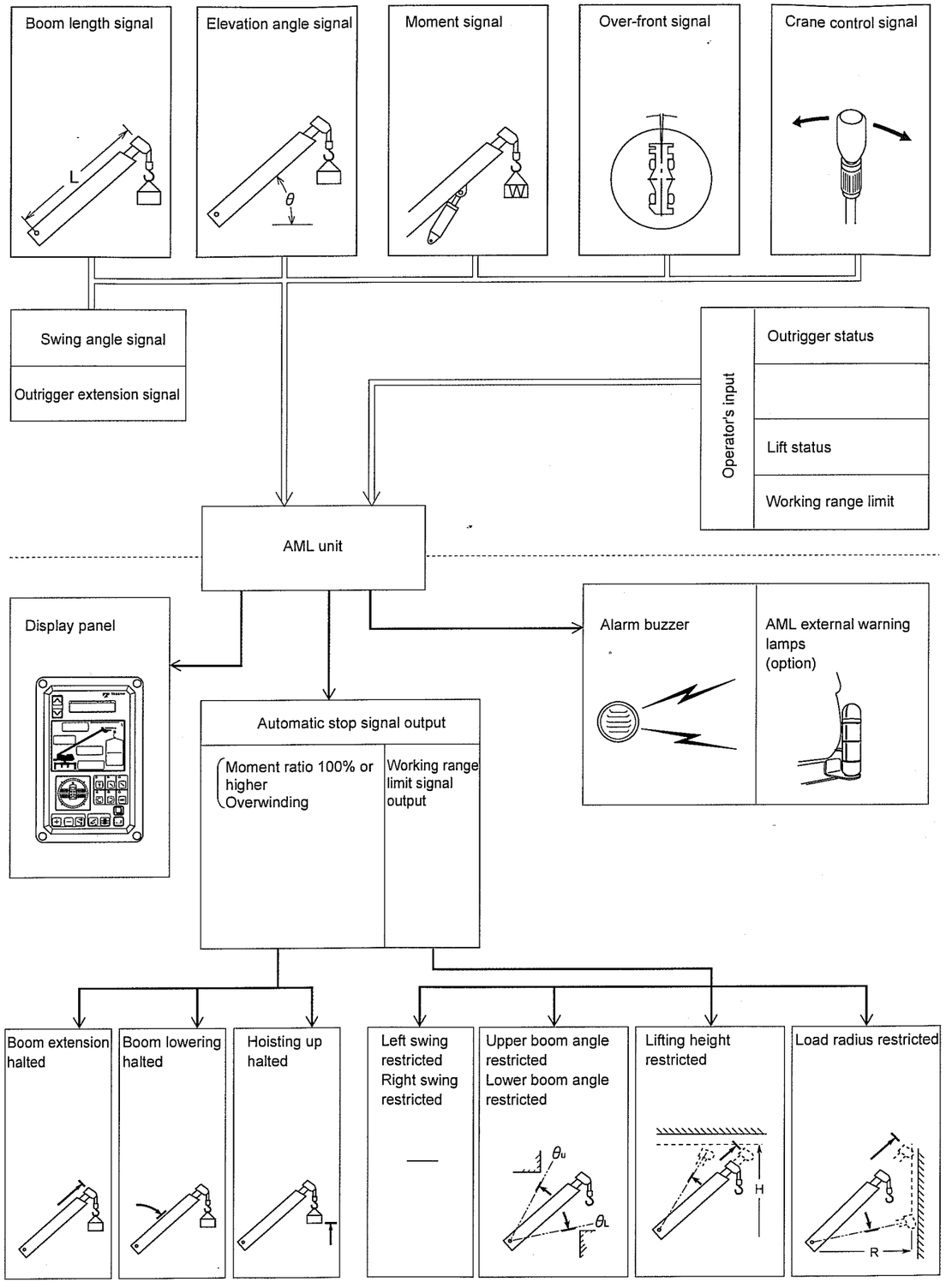




(4) Alarm function

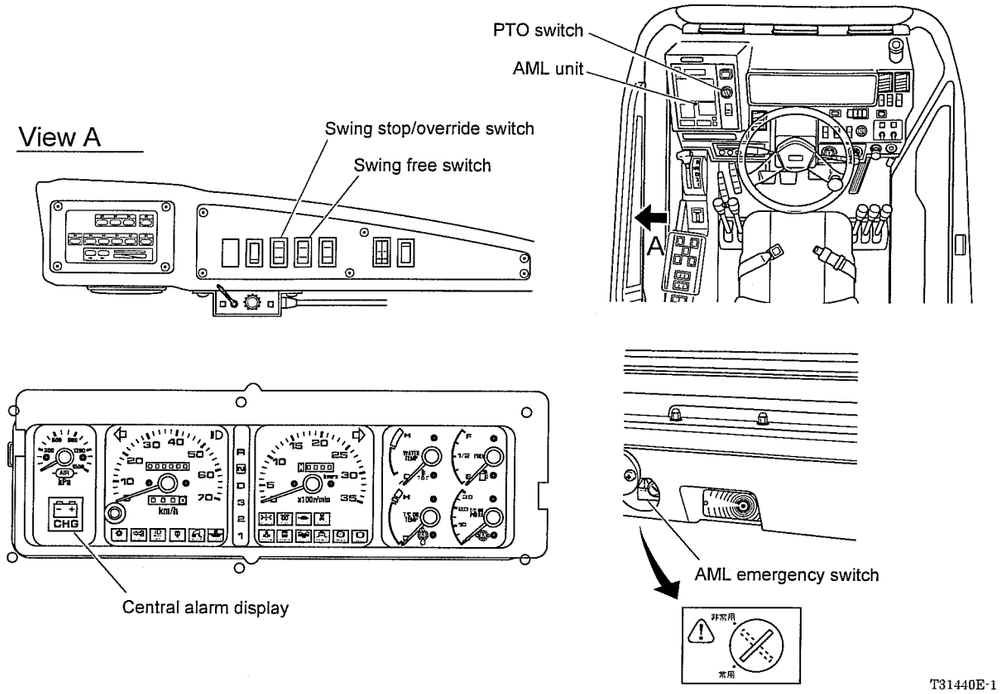
Condition	Alarm
Overwinding	Buzzer: Sounds continuously.
Moment ratio is between 90% and 100%	Moment display: Associated yellow segments are lit. Buzzer: Sounds intermittently.
Moment ratio exceeds 100%	Moment display: Associated segments are lit until the moment reaches 110%; all segments are lit when moment exceeds 110%. Buzzer: Sounds continuously.
Crane operation needs to be controlled	Moment display: Displays control messages. Buzzer: Beeps 3 seconds. (*1)
Working range restricting function activated	Associated restriction indicator lamp flashes. Buzzer: Beeps 3 seconds. (*1)
AML system error	Moment display: Displays failure messages. Buzzer: Beeps 3 seconds. (*1)

(*1): There are two types of buzzer sounds as follows:
When slow stop control is activated: Long sounds
When other controls are activated: Short sounds



Controls

For details of the AML, refer to the "How to Use the AML Unit" section later in this manual.



T31440E-1

PTO Switch

The PTO switch activates the crane's hydraulic pump and the AML. For more details, refer to the "Operating the PTO and Warming Up the Machine" section later in this manual.

Swing Stop/Override Switch

This switch is used to override the automatic stop function for swing operation. For the details on this switch, refer to "Swinging the Boom" section.

Messages and Recovery Operations

When a message is displayed, recover normal operation using the recommended actions shown below.

◆The crane must be repaired if the screen shows a message other than those listed below or shows the same message again after appropriate settings and operations have been performed. If this happens, contact the nearest TADANO distributor or dealer.

1. Alarm message

No.	Message	Recommended operation
1	Warning: 0001 Warning: 0002 Warning: 0003 Warning: 0004	Displayed when the outrigger beam is retracted during the crane operation. Extend the outrigger again and re-enter the outrigger extension width.
2	Warning: 0015 (*1)	Hoist down or retract the boom to lower the hook block.
3	Error: 0016 Error: 0017	Displayed when the current crane position is out of those assumed by AML or when such a status is entered into AML. • Re-enter operating status. • Retract boom if crane is operating on rubber.
4	Error: 0037	Wait until the accumulator pressure increases.
5	Warning: 0046	Displayed when the outriggers are stowed. Re-enter the outrigger extension width.
6	Warning: 0056 (*2)	Displayed when the swing operation is coming closer to the overloading state when each of front, rear, right and left outrigger width differs. Stop the operation and swing to the opposite side, or retract or raise the boom to prevent overloading.
7	Warning: 0057 Warning: 0058 Warning: 0059 Warning: 0060	Displayed when the outriggers are retracted and the current capacity is shifted to the smaller capacity of the outrigger extension (lifting capacity) during the crane operation. Proceed with the further operation if the smaller capacity still satisfies the safe condition of the crane. If the smaller capacity may cause the overloading, extend the outrigger again and re-enter the outrigger extension width.
8	Warning: 0010 (*2)	Displayed when the swing operation is coming closer to the overloading state when the swing limit of the working range limit function is entered. Stop the operation and swing to the opposite side.

*1: Displayed when overwind cutout disable switch is deactivated.
*2: Displayed when the swing stop/override switch is in the override side.

2. Stoppage (slow stop) control message

No.	Message	Recommended operation
1	Warning: 0082	Set the swing lever to the neutral position.
2	Warning: 0081	Set the boom elevating lever to the neutral position.

3. Stoppage message

No.	Message	Recommended operation
1	Warning: 0024	Hoist down the winch or retract the boom to lower the hook block.
2	Warning: 0023	Hoist down the winch, retract the boom, raise the boom or swing to the safe side.
3	Warning: 0026	Lower the boom.
4	Warning: 0027	Raise the boom.
5	Warning: 0028	Retract or lower the boom.
6	Warning: 0029	Retract or raise the boom.
7	Warning: 0042 (*1) Warning: 0043 (*1) (The boom reaches its swing limit.)	Swing to the opposite side.
8	Warning: 0007 (*1) (Swing operation reaches the overloading state.)	Swing to the opposite side, raise the boom or retract the boom.
9	Warning: 0085 (Boom raising operation reaches its stroke end.)	Lower the boom.
10	Warning: 0085 (Boom lowering operation reaches its stroke end.)	Raise the boom.
11	Warning: 0088 (Boom lift with the jib mounted reaches its control limit.)	Hoist down the winch, retract the boom, raise the boom, or perform the boom lift with the jib stowed.

*1: Displayed when the swing stop/override switch is in the override side, but the automatic stop function is deactivated at this time.

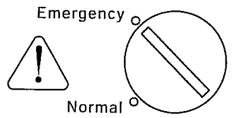
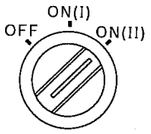
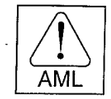
In the Event of AML Failure

Using the AML Emergency Switch

⚠ WARNING

⚠ While the AML emergency switch is in the Emergency position, or the PTO switch is in the "ON (II)" position, the AML's automatic stop function is deactivated. Use of this switch during normal operation is extremely dangerous. Use it only if an AML failure renders the crane inoperable. Immediately after operating the switch, lower the load and retract the boom. Then, stow the boom using elevation and swing operations.
⚠ The AML automatic stop function will not be deactivated while the AML emergency switch is in the "Normal" position, even if the PTO switch is set to the "ON (II)" position.

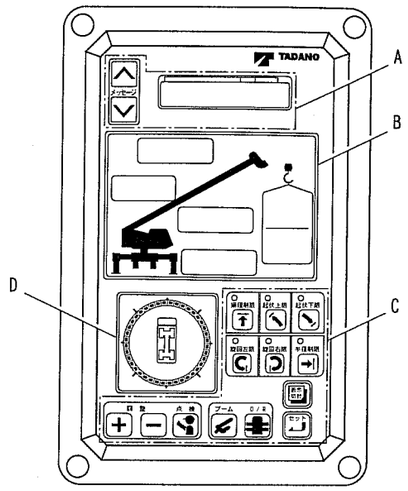
Faults in the AML system render the crane inoperable. If the crane does not return to normal operation after action is taken in accordance with the display message, there is a fault in the system.
In the event of such failure, use the AML emergency switch and PTO switch to stow the crane. Insert the key into the keyhole of the AML emergency switch and turn it to the "Emergency" position. Then, turn the PTO switch to the "ON (II)" position. At this time, the AML cancellation warning sign will light up on the central alarm display.
◆The AML emergency switch key should be kept by the person in charge of the vehicle or work site.

AML emergency switch	
PTO switch	
Central alarm display	

T20055E

How to Use the AML Unit

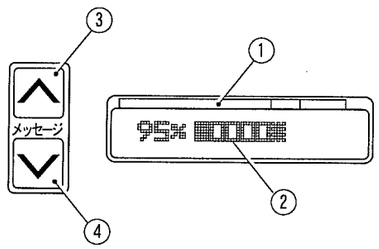
Component Names and Functions



T02235

A: Bar graph display
B: Display panel (1)
C: Control panel
D: Display panel (2)

A: Bar Graph Display

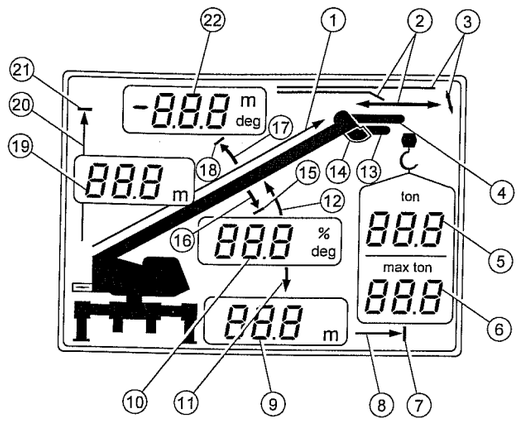


T02237

1. Moment ratio color indicator
   Identifies the safe (green), warning (yellow), or critical (red) level of the moment ratio displayed in the bar graph.

2. Moment ratio display
   Normally displays the moment ratio with a bar graph and numeric value. While the display alternation key is pressed, displays the main hydraulic system oil pressure and the accumulator pressure. While the increase or decrease key is pressed, displays the elevation speed adjustment rate. When a detector error or other error is detected, displays an error message.
3. Scroll-up key (< ↑ >)
   Press this key to see a previous message on the moment ratio display.
4. Scroll-down key (< ↓ >)
   Press this key to see the next message on the moment ratio display.

B: Display Panel (1)



T21541

1. Boom length symbol
   Indicates that the boom length display [19] shows the boom length.

2. Jib length symbol
   Indicates that the jib angle display [22] shows the jib length.

3. Jib angle symbol
   Indicates that the jib angle display [22] shows the jib offset angle.

4. Jib symbol
   Marked up when the jib lift is selected.

5. Actual load display
   Displays the actual load.

6. Rated lifting capacity display
   Displays the rated lifting capacity.

7. Load radius limit symbol
   Indicates that the load radius display [9] shows the registered load radius limit value. When this symbol lights up, the symbol [8] lights up at the same time.

8. Load radius symbol
   Indicates that the load radius display [9] shows the load radius.

9. Load radius display
   Normally displays the load radius. When the display alternation key is pressed, displays the swing angle. If the load radius limit feature is active, displays the specified limit value while the register key is pressed.

10. Elevation angle display
    Normally displays the boom elevation angle. When the display alternation key is pressed, displays the moment ratio (%). If the elevation angle lower limit feature is active, displays the specified limit value while the register key is pressed.

11.,12. Elevation angle symbols
    Indicate that the elevation angle display [10] shows the boom elevation angle.

13. Single top symbol
    Marked up when the single top lift is selected.

14. Boom symbol
    Marked up when the boom lift is selected.

15., 16. Elevation angle lower limit symbols
    Indicate that the elevation angle display [10] shows the specified elevation angle lower limit value.

17., 18. Elevation angle upper limit symbols
    Indicate that the jib angle display [22] shows the specified elevation angle upper limit value.

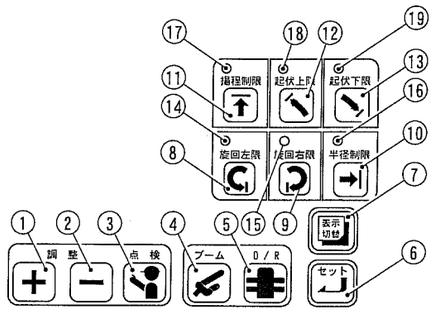
19. Boom length display
    Normally displays the boom length. While the display alternation key is pressed, displays the lifting height. If the lifting height limit feature is active, displays the specified limit value while the register key is pressed.

20. Lifting height symbol
    Indicates that the boom length display [19] shows the lifting height.

21. Lifting height limit symbol
    Indicates that the boom length display [19] shows the specified lifting height limit value. When this symbol lights up, the symbol [20] lights up at the same time.

22. Jib angle display
    Displays the jib offset angle when the jib lift is selected. When the display alternation key is pressed, displays the jib length. If the elevation angle upper limit feature is active, displays the specified limit value while the register key is pressed.

C: Control Panel



T02239

1. Increase key
   Used to increase the selected value.

2. Decrease key
   Used to decrease the selected value.

3. Check key
   Used to check the AML system functions.

4. Lift status selector key
   Used to select the lift status.

5. Outrigger position selector key
   Used to select the outrigger status.

6. Register key
   Used to register a selected state.

7. Display alteration key
   Used to alternate the displays on display panel 1.

8. Left swing limit key
   Used to activate and cancel the left swing limiting function.

9. Right swing limit key
   Used to activate and cancel the right swing limiting function.

10. Load radius limit key
    Used to activate and cancel the load radius limiting function.

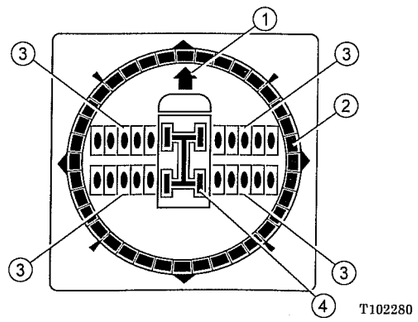
11. Lifting height limit key
    Used to activate and cancel the lifting height limiting function.

12. Upper boom angle limit restriction key
    Used to activate and cancel the uppermost boom angle limiting function.

13. Lower boom angle limit restriction key
    Used to activate and cancel the lowermost boom angle limiting function.

14.–19. Restriction indicator lamp
    Lights up when the corresponding restriction function is activated. When the crane reaches the set limit during operation while the restriction function is active, the indicator lamp flashes.

D: Display Panel (2)



T102280

1. Over-front area symbol
   Indicates that the boom is positioned in the front area.

2. Swing position display
   Indicates the boom position (unit: 10°).

3. Outrigger position symbols
   Indicate the outrigger position.
   The symbols flash as you enter the outrigger position and become marked up when you complete the entry.

4. On-rubber symbol
   Indicates that on-rubber status is selected.

Turning the AML On and Off

Power ON

Set the PTO switch to the ON (I) position. The crane is now ready for operation. As the PTO indicator lamp lights up, the AML activates and displays the crane operation status.

◆Before starting crane operations, update the operation status stored in the AML.

Power OFF

Set the PTO switch to the OFF position. The AML deactivates and the display goes out.

Selecting Operational Status

⚠ WARNING

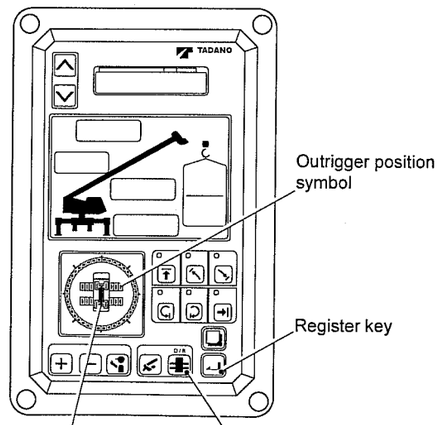
⚠ Incorrectly entering the operation status into the AML can result in a serious accident such as the crane falling over or being damaged. Before starting a crane operation, make sure that the operation status stored in the AML matches the actual operation status.

Registering Outrigger Status

◆The on-rubber status is automatically set when the AML is turned on.

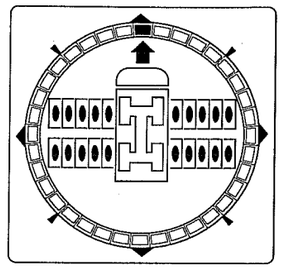
◆Even when you turn the AML off (by setting the PTO switch to OFF), the currently registered operation status is retained in the AML. The stored data is available next time you turn on the AML. Note, however, that the data is erased after 2 hours. If you have interrupted the operation for more than 2 hours, register the operation status again into the AML before resuming the operation.

Use the outrigger position selector key to register the outrigger position into the AML. Then follow the procedure described in the following paragraphs.



T02241E

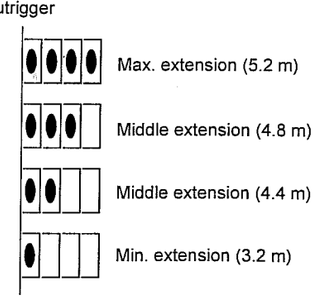
(1) On-outrigger operation
Press the outrigger position selector key. The AML automatically detects the current outrigger position and displays the detected position by flashing the corresponding outrigger position symbols.
Check that the outrigger position symbols flashing on the display match the actual outrigger position. If they do, press the register key to store the outrigger position to the AML memory. The outrigger position symbols will be marked up when the outrigger position is registered.



T102283

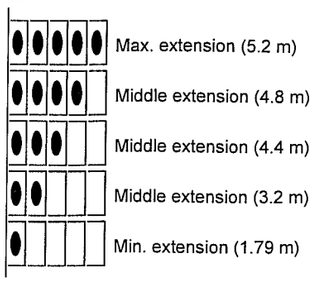
The outrigger positions are displayed as follows.

X-type outrigger



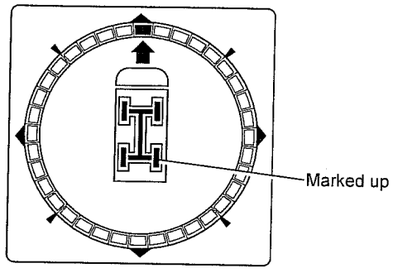
T21581E

H-type outrigger



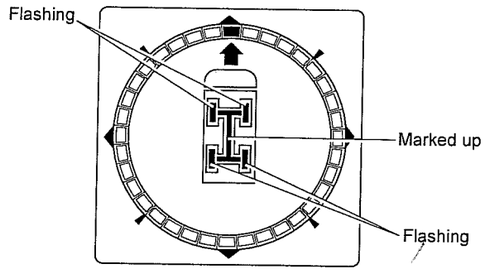
T21582E

(2) On-rubber stationary operation
Press the outrigger position selector key. At this time, the outrigger position symbols flash. Press the outrigger position selector key again. At this time, the outrigger position symbols go out and the on-rubber symbol becomes marked up. The on-rubber status is now registered in the AML memory.



T21593E

(3) On-rubber creep operation
Press the outrigger position selector key to flash the tire part of the on-rubber symbol becomes marked up. The on-rubber status is now registered in the AML memory.

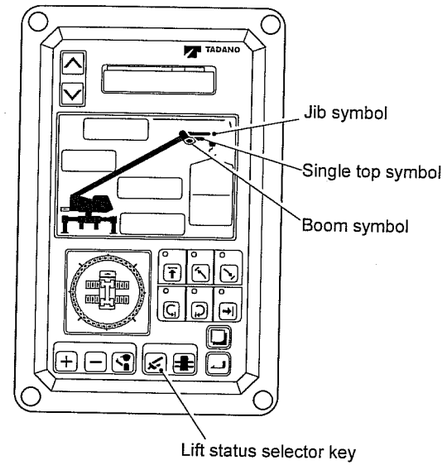


T21594E

Registering Lift Status

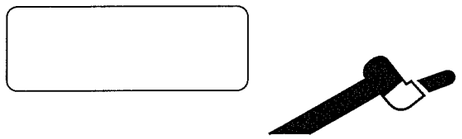
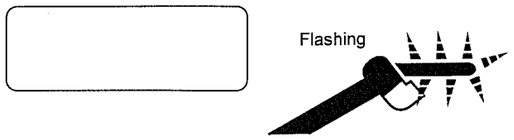
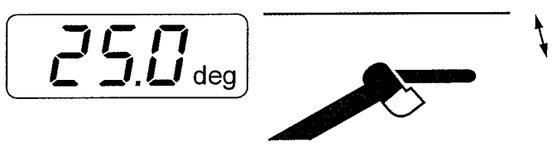
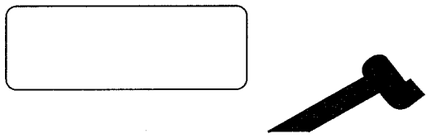
◆The single top lift status is automatically selected when the power supply is turned on.

◆Even when you turn the AML off (by setting the PTO switch to OFF), the currently registered operation status is retained in the AML. The registered data is available next time you turn on the AML. Note, however, that the data is erased after 2 hours. If you have interrupted the operation for more than 2 hours, register the operation status again into the AML before resuming the operation.



T02243E

The lift status selector key is used to register the lift status. Each time the lift status selector key is pressed, the lift status changes. The status changes in numerical sequence as shown in the following table. The display returns to (1) if you press the switch when status (9) is displayed on the screen. Register the status that corresponds to the actual lift status.

Display	Type of lift	
	Single top lift	(1)
	Jib set (mounting or stowage)	(2)
	Jib lift Jib offset angle: 5°	(3)
	Jib lift Jib offset angle: 25°	(4)
	Jib lift Jib offset angle: 45°	(5)
	Boom lift	(6)

T31199E

AML Pre-operational Inspection

⚠ WARNING

⚠ Operating the crane with a malfunctioning AML could cause the crane to overturn or be damaged. Be sure to perform the pre-operational inspection on the AML system and start the crane only after ensuring that the system is operating properly.

◆Before starting a crane operation, follow the steps below to check that the AML system operates normally.
◆From any of the following steps (1 through 10), you can return to the normal operation mode by pressing the display alteration key or check key.

1. Set the crane with the outriggers extended to the maximum length position and perform the level adjustment.

2. Press the check button and check the following:
Display panels (1) and (2), moment ratio display, and display symbols ···· All segment marked up
Buzzer ·· Continuous beeping
Operations toward critical conditions
·· Automatically stopped

3. Place the crane under the following conditions:
Boom : Fully retracted
Hook block : 16-ton hook block

4. Press the register key. The following message appears on the bar graph display area:

Fully ret boom ↓
Press REG key

5. Press the register key. The boom length is normal if the following message appears:

Boom A 10 ± 0.3°

If one of the following messages appear, take corresponding measures.

If the detected boom length is shorter than the normal length at the fully retracted position:

Boom length is ↓
wrong. ↓
Call Repairshop

If the detected boom length is longer than the normal length at the fully retracted position:

Retract boom ↓
If not retract ↓
any more, Call ↓
Repairshop

If an inspection request message is displayed, have your crane inspected and repaired at the nearest TADANO distributor or dealer.

6. Raise the boom to an elevation angle of 10°. When the boom is set to an elevation angle of (10° ± 0.3°), the following message appears automatically on the display:

MMT ＊＊＊±＊＊ ＊＊＊ ↓
(Standard value) (Detected value)
ADJ. by INC.(DEC.) key

7. If the detected value is greater or smaller than the standard value, use the decrease (-) or increase (+) key on the control panel to adjust the reading until the difference is within the allowable range.

8. When the calibration is complete at an elevation angle of (10° ± 0.3°), the following message appears:

10° Adjustment ↓
Is over Press ↓
Register key

9. Press the register key. The following message appears:

Boom A 50 ± 0.3°

10. Raise the boom to an elevation angle of 50°. When the boom is set to an elevation angle of (50° ± 0.3°), the following message appears automatically on the display:

If the detected moment is within the normal range:

NO Abnormality	↓
Press register	↓
key.	

If the above message appears, press the register key to complete the pre-operational inspection. The AML will return to the normal operation mode and a bar graph will appear on the moment ratio display.

If the detected moment is abnormal:

MMT 50° is	↓
Wrong Call	↓
Repairshop.	↓
Press Dsp. Alt.	↓
key.	

The moment detector requires readjustment. Have it inspected and readjusted at the TADANO distributor or dealer.
Press the display alternation key to terminate the pre-operational inspection. The AML will return to the normal operation mode and a bar graph will appear on the moment ratio display.

How to Use the Working Range Limit Function

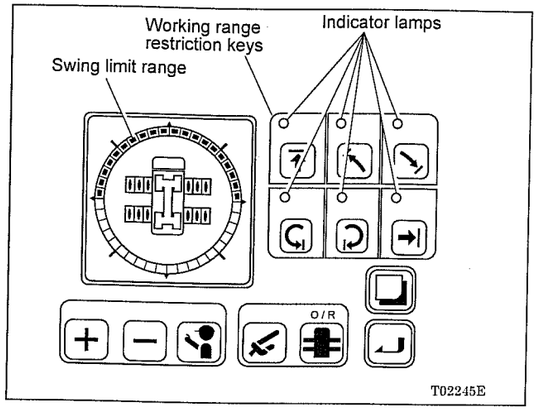
[NOTICE]

◆Do not register a limit position into the AML with the boom positioned very close to an obstacle. If you do, a collision with the obstacle may occur under some operating conditions or with certain control procedures. Provide enough clearance between limit positions and obstacles.

The working range restricting function automatically stop the boom telescoping, elevation, or swing operation when the preset elevation angle (upper/lower limits), lifting height, load radius, or swing angle (right/left) is reached. The working range limit function is useful for handling a load in a confined place because it defines the area in which the boom can operate.

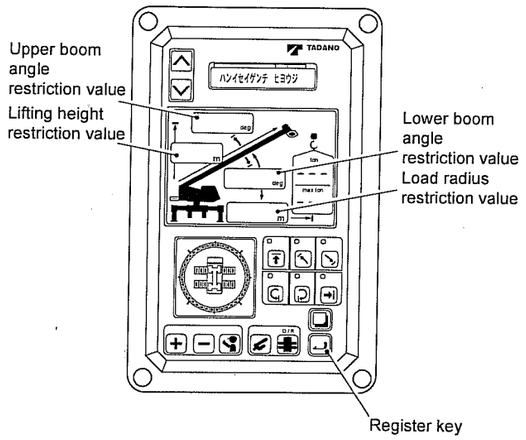
Elevation angle upper limit Elevation angle lower limit Lifting height limit Load radius limit Left swing limit Right swing limit	Automatic stop and warning buzzer (3-second beeping)

◆When the swing stop/override switch is set to the override position, the warning buzzer sounds, but the swing limit function does not automatically stop the swing operation.
◆Even when you turn the AML off (by setting the PTO switch to OFF), the limit position data is retained in the AML. The stored data is available next time you turn on the AML. Note, however, that the data is erased after 2 hours. If you have interrupted the operation for more than 2 hours, register the limit position again into the AML before resuming the operation.



Working Range Limit Values

Press in the register key while the working range limit functions are registered. While the key is being pressed, the registered working range limit values are displayed. The message "Working range" will be displayed on the moment ratio display.



Boom Angle Limit

Raise or lower the boom to the desired angle, and press the elevation angle upper or lower key. The corresponding limit symbol will flash, indicating that the current boom angle has been registered in the memory as the boom angle upper or lower limit.
When the boom is moved back to an angle within the set limit, the restriction indicator lamp stops flashing and remain lit. When the boom angle again reaches the set limit, the indicator lamp flashes. At the same time, the boom movement (raising or lowering) automatically stops, and the warning buzzer sounds (3-second beeping).
To cancel the registered limit, press the elevation angle upper or lower key again. The corresponding elevation angle limit symbol will go out.

Lifting Height Limit

Move the boom to the desired height, and press the lifting height limit key. The lifting height symbol will flash, indicating that the current lifting height has been registered in the memory as the lifting height limit.
When the boom is moved back to a height within the set limit, the lifting height restriction indicator lamp stops flashing and remains lit. When the lifting height again reaches the set limit, the indicator lamp flashes. At the same time, the boom movement (raising or extending) automatically stops, and the warning buzzer sounds (3-second beeping).
To cancel the registered limit, press the lifting height limit key again. The lifting height symbol will go out.

Load Radius Limit

Move the boom to the desired load radius, and press the load radius limit key. The load radius limit symbol will flash, indicating that the current load radius has been registered in the memory as the load radius limit. When the boom is moved back to a load radius within the set limit, the load radius restriction indicator lamp stops flashing and remains lit. When the load radius again reaches the set limit, the indicator lamp flashes. At the same time, the boom movement (lowering or extending) automatically stops, and the warning buzzer sounds (3-second beeping).
To cancel the registered limit, press the load radius limit key again. The load radius limit symbol will go out.

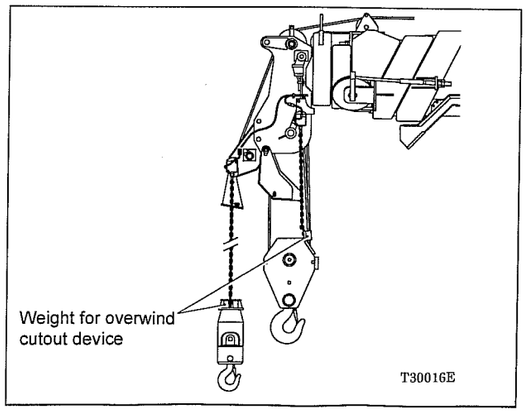
Swing Limit

To register a swing limit, swing to the desired angle, and press the right or left swing limit key. At this time, the corresponding swing limit indicator lamp flashes and the buzzer sounds (3-second beeping). The current swing angle is registered as the right or left swing angle. When you swing back to an angle within the limit, the buzzer (3-second beeping) stops, and the swing angle limit indicator lamp stops flashing and remains lit. When you swing again to the limit angle, the swing operation automatically stops and the buzzer sounds (3-second beeping).
To cancel the registered limit, press the right or left swing limit key again. Then the corresponding swing limit indicator lamp will go out.
◆Use the swing limit function with both the right and left swing limits defined. The swing limit function may not warn you when it should if used with only one of the swing limits defined.
◆The swing limit function does not automatically stop the swing operation when the swing stop/override switch is set to the override position. When the preset limit is reached, the swing restriction indicator lamp flashes, a warning message appears, and the warning buzzer of the AML unit sounds (3-second beeping), but the automatic stop function is not available. Perform swing operations carefully.

Other Safety Devices

Overwind Cutout Device

The overwind cutout device prevents damage to the crane that would be caused by pulling the hook block into the boom head. When the hook block approaches the boom head, single top or jib head, the overwind cutout device sends a signal to the AML, which then stops any further crane action toward the critical condition.
When overwinding is detected, the crane will be set in the following status:
(1) Any operation involving action toward the critical state (hoisting up, extending or lowering the boom) is halted.
(2) If a critical-state operation is attempted, the alarm buzzer sounds and a message appears to alert the operator.
When the crane is automatically stopped because the overwind cutout device has been activated, retract the boom or hoist down to move the hook block away from the boom head, single top or jib head.
◆The overwind cutout device for the jib can also be used for the single top.
◆When the jib or single top is mounted, be sure to connect the leads of the overwind cutout device correctly. If the leads are not connected, the AML assumes an overwind condition, and all actions toward the critical condition are automatically stopped.
◆Once overwinding has occurred, alarm buzzer keeps sounding till the hook block is lowered.

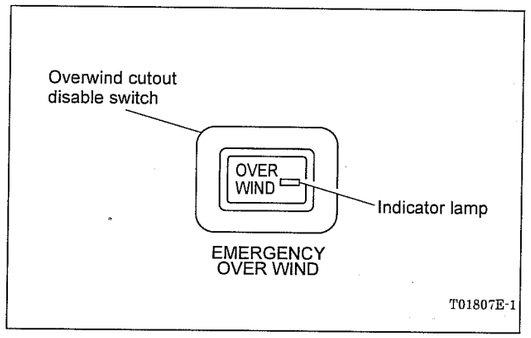


Deactivation of the Overwind Cutout Function

⚠ WARNING

⚠When the overwind cutout function is deactivated, the automatic stop function will not operate even if the hook block is overhoisted. Be careful not to overwind when deactivating the overwind cutout function is unavoidable or specifically required.

Use the overwind cutout switch to deactivate the overwind cutout function.
While the overwind cutout function is deactivated, the indicator lamp is lit.



Low Accumulator Pressure Warning Device

⚠ WARNING

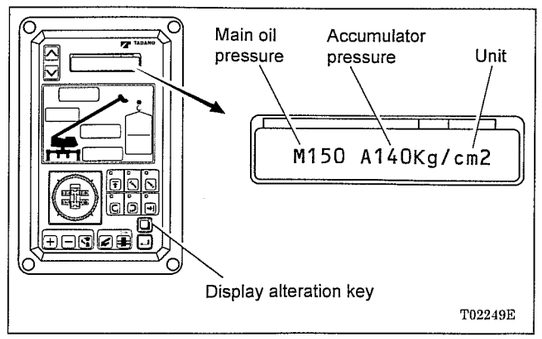
⚠ If the accumulator pressure decreases, winch clutch performance deteriorates so that loads may drop dangerously. Also, the winch brake becomes difficult to be released, causing the brake to drag during winch operation. This can cause the brake linings to wear rapidly.
When the alarm buzzer sounds when you set the PTO switch to the ON (I) position, increase the engine speed, supplying additional pressure to the accumulator until the buzzer stops. Should the buzzer sound during an operation, stop the operation immediately and supply more pressure to the accumulator. If the buzzer sounds frequently during operation, contact your nearest TADANO distributor or dealer to have the crane inspected.

The low accumulator pressure warning device activates the warning buzzer when the pressure in the accumulator decreases to the warning level.
The normal range and warning level of the pressure in the accumulator during operations are as follows:

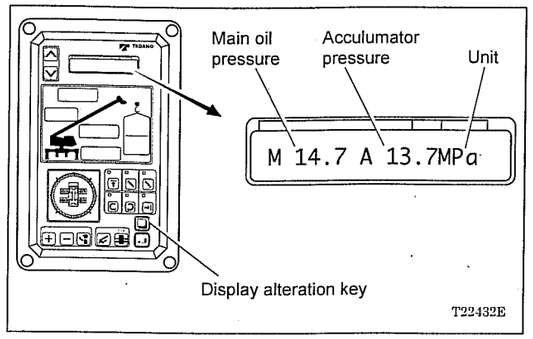
Specified pressure range	Approx. 12.4–15.5 MPa {127–158 kgf/cm²}
Low pressure alarm level	Approx. 9.3 MPa {95 kgf/cm²}

While the display alternation key on the AML display is pressed, the pressure in the accumulator appears in the bar graph display area of the moment ratio display.

Serial No.: up to 525576



Serial No.: 525577 and later

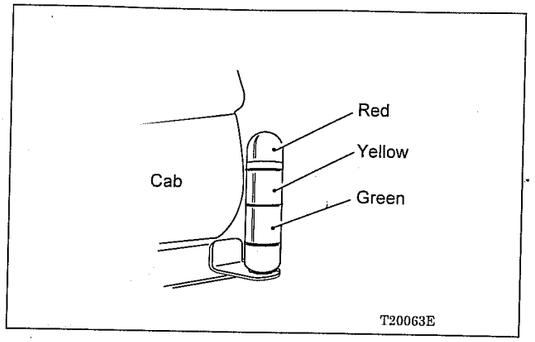


External Warning Lamps (Option)

⚠ WARNING

⚠ When the external warning lamp in red lights, crane operation to the critical side stops. Do not cancel AML stop function to continue crane operation. Operate the crane toward safety side at once. Restart the work after lamp lighting has changed from red to yellow or green.

The external warning lamps are to inform the people engaged in work around the crane of AML conditions.



Lamp	Crane condition (AML status)
Green	Safe • Moment ratio is less than 90%
Yellow	Not in danger, but attention needed • Moment ratio is between 90% (incl.) and 100% (excl.).
Red	In danger (Motion to critical side stops.) • Moment ratio is 100% or higher. • Overwind cutout function is deactivated by pressing the overwind cutout disable switch. The red lamp also lights up when the AML's automatic stop function is disabled.

◆Put a cover on the external warning lamps when traveling on public roads.

Operating the PTO and Warming Up the Machine

Operating the PTO

[NOTICE]

◆During normal crane operations, be sure to set the PTO switch to "ON (I)" and set the AML emergency switch to "Normal".

◆The AML cancellation warning sign appears on the central alarm display when the PTO switch is set to "ON (II)" and the AML emergency switch is set to "Emergency". At this time, all AML features except the display feature are disabled. Never choose this mode for normal crane operations because of the following restrictions:

(1) The AML will not stop the crane operation even when the moment ratio reaches 100%.

(2) The AML will warn the operator when overwinding is about to take place, but will not automatically stop the operation causing the overwinding.

When the PTO switch are set to "ON (I)" or "ON (II)" after starting the engine, the hydraulic pump is driven, and also the AML is energized to enable crane operations. After the operation, set the PTO switch to OFF, and the hydraulic pump will stop to deenergize the AML.

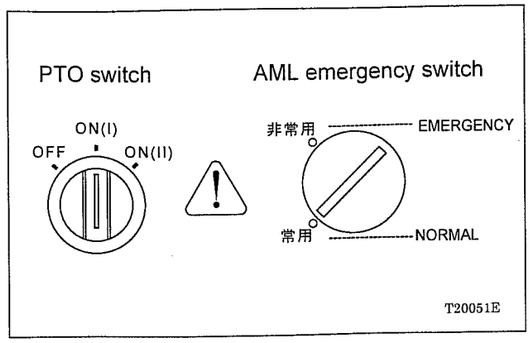
Engaging the PTO

1. Make sure that all the control levers (winch, boom elevating, telescoping, and swing levers) are in the neutral position.

2. Start the engine and activate the suspension lock operation to lower the chassis frame fully.

3. Set the PTO switch to the "ON (I)" position to enable crane operations. At this time, the PTO indicator lamp will light up and the AML will be energized. After registering the operation status in the AML memory, start crane operations.

◆Make sure that the engine is running at the idling speed when you set the PTO switch to the "ON (I)" position.



Operation	On-road travel	Crane operation	Attachment operation
PTO switch	ON(I) OFF ON(II)	ON(I) OFF ON(II)	ON(I) OFF ON(II)
PTO lamp	P.T.O	P.T.O	P.T.O
AML emergency switch	EMERGENCY NORMAL	EMERGENCY NORMAL	EMERGENCY NORMAL
Central alarm display	AML	AML	AML

T20052E

Disengaging the PTO

Set the PTO switch to OFF. At this time, the PTO indicator lamp will go out and the AML will be deenergized.

◆If you set the PTO switch to ON again within 2 hours, the previous settings are restored on the AML display.

T022311E

Warming Up the Machine

[NOTICE]

◆Be sure to allow the machine to warm up before the start of any operation. This practice is especially important in cold weather when the engine and hydraulic oil viscosities are high. If an operation is started without sufficiently warming up the engine and machine, highly viscous oils may cause damage to the engine and hydraulic system.

1. Let the engine warm up at idling speed for approximately five minutes after engaging the PTO. When it is very cold, extend the warmup time as necessary, according to the ambient temperature.

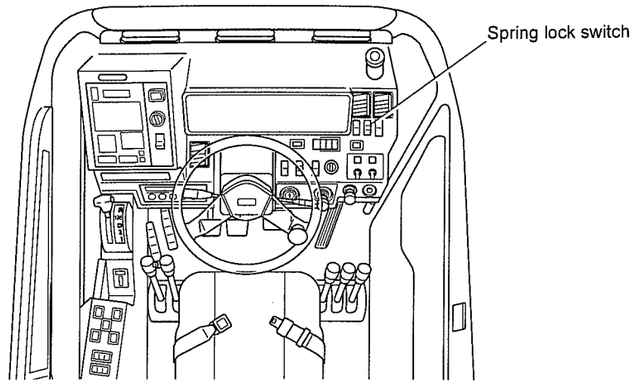
2. Increase the engine speed to between 800 to 1,000 min^{-1} {rpm} and operate the crane without a load for approximately five to ten minutes. When it is very cold, extend the operating time according to the ambient temperature.

◆Check the engine, hydraulic pumps, hydraulic motors, swing bearings and each pivot pin for any abnormal sound. If any are found, stop operation immediately and contact the nearest TADANO distributor or dealer.

3. Only start a lift operation after the machine has been sufficiently warmed up without a load.

Spring Lock

Controls



T31441E

Spring Lock

[NOTICE]

◆Prior to the crane operation (extending the outriggers), be sure to lower the frame completely by activating the spring lock. After this operation make sure that the spring lock cylinder has retracted.

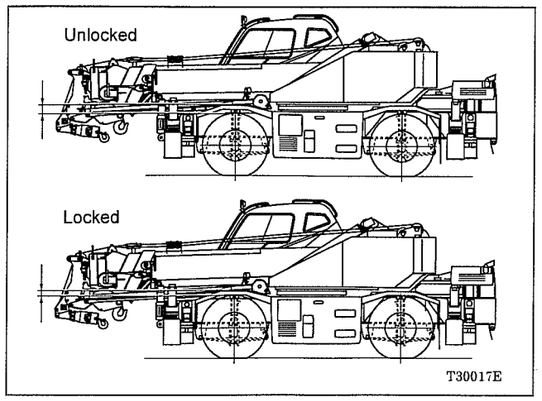
◆Be sure to park the vehicle before activating the spring lock.

◆Outrigger operation and crane operation are available only while the suspension is locked.

The spring locking operation locks the suspension mechanism by retracting the spring lock cylinders fully and pulling up the springs.

Use the spring lock switch to lock or release the spring lock.

◆Before traveling on public roads, release the spring lock.



T30017E

Locking the Spring

1. Set the crane as follows:

(1) Fully retract the boom, level it and place it over the front end.

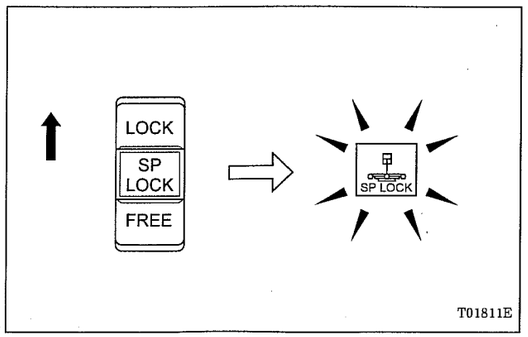
(2) Park on firm and level ground. Set the gearshift lever in the "N" position.

(3) Activate the parking brake.

2. Activate the spring lock as follows:

(1) Press the "Lock" side of the spring lock switch and hold it down until locking is completed (approx. 10 seconds). The spring lock confirmation lamp flashes until the spring lock is completed.

(2) After locking is completed, the spring lock confirmation lamp lights up, indicating the suspension is locked.



T01811E

Releasing the Spring Lock

1. Set the crane as follows:

(1) Fully retract the boom, level it and place it over the front end.

(2) Park on firm and level ground. Set the gearshift lever in the "N" position.

(3) Activate the parking brake.

2. Turn the PTO switch to the OFF.

3. Press the "Free" side of the spring lock switch and hold it down until the spring lock confirmation lamp goes out.

4. When the spring lock confirmation lamp goes out, the suspension becomes unlocked. Release the switch.

Outriggers

Setting the Crane

⚠ WARNING

⚠ If the crane is set on inappropriate ground, it is possible that the crane could overturn. Always set the crane on firm ground.

Preparing the Ground

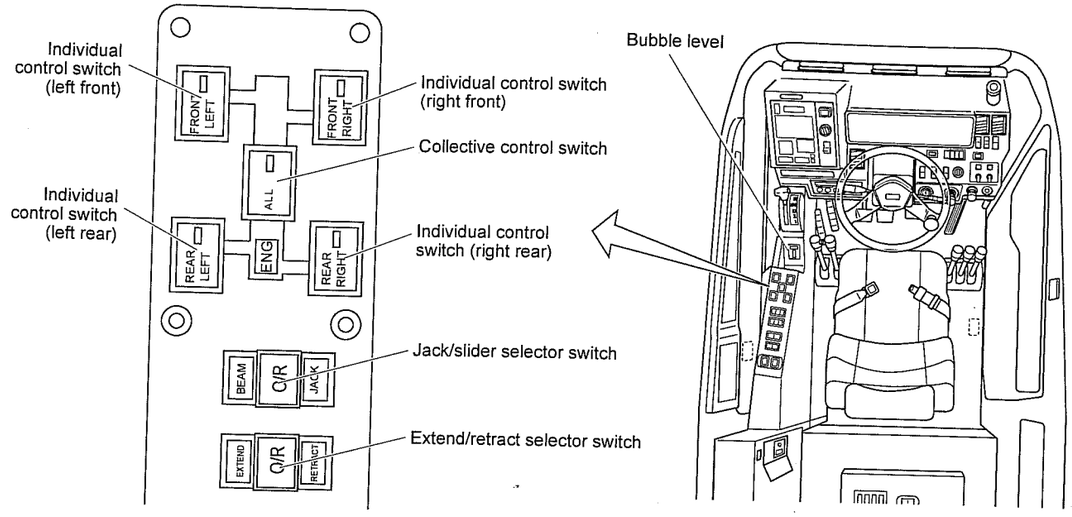
When setting the crane on soft ground or on ground that cannot bear the weight of the crane is unavoidable, carry out the following procedures:

(1) Grade a slope or rough surface so that the crane can be set in a level position.

(2) Place steel plates or wood blocks on the surfaces where the outrigger floats are to be located, in order to distribute the bearing pressure over a larger area. The steel plates and wood blocks must be sufficiently strong and large in area and also appropriate for the ground condition. The outrigger floats must be set at the center of the plates or blocks.

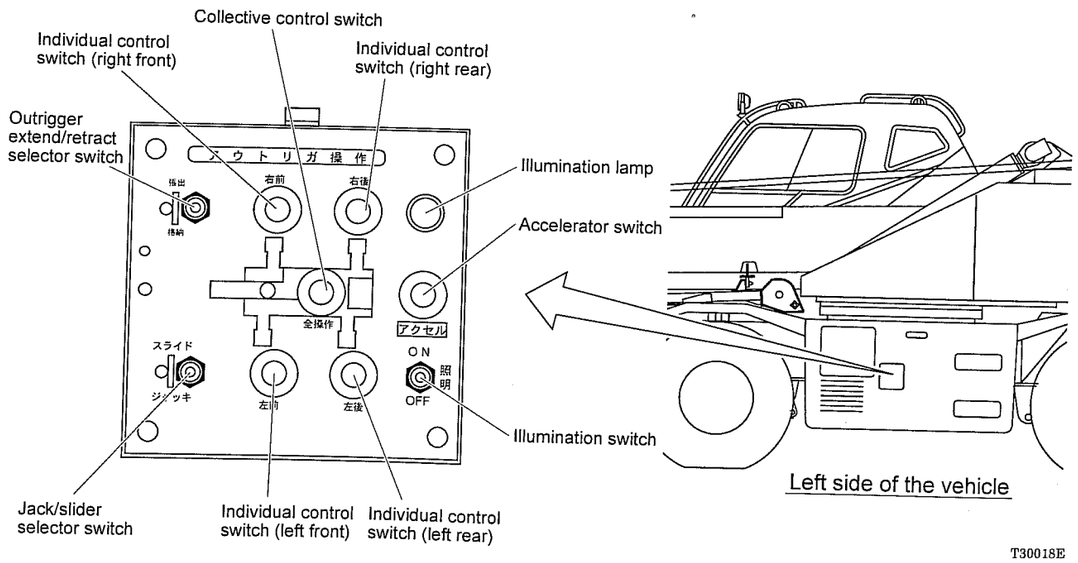
Controls

Inside the cab



T31443E

Outside the cab



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